Cavanaugh Macdonald
CONSULTING, LLC

The experience and dedication you deserve

Nebraska Public Employees Retirement Systems
Request for Proposal
RFP Number 5989 Z1

Technical Proposal

Due Date: January 24, 2019

Submitted by:
Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

Brent A. Banister, PhD, FSA, EA, FCA, MAAA
Chief Actuary

Cavanaugh Macdonald Consulting, LLC
3802 Raynor Parkway, Suite 202
Bellevue, NE 68123
402-905-4461

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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 Contact Information	
Bidder Name:	Cavanaugh Macdonald Consulting, LLC
Bidder Address:	3550 Busbee Parkway, Suite 250 Kennesaw, GA 30144
Contact Person & Title:	Patrice Beckham, Principal and Consulting Actuary
E-mail Address:	patb@cavmacconsulting.com
Telephone Number (Office):	(402) 905-4461
Telephone Number (Cellular):	(402) 630-4122
Fax Number:	(402) 905-4464

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 State Contact Information	
Bidder Name:	Cavanaugh Macdonald Consulting, LLC.
Bidder Address:	3802 Raynor Parkway, Suite 202 Bellevue, NE 68123
Contact Person & Title:	Patrice Beckham, Principal and Consulting Actuary
E-mail Address:	PatB@CavMacConsulting.com
Telephone Number (Office):	(402) 905-4461
Telephone Number (Cellular):	(402) 630-4122
Fax Number:	(402) 905-4464

Cavanaugh Macdonald
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TRANSMITTAL LETTER

January 24, 2019

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

Re: RFP 5989 Z1 for Consulting and Actuarial Services

Dear Ms. Walton and Ms. Storant:

Cavanaugh Macdonald Consulting, LLC (CMC) is pleased to offer our proposal to continue to provide consulting and actuarial services to the Nebraska Public Employees Retirement System (NPERS) in response to your RFP. We believe our proposal will demonstrate that of all actuarial consulting firms serving the public sector retirement community, we present the best combination of experience and expertise at a reasonable price. As NPERS' retained actuary for the last six years, we have proven our ability to successfully perform the services described in the RFP under acceptable contract terms.

Our firm was founded to offer state and local governments the experience and dedication they deserve in retaining actuarial consulting services for their employee retirement plans. CMC is staffed by seasoned consultants who are dedicated to serving public sector benefit plans. We have been and will continue to be leaders in the public sector consulting community, providing impartial advice and maintaining our independence from political and other outside influences.

3802 Raynor Pkwy, Suite 202, Bellevue, NE 68123
Phone (402) 905-4461 • Fax (402) 905-4464
www.CavMacConsulting.com
Offices in Kennesaw, GA • Bellevue, NE

Our strengths include:

- A senior staff that averages 30 years of experience serving public sector benefit plans – the expertise and knowledge of our staff regarding public sector actuarial consulting is as great, if not greater, than any of our competitors.

- A lengthy list of retirement systems for which we currently serve as the retained pension actuary, including statewide retirement systems in Alabama, Connecticut, Georgia, Iowa, Indiana, Kansas, Kentucky, Mississippi, Missouri, Montana, Minnesota, Nebraska, New Mexico, North Carolina, Ohio, Oklahoma, and Virginia.

- A dedicated staff and an organizational structure that allows flexibility to meet client needs and to provide a high level of client/staff interaction.

It is these strengths in particular that drive our success and allow us to continue to be the leading public sector actuarial consulting firm in the country. We are committed to maintaining our focus so as to continue to build on our success.

Questions regarding this proposal may be directed to Patrice Beckham and Brent Banister, who are authorized to bind the firm:

Patrice A. Beckham, FSA, FCA, EA, MAAA
Principal and Consulting Actuary
Cavanaugh Macdonald Consulting, LLC
3802 Raynor Parkway, Suite 202
Bellevue, NE 68123
(402) 905-4461
PatB@CavMacConsulting.com

Brent A. Banister, Ph.D., FSA, EA, MAAA, FCA
Chief Actuary
Cavanaugh Macdonald Consulting, LLC
3802 Raynor Parkway, Suite 202
Bellevue, NE 68123
(402) 905-4462
BrentB@CavMacConsulting.com

This proposal will be valid for 120 days following the January 24, 2019 due date.

We value our current relationship with the Nebraska Public Employees Retirement System (NPERS) and we welcome this opportunity to extend our long-term working relationship.

Sincerely,

Patrice Beckham

Brent A. Banister

Patrice Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

Brent A. Banister, FSA, EA, FCA, MAAA
Chief Actuary

SECTION II – TERMS AND CONDITIONS

The Terms and Conditions are provided on the following pages.

II. TERMS AND CONDITIONS

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;
2. 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:
PB			

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

4. Request for Proposal and Addenda;
5. Amendments to the RFP;
6. 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:
PB			

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:
PB			

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:
PB			

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

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

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:
PB			

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:
PB			

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:
PB			

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 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 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, 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.

5. 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:
PB			

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:
PB			

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:
PB			

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.

O. CONFIDENTIALITY

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

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

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;

b. 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;

d. 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 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 (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
PB			

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 all completed or partially completed deliverables to the State;
3. 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;
5. 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.

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.

Section III – Contractor Duties

The Contractor Duties section is provided on the following pages.

We would propose the following alternative to the insurance requirements under Section G:

1. Eliminate the requirement for "All Owned" Auto Liability coverage since our firm does not own any vehicles.

2. We currently have Hired and Non-Owned Auto Liability coverage, but additional insureds cannot be added, so we request that this requirement be waived.

3. Our current coverage for Employee Dishonesty is $25,000 rather than the requested amount of $1 million. Because this has been adequate for the past six years (under the current contract) and generally meets industry standards, we request that the coverage be maintained at the current level of $25,000. We are open to negotiation on this issue, if necessary.

III. CONTRACTOR DUTIES

A. INDEPENDENT CONTRACTOR / OBLIGATIONS

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

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,
6. 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:
PB			

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:

1. 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.

2. 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.

3. 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:
PB			

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:
PB			

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

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.

G. INSURANCE REQUIREMENTS

Accept (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
		PB	**Please see proposal for details.**

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,
3. 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 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 following termination or expiration of the contract.

SECTION IV – PAYMENT

The Payment section is provided on the following pages.

I. PAYMENT

A. PROHIBITION AGAINST ADVANCE PAYMENT (Statutory)

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

A. 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 (Initial)	Reject (Initial)	Reject & Provide Alternative within RFP Response (Initial)	NOTES/COMMENTS:
PB			

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:
PB			

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:
PB			

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:
PB			

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

The State shall have the right to audit the Contractor's performance of this contract upon a thirty (30) business days' written notice. 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 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 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.

Section V – Project Description and Scope of Work

CMC agrees with all contract requirements listed in Section V: Project Description and Scope of Work.

SECTION VI - 1. REQUEST FOR PROPOSAL FOR CONTRACTUAL SERVICES FORM

By signing the "RFP for Contractual Services" form, the bidder guarantees compliance with the provisions stated in this RFP, agrees to the Terms and Conditions stated in this RFP unless otherwise agreed to, and certifies bidder maintains a drug free work place environment.

The RFP for Contractual Services form must be signed using an indelible method (not electronically) and returned per the schedule of events in order to be considered for an award.

The completed and signed "Request for Proposal for Contractual Services" form is provided on the following page. The acceptance of all terms and conditions is provided in Section II above.

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.

_✓_ 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:	**Cavanaugh Macdonald Consulting, LLC.**
COMPLETE ADDRESS:	**3802 Raynor Parkway, Suite 202 Bellevue, NE 68123**
TELEPHONE NUMBER:	**(402) 905-4461**
FAX NUMBER:	**(402)-905-4464**
DATE:	**January 22, 2019**
SIGNATURE:	Patrice Beckham
TYPED NAME & TITLE OF SIGNER:	**Patrice Beckham, Principal and Consulting Actuary**

Section VI - 2. Corporate Overview – Bidder Identification and Information

The Corporate Overview section of the Technical Proposal should consist of the following subdivisions:

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.

Cavanaugh Macdonald Consulting, LLC (CMC), a limited liability corporation, was incorporated in the State of Georgia in 2005 and has been providing actuarial services to state and local governmental pension and health plans since that time. CMC is a wholly independent, privately held firm with current ownership held by eight Principals, all of whom are active employees of the firm. There has not been any change in the form of organization since CMC was first organized. There is no other parent, affiliate, subsidiary company or partnership.

Our headquarters is located in Kennesaw Georgia (address below). We also maintain offices in the Omaha metro area (Bellevue, Nebraska) and the Chicago metro area (Naperville, Illinois). Actuarial services are currently provided to NPERS from the Omaha office and we propose the account continue to be serviced from that office.

Bellevue Office
3802 Raynor Parkway, Suite 202
Bellevue, NE 68123

Kennesaw Office
3550 Busbee, Suite 250
Kennesaw, GA 30144

Naperville Office
819 North Brainard Street
Naperville, IL 60563

b. FINANCIAL STATEMENTS

The bidder must 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.

Although Cavanaugh Macdonald is not a publicly held company, we do produce audited financial reports each year. CMC's latest *CONFIDENTIAL* Financial Statements are provided in Appendix A (sealed in a separate package as they are considered "proprietary information" per the Scope of Work Section of the RFP). As a privately held company, CMC could be placed at a significant competitive disadvantage if other actuarial firms had access to the firm's current financial condition and detailed information on revenue and expenses.

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.

CMC is not, and has never been, in violation of any statutes or regulatory rules that might have an impact on the firm's operations.

A lawsuit was filed in late December, 2017 by individuals claiming status as beneficiaries under the Kentucky Retirement System. The Complaint names a large number of Defendants, which includes Cavanaugh Macdonald Consulting. We believe any claims against Cavanaugh Macdonald are without merit and we intend to fully defend the suit. Because it is an ongoing lawsuit, our attorneys have insisted that we cannot provide any further information.

A lawsuit was filed in early 2018 by a Union regarding the lack of a COLA for Ohio SERS. The Complaint names the System, the Attorney General and also includes Cavanaugh Macdonald Consulting. We believe any claims against Cavanaugh Macdonald are without merit and we intend to fully defend the suit. Because it is an ongoing lawsuit, our attorneys have insisted that we cannot provide any further information.

Please note that neither of these lawsuits were filed by our clients, the retirement systems. Rather, they were filed by members of the system.

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.

No change in ownership or control of the company is anticipated in the twelve months following the proposal due date. CMC understands that if awarded the contract, any change of ownership will require notification to the State.

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

Due to its geographic proximity to NPERS and staff availability, our Bellevue, Nebraska office will provide the services requested in the RFP, with assistance from the Kennesaw office if needed.

Cavanaugh Macdonald Consulting
3802 Raynor Parkway, Suite 202
Bellevue, NE 68123
401-905-4461 Phone 402-905-4464 Fax

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.

CMC has held a contract with the State of Nebraska for actuarial consulting services since 2013.

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.

No such relationship exists or has existed.

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.

No such relationship exists or has existed.

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.

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.

We have never had a contract terminated for default.

In 2015, our relationship with **Glynn County, GA** (1,300 members) was lost when the bid included a requirement to build a benefit calculator. We did not agree to do this project under a fixed fee as the calculator scope was not defined. Another firm did bid a fixed fee and therefore they were successful.

Orah L. Reed, PHR
Director of Human Resources
Glynn County Board of Commissioners
1725 Reynolds Street, Suite 302
Brunswick, GA 31520
912.554.7172
oreed@glynncounty-ga.gov

In 2017, our relationship with the **Kentucky Retirement System** (344,000 members) was not renewed during a period of major turnover of the System's key personnel, including the Executive Director, and multiple vendors.

Ms. Karen Roggenkamp
Executive Director, Office of Operations
Kentucky Retirement Systems
1260 Louisville Road
Frankfort, KY 40601
502.696.8455
Karen.Roggenkamp@kyret.ky.com

In 2019, our contract with the **Colorado Public Employees Retirement Association** was not renewed after the system issued a RFP for actuarial services.

Mr. Karl Paulson
Manager of Strategic Innovation
Public Employees' Retirement Association of Colorado
1301 Pennsylvania Street
Denver, CO 80203-2386
303.837.6203
kpaulson@copera.org

In 2019, our contract with the **Cincinnati Retirement System** was not renewed after the system issued a RFP for actuarial services.

Ms. Paula Tilsley
Executive Director
The Cincinnati Retirement System
801 Plum Street, Room 328 City Hall
Cincinnati, OH 45202
513.352.6296
Paula.Tilsley@cincinnati-oh.gov

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 Proposal.

Answers to this question are provided in the Technical Approach section of this RFP.

The bidder must 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 must provide the originally scheduled completion date and budget, as well as the actual (or currently planned) completion date and actual (or currently planned) completion date and actual (or currently planned) budget.

Answers to these questions are provided in the Corporate Overview section of the Technical Approach form. Note that we do not use any subcontractors to perform the services in the RFP.

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

All work was performed by Cavanaugh Macdonald Consulting employees.

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.

Not applicable.

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 Proposal.

Answers to this question are provided in the Technical Approach section of this RFP.

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.

We are proposing that the current team continue to serve NPERS. Those team members (all staff, including professional and other staff) are listed in the following table:

Team Member Role	Credentials	Title	Actuarial Experience	Office Location
Patrice Beckham Primary Actuary	FSA, FCA, EA, MAAA	Principal	30+	Bellevue
Brent Banister Secondary Actuary	FSA, FCA, EA, MAAA	Chief Actuary	25	Bellevue
Larry Langer Resource Actuary	ASA, FCA, EA, MAAA	Principal	25	Naperville
Bryan Hoge Project Manager	FSA, FCA, EA, MAAA	Senior Actuary	14	Bellevue
Virginia Fritz Valuation Actuary	FSA, FCA, EA, MAAA	Senior Actuary	14	Bellevue
Aaron Chochon Production	ASA, ACA, EA, MAAA	Actuary	8	Bellevue
Megan Skiles Production		Actuarial Analyst	2	Bellevue

Key to Actuarial Credentials:
FSA: Fellow, Society of Actuaries
ASA: Associate, Society of Actuaries
EA: Enrolled Actuary
FCA: Fellow of Conference of Consulting Actuaries
ACA: Associate of Conference of Consulting Actuaries
MAAA: Member, American Academy of Actuaries

Patrice Beckham will serve as the day-to-day contact for NPERS and direct all projects with back up and support from Brent Banister. Both Pat and Brent meet the "Scope of Work" requirements.

A brief description of the responsibilities of each team member is included below:

- **Patrice Beckham – Co-Lead Actuary**

  Main contact for NPERS, responsible for final review of all work, provide legislative testimony, recommendation of assumptions and methods; lead actuarial team.

- **Brent Banister – Co-Lead Actuary**

  Main contact for NPERS, responsible for final review of all work, provide legislative testimony, recommendation of assumptions and methods; lead actuarial team.

- **Larry Langer – Resource Actuary**

  Available resource for special projects or for additional actuarial perspective, as needed.

- **Bryan Hoge and Virginia Fritz – Project Managers**

  Alternate contact for NPERS if needed, responsible for management of all pension projects, valuations, projections and experience studies, first reviewer of pension results.

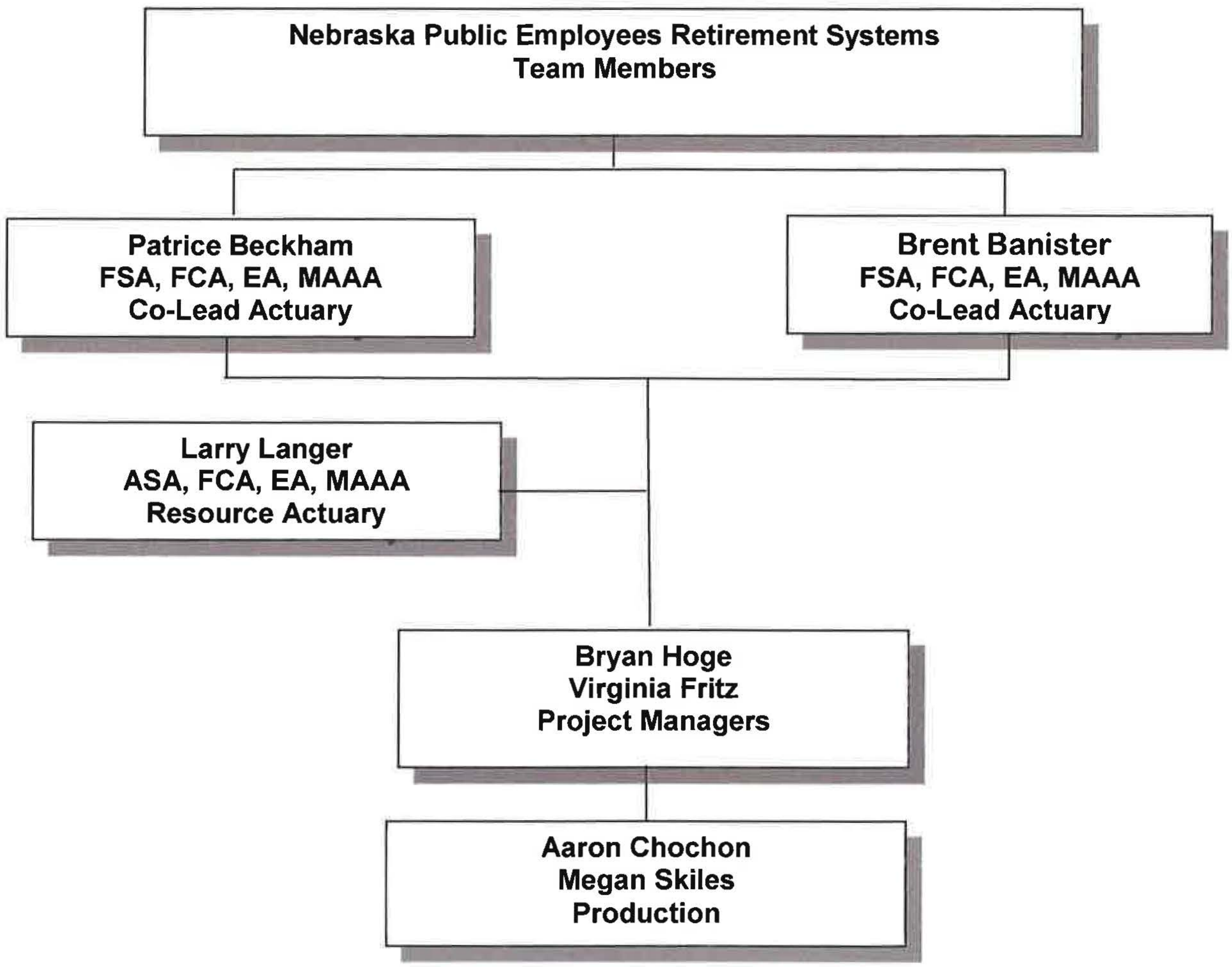
- **Aaron Chochon and Megan Skiles – Production**
  Data reconciliation and preparation for the software, programming of valuation software, review of all results, and creation of initial draft of the valuation reports.

Because we only work with public sector benefit plans, we have structured our firm in such a way that we can be assured of meeting our clients' needs. To accomplish that, we assign all large public sector clients two experienced consultants that are each qualified and experienced as lead consultants. They collaborate on all projects and both are involved with client projects and requests. By having two senior consultants assigned, the team can always respond to emergency requests and short notice meetings with fully informed and experienced consultants.

Patrice Beckham and Brent Banister will serve as the Co-Lead Actuaries and will be responsible for providing services to NPERS. They will be the main contacts for NPERS. As such, they will provide services directly to NPERS and will assign other professionals as appropriate. As Co-Leads, Patrice and Brent will have the responsibility for the client relationship, will oversee all actuarial services provided, and will provide their experience and expertise to NPERS. They will be responsible for the final actuarial reports and presentations, attend meetings with the Board, as needed, including the presentation of the valuation and experience study reports. They will also be responsible for any special studies that may be requested.

Bryan Hoge and Virginia Fritz will serve as the Support Actuaries and Project Managers for the team. They will provide back up for senior consultant, as needed, and will manage the technical aspects of the actuarial work performed for NPERS. Bryan and Virginia will supervise the valuations, experience studies, and special project work with a focus on the technical issues. They will be responsible for the annual valuation results including the development of key items like the funded ratio, unfunded actuarial liability, actuarial contribution rate, and gain/loss analysis. As the project managers they will also review the data preparation work that is completed by the production staff to ensure its accuracy.

Aaron Chochon and Megan Skiles will comprise the production staff of the team. They are responsible for the review and reconciliation of the member data and financial (asset) information. In addition, they will also be responsible for running the valuation software and performing the initial review of valuation results. The organization chart, which shows the reporting relationships for the NPERS team, is included on the following page.


