

Nebraska Public Employees Retirement Systems (NPERS)

Actuarial Services Proposal

Technical Proposal RFP 5989 Z1

Response Due: January 24, 2019



101 North Wacker Drive Suite 500 Chicago, IL 60606-1724 T 312.984.8500 www.segalco.com

January 22, 2019

Ms. Annette Walton/Ms. Nancy Storant State Purchasing Bureau 1526 K. Street, Suite 130 Lincoln, NE 68508

RE: Actuarial Services for the Nebraska Public Employees Retirement Systems (NPERS) (RFP Number 5989 Z1)

Dear Ms. Walton and Ms. Storanti:

Segal Consulting (Segal) is pleased to submit this technical proposal to provide actuarial services to the Nebraska Public Employees Retirement Systems (NPERS). Our proposal is intended to be fully responsive to your request. The proposal describes Segal's qualifications and experience and demonstrates our commitment to deliver strategic and technical insight in a responsive manner.

Segal has been assisting public plans and employers for more than 75 years. Serving the public sector market is a key focus at Segal and is the primary concern for our senior consulting team proposed for NPERS. By concentrating on the particular needs of public sector clients, Segal is able to bring specialized expertise and experience to our clients.

Our proposal describes in detail how Segal intends to approach this assignment and why we are ideally suited to provide these services. We want to highlight the following points:

- ➤ Our Commitment to Service: We have assembled a technically competent and highly experienced team to work with NPERS. In addition to meeting the technical requirements of this contract, our approach will be to bring our knowledge of industry practices and trends to our recommendations, and to develop an excellent rapport with NPERS to achieve its goals.
- Our Expert Advice: Segal provides expert advice, including on pension and OPEB issues, to approximately 500 public sector entities representative of 37 states, plus the District of Columbia, the U.S. Virgin Islands, the U.S. Government and Canada. Segal distributes various sources of information and resources to the public sector, demonstrating our expertise. We continually support the public sector and provide leadership by identifying trends and providing articles for industry publications that shape public employee benefit plan decisions.
- ➤ Our GASB Experience: Segal has been active in the development and implementation of GASB Statements No. 67, 68, 74 and 75. Our consultants worked directly with the GASB during the Statement drafting process. We kept our clients informed of the changes throughout the process through client notices and webinars, and submitted formal comments on statement drafts. Segal has performed calculations of the net pension liability and pension expense for our clients under these Statements. In addition, Matt Strom, the Actuary assigned to NPERS served on GASB's task force during the drafting stage and in the development of the Implementation Guides for Statements 67 and 68.

- ➤ Our Projection Modeling Software: Segal Pulse is a web-based pension plan modeling tool that gives plan sponsors the hands-on ability to run projections of possible future financial and demographic events to uncover the financial consequences.
- ➤ Our Commitment to Quality: Actuarial work requires complex calculations and high-level computer programming. Our intensive quality review process not only checks the accuracy of the calculations but also analyzes the results from the client's perspective.

This proposal will remain valid for 90 days or until NPERS' evaluation committee selects a firm to provide the services contained in the Request for Proposal (RFP) or terminates its search for a vendor. Segal Consulting and the actuarial consultants listed in the proposal meet or exceed all minimum requirements contained in the RFP.

If awarded the engagement, Segal reserves the right to negotiate mutually agreeable term and conditions.

Requests for additional information regarding our proposal may be addressed to the following individual:

Kim Nicholl, FSA, MAAA, FCA, EA

Senior Vice President & Consulting Actuary
101 North Wacker Drive, Suite 500
Chicago, IL 60606-1724
312.984.8527
knicholl@segalco.com

We appreciate the opportunity to offer this proposal and are available to discuss this material or provide additional information as needed.

Sincerely,

Kim Nicholl, FSA, FCA, EA, MAAA

Kin Necholl

Senior Vice President and Consulting Actuary

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Contents

Actuarial Services Proposal (RFP Number 5989 Z1)January 22, 2019

Required Proposal Forms	
Corporate Overview	
Sections II through VI	8
Technical Approach	37
Cost Proposal	7
Sample Reports and Materials	72

Required Proposal Forms

As required, we are submitting the following forms completed as instructed.

- Form A Bidder Contact Sheet
- Request for Proposal for Contractual Services Page

Form A Bidder Contact Sheet Request for Proposal Number 5989 Z1

Form A should be completed and submitted with each response to this RFP. This is intended to provide the State with information on the bidder's name and address, and the specific person(s) who are responsible for preparation of the bidder's response.

Preparation of Response Co	ntact Information		
Bidder Name:	Sidder Name: Segal Consulting		
Bidder Address:	101 North Wacker, Suite 500 Chicago, IL 60606-1724		
Contact Person & Title:	Kim Nicholl, Senior Vice President		
E-mail Address:	knicholl@segalco.com		
Telephone Number (Office):	(312) 984-8527		
Telephone Number (Cellular):	(847) 477-0068		
Fax Number:	(312) 896-9364		

Each bidder should also designate a specific contact person who will be responsible for responding to the State if any clarifications of the bidder's response should become necessary. This will also be the person who the State contacts to set up a presentation/demonstration, if required.

Communication with the Stat	e Contact Information		
Bidder Name: Segal Consulting			
Bidder Address:	101 North Wacker, Suite 500 Chicago, IL 60606-1724		
Contact Person & Title:	Kim Nicholl, Senior Vice President		
E-mail Address:	knicholl@segalco.com		
Telephone Number (Office):	(312) 984-8527		
Telephone Number (Cellular):	(847) 477-0068		
Fax Number:	(312) 896-9364		

REQUEST FOR PROPOSAL FOR CONTRACTUAL SERVICES FORM

BIDDER MUST COMPLETE THE FOLLOWING

By signing this Request for Proposal for Contractual Services form, the bidder guarantees compliance with the procedures stated in this Request for Proposal, and agrees to the terms and conditions unless otherwise indicated in writing and certifies that bidder maintains a drug free work place.

Per Nebraska's Transparency in Government Procurement Act, Neb. Rev Stat § 73-603 DAS is required to collect statistical information regarding the number of contracts awarded to Nebraska Contractors. This information is for statistical purposes only and will not be considered for contract award purposes.

information to statistical purposes only and will not be considered for contract award purposes.
NEBRASKA CONTRACTOR AFFIDAVIT: Bidder hereby attests that bidder is a Nebraska Contractor. "Nebraska Contractor" shall mean any bidder who has maintained a bona fide place of business and at least one employee within this state for at least the six (6) months immediately preceding the posting date of this RFP.
I hereby certify that I am a Resident disabled veteran or business located in a designated enterprise zone in accordance with Neb. Rev. Stat. § 73-107 and wish to have preference, if applicable, considered in the award of this contract.
I hereby certify that I am a blind person licensed by the Commission for the Blind & Visually Impaired in accordance with Neb. Rev. Stat. §71-8611 and wish to have preference considered in the award of this contract.

FORM MUST BE SIGNED USING AN INDELIBLE METHOD (NOT ELECTRONICALLY)

FIRM:	Segal Consulting		
COMPLETE ADDRESS:	101 North Wacker, Suite 500 Chicago, IL 60606-1724		
TELEPHONE NUMBER:	(312) 984-8527		
FAX NUMBER:	(312) 896-9364		
DATE:	1116/2019		
SIGNATURE:	From mestall		
TYPED NAME & TITLE OF SIGNER:			

Corporate Overview

a. BIDDER IDENTIFICATION AND INFORMATION

The bidder should provide the full company or corporate name, address of the company's headquarters, entity organization (corporation, partnership, proprietorship), state in which the bidder is incorporated or otherwise organized to do business, year in which the bidder first organized to do business, and whether the name and form of organization has changed since first organized.

The Segal Group is a corporation located in New York. Founded in 1939, as the Martin E. Segal Company, Segal has been providing actuarial services for 78 years. From the beginning, Segal has been involved in developing health and retirement programs that meet the needs of employees and employers. Segal began to provide services to private sector and public sector plans by the 1950s. The Segal Group was incorporated in 1967 as a Delaware corporation.

Segal Consulting, Sibson Consulting, Segal Marco Advisors, and Segal Select are all members of The Segal Group. While company names and logos have evolved over the firm's history, members of The Segal Group remain independent, employee-owned firms that provide unbiased consulting.

Segal currently has 1,015 full-time employees. Segal is headquartered in New York City and has 25 offices throughout the United States and Canada in the following cities:

Atlanta	Detroit	Montreal	Raleigh
Boston/	Edmonton	New Orleans	San Francisco
Braintree	Hartford	New York	Seattle
Chicago	Houston	Philadelphia/	Toronto
Cleveland	Los Angeles/	Fort Washington	Washington, DC
Dallas	Glendale	Phoenix	Worcester, MA
Darien	Minneapolis	Princeton	
Denver			

Segal's headquarters is located at:

Segal Consulting

333 West 34th Street, 3rd Floor New York, NY 10001-2402

Segal is owned by its 275 employee officers and is governed by an 11-member Board of Directors that sets policy for the organization. Implementation of policies, development of strategies and day-to-day operations are the responsibilities of David Blumenstein, our Chief Executive Officer.

As actuarial consultants to the public sector, we serve the needs of a wide range of clients, including:

- State and local governments;
- > Statewide employee retirement systems and health benefit plans;
- Public school and higher education institutions;
- Federal government agencies and other public organizations and entities; and
- Special districts: transit, utilities, water, toll and port authorities.



X Segal Consulting	X Sibson Consulting	★ Segal Marco Advisors	X Segal Select Insurance
Strategic Benefits • Public Sector Entities • Multiemployer Funds	Strategic HR and Benefits Public and Private Corporations Higher Education Institutions Not-for-Profit Organizations Sports Organizations	Public, Private and Mubemployer Health and Pension Plans Foundations and Endowmens Financial Services Firms and Institutional Asset Owners	Insurance Brokerage Services Multiemployer Funds Public Sector Entities
Administration and Technology Consulting Benefit Audit Solutions Communications Compliance	HR Technology and Automation Organizational Effectiveness Performance and Rewards Public Sector Compensation and Human Resources (through Segal Waters)	Traditional Consulting Defined Contribution Consulting Corporate Governance and Proxy Voting Discretionary Consulting Advisor Solutions for Financial Intermediaties	Fiduciary Liability Employment Practice Liability Cyber Liability Fidelity Bonds

b. FINANCIAL STATEMENTS

The bidder should provide financial statements applicable to the firm. If publicly held, the bidder should provide a copy of the corporation's most recently audited financial reports and statements, and the name, address, and telephone number of the fiscally responsible representative of the bidder's financial or banking organization.

If the bidder is not a publicly held corporation, either the reports and statements required of a publicly held corporation, or a description of the organization, including size, longevity, client base, areas of specialization and expertise, and any other pertinent information, should be submitted in such a manner that proposal evaluators may reasonably formulate a determination about the stability and financial strength of the organization.

The bidder must disclose any and all judgments, pending or expected litigation, or other real or potential financial reversals, which might materially affect the viability or stability of the organization, or state that no such condition is known to exist.

The State may elect to use a third party to conduct credit checks as part of the corporate overview evaluation.

The Segal Group has been profitable throughout its history. The Segal Group's annual revenue for 2017 was approximately \$247.8 million; annual revenue for 2016 was approximately \$226.5 million; in 2015, it was approximately \$225.1 million; (these figures include member companies Segal Consulting, Sibson Consulting, Segal Marco Advisors and Segal Select Insurance Services).

We are providing a copy of a recent financial report as a demonstration of our firm's stability and financial strength as part of our proposal response.

There are no pending or expected litigation, or other real or potential financial reversals, which might materially affect the viability or stability of the organization.

c. CHANGE OF OWNERSHIP

If any change in ownership or control of the company is anticipated during the twelve (12) months following the proposal due date, the bidder should describe the circumstances of such change and indicate when the change will likely occur. Any change of ownership to an awarded vendor(s) will require notification to the State.

At this time, we do not anticipate any change in ownership or control of the company during the twelve (12) months following the proposal due date. If there is any change ownership, Segal will notify the State. In order to meet the expanding human resource and employee benefits of our clients, Segal has welcomed strategic acquisitions in the past; however, it did not change ownership or control of the company. We expect Segal will continue to be independent and employee owned.

d. OFFICE LOCATION

The bidder's office location responsible for performance pursuant to an award of a contract with the State of Nebraska should be identified.

Segal's Chicago office will be primarily responsible for providing services to NPERS at the address below:

Segal Consulting

101 North Wacker Drive, Suite 500 Chicago, IL 60606-1724 (312) 984.8500

The Chicago office is the Company's second largest office and is staffed with actuaries and consultants, as well as associates with expertise in cost management, fund office administration, underwriting, compliance and communications. In addition, the office has clerical, HR and systems staff and support.

e. RELATIONSHIPS WITH THE STATE

The bidder should describe any dealings with the State over the previous ten (10) years. If the organization, its predecessor, or any Party named in the bidder's proposal response has contracted with the State, the bidder should identify the contract number(s) and/or any other information available to identify such contract(s). If no such contracts exist, so declare.

Segal performs actuarial consulting services for the State's health plan.

Aside from that work, to our knowledge, Segal has not had a contract with the State over the previous ten (10) years.

f. BIDDER'S EMPLOYEE RELATIONS TO STATE

If any individual named in the bidder's proposal response is or was an employee of the State within the past twelve (12) months, identify the individual(s) by name, State agency with whom employed, job title or position held with the State, and separation date. If no such relationship exists or has existed, so declare.

If any employee of any agency of the State of Nebraska is employed by the bidder or is a subcontractor to the bidder, as of the due date for proposal submission, identify all such individuals by name, position held with the bidder, and position held with the State (including job title and agency). Describe the responsibilities of such persons within the proposing organization. If, after review of this information by the State, it is determined that a conflict of interest exists or may exist, the bidder may be disqualified from further consideration in this proposal. If no such relationship exists, so declare.

There is no individual named in this proposal response that is or was an employee of the State within the past twelve (12) months. There are no known subcontracting arrangements with the State as of this submission.

Segal maintains a Relationship Identification and Conflict Identification System (R&C Module) that allows us to check for conflicts or potential conflicts with new clients, prospects, and non-routine assignments for existing clients. The module is designed to surface any potential conflict issues and track their resolution prior to undertaking a new project to avoid taking on projects that could be perceived as a conflict of interest by existing clients and jeopardize our relationship with them.

This proposal has been vetted through Segal's R&C Module, and it is our understanding that there are no known conflicts of interests as it relates to NPERS or its affiliates, which could affect Segal's ability to enter this contract.

g. CONTRACT PERFORMANCE

If the bidder or any proposed subcontractor has had a contract terminated for default during the past ten (10) years, all such instances must be described as required below. Termination for default is defined as a notice to stop performance delivery due to the bidder's non-performance or poor performance, and the issue was either not litigated due to inaction on the part of the bidder or litigated and such litigation determined the bidder to be in default.

There have been none.

It is mandatory that the bidder submit full details of all termination for default experienced during the past ten (10) years, including the other Party's name, address, and telephone number. The response to this section must present the bidder's position on the matter. The State will evaluate the facts and will score the bidder's proposal accordingly. If no such termination for default has been experienced by the bidder in the past ten (10) years, so declare.

If at any time during the past ten (10) years, the bidder has had a contract terminated for convenience, non-performance, non-allocation of funds, or any other reason, describe fully all circumstances surrounding such termination, including the name and address of the other contracting Party.

Just as we gain new clients each year, our relationships with some clients terminate each year as a result of competitive bidding, plan termination, mergers, acquisitions, change of client leadership and other reasons.

h. SUMMARY OF BIDDER'S CORPORATE EXPERIENCE

The bidder should provide a summary matrix listing the bidder's previous projects similar to this RFP in size, scope, and complexity. The State will use no more than three (3) narrative project descriptions submitted by the bidder during its evaluation of the proposal. Please provide this information on Attachment B. Technical Approach.

The bidder should address the following:

- i. Provide narrative descriptions to highlight the similarities between the bidder's experience and this RFP. These descriptions should include:
 - a) The time period of the project;
 - b) The scheduled and actual completion dates;
 - c) The Contractor's responsibilities;



- d) For reference purposes, a customer name (including the name of a contact person, a current telephone number, a facsimile number, and e-mail address); and
- e) Each project description should identify whether the work was performed as the prime Contractor or as a subcontractor. If a bidder performed as the prime Contractor, the description should provide the originally scheduled completion date and budget, as well as the actual (or currently planned) completion date and actual (or currently planned) budget.

Segal, as the primary Contractor, will provide the above requested information on *Attachment B*. Segal will not use any subcontractors for the required services associated with this engagement.

ii. Contractor and subcontractor(s) experience should be listed separately. Narrative descriptions submitted for subcontractors should be specifically identified as subcontractor projects.

Segal, as the primary Contractor, will provide the above requested information on *Attachment B*. Segal will not use any subcontractors for the required services associated with this engagement.

iii If the work was performed as a subcontractor, the narrative description should identify the same information as requested for the Contractors above. In addition, subcontractors should identify what share of contract costs, project responsibilities, and time period were performed as a subcontractor.

Segal, as the primary Contractor, will provide the above requested information on *Attachment B*. Segal will not use any subcontractors for the required services associated with this engagement.

i. SUMMARY OF BIDDER'S PROPOSED PERSONNEL/MANAGEMENT APPROACH

The bidder should present a detailed description of its proposed approach to the management of the project. Please provide your response on Attachment B Technical Approach.

The bidder should identify the specific professionals who will work on the State's project if their company is awarded the contract resulting from this RFP. The names and titles of the team proposed for assignment to the State project should be identified in full, with a description of the team leadership, interface and support functions, and reporting relationships. The primary work assigned to each person should also be identified.

The bidder should provide resumes for all personnel proposed by the bidder to work on the project. The State will consider the resumes as a key indicator of the bidder's understanding of the skill mixes required to carry out the requirements of the RFP in addition to assessing the experience of specific individuals.

Resumes should not be longer than three (3) pages. Resumes should include, at a minimum, academic background and degrees, professional certifications, understanding of the process, and at least three (3) references (name, address, and telephone number) who can attest to the competence and skill level of the individual. Any changes in proposed personnel shall only be implemented after written approval from the State.

As requested, we are providing our response in *Attachment B Technical Approach*. Please refer to the *Team Biographies* section of the proposal (following *Attachment B*) for professional biographies of the proposed team members.

For your needs, we are proposing a team of professionals dedicated to assisting NPERS. We can assure you that due to our careful planning, the selected team members we have assembled for this proposal are fully available and will work closely to address the needs of your plans.

Segal has a transition plan to deal with the possible sudden departure of key Segal professionals within the group. In the event that a need arises to replace any key personnel (due to circumstances beyond our control) we will discuss the situation with our client before making a final decision. It is Segal's policy to reassign primary consultants only with the client's consent.

j. SUBCONTRACTORS

If the bidder intends to subcontract any part of its performance hereunder, the bidder should provide:

- i. name, address, and telephone number of the subcontractor(s);
- i. specific tasks for each subcontractor(s);
- ii. percentage of performance hours intended for each subcontract; and
- iii. total percentage of subcontractor(s) performance hours.

Segal will not use any subcontractors for services associated with this engagement.

Sections II through VI

Segal acknowledges that we have carefully read Sections II through VI of the RFP as instructed. We are providing the requested information and deliverables for each Section (if applicable).

II. Terms and Conditions

Segal acknowledges that it has carefully read and completed Section II as required.

Bidders should complete Sections II through VI as part of their proposal. Bidder is expected to read the Terms and Conditions and should initial either accept, reject, or reject and provide alternative language for each clause. The bidder should also provide an explanation of why the bidder rejected the clause or rejected the clause and provided alternate language. By signing the RFP, bidder is agreeing to be legally bound by all the accepted terms and conditions, and any proposed alternative terms and conditions submitted with the proposal. The State reserves the right to negotiate rejected or proposed alternative language. If the State and bidder fail to agree on the final Terms and Conditions, the State reserves the right to reject the proposal. The State of Nebraska is soliciting proposals in response to this RFP. The State of Nebraska reserves the right to reject proposals that attempt to substitute the bidder's commercial contracts and/or documents for this RFP.

The bidders should submit with their proposal any license, user agreement, service level agreement, or similar documents that the bidder wants incorporated in the contract. The State will not consider incorporation of any document not submitted with the bidder's proposal as the document will not have been included in the evaluation process. These documents shall be subject to negotiation and will be incorporated as addendums if agreed to by the Parties.

If a conflict or ambiguity arises after the Addendum to Contract Award have been negotiated and agreed to, the Addendum to Contract Award shall be interpreted as follows:

- 1. If only one Party has a particular clause then that clause shall control;
- If both Parties have a similar clause, but the clauses do not conflict, the clauses shall be read together;
- 3. If both Parties have a similar clause, but the clauses conflict, the State's clause shall control.

A. GENERAL

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

The contract resulting from this RFP shall incorporate the following documents:

- 4. Request for Proposal and Addenda;
- 5. Amendments to the RFP;
- Questions and Answers:
- 7. Contractor's proposal (RFP and properly submitted documents);
- 8. The executed Contract and Addendum One to Contract, if applicable; and,
- 9. Amendments/Addendums to the Contract.

These documents constitute the entirety of the contract.

Unless otherwise specifically stated in a future contract amendment, in case of any conflict between the incorporated documents, the documents shall govern in the following order of preference with number one (1) receiving preference over all other documents and with each lower numbered document having preference over any higher numbered document: 1) Amendment to the executed Contract with the most recent dated amendment having the highest priority, 2) executed Contract and any attached Addenda, 3) Amendments to RFP and any Questions and Answers, 4) the original RFP document and any Addenda, and 5) the Contractor's submitted Proposal.

Any ambiguity or conflict in the contract discovered after its execution, not otherwise addressed herein, shall be resolved in accordance with the rules of contract interpretation as established in the State of Nebraska.

B. NOTIFICATION

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

Contractor and State shall identify the contract manager who shall serve as the point of contact for the executed contract.

Communications regarding the executed contract shall be in writing and shall be deemed to have been given if delivered personally or mailed, by U.S. Mail, postage prepaid, return receipt requested, to the parties at their respective addresses set forth below, or at such other addresses as may be specified in writing by either of the parties. All notices, requests, or communications shall be deemed effective upon personal delivery or three (3) calendar days following deposit in the mail.

C. NOTICE (POC)

The State reserves the right to appoint a Buyer's Representative to manage [or assist the Buyer in managing] the contract on behalf of the State. The Buyer's Representative will be appointed in writing, and the appointment document will specify the extent of the Buyer's Representative authority and responsibilities. If a Buyer's Representative is appointed, the Contractor will be provided a copy of the appointment document, and is expected to cooperate accordingly with the Buyer's Representative. The Buyer's Representative has no authority to bind the State to a contract, amendment, addendum, or other change or addition to the contract.

D. GOVERNING LAW (Statutory)

Notwithstanding any other provision of this contract, or any amendment or addendum(s) entered into contemporaneously or at a later time, the parties understand and agree that, (1) the State of Nebraska is a sovereign state and its authority to contract is therefore subject to limitation by the State's Constitution, statutes, common law, and regulation; (2) this contract will be interpreted and enforced under the laws of the State of Nebraska; (3) any action to enforce the provisions of this agreement must be brought in the State of Nebraska per state law; (4) the person signing this contract on behalf of the State of Nebraska does not have the authority to waive the State's sovereign immunity, statutes, common law, or regulations; (5) the indemnity, limitation of liability, remedy, and other similar provisions of the final contract, if any, are entered into subject to the State's Constitution, statutes, common law, regulations, and sovereign immunity; and, (6) all terms and conditions of the final contract, including but not limited to the clauses concerning third party use, licenses, warranties, limitations of liability, governing law and venue, usage verification, indemnity, liability, remedy or other similar provisions of the final contract are entered into specifically subject to the State's Constitution, statutes, common law, regulations, and sovereign immunity.

The Parties must comply with all applicable local, state and federal laws, ordinances, rules, orders, and regulations.

E. BEGINNING OF WORK

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

The bidder shall not commence any billable work until a valid contract has been fully executed by the State and the successful Contractor. The Contractor will be notified in writing when work may begin.

F. CHANGE ORDERS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

The State and the Contractor, upon the written agreement, may make changes to the contract within the general scope of the RFP. Changes may involve specifications, the quantity of work, or such other items as the State may find necessary or desirable. Corrections of any deliverable, service, or work required pursuant to the contract shall not be deemed a change. The Contractor may not claim forfeiture of the contract by reasons of such changes.

The Contractor shall prepare a written description of the work required due to the change and an itemized cost sheet for the change. Changes in work and the amount of compensation to be paid to the Contractor shall be determined in accordance with applicable unit prices if any, a pro-rated value, or through negotiations. The State shall not incur a price increase for changes that should have been included in the Contractor's proposal, were foreseeable, or result from difficulties with or failure of the Contractor's proposal or performance.

No change shall be implemented by the Contractor until approved by the State, and the Contract is amended to reflect the change and associated costs, if any. If there is a dispute regarding the cost, but both parties agree that immediate implementation is necessary, the change may be implemented, and cost negotiations may continue with both Parties retaining all remedies under the contract and law.

G. NOTICE OF POTENTIAL CONTRACTOR BREACH

Accept (Initial)	Reject	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
X	, , , , ,	,	

If Contractor breaches the contract or anticipates breaching the contract, the Contractor shall immediately give written notice to the State. The notice shall explain the breach or potential breach, a proposed cure, and may include a request for a waiver of the breach if so desired. The State may, in its discretion, temporarily or permanently waive the breach. By granting a waiver, the State does not forfeit any rights or remedies to which the State is entitled by law or equity, or pursuant to the provisions of the contract. Failure to give immediate notice, however, may be grounds for denial of any request for a waiver of a breach.

H. BREACH

Accept (Initial)	Reject	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
X	, <u>,</u>	()	100 1 <u>2</u> 0,00 mm.2.110.

Either Party may terminate the contract, in whole or in part, if the other Party breaches its duty to perform its obligations under the contract in a timely and proper manner. Termination requires written notice of default and a thirty (30) calendar day (or longer at the non-breaching Party's discretion considering the gravity and nature of the default) cure period. Said notice shall be delivered by Certified Mail, Return Receipt Requested, or in person with proof of delivery. Allowing time to cure a failure or breach of contract does not waive the right to immediately terminate the contract for the same or different contract breach which may occur at a different time. In case of default of the Contractor, the State may contract the service from other sources and hold the Contractor responsible for any excess cost occasioned thereby.

The State's failure to make payment shall not be a breach, and the Contractor shall retain all available statutory remedies and protections.

I. NON-WAIVER OF BREACH

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
X			

The acceptance of late performance with or without objection or reservation by a Party shall not waive any rights of the Party nor constitute a waiver of the requirement of timely performance of any obligations remaining to be performed.

J. SEVERABILITY

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

If any term or condition of the contract is declared by a court of competent jurisdiction to be illegal or in conflict with any law, the validity of the remaining terms and conditions shall not be affected, and the rights and obligations of the parties shall be construed and enforced as if the contract did not contain the provision held to be invalid or illegal.

K. INDEMNIFICATION

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
		Х	See proposed redline/legal edits in paragraph(s) below.

- 1. GENERAL: The Contractor agrees to defend, indemnify, and hold harmless the State and its employees, volunteers, agents, and its elected and appointed officials ("the indemnified parties") from and against any and all third party claims, liens, demands, damages, liability, actions, causes of action, losses, judgments, costs, and expenses of every nature, including investigation costs and reasonable and documented expenses, settlement costs, and attorney fees and expenses ("the claims"), sustained or asserted against the State for personal injury, death, or property loss or damage, arising out of, resulting from, or attributable to the extent that is judicially determined that these are the direct result of willful misconduct, negligence, error, or omission of the Contractor, its employees, subcontractors, consultants, representatives, and agents, resulting from this contract, except to the extent such Contractor liability is attenuated by any action of the State which directly and proximately contributed to the claims.
- 2. INTELLECTUAL PROPERTY: The Contractor agrees it will, at its sole cost and expense, defend, indemnify, and hold harmless the indemnified parties from and against any and all claims, to the extent such claims arise out of, result from, or are attributable to, it is judicially determined that such claims are the direct result of the actual or alleged infringement or misappropriation of any patent, copyright, trade secret, trademark, or confidential information of any third party by the Contractor or its employees, subcontractors, consultants, representatives, and agents; provided, however, the State gives the Contractor prompt notice in writing of the claim. The Contractor may not settle any infringement claim that will affect the State's use of the Licensed Software without the State's prior written consent, which consent may be withheld for any reason. If a judgment or settlement is obtained or reasonably anticipated against the State's use of any intellectual property for which the Contractor has indemnified the State, the Contractor shall, at the Contractor's sole cost and expense, promptly modify the item or items which were determined to be infringing, acquire a license or licenses on the State's behalf to provide the necessary rights to the State to eliminate the infringement, or provide the State with a non-infringing substitute that provides the State the same

functionality. At the State's election, the actual or anticipated judgment may be treated as a breach of warranty by the Contractor, and the State may receive the remedies provided under this RFP.

- 3. PERSONNEL: The Contractor shall, at its expense, indemnify and hold harmless the indemnified parties from and against any claim with respect to withholding taxes, worker's compensation, employee benefits, or any other claim, demand, liability, damage, or loss of any nature relating to any of the personnel, including subcontractor's and their employees, provided by the Contractor.
- 4. **SELF-INSURANCE:** The State of Nebraska is self-insured for any loss and purchases excess insurance coverage pursuant to Neb. Rev. Stat. § 81-8,239.01 (Reissue 2008). If there is a presumed loss under the provisions of this agreement, Contractor may file a claim with the Office of Risk Management pursuant to Neb. Rev. Stat. §§ 81-8,829 81-8,306 for review by the State Claims Board. The State retains all rights and immunities under the State Miscellaneous (Section 81-8,294), Tort (Section 81-8,209), and Contract Claim Acts (Section 81-8,302), as outlined in Neb. Rev. Stat. § 81-8,209 et seq. and under any other provisions of law and accepts liability under this agreement to the extent provided by law.
- The Parties acknowledge that Attorney General for the State of Nebraska is required by statute to
 represent the legal interests of the State, and that any provision of this indemnity clause is subject to
 the statutory authority of the Attorney General.

L. ATTORNEY'S FEES

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

In the event of any litigation, appeal, or other legal action to enforce any provision of the contract, the Parties agree to pay all expenses of such action, as permitted by law and if order by the court, including attorney's fees and costs, if the other Party prevails.

M. CONTRACTING WITH OTHER NEBRASKA POLITICAL SUB-DIVISIONS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

The Contractor may, but shall not be required to, allow agencies, as defined in Neb. Rev. Stat. §81-145, to use this contract. The terms and conditions, including price, of the contract may not be amended. The State shall not be contractually obligated or liable for any contract entered into pursuant to this clause. A listing of Nebraska political subdivisions may be found at the website of the Nebraska Auditor of Public Accounts.

N. FORCE MAJEURE

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
		Х	See proposed redline/legal edits in paragraph(s) below.

Neither Party shall be liable for any costs or damages, or for default resulting from its inability to perform any of its obligations under the contract due to a natural or manmade event outside the control and not the fault of the affected Party ("Force Majeure Event"). The Party so affected shall immediately make a written request for relief to the other Party, and shall have the burden of proof to justify the request. The other Party may grant the relief requested; relief may not be unreasonably withheld. Labor disputes with the impacted Party's own employees will not be considered a Force Majeure Event.

In addition, to the maximum extent permitted by law, neither party shall be liable under any legal or equitable theory, whether in contract or tort, for any indirect, incidental, special, consequential or punitive damages or costs whether or not the party was advised or could have foreseen the possibility of such damages.

O. CONFIDENTIALITY

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
		X	See proposed redline/legal edits in paragraph(s) below.

All materials and information provided by the Parties or acquired by a Party on behalf of the other Party shall be regarded as confidential information. All materials and information provided or acquired shall be handled in accordance with federal and state law, and ethical standards. Should said confidentiality be breached by a Party, the Party shall notify the other Party immediately—as soon as practicable but not less than five (5) business days of said breach and take immediate corrective action.

It is incumbent upon the Parties to inform their officers and employees of the penalties for improper disclosure imposed by the Privacy Act of 1974, 5 U.S.C. 552a. Specifically, 5 U.S.C. 552a (i)(1), which is made applicable by 5 U.S.C. 552a (m)(1), provides that any officer or employee, who by virtue of his/her employment or official position has possession of or access to agency records which contain individually identifiable information, the disclosure of which is prohibited by the Privacy Act or regulations established thereunder, and who knowing that disclosure of the specific material is prohibited, willfully discloses the material in any manner to any person or agency not entitled to receive it, shall be guilty of a misdemeanor and fined not more than \$5,000.

P. EARLY TERMINATION

Accept (Initial)	Reject	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
			See proposed redline/legal edits in paragraph(s) below

The contract may be terminated as follows:

- 1. The State and the Contractor, by mutual written agreement, may terminate the contract at any time.
- 2. The State, in its sole discretion, may terminate the contract for any reason upon thirty (30) calendar day's written notice to the Contractor. Such termination shall not relieve the Contractor of warranty or other service obligations incurred under the terms of the contract. In the event of termination the Contractor shall be entitled to payment, determined on a pro rata basis, for products or services satisfactorily performed or provided.
- 3. The State may terminate the contract immediately for the following reasons:
 - a. if directed to do so by statute;
 - Contractor has made an assignment for the benefit of creditors, has admitted in writing its inability to pay debts as they mature, or has ceased operating in the normal course of business;
 - c. a trustee or receiver of the Contractor or of any substantial part of the Contractor's assets has been appointed by a court;
 - fraud, misappropriation, embezzlement, malfeasance, misfeasance, or illegal conduct pertaining to performance under the contract by its Contractor, its employees, officers, directors, or shareholders;
 - e. an involuntary proceeding has been commenced by any Party against the Contractor under any one of the chapters of Title 11 of the United States Code and (i) the proceeding has been pending for at least sixty (60) calendar days; or (ii) the Contractor has consented, either expressly or by operation of law, to the entry of an order for relief; or (iii) the Contractor has been decreed or adjudged a debtor;
 - f. a voluntary petition has been filed by the Contractor under any of the chapters of Title 11 of the United States Code;
 - g. Contractor willfully and intentionally discloses confidential information;
 - h. Contractor has or announces it will discontinue support of the deliverable; and,
 - i. In the event funding is no longer available.

Q. CONTRACT CLOSEOUT

Accept (Initial)	Reject	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
		х	See proposed redline/legal edits in paragraph(s) below

Upon contract closeout for any reason the Contractor shall within 30 business days, unless stated otherwise herein:

- 1. Transfer all completed or partially completed deliverables to the State;
- 2. Transfer ownership and title to Deliver all completed or partially completed deliverables to the State; the State's ownership of the deliverables shall be as described in Section III. 3. below.
- Return to the State all information and data, unless the Contractor is permitted to keep the
 information or data by contract or rule of law. Contractor may retain one copy of any information or
 data as required to comply with applicable work product documentation standards or as are
 automatically retained in the course of Contractor's routine back up procedures;
- 4. Cooperate with any successor Contactor, person or entity in the assumption of any or all of the obligations of this contract;
- Cooperate with any successor Contactor, person or entity with the transfer of information or data related to this contract;
- 6. Return or vacate any state owned real or personal property; and,
- 7. Return all data in a mutually acceptable format and manner.

If it is not feasible for Contractor to return (or destroy, if applicable) portions of the data or information in its possession, Contractor shall inform the State as to the specific reasons that make such return or destruction infeasible. The State acknowledges that Contractor may retain an archival copy of all such information to support Contractor's provision of the Services provided under this Contract and in accordance with Contractor's business continuity and document retention policies, subject to Contractor's continued compliance with its confidentiality obligations

Nothing in this Section should be construed to require the Contractor to surrender intellectual property, real or personal property, or information or data owned by the Contractor for which the State has no legal claim.

III. CONTRACTOR DUTIES

Segal acknowledges that it has carefully read and completed Section III as required.

A. INDEPENDENT CONTRACTOR/OBLIGATIONS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

It is agreed that the Contractor is an independent contractor and that nothing contained herein is intended or should be construed as creating or establishing a relationship of employment, agency, or a partnership.

The Contractor is solely responsible for fulfilling the contract. The Contractor or the Contractor's representative shall be the sole point of contact regarding all contractual matters.

The Contractor shall secure, at its own expense, all personnel required to perform the services under the contract. The personnel the Contractor uses to fulfill the contract shall have no contractual or other legal relationship with the State; they shall not be considered employees of the State and shall not be entitled to any compensation, rights or benefits from the State, including but not limited to, tenure rights, medical and hospital care, sick and vacation leave, severance pay, or retirement benefits.

By-name personnel commitments made in the Contractor's proposal shall not be changed without the prior written approval of the State. Replacement of these personnel, if approved by the State, shall be with personnel of equal or greater ability and qualifications.

All personnel assigned by the Contractor to the contract shall be employees of the Contractor or a subcontractor, and shall be fully qualified to perform the work required herein. Personnel employed by the Contractor or a subcontractor to fulfill the terms of the contract shall remain under the sole direction and control of the Contractor or the subcontractor respectively.

With respect to its employees, the Contractor agrees to be solely responsible for the following:

- 1. Any and all pay, benefits, and employment taxes and/or other payroll withholding;
- 2. Any and all vehicles used by the Contractor's employees, including all insurance required by state law:
- 3. Damages incurred by Contractor's employees within the scope of their duties under the contract;
- 4. Maintaining Workers' Compensation and health insurance that complies with state and federal law and submitting any reports on such insurance to the extent required by governing law.
- 5. Determining the hours to be worked and the duties to be performed by the Contractor's employees; and.
- All claims on behalf of any person arising out of employment or alleged employment (including without limit claims of discrimination alleged against the Contractor, its officers, agents, or subcontractors or subcontractor's employees)

If the Contractor intends to utilize any subcontractor, the subcontractor's level of effort, tasks, and time allocation should be clearly defined in the bidder's proposal. The Contractor shall agree that it will not utilize any subcontractors not specifically included in its proposal in the performance of the contract without the prior written authorization of the State.

The State reserves the right to require the Contractor to reassign or remove from the project any Contractor or subcontractor employee.

Contractor shall insure that the terms and conditions contained in any contract with a subcontractor does not conflict with the terms and conditions of this contract.

The Contractor shall include a similar provision, for the protection of the State, in the contract with any subcontractor engaged to perform work on this contract.

B. EMPLOYEE WORK ELIGIBILITY STATUS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
X			

The Contractor is required and hereby agrees to use a federal immigration verification system to determine the work eligibility status of employees physically performing services within the State of Nebraska. A federal immigration verification system means the electronic verification of the work authorization program authorized by the Illegal Immigration Reform and Immigrant Responsibility Act of 1996, 8 U.S.C. 1324a, known as the E-Verify Program, or an equivalent federal program designated by the United States Department of Homeland Security or other federal agency authorized to verify the work eligibility status of an employee.

If the Contractor is an individual or sole proprietorship, the following applies:

- The Contractor must complete the United States Citizenship Attestation Form, available on the Department of Administrative Services website at http://das.nebraska.gov/materiel/purchasing.html
 The completed United States Attestation Form should be submitted with the RFP response.
- If the Contractor indicates on such attestation form that he or she is a qualified alien, the Contractor
 agrees to provide the US Citizenship and Immigration Services documentation required to verify the
 Contractor's lawful presence in the United States using the Systematic Alien Verification for
 Entitlements (SAVE) Program.
- The Contractor understands and agrees that lawful presence in the United States is required and the Contractor may be disqualified or the contract terminated if such lawful presence cannot be verified as required by Neb. Rev. Stat. §4-108.

C. COMPLIANCE WITH CIVIL RIGHTS LAWS AND EQUAL OPPORTUNITY EMPLOYMENT/NONDISCRIMINATION (Statutory)

The Contractor shall comply with all applicable local, state, and federal statutes and regulations regarding civil rights laws and equal opportunity employment. The Nebraska Fair Employment Practice Act prohibits Contractors of the State of Nebraska, and their subcontractors, from discriminating against any employee or applicant for employment, with respect to hire, tenure, terms, conditions, compensation, or privileges of employment because of race, color, religion, sex, disability, marital status, or national origin (Neb. Rev. Stat. §48-1101 to 48-1125). The Contractor guarantees compliance with the Nebraska Fair Employment Practice Act, and breach of this provision shall be regarded as a material breach of contract. The Contractor shall insert a similar provision in all subcontracts for services to be covered by any contract resulting from this RFP.

D. COOPERATION WITH OTHER CONTRACTORS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

Contractor may be required to work with or in close proximity to other contractors or individuals that may be working on same or different projects. The Contractor shall agree to cooperate with such other contractors or individuals, and shall not commit or permit any act which may interfere with the performance of work by any other contractor or individual. Contractor is not required to compromise Contractor's intellectual property or proprietary information unless expressly required to do so by this contract.

E. PERMITS, REGULATIONS, LAWS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

The contract price shall include the cost of all royalties, licenses, permits, and approvals, whether arising from patents, trademarks, copyrights or otherwise, that are in any way involved in the contract. The Contractor shall obtain and pay for all royalties, licenses, and permits, and approvals necessary for the execution of the contract. The Contractor must guarantee that it has the full legal right to the materials, supplies, equipment, software, and other items used to execute this contract.

F. OWNERSHIP OF INFORMATION AND DATA/DELIVERABLES

Accept	Reject	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
(minum)			See proposed redline/legal edits in paragraph(s) below

The State shall have the unlimited right to publish, duplicate, use, and disclose all information and data developed or obtained by the Contractor on behalf of the State pursuant to this contract.

The State shall own and hold exclusive title to any deliverable developed as a result of this contract. Contractor shall have no ownership interest or title, and shall not patent, license, or copyright, duplicate, transfer, sell, or exchange, the design, specifications, concept, or deliverable.

Except to the extent that they incorporate the Contractor's proprietary know-how, software, techniques, methodologies and report formats (collectively, "Contractor's Proprietary Information"), all reports, paperwork, documents, data, and other tangible materials authored or prepared and delivered by the Contractor to the State under the terms of this contract (collectively, the "Deliverables") shall be the sole and exclusive property of the State, once paid for by the State. To the extent that the Contractor's Proprietary Information is incorporated into such Deliverables, the State shall have a perpetual, nonexclusive, worldwide, royalty-free license to use, copy, and modify the Contractor's Proprietary Information as part of the Deliverables, for use internally and for its intended purpose.

G. INSURANCE REQUIREMENTS

Accept	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
`		X	See proposed redline/legal edits in paragraph(s) below

The Contractor shall throughout the term of the contract maintain insurance as specified herein and provide the State a current Certificate of Insurance/Acord Form (COI) verifying the coverage. The Contractor shall not commence work on the contract until the insurance is in place. If Contractor subcontracts any portion of the contract the Contractor must, throughout the term of the contract, either:

- 1. Provide equivalent insurance for each subcontractor and provide a COI verifying the coverage for the subcontractor;
- 2. Require each subcontractor to have equivalent insurance and provide written notice to the State that the Contractor has verified that each subcontractor has the required coverage; or,
- Provide the State with copies of each subcontractor's Certificate of Insurance evidencing the required coverage.

The Contractor shall not allow any subcontractor to commence work until the subcontractor has equivalent insurance. The failure of the State to require a COI, or the failure of the Contractor to provide a COI or require subcontractor insurance shall not limit, relieve, or decrease the liability of the Contractor hereunder.

In the event that any policy written on a claims-made basis terminates or is canceled during the term of the contract or within five (5) years one (1) year of termination or expiration of the contract, the Contractor shall obtain an extended discovery or reporting period, or a new insurance policy, providing coverage required by this contract for the term of the contract and five (5) years one (1) year following termination or expiration of the contract.

If by the terms of any insurance a mandatory deductible is required, or if the Contractor elects to increase the mandatory deductible amount, the Contractor shall be responsible for payment of the amount of the deductible in the event of a paid claim.

Notwithstanding any other clause in this contract, the State may recover up to the liability limits of the insurance policies required herein.

1. WORKERS' COMPENSATION INSURANCE

The Contractor shall take out and maintain during the life of this contract the statutory Workers' Compensation and Employer's Liability Insurance for all of the contactors' employees to be engaged in work on the project under this contract and, in case any such work is sublet, the Contractor shall require the subcontractor similarly to provide Worker's Compensation and Employer's Liability Insurance for all of the subcontractor's employees to be engaged in such work. This policy shall be written to meet the statutory requirements for the state in which the work is to be performed, including Occupational Disease. The policy shall include a waiver of subrogation in favor of the State. The COI shall contain the mandatory COI subrogation waiver language found hereinafter. The amounts of such insurance shall not be less than the limits stated hereinafter. For employees working in the State of Nebraska, the policy must be written by an entity authorized by the State of Nebraska Department of Insurance to write Workers' Compensation and Employer's Liability Insurance for Nebraska employees.

2. COMMERCIAL GENERAL LIABILITY INSURANCE AND COMMERCIAL AUTOMOBILE LIABILITY INSURANCE

The Contractor shall take out and maintain during the life of this contract such Commercial General Liability Insurance and Commercial Automobile Liability Insurance as shall protect Contractor and any subcontractor performing work covered by this contract from claims for damages for bodily injury, including death, as well as from claims for property damage, which may arise from operations under this contract, whether such operation be by the Contractor or by any subcontractor or by anyone directly or indirectly employed by either of them, and the amounts of such insurance shall not be less than limits stated hereinafter.

The Commercial General Liability Insurance shall be written on an occurrence basis, and provide Premises/Operations, Products/Completed Operations, Independent Contractors, Personal Injury, and Contractual Liability coverage. The policy shall include the State, and others as required by the contract documents, as Additional Insured(s). This policy shall be primary, and any insurance or self-insurance carried by the State shall be considered secondary and non-contributory. The COI shall contain the mandatory COI liability waiver language found hereinafter. The Commercial Automobile Liability Insurance shall be written to cover all Owned, Non-owned, and Hired vehicles.

REQUIRED INSURANCE COVERAGE COMMERCIAL GENERAL LIABILITY		
General Aggregate	\$2,000,000	
Products/Completed Operations Aggregate	\$2,000,000	
Personal/Advertising Injury	\$1,000,000 per occurrence	
Bodily Injury/Property Damage	\$1,000,000 per occurrence	
Medical Payments	\$10,000 any one person	
Damage to Rented Premises (Fire)	\$300,000 each occurrence	
Contractual	Included	
XCU Liability (Explosion, Collapse, and Underground Damage)	Included	
Independent Contractors	Included	
If higher limits are required, the Umbrella/Excess Liability limits	are allowed to satisfy the higher limit.	
WORKER'S COMPENSATION		
Employers Liability Limits	\$500K/\$500K/\$500K	
Statutory Limits- All States	Statutory - State of Nebraska	
Voluntary Compensation	Statutory	
COMMERCIAL AUTOMOBILE LIABILITY		
Bodily Injury/Property Damage	\$1,000,000 combined single limit	
Include All Owned, Hired & Non-Owned Automobile liability	Included	
Motor Carrier Act Endorsement	Where Applicable	
UMBRELLA/EXCESS LIABILITY		
Over Primary Insurance	\$5,000,000 per occurrence	
PROFESSIONAL LIABILITY		
All Other Professional Liability (Errors & Omissions)	\$10,000,000 Per Claim/Aggregate	
COMMERCIAL CRIME		
Crime/Employee Dishonesty Including 3rd Party Fidelity	\$1,000,000	
CYBER LIABILITY		
Breach of Privacy, Security Breach, Denial of Service, Remediation Fines and Penalties	n, \$1,000,000	
MANDATORY COI SUBROGATION WAIVER LANGUAGE		
"Workers' Compensation policy shall include a waiver of subrogation	n in favor of the State of Nebraska."	
MANDATORY COI LIABILITY WAIVER LANGUAGE		
"Commercial General Liability & Commercial Automobile Liability po an Additional Insured and the policies shall be primary and any insushall be considered secondary and non-contributory as additionally	urance or self-insurance carried by the St	

If the mandatory COI subrogation waiver language or mandatory COI liability waiver language on the COI states that the waiver is subject to, condition upon, or otherwise limit by the insurance policy, a copy of the relevant sections of the policy must be submitted with the COI so the State can review the limitations imposed by the insurance policy.

EVIDENCE OF COVERAGE

The Contractor shall furnish the Contract Manager, with a certificate of insurance coverage complying with the above requirements prior to beginning work at:

Nebraska Retirement Systems Attn: Controller 1526 K St. Ste. 400 Lincoln, NE 68508

These certificates or the cover sheet shall reference the RFP number, and the certificates shall include the name of the company, policy numbers, effective dates, dates of expiration, and amounts and types of coverage afforded. If the State is damaged by the failure of the Contractor to maintain such insurance, then the Contractor shall be responsible for all reasonable costs properly attributable thereto.

Reasonable notice of cancellation of any required insurance policy must be submitted to the contract manager as listed above when issued and a new coverage binder shall be submitted immediately to ensure no break in coverage.

4. **DEVIATIONS**

The insurance requirements are subject to limited negotiation. Negotiation typically includes, but is not necessarily limited to, the correct type of coverage, necessity for Workers' Compensation, and the type of automobile coverage carried by the Contractor.

H. ANTITRUST

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

The Contractor hereby assigns to the State any and all claims for overcharges as to goods and/or services provided in connection with this contract resulting from antitrust violations which arise under antitrust laws of the United States and the antitrust laws of the State.

I. CONFLICT OF INTEREST

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:	
X			ii .	

By submitting a proposal, bidder certifies that there does not now exist a relationship between the bidder and any person or entity which is or gives the appearance of a conflict of interest related to this RFP or project.

The bidder certifies that it shall not take any action or acquire any interest, either directly or indirectly, which will conflict in any manner or degree with the performance of its services hereunder or which creates an actual or an appearance of conflict of interest.

The bidder certifies that it will not knowingly employ any individual known by bidder to have a conflict of interest.

The Parties shall not knowingly, for a period of two years after execution of the contract, recruit or employ any employee or agent of the other Party who has worked on the RFP or project, or who had any influence on decisions affecting the RFP or project.

J. STATE PROPERTY

Accept (Initial)	Reject	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
X		()	

The Contractor shall be responsible for the proper care and custody of any State-owned property which is furnished for the Contractor's use during the performance of the contract. The Contractor shall reimburse the State for any loss or damage of such property; normal wear and tear is expected.

K. SITE RULES AND REGULATIONS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

The Contractor shall use its best efforts to ensure that its employees, agents, and subcontractors comply with site rules and regulations while on State premises. If the Contractor must perform on-site work outside of the daily operational hours set forth by the State, it must make arrangements with the State to ensure access to the facility and the equipment has been arranged. No additional payment will be made by the State on the basis of lack of access, unless the State fails to provide access as agreed to in writing between the State and the Contractor.

L. ADVERTISING

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

The Contractor agrees not to refer to the contract award in advertising in such a manner as to state or imply that the company or its services are endorsed or preferred by the State. Any publicity releases pertaining to the project shall not be issued without prior written approval from the State.

M. NEBRASKA TECHNOLOGY ACCESS STANDARDS (Statutory)

Contractor shall review the Nebraska Technology Access Standards, found at http://nitc.nebraska.gov/standards/2- 201.html and ensure that products and/or services provided under the contract are in compliance or will comply with the applicable standards to the greatest degree possible. In the event such standards change during the Contractor's performance, the State may create an amendment to the contract to request the contract comply with the changed standard at a cost mutually acceptable to the parties.

N. DISASTER RECOVERY/BACK UP PLAN

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
X			

The Contractor shall have a disaster recovery and back-up plan, of which a copy should be provided upon request to the State, which includes, but is not limited to equipment, personnel, facilities, and transportation, in order to continue services as specified under the specifications in the contract in the event of a disaster.

O. DRUG POLICY

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

Contractor certifies it maintains a drug free work place environment to ensure worker safety and workplace integrity. Contractor agrees to provide a copy of its drug free workplace policy at any time upon request by the State.

IV. PAYMENT

A. PROHIBITION AGAINST ADVANCE PAYMENT (Statutory)

Payments shall not be made until contractual deliverable(s) are received and accepted by the State.

B. TAXES (Statutory)

The State is not required to pay taxes and assumes no such liability as a result of this solicitation. Any property tax payable on the Contractor's equipment which may be installed in a state-owned facility is the responsibility of the Contractor.

C. INVOICES

Accept	Reject	Reject & Provide Alternative within RFP Response	
(Initial)	(Initial)	(Initial)	NOTES/COMMENTS:
Х			

Invoices for payments must be submitted by the Contractor to the agency requesting the services with sufficient detail to support payment. Mail to Nebraska Retirement Systems, 1526 K Street Suite 400, Lincoln, NE 68508. The terms and conditions included in the Contractor's invoice shall be deemed to be solely for the convenience of the parties. No terms or conditions of any such invoice shall be binding upon the State, and no action by the State, including without limitation the payment of any such invoice in whole or in part, shall be construed as binding or estopping the State with respect to any such term or condition, unless the invoice term or condition has been previously agreed to by the State as an amendment to the contract.

D. INSPECTION AND APPROVAL

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
х			

Final inspection and approval of all work required under the contract shall be performed by the designated State officials.

E. PAYMENT

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

State will render payment to Contractor when the terms and conditions of the contract and specifications have been satisfactorily completed on the part of the Contractor as solely determined by the State. (Neb. Rev. Stat. §73-506(1)) Payment will be made by the responsible agency in compliance with the State of Nebraska Prompt Payment Act (See Neb. Rev. Stat. §81-2401 through 81-2408). The State may require the Contractor to accept payment by electronic means such as ACH deposit. In no event shall the State be responsible or liable to pay for any services provided by the Contractor prior to the Effective Date of the contract, and the Contractor hereby waives any claim or cause of action for any such services.

F. LATE PAYMENT (Statutory)

The Contractor may charge the responsible agency interest for late payment in compliance with the State of Nebraska Prompt Payment Act (See Neb. Rev. Stat. §81-2401 through 81-2408).

G. SUBJECT TO FUNDING/FUNDING OUT CLAUSE FOR LOSS OF APPROPRIATIONS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
Х			

The State's obligation to pay amounts due on the contract for a fiscal years following the current fiscal year is contingent upon legislative appropriation of funds. Should said funds not be appropriated, the State may terminate the contract with respect to those payments for the fiscal year(s) for which such funds are not appropriated. The State will give the Contractor written notice thirty (30) calendar days prior to the effective date of termination. All obligations of the State to make payments after the termination date will cease. The Contractor shall be entitled to receive just and equitable compensation for any authorized work which has been satisfactorily completed as of the termination date. In no event shall the Contractor be paid for a loss of anticipated profit.

H. RIGHT TO AUDIT (First Paragraph is Statutory)

Accept	Reject	RFP Response	NOTES/COMMENTS: See proposed redline/legal edits in paragraph(s) below
(Initial)	(Initial)	(Initial)	
		Reject & Provide Alternative within	

The State shall have the right to audit the Contractor's performance of this contract upon a thirty (30) business days' written notice. Such audit shall be conducted at the Contractor's place of business and during Contractor's normal business hours. Contractor shall utilize generally accepted accounting principles, and shall maintain the accounting records, and other records and information relevant to the contract (Information) to enable the State to audit the contract. The Subject to any applicable privileges or other legally binding obligations of confidentiality and upon advance written request the State may audit and the Contractor shall maintain, the Information during the term of the contract and for a period of five (5) years after the completion of this contract or until all issues or litigation are resolved, whichever is later. The Contractor shall make the Information available to the State at Contractor's place of business or a location acceptable to both Parties during normal business hours. If this is not practical or the Contractor so elects, the Contractor may provide electronic or paper copies of the Information. The State reserves the right to examine, make copies of, and take notes on any Information directly relevant to this contract, regardless of the form or the Information, how it is stored, or who possesses the Information. Under no circumstance will the Contractor be required to create or maintain documents not kept in the ordinary course of Contractor's business operations, nor will Contractor be required to disclose any information, including but not limited to product cost data, which is confidential or proprietary to Contractor.

The Parties shall pay their own costs of the audit unless the audit finds a previously undisclosed overpayment by the State. If a previously undisclosed overpayment exceeds one-half of one percent (.5%) of the total contract billings, or if fraud, material misrepresentations, or non-performance is discovered on the part of the Contractor, the Contractor shall reimburse the State for the total costs of the audit. Overpayments and audit costs owed to the State shall be paid within ninety (90) business days of written notice of the claim. The Contractor agrees to correct any material weaknesses or condition found as a result of the audit.

V. PROJECT DESCRIPTION AND SCOPE OF WORK

Segal acknowledges that it has carefully read Section V and understands the Project Overview and Scope of Services. We have included proposed edits and clarification notes.

A. PROJECT OVERVIEW

The Nebraska Public Employees Retirement Systems (NPERS), under the direction of the Public Employees Retirement Board (PERB), administers five (5) statewide retirement systems and one deferred compensation plan for the State of Nebraska. The oldest system (the School Plan) was created in 1945. NPERS recognizes the importance of a successful retirement and is dedicated to providing the highest quality service necessary to assist members in achieving this goal.

The primary function of NPERS is the administration of legislatively mandated benefit programs and related services. All five (5) employee group retirement plans administered by NPERS are governmental plans as defined in Internal Revenue Code (IRC) § 414(d). The deferred compensation plan is instituted under IRC § 457(b). Currently NPERS carries out its mission from one location in Lincoln, Nebraska.

NPERS administers three defined benefit (DB) plans, two defined contribution (DC) plans, two cash balance plans (CB) and one deferred compensation plan (DCP). NPERS serves approximately 130,000 active, inactive and retired members. The market value of all plan assets (DB, DC, CB & DCP) was approximately \$14.7 billion at the end of 2017.

- 1. The three defined benefit plans are the:
 - a. Nebraska School Employees Retirement System (School Employees Retirement Act, Neb. Rev. Stat. §§ 79-901 to 79-977.03). The School Plan has approximately 87,898 members (active, inactive, and retired).
 - Nebraska Judges Retirement System (Judges Retirement Act, Neb. Rev. Stat. §§ 24-701 to 24-714). The Judges Plan has approximately 337 members (active, inactive and retired).
 - c. Nebraska State Patrol Retirement System (Nebraska State Patrol Retirement Act, Neb. Rev. Stat. §§ 81-2014 to 81-2041). The State Patrol Plan has approximately 859 members (active, inactive and retired).

In the DB plans, monthly benefit payments of approximately \$49,976,729 are payable to 24,924 recipients. Fiscal year 2017 member contributions totaled \$192,420,799 and employer contributions totaled \$193,172,769. DB plan assets at market value totaled \$11,450,604,510 as of June 30,2017.

- 2. The two defined contribution plans are the:
 - State Employees Retirement System (State Employees Retirement Act, Neb. Rev. Stat. §§ 84-1301 to 84-1333). The State DC Plan has approximately 3,744 members (active and inactive).
 - County Employees Retirement System (County Employees Retirement Act, Neb. Rev. Stat. §§ 23-2301 to 23-2334). The County DC Plan has approximately 1,600 members (active and inactive).

- 3. The two cash balance plans are the:
 - State Employees Retirement System (State Employees Retirement Act, Neb. Rev. Stat. § 84-1301 to 84-1333). The State CB plan has approximately 22,245 members. (active, inactive and retired)
 - County Employees Retirement System (County Employees Retirement Act, Neb. Rev. Stat. § 23- 2301 to 23-2334). The County CB plan has approximately 10,234 members. (active, inactive and retired)

The State and County Plans use unisex tables on contributions made after January 1, 1984, in the calculation of monthly benefits, and use male tables for contributions made prior to January 1, 1984. In order to pay the difference between the benefit available based upon unisex tables for all contributions made and the benefit as calculated above, the State and County plans each have an actuarially valued "Equal Retirement Benefit Fund."

4. The Deferred Compensation Plan

The DCP has approximately 3,448 members and is authorized by §§ 84-1504 through 84-1513. Also administered by NPERS is the Spousal Pension Rights Act Neb. Rev. Stat. §§ 42-1101 to 42-1113, which governs qualified domestic relations orders in the five NPERS administered pension plans.