Nebraska Public Employees Retirement Systems
Team Members
Patrice Beckham
FSA, FCA, EA, MAAA
Co-Lead Actuary
Brent Banister
FSA, FCA, EA, MAAA
Co-Lead Actuary
Larry Langer
ASA, FCA, EA, MAAA
Resource Actuary
Bryan Hoge
Virginia Fritz
Project Managers
Aaron Chochon
Megan Skiles
Production

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 must not be longer than three (3) pages. Resumes shall 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.

CMC understands that any change in proposed personnel can only be implemented after written approval from the State.

Resumes for your proposed team are provided on the following pages. As requested, client references are included for all credentialed actuarial staff in the following table:

Team Member	References		
Patrice Beckham	Mr. Alan Conroy KPERS 611 S. Kansas Ave Topeka, KS 66603 785.296.6880	Ms. Donna Mueller IPERS 7401 Register Drive Des Moines, IA 50321 515.281.0072	Mr. John Wicklund Minnesota Teachers 60 Empire Drive St. Paul, MN 651.296.8051
Brent Banister	Mr. Andy Blough INPERS One North Capitol, Suite 001 Indianapolis, IN 46204 317.234.6022	Ms. Donna Mueller IPERS 7401 Register Drive Des Moines, IA 50321 515.281.0072	Mr. John Wicklund Minnesota Teachers 60 Empire Drive St. Paul, MN 651.296.8051
Larry Langer	Mr. Jerry Lee City of Milwaukee 789 N. Water St., #300 Milwaukee, WI 53202 414.286.5454	Ms. Patricia Bishop Virginia Retirement System 1200 East Main Street Richmond, VA 23219 804.771.7332	Mr. Steve Toole North Carolina Retirement System 3200 Atlantic Avenue Raleigh, NC 27604 919.814.4197
Bryan Hoge	Ms. Ronda Stegmann MOSERS 907 Wildewood Drive Jefferson City, MO 65109 573.632.6113	Ms. Judy McNeal KPERS 611 S. Kansas Ave Topeka, KS 66603 785.296.1024	Ms. Cecelia Carter Omaha School Employees Retirement System 3215 Cuming Street Omaha, NE 68131 402.557.2105
Virginia Fritz	Mr. Andy Blough INPERS One North Capitol, Suite 001 Indianapolis, IN 46204 317.234.6022	Ms. Miriam McKay INPERS One North Capitol, Suite 001 Indianapolis, IN 46204 317.234.4182	Mr. Randy Gerke NPERS 1526 "K" Street, Suite 400 Lincoln, NE 68509 402.471.9495
Aaron Chochon	Ms. Sherri Shinkle Kansas City Area Transit Authority 1200 East 18th Street Kansas City, MO 64108 816.346.0375	Mr. Brent Hall WaterOne 10747 Renner Parkway Lenexa, KS 66219 913.895.5792	Mr. Bernard in den Bosch City of Omaha 1819 Farnam Street Omaha, NE 68183 402.650.5976

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

- **Role;**

  Co-Lead Actuary

- **Date of Hire;**

  September, 2010

- **Current responsibilities;**

  Patrice has a broad range of experience in proposed legislation analysis and testimony, actuarial audits, experience studies, valuations, and the design, administration and funding of public retirement plans and postretirement health plans. Pat is responsible for the preparation of annual pension and other post-employment benefit (OPEB) valuations, proposed legislative pricing, experience studies, and modeling.

- **Relevant experience;**

  Patrice has been consulting to public pension systems since 1987. She has worked extensively with large statewide systems, including Colorado Public Employees Association, Iowa Public Employees Retirement System, Kansas Public Employees Retirement System, Minnesota Teachers, Missouri State Employees Retirement System, and the Oklahoma Public Employees Retirement System, in preparing the annual valuation, developing projection models, and conducting legislative cost studies and experience studies. She also has a significant amount of experience with retirement systems for municipal system covering civilians, public safety members, and utilities.

- **Education;**

  - BS in Mathematics from University of Nebraska – Lincoln (magna cum laude)

- **Professional designations and memberships; and**

  - Fellow of the Society of Actuaries
  - Enrolled Actuary under ERISA
  - Fellow of the Conference of Consulting Actuaries
  - Member of the American Academy of Actuaries

Patrice A. Beckham, FSA, EA, FCA, MAAA, *continued*

➢ **Relevant publications, studies, or presentations.**

Pat has presented at several conferences and before many legislative bodies, including:

- Conference of Consulting Actuaries
- P2F2 Annual Conference
- Midplains GFOA Conference
- Missouri Association of Public Employees Retirement System
- Mayor's Task Force on Pension Reform, Omaha, Nebraska
- Kansas Public Employees Retirement System Study Commission
- Kansas House Committee on Pensions and Benefits
- Minnesota Legislative Commission on Pension and Retirement
- Colorado Legislative Audit Committee
- Iowa Public Retirement Systems Committee
- Nebraska Retirement Systems Committee
- Citizens Task Force, Lincoln Nebraska

Brent A. Banister, PhD, FSA, EA, FCA, MAAA
Chief Actuary

- **Role;**

  Co-Lead Actuary

- **Date of Hire;**

  September, 2010

- **Current responsibilities;**

  Brent has a broad range of experience in proposed legislation analysis and testimony, actuarial audits, experience studies, valuations, and the design, administration and funding of public retirement plans and postretirement health plans. Brent is responsible for the preparation of annual pension and other post-employment benefit (OPEB) valuations, experience studies, and modeling current and proposed plan designs.

- **Relevant experience;**

  Brent has public sector consulting experience since 1994 providing services to large public clients. He has worked extensively with large statewide systems, including Indiana Public Employees Retirement System, Iowa Public Employees Retirement System, Kansas Public Employees Retirement System, Minnesota Teachers Retirement Association, Nebraska Public Employees Retirement System, and Oklahoma Public Employees Retirement System, in preparing the annual valuation, developing projection models, and conducting cost and experience studies. With a prior employer, Brent performed a significant amount of review work for other consultants covering retirement and postemployment benefits on systems from municipalities through statewide systems all across the country.

- **Education;**

  - BS in Mathematics from Washington State University
  - PhD in Mathematics from Washington State University

- **Professional designations and memberships; and**

  - Fellow of the Society of Actuaries
  - Enrolled Actuary under ERISA
  - Fellow of the Conference of Consulting Actuaries
  - Member of the American Academy of Actuaries

Brent Banister, PhD, FSA, EA, FCA, MAAA ***continued***

➢ **Relevant publications, studies, or presentations.**

Brent has presented at several conferences and before many legislative bodies including:

- P2F2 Annual Conference
- Oklahoma Public Fund Trustee Conference
- Nebraska Actuaries Club
- Kansas Public Employees Retirement System Study Commission
- Minnesota Legislative Commission on Pension and Retirement
- Iowa Public Retirement Systems Committee
- Nebraska Retirement Systems Committee

Larry Langer, ASA, EA, FCA, MAAA
Cavanaugh Macdonald Consulting, LLC
Principal and Consulting Actuary

- **Role;**
  Resource Actuary

- **Date of Hire;**
  June, 2017

- **Current responsibilities;**
  Larry has a broad range of experience in such areas as public plan consulting, valuations, plan design, legislative impact analysis, experience studies, asset/liability models, federal compliance and GASB issues, deferred retirement option plans (DROP), stable contribution policies, and retiree health care benefit plan design, valuations and funding strategies. He currently serves as co-lead on the North Carolina Retirement Systems, the Virginia Retirement Systems, the Retirement Systems of Alabama, the Ohio Police & Fire Fund, the Cook County Pension Fund, and the City of Milwaukee Employes' Retirement System and serves as a support actuary for the Indiana Public Retirement Systems. He has a significant amount of experience with retirement systems for municipal systems covering civilians, public safety members, and utilities.

- **Relevant experience;**
  Larry began his actuarial career in 1989. Larry has served as an actuarial consultant to numerous state and local government retirement systems since 1997.

- **Education;**
  - B.S. in Actuarial Science from Central Michigan University

- **Professional designations and memberships; and**
  - Associate of the Society of Actuaries
  - Enrolled Actuary under ERISA
  - Fellow of the Conference of Consulting Actuaries
  - Member of the American Academy of Actuaries

- **Relevant publications, studies or presentations.**
  Larry has recently presented the following:

  - "Actuary Hour" at Michigan Association of Public Employee Retirement Systems (MAPERS) conference, Most recently September 2018
  - "Actuaries, Economists and Accountants: Proposed Changes to Actuarial Standards" panel discussion at NASRA 2018 Annual Meeting, August 2018

Larry Langer, ASA, EA, FCA, MAAA *continued*

- "Interest Assumptions in Public Sector Plans" at the International Foundation of Employee Benefit Plans 62nd Annual Employees Benefits Conference, November 2016
- "Communication Challenges of GASB 67/68: Panel Discussion" at National Pension Education Association (NPEA), October 2014
- "Decoding Actuarial Assumptions" at the Illinois Public Pension Institute, March 2013

Larry is a past member of the Public Plans Subcommittee of the American Academy of Actuaries.

He participated in the development of the February 2014 Issue Brief entitled "Objectives and Principles for Funding Public Sector Pension Plans". During his career he has testified to numerous legislative committees regarding various pension actuarial issues.

Bryan Hoge, FSA, EA, FCA, MAAA
Senior Actuary

- **Role;**

  Senior Actuary

- **Date of Hire;**

  April, 2014

- **Current responsibilities;**

  Bryan has a broad range of experience in data analysis, actuarial funding and GASB valuations, experience studies, and modeling.

- **Relevant experience;**

  Bryan has been providing pension and OPEB consulting to clients since 2005. He has worked with a number of public clients including Iowa Public Employees Retirement System, Kansas Public Employees Retirement System, Minnesota Teachers Retirement Association, Nebraska Public Employees Retirement System, Missouri State Employees' Retirement System and Oklahoma Public Employees Retirement System, in preparing the annual funding valuations, annual GASB valuations, experience studies and developing projection models. He also has experience with municipal systems covering civilians, public safety members and utilities.

- **Education;**

  - B.S. in Actuarial Science from Drake University

- **Professional designations and memberships; and**

  - Fellow of the Society of Actuaries
  - Enrolled Actuary under ERISA
  - Fellow of the Conference of Consulting Actuaries
  - Member of the American Academy of Actuaries

- **Relevant publications, studies, or presentations.**

  Bryan has presented before the following:

  - Missouri Association of Public Employees Retirement System
  - Lincoln, Nebraska City Council
  - Citizens Task Force, Lincoln Nebraska
  - Ralston, Nebraska Pension Committee

Virginia Fritz, FSA, EA, FCA, MAAA
Senior Actuary

- **Role;**
-

  Senior Actuary

- **Date of Hire;**
  August 2017

- **Current responsibilities;**
  Virginia is responsible for the preparation and review of annual pension valuations for funding and GASB purposes, experience studies, and proposed legislation pricing. Other topics Virginia covers include service purchase calculations, optional form factors, and plan design analysis.

- **Relevant experience;**
  Virginia has worked since 2005 providing pension consulting experience for mid to large sized clients, including extensive experience with the Indiana Public Employees retirement System, having worked on a variety of projects from both a funding and accounting perspective including annual pension and other post-employment benefit (OPEB) valuation reports, plan projections and plan design analysis.

- **Education;**
  - B.S.B.A. in Actuarial Science from University of Nebraska–Lincoln

- **Professional designations and memberships; and**
  - Fellow of the Society of Actuaries
  - Enrolled Actuary under ERISA
  - Fellow of the Conference of Consulting Actuaries
  - Member of the American Academy of Actuaries

Aaron Chochon, ASA, ACA, MAAA
Senior Actuarial Analyst

➢ **Role;**

Senior Analyst

➢ **Years with the firm;**

5 years.

➢ **Areas of expertise;**

Aaron has a broad range of experience in data analysis, pension valuations, pension cost studies, and pension projections.

➢ **Relevant experience;**

Aaron has provided analyst services since 2011 to many public clients, such as Kansas PERS, Nebraska PERS, Iowa PERS, Oklahoma PERS, and numerous local governmental clients.

➢ **Education;**

- B.A. in Mathematics from Hastings College

➢ **Professional designations and memberships;**

- Associate of the Society of Actuaries
- Associate of the Conference of Consulting Actuaries
- Member of the American Academy of Actuaries

Megan E. Skiles
Actuarial Analyst

- **Role;**

  Actuarial Analyst

- **Date of Hire;**

  May, 2017

- **Areas of expertise;**

  Megan has experience in data analysis, benefit calculations, and pension valuations.

- **Relevant experience;**

  Megan has provided analyst services to many public clients, such as Nebraska PERS, Indiana PERS, Oklahoma PERS, and numerous local governmental clients.

- **Education;**

  - B.A. in Mathematics from University of Nebraska at Omaha
  - SOA Financial Mathematics Exam

j. SUBCONTRACTORS
If the bidder intends to subcontract any part of its performance hereunder, the bidder must provide:

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

CMC will not be using any subcontractor(s).

SECTION VI - 3. TECHNICAL APPROACH

The technical approach section of the Technical Proposal must consist of the following subsections:

a. **Understanding of the project requirements;**
b. **Attachment A: Mandatory Qualifications**
c. **Attachment B: Proposed Technical approach; and,**
d. **Deliverables, due dates and Cost Proposal.**

a. Understanding of the project requirements

The retained actuary hired by NPERS is expected to be a key member of the NPERS team and, as such, will provide broad, comprehensive actuarial services to the Board, staff and other interested parties. The scope of services includes but is not limited to:

- Valuation services
- GASB services
- Projection services
- Actuarial experience study services
- Benefit Adequacy Study
- Actuarial consulting services
- Supplemental services

We will discuss each service category in the Technical Approach section of Attachment B.

b. Attachment A: Mandatory Qualifications

The Mandatory Qualification Certification and Questionnaire is provided on the following page.

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. 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.

✓ Yes. _____ No.

3. 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.

✓ Yes. _____ No.

4. 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.

✓ Yes. _____ No.

5. All services to be provided on behalf of the account shall be in accordance with generally accepted actuarial principles.

✓ Yes. _____ No.

6. The actuarial firm must carry liability insurance as set forth in this RFP for the duration the contract. (Section III, G Insurance Requirements)

✓ Yes. _____ No.

January 22, 2019	Cavanaugh Macdonald Consulting, LLC.
Date	Name of firm
Patrice A. Beckham	Patrice Beckham
Name and title of individual signing for the firm.	Signature

c. Attachment B: Proposed Technical Approach

The Proposed Technical Approach form is provided on the following pages.

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: The Nebraska Public Employees Retirement System (NPERS) administers five statewide retirement systems, two plans for the Equal Retirement Benefit Fund (which are also defined benefit by definition), and one deferred compensation plan for the State of Nebraska. All seven defined benefit plans administered by NPERS are governmental plans, as defined in the Internal Revenue Code §414(d). Of the five main defined benefit plans, three of them (Nebraska School Employees Retirement System, Nebraska Judges Retirement System, and the Nebraska State Patrol Retirement System) are traditional defined benefit plans with retirement benefits based on final average salary and years of service. Two of the plans, the State Employees Retirement System and the County Employees Retirement System are cash balance plans. NPERS serves about 95,000 active, inactive, and retired members with monthly benefit payment of around $50 million and assets of $11.5 billion. There are three broad categories of services to be provided by the NPERS retained actuary: ➢ Valuation services, including GASB reporting and projection services; ➢ Experience study services; ➢ Actuarial consulting services (including special projects like the Benefit Adequacy Study). We refer to clients for whom these types of comprehensive actuarial services are provided as "retainer clients". All of the retainer clients for whom we provide comprehensive actuarial services similar to those listed in the RFP are included in Appendix C. Many of those retainer clients are statewide systems who are responsible for multiple retirement plans covering different memberships, similar to NPERS. As requested in the RFP, we have selected three current clients for whom projects similar to those identified

in the RFP with respect to size, scope and complexity are completed on a regular basis. The co-lead consultants for these systems are the same co-leads that are proposed for NPERS. Summary information on these three systems is shown in the following table:

System	Work Performed	Total # of Participants Total Assets ($)	Contact Information
• Iowa Public Employees Retirement System* • Regular Member • Special Services Group 1 • Special Service Group 2	2010 – Present Annual actuarial valuation and experience studies, legislation	350,000 $27 Billion	Ms. Donna Mueller Chief Executive Officer Iowa Public Employees Retirement System 7401 Register Drive Des Moines, IA 50321 515.281.0072 515.281.0045 (Fax) donna.mueller@ipers.org
• Kansas Public Employees Retirement System* • Public Employees • Police and Fire • Judges	2010 – Present Annual actuarial valuations and experience studies, legislation	311,000 $19 Billion	Mr. Alan Conroy Executive Director 611 S. Kansas Ave, Suite 100 Topeka, KS 66603 785.296.6880 785.296.6638 (Fax) aconroy@kpers.org
• Indiana Public Employees Retirement System • Teachers Pre-1996 • Teachers Post-1996 • Public Employees • Public Safety • Judicial • Prosecuting Attorneys • Excise, Gaming, and Conservation Officers • Legislators • Old Fire and Police Plans	2017 – Present Annual actuarial valuations and legislation, with an experience study to be performed in 2020.	483,000 $37 Billion	Mr. Andy Blough Director of Actuarial Analysis Indiana Public Retirement System One North Capitol, Suite 001 Indianapolis, IN 46204 317.234.6022 rblough@inprs.in.gov

Please note that Ms. Beckham and Mr. Banister provided services to IPERS and KPERS for many years prior to joining Cavanaugh Macdonald in 2010. In addition, they have provided services to NPERS for the last six years so the System is familiar with their abilities and skills.

All of the work for all three of these clients was performed as prime contractors. No subcontractors were used.

IOWA PUBLIC EMPLOYEES RETIREMENT SYSTEM (IPERS)

IPERS administers benefits for all state employees, schools employees and most public employees working for Iowa counties and cities. While there is only one "system" in IPERS, there are three distinct groups with different benefit structures and unique contribution rates. The largest group covered under

IPERS is the "regular" membership which includes most State employees, all School employees and most Local employees other than law enforcement employees. The other two groups are referred to as "Special Service Group 1" (composed of sheriffs and deputies) and "Special Service Group 2" (other protection occupation groups such as correctional officers, airport firefighters, conservation officers, etc). As mentioned earlier, separate valuation results are produced each year for each group including projection modeling.

IPERS valuations are prepared each year as of June 30. Membership data is generally received in late August and financial information around the first of October. In accordance with our contract with IPERS, the valuation report and the corresponding Board presentation must be completed and received by IPERS no later than the third Monday in November. Each year we work together with IPERS to develop a written work plan with specific dates for each key step in the valuation process. If something unexpected occurs during the valuation process, the timeline is adjusted and the revised dates apply. This is particularly important in the IPERS contract because "performance incentive" pay is dependent on Cavanaugh Macdonald meeting the key deliverable dates in the work plan.

The work plan for 2018 fiscal year cycle, along with the actual completion dates, is summarized in the table below.

Description	Responsible Team	Work Plan	Actual Completion Date
Ship member data to actuary	IPERS Data	8/27/18	8/25/18
Questions on data	Actuary		9/11/18
Send financials to actuary	IPERS Accounting	10/1/18	10/1/18
Calculate and send certain split service asset transfer amounts	IPERS Accounting	10/2/18	10/2/18
Draft report to IPERS	Actuary	10/19/18	10/19/18
Asset transfer amounts to IPERS	Actuary	10/19/18	10/19/18
Draft funding report meeting	Actuary/IPERS	10/24/18	10/24/18
Draft GASB 67 report to IPERS	Actuary	11/6/2018	
Final funding valuation report to IPERS	Actuary	11/15/18	11/2/18
CAFR letter to IPERS	Actuary	11/15/18	11/13/18
Presentation to Board	Actuary	12/6/18	12/6/18
Planning meeting for FY18 valuation	Actuary/IPERS	4/4/19	
Valuation model to IPERS	Actuary	2/4/19	Work in progress

Under our contract with IPERS, we perform comprehensive actuarial services that are identified in the following categories (per language in the contract):

(1) Valuation Services
   a. Annual actuarial valuations
   b. Actuarial section of CAFR
   c. Certify IPERS' ability to increase the November dividend
   d. Projection model based on valuation
(2) GASB reporting under Statements Number 67 and 68
(3) Consultation and Advisory Services
   a. Provide ongoing actuarial consultation and support
   b. Prepare actuarial cost estimates of proposed legislation

c. Assist IPERS staff in reviewing new legislation or proposed changes to existing retirement laws
d. Recommend possible changes to improve IPERS' financing and benefit structure
e. Assist in updating IPERS' funding policy
f. Provide advice on specific benefit cases.
g. Prepare various actuarial operating tables and factors

(4) Additional Services

a. Provide updated actuarial factors, as needed
b. Conduct experience studies as requested.
c. Conduct asset/liability studies or provide information to others preparing such report
d. Assist IPERS with plan mergers, as they arise
e. Perform other actuarial consulting services as requested.

Due to changes in the underlying actuarial assumptions, new optional form factors were prepared for IPERS during the current contract period. This work is included under actuarial consulting services so no additional fees were paid. This work was performed under a fixed fee retainer of $105,000 and there was no adjustment to this budget.

KANSAS PUBLIC EMPLOYEES RETIREMENT SYSTEM (KPERS)

KPERS administers three separate retirement systems: (1) the Kansas Public Employees Retirement System (KPERS), (2) Kansas Police and Firemen's Retirement System (KPF) and (3) the Kansas Retirement System for Judges. KPERS covers all state employees, schools employees, and most public employees working for Kansas counties, cities and other local employers. While the benefit structure for KPERS is the same for all members, separate valuations are prepared for each of the three groups (State, School, Local) and different contribution rates apply to each group. Within the State group, there are two correctional groups that have different retirement eligibility (one group may retire with unreduced benefits at age 55 and the other may retire with unreduced benefits at age 60) and, therefore, different contribution rates. One comprehensive report is prepared that provides the actuarial results for KPERS, KPF and Judges as that is the preference of the client.

The valuation date for KPERS is December 31 of each year. We do not have a formal timeline for the KPERS valuation largely because we have worked with this client for over 20 years and automatically plan for this valuation cycle (note they were a client of Ms. Beckham and Mr. Banister while they were at their prior employer). Over that time period, the dates for receiving the member data and financial data have changed with data now available at earlier dates. The key date in the valuation process is the presentation of results to the Board at their July meeting. The timeline for the work plan begins on the date we receive the membership data (currently around mid-May) and ends with the mailing date for the Board materials (Thursday before the Board meeting). We develop target dates internally with our staff to ensure the actual completion dates will meet KPERS' needs. The following table summarizes the key dates for the most recent KPERS valuation, December 31, 2017.

Description	Responsible	Target Date	Actual Completion Date
Member data to actuary	KPERS	5/1/2018	5/7/2018
Send financials to actuary	KPERS	5/31/2018	5/31/2018
Draft report to KPERS	Actuary	7/5/2018	7/2/2018
Meeting re draft report	Actuary/KPERS	7/10/2018	7/9/2018
Final valuation report to KPERS	Actuary	7/10/2018	7/10/2018
Board Presentation to KPERS	Actuary	7/10/2018	7/10/2018
Board mailing	KPERS	7/11/2018	7/11/2018
Presentation of Results to Board	Actuary	7/20/2018	7/20/2018
Valuation model prepared	Actuary	8/15/2018	8/14/2018

Under our contract with KPERS, we perform comprehensive actuarial services that are identified in the following categories:

(1) Valuation Services
(2) Fiscal Impact of Proposed Legislation
(3) Special Studies
(4) Board Meetings
(5) Legislative Meetings
(6) General Consulting Services
(7) Projection Model
(8) Affiliation studies

All work is performed for KPERS as the prime contractor. No subcontractors are used. Our retainer fee for KPERS for calendar year 2018 was $207,000. The budgeted amount has always been met for these core services.

Occasionally when there is extensive activity during the legislative session, the contract will be amended to increase the budget for legislative services. Due to the level of activity, this has not occurred in recent years.

INDIANA PUBLIC EMPLOYEES RETIREMENT SYSTEM (INPRS)

INPRS administers eight separate retirement funds covering government employees throughout the state. Each of the eight funds has a valuation report which includes both funding results and accounting results. Additionally, INPRS is the state agency charged with coordinating the actuarial work for some old local police and fire plans that are now state funded.

The valuation date for INPRS is June 30 of each year. However, the valuations are performed with the census data from a year earlier and then results are rolled forward using standard actuarial formulae. This results in an overlap period in the fall when we are working on two consecutive valuations for each fund concurrently.

The following table summarizes the key steps for the 2018 INPRS valuation report:

Description	Responsible	Target Date	Actual Completion Date
Member data to actuary	INPRS	8/1/2017	7/25/2017
Status reconciliation report	Actuary/INPRS	11/30/2017	11/20/2017
Review assumptions with Board	Actuary/INPRS	2/23/2018	2/23/2018
Complete data reconciliation	Actuary/INPRS	3/29/2018	5/31/2018 (mutually agreed)
Additional Year-end census data	INPRS	7/20/201/	7/20/2018
Draft reports to INPRS	Actuary	9/1/2018	8/27/2018
Final draft reports to INPRS	Actuary	10/19/2018	10/19/2018
Board Presentation	Actuary/INPRS	10/26/2018	10/26/2018
Updated valuation reports	Actuary	11/3/2018	11/1/2018
Final valuation reports	Actuary	11/21/2018	11/1/2018

As noted, because this process extends over 16 months, there is a four-month period in which two years of reports are being worked on concurrently.

Additionally, our contract calls for a specified number of cost studies and affiliation/disaffiliation studies, along with the preparation of an actuarial valuation report for a group of old fire and police plans. This work is covered by our annual retainer fee of $231,500 for FYE 2018, which was met. (Additional fees were charged for work outside the scope of services.) All work was performed by CMC with no subcontractors used.

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:

Cavanaugh Macdonald Consulting was incorporated in June, 2005 and has been continuously providing actuarial services to public retirement systems since that time. Please see our listing of public pension fund clients in Appendix C which includes contact information for many systems for whom we have provided services for over five years.

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:

Patrice Beckham meets the minimum experience requirement of ten years. She has been providing actuarial services to public retirement systems for over 25 years. Her current clients include the Iowa Public Employees Retirement System and the Kansas Public Employees Retirement System which are systems Ms. Beckham has worked with for more than ten years. They can attest to her breadth of experience, including general consulting, experience analysis, and funding and GASB valuations, as well as her ability to explain complex actuarial matters and concepts in understandable terms.

Brent Banister meets the minimum experience requirement of ten years. He has been providing actuarial services to public retirement systems for nearly 25 years. His current clients include the Iowa Public Employees Retirement System, the Kansas Public Employees Retirement System, and the Oklahoma Public Employees Retirement System, all of which Mr. Banister has worked with for more than ten years. They can attest to his breadth of experience, including general consulting, experience analysis, and funding and GASB valuations, as well as his ability to explain complex actuarial matters and concepts in understandable terms.

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:

The following credentialed actuaries currently serve on the NPERS team and will continue under this proposal:

Patrice Beckham, FSA, FCA, EA, MAAA: 35 years of experience
Brent Banister, FSA, FCA, EA, MAAA: 25 years of experience
Larry Langer, ASA, FCA, EA, MAAA: 25 years of experience
Bryan Hoge, FSA, FCA, EA, MAAA: 14 years of experience
Virginia Fritz, FSA, FCA, EA, MAAA: 14 years of experience
Aaron Chochon, ASA, ACA, EA, MAAA: 8 years of experience

All of our professional staff are members of the Society of Actuaries, American Academy of Actuaries and the Conference of Consulting Actuaries. Their credentials with the Society of Actuaries can be verified by going to the website, www.soa.org, and searching the "Actuarial Directory". It also includes the date their designations were granted. This will allow you to verify the actuarial credentials and years of experience of our professional staff. Please see their individual resumes included in the proposal.

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

Bidder response:

The management of any retirement system is dependent on reliable, realistic estimates of the liabilities represented by future benefit payments which are provided by the actuarial work performed for the System. However, actuarial services require a highly technical and specialized skill set and, given the education and experience requirements, most systems do not have actuaries on staff. Therefore, the Board of Trustees typically hires a retained actuary to provide actuarial services to the staff and Board, as needed.

As a trusted advisor to the Board of Trustees, the actuary is hired to provide certain technical services to NPERS, including annual actuarial valuations for funding and GASB reporting, periodic experience investigations, and a broad range of actuarial consulting services. The actuary, working closely with staff, must develop a level of trust with all the System's constituencies so that any conclusions or recommendations of the actuary are deemed credible and readily accepted by all stakeholders. All this must be done at a reasonable cost and within a reasonable timeframe.

Annual actuarial valuations of the plan, both funding and accounting, are at the core of the work provided by the retained actuary. Although these valuations can become almost "routine", the results form the basis for all the other actuarial and consulting work performed by the actuary, so their accuracy is critical.

NPERS, like many of the statewide retirement systems we currently serve, needs not only the annual funding valuation, but additional information for accounting determinations and disclosures, exhibits for the state's CAFR, analyses of the cost or other impact of proposed legislation, assistance with actuarial factors and periodic calculations in the course of operations, periodic experience studies, a resource who is familiar with what peer retirement systems are doing, and general help with the complexities of operating a large retirement system in an environment where public retirement systems are frequently under intense scrutiny. This is the world we live in, too, and we have prepared ourselves to be able to meet the needs of our clients.

While NPERS is similar to other retirement systems in many ways, it also has its own unique personality. A distinct history is the result of merging of different interests and styles of the Board members and system staff, the context of the state laws, practices, and expectations, and a culture that is molded from policy makers and members alike. Consequently, the nature of this work is not to offer "one size fits all" solutions, but rather to craft the tools, skills, and resources we have into an approach that is consistent with the way NPERS functions and will meets NPERS' needs.

Our reports and presentations will directly address the important topic of risk assessment. Each state pension system has a unique set of risks arising from benefit design, funding approaches, tolerance for variation in contribution rates, and demographic considerations. In light of this, CMC finds it appropriate to provide the needed background, information and tools to help our clients assess their own risks. Sometimes this is accomplished through additional exhibits in the valuation report or simply pointing the Board and Staff to new studies and papers. Other times, more sophisticated tools and information are necessary or more appropriate. For example, in the past as well as the future, we will provide to you an Excel-based model that will allow NPERS' staff the ability to anticipate actuarial results under various possible investment return options or other alternative scenarios. An in-depth risk report will likely be prepared periodically to allow us to perform a "deeper dive" into the measurement of various key risks.

6. Describe bidder's approach for providing Actuarial Consulting Services for public pension funds.
Bidder response: There are a number of additional services that the retained actuary will likely be called upon to provide over the term of the contract. Rather than identify them all in this space, we will simply state that those services listed in the RFP under "Consulting Services" are all normal services that are typically provided to our retainer clients on an ongoing basis or special projects provided to our clients on an as needed basis. Therefore, we have extensive experience in providing these types of consulting services to public pension systems. In addition, we are members of NASRA, NCTR and P2F2. These memberships and our participation in the annual conferences of each organization keep us well informed of current topics and issues. In addition, CMC will proactively keep the Board and staff aware of developments at the federal level and within the public pension and actuarial communities that may have an impact on financing, operations or reporting.
7. Describe bidder's approach for providing Actuarial Valuation Services for defined benefit and cash balance public pension funds. Give examples.
Bidder response: The core of our work effort will be the annual actuarial valuations of the five NPERS defined benefit plans and the two ERBF plans. The valuation date for the two Cash Balance plans and the two ERBF plans is January 1 and the valuation date for the School Employees, State Patrol, and Judges systems is July 1. The two valuation dates result in the valuation work for NPERS being spread over most of the calendar year, which is an advantage because one core set of team members can perform the valuation work on all of the plans. This creates efficiency in processing, better understanding of the member data, and enables us to develop relationships with key NPERS staff. The valuations will be completed by the dates mutually established in the valuation timeline each year, assuming timely receipt of all necessary member data and financial information. The valuations will determine the liability for all benefits promised to the active, retired and inactive members of each system as of the valuation date. Applying the actuarial funding method and reflecting the actuarial value of assets will produce the actuarial contribution rates necessary to fund the promised benefits in accordance with state statutes. All valuation work will be performed in accordance with Actuarial Standards of Practice as promulgated by the American Academy of Actuaries. The end work product will be actuarial valuation reports that detail the liabilities of the system, demonstrate the application of the funding method and provide the resulting actuarial contributions. The valuation reports will include a summary of principal financial results for the system including actuarial contribution rates (normal cost and unfunded actuarial accrued liability), actuarial value of assets, actuarial liabilities, membership demographics, and detailed gain/loss analysis. The reports will contain sufficient explanatory text to provide a reasonable understanding of all actuarial assumptions, methods, trends and conclusions to individuals with a fiduciary responsibility for the funding status of the retirement plans. As appropriate, the valuation reports will contain comments and recommendations concerning the retirement plans' actuarial condition and funding progress. Our valuation reports are customized and typically include an executive summary with graphs as well as a narrative discussing the current year's valuation results. We strive to create reports that contain information that is important to the client in a format that is friendly and readily usable. We solicit client input as to the presentation of results by allowing sufficient time for the staff to review the reports before it is provided to the Board. Assuming timely receipt of all necessary data and financial information, draft reports will be provided to staff for review and comment by dates set in the work plan. The final reports will also be submitted to

NPERS prior to the Board mailing date as set out in the work plan. The detailed findings of the final reports will be presented to the PERB at their request and to other interested parties as directed by the PERB.

As part of the valuation process, CMC will prepare a model to be provided to NPERS' staff which will provide detailed information on cash flows (benefit payments and contributions) as well as allow for sensitivity analysis (modeling future valuation results if actual results vary from expected results). We strongly believe that a computer modeling tool can help the staff and trustees more clearly understand the implications of their decisions, as well as demonstrate and quantify the risk associated with funding the system. We believe this modeling is so valuable that we routinely give our clients a copy of the model so they can use it independently and perform their own analysis in house.

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

Bidder response:

The retained actuary will provide the necessary calculations and information for compliance with the current Government Accounting Standards Board (GASB) Statements 67 and 68. GASB 67 is prepared for financial reporting by the system and GASB 68 provides the necessary information for employers who sponsor or participate in one of the NPERS' systems. In addition, for multiple cost sharing plans, like the School Retirement System and County Retirement System, the actuary will maintain the records for the various schedules that are required and will provide the information for each covered employer under GASB 68. We will provide supporting services to NPERS, as needed by internal auditors.

We currently provide GASB services to essentially all of our clients so we are very familiar with the details of the calculations under the two Standards as well as auditors' requests for additional information. Our reports are written to streamline the process of gathering the required information by the auditors.

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

Bidder Response:

Projection models have become a necessary and important part of delivering key actuarial services to public retirement systems. We have recognized the value of these models for many years, and as a result, have used them for many of our clients for a long time. Some, such as KPERS, have had a computer model since 1994.

NPERS has expressed an interest in several different types of actuarial projections:

(1) Five 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 Cash Balance Systems. The modeling tool will permit either NPERS or Cavanaugh Macdonald to provide updates throughout the fiscal year using actual investment returns to date. While the model will be used to produce these projections, a separate report can be prepared and presented with the actuarial valuation. The modeling software will be given to NPERS so it can be used by staff throughout the year to provide updates. For the School System, the contributions required to fund the Omaha Service Annuity and the percentage of payroll state contributions for the Omaha School Employees Retirement System will also be included.

(2) The actuarial valuation report provides important and valuable information, but the information is taken as a "snapshot" measurement at one point in time. The valuation report provides little information as to the expected trends for key funding measurements and contributions in future years. This is where projection models fill a critical need. A thirty year projection model will be prepared each year in conjunction with the annual valuation report. This model will be on an open group basis, i.e. a constant number of active members in all future years so new entrants are assumed to replace those members who leave active status. In addition, this projection model will be developed as a deterministic model where one or several variables can be changed and then compared to another scenario. For instance, the investment return earned in the next ten years could be changed from 7.50% to 7.00% to evaluate the impact of such investment returns on the System's funding. We do not use an "off the shelf" model, but rather create a customized model so the variables in the model are those that are critical to NPERS. We have been providing open group, deterministic models to many of our clients for over 15 years, including NPERS for the last six years. Some sample screen shots from some of our models are shown at the end of this section, but the NPERS models will continue to be customized based on input from the Board and staff.

We are also very capable and experienced in building full stochastic asset-liability models, as well as deterministic models. We routinely perform long–range projection of valuation results to include required funding using both closed-group and open-group techniques. We utilize a fully customized model to enhance the usefulness of the projections and allow for the analysis of additional variables that are of most interest to each client. Depending on the system's situation, these variables might be different investment returns, amortization methods/periods, actuarial or statutory contribution rates or benefits (such as ad hoc COLAs). Valuation modeling tools will be prepared for all of the systems.

(3) NPERS has also indicated that they want an interactive model prepared on an open group basis over a 30 year projection period for the School Employees, State Patrol, and Judges plans that can be used as a tool to analyze the long term cost impact of changes in the plan design for both current and future members. While the RFP identified a number of parameters that should be included with the model, we propose to have in-depth conversations with NPERS before beginning this project to ensure the design and functionality of the final modeling tool addresses the specific needs of NPERS.

Given our broad experience working exclusively with public retirement systems, we have extensive experience with respect to plan design changes, both for current and future hires. Nearly all of our clients have been through the process of making changes to their plan design since the significant market losses in calendar year 2008 and fiscal year end 2009. As a result, our plan design capabilities are unmatched, and paired with our modeling capabilities, we have experience in developing tools to allow decision makers to assess the long-term implications of changes to benefits and funding levels on the fly. Below we provide some screen shots of such tools and some graphical output of our models which we have developed to assist our clients with considering plan design changes. In each situation, the model was customized to address the specific needs and focus of the client.

This model provided information to a client with a new tier. In addition to total funding results, graphs such as this allowed an understanding of how the impact of the new tier would emerge over time.

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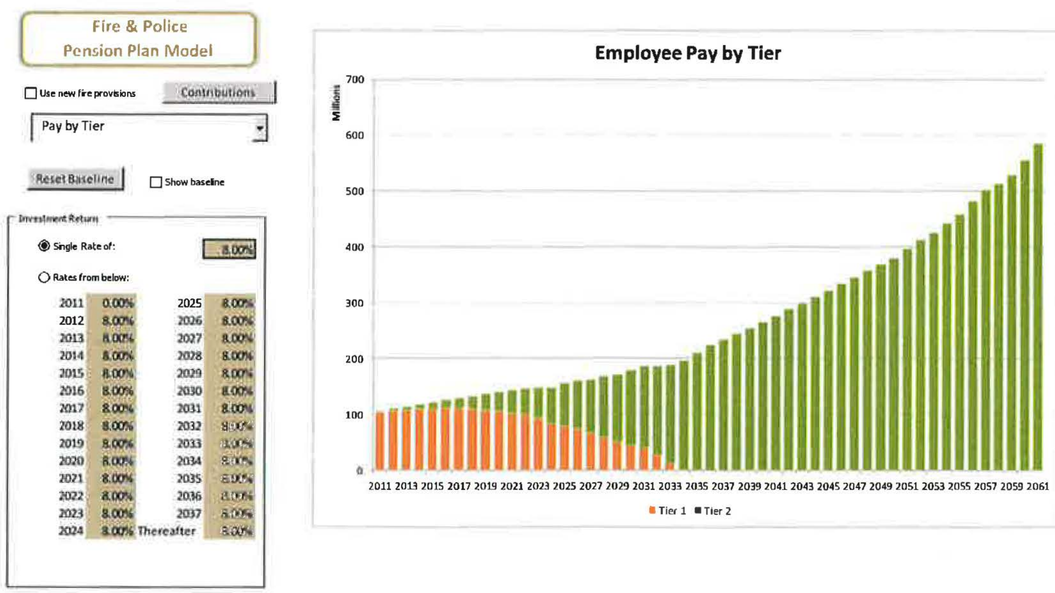
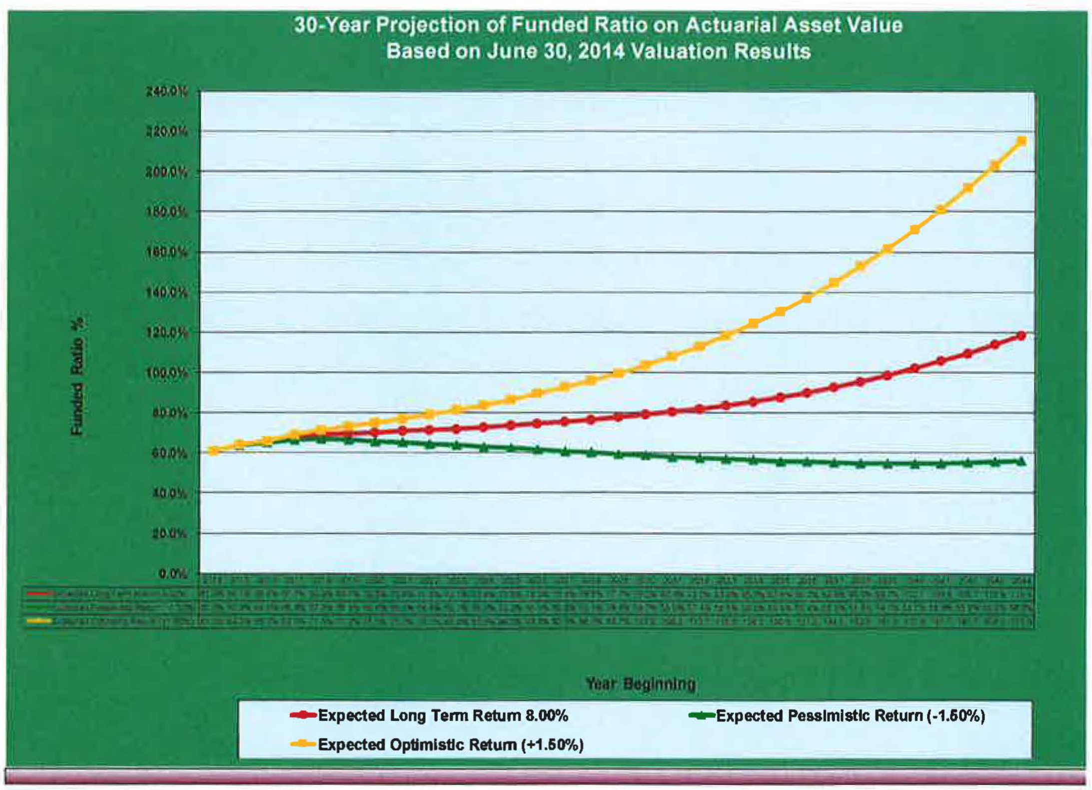


The graph above was used to help illustrate how a new tier would affect the system.