As a result of the Request for Proposals (RFP) process, NPERS intends to select a qualified firm to provide the actuarial services for the retirement plans described above and more specifically in Section B "Scope of Work" of this RFP.

B. SCOPE OF WORK

The actuarial services as described below shall be provided at a rate as set forth in the Cost Proposal. Under the direction of the PERB and the Director of NPERS, the Contractor will provide the services as described in the following subsections.

We propose the following legal edit to the Scope of Services (on page 1 of RFP):

Any entity awarded a contract or submitting a proposal or response to the RFP agrees not to sue, file a claim, or make a demand of any kind, and will indemnify and hold harmless the State and its employees, volunteers, agents, and its elected and appointed officials from and against any and all claims, liens, demands, damages, liability, actions, causes of action, losses, judgments, costs, and reasonable and documented expenses of every nature, including investigation costs and expenses, settlement costs, and attorney fees and expenses, sustained or asserted against the State, arising out of, resulting from, or attributable to the extent that it is judicially determined that these are directly the result of the posting of the contract or the proposals and responses to the RFP, awards, and other documents.

In providing the services as described below, the Contractor will periodically prepare a detailed data request outlining what data and information is necessary in order to perform such services. The State agrees to provide the Contractor and instruct its staff, legal counsel and other service providers (the "Other Professionals") to provide the Contractor on a timely basis with any and all information included in the Contractor's data request, along with any other information the Contractor reasonably requests (e.g., financial data) and any other data or information needed to perform the services. Data will be requested in a computer format compatible with Contractor's computer system. Upon receipt of the data, the Contractor will examine it for missing information and internal consistency. The Contractor may charge the State at its normal hourly rates if it is necessary to convert data not presented in the format requested and for the additional processing time required to reconcile data that contains errors, duplicate records or missing information. The State agrees and acknowledges that the Contractor shall have the right to rely on the accuracy of the data and information provided by the State and the Other Professionals and shall have no responsibility for independently verifying this data and information, except that the Contractor

shall have the duty to advise the State if the data and information appears to be abnormal, unusual, or incorrect. The State agrees that it will notify Contractor (and require the Other Professionals to notify Contractor) promptly upon gaining knowledge of any material change to any of the information provided to the Contractor.

1. CONSULTING SERVICES

- Provide actuarial consultation and advisory services on any technical, policy, legal, or administrative issues via meetings, telephone calls and written correspondence, as described more fully in the following sections.
- b. Make recommendations to the PERB on possible improvements for the financing and benefit structure of the retirement systems as new developments in the retirement industry occur. Keep the PERB apprised of current trends and progress within the actuarial profession and public pension plans.
- c. Review, consult on, and perform other actuarial functions in pricing proposed state and federal statutory changes or enactments; advise on any other implications such as administrative issues resulting from such proposed state and federal enactments. Consult and advise on the policy and administrative problems of implementing newly enacted legislation.
- d. Assist the PERB and NPERS with proposed changes to the governing retirement statutes, rules and regulations for all plans.
- e. Keep NPERS staff advised on anticipated and actual developments in federal statutes, rules and regulations regarding all aspects of pension and taxation law, such as financing, benefits, vesting, fiduciary responsibility, disclosure and similar topics. This notification and advice shall include, but not be limited to, information on Internal Revenue Code § 415, 401(a) (in its entirety) and all other federal requirements necessary for the PERB to preserve the "qualified plan status" of the retirement plans within the PERB's administrative jurisdiction, and also the IRC § 457 DCP.
- f. Develop, provide and maintain the various actuarial assumptions, tables, rates and factors needed by the NPERS staff to administer the retirement systems. These may include, but are not limited to actuarial assumptions, mortality tables, present value and survivor benefits factors, factors for the purchases of permissive service credit, the asset valuation method, the amortization schedule for unfunded actuarial accrued liabilities, the required statutory payroll percentage contributions from employees and employers, estimated employer and state required actuarial contribution amount projections, and other similar actuarial information as specified by the staff of NPERS.
- g. Appear before the PERB, the Governor of the State of Nebraska or the Governor's designee (Governor), and at hearings of the Legislature as necessary to discuss actuarial standards, principles and other factors used in determining funding requirements, pricing of legislation, or effective administration of the retirement systems or other related topics. Appearances will be required as the Director of NPERS or the PERB Chairperson deems necessary. Estimated number of days per year spent in person in Lincoln for these appearances is twelve (12) business days. The actual number of meetings may be more or less as required by the State. The Contractor is responsible for all costs even if the number of meetings per year exceeds the estimates. All travel costs must be included in the bid price.
- h. Respond to requests from the Director of NPERS and other authorized NPERS staff for actuarial advice about the application of factors and tables in specific situations. This is anticipated to include review of specific questions raised by members, retirees or beneficiaries concerning the actuarial aspects of specific benefit calculations, or other actuarial questions.
- The Contractor must assure that technology implemented at NPERS will be compatible with technology used or maintained by the Contractor.

- j. Assist in reviewing the form and content of records and data kept by NPERS as needed for the assessment of legislative proposals, actuarial studies, experience analysis and other valuations. As requested, the Contractor will make suggestions and recommendations for the modification, additions or deletions that will ensure the maintenance of the full range of data needed by the Contractor.
- k. Assist the PERB in selecting the most appropriate method or approach for valuing system assets and suggesting how the valuation system can be improved. Assist the PERB in reviewing and recommending the most appropriate methods for calculating repayments and purchase of service benefits.
- I. As requested assist the Nebraska State Auditor's office with annual audits of all NPERS retirement plans. This may involve the explanation of actuarial principles and other information to educate and assist the auditors. The Contractor shall be prepared to spend ten (10) to fifteen (15) business days on this issue per year via written and / or oral communication.

2. VALUATION SERVICES

- a. As of June 30th of each year, perform actuarial valuation of the assets, liabilities and reserves for the three DB retirement systems, commencing with the fiscal year ending June 30, 2019. Prior to the start of the valuation an analysis of needs associated with a valuation report will be done. This will include review of any plan changes resulting from legislation passed since the previous valuation and review of actuarial assumptions for continued reasonableness. Contractor will determine the contributions required to discharge the liabilities and administrative costs as established by Nebraska statutes.
- b. As of December 31st of each year, perform a valuation of the assets, liabilities, and reserves for the State and County CB plans and the Equal Retirement Benefit Funds (ERBF), commencing with the calendar year ending December 31, 2019. Contractor will determine the contributions required to discharge the liabilities and administrative costs as established by Nebraska statutes.
- c. Submit to NPERS staff a draft report on each completed actuarial valuation, to include the results of the valuation, the certification of contribution requirements and comments on the actuarial condition and progress of the five (5) retirement systems. These reporting requirements also include preparation of the required disclosure statements or information from which disclosure statements may be developed as required by Governmental Accounting Standards Board (GASB) principles or Actuarial Standards Board (ASB) principles. Upon NPERS approval of the draft report, up to seventy (70) final copies will be submitted to the NPERS office by November 1st of each year for the School, Judges and State Patrol plans and by May 1st of each year for the CB plans and the ERBF Funds.
- d. The NPERS' staff shall furnish the awarded Contractor the data requested on each member of the retirement systems that is required by the Contractor to make the actuarial valuation referred to in Section V(B) Scope of Work (1) a, b, and c. Data on each member shall be furnished to the Contractor on disc or other available electronic medium, as agreed between the Contractor and NPERS.
- e. The data for all members of NPER/PERB shall be protected with encryption and shall remain the property of the PERB. At the request of the PERB, the Contractor agrees that all data shall be forwarded via an agreed upon electronic media, to the NPERS Director's office or other location as directed by the PERB at no additional cost to the State. The confidential data maintained on behalf of the PERB by the Contractor shall not be released to anyone, nor shall the data be released without the prior written consent of the PERB.

3. GOVERNMENTAL ACCOUNTING STANDARDS BOARD (GASB) SERVICES

a. Assist NPERS in providing to covered plan employers the required supplementary information in accordance with GASB statement nos. 67 and 68 (or successor provisions). This applies to

- single and agent employers required to present supplementary information for the ten (10) most recent fiscal years, including: (1) sources of changes in the net pension liability, (2) the components of the net pension liability and related ratios, including the pension plan's fiduciary net position as a percentage of the total pension liability, and the net pension liability as a percentage of covered-employee payroll.
- b. Actuarially determine and assist NPERS in: (1) providing a schedule covering each of the ten (10) most recent fiscal years for each covered employer that includes information about the actuarially determined contribution, contributions to the pension plan, and related ratios; and (2) explaining factors that significantly affect trends in the amounts reported in the schedules, such as changes of benefit terms, changes in the size or composition of the population covered by the benefit terms, or the use of different assumptions.
- c. Assist NPERS in addressing both current and proposed GASB changes in pension related accounting issues affecting the retirement plans.

4. PROJECTION SERVICES

- a. Prepare an annual five (5) year projection of estimated employee, employer and State required contribution amounts and additional State contribution requirements for the School System, the State Patrol System, the Judges System, and the State and County CB benefit systems, and provide interim updates using actual fund rates of return provided by NPERS or Nebraska Investment Council (NIC), as requested. The projections will be prepared as a separate report and presented with the annual actuarial valuations. The projections will be based on the latest actuarial valuation results rolled forward for each quarter. Under the School System, these projections will include contributions required to fund the Omaha Service Annuity, School System COLAs, and percentage of salary State contributions for the School System and Omaha.
- b. Prepare an annual thirty (30) year open group deterministic projection of estimated employee, employer and State required contribution amounts based on the results of the actuarial valuations, and additional State contribution requirements (if necessary) for the School Retirement System, Judges Retirement System and the State Patrol Retirement System. The projections will be prepared as a separate report and presented with the annual actuarial valuation of the plans. The projections will be based on the latest actuarial valuation results.
- Provide an open group projection modeling software covering a thirty (30) year period. The model will show the following: a projection of the number of members and payroll growth over a thirty (30) year period, separated between current active members and future new hired members. New entrant profiles will be based on recent experience. Future active population will be assumed to remain stable or can include a membership growth assumption. All other future demographic experience will be assumed to match the actuarial assumptions. A projection of the actuarial liabilities, market and actuarial value of assets, expected cash flows, funded ratio, normal cost, contribution rates, and contribution amounts. Differences between current and proposed plan changes can be quantified for each year during the projection period to show the changes in employee, employer and State contributions. The modeling software shall be interactive and user friendly. It shall include the ability to modify a number of variables for scenario testing, including but not limited to the following: benefit formula multiplier, salary period, retirement age, vesting period, cost of living adjustments, employee contributions, employer contributions, State contributions, optional contributions, amortization methods, assumed rate of return, and annual interest rates. In addition, the modeling software shall have the following attributes: ability to project surpluses, ability to be updated as needed, printable charts, and ownership rights by NPERS as described in Section III F. above.

5. ACTUARIAL EXPERIENCE STUDY

- a. The Contractor will assist the PERB in an analysis of the demographic and financial experience of the Nebraska School Retirement System, the Nebraska State Employee Retirement System, the Nebraska County Employees Retirement System, the Nebraska State Patrol Retirement System, and the Nebraska Judges Retirement System. The primary purpose of the analysis will be to determine the direction and magnitude of the various demographic and economic trends which affect the current and future liabilities of the retirement systems, to modify the actuarial assumptions to recognize these trends, and to obtain a more accurate determination of the systems' liabilities and the resulting costs.
- b. The study will determine whether the actuarial assumptions and methods currently used in the DB and CB plans are reasonable (taking into account the experiences of the plan and reasonable expectations), and offer the actuary's best estimate of anticipated experience under the plans.
 - [Although not subject to the Employee Retirement Security Income Act (ERISA), the experience study shall give due regard to the standards found in 29 U.S.C. § 1082(c)(3).] Factors examined shall include the experience of the plan, experience trends, external trends and external factors.
- c. The Contractor shall to present the findings of the experience study along with suggested changes to the actuarial assumptions and methods to the PERB.
- d. If the contract is renewed for a second term, the Contractor shall complete an Actuarial Experience Study by December 31, 2020, using the four years ending June 30, 2019, or December 31, 2019, and at a four year intervals thereafter or as required by the State Legislature.

6. BENEFIT ADEQUACY STUDY

- a. Perform a review and analysis of the benefit, funding, and investment adequacy for the five (5) major public employee retirement systems of the State of Nebraska covering the Nebraska State Employees Retirement System (DC and CB plans); Nebraska School Employees Retirement System (DB plan); Nebraska County Employees Retirement System (DC and CB plans); Nebraska Judges Retirement System (DB plan); and the Nebraska State Patrol Employees Retirement System (DB and deferred retirement option plans).
- b. The benefit adequacy study shall include an analysis of the following system areas: income replacement needs; calculation of benefit adequacy achieved covering (1) value of the retirement benefit, (2) income replacement ratios, and (3) over/under target comparisons; competiveness of the retirement systems; comparison with national average practices; contribution rate comparison for regional retirement systems; and recommendations to meet benefit adequacy and/or competiveness needs.
- c. This study shall include establishing benefit policy recommendations for retirement plans under the following three approaches: (1) Benefit Adequacy Approach provide retirement income needed to maintain the same standard of living to an employee at and throughout retirement as was earned while the employee was working; (2) Competitiveness Approach provide retirement benefits at a level competitive with other regional statewide retirement systems and local employers who are competing for employees with like skills; and, (3) Cost Approach provide the best retirement benefit possible given a fixed contribution level and investment risk tolerance.

7. SUPPLEMENTAL SERVICES

a. The PERB or the Director of NPERS may require other services beyond those documented in subsections B1, B2, B3, B4, B5 and B6. Any supplemental charges resulting from these additional services must be at the hourly rate as set forth in the - Cost Proposal. The invoices

- must be itemized and billed to the appropriate system or systems in the month following the month when charges were incurred.
- b. Services may from be requested by entities other than the PERB (such as the Nebraska Unicameral Legislature, or groups representing retirement system participants) who will use the services of the Contractor to price benefit changes and improvements as provided by Neb. Rev. Stat. § 84-1503(2). When services are provided to other groups or entities, the charges resulting from these services are not a part of this RFP, and must be billed and collected from the requesting entity or entities.

C. DURATION/RENEWAL OF THE CONTRACT

Pursuant to Neb. Rev. Stat. § 84-1503(2)(e), actuarial contracts of the PERB must be obtained through a competitive, formal, and sealed bidding process at least once every three (3) years, unless the PERB determines that such a process would not be cost effective and that the actuarial services performed have been satisfactory, in which case the contract may also contain an option for a renewal without a competitive, formal, and sealed bidding process for up to three additional years.

This section of the contract is subject to any amendment in the governing law.

D. ATTACHMENTS AND SUPPLEMENTARY INFORMATION

- 1. Attachment A Mandatory Qualification Certification and Questionnaire
- 2. Attachment B Technical Approach
- 3. Actuarial Valuation Reports for the Nebraska Public Employees Retirement Systems, County Employees Retirement System, Cash Balance Benefit Fund, Judges Retirement System, School Retirement System, State Employees Retirement System, Cash Balance Benefit Fund, and the State Patrol Retirement System. Copies of these reports may be found at:
 - a. http://npers.ne.gov/SelfService/public/howto/publications/ActuarialReports/ActuaryCounty2018.p d f
 - b. http://npers.ne.gov/SelfService/public/howto/publications/ActuarialReports/ActuaryJudges2017.
 - c. http://npers.ne.gov/SelfService/public/howto/publications/ActuarialReports/ActuarySchool2017.p
 - http://npers.ne.gov/SelfService/public/howto/publications/ActuarialReports/ActuaryState2018.pdf
 - e. http://npers.ne.gov/SelfService/public/howto/publications/ActuarialReports/ActuaryStatePatrol20 1 7.pdf
- 4. The Governmental Accountability and Standards Board (GASB) State No. 68 Report for the Nebraska Public Employees Retirement Systems, County Employees Retirement System, Cash Balance Benefit Fund, Judges Retirement System, School Retirement System, State Employees Retirement System, Cash Balance Benefit Fund, and the State Patrol Retirement System. Copies of these reports may be found at:
 - a. http://npers.ne.gov/SelfService/public/howto/publications/ActuarialReports/2018CountyGASB68.
 p df
 - http://npers.ne.gov/SelfService/public/howto/publications/ActuarialReports/2018JudgeGASB68.
 pd f
 - c. http://npers.ne.gov/SelfService/public/howto/publications/ActuarialReports/2018SchoolGASB68. p df

- http://npers.ne.gov/SelfService/public/howto/publications/ActuarialReports/2018OmahaAnnuityG ASB68.pdf
- e. http://npers.ne.gov/SelfService/public/howto/publications/ActuarialReports/2018StateGASB68.p df
- f. http://npers.ne.gov/SelfService/public/howto/publications/ActuarialReports/2018PatrolGASB68.p
- Nebraska Public Employees Retirement Systems Experience Study, Study Period: Four Years Ending June 30, 2015 or December 31, 2015, found at: http://npers.ne.gov/SelfService/public/howto/publications/2016ExperAnalysis.pdf;
- Nebraska Public Employees Retirement Systems Benefit Review Study of the Nebraska Retirement Systems, August 2000, found at: http://npers.ne.gov/SelfService/public/howto/publications/Buck2000.pdf
- 7. Copies of applicable Nebraska Revised Statutes governing the plans administered by the Nebraska Public Employees Retirement Board and Nebraska Public Employees Retirement Systems:
 - a. The County Employees' Retirement Act found at: https://nebraskalegislature.gov/laws/display_html.php?begin_section=23-2301&end_section=23-2334
 - The Judges Retirement Act found at: https://nebraskalegislature.gov/laws/display_html.php?begin_section=24-701&end_section=24-714
 - c. The Spousal Pension Rights Act found at: https://nebraskalegislature.gov/laws/display_html.php?begin_section=42-1101&end_section=42-1113
 - d. The School Employees Retirement Act found at: https://nebraskalegislature.gov/laws/display_html.php?begin_section=79-901&end_section=79-977.03
 - The Nebraska State Patrol Retirement Act found at: https://nebraskalegislature.gov/laws/display_html.php?begin_section=81-2014&end_section=81-2041
 - f. The State Employees Retirement Act found at: https://nebraskalegislature.gov/laws/display_html.php?begin_section=84-1301&end_section=84-1333
 - g. The enabling legislation for the Nebraska Public Employees Retirement Board and the Deferred Compensation Plan found at: https://nebraskalegislature.gov/laws/display_html.php?begin_section=84-1501&end_section=84-1514
- 8. Copy of Nebraska Administrative Code, Title 303, Chapters 1 through 25, found at: http://www.sos.ne.gov/rules-and-regs/regsearch/Rules/index.cgi?l=Public_Employees_Retirement_Systems&t=Title-303
- 9. Attachment I Copies of The Audit Report of the Nebraska Public Employees Retirement Systems for
 - a. The State and County Employees Retirement Plans Pension Trust Funds of the State of Nebraska, January 1, 2017, through December 31, 2017, found at:
 http://www.auditors.nebraska.gov/APA Reports/2018/SA852-08152018-
 January 1 2017 through December 31 2017 Audit Report.pdf

- The School Employees, Judges, and State Patrol Retirement Plans Pension Trust Funds of the State of Nebraska for the Fiscal Year ended June 30, 2017, found at:
 http://www.auditors.nebraska.gov/APA Reports/2018/SA851-02142018 July 1 2016 through June 30 2017 Audit Report.pdf
- 10. Nebraska Public Employees Retirement Systems Rules & Regulations and Guidance Document Index found at: http://npers.ne.gov/SelfService/public/howto/publications/GuideDocIndex.pdf
- 11. Nebraska Public Employees Retirement Systems Plan Handbooks for:
 - a. The County Employees' Retirement System found at: http://npers.ne.gov/SelfService/public/howto/handbooks/handbookCounty.pdf
 - The Judges Retirement System found at: http://npers.ne.gov/SelfService/public/howto/handbooks/handbookJudge.pdf
 - c. The School Retirement System found at: http://npers.ne.gov/SelfService/public/howto/handbooks/handbookSchool.pdf
 - d. The State Employees' Retirement System found at: http://npers.ne.gov/SelfService/public/howto/handbooks/handbookState.pdf
 - e. The State Patrol Retirement System found at: http://npers.ne.gov/SelfService/public/howto/handbooks/handbookPatrol.pdf

E. DELIVERABLES

See Cost Proposal.

Any and all actuarial valuation reports, legislative reports, cost studies, benefit adequacy studies, experience studies, financial audit reports, GASB reports, or any other study or report identified in the Project Overview, Scope of Work, Mandatory Qualifications, and Attachments and Supplementary Information, produced by the actuary must be substantially similar in form, format, and content to the reports listed in the Attachments and Supplementary Information section of this RFP. Bidders should submit samples or copies of similar reports and studies with their response.

VI. PROPOSAL INSTRUCTIONS

Segal acknowledges that it has carefully read Section VI including the requirements for preparing and submitting the Technical and Cost Proposals and agrees to comply.

VII. COST PROPOSAL REQUIREMENTS

Segal acknowledges that it has carefully read Section VII has agrees to comply to the proposal requirements and submission instructions for the Cost Proposal.

Technical Approach

The section includes the following:

- Attachment A: Mandatory Qualifications
- Attachment B: Proposed Technical Approach

Attachment A: Mandatory Qualifications

As requested, we have completed Attachment A.

Attachment A

Mandatory Qualification Certification and Questionnaire

Request for Proposal Number 5989 Z1

All bidders are required to complete this attachment.

The bidder hereby certifies that it meets all of the following mandatory qualifications:

1.	As of December 31, 2018, the bidder has a minimum of three (3) public pension fund clients.				
	Yes	□ No			
2.	a pu cons satis	bidder has a minimum of five (5) years of experience in this pension fund. This means that the bidder as an orgulating services to a public pension fund for at least five (5) sulting services to a public pension fund.	ganization has been providing actuarial (5) years. This requirement is not		
	Yes	□ No			
3.	in progene shall actual legis assu	bidder's lead consultant on the account must have a moviding actuarial consulting service to public pension fueral consulting, experience analysis, and valuation assilused have experience in testifying before legislative an arial positions and the principles used in valuing a publication, and an ability to discuss in laymen's terms the fumptions; and other actuarial matters. The lead consultation of Actuaries.	unds. This experience shall include gnments for such funds. This person and administrative bodies in support of lic retirement system or pricing ollowing: actuarial theory; basis for		
\boxtimes	Yes	□ No			
4.	field Fello Prac	essional staff assigned to the account shall have a min of actuarial science and will include persons with appro ow or Associate of Society of Actuaries, and/or Fellow o ctice, and/or Member of the American Academy of Actu ary under the provisions of the Employee Retirement Ir	opriate professional credentials such as of the Conference of Actuaries in Public aries, and/or meet standards of a qualified		
	Yes	□ No			
5.		ervices to be provided on behalf of the account shall be arial principles.	e in accordance with generally accepted		
	Yes	□ No			
6.		actuarial firm must carry liability insurance as set forth ract. (Section III, G Insurance Requirements)	in this RFP for the duration the		
		□No			
Seg	al agr	rees to carry liability insurance for the duration of the co	ontract.*		
Da	16 te	Segal Consulting Name of firm			
		holl, Senior Vice President nd title of individual signing for the firm	Signature Wulder		

Attachment B: Proposed Technical Approach

5989 Z1 ATTACHMENT B Technical Approach

Bidders shall complete and submit a Technical Approach Document to provide Actuarial Services for the Nebraska Public Employees Retirement Systems (NPERS). Bidders are required to describe in detail how their proposed solution meets the specifications outlined within each Requirement.

The Technical Approach Document must indicate how the bidder intends to comply with the requirement and the effort required to achieve that compliance. It is not sufficient for the bidder to simply state that it intends to meet the requirements of the RFP. The State will consider any such response to the requirements in this RFP to be non-responsive. The narrative should provide the State with sufficient information to differentiate the bidder's solution from other bidders' solutions.

Corporate Overview

- 1. Qualification One: As of December 31, 2018, bidder has a minimum of three (3) public pension fund clients. Please submit a written description of how this qualification is satisfied, including, at a minimum, a list of at least three (3) public pension fund clients for whom the bidder currently provides actuarial consulting services. These descriptions should include:
 - a. The time period of the project;
 - b. The scheduled and actual completion dates;
 - c. The Contractor's responsibilities;
 - d. For reference purposes, a customer name (including the name of a contact person, a current telephone number, a facsimile number, and e-mail address); and,
 - e. Each project description should identify whether the work was performed as the prime Contractor or as a subcontractor. If a bidder performed as the prime Contractor, the description should provide the originally scheduled completion date and budget, as well as the actual (or currently planned) completion date and actual (or currently planned) budget.

Bidder Response: We are including the following client references.

Vermont Retirement Systems

Time Period of the Project: Annual valuations are due by late October. Special projects are due within an agreed upon time.

Scheduled and Actual Complete Dates: Segal has met all scheduled completion for routine and non-routine consulting services.

Contractor's Responsibilities: The scope of services includes actuarial valuations for three defined benefit pension systems and two retiree medical programs. In addition, we provide non-routine consulting advice regarding the pension systems and perform periodic studies, such as five-year experience reviews.

Client Contact Information:

Ms. Beth Pearce State Treasurer 802.828.5195

Beth Pearce@vermont.gov

Project Description: Segal began serving as the Vermont Retirement Systems actuarial consultant in 2017. The Vermont Retirement System (VRS) consists of three plans with multiple tiers. As of June 30, 2017, all three systems combined have \$4.2 billion in assets and 52,642 participants.

Teachers' Retirement System of the State of Illinois

Time Period of the Project: Annual valuations are due by late October. Special projects are due within an agreed upon time.

Scheduled and Actual Complete Dates: Segal has met all scheduled completion for routine and non-routine consulting services.

Contractor's Responsibilities: Segal provides actuarial and consulting services to IL TRS, which includes annual actuarial valuations, certification of statutory and Board funding policy contribution rates, special requests, and periodic experience studies.

Client Contact Information:

Mr. Richard Ingram
Teachers' Retirement System of the State of Illinois
Executive Director
2815 West Washington Street
Springfield, IL 62794-8253
217.753.0970
ringram@trsil.org

Project Description: Segal has been the actuary for Illinois TRS since 2016. As of June 30, 2017, TRS had \$50 billion in assets and over 400,000 members.

North Dakota Teachers' Fund for Retirement

Time Period of the Project: Annual valuations are due by late October. Special projects are due within an agreed upon time.

Scheduled and Actual Complete Dates: Segal has met all scheduled completion for routine and non-routine consulting services.

Contractor's Responsibilities: Segal performs the annual actuarial valuation, prepares the GASB 67 and 68 disclosure information, completes a quinquennial experience review, provides analysis and cost impact statements of proposed legislation, and advises Fund staff of current events related to public sector plans.

Client Contact Information:

Ms. Fay Kopp
Deputy Executive Director
ND Retirement & Investment Office
1930 Burnt Boat Drive
Bismarck, ND 58507-7100
701.328.9885
fkopp@nd.gov

Project Description: In 2012, Segal was engaged as the ongoing actuarial valuation and consulting actuary. The North Dakota Teachers' Fund for Retirement (NDTFFR) has \$2.2 billion in assets and covers 10,000 active members and 8,000 inactives, retirees and beneficiaries.

Chicago Park Employees' Annuity and Benefit Fund

Time Period of the Project: Annual valuations are due by late April. Special projects are due within an agreed upon time.

Scheduled and Actual Complete Dates: Segal has met all scheduled completion for routine and non-routine consulting services.

Contractor's Responsibilities: Segal provides actuarial and consulting services to the Park Employees' Annuity and Benefit Fund of Chicago including annual actuarial valuations and periodic experience studies.

Client Contact Information:

Mr. Dean J. Niedospial
Executive Director
Park Employees' Annuity & Benefit Fund of Chicago
55 East Monroe Street, Suite 2720
Chicago, IL 60603
312.553.9265
dean@chicagoparkpension.org

Project Description: Segal been providing actuarial and consultant services to the Park Employees' Annuity and Benefit Fund of Chicago (PEABF) since 2012. As of June 30, 2012, PEABF had \$440 million in assets and 6,000 members.

Municipal Employees' Annuity and Benefit Fund of Chicago

Time Period of the Project: Annual valuations are due by late April. Special projects are due within an agreed upon time.

Scheduled and Actual Complete Dates: Segal has met all scheduled completion for routine and non-routine consulting services.

Contractor's Responsibilities Segal provides actuarial and consulting services to the MEABF, including annual actuarial valuations, legislative cost analyses, and periodic experience studies.

Client Contact Information:

Mr. James Mohler
Executive Director
Municipal Employees' Annuity & Benefit Fund of Chicago
321 N Clark St #700
Chicago, IL 60654
312.236.4700
MOHLERJ@meabf.org

Project Description: In 2015, Segal began working with the Municipal Employees' Annuity and Benefit Fund of Chicago (MEABF) to provide actuarial and consulting services. As of December 31, 2014, MEABF had \$5.2 billion in assets and 70,000 members.

2. Qualification Two: The bidder has a minimum of five (5) years of experience in providing actuarial consulting services to a public pension fund. This means that the bidder as an organization has been providing actuarial consulting services to a public pension fund for at least five (5) years. This requirement is not satisfied simply because its employees have at least five (5) years' experience in providing actuarial consulting services to a public pension fund. Please submit a written description of how this qualification is satisfied, including, at a minimum, a list of the public pension fund clients for whom the actuarial consulting firm has provided actuarial consulting services for at least five (5) years.

Bidder Response: Segal's Public Sector Market team provides benefit consulting services to approximately 532 public sector entities representative of 31 states, plus the District of Columbia, the U.S. Virgin Islands, Puerto Rico, the U.S. Government and Canada. We have been providing actuarial consulting services to public sector retirement plans since 1955. Retirement actuarial consulting services are provided to over 100 public sector funds including state, local, transportation, and both primary and secondary education venues.

Client assets vary in size, with our larger systems representing between \$1 billion and over \$40 billion. Segal's retirement practice is known for the depth of its knowledge. Many of our consultants are recognized as national experts, testifying before legislatures, leading professional associations and committees, and speaking at national and regional conferences and forums. Our consultants are also regular contributors to professional magazines and journals.

We have performed actuarial valuation and consulting services, experience analysis reviews and/or actuarial audits for the following complex public-sector defined benefit plans in recent years. The programs administered by these systems include defined benefit plans. Some systems administer defined contribution and retiree health care plans.

The following chart shows a list of our public sector retirement clients that we have provided services to for at least five (5) years.

Client	Initial Contract Year	Total Membership	Asset Size
University of California Retirement System	2004	289,500	\$62 Billion
Public Employees' Retirement System of the State of Nevada	1976	186,600	\$39 Billion
City of Los Angeles Fire and Police Pension Plan	2006	26,500	\$21 Billion
Los Angeles City Employees' Retirement System	2004	51,700	\$16 Billion
Orange County Employees Retirement System	2004	43,500	\$13 Billion
San Diego County Employees Retirement Association	2003	41,900	\$11 Billion
The Water and Power Employees' Retirement Plan of the City of Los Angeles	1999	20,750	\$11 Billion
Sacramento County Employees' Retirement System	2004	27,400	\$9 Billion
San Bernardino County Employees' Retirement Association	2002	38,850	\$9 Billion

Client	Initial Contract Year	Total Membership	Asset Size
Alameda County Employees' Retirement Association	2003	22,600	\$7 Billion
Contra Costa County Employees' Retirement Association	2003	22,050	\$7 Billion
Boston Retirement System	prior to 2005	44,723	\$6 Billion
Ventura County Employees' Retirement Association	2003	18,200	\$5 Billion
Municipal Employees' Annuity and Benefit Fund of Chicago	2014	72,408	\$4.6 Billion
Fresno County Employees' Retirement Association	2006	17,970	\$4.4 Billion
Kern County Employees' Retirement Association	2011	19,200	\$3.9 Billion
Fire and Police Pension Fund, San Antonio	2003	6,421	\$2.8 Billion
University of Missouri Retirement, Disability and Death Benefit Plan	prior to 2005	29,304	\$2.5 Billion
North Dakota Teachers' Fund for Retirement	2011	21,853	\$2.4 Billion
Sonoma County Employees' Retirement Association	2007	10,050	\$2.4 Billion
Georgia Municipal Employees Benefit System	2005	37,448	\$2.1 Billion
City of Jacksonville General Employees Retirement Plan	2010	9,960	\$1.8 Billion
East Bay Municipal Utility District Retirement System	2007	3,800	\$1.6 Billion
Los Angeles Department of Water & Power	2002	17,250	\$1.6 Billion
City of Fresno Fire and Police Retirement System	2006	2,250	\$1.5 Billion
Memphis Light, Gas and Water Division Retirement and Pension System	1999	5,297	\$1.4 Billion
City of Cambridge Contributory Retirement System	prior to 2005	5,892	\$1.2 Billion
City of Fresno Employees Retirement System	2006	4,300	\$1.2 Billion
DeKalb County Pension Plan	1988	10,680	\$1.2 Billion
Fulton County Employees Retirement System	2013	3,652	\$1.2 Billion
Middlesex County Retirement System	prior to 2005	17,360	\$1.2 Billion
City of Atlanta General Employees' Pension Fund	1994	7,601	\$1.1 Billion
City of Birmingham Retirement and Relief System	prior to 1990	7,227	\$1.0 Billion

Client	Initial Contract Year	Total Membership	Asset Size
Park Employees' Annuity and Benefit Fund of Chicago	2012	6,133	\$1.0 Billion
Barnstable County Retirement System	prior to 2005	8,258	\$942 Million
Government of the Virgin Islands Retirement System	1993	18,019	\$917 Million
City of Worcester Retirement System	prior to 2005	6,825	\$837 Million
Imperial County Employees' Retirement System	2007	3,760	\$779 Million
County of Santa Clara	2011	25,000	\$705 Million
Retirement Plan for Employees of NJ Transit Bus Operations, Inc. Amalgamated Transit Union	prior to 2005	7,431	\$630 Million
City of Orlando Police Officers' Pension Fund	1995	1,436	\$512 Million
Mendocino County Employees' Retirement Association	2011	3,050	\$484 Million
Massachusetts Water Resource Authority	2013	1,736	\$466 Million
City of Providence	2013	6,523	\$349 Million
City of Savannah Employees' Retirement Plan	prior to 1997	4,165	\$346 Million
New Jersey Transit Non-Agreement Retirement Plan	prior to 2005	2,628	\$345 Million
Hampden County Regional Retirement System	prior to 2005	4,666	\$321 Million
Newton Contributory Retirement System	2014	3,598	\$306 Million
Town of Brookline Contributory Retirement System	prior to 2005	3,812	\$274 Million
City of Holyoke Retirement System	prior to 2005	2,307	\$262 Million
Weld County Retirement Plan	2012	2,170	\$255 Million
Town of East Hartford Pension Plan	prior to 1995	1,258	\$225 Million
City of Chattanooga Fire and Police Pension Fund	1998	1,635	\$213 Million
Fulton-DeKalb Hospital Authority Employees' Retirement Plan	2012	6,196	\$209 Million
City of Jacksonville Corrections Officers Retirement Plan	2010	969	\$167 Million
Employees Retirement Plan of the Town of Hamden	prior to 1992	1,136	\$164 Million
Town of Wellesley Contributory Retirement System	prior to 2005	1,316	\$164 Million
City of Salem Retirement System	2009	1,689	\$150 Million
City of Marlborough Retirement System	2013	1,233	\$145 Million

Client	Initial Contract Year	Total Membership	Asset Size
Town of Needham Contributory Retirement System	2013	1,322	\$142 Million
Board of Education Employees' Pension Fund of Essex County	prior to 2005	809	\$131 Million
Retirement Plan for Employees of the Water Works and Sewer Board of the City of Birmingham	2008	899	\$129 Million
Town of Natick Contributory Retirement System	2002	1,179	\$128 Million
City of Atlanta General Employees' Pension Fund Employees of the Atlanta Board of Education	1994	2,900	\$124 Million
Town of Andover Retirement System	1998	1,278	\$124 Million
Judicial Retirement System of Nevada	1976	191	\$116 Million
Boston Water and Sewer Commission	2006	722	\$102 Million
Town of Belmont Retirement System	2013	1,038	\$96 Million
Chicago Housing Authority Employees' Retirement Plan	2013	1,061	\$95 Million
City of Gloucester Retirement System	2012	1,050	\$93 Million
City of Gainesville Retirement Plan A	2007	786	\$91 Million
City of Vero Beach General Employee Retirement Plan	1998	770	\$77 Million
City of Bridgeport Public Safety Plan A	prior to 2000	677	\$71 Million
City of Bridgeport Plan B (Police)	prior to 2000	127	\$61 Million
Retirement Plan of Hampton Roads Transportation District Commission	prior to 2005	1,007	\$60 Million
Pension Plan for General Employees of the Town of North Haven	prior to 1995	367	\$56 Million
Town of Portsmouth, Rhode Island	2014	317	\$53 Million
City of Birmingham Firemen's and Policemen's Supplemental Pension System	prior to 1990	1,827	\$44 Million
City of Bridgeport Plan B (Fire)	prior to 2000	77	\$37 Million
Town of North Haven Police Department Pension Plan	prior to 1995	92	\$25 Million
Town of Johnston, Rhode Island Firefighters Pension System	2001	113	\$23 Million
Retirement Plan for the Full-Time Employees of the Town of Ledyard	prior to 1990	209	\$22 Million
Town of Johnston, Rhode Island Police Pension System	2001	153	\$18 Million

Client	Initial Contract Year	Total Membership	Asset Size
City of Birmingham Retirement and Relief System Health Department Employees	prior to 1990	46	\$15 Million
Town of North Haven Fire Department Pension Plan	prior to 1995	57	\$15 Million
Retirement Plan for Employees of West Haven (CT) First Fire District	2015	100	\$13 Million
Retirement Plan for Policemen of the Town of Wolcott	prior to 1995	43	\$12 Million
Town of Middlebury Retirement Plan	prior to 2005	95	\$11 Million
Town of Westbrook Retirement Plan	prior to 1995	162	\$9 Million
Retirement Plan for Employees of the Town of Wolcott	prior to 1995	115	\$8 Million
Legislators' Retirement System of the State of Nevada	1976	158	\$4.6 Million
Massachusetts State College Building Authority	2004	21	\$4.3 Million
City of Birmingham Unclassified Employees' Pension & Relief System	prior to 1990	13	\$0.8 Million
City of Bridgeport's Janitors' and Engineers' Retirement Fund	prior to 2005	30	\$0.0 Million

3. Qualification Three: The bidder's lead consultant on the account must have a minimum of ten (10) years of experience in providing actuarial consulting service to public pension funds. This experience shall include general consulting, experience analysis, and valuation assignments for such funds. This person shall also have experience in testifying before legislative and administrative bodies in support of actuarial positions and the principles used in valuing a public retirement system or pricing legislation, and an ability to discuss in laymen's terms the following: actuarial theory; basis for assumptions; and other actuarial matters. The lead consultant must be a member of the American Academy of Actuaries. Please submit a written description of how this qualification is satisfied, including, at a minimum, a list of the lead consultant's experience in providing actuarial consulting services to public pension funds for at least ten (10) years, and showing past experience at testifying before legislative and administrative bodies.

Bidder Response: Kim Nicholl, FSA, FCA, MAAA, EA, Senior Vice President and Consulting Actuary will serve as Lead Consultant and Principal Actuary. Kim joined Segal in 2010 and has over 30 years of experience. Kim's vast experience includes general consulting, experience analysis, and valuation assignments for Public Sector clients. Kim also has extensive experience in testifying before legislative and administrative bodies in support of actuarial positions and the principles. She has testified before state legislative bodies in Ohio, Illinois, Kentucky, North Dakota, Maryland, Michigan, Missouri, Texas and Wisconsin. She is highly respected for her ability to discuss actuarial matters including actuarial theory and assumptions in laymen's terms.

Kim graduated magna cum laude from Loyola University with a Bachelor of Science degree in Mathematics. Kim is a Fellow of the Society of Actuaries, a Fellow of the Conference of Consulting Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary under ERISA. Kim's clients have included municipal and state retirement systems in Illinois, Indiana, Maryland, Missouri, North Dakota, Ohio, Pennsylvania, Texas and Wisconsin.

She is 100% committed to providing actuarial services to public sector clients, and her long career in this area provides her with an keen understanding of the issues specific to public sector retirement systems.

Matthew A. Strom, FSA, MAAA, EA, *Vice President and Actuary*, will serve as Co-Lead Consultant and Actuary. Matt has over 15 years of experience consulting to sponsors of pension plans. His responsibilities include reviewing actuarial valuations, preparing actuarial cost studies, and managing other special projects. His expertise includes deterministic cost and funding level projections, experience studies, and asset/liability modeling. He is highly respected for his ability to discuss actuarial matters.

4. Qualification Four: Professional staff assigned to the account shall have a minimum of five (5) years of experience in the field of actuarial science and will include persons with appropriate professional credentials such as Fellow or Associate of Society of Actuaries, and/or Fellow of the Conference of Actuaries in Public Practice, and/or Member of the American Academy of Actuaries, and/or meet standards of a qualified actuary under the provisions of the Employee Retirement Income Security Act of 1974. Please submit a written description of how this qualification is satisfied, including, at a minimum, a list of the professional staffs' experience in providing actuarial consulting services to public pension funds for at least five (5) years, and showing the professional staffs' credentials.

Bidder Response: We have assembled a highly qualified team to work with NPERS. Our team comprises experienced consulting actuaries and other defined benefit plan professionals. The members have significant experience with public sector clients who have similar needs and a track record of providing innovative, efficient solutions in a timely and cost-effective manner. The team includes our best technical experts, while maintaining clear account management through a seasoned professional who is directly involved in the day-to-day consulting, actuarial, and administrative work.

The team will be led by Kim Nicholl, FSA, MAAA, FCA, EA who will serve as the Client Relationship Manager and Principal Actuary, she will work closely with Matt Strom, FSA, MAAA, EA who will serve as the Supporting Actuary.

It is Segal's policy to reassign primary consultants only with the client's consent. In the event either Kim or Matt made the decision to leave, Segal would meet with NPERS to discuss the personnel assigned as a replacement. The NPERS would have the authority to reject the proposed replacement and Segal would identify another candidate to be vetted by PERS. Segal agrees to keep NPERS abreast of any other personnel changes of those professionals assigned to work on NPERS account. In addition, we will make other top Segal public sector actuaries available as resources to the team wherever their special skill sets may be required.

Proposed Segal Team to Service NPERS

Team Member

Role

Client Relationship Management and Lead Actuaries

Kim Nicholl, FSA, MAAA, FCA, EA

Senior Vice President, Consulting Actuary 312.984.8527

knicholl@segalco.com

Matthew A. Strom, FSA, MAAA, EA

Vice President and Actuary 312.984.8534 mstrom@segalco.com

Actuarial Support Team

Geoff Bridges, FSA, FCA, MAAA, EA

Actuary 312.984.8622 gbridges@segalco.com

Jacob Libauskas, FSA, MAAA, EA

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Tatsiana Dybal, FSA, MAAA, EA

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Jakob Nolan

Actuarial Associate 312-984-8629

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Caroline Levitt

Actuarial Associate 312-984-8592

CLevitt@segalco.com

Compliance

Melanie Walker, JD

Senior Vice President, National Compliance Practice 303.714.9942

mwalker@segalco.com

Kim will serve as the client relationship manager and Principal Actuary for NPERS. She has over 30 years of experience supporting the design and financing of retirement and other employee benefit programs for the public sector. She will review all correspondence and reports, present results to the Board, and manage the relationship. Kim will

work closely with Matt to ensure that NPERS needs are met.

Matt Strom will serve as Supporting Actuary for NPERS. His responsibilities will include reviewing the actuarial valuations, preparing actuarial cost studies, and managing other special projects, as needed. Matt's expertise includes deterministic cost and funding level projections, plan design analyses, experience studies, asset/liability modeling, and actuarial audits. He will work closely with Kim to ensure that NPRS needs are met.

Geoff will be responsible for reviewing the actuarial valuations and projections, and assisting with actuarial cost studies and experience studies. Geoff's expertise includes deterministic cost and funding level projections, plan design analyses, experience studies, and actuarial audits. Geoff works closely with Kim and Matt.

Jake will perform valuations and projections, prepare reports, assist with plan design, and experience studies.

Tanya will prepare annual actuarial valuations and projections, and assisting with actuarial cost studies and experience studies.

Jakob will do the initial programing and calculation work. He will perform data reconciliation under the guidance of Geoff, Jacob and Tanya.

Caroline will do the initial programing and calculation work. She will perform data reconciliation under the guidance of Geoff, Jacob and Tanya.

Melanie will support the team on any compliance issues. Her primary area of expertise is with public sector retirement plans and she serves as a national resource for Segal in this area.

Technical Approach

5. Describe bidder's understanding of the Scope of Work for this RFP.

Bidder response: It is our understanding that the objective of this RFP is to secure a qualified bidder to provide a range of actuarial services for NPERS at a competitive and reasonable cost.

If selected, Segal will perform the following services as outlined in the Scope of Work section of this RFP:

- Consulting Services
- Valuation Services
- Governmental Accounting Standards Board (GASB) Services
- Projection Services
- Actuarial Experience Study
- Benefit Adequacy Study
- Supplemental Services

We understand that some services will need to be performed annually; while others may be on an ad-hoc basis.

6. Describe bidder's approach for providing Actuarial Consulting Services for public pension funds.

Bidder response: When providing actuarial consulting services for public pension fund, we typically prepare a project work plan to discuss with the client and to establish a mutual agreement on the tasks and costs prior to starting the project.

Segal's overall approach is highlighted by our commitment to our clients. By forming a partnership with our clients, we serve as both advisors and advocates. Technical competence is important, but we also strongly believe that our role as consultant is to add value to our clients and their employees.

Segal understands that a smooth transition from the current actuarial consultant is crucial. The key tasks in the transition process are as follows:

- Testing the Initial Year's Valuations for Accuracy and Precision Our approach to transitioning the actuarial work from your current actuary to Segal begins with our actuaries programming your pension and OPEB valuations into our valuation system and thoroughly testing and reviewing the results. The senior actuarial analysts and valuation manager will thoroughly review every aspect of the program. We will collect detailed liability calculations for a representative sample of the member population to confirm our existing programming is accurate. In addition, the team will review the relevant statues to ensure consistency with the benefits being valued in the actuarial valuations.
- Reconciling Differences in Calculations and Methodologies Once we are comfortable that our liability calculations are accurate, we will compare our results to those of the current actuary. Often, this comparison will reveal that Segal and the current actuary agree on the calculations and methods. If the comparison of Segal's valuation results with those of the current actuary identifies differences, we will communicate with the current actuary to reconcile them. This process usually requires a combination of phone conversations and written exchanges, often via e-mail .requires a combination of phone conversations and written exchanges, often via e-mail.

We have special expertise in advising retirement systems regarding the rapidly changing structure of public sector retirement. Virtually every state and hundreds of local governments have revamped their retirement plans since 2010. In addition, federal legislation and/or regulations, ranging from the

Security and Exchange Commission's actions related to pension liability disclosure in bond documents, to proposed legislation requiring reporting specific information to the U. S. Treasury, suggest an active interest by federal government agencies in state and local government retirement systems. We will provide our legislative and regulatory updates and governmental publications to the Board and staff, and any other interested personnel, and we will keep the Board and staff aware of developments as they occur and their potential impact. We will provide educational discussions on a variety of topics. Segal produces a wide array of public sector plan-specific publications to ensure our clients are informed and prepared. In addition, we keep our clients informed of changes through client notices and webinars.

We also will advise the Board and staff regarding pension accounting standards proposed or issued by the Governmental Accounting Standards Board.

Segal will testify before legislative committees as requested, discuss proposed legislation with the NPERS staff and the board, and will attend meetings and hearings as requested.

Public Testimony Experience – Segal works effectively in both open and closed session with legislative bodies, administrative staff, benefit plan vendors and other stakeholders. Our consultants and actuaries have direct experience in giving testimony to public boards, commissions and other governing bodies.

Ms. Nicholl has testified before state legislative bodies in Ohio, Illinois, Kentucky, North Dakota, Maryland, Michigan, Missouri, Texas and Wisconsin. She currently serves on the American Academy of Actuaries Public Pensions Subcommittee.

Some examples include:

- North Dakota Legislative Employee Benefits Program Committee, testimony on plan design proposals;
- City of Phoenix City Counsel, testimony on plan design proposals;
- City of Detroit bankruptcy court, testimony on pension plan changes and effect on retirees;
- · City of St. Louis, testimony on pension changes to Firefighters' Pension Plan; and
- City of Stockton, bankruptcy court, testimony on the CalPERS pension plan and the Stockton required contribution.

Mr. Strom has testified before administrative bodies in Milwaukee (City and County Budget Committee), Chicago (Workforce Development and Audit Committee), Phoenix (Pension Reform Task Force; City Council) and Kansas City, Missouri (Blue Ribbon Pension Task Force). Segal recognizes that "actuarial soundness" is neither an absolute nor a unique concept. Segal focuses on accuracy, consistency, reasonableness, and appropriateness in the context of actuarial soundness and in light of the governing plan rules and regulations.

7. Describe bidder's approach for providing Actuarial Valuation Services for defined benefit and cash balance public pension funds. Give examples.

Bidder response:

Valuation Process and Schedule

In performing actuarial valuations, we have an established routine that defines the sequence, methodology, and quality control on the project. The majority of the work is performed by experienced actuarial analysts and is reviewed by the supervising and principal actuaries. The following work plan describes that routine at a general level and indicates how we would work to complete the actuarial valuations for NPERS:

- 1. **Do the initial preparation**. Set up files, including plan documents for all plans, previous valuations, and any other relevant materials. Prepare a summary of the benefit plans and the current assumptions. Speak with NPERS staff to ensure that Segal has full understanding of the operation of each plan of benefits.
- 2. **Prepare data requests.** Identify all required information for the calculations. This will include complete census information on active, terminated and retired participants, as well as a complete statement of plan assets and a financial reconciliation to the prior valuation date.
- 3. **Review of initial preparation and data request**. Have the initial preparation and data request reviewed by the Reviewer.
- 4. **Send the data request.** Work with the NPERS staff members, as necessary, to simplify data preparation and assure its completeness and accuracy. The preferred method is to upload participant data electronically to Segal's secure file transfer protocol (FTP) website. Financial data should be provided in the form of financial statements completed by the NPERS or its independent auditor.
- 5. **Review the data when received**, to be sure it conforms to the data request. Run the participant data through standard "edit and distribution" programs to verify completeness and reasonableness. Discuss any problems with NPERS and/or municipalities' staff.
- 6. **Develop and/or revise and test all computer programs**. We will make programming adjustments as necessary to take into account changes in benefits, contributions, and actuarial assumptions. We go through extensive testing of valuation applications before, during, and after processing the actual valuations to ensure that the programs perform as expected.
- 7. **Review assumptions against experience**. The project team will assess developing trends and analyze actuarial gains and losses since the prior valuation. We will discuss with NPERS staff, if necessary, to verify unusual results.
- 8. **Complete the actuarial calculations**. Run final versions of computer valuation programs. Prepare work sheets and tables. Submit all calculations to reviewer for verification of mathematical accuracy.
- 9. **Review the actuarial valuations**. This review is conducted by the Reviewer, and encompasses the entire process including participant and financial data preparation, calculations, and programs. The Reviewer assumes responsibility for the completeness and correctness of the actuarial results.
- 10. Draft the reports and presentation to be presented to NPERS.
- 11. Final review. The Peer Review Actuary and Lead Actuaries will conduct this review.
- 12. **Distribute draft documents and finalize**. Share drafts of the valuation reports and presentation with NPERS staff and incorporate suggested improvements into final documents.
- 13. **Meet with NPERS** to discuss the reports, the findings, the reasons for changes, and any other relevant matters.
- 14. Follow up with the NPERS on any action arising from the reports.

We have found that these procedures ensure a quality actuarial product and communicate the results in a clear manner. Non-routine projects follow similar quality control steps.

The team assigned to NPERS performs annual valuations for a number of state retirement systems, including Illinois Teachers' Retirement System, Colorado Public Employees' Retirement Association, North Dakota Teachers' Fund for Retirement.

8. Describe bidder's approach for providing GASB Services for single and multiple employer public pension funds. Give examples.

Bidder response:

The services that Segal provides for single and multiple employer plans to comply with GASB Statement 67 and 68 Services include:

- Calculation of the discount rate Segal has developed a spreadsheet that we use to determine the single equivalent interest rate.
- ▶ Determination of net pension liability (NPL/NOL) Segal will determine the NPL/NOL. The NPL/NOL is equal to the total pension liability (TPL/TOL) minus plan assets at market value. The TPL/TOL is the actuarial accrued liability, based upon the entry age normal actuarial cost method and the GASB discount rate. GASB requires that the entry age normal cost method be used to determine each plan member's service costs as a level percentage of that member's projected pay.
- Determination of NPL/NOL and change in net pension liability The pension expense is the change in NPL/NOL, with deferred recognition of certain elements. The components of the new pension expense include:
 - Service cost (i.e., normal cost);
 - Interest on the TPL/TOL as of the beginning of the year;
 - Changes in TPL/TOL over the year (with certain deferrals);
 - Differences between actual and projected earnings over the year (with certain deferrals);
 - Projected investment returns over the year;
 - Employee contributions; and
 - Other changes in plan net position (i.e., market value of assets).
- Financial statements, note disclosures, and required supplementary information Segal can work with NPERS to prepare the financial statements, note disclosures, and required supplementary information. Highlights of the required disclosures include:
 - Description of the plan;
 - Description of significant assumptions, as well as the dates of experience studies on which the significant assumptions are based;
 - Investment policies;
 - Policy for determining contributions;
 - Components of the NPL/NOL;
 - Significant assumptions;
 - Sensitivity analysis of the impact on NPL/NOL of a one percentage point increase and decrease in the discount rate and health care trend rates;
 - Changes in the NPL/NOL for the past 10 years;
 - NPL/NOL for the past 10 years;
 - Schedule of actuarially determined contributions for the past 10 years;
 - Development of long-term earnings assumption; and
 - Money weighted rates of investment return for past 10 years (plans only).

9. Describe bidder's approach for providing Projection Services for public pension funds. Give examples.

Bidder Response:

Projection Services

Segal performs projection studies for many different purposes, including the following:

- To estimate the cost of a retirement system for a future fiscal year or years, expressed as dollar amounts, percentage of payroll, or funding period;
- > To determine the funding period and shortfall/excess based on fixed contribution rates;
- > To illustrate the impact of emerging experience differing from the actuarial assumptions;
- To show the effect of changes in funding policy;
- To project future cash flows;
- > To illustrate the effect of various anticipated demographic and numerical changes in the future population of the systems; and/or
- To forecast the impact of potential legislative changes on different investment strategies.

Each projection study completed will reflect an appropriate degree of sophistication. For example, if we believe that a relatively unsophisticated model will produce results as reliable as a more comprehensive procedure, we will use the former methodology as agreed upon by NPERS. As business people, we emphasize both reliability in results and practicality in required timing and available assumptions in order to choose the appropriate methodology to employ in projection studies.

Segal's capabilities include our proprietary Forecast dynamic real-time modeling tool that accommodates deterministic projections to increase understanding and facilitate decision-making by allowing plan sponsors to view and assess emerging retirement plan finances. Segal's Asset Liability Modeling (ALM) tool is used for stochastic asset/liability modeling studies to make sound decisions regarding plan assets and liabilities while measuring actuarial funding risks.

We also provide a client version of our modeling called Segal Pulse®. Pulse is Segal's web-based version of our popular modeling tool that dynamically generates financial and actuarial deterministic projections. Pulse fosters discussions related to the current and future economic environment as well as demographic trends.

Our modeling functionalities include:

- Changes in future investment return
- Active population growth/decline
- Different amortization methods and periods
- Alternative plan designs
- Changes to the investment return and salary increase assumptions

Sample Projection Modeling: Segal Pulse



10. Describe bidder's approach for providing Actuarial Experience Studies for public pension funds. Give examples.

Bidder Response: Segal performs experience studies to develop actuarial assumptions. Tabulations are compiled that show the distribution by age of the number of members during the four-year period "exposed" to the events of termination from employment, retirement, death, and disability. A member is considered exposed to an event if he meets the age and service requirements for that event. The assumed rates of occurrence for each event, used in the most recent annual actuarial valuations, are then applied to the number of members exposed to determine the number of members expected to separate from service or die for each category. If the actuarial assumptions were changed during the interim period, only the most recently adopted assumptions are used. The analysis can be done by individual or weighted by benefit amounts.

The actual number of members who separated due to each event is then compared to the expected number. The results are then expressed as a ratio of actual experience over expected experience. In some instances, a high ratio is favorable for the financial experience of the system, and in other cases a high ratio is unfavorable. Data is generally grouped by age in five-year increments to provide statistically significant results.

The results of the experience study are the basis for the actuary's recommendation of assumption changes. However, the actuary must also take into account factors that impact member behavior, such as benefit changes within the retirement system or special early retirement incentives. In addition, retiree health care benefits or general economic conditions might influence the age a member will retire. Any special events that occurred during the experience period that are not likely to recur must be removed from the analysis. In addition, the actuary must consider future expectations of experience due to future plan changes or changes in the economy.

To summarize, the actuary's recommendation of assumptions is based on the following:

- Comparison of actual to expected experience;
- > Adjustment for special plan benefits, circumstances, and economic conditions; and

- Adjustment for future plan changes and economic conditions.
- Generally, actuarial assumptions are selected with a slight margin for adverse experience so that the financial strength of the system can be maintained.

Traditionally, salary increases have been separated into inflation, productivity, and merit/seniority components. Each component is analyzed separately with only the merit/seniority component being a function of the system demographics. Frequently, we may discover that actual inflation has been lower than the actuary assumed, and that may be masking an understatement of the merit/seniority component. By separating those components and studying each separately, we are able to refine each component and produce more accurate and consistent figures.

Review of Demographic Assumptions

The assumptions included in the demographic experience investigation are:

- Death in active service
- Mortality after service retirement
- Mortality after disability retirement
- Retirement
- Disability retirement
- Termination
- Leave conversions
- Investment return

- Individual salary increases
- Payroll growth
- Wage growth
- Inflation
- Percentage of members married at retirement
- Administrative expenses
- > Optional forms of payment

Review Rate of Inflation

With respect to COLA assumptions, we would look to the market's expectations of inflation as reflected in the fixed income yields. In addition, we would look to forecasts made by economists and investment consulting and investment management firms.

Review of Rate of Investment Return

Actuarial Standard of Practice No. 27 (ASOP 27), entitled "Selection of Economic Assumptions for Measuring Pension Obligations," addresses acceptable methodologies for setting the investment return assumption. This assumption is typically constructed by considering various factors including, but not limited to, the time value of money; inflation and inflation risk; illiquidity; credit risk; macroeconomic conditions; and growth in earnings, dividends, and rents. In developing a reasonable assumption for these factors and in combining the factors to develop the investment return assumption, the actuary may consider a broad range of data and other inputs, including the judgment of investment professionals.

Sources of Investment Data

ASOP 27 encourages the actuary to review appropriate investment data, including:

- Current yields to maturity of fixed income securities, such as government securities and corporate bonds
- Forecasts of inflation, GDP growth, and total returns for each asset class
- Historical investment data, including real risk-free returns, the inflation component of the return, and the real return or risk premium for each asset class

- Historical plan performance
- Historical data showing standard deviations, correlations, and other statistical measures related to historical returns of each asset class and to inflation

Other Factors to be Considered

ASOP 27 also advises the actuary to take into account the following factors:

- Investment policy;
- > Reinvestment risk;
- Investment volatility;
- Investment manager performance;
- Investment expenses;
- Cash flow timing;
- Benefit volatility; and
- > Other issues unique to the plan

Steps

We first review historic returns on actuarial and market values of assets. Historical returns should not be used as the sole basis for selecting the interest rate for calculating costs in future years since the interest rate is an assumption that is used to fund the present value of benefits payable many years into the future.