The graph above was used to demonstrate the sensitivity of the funded ratio to different rates of return.

Examples

One of our clients was recently looking at plan design changes but wanted to make sure the burden of sacrifice was shared amongst its shareholders; active members, retirees and employers. Through the use of our modeler capabilities, we were able to expand it and build an easy to understand representation to the shared responsibilities for certain plan design changes. From the output, the reader is able to understand the percentage of change due to retirement eligibility or Cost-of-Living Adjustments and which shareholder bears the cost of those changes.

We have previously assisted the Iowa Public Employees Retirement System (IPERS) with updating its Funding Policy. For many years, member and employer contribution rates had been set by statute, but legislation changed which granted the Investment Board a degree of discretion in setting contribution rates. When the GASB 67 and 68 standards were introduced, it was clear that a formal funding policy would be beneficial to IPERS. Cavanaugh Macdonald met multiple times with a committee that included representatives of IPERS' staff, the Investment Board, and the Benefits Advisory Committee to help develop a comprehensive funding policy. Challenges included the desire by employers and members for stable contributions, concerns by Investment Board members that the System become well-funded as soon as possible, and disparate funding differences between the three plans (two small uniformed plans were better funded than the large regular member plan). Using stochastic modeling to measure such things as variability of contribution rate changes, the working group arrived at a policy which was adopted by the Investment Board and has worked extremely well. This example illustrates our ability to use deterministic and stochastic projections, along with our experience spanning from working with public retirement systems across the nation, to help our clients improve their approach to funding.

KPERS has a statutory cap on how much the employer contribution rate can change from year to year for the State/School and Local groups. Since 1994, the statutory contribution rate for the State/School group has been less than the full actuarial contribution rate. KPERS has relied on the valuation modeling tool for years to provide insight into when the statutory and actuarial contribution rates might converge and level of the contribution rate at that time.

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

Bidder Response:

As a leading provider of actuarial services to large public sector retirement systems, we routinely perform experience investigations. Most of our state clients perform an experience study every three to five years so we have either performed one in the past three years or will be performing one in the near future. These studies serve as the primary basis for our recommendations of actuarial assumptions and methods to the governing boards.

Developing actuarial assumptions is as much an art as a science, guided by the relevant Actuarial Standards of Practice. The "science" part involves collecting observed data during the study period and comparing the actual experience to what was expected, based on the assumptions. Depending upon the quantity and quality of available data, the membership composition, and the plan provisions, we will decide whether the assumption should be studied in total or in smaller groups (e.g. by gender or by plan tier). In many cases, we will also weight the observed actual and expected results so as to give more credence to the actual experience of members with larger liabilities.

The "art" part comes in to play when we consider what unique circumstances may have had a significant influence, or what broad societal trends are in play. The objective of the analysis is to determine if recent experience provides a credible indication of divergence from the current assumption. If so, further analysis is performed to assess and recommend an appropriate adjustment, if any, which is necessary to restore the assumption as a reasonable expectation of the future long-term experience. As stated before, we are careful not to over-react to short-term trends but focus on the materiality and credibility of the recent experience relative to the long-term future expectation. We will also discuss emerging patterns with other actuaries around the firm to draw on the broader experience that can help us assess long term trends.

Our experience investigation process complies with the guidance provided by Actuarial Standards of Practice (ASOP) Nos. 27 (economic assumptions) and 35 (demographic assumptions). As we have in the past, we will prepare a comprehensive experience study report that will detail our findings for each material actuarial assumption and method separately, showing actual experience over the period in comparison with the expected experience based on current assumptions. We will present our assessment of the observed experience in the context of current long-term expectations. If there are any recommended changes to the assumption, we will provide the comparative analysis and fiscal impact of the recommendation.

In rare instances, new assumptions or adjustments to current assumptions may be necessary in the period between experience investigations. This is primarily due to changes to the benefit provisions or the environment of the employers, but may be necessary to reflect a major shift in emerging trends that will have a material impact on the long-term future expectations of the current assumption. In these cases, we prefer to perform a limited scope study that would provide the means to assess if an adjustment is necessary to a current assumption or if there is the basis for a new assumption. As with a full experience study, we would present our findings along with our recommendation to the Board.

The valuation requires the use of certain assumptions with respect to the occurrence of future events, such as rates of death, termination of employment, retirement age, and salary changes to estimate the obligations of the System. The basic purpose of an experience study is to determine whether the actuarial assumptions currently in use have adequately projected actual emerging experience. This information, along with the professional judgment of System personnel and advisors, is used to evaluate the appropriateness of continued use of the current actuarial assumptions. When analyzing experience and assumptions, it is important to recognize that actual experience is reported short term while assumptions are intended to be long term estimates of experience.

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

Bidder Response:

Benefit Adequacy Study

NPERS anticipates that a Benefit Adequacy Study will likely be performed in 2014 or 2015. The last Benefit Adequacy Study was issued in August of 2000 so an updated analysis is warranted, particularly due to the many changes in the retirement systems under NPERS, in addition to other public retirement systems that may be used for comparative purposes. The following discussion is general in nature. We recommend that we discuss the project with the PERB and staff before any work commences to ensure the final report will address all issues in a comprehensive manner.

The Study will include a review and analysis of the benefits, funding and investment adequacy for the five major public employee retirement systems of the State of Nebraska: (1) State Employees Retirement System (defined contribution and cash balance plans), (2) County Employees Retirement System (defined contribution and cash balance plans), (3) School Employees Retirement System (defined benefit plan), (4) Judges Retirement System (defined benefit plan) and (5) State Patrol Employees Retirement System (defined benefit plan with deferred retirement option plan). The specific areas expected to be included in the Study are:

(1) Income Replacement Needs, including value of retirement benefit, income replacement ratios, and over/under target comparisons.
(2) Competitiveness of the retirement systems,
(3) Comparison with national average practices,
(4) Contribution rate comparison and benefit design comparison for regional retirement systems,
(5) Recommendations to meet benefit adequacy and competitiveness needs.

Given that many retirement systems now have more than one tier of benefits, it will important to identify which benefit design for other systems should be used for the comparative analysis.

The conclusions of the Study are expected to include establishing benefit policy recommendations for retirement plans under three approaches: (1) Benefit Adequacy Approach, (2) Competitiveness Approach, and (3) Cost Approach. These three approaches represent three distinct ways to analyze the results of the study. Ultimately, policy makers will need to prioritize the importance of achieving each of these goals as it may be difficult, if not impossible, to meet more than one of the goals. For example it may be difficult to provide the retirement income necessary to maintain the same standard of living as was earned while the employee was actively working and to fund those benefits with stable contribution rates that are sustainable over the long term. There are generally tradeoffs involved so it is important for the consultants to effectively communicate the results of the Study to all interested parties.

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

Bidder Response:

There are a number of supplemental services the retained actuary may be expected to provide to the System.

Other services will be provided when requested by NPERS. The scope of potential services is similar to those provided by CMC to our other large public retirement system clients.

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

Bidder Response:

Because all of work is performed for public retirement systems, of which many are large, complex statewide systems we understand the importance of accurate, timely responses to proposed legislation. NPERS can be assured that we have the capability to respond to any requests in a timely manner and with a study that is easily understood. Given the significant experience of the actuaries on the proposed NPERS team, coupled with our peer review requirements, we are able to ascertain whether or not the calculated impact of proposed legislation is reasonable. In our statements we generally provide a summary of the legislative changes, a description of the assumptions and methods used to determine the impact, the results of our calculations in comparison to the baseline (no change) and any comments or observations we consider appropriate about the legislation and the results. We will provide a clear explanation of our interpretations, assumptions and methods used in performing the analysis and an explanation concerning any behavior changes that may be experienced in the future due to proposed legislation. Finally, we provide any comments of the impact of any federal, state or GASB regulatory requirements on the proposed legislation.

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Due to our extensive work with other Nebraska public retirement systems, we have developed a solid reputation for our expertise with the Nebraska Retirement Systems Committee and staff as well as executive branch staff members.

d. Deliverables, due dates and Cost Proposal

As the current retained actuary for NPERS, there will be no transition work. The following tables address our best estimate of the timeline for the work to be completed in connection with the regular annual services including the actuarial valuations (including the Equal Retirement Benefit Fund Valuations), GASB reporting services and projection services. Other services, such as providing cost estimates for proposed legislation, creating factors, and ongoing consulting services will occur on an as needed basis. Therefore, the timeline for those services cannot be anticipated in advance and they have not been included in the following timelines.

School, State Patrol, and Judges Systems: July 1 Valuation Schedule

Estimated Date	Task	Responsibility
8/1	Send membership data for 7/1 valuations to actuary	NPERS
8/1 – 9/15	Review data for completeness and reasonableness. Follow-up with NPERS on any discrepancies or data questions.	CMC
9/30	Receive follow-up data from NPERS, if any, and prepare data for valuation software.	CMC
10/1	Send asset information for FYE	NPERS
10/1 – 10/9	Run valuations and summarize liability results	CMC
10/10 - 10/12	Calculate actuarial value of assets and incorporate into funding calculations	CMC
10/13– 10/17	Review results, calculate gain/loss and prepare draft valuation reports	CMC
10/18 – 10/21	Internal peer review	CMC
10/10 – 10/21	Prepare five year projection report and 30 year projections	CMC
10/27	Draft report to NPERS for review	CMC
10/28 – 11/3	Review and discuss draft report	NPERS & CMC
11/4	Make final changes to report and send electronic version to NPERS for final review	CMC
11/5	Print and ship copies of final report	CMC
Early November	Board presentation to NPERS for review and discussion	NPERS & CMC
November	Present valuation results to Board	CMC
As requested	Presentation of valuation results to legislative committee	CMC
January	Discuss changes for the following year	NPERS & CMC

State and County Cash Balance Plans and Equal Retirement Benefits Funds
January 1 Valuation Schedule

Estimate Date	Task	Responsibility
2/14	Send membership data for 1/1 valuations to actuary	NPERS
2/14 – 3/5	Review data for completeness and reasonableness. Follow-up with NPERS on any discrepancies or data questions.	CMC
3/15	Receive follow-up data from NPERS, if any, and prepare data for valuation software.	CMC
3/15	Send asset information for CYE	NPERS
3/15 – 3/23	Run valuations and summarize liability results	CMC
3/17 – 3/23	Calculate actuarial value of assets and incorporate into funding calculations	CMC
3/24 – 4/1	Review results, calculate gain/loss and prepare draft valuation report	CMC
4/1 – 4/6	Internal peer review	CMC
3/15 – 4/1	Prepare five year projection report and 30 year projections	CMC
4/7	Draft report to NPERS for review	CMC
4/8 – 4/12	Review and discuss draft report with NPERS	NPERS & CMC
4/13	Make final changes to report and send electronic version to NPERS for final review	CMC
4/15	Print and ship copies of final report	CMC
April	Board presentation to NPERS for review and discussion	NPERS & CMC
As requested	Presentation of valuation results to legislative committee	CMC
June 2014	Discuss changes for the following year	NPERS & CMC

SECTION VI - 3. TECHNICAL APPROACH

The completed Cost Sheet and Cost Proposal are provided in a separately, sealed envelope.

APPENDIX A – CONFIDENTIAL FINANCIAL STATEMENTS

The most recent CONFIDENTIAL financial statements are provided in a separately sealed envelope as they are considered "proprietary information" and we request that the State withhold this information from the public record.

APPENDIX B – STATE OF GEORGIA CERTIFICATE OF EXISTENCE

The State of Georgia Certificate of Existence is provided on the following page.

COBB COUNTY
OCCUPATION TAX CERTIFICATE

P.O. BOX 649 - MARIETTA, GEORGIA 30061-0649
(770) 528-8410

NOT TRANSFERABLE

BUSINESS LOCATION
3550 BUSBEE PKWY 250
DATE ISSUED
01-01-2019

D/B/A CAVANAUGH MACDONALD CONSULTING
CAVANAUGH MACDONALD CNSLTG LLC
3550 BUSBEE PKWY, 250
KENNESAW, GA 30144

CERTIFICATE NUMBER
120389
FOR YEAR
2019
CERTIFICATE EXPIRES
12-31-2019

TYPE **GENERAL**

CERTIFICATE MUST BE DISPLAYED
THIS CERTIFICATE IS NOT VALID IF OWNERSHIP OR BUSINESS LOCATION CHANGES
PROFESSIONALS & ATTORNEYS AT LAW ARE NOT REQUIRED TO DISPLAY

BUSINESS DESCRIPTION

CLASSIFICATION CODE	CLASSIFICATION NAME	AMOUNT
874201	CONSULTANT SERVICE - MANAGEMENT	1921.00

PAYMENT DATE 11-15-2018

4332 1,921.00 4312 0.00 4314 0.00 4316 0.00 4318 0.00
4545 0.00

SUB TOTAL	$	1,921.00
PENALTY	$	0.00
INTEREST	$	0.00
TOTAL	$	1,921.00

CD - Bus License Certificate,120389,2019,CAVANAUGH MACDONALD CONSULTING

RECEIVED
NOV 1 7 2018
BY

Sandra S. Richardson
BUSINESS LICENSE DIVISION MANAGER

R.R
AUTHORIZED INITIALS

IMPORTANT NOTICE

1. Interest as provided by law will be imposed for failure to renew certificate prior to expiration date.
2. Please document to Cobb County Business License Office when business goes out of business.
3. Please provide written notification of any change in address or ownership change. A fee of $10 will be charged to reprint certificate.
4. Please contact the business license office if you have not received a renewal notice two weeks prior to expiration of certificate.
5. Interest can not be waived despite failure to receive renewal notice. Contact the business license office for fee information.

PLACE ON DISPLAY

242303

STATE OF GEORGIA

Secretary of State
Corporations Division
313 West Tower
#2 Martin Luther King, Jr. Dr.
Atlanta, Georgia 30334-1530

CONTROL NUMBER	: 0539382
DATE INC/AUTH/FILED	: June 07, 2005
JURISDICTION	: Georgia
PRINT DATE	: 8/8/2013 5:36:31 PM

CERTIFICATE OF EXISTENCE

I, Brian P. Kemp, the Secretary of State of the State of Georgia, do hereby certify under the seal of my office that

CAVANAUGH MACDONALD CONSULTING, LLC
A Domestic Limited Liability Company

was formed in the jurisdiction stated above or was authorized to transact business in Georgia on the above date. Said entity is in compliance with the applicable filing and annual registration provisions of Title 14 of the Official Code of Georgia Annotated and has not filed articles of dissolution, certificate of cancellation or any other similar document with the office of the Secretary of State.

This certificate relates only to the legal existence of the above-named entity as of the date issued. It does not certify whether or not a notice of intent to dissolve, an application for withdrawal, a statement of commencement of winding up or any other similar document has been filed or is pending with the Secretary of State.

This certificate is issued pursuant to Title 14 of the Official Code of Georgia Annotated and is prima-facie evidence that said entity is in existence or is authorized to transact business in this state.

Brian P. Kemp
Secretary of State

Tracking #: gebBIEzE

APPENDIX C – CLIENT LIST

Our full pension client list is provided on the following pages.

System	Work Performed	Total # of Participants Total Assets ($)	Contact Information
1. Alabama: • Clerks and Registers Retirement System • Employees' Retirement System • Judicial Retirement System • Teachers Retirement System	1981 – Present Annual actuarial valuations, experience studies, legislation	354,012 $36.7 Billion	Dr. David Bronner Chief Executive Officer Retirement Systems of Alabama 201 South Union Street Montgomery, AL 36130-2150 334.517.7000 david.bronner@rsa-al.gov
2. Alabama Peace Officers Annuity & Benefit Fund	1996 – Present Annual actuarial valuations, legislation	4,600 $22 Million	Mr. John E. Hixon, Jr. Executive Director Alabama Peace Officers' Annuity & Benefit Fund 514 South McDonough Street Montgomery, AL 36102-2186 334.242.4079 John.Hixon@apoabf.alabama.gov
3. Central Nebraska Public Power and Irrigation District	2010 – present Annual actuarial valuations	153 $14.8 Million	Ms. Rochelle Jurgens Controller 415 Lincoln Street PO Box 740 Holdrege, NE 68949 308.995.8601 rjurgens@cnppid.com
4. Charlotte Firefighters Retirement System	2000 – Present Annual actuarial valuations and experience studies	1,700 $484.6 Million	Ms. Sandra Thiry Administrator Charlotte Firefighters' Retirement System Charlotte National Building 428 East Fourth Street, Suite 205 Charlotte, NC 28202 704.626.2728 sthiry@ci.charlotte.nc.gov
5. Chattanooga Area Regional Transportation Authority	2016– Present Annual actuarial valuations	277 $14.8 Million	Ms. Autumn Jewell Chief Financial Officer Chattanooga Area Regional Transportation Authority 617 Wilcox Boulevard Chattanooga, TN 37406 423.629.1411 jewell_autumn@gocarta.org
6. City of Chattanooga General Pension Plan	2012 - Present Annual actuarial valuations and experience studies	2,700 $292 Million	Ms. Daisy W. Madison, CPA, CGFM Administrator/City Finance Officer Finance and Administration 101 East 11th Street Suite 101 Chattanooga, TN 37402 423.757.5230 dmadison@chattanooga.gov
7. Cobb County (GA)	2007 – Present Annual actuarial valuations, experience studies and benefit statements	11,300 $526.4 Million	Mr. Tony Hagler Human Resources Director 100 Cherokee Street Marietta, GA 30090-9679 770.528.1505 Tony.Hagler@cobbcounty.org

APPENDIX C – CLIENT LIST

System	Work Performed	Total # of Participants Total Assets ($)	Contact Information
8. Connecticut Municipal Employees' Retirement System	2013 – Present Annual actuarial valuations, experience studies, legislation	16,500 $2.4 Billion	Mr. John Herrington Director State of Connecticut Office of the State Comptroller Retirement Services Division 55 Elm Street Hartford, CT 06106 860.702.3487 John.Herrington@po.state.ct.us
9. Connecticut State Employees' Retirement System	2009 – Present Actuarial valuations, experience studies, legislation	100,000 $11.9 Billion	Mr. John Herrington Director State of Connecticut Office of the State Comptroller Retirement Services Division 55 Elm Street Hartford, CT 06106 860.702.3487 John.Herrington@po.state.ct.us
10. Connecticut Teachers Retirement Board	2009 – Present Actuarial valuations, experience studies, legislation	90,000 $16 Billion	Ms. Helen Quinn Sullivan Administrator Connecticut Teachers' Retirement Board 765 Asylum Avenue, 2nd Floor Hartford, CT 06105 860.241.8402 Helen.Sullivan@ct.gov
11. District of Columbia Retirement Board	2010 – Present Actuarial valuations, experience studies, legislation	20,000 $7.7 Billion	Ms. Sheila Morgan Johnson Executive Director DCRB 900 7th Street, NW Suite 200 Washington, DC 20001 202.343.3200 sheila.morgan-johnson@dc.gov
12. City of East Point Employees Retirement Plan	2013 – Present Annual actuarial valuations and experience studies	808 $79 Million	Ms. Charlotte Cagle, Chairperson City of East Point Employees Retirement Plan P.O. Box 90129 East Point, Georgia 30364 770.780.1117 chaircharlottecagle@gmail.com
13. Georgia: • Employees' Retirement System • Judicial Retirement System • Legislative Retirement System • Military Pension Fund • Public School Employees' Retirement System	1981 – Present Annual actuarial valuations, experience studies, legislation	266,000 $16.1 Billion	Mr. Jim Potvin Executive Director Employees' Retirement System of Georgia Two Northside 75, Suite 300 Atlanta, GA 30318-7778 404.603.5605 jim.potvin@ers.ga.gov

System	Work Performed	Total # of Participants Total Assets ($)	Contact Information
14. Georgia Firefighters' Pension Fund	2010 - Present Actuarial valuations, experience studies, legislation	19,000 $843.4 Million	Mr. Morgan Wurst Executive Director Georgia Firefighters' Pension Fund 2171 East View Parkway Conyers, GA 30013 770.388.5757 execdir@gfpf.org
15. Georgia Sheriffs' Retirement Fund	2005 – Present Actuarial valuations, experience studies, legislation	370 $92.5 Million	Ms. Lisa Petty Secretary – Treasurer Sheriffs' Retirement Fund of Georgia P.O. Box 1000 Stockbridge, GA 30281 770.914.1076 lpetty@georgiasheriffs.org
16. Georgia Teachers Retirement System	1981 – Present Annual actuarial valuations and experience studies	327,114 $66.8 Billion	Mr. L. C. (Buster) Evans Executive Director Teachers Retirement System of Georgia Two Northside 75, Suite 200 Atlanta, GA 30318-7901 404.352.6523 buster.evans@trsga.com
17. Gwinnett County Board of Education's Retirement System	2005 – Present Annual actuarial valuations and experience studies	27,100 $1.8 Billion	Mr. Tom Daymude Director Gwinnett County Board of Education's Retirement System P.O. Box 343 Lawrenceville, GA 30046 678.377.7369 tom_daymude@gwinnett.k12.ga.us
18. Gwinnett County Retirement Systems	2006 – Present Actuarial valuations and experience studies	4,500 $900 Million	Ms. Debbi Davidson Gwinnett County 75 Langley Drive Lawrenceville, GA 30045 770.822.7956 Debbi.Davidson@gwinnettcounty.com
19. City of Hollywood Police Officers' Retirement System	2008 – Present Annual actuarial valuations	623 $173 Million	Mr. Dave Williams Plan Administrator City of Hollywood Police Officers' Retirement System 4205 Hollywood Boulevard, Suite 4 Hollywood, FL 33021 954.967.4395 davew@hollywoodpolicepensionfund.com
20. Indiana Public Retirement System	2017 – Present Annual actuarial valuations and experience studies, legislation	462,000 $29.9 Billion	Mr. Steve Russo Executive Director Indiana Public Retirement System One North Capitol, Suite 001 Indianapolis, IN 46204 sterusso@inprs.in.gov 312-232-3864

APPENDIX C – CLIENT LIST

System	Work Performed	Total # of Participants Total Assets ($)	Contact Information
21. Iowa Judicial Retirement Fund	2010 – Present Annual actuarial valuations and experience studies, legislation	403 $186.2 Million	Ms. Peggy Sullivan Director, Finance/Personnel State Court Administrator's Office 1111 E. Court Avenue Des Moines, IA 50319 515.242.0171 Peggy.sullivan@iowacourts.gov
22. Iowa Peace Officers Retirement System	2010 – Present Annual actuarial valuations, experience studies and legislation	1,210 $410.6 Million	Ms. Linda Guffey POR Executive Officer Department of Public Safety 215 E. 7th Street, 4th Floor Des Moines, IA 50319 515.725.6248 guffy@dps.state.ia.us
23. Iowa Public Employees Retirement System	2010 – Present Annual actuarial valuation and experience studies, legislation	346,000 $28.4 Billon	Ms. Donna Mueller Chief Executive Officer Iowa Public Employees Retirement System 7401 Register Drive Des Moines, IA 50321 515.281.0070 donna.mueller@ipers.org
24. Jefferson County Employees Retirement System	1998 – Present Annual actuarial valuations	4,400 $1 Billion	Ms. Amy Adams GRS Executive Director The General Retirement System for Employees of Jefferson County Suite 430 Courthouse 716 Richard Arrington, Jr., Blvd., N. Birmingham, AL 35203 205.325.5354 amy@grsal.net
25. Kansas City Area Transportation Authority • Salaried • Union	2016 – Present Annual actuarial valuation and experience studies, legislation	1,000 $62 Million	Ms. Teresa Bing Chief Human Resources Officer Kansas City Area Transportation Authority 1200 East 18th Street Kansas City, MO 64108 816.346.0205 tbing@kcata.org
26. Kansas City Board of Public Utilities	2005 – Present Annual actuarial valuations and experience studies, legislation	1,300 $479 Million	Ms. Mindy Harris Plan Administrator Board of Public Utilities 540 Minnesota Avenue Kansas City, KS 66101-2930 913.573.6938 mharris@bpu.com
27. Kansas City Police Retirement System and Police Civilians Retirement System	2007 – Present Annual actuarial valuations and experience studies, legislation	3,500 $918 Million	Mr. Jim Pyle Pension Systems Manager 9701 Marion Park Drive, B Kansas City, Missouri 64137 816.482.8138 jpyle@kcpd.org
28. Kansas Public Employees Retirement System • Public Employees • Police and Fire • Judges	2010 – Present Annual actuarial valuations and experience studies, legislation	284,912 $16.9 Billion	Mr. Alan Conroy Executive Director 611 S. Kansas Ave, Suite 100 Topeka, KS 66603 785.296.1019 aconroy@kpers.org

APPENDIX C – CLIENT LIST

System	Work Performed	Total # of Participants Total Assets ($)	Contact Information
29. Kansas City Public Schools Retirement System	2014 – Present Annual actuarial valuations and experience studies, legislation	10,300 $636.1 Million	Ms. Christine Geier Executive Director Public School Retirement System 3100 Broadway, Suite 1211 Kansas City, MO. 64111 816-472-5800 christine.geier@kcpsrs.org
30. Kentucky Teachers' Retirement System	1981 – Present Annual actuarial valuations, experience studies, legislation	177,000 $18.7 Billion	Mr. Eric Wampler Deputy Executive Secretary Kentucky Teachers' Retirement System 479 Versailles Road Frankfort, KY 40601-3800 502.848.8505 Eric.Wampler@trs.ky.gov
31. Lexington-Fayette Urban County Government Policemen's and Firefighters' Retirement Fund	2006 – Present Actuarial valuations	2,200 $635 Million	D. Chad Hancock Financial Administrator Lexington-Fayette Urban County Government 200 East Main Street Lexington, KY 40507 859.258.3300 chancock@lexingtonky.gov
32. Lincoln, Nebraska Police and Fire Pension Fund	2015 – Present Annual actuarial valuations and experience studies, legislation	1,100 $176.8 Million	Mr. Paul Lutomski Police and Fire Pension Officer Lincoln, NE Police and Fire Pension Fund 555 South 10th Street, Room 302 Lincoln. NE 68508 402.441.8749 plutomski@lincoln.ne.gov
33. Macon/Bibb County Employees Retirement System	2001 – Present Annual actuarial valuations	1,600 $114.8 Million	Ms. Kimberly Roberts Finance Department Macon-Bibb County Government 700 Poplar Street PO Box 247 Macon, GA 31202 478.751.7239 kroberts@macon.bibb.us
34. Marietta Lights and Water	2013 – Present Annual actuarial valuation and experience studies	1,600 $102.9 Million	Mr. Davy Godfrey City of Marietta, Georgia 205 Lawrence Street Marietta, GA 30060 770.794.5508 DGodfrey@mariettaga.gov
35. Metropolitan Utilities District of Omaha Nebraska	2010 – Present Annual actuarial valuation and experience studies	1,500 $329.3 Million	Ms. Debra Schneider Chief Financial Officer 1723 Harney Street Omaha, NE 68102 402.504.7128 Schneider@mudnebr.com

System	Work Performed	Total # of Participants Total Assets ($)	Contact Information
36. Miami General Employees' and Sanitation Employees' Retirement Trust	2008 – Present Actuarial valuations	3,700 $589 Million	Mr. Edgard Hernandez Pension Administrator City of Miami General Employees' and Sanitation Employees' Retirement Trust (GESE) 2901 Bridgeport Avenue Coconut Grove, FL 33133-3607 305.441.2300 Edgard@gese.org
37. City of Milwaukee Employes Retirement System	2019 – Present Actuarial valuations, experience studies	24,000 $5.2 Billion	Mr. Jerry Allen Executive Director Employes' Retirement System City of Milwaukee 789 N. Water Street, Suite 300 Milwaukee, WI 53202 414.286.5454 Jerry.allen@cmers.com
38. Minnesota Teachers' Retirement Association	2011 – Present Annual actuarial valuations, experience studies, legislation	185,700 $20.4 Billion	Ms. Laurie Hacking Executive Director Teachers' Retirement Association of Minnesota 60 Empire Drive, Suite 400 St. Paul, MN 55103 651.296.6523 lhacking@minnesotatra.org
39. Mississippi: • Highway Safety Patrol Retirement System • Municipal Retirement Systems • Public Employees Retirement System • Supplemental Legislative Retirement Plan	1992 – Present Annual actuarial valuations, experience studies, legislation	257,220 $28.3 Billion	Mr. Ray Higgins Executive Director Mississippi PERS PERS Building 429 Mississippi Street Jackson, MS 39201-1005 601.359.2241 RHiggins@pers.ms.gov
40. Missouri State Employees' Retirement System	2017 – Present Annual actuarial valuations, experience studies, legislation	115,839 $8.6 Billion	Ms. Ronda Stegmann Director Missouri State Employees' Retirement System 907 Wildwood Drive Jefferson City, MO 65109 573-632-6113 rondas@mosers.org
41. Montana Public Employees' Retirement Administration	2016 Annual actuarial valuations, experience studies, legislation	58,000 $6.4 Billion	Mr. Dore Schwinden Executive Director Montana Public Employees' Retirement Administration 100 North Park Avenue, Suite 200 Helena, MT 59620 406-444-5459 dschwinden@mt.gov
42. Montana Teachers Retirement System	2009 – Present Annual actuarial valuations, experience studies, legislation	47,658 $3.7 Billion	Mr. Shawn Graham Executive Director Montana TRS 1500 Sixth Avenue Helena, MT 59620 406.444.3376 ShawnGraham@mt.gov

System	Work Performed	Total # of Participants Total Assets ($)	Contact Information
43. Nebraska Public Employees Retirement System	2013 – Present Annual actuarial valuations, experience studies, legislation	117,482 $1.7 Billion	Mr. Randy Gerke Director Nebraska Public Employees Retirement Systems 1526 "K" Street, Suite 400 Lincoln, NE 68509-4816 402.471.9495 randy.gerke@nebraska.gov
44. New Mexico Public Employees' Retirement Association	2010 – Present Annual actuarial valuations, experience studies, legislation	96,500 $14 Billion	Mr. Wayne Propst Executive Director New Mexico PERA 33 Plaza La Prensa Santa Fe, NM 87507 505.476.9301 Wayne.Propst@state.nm.us
45. North Carolina Employee Retirement Systems • Teachers' and State Employees' Retirement System (TSERS) • Local Governmental Employees' Retirement System (LGERS) • Legislative Retirement System (LRS) • Consolidated Judicial Retirement System (CJRS) • Firefighters' and Rescue Squad Workers' Pension Fund (FRSWPF) • National Guard Pension Fund (NGPF) • Register of Deeds' Supplemental Pension Fund (RDSPF) • Disability Income Plan of North Carolina (DIPNC) • Death Benefit Plans o Death Benefit Plan for Members of TSERS o Death Benefit Plan for Members of LGERS o Separate Insurance Benefits Plan for Law Enforcement Officers o Retirees' Contributory Death Benefit Plan Employees' Retirement System	2018 – Present Annual actuarial valuations, experience studies, legislation	Over 900,000 $98.3 Billion	Mr. Steve Toole Executive Director NC Retirement Systems 3200 Atlantic Avenue Raleigh, NC 27604 919.814.4197 Steve.Toole@nctreasurer.com
46. Ocean City, MD	2012 – Present Annual actuarial valuations, experience studies, legislation	650 $118.7 Million	Mr. Wayne Evans Human Resources Director Town of Ocean City 301 Baltimore Avenue Ocean City, MD 21842 410.289.8766 wevans@oceancitymd.gov

Appendix C – Client List

System	Work Performed	Total # of Participants Total Assets ($)	Contact Information
47. Ohio School Employees Retirement System	2008 – Present Annual actuarial valuations, experience studies, legislation	204,000 $12.8 Billion	Mr. Richard Stensrud Executive Director School Employees Retirement System 300 East Broad Street, Suite 100 Columbus, OH 43215 614.222.5890 RStensrud@ohsers.org
48. Oklahoma Law Enforcement Retirement System	2013 – Present Annual Actuarial Valuations	2,700 $895 Million	Ms. Carol Sims Accounting Supervisor Oklahoma Law Enforcement Retirement System 421 NW 13th Street, Suite 100 Oklahoma City, OK 73103 Carol.Sims@olers.ok.gov
49. Oklahoma Police Pension and Retirement System	2016 - Present Annual actuarial valuations, experience studies, legislation	9,000 $1.9 Billion	Ms. Ginger Sigler Executive Director Oklahoma Police Pension and Retirement System 1001 N. W. 63rd Street, Suite 305 Oklahoma City, OK 73116-7335 405-840-3555 Ext. 223 Ginger.Sigler@opprs.ok.gov
50. Oklahoma Public Employee Retirement System	2010 – Present Annual actuarial valuations, experience studies, legislation	82,500 $8.6 Billion	Mr. Joe Fox Executive Director Oklahoma Public Employees Retirement System 5400 N. Grand Blvd., Suite 400 Oklahoma City, OK 73112 405.858.6737 jfox@opers.state.ok.us
51. Omaha Employees Retirement System	2010 – Present Annual actuarial valuations and experience studies	2,600 $238.7 Million	Mr. Stephen Curtiss Finance Director City of Omaha Employees Retirement System 1819 Farnam Street Omaha, NE 68183 402.444.5417 stephen.curtiss@ci.omaha.ne.us
52. Omaha Schools Employees Retirement System	2010-Present Annual actuarial valuations, experience studies, legislation	12,700 $1.2 Billion	Ms. Cecelia M. Carter Executive Director Omaha School Employees Retirement System 3215 Cuming Street Omaha, NE 68131 402.557.2105 Cecelia.Carter@ops.org
53. Omaha Police and Fire Retirement System	2010 – Present Annual actuarial valuations and experience studies	2,900 $599.9 Million	Mr. Stephen Curtiss Finance Director City of Omaha Police and Fire Retirement System 1819 Farnam Street Omaha, NE 68183 402.444.5417 stephen.curtiss@ci.omaha.ne.us

System	Work Performed	Total # of Participants Total Assets ($)	Contact Information
54. Palau Civil Service Pension Plan	Annual actuarial valuations, GASB 67/68	4,912 $28 Million	Mr. Presley Etibek Executive Director Republic of Palau Civil Service Pension Plan PO Box 1767 Koror, Palau PW 96940 cspp@palaunet.com
55. Pensacola General Employees' Retirement Fund	1990 – Present Annual actuarial valuations and experience studies	874 $136.8 Million	Mr. Richard Barker, Jr. Pension Administrator Pensacola General Employees' Retirement Fund P.O. Box 12910 475 East Strong Street Pensacola, FL 32521-0061 850.435.1823 rbarker@ci.pensacola.fl.us
56. Pinellas Park General Employee's Pension Plan	2010 – Present Annual actuarial valuations and experience studies	551 $69 Million	Ms. Denise Cowdrick City of Pinellas Park General Employees' Pension Plan Human Resources 5141 – 78th Avenue Pinellas Park, FL 33781 727.541.0700 Ext. 1307 retirement_services@pinellas-park.com
57. City of Pompano Beach General Employees' Retirement System	2010 – Present Annual actuarial valuations and experience studies	896 $150.3 Million	Ms. Madelene L. Klein Executive Director City of Pompano Beach General Employees' Retirement System 555 South Andrews Avenue, Suite 106 Pompano Beach, FL 33069 954.782.2660 pompgers@aol.com
58. Employees' Retirement System of the Puerto Rico Electric Power Authority	2008 – Present Actuarial valuations, experience studies, legislation	19,300 $1.4 Billion	Ms. Maria Hernandez Ramirez Administrator Employees' Retirement System of the Puerto Rico Electric Power Authority Juan Ruiz Vélez Building 1110 Ponce de León Avenue San Juan, Puerto Rico 00908 787.521.4746 Mariae.Hernandez @prepa.com
59. Shelby County Retirement System	2009 – Present Annual actuarial valuations, experience studies, legislation	9,800 $1.2 Billion	Ms. Nicole Taylor Manager of Pension Administration Shelby County Government 160 N. Main, Rm. 550 Memphis, TN 38103 901.545.3571 Nicole.Taylor@shelbycountytn.gov
60. Tuscaloosa Police Officers and Firefighters Retirement Plan	1997 – Present Annual actuarial valuations and experience studies	854 $60.3 Million	Mr. Greg Medders Chairman Tuscaloosa Police Officers and Firefighters Retirement Plan P.O. Box 1447 Tuscaloosa, AL 35403 205.242.8397 gmedders1965t@gmail.com

Appendix C – Client List

System	Work Performed	Total # of Participants Total Assets ($)	Contact Information
61. University of Puerto Rico Retirement System	2013 - Present Annual actuarial valuations, experience studies, legislation	18,800 $1.3 Billion	Ms. Maria del Carmen Lopez Executive Director University of Puerto Rico Retirement System 1019 Ponce de Leon Avenue Rio Piedras, PR 00915 787.751.4550 Mclopez.ret@.upr.edu
62. Virginia Retirement System	2007 – Present Annual actuarial valuations, experience studies, legislation	687,000 $74.1 Billion	Ms. Patricia S. Bishop Director Virginia Retirement System 1200 E. Main Street Richmond, VA 23219 804.771.7332 pbishop@varetire.org
63. WaterOne	2013 – Present Annual actuarial valuations, experience studies, and consulting	507 $37.3 Million	Ms. Hemi Marcille Interim Director of Human Resources Water District No. 1 of Johnson County 10747 Renner Boulevard Lenexa, KS 66219 913.895.5528 hemim@waterone.org
64. Wichita Employees' Retirement System	2012 – Present Annual actuarial valuations, experience studies, legislation	3,054 $541.2 Million	Ms. Pam Beim Pension Manager Wichita Retirement Systems 455 N. Main Street Wichita, KS 67202 316.268.4544 pbeim@wichita.gov
65. Wichita Police and Fire Retirement System	2012 – Present Annual actuarial valuations, experience studies, legislation	2,076 $592.9 Million	Ms. Pam Beim Pension Manager Wichita Retirement Systems 455 N. Main Street Wichita, KS 67202 316.268.4544 pbeim@wichita.gov

Appendix D – Sample Reports

Sample valuation reports are provided on the following pages.

Cavanaugh Macdonald
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IOWA PUBLIC EMPLOYEES' RETIREMENT SYSTEM

Actuarial Valuation Report as of June 30, 2018

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Cavanaugh Macdonald
CONSULTING, LLC
The experience and dedication you deserve

October 29, 2018

Investment Board
Iowa Public Employees' Retirement System
7401 Register Drive
Des Moines, IA 50321

Re: June 30, 2018 Actuarial Valuation Report

Dear Investment Board Members:

At your request, we have performed an actuarial valuation of the Iowa Public Employees' Retirement System (IPERS or System) as of June 30, 2018 to measure the assets and liabilities of the System, determine the funded status, and set the Required Contribution Rate based on the results of the valuation and IPERS' Contribution Rate Funding Policy. While not verifying the data at its source, the actuary performed tests for consistency and reasonableness. The major findings of the valuation are contained in this report which reflects the benefit provisions in place on June 30, 2018. There have been no changes to the benefit provisions or actuarial methods since last year's valuation. However, an experience study of the System's demographic assumptions was performed and the results were presented to the Board in June, 2018. At the recommendation of the actuary, the Board adopted a new set of demographic assumptions. The assumption changes, as well as their impact on the current valuation results, are discussed further in the Executive Summary section of the report.

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

All costs, liabilities, and other factors for the System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer our best estimate of anticipated experience affecting the System. The Investment Board has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in Appendix C.

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

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of potential results is not presented herein.

The actuarial computations presented in this report are for purposes of determining the recommended funding amounts for the System and have been made on a basis consistent with our understanding of the System's funding requirements and goals and the plan provisions described in Appendix B of this report. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes. In particular, actuarial computations for purposes of fulfilling financial reporting requirements for the System under Governmental Accounting Standards Board Statements No. 67 and No. 68 will be presented in separate reports.

The consultants who worked on this assignment are pension actuaries with significant public plan experience. In addition, the signing actuaries are independent of the System and the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system and on actuarial assumptions that are internally consistent and reasonable based on the actual experience of the System. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

We respectfully submit the following report and look forward to discussing it with you.