Next, we estimate future returns using a Capital Asset Pricing Model (CAPM) that takes into consideration all of the elements recommended by ASOP 27.

In developing our recommendation, we take into account the system's current target asset allocation, for example:

Asset Class	Target Allocation	
Fixed Income	32% - 35%	
US Equity	50%	
Private Equity	0% - 3%	
International Equity	15%	
Total	100%	

We recommend changes to the interest rate if our analysis shows that it should be changed. Before recommending a change to assumptions, we will assure ourselves that the observed assumption deviations during the experience period are not just short-term or transitory in nature. This will be done by discussing observations with staff and reviewing the results of earlier experience studies.

We will also review the asset smoothing method and any other actuarial methods or practices. Particular attention will be paid to maintaining a reasonable relationship between the market value and actuarial value, as well as assuring that the interest crediting and actuarial processes are consistent.

Our experience analysis report will include an analysis of the cost impact of any recommended assumption changes, showing the individual cost effect of each major assumption change.

11. Describe bidder's approach for providing Benefit Adequacy Studies for public pension funds.

Bidder Response: Segal will perform a review and analysis of the benefit, funding and investment adequacy for the five major retirement systems. We will prepare straw person examples showing the value of the retirement benefits, income replacement ratios, and competitiveness by comparison to other retirement systems.

We will compare benefits provided by NPERS to those of other retirement systems and national data. The study will also include benefit policy recommendations that address benefit adequacy, competitiveness, and cost

Segal has developed an innovative, customizable Plan Management Policy framework that allows board members, plan sponsors and other stakeholders to assess the financial health of its pension plans. The Plan Management Policy results in a dashboard of information, including stochastic and deterministic projections on key metrics, a scoring system, and a resulting "green, yellow, red" assessment of the system. The Policy allows the board, plan sponsor, and other stakeholders insights into the future viability of the PERA and the ability to proactively make decisions to address potential issues.

12. Describe bidder's approach for providing Supplemental Services for public pension funds.

Bidder Response: If Segal's assistance involves services that are beyond those covered in our agreement contract, we would meet with NPERS to discuss and obtain NPERS approval before rendering such services, Generally, our fees for supplemental services will be based on our regular time charge rates. Additional expenses, which may be incurred for special project work, will be included in the fee estimate. Services provided by outside vendors (for example, design services for communication pieces) will, to the extent practicable, be billed directly to NPERS by the vendor. We do understand that it may be difficult at times to predict in advance services that may be needed.

13. Describe bidder's experience at providing Legislative Expertise for public pension funds.

Bidder Response:

Proposed legislative benefit changes:		
(a) Review of proposal (if possible, a copy of the actual bill draft is preferred)	Upon receipt	For most typical benefit change proposals, we are able to provide a review within five working days of the request. During the legislative session, we will provide the initial review within one day.
(b) Preliminary review and assessment of time requirement to complete	Upon receipt	For more complicated benefit modification proposals, a timeframe of providing our responses within 10 working days may be warranted.
(c) Delivery of actuarial and cost analysis	As requested by NPERS – generally within 1-10 working days	We will prepare actuarial and cost analyses as requested.

Improvements in financing and benefits structure	Ongoing	Segal Consulting actively participates in a variety of national public sector retirement organizations, including NASRA, NCTR, NAGDCA, NCPERS, and the pension related activities of the GFOA, GASB and the NCSL. We also engage in independent research activities through which we monitor new and creative efforts of state retirement systems to enhance their funding and benefit structures. We will inform NPERSD of new developments and their applications and potential impact on a proactive basis through a combination of direct communications and our governmental benefits bulletins.
Drafting legislation and related services	As requested	We will assist NPERS staff in drafting proposed changes to existing retirement laws.
New developments and federal legislation	Ongoing	Segal Consulting closely monitors federal legislative and regulatory activity impacting the design, funding and operations of public sector retirement plans. Through a combination of activities of our National Market Leader, Legal Research Division and public sector pension consultants and actuaries, we will be able to provide to NPERS a current outlook on these federal activities and issues.
		We actively participate in the National Association of Public Pension Attorneys and maintain independent contacts with legal Counsel for NCTR and with legislative staff members of the NASRA and GFOA.

Segal has placed a long-standing emphasis on the importance of research and development that keeps our clients informed on all aspects of Public Sector employee benefits programs. We have extensive experience in preparing comprehensive studies and reports on benefits-related topics involving pension legislative and regulatory issues for many of our clients.

Segal will help NPERS identify and monitor pertinent federal, legal and regulatory developments through daily review of specialized trade publications and research critical state and local regulatory matters as necessary. We monitor the release of relevant government materials and have prompt access to all official documents, such as proposed and final regulations, Revenue Rulings, and bills introduced or acted on in Congress.

Segal produces a wide array of public sector plan-specific publications to ensure our clients are informed and prepared, including:

- Update, a newsletter which summarizes important developments affecting plan compliance.
- Data, surveys and studies of interest to sponsors of public sector plans.
- Hot Topics, timely alerts published on our website and distributed via email.
- Public Sector Letter, periodic publications that discuss creative benefit planning options for employers and plan sponsors.

Segal offers a publication dedicated to public sector health plan issues and news:

> TRENDS, a quarterly publication that captures noteworthy developments of interest to sponsors of public sector health plans.

Segal offers a publication dedicated to public sector pension plan issues and news:

- > DC Digest, a quarterly compendium of trends, developments and insights of interest to defined contribution (DC) plan sponsors.
- > Segal also offers the *Fiduciary Shield*, which addresses insurance issues for plans.

Segal's experts frequently discuss our publications and studies in complimentary webinars.

Team Biographies

Kim Nicholl, FSA, MAAA, FCA, EA Senior Vice President, Consulting Actuary, National Public Sector Retirement Practice Leader, Chicago

Expertise

Ms. Nicholl is a Senior Vice President and Consulting Actuary in Segal's Chicago office and is the firm's National Public Sector Retirement Practice Leader. She has over 25 years of experience supporting the design and financing of retirement and other employee benefit programs for the public sector. For NPERS Ms. Nicholl will serve as the Client Relationship Manager and Principal Actuary.

Ms. Nicholl has consulted on the design and interpretation of plan provisions for defined benefit and defined contribution retirement plans, and on their relationship to ERISA, IRS regulations and new legislation. Her experience includes all aspects of employee benefit programs.

Ms. Nicholl's specialized expertise includes:

- > Supervising, reviewing, and certifying actuarial valuations and studies for defined benefit retirement plans and postretirement health care plans.
- Analyzing benefits provided from defined benefit, defined contribution and postretirement health care plans for purposes of restating retirement income policies, with recommendations based on client goals.
- Performing plan design analyses for public pension and postretirement health care plans.
- Performing experience analysis studies resulting in changes to actuarial assumptions used in the actuarial valuations of defined benefit retirement plans.
- Performing asset/liability modeling studies for large retirement plans.

Ms. Nicholl's clients have included: Teachers Retirement System of the State of Illinois, Metropolitan Water Reclamation District of Greater Chicago, Missouri Public School and Public Education Employee Retirement Systems, North Dakota Teachers' Fund for Retirement, Ohio Police and Fire Pension Fund, State Teachers Retirement System of Ohio, Commonwealth of Pennsylvania, Pennsylvania School Employees' Retirement System, Texas Employees Retirement System, and Virginia Joint Legislative Audit and Review Commission.

Current Client References

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Professional Background

Prior to joining Segal in 2010, Ms. Nicholl served as National Leader of Public Sector Retirement Consulting at another consulting firm. Ms. Nicholl was at PricewaterhouseCoopers from 2007-2010; Buck Consultants (now Conduent HR Services) from 1993-2007 and The Wyatt Company prior to 1993. Ms. Nicholl is responsible for five accounts.

Education/Professional Designations

Ms. Nicholl graduated magna cum laude from Loyola University with a BS degree in Mathematics. She is a Fellow of the Society of Actuaries, a Fellow of the Conference of Consulting Actuaries, a Member of the American Academy of Actuaries and an Enrolled Actuary under ERISA.

Publications/Speeches

Ms. Nicholl speaks and presents frequently at professional organizations, including the National Council on Teacher Retirement, the National Association of State Retirement Administrators the National Conference on Public Employee Retirement Systems, the International Foundation of Employee Benefits and the Conference of Consulting Actuaries. Additionally, she has provided educational sessions for the Boards and Staff of public pension retirement systems. Ms. Nicholl has testified before state legislative bodies in Illinois, Wisconsin, Maryland, Ohio and Texas. She currently serves on the American Academy of Actuaries Public Pensions Subcommittee.

Recent presentations and publications include:

"Analytics of Managing Risk in Your Defined Benefit Plan," Kim Nicholl and Matt Strom, Segal webinar, June 2015

"Public-Sector Pension Plans: Major Challenges & Common-Sense Solutions," Kim Nicholl, Government Finance Review, April 2013

"GASB Approves New Accounting Standards for Public Sector Pension Plans and Sponsoring Employers," Kim Nicholl and Paul Angelo, *Pension Section News*, November 2012

"Hybrids in the Public Sector," IFEBP 58th Annual Employee Benefits Conference, November 2012

"GASB's Proposed Changes to Pension Accounting Standards for Public Sector Employers," Paul Angelo, Rocky Joyner and Kim Nicholl, *Benefit Magazine* (IFEPB), June 2012

"Planning a Successful Pension Funding Policy," Kim M. Nicholl, Paul Angelo, and Cathie G. Eitelberg, Segal *Public Sector Letter*, November 2011

"Public Pension Plans," SOA 2011 Annual Meeting & Exhibit, October 2011

"Actual Cost vs. Market Price: Does Market Valuation of Pension Liabilities Fit the Public Sector?," Paul Angelo, Kim M. Nicholl and Cathie G. Eitelberg, Segal *Public Sector Letter*, June 2011

"Pension Plan Design and Costs," Pew Center on the States Public Pension Conference, June 2011

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Matthew A. Strom, FSA, MAAA, EA Vice President and Actuary, Chicago

Expertise

Mr. Strom is a Vice President and Actuary in Segal's Chicago office with over 15 years of experience consulting to sponsors of defined benefit pension plans. His responsibilities include reviewing actuarial valuations, preparing actuarial cost studies, and managing other special projects for multiemployer, corporate, and public sector retirement plans. Mr. Strom's expertise includes deterministic cost and funding level projections, plan design analyses, experience studies, asset/liability modeling, and actuarial audits.

Current Client References

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Professional Background

Prior to joining Segal, Mr. Strom was a Senior Consultant at another large benefits consulting firm. In this position, he managed and analyzed defined benefit and post-retirement welfare benefit valuations and assisted clients with various administrative and plan design issues. His clients range in size from several hundred to over 450,000 participants.

Education/Professional Designations

Mr. Strom received a BS with high distinction in Actuarial Science from the University of Illinois at Urbana-Champaign. He is a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary.

Publications/Speeches

"The Analytics of Managing Risk in Your Defined Benefit Plan," Segal Consulting Spring 2015 Public Sector Webinar Series, June 2015

"Understanding Pension Obligation Bonds," Benefits and Compensation Digest (IFEBP), July 2007

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Geoff Bridges, FSA, MAAA, FCA, EA Actuary, Chicago

Expertise

Mr. Bridges is an Actuary in Segal's Chicago office with over 20 years of experience consulting to sponsors of defined benefit pension plans. His responsibilities include reviewing actuarial valuations and projections, and assisting with actuarial cost studies and experience studies. Mr. Bridges' expertise includes deterministic cost and funding level projections, plan design analyses, experience studies, and actuarial audits. Mr. Bridges works on two public sector accounts as well as three multiemployer accounts.

Current Client References

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Milwaukee Transport Services

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Professional Background

Prior to joining Segal in 2017, Mr. Bridges worked for an independent consulting firm from 1994 to 2011. He was a Senior Consultant at an insurance company with a defined benefit consulting practice from 2011 to 2016. In these positions, he managed and analyzed defined benefit and post-retirement welfare benefit valuations and assisted clients with various funding, accounting, administrative and plan design issues.

Education/Professional Designations

Mr. Bridges received a BA in Mathematics from Reed College and a MS in Applied Mathematics from the University of Washington. He is a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries, and an Enrolled Actuary.

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Jacob Libauskas, FSA, MAAA, EA Actuary, Retirement, Chicago

Expertise

Mr. Libauskas is an Actuary in the Retirement Practice in Segal's Chicago office. He is responsible for performing valuations and projections, preparing reports, assisting with plan design, and experience studies. He specializes in corporate and public sector plans.

Professional Background

Prior to joining Segal, Mr. Libauskas worked at another consulting firm in their Retirement Service Center where he prepared corporate and public valuations and reports.

Education/Professional Designations

Mr. Libauskas earned a BS in Actuarial Science and Statistics from Purdue University. He is also a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries and an Enrolled Actuary. Mr. Libauskas has received the firm's prestigious Quality Star Award.

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Tatsiana Dybal, FSA, MAAA, EA Actuary, Chicago

Expertise

Ms. Dybal is an Actuary in Segal's Chicago office with over eight years of experience in actuarial consulting. She is responsible for preparing annual valuations and projections and assisting with plan design and experience studies. She specializes in corporate and public sector plans.

Professional Background

Ms. Dybal joined Segal in 2007 as an Actuarial Analyst in the firm's Retirement Practice. She was promoted to Senior Actuarial Analyst in 2009 and then to Assistant Actuary. Prior to joining Segal, Ms. Dybal worked in the marketing department of a technology firm for seven years, and managed the supply chain of a foreign diamond exchange.

Education/Professional Designations

Ms. Dybal received an MS in Physics and Mathematics from State University (Minsk, Belarus) and an MS with high distinction in Actuarial Science from DePaul University. She is a Fellow of the Society of Actuaries, a Member of the American Academy of Actuaries and an Enrolled Actuary.

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Jakob M. Nolan Actuarial Associate, Chicago

Expertise

Mr. Nolan is an Actuarial Associate in Segal's Chicago office with one year of experience. He prepares valuation reports for corporate and multiemployer clients, among other projects.

Professional Background

Prior to Segal, Mr. Nolan served as a Pension Actuarial Intern at Aon Hewitt.

Education/Professional Designations

Mr. Nolan holds a BS in Mathematics from the University of Illinois at Chicago. He has one exam left to pass before earning his Associate designation with the Society of Actuaries (ASA).

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Caroline A. Levitt Actuarial Associate, Chicago

Expertise

Ms. Levitt is an Actuarial Associate in Segal's Chicago office with one year of experience. She prepares valuation reports for public and multiemployer clients, among other projects.

Education/Professional Designations

Ms. Levitt graduated with a BS in Actuarial Mathematics and a minor in Statistics from the University of Michigan. She has one exam left to pass before earning her Associate designation with the Society of Actuaries (ASA).

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Melanie Walker, JD Senior Vice President, National Compliance Practice, Denver

Expertise

Ms. Walker is a Senior Vice President in Segal's National Compliance Practice based in the firm's Denver office. She provides ongoing and special project compliance services for employee benefit plans to clients in Segal's three market divisions (public sector, private sector and multiemployer). Her primary area of expertise is with public sector retirement plans and she serves as a national resource for Segal in this area.

Professional Background

Prior to joining Segal, Ms. Walker worked in employment law at a firm in Denver.

Education/Professional Designations

Ms. Walker received a BA in Political Science and International Affairs with an area of concentration in the Former Soviet Union at the University of Colorado at Boulder and a JD from the University of Colorado School of Law. She is a licensed attorney in the State of Colorado.

Ms. Walker is an active member of the National Association of Public Pension Attorneys (NAPPA). She is also a member of the National Association of Government Defined Contribution Administrators (NAGDCA) where she serves as part of their 403b Task Force for 2015.

Publications/Speeches

Ms. Walker frequently authors Segal publications for distribution to Segal's public sector retirement plan clients and has written articles for the NAPPA and NAGDCA newsletters. She is also a speaker on public sector retirement and benefits issues, including speaking for the International Foundation of Employee Benefit Plans and for the American Society of Pension Actuaries.

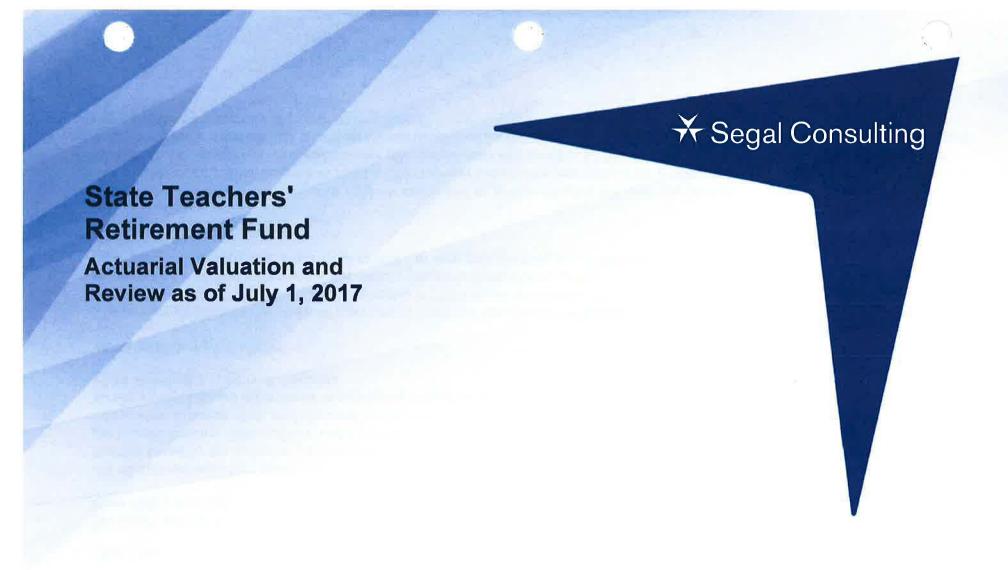
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Cost Proposal

As requested, we are providing the Cost Proposal under a separate cover. We understand that the summary shall present the total fixed price to perform all of the requirements of the RFP.

Sample Reports and Materials

We are providing sample reports and materials as part of our proposal response.



This report has been prepared at the request of the Board of Trustees to assist in administering the Fund. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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October 13, 2017

Board of Trustees State Teachers' Retirement Fund 123 Main Street Capital, IL 12345-6789

Dear Trustees:

We certify that the information contained in this report is accurate and fairly presents the actuarial position of the State Teachers' Retirement Fund (TRF) as of July 1, 2017.

All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion the results presented also comply with the State Code, and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board (GASB). The undersigned are independent actuaries. Both are Fellows of the Society of Actuaries, Enrolled Actuaries, and Members of the American Academy of Actuaries, and both are experienced in performing valuations for large public retirement systems. They both meet the Qualification Standards of the American Academy of Actuaries.

ACTUARIAL VALUATION

The primary purposes of the valuation report are to determine the adequacy of the current employer contribution rate, to describe the current financial condition of TRF, and to analyze changes in TRF's financial condition. In addition, the report provides information required by TRF in connection with the Governmental Accounting Standards Board Statement No. 67 (GASB 67) and it provides various summaries of the data. Valuations are prepared annually, as of July 1 of each year, the first day of TRF's plan and fiscal year.

FINANCING OBJECTIVES

The member and employer contribution rates are established by statute. Member and employer rates are 11.75% and 12.75%, respectively. The 11.75% member contribution rate and 12.75% employer contribution rate will remain in effect until TRF is 100% funded on an actuarial basis. At that point, the employer and member contribution rates will revert to 7.75%. The rates are intended to be sufficient to pay TRF's normal cost and to amortize TRF's unfunded actuarial accrued liability (UAAL) over a period of 26 years beginning July 1, 2017, although at any given time the statutory rates may be insufficient.

PROGRESS TOWARD REALIZATION OF FINANCING OBJECTIVES

In order to determine the adequacy of the 12.75% statutory employer contribution rate, it is compared to the actuarially determined contribution (ADC). The ADC is equal to the sum of (a) the employer normal cost rate and (b) the level percentage of pay required to amortize the UAAL over the 30-year closed period that began July 1, 2013 (26 years remaining as of July 1, 2017). For this calculation, payroll is assumed to increase 3.25% per year. As of July 1, 2017, the ADC is 12.99%, compared to 13.22% last year. This is greater than the 12.75% rate currently required by law.

The decrease in ADC is primarily driven by an actuarial gain on assets and demographic experience emerging more favorably than assumed.

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) increased from last year. The funded ratio at July 1, 2016, was 62.1%, while it is 63.7% as of July 1, 2017. Based on the market value of assets rather than the actuarial value of assets, the funded ratio increased to 63.2%, compared to 59.2% last year.

The Fund has a net investment loss of \$19 million from previous years that has not yet been recognized in the actuarial value of assets because of the five-year smoothing. This unrecognized asset loss is due to market losses during FY 2015 and FY 2016 offset by market gains in FY 2014 and FY 2017. As these losses are recognized over the next four years, the funded ratio is expected to slightly decline, assuming the Fund earns 7.75% in the future.

REPORTING CONSEQUENCES

TRF is required to disclose certain actuarial information in its Comprehensive Annual Financial Report (CAFR), including the Net Pension Liability (NPL), the sensitivity of the NPL to changes in the discount rate, a schedule of changes in NPL, and a comparison of actual contributions to the ADC. The State and the school districts need to comply with GASB 68, which also requires disclosure of certain actuarial information in their financial statements. This information will be provided in a separate report.

BENEFIT PROVISIONS

The actuarial valuation reflects the benefit and contribution provisions set forth in the State Code. These have not changed from the prior valuation.

ASSUMPTIONS AND METHODS

Actuarial assumptions and methods are set by the Board of Trustees, based upon recommendations made by the Fund's actuary. On April 30, 2015, the Board adopted new assumptions, effective for the July 1, 2015 valuation. In our opinion, the actuarial assumptions as approved by the Board are reasonable, taking into account the experience of the Fund and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience of the Fund. The actuarial assumptions and methods used for funding purposes meet the parameters set by Actuarial Standards of Practice.

Effective with the July 1, 2013, actuarial valuation, the Trustees adopted an Actuarial Funding Policy, which provides direction on how to calculate an actuarially determined contribution. The actuarially determined contribution is compared to statutory contribution rates as a measure of funding adequacy.

The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates, and funding periods.

DATA

Member data for retired, active, and inactive participants was supplied as of July 1, 2017, by the staff of the Retirement Office. We have not subjected this data to any auditing procedures, but have examined the data for reasonableness and consistency with the prior year's data. Asset information was also supplied by the staff. That assistance is gratefully acknowledged.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By

Kim Nicholl, FSA, MAAA, EA Senior Vice President and Actuary

in Nedon

Matthew A. Strom, FSA, MAAA, EA

Vice President and Actuary

Table of Contents

State Teachers' Retirement Fund Actuarial Valuation and Review as of July 1, 2017

Section 1: Actuarial Valuation Summary	
Purpose and Basis	6
Valuation Highlights	7
Summary of Key Valuation Results	
Important Information About Actuarial Valuations	10
Section 2: Actuarial Valuation Results	
A. Member Data	12
B. Financial Information	20
C. Actuarial Experience	23
D. Changes in the Actuarial Accrued Liability	28
E. Cash Flow	29
F. Development of Unfunded/(Overfunded) Actuarial Accrued Liability	30
G. Actuarially determined Contribution	31
H. History of Employer Contributions	33
I. Additional Information	35
J. GFOA Solvency Test	37
K. Summary of Actuarial Valuation Results	38
L. Actuarial Balance Sheet	39
M. Determination of Contribution Sufficiency	40

Section 3: Supplemental Information	
Exhibit A – Table of Plan Coverage	43
Exhibit B - Members in Active Service as of July 1, 2017	
Exhibit C – Schedule of Annuitants	45
Exhibit D – Reconciliation of Member Data	47
Exhibit E – Summary Statement of Income and Expenses on a M Value Basis	
Exhibit F - Summary Statement of Plan Assets	49
Exhibit G - Development of the Fund Through June 30, 2017	50
Exhibit H – Definition of Pension Terms	51
Section 4: Actuarial Valuation Basis	
Exhibit I – Actuarial Assumptions and Actuarial Cost Method	56
Exhibit II – Summary of Plan Provisions	61
Exhibit III - Summary of Plan Changes	65
Section 5: GASB Information	
Exhibit 1 – Net Pension Liability	69



Section 1: Actuarial Valuation Summary

Purpose and Basis

This report was prepared by Segal Consulting to present a valuation of the Fund as of July 1, 2017. The valuation was performed to determine whether the assets and contribution rates are sufficient to provide the prescribed benefits and to provide information for required disclosures under Governmental Accounting Standards Board (GASB) Statement No. 67. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of Fund assets to cover the estimated cost of settling the Fund's benefit obligations. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law.

Certain disclosure information required by GASB Statements 67 and 68 as of July 1, 2017 for TRF is provided in a separate report.

The contribution requirements presented in this report are based on:

- The benefit provisions set forth in the State Code, as administered by the TRF Board of Trustees;
- The characteristics of covered active members, inactive members, and retirees and beneficiaries as of July 1, 2017, provided by the State Retirement and Investment Office:
- The assets of the Fund as of June 30, 2017, provided by the State Retirement and Investment Office;
- Economic assumptions regarding future salary increases and investment earnings;
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.; and
- The funding policy adopted by the TRF Board of Trustees.

Valuation Highlights

- 1. Segal strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and a portion of the principal balance. The funding policy adopted by the TRF meets this standard.
- 2. The employer statutory contribution rate for the fiscal year beginning July 1, 2017, under the State Code is equal to 12.75% of payroll for employers. Compared to the actuarially determined contribution of 12.99% of payroll, there is a contribution deficiency of 0.24% of payroll as of July 1, 2017. The actuarially determined contribution rate defined by the Fund's funding policy is based on a 26-year level percent of payroll amortization of the unfunded actuarial accrued liability. The employer statutory contribution rate of 12.75% results in an effective amortization period of 27 years; only one year longer than the Fund's funding policy amortization period.
- 3. Actual employer contributions made during the fiscal year ending June 30, 2017 were \$86,058,868, which is 97.7% of the actuarially determined contribution. In the prior fiscal year, actual contributions were \$82,839,932, which is 97.8% of the prior year actuarially determined contribution.
- 4. The funded ratio based on the actuarial value of assets over the actuarial accrued liability as of July 1, 2017, is 63.7%, compared to 62.1% as of July 1, 2016. This ratio is a measure of funding status and its history is a measure of funded progress. These measurements are not necessarily appropriate for assessing the sufficiency of the Fund's assets to cover the estimated cost of settling the Fund's benefit obligation or the need for or the amount of future contributions.
- 5. For the year ended June 30, 2017, Segal has determined that the asset return on a market value basis was 12.6%. After gradual recognition of investment gains and losses under the actuarial smoothing method, the actuarial rate of return was 8.2%. This represents an experience gain when compared to the assumed rate of 7.75%. As of June 30, 2017, the actuarial value of assets (\$2.380 billion) represented 100.8% of the market value (\$2.360 billion).
- 6. The portion of deferred investment gains and losses recognized during the calculation of the July 1, 2017, actuarial value of assets contributed to a gain of \$9.5 million. The demographic and liability experience resulted in a \$11.1 million gain.
- 7. As mentioned above, the current method used to determine the actuarial value of assets yields an amount that is 100.8% of the market value of assets as of June 30, 2017. 100.8% falls within the 20% corridor, so no further adjustment to the actuarial value of assets is necessary. Guidelines in Actuarial Standard of Practice No. 44 (Selection and Use of Asset Valuation Methods for Pension Valuations) recommend that asset values fall within a reasonable range around the corresponding market value. The actuarial asset method complies with these guidelines.

- 8. When measuring pension liability for GASB purposes, the same actuarial cost method (Entry Age Normal) is used to determine the funded status of the Fund, the actuarially determined contribution rate, and the effective amortization period. In addition, the GASB blended discount rate calculation results in the same discount rate (expected return on assets) as used for funding purposes (7.75%). This means that the Total Pension Liability (TPL) measure for financial reporting shown in this report is determined on the same basis as the Actuarial Accrued Liability (AAL) measure for funding. We note that the same is true for the Normal Cost component of the annual plan cost for funding and financial reporting.
- 9. The Net Pension Liability (NPL) is equal to the difference between the TPL and the Fund Fiduciary Net Position. The Fund Fiduciary Net Position is equal to the market value of assets and therefore, the NPL measure is the same as the Unfunded Actuarial Accrued Liability on a market value basis. The NPL decreased from \$1,465,058,563 as of June 30, 2016, to \$1,373,525,753 as of June 30, 2017.
- 10. The Fund's cash flow (contributions minus benefit payments, refunds, and expenses) as a percentage of the market value of assets is -1.3% as of June 30, 2017, compared to -1.2% as of June 30, 2016. The decrease in net cash flow is primarily due to the growth of benefit payments and expenses. It is not unusual for a mature pension system to operate with minor negative cash flow as returns on investments generally exceed the net cash outflow and assets continue to rise.

Summary of Key Valuation Results

		2017	2016
Demographic data for	Number of retirees and beneficiaries	8,501	8,249
olan year beginning	 Number of inactive vested members 	1,600	1,60
July 1	 Number of inactive non-vested members contributions 	878	779
	Number of active members	10,874	10,813
	 Total payroll supplied by System, annualized 	\$650,052,674	\$627,002,353
	Average payroll supplied by System, annualized	\$59,780	\$57,986
Statutory contributions	Member rate	11.75%	11.75%
for fiscal year beginning	Employer rate	12.75%	12.75%
July 1:	Actuarially determined contribution rate	12.99%	13.22%
	Margin/(deficit)	-0.24%	-0.47%
Actuarial accrued	Retirees and beneficiaries	\$2,092,923,830	\$1,976,315,201
liability for plan year	 Inactive vested members 	89,410,993	84,502,367
beginning July 1:	 Inactive non-vested members 	6,560,485	5,214,727
	Active members	1,545,121,520	1,523,361,556
	Total	\$3,734,016,828	\$3,589,393,851
	 Normal cost including administrative expenses for plan year beginning July 1 	\$83,230,495	\$80,236,633
Assets for plan year	Market value of assets (MVA)	\$2,360,491,075	\$2,124,335,288
beginning July 1:	 Actuarial value of assets (AVA) 	2,379,811,205	2,229,292,988
	 Actuarial value of assets as a percentage of market value of assets 	100.8%	104.9%
Funded status for plan	 Unfunded/(overfunded) actuarial accrued liability on market value of assets 	\$1,373,525,753	\$1,465,058,563
year beginning July 1:	Funded percentage on MVA basis	63.2%	59.2%
	 Unfunded/(overfunded) actuarial accrued liability on actuarial value of assets 	\$1,354,205,623	\$1,360,100,863
	 Funded percentage on AVA basis 	63.7%	62.1%
	Effective amortization period	27 years	29 years
GASB information:	Discount rate	7.75%	7.75%
	Total pension liability	\$3,734,016,828	\$3,589,393,851
	Plan fiduciary net position	2,360,491,075	2,124,335,288
	Net pension liability	\$1,373,525,753	\$1,465,058,563
	 Plan fiduciary net position as a percentage of total pension liability 	63.2%	59.2%
Gains/(losses):	Asset experience	\$9,464,023	-\$33,588,108
	Liability experience	11,371,394	-7,742,413
	Administrative expenses	-275,066	133,635
	Assumption/method changes	<u>0</u>	<u>C</u>
	Total gain/(loss)	\$20,560,351	-\$41,196,887

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 TRF. Segal does not audit such data fo 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 TRF. TRF 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 if 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.

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 TRF. 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 Fund'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 Fund.
- Actuarial results in this report are not rounded, but that does not imply precision.
- If the TRF 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. TRF 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 Fund, it is not a fiduciary in its capacity as actuaries and consultants with respect to the Fund.

Section 2: Actuarial Valuation Results

A. Member Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered members, including active members, inactive members, retirees and beneficiaries.

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

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

MEMBER POPULATION: 2008 –2017

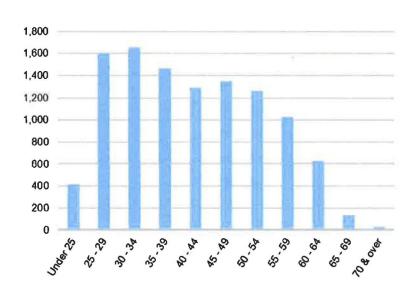
As of July 1	Active Members	Inactive Vested Members	Inactive Non- vested Members	Retirees and Beneficiaries	Ratio of Actives to Retirees and Beneficiaries
2008	9,561	1,459	229	6,317	1.51
2009	9,707	1,490	292	6,466	1.50
2010	9,907	1,472	331	6,672	1.48
2011	10,004	1,463	407	6,933	1.44
2012	10,014	1,483	468	7,151	1.40
2013	10,138	1,500	563	7,489	1.35
2014	10,305	1,509	661	7,747	1.33
2015	10,514	1,607	660	8,025	1.31
2016	10,813	1,601	779	8,249	1.31
2017	10,874	1,600	878	8,501	1.28

Active Members

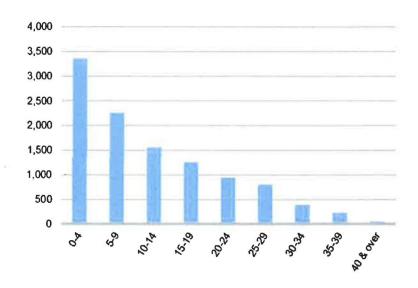
Plan costs are affected by the age, years of service and compensation of active members. In this year's valuation, there were 10,874 active members with an average age of 42.1 and average years of service of 11.9 years. The 10,813 active members in the prior valuation had an average age of 42.3 and average service of 12.1 years.

Distribution of Active Participants as of July 1, 2017

ACTIVES BY AGE



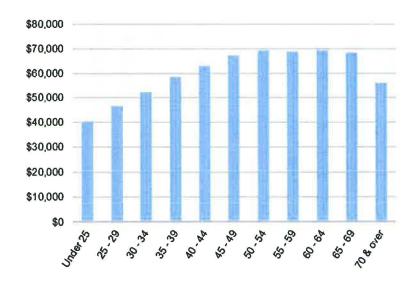
ACTIVES BY YEARS OF SERVICE



In this year's valuation, there were 10,874 active members with an average compensation of \$59,780. The 10,813 active members in the prior valuation had an average compensation of \$57,986.

Distribution of Active Participants as of July 1, 2017

ACTIVES BY AGE AND AVERAGE COMPENSATION



Inactive Members

In this year's valuation, there were 1,600 members with a vested right to a deferred or immediate vested benefit.

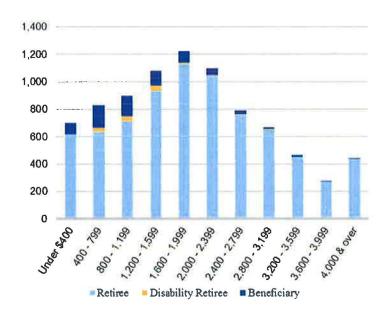
In addition, there were 878 non-vested members entitled to a return of their employee contributions.

Retirees and Beneficiaries

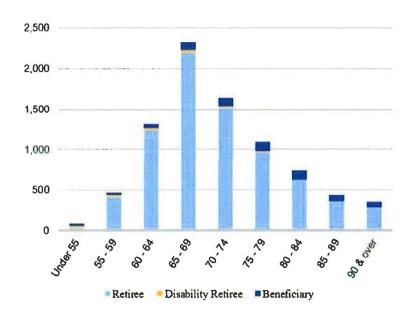
As of July 1, 2017, 7,792 retirees and 709 beneficiaries were receiving total monthly benefits of \$16,576,096. For comparison, in the previous valuation, there were 7,563 retirees and 686 beneficiaries receiving monthly benefits of \$15,602,746.

Distribution of Retirees and Beneficiaries as of July 1, 2017

RETIREES AND BENEFICIARIES BY TYPE AND MONTHLY AMOUNT



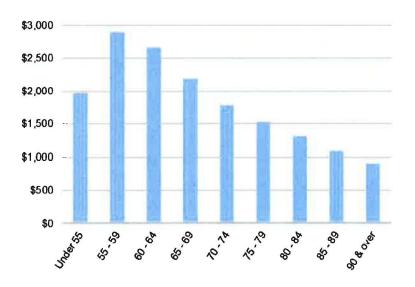
RETIREES AND BENEFICIARIES BY TYPE AND BY AGE



As of July 1, 2017, the average monthly benefit for retirees is \$1,950, compared to \$1,891 in the previous valuation. The average age for retirees is 71.7 in the current valuation, compared with 71.4 in the prior valuation.

Distribution of Retirees and Beneficiaries as of July 1, 2017

RETIREES AND BENEFICIARIES BY AGE AND AVERAGE MONTHLY AMOUNT



Historical Plan Population

The chart below demonstrates the progression of the active population over the last 20 years.

ACTIVE MEMBER DATA STATISTICS: 1998 – 2017

	Active N	lembers	Total Payroll System, A		Averag	e Salary		
As of July 1	Number	Percent Change	Amount in \$ Millions	Percent Change	\$ Amount	Percent Change	Average Age	Average Service
1998	9,896	-1.1%	298.4	1.5%	30,156	2.6%	43.5	14.0
1999	10,046	1.5%	314.6	5.4%	31,318	3.9%	44.0	14.4
2000	10,025	-0.2%	323.0	2.7%	32,223	2.9%	43.9	14.1
2001	10,239	2.1%	342.2	5.9%	33,421	3.7%	44.4	14.4
2002	9,931	-3.0%	348.1	1.7%	35,052	4.9%	44.5	14.4
2003	9,916	-0.2%	367.9	5.7%	37,105	5.9%	44.8	14.6
2004	9,826	-0.9%	376.5	2.3%	38,321	3.3%	44.9	14.7
2005	9,801	-0.3%	386.6	2.7%	39,447	2.9%	44.9	14.7
2006	9,585	-2.2%	390.1	0.9%	40,703	3.2%	44.8	14.6
2007	9,599	0.1%	401.3	2.9%	41,810	2.7%	44.7	14.5
2008	9,561	-0.4%	417.7	4.1%	43,684	4.5%	44.6	14.4
2009	9,707	1.5%	440.0	5.3%	45,327	3.8%	44.5	14.3
2010	9,907	2.1%	465.0	5.7%	46,937	3.6%	44.2	14.0
2011	10,004	1.0%	488.8	5.1%	48,857	4.1%	43.9	13.8
2012	10,014	0.1%	505.3	3.4%	50,458	3.3%	43.7	13.7
2013	10,138	1.2%	526.7	4.2%	51,953	3.0%	43.2	13.2
2014	10,305	1.6%	557.2	5.8%	54,073	4.1%	42.9	12.8
2015	10,514	2.0%	589.8	5.8%	56,095	3.7%	42.5	12.4
2016	10,813	2.8%	627.0	6.3%	57,986	3.4%	42.3	12.1
2017	10,874	0.6%	650.1	3.7%	59,780	3.1%	42.1	11.9

The chart below shows the growth among the retired population over the last 10 years.

SERVICE RETIREES DATA STATISTICS: 2008 – 2017

	Service Retirees		Average Amo		
As of July 1	Number	Percent Change	\$ Amount	Percent Change	Average Age
2008	5,695	3.8%	18,361	3.0%	70.8
2009	5,833	2.4%	18,806	2.4%	70.8
2010	6,029	3.4%	19,445	3.4%	70.7
2011	6,252	3.7%	19,990	2.8%	70.7
2012	6,448	3.1%	20,739	3.7%	70.8
2013	6,754	4.7%	21,462	3.5%	70.8
2014	6,991	3.5%	22,230	3.6%	70.9
2015	7,250	3.7%	22,976	3.4%	71.0
2016	7,435	2.6%	23,593	2.7%	71.3
2017	7,664	3.1%	24,352	3.2%	71.5

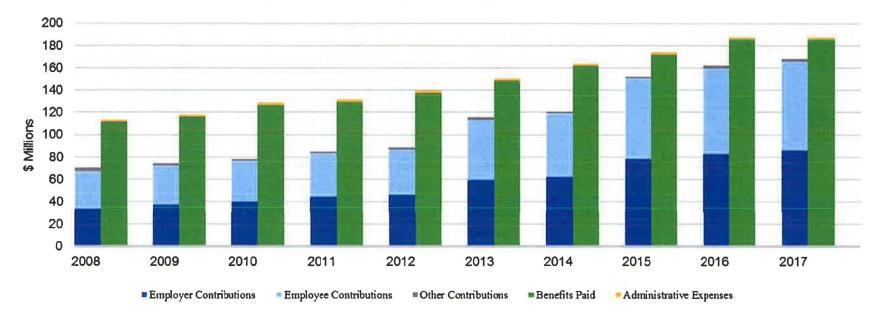
This table does not include disability retirees or beneficiaries.

B. Financial Information

Retirement plan funding anticipates that, over the long term, both contributions (less administrative expenses) and investment earnings (less investment fees) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

Additional financial information, including a summary of these transactions for the valuation year, is presented in Section 3, Exhibits E, F and G.

COMPARISON OF CONTRIBUTIONS WITH BENEFITS PAID FOR YEARS ENDED JUNE 30, 2008 - 2017



It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has 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. A characteristic of the asset valuation method is that, over time, it is more likely to produce an actuarial value of assets that is less than the market value of assets. The asset method provides a degree of conservatism to increase the likelihood that benefits are funded. 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.

DETERMINATION OF ACTUARIAL VALUE OF ASSETS FOR YEAR ENDED JUNE 30, 2017, AND JUNE 30, 2016

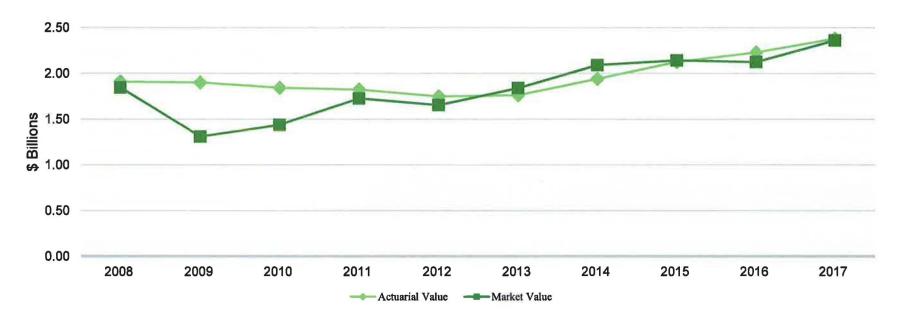
į,			20	017	20	016
1.	Market value of assets available for benefits			\$2,360,491,075		\$2,124,335,288
2.	Calculation of unrecognized return*	Original Amount**	% Not Recognized		% Not Recognized	
	a. Year ended June 30, 2017	\$103,235,815	80%	\$82,588,652		
	b. Year ended June 30, 2016	-156,759,166	60%	-94,055,500	80%	-\$125,407,333
	c. Year ended June 30, 2015	-93,205,396	40%	-37,282,158	60%	-55,923,238
	d. Year ended June 30, 2014	147,144,380	20%	29,428,876	40%	58,857,751
	e. Year ended June 30, 2013	87,575,593		<u>0</u>	20%	17,515,119
	f. Total unrecognized return			-\$19,230,130		-\$104,957,700
3.	Actuarial value of assets (Current Assets): 1 - 2f			\$2,379,811,205		\$2,229,292,288
4.	Actuarial value as a percent of market value: 3 ÷ 1			<u>100.8%</u>		<u>104.9%</u>

^{*} Recognition at 20% per year over five years

^{**} Total return minus expected return on a market value basis

Both the actuarial value and market value of assets are representations of TRF'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 Fund's liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

ACTUARIAL VALUE OF ASSETS VS. MARKET VALUE OF ASSETS AS OF JUNE 30, 2008 - 2017



C. Actuarial Experience

To calculate any actuarially determined 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), any contribution requirement will decrease from the previous year. On the other hand, any 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.

The total gain is \$20,560,351, which includes \$9,464,023 from investment gains and \$11,096,328 in net gains from all other sources. The net experience variation from individual sources other than investments was 0.3% of the actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

ACTUARIAL EXPERIENCE FOR YEAR ENDED JUNE 30, 2017

1.	Net gain/(loss) from investments*	\$9,464,023
2.	Net gain/(loss) from administrative expenses	-275,066
3.	Net gain/(loss) from liability and other experience	11,371,394
4.	Net experience gain/(loss): 1 + 2 + 3	\$20,560,351

^{*} Details on next page.

Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Fund's investment policy. The rate of return on the market value of assets was 12.64% for the year ended June 30, 2017.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.75%. The actual rate of return on an actuarial basis for the 2017 plan year was 8.18%. Since the actual return for the year was greater than the assumed return, the Fund experienced an actuarial gain during the year ended June 30, 2017 with regard to its investments.

INVESTMENT EXPERIENCE

		Year E June 30		Year E June 30	
		Market Value	Actuarial Value	Market Value	Actuarial Value
1.	Value assets at the beginning of year	\$2,124,335,288	\$2,229,292,988	\$2,141,920,800	\$2,125,017,451
2.	Contributions during the fiscal year	168,157,111	168,157,111	161,995,828	161,995,828
3.	Benefits and expense during the fiscal year	198,689,975	198,689,975	-187,820,336	-187,820,336
4.	Value of assets at end of year	2,360,491,075	2,379,811,205	2,124,335,288	2,229,292,988
5.	Net investment income: 4 - 1 - 2 +3	\$266,688,651	\$181,051,081	\$8,238,996	\$130,100,044
6.	Average value of assets: 1 + [2 - 3] x ½	\$2,109,068,856	\$2,214,026,556	\$2,129,008,546	\$2,112,105,197
7.	Rate of return: 5 ÷ 6	12.64%	8.18%	0.39%	6.16%
8.	Assumed rate of return	7.75%	7.75%	7.75%	7.75%
9.	Expected investment income: 6 x 8	\$163,452,836	\$171,587,058	\$164,998,162	\$163,688,153
10.	Actuarial gain/(loss): 5 – 9	<u>\$103,235,815</u>	\$9,464,023	<u>-\$156,759,166</u>	<u>-\$33,588,108</u>

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the actual market value investment return for the last 20 years, including averages over select time periods.

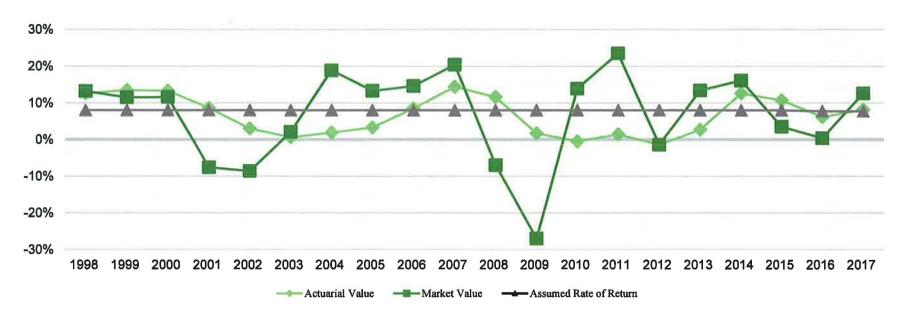
INVESTMENT RETURN - MARKET VALUE VS. ACTUARIAL VALUE: 1988 - 2017

Year Ended June 30	Market Value	Actuarial Value	Year Ended June 30	Market Value	Actuarial Value	Year Ended June 30	Market Value	Actuarial Value
1988	5.0%	7.3%	1998	13.2%	12.6%	2008	-7.0%	11.6%
1989	14.3	8.6	1999	11.5	13.5	2009	-27.0	1.7
1990	6.7	7.7	2000	11.6	13.3	2010	13.9	-0.5
1991	7.5	5.8	2001	-7.6	8.6	2011	23.5	1.4
1992	12.4	6.5	2002	-8.6	3.0	2012	-1.4	-1.4
1993	14.7	8.1	2003	2.1	0.6	2013	13.4	2.7
1994	1.2	7.0	2004	18.9	1.9	2014	16.1	12.6
1995	13.6	9.1	2005	13.3	3.3	2015	3.5	10.7
1996	15.6	11.3	2006	14.6	8.5	2016	0.4	6.2
1997	18.5	12.6	2007	20.4	14.4	2017	12.6	8.2
				Most r	ecent five-year ave	erage return	9.0%	8.0%
				Most r	ecent ten-year ave	rage return	3.8%	5.2%
Most recent 15-year average return							7.0%	5.3%
				Most r	ecent 20-year aver	age return	6.1%	6.5%
				Most r	ecent 30-year aver	age return	7.7%	7.1%

Note: For 2011-2017, investment returns on market basis were determined by Segal.

Subsection B described the actuarial asset valuation method that gradually recognizes fluctuations in the market value rate of return. The goal of this is to stabilize the actuarial rate of return and to produce more level pension plan costs.

MARKET AND ACTUARIAL RATES OF RETURN FOR YEARS ENDED JUNE 30, 1998 - 2017



Administrative Expenses

Administrative expenses for the year ended June 30, 2017 totaled \$2,173,431 compared to the assumption of \$1,902,577. This resulted in a loss of \$275,066 for the year, when adjusted for timing.

Other Experience

There are other 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:

- > the extent of turnover among participants,
- > retirement experience (earlier or later than projected),
- > mortality (more or fewer deaths than projected),
- the number of disability retirements (more or fewer than projected), and
- salary increases (greater or smaller than projected).

The net gain from this other experience for the year ended June 30, 2017 amounted to \$11,371,394, which is 0.3% of the actuarial accrued liability.

EXPERIENCE DUE TO CHANGES IN DEMOGRAPHICS FOR YEAR ENDED JUNE 30, 2017

Turnover	-\$2,012,594
Retirement	-1,502,862
Deaths among retired members and beneficiaries	9,358,428
Salary/service increase for continuing actives	9,408,089
New entrants	-4,865,404
Miscellaneous	<u>985,737</u>
Total gain/ (loss)	\$11,371,394

D. Changes in the Actuarial Accrued Liability

The actuarial accrued liability as of July 1, 2017 is \$3,734,016,828, an increase of \$144,622,977, or 4.0%, from the actuarial accrued liability as of the prior valuation date. The change in liability is due to interest, accumulation and payment of benefits, and actuarial experience (as discussed in the previous subsection).

Actuarial Assumptions

- > There are no assumption changes reflected in this report.
- > Details on actuarial assumptions and methods are in Section 4, Exhibit I.

Plan Provisions

- > There were no changes in plan provisions since the prior valuation.
- > A summary of plan provisions is in Section 4, Exhibit II.

E. Cash Flow

Cash flow is the difference between contributions and benefit payments, refunds, and expenses. Negative cash flow indicates that the payments made from the Fund exceed contributions made to the Fund.

HISTORY OF CASH FLOW: 2008 - 2017

Year Ended June 30	Contributions ¹	Disbursements or Expenditures						
		Benefit Payments	Refunds	Administrative Expenses	Total Disbursements	Net Cash Flow for the Year ²	Market Value of Assets	Net Cash Flow as Percent of Market Value
2008	\$70,573,389	(\$106,456,334)	(\$5,500,476)	(\$1,639,521)	(\$113,5 <mark>96,331</mark>)	(\$43,022,942)	\$1,846,113,411	-2.3%
2009	74,380,980	(113,966,079)	(2,362,251)	(1,707,506)	(118,035,836)	(43,654,856)	1,309,716,730	-3.3%
2010	78,105,830	(124,472,154)	(2,557,240)	(1,902,796)	(128,932,190)	(50,826,360)	1,437,949,843	-3.5%
2011	84,923,250	(127,435,564)	(2,210,738)	(2,003,705)	(131,650,007)	(46,726,757)	1,726,179,317	-2.7%
2012	88,808,604	(135,250,568)	(2,479,194)	(1,596,976)	(139,326,738)	(50,518,134)	1,654,149,659	-3.1%
2013	115,849,348	(145,943,323)	(3,053,395)	(1,623,638)	(150,620,356)	(34,771,008)	1,839,583,960	-1.9%
2014	120,991,968	(158,350,355)	(3,908,921)	(1,586,045)	(163,845,321)	(42,853,353)	2,090,977,056	-2.0%
2015	152,463,762	(168,349,762)	(3,889,671)	(1,923,392)	(174,162,825)	(21,699,063)	2,141,920,800	-1.0%
2016	161,995,828	(180,617,784)	(5,350,896)	(1,851,656)	(187,820,336)	(25,824,508)	2,124,335,288	-1.2%
2017	168,157,111	(191,104,694)	(5,411,850)	(2,173,431)	(198,689,975)	(30,532,864)	2,360,491,075	-1.3%

¹ Includes employee and employer contributions, as well as any purchased service credits during the year ² Equal to Contributions + Total Disbursements

F. Development of Unfunded/(Overfunded) Actuarial Accrued Liability

DEVELOPMENT OF UNFUNDED/(OVERFUNDED) ACTUARIAL ACCRUED LIABILITY **FOR YEAR ENDED JUNE 30, 2017, AND JUNE 30, 2016**

		20	017	20	16
1.	Unfunded/(overfunded) actuarial accrued liability at beginning of year		\$1,360,100,863		\$1,324,758,531
2.	Normal cost at beginning of year		77,315,074		70,147,697
3.	Total contributions		168,157,111	_	161,995,828
4.	Interest on:				
	a. Unfunded actuarial accrued liability and normal cost	\$111,399,735		\$108,105,233	
	b. Total contributions	<u>5,892,587</u>		<u>5,676,683</u>	
	c. Total interest: 4a - 4b		\$117,292,322		\$102,428,550
5.	Expected unfunded/(overfunded) actuarial accrued liability		\$1,374,765,974		\$1,335,338,949
6.	Changes due to (gain)/loss:				
	a. Investments	-\$9,464,023		\$33,588,108	
	b. Demographics	<u>-11,096,328</u>		7,608,779	
	c. Total changes due to (gain)/loss: 6a + 6b		(20,560,351)		41,196,887
7.	Changes due to plan amendments		0		0
8.	Changes in actuarial cost method		0		0
9.	Changes in actuarial assumptions		0		0
10.	Changes due to actuarial audit		<u>0</u>		-16,434,973
11.	Unfunded/(overfunded) actuarial accrued liability at end of year: 5 + 6c + 7 + 8 + 9 + 10		\$1,354,205,623		\$ <u>1,360,100,863</u>

G. Actuarially Determined Contribution

The amount of the actuarially determined contribution is comprised of an employer normal cost payment and a payment on the unfunded/(overfunded) actuarial accrued liability. This total amount is divided by the projected payroll for active members to determine the actuarially determined contribution of 12.99% of payroll.

TRF sets the methodology used to calculate the actuarially determined contribution based on a closed amortization period of 30 years, established as of July 1, 2013. As of July 1, 2017, there are 26 years remaining on this schedule. The employer contribution rate set by the TRF is currently 12.75% of payroll. Since the actuarially determined contribution is 12.99% of payroll, there is a deficit of 0.24% of payroll. The calculated employer normal cost (including expenses) is 0.31% of payroll. The remaining 12.69% of payroll will amortize the unfunded actuarial accrued liability over a period of 26 years.

The contribution requirement as of July 1, 2017 is based on the data previously described, the actuarial assumptions and plan provisions described in Section 4, including all changes affecting future costs adopted at the time of the actuarial valuation, actuarial gains and losses, and changes in the actuarial assumptions.

ACTUARIALLY DETERMINED CONTRIBUTION*

- 1		Year Beginning July 1					
		20	17	20	16		
		Amount	% of Payroll	Amount	% of Payroll		
1.	Total normal cost, adjusted for timing*	\$83,230,495	12.06%	\$80,236,633	12.04%		
2.	Expected employee contributions	81,117,159	<u>11.75%</u>	78,305,065	<u>11.75%</u>		
3.	Employer normal cost, adjusted for timing*: 1 - 2	\$2,113,336	0.31%	\$1,931,568	0.29%		
4.	Actuarial accrued liability	3,734,016,828		3,589,393,851			
5.	Actuarial value of assets	2,379,811,205		2,229,292,988			
6.	Unfunded/(overfunded) actuarial accrued liability: 4 - 5	1,354,205,623		1,360,100,863			
7.	Payment on unfunded actuarial accrued liability, adjusted for timing*	87,579,901	12.69%	86,189,591	12.93%		
8.	Total recommended contribution: 3 + 7	\$89,693,237	12.99%	\$88,121,159	13.22%		
9.	Total payroll supplied by System, annualized	\$650,052,674		\$627,002,353			
10.	Projected annual payroll for fiscal year beginning July 1	\$690,358,799		\$666,426,087			

^{*} Normal cost includes administrative expenses and contributions are assumed to be paid at the middle of every month

Reconciliation of Actuarially Determined Contribution

The chart below details the changes in the actuarially determined contribution from the prior valuation to the current year's valuation.

RECONCILIATION OF ACTUARIALLY DETERMINED CONTRIBUTION

		July 1, 2017	July 1, 2	016
1.	Prior valuation	13.229	6	13.04%
2.	Increases/(decreases) due to:			
	 Effect of change in amortization period (decrease from 28 years to 27 years remaining as of July 1, 2016 and decrease from 27 years to 26 years remaining as of July 1, 2017) 	0.00%	0.00%	
	Effect of change in covered payroll and normal cost	-0.03%	-0.39%	
	 Effect of contributions (more)/less than actuarially determined contribution: 12.75% rather than 13.04% for FY2016 and 12.75% rather than 13.22% for FY2017 	-0.01%	-0.06%	
	Effect of gains and losses on accrued liability	-0.10%	0.07%	
	Effect of investment (gain)/loss	-0.09%	0.32%	
	Effect of legislative changes	0.00%	0.00%	
	Effect of change in actuarial assumptions	0.00%	0.00%	
	Net effect of other changes	0.00%	0.24%	
	Total change	-0.239	<u>%</u>	0.18%
3.	Current valuation: 1 + 2	12.999	%	13.22%
4.	Statutory employer contribution rate	12.759	%	12.75%
5.	Margin available [contribution sufficiency/(deficiency)]: 4 - 3	<u>-0.24</u> °	<u>%</u>	<u>-0.47%</u>

H. History of Employer Contributions

Critical information to assess the funding progress is the historical comparison of the actuarially determined contribution (annual required contribution prior to July 1, 2014) to the actual contributions. A history of the most recent years of contributions is shown below.

HISTORY OF EMPLOYER CONTRIBUTIONS: 2008 – 2017

	and the second s	Determined ribution (ADC)1	Actual Employe		
Fiscal Year Ended June 30	Amount ³	Percentage of Payroll ⁴	Amount	Percentage of Payroll	Percent Contributed
2008	\$44,114,585	10.15%	\$33,683,550	7.75%	76.4%
2009	41,986,174	9.24%	37,487,655	8.25%	89.3%
2010	52,053,217	10.78%	39,836,646	8.25%	76.5%
2011	65,112,696	12.79%	44,545,433	8.75%	68.4%
2012	69,373,794	13.16%	46,126,193	8.75%	66.5%
2013	52,396,153	9.4 <mark>9%</mark> ⁵	59,352,860	10.75%	113.3%
2014	59,513,485	10.26%	62,355,146	10.75%	104.8%
2015	71,167,632	11.57%	78,422,098	12.75%	110.2%
2016	84,724,122	13.04%	82,839,932	12.75%	97.8%
2017	89,231,211	13.22%	86,058,868	12.75%	97.7%

¹ Prior to FY 2014, the ADC is the same as the GASB ARC determined under GASB 25.

² Prior to FY 2014, these amounts include prior year corrections.

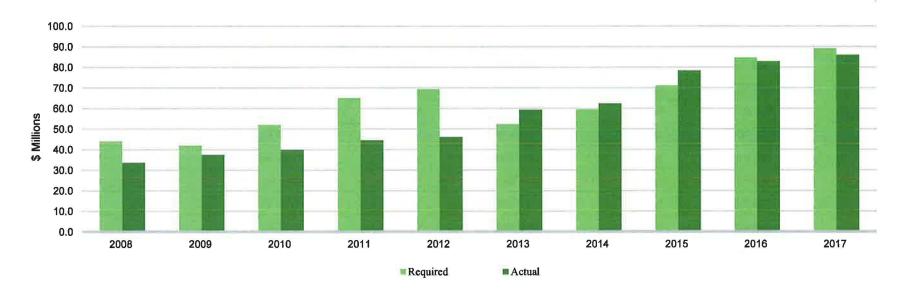
³ The dollar amount of the ADC for FY 2014 through FY 2017 is based on actual payroll for the year and differs from the estimated dollar amount shown in the prior year's actuarial valuation report because of differences between estimated and actual payroll.

⁴ The ADC for each fiscal year is based on the actuarial valuation as of the beginning of the year. Therefore, the FY 2017 ADC is based on the July 1, 2016 valuation. The ADC is defined as the contribution rate required to pay the employer normal cost and to amortize the unfunded actuarial accrued liability over the closed 30-year period that began July 1, 2013 as a level percentage of payroll.

⁵ The FY 2013 ADC reflects the actuarial present value of the increased statutory contributions scheduled to occur July 1, 2014.

The chart below presents a graphical representation of the historical comparison of the actuarially determined contribution to the actual contributions for TRF.

ACTUARIALLY DETERMINED VERSUS ACTUAL EMPLOYER CONTRIBUTIONS, YEARS ENDED JUNE 30



I. Additional Information

The other critical piece of information regarding TRF's financial status is the funded ratio. This ratio compares the actuarial value of assets to the actuarial accrued liabilities of the Fund. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors. The chart below shows the funded ratio calculated using the actuarial value of assets.

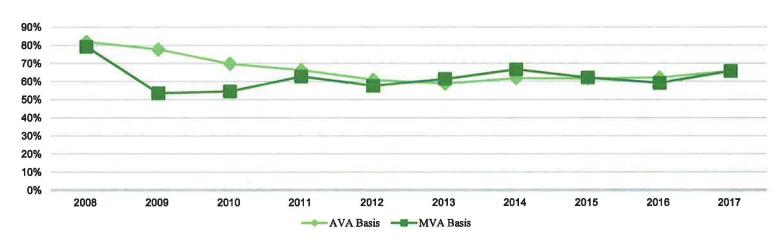
SCHEDULE OF FUNDING PROGRESS

As of July 1	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded/ Accrued Liability (UAAL)	Funded Ratio	Total Payroll Supplied by System, Annualized	UAAL as a % of Compensation
2008	1,909,500,000	2,330,600,000	421,200,000	81.9%	417,700,000	100.8%
2009	1,900,327,834	2,445,896,710	545,568,876	77.7%	439,986,705	124.0%
2010	1,841,960,220	2,637,165,045	795,204,825	69.8%	465,007,110	171.0%
2011	1,822,598,871	2,749,751,755	927,152,884	66.3%	488,764,292	189.7%
2012	1,748,080,771	2,871,870,286	1,123,789,515	60.9%	505,285,069	222.4%
2013	1,762,321,644	2,997,139,087	1,234,817,443	58.8%	526,698,342	234.4%
2014	1,940,473,504	3,138,799,773	1,198,326,269	61.8%	557,222,917	215.1%
2015	2,125,017,451	3,449,775,982	1,324,758,531	61.6%	589,783,780	224.6%
2016	2,229,292,988	3,589,393,851	1,360,100,863	62.1%	627,002,353	216.9%
2017	2,379,811,205	3,734,016,828	1,354,205,623	63.7%	650,052,674	208.3%

Note: Numbers for 7/1/2008 valuation dates are rounded.

The chart below shows the funded ratio calculated using both the actuarial value of assets and the market value of assets.

FUNDED RATIO, AS OF JULY 1



J. GFOA Solvency Test

The Actuarial Accrued Liability represents the present value of benefits earned, calculated using the plan's actuarial cost method. The Actuarial Value of Assets reflects the financial resources available to liquidate the liability. The portion of the liability covered by assets reflects the extent to which accumulated plan assets are sufficient to pay future benefits, and is shown for liabilities associated with employee contributions, pensioner liabilities, and other liabilities. The Government Finance Officers Association (GFOA) recommends that the funding policy aim to achieve a funded ratio of 100 percent.

GFOA SOLVENCY TEST AS OF JULY 1

	2017	2016
Actuarial accrued liability (AAL)		
Active member contributions	\$839,076,681	\$792,788,975
Retirees and beneficiaries	2,092,923,830	1,976,315,201
Active and inactive members (employer financed)	802,016,317	820,289,675
Total	\$3,734,016,828	\$3,589,393,851
Actuarial value of assets	\$2,379,811,205	\$2,229,292,988
Cumulative portion of AAL covered	_	
Active member contributions	100.0%	100.0%
Retirees and beneficiaries	73.6%	72.7%
Active and inactive members (employer financed)	0.0%	0.0%

K. Summary of Actuarial Valuation Results

		July 1, 2017	July 1,	2016
A.	Determination of Actuarial Accrued Liability		SET OF SUPPLE	
1.	Active members			
	a. Retirement benefits	\$2,168,649,742	\$2,118,617,183	
	b. Disability benefits	34,821,841	33,023,457	
	c. Death benefits	37,339,571	35,998,781	
	d. Withdrawal benefits	152,460,825	141,479,143	
	e. Total	2,393	271,979	\$2,329,118,564
2.	Inactive vested members	89	410,993	84,502,367
3.	Inactive non-vested members	6	560,485	5,214,727
4.	Retirees and beneficiaries	2,092	923,830	1,976,315,201
5.	Actuarial Present Value of Projected Benefits: 1e + 2 + 3 + 4	\$4,582	167,287	\$4,395,150,859
6.	Actuarial Present Value of Future Normal Costs, Active Members			
	a. Retirement benefits	\$666,419,486	\$636,231,737	
	b. Disability benefits	15,828,831	14,996,785	
	c. Death benefits	16,296,393	15,609,541	
	d. Withdrawal benefits	149,605,749	<u>138,918,945</u>	
	e. Total	\$848	150,459	\$805,757,008
7.	Actuarial Accrued Liability: 5 – 6e	<u>\$3,734</u>	016,828	\$3,589,393,851
В.	Determination of Unfunded Actuarial Accrued Liability			
1.	Actuarial accrued liability	\$3,734	016,828	\$3,589,393,851
2.	Actuarial value of assets	2,379	<u>811,205</u>	2,229,292,288
3.	Unfunded actuarial accrued liability: 1 - 2	\$1,354	205,623	\$1,360,100,863

L. Actuarial Balance Sheet

An overview of the Fund's funding is given by an Actuarial Balance Sheet. In this approach, first the amount and timing of all future payments that will be made by the Fund for current participants is determined. Then these payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value, referred to as the "liability" of the Fund.

Second, this liability is compared to the assets. The "assets" for this purpose include the net amount of assets already accumulated by the Fund, the present value of future member contributions, the present value of future employer normal cost contributions, and the present value of future employer amortization payments for the unfunded actuarial accrued liability.

ACTUARIAL BALANCE SHEET

	As	of
	July 1, 2017	July 1, 2016
Liabilities		
Present value of benefits for retirees and beneficiaries	\$2,092,923,830	\$1,976,315,201
Present value of benefits for inactive members	95,971,478	89,717,094
Present value of benefits for active members	<u>2,393,271,979</u>	2,329,118,564
Total liabilities	\$4,582,167,287	\$4,395,150,859
Assets		
Total valuation value of assets	\$2,379,811,205	\$2,229,292,288
Present value of future contributions by members	906,244,234	859,717,173
Present value of future employer contributions for:		
» Entry age normal costs	-58,093,775	-53,959,465
» Unfunded actuarial accrued liability	<u>\$1,354,205,623</u>	\$1,360,100,863
Total of current and future assets	<u>\$4,582,167,287</u>	<u>\$4,395,150,859</u>

M.Determination of Contribution Sufficiency

		July 1,	2017	July 1, 2016		
A.	Statutory Contributions	%Payroll	\$ Amount	% Payroll	\$ Amount	
1.	Member contributions	11.75%	\$81,117,159	11.75%	\$78,305,065	
2.	Employer contributions	12.75%	88,020,747	12.75%	84,969,326	
3.	Total	24.50%	<u>\$169,137,906</u>	24.50%	\$163,274,391	
В.	Actuarially Determined Contribution	% Payroll	\$ Amount	% Payroll	\$ Amount	
1.	Normal cost					
	a. Retirement	8.99%	\$62,129,851	9.06%	\$60,354,225	
	b. Disability	0.20%	1,389,983	0.20%	1,336,108	
	c. Death	0.22%	1,491,791	0.22%	1,451,543	
	d. Deferred termination benefit and refunds	<u>1.89%</u>	13,029,709	<u>1.85%</u>	12,334,187	
	e. Total	<u>11.30%</u>	\$78,041,335	<u>11.33%</u>	<u>\$75,476,063</u>	
	f. Normal cost, adjusted for timing	11.73%	80,990,337	11.75%	78,334,056	
2.	Administrative expenses, adjusted for timing	0.32%	2,240,158	0.29%	1,902,577	
3.	Gross normal cost including administrative expenses, adjusted for timing: 1f + 2	12.05%	\$83,230,495	12.04%	\$80,236,633	
4.	Less member contribution rate	11.75%	81,117,159	11.75%	78,305,065	
5.	Employer normal cost rate: 3-4	0.30%	2,113,336	0.29%	1,931,568	
6.	Unfunded actuarial accrued liability rate, adjusted for timing	12.69%	87,579,901	12.93%	86,189,591	
7.	Total: 5 + 6	12.99%	89,693,237	13.22%	88,121,159	
C.	Contribution Sufficiency / (Deficiency): A2 - B7	-0.24%	-\$1,672,490	-0.47%	-\$3,151,833	
	Projected annual payroll for fiscal year beginning on the valuation date		\$690,358,799		\$666,426,087	

Section 3: Supplemental Information

MEMBERSHIP DATA

Membership data was provided on electronic files sent by TRF staff. Data for active members includes sex, birth date, service, salary for the prior fiscal year, and accumulated contributions. Data for inactive members was similar, but also includes the members' unreduced benefit. For retired members, data includes status (service retiree, disabled retiree or beneficiary), sex, birth date, pension amount, date of retirement, form of payment, and beneficiary sex and birth date if applicable.

While not verifying the correctness of the data at the source, we performed various tests to ensure the internal consistency of the data and its overall reasonableness.

Membership statistics are summarized in Exhibit A. Exhibit B shows the age/service distribution of active members. Exhibit C-1 and Exhibit C-2 show the distribution of retirees by option and by benefit amount. Exhibit D shows a reconciliation of the member data from last year's valuation to this year's valuation.

The number of active members increased by 0.6% since last year, from 10,813 to 10,874. Note that normally the actual number of members employed during the year will be somewhat higher than the valuation count, since the July 1 count excludes most June and July retirees but does not include new teachers joining the system for the next school year.

Total payroll increased 3.6% since last year. For all comparative purposes, payroll is the amount supplied by TRF staff (i.e., the 2016-2017 member pay), annualized. However, this figure is increased by one year's assumed pay increase to determine the member's rate of pay (and thus, total projected payroll) at July 1, 2017. Pay is assumed to change only at the beginning of a school/fiscal year.

Average pay increased by 3.1%, from \$57,986 to \$59,780. This includes the impact of replacing more highly paid members who retire with new teachers. The average increase in salary for the 9,945 continuing members (members active in both this valuation and the preceding valuation) was 7.1%.

The average age of active members decreased from 42.3 years to 42.1 years, and their average service decreased from 12.1 years to 11.9 years.

The table below shows additional information about the active membership this year and last year. Tier 1 Grandfathered members are those who had 65 points as of June 30, 2013, or were at least age 55 and vested. Members who joined prior to June 30, 2008, and did not meet these criteria are considered Tier 1 Non-grandfathered members. Tier 2 members are those hired or rehired after June 30, 2008. All new members in future years will enter as Tier 2 members, so the number will increase over time. The Tier 1 Grandfathered and Nongrandfathered population will decrease each year as members leave due to retirement, termination, death, and disability.

ACTIVE STATISTICS

Category	July 1, 2017	July 1, 2016
Plan Eligibility:		
Tier 1 Grandfathered	2,221	2,559
Tier 1 Non-grandfathered	3,237	3,272
• Tier 2	<u>5,416</u>	<u>4,982</u>
• Total	10,874	10,813
Benefit Eligibility:		
Non-Vested	3,331	3,380
Vested	5,789	5,608
 Early Retirement 	859	851
Normal Retirement	<u>895</u>	974
• Total	10,874	10,813

In addition, this table shows the number of members who are non-vested, those who are vested but not eligible for retirement, those who are eligible only for an early retirement (reduced) benefit, and those eligible for a normal (unreduced) benefit. As of the valuation date, 1,754 members were eligible for either reduced or unreduced retirement, a decrease over last year's figure of 1,825.

Exhibit A - Member Data

Category	July 1, 2017	July 1, 2016	Change From Prior Year
Active members:			
• Males	2,731	2,742	-0.40%
• Females	8,143	8,071	0.89%
Total number	10,874	10,813	0.56%
 Total payroll supplied by System, annualized 	\$650,052,674	\$627,002,353	3.68%
Average salary	\$59,780	\$57,986	3.09%
Average age	42.1	42.3	-0.2
Average service	11.9	12.1	-0.2
Total contributions with interest	\$839,076,681	\$792,788,975	5.84%
 Average contribution with interest 	\$77,164	\$73,318	5.25%
Vested inactive members:			
• Number	1,600	1,601	-0.06%
Total annual deferred benefits	\$11,604,535	\$11,131,831	4.25%
Average annual deferred benefit	\$7,253	\$6,953	4.31%
Average age	49.1	49.3	-0.2
Non-vested inactive members:			
Number	878	779	12.71%
 Employee contributions with interest due 	\$5,040,170	\$5,214,700	-3.35%
Average refund due	\$5,741	\$6,702	-14.34%
Average age	37.0	37.0	0.0
Service retirees:			
 Number 	7,664	7,435	3.08%
Total annual benefit	\$186,635,145	\$175,417,123	6.40%
Average annual benefit	\$24,352	\$23,593	3.22%
Average age	71.5	71.3	-0.2
Disabled retirees:			
• Number	128	128	0.00%
Total annual benefit	\$1,877,679	\$1,885,987	-0.44%
Average annual benefit	\$14,669	\$14,734	-0.44%
Average age	63.4	62.7	0.7
Beneficiaries:			
Number	709	686	3.35%
Total annual benefit	\$10,400,322	\$9,929,829	4.74%
Average annual benefit	\$14,669	\$14,475	1.34%
Average age	75.4	72.9	2.5

Exhibit B - Members in Active Service as of July 1, 2017 By Age, Years of Credited Service, and Average compensation

	Years of Credited Service									
Age	Total	0-4	5-9	10-14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	416	416	0	0	0	0	0	0	0	0
	\$40,383	\$40,383	0	0	0	0	0	0	0	0
25 - 29	1,607	1,253	354	0	0	0	0	0	0	0
	46,799	45,587	\$51,088	0	0	0	0	0	0	0
30 - 34	1,656	530	906	220	0	0	0	0	0	0
	52,121	46,914	53,968	\$57,057	0	0	0	0	0	0
35 - 39	1,467	336	388	600	143	0	0	0	0	0
	58,672	49,501	57,582	62,713	\$66,219	0	0	0	0	0
40 - 44	1,292	246	216	267	465	98	0	0	0	0
	63,207	50,159	58,389	64,666	69,259	\$73,892	0	0	0	0
45 - 49	1,350	188	159	184	253	427	136	3	0	0
	67,343	52,611	60,217	64,982	70,221	72,998	\$75,983	\$73,633	0	0
50 - 54	1,262	162	80	122	165	197	398	137	1	0
	69,448	55,149	60,386	62,512	67,265	71,925	76,258	77,131	\$65,873	0
55 - 59	1,028	127	90	82	130	131	185	189	94	0
	68,796	54,863	60,533	61,249	65,732	70,017	76,668	76,685	73,299	0
60 - 64	630	67	47	69	81	79	78	54	128	27
	69,424	54,873	61,772	65,256	64,557	72,899	73,949	75,254	76,212	\$77,034
65 - 69	136	23	20	15	21	9	12	7	14	15
	68,374	60,028	59,414	59,000	73,363	66,344	68,622	75,906	72,891	88,797
70 & over	30	9	4	2	3	1	3	3	2	3
	56,199	39,558	51,496	42,907	61,214	81,502	83,012	67,298	73,814	58,153
Total	10,874	3,357	2,264	1,561	1,261	942	812	393	239	45
	\$59,780	\$47,352	\$55,691	\$62,476	\$68,230	\$72,389	\$75,995	\$76,535	\$74,808	\$79,696

Exhibit C-1 – Schedule of Annuitants by Type of Benefit as of July 1, 2017

Type of Benefits/Form of Payment	Number	Annual Benefits Amount	Average Monthly Benefits
Service:			
Straight Life	2,960	\$62,457,528	\$1,758
• 100% J&S	3,195	89,157,980	2,325
• 50% J&S	666	18,021,369	2,255
5 Years C&L	18	267,235	1,237
10 Years C&L	172	3,491,174	1,691
20 Years C&L	113	2,670,989	1,970
• Level	<u>540</u>	10,568,870	<u>1,631</u>
Subtotal:	7,664	\$186,635,145	\$2,029
Disability:			
Straight Life	102	\$1,541,985	\$1,260
• 100% J&S	18	234,011	1,083
• 50% J&S	6	85,766	1,191
• 5 Years C&L	1	6,254	521
• 10 Years C&L	0	0	0
20 Years C&L	1	9,663	805
• Level	<u>0</u>	0	0
Subtotal:	128	\$1,877,679	\$1,222
Beneficiaries:			
Straight Life	667	\$10,052,526	\$1,256
10 Years Certain	4	28,081	585
20 Years Certain	12	124,389	864
QDRO Alternate Payee	<u>26</u>	<u>195,326</u>	<u>626</u>
Subtotal:	709	\$10,400,322	\$1,222
Total:	8,501	\$198,913,146	\$1,950

Exhibit C-2 - Schedule of Annuitants by Monthly Benefit as of July 1, 2017

Monthly Benefit Amount	Number of Members	Female	Male	Average Service
Under \$200	251	185	66	6.16
200 - 399	460	349	111	11.73
400 - 599	435	337	98	16.21
600 - 799	400	287	113	20.06
800 - 999	401	292	109	22.22
1,000 - 1,199	497	377	120	25.67
1,200 - 1,399	513	347	166	27.12
1,400 - 1,599	567	376	191	28.92
1,600 - 1,799	622	416	206	29.12
1,800 - 1,999	605	405	200	29.98
2,000 - 2,199	566	397	169	29.85
2,200 - 2,399	531	347	184	30.48
2,400 - 2,599	421	285	136	31.62
2,600 - 2,799	372	249	123	32.21
2,800 - 2,999	356	223	133	32.82
3,000 - 3,199	314	214	100	33.31
3,200 - 3,399	272	182	90	34.27
3,400 - 3,599	197	117	80	33.85
3,600 - 3,799	162	94	68	35.16
3,800 - 3,999	115	68	47	35.08
4,000 & over	<u>444</u>	<u>226</u>	<u>218</u>	<u>36.65</u>
otal:	8,501	5,773	2,728	27.38

Exhibit D – Reconciliation of Member Data by Status

	Active Members	Vested Terminated Members	Non-Vested Terminated Members	Service Retirees	Disabled Retirees	Beneficiaries	Total
Number as of July 1, 2016	10,813	1,601	779	7,435	128	686	21,442
Additions and new members	835	0	0	0	0	0	825
Retirements	-328	-63	0	391	0	0	0
Disability	-1	-3	0	0	4	0	0
Died with beneficiary	-3	0	0	-41	-1	48	3*
Died without beneficiary	-5	-3	0	-121	-3	-23	-155
Terminated vested	-153	153	0	0	0	0	0
Terminated non-vested	-198	0	198	0	0	0	0
Refunds	-179	-32	-58	0	0	0	-269
Rehired as active	94	-53	-4 1	0	0	0	0
Expired benefits	0	0	0	0	0	-6	-6
New alternate payee	0	0	0	0	0	4	4
Data adjustments	<u>-1**</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>-1</u>
Number as of July 1, 2017	10,874	1,600	878	7,664	128	709	21,853

^{*} Due to multiple beneficiaries

^{**} Removed from database after being reported to TRF in error

Exhibit E – Summary Statement of Income and Expenses on a Market Value Basis

	Year Ended Ju	ne 30 , 2017	Year Ended Ju	ne 30 , 2016
Net assets at market value at the beginning of the year		\$2,124,335,288		\$2,141,920,800
Contribution:				
 Employee contributions 	\$79,309,153		\$76,342,685	
Employer contributions	86,058,868		82,839,932	
Purchased service credit	2,553,200		2,768,245	
 Interest, penalties and other 	235,890		<u>44,966</u>	
Total contribution income		\$168,157,111		\$161,995,828
Investment income:				
 Interest, dividends and other income 	\$50,718,890		\$49,982,337	
Securities lending income	229,936		304,571	
 Investment expenses 	<i>-</i> 6,011,791		-6,034,689	
Securities lending income	<u>-45,973</u>		<u>-60,907</u>	
Net investment income		\$44,891,062		\$44,191,312
Net realized and unrealized gains/(losses)		221,797,589		<u>-35,952,316</u>
Total income available for benefits		\$434,845,762		\$170,234,824
Less benefit payments and expenses:				
Regular annuity benefits	\$190,029,141		\$179,625,551	
Partial lump-sum benefits paid	1,075,553		992,233	
Refunds	<u>5,411,850</u>		<u>5,350,896</u>	
Total benefits and refunds	\$196,516,544		\$185,968,680	
 Administrative and miscellaneous expenses 	\$2,173,431		\$1,851,656	
Total benefit payments and expenses		\$198,689,975		\$187,820,336
Change in reserve for future benefits		\$236,155,787		-\$17,585,512
Net assets at market value at the end of the year		\$2,360,491,075		\$2,124,335,288



Exhibit F – Summary Statement of Plan Assets

	June 30 , 20	17	June 30, 2	016
Cash and cash equivalents (operating cas	n)	\$19,082,062		\$19,747,422
Invested securities lending collateral		12,839,759		19,859,451
Total accounts receivable		35,281,492		35,020,845
Investments:				
• Equities	\$1,275,571,112		\$1,131,917,482	
Fixed Income	521,927,872		479,086,760	
Short-term	27,243,767		18,515,640	
Real assets	407,547,460		369,771,496	
Private equity	76,976,255		73,374,321	
Total investments at market value		\$2,309,266,466		\$2,072,665,699
Total assets		\$2,376,469,779		\$2,147,293,417
Deferred outflows of resources related to p	ensions	384,391		168,324
Total accounts payable		16,307,753		23,056,143
Deferred inflows related to pensions		<u>55,342</u>		<u>70,310</u>
Net assets at market value		\$2,360,491,075		\$2,124,335,288
Net assets at actuarial value		\$2,379,811,205		\$2,229,292,288
	3% 1% Equities Fixed Income Real Estate Private Equity Invested Cash	55%	3% 1% 18% 23%	35%

Exhibit G - Development of the Fund Through June 30, 2017

Year Ended June 30	Employer Contributions	Employee Contributions	Other Contributions	Net Investment Return*	Admin. Expenses	Benefit Payments	Market Value of Assets at Year-End**	Actuarial Value of Assets at Year-End	Actuarial Value as a Percent of Market Value
2008	\$33,683,550	\$33,237,677	\$3,652,162	(\$140,641,059)	(\$1,639,521)	(111,956,810)	\$1,846,113,411	\$1,909,500,000	103.4%
2009	37,487,655	34,712,846	2,180,479	(492,741,825)	(1,707,506)	(116,328,330)	1,309,716,730	1,900,327,834	145.1%
2010	39,836,646	36,848,481	1,420,703	179,059,473	(1,902,796)	(127,029,394)	1,437,949,843	1,841,960,220	128.1%
2011	44,545,433	38,869,260	1,508,557	332,952,526	(2,003,705)	(129,646,302)	1,726,179,317	1,822,598,871	105.6%
2012	46,126,193	40,254,562	2,427,849	(23,108,500)	(1,596,976)	(137,729,762)	1,654,149,659	1,748,080,771	105.7%
2013	59,352,860	53,824,557	2,671,931	218,581,671	(1,623,638)	(148,996,718)	1,839,583,960	1,762,321,644	95.8%
2014	62,355,146	56,554,767	2,082,055	292,660,404	(1,586,045)	(162,259,276)	2,090,977,056	1,940,473,504	92.8%
2015	78,422,098	72,268,451	1,773,213	73,204,806	(1,923,392)	(172,239,433)	2,141,920,800	2,125,017,451	99.2%
2016	82,839,932	76,342,685	2,813,211	8,238,996	(1,851,656)	(185,968,680)	2,124,335,288	2,229,292,988	104.9%
2017	86,058,868	79,309,153	2,789,090	266,688,651	(2,173,431)	(196,516,544)	2,360,491,075	2,379,811,205	100.8%

^{*} On a market basis, net of investment fees; for 2008-2010 and 2015-2017, net of investment fees and administrative expenses

^{**} The market value of assets as of June 30, 2014 was restated by (\$561,999) due to GASB 68 implementation. The restated amount is \$2,090,415,057.

Exhibit H - Definition of Pension Terms

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

Actuarial Accrued Liability for Actives:	The value of all projected benefit payments for current members less the portion that will be paid by future normal costs.
Actuarial Accrued Liability for Pensioners:	The single-sum value of lifetime benefits to existing pensioners. This sum takes into account life expectancies appropriate to the ages of the pensioners 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 (ADC).
Actuarial Gain or Loss:	A measure of the difference between actual experience and 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 that 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 actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding 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 o 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 calculations 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 ADC.
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.
Actuarially Determined Contribution (ADC):	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Fund's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment.
Amortization Method:	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Assumptions or Actuarial	The estimates upon which the cost of the Fund is calculated, including:
Assumptions:	 a. <u>Investment return</u> - the rate of investment yield that the Fund will earn over the long term future;
	 b. <u>Mortality rates</u> - the death rates of employees and pensioners; life expectancy is based on these rates;
	c. Retirement rates - the rate or probability of retirement at a given age;
	 d. <u>Withdrawal rates</u> - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;
	e. <u>Salary increase rates</u> - 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 termination.
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 contributions.
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.
Funded Ratio:	The ratio of the Actuarial Value of Assets (AVA) to the Actuarial Accrued Liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.

Funding Period or Amortization Period:	The term "Funding Period" is used in two ways. First, it is the period used in calculating the Amortization Payment as a component of the ADC. Second, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on the statutory employer contribution rate, and assuming no future actuarial gains or losses.
GASB:	Governmental Accounting Standards Board.
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.
Margin:	The difference, whether positive or negative, between the statutory employer contribution rat and the Actuarially Determined Contribution (ADC).
Net Pension Liability (NPL):	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
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 with respect to 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 refer to the total of employee contributions and employer Normal Cost unless otherwise specifical stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member form hire until ultimate termination, death, disability, or retirement.
Open Amortization Period:	An open amortization period is one that is used to determine the Amortization Payment, but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period 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:	Market value of assets.
Real Rate of Return:	Nominal rate of return on investments, adjusted for inflation.

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: Actuarial Valuation Basis

Exhibit I – Actuarial Assumptions and Actuarial Cost Method

Investment Return Rate:

7.75% per annum, compounded annually, equal to an assumed 2.75% inflation rate plus a 5.50% real rate of return, less 0.50% for expected investment expenses. (Adopted effective July 1, 2015).

Mortality Rates:

The mortality rates were based on historical and current demographic data, as used in the experience study dated April 30, 2015. The underlying tables reasonably reflect the mortality experience of the Fund as of the measurement date.

Post-Retirement Non-Disabled:

RP-2014 Healthy Annuitant Mortality Table set back one year, multiplied by 50% for ages under 75 and grading up to 100% by age 80, projected generationally using Scale MP-2014. (Adopted effective July 1, 2015). Sample 2014 mortality rates are as follows:

Age	Male	Female
50	0.20%	0.14%
55	0.27%	0.17%
60	0.37%	0.24%
65	0.51%	0.37%
70	0.77%	0.58%
75	1.22%	0.95%
80	3.62%	2.82%
85	6.93%	5.40%
90	12.15%	9.56%
95	20.11%	16.30%
100	29.38%	25.11%

The mortality tables are adjusted forward from 2014 using a generational projection to reflect future mortality improvement.

Post-Retirement Disabled:

RP-2014 Disabled Mortality Table set forward 4 years. (Adopted effective July 1, 2015).

Pre-Retirement Non-Disabled:

RP-2014 Employee Mortality Table, projected generationally using Scale MP-2014. (Adopted effective July 1, 2015).

Section 4: Actuarial Basis as of July 1, 2017 for the State Teachers' Retirement Fund



Retirement Rates:

The following rates of retirement are assumed for members eligible to retire. (Adopted effective July 1, 2015).

	Unreduced	Retirement*	Reduced Retirement
Age	Male	Female	Male/Female
50-54	15.00%	15.00%	
55-57	15.00%	15.00%	2.00%
58	15.00%	15.00%	3.00%
59	15.00%	15.00%	3.50%
60	15.00%	15.00%	4.00%
61	25.00%	25.00%	6.50%
62	35.00%	35.00%	9.00%
63	25.00%	30.00%	12.00%
64	35.00%	40.00%	12.00%
65	40.00%	50.00%	
66	30.00%	40.00%	
67	30.00%	30.00%	
68	25.00%	30.00%	
69	25.00%	30.00%	
70-74	25.00%	25.00%	
75	100.00%	100.00%	

^{*}If a member reaches eligibility for unreduced retirement before age 65 under the rule of 85 (Grandfathered Tier 1) or the Rule of 90/Age 60 (Non-grandfathered Tier 1 and Tier 2), 10% is added to the rate at the age (and only this age) the member becomes first eligible for an unreduced retirement benefit.

Disability Rates:

Shown below for selected ages. (Adopted effective July 1, 2010).

	IN THE RESIDENCE OF THE PARTY O
Age	Rates
20	0.011%
25	0.011%
30	0.011%
35	0.011%
40	0.033%
45	0.055%
50	0.088%
55	0.154%
60	0.297%

Termination Rates:

Termination rates based on years of service, for causes other than death, disability, or retirement. (Adopted effective July 1, 2015).

Years from Hire	Male	Female	Years from Hire	Male	Female
0	20.00%	20.00%	10	2.50%	2.50%
1	14.00%	12.00%	11	2.00%	2.50%
2	11.00%	9.00%	12	2.00%	2.50%
3	8.00%	7.00%	13	2.00%	2.50%
4	6.50%	6.00%	14	2.00%	2.50%
5	5.00%	5.00%	15-18	1.50%	2.00%
6	4.00%	4.00%	19	0.75%	2.00%
7	3.50%	3.50%	20-24	0.75%	1.50%
8	3.00%	3.00%	25 & over	0.75%	0.75%
9	2.50%	2.50%			

Termination rates eliminated at first retirement eligibility

Salary Increase Rates:

Inflation rate of 2.75% plus productivity increase rate of 1.50%, plus step-rate/promotional increase as shown below. (Adopted effective July 1, 2015).

Years from Hire	Annual Step-Rate Promotional Component	Annual Total Salary Increase
0	10.25%	14.50%
1	3.50	7.75
2	3.25	7.50
3	3.00	7.25
4	2.75	7.00
5	2.50	6.75
6	2.25	6.50
7	2.00	6.25
8-9	1.75	6.00
10-11	1.50	5.75
12-13	1.25	5.50
14-15	1.00	5.25
16-18	0.75	5.00
19-22	0.50	4.75
23-24	0.25	4.50
25 & over	0.00	4.25

Payroll Growth Rate:

3.25% per annum. This assumption does not include any allowance for future increase in the number of members. (Adopted effective July 1, 2010).

Percent Married:

For valuation purposes, 75% of members are assumed to be married. Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses. (Adopted effective July 1, 1992).

Percent Electing a Deferred Termination Benefit:

Terminating members are assumed to elect the most valuable benefit at the time of termination. Termination benefits are assumed to commence at the first age at which unreduced benefits are available. (Adopted effective July 1, 1990).

The liability includes a 3% load for members who retired during the year ended June 30, 2017, to reflect that their benefits are not finalized as of the valuation date.
Administrative expenses of \$2,233,200 (actual expenses for the previous year, increased with inflation) are expected to be paid monthly for the year beginning July 1, 2017.
The actuarial value of assets is based on the market value of assets with a five-year phase-in of actual investment return in excess of (or less than) expected investment income. Expected investment income is determined using the assumed investment return rate and the market value of assets (adjusted for receipts and disbursements during the year). The actual investment return for this purpose is determined net of all investment expenses. The actuarial value is further adjusted, if necessary, to be within 20% of the market value.
Normal cost and actuarial accrued liability are calculated on an individual basis and are allocated by salary. Entry age is determined as the age at member's enrollment in TRF. The actuarial accrued liability is the difference between the total present value of future benefits and the actuarial present value of future normal costs. The unfunded actuarial accrued liability (UAAL) is the excess of the actuarial accrued liability over the actuarial value of assets.
The actuarially determined contribution (ADC) is determined as the sum of (a) the employer normal cost rate, and (b) a level percentage of payroll required to amortize the unfunded actuarial accrued liability over the 30-year closed period that began July 1, 2013.

Exhibit II - Summary of Plan Provisions

This exhibit summarizes the major provisions of the Fund included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Effective Date:	July 1, 1971			
Plan Year:	July 1 through June 30			
Administration:	The Teachers' Retirement Fund (TRF) is administrated by a Board of Trustees. A separate State Investment Board is responsible for the investment of the trust assets, although TRF's Board establishes the asset allocation policy. The Retirement and Investment Office is the administrative agency for TRF.			
Type of Plan:	TRF is a qualified governmental defined benefit retirement plan. For Governmental Accounting Standards Board purposes, it is a cost-sharing multiple-employer public employee retirement system.			Standards
Eligibility:	All certified teachers of any public school in the State participate in TRF. This includes teachers, supervisors, principals, administrators, etc. Non-certified employees such as teacher's aides, janitors, secretaries, drivers, etc. are not allowed to participate in TRF. Eligible employees become members at their date of employment.			aries, drivers,
Member Contributions:	All active members contribute 11.75% of their salary per year. The employer may "pick up" the member's contribution under the provisions of Internal Revenue Code Section 414(h). The member contribution rate was increased from 7.75% to 9.75% effective July 1, 2012, and was increased to 11.75% effective July 1, 2014. The total addition of 4.00% to the member contribution rate will remain in effect until TRF is 100% funded on an actuarial basis. At that point, the member contribution rate will revert to 7.75%.			
Salary:	A member's total earnings are used for salary purposes, including overtime, etc., and including nontaxable wages under a Section 125 plan, but excluding certain extraordinary compensation, such as fringe benefits or unused sick and vacation leave.			
Employer Contributions:			ontributes a percentage of the member's s, since July 1, 2008, additions as show	
	Effective Date	Addition to 7.75% Base Rate	Employer Contribution Rate	
	July 1, 2008	0.50%	8.25%	
	July 1, 2010	1.00%	8.75%	
	July 1, 2012	3.00%	10.75%	
	July 1, 2014	5.00%	12.75%	

However, the additions are subject to a "sunset" provision, so the contribution rate will revert to 7.75% once the funded ratio reaches 100%, measured using the actuarial value of assets. The contribution rate will not automatically increase if the funded ratio later falls back below 100%.

Service:	Employees receive credit for service while a member. A member may also purchase credit for certain periods, such as time spent teaching at a public school in another state, by paying the actuarially determined cost of the additional service. Special rules and limits govern the purchase of additional service.
Tiers:	Members who join TRF by June 30, 2008 are in Tier 1, while members who join later are in Tier 2. If a Tier 1 member terminates, takes a refund, and later rejoins TRF after June 30, 2008, that member will be in Tier 2. As of June 30, 2013, Tier 1 members who are at least age 55 and vested (3 years of service) as of the effective date, or the sum of the member's age and service is at least 65, are considered Grandfathered, and previous plan provisions will not change. Tier 1 members who do not fit these criteria as of June 30, 2013, are considered Non-grandfathered. These members, along with Tier 2, have new plan provisions, as described below.
Final Average Compensation (FAC):	The average of the member's highest three (Tier 1 members) or five (Tier 2 members) plan year salaries. Monthly benefits are based on one-twelfth of this amount.
Normal Retirement:	a. Eligibility:

a. Eligibility:

- Tier 1 members may retire upon Normal Retirement on or after age 65 with credit for 3 years of service, or if earlier, when the sum of the member's age and service is at least 85. Effective as of June 30, 2013, Tier 1 members who are at least age 55 and vested (3 years of service) as of the effective date, or the sum of the member's age and service is at least 65, normal retirement eligibility will not change (participants are Grandfathered). For those who did not meet these criteria as of June 30, 2013 (Non-grandfathered), members may retire upon Normal Retirement on or after age 65 with credit for 3 years of service, or if earlier, when the sum of the member's age and service is at least 90, with a minimum age of 60.
- Tier 2 members may retire upon Normal Retirement on or after age 65 with credit for 5 years of service, or, if earlier, when the sum of the member's age and service is at least 90. Effective July 1, 2013, Tier 2 members may retire upon Normal Retirement on or after age 65 with credit for 5 years of service, or if earlier, when the sum of the member's age and service is at least 90, with a minimum age of 60.
- b. Monthly Benefit: 2.00% of FAC (monthly) times years of service.
- Payment Form: Benefits are paid as a monthly life annuity, with a guarantee that if the payments made do not exceed the member's contributions plus interest, determined as of the date of retirement, the balance will be paid in a lump-sum to the member's beneficiary. Optional forms of payment are available: see below.

Early Retirement:	 a. Eligibility: Tier 1 members may retire early after reaching age 55 with credit for three years of service, while Tier 2 members may retire early after reaching age 55 with credit for five years of service. b. Monthly Benefit: 2.00% of FAC (monthly) times years of service, multiplied by a factor that reduces the benefit 6% for each year from the earlier of (i) age 65, or (ii) the age at which current service plus age equals 85 (Tier 1 members) or 90 (Tier 2 members). Effective July 1, 2013 for members who are either Non-grandfathered Tier 1 or Tier 2: 2.00% of FAC (monthly) times years of service, multiplied by a factor that reduces the benefit 8% for each year from the earlier of (i) age 65, or (ii) the age at which current
	service plus age equals 90 with a minimum age of 60.
	c. Payment Form: Same as for Normal Retirement above.
Disability Retirement:	 Eligibility: A member is eligible provided he/she has credit for at least one year of service. Effective July 1, 2013, a member is eligible provided he/she has credit for at least five years of service.
	 Monthly Benefit: 2.00% of FAC (monthly) times years of service with a minimum 20 years of service. Effective July 1, 2013, 2.00% of FAC (monthly) times years of service.
	c. Payment Form: The disability benefit commences immediately upon the member's retirement. Benefits cease upon recovery or reemployment. Disability benefits are payable as a monthly life annuity with a guarantee that, at the member's death, the sum of the member's contributions plus interest as of the date of retirement that is in excess of the sum of payments already received will be paid in a lump sum to the member's beneficiary.
	d. All alternative forms of payment other than level income and the partial lump-sum option are also permitted in the case of disability retirement. For basis recovery only, disability benefits are converted to normal retirement benefits when the member reaches normal retirement age or age 65, whichever is earlier.
Deferred Termination Benefit:	a. Eligibility: A Tier 1 member with at least three years of service, or a Tier 2 member with at least five years of service, who does not withdraw his/her contributions from the fund, is eligible for a deferred termination benefit.
	b. Monthly Benefit: 2.00% of FAC (monthly) times years of service. Both FAC and service are determined at the time the member leaves active employment. Benefits may commence unreduced at age 65 or when the sum of the member's age and service is 85 (Grandfathered Tier 1 members) or 90 with a minimum age of 60 (Non-grandfathered Tier 1 and Tier 2 members). Reduced benefits may commence at or after age 55 if the member is not eligible for an unreduced benefit. Reductions are the same as for Early Retirement.
	c. Payment Form: The form of payment is the same as for Normal Retirement above.
	 Death Benefit: A member who dies after leaving active service but before retiring is entitled to receive a benefit as described below.
Withdrawal (Refund) Benefit:	a. Eligibility: Tier 1 members leaving covered employment with less than three years of service, and Tier 2 members leaving covered employment with less than five years of service, are eligible. Optionally, vested members may withdraw their contributions plus interest in lieu of the deferred benefits otherwise due.
	 Benefit: The member who withdraws receives a lump-sum payment of his/her employee contributions, plus the interest credited on these contributions. Interest is credited at 6% per year (0.5% per month).

Death Benefit:

- a. Eligibility: Death must have occurred while an active or an inactive, non-retired member.
- b. Benefit: Upon the death of a nonvested member, a refund of the member's contributions and interest is paid. Upon the death of a vested member, the beneficiary may elect (i) the refund benefit above, or (ii) a life annuity of the normal retirement benefit, determined under Option One below, based on FAC and service as of the date of death, but without applying any reduction for the member's age at death. In determining the reduction for Option One, members not eligible for normal retirement benefits use the Fund's option tables for disabled members.

Optional Forms of Payment:

There are optional forms of payment available on an actuarially equivalent basis, as follows:

Option 1 - A life annuity payable while either the participant or his beneficiary is alive, "popping-up" to the original life annuity if the beneficiary predeceases the member.

Option 2 - A life annuity payable to the member while both the member and beneficiary are alive, reducing to 50% of this amount if the member predeceases the beneficiary, and "popping-up" to the original life annuity if the beneficiary predeceases the member.

Option 3a - A life annuity payable to the member, with a guarantee that, should the member die prior to receiving 60 payments (five years), the payments will be continued to a beneficiary for the balance of the fiveyear period. (This option has been replaced by Option 3b. It is not available to employees who retire on or after August 1, 2003. Retirees who elected this option prior to that date are unaffected.)

Option 3b - A life annuity payable to the member, with a guarantee that, should the member die prior to receiving 240 payments (twenty years), the payments will be continued to a beneficiary for the balance of the twenty-year period. (This option replaced Option 3a effective August 1, 2003.)

Option 4 - A life annuity payable to the member, with a guarantee that, should the member die prior to receiving 120 payments (10 years), the payments will be continued to a beneficiary for the balance of the ten-year period.

Option 5 - A non-level annuity payable to the member, designed to provide a level total income when combined with the member's Social Security benefit. This option is not available to disabled retirees.

In addition, members may elect a partial lump-sum option (PLSO) at retirement. Under this option, a member receives an immediate lump-sum equal to 12 times the monthly life annuity benefit and a reduced annuity. The reduction is determined actuarially. The member can then elect to receive the annuity benefit in one of the other optional forms, except that members who receive a PLSO may not elect Option 5 - the level income option. The PLSO is not available to disabled retirees or retirees who are not eligible for an unreduced retirement benefit.

Actuarial equivalence is based on tables adopted by the Board of Trustees.

Cost-of-living Increase:

From time to time, TRF has been amended to grant certain post-retirement benefit increases. However, TRF has no automatic cost-of-living increase features.

Exhibit III - Summary of Plan Changes

1991 Legislative Sessions:

- 1. Benefit multiplier increased form 1.275% to 1.39% for all future retirees.
- 2. Provide a post retirement benefit increases for all annuitants receiving a monthly benefit on June 30, 1991. The monthly increase is the greater of a 10% increase or a level increase based on years of service and retirement date:
 - a. \$3 per year of service for retirements before 1980
 - b. \$2 per year of service for retirements between 1980 and 1983
 - c. \$1 per year of service for retirements from 1984 through June 30, 1991

Minimum increase is \$5 per month. Maximum increase is \$75 per month

1993 Legislative Session:

- 1. Benefit multiplier increased from 1.39% to 1.55% for all future retirees.
- 2. Provide a post-retirement benefit increase for all annuitants receiving a monthly benefit on June 30, 1993. The monthly increase is the greater of a 10% increase or a level increase based on years of service and retirement date:
 - a. \$3 per year of service for retirements before 1980
 - b. \$2.50 per year of service for retirements between 1980 and 1983
 - c. \$1 per year of service for retirements from 1984 through June 30, 1993

Minimum increase is \$5 per month. Maximum increase is \$100 per month.

- 3. Minimum retirement benefit increased to \$10 times years of service up to 25, plus \$15 times years of service greater than 25. (Previously was \$6 up to 25 years of service plus \$7.50 over 25 years of service.)
- 4. Disability benefit changed to 1.55% of FAC times years of service using a minimum of 20 years of service.

1995 Legislative Session:

There were no material changes made during the 1995 legislative session.

1997 Legislative Session:

- 1. Benefit multiplier increased from 1.55% to 1.75% for all future retirees.
- 2. Member contribution rate and employer contribution rate increased from 6.75% to 7.75%.
- A \$30.00/month benefit improvement was granted to all retirees and beneficiaries.

1999 Legislative Session:

- 1. Active members will now be fully vested after three years (rather than five years) of service.
- 2. Early retirement benefits will be reduced 6% per year from the earlier of (i) age 65, or (ii) the date as of which age plus service equals 85 (rather than from age 65 in all cases).
- 3. An ad hoc COLA was provided for all retirees and beneficiaries. This increase is equal to an additional \$2.00 per month for each year of service plus \$1.00 per month for each year since the member's retirement.
- 4. The formula multiplier was increased from 1.75% to 1.88% effective July 1, 1999.

2001 Legislative Session:

- 1. An ad hoc COLA was provided for all retirees and beneficiaries. The ad hoc COLA increase is equal to an additional \$2.00 per month for each year of service plus \$1.00 per month for each year since the member's retirement. Retirees and beneficiaries will also receive two additional increases equal to 0.75% times the monthly benefit, payable July 1, 2001 and July 1, 2002. The two 0.75% increases are conditional. If the actuarial margin is a shortfall, i.e., is negative, by 60 basis points or more, or if the margin has been negative by 30 or more basis points for two years, the Board could elect to suspend the increase.
- 2. The formula multiplier was increased from 1.88% to 2.00% effective July 1, 2001.

2003 Legislative Session:

- 1. Partial lump-sum option adopted, equal to twelve times the monthly life annuity benefit. Not available if level-income option is elected. Not available for reduced retirement or disability retirement.
- 2. Five-year certain and life option replaced with 20-year certain and life. This does not impact retirees who retired under the five-years certain and life option.
- 3. Employer service purchase authorized.
- 4. Active members of the Department of Public Instruction are permitted to make a one-time irrevocable election to transfer to the State Public Employees Retirement System in FY 2004. Both assets and liabilities for all TRF service will be transferred for electing employees. Transferred assets will be based on the actuarial present value of the member's accrued TRF benefit, or the member's contribution account balance if larger.

2005 Legislative Session:

There were no material changes made during the 2005 legislative sessions.

2007 Legislative Session:

- 1. For active members hired on or after July 1, 2008 (called Tier 2 members):
 - a. Members will be eligible for an unreduced retirement benefit when they reach age 65 with at least five years of service (rather than three years of service); or if earlier, when the sum of the member's age and service is at least 90 (rather than 85).
 - b. Members will be eligible for a reduced (early) retirement benefit when they reach age 55 with five years of service, rather than three years of service.
 - c. Members will be fully vested after five years of service (rather than three year of service).
 - d. The Final Average Compensation for Tier 2 members is the average of the member's highest five plan year salaries, rather than the average of the three highest salaries.
- 2. The employer contribution rate increases from 7.75% to 8.25% effective July 1, 2008, but this rate will be reset to 7.75% once the Fund reaches a 90% funded ratio, measured using the actuarial value of assets. (If the funded ratio later falls below 90% again, the contribution rate will not automatically return to 8.25%.)
- Employer contributions are required on the salary of reemployed retirees.
- 4. Active members of the Department of Career and Technical Education are permitted to make a one-time irrevocable election to transfer to the State Public Employees Retirement System in FY 2008. Both assets and liabilities for all TRF service will be transferred for electing employees. Transferred assets will be the actuarial present value of the member's accrued TRF benefit, or the member's contribution account balance, if larger.

2009 Legislative Session:

- An individual who retired before January 1, 2009, and is receiving monthly benefits is entitled to receive a supplemental payment from the fund. The supplemental payment is equal to an amount determined by taking twenty dollars multiplied by the member's number of years of service credit plus fifteen dollars multiplied by the number of years since the member's retirement as of January 1, 2009. The supplemental payment may not exceed the greater of 10% of the member's annual annuity or \$750.00. TRF will make the supplemental payment in December 2009.
- 2. The employer contribution rate increases from 8.25% to 8.75% effective July 1, 2010, but this rate will be reset to 7.75% once the Fund reaches a 90% funded ratio, measured using the actuarial value of assets. (If the funded ratio later falls below 90% again, the contribution rate will not automatically return to 8.75%.)

2011 Legislative Session:

- 1. The employer contribution rate increases from 8.75% to 10.75% effective July 1, 2012, and increases thereafter to 12.75% effective July 1, 2014. The member contribution rate increases from 7.75% to 9.75% effective July 1, 2012, and increases thereafter to 11.75% effective July 1, 2014. Employer and member contributions will be reset to 7.75% once the Fund reaches a 90% funded ratio, measured using the actuarial value of assets.
- 2. For current Tier 1 members who, as of June 30, 2013, are vested (at least 3 years of service), and at least age 55, OR the sum of the member's age and service is at least 65, are considered a Tier 1 Grandfathered member. Current Tier 1 members, who will not meet this criteria as of June 30, 2013, are considered a Tier 1 Non-grandfathered member.
- 3. Eligibility for normal/ unreduced retirement benefits do not change for Tier 1 Grandfathered members. For Tier 1 Non-grandfathered and Tier 2 members, effective after June 30, 2013, unreduced retirement benefits start when the member reaches age 65 and is vested (3 years for Tier 1 Non-grandfathered, 5 years for Tier 2); or if earlier, when the sum of the member's age and service is at least 90, with a minimum age of 60.
- 4. Early retirement benefits do not change for Tier 1 Grandfathered members. For Tier 1 Non-grandfathered and Tier 2 members, effective after June 30, 2013, the normal retirement benefit will be reduced by 8% per year from the earlier of age 65 OR the age at which the sum of the member's age and service is at least 90, with a minimum age of 60.
- 5. Effective after June 30, 2013, all members may retire on disability after a period of at least five years of service (rather one year of service). The amount of the benefit is based on a 2% multiplier and actual service (rather than a minimum of twenty years of service in the current calculation).
- 6. Effective July 1, 2012, re-employed retirees are required to pay member contributions.
- 7. Effective August 1, 2011, beneficiary and death benefit provisions were updated, and the 60-month death payment benefit was removed.

2013 Legislative Session:

- 1. Employer and member contribution rates will be reset to 7.75% once the Fund reaches a 100% funded ratio (rather than the 90% funded ratio enacted with the 2011 Legislation), measured using the actuarial value of assets.
- Various technical and administrative changes that do not have an actuarial effect on the Fund were enacted.

2015 Legislative Session:

1. Various technical and administrative changes that do not have an actuarial effect on the Fund were enacted.

2017 Legislative Session:

There were no material changes made during the 2017 legislative sessions.

Section 5: GASB Information

Exhibit 1 - Net Pension Liability

The components of the net pension liability at were as follows:

	July 1, 2017	July 1, 2016
Total pension liability	\$3,734,016,828	\$3,589,393,851
Plan fiduciary net position	(2,360,491,075)	(2,124,335,288)
Net pension liability	\$1,373,525,753	\$1,465,058,563
Plan fiduciary net position as a percentage of the total pension liability	63.2%	59.2%

The net pension liability was measured as of June 30, 2017, and is determined based on the total pension liability from the July 1, 2017, actuarial valuation.

Plan provisions. The plan provisions used in the measurement of the net pension liability are the same as those used in the actuarial valuation as of July 1, 2017.

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of July 1, 2017, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation 2.75%

Salary increases 4.25% to 14.50%, varying by service, including inflation and productivity

Investment rate of return 7.75%, net of pension plan investment expense, including inflation

Cost-of-living adjustments None

For active and inactive members, mortality rates were based on the RP-2014 Employee Mortality Table, projected generationally using Scale MP-2014. For healthy retirees, mortality rates were based on the RP-2014 Healthy Annuitant Mortality Table set back one year, multiplied by 50% for ages under 75 and grading up to 100% by age 80, projected generationally using Scale MP-2014. For disabled retirees, mortality rates were based on the RP-2014 Disabled Mortality Table set forward four years.



The actuarial assumptions used were based on the results of an experience study dated April 30, 2015. They are the same as the assumptions used in the July 1, 2017 funding actuarial valuation.

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. Best estimates of arithmetic real rates of return for each major asset class included in the pension plan's target asset allocation as of July 1, 2017 are summarized in the following table:

Asset Class	Target Allocation	Long-Term Expected Real Rate of Return*
Global Equities	58%	6.7%
Global Fixed Income	23%	0.8%
Global Real Assets	18%	5.2%
Cash Equivalents	<u>1%</u>	0.0%
Total	100%	

^{*} Geometric real rates of return are net of inflation.

Discount rate: The long-term expected rate of return on pension plan investments is 7.75%. The high quality tax-exempt general obligation municipal bond rate (20-Bond GO Index) as of the closest date prior to the valuation date of June 30, 2017, is 3.58%, as published by the Board of Governors of the Federal Reserve System.

The discount rate used to measure the total pension liability was 7.75% as of June 30, 2017. The projection of cash flows used to determine the discount rate assumed plan member and employer contributions will be made at rates equal to those based on this July 1, 2017, Actuarial Valuation Report. For this purpose, only employer contributions that are intended to fund benefits of current plan members and their beneficiaries are included. Projected employer contributions that are intended to fund the service costs of future plan members and their beneficiaries, as well as projected contributions from future plan members, are not included. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members as of June 30, 2017. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability as of June 30, 2017.



Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability, calculated using the discount rate of 7.75%, as well as what the net pension liability would be if it were calculated using a discount rate that is one-percentage-point lower (6.75%) or one-percentage-point higher (8.75%) than the current rate:

	1% Decrease (6.75%)	Current Discount (7.75%)	1% Increase (8.75%)
Net pension liability as of June 30, 2015	\$1,728,392,470	\$1,307,855,182	\$957,135,967
Net pension liability as of June 30, 2016	\$1,900,291,033	\$1,465,058,563	\$1,102,551,032
Net pension liability as of June 30, 2017	\$1,826,126,843	\$1,373,525,753	\$996,748,988



Exhibit 2 – Schedules of Changes in Net Pension Liability

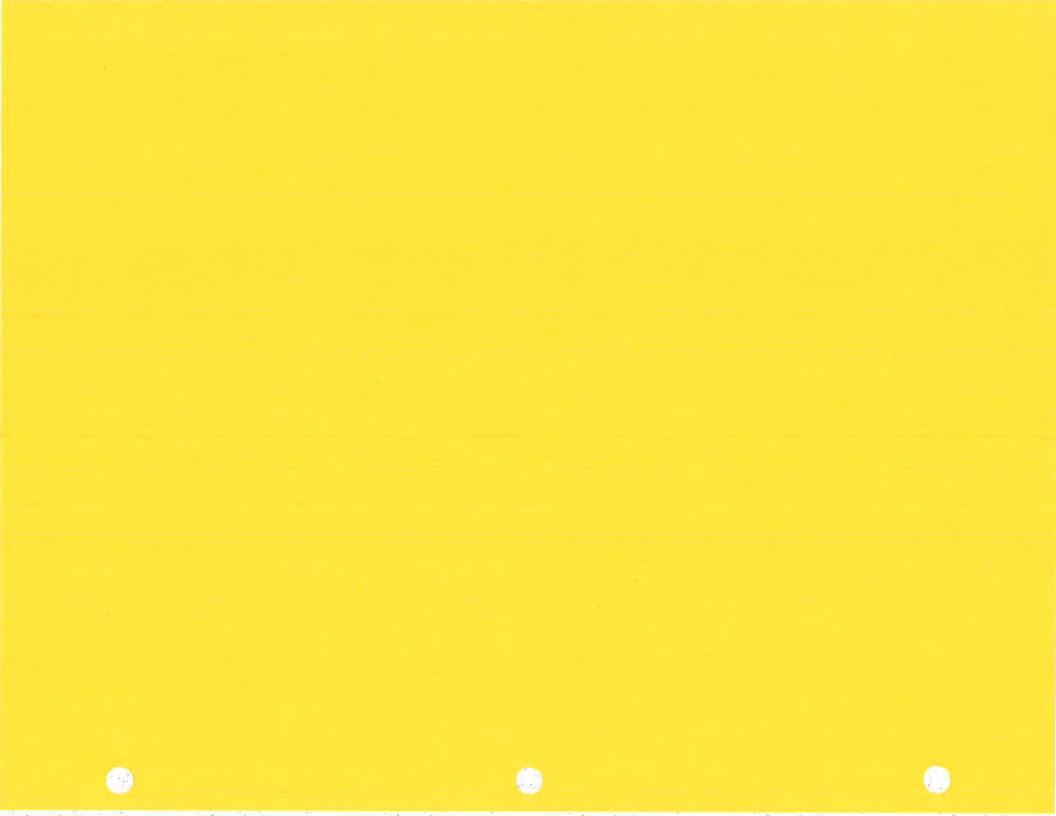
	2017	2016
Total pension liability		
Service cost	\$75,476,063	\$68,239,440
• Interest	276,412,402	265,439,909
Change of benefit terms	0	0
Differences between expected and actual experience	(10,748,944)	(8,092,800)
Changes of assumptions	0	Ó
Benefit payments, including refunds of employee contributions	(196,516,544)	(185,968,680)
Net change in total pension liability	\$144,622,977	\$139,617,869
Total pension liability – beginning	3,589,393,851	3,449,775,982
Total pension liability – ending (a)	\$3,734,016,828	\$3,589,393,851
Plan fiduciary net position		
Contributions – employer	\$86,058,868	\$82,839,932
Contributions – employee	79,309,153	76,342,685
Contributions – purchased service credit	2,553,200	2,768,245
Contributions – other	235,890	44,966
Net investment income	266,688,651	8,238,996
Benefit payments, including refunds of employee contributions	(196,516,544)	(185,968,680)
Administrative expense	(2,173,431)	(1,851,656)
• Other	Ó	ì΄Ó
Net change in plan fiduciary net position	236,155,787	(\$17,585,512)
Plan fiduciary net position – beginning	2,124,335,288	2,141,920,800
Plan fiduciary net position – ending (b)	\$2,360,491,075	\$2,124,335,288
Net pension liability – ending (a) – (b)	\$1,373,525,753	\$1,465,058,563
Plan fiduciary net position as a percentage of the total pension liability	63.2%	59.2%
Covered employee payroll	\$674,971,342	\$649,724,868
Net pension liability as percentage of covered employee payroll	203.5%	225.5%



Exhibit 3 – Schedule of Employer Contributions

Fiscal Year Ended June 30	Actuarially Determined Contributions	Contributions in Relation to the Actuarially Determined Contributions	Contribution Deficiency (Excess)	Covered- Employee Payroll	Contributions as a Percentage of Covered Employee Payroll
2013	\$52,396,153	\$59,300,720	\$(6,904,567)	\$551,655,590	10.75%
2014	59,513,485	62,355,146	(2,841,661)	580,053,235	10.75%
2015	71,167,632	78,422,098	(7,254,466)	615,104,860	12.75%
2016	84,724,122	82,839,932	1,884,190	649,724,868	12.75%
2017	89,231,211	86,058,868	3,172,343	674,971,342	12.75%







State Teachers' Retirement Fund

Actuarial Valuation as of July 1, 2017

October 26, 2017

Presented By:

Kim Nicholl, FSA, MAAA, EA Senior Vice President

Matt Strom, FSA, MAAA, EA Vice President

Discussion Topics – Valuation and Projections

Segal Consulting

- Overview of Valuation Process
- **➢ Summary of Valuation Highlights**
- Valuation Results and Projections
- Update on Public Sector Topics

Purposes of the Actuarial Valuation

- > Report the Fund's actuarial assets
- Calculate the Fund's liabilities
- Determine the funding policy Actuarially Determined Contribution (ADC) for fiscal year 2018 and compare to the statutory employer contribution
- Determine the effective amortization period
- Explore the reasons why the current valuation differs from the prior valuation
- Provide information for annual financial statements

The Valuation Process

Input

Member Data

Asset Information

Benefit Provisions

Actuarial Assumptions

Funding Methodology

Results

Actuarial Value of Assets

Normal Cost and Actuarial Liability

Unfunded Liability and Funded Ratio

Funding Period

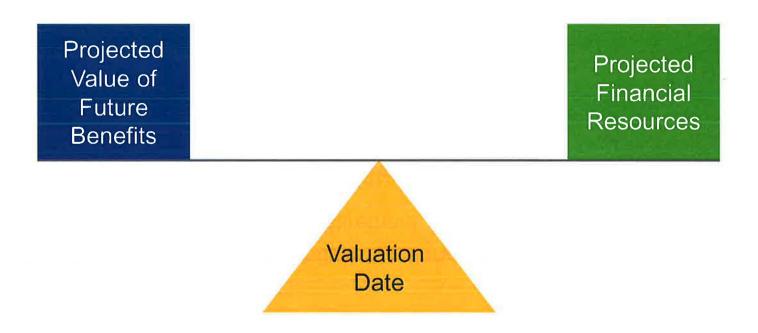
Actuarially Determined Employer Contribution

Accounting Results

How is an Actuarial Valuation Performed?