Patrice Beckham

Brent A. Banister

Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary

Brent A. Banister, PhD, FSA, EA, FCA, MAAA
Chief Actuary

INTRODUCTION

This report presents the results of the June 30, 2018 actuarial valuation of the Iowa Public Employees' Retirement System (IPERS). The primary purposes of performing the valuation are as follows:

- to determine the Actuarial Contribution Rate (ACR) and the Required Contribution Rate (RCR) for the Regular membership, Sheriffs and Deputies, and the Protection Occupation group (all public safety members other than Sheriffs and Deputies) in accordance with IPERS' Contribution Rate Funding Policy (described in Appendix D),
- to evaluate the funded status of the System and disclose various asset and liability measures as of June 30, 2018,
- to determine the actuarial experience of the System since the last valuation, and
- to analyze and report on trends in System contributions, assets, and liabilities over the past several years.

While there have been no changes to the plan provisions or actuarial methods since last year's valuation, an experience study of the System's demographic assumptions was performed and the results were presented to the Investment Board in June, 2018. As a result, the Investment Board adopted a new set of demographic assumptions, based on the recommendations of the System's actuary, which included:

- Mortality assumption was changed to the family of RP-2014 Mortality Tables for all groups, with mortality improvements modeled using Scale MP-2017.
- Retirement rates for Regular members were lowered to better reflect actual experience. For the Sheriffs and Deputies, the retirement assumption was modified to reflect lower retirement rates at the younger ages. For the Protection Occupation group, the retirement rates were modified both higher and lower across the age ranges.
- Disability rates were lowered for all groups to better reflect the actual experience.
- Termination rates for Regular members were adjusted to better reflect actual experience. Separate termination assumptions were adopted for the two Special Service groups and the assumptions were changed to be service-based rather than age-based.
- The probability of a vested member electing to receive a deferred benefit was adjusted for Regular members to better reflect actual experience.
- The merit component of the salary increase assumption was adjusted to better reflect actual salary increases.

The impact of these assumption changes on the July 1, 2018 valuation results is summarized in the following tables (dollars in millions):

Regular Members	Prior Assumptions	New Assumptions	Difference
Actuarial Liability (AL)	$36,226	$36,289	$63
Actuarial Value of Assets (AVA)	29,513	29,513	0
Unfunded AL (UAL)	$ 6,712	$ 6,776	$63
Funded Ratio	81.5%	81.3%	(0.2%)
Normal Cost Rate	10.40%	10.49%	0.09%
UAL Rate	5.15%	5.21%	0.06%
Actuarial Contribution Rate	15.55%	15.70%	0.15%
Required Contribution Rate	15.73%	15.73%	0.00%

Note: Numbers may not add due to rounding

Sheriffs & Deputies	Prior Assumptions	New Assumptions	Difference
Actuarial Liability (AL)	$725	$697	($27)
Actuarial Value of Assets (AVA)	683	683	0
Unfunded AL (UAL)	$ 42	$ 15	($27)
Funded Ratio	94.2%	97.9%	3.7%
Normal Cost Rate	16.89%	16.85%	(0.04%)
UAL Rate	2.14%	0.46%	(1.68%)
Actuarial Contribution Rate	19.03%	17.31%	(1.72%)
Required Contribution Rate	19.52%	19.02%	(0.50%)

Note: Numbers may not add due to rounding

Protection Occupation	Prior Assumptions	New Assumptions	Difference
Actuarial Liability (AL)	$1,658	$1,656	($2)
Actuarial Value of Assets (AVA)	1,632	1,632	0
Unfunded AL (UAL)	$ 26	$ 24	($2)
Funded Ratio	98.4%	98.5%	0.1%
Normal Cost Rate	16.26%	15.22%	(1.04%)
UAL Rate	0.49%	0.39%	(0.10%)
Actuarial Contribution Rate	16.75%	15.61%	(1.14%)
Required Contribution Rate	17.02%	16.52%	(0.50%)

Note: Numbers may not add due to rounding

The actuarial valuation results provide a "snapshot" view of the System's financial condition on June 30, 2018. The results reflect net favorable experience for the past plan year as demonstrated by an unfunded actuarial liability (UAL) that was lower than expected after considering the impact of the assumption changes. The total UAL on June 30, 2018 for all three membership groups covered by IPERS is $6.815 billion as compared to an expected UAL of $7.114 billion. The favorable experience was the aggregate result of an experience gain of $162 million on the actuarial value of assets and an experience gain of $137 million on System liabilities.

Historically, the contribution rate for Regular members was set by state statute. Effective with the 2011 valuation, IPERS has the authority to set the Required Contribution Rate for the Regular membership group based on the Actuarial Contribution Rate developed in the annual actuarial valuation, subject to a maximum change of 1.00% per year. Based on the current Contribution Rate Funding Policy, which is described in Appendix D, the Required Contribution Rate remains unchanged at 15.73% of pay for Regular members, while it dropped 0.50% of pay for both the Sheriffs and Deputies and the Protection Occupation groups. The Required Contribution Rate is above the ACR for all three groups, as shown in the following table.

Contribution Rate for FY 2020	Regular Membership	Sheriffs and Deputies	Protection Occupation
1. Normal Cost Rate	10.49%	16.85%	15.22%
2. Amortization of UAL	5.21%	0.46%	0.39%
3. Actuarial Contribution Rate	15.70%	17.31%	15.61%
4. Required Contribution Rate	15.73%	19.02%	16.52%
5. Shortfall/(Margin) (3) – (4)	(0.03%)	(1.71%)	(0.91%)
6. Employee Contribution Rate	6.29%	9.51%	6.61%
7. Employer Contribution Rate (4) - (6)	9.44%	9.51%	9.91%
8. Unfunded Actuarial Liability ($M)	$6,776	$15	$24
9. Funded Ratio	81.3%	97.9%	98.5%

Further details on the valuation results can be found in the following sections of this Executive Summary.

EXPERIENCE FOR THE PRIOR PLAN YEAR

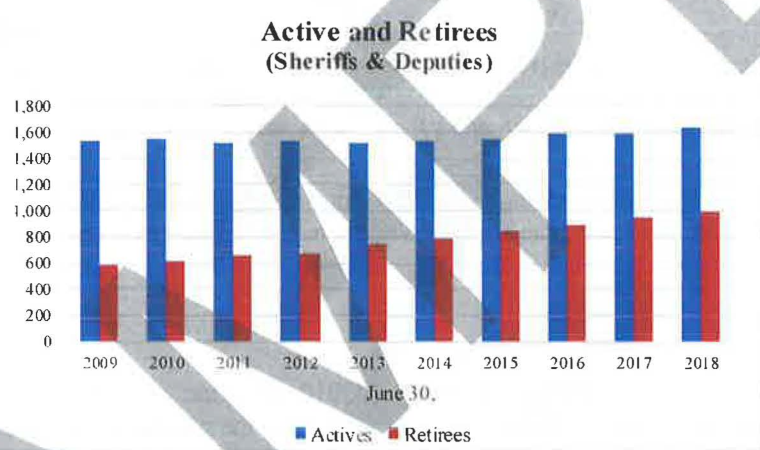
Numerous factors contributed to the change in the Systems' assets, liabilities and the Actuarial Contribution Rate between the June 30, 2017 and June 30, 2018 valuation. The components are examined in the following discussion.

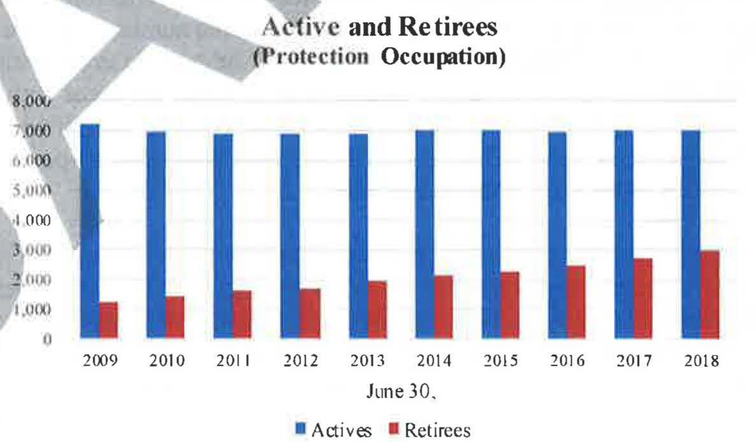
MEMBERSHIP

There were 161,705 active Regular members in the 2018 valuation compared to 161,315 in the 2017 valuation, a 0.2% increase. The graphs on the next page show the number of active and retired members for the past 10 years. The number of active members in the Regular group fell during the four-year period following the Great Recession, but has steadily increased since the 2012 valuation. The current active count of 161,705 is the highest to occur during the 10-year period. When the number of active members increases, it has a positive influence on the System's funding as a larger amount of contributions is received. In addition, the UAL contribution rate is favorably impacted by a larger group of active members and the resulting higher payroll. The UAL is amortized assuming future covered payroll will increase 3.25% per year. If total payroll grows more than 3.25%, the UAL payment is divided by payroll that is larger than expected, which results in a lower UAL contribution rate.

The following graphs show the number of active members compared to the number of members receiving a benefit (retired reemployed members are counted only as retirees) for each of the membership groups. While the number of Regular active members has both increased and decreased at times over this period, the number of members who are receiving a benefit has been steadily increasing. Due to historical reasons, the Sheriffs and Deputies group and the Protection Occupation group have proportionately fewer retirees, but the counts also continue to increase. Finally, it should be noted that the number of active members in the Protection Occupation group decreased overall from 2009 to 2018.


Actives and Retirees
(Regular Members)
Thousands
180
160
140
120
100
80
60
40
20
0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
June 30,
Actives
Retirees


Active and Retirees
(Sheriffs & Deputies)
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
June 30,
Actives
Retirees


Active and Retirees
(Protection Occupation)
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
June 30,
Actives
Retirees

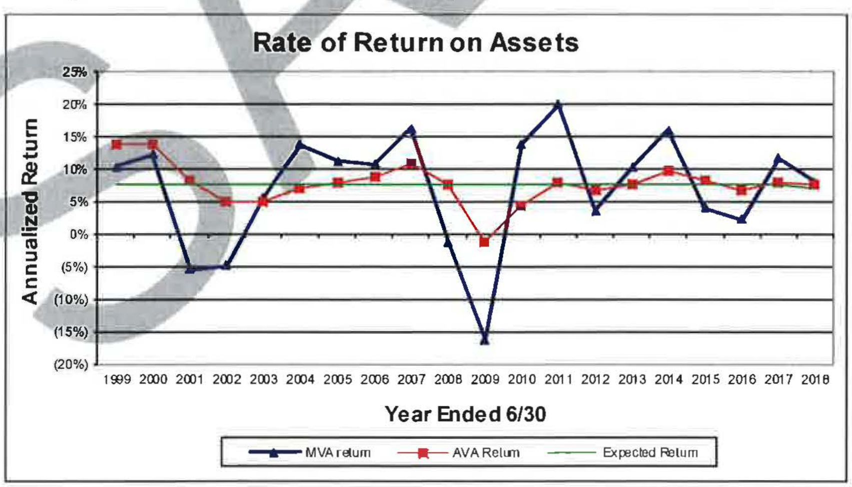
ASSETS

As of June 30, 2018, the System (all membership groups) had total assets of $32.315 billion, when measured on a market value basis. This was an increase of $1.536 billion from the prior year.

The market value of assets is not used directly in the calculation of the unfunded actuarial liability and the Actuarial Contribution Rates. An asset valuation method, which smoothes the effect of market fluctuations, is used to determine the value of assets used in the valuation. This amount, called the "actuarial value of assets", is equal to the expected asset value, based on the actuarial value in the prior year, net cash flows, and the assumed rate of return (7.0%) plus 25% of the difference between the actual market value and the expected asset value. After applying the asset valuation method, the resulting value must be no less than 80% of market value and no more than 120% of market value (referred to as a "corridor"). The corridor did not apply this year. The actuarial value of assets as of June 30, 2018 was $31.828 billion, an increase of $1.356 billion from the value in the prior year. The components of the change in the asset values are shown in the following table:

	Market Value ($M)		Actuarial Value ($M)	
Net Assets, June 30, 2017	$	**30,779**	$	**30,472**
• Employer and Member Contributions	+	1,203	+	1,203
• Benefit Payments and Refunds	-	2,111	-	2,111
• Expected Investment Income, net of expenses (Based on 7.0% assumption)	+	2,123	+	2,102
• Actuarial Gain/(Loss) on Investment Return	+	321	+	162
Net Assets, June 30, 2018 Before FED Transfer	**$**	**32,315**	**$**	**31,828**
• FED Transfer	+	0	+	0
Net Assets, June 30, 2018 After FED Transfer	**$**	**32,315**	**$**	**31,828**
• Application of Corridor		NA	-	0
Final Net Assets, June 30, 2018	**$**	**32,315**	**$**	**31,828**

The time-weighted rate of return on a market value basis, as reported by IPERS, was 7.97%. The dollar-weighted rate of return, net of investment and administrative expenses, measured on the actuarial value of assets was 7.54%. Since this return was above the investment return assumption of 7.00% for FY 2018, this experience resulted in an actuarial gain of $162 million.



Rates of return on the actuarial value of assets are much smoother than market value returns, illustrating the advantage of using an asset smoothing method.

Please see Exhibits 2 and 3 in Section II of this report for a summary of the market and actuarial value of assets by group (Regular, Sheriffs and Deputies, and Protection Occupation group) as of June 30, 2018.

In last year's valuation, there was a deferred (unrecognized) investment gain (actuarial value exceeded market value) of $307 million. Due to the rate of return on the market value of assets for FY 2018, the deferred investment gain has increased to $487 million in the current valuation. The deferred investment gain will be recognized in the smoothing method in future years, but may be offset by actual investment experience if it is less favorable than assumed. For example, a return of about 5.6% on the market value of assets during FY 2019 would fully recognize the $487 million deferred investment gain and result in a return of 7.0% on the actuarial value of assets.

LIABILITIES

The actuarial liability is that portion of the present value of future benefits that will not be paid by future normal costs. The difference between this liability and the actuarial value of assets at the same date is called the unfunded actuarial liability. The dollar amount of the UAL will be reduced if the contributions to the System exceed the normal cost for the year plus interest on the prior year's UAL, assuming that all actuarial assumptions are met.

The unfunded actuarial liability by group, as of June 30, 2018, is shown in the following table:

($Millions)	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total*
Actuarial Liability	$36,289	$697	$1,656	$38,643
Actuarial Value of Assets	29,513	683	1,632	31,828
Unfunded Actuarial Liability*	$ 6,776	$ 15	$ 24	$ 6,815
Funded Ratio	81.3%	97.9%	98.5%	82.4%

*May not add due to rounding.

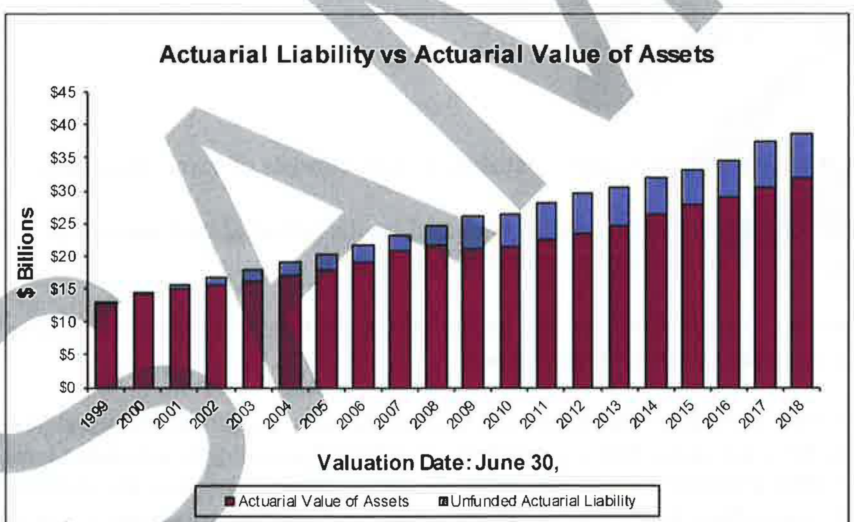
See Exhibit 7 in Section III of the report for the detailed development of the unfunded actuarial liability for each group.

Changes in the UAL occur for various reasons. The net decrease in the UAL from June 30, 2017 to June 30, 2018 was $153 million, largely due to the impact of favorable experience. The components of the net change in the UAL are shown in the following table (in millions):

Unfunded Actuarial Liability, June 30, 2017 ($M)	$ 6,968
• Expected increase from amortization method	185
• Expected decrease from contributions above actuarial rate	(57)
• Investment experience	(162)
• Liability experience*	(137)
• Changes in demographic assumptions	35
• Other	(17)
Unfunded Actuarial Liability before FED transfer, June 30, 2018	$ 6,815
• FED Transfer for favorable experience	0
Unfunded Actuarial Liability after FED transfer, June 30, 2018	$ 6,815

* Liability experience is 0.35% of the actuarial liability.

As can be observed above, various factors impacted the UAL. Actuarial gains (losses), which result from actual experience that is more (less) favorable than anticipated based on the actuarial assumptions, are reflected in the UAL. They are measured as the difference between the expected unfunded actuarial liability and the actual unfunded actuarial liability, taking into account any changes due to actuarial assumptions and methods or benefit provision changes. Overall, the System experienced a net actuarial gain of $299 million. The total actuarial gain may be explained by considering the separate experience of assets and liabilities. As discussed earlier, there was a $162 million actuarial gain as measured on the actuarial value of assets. There was a net actuarial gain of $137 million from demographic experience that was more favorable than anticipated by the actuarial assumptions. While there are various components of demographic experience, both gains and losses, the most significant experience came as a result of favorable salary experience due to smaller salary increases than were expected.

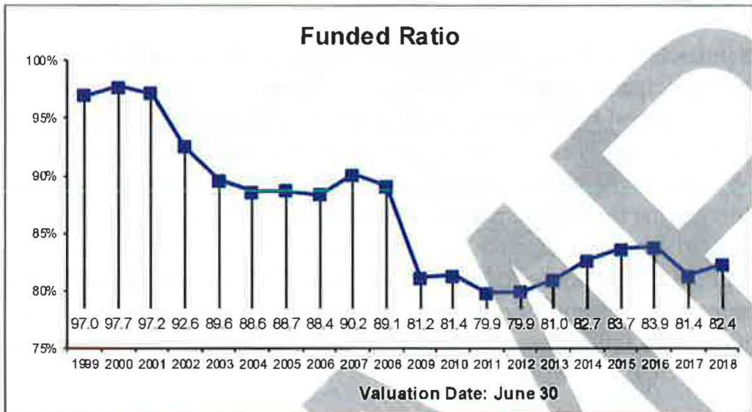


The dollar amount of the UAL has grown over the past two decades due to numerous factors, the most significant of which have been the investment loss of FY 2009, many years of contributions below the Actuarial Contribution Rate, and changes in actuarial assumptions.

An evaluation of the unfunded actuarial liability on a pure dollar basis may not provide a complete analysis since only the difference between the assets and liabilities (which are both very large numbers) is reflected. Another way to evaluate the unfunded actuarial liability, and the progress made in its funding, is to track the funded ratio, the ratio of the actuarial value of assets to the actuarial liability. The funded status information, for the entire System, is shown in the following table (in millions).

	6/30/14	6/30/15	6/30/16	6/30/17	6/30/18
Funded Ratio (Actuarial Value)	82.7%	83.7%	83.9%	81.4%	82.4%
Unfunded Actuarial Liability ($M)	$5,544	$5,455	$5,586	$6,968	$6,815

Measures of the funded ratio presented here are not an indication of the System's ability to settle its current obligations, nor, on its own, is it an indication of the need for future funding. In addition, please note that due to the use of an asset smoothing method the funded ratio, based on the market value of assets, may differ from the funded ratio based on the actuarial value of assets.



Negative investment experience in FY 2009 caused a significant drop in the funded ratio, which had been stable at around 90% since 2003. The funded ratio stabilized in FY 2010 due to a strong investment return coupled with benefit reductions and has remained between 80% and 84% in recent years.

CONTRIBUTION RATE

Under the Entry Age Normal cost method, the Actuarial Contribution Rate consists of two components:

- a "normal cost" for the portion of projected liabilities allocated by the actuarial cost method to the service of members during the year following the valuation date, and
- an "unfunded actuarial liability contribution" for the excess of the portion of projected liabilities allocated to service to date over the actuarial value of assets.

This valuation is used to determine the contribution rates that will be effective July 1, 2019 for the fiscal year ending June 30, 2020. Prior to the 2011 valuation, Regular members contributed according to scheduled rates set in statute. Beginning with the 2011 valuation (which applied to FY 2013), IPERS was given the statutory authority to set the Required Contribution Rate for Regular members, subject to a maximum increase of 1.00% per year. Based on IPERS' Contribution Rate Funding Policy, the Required Contribution Rate for Regular members in this valuation (which sets the contribution rate for FY 2020) will remain unchanged from the prior valuation.