- Gather data as of the valuation date
 - Participant data
 - Financial data
- Project a benefit for each member, for each possible benefit
- Utilize actuarial assumptions
 - Economic (investment return, inflation, salary raises)
 - Demographic (death, disability, retirement, turnover)
- Apply assumptions to benefits to determine a total liability and assign liabilities to service
- Apply the funding policy to determine the actuarially determined contribution (ADC)
 - Based on actuarial cost method and asset valuation method

Actuarial Balance



Over the life of a pension system,

Benefits + Expenses = Contributions + Investment Return

Contributions = Benefits + Expenses - Investment Return

Actuarially Determined Contribution vs. Funding Period

Actuarially Determined Contribution (ADC)

- Equal to the normal cost plus amortization of the unfunded actuarial accrued liability (UAAL)
- > The funding policy components:
 - Entry age cost method
 - Asset valuation method
 - Amortization period

Funding Period

- Number of years that the UAAL is expected to be amortized based upon the fixed member and employer contribution rates
- ➤ Funding period is compared to the ADC's amortization period to assess the progress toward amortizing the unfunded accrued liability

The employer contribution rate is compared to the ADC as a measure of the adequacy of the employer (and member) contribution rates.

Actuarial Assumptions

Two types:

Demographic

- Retirement
- Disability
- Death in active service
- Withdrawal
- Death after retirement

Economic

- Inflation 2.75%
- Investment return 7.75%
- Salary increases 14.50% for new members to 4.25% for members with 25+ years
- Payroll growth 3.25%

Actuaries make assumptions as to when and why a member will leave active service, and estimate the amount and duration of the pension benefits paid.

Actuarial Methods

Asset Valuation Method (Actuarial Assets)

- Investment gains and losses recognized over a number of years
- TRF uses a five-year smoothing method
- A 20% market value corridor is applied – actuarial value of assets must fall within 80% to 120% of market value)

Cost Method

- Allocation of liability to past and future service
- TRF uses the entry age normal cost method
 - Allocates cost of member's retirement benefit over expected career as a level % of salary
 - Most common cost method among public sector retirement systems
 - Required by GASB

Amortization Method

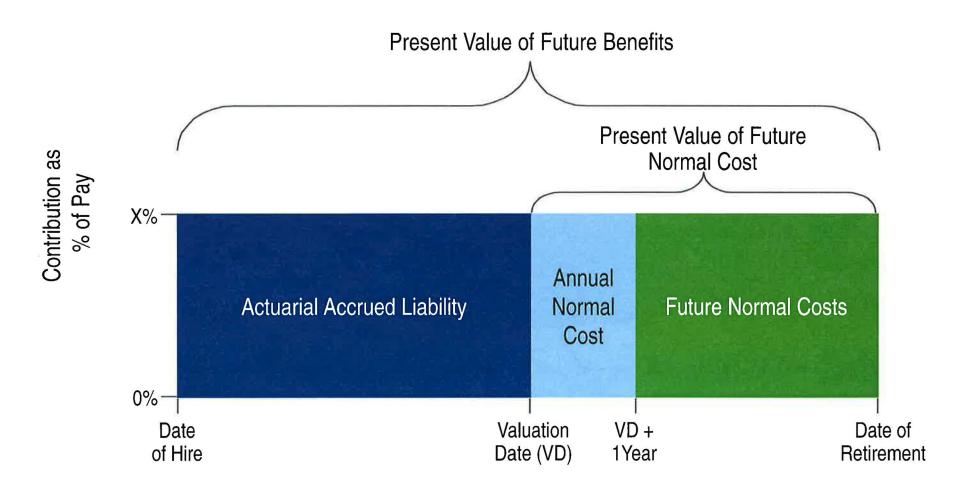
- > Relies on two inputs:
 - Number of years to amortize the UAL
 - Level dollar or level percentage of payroll approach
- TRF's amortization method:
 - 30-year closed period that began July 1, 2013
 - 26 years remaining
 - Level percentage of payroll

Entry Age Normal Cost Method

Allocates cost between past and future service

- > Normal Cost: Cost of annual benefit accrual as a level percent of salary
- Actuarial Accrued Liability: Represents accumulated value of past normal costs (or difference between total cost and future normal costs)
- ➤ Unfunded Actuarial Accrued Liability: Actuarial accrued liability minus actuarial value of assets

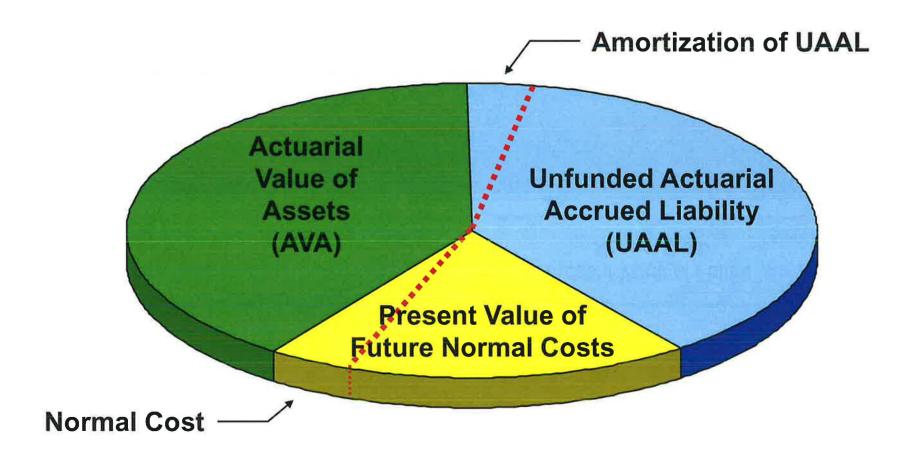
Funding Process



Actuarial Accrued Liability - Assets = Unfunded Actuarial Accrued Liability

Actuarially Determined Contribution

Present Value of Future Benefits



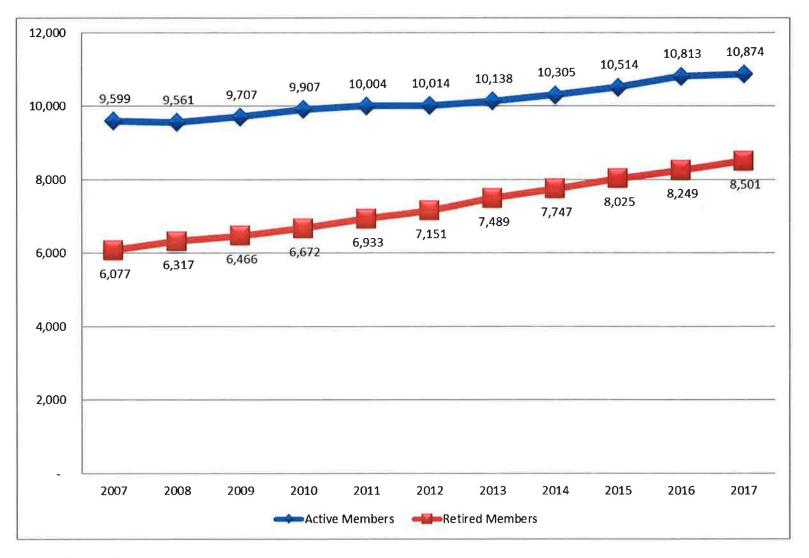
Summary of Valuation Highlights

- ➤ Market value of assets returned 12.6% for year ending 6/30/17 (Segal calculation)
 - Gradual recognition of deferred losses resulted in 8.2% return on actuarial value of assets
- ➤ Net impact on funded ratio was an increase from 62.1% (as of 7/1/16) to 63.7% (as of 7/1/16)
- ➤ Effective amortization period decreased from 29 years to 27 years
- ➤ Net impact on actuarially determined contribution (ADC) was a decrease from 13.22% of payroll to 12.99% of payroll
 - Based on the employer contribution rate of 12.75%, the contribution deficiency has decreased from 0.47% of payroll to 0.24% of payroll
- ➤ GASB Net Pension Liability decreased from \$1.47 billion as of 6/30/16, to \$1.37 billion as of 6/30/17

Membership

	2017	2016	Change
Active			
Number	10,874	10,813	+0.6%
Payroll (annualized)	\$650.1 mil	\$627.0 mil	+3.7%
 Average Age 	42.1 years	42.3 years	- 0.2 years
Average Service	11.9 years	12.1 years	- 0.2 years
Retirees and Beneficiaries			
Number	8,501	8,249	+3.1%
 Total Annual Benefits 	\$198.9 mil	\$187.2 mil	+6.3%
 Average Monthly Benefit 	\$1,950	\$1,891	+3.1%

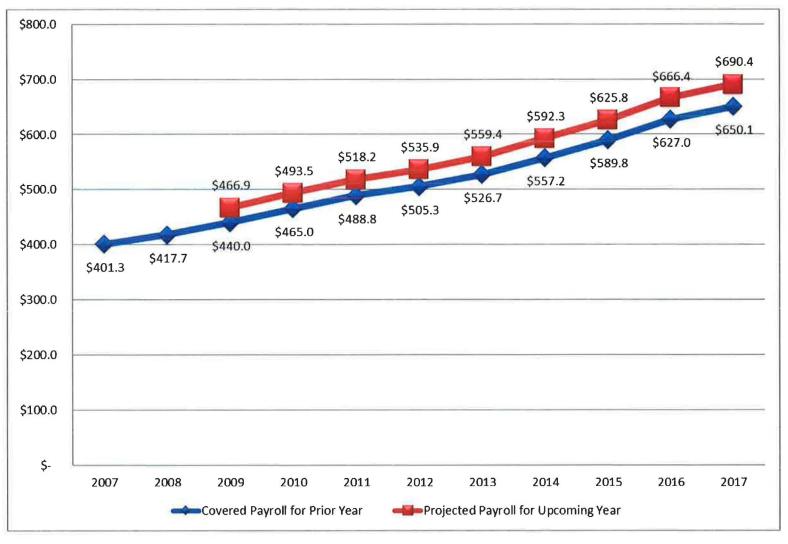
Active and Retired Membership



Since 2007, number of retirees and beneficiaries has increased 3.4% per year on average.

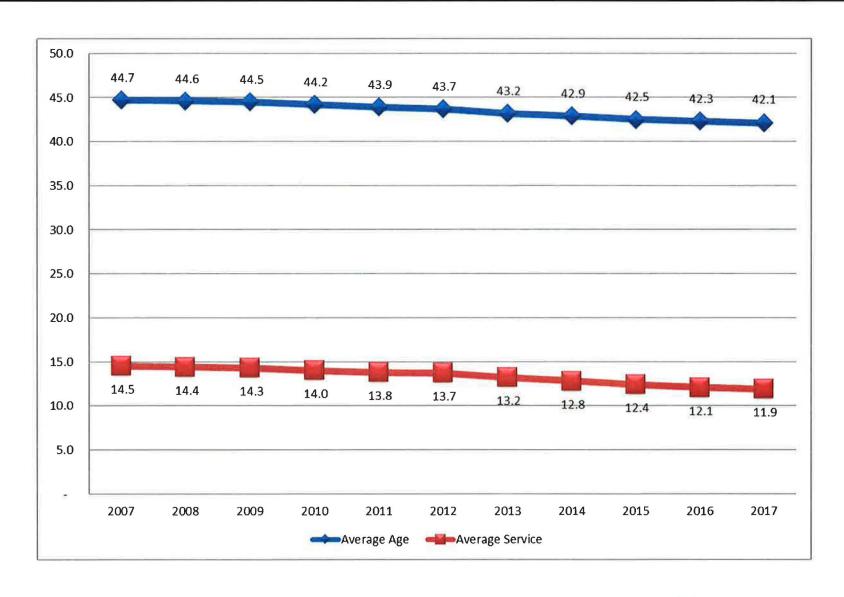
Active Payroll

\$ Millions

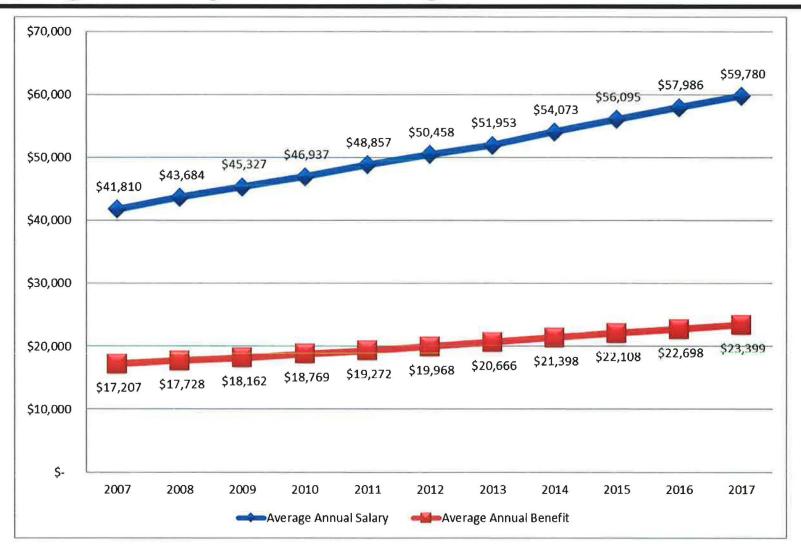


Since 2007, active payroll has increased, on average, 4.9% per year.

Average Age and Service of Active Members



Average Salary and Average Benefit



Since 2007, average salary has increased, on average, 3.6% per year. Average annual benefit has increased by 3.3% per year.

Assets

- The market value of assets increased from \$2.12 billion (as of 6/30/16) to \$2.36 billion (as of 6/30/17)
 - Segal determined the investment return was 12.64%, net of investment expenses
- The actuarial value of assets increased from \$2.23 billion (as of 6/30/16) to \$2.38 billion (as of 6/30/17)
 - Investment return of 8.18%, net of investment expenses
 - Actuarial value is 100.8% of market
 - There is a total of \$19 million of deferred net investment losses that will be recognized in future years
- ➤ The average annual return on market assets
 - 10-year average is 3.8%
 - 20-year average is 6.1%
- ➤ The average annual return on <u>actuarial</u> assets
 - 10-year average is 5.2%
 - 20-year average is 6.5%

Market Value of Assets (\$ in millions)

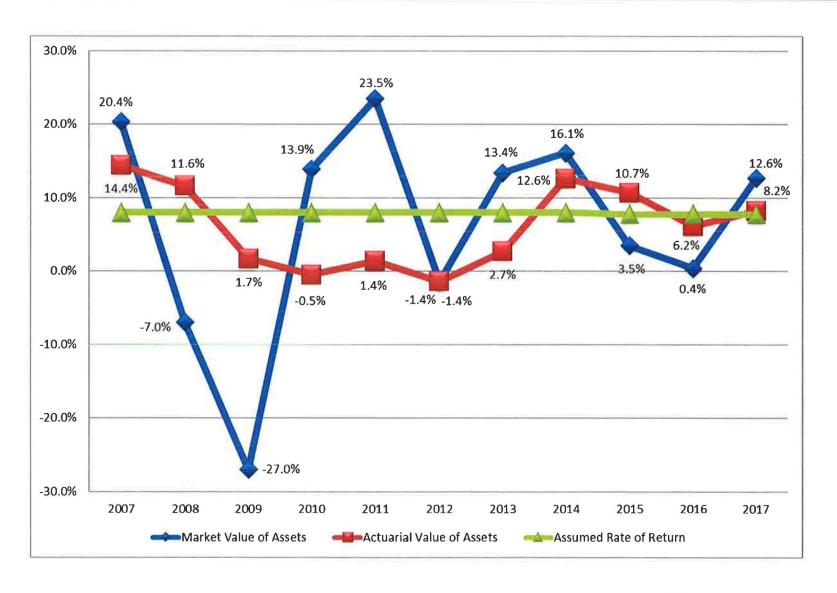
	Fiscal Year Ending June 30, 2017	Fiscal Year Ending June 30, 2016
Beginning of Year	\$2,124	\$2,142
Contributions:		
Employer	86	83
Member	79	76
Service Purchases	3	3
Total	168	162
Benefits and Refunds	(199)	(186)
Investment Income (net)	267	6
End of Year	\$2,360	\$2,124
Rate of Return	12.64%	0.39%

Actuarial Value of Assets (\$ in millions)

1. Market Value of Assets as of June 30, 2016	\$2,124
2. Cash Flow Items for FYE June 30, 2017	(30)
3. Expected Return	163
4. Expected Market Value of Assets (1) + (2) + (3)	\$2,257
5. Actual Market Value of Assets on June 30, 2017	2,360
6. Excess/(Shortfall) for FYE June 30, 2017 (5) – (4)	103
Excess/(Shortfall) Returns:	

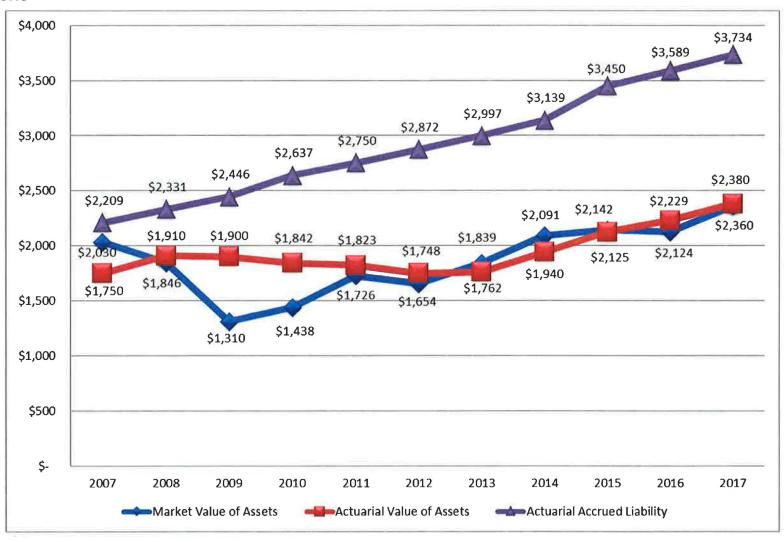
Year	Initial Amount	Deferral %	Unrecognized Amount
2017	\$103	80%	\$83
2016	(157)	60%	(94)
2015	(93)	40%	(37)
2014	147	20%	29
2013	87	0%	0
7. Total			(\$19)
8. Actuarial Value of Assets as of June 30, 2017 (5) - (7) \$2,3			
Actuarial Value of Assets as a % of Market Value of Assets 100.8%			

Asset Returns



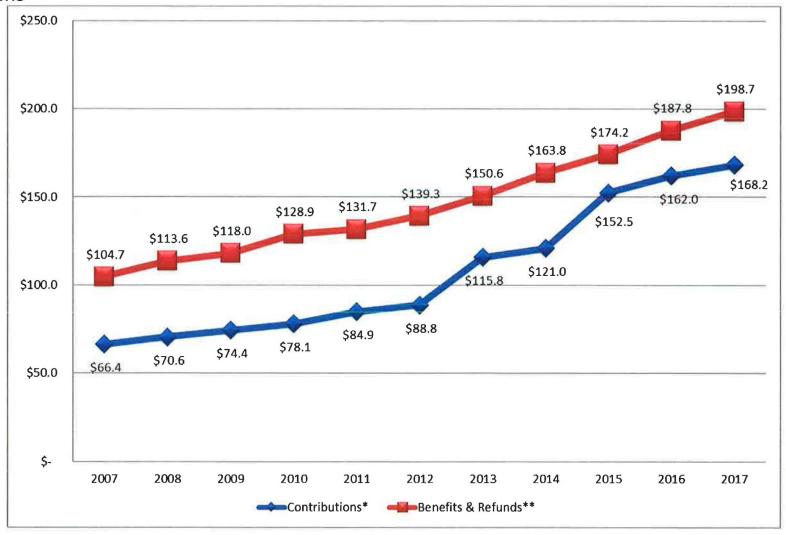
Market and Actuarial Values of Assets Compared to Actuarial Accrued Liability

\$ Millions



Contributions vs. Benefits and Refunds

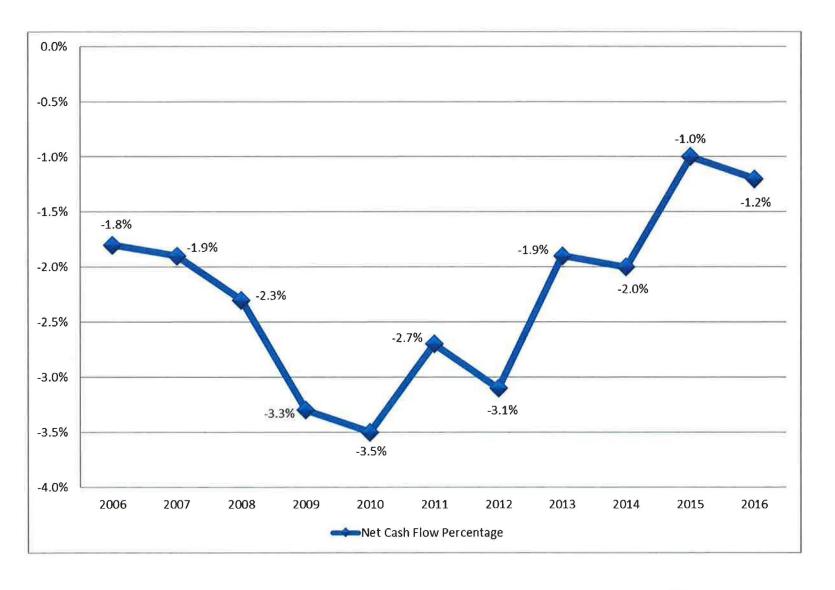
\$ Millions



^{*} Includes member and employer contributions, and service purchases

^{**} Includes administrative expenses

Net Cash Flow as a % of Market Value



Valuation Results (\$ in millions)

	July 1, 2017	July 1, 2016
Actuarial Accrued Liability:		
Active Members	\$1,545	\$1,523
Inactive Members	96	90
 Retirees and Beneficiaries 	2,093	1,976
Total	\$3,734	\$3,589
Actuarial Assets	2,380	2,229
Unfunded Accrued Liability	\$1,354	\$1,360
Funded Ratio	63.7%	62.1%

Actuarially Determined Contribution

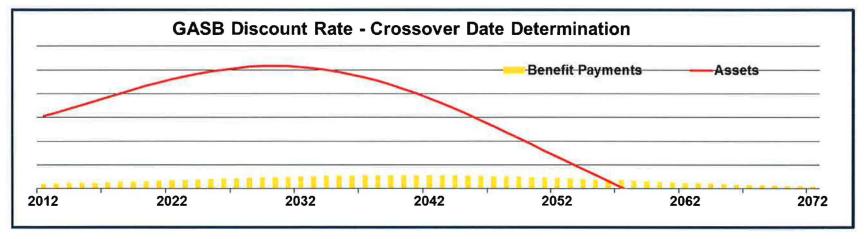
	For the Year Beginning		
	July 1, 2017	July 1, 2016	
Normal Cost Rate	12.06%	12.04%	
Member Rate	<u>11.75%</u>	<u>11.75%</u>	
Employer Normal Cost Rate	0.31%	0.29%	
Amortization of UAAL	<u>12.69%</u>	<u>12.93%</u>	
Actuarially Determined Contribution	12.99%	13.22%	
Statutory Employer Rate	12.75%	12.75%	
Contribution Sufficiency/(Deficiency)	(0.24%)	(0.47%)	

GASB Discount Rate

- Determined annually based on a projection of benefit payments and assets
 - Benefit payments projection is for current members
 - Asset projection is based on expected investment return assumption (7.75%) and contributions on behalf of current members
- If projected assets are always sufficient to pay projected benefit payments, the GASB discount rate is equal to the expected investment return assumption
- If not, a blended discount rate must be used
 - For projected benefit payments that are covered by projected assets, the expected return assumption is used
 - For projected benefit payments that are **not** covered by projected assets, the 30-year AA/Aa tax-exempt municipal bond index is used (3.58%)
 - The date at which projected assets are not sufficient to cover projected benefit payments is called the "crossover date"

GASB Discount Rate

As an example, the graph below shows the crossover occurring in 2058 for a hypothetical plan.



- Determination if a plan has a crossover date depends on
 - The Fund's current funded ratio
 - Projected future contributions and benefit payments
 - Expected investment return
- As of July 1, 2017, TRF does not have a crossover date

Net Pension Liability (\$ in millions)

Collective TRF	June 30, 2017	June 30, 2016
Total Pension Liability at 7.75%	\$3,734	\$3,589
Fiduciary Net Plan Position (i.e., MVA)	2,360	2,124
Net Pension Liability (NPL)	1,374	1,465
Sensitivity to changes in discount rate		
• 1% decrease (6.75%)	\$1,826	\$1,900
 Current discount rate (7.75%) 	1,374	1,465
• 1% increase (8.75%)	997	1,103

Reconciliation of Collective Net Pension Liability

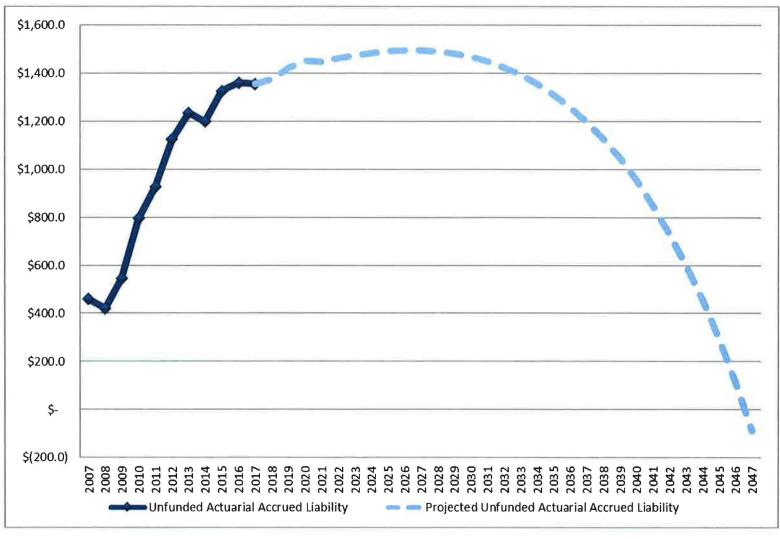
(\$ in millions)	Total Pension Liability	Plan Fiduciary Net Position	Net Pension Liability
Balance as of June 30, 2016	\$3,589	\$2,124	\$1,465
Changes for the year			
Service cost	75		75
Interest	277		277
Difference between expected and actual experience	(10)		(10)
Contributions – employer		86	(86)
Contributions – member		79	(79)
Contributions – purchased service credit and other		3	(3)
Net investment income		267	(267)
Benefit payments and refunds of contributions	(197)	(197)	0
Administrative expense		(2)	2
Changes of assumptions	-		-
Change of benefit terms	-		-
Net changes	<u> 145</u>	236	<u>(91)</u>
Balance as of June 30, 2017	\$3,734	\$2,360	\$1,374

Collective Pension Expense (\$ in millions)

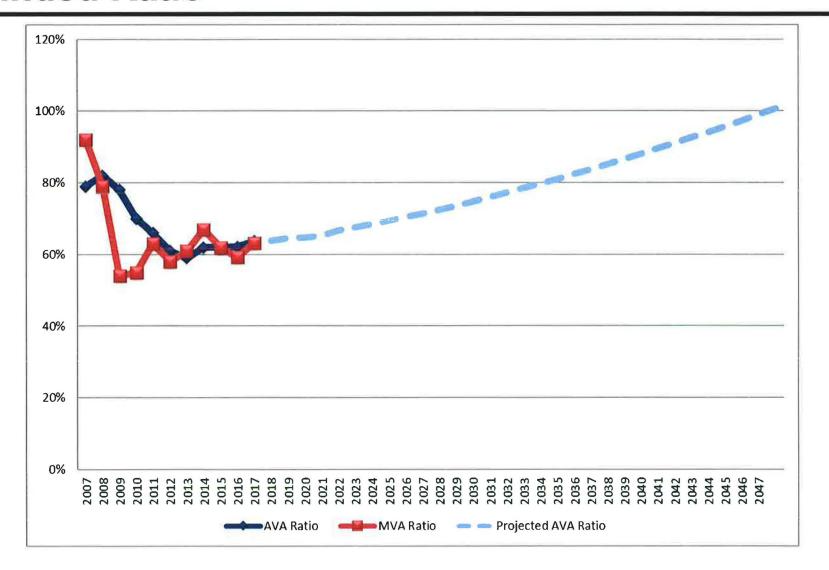
	Year ending June 30, 2017	Year ending June 30, 2016
Service cost	\$75	\$68
Interest on the total pension liability	276	265
Projected earning on plan investments	(163)	(165)
Contributions – member	(79)	(76)
Contributions – purchased service credit and other	(3)	(3)
Administrative expense	2	2
Current year of recognition of:		
Change of assumptions	24	24
Difference between expected and actual experience	(1)	0
 Difference between projected and actual earning on pension plan investments 	0	20
 Change of benefit terms 	0	0
Total pension expense	\$132	\$137

Unfunded Actuarial Accrued Liability

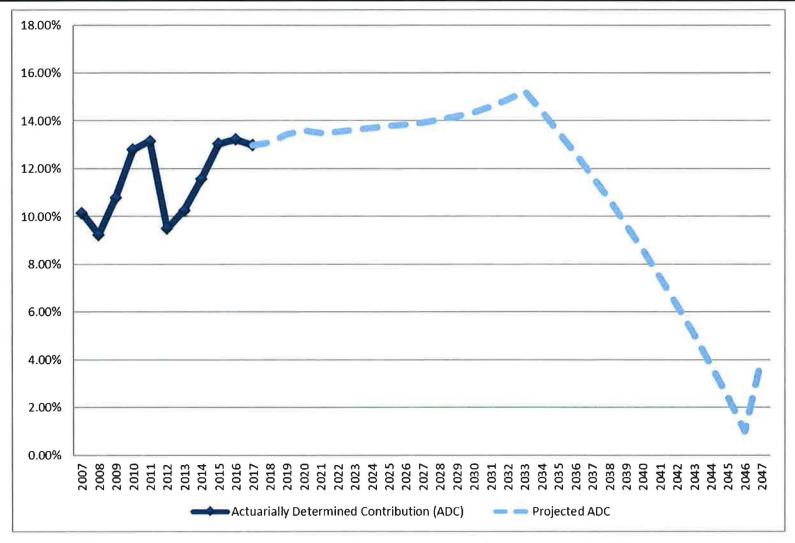
\$ Millions



Funded Ratio



Actuarially Determined Contribution (ADC)

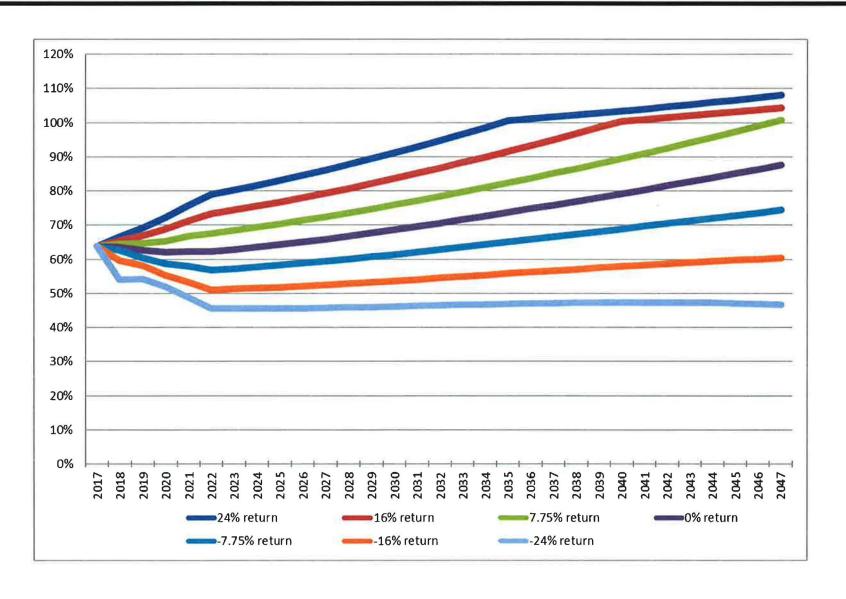


- For 2007 2013, the calculation of the ADC was based on a 30-year open level percentage of payroll amortization.
- Beginning in 2013, the period is 30-year closed. In 2033, when the remaining period reaches 10 years, it is assumed to operate as 10-year open
- 2012 and 2013 reflect the actuarial present value of contribution increases effective July 1, 2014.

Sensitivity Projections

- ➤ Projections of estimated funded ratios for 30 years
 - Based on FY18 investment return scenarios ranging from -24% to +24%
 - Assumes Fund earns 7.75% per year in FY19 and each year thereafter
 - Additional projections assuming Fund earns 6.75% or 8.75% per year every year
 - Administrative expenses increase by 2.75% each year
 - All other experience is assumed to emerge as expected
- ➤ Includes contribution rates from HB 1134
 - Member rate is 11.75%
 - Employer rate is 12.75%
 - Member and Employer Contribution rates "sunset" back to 7.75% once the funded ratio reaches 100% (based on actuarial assets)

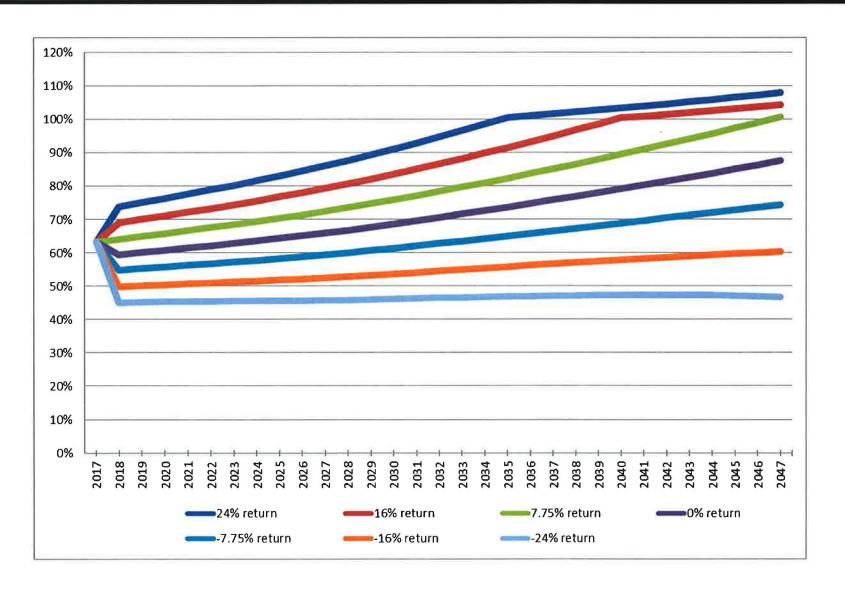
Projected Funded Ratios (AVA Basis)



Projected Funded Ratios (AVA Basis)

Valuation Year	24% for FY2018	16% for FY2018	7.75% for FY2018	0% for FY2018	-7.75% for FY2018	-16% for FY2018	-24% for FY2018
2017	64%	64%	64%	64%	64%	64%	64%
2018	67%	66%	65%	64%	63%	60%	54%
2019	69%	67%	65%	63%	60%	58%	54%
2020	72%	69%	65%	62%	59%	55%	52%
2021	76%	71%	67%	62%	58%	53%	49%
2022	79%	73%	68%	62%	57%	51%	45%
2027	86%	79%	72%	66%	59%	52%	46%
2032	95%	87%	78%	71%	63%	55%	46%
2037	102%	95%	85%	76%	67%	57%	47%
2042	105%	102%	93%	82%	70%	59%	47%
2047	108%	104%	101%	88%	74%	60%	47%

Projected Funded Ratios (MVA Basis)



Projected Funded Ratios (MVA Basis)

Valuation Year	24% for FY2018	16% for FY2018	7.75% for FY2018	0% for FY2018	-7.75% for FY2018	-16% for FY2018	-24% for FY2018
2017	63%	63%	63%	63%	63%	63%	63%
2018	74%	69%	64%	59%	55%	50%	45%
2019	75%	70%	65%	60%	55%	50%	45%
2020	76%	71%	66%	61%	56%	50%	45%
2021	78%	72%	67%	61%	56%	51%	45%
2022	79%	73%	68%	62%	57%	51%	45%
2027	86%	79%	72%	66%	59%	52%	46%
2032	95%	87%	78%	71%	63%	55%	46%
2037	102%	95%	85%	76%	67%	57%	47%
2042	105%	102%	93%	82%	70%	59%	47%
2047	108%	104%	101%	88%	74%	60%	47%

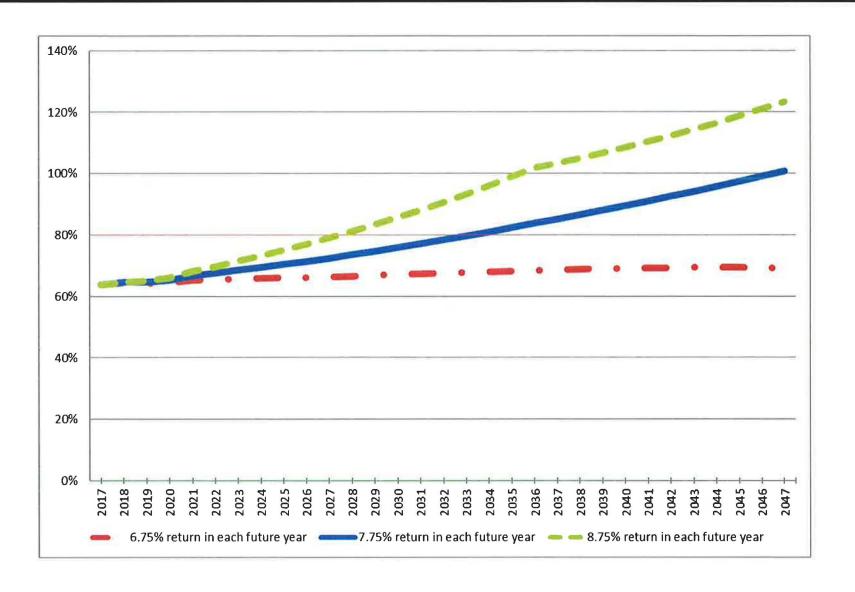
Projected Margin (AVA Basis)

Valuation Year	24% for FY2018	16% for FY2018	7.75% for FY2018	0% for FY2018	-7.75% for FY2018	-16% for FY2018	-24% for FY2018
2017	-0.24%	-0.24%	-0.24%	-0.24%	-0.24%	-0.24%	-0.24%
2018	0.36%	0.02%	-0.34%	-0.68%	-1.02%	-2.09%	-4.17%
2019	0.99%	0.17%	-0.68%	-1.48%	-2.28%	-3.13%	-4.60%
2020	1.80%	0.50%	-0.85%	-2.11%	-3.38%	-4.72%	-6.03%
2021	2.92%	1.12%	-0.73%	-2.46%	-4.20%	-6.05%	-7.85%
2022	3.87%	1.57%	-0.79%	-3.02%	-5.24%	-7.61%	-9.90%
2027	5.68%	2.30%	-1.18%	-4.45%	-7.72%	-11.21%	-14.58%
2032	9.08%	3.56%	-2.14%	-7.48%	-12.83%	-18.53%	-24.05%
2037	4.11%	8.78%	1.07%	-6.16%	-13.40%	-21.10%	-28.57%
2042	5.31%	4.07%	6.47%	-2.67%	-11.81%	-21.55%	-30.98%
2047	6.82%	5.24%	3.72%	1.58%	-10.05%	-22.43%	-34.43%

^{*} The projected margin is based on a 30-year closed period starting July 1, 2013. Once the period declines to 10 years remaining, the projected margin is based on a 10-year open period.

^{**} If an overfunding exists, the surplus is amortized over a 30-year open period.

Projected Funded Ratios (AVA Basis) Actual Returns +1% or -1% of Assumed



Projected Funded Ratios (AVA Basis) Actual Returns +1% or -1% of Assumed

Valuation Year	6.75% Return in Each Future Year	7.75% Return in Each Future Year	
2017	64%	64%	64%
2018	64%	65%	65%
2019	64%	65%	65%
2020	65%	65%	66%
2021	65%	67%	68%
2022	65%	68%	70%
2027	66%	72%	79%
2032	68%	78%	91%
2037	69%	85%	103%
2042	69%	93%	112%
2047	69%	101%	123%

Public Sector Topics In the News

- Actuarial Standards Board New Standard is expected to be issued in draft format that will likely require:
 - Solvency liability would be disclosed with all funding valuations
 - Present value of accrued benefits discounted at U.S. Treasury Rates
 - Actuary should calculate and disclose a reasonable ADC
 - Normal cost based on each member's benefits
 - No perpetual negative amortization (where contribution is less than the normal cost plus interest on the UAAL)
 - Other suggested disclosures:
 - Assessment of when assets are expected to be depleted
 - Amortization period for fixed rate plans
 - Whether contribution is less than normal cost plus interest on the UAAL

Public Sector Topics In the News (continued)

- Actuarial Standard of Practice on Assessment and Disclosure of Risk is expected this year:
 - Additional information will be required to be provided to intended users of the risks of future experience differing from the assumptions
 - Would apply when performing an actuarial funding valuation or a pricing valuation of a proposed change
 - Steps that actuary would need to take:
 - Identify the risks
 - Include an assessment of the risks identified
 - » Scenario tests impact of one possible event, several simultaneous events, or several sequential events
 - » Sensitivity tests impact of change in actuarial assumption or method
 - » Stress test impact of adverse changes in one or a few factors
 - » Stochastic modeling
 - Actuary to recommend a more detailed assessment if actuary believes it would be beneficial to intended users

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: The single-sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners 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 Actuarial Loss: A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two actuarial valuation dates. Through the Actuarial Assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the plan's 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, termination of employment, 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 be provide sufficient assets to pay all projected benefits and expenses when due.

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

Actuarial Value of Assets (AVA): The value of the plan'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 ADC.

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.

Actuarially Determined Contribution (ADC): The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation. The ADC consists of the Employer Normal Cost and the Amortization Payment.

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

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

Assumptions or Actuarial Assumptions: The estimates on which the cost of a plan is calculated including:

- (a) Investment return the rate of investment yield that the plan will earn over the long-term future;
- (b) Mortality rates the death rates of employees and pensioners; life expectancy is based on these rates;
- (c) Retirement rates the rate or probability of retirement at a given age;
- (d) Turnover rates the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;
- (e) 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 Funding Period and Open Amortization Period.

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

Defined Benefit Plan: 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 employers. This is equal to the Normal Cost less expected member contributions.

Experience Study: A periodic review and analysis of the actual experience of a plan 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.

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

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

GASB: Governmental Accounting Standards Board.

GASB 67 and GASB 68: Governmental Accounting Standards Board 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 a plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the plan's assets. 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.

Margin: The difference, whether positive or negative, between the statutory employer contribution rate and the Actuarially Determined Contribution.

Net Pension Liability (NPL): The Net Pension Liability is equal to Total Pension Liability minus Plan Fiduciary Net Position.

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. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member from hire until ultimate termination, death, disability, or retirement.

Open Amortization Period: An Open Amortization Period is one that is used to determine the Amortization Payment, but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period 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: GASB term for the market value of assets.

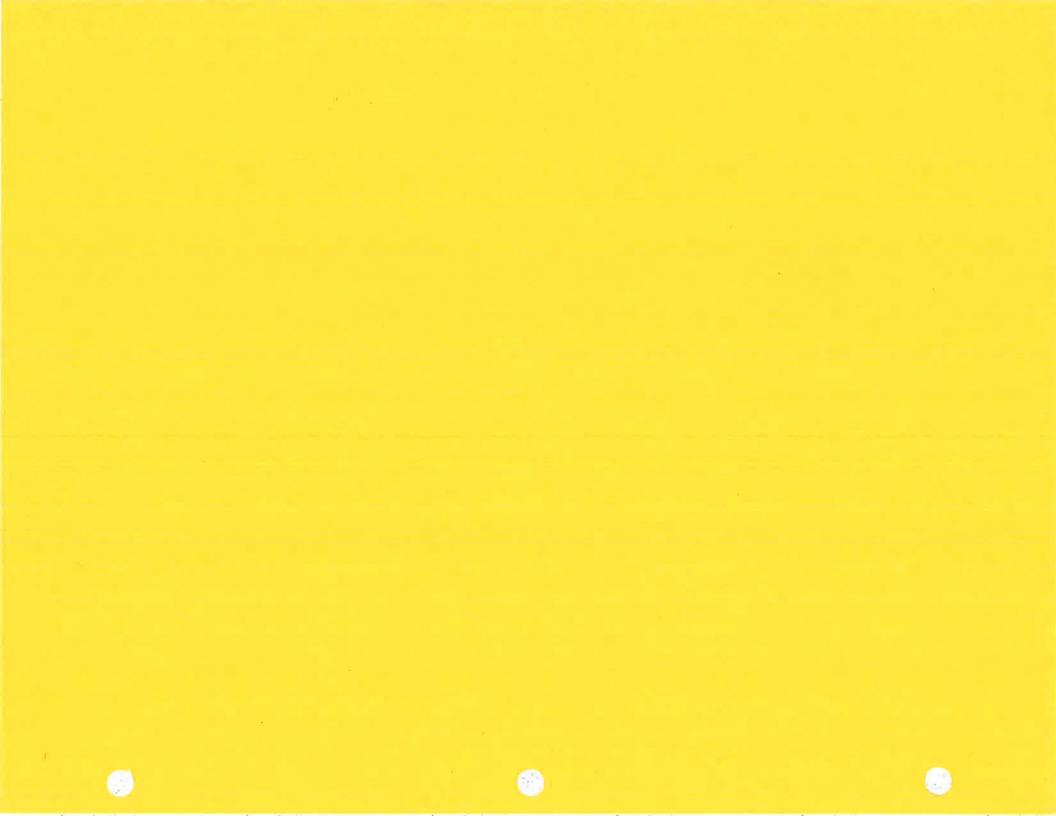
Total Pension Liability (TPL): The actuarial accrued liability based on the blended discount rate as described in GASB 67/68.

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.

Caveats

This presentation is based on the results of the July 1, 2017, actuarial valuation performed for the Board of Trustees of the State Teachers' Retirement Fund. The actuarial valuation report has information on the plan provisions, data, methods and assumptions used in the valuation. Use of the information in this presentation is subject to the caveats described in that document. The measurements in this presentation may not be appropriate for purposes other than those described in the actuarial valuation report.





State Teachers Retirement Fund

Actuarial Experience Review July 1, 2011 to June 30, 2016



101 North Wacker Drive Suite 500 Chicago, IL 60606-1724 T 312.984.8500 www.segalco.com

June 1, 2017

Board of Trustees State Teachers Retirement Fund 123 Main Street Capital, IL 12345-6789

Ladies and Gentlemen:

This report presents the results of the actuarial review of the demographic and economic experience of the State Teachers Retirement Fund (TRF) for the period July 1, 2011 through June 30, 2016. This experience review was prepared in accordance with Section 1234 of the State Code, which requires the actuary for TRF to make an actuarial investigation into the mortality, service, and other experience of the members, retirees and beneficiaries covered under the Fund at least once in each five-year period.

All current actuarial assumptions were reviewed as part of this study. This review is the basis for our recommendation of the assumptions to be used for the July 1, 2017 actuarial valuation of pension benefits and the January 1, 2018 actuarial valuation of retiree health care benefits.

In preparing the results presented in this report, we have relied upon information (some oral and some in writing) that TRF provided to us regarding the membership census data and financial information. While the scope of our engagement did not call for us to perform an audit or independent verification of this information, we have reviewed this information for reasonableness. The accuracy of the results presented in this report is dependent upon the accuracy and completeness of the underlying information.

This review recommends assumptions to be used in the valuation to measure the Fund's financial condition as of a single date. Future actuarial measurements may differ significantly from the current measurements presented in this report due to other assumption sets. This report does not include an analysis of the potential range of such future measurements.

Our analysis was conducted in accordance with generally accepted actuarial principles as prescribed by the Actuarial Standards Board (ASB) and the American Academy of Actuaries. Additionally, the development of all assumptions contained herein is in accordance with ASB Actuarial Standard of Practice (ASOP) No. 27 (Selection of Economic Assumptions for Measuring Pension Obligations) and ASOP No. 35 (Selection of Demographic and Other Non-Economic Assumptions for Measuring Pension Obligations).

State Teachers Retirement Fund June 1, 2017 Page 2

The undersigned actuaries are independent. Both are Fellows of the Society of Actuaries, Enrolled Actuaries, and Members of the American Academy of Actuaries, and both are experienced in performing experience studies for large public retirement systems. They both meet the Qualification Standards of the American Academy of Actuaries.

Respectfully submitted,

Segal Consulting, a Member of the Segal Group

Kim Nicholl, FSA, MAAA, EA, FCA Senior Vice President and Actuary

nedol

Matthew A. Strom, FSA, MAAA, EA Vice President and Actuary

Table of Contents

State Teachers Retirement Fund

Experience Review for the Period July 1, 2011 through June 30, 2016

I. Executive Summary	
A. Introduction	
B. Recommendations	3
II. Economic Assumptions	11
A. Inflation	12
B. Rate of Investment Return	14
C. Rate of Individual Salary Increases	17
D. Payroll Growth	20
III. Demographic Assumptions	21
A. Mortality	22
B. Retirement	30
C. Termination	32
D. Disability Retirement	37
E. Other Demographic Assumptions	
IV. Appendix	41
Appendix A: Proposed Rates of Individual Salary Increases	41
Appendix B: Proposed Mortality Rates	43
Appendix C: Proposed Retirement Rates	45
Appendix D: Proposed Termination Rates	50
Appendix E: Proposed Disability Rates	53



A. Introduction

Actuarial valuations are prepared annually to determine whether the contributions being made by members and employers are sufficient to fund the State Teachers Retirement Fund. Each actuarial valuation is highly dependent on the assumptions that the actuary uses to project the benefits expected to be paid in the future to all members of TRF. The projection of expected future benefit payments is based on the characteristics of members as of the valuation date, the benefit provisions in effect on that date, and assumptions of future events and conditions.

The assumptions used in actuarial valuations can be grouped in two categories: (1) economic assumptions - the assumed long-term rates of investment return, salary increases and payroll growth, and (2) non-economic or demographic assumptions - the assumed rates of termination, disability, retirement, and mortality. Demographic assumptions are primarily selected on the basis of recent experience (although a change in plan design or the employment environment may suggest otherwise), while economic assumptions rely more on a long-term perspective of expected future trends.

If actual experience exactly matches the expected experience, the actual annual cost of TRF will equal the annual cost determined by the actuarial valuation. However, this result is virtually never achieved, due to the long-term nature of the benefit projections and the numerous assumptions used in actuarial valuations. TRF recognizes actuarial gains and losses each year, reflecting the net difference between actual experience and anticipated experience. Determination of the funding period is updated in connection with each actuarial valuation to reflect the net gain or loss. A pattern of gains or losses with respect to one or more assumptions is the basis for recommended changes to the assumptions. Each valuation measures the effectiveness of each assumption and allows for the monitoring of the assumptions.

Actuarial experience studies are undertaken periodically and serve as the basis for recommended changes in actuarial assumptions and methods. A change in assumptions is recommended when it is demonstrated that the current assumptions do not accurately reflect the current trend determined from analysis of the data or anticipated future trends based upon reasonable expectations. The data analyzed include actual experience for demographic assumptions and economic forecasts for economic assumptions. The Actuarial Standards Board (ASB) provides actuaries with standards of practice that provide guidance and recommendations on acceptable methods and techniques to be used in developing both economic and demographic assumptions. Specifically, these are the ASB Actuarial Standard of Practice (ASOP) No. 27 (Selection of Economic Assumptions for Measuring Pension Obligations) and ASOP No. 35 (Selection of Demographic and Other Non-Economic Assumptions for Measuring Pension Obligations).

This study reviews the actuarial experience of TRF for the five-year period from July 1, 2011 through June 30, 2016, compares this experience to the current actuarial assumptions, and recommends changes to the assumptions as necessary. Economic assumption recommendations were primarily developed based on inputs related to economic forecasts and capital market expectations.

A summary of the key points of our review and our recommendations follows.

B. Recommendations

The experience review provides an opportunity for the Board, staff and actuary to consider how specific assumptions or methods affect the funding of the Fund, including the funding period, the funded ratio and the adequacy of contributions made by members and employers (as compared to the Actuarially Determined Employer Contribution). We have reviewed both economic and demographic experience of the Fund as it relates to the expected actuarial experience based on the current plan assumptions. Included are recommendations for changes in assumptions that we believe will more accurately reflect the future experience of TRF.

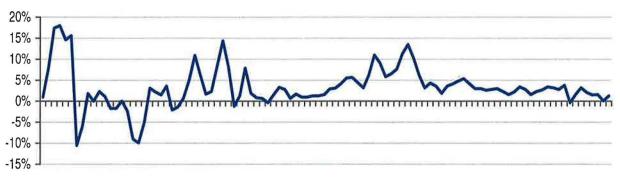
The detailed analysis of each individual assumption is discussed later in this report.

Economic Assumptions

Economic assumptions include inflation, rate of investment return (or discount rate), rate of individual salary increases, and payroll growth rate.

Inflation

Inflation continues at relatively low levels from a historical perspective, as shown in the graph below.



1915 1920 1925 1930 1935 1940 1945 1950 1955 1960 1965 1970 1975 1980 1985 1990 1995 2000 2005 2010 2015

The current inflation assumption is 2.75% per annum. The outlook for inflation remains less than 2.50% over a 20-year horizon as stated by Advisor Inc., Segal Rogerscasey¹, and other leading investment advisors. In light of all sources of inflation expectations reviewed in our study, we recommend a decrease in the current assumption of 2.75% to 2.50%. We also recommend changes to the other economic assumptions since these assumptions have an underlying inflation component.

The investment return assumption is comprised of inflation and the real rate of return for each asset class. The assumed rate of individual salary increases is comprised of inflation, and merit and seniority increases. Finally, payroll growth is a function of inflation and merit increases.

¹ In 2017, Segal Rogerscasey acquired Marco Consulting Group, and is now Segal Marco Advisors.



Rate of Investment Return

The Fund has averaged investment returns of 5.8% and 6.9% over the last 10 years and 20 years, respectively. The current assumption is 7.75%. Thus, on average the Fund has underperformed the assumption, but less-so as more years are included in the experience period.

Based on the Fund's target allocation and the 10-year Capital Market Assumptions (CMA) provided by Advisor Inc., the net real rate of investment return (net investment and administrative expenses) is 4.48%, compared to the current expectation of 5.00%. Since we recommend that the inflation assumption be reduced to 2.5%, and the investment return assumption is the combination of expected inflation plus expected real rate of return, we recommend lowering the investment return assumption from 7.75% to 7.00%.

Rate of Individual Salary Increases

We study the merit and seniority increases separately from inflation. Analysis of the distribution of merit and seniority increases by age during the study period shows that these increases were less than expected.

Accounting for the recommended decrease in the inflation assumption, we recommend decreasing the current age-based assumption that grades from 12.25% at age 25 to 3.25% at age 65 to rates that grade from 11.50% at age 25 to 2.50% at age 65.

Payroll Growth

The payroll growth rate is used to estimate annual increases in payroll in order to determine the amortization payment toward the unfunded accrued liability (UAL) and the funding period. The current payroll growth assumption is 3.5% for two years and 4.0% thereafter. Actual average increases in covered payroll have been -0.6% and 0.6% over the last 5 and 10 years, respectively. Based upon an open group projection using the recommended individual salary increase assumption, aggregate projected payroll is expected to increase by 2.99% per year over 10 years and 2.69% over 20 years. As our recommendation for the investment return assumption is weighted toward the next 10 years, we recommend lowering the payroll growth assumption to 3.0% for all future years.

Demographic Assumptions

The demographic assumptions include mortality, retirement, termination (or withdrawal), disability incidence, percent married, and spouse age difference. Demographic assumptions specific to the retiree health care valuation include retiree health care plan participation.

Mortality

The current post-retirement mortality table for healthy annuitant lives is the RP-2000 Combined Mortality Table with static projection to 2022 using Scale AA. The actual rate of mortality was slightly less than expected for both male and female healthy annuitants over the study period. In order to minimize gains and losses due to experience, we suggest changing the mortality assumption to the latest Society of Actuaries' mortality table ("RP-2014"), adjusted to better match experience of the Fund. Additionally, in order to account for future mortality improvement, we recommend applying the latest generational mortality improvement scale ("MP-2016"), which is intended to be used with the RP-2014 tables.

The valuation of disabled lives relies on a separate mortality table. The current mortality table for disabled lives is an age-based table of rates. Experience for disabled annuitants has been less than expected based on the current assumptions. We recommend updating this assumption to a variation of the RP-2014 Disability Mortality Table adjusted for the credibility of the size of the experience data and building in future mortality improvements projected on a generational basis using Scale MP-2016.

The current mortality table for active members is the same as for healthy annuitants for early ages. As very few members die in active status, the actual experience is insufficient to set an assumption. In addition, the liability associated with active death is a small percentage of the total liability. Since we are using the RP-2014 Annuitant Table for retired lives, we recommend using the RP-2014 Employer Table for active members, building in future mortality improvements projected on a generational basis using Scale MP-2016.

Retirement

The current retirement rates for active members of the Defined Benefit (DB) Plan are based on members' age, gender, and years of service at retirement. There are different retirement rates depending on grandfather status. Grandfathered members are those eligible to retire as of July 1, 2015. The actual retirement experience over the period of the study is skewed due to 2012 pension reform changes and therefore provide an unreliable basis for developing a revised retirement assumption. We recommend the continued use of the DB Plan retirement rates, with appropriate simplifications.

The current retirement assumption for inactive vested members of the DB Plan is that members will retire at age 60, or the first age at which unreduced benefits are available, if earlier. Effective with the 2012 pension reform, unreduced benefits are not available prior to age 65 (without 35 years of service). Therefore, we recommend adding retirement rates of 5% at each early retirement age through age 64 and assume that 100% of remaining inactive vested members retire at age 65, or the first age at which unreduced benefits are available.

A separate age-based table is applied to active members who were hired on or after July 1, 2001 and elected to participate in the Combined Plan As there is not enough retirement experience for this group, we recommend continued use of the current assumption. We believe the current assumed pattern of retirement for the Combined Plan members is not unreasonable, and we will continue to track actual Combined Plan retirement experience as it emerges.

Termination

The current turnover rates are based on gender, age and service. Service-based rates apply to non-vested members with less than five years of service. Age-based tables apply to vested members with five or more years of service. The actual turnover experience over the study period was analyzed net of rehires to arrive at the "net" termination experience. The experience shows that actual turnover for both non-vested and vested members was less than expected. Therefore, we recommend decreasing termination rates in both tables.

Disability Retirement

The current disability retirement rates are based on members' age and gender. During the experience study period, the number of disabilities was reasonably close to expectation, and experience was similar for males and females. Therefore, we recommend a unisex, age-based table with slightly increased rates.

Other Demographic Assumptions

Other demographic assumptions that impact the valuation are the percent married, age difference, and retiree health participation assumptions.

We do not collect spousal information for active employees but we have spousal information for retirees. The current percent married assumption is 80% for males and 60% for females. We found 76% of male retirees and 47% of female retirees appeared married based on their annuity options elected. Additionally, we found that, on average, male retirees were approximately 3.1 years older and female retirees were approximately 0.4 years younger than their respective spouses, compared to the current assumption of 3 years older for male members and 1 year younger for female members. We recommend no changes to the percent married or age difference assumptions.

The current retiree health participation rates are based on status at termination (retirement, disability, inactive vested). During the experience study period, the number of new service retirees electing health coverage was reasonably close to expectations, and the number of new disabled retirees and inactive vested electing health coverage at retirement was less than expected. Therefore, we recommend no changes to the service retiree participation assumption and reducing the participation assumption for disabled retirees and inactive vested participants.

Summary of Actuarial Experience

For the five-year period under review, the Fund has experienced actuarial gains, except for the years ended June 30, 2012 and June 30, 2015. Investment returns on the market value of assets has averaged 5.8% and 6.9% over the last 10 and 20 years. Despite a general underperformance relative to expected, the imputed return on the actuarial value of assets has produced gains during the study period. Experience for non-investment assumptions has produced losses over all five years of the study period. A summary of the historical gains and losses is shown below.

	Actuarial Accrued	Total Actuarial Gain/(Loss)		Actuarial As Investme Gain/(Los	nt	Non-Investment Gain/(Loss)	
Valuation Date	Liability (AAL) (\$ in millions)	Amount (\$ in millions)	% of AAL	Amount (\$ in millions)	% of AAL	Amount (\$ in millions)	% of AAL
July 1, 2016	\$100,756	\$290	0.3%	\$774	0.7%	-\$485	-0.5%
July 1, 2015	99,015	-232	-0.2%	1,068	1.1%	-1,301	-1.3%
July 1, 2014	96,167	3,178	3.3%	3,334	3.5%	-156	-0.2%
July 1, 2013	94,367	2,092	2.2%	2,483	2.6%	-391	-0.4%
July 1, 2012	106,302	-3,982	3.7%	325	0.3%	-4,307	-4.1%

I. Executive Summary

Summary of Assumptions and Recommended Changes

The following table summarizes the actuarial assumptions and methods used in the valuation and the changes recommended in this report.

Description	Current	Proposed
Economic Assumptions		
Inflation	2.75%	2.50%
Investment Return	7.75%	7.00%
Rate of Individual Salary Increases	Merit/seniority rates based on age, plus inflation	Decreases to merit/seniority rates. Total rates also lowered by 0.25% due to lower recommended inflation
Payroll Growth	3.50% for two years, 4.00% thereafter	3.00%
Demographic Assumptions		
Healthy Post-Retirement Mortality	RP-2000 Combined Table, males set back two years through age 89, females set back four years through age 79, set back one year from 80 through 89	RP-2014 Healthy Annuitant Table with 50% of rates through age 69, 70% of rate between 70 and 79, 90% of rates between 80 and 84. Mortality improvement based on MP-2016 scale
Disabled Post-Retirement Mortality	Rates developed based on experience	RP-2014 Disabled Mortality Table with 90% of rates for males and 100% of rates for females. Mortality improvement based on MP-2016 scale
Healthy Pre-Retirement Mortality	Healthy Post-Retirement Mortality with adjustments at earlier ages	RP-2014 Employee Mortality Table with generational mortality improvement using scale MP-2016
Active Retirement	Current rates vary based on members' age, gender, and years of service at retirement. Separate tables of rates for grandfathered and non-grandfathered.	Minor modifications to format of curren rates
Inactive Vested Retirement	100% at age 60	5% through age 64 and 100% at age 65
Termination	Service-based rates apply to non- vested terminations within the first five years of service. Age-based rates apply after the first five years of service.	Lower rates for both non-vested and vested termination tables
Disability Retirement	Age and gender-based rates	Unisex rates by age with slightly increased rates
Other Demographic Assumptions		
Percent Married	80% of male members and 60% of female members are assumed to be married	No change
Age of Difference	Male members are 3 years older and female members are 1 year younger than their spouses	No change
Retiree Health Participation	75% of eligible service retirees	75% of eligible service retirees
	84% of eligible disabled retirees 47% of inactive vested participants who did not cash out	65% of eligible disabled retirees 30% of inactive vested participants who did not cash out

I. Executive Summary

Impact of Assumption and Method Changes on Valuation Results

The following tables detail the impact of the change in assumptions and methods on the June 30, 2016 actuarial valuation results.

Description	Current Assumptions (\$ in Millions)	Proposed Mortality Assumption (\$ in Millions)	Proposed Mortality and Other Demographic Assumptions (\$ in Millions)
Actuarial Accrued Liability (AAL)	\$100,756	\$104,889	\$104,768
Actuarial Value of Assets (AVA)	70,115	70,115	70,115
Unfunded Accrued Liability (UAL)	\$30,642	\$34,775 +4,133	\$34,653 -122
Funded Percentage	69.6%	66.8% -2.7%	66.9% +0.1%
Funding Period	26.6 years	35.4 years +8.8 years	36.9 years +1.6 years
Normal Cost Rate	10.58%	11.13% +0.55%	11.54% +0.42%

Description	Proposed Demographic Assumptions and Current Economic Assumptions (\$ in Millions)	Proposed Demographic Assumptions and 7.00% Return (\$ in Millions)	Proposed Demographic, 7.00% Return, and Other Economic ¹ Assumptions (\$ in Millions)
Actuarial Accrued Liability (AAL)	\$104,768	\$113,583	\$112,241
Actuarial Value of Assets (AVA)	70,115	70,115	70,115
Unfunded Accrued Liability (UAL)	\$34,653	\$43,469 +8,815	\$42,127 -1,3 42
Funded Percentage	66.9%	61.7% - 5.2%	62.5% +0.7%
Funding Period	36.9 years	70.7 years +33.8 years	Infinite
Normal Cost Rate	11.54%	14.04% +2.50%	12.83% -1. 21 %

* Segal Consulting

¹ Rate of individual salary increases and payroll growth

I. Executive Summary

Description	Current Assumptions (\$ in Millions)	Proposed Assumptions (\$ in Millions)	Impact (\$ in Millions)
Actuarial Accrued Liability (AAL)	\$100,756	\$112,241	+11,485
Actuarial Value of Assets (AVA)	70,115	70,115	0
Unfunded Accrued Liability (UAL)	30,642	\$42,127	+11,485
Funded Percentage	69.6%	62.5%	-7.1%
Funding Period	26.6 years	Infinite	Infinite
Normal Cost Rate	10.58%	12.83%	+2.25%

The changes in mortality assumption would increase the June 30, 2016 actuarial accrued liability by approximately \$4,133 million, or 4.1%. This increase was slightly offset by changes in the termination, disability, and retirement assumptions, which lowered the actuarial accrued liability by \$122 million, or 0.1%.

The net impact of the recommended economic assumption changes would increase the actuarial accrued liability by approximately \$7,473 million, or 7.1%. The primary driver of the increase in the actuarial accrued liability is the lowering of the investment return assumption from 7.75% to 7.00%. The changes to the rate of individual salary increases and inflation assumptions decreased the accrued liability by \$1,342 million, or 0.1%.

Overall, the recommended economic and demographic changes would increase the actuarial accrued liability by \$11,485 million, or 11.4%, increase the normal cost rate by 2.25%, and increase the funding period to infinite.

Impact of Assumption Changes on Retiree Health Care Valuation Results

The following table details the impact of the change in assumptions on the results of the January 1, 2017 actuarial valuation of retiree health care benefits.

Description	Current Assumptions (\$ in Millions)	Proposed Assumptions (\$ in Millions)	Impact (\$ in Millions)
Actuarial Accrued Liability (AAL)	\$3,885	\$4,792	+907
Market Value of Assets (MVA)	3,222	3,222	0
Unfunded Accrued Liability (UAL)	\$663	\$1,570	+907
Funded Percentage	82.9%	67.2%	-15.7%
Solvency Period	22 years	18 years	-4 years

The assumption changes increase the retiree health actuarial accrued liability (AAL) by \$907 million, primarily due to lowering the rate of return from 7.75% to 7.00%. As a result, the solvency period is reduced four years, from 22 years to 18 years.

The economic assumptions have a significant impact on the development of plan liabilities. Changes to these assumptions can substantially alter the actuarial valuation results. The goal of an experience study is to produce a consistent set of economic assumptions that appropriately reflect expected future economic trends.

The primary economic assumptions that affect TRF's valuation results are:

- Inflation
- Rate of Investment Return
- Rate of Individual Salary Increases
- Payroll Growth

The Actuarial Standards Board (ASB) has adopted Actuarial Standard of Practice No. 27 (ASOP 27 - Selection of Economic Assumptions for Measuring Pension Obligations) to provide actuaries guidance in developing economic assumptions.

The inflation component is included in all economic assumptions, and therefore is key to developing a consistent set of actuarial assumptions. The rate of investment return assumption includes an inflation component and a real rate of return component. The components of the salary increase assumption are inflation and merit increases. The main component of the payroll growth assumption is inflation.

A. Inflation

In developing the recommendation for the assumed inflation component, actuarial standards of practice suggest the actuary review appropriate inflation data. This data may include consumer price indexes, the implicit price deflator, forecasts of inflation, and yields on government securities of various maturities. For this study, we referred to commonly referenced historical measures of inflation, the National Consumer Price Index for all urban consumers (CPI-U).

The table below shows that recent inflation experience is well below the longer-term average rate.

Average Annual Change as of June 30, 2016	CPI-U
Past 5 Years	1.32%
Past 10 Years	1.74%
Past 20 Years	2.18%
Past 30 Years	2.66%
Past 50 Years	4.10%

The average annual rate of increase in the CPI-U in the past 10 years has been at its lowest levels since the early 1960s. Historical trend is a less important consideration for the assumed rate of inflation, but assists in determining the reasonable bounds of expected inflation.

Horizon's 2016 Survey of Capital Market Assumptions¹, which includes Segal Rogerscasey and Advisors Inc., indicates that the average median inflation assumption is 2.31% over the next 20 years. The future expectations of the 35 individual advisors in the survey range from 2.00% to 2.80%.

Next, we considered the measure of future inflation expectation by observing market-based forecasts. Treasury Inflation Protection Securities (TIPS) are government bonds, which, in addition to a fixed yield, add the actual percentage change in CPI to the principal value. Therefore, the spread between the TIPS and the Conventional Treasury note/bond of the same maturity is an indication of the market's forecast for inflation.

Because of the inflation protection, TIPS' yields are almost always considerably lower than those of regular Treasury securities of similar maturities. As of the last week of June 2016, the yields on 30-year Treasury Bonds were as follows:

➤ Inflation indexed: 0.88%

Non-inflation indexed: 2.49%

This survey, prepared by Horizon Actuarial Services, LLC, compiles and averages the capital market assumptions of 35 investment advisors.



12

The difference of 1.61% means that for 30-year TIPS to match the return of the conventional 30-year Treasury for a buy-and-hold income investor, inflation would have to measure 1.61% per year over the next 30 years. The financial market's current expectations of inflation over the next 30 years is one indicator of future trend. However, additional risk premiums and investor preferences can be factored into the bond yields that is unrelated to market expectations of inflation, possibly distorting the reliability of this indicator.

As a check of the validity of this assumption, we reference the 2016 Annual Report of the Board of Trustees of the Federal Old-Age and Survivors Insurance and Disability Insurance Trust Funds (2016 OASDI Trustees Report). Three inflation assumptions used in this report was 2.00% for the low-cost projection, 2.60% for the intermediate projection, and 3.20% for the high-cost projection.

The Public Plans Data (PPD) database maintained by the Center for Retirement Research at Boston College includes general information on 160 public pension systems. Based on PPD, the average inflation assumption for 2015 is 3.05%, compared to an average of 3.27% for 2011.

Considering the level indicated by financial market data (1.61%) and the median rate used by peer retirement systems (3.05%), we recommend the inflation assumption to be lowered from 2.75% to 2.50%.

B. Rate of Investment Return

The rate of investment return is used to determine the present value of expected future plan payments. The selection of an investment return assumption considers capital market outlook, the Funds' portfolio mix, and historical returns.

The current assumption is 7.75%, which is composed of the following components:

Inflation: 2.75%; and,

Real Rate of Return: 5.00%, net of investment and administrative expenses

The table below shows the Fund's actual investment returns on a market value of assets basis as well as an actuarial value of assets basis.

Average Annual Return as of June 30, 2016	Market Value of Assets Basis	Actuarial Value of Assets Basis
Past 10 Years	5.8%	7.2%
Past 15 Years	6.1%	6.0%
Past 20 Years	6.9%	7.5%

The average annual rate of return over the past 10, 15, and 20 years has been lower than the current assumption of 7.75% on both a market value of assets as well as an actuarial value of assets basis. Historical trend is a less important consideration for the assumed rate of investment return, but assists in determining the reasonable bounds of expected investment return.

In developing the real rate of return, we examined the CMA used by Advisors, Inc. The current assumptions for the asset classes and the portfolio's expected real return are shown below.

Asset Class	Callan 10-Year Annual Arithmetic Real Return	Target Allocation ¹	Weighted Real Return
Liquidity Reserves	0.00%	1%	0.00%
Fixed Income	0.80%	18%	0.14%
Domestic Equities	6.60%	31%	2.05%
International Equities	6.75%	26%	1.76%
Real Estate	4.95%	10%	0.50%
Private Equity	10.90%	7%	0.76%
Opportunistic/Diversified	4.90%	7%	0.34%
Total		100%	5.55%
Adjustment to Geometric			(0.87%)
Geometric Real Rate of Return			4.68%

* Segal Consulting

¹ Based on TRF Investment Policy

Using the Fund's target asset allocation and the CMA provided by Advisors Inc., the expected real rate of return is 4.68%.

The real rate of return for the portfolio must be reduced to account for investment and administrative expenses. The investment expenses as a percent of the average market value of assets for the past five years are shown on the following table:

	Average Market Value	Investment	Expense
Year Ended June 30	of Assets (\$ in Millions)	Amount (\$ in Millions)	Percent
2016	\$68,161	\$227	0.33%
2015	68,908	221	0.31%
2014	62,638	192	0.31%
2013	58,708	183	0.31%
2012	61,358	175	0.28%
Total	\$319,773	\$998	0.31%

TRF staff estimates that two-thirds of the investment expenses related to real estate and alternative investment fees are included in capital market return assumptions. Advisors Inc. verified in communication with TRF and Segal that their capital market expectations were net of expenses for these two asset classes. For the fiscal year ending June 30, 2016, 76% of fees to external asset managers are related to real estate and alternative investments. Therefore, the adjustment for investment expense experience is 0.11%.

The administrative expenses as a percent of the average market value of assets for the past five years are shown on the following table:

Vacu Fuelad	Average Market Value Admin		istrative Expense	
Year Ended June 30	of Assets (\$ in Millions)	Amount (\$ in Millions)	Percent	
2016	\$68,161	\$66	0.10%	
2015	68,908	60	0.09%	
2014	62,638	60	0.10%	
2013	58,708	59	0.10%	
2012	61,358	58	0.09%	
Total	\$319,773	\$303	0.09%	

Considering actual recent experience and expected future trends, we recommend a 0.20% reduction in the real rate of return to account for investment and administrative expenses.

Accounting for investment and administrative expenses, the expected net real rate of return can be determined as follows:

Net Real Rate of Return	4.48%
Less Expenses	(0.20%)
Gross Real Rate of Return	4.68%

In other words, there is a 50% likelihood of earning an annual real rate of return, net of expenses, of at least 4.48% using the CMA of Advisors Inc., which are based on a 10-year horizon.

The following table summarizes the components of the proposed investment return assumption.

Assumption Component	Proposed Assumption
Net Real Rate of Return	4.48%
Inflation	2.50%
Total Return Assumption	6.98%

Segal Rogerscasey's CMA indicate a 0.50% increase in the real rate of return when comparing 10-year and 20-year horizons. This suggests a possible investment return assumption range of 6.95% to 7.45%. However, given the uncertainty of CMA over a longer horizon, we would not reflect the full 50 basis point adjustment in our recommended rate.

After considering the longer TRF investment horizon, but giving greater weight to the next 10 years, we recommend lowering the investment return assumption from 7.75% to 7.00%.

C. Rate of Individual Salary Increase

The rate of individual salary increase is used to determine members' benefits provided by the Fund. Generally, a member's salary will change over the long term in accordance with inflation and merit and seniority scale. The actuary should review available compensation data when selecting this assumption, including plan sponsor's current compensation practices and any anticipated changes; historical compensation increases and practices of the plan sponsor and other sponsors in the same industry or geographic area; and historical national wage increases, and productivity growth.

The estimated rate of individual salary increases consists of two components:

- Inflation; and
- Merit and seniority increases

The inflation component represents the "across the board" average annual increase in salaries shown in the experience data. The merit and seniority component includes the additional increases in salary due to performance, seniority, promotions, etc.

Since merit and seniority increases are unique to each retirement system, it is appropriate to base this assumption on recent experience. We study the merit and seniority increases separately from inflation.

The current salary increase assumption (including inflation) uses age-based rates that range from 12.25% at age 25 to 3.25% at age 65. The historical compensation data adjusted by approximately 1.80% to account for actual inflation during the study period was evaluated based on age and service. The strongest relationship continues to be based on members' age, with a trend of inflation and merit and seniority increases occurring through age 65, and modest inflationary increases occurring thereafter.

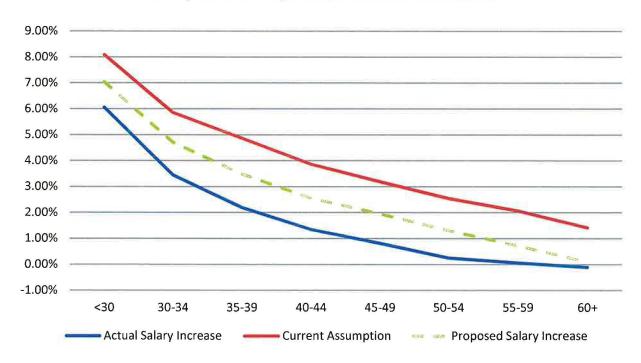
The following tables and graph compares the actual, expected and proposed individual salary increases during the period of the experience study, adjusted to remove inflation.

Age	Total Exposure	Actual Increase Above Inflation	Expected Increase Above Inflation	Proposed Increase Above Inflation
<30	94,311	6.05%	8.09%	7.05%
30 - 34	103,981	3.45%	5.86%	4.71%
35 - 39	109,923	2.19%	4.87%	3.49%
40 - 44	115,626	1.34%	3.87%	2.55%
45 - 49	100,724	0.81%	3.19%	1.95%
50 - 54	88,218	0.25%	2.55%	1.31%
55 - 59	68,032	0.06%	2.06%	0.72%
60+	45,441	-0.11%	1.45%	0.10%
Total	726,256	1.67%	3.97%	2.71%

Table 1:
Actual and Expected Salary Increases
Compared to Proposed, In Excess of Inflation

Age Range	Prior Increases (in \$000s)	Actual Increase ¹ (in \$000s)	Expected Increase ² (in \$000s)	Actual to Expected	Proposed Increase ³ (in \$000s)	Proposed to Expected
<30	3,684	3,907	3,982	98.1%	3,944	99.1%
30 - 34	5,258	5,439	5,566	97.7%	5,506	98.8%
35 - 39	6,481	6,623	6,796	97.5%	6,707	98.8%
40 - 44	7,249	7,346	7,529	97.6%	7,434	98.8%
45 - 49	6,564	6,617	6,773	97.7%	6,692	98.9%
50 - 54	5,878	5,893	6,028	97.8%	5,955	99.0%
55 - 59	4,559	4,562	4,653	98.0%	4,592	99.3%
60+	3,060	3,057	3,104	98.5%	3,063	99.8%
Total	42,733	43,445	44,431	97.8%	43,892	99.0%

Graph 1:
Actual and Expected Salary Increases
Compared to Proposed, In Excess of Inflation



¹ Adjusted for actual average inflation of approximately 1.80% during the experience period.

² Adjusted for assumed inflation of 2.75%.

³ Proposed rate of individual salary increases table does not reflect underlying assumption for inflation.

As shown above, the actual rate of individual salary increases above inflation was less than the expected rate for all age bands. Based on this experience, we recommend decreasing the merit component of the individual salary increases, as well as a 0.25% reduction due to lower recommended inflation. The table showing the proposed total rates of individual salary increases is included in Appendix A.

D. Payroll Growth

The payroll growth assumption represents the expected annual increase in total covered payroll from one year to the next. The payroll growth assumption is used to estimate annual increases in payroll in order to determine the amortization payment toward the unfunded accrued liability (UAL) and the funding period. The amortization payment is expected to increase each year as payroll increases, meaning that amortization payments are back loaded.

A lower payroll growth assumption is more conservative, as lower payroll growth rate results in larger amortization payments. For example, an assumed rate of payroll growth of 0% uses level amortization payments, similar to that of a mortgage.

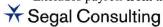
The current assumption for payroll growth is 3.50% for two years, 4.0% per year thereafter. The Fund's historical payroll amounts and active population headcounts since the 2006 fiscal year are shown in the table below.

Year Ended June 30	Covered Payroll ¹ (\$ in millions)	% Increase/Decrease From Prior Year	Active Member Headcount	% Increase/Decrease From Prior Year
2016	\$10,069.3	0.8%	169,212	2.6%
2015	9,985.2	1.6%	164,925	-2.6%
2014	9,833.0	-0.9%	169,295	-0.4%
2013	9,917.9	-1.8%	169,945	-1.8%
2012	10,102.5	-2.6%	173,044	-2.7%
2011	10,369.4	0.3%	177,897	1.2%
2010	10,342.5	2.2%	175,842	0.6%
2009	10,122.1	2.9%	174,807	0.9%
2008	9,834.2	2.2%	173,327	-0.5%
2007	9,620.4	1.8%	174,110	-0.6%
2006	9,455.4		175,065	
	5-year average:	-0.6%	5-year average:	-1.0%
	10-year average:	0.6%	10-year average:	-0.3%

Using the recommended rate of individual salary increase assumption from the prior section, we performed an open group projection. Results showed that, on average, projected total payroll increases by 2.99% per year over 10 years and 2.69% over 20 years.

Based on experience and a recommended decrease to the assumed inflation rate, we recommend lowering the assumption from 3.50% for two years and 4.00% per year thereafter to 3.00% for all future years.

¹ Excludes payroll from the Defined Contribution and Alternative Retirement Plans.



The demographic assumptions used to value the Fund reflect the expected occurrences of various events among members of the Fund. The assumptions should reflect specific characteristics of the Fund and produce reasonable results. A reasonable assumption is one that is expected to model the contingency being measured and not expected to produce significant gains and losses. The types of demographic assumptions used to measure pension obligations include, but are not limited to the following:

- Mortality;
- > Retirement;
- > Termination;
- Disability Retirement; and
- Other assumptions such as percent married and age difference between spouses

The Actuarial Standards Board (ASB) has adopted Actuarial Standard of Practice No. 35 (ASOP 35 - Selection of Demographic and Other Non-Economic Assumptions for Measuring Pension Obligations) to provide actuaries guidance in developing demographic assumptions. The standard recommends the actuary follow a general procedure for selecting demographic assumptions. The first step is to identify the types of assumptions to use. The actuary should consider relevant plan provisions that will affect timing and value of any potential benefit payments, all contingencies that give rise to benefits or loss of benefits and the characteristics of the covered group. The next step is to identify the relevant assumption universe. The assumption universe may include prior experience studies or general studies of trends relevant to the type of demographic assumption in addition to plan experience to the extent that it is credible. The third step is to consider the assumption format. The format may include different tables for different segments of the covered population (i.e. different termination tables for males/females). The final step is the select the specific assumption and evaluate the reasonableness of each assumption. The specific experience of the Fund should be incorporated but not given undue weight to past experience if recent experience is attributable to a phenomenon that is unlikely to continue. For example, if recent rates of termination were due to a one-time reduction in workforce it may be unreasonable to assume that such rates will continue.

A. Mortality

One of the most basic actuarial assumptions is the probability of death. The mortality assumption takes the form of a mortality table that contains for each age in the table a probability of a person dying between that age and the next. TRF currently uses three sets of mortality tables for its population: post-retirement mortality, disabled mortality, and pre-retirement mortality tables.

1. Healthy Post-Retirement Mortality

The mortality experience of healthy retirees is important as it helps estimate the durations over which retirement benefits are paid. Lower mortality rates mean longer benefit payment periods and, therefore, higher benefit costs.

Currently, TRF uses healthy post-retirement mortality rates based on RP-2000 Combined Mortality Table with static projection to 2022. Male rates are set back two years through age 89 with no setback for age 90 and above while female rates are set back four years through age 79, one year from age 80 through 89, and no set back from age 90 and above.

The experience analysis for the past five years reveals that, in total, fewer participants in pay status have died than expected on a counts basis as well as a benefits-weighted basis. For the post-retirement mortality assumption, our analysis uses a benefits-weighted approach, which weights the probability of death with each annuitant's pension benefit amount. This methodology takes into consideration any correlation between the health of the annuitant and the size of their benefit.

The following table provides a summary of mortality experience for service annuitants by basis and gender for the study period:

Gender	Exposures	Actual Deaths	Expected Deaths	Ratio of Actual Deaths to Expected Deaths				
Basis – Counts								
Male	220,730	5,375	5,581	96.3%				
Female	405,976	7,933	8,444	93.9%				
Total	626,706	13,308	14,025	94.9%				
	Basi	s – Benefits (in 000's)					
Male	11,274,458	218,720	244,603	89.4%				
Female	16,529,238	226,579	249,429	90.8%				
Total	27,803,696	445,299	494,032	90.1%				

We recommend revising the post-retirement mortality assumption to use a variation of the latest Society of Actuaries' mortality tables ("RP-2014"). To better match TRF's experience, we have adjusted the base RP-2014 Annuitant Mortality Table by applying 50% of rates through age 69, 70% of rates between ages 70 and 79, 90% of rates between ages 80 and 84, and 100% of rates thereafter. The proposed healthy post-retirement mortality rates are included in Appendix B.

In order to reflect future improvements in life expectancy, we recommend applying the latest generational mortality improvement scale ("MP-2016"), which is intended to be used with the RP-2014 tables, from 2014 forward. Applying a generational adjustment to the mortality table results in slight improvements in life expectancy in each future year and decreases the likelihood, for example, that the projected life expectancy of a 35-year old active member today will be understated when benefit payments are projected to start 30 years from now.

Table 2 shows further detail regarding the post-retirement mortality experience for the study period. Graphs 2A and 2B present this information graphically for both males and females.

Table 2:
Healthy Post-Retirement Mortality Rates
Actual and Expected Experience, Benefits-Weighted Basis (in 000's)

Male

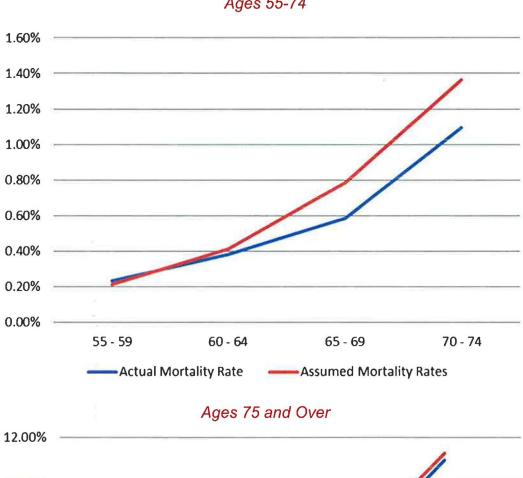
Age Range	Exposures	Actual Deaths	Actual Mortality Rate	Expected Deaths	Current Mortality Rate	Proposed Death	Proposed Mortality Rate	Ratio of Actual Rate to Proposed Rate
55 – 59	727,777	1,874	0.3%	1,961	0.3%	2,457	0.3%	76.3%
60 – 64	2,283,562	9,933	0.4%	11,593	0.5%	10,401	0.5%	95.5%
65 – 69	3,039,575	21,150	0.7%	28,779	1.0%	19,709	0.7%	107.3%
70 – 74	2,190,726	28,542	1.3%	34,573	1.6%	30,768	1.4%	92.8%
75 – 79	1,439,404	35,157	2.4%	39,329	2.7%	32,826	2.3%	107.1%
80 – 84	938,099	45,765	4.9%	48,178	5.1%	46,498	5.0%	98.4%
85 and over	655,314	76,299	11.6%	80,191	12.2%	75,447	11.5%	101.1%
Total	11,274,458	218,720	1.9%	244,603	2.2%	218,107	1.9%	100.3%

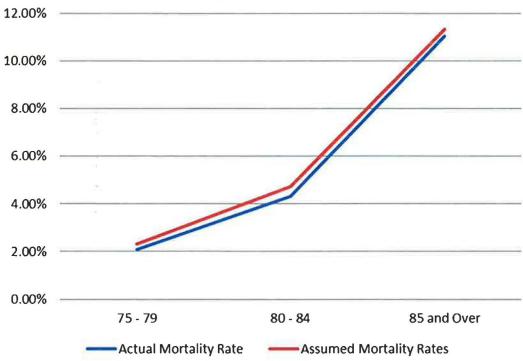
Female

Age Range	Exposures	Actual Deaths	Actual Mortality Rate	Expected Deaths	Current Mortality Rate	Proposed Death	Proposed Mortality Rate	Ratio of Actual Rate to Proposed Rate
55 – 59	1,541,764	3,452	0.2%	2,923	0.2%	3,358	0.2%	102.8%
60 – 64	4,389,984	15,470	0.4%	16,082	0.4%	13,890	0.3%	111.4%
65 – 69	4,455,398	22,742	0.5%	29,959	0.7%	21,398	0.5%	106.3%
70 – 74	2,669,649	24,666	0.9%	31,815	1.2%	28,915	1.1%	85.3%
75 – 79	1,590,109	28,188	1.8%	30,661	1.9%	28,172	1.8%	100.1%
80 – 84	990,460	37,490	3.8%	42,928	4.3%	38,425	3.9%	97.6%
85 and over	891,874	94,571	10.6%	95,057	10.7%	91,814	10.3%	103.0%
Total	16,529,238	226,579	1.4%	249,429	1.5%	225,973	1.4%	100.3%
Grand Total	27,803,696	445,299	1.6%	494,032	1.8%	444,080	1.6%	100.3%

Graph 2.A: **Healthy Post-Retirement Mortality Rates Actual Versus Expected Experience, Benefits-Weighted Basis**

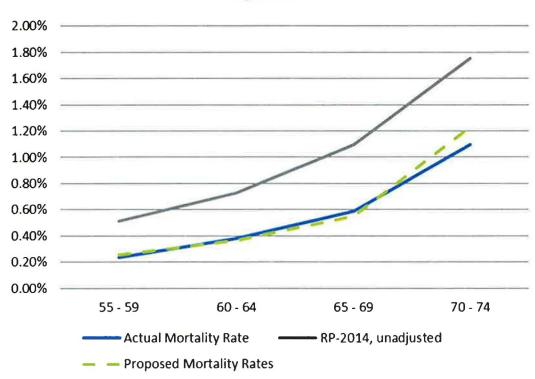




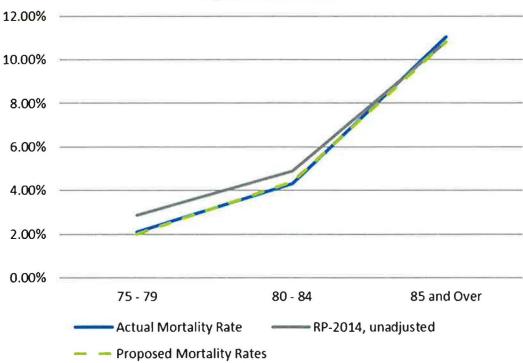


Graph 2.B:
Healthy Post-Retirement Mortality Rates
Actual Versus Proposed Experience, Benefits-Weighted Basis





Ages 75 and Over



2. Disabled Post-Retirement Mortality

Mortality experience among disabled annuitants is studied separately from service retirees because of characteristically high levels of mortality exhibited by disability retirees. The current rates are based on gender and age, and were developed in prior experience studies.

The experience analysis for the past five years reveals that fewer disabled annuitants have died than expected. Similar to healthy post-retirement mortality, our analysis of the disabled mortality rates uses a benefits-weighted approach.

The following table summarizes the disabled annuitant mortality experience by basis and gender for the study period:

Gender	Exposures	Actual Deaths	Expected Deaths	Ratio of Actual Deaths to Expected Deaths
		Basis - Cou	nts	
Male	9,428	377	418	90.1%
Female	19,295	634	677	93.7%
Total	28,723	1,011	1,095	92.3%
	Basi	s – Benefits (in 000's)	
Male	379,375	13,695	15,491	85.6%
Female	670,409	18,597	21,140	88.0%
Total	1,049,784	32,292	37,132	87.0%

We recommend changing the mortality assumption for disabled lives to use a variation of the most recent RP-2014 Disabled Mortality Table. The unadjusted table results in the following ratios:

- > 83.7% is the ratio of actual to proposed deaths for male disabled lives
- > 100.7% is the ratio of actual to proposed deaths for female disabled lives

After adjusting for the credibility of the size of the experience data, we recommend using 90% of male rates and 100% of female rates from the RP-2014 Disabled Mortality Table. This will produce a ratio of actual to expected deaths for the entire population of about 97%. The proposed disabled post-retirement mortality rates are included in Appendix B. Similar to the proposed healthy post-retirement mortality assumption, we recommend applying future mortality improvement projected on a generational basis using projection scale MP-2016 from 2014 forward.

On the following pages, Table 3 summarizes the disabled annuitant mortality experience for the study period. Graph 3 presents this information graphically for both males and females.

Table 3:

Disabled Post-Retirement Mortality Rates Actual Versus Expected Experience, Compared to Proposed, Benefits-Weighted Basis (in 000's)

Male

Age Range	Exposures	Actual Deaths	Actual Mortality Rate	Expected Deaths	Current Mortality Rate	Proposed Death	Proposed Mortality Rate	Ratio of Actual Rate to Proposed Rate
45 – 49	7,906	147	1.96%	170	2.2%	135	1.7%	109.3%
50 – 54	20,407	777	3.8%	440	2.2%	399	2.0%	194.8%
55 – 59	38,485	943	2.5%	830	2.2%	858	2.2%	109.9%
60 – 64	81,649	1,948	2.4%	1,760	2.2%	2,105	2.6%	92.5%
65 – 69	94,833	2,193	2.3%	3,458	3.7%	2,957	3.1%	74.2%
70 – 74	59,519	2,277	3.8%	2,753	4.6%	2,398	4.0%	95.0%
75 – 79	38,776	1,941	5.0%	2,337	6.0%	2,158	5.6%	90.0%
80 – 84	24,475	1,642	6.7%	2,219	9.1%	1,936	7.9%	84.8%
85 and Over	13,326	1,826	13.7%	2,026	15.2%	1,775	13.3%	102.9%
Total	379,375	13,695	3.6%	15,991	4.2%	14,720	3.9%	93.0%

Female

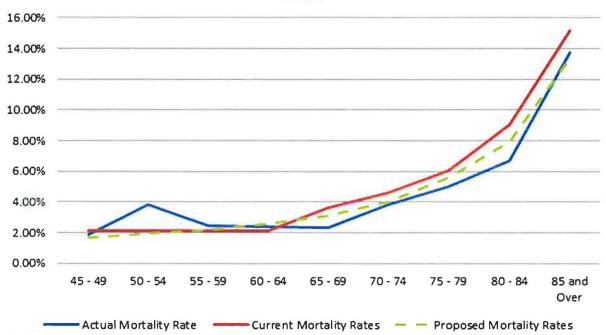
Age Range	Exposures	Actual Deaths	Actual Mortality Rate	Expected Deaths	Current Mortality Rate	Proposed Death	Proposed Mortality Rate	Ratio of Actual Rate to Proposed Rate
45 – 49	27,677	567	2.1%	572	2.1%	288	1.0%	196.6%
50 – 54	56,881	749	1.3%	1,175	2.1%	745	1.3%	100.5%
55 – 59	99,852	2,029	2.0%	2,062	2.1%	1,556	1.6%	130.4%
60 – 64	165,174	3,590	2.2%	3,411	2.1%	3,046	1.8%	117.9%
65 – 69	139,570	2,810	2.0%	4,117	3.0%	3,233	2.3%	86.9%
70 – 74	84,518	2,312	2.7%	2,493	3.0%	2,733	3.2%	84.6%
75 – 79	47,957	1,923	4.0%	2,340	4.9%	2,277	4.8%	84.5%
80 – 84	26,741	1,577	5.9%	2,001	7.5%	1,893	7.1%	83.3%
85 and Over	22,040	3,040	13.8%	2,971	13.5%	2,701	12.3%	112.6%
Total	670,409	18,597	2.8%	21,141	3.2%	18,471	2.8%	100.7%
Grand Total	1,049,784	32,292	3.1%	37,132	3.5%	33,191	3.2%	97.3%

Grand Total	1,049,784	32,292	3.1%	37,132	3.5%	33,191	3.2%	97.3%

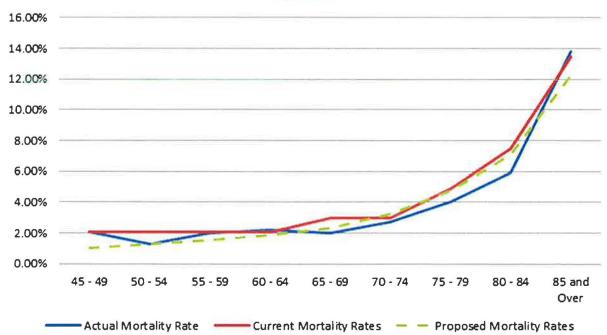
Graph 3:

Disabled Post-Retirement Mortality Rates
Actual Versus Expected Experience, Compared to Proposed,
Benefits-Weighted Basis

Males



Females



3. Healthy Pre-Retirement Mortality

The mortality experience of active and terminated vested members should be considered for several reasons. First, in combination with termination and disability rates, the pre-retirement mortality table enables the actuary to estimate the number of individuals who will eventually be eligible for a service retirement benefit, and thereby estimate the liability for those individuals. In addition, the death of a member before retirement may result in a benefit payable to a beneficiary, and the liability for these benefits must be taken into account in the valuation.

The current assumption is based on the healthy post-retirement mortality rates, with additional adjustments at earlier ages. Over the period of the experience study, very few members died while in active status, which does not provide enough credible experience to base the pre-retirement mortality assumption strictly on experience. In addition, the liability associated with pre-retirement mortality is a relatively small percentage compared to the total liability. We conclude that plan experience is insufficient to set an assumption.

Since we are using the RP-2014 Annuitant Mortality Table for the retired lives, we recommend using the RP-2014 Employee Table for the healthy pre-retirement mortality assumption. The proposed healthy pre-retirement mortality rates are included in Appendix B. Similar to the healthy post-retirement mortality assumption, we also recommend applying the latest generational mortality improvement scale (MP-2016), in order to account for future mortality improvements.

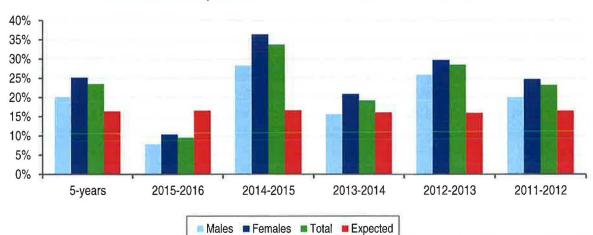
B. Retirement

1. Active Retirement

The current DB Plan retirement assumption for active members is based on members' age, gender, and years of service at retirement. There are three tables of rates: applicable through July 1, 2014, grandfathered after July 1, 2014, and non-grandfathered after July 1, 2014.

The experience shows that 23,544 Defined Benefit Plan members retired from active status during the study period. As the table and graph below illustrates, the actual retirement experience has been greater than expected in all years except for 2015/2016.

Actual and Expected Active Retirement for DB Plan



Total Rate	5-year Average	2015-2016	2014-2015	2013-2014	2012-2013	2011-2012
Expected	16.3%	16.6%	16.6%	16.1%	15.9%	16.5%
Actual	23.5%	9.5%	33.8%	19.2%	28.5%	23.2%

The main reason for accelerated retirement through 2015, followed by far fewer retirements in 2016, was the 2012 pension reform changes. While we did examine the experience to determine whether there is enough difference to warrant a revised retirement assumption, it appears that actual retirement experience provides an unreliable basis for developing an assumption. Therefore, we recommend the continued use of the DB Plan rates, with appropriate simplifications. The revised rates are included in Appendix C.

Retirement rates for the Combined Plan are based on members' gender and age. The size of the covered group under the Combined Plan does not provide enough credible experience to warrant an assumption change. Given the lack of experience, we recommend continued use of the Combined Plan retirement rates.

We will continue to monitor actual retirement experience for the Combined Plan as it emerges.

2. Inactive Vested Retirement

The current assumption for inactive vested members is that all will retire at age 60, or the first age at which unreduced benefits are available, if earlier.

The following table summarizes the inactive vested experience for members under age 60 by gender for the study period:

Gender	Exposures	Actual Retirements	Ratio of Actual Retirements to Exposures
Male	3,885	154	4.0%
Female	6,578	430	6.5%
Total	10,463	584	5.6%

Subsequent to the 2012 pension reform, unreduced benefits are no longer available prior to age 65 without 35 years of service. Therefore, we recommend adding retirement rates of 5% at each early retirement age through age 64 and assume that 100% of remaining inactive vested members retire at age 65, or the first age at which unreduced benefits are available.

C. Termination

The termination rates used in annual actuarial valuations project the percentage of employees at each age or service duration that are expected to terminate membership before retirement age. These rates take account of possible terminations for all causes other than retirement, death, or disability and include both voluntary and involuntary withdrawals from service.

Terminations before retirement age give rise to some benefit rights, but may also involve the forfeiture of a portion of previously accrued benefits. Forfeitures resulting from turnover are anticipated in advance and help finance benefits that become payable to other members. In some cases, members who leave the plan with five or more years of service and are eligible for deferred vested benefits withdraw their deposits, thus forfeiting the portion of their accrued benefit rights based on employer contributions.

The turnover experience studied includes all terminations of active employment for members not vested at termination (since such members are not eligible for other benefits, termination of employment will, most likely, result in a withdrawal of employee contributions), and terminations of membership for members who were vested and either withdrew their contributions or are eligible for future benefits. These terminations are offset by rehired members to arrive at "net" turnover for each year of the study period.

Currently, the turnover assumption used in the valuation is based on the members' age, gender, and service. The current assumption has separate rates for members with less than five years of service (service-based) and five or more years of service (age-based).

Actual terminations were significantly lower than expected for both non-vested and vested termination rates, as shown in the table below.

Gender	Exposures	Actual Terminations	Expected Terminations	Actual to Expected
	T	ermination – No	n-Vested	
Male	73,175	11,922	15,671	76%
Female	163,466	18,510	33,367	55%
Total	236,641	30,432	49,038	62%
	-	Termination -	Vested	
Male	138,693	2,796	3,160	88%
Female	375,311	6,980	8,722	80%
Total	514,004	9,776	11,882	82%

After reviewing the experience further, we recommend decreasing termination rates to reflect the experience over the past five years. Comparisons of the actual experience, expected turnovers, and proposed rates for members with less than five years of service are shown in Tables 4. A comparison of the actual experience, expected turnovers, and proposed rates for members with at least five years of service is shown in Table 5. The complete listing of the proposed termination rates are included in Appendix D.

Table 4: Non-Vested Termination Actual and Expected Experience Compared to Proposed, Service-Based Male

Years of Service	Exposures	Actual Terminations ¹	Actual Turnover Rate	Expected Terminations	Ratio of Actual to Expected Rate	Proposed Terminations	Ratio of Actual to Proposed Rate
0 - 0.99	19,894	5,584	28.1%	6,963	80.2%	5,968	93.6%
1 - 1.99	17,969	3,006	16.7%	4,492	66.9%	3,594	83.6%
2 - 2.99	13,699	1,535	11.2%	2,055	74.7%	2,055	74.7%
3 - 3.99	11,516	1,082	9.4%	1,152	94.0%	1,152	94.0%
4 - 4.99	10,097	715	7.1%	1,010	70.8%	1,010	70.8%
Total	73,175	11,922	16.3%	15,671	76.1%	13,778	86.5%

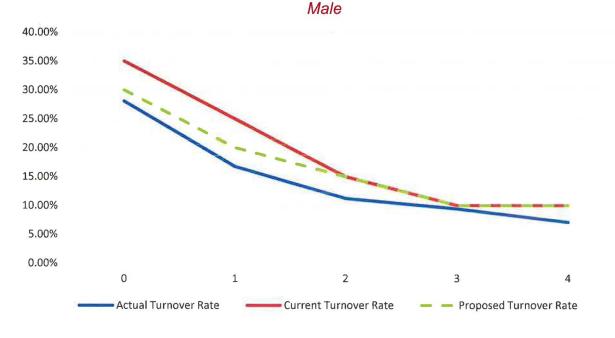
Female

Years of Service	Exposures	Actual Terminations ¹	Actual Turnover Rate	Expected Terminations	Ratio of Actual to Expected Rate	Proposed Terminations	Ratio of Actual to Proposed Rate
0 - 0.99	37,299	7,147	19.2%	13,055	54.8%	9,325	76.7%
1 - 1.99	40,726	5,293	13.0%	10,182	52.0%	8,145	65.0%
2 - 2.99	31,725	2,712	8.6%	4,759	57.0%	3,173	85.5%
3 - 3.99	27,752	1,918	6.9%	2,775	69.1%	2,775	69.1%
4 - 4.99	25,964	1,440	5.6%	2,596	55.5%	2,596	55.5%
Total	163,466	18,510	11.3%	33,367	55.5%	26,014	71.2%

	The resulting sections in						
rand Total	236,641	30,432	12.9%	49,038	62.1%	40,972	74.3%

Actual terminations as shown in the table are net of rehired employees.

Graph 4:
Non-Vested Termination
Actual and Expected Experience Compared to Proposed, Service-Based



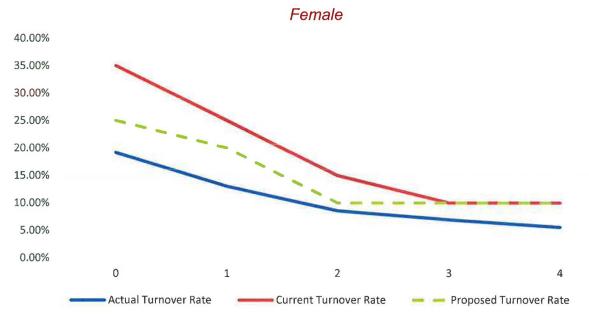


Table 5: **Vested Termination** Actual and Expected Experience Compared to Proposed, Age-Based Male

Age Range	Exposures	Actual Terminations ¹	Actual Turnover Rate	Expected Terminations	Ratio of Actual to Expected Rate	Proposed Terminations	Ratio of Actual to Proposed Rate
< 30	3,358	110	3.3%	128	86.1%	120	91.6%
30 – 34	18,909	424	2.2%	396	107.2%	436	97.3%
35 – 39	26,932	478	1.8%	488	97.9%	484	98.8%
40 – 44	29,215	500	1.7%	561	89.2%	511	97.8%
45 – 49	26,558	426	1.6%	530	80.4%	517	82.4%
50 – 54	22,271	472	2.1%	603	78.3%	548	86.2%
55 – 59 ²	11,450	386	3.4%	455	84.8%	405	95.2%
Total	138,693	2,796	2.0%	3,160	88.5%	3,021	92.6%

Female

ge Range	Exposures	Actual Terminations ¹	Actual Turnover Rate	Expected Terminations	Ratio of Actual to Expected Rate	Proposed Terminations	Ratio of Actual to Proposed Rate
< 30	13,723	530	3.9%	753	70.4%	673	78.8%
30 – 34	58,100	1,619	2.8%	1,936	83.6%	1,767	91.7%
35 – 39	68,390	1,037	1.5%	1,379	75.2%	1,198	86.6%
40 – 44	73,321	815	1.1%	1,134	71.9%	952	85.7%
45 – 49	67,056	885	1.3%	942	94.0%	935	94.6%
50 – 54	57,867	954	1.7%	1,477	64.6%	1,170	81.6%
55 – 59 ²	36,854	1,140	3.1%	1,101	103.5%	1,106	103.1%
Total	375,311	6,980	1.9%	8,722	80.0%	7,799	89.5%

Grand Total 514,004	9,776	1.9%	11,882	82.3%	10,820	90.4%
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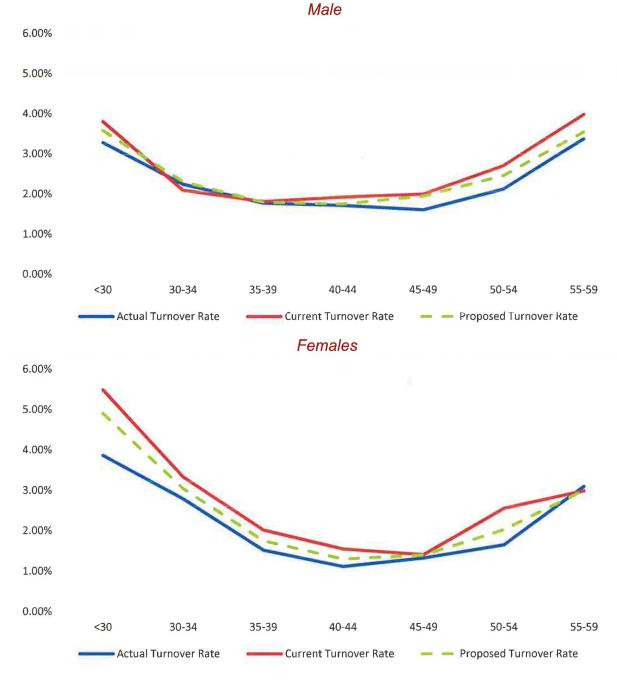
Actual terminations as shown in the table are net of rehired employees.

Excludes terminations from members who are eligible for retirement.

Graph 5:

Vested Termination

Actual and Expected Experience Compared to Proposed, Age-Based





D. Disability Retirement

Disability rate tables function in the same way as mortality tables. The rate at each age indicates the probability of becoming disabled before the next age. Disability rates add liability for the value of the disability benefits, but lessen the value of retirement benefits ultimately payable, since anyone who becomes disabled is not projected to receive retirement benefits other than the disability benefit.

The current disability rates are based on members' age and gender and range from 0.008% at age 20 to 0.30% at age 65. The following table summarizes the disability experience for the plan during the study period. Overall, the number of actual male disabilities was less and the actual female disabilities was more than the number of assumed disabilities.

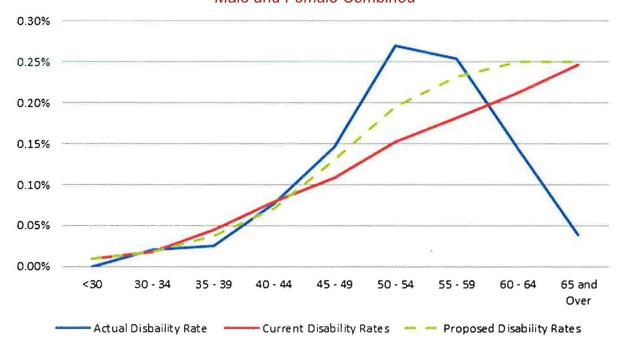
Gender	Exposures	Actual Disabilities	Actual Disability Rate	Expected Disabilities	Ratio of Actual Disabilities to Expected Disabilities
Male	244,995	222	0.09%	306	72.6%
Female	610,901	698	0.11%	502	138.9%
Total	855,896	920	0.11%	808	113.9%

In light of the above, considering the small sample size, and given experience for males and females was similar, we recommend a unisex age-based table with slightly increased rates. The complete listing of the proposed disability rates are included in Appendix E.

Table 6:
Disability Retirement
Actual and Expected Experience Compared to Proposed, Age-Based
Male and Female Combined

Age Range	Exposures	Actual Disabilities	Actual Disability Rate	Expected Disabilities	Ratio of Actual to Expected Rate	Proposed Disabilities	Ratio of Actual to Proposed Rate
< 30	104,434	0	0.00%	10	0.0%	0.01%	0.0%
30 – 34	114,926	23	0.02%	20	112.9%	0.02%	109.6%
35 – 39	121,489	31	0.03%	54	57.1%	0.04%	67.3%
40 – 44	127,233	98	0.08%	101	97.4%	0.07%	109.7%
45 - 49	113,552	166	0.15%	123	135.3%	0.13%	111.7%
50 – 54	103,600	280	0.27%	158	177.1%	0.20%	138.1%
55 – 59	91,342	232	0.25%	166	139.9%	0.23%	109.8%
60 – 64	56,160	81	0.14%	119	68.1%	0.25%	57.7%
65 & Over	23,160	9	0.04%	57	15.7%	0.25%	15.5%
Total	855,896	920	0.11%	808	113.8%	0.11%	99.2%

Graph 6:
Disability Retirement
Actual and Expected Experience Compared to Proposed, Age-Based
Male and Female Combined



E. Other Demographic Assumptions

Spouse Information

The current assumption for members as they relate to their spouses are:

- ➤ Percent Married 80% of male members and 60% of female members are assumed to be married; and
- Age Difference male members are three years older than their spouses and females are one year younger than their spouses

The following table summarizes the experience for the plan during the study period. Overall, the actual percent married and the actual age differences were similar to the expectation.

	Percen	t Married	Age Difference		
Gender	All Retirees	Newly Retired	All Retirees	Newly Retired	
Male	76.2%	76.9%	3.1 years older	2.5 years older	
Female	47.4%	55.6%	0.4 years younger	1.5 years younger	

In light of the above, we recommend no changes to either assumption.

Retiree Health Participation

The current assumption is 75% of future eligible service retirees, 84% of future eligible disabled retirees and 47% of inactive vested participants who do not cash out are assumed to elect health coverage at retirement.

The following table summarizes the participation experience of each group from January 1, 2013 to December 31, 2016:

	Exposures	Actual	Expected	Ratio of Actual Enrollees to Expected Enrollees	Actual Participation	Expected Participation
Service Retiree	28,230	20,810	21,173	98.3%	74%	75%
Disabled	987	622	829	75.0%	63%	84%
Inactive Vested	1,041	273	489	55.8%	26%	47%

The actual number of service retirees who enrolled in health coverage is close to the expected number. We recommend no change to the 75% participation assumption.

The actual number of disabled retirees who enrolled in health coverage is lower than the expected number. We recommend decreasing the participation assumption to 65% for eligible disabled retirees.

The actual number of inactive vested participants who did not cash out their pension who enrolled in health coverage is also lower than the expected number. We recommend decreasing the participation assumption to 30% for eligible inactive vested participants who do not cash out their pension.

IV. Appendix

Appendix A: Proposed Salary Increases

Age	Total Exposures	Actual Increase ¹	Expected Increase ²	Proposed Increase ³	Proposed Increase Plus Inflation ⁴
20	4	14.83%	9.90%	10.00%	12.50%
21	97	18.31%	10.34%	10.00%	12.50%
22	2,389	9.51%	10.28%	10.00%	12.50%
23	6,163	9.51%	10.29%	10.00%	12.50%
24	9,468	9.26%	10.26%	9.75%	12.25%
25	11,913	7.84%	10.26%	9.00%	11.50%
26	13,812	6.23%	8.33%	7.25%	9.75%
27	15,348	5.25%	7.44%	6.25%	8.75%
28	16,941	4.73%	6.96%	5.75%	8.25%
29	18,169	4.24%	6.63%	5.50%	8.00%
30	19,168	4.10%	6.24%	5.25%	7.75%
31	20,097	3.68%	6.09%	5.00%	7.50%
32	21,049	3.60%	5.73%	4.75%	7.25%
33	21,636	3.12%	5.74%	4.50%	7.00%
34	22,031	2.98%	5.62%	4.25%	6.75%
35	22,056	2.68%	5.44%	4.00%	6.50%
36	22,052	2.53%	5.15%	3.75%	6.25%
37	21,875	2.20%	4.92%	3.50%	6.00%
38	21,674	1.91%	4.54%	3.25%	5.75%
39	22,266	1.69%	4.35%	3.00%	5.50%
40	23,039	1.53%	4.02%	2.75%	5.25%
41	23,350	1.41%	4.02%	2.75%	5.25%
42	23,469	1.38%	3.93%	2.50%	5.00%
43	23,347	1.31%	3.73%	2.50%	5.00%
44	22,421	1.10%	3.63%	2.25%	4.75%
45	21,283	1.12%	3.48%	2.25%	4.75%
46	20,422	0.90%	3.34%	2.00%	4.50%
47	19,856	0.75%	3.19%	2.00%	4.50%
48	19,623	0.80%	3.03%	1.75%	4.25%
49	19,540	0.48%	2.88%	1.75%	4.25%
50	18,996	0.52%	2.73%	1.50%	4.00%
51	18,136	0.36%	2.65%	1.50%	4.00%
52	17,311	0.32%	2.55%	1.25%	3.75%
53	17,060	0.06%	2.46%	1.25%	3.75%
54	16,715	-0.05%	2.33%	1.00%	3.50%
55	15,775	0.07%	2.25%	1.00%	3.50%

Adjusted for actual average inflation of approximately 1.80% during the experience period.

² Adjusted for assumed inflation of 2.75%.

Proposed rate of individual salary increases table does not reflect underlying assumption for inflation.

Reflects proposed assumption for inflation of 2.50%.

IV. Appendix

Appendix A: Proposed Salary Increases continued

Age	Total Exposures	Actual Increase ¹	Expected Increase ²	Proposed Increase ³	Proposed Increase Plus Inflation ⁴
56	14,835	0.15%	2.15%	0.75%	3.25%
57	13,863	-0.05%	2.03%	0.75%	3.25%
58	12,586	0.05%	1.96%	0.50%	3.00%
59	10,973	0.08%	1.84%	0.50%	3.00%
60	9,550	0.09%	1.74%	0.25%	2.75%
61	8,359	-0.05%	1.76%	0.25%	2.75%
62	7,125	0.04%	1.23%	0.00%	2.50%
63	5,405	-0.12%	1.26%	0.00%	2.50%
64	3,742	-0.44%	1.19%	0.00%	2.50%
65+	11,260	-0.44%	1.14%	0.00%	2.50%
Total	726,249	1.67%	3.97%	2.71%	5.21%

Reflects proposed assumption for inflation of 2.50%.



Adjusted for actual average inflation of approximately 1.8% during the experience period.

² Adjusted for assumed inflation of 2.75%.

Proposed rate of individual salary increases table does not reflect underlying assumption for inflation.