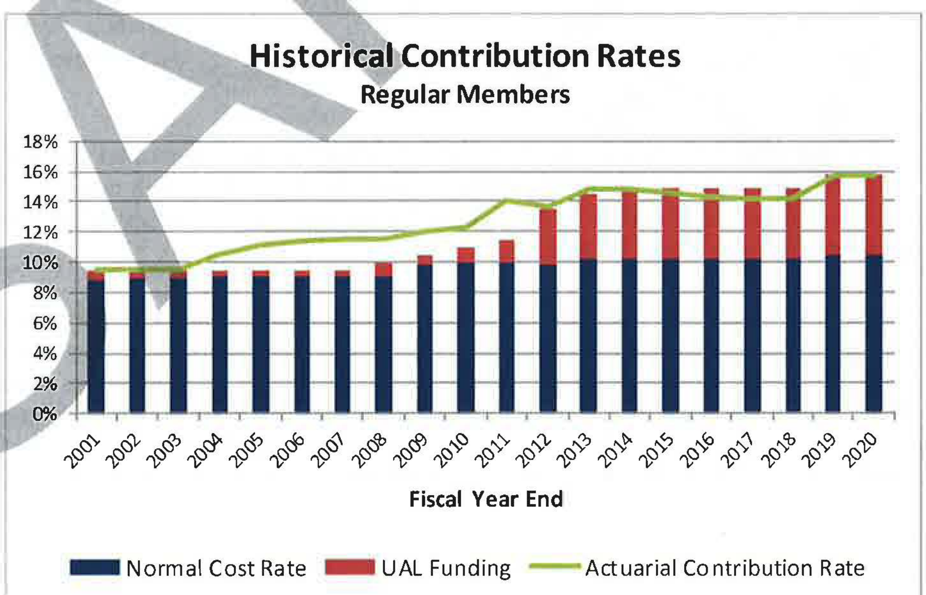
The remaining 5% of the active members, the Sheriffs and Deputies group and the Protection Occupation group, have historically contributed at the Actuarial Contribution Rate which was subject to change each year.

These groups now contribute based on the same funding policy as is used for the Regular members. According to the current Contribution Rate Funding Policy, if the Actuarial Contribution Rate is less than the previous Required Contribution Rate by 0.50% or more, then the Required Contribution Rate shall be lowered by 0.50% provided the funded ratio of the membership group is 95% or higher. The current valuation results show that the Actuarial Contribution Rate has decreased by 2.21% for the Sheriffs and Deputies group and 1.41% for the Protection Occupation group. Both groups also have a funded ratio greater than 95%. Therefore, the Required Contribution Rate for both of these groups will decrease by 0.50% of pay compared to the prior valuation. We would note that, based on the results of this valuation, the Required Contribution Rate is greater than the Actuarial Contribution Rate for all three groups.

See Exhibit 14 in Section IV for the development of these contribution rates which are summarized in the following table:

Contribution Rate for FY 2020	Regular Membership	Sheriffs & Deputies	Protection Occupation
1. Actuarial Contribution Rate	15.70%	17.31%	15.61%
2. Required Contribution Rate	15.73%	19.02%	16.52%
3. Employee Contribution Rate	6.29%	9.51%	6.61%
4. Employer Contribution Rate (2) – (3)	9.44%	9.51%	9.91%
5. Shortfall/(Margin) (1) – (2)	(0.03%)	(1.71%)	(0.91%)

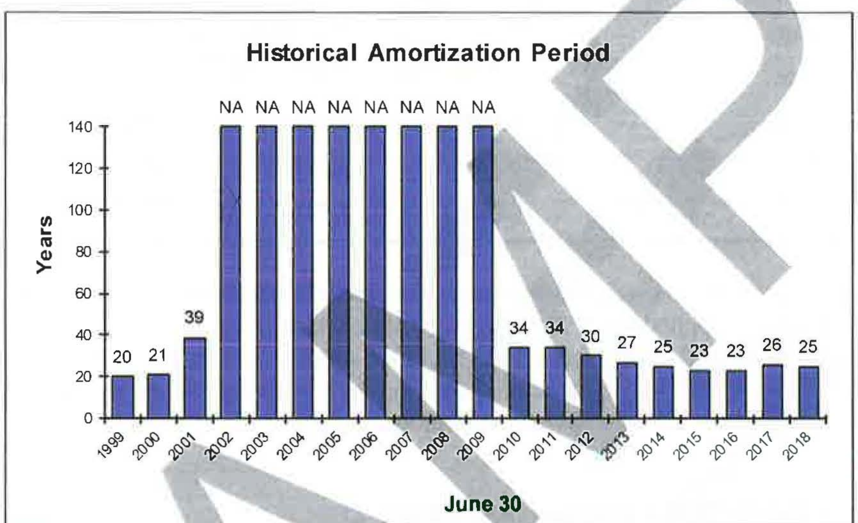
In 2006 and 2010, legislation was passed that increased the statutory contribution rate for Regular members. Beginning with the 2011 valuation (which applied to FY 2013), the Investment Board was given the authority to set the Required Contribution Rate for Regular members subject to certain statutory limitations. A historical summary of the actual contribution rate, split between the normal cost and the remaining amount available to fund the UAL, and the Actuarial Contribution Rate is shown in the following graph:



For a number of years, the actual contributions were less than the Actuarial Contribution Rate and only a small portion of the total contribution rate was available to fund the UAL. Recent changes have increased this portion, providing more progress toward eliminating the UAL.

Based on the results of this valuation and the Contribution Rate Funding Policy adopted by the Investment Board, the Required Contribution Rate for the fiscal year ending June 30, 2020 for the Regular members is 15.73%, which is greater than the Actuarial Contribution Rate by 0.03% of pay.

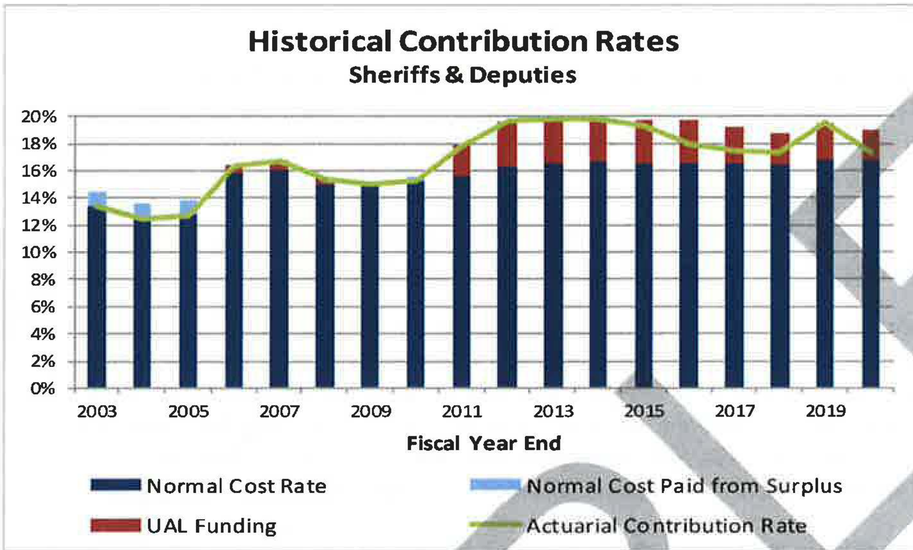
The Actuarial Contribution Rate is determined based on the snapshot of the System taken on the valuation date, June 30, 2018, and applies only for the fiscal year beginning July 1, 2019. The Actuarial Contribution Rate in future years will change each year as the deferred actuarial investment experience is recognized and other experience (both investment and demographic) impacts the System. The Required Contribution Rate will be set in each future year based on the Actuarial Contribution Rate for that year and the Contribution Rate Funding Policy.

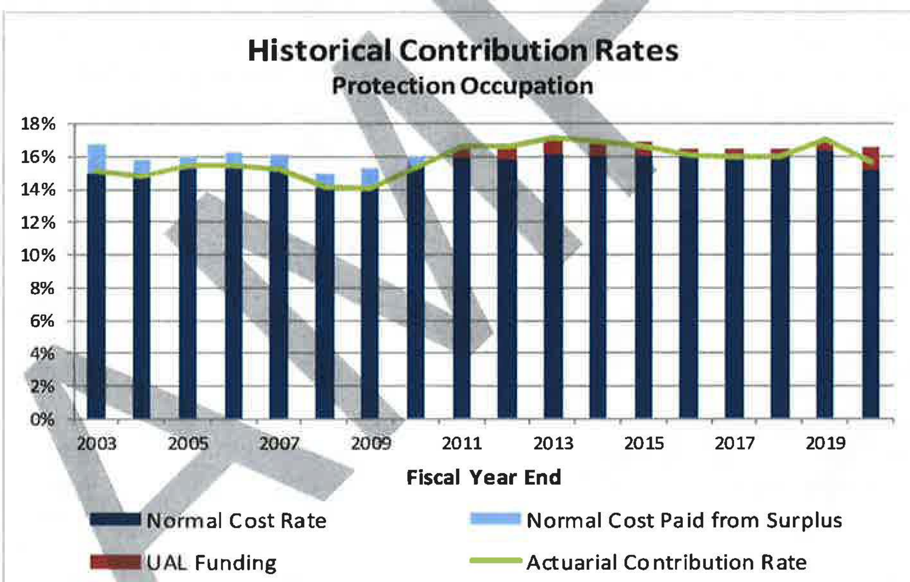


Based on the statutory contribution rate, the period to amortize the UAL was infinite in the 2002 to 2009 valuations. Due to the benefit reductions in 2010 and the increase in the contribution rate beginning in FY 2012, more funds are available to finance the UAL and the years to amortize is finite. Future investment experience will have a significant impact on the System's funding and the years to amortize the UAL.

Note: Years to amortize after 2012 assume the current UAL amortization contribution rate remains level in future years. However, the provisions in the Contribution Rate Funding Policy will result in changes in the contribution rates over time. See Exhibits 12 through 14 for the applicable amortization periods established pursuant to the Actuarial Amortization Method.

As shown in the graphs on the next page, the Sheriffs and Deputies group and the Protection Occupation group have historically contributed the full Actuarial Contribution Rate. During the 20-year period shown, both groups have contributed the full Actuarial Contribution Rate every year (sometimes using surplus for to fund part of the normal cost rate), and have contributed more than the ACR in four of the past five years, due to the Contribution Rate Funding Policy. As a result, the current valuation results show that both groups are close to a funded ratio of 100% (97.9% for Sheriffs and Deputies, and 98.5% for Protection Occupation).


Historical Contribution Rates
Sheriffs & Deputies
20%
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
2003
2005
2007
2009
2011
2013
2015
2017
2019
Fiscal Year End
Normal Cost Rate
Normal Cost Paid from Surplus
UAL Funding
Actuarial Contribution Rate


Historical Contribution Rates
Protection Occupation
18%
16%
14%
12%
10%
8%
6%
4%
2%
0%
2003
2005
2007
2009
2011
2013
2015
2017
2019
Fiscal Year End
Normal Cost Rate
Normal Cost Paid from Surplus
UAL Funding
Actuarial Contribution Rate

SUMMARY

While there have been no changes to the plan provisions or actuarial methods since last year's valuation, an experience study of the System's demographic assumptions was performed and the results were presented to the Board in June, 2018. Based on the actuary's recommendations, the Board adopted a new set of demographic assumptions. As a result of the changes to the demographic assumptions, the unfunded actuarial liability increased by $35 million and the Required Contribution Rate decreased by 0.50% of pay for both the Sheriffs and Deputies and the Protection Occupation groups. For Regular members, the Required Contribution Rate calculated in the current valuation was unaffected by the experience study.

The investment return on the market value of assets for FY 2018 was 7.97%, as reported by IPERS. Due to the application of the asset smoothing method and the deferred asset gains, the investment return on the actuarial value of assets was 7.54%, which is above the assumed investment return of 7.00%. Therefore, there was an experience gain on the actuarial value of assets. In addition, there was also an experience gain on the System's liabilities. The System's combined experience for FY 2018 was an aggregate experience gain of $299 million, resulting in a lower unfunded actuarial liability than was expected.

As mentioned earlier in this section, the System utilizes an asset smoothing method in the valuation process. While this is a common procedure for public retirement systems, it is important to identify the potential impact of the deferred investment experience. The asset smoothing method impacts only the timing of when the actual market experience is recognized in the valuation process. As a result of the return on the market value of assets for FY 2018, there is currently a deferred investment gain of $487 million. The key valuation results, using both actuarial and market value of assets, are shown below:

Actuarial Contribution Rate*	Actuarial Value	Market Value
Regular Members		
Normal Cost	10.49%	10.49%
UAL Contribution	5.21%	4.79%
Total Contribution	15.70%	15.28%
UAL ($M)	$ 6,776	$ 6,326
Funded Ratio	81.3%	82.6%
Sheriffs and Deputies		
Normal Cost	16.85%	16.85%
UAL Contribution	0.46%	0.00%
Total Contribution	17.31%	16.85%
UAL ($M)	$ 15	$ 4
Funded Ratio	97.9%	99.5%
Protection Occupation		
Normal Cost	15.22%	15.22%
UAL Contribution	0.39%	0.00%
Total Contribution	15.61%	15.22%
UAL ($M)	$ 24	$ (2)
Funded Ratio	98.5%	100.1%

*Actuarial Contribution Rate is calculated prior to the application of the Contribution Rate Funding Policy which determines the Required Contribution Rate.

For each membership group, the Actuarial Contribution Rate consists of the normal cost and an amortization payment (not less than zero) of the group's unfunded actuarial liability. The normal cost may only be offset by a negative amortization payment after a membership group has attained a funded ratio of 110.0% or greater for three consecutive years. The Actuarial Contribution Rate for FY 2020 is 15.70% of pay for Regular members, which is 0.03% less than the prior valuation. The Actuarial Contribution Rate for the Sheriffs and Deputies group in this valuation decreased by 2.21% of pay from last year's rate to 17.31% of pay. The Actuarial Contribution Rate for the Protection Occupation group decreased by 1.41% of pay to 15.61% of pay.

Based on the Contribution Rate Funding Policy adopted by the Investment Board, the Required Contribution Rate determined in this year's valuation for Regular members remains unchanged from last year at 15.73% of pay (applicable for the fiscal year ending June 30, 2020). The Required Contribution Rate for the Sheriffs and Deputies group in this valuation decreased by 0.50% of pay from last year's rate to 19.02% of pay. The Required Contribution Rate for the Protection Occupation group also decreased by 0.50% of pay to 16.52% of pay. The Required Contribution Rate remains higher than the Actuarial Contribution Rate for FY 2020 for all three membership groups.

The Actuarial Contribution Rate is determined based on the snapshot of the System taken on the valuation date, June 30, 2018, and applies only for the fiscal year beginning July 1, 2019. The Actuarial Contribution Rate in the future will change each year as the deferred actuarial investment experience is recognized and as other experience (both investment and demographic) impacts the System. While the Required Contribution Rate can vary each year, the annual change to the rate for Regular members is limited by statute to 1.0% and the Contribution Rate Funding Policy also limits the decrease in the rate. Therefore, depending on actual experience in future years, the Required Contribution Rate may vary from the Actuarial Contribution Rate.

The long-term financial health of IPERS is heavily dependent on two key items: (1) future investment returns and (2) systematic contributions to the System at the full actuarially determined rate. Given the System's current funded status, the Actuarial Contribution Rate, and the Required Contribution Rate, the System's funded ratio is expected to improve over the long term, assuming all actuarial assumptions are met in the future and contributions are made according to the current Contribution Rate Funding Policy.

We conclude this executive summary by presenting comparative statistics and actuarial information on both the June 30, 2018 and June 30, 2017 valuations. All figures shown include the Regular membership, Sheriffs and Deputies, and the Protection Occupation group.

SUMMARY OF HISTORICAL CHANGE IN IPERS UNFUNDED ACTUARIAL LIABILITY

($Millions)	FY03	FY04	FY05	FY06	FY07	FY08	FY09	FY10	FY11	FY12	FY13
Unfunded Actuarial Liability (BOY[1])	1,255	1,867	2,176	2,289	2,507	2,266	2,665	4,895	4,931	5,682	5,916
• Expected Change											
– From Amortization Method	24	36	42	22	49	44	52	95	96	110	115
– Contributions different than Actuarial Rate	61	87	103	125	118	127	140	248	218	65	21
• Investment Experience	402	75	(89)	(235)	(622)	5	1,903	666	(66)	168	(15)
• Liability and Other Experience	125	82	57	242	187	214	135	(185)	(17)	(109)	(250)
• Benefit Enhancements	0	29	0	0	0	6	0	(674)	0	0	0
• Change in Assumptions/Methods	0	0	0	64	27	3	0	(114)	417	0	0
• Change in Actuarial Software	0	0	0	0	0	0	0	0	103	0	0
• FED Transfer	0	0	0	0	0	0	0	0	0	0	0
Unfunded Actuarial Liability (EOY[2])	1,867	2,176	2,289	2,507	2,266	2,665	4,895	4,931	5,682	5,916	5,787

1 = Beginning of Year
2 = End of Year

Note: The amounts shown in each year are not additive because they are calculated on each valuation date and, therefore, represent a value at a different point in time.

SUMMARY OF HISTORICAL CHANGE IN IPERS UNFUNDED ACTUARIAL LIABILITY (continued)

($Millions)	FY14	FY15	FY16	FY17	FY18
Unfunded Actuarial Liability (BOY[1])	5,787	5,544	5,455	5,586	6,968
• Expected Change					
– From Amortization Method	99	72	54	52	185
– Contributions different than Actuarial Rate	0	(20)	(38)	(58)	(57)
• Investment Experience	(527)	(171)	236	(102)	(162)
• Liability and Other Experience	(29)	30	(121)	57	(154)
• Benefit Enhancements	0	0	0	0	0
• Change in Assumptions/Methods	215	0	0	1,433	35
• Change in Actuarial Software	0	0	0	0	0
• FED Transfer	(1)	0	0	0	0
Unfunded Actuarial Liability (EOY[2])	5,544	5,455	5,586	6,968	6,815

1 = Beginning of Year
2 = End of Year

Note: The amounts shown in each year are not additive because they are calculated on each valuation date and, therefore, represent a value at a different point in time.

IOWA PUBLIC EMPLOYEES' RETIREMENT SYSTEM
PRINCIPAL RESULTS

	June 30, 2018	June 30, 2017	% Chg
SYSTEM MEMBERSHIP			
1. Active Membership			
- Number of Members (excluding Retired/Reemployed)	170,376	169,909	0.3
- Projected Payroll for Upcoming Fiscal Year	$8,176M	$8,058M	1.5
- Average Salary	$47,989	$47,425	1.2
2. Inactive Membership			
- Number Not in Pay Status	70,023	67,955	3.0
- Number of Retirees/Beneficiaries	120,755	117,508	2.8
- Average Annual Benefit	$17,036	$16,602	2.6
ASSETS AND LIABILITIES			
1. Net Assets (excluding FED reserve)			
- Market Value	$32,315M	$30,779M	5.0
- Actuarial Value	31,828M	30,472M	4.4
2. Projected Liabilities			
- Retired Members	$20,660M	$19,335M	6.9
- Inactive Members	907M	835M	8.6
- Active Members	24,792M	24,515M	1.1
- Total Liability	$46,358M	$44,685M	3.7
3. Actuarial Liability	$38,643M	$37,440M	3.2
4. Unfunded Actuarial Liability	$6,815M	$6,968M	(2.2)
5. Funded Ratio			
a. Actuarial Value Assets/Actuarial Liability	82.36%	81.39%	1.2
b. Market Value Assets/Actuarial Liability	83.62%	82.21%	1.7
SYSTEM CONTRIBUTIONS			
Required Contribution Rate, Regular Members*	15.73%	15.73%	0.0
Employer Contribution Rate	9.44%	9.44%	0.0
Employee Contribution Rate	6.29%	6.29%	0.0
Total Actuarial Contribution Rate	15.70%	15.73%	(0.2)
Shortfall/(Margin)	(0.03%)	0.00%	NA

Note: Totals may not add due to rounding

M = ($)Millions

* Contribution rates for Sheriffs and Deputies are 9.51% for employers, 9.51% for employees

Contribution rates for Protection Occupation are 9.91% for employers, 6.61% for employees

SECTION II

SYSTEM ASSETS

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In this section, the values assigned to the assets held by the System are presented. These assets are valued on two different bases: the market value and the actuarial value.

Market Value of Net Assets

For certain accounting statement purposes, System assets are valued at current market prices. These values represent the "snapshot" of the fair value of System assets as of the valuation date.