IV. Appendix

Appendix B: Proposed Mortality Rates

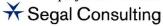
Healthy Post-Retirement Mortality Rates¹

	Ma	ale	Female		
Age	Current Mortality Rates	Proposed Mortality Rates	Current Mortality Rates	Proposed Mortality Rates	
50	0.14%	0.20%	0.08%	0.14%	
55	0.19%	0.29%	0.13%	0.18%	
60	0.37%	0.39%	0.27%	0.26%	
65	0.73%	0.55%	0.52%	0.40%	
70	1.31%	1.17%	0.98%	0.90%	
75	2.16%	1.88%	1.60%	1.47%	
80	3.99%	4.02%	3.56%	3.14%	
85	7.52%	7.75%	5.96%	6.05%	
90	16.79%	13.59%	12.33%	10.71%	
95	25.60%	21.86%	18.61%	17.90%	
100	33.71%	31.40%	23.23%	27.09%	

Disabled Post-Retirement Mortality¹

	Ma	ale	Female	
Age	Current Mortality Rates	Proposed Mortality Rates	Current Mortality Rates	Proposed Mortality Rates
45	2.16%	1.53%	2.07%	0.90%
50	2.16%	1.84%	2.07%	1.19%
55	2.16%	2.10%	2.07%	1.45%
60	2.16%	2.39%	2.07%	1.70%
65	3.08%	2.85%	2.95%	2.09%
70	4.62%	3.63%	2.95%	2.82%
75	5.08%	4.89%	4.43%	4.10%
80	7.81%	6.90%	6.35%	6.10%
85	11.77%	10.20%	9.76%	9.04%
90	17.43%	15.57%	14.71%	13.27%
95	25.36%	22.25%	21.79%	19.59%
100	36.00%	29.40%	31.70%	27.82%

Proposed mortality rates above are sample rates for 2014. For actuarial valuation purposes, mortality rates will be projected from 2014 on a generational basis using the MP-2016 improvement scale.



Appendix B: Proposed Mortality Rates continued

Healthy Pre-Retirement Mortality¹

	Ma	ale	Fen	nale
Age	Current Mortality Rates	Proposed Mortality Rates	Current Mortality Rates	Proposed Mortality Rates
20	0.02%	0.04%	0.01%	0.02%
25	0.03%	0.05%	0.01%	0.02%
30	0.04%	0.05%	0.02%	0.02%
35	0.06%	0.05%	0.03%	0.03%
40	0.08%	0.06%	0.04%	0.04%
45	0.08%	0.10%	0.06%	0.07%
50	0.10%	0.17%	0.06%	0.11%
55	0.14%	0.28%	0.10%	0.17%
60	0.28%	0.47%	0.14%	0.24%
65	0.55%	0.83%	0.26%	0.37%
70	0.98%	1.39%	0.49%	0.63%
75	1.63%	2.32%	0.81%	1.08%
80	3.00%	3.88%	1.78%	1.84%

Proposed mortality rates above are sample rates for 2014. For actuarial valuation purposes, mortality rates will be projected from 2014 on a generational basis using the MP-2016 improvement scale.



Appendix C: Proposed Retirement Rates

Defined Benefit Plan

Grandfathered Rates – Males

		5 Years of vice		Years of rvice		Years of rvice		re Years of rvice
Age	Current	Proposed	Current	Proposed	Current	Proposed	Current	Proposed
<53	0%	0%	0%	0%	20%	20%	40%	30%
53	0%	0%	0%	0%	20%	20%	40%	30%
54	0%	0%	0%	0%	20%	20%	60%	40%
55	0%	0%	6%	6%	20%	20%	60%	40%
56	0%	0%	6%	6%	20%	20%	60%	40%
57	0%	0%	6%	6%	20%	20%	60%	40%
58	0%	0%	6%	6%	20%	20%	60%	40%
59	0%	0%	7%	7%	20%	20%	55%	40%
60	10%	10%	7%	7%	20%	20%	55%	40%
61	10%	10%	7%	7%	20%	20%	55%	40%
62	12%	12%	8%	8%	20%	20%	55%	40%
63	12%	12%	8%	8%	12%	25%	55%	35%
64	12%	12%	12%	12%	12%	25%	40%	25%
65	20%	20%	20%	20%	12%	25%	40%	25%
66	20%	20%	20%	20%	12%	25%	40%	25%
67	15%	15%	20%	20%	12%	25%	35%	25%
68	15%	15%	20%	20%	12%	25%	30%	20%
69	15%	15%	20%	20%	12%	25%	30%	20%
70	15%	15%	20%	20%	12%	25%	30%	20%
71	15%	15%	20%	20%	12%	25%	30%	20%
72	15%	15%	20%	20%	12%	25%	30%	20%
73	15%	15%	20%	20%	12%	25%	30%	20%
74	15%	15%	20%	20%	12%	25%	30%	20%
75	100%	100%	100%	100%	100%	100%	100%	100%

Appendix C: Proposed Retirement Rates continued

Defined Benefit Plan

Grandfathered Rates – Female

		5 Years of rvice		Years of rvice		Years of rvice	35 or More Years of Service	
Age	Current	Proposed	Current	Proposed	Current	Proposed	Current	Proposed
<53	0%	0%	0%	0%	20%	20%	50%	35%
53	0%	0%	0%	0%	20%	20%	50%	35%
54	0%	0%	0%	0%	20%	20%	60%	40%
55	0%	0%	9%	9%	20%	20%	60%	40%
56	0%	0%	9%	9%	20%	20%	60%	40%
57	0%	0%	9%	9%	20%	20%	60%	40%
58	0%	0%	9%	9%	20%	20%	55%	40%
59	0%	0%	10%	10%	25%	25%	55%	40%
60	10%	10%	10%	10%	30%	30%	55%	45%
61	10%	10%	10%	10%	30%	30%	55%	45%
62	10%	10%	12%	12%	30%	30%	55%	45%
63	10%	10%	12%	12%	35%	35%	55%	45%
64	15%	15%	20%	20%	35%	35%	55%	45%
65	25%	25%	30%	30%	35%	35%	55%	45%
66	20%	20%	30%	30%	35%	35%	55%	45%
67	20%	20%	20%	20%	35%	35%	55%	45%
68	20%	20%	20%	20%	35%	35%	55%	45%
69	20%	20%	20%	20%	35%	35%	55%	45%
70	20%	20%	20%	20%	35%	35%	40%	40%
71	20%	20%	20%	20%	35%	35%	40%	40%
72	20%	20%	20%	20%	35%	35%	40%	40%
73	20%	20%	20%	20%	35%	35%	40%	40%
74	20%	20%	20%	20%	35%	35%	40%	40%
75	100%	100%	100%	100%	100%	100%	100%	100%

Appendix C: Proposed Retirement Rates continued

Defined Benefit Plan

Non-grandfathered Rates - Male

		5 Years of rvice		Years of ervice		Years of vice ¹	35 or More Years of Service ¹	
Age	Current	Proposed	Current	Proposed ²	Current	Proposed	Current	Proposed
<53	0%	0%	0%	0%	20%	20%	20%	20%
53	0%	0%	0%	0%	20%	20%	20%	20%
54	0%	0%	0%	0%	20%	20%	20%	20%
55	0%	0%	3%	3%	20%	20%	20%	20%
56	0%	0%	3%	3%	20%	20%	20%	20%
57	0%	0%	3%	3%	20%	20%	20%	20%
58	0%	0%	3%	3%	20%	20%	20%	20%
59	0%	0%	5%	5%	20%	20%	20%	20%
60	5%	5%	5%	5%	20%	20%	25%	25%
61	6%	6%	6%	6%	20%	20%	25%	25%
62	7%	7%	7%	7%	20%	20%	25%	25%
63	8%	8%	8%	8%	12%	25%	25%	25%
64	10%	10%	10%	10%	12%	25%	25%	25%
65	20%	20%	20%	20%	12%	25%	25%	25%
66	20%	20%	20%	20%	12%	25%	25%	25%
67	15%	20%	20%	20%	12%	25%	25%	25%
68	15%	20%	20%	20%	12%	25%	20%	20%
69	15%	20%	20%	20%	12%	25%	20%	20%
70	15%	20%	20%	20%	12%	25%	20%	20%
71	15%	20%	20%	20%	12%	25%	20%	20%
72	15%	20%	20%	20%	12%	25%	20%	20%
73	15%	20%	20%	20%	12%	25%	20%	20%
74	15%	20%	20%	20%	12%	25%	20%	20%
75	100%	100%	100%	100%	100%	100%	100%	100%



Use two times 25-29 Years of Service rates if not eligible for unreduced retirement (prior to age 65)
 Rates prior to age 60 are zero if retirement eligibility requirements are not met

Appendix C: Proposed Retirement Rates continued

Defined Benefit Plan

Non-grandfathered Rates - Female

		5 Years of rvice		Years of ervice		Years of vice ¹		re Years of vice ¹
Age	Current	Proposed	Current	Proposed ²	Current	Proposed	Current	Proposed
<53	0%	0%	0%	0%	20%	20%	20%	20%
53	0%	0%	0%	0%	20%	20%	20%	20%
54	0%	0%	0%	0%	20%	20%	20%	20%
55	0%	0%	5%	5%	20%	20%	20%	20%
56	0%	0%	5%	5%	20%	20%	20%	20%
57	0%	0%	5%	5%	20%	20%	20%	20%
58	0%	0%	5%	5%	20%	20%	20%	20%
59	0%	0%	5%	5%	25%	25%	25%	25%
60	5%	10%	10%	10%	30%	30%	30%	30%
61	6%	10%	10%	10%	30%	30%	30%	30%
62	7%	10%	10%	10%	30%	30%	30%	30%
63	8%	10%	10%	10%	35%	35%	35%	35%
64	12%	15%	15%	15%	35%	35%	35%	35%
65	25%	30%	30%	30%	35%	35%	35%	35%
66	20%	30%	30%	30%	35%	35%	35%	35%
67	20%	20%	20%	20%	35%	35%	35%	35%
68	20%	20%	20%	20%	35%	35%	35%	35%
69	20%	20%	20%	20%	35%	35%	35%	35%
70	20%	20%	20%	20%	35%	35%	30%	30%
71	20%	20%	20%	20%	35%	35%	30%	30%
72	20%	20%	20%	20%	35%	35%	30%	30%
73	20%	20%	20%	20%	35%	35%	30%	30%
74	20%	20%	20%	20%	35%	35%	30%	30%
75	100%	100%	100%	100%	100%	100%	100%	100%



Use two times 25-29 Years of Service rates if not eligible for unreduced retirement (prior to age 65)
 Rates prior to age 60 are zero if retirement eligibility requirements are not met

Appendix C: Proposed Retirement Rates continued

Combined Plan

Age	Male	Female		
60	13%	22%		
61	7%	9%		
62	7%	9%		
63	7%	9%		
64	9%	15%		
65	17%	20%		
66	15%	13%		
67	12%	13%		
68	12%	12%		
69	12%	12%		
70	12%	12%		
71	12%	12%		
72	12%	12%		
73	12%	12%		
74	12%	12%		
75	100%	100%		

Appendix D: Proposed Termination Rates

Non-Vested Terminations

Male

Service	Total Exposures	Actual Terminations	Actual Turnover Rate	Proposed Turnover Rate	Proposed Terminations
0 - 0.99	19,894	5,584	28.1%	30.0%	5,968
1 - 1.99	17,969	3,006	16.7%	20.0%	3,594
2 - 2.99	13,699	1,535	11.2%	15.0%	2,055
3 - 3.99	11,516	1,082	9.4%	10.0%	1,152
4 - 4.99	10,097	715	7.1%	10.0%	1,010
Total	73,175	11,922	16.3%	18.8%	13,778

Female

Service	Total Exposures	Actual Terminations	Actual Turnover Rate	Proposed Turnover Rate	Proposed Terminations
0 - 0.99	37,299	7,147	19.2%	25.0%	9,325
1 - 1.99	40,726	5,293	13.0%	20.0%	8,145
2 - 2.99	31,725	2,712	8.7%	10.0%	3,173
3 - 3.99	27,752	1,918	6.9%	10.0%	2,775
4 - 4.99	25,964	1,440	5.7%	10.0%	2,596
Total	163,466	18,510	11.3%	15.9%	26,014

Appendix D: Proposed Termination Rates continued

Vested Terminations

Male

Age	Total Exposures	Actual Terminations	Actual Turnover Rate	Proposed Turnover Rate	Proposed Terminations
23	2	0	0.00%	11.25%	0.2
24	2	0	0.00%	11.25%	0.2
25	2	0	0.00%	11.25%	0.2
26	10	1	10.00%	10.00%	1.0
27	262	10	3.82%	6.00%	15.7
28	1,052	31	2.95%	3.50%	36.8
29	2,028	68	3.35%	3.25%	65.9
30	2,741	74	2.70%	2.75%	75.4
31	3,296	68	2.06%	2.50%	82.4
32	3,880	98	2.53%	2.25%	87.3
33	4,319	97	2.25%	2.25%	97.2
34	4,673	87	1.86%	2.00%	93.5
35	5,035	103	2.05%	2.00%	100.7
36	5,264	89	1.69%	1.75%	92.1
37	5,488	94	1.71%	1.75%	96.0
38	5,552	97	1.75%	1.75%	97.2
39	5,593	95	1.70%	1.75%	97.9
40	5,688	99	1.74%	1.75%	99.5
41	5,892	125	2.12%	1.75%	103.1
42	5,876	94	1.60%	1.75%	102.8
43	5,916	87	1.47%	1.75%	103.5
44	5,843	95	1.63%	1.75%	102.3
45	5,677	91	1.60%	1.75%	99.3
46	5,407	110	2.03%	2.00%	108.1
47	5,237	58	1.11%	2.00%	104.7
48	5,147	102	1.98%	2.00%	102.9
49	5,090	65	1.28%	2.00%	101.8
50	5,089	88	1.73%	2.00%	101.8
51	4,930	95	1.93%	2.25%	110.9
52	4,510	84	1.86%	2.50%	112.8
53	4,064	107	2.63%	2.75%	111.8
54	3,678	98	2.66%	3.00%	110.3
55	2,472	82	3.32%	3.25%	80.3
56	2,373	67	2.82%	3.50%	83.1
57	2,291	80	3.49%	3.50%	80.2
58	2,213	77	3.48%	3.75%	83.0
59	2,101	80	3.81%	3.75%	78.8
Total	138,693	2,796	2.02%	2.18%	3,020.9

Appendix D: Proposed Termination Rates continued

Vested Terminations

Female

Age	Total Exposures	Actual Terminations	Actual Turnover Rate	Proposed Turnover Rate	Proposed Terminations
24	1	0	0.00%	13.25%	0.1
25	2	0	0.00%	12.50%	0.3
26	40	0	0.00%	11.25%	4.5
27	1,695	65	3.83%	8.00%	135.6
28	4,621	194	4.20%	4.75%	219.5
29	7,364	271	3.68%	4.25%	313.0
30	9,249	315	3.41%	3.75%	346.8
31	10,694	339	3.17%	3.50%	374.3
32	11,875	337	2.84%	3.00%	356.3
33	12,850	347	2.70%	2.75%	353.4
34	13,432	281	2.09%	2.50%	335.8
35	13,723	252	1.84%	2.00%	274.5
36	13,772	214	1.55%	1.75%	241.0
37	13,805	213	1.54%	1.75%	241.6
38	13,637	202	1.48%	1.75%	238.6
39	13,453	156	1.16%	1.50%	201.8
40	14,019	171	1.22%	1.50%	210.3
41	14,498	131	0.90%	1.25%	181.2
42	14,799	147	0.99%	1.25%	185.0
43	15,042	187	1.24%	1.25%	188.0
44	14,963	179	1.20%	1.25%	187.0
45	14,443	138	0.96%	1.25%	180.5
46	13,730	184	1.34%	1.25%	171.6
47	13,185	193	1.46%	1.50%	197.8
48	12,889	182	1.41%	1.50%	193.3
49	12,809	188	1.47%	1.50%	192.1
50	12,929	183	1.42%	1.75%	226.3
51	12,685	189	1.49%	1.75%	222.0
52	11,681	170	1.46%	2.00%	233.6
53	10,609	213	2.01%	2.25%	238.7
54	9,963	199	2.00%	2.50%	249.1
55	7,801	234	3.00%	3.00%	234.0
56	7,625	232	3.04%	3.00%	228.8
57	7,578	255	3.37%	3.00%	227.3
58	7,303	242	3.31%	3.00%	219.1
59	6,547	177	2.70%	3.00%	196.4
Total	375,311	6,980	1.86%	2.08%	7,799.2

Appendix E: Proposed Disability Retirement Rates

Unisex

Age Range	Exposures	Actual Disabilities	Actual Disability Rate	Proposed Disability Rate	Proposed Disabilities
Under 30	104,434	0	0.00%	0.01%	10.4
30	21,382	3	0.01%	0.01%	2.1
31	22,250	0	0.00%	0.01%	3.1
32	23,124	7	0.03%	0.02%	4.2
33	23,853	5	0.02%	0.02%	5.2
34	24,317	8	0.03%	0.03%	6.3
35	24,569	5	0.02%	0.03%	7.4
36	24,451	4	0.02%	0.03%	8.3
37	24,447	11	0.04%	0.04%	9.3
38	24,145	7	0.03%	0.04%	10.1
39	23,877	4	0.02%	0.05%	11.0
40	24,628	9	0.04%	0.05%	12.3
41	25,373	13	0.05%	0.06%	15.2
42	25,677	20	0.08%	0.07%	18.0
43	25,749	24	0.09%	0.08%	20.6
44	25,806	32	0.12%	0.09%	23.2
45	24,593	19	0.08%	0.10%	24.6
46	23,362	38	0.16%	0.12%	27.1
47	22,379	29	0.13%	0.13%	29.5
48	21,774	47	0.22%	0.15%	32.2
49	21,444	33	0.15%	0.16%	35.2
50	21,340	49	0.23%	0.18%	38.4
51	21,404	55	0.26%	0.19%	40.2
52	20,868	51	0.24%	0.20%	40.9
53	20,106	72	0.36%	0.20%	41.0
54	19,882	53	0.27%	0.21%	42.1
55	19,645	41	0.21%	0.22%	43.2
56	19,515	49	0.25%	0.23%	44.1
57	18,638	52	0.28%	0.23%	43.2
58	17,308	51	0.29%	0.24%	41.2

Appendix E: Proposed Disability Rates continued

Unisex

Age Range	Exposures	Actual Disabilities	Actual Disability Rate	Proposed Disability Rate	Proposed Disabilities
59	16,236	39	0.24%	0.24%	39.6
60	14,723	30	0.20%	0.25%	36.8
61	12,660	18	0.14%	0.25%	31.7
62	11,108	14	0.13%	0.25%	27.8
63	9,561	14	0.15%	0.25%	23.9
64	8,108	5	0.06%	0.25%	20.3
65 & Over	23,160	9	0.04%	0.25%	57.9
Total	855,896	920	0.11%	0.11%	927.9





University of Idaho

Actuarial Valuation and Review of Other Postemployment Benefits (OPEB) as of December 31, 2017 in accordance with:
GASB Statement No. 74 Reporting for Fiscal Year Ending December 31, 2017
GASB Statement No. 75 Reporting for Fiscal Year Ending June 30, 2018
(Using a December 31, 2017 Measurement Date)

This report has been prepared at the request of the University to assist in administering the Retiree Benefits Trust. This valuation report may not otherwise be copied or reproduced in any form without the consent of the University and may only be provided to other parties in its entirety. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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June 8, 2018

Ms. Delaine Flomer Senior Payroll & Benefits Accountant University of Idaho 875 Perimeter Drive, MS-4332 Moscow, Idaho 83844-4332

Dear Ms. Flomer:

We are pleased to submit this Actuarial Valuation and Review of Other Postemployment Benefits (OPEB) as of December 31, 2017, in accordance with Governmental Accounting Standards Board Statements No. 74 Reporting for fiscal year ending December 31, 2017, and Governmental Accounting Standards Board Statements No. 75 for fiscal year ending June 30, 2018 (using a December 31, 2017 measurement date). The report summarizes the actuarial data used in the valuation, disclosures the Net OPEB Liability (NOL) as of December 31, 2017, and analyzes the preceding year's experience. In addition, we have calculated the Actuarially Determined Contribution under the full funding policy of a 20 year closed, level dollar amortization for fiscal year ending June 30, 2018 and for fiscal year ending June 30, 2019. This report was based on the census data and the financial information prepared by Ms. Delaine Flomer, and the terms of the Plan. The actuarial calculations were completed under the supervision of Yori Rubinson, FSA MAAA.

Sincerely,

Sibson Consulting, a Member of The Segal Group, Inc.

By:

Daniel A. Levin, FSA MAAA FCA CEBS

Senior Vice President

ice President and Retiree Health Actuary

John C. Keats III cc:

SECTION 1

EXECUTIVE SUMMARY

Important Information about Actuarial Valuations1
Purpose3
Highlights of the Valuation3
Summary of Key Valuation Results4
Actuarial Certification 5

SECTION 2

VALUATION RESULTS

EXHIBIT 1 General Information about the OPEB Plan6
EXHIBIT 2 Net OPEB Liability8
EXHIBIT 3 Determination of Discount Rate and Investment Rates of Return9
EXHIBIT 4 Sensitivity14
EXHIBIT 5 Schedule of Changes in Net OPEB Liability – Last Fiscal Year
EXHIBIT 6 Deferred Outflows of Resources and Deferred Inflows of Resources 17
EXHIBIT 7 Schedule of Recognition of Changes in Total Net OPEB Liability
EXHIBIT 8 OPEB Expense19
EXHIBIT 9 Schedule of Contributions – Last Ten Fiscal Years
EXHIBIT 10 Actuarially Determined Contribution
EXHIBIT 11 Statement of Net Fiduciary Position

Schedule of Investment Returns 24

EXHIBIT 12

SECTION 3

SUPPORTING INFORMATION

EXHIBIT I Summary of Participant Data25
EXHIBIT II Actuarial Assumptions and Actuarial Cost Method26
EXHIBIT III Summary of Plan33
EXHIBIT IV Definition of Terms39
EXHIBIT V Accounting Requirements41



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, Sibson Consulting ("Sibson") 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 University of Idaho to keep Sibson informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Sibson 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. Sibson 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 Sibson to receive the best possible data and to be informed about any known incomplete or inaccurate data.
- Assets Part of the cost of a plan will be paid from existing assets the balance will need to come from future contributions and investment income. The valuation is based on the asset values as of the valuation date, typically reported by the auditor. Some plans include assets, such as private equity holdings, real estate, or hedge funds that are not subject to valuation by reference to transactions in the marketplace. A snapshot as of a single date may not be an appropriate value for determining a single year's contribution requirement, especially in volatile markets. Plan sponsors often use an "actuarial value of assets" that differs from market value to reflect gradually year-to-year changes in the market value of assets in determining the contribution requirements.
- Actuarial assumptions In preparing an actuarial valuation, Sibson 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, Sibson 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



SECTION 1: Executive Summary for the University of Idaho's December 31, 2017 Measurement Under GASB 74 and 75

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.

Given the above, the user of Sibson's actuarial valuation (or other actuarial calculations) needs to keep the following in mind:

- > The actuarial valuation is prepared for use by the University of Idaho. It includes information for compliance with accounting standards and for the plan's auditor. Sibson is not responsible for the use or misuse of its report, particularly by any other party.
- > If the University of Idaho is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Sibson 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, Sibson 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 unrounded, 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.
- Sibson does not provide investment, legal, accounting, or tax advice. Sibson'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 University of Idaho should look to their other advisors for expertise in these areas.
- While Sibson 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 Sibson's valuation, Sibson may revise that valuation or make an appropriate adjustment in the next valuation.
- Sibson's report shall be deemed to be final and accepted by the University of Idaho upon delivery and review. The University of Idaho should notify Sibson immediately of any questions or concerns about the final content.

As Sibson 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.



Purpose

This report presents the results of our actuarial valuation of the University of Idaho's (the "Employer") OPEB plan as of December 31, 2017, required by Governmental Accounting Standards Board (GASB) Statement No. 74, Financial Reporting for Postemployment Benefit Plans Other than Pension Plan for fiscal year ending December 31, 2017, and GASB Statement No. 75, Accounting and Financial Reporting for Postemployment Benefits Other than Pensions for fiscal year ending June 30, 2018 (using a December 31, 2017 measurement date). The actuarial computations made are for purposes of fulfilling plan accounting and funding requirements. Determinations for purposes other than meeting financial accounting and funding requirements may be significantly different from the results reported here.

Highlights of the Valuation

ACCOUNTING AND FINANCIAL REPORTING

- The Net OPEB liability (NOL) as of December 31, 2017 is \$33,335,830, a decrease of \$2,302,784, from the prior year NOL of \$35,638,614.
 - The decrease in the NOL as of December 31, 2017 was due to return on assets that were greater than expected (11.25% actual vs. 5.50% expected). The University's market value of assets as of December 31, 2017 is \$34,984,371, an increase of \$3,737,768 from the prior year.
 - As of December 31, 2017, the ratio of assets to the Total OPEB Liability (the funded ratio) is 51.21%.
- The Annual OPEB Expense is \$2,101,087 for the year ending June 30, 2018.

FUNDING (WITH FUNDING POLICY)

- The Actuarially Determined Contribution (ADC) for the year ending June 30, 2018 is equal to the normal cost plus a 19-year amortization of the unfunded liability. This requires a contribution toward OPEB benefits of \$3,536,582 or 2.24% of projected payroll for the year ending June 30, 2018.
- The Actuarially Determined Contribution (ADC) for the year ending June 30, 2019 is equal to the normal cost plus an 18-year amortization of the unfunded liability. This requires a contribution toward OPEB benefits of \$3,451,072 or 2.13% of projected payroll for the year ending June 30, 2019.
- > The following outlines the differences in assumptions from the accounting calculation:
 - The Normal Cost for Tier 4 participants is assumed to increase annually with payroll to reflect future new hires.



SECTION 1: Executive Summary for the University of Idaho's December 31, 2017 Measurement Under GASB 74 and 75

Summary of Key Valuation Results Funding Discount Rate: 5.50% As of December 31, 2016 As of December 31, 2017 **Total OPEB Liability** \$66,885,217 \$68,320,201 Plan Fiduciary Net Position (Assets) 31,246,603 34,984,371 \$35,638,614 **Net OPEB Liability** \$33,335,830 Plan Fiduciary Net Position as a percentage of Total OPEB Liability 46.72% 51.21% As of December 31, 2017 **Annual OPEB Expense** \$2,101,087 505,073 Service Cost at End of Year Under GASB 75 159,935,268 **Total Payroll** For Year Ending June 30, 2018 For Year Ending June 30, 2019 **Actuarially Determined Contribution for Fiscal Year Ending** \$3,536,582 \$3,451,072 **Actual Contribution for Fiscal Year Ending** N/A N/A **Benefit Payments Net of Retiree Contributions** N/A N/A



June 8, 2018

ACTUARIAL CERTIFICATION

This is to certify that Sibson Consulting, a Member of The Segal Group, Inc. has conducted an actuarial valuation of certain benefit obligations of the University of Idaho's Retiree Benefits Trust other postemployment benefit programs as of December 31, 2017, 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 Statements 74 and 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. Sibson Consulting does not audit the data provided. The accuracy and comprehensiveness of the data is the responsibility of those supplying the data. Sibson, however, does review the data for reasonableness and consistency.

The actuarial computations made are for purposes of fulfilling plan accounting and funding requirements. Determinations for purposes other than meeting financial accounting and funding 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 (such as the end of an amortization period); 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 my knowledge, this report is complete and accurate and in my opinion presents the information necessary to comply with GASB Statements 74 and 75 with respect to the benefit obligations addressed. The signing actuary is a member of the Society of Actuaries, the American Academy of Actuaries, and other professional actuarial organizations and meets the "General Qualification Standards for Statements of Actuarial Opinions" to render the actuarial opinion contained herein.

Vice President and Retiree Health Actuary

* Sibson Consulting

General Information about the OPEB Plan

Plan Description

Plan administration:

The University of Idaho administers the OPEB plan that is used to provide postemployment benefits other than pensions (OPEB) for permanent full-time general employees. Management of the OPEB plan is overseen by University of Idaho Administration.

Plan membership: At May 1, 2017, the University of Idaho plan membership consisted of the following:

	Medical	Dental	Life	Sick-Leave
Retired members or beneficiaries currently receiving benefits	815	190	663	60
Vested terminated members entitled to but not yet receiving benefits	N/A	N/A	N/A	N/A
Active members	<u> 575</u>	<u>575</u>	_38	<u>2,039</u>
Total	1,390	765	701	2,099

Benefits provided:

The University of Idaho ("University") provides medical and dental benefits to eligible retirees, disabled employees, spouses, and survivors. The University also provides life insurance benefits to eligible retirees. Long-term disabled employees are treated as retirees and eligible for these same retiree benefits. These benefits represent a single-employer defined benefit plan administered by the University.

Under certain conditions the University pays a portion of the coverage for retirees and disabled employees and the retiree or disabled employee pays the remainder. Spouses and survivors are always required to pay 100% of the cost for these benefits. In general, the employee must have completed at least 30 years of credited service or the sum of his/her age and years of credited service must total at least 80 to qualify for this benefit. Employees who were hired on or after January 1, 2002 are not eligible for this benefit. Employees hired after January 1, 2002 are eligible to participate in the University's health insurance plan, but the University does not cover any portion of their premiums, deductibles, or coinsurance; those costs are the sole responsibility of the employee. However, these employees are eligible to convert 50% of unused accrued sick time, up to 600 hours, to pay for their medical premiums. All University post-employment benefits may be further established or amended by the University or the State Board of Education.



University of Idaho Contributions:

The University of Idaho contributes the Actuarial Determined Contribution (ADC) (previously the Annual Required Contribution under GASB Statement No. 45) to fund the future payments required to provide post-employment benefits other than pension ("OPEB"). At the end of each fiscal year, the University of Idaho deposits the excess of the ADC over the amount of actual benefit payments net of retiree contributions into the Retiree Benefits Trust. After the University has paid off the entire Net OPEB Liability under the 20-year closed level dollar amortization funding policy, contributions will be equal to the annual normal cost.

Net OPEB Liability

Reporting Date for Employer under GASB 75	June 30, 2018
Reporting Date for Employer under GASB 74	December 31, 2017
Measurement Date for Employer under GASB 74 & 75	December 31, 2017
The components of the Net OPEB Liability are as follows:	
Total OPEB Liability	\$68,320.201
Plan Fiduciary Net Position	<u>34,984,371</u>
Net OPEB Liability	\$33,335,830
Plan Fiduciary Net Position as a percentage of the Total OPEB Liability	51.21%

The Net OPEB Liability was measured as of December 31, 2017. Plan Fiduciary Net Position (plan assets) was valued as of the measurement date and the Total OPEB Liability was determined from actuarial valuations as of May 1, 2017, and was projected forward to the measurement date of December 31, 2017 using standard actuarial techniques.

Actuarial assumptions. The total OPEB liability was measured by an actuarial valuation as of December 31, 2017 used the following actuarial assumptions, applied to all periods included in the measurement, unless otherwise specified:

Inflation	2.00%
Salary increases	3.00%, including inflation
Discount Rate	5.50%
Healthcare costs trend rates	
Non-Medicare Medical & Prescription Drugs	7.58% graded to 4.50% over 13 years
Medicare Medical	5.90% graded to 4.50% over 10 years
Medicare Prescription Drugs	10.67% graded to 4.50% over 13 years
Dental	4.00%
Mortality Rates	
Healthy	Approximate 2006 table based on Headcount-Weighted RP-2014 Combined Healthy Annuitant, projected generationally with Scale MP-2015 from 2006
Disabled	Approximate 2006 table based on Headcount-Weighted RP-2014 Disabled Retiree, projected generationally with Scale MP-2015 from 2006

Detailed information regarding all actuarial assumptions can be found in Section 3, Exhibit II.



Determination of Discount Rate and Investment Rates of Return

DEVELOPMENT OF LONG-TERM RATE

The long-term expected rate of return on OPEB plan investments was determined using a building block method in which best estimate ranges of expected future rates of return (expected returns, net of investment expense and inflation) are developed for each major asset class. These returns are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the current asset allocation percentage and by adding expected inflation and subtracting expected investment expenses and a risk margin. The current allocation and projected arithmetic real rates of return for each major asset class, after deducting inflation, but before investment expenses, used in the derivation of the long-term expected investment rate of return assumption are summarized below:

Asset Class	Current Allocation	Long-Term Expected Arithmetic Real Rate of Return	Money Weighted Real Rate of Return
Domestic equity	33.88%	6.40%	2.17%
International equity, developed markets	9.11%	7.40%	0.67%
International equity, emerging markets	2.23%	9.80%	0.22%
Fixed income, core	51.81%	1.75%	0.91%
Short term governmental money market	_2.97%	1.10%	0.03%
Total	100.00%		4.00%
Inflation			2.00%
Investment Rate of Return (Gross)			6.00%
Investment Expenses			(0.25%)
Investment Rate of Return (Net)			5.75%
Long-Term Rate of Return Used in Valuation			5.50%

The University of Idaho established the Retiree Benefits Trust ("RBT") in 2008 to fund the future payments required to provide post-employment benefits other than pension ("OPEB"). The RBT is an independent, irrevocable trust administered on behalf of the University by Wells Fargo Bank as trustee.



EXHIBIT 3 (continued)

Determination of Discount Rate and Investment Rates of Return

PROJECTION OF OPEB PLAN'S FIDUCIARY NET POSITION FOR USE IN CALCULATION OF DISCOUNT RATE!

The projection of cash flow used to determine the discount rate assumed that the University of Idaho's contributions would be made at rates equal to the actuarially determined contribution rates. Based on these assumptions, the OPEB Plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan member. Therefore, the long-term expected rate of return of 5.50% on plan investments was applied to all periods of projected benefit payments to determine the Total OPEB Liability.

Year Beginning Jan 1,²	Projected Beginning Plan Fiduciary Net Position (a)	Projected Total Contributions ³ (b)	Projected Benefit Payments and Administrative Expenses⁴ (c)	Projected Investment Earnings⁵ (d)	Projected Ending Plan Fiduciary Net Position (e) = (a) + (b) - (c) + (d)
2018	\$34,984,371	\$3,530,876	\$3,597,495	\$1,922,333	\$36,840,086
2019	36,840,086	3,256,807	3,746,370	2,012,922	38,363,445
2020	38,363,445	3,235,431	3,898,079	2,092,011	39,792,807
2021	39,792,807	3,214,585	4,054,059	2,165,828	41,119,162
2022	41,119,162	3,192,330	4,243,445	2,233,035	42,301,081
2023	42,301,081	3,167,549	4,443,453	2,291,942	43,317,119
2024	43,317,119	3,140,861	4,628,764	2,342,072	44,171,288
2025	44,171,288	3,112,214	4,789,179	2,383,922	44,878,245
2026	44,878,245	3,080,601	4,951,338	2,417,547	45,425,054
2027	45,425,054	3,046,244	5,099,914	2,442,658	45,814,042
2028	45,814,042	3,014,593	5,210,983	2,460,180	46,077,832
2029	46,077,832	2,990,058	5,271,707	2,472,375	46,268,559
2030	46,268,559	2,967,092	5,312,396	2,481,138	46,404,392
2031	46,404,392	2,944,139	5,353,406	2,486,874	46,481,999
2032	46,481,999	2,921,081	5,350,385	2,490,598	46,543,294
2033	46,543,294	2,903,057	5,316,864	2,494,390	46,623,877



Year Beginning Jan 1,²	Projected Beginning Plan Fiduciary Net Position (a)	Projected Total Contributions ³ (b)	Projected Benefit Payments and Administrative Expenses ⁴ (c)	Projected Investment Earnings⁵ (d)	Projected Ending Plar Fiduciary Net Position (e) = (a) + (b) - (c) + (d)
2034	\$46,623,877	\$2,888,261	\$5,252,483	\$2,500,167	\$46,759,822
2035	46,759,822	2,875,892	5,150,483	2,510,076	46,995,308
2036	46,995,308	2,865,033	5,047,357	2,525,531	47,338,515
2037	47,338,515	78,490	4,934,206	2,471,873	44,954,672
2038	44,954,672	69,517	4,806,693	2,343,978	42,561,475
2039	42,561,475	60,677	4,665,189	2,215,952	40,172,915
2040	40,172,915	52,062	4,512,735	2,088,484	37,800,726
2041	37,800,726	44,706	4,344,508	1,962,378	35,463,303
2042	35,463,303	38,053	4,194,333	1,837,714	33,144,736
2043	33,144,736	32,486	4,034,064	1,714,390	30,857,549
2044	30,857,549	27,438	3,838,907	1,593,753	28,639,833
2045	28,639,833	22,563	3,652,429	1,476,706	26,486,673
2046	26,486,673	18,364	3,478,063	1,362,899	24,389,873
2047	24,389,873	14,962	3,294,575	1,252,461	22,362,720
2048	22,362,720	12,229	3,096,727	1,146,261	20,424,483
2049	20,424,483	9,752	2,904,595	1,044,804	18,574,444
2050	18,574,444	7,203	2,716,523	948,085	16,813,208
2051	16,813,208	5,254	2,528,110	856,276	15,146,628
2052	15,146,628	3,920	2,334,922	769,820	13,585,445
2053	13,585,445	2,879	2,146,184	689,047	12,131,187
2054	12,131,187	2,029	1,956,902	614,176	10,790,490
2055	10,790,490	1,342	1,772,312	545,427	9,564,946
2056	9,564,946	858	1,596,639	482,775	8,451,941
2057	8,451,941	508	1,440,852	425,777	7,437,373
2058	7,437,373	312	1,291,408	374,026	6,520,303

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SECTION 2: Valuation Results for the University of Idaho's December 31, 2017 Measurement Under GASB 74 and 75

Year Beginning Jan 1,²	Projected Beginning Plan Fiduciary Net Position (a)	Projected Total Contributions ³ (b)	Projected Benefit Payments and Administrative Expenses⁴ (c)	Projected Investment Earnings⁵ (d)	Projected Ending Plar Fiduciary Net Position (e) = (a) + (b) - (c) + (d)
2059	\$6,520,303	\$184	\$1,151,981	\$327,366	\$5,695,871
2060	5,695,871	92	1,026,504	285,424	4,954,884
2061	4,954,884	40	911,994	247,776	4,290,706
2062	4,290,706	19	804,130	214,172	3,700,767
2063	3,700,767	7	705,906	184,390	3,179,258
2064	3,179,258	2	619,017	158,064	2,718,307
2065	2,718,307	0	542,188	134,796	2,310,915
2066	2,310,915	0	472,888	114,270	1,952,297
2067	1,952,297	0	410,757	96,232	1,637,772
2068	1,637,772	0	355,290	80,438	1,362,920
2069	1,362,920	0	305,391	66,675	1,124,204
2070	1,124,204	0	260,510	54,763	918,456
2071	918,456	0	220,347	44,537	742,646
2072	742,646	0	184,651	35,836	593,831
2073	593,831	0	153,160	28,505	469,176
2074	469,176	0	125,631	22,396	365,941
2075	365,941	0	101,819	17,364	281,487
2076	281,487	0	81,444	13,272	213,314
2077	213,314	0	64,223	9,990	159,082
2078	159,082	0	49,861	7,397	116,618
2079	116,618	0	38,061	5,381	83,938
2080	83,938	0	28,534	3,842	59,246
2081	59,246	0	20,981	2,689	40,953
2082	40,953	0	15,107	1,843	27,689
2083	27,689	0	10,632	1,234	18,291

[★] Sibson Consulting

Year Beginning Jan 30,²	Projected Beginning Plan Fiduciary Net Position (a)	Projected Total Contributions ³ (b)	Projected Benefit Payments and Administrative Expenses⁴ (c)	Projected Investment Earnings⁵ (d)	Projected Ending Plan Fiduciary Net Position (e) = (a) + (b) - (c) + (d)
2084	18,291	0	7,305	\$808	\$11,793
2085	11,793	0	4,894	516	7,415
2086	7,415	0	3,191	321	4,545
2087	4,545	0	2,021	195	2,720
2088	2,720	0	1,241	116	1,594
2089	1,594	0	741	68	922
2090	922	0	428	39	532
2091	532	0	241	23	315
2092	315	0	132	14	197
2093	197	0	71	9	135
2094	135	0	37	6	104
2095	104	0	19	5	90
2096	90	0	9	5	86
2097	86	0	4	5	87
2098	87	0	1	5	91
2099	91	0	1	5	95
2100	95	0	0	5	99

Notes:

- 1 Amounts may not total exactly due to rounding
- 2 Years beyond 2100 have been omitted from this table as the Projected Benefit Payments are \$0.
- 3 Column (b): Projected total contributions include the service cost applied to closed group (based on covered active members as of May 1, 2017) plus employer contributions to the unfunded actuarial liability. Contributions are assumed to occur at the middle of the year.
- 4 Column (c): Projected benefit payments have been determined in accordance with paragraphs 43-47 of GASB Statement No. 74 and are based on the closed group of active, retired members and beneficiaries as of May 1, 2017.
- 5 Column (d): Projected investment earnings are based on the assumed investment rate of return of 5.50% per annum and reflect the assumed timing of benefit payments made at the beginning of each month.

The Plan's Fiduciary Net Position is never projected to be exhausted.



Sensitivity

The following presents the NOL of the University as well as what the University's NOL would be if it were calculated using a discount rate that is 1-percentage-point lower (4.50%) or 1-percentage-point higher (6.50%) 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 in Discount Rate (4.50%)	Current Discount Rate (5.50%)	1% Increase in Discount Rate (6.50%)
Net OPEB Liability (Asset)	\$41,824,578	\$33,335,830	\$26,246,689
	1% Decrease in Healthcare Cost Trend Rates	Current Healthcare Cost Trend Rates	1% Increase in Healthcare Cost Trend Rates
Net OPEB Liability (Asset)	\$26,628,323	\$33,335,830	\$41,327,663

Schedule of Changes in Net OPEB Liability – Last Fiscal Year¹

Reporting Date for Employer under GASB 75	June 30, 2018	
Reporting Date for Employer under GASB 74	December 31, 2017	
Measurement Date for Employer under GASB 74 & 75	December 31, 2017	
Total OPEB Liability		
Service cost at end of year	\$505,073	
Interest	3,606,077	
Change of benefit terms	0	
Differences between expected and actual experience	0	
Changes of assumptions	0	
Benefit payments, including refunds of member contributions	(2,676,167)	
Net change in Total OPEB Liability	\$1,434,984	
Total OPEB Liability – beginning	\$66,885,217	
(a) Total OPEB Liability – ending	<u>\$68,320,201</u>	
Plan Fiduciary Net Position		
Contributions – employer	\$2,961,065	
Contributions – employee	0	
Net investment income	3,527,768	
Benefit payments, including refunds of member contributions	(2,676,167)	
Administrative expense	(74,899)	
Net change in Plan Fiduciary Net Position	\$3,737,768	
Plan Fiduciary Net Position – beginning	\$31,246,603	
(b) Plan Fiduciary Net Position – ending	\$34,984,371	
(c) Net OPEB Liability – ending (a) – (b)	<u>\$33,335,830</u>	
Plan Fiduciary Net Position as a percentage of the Total OPEB Liability	51.21%	
Covered employee payroll	\$159,935,268	
Plan Net OPEB Liability as percentage of covered employee payroll	20.84%	

¹ The above information is required beginning in 2017. A full 10-year trend will be compiled in future years.



SECTION 2: Valuation Results for the University of Idaho's December 31, 2017 Measurement Under GASB 74 and 75

EXHIBIT 5

Schedule of Changes in Net OPEB Liability – Last Fiscal Year (continued)

Notes to Schedule:

Benefit changes: The December 31, 2016 liabilities in this report were developed based on data as of May 1, 2017. The valuation

liabilities were calculated as of December 31, 2017, then adjusted to December 31, 2016. No plan changes were

valued.

Changes of assumptions: The December 31, 2016 liabilities in this report were developed based on data as of May 1, 2017. The valuation

liabilities were calculated as of December 31, 2017, then adjusted to December 31, 2016. No assumption changes

were valued.



Deferred Outflows of Resources and Deferred Inflows of Resources

The following charts reflect the deferred inflows and outflows of resources related to OPEB. Deferred inflows and outflows are differences between actual and expected experience that are not reflected in the current year's expenses.

Reporting Date for Employer under GASB 75

June 30, 2018

Measurement Date for Employer under GASB 75

December 31, 2017

Deferred (Outflows/(Inflows)	of Resources f	for Current Year
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		Deferred Outflows of Resources	Deferred Inflows of Resources	Recognition Period
1.	Changes of assumptions or other inputs	\$0	\$0	7 years
2.	Difference between expected and actual experience in the Total OPEB Liability	0	0	7 years
3.	Net difference between projected and actual earnings on investments	<u>0</u>	(1,803,507)	5 years
4.	Total Deferred Outflows/(Inflows) of Resources	\$0	(\$1,803,507)	N/A

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 June 30:

2019	(360,701)
2020	(360,701)
2021	(360,701)
2022	(360,701)
Thereafter	0



EXHIBIT 7
Schedule of Recognition of Changes in Total Net OPEB Liability

Measurement Date Dec 31,	2017 Experience	2017 Assumptions	2017 Investments	2017 Total	2018	2019	2020	2021	Outflows	Inflows	Total
Amt Established	\$0	\$0	(\$1,803,507)	(\$1,803,507)					\$0	(\$1,803,507)	(\$1,803,507)
Amt Recognized in FY June 30,	E										
2018			(\$360,701)	(\$360,701)						(\$360,701)	(\$360,701)
2019			(360,701)	(360,701)						(360,701)	(360,701)
2020			(360,701)	(360,701)						(360,701)	(360,701)
2021			(360,701)	(360,701)						(360,701)	(360,701)
2022			(360,701)	(360,701)						(360,701)	(360,701)
2023			0	0						0	0
2024			0	0						0	0
2025			0	0						0	0
Deferred Balance at June 30,											
2018			(\$1,442,806)	(\$1,442,806)						(\$1,442,806)	(\$1,442,806)
2019			(1,082,104)	(1,082,104)						(1,082,104)	(1,082,104)
2020			(721,403)	(721,403)						(721,403)	(721,403)
2021			(360,701)	(360,701)						(360,701)	(360,701)
2022			0	0						0	0
2023			0	0						0	0
2024			0	0						0	0
2025			0	0						0	0



OPEB Expense

Reporting Date for Employer under GASB 75	June 30, 2018
Measurement Date for Employer under GASB 75	December 31, 2017
Components of OPEB Expense	
1. Service cost at end of year	\$505,073
2. Interest on the Total OPEB Liability	3,606,077
3. Employee contributions	0
4. Administrative expense	74,899
5. Projected earnings on plan investments	(1,724,261)
6. Expensed portion of current-period differences between actual and projected earnings on plan investments	(360,701)
7. Expensed portion of current-period difference between expected and actual experience in the Total OPEB Liability	0
8. Expensed portion of current-period changes of assumptions or other inputs	0
9. Current year plan changes	0
10. Recognition of beginning of year deferred outflows of resources as OPEB expense	0
11. Recognition of beginning of year deferred inflows of resources as OPEB expense	0
Total OPEB Expense	\$2,101,087



EXHIBIT 9

Schedule of Contributions – Last Ten Fiscal Years¹

Year Ended June 30,	Actuarially Determined Contributions	Contributions in Relation to the Actuarially Determined Contributions ²	Contribution Deficiency / (Excess)	Covered-Employee Payroll	Contributions as a Percentage of Covered Employee Payroll
2010	\$5,863,000	\$6,801,000	(\$938,000)	\$124,584,000	5.46%
2011	5,250,000	5,618,000	(368,000)	121,834,000	4.61%
2012	4,806,000	5,201,000	(395,000)	123,237,000	4.22%
2013	3,723,000	4,404,000	(681,000)	123,592,000	3.56%
2014	3,368,000	3,178,000	190,000	132,777,000	2.39%
2015	3,177,000	3,233,000	(56,000)	140,728,000	2.30%
2016	2,711,000	2,751,000	(40,000)	150,995,000	1.82%
2017	3,321,000	3,157,000	164,000	152,999,000	2.06%
2018	3,537,000	N/A	N/A	157,589,000	N/A
2019	3,451,000	N/A	N/A	162,317,000	N/A

All the numbers shown above are rounded to the nearest thousand.

For years prior to the year ended June 30, 2017, the Actuarial Determined Contributions ("ADC") was assumed to be equal to the Annual Required Contributions ("ARC") as reported under GASB Statement No. 45 for each applicable year.

For the years ending June 30, 2010 through 2011, the amount of actual contributions in relation to the Actuarially Determined Contributions were estimated based on the "percentage contributed" as shown on page 49 of the University of Idaho Financial Statements for the years ended June 30, 2014 and 2013 and Report of Independent Auditors.

Notes to Exhibit 9

Methods and assumptions used to establish "actuarially determined contribution" rates:

Valuation date

Actuarially determined contribution rates are calculated as of June 30, one year prior to the end of the fiscal

year in which contributions are reported

Measurement date June 30, 2018

Actuarial cost method Entry Age, Level Percentage of Payroll

Amortization method Level Dollar, Closed

Remaining amortization period 19 years remaining for the year ending June 30, 2018

18 years remaining for the year ending June 30, 2019

Asset valuation method The market value of assets as of March 31, 2018 projected to June 30, 2018 with a 5.50% rate of return

EXHIBIT 10

Actuarially Determined Contribution

	Year Ending June 30, 2018	% of Payroll	Year Ending June 30, 2019	% of Payroll
a) Normal Cost ¹	\$543,068	0.34%	\$543,646	0.33%
Actuarial Accrued Liability	\$67,992,385	43.15%	\$68,629,793	42.28%
Assets	\$33,244,712	21.10%	\$35,932,666	22.14%
Unfunded Actuarial Accrued Liability	\$34,747,673	22.05%	\$32,697,126	20.14%
Remaining Amortization Period	19 years		18 years	
Level Dollar Amortization Factor	11.61		11.25	
b) Amortization of Unfunded Actuarial Accrued Liability	\$2,993,514	1.90%	\$2,907,426	1.79%
(c) Total Actuarially Determined Contribution (a) + (b)	\$3,536,582	2.24%	\$3,451,072	2.13%
Cotal Payroll	\$157,588,902		\$162,316,569	

¹ The Normal Cost is assumed to annually increase with a payroll growth of 3.00% for Tier 4 participants only, to simulate an open group Tier 4 population.

If the University continues to pay the Actuarially Determined Contribution (ADC) for the remainder of the funding policy (20-year closed level dollar amortization), the Total OPEB Liability will be 100% funded after the fiscal year ending June 30, 2035.



EXHIBIT 11
Statement of Net Fiduciary Position

	December 31, 2017
Assets 1	
Cash and deposits	\$0
Receivables:	
Contributions	\$0
Due from broker for investments sold	0
Investment income, total accruals	<u>1,239</u>
Total receivables	\$1,239
Investments:	
Cash Equivalents	\$1,037,703
Domestic equities	11,850,209
Fixed income	18,125,577
International equities	3,969,643
Total investments	\$34,983,132
Total assets	\$34,984,371
Liabilities	
Payables:	
Investment management fees	\$0
Due to broker for investments purchased	<u>0</u>
Total liabilities	<u>\$0</u>
Net position restricted for OPEB	\$34,984,371

¹ Asset information was provided by the University of Idaho, and was based on the monthly statement of assets as of December 31, 2017 prepared by Wells Fargo.

EXHIBIT 12

Schedule of Investment Returns¹

Year Ending December 31,	Annual Money Weighted Rate of Return, Net of Investment Expense
2016	6.14%
2017	11.25%

¹ The above information is required beginning in 2017. A full 10-year trend will be compiled in future years.



EXHIBIT I Summary of Participant Data

	Provided as of May 1, 2017						
Retirees Electing Coverage	Medical	Dental	Life	Sick-Leave	<u>Total</u>		
Number of retirees	772	185	663	54*	826		
Average age of retirees	74.7	68.5	76.2	68.4	74.3		
Number of dependent spouses	111	27	1988	2	113		
Average age of dependent spouses	74.8	69.1	() = (80.9	75.2		
Surviving Spouses Electing Coverage							
Number	43	5	-		43		
Average age	83.5	70.8			83.5		
Disabled Retirees Electing Coverage							
Number		•	-	6	6		
Average age	51	-		73.7	73.7		
Active Participants							
Number	575	575	38	2,039	2,614		
Average age	57.6	57.6	68.5	42.3	45.6		
Average years of service	24.4	24.4	37.7	5.5	9.7		
Average expected retirement age	67.5	67.5	70.3	65.6	66.0		

^{*} Includes current Tier IV retirees with a sick leave credit bank equal to \$0.



EXHIBIT II					
Actuarial Assumptions and Actuari	al Cost Method				
Detailed census data, claim experience, and summary plan descriptions for postretirement welfare were provided by University of Idaho. The census data was collected as of May 1, 2017, and was p forward to the measurement date of December 31, 2017 using standard actuarial techniques.					
Actuarial Cost Method:	Entry-Age Normal, Level Percentage of Pay				
Asset Valuation Method:	Market Value				
Amortization Method:	Level Dollar, 20 year closed (19 years remaining for year ending June 30, 2018; 18 years remaining for year ending June 30, 2019)				
Measurement Date:	December 31, 2017				
Actuarial Valuation Date:	May 1, 2017				
Discount Rate:	5.50%. Based on our own analysis of the University's asset distribution, we believe 5.50% is a reasonable long-term estimate, as shown in Section 2, Exhibit 3.				
Funding Discount Rate:	5.50%				
Salary Increase Rate:	3.00% per year				
Demographic Assumptions:	The demographic assumptions used in this valuation (including mortality, disability, turnover, retirement, enrollment elections, percent married and relative ages of spouses) were based on demographic data, a comparison of similar plans in the same industry, and estimated future experience and professional judgment. As part of the analysis, a comparison was made between actual and projected experience for each individual assumption.				

Postretirement Mortality Rates:

Healthy

Approximate 2006 table based on Headcount-Weighted RP-2014 Combined Healthy Annuitant, projected generationally with Scale MP-2015 from 2006

Disabled

Approximate 2006 table based on Headcount-Weighted RP-2014 Disabled Retiree, projected generationally with Scale MP-2015 from 2006

These tables reasonably reflect the projected mortality experience of the Plan as of the valuation date. The additional projection is a provision made for future mortality improvement.

Termination Rates before Retirement:

Rate	(%)
IZULE	701

	<u>Mor</u>	tality*	Withd	rawal**	Disability
Age	Male	Female	Male	Female	
20	0.07	0.02	17.04	23.43	0.010
30	0.06	0.03	10.65	12.78	0.015
40	0.10	0.06	5.11	5.33	0.075
50	0,25	0.14	4.26	4.90	0.230

^{*} Rates are Approximate 2006 table based on Headcount-Weighted RP-2014 Combined Healthy Employee, projected generationally with Scale MP-2015 from 2006. Rates shown are prior to any generational projection.

Retirement Rates:

The following rates apply after meeting the requirements, dependent on Tier, to be eligible to participate in the retiree health plan:

Age	Rate (%)	Age	Rate (%)
50-52	1	62	15
53-54	2	63-64	5
55-57	3	65	20
58-59	4	66-69	10
60-61	5	70 & Over	100



^{**} Rates shown are the ultimate rates that apply after the employee has attained five or more years of service. Select rates apply in each year the employee has less than five years of service.

Missing	Participan	t Data:

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. Active participants provided with missing demographic items were assumed to have their census information be equal to the average value of new hires.

Participation and Coverage Election:

100% of employees eligible to retire and receive subsidized postretirement welfare coverage were assumed to participate in the plan. Participants were assumed to remain in their current plan election (Plan A vs. Plan B).

Current retired participants who have waived coverage were excluded from the valuation. Future retirees currently waiving coverage were assumed to waive coverage at retirement.

100% of future retirees eligible to receive coverage with a disability retirement are assumed to be eligible for Tier IV benefits (Sick Leave Credit Bank).

Sick Leave Credit Bank Assumption: It is assumed that 40 hours of sick time will be banked each year. Hourly rate used to convert unused sick time to dollar amount is assumed to be salary at retirement divided by 2,080 hours for future retirees.

Employees hired prior to January 1, 2002 are assumed to not elect Tier IV (Sick Leave) benefits.

Dependents:

Actual spouses were valued for current retirees. No spouses were valued for future retirees since all are required to pay 100% of the true actuarial cost.

Per Capita Cost Development:

Non-Medicare Medical

Per capita claims medical costs were based on actual non-Medicare retiree claim experience for the period April 1, 2015 through March 31, 2017. Claims were separated by plan year, then adjusted as follows:

- > total claims were divided by the number of adult members to yield a per capita claim,
- the per capita claim was trended to the midpoint of the valuation year at assumed trend rates, and
- the per capita claim was adjusted for the effect of any plan changes.

Per capita claims for each plan year were then combined by taking a weighted average. The weights used in this average account for a number of factors including each plan year's volatility of claims experience and distance to the valuation year. Actuarial factors were then applied to the weighted average cost to estimate individual retiree and spouse costs by age and by gender.

Non-Medicare Prescription Drug

Per capita claims prescription drug costs were based on actual non-Medicare retiree claim experience furnished by the Plan Administrator for the period April 1, 2016 through March 31, 2017. Claims were then adjusted as described above to yield a combined weighted average per capita claims cost. Actuarial factors were then applied to the weighted average cost to estimate individual retiree and spouse costs by age and by gender.



Medicare Medical

Per capita claims medical costs were based on actual Medicare retiree claim experience furnished by the Plan Administrator for the period April 1, 2014 through March 31, 2017. Claims were separated by plan year, then adjusted as described above to yield a combined weighted average per capita claims cost. Actuarial factors were then applied to the weighted average cost to estimate individual retiree and spouse costs by age and by gender.

Medicare Prescription Drug (Tier I – Plan A)

Per capita claims prescription drug costs were based on actual Medicare Tier I Plan A retiree claim experience furnished by the Plan Administrator for the period April 1, 2015 through March 31, 2017. Claims were separated by plan year, then adjusted as described above to yield a combined weighted average per capita claims cost. Actuarial factors were then applied to the weighted average cost to estimate individual retiree and spouse costs by age and by gender. Claims were then reduced by approximately 33% to reflect subsides and reimbursements associated with the EGWP Plan.

Medicare Prescription Drug (Tiers II & III – Plan A) Per capita claims prescription drug costs were based on the 2017 CMS national Medicare Part D monthly average beneficiary premium.

Dental

Per capita claims dental costs were based on actual retiree claim experience furnished by the Plan Administrator for the period April 1, 2015 through March 31, 2017. Claims were separated by plan year, then adjusted as described above to yield a combined weighted average per capita claims cost.

Benefit Provider Expenses & Fees

Per capita expenses and fees associated with providing benefits were based on the negotiated rates effective as of January 1, 2018.

Per Capita Health Costs:

The annual per capita dental costs for the plan year beginning January 1, 2018 was estimated to be \$463. Medical and prescription drug claims costs for the year beginning January 1, 2018, are shown in the table below for retirees and for spouses at selected ages. Benefit provider expenses and fees were included in the medical costs. These costs are net of deductibles and other benefit plan cost sharing provisions. The annual per capita HRA contribution made to retirees in Tiers II & III Plan A in lieu of prescription coverage was estimated to be \$479. Plan B Medicare costs reflect that there is no Medicare prescription drug coverage.

	Plan A Medical & Prescription Drugs – Tier I			Plan A Medical & Prescription Drugs – Tier II, III, IV*			Plan B Medical & Prescription Drugs – All Tiers					
	Re	tiree	Sp	ouse	Re	tiree	Spo	ouse	Re	tiree	Spe	ouse
Age	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
50	\$5,764	\$6,566	\$4,026	\$5,272	\$5,764	\$6,566	\$4,026	\$5,272	\$5,581	\$6,357	\$3,898	\$5,104
55	6,846	7,068	5,388	6,102	6,846	7,068	5,388	6,102	6,628	6,843	5,217	5,908
60	8,130	7,618	7,213	7,078	8,130	7,618	7,213	7,078	7,872	7,376	6,984	6,853
64	9,327	8,082	9,105	7,966	9,327	8,082	9,105	7,966	9,031	7,825	8,816	7,713
65	3,899	3,314	3,899	3,314	2,807	2,458	2,807	2,458	1,482	1,260	1,482	1,260
70	4,519	3,572	4,519	3,572	3,177	2,611	3,177	2,611	1,718	1,358	1,718	1,358
75	4,870	3,845	4,870	3,845	3,386	2,774	3,386	2,774	1,852	1,462	1,852	1,462

^{*} No Medicare prescription drug coverage is provided to participants with Tier IV coverage.

For disabled retirees under age 65, per capita medical costs for the year beginning January 1, 2018 are \$2,328 for Plan A and \$1,482 for Plan B.

Life Insurance Expenses & Fees: An additional 10% load was added to the death benefit for Tier I retirees.

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 above. The trend shown for a particular plan year is the rate that is applied to that year's cost to yield the next year's projected cost.

Rate (%)

Year Ending	Non-Medicare	М	edicare	
Dec 31,	Medical and Prescription Drugs	Medical	Prescription Drugs	Dental
2018	7.58	5.90	10.67	4.00
2019	7.33	5.75	10.17	4.00
2020	7.08	5.60	9.67	4.00
2021	6.83	5.45	9.17	4.00
2022	6.58	5.30	8.67	4.00
2023	6.33	5.15	8.17	4.00
2024	6.08	5.00	7.67	4.00
2025	5.83	4.85	7.17	4.00
2026	5.58	4.70	6.67	4.00
2027	5.33	4.55	6.17	4.00
2028	5.08	4.50	5.67	4.00
2029	4.83	4.50	5.17	4.00
2030	4.58	4.50	4.67	4.00
2031+	4.50	4.50	4.50	4.00

The trend rate assumptions were developed using Segal's internal guidelines, which are established each year using data sources such as the 2017 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.

Retiree Contribution Increase Rate:

All required retiree contribution rates were assumed to increase with medical and prescription drug trend. Tier I retiree contributions are capped at a 10% annual increase.

changes were valued.

Plan Design:	Development of plan liabilities was based on the substantive plan of benefits in effect as described in Exhibit III.
Health Care Reform Assumptions:	The valuation does not reflect the potential impact of any future changes due to the Patient Protection and Affordable Care Act (PPACA) and the Health Care and Education Reconciliation Act (HCERA) of 2010, other than those previously adopted. Any future aspects that do apply are assumed to have a <i>de minimis</i> effect. This includes the potential excise tax on plans that exceed certain cost thresholds beginning in 2022. Based on the Plan's current projected costs, compared to the excise tax thresholds, we believe the effect on the obligation from the excise tax is <i>de minimis</i> .
Assumption Changes since Prior Valuation:	The December 31, 2016 liabilities in this report were developed based on data as of May 1, 2017. The valuation
	liabilities were calculated as of December 31, 2017, then adjusted to December 31, 2016. No assumption

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: A retiree may be eligible to participate in the retiree health plan if they satisfy one of the following criteria: Hired before January 1, 2002 Tier I Have been enrolled, or eligible to enroll, as the primary subscriber in the active Health Plan for at least 5 years, and meet one of the following criteria on or before September 30, 2007: Attainment of age 55 with the sum of age and years of service is at least 80, or Attainment of age 64 and 15 years of service. 30 years of service (no minimum age requirement), or Tier II Have been enrolled, or eligible to enroll, as the primary subscriber in the active Health Plan for at least 15 years, and meet one of the following criteria on or before June 30, 2011: Attainment of age 55 with 15 years of service, and the sum of age and years of service is at least 80, or 30 years of service (no minimum age requirement). Tier III Have been enrolled, or eligible to enroll, as the primary subscriber in the active Health Plan for at least 20 years, and meet one of the following criteria on or after July 1, 2011: Attainment of age 55 with 20 years of service, and the sum of age and years of service is at least 90 30 years of service (no minimum age requirement) Hired on or after January 1, 2002 Have been enrolled, or eligible to enroll, as the primary subscriber in the active Health Plan for at least 10 years, Tier IV and attainment of age 55 with 10 years of service.

* Sibson Consulting

SECTION 3: Supporting Information for the University of Idaho's December 31, 2017 Measurement Under GASB 74 and 75

Disability Retirement	Have been the primary subscriber on an active Health Plan for at least 10 years, qualify for a disability retirement or retirement contribution replacement benefits from a state, Social Security or the University of Idaho's Long-Term Disability Plan, and have 10 years of service. If a participant becomes disabled and qualifies for benefits under Tier I, Tier II, or Tier III they will be eligible to receive those benefits.
Benefit Types:	
Tier I	Medical, prescription drug, dental, and life insurance. Participants have the option of Plan A or Plan B. Medicare prescription drug coverage is only provided to participants in Plan A. Participants must contribute 100% of the true actuarial cost of dental once eligible for Medicare.
Tier II & Tier III	Medical, prescription drug, and dental. Participants have the option of Plan A or Plan B. No Medicare prescription drug coverage is provided, however participants in Plan A receive an HRA deposit in lieu of coverage. Participants must contribute 100% of the true actuarial cost of dental once eligible for Medicare.
Tier IV	Medical, prescription drug, and dental. No Medicare prescription drug coverage is provided. Participants are required to contribute 100% of the true actuarial cost at all ages, but may convert 50% of unused accrued sick time, up to 600 hours, to pay for their medical coverage. Participants must contribute 100% of true actuarial cost of dental.
Duration of Coverage:	Lifetime.
Dependent Benefits:	Same benefits as retirees. Spouses, dependents, and surviving spouses are required to contribute 100% of the true actuarial cost.
Dependent Coverage:	Lifetime.
Medicare Integration Rule:	Carve-out (maintenance of benefits) method in which the plan benefit is first determined without regard to Medicare payments, and is then reduced by the amount of such payments.



Retiree Contributions:

Contribution rates depend on eligibility tier and the plan option. Contributions are based on the actuarial developed cost of coverage. Spouses and dependents pay 100% of the actuarial cost of coverage. The monthly contributions effective as of January 1, 2018 are shown in the table below.

Medical &	Non-Medicare		Medicare	
Prescription Drug	Retiree	Spouse	Retiree	Spouse
Tier I, Plan A*	\$62.16	\$822.60	\$30.75	\$410.19
Tier I, Plan B*	\$0.00	\$657.44	\$0.00	\$156.13
Tier II & III, Plan A	\$67.00	\$822.60	\$30.75	\$175.68
Tier II & III, Plan B	\$0.00	\$657.44	\$0.00	\$156.13
Tier IV, Plan A	\$822.60	\$822.60	\$175.68	\$175.68
Tier IV, Plan B	\$657.44	\$657.44	\$156.13	\$156.13
Disabled, Plan A	\$625.53	\$822.60	\$175.68	\$175.68
Disabled, Plan B	\$494.34	\$657.44	\$156.13	\$156.13

^{*} Tier I retiree contribution increases are capped at 10% each year.

Dental*	Non-Medicare	Medicare
Retiree	\$0.00	\$43.23
Spouse	\$43.23	\$43.23

^{*} Spouses, dependents, and Medicare retirees pay 100% of the actuarial cost of coverage.

Sick Leave Credit Bank:

Participants in Tier IV are eligible to offset the cost of their retiree medical coverage with accumulated unused sick leave credit. The sick leave credited amount is determined by converting banked number of unused sick days to hours and multiplying by the final pay rate at retirement. Retirees may convert 50% of their sick leave balance, to a maximum of 600 hours.

Benefit Descriptions:

PLAN A (TRADITIONAL PPO PLAN)

Non-Medicare Medical		
	<u>In-Network</u>	Out-of-Network
Annual Deductible	\$400 individual/\$1,200 family	\$600 per individual
Coinsurance	80%	65%
Out-of-Pocket Maximum	\$3,600 individual/\$10,800 family	\$5,200 per individual

Medicare Medical	
Annual Deductible	\$300 per individual
Coinsurance	80%
Out-of-Pocket Maximum	\$2,600 per individual

Non-Medicare Prescription Drug (Medicare for Tier 1 only)				
	Retail P	Retail Pharmacy		
Annual Deductible	\$125 per ir	\$125 per individual (\$225 for Tier 1 Med		
Copayments				
Generic	25% \$12 min / \$25 max	25% \$36 min / \$75 max	\$36	
Formulary Brand	25% \$25 min / \$75 max	25% \$75 min / \$225 max	\$75	
Non-Formulary	25% \$40 min / \$100 max	25% \$120 min / \$300 max	\$120	

PLAN B (HIGH DEDUCTIBLE HEALTH PLAN)

Non-Medicare Medical		
	In-Network & Out-of-Network	
Annual Deductible	\$1,500 individual/\$3,000 family	
Coinsurance	70%	
Out-of-Pocket Maximum	\$3,100 individual/\$6,200 family	

Medicare Medical		
Annual Deductible	\$1,500 per individual	
Coinsurance	70%	
Out-of-Pocket Maximum	\$3,100 per individual	

Non-Medicare Prescription Drug		
	Retail Pharmacy	Mail Order Program
Annual Deductible	Combined Medical &	Prescription Drug
Copayments	<u>30-day</u> <u>90-day</u>	90-day supply
Generic	30% after d	eductible
Formulary Brand	30% after d	eductible
Non-Formulary Brand	30% after deductible	

Dental (Plan A & Plan B)	
Annual Deductible (Class I not subject to deducible)	\$50 per person (\$150 maximum)
Class I (diagnostic, preventative, X-rays)	Plan pays 100%
Class II (diagnostic, preventative, X-rays)	Plan pays 80%
Class III (diagnostic, preventative, X-rays)	Plan pays 50%
Class IV (Orthodontia)	Not covered
Annual Maximum (All services combined)	\$1,000 per person

Life Insurance	
Tier 1 Retirees only	Lesser of 10,000 or coverage amount as June 30, 2007

Plan Changes since Prior Valuation: None.

Exhibit IV		
efinition of Terms		
The following list defines certain t	technical terms for the convenience of the reader:	
Assumptions or Actuarial	The estimates on which the cost of the Plan is calculated including:	
Assumptions:	(a) <u>Investment return</u> — the rate of investment yield that the Plan will earn over the long-term future;	
	(b) <u>Mortality rates</u> — the death rates of employees and pensioners; life expectancy is based on these rates;	
	(c) Retirement rates — the rate or probability of retirement at a given age;	
	(d) <u>Turnover rates</u> — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement.	
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.	
Service Cost:	The amount of contributions required to fund the benefit allocated to the current year of service.	
Actuarially Determined Contribution:	A target or recommended contribution to an OPEB plan for the reporting period based on the most recent measurement available.	
Valuation Date:	The date at which the actuarial valuation is performed	
Measurement Date:	The date at which the actuarial valuation is projected to for the calculation of the Total OPEB Liability	
Covered Employee Payroll:	The payroll of the employees that are provided OPEB benefits	



SECTION 3: Supporting Information for the University of Idaho's December 31, 2017 Measurement Under GASB 74 and 75

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:
	(1) the actuarial present value of projected benefit payments projected to be funded by plan assets using a long term rate of return, and
	(2) the actuarial present value of projected benefit payments that are non 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 Net Fiduciary Position
OPEB Expense:	Expense arising from certain changes in the net OPEB liability or total OPEB liability
Plan Net Fiduciary Position:	Market Value of Assets
Real Rate of Return:	The rate of return on an investment after removing inflation

Exhibit V

Accounting Requirements

The Governmental Accounting Standards Board (GASB) issued Statement Number 74 – Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans, and 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 (OPEB) 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 health, prescription drug, 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 4, 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 introduce an accrual-basis accounting requirement, thereby recognizing the employer cost of postemployment benefits over an employee's career. The standards also introduce 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 4. 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 Net Plan Fiduciary 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. Exhibits IV and VI of Section 4 contain a definition of terms as well as more information about GASB 74/75 concepts.

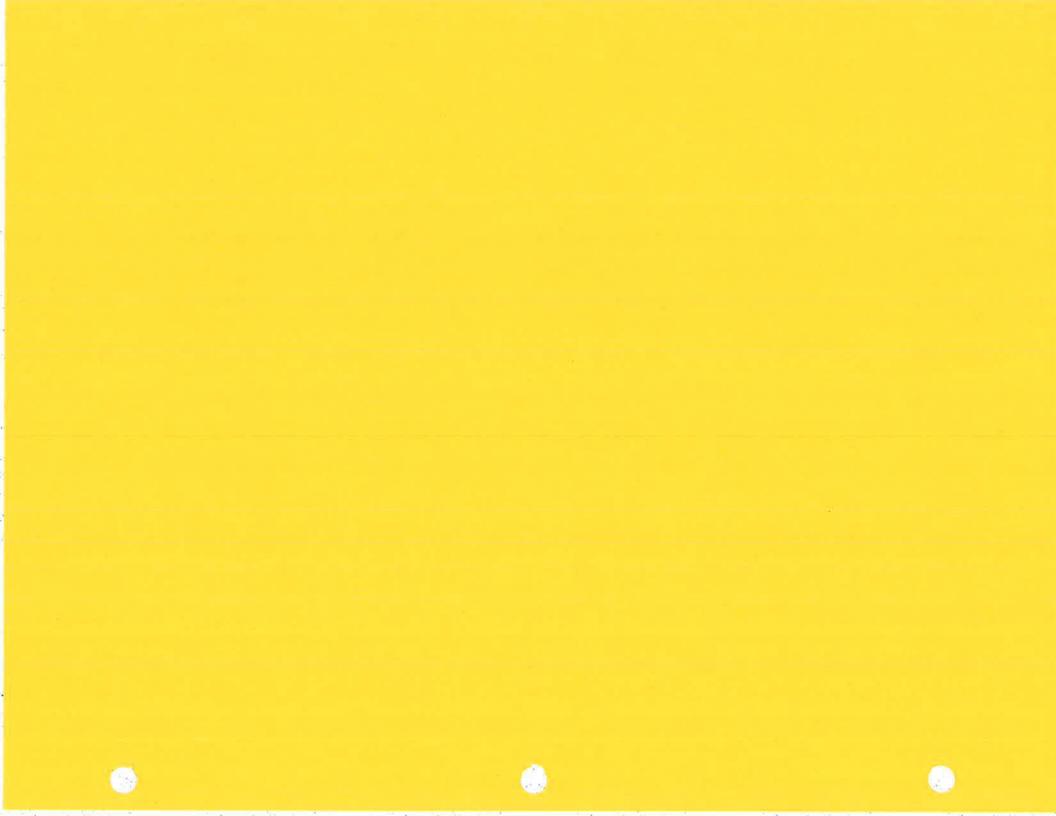
The calculation of an accounting obligation does not, in and of itself, imply that there is any legal liability to provide the benefits valued, nor is there any implication that the Employer is required to implement a funding policy to satisfy the projected expense.

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 for the University of Idaho's December 31, 2017 Measurement Under GASB 74 and 75

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.





XXX

Actuarial Valuation and Review of Other Postemployment Benefits (OPEB) as of June 30, 2017 in accordance with:
GASB Statement No. 74 Reporting for Fiscal Year Ending June 30, 2017
GASB Statement No. 75 Reporting for Fiscal Year Ending June 30, 2018
(Using a June 30, 2017 Measurement Date)

This report has been prepared at the request of XXX to assist in administering the Retiree Benefits Trust. This valuation report may not otherwise be copied or reproduced in any form without the consent of XXX and may only be provided to other parties in its entirety. The measurements shown in this actuarial valuation may not be applicable for other purposes. Copyright © 2017 by The Segal Group, Inc. All rights reserved.



101 NORTH WACKER DRIVE, SUITE 500 CHICAGO, IL 60606 T 312.984.8500 F 312.896.9364 www,Segalco.com

Date
Dear:
We are pleased to submit this Actuarial Valuation and Review of Other Postemployment Benefits (OPEB) as of June 30, 2017, in accordance with Governmental Accounting Standards Board Statements No. 74 Reporting for fiscal year ending June 30, 2017, and Governmental Accounting Standards Board Statements No. 75 for fiscal year ending June 30, 2018 (using a June 30, 2017 measurement date). The report summarizes the actuarial data used it the valuation, disclosures the Net OPEB Liability (NOL) as of June 30, 2017, and analyzes the preceding year's experience. In addition, we have calculated the Actuarially Determined Contribution under the full funding policy of a 20 year closed, level dollar amortization for fiscal year ending June 30, 2018. This report was based on the census data and the financial information prepared by, and the terms of the Plan. The actuarial calculations were completed under the supervision of, FSA MAAA.
Sincerely,
Segal Consulting, a Member of The Segal Group, Inc.
By: Consultant and Actuary

SECTION 1

EXECUTIVE SUMMARY

Important Information about Actuarial Valuations
Purpose
Highlights of the Valuation3
Summary of Key Valuation Results4
Actuarial Certification

SECTION 2

EXHIBIT 12

VALUATION RESULTS

EXHIBIT 1 General Information about the OPEB Plan6
EXHIBIT 2 Net OPEB Liability8
EXHIBIT 3 Determination of Discount Rate and Investment Rates of Return9
EXHIBIT 4 Sensitivity11
EXHIBIT 5 Schedule of Changes in Net OPEB Liability – Last Fiscal Year12
EXHIBIT 6 Deferred Outflows of Resources and Deferred Inflows of Resources14
EXHIBIT 7 Schedule of Recognition of Changes in Total Net OPEB Liability15
EXHIBIT 8 OPEB Expense16
EXHIBIT 9 Schedule of Contributions – Last Ten Fiscal Years17
EXHIBIT 10 Actuarially Determined Contribution 19
EXHIBIT 11 Statement of Net Fiduciary Position 20

Schedule of Investment Returns21

SECTION 3

SUPPORTING INFORMATION

EXHIBIT I Summary of Participant Data	22
EXHIBIT II Actuarial Assumptions and Actuarial Cost Method	
EXHIBIT III Summary of Plan	30
EXHIBIT IV Definition of Terms	36
EXHIBIT V Accounting Requirements	38



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 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. 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 XXX 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 Part of the cost of a plan will be paid from existing assets the balance will need to come from future contributions and investment income. The valuation is based on the asset values as of the valuation date, typically reported by the auditor. Some plans include assets, such as private equity holdings, real estate, or hedge funds that are not subject to valuation by reference to transactions in the marketplace. A snapshot as of a single date may not be an appropriate value for determining a single year's contribution requirement, especially in volatile markets. Plan sponsors often use an "actuarial value of assets" that differs from market value to reflect gradually year-to-year changes in the market value of assets in determining the contribution requirements.
- 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



SECTION 1: Executive Summary for XXX's June 30, 2017 Measurement Under GASB 74 and 75

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.

Given the above, the user of Segal's actuarial valuation (or other actuarial calculations) needs to keep the following in mind:

- The actuarial valuation is prepared for use by XXX. 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 XXX 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 unrounded, 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. XXX 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 XXX upon delivery and review. XXX should notify Segal immediately of any questions or concerns about the final content.

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.



Purpose

This report presents the results of our actuarial valuation of Governmental Entity (the "Employer") OPEB plan as of June 30, 2017, required by Governmental Accounting Standards Board (GASB) Statement No. 74, Financial Reporting for Postemployment Benefit Plans Other than Pension Plan for fiscal year ending June 30, 2017, and GASB Statement No. 75, Accounting and Financial Reporting for Postemployment Benefits Other than Pensions for fiscal year ending June 30, 2018 (using a June 30, 2017 measurement date). The actuarial computations made are for purposes of fulfilling plan accounting and funding requirements. Determinations for purposes other than meeting financial accounting and funding requirements may be significantly different from the results reported here.

Highlights of the Valuation

ACCOUNTING AND FINANCIAL REPORTING

- The Net OPEB liability (NOL) as of June 30, 2017 is \$34,747,673, a decrease of \$1,572,554, from the prior year NOL of \$36,320,227.
 - The decrease in the NOL as of June 30, 2017 was due to return on assets that were greater than expected (7.54% actual vs. 5.50% expected). XXX's market value of assets as of June 30, 2017 is \$33,244,712, an increase of \$2,716,840 from the prior year.
 - As of June 30, 2017, the ratio of assets to the Total OPEB Liability (the funded ratio) is 48.89%.
- The Annual OPEB Expense is \$2,272,387 for the year ending June 30, 2018.

FUNDING

- The Actuarially Determined Contribution (ADC) is equal to the normal cost plus a 19-year amortization of the unfunded liability. This requires a contribution toward OPEB benefits of \$3,536,582 or 2.24% of projected payroll for the year ending June 30, 2018.
- > The following outlines the differences in assumptions from the accounting calculation:
 - The Normal Cost for Tier 4 participants is assumed to increase annually with payroll to reflect future new hires.

Summary of Key Valuation Results		
	As of June 30, 2016	As of June 30, 2017
Total OPEB Liability	\$66,822,318	\$67,992,385
Plan Fiduciary Net Position (Assets)	30,527,871	33,244,712
Net OPEB Liability	\$36,294,447	\$34,747,673
Plan Fiduciary Net Position as a percentage of Total OPEB Liability	45.69%	48.89%
	For Year Ending June 30, 2017	For Year Ending June 30, 2018
Actuarially Determined Contribution for Fiscal Year Ending	\$3,320,985	\$3,536,582
Actual Contribution for Fiscal Year Ending	3,156,915	N/A
Benefit Payments Net of Retiree Contributions	2,946,915	N/A
		For Year Ending June 30, 2018
Annual OPEB Expense		\$2,272,387
Service Cost at End of Year Under GASB 75		521,710
Total Payroll		157,588,902



August 18, 2017

ACTUARIAL CERTIFICATION

This is to certify that Segal Consulting, a Member of The Segal Group, Inc. has conducted an actuarial valuation of certain benefit obligations of XXX's Retiree Benefits Trust other postemployment benefit programs as of June 30, 2017, 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 Statements 74 and 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 Consulting 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 and funding requirements. Determinations for purposes other than meeting financial accounting and funding 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 (such as the end of an amortization period); 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 my knowledge, this report is complete and accurate and in my opinion presents the information necessary to comply with GASB Statements 74 and 75 with respect to the benefit obligations addressed. The signing actuary is a member of the Society of Actuaries, the American Academy of Actuaries, and other professional actuarial organizations and meets the "General Qualification Standards for Statements of Actuarial Opinions" to render the actuarial opinion contained herein.

Actuary, FSA MAAA



EXHIBIT 1

General Information about the OPEB Plan

Plan Description

Plan administration:

XXX administers the OPEB plan that is used to provide postemployment benefits other than pensions (OPEB) for permanent full-time general employees. Management of the OPEB plan is overseen by XXX Administration.

Plan membership: At May 1, 2017, XXX plan membership consisted of the following:

	Medical	Dental	Life	Sick-Leave
Retired members or beneficiaries currently receiving benefits	815	190	663	60
Vested terminated members entitled to but not yet receiving benefits	N/A	N/A	N/A	N/A
Active members	<u>575</u>	<u>575</u>	_38	2,039
Total	1,390	765	701	2,099

Benefits provided:

XXX provides medical and dental benefits to eligible retirees, disabled employees, spouses, and survivors. XXX also provides life insurance benefits to eligible retirees. Long-term disabled employees are treated as retirees and eligible for these same retiree benefits. These benefits represent a single-employer defined benefit plan administered by XXX.

Under certain conditions XXX pays a portion of the coverage for retirees and disabled employees and the retiree or disabled employee pays the remainder. Spouses and survivors are always required to pay 100% of the cost for these benefits. In general, the employee must have completed at least 30 years of credited service or the sum of his/her age and years of credited service must total at least 80 to qualify for this benefit. Employees who were hired on or after January 1, 2002 are not eligible for this benefit. Employees hired after January 1, 2002 are eligible to participate in XXX's health insurance plan, but XXX does not cover any portion of their premiums, deductibles, or coinsurance; those costs are the sole responsibility of the employee. However, these employees are eligible to convert 50% of unused accrued sick time, up to 600 hours, to pay for their medical premiums. All XXX post-employment benefits may be further established or amended by XXX or

XXX Contributions:

XXX contributes the Actuarial Determined Contribution (ADC) (previously the Annual Required Contribution under GASB Statement No. 45) to fund the future payments required to provide post-employment benefits other than pension ("OPEB"). At the end of each fiscal year, XXX deposits the excess of the ADC over the amount of actual benefit payments net of retiree contributions into the Retiree Benefits Trust. After XXX has paid off the entire Net OPEB Liability under the 20-year closed level dollar amortization funding policy, contributions will be equal to the annual normal cost.

EXHIBIT 2

Net OPEB Liability

Reporting Date for Employer under GASB 75	June 30, 2018
Reporting Date for Employer under GASB 74	June 30, 2017
Measurement Date for Employer under GASB 74 & 75	 June 30, 2017
The components of the Net OPEB Liability are as follows:	
Total OPEB Liability	\$67,992,385
Plan Fiduciary Net Position	33,244,712
Net OPEB Liability	\$34,747,673
Plan Fiduciary Net Position as a percentage of the Total OPEB Liability	48.89%

The Net OPEB Liability was measured as of June 30, 2017. Plan Fiduciary Net Position (plan assets) was valued as of the measurement date and the Total OPEB Liability was determined from actuarial valuations as of May 1, 2017, and was projected forward to the measurement date of June 30, 2017 using standard actuarial techniques.

Actuarial assumptions. The total OPEB liability was measured by an actuarial valuation as of June 30, 2017 used the following actuarial assumptions, applied to all periods included in the measurement, unless otherwise specified:

Inflation	2.00%
Salary increases	3.00%, including inflation
Discount Rate	5.50%
Healthcare costs trend rates	
Non-Medicare Medical & Prescription Drugs	7.71% graded to 4.50% over 13 years
Medicare Medical	5.97% graded to 4.50% over 10 years
Medicare Prescription Drugs	10.92% graded to 4.50% over 13 years
Dental	4.00%
Mortality Rates	
Healthy	Approximate 2006 table based on Headcount-Weighted RP-2014 Combined Healthy Annuitant, projected generationally with Scale MP-2015 from 2006
Disabled	Approximate 2006 table based on Headcount-Weighted RP-2014 Disabled Retiree, projected generationally with Scale MP-2015 from 2006

Detailed information regarding all actuarial assumptions can be found in Section 4, Exhibit II.



EXHIBIT 3

Determination of Discount Rate and Investment Rates of Return

DEVELOPMENT OF LONG-TERM RATE

The long-term expected rate of return on OPEB plan investments was determined using a building block method in which best estimate ranges of expected future rates of return (expected returns, net of investment expense and inflation) are developed for each major asset class. These returns 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 and subtracting expected investment expenses and a risk margin. The target allocation and projected arithmetic real rates of return for each major asset class, after deducting inflation, but before investment expenses, used in the derivation of the long-term expected investment rate of return assumption are summarized below:

Asset Class	Target Allocation	Long-Term Expected Arithmetic Real Rate of Return	Money Weighted Real Rate of Return
Domestic equity	29.35%	6.71%	1.97%
International equity, developed markets	10.00%	7.71%	0.77%
Fixed income, core	57.00%	2.11%	1.20%
Short term governmental money market	3.65%	1.10%	0.04%
Total	100.00%		3.98%
Inflation			2.00%
Investment Rate of Return (Gross)			5.98%
Investment Expenses			(0.25%)
Investment Rate of Return (Net)			5.73%
Long-Term Rate of Return Used in Valuation			5.50%

XXX established the Retiree Benefits Trust ("RBT") in 2008 to fund the future payments required to provide post-employment benefits other than pension ("OPEB"). The RBT is an independent, irrevocable trust administered on behalf of XXX by Wells Fargo Bank as trustee.



9

EXHIBIT 3 (continued)

Determination of Discount Rate and Investment Rates of Return

PROJECTION OF OPEB PLAN'S FIDUCIARY NET POSITION FOR USE IN CALCULATION OF DISCOUNT RATE¹

The projection of cash flow used to determine the discount rate assumed that XXX's contributions would be made at rates equal to the actuarially determined contribution rates. Based on these assumptions, the OPEB Plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan member. Therefore, the long-term expected rate of return of 5.50% on plan investments was applied to all periods of projected benefit payments to determine the Total OPEB Liability.

Year Beginning June 30,²	Projected Beginning Plan Fiduciary Net Position (a)	Projected Total Contributions ³ (b)	Projected Benefit Payments and Administrative Expenses ⁴ (c)	Projected Investment Earnings⁵ (d)	Projected Ending Plan Fiduciary Net Position (e) = (a) + (b) - (c) + (d)
2017	\$33,244,712	\$3,530,876	\$3,543,395	\$1,732,320	\$34,964,513
2018	34,964,513	3,498,651	3,661,763	1,823,698	36,625,099
2019	36,625,099	3,476,673	3,826,600	1,910,557	38,185,728
2020	38,185,728	3,454,864	3,972,814	1,992,425	39,660,204
(*)**	***	900	223	3444	***
2098	105	0	1	6	110
2099	110	0	1	6	115
2100	115	0	0	6	121

Notes:

- 1 Amounts may not total exactly due to rounding
- 2 Years beyond 2100 have been omitted from this table as the Projected Benefit Payments are \$0.
- 3 Column (b): Projected total contributions include the service cost applied to closed group (based on covered active members as of June 30, 2017) plus employer contributions to the unfunded actuarial liability. Contributions are assumed to occur at the end of the year.
- 4 Column (c): Projected benefit payments have been determined in accordance with paragraphs 43-47 of GASB Statement No. 74 and are based on the closed group of active, retired members and beneficiaries as of June 30, 2017.
- 5 Column (d): Projected investment earnings are based on the assumed investment rate of return of 5.50% per annum and reflect the assumed timing of benefit payments made at the beginning of each month.

The Plan's Fiduciary Net Position is never projected to be exhausted.



EXHIBIT 4

Sensitivity

The following presents the NOL of XXX as well as what XXX's NOL would be if it were calculated using a discount rate that is 1-percentage-point lower (4.50%) or 1-percentage-point higher (6.50%) 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 in Discount Rate (4.50%)	Current Discount Rate (5.50%)	1% Increase in Discount Rate (6.50%)
Net OPEB Liability (Asset)	\$43,305,996	\$34,747,673	\$27,612,131
	1% Decrease in Healthcare Cost Trend Rates	Current Healthcare Cost Trend Rates	1% Increase in Healthcare Cost Trend Rates
Net OPEB Liability (Asset)	\$28,239,175	\$34,747,673	\$42,502,761

EXHIBIT 5
Schedule of Changes in Net OPEB Liability – Last Fiscal Year¹

Reporting Date for Employer under GASB 75 June 30, 201		
Reporting Date for Employer under GASB 74	June 30, 2017	
Measurement Date for Employer under GASB 74 & 75 June 30, 2017		
Total OPEB Liability		
Service cost at end of year	\$521,710	
Interest	3,595,272	
Change of benefit terms	0	
Differences between expected and actual experience	0	
Changes of assumptions	0	
Benefit payments, including refunds of member contributions	(2,946,915)	
Net change in Total OPEB Liability	\$1,170,067	
Total OPEB Liability – beginning	\$66,822,318	
(a) Total OPEB Liability – ending	<u>\$67,992,385</u>	
Plan Fiduciary Net Position		
Contributions – employer	\$3,156,915	
Contributions – employee	0	
Net investment income	2,506,840	
Benefit payments, including refunds of member contributions	(2,946,915)	
Administrative expense	0	
Net change in Plan Fiduciary Net Position	\$2,716,840	
Plan Fiduciary Net Position – beginning	\$30,527,871	
(b) Plan Fiduciary Net Position – ending	\$33,244,712	
(c) Net OPEB Liability – ending (a) – (b)	<u>\$34,747,673</u>	
Plan Fiduciary Net Position as a percentage of the Total OPEB Liability	48.89%	
Covered employee payroll	\$157,588,902	
Plan Net OPEB Liability as percentage of covered employee payroll	22.05%	

The above information is required beginning in 2017. A full 10-year trend will be compiled in future years.



Schedule of Changes in Net OPEB Liability – Last Fiscal Year (continued)

Notes to Schedule:

Benefit changes:

The June 30, 2016 liabilities in this report were developed based on data as of May 1, 2017. The valuation liabilities were calculated as of June 30, 2017, then adjusted to June 30, 2016. No plan changes were valued.

Changes of assumptions:

The June 30, 2016 liabilities in this report were developed based on data as of May 1, 2017. The valuation liabilities were calculated as of June 30, 2017, then adjusted to June 30, 2016. No assumption changes were valued.

Deferred Outflows of Resources and Deferred Inflows of Resources

The following charts reflect the deferred inflows and outflows of resources related to OPEB. Deferred inflows and outflows are differences between actual and expected experience that are not reflected in the current year's expenses.

Reporting Date for Employer under GASB 75

Measurement Date for Employer under GASB 75

June 30, 2018

June 30, 2017

Deferred Outflows/(Inflows) of Resources for Current Year

		Deferred Outflows of Resources	Deferred Inflows of Resources	Recognition Period
1.	Changes of assumptions or other inputs	\$0	\$0	7 years
2.	Difference between expected and actual experience in the Total OPEB Liability	0	0	7 years
3.	Net difference between projected and actual earnings on investments	<u>0</u>	(827,807)	5 years
4.	Total Deferred Outflows/(Inflows) of Resources	\$0	(\$827,807)	N/A

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 June 30:

2017	(\$165,561)
2018	(165,561)
2019	(165,561)
2020	(165,561)
2021	(165,561)
2022	0
Thereafter	0



EXHIBIT 7
Schedule of Recognition of Changes in Total Net OPEB Liability

Measurement Date June 30,	2017 Experience	2017 Assumptions	2017 Investments	2017 Total	2018	2019	2020	2021	Outflows	Inflows	Total
Amt Established	\$0	\$0	(\$827,807)	(\$827,807)					\$0	(\$827,807)	(\$827,807)
Amt Recognized in FY											
2017			(\$165,561)	(\$165,561)						(\$165,561)	(\$165,561)
2018			(165,561)	(165,561)						(165,561)	(165,561)
2019			(165,561)	(165,561)						(165,561)	(165,561)
2020			(165,561)	(165,561)						(165,561)	(165,561)
2021			(165,561)	(165,561)						(165,561)	(165,561)
2022			0	0						0	0
2023			0	0						0	0
2024			0	0						0	0
Deferred Balance at June 30,											
2017			(\$662,246)	(\$662,246)						(\$662,246)	(\$662,246)
2018			(496,684)	(496,684)						(496,684)	(496,684)
2019			(331,123)	(331,123)						(331,123)	(331,123)
2020			(165,561)	(165,561)						(165,561)	(165,561)
2021			0	0						0	0
2022			0	0						0	0
2023			0	0						0	0
2024			0	0						0	0

OPEB Expense

Reporting Date for Employer under GASB 75 June 30, 2018				
Measurement Date for Employer under GASB 75	June 30, 2017			
Components of OPEB Expense				
1. Service cost at end of year	\$521,710			
2. Interest on the Total OPEB Liability	3,595,272			
3. Employee contributions	0			
4. Administrative expense	0			
5. Projected earnings on plan investments	(1,679,033)			
6. Expensed portion of current-period differences between actual and projected earnings on plan investments	(165,561)			
7. Expensed portion of current-period difference between expected and actual experience in the Total OPEB Liability	0			
8. Expensed portion of current-period changes of assumptions or other inputs	0			
9. Current year plan changes	0			
10. Recognition of beginning of year deferred outflows of resources as OPEB expense	0			
11. Recognition of beginning of year deferred inflows of resources as OPEB expense	0			
Total OPEB Expense	\$2,272,387			

EXHIBIT 9

Schedule of Contributions – Last Ten Fiscal Years¹

Year Ended June 30,	Actuarially Determined Contributions	Contributions in Relation to the Actuarially Determined Contributions ²	Contribution Deficiency / (Excess)	Covered-Employee Payroll	Contributions as a Percentage of Covered Employee Payroll
2009	\$6,362,000	\$6,426,000	(\$64,000)	\$129,435,000	4.96%
2010	5,863,000	6,801,000	(938,000)	124,584,000	5.46%
2011	5,250,000	5,618,000	(368,000)	121,834,000	4.61%
2012	4,806,000	5,201,000	(395,000)	123,237,000	4.22%
2013	3,723,000	4,404,000	(681,000)	123,592,000	3.56%
2014	3,368,000	3,178,000	190,000	132,777,000	2.39%
2015	3,177,000	3,233,000	(56,000)	140,728,000	2.30%
2016	2,711,000	2,751,000	(40,000)	150,995,000	1.82%
2017	3,321,000	3,157,000	164,000	152,999,000	2.06%
2018	3,537,000	N/A	N/A	157,589,000	N/A

All the numbers shown above are rounded to the nearest thousand.

For years prior to the year ended June 30, 2017, the Actuarial Determined Contributions ("ADC") was assumed to be equal to the Annual Required Contributions ("ARC") as reported under GASB Statement No. 45 for each applicable year.

² For the years ending June 30, 2009 through 2011, the amount of actual contributions in relation to the Actuarially Determined Contributions were estimated based on the "percentage contributed" as shown on page 49 of XXX Financial Statements for the years ended June 30, 2014 and 2013 and Report of Independent Auditors.

SECTION 2: Valuation Results for XXX's June 30, 2017 Measurement Under GASB 74 and 75

Notes to Exhibit 9

Methods and assumptions used to establish "actuarially determined contribution" rates:

Valuation date Actuarially determined contribution rates are calculated as of June 30, one year prior to the end of the fiscal

year in which contributions are reported

Measurement date June 30, 2017

Actuarial cost method Entry Age, Level Percentage of Payroll

Amortization method Level Dollar, Closed

Remaining amortization period 19 years remaining for the year ending June 30, 2018

Asset valuation methodThe market value of assets as of the measurement date

EXHIBIT 10

Actuarially Determined Contribution

	Year Ending June 30, 2017 ¹	% of Payroll	Year Ending June 30, 2018	% of Payroll
(a) Normal Cost	\$661,780	0.43%	\$543,068	0.34%
Actuarial Accrued Liability	\$62,306,392	40.72%	\$67,992,385	43.15%
Assets	\$30,257,871	19.78%	\$33,244,712	21.10%
Unfunded Actuarial Accrued Liability	\$31,778,521	20.77%	\$34,747,673	22.05%
Remaining Amortization Period	20 years		19 years	
Level Dollar Amortization Factor	11.95		11.61	
(b) Amortization of Unfunded Actuarial Accrued Liability	\$2,659,205	1.74%	\$2,993,514	1.90%
(c) Total Actuarially Determined Contribution (a) + (b)	\$3,320,985	2.17%	\$3,536,582	2.24%
Total Payroll	\$152,998,934		\$157,588,902	

¹ The census data and assumptions used in these calculations were the same as those used for XXX July 1, 2015 Actuarial Valuation under GASB Statement No. 45, except Entry Age Normal, level percent of pay was used for the actuarial cost method, rather than level dollar. The Normal Cost is assumed to annually increase with a payroll growth of 3.00% for Tier 4 participants only, to simulate an open group Tier 4 population.

If XXX continues to pay the Actuarially Determined Contribution (ADC) for the remainder of the funding policy (20-year closed level dollar amortization), the Total OPEB Liability will be 100% funded after the fiscal year ending June 30, 2035.

EXHIBIT 8
Statement of Net Fiduciary Position

y	June 30, 2017
Assets ¹	
Cash and deposits	\$0
Receivables:	
Contributions	\$0
Due from broker for investments sold	0
Investment income, total accruals	<u>646</u>
Total receivables	\$646
Investments:	
Cash Equivalents	\$1,201,570
Domestic equities	10,107,738
Fixed income	18,957,089
International equities	2,977,669
Total investments	\$33,244,066
Total assets	\$33,244,712
Liabilities	
Payables:	
Investment management fees	\$0
Due to broker for investments purchased	<u>0</u>
Total liabilities	<u>\$0</u>
Net position restricted for OPEB	\$33,244,712

¹ Asset information was provided by XXX, and was based on the monthly statement of assets as of June 30, 2017 prepared by YYY.



Schedule of Investment Returns¹

Year Ending June 30,	Annual Money Weighted Rate of Return, Net of Investment Expense
2016	1.67%
2017	7.54%

¹ The above information is required beginning in 2017. A full 10-year trend will be compiled in future years.

EXHIBIT I Summary of Participant Data

		<u>Pr</u>	ovided as of May	1, 2017	
Retirees Electing Coverage	Medical	Dental	<u>Life</u>	Sick-Leave	<u>Total</u>
Number of retirees	772	185	663	54*	826
Average age of retirees	74.7	68.5	76.2	68.4	74.3
Number of dependent spouses	111	27	*	2	113
Average age of dependent spouses	74.8	69.1	*	80.9	75.2
Surviving Spouses Electing Coverage					
Number	43	5	×	2	43
Average age	83.5	70.8	¥	2	83.5
Disabled Retirees Electing Coverage					
Number	-	1 <u>=</u>	2	6	6
Average age	- 12c		2	73.7	73.7
Active Participants					
Number	575	575	38	2,039	2,614
Average age	57.6	57.6	68.5	42.3	45.6
Average years of service	24.4	24.4	37.7	5.5	9.7
Average expected retirement age	67.5	67.5	70.3	65.6	66.0

^{*} Includes current Tier IV retirees with a sick leave credit bank equal to \$0.



EXHIBIT II			
Actuarial Assumptions and Actuaria	al Cost Method		
Data:	Detailed census data, claim experience, and summary plan descriptions for postretirement welfare benefits were provided by XXX. The census data was collected as of May 1, 2017, and was projected forward to the measurement date of June 30, 2017 using standard actuarial techniques.		
Actuarial Cost Method:	Entry-Age Normal, Level Percentage of Pay		
Asset Valuation Method:	Market Value		
Amortization Method:	Level Dollar, 20 year closed (19 years remaining for year ending June 30, 2018)		
Measurement Date:	June 30, 2017		
Actuarial Valuation Date:	May 1, 2017		
Discount Rate:	5.50%. Based on our own analysis of XXX's asset distribution, we believe 5.50% is a reasonable long-term estimate, as shown in Section 2, Exhibit 3.		
Funding Discount Rate:	5.50%		
Salary Increase Rate:	3.00% per year		
Demographic Assumptions:	The demographic assumptions used in this valuation (including mortality, disability, turnover, retirement, enrollment elections, percent married and relative ages of spouses) were based on demographic data, a comparison of similar plans in the same industry, and estimated future experience and professional judgment. As part of the analysis, a comparison was made between actual and projected experience for each individual assumption.		

Postretirement Mortality Rates:

Healthy

Approximate 2006 table based on Headcount-Weighted RP-2014 Combined Healthy Annuitant, projected generationally with Scale MP-2015 from 2006

Disabled

Approximate 2006 table based on Headcount-Weighted RP-2014 Disabled Retiree, projected generationally with Scale MP-2015 from 2006

These tables reasonably reflect the projected mortality experience of the Plan as of the valuation date. The additional projection is a provision made for future mortality improvement.

Termination Rates before Retirement:

			Rate (%)	
	Mortality*		Withd	Disability	
Age	Male	Female	Male	Female	
20	0.07	0.02	17.04	23.43	0.010
30	0.06	0.03	10.65	12.78	0.015
40	0.10	0.06	5.11	5.33	0.075
50	0.25	0.14	4.26	4.90	0.230

^{*} Rates are Approximate 2006 table based on Headcount-Weighted RP-2014 Combined Healthy Employee, projected generationally with Scale MP-2015 from 2006. Rates shown are prior to any generational projection.

Retirement Rates:

The following rates apply after meeting the requirements, dependent on Tier, to be eligible to participate in the retiree health plan:

Age	Rate (%)	Age	Rate (%)
50-52	1	62	15
53-54	2	63-64	5
55-57	3	65	20
58-59	4	66-69	10
60-61	5	70 & Over	100



^{**} Rates shown are the ultimate rates that apply after the employee has attained five or more years of service. Select rates apply in each year the employee has less than five years of service.

Missing Participant Data:

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. Active participants provided with missing demographic items were assumed to have their census information be equal to the average value of new hires.

Participation and Coverage Election:

100% of employees eligible to retire and receive subsidized postretirement welfare coverage were assumed to participate in the plan. Participants were assumed to remain in their current plan election (Plan A vs. Plan B).

Current retired participants who have waived coverage were excluded from the valuation. Future retirees currently waiving coverage were assumed to waive coverage at retirement.

100% of future retirees eligible to receive coverage with a disability retirement are assumed to be eligible for Tier IV benefits (Sick Leave Credit Bank).

Sick Leave Credit Bank Assumption:

It is assumed that 40 hours of sick time will be banked each year. Hourly rate used to convert unused sick time to dollar amount is assumed to be salary at retirement divided by 2,080 hours for future retirees.

Employees hired prior to January 1, 2002 are assumed to not elect Tier IV (Sick Leave) benefits.

Dependents:

Actual spouses were valued for current retirees. No spouses were valued for future retirees since all are required to pay 100% of the true actuarial cost.

Per Capita Cost Development:

Non-Medicare Medical

Per capita claims medical costs were based on actual non-Medicare retiree claim experience for the period April 1, 2015 through March 31, 2017. Claims were separated by plan year, then adjusted as follows:

- > total claims were divided by the number of adult members to yield a per capita claim,
- the per capita claim was trended to the midpoint of the valuation year at assumed trend rates, and
- > the per capita claim was adjusted for the effect of any plan changes.

Per capita claims for each plan year were then combined by taking a weighted average. The weights used in this average account for a number of factors including each plan year's volatility of claims experience and distance to the valuation year. Actuarial factors were then applied to the weighted average cost to estimate individual retiree and spouse costs by age and by gender.

Non-Medicare Prescription Drug

Per capita claims prescription drug costs were based on actual non-Medicare retiree claim experience furnished by the Plan Administrator for the period April 1, 2016 through March 31, 2017. Claims were then adjusted as described above to yield a combined weighted average per capita claims cost. Actuarial factors were then applied to the weighted average cost to estimate individual retiree and spouse costs by age and by gender.



Medicare Medical

Per capita claims medical costs were based on actual Medicare retiree claim experience furnished by the Plan Administrator for the period April 1, 2014 through March 31, 2017. Claims were separated by plan year, then adjusted as described above to yield a combined weighted average per capita claims cost. Actuarial factors were then applied to the weighted average cost to estimate individual retiree and spouse costs by age and by gender.

Medicare Prescription Drug (Tier I – Plan A) Per capita claims prescription drug costs were based on actual Medicare Tier I Plan A retiree claim experience furnished by the Plan Administrator for the period April 1, 2015 through March 31, 2017. Claims were separated by plan year, then adjusted as described above to yield a combined weighted average per capita claims cost. Actuarial factors were then applied to the weighted average cost to estimate individual retiree and spouse costs by age and by gender. Claims were then reduced by approximately 33% to reflect subsides and reimbursements associated with the EGWP Plan.

Medicare Prescription Drug (Tiers II & III – Plan A) Per capita claims prescription drug costs were based on the 2017 CMS national Medicare Part D monthly average beneficiary premium.

Dental

Per capita claims dental costs were based on actual retiree claim experience furnished by the Plan Administrator for the period April 1, 2015 through March 31, 2017. Claims were separated by plan year, then adjusted as described above to yield a combined weighted average per capita claims cost.

Benefit Provider Expenses & Fees

Per capita expenses and fees associated with providing benefits were based on the negotiated rates effective as of January 1, 2018.

Per Capita Health Costs:

The annual per capita dental costs for the plan year beginning July 1, 2017 was estimated to be \$454. Medical and prescription drug claims costs for the year beginning July 1, 2017, are shown in the table below for retirees and for spouses at selected ages. Benefit provider expenses and fees were included in the medical costs. These costs are net of deductibles and other benefit plan cost sharing provisions. The annual per capita HRA contribution made to retirees in Tiers II & III Plan A in lieu of prescription coverage was estimated to be \$455. Plan B Medicare costs reflect that there is no Medicare prescription drug coverage.

	Plan A Medical & Prescription Drugs – Tier I			Plan A Medical & Prescription Drugs – Tier II, III, IV*			Plan B Medical & Prescription Drugs – All Tiers					
	Re	tiree	Spe	ouse	Re	tiree	Spe	ouse	Re	tiree	Sp	ouse
Age	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
50	\$5,553	\$6,325	\$3,879	\$5,079	\$5,553	\$6,325	\$3,879	\$5,079	\$5,377	\$6,124	\$3,756	\$4,917
55	6,595	6,809	5,191	5,879	6,595	6,809	5,191	5,879	6,386	6,593	5,026	5,692
60	7,832	7,339	6,949	6,818	7,832	7,339	6,949	6,818	7,583	7,106	6,728	6,602
64	8,986	7,786	8,772	7,674	8,986	7,786	8,772	7,674	8,700	7,538	8,493	7,430
65	3,753	3,190	3,753	3,190	2,716	2,377	2,716	2,377	1,440	1,224	1,440	1,224
70	4,349	3,437	4,349	3,437	3,075	2,526	3,075	2,526	1,669	1,319	1,669	1,319
75	4,687	3,700	4,687	3,700	3,279	2,684	3,279	2,684	1,798	1,420	1,798	1,420

^{*} No Medicare prescription drug coverage is provided to participants with Tier IV coverage.

For disabled retirees under age 65, per capita medical costs for the year beginning July 1, 2017 are \$2,261 for Plan A and \$1,440 for Plan B.

Life Insurance Expenses & Fees:

An additional 10% load was added to the death benefit for Tier I retirees.

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 above. The trend shown for a particular plan year is the rate that is applied to that year's cost to yield the next year's projected cost.

Rate (%)

		1 100	.0 (70)		
Year Ending	Medi	cal	Prescription	on Drugs	_
June 31,	Non-Medicare	Medicare	Non-Medicare	Medicare	Dental
2018	7.71	5.97	7.71	10.92	4.00
2019	7.46	5.82	7.46	10.42	4.00
2020	7.21	5.67	7.21	9.92	4.00
2021	6.96	5.52	6.96	9.42	4.00
2022	6.71	5.37	6.71	8.92	4.00
2023	6.46	5.22	6.46	8.42	4.00
2024	6.21	5.07	6.21	7.92	4.00
2025	5.96	4.92	5.96	7.42	4.00
2026	5.71	4.77	5.71	6.92	4.00
2027	5.46	4.62	5.46	6.42	4.00
2028	5.21	4.50	5.21	5.92	4.00
2029	4.96	4.50	4.96	5.42	4.00
2030	4.71	4.50	4.71	4.92	4.00
2031+	4.50	4.50	4.50	4.50	4.00

The trend rate assumptions were developed using Segal's internal guidelines, which are established each year using data sources such as the 2017 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.

Retiree Contribution Increase Rate:

All required retiree contribution rates were assumed to increase with medical and prescription drug trend. Tier I retiree contributions are capped at a 10% annual increase.

Plan Design:	Development of plan liabilities was based on the substantive plan of benefits in effect as described in Exhibit III.
Health Care Reform Assumptions:	The valuation does not reflect the potential impact of any future changes due to the Patient Protection and Affordable Care Act (PPACA) and the Health Care and Education Reconciliation Act (HCERA) of 2010, other than those previously adopted. Any future aspects that do apply are assumed to have a <i>de minimis</i> effect. This includes the potential excise tax on plans that exceed certain cost thresholds beginning in 2020. Based on the Plan's current projected costs, compared to the excise tax thresholds, we believe the effect on the obligation from the excise tax is <i>de minimis</i> .
Assumption Changes since Prior Valuation:	The June 30, 2016 liabilities in this report were developed based on data as of May 1, 2017. The valuation liabilities were calculated as of June 30, 2017, then adjusted to June 30, 2016. No assumption changes were valued.

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: A retiree may be eligible to participate in the retiree health plan if they satisfy one of the following criteria: Hired before January 1, 2002 Tier I Have been enrolled, or eligible to enroll, as the primary subscriber in the active Health Plan for at least 5 years, and meet one of the following criteria on or before September 30, 2007: Attainment of age 55 with the sum of age and years of service is at least 80, or Attainment of age 64 and 15 years of service. 30 years of service (no minimum age requirement), or Have been enrolled, or eligible to enroll, as the primary subscriber in the active Health Plan for at least 15 years, Tier II and meet one of the following criteria on or before June 30, 2011: Attainment of age 55 with 15 years of service, and the sum of age and years of service is at least 80, or 30 years of service (no minimum age requirement). Tier III Have been enrolled, or eligible to enroll, as the primary subscriber in the active Health Plan for at least 20 years, and meet one of the following criteria on or after July 1, 2011: Attainment of age 55 with 20 years of service, and the sum of age and years of service is at least 90 30 years of service (no minimum age requirement) Hired on or after January 1, 2002 Have been enrolled, or eligible to enroll, as the primary subscriber in the active Health Plan for at least 10 years, Tier IV and attainment of age 55 with 10 years of service.



Disability Retirement	Have been the primary subscriber on an active Health Plan for at least 10 years, qualify for a disability retirement or retirement contribution replacement benefits from a state, Social Security or XXX's Long-Term Disability Plan, and have 10 years of service. If a participant becomes disabled and qualifies for benefits under Tier I, Tier II, or Tier III they will be eligible to receive those benefits.
Benefit Types:	
Tier I	Medical, prescription drug, dental, and life insurance. Participants have the option of Plan A or Plan B. Medicare prescription drug coverage is only provided to participants in Plan A. Participants must contribute 100% of the true actuarial cost of dental once eligible for Medicare.
Tier II & Tier III	Medical, prescription drug, and dental. Participants have the option of Plan A or Plan B. No Medicare prescription drug coverage is provided, however participants in Plan A receive an HRA deposit in lieu of coverage. Participants must contribute 100% of the true actuarial cost of dental once eligible for Medicare.
Tier IV	Medical, prescription drug, and dental. No Medicare prescription drug coverage is provided. Participants are required to contribute 100% of the true actuarial cost at all ages, but may convert 50% of unused accrued sick time, up to 600 hours, to pay for their medical coverage. Participants must contribute 100% of true actuarial cost of dental.
Duration of Coverage:	Lifetime.
Dependent Benefits:	Same benefits as retirees. Spouses, dependents, and surviving spouses are required to contribute 100% of the true actuarial cost.
Dependent Coverage:	Lifetime.
Medicare Integration Rule:	Carve-out (maintenance of benefits) method in which the plan benefit is first determined without regard to Medicare payments, and is then reduced by the amount of such payments.

Retiree Contributions:

Contribution rates depend on eligibility tier and the plan option. Contributions are based on the actuarial developed cost of coverage. Spouses and dependents pay 100% of the actuarial cost of coverage. The monthly contributions effective as of January 1, 2018 are shown in the table below.

Medical &	Non-M	ledicare	Medicare		
Prescription Drug	Retiree	Spouse	Retiree	Spouse	
Tier I, Plan A*	\$62.16	\$822.60	\$30.75	\$410.19	
Tier I, Plan B*	\$0.00	\$657.44	\$0.00	\$156.13	
Tier II & III, Plan A	\$67.00	\$822.60	\$30.75	\$175.68	
Tier II & III, Plan B	\$0.00	\$657.44	\$0.00	\$156.13	
Tier IV, Plan A	\$822.60	\$822.60	\$175.68	\$175.68	
Tier IV, Plan B	\$657.44	\$657.44	\$156.13	\$156.13	
Disabled, Plan A	\$625.53	\$822.60	\$175.68	\$175.68	
Disabled, Plan B	\$494.34	\$657.44	\$156.13	\$156.13	

^{*} Tier I retiree contribution increases are capped at 10% each year.

Dental*	Non-Medicare	Medicare
Retiree	\$0.00	\$43.23
Spouse	\$43.23	\$43.23

^{*} Spouses, dependents, and Medicare retirees pay 100% of the actuarial cost of coverage.

Sick Leave Credit Bank:

Participants in Tier IV are eligible to offset the cost of their retiree medical coverage with accumulated unused sick leave credit. The sick leave credited amount is determined by converting banked number of unused sick days to hours and multiplying by the final pay rate at retirement. Retirees may convert 50% of their sick leave balance, to a maximum of 600 hours.

Benefit Descriptions:

PLAN A (TRADITIONAL PPO PLAN)

Non-Medicare Medical				
	<u>In-Network</u>	Out-of-Network		
Annual Deductible	\$400 individual/\$1,200 family	\$600 per individual		
Coinsurance	80%	65%		
Out-of-Pocket Maximum	\$3,600 individual/\$10,800 family	\$5,200 per individual		

Medicare Medical				
Annual Deductible	\$300 per individual			
Coinsurance	80%			
Out-of-Pocket Maximum	\$2,600 per individual			

Non-Medicare Prescription Drug (Medicare for Tier 1 only)					
	Retail P	Retail Pharmacy			
Annual Deductible	\$125 per in	\$125 per individual (\$225 for Tier 1 Medicare)			
Copayments					
Generic	25% \$12 min / \$25 max	25% \$36 min / \$75 max	\$36		
Formulary Brand	25% \$25 min / \$75 max	25% \$75 min / \$225 max	\$75		
Non-Formulary	25% \$40 min / \$100 max	25% \$120 min / \$300 max	\$120		

PLAN B (HIGH DEDUCTIBLE HEALTH PLAN)

Non-Medicare Medical				
	In-Network & Out-of-Network			
Annual Deductible	\$1,500 individual/\$3,000 family			
Coinsurance	70%			
Out-of-Pocket Maximum	\$3,100 individual/\$6,200 family			

Medicare Medical	
Annual Deductible	\$1,500 per individual
Coinsurance	70%
Out-of-Pocket Maximum	\$3,100 per individual

Non-Medicare Prescription Drug						
	Retail Pharmacy		Mail Order Program			
Annual Deductible	Combined Medical & Prescription Drug					
Copayments	<u>30-day</u>	<u>90-day</u>	90-day supply			
Generic	30% after deductible					
Formulary Brand	30% after deductible					
Non-Formulary Brand	30% after deductible					

Dental (Plan A & Plan B)				
Annual Deductible (Class I not subject to deducible)	\$50 per person (\$150 maximum)			
Class I (diagnostic, preventative, X-rays)	Plan pays 100%			
Class II (diagnostic, preventative, X-rays)	Plan pays 80%			
Class III (diagnostic, preventative, X-rays)	Plan pays 50%			
Class IV (Orthodontia)	Not covered			
Annual Maximum (All services combined)	\$1,000 per person			

Life Insurance	
Tier 1 Retirees only	Lesser of 10,000 or coverage amount as June 30, 2007

Plan Changes since Prior Valuation: None.

Exhibit IV							
Definition of Terms							
The following list defines certain t	technical terms for the convenience of the reader:						
Assumptions or Actuarial	The estimates on which the cost of the Plan is calculated including:						
Assumptions:	(a) <u>Investment return</u> — the rate of investment yield that the Plan will earn over the long-term future;						
	(b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates;						
	(c) Retirement rates — the rate or probability of retirement at a given age;						
	(d) <u>Turnover rates</u> — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement.						
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.						
Service Cost:	The amount of contributions required to fund the benefit allocated to the current year of service.						
Actuarially Determined Contribution:	A target or recommended contribution to an OPEB plan for the reporting period based on the most recent measurement available.						
Valuation Date:	The date at which the actuarial valuation is performed						
Covered Employee 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:						
	(1) the actuarial present value of projected benefit payments projected to be funded by plan assets using a long term rate of return, and						
	(2) the actuarial present value of projected benefit payments that are non 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						

SECTION 3: Supporting Information for XXX's June 30, 2017 Measurement Under GASB 74 and 75

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 Net Fiduciary Position	
Plan Net Fiduciary Position:	Market Value of Assets	
Real Rate of Return:	The rate of return on an investment after removing inflation	

Exhibit V

Accounting Requirements

The Governmental Accounting Standards Board (GASB) issued Statement Number 74 – Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans, and 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 (OPEB) 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 health, prescription drug, 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 4, 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 introduce an accrual-basis accounting requirement, thereby recognizing the employer cost of postemployment benefits over an employee's career. The standards also introduce 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 4. 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 Net Plan Fiduciary 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. Exhibits IV and VI of Section 4 contain a definition of terms as well as more information about GASB 74/75 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.

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 for XXX's June 30, 2017 Measurement Under GASB 74 and 75



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