Actuarial Value of Net Assets

The market value of assets may not necessarily be the best measure of the System's ongoing ability to meet its obligations.

To arrive at a suitable value for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens volatility in the market value while still indirectly recognizing market value. The specific technique follows:

Step 1: Determine the expected value of plan assets at the current valuation date using the actuarial assumption for investment return on the prior actuarial value of assets and the actual receipts and disbursements of the fund for the previous 12 months.

Step 2: Subtract the expected value determined in Step 1 from the total market value of the Fund at the current valuation date.

Step 3: Multiply the difference between market and expected values determined in Step 2 by 25%.

Step 4: Add the expected value of Step 1 and the product of Step 3 to determine the actuarial value of assets.

Step 5: Verify the preliminary actuarial value of assets in Step 4 is not more than 120% of the market value of assets, nor less than 80% of the market value. If it is, adjust the actuarial value of assets so it falls within the 80% - 120% corridor.

EXHIBIT 1

ANALYSIS OF NET ASSETS AT MARKET VALUES

($ Millions)

	June 30, 2018			June 30, 2017		
		Amount	% of Total		Amount	% of Total
Cash & Equivalents	$	331	1.0%	$	1,254	4.1%
Capital Assets, Receivables and Payables		(933)	(2.9)		(1,182)	(3.8)
Domestic Equity		7,382	22.8		7,068	23.0
International Equity		5,671	17.5		4,635	15.1
Fixed Income		10,551	32.8		10,090	32.7
Public Real Assets		2,387	7.4		2,208	7.2
Private Real Assets		1,986	6.1		1,984	6.4
Private Equity/Debt		4,414	13.7		3,890	12.6
Securities Lending Collateral Pool		526	1.6		832	2.7
TOTAL NET ASSETS	$	32,315	100.0%	$	30,779	100.0%
FED Reserve (Before current year transfer)		0			0	
Current Year FED Transfer Payable		0			0	
Net Retirement System Assets	$	32,315		$	30,779	

EXHIBIT 2

SUMMARY OF FUND ACTIVITY
(Market Value)

	Regular Membership	Sheriffs & Deputies	Protection Occupation	FED Reserve	Total
NET RETIREMENT SYSTEM ASSETS ON JUNE 30, 2017*	$28,575,078,992	$649,668,861	$1,554,189,858	$0	$30,778,937,711
REVENUE					
Employer contributions	671,598,096	10,564,954	34,589,731	0	716,752,781
Member contributions	447,780,981	10,564,954	23,059,821	0	481,405,756
Service purchase	4,219,054	0	410,592	0	4,629,646
Investment income	2,345,271,870	53,678,541	128,700,445	0	2,527,650,856
Total Revenue	$3,468,870,001	$74,808,449	$186,760,589	$0	$3,730,439,039
DISBURSEMENTS					
Benefit payments	1,948,951,644	31,004,667	72,471,434	0	2,052,427,745
Member refunds	51,092,081	1,681,775	6,150,756	0	58,924,612
Administrative expenses	14,153,625	113,406	486,811	0	14,753,842
Investment expenses	63,726,309	1,458,567	3,497,080	0	68,681,956
Total Expenses	$2,077,923,659	$34,258,415	$82,606,081	$0	$2,194,788,155
PRELIMINARY NET ASSETS ON JUNE 30, 2018	$29,966,025,334	$690,218,895	$1,658,344,366	$0	$32,314,588,595
TRANSFERS					
Membership changes	(3,120,215)	3,353,475	(233,260)	0	0
FED Reserve	0	0	0	0	0
ADJUSTED NET ASSETS ON JUNE 30, 2018	$29,962,905,119	$693,572,370	$1,658,111,106	$0	$32,314,588,595

* Beginning net position as of June 30, 2017 has been restated by ($178,615) for the General Membership and in total due to accounting adjustments

EXHIBIT 3

ACTUARIAL VALUE OF NET ASSETS

	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
1. Actuarial Value of Assets as of June 30, 2017*	$28,292,612,060	$642,509,070	$1,537,125,949	$30,472,247,079
2. Actual Receipts/Disbursements				
a. Contributions	1,123,598,131	21,129,908	58,060,144	1,202,788,183
b. Benefit Payments and Refunds	2,000,043,725	32,686,442	78,622,190	2,111,352,357
c. Net Change	(876,445,594)	(11,556,534)	(20,562,046)	(908,564,174)
3. Expected Value of Assets as of June 30, 2018 $[(1) \times 1.07] + [(2c) \times (1.07)^{.5}]$	29,366,492,532	675,530,533	1,623,455,220	31,665,478,285
4. Preliminary Market Value of Assets as of June 30, 2018	29,966,025,334	690,218,895	1,658,344,366	32,314,588,595
5. Difference Between Market and Expected Values (4) - (3)	599,532,802	14,688,362	34,889,146	649,110,310
6. Preliminary Actuarial Value of Assets as of June 30, 2018 (3) + [(5) x 25%]	29,516,375,733	679,202,624	1,632,177,507	31,827,755,864
7. Transfers				
a. Membership changes	(3,073,208)	3,302,953	(229,745)	0
b. FED Reserve	0	0	0	0
8. Initial Actuarial Value of Assets as of June 30, 2018	$29,513,302,525	$682,505,577	$1,631,947,762	$31,827,755,864
9. Determination of Corridor				
a. 80% of Market Value of Assets	23,970,324,095	554,857,896	1,326,488,885	25,851,670,876
b. 120% of Market Value of Assets	35,955,486,143	832,286,844	1,989,733,327	38,777,506,314
10. Final Actuarial Value of Assets as of June 30, 2018 (8), but not less than (9a), nor greater than (9b)	$29,513,302,525	$682,505,577	$1,631,947,762	$31,827,755,864

* Beginning net position as of June 30, 2017 has been restated by ($176,835) for the General Membership and in total due to accounting adjustments.

EXHIBIT 4

HISTORICAL COMPARISON (ACTUARIAL AND MARKET)

Value as of June 30	Actuarial Value of Net Assets (AVA)	Market Value of Net Assets (MVA)	AVA/MVA
1999 *	12,664,031,437	14,814,311,451	85%
2000 *	14,145,141,535	16,473,516,141	86%
2001	15,112,424,729	15,357,519,356	98%
2002	15,613,114,099	14,387,799,637	109%
2003	16,120,476,011	14,915,941,546	108%
2004	16,951,942,539	16,726,227,853	101%
2005	17,951,490,071	18,224,067,613	99%
2006	19,144,036,519	19,847,676,903	96%
2007	20,759,628,415	22,624,387,015	92%
2008	21,857,423,183	21,844,112,206	100%
2009	21,123,979,941	17,603,316,618	120%
2010	21,537,458,560	19,538,971,423	110%
2011	22,575,309,199	22,772,344,651	99%
2012	23,530,094,461	23,024,773,746	102%
2013	24,711,096,187	24,756,663,715	100%
2014	26,460,428,085	28,038,549,893	94%
2015	27,915,379,103	28,429,834,829	98%
2016	29,033,696,587	28,326,433,656	102%
2017	30,472,423,914	30,779,116,326	99%
2018	31,827,755,864	32,314,588,595	98%

*Reflects reduction for transfers to the Favorable Experience Dividend Reserve Account.

Values are for all three membership groups, but exclude the Favorable Experience Dividend Reserve Account.

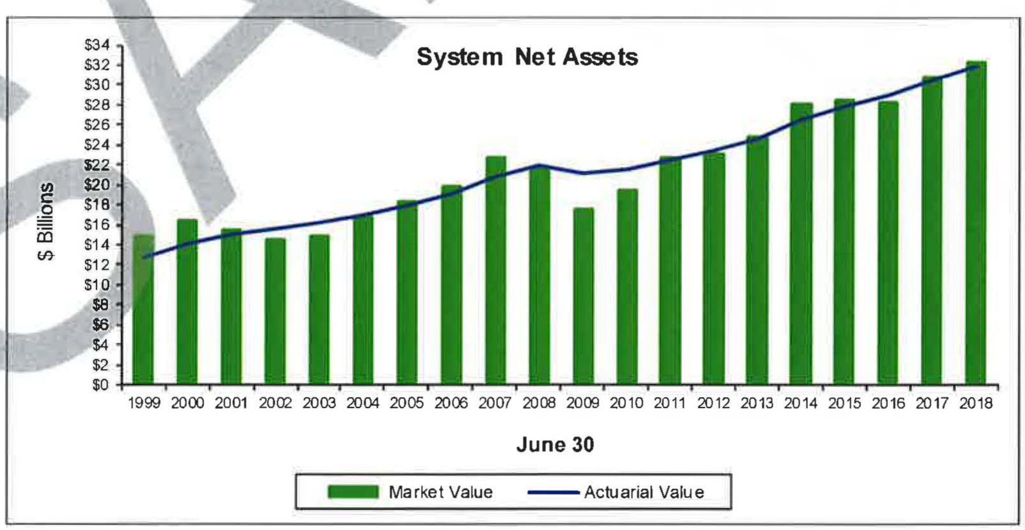

EXHIBIT 5

SUMMARY OF FAVORABLE EXPERIENCE DIVIDEND RESERVE

1. Initial Market Value of FED Reserve as of June 30, 2018	$	0
2. Transfer to Membership Groups		0
3. Final Value of FED Reserve as of June 30, 2018 (1) - (2)	$	0

SECTION III

SYSTEM LIABILITIES

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SECTION III

SYSTEM LIABILITIES

A fundamental principle in financing the liabilities of a retirement program is that the cost of its benefits should be related to the period in which benefits are earned, rather than to the period of benefit distribution. There are several methods used to allocate the cost of benefits to members' working lifetimes. These mathematical techniques are called actuarial cost methods.

The method used for this valuation is referred to as the "entry age normal" actuarial cost method. In general, under this method, a contribution that is a level percent of rates of pay is determined for each member, which if paid from date of hire to retirement date, will finance all future benefit payments. The level percent of pay that is developed is called the **"normal cost"**. The sum of the individual normal cost dollar amounts is divided by expected covered payroll of current actives to determine the normal cost rate for the System.

The actuarial liability is that portion of the present value of future benefits (PVFB) that will not be paid by the normal costs in future years. The difference between this liability and the actuarial value of assets as of the same date is referred to as the **unfunded actuarial liability (UAL).** If contributions exceed the normal cost for the year, after allowing for interest on the previous balance of the UAL, this liability will be reduced. Benefit changes, experience gains and losses, and changes in actuarial assumptions or procedures will also have an effect on the total actuarial liability and on the portion of it that is unfunded.

The UAL is projected to the following year to reflect the time lag from the valuation date to the date the contribution rates are effective and is then amortized according to the Actuarial Amortization Method adopted by the Investment Board.

Effective with the June 30, 2008 valuation, a transfer of assets is performed as of June 30th for all employees whose membership group changed since the prior valuation. The purpose behind the transfer is to better match the assets and liabilities for each membership group by having both the assets and liabilities for each member reside in their current membership group. When employees move between membership groups, an asset transfer for valuation purposes is made based on the funded ratio of their former group prior to the transfer. The asset transfer calculation is determined by multiplying the actuarial liability of the employee transferring by the funded ratio of their former group just prior to the transfer. The asset values after the transfers and the liabilities for the employees reside in their current membership group and are used to prepare the final valuation results.

A summary of the number of employees who transferred is shown below:

From	**To**		
	Regular	**Sheriffs and Deputies**	**Protection Occupation**
Regular		17	191
Sheriffs and Deputies	4		22
Protection Occupation	131	72	

The impact on the UAL from the transfer is shown below:

Regular	**Sheriffs and Deputies**	**Protection Occupation**
($2,977,988)	$1,042,226	$1,949,395

EXHIBIT 6

PRESENT VALUE OF FUTURE BENEFITS
as of June 30, 2018

The actuarial present value of future benefits represents the current value of benefits expected to ultimately be earned by the current members of the System as of the valuation date.

	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
Present Value of Future Benefits:				
Active Members				
Retirement benefits	$21,142,587,266	$508,105,531	$1,120,852,669	$22,771,545,466
Death benefits	257,502,749	6,913,861	21,969,590	286,386,200
Termination benefits	1,082,558,342	21,763,890	125,146,842	1,229,469,074
Disability benefits	441,522,391	15,495,550	47,379,439	504,397,380
Inactive Members				
Vested members	751,576,093	10,037,566	45,640,843	807,254,502
Nonvested members	96,756,451	253,980	2,277,399	99,287,830
Retired Members and Beneficiaries	19,516,533,248	341,195,487	801,836,796	20,659,565,531
Total Present Value of Future Benefits	$43,289,036,540	$903,765,865	$2,165,103,578	$46,357,905,983

EXHIBIT 7

UNFUNDED ACTUARIAL LIABILITY
as of June 30, 2018

	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
1. Present Value of Future Benefits	$43,289,036,540	$903,765,865	$2,165,103,578	$46,357,905,983
2. Present Value of Future Normal Costs	6,999,875,655	206,426,455	508,770,220	7,715,072,330
3. Actuarial Liability (1) - (2)	$36,289,160,885	$697,339,410	$1,656,333,358	$38,642,833,653
4. Actuarial Value of Net Assets	29,513,302,525	682,505,577	1,631,947,762	31,827,755,864
5. Unfunded Actuarial Liability (3) - (4)	$6,775,858,360	$14,833,833	$24,385,596	$6,815,077,789
6. Funded Ratio (4) / (3)	81.3%	97.9%	98.5%	82.4%

EXHIBIT 8

CALCULATION OF ACTUARIAL (GAIN)/LOSS AND ANY TRANSFER TO THE FAVORABLE EXPERIENCE DIVIDEND RESERVE
Based on the June 30, 2018 Actuarial Valuation

The Favorable Experience Dividend (FED) reserve account was created by legislation in 1998. The main purpose of the account is to help offset the negative impact of postretirement inflation for members who retired after June 30, 1990. The law provided that a portion of the favorable actuarial experience, if any, in subsequent years would be transferred to the FED reserve. Legislation passed in 2000 capped the FED reserve at ten years of expected payouts at the maximum level. Further legislation in 2006 prohibited further transfers to the FED until the System has no remaining UAL. The System currently has an UAL so no transfer is to be made this year, nor is any future transfer assumed for any actuarial valuation calculations.

1. June 30, 2017 Unfunded Actuarial Liability	$	6,968,134,950
2. Normal Cost for year ending June 30, 2018		806,277,386
3. Employer and Employee Contributions*		1,198,158,537
4. Change due to membership transfers		13,633
5. Change due to FED transfer		0
6. Change due to assumptions		34,635,401
7. Expected Unfunded Actuarial Liability as of June 30, 2018 [(1) + (2)] * 1.07 - (3) * $(1.07)^{.5}$ + (4) + (5) + (6)		7,113,885,406
8. Actual Unfunded Actuarial Liability as of June 30, 2018		6,815,077,789
9. (Gain)/loss (8) - (7)		(298,807,617)
10. Portion of gain to transfer to FED		N/A
11. Amount of Actuarial Value of Assets to transfer to FED	$	0
12. Market value of FED transfer	$	0

* Does not include service purchases

EXHIBIT 9

ACTUARIAL (GAIN)/LOSS BY GROUP
Based on the June 30, 2018 Actuarial Valuation

	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
1. Expected Actuarial Liability				
a. Actuarial Liability at June 30, 2017	$35,176,950,577	$691,205,752	$1,572,225,700	$37,440,382,029
b. Normal Cost for FY 2018	734,000,976	17,753,900	54,522,510	806,277,386
c. Benefit Payments for FY 2018	(2,000,043,725)	(32,686,442)	(78,622,190)	(2,111,352,357)
d. Interest on (a), (b), and (c) at 7.0%	2,444,949,018	48,502,499	111,167,139	2,604,618,656
e. Transfers and Service Purchases	(1,400,792)	4,033,278	2,170,090	4,802,576
f. Change due to assumption changes	63,506,324	(27,286,341)	(1,584,582)	34,635,401
g. Expected Actuarial Liability as of June 30, 2018	$36,417,962,378	$701,522,646	$1,659,878,667	$38,779,363,691
2. Actuarial Liability at June 30, 2018	$36,289,160,885	$697,339,410	$1,656,333,358	$38,642,833,653
3. Actuarial Liability (Gain)/Loss (2) - (1g)	($128,801,493)	($4,183,236)	($3,545,309)	($136,530,038)
4. Expected Actuarial Value of Assets				
a. Actuarial Value of Assets at June 30, 2017	$28,292,612,060	$642,509,070	$1,537,125,949	$30,472,247,079
b. Contributions for FY 2018	1,123,598,131	21,129,908	58,060,144	1,202,788,183
c. Benefit Payments for FY 2018	(2,000,043,725)	(32,686,442)	(78,622,190)	(2,111,352,357)
d. Interest on (a), (b), and (c) at 7.0%	1,950,326,066	44,577,997	106,891,317	2,101,795,380
e. Transfers	(3,073,208)	3,302,953	(229,745)	0
f. Expected Actuarial Value of Assets as of June 30, 2018	$29,363,419,324	$678,833,486	$1,623,225,475	$31,665,478,285
5. Actuarial Value of Assets at June 30, 2018	$29,513,302,525	$682,505,577	$1,631,947,762	$31,827,755,864
6. Actuarial Value of Assets (Gain)/Loss (4f) - (5)	($149,883,201)	($3,672,091)	($8,722,287)	($162,277,579)
7. Net Actuarial (Gain)/Loss (3) + (6)	($278,684,694)	($7,855,327)	($12,267,596)	($298,807,617)

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SECTION IV

SYSTEM CONTRIBUTIONS

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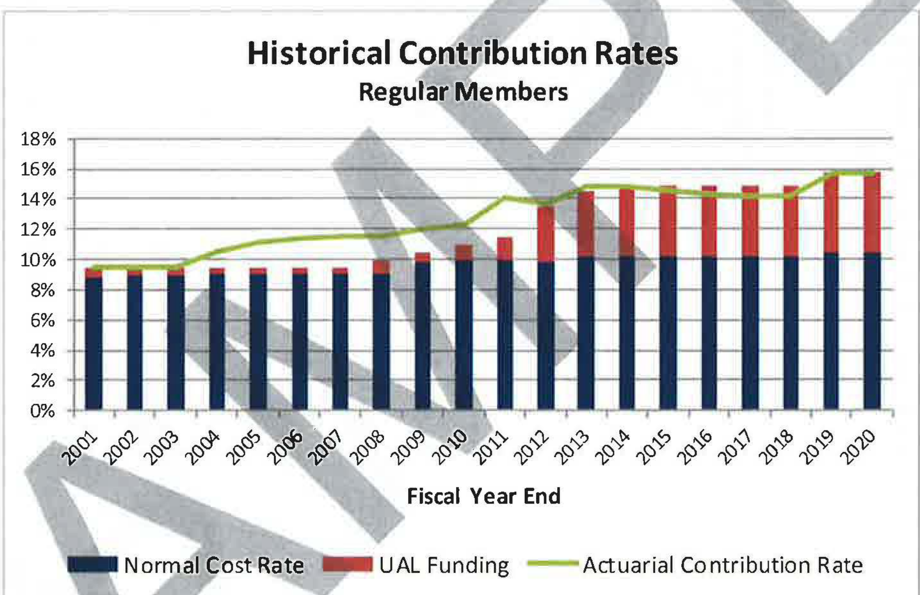
Under the actuarial funding method described in Appendix C, the actuarial contribution rate consists of two elements:

(1) the normal cost rate and
(2) the contribution rate to amortize the unfunded actuarial liability as a level percent of payroll.

The unfunded actuarial liability represents the difference between the portion of the present value of future benefits allocated to service credited prior to the valuation date by the actuarial cost method and the actuarial value of assets as of that date.

In 2006 and 2010, legislation was passed that increased the statutory contribution rate for Regular members. Beginning with the 2011 valuation (applicable for contributions for FY 2013), the Investment Board was given the authority to set the Required Contribution Rate for Regular members subject to certain statutory limitations. A historical summary of the actual contribution rate and the actuarial contribution rate is shown in the graph below:



Effective with the June 30, 2008 valuation, a transfer of assets is performed on June 30th for all split service members (those members with service in more than one membership group) whose membership group changed since the prior valuation. In addition, IPERS also transfers assets for certain split service members who have not changed groups since the last valuation. As a result, all assets and liabilities for each member reside in their current membership group. When members move between membership groups, an asset transfer for valuation purposes is made based on the funded ratio of their former group prior to the transfer. The asset transfer calculation is determined by multiplying the actuarial liability of the members transferring by the funded ratio of their former group just prior to the transfer. The asset values after the transfers and the liabilities for the members reside in their current membership group and are used to prepare the final valuation results.

EXHIBIT 10

ACTUARIAL BALANCE SHEET
as of June 30, 2018

	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
ASSETS				
Actuarial value of assets	$29,513,302,525	$682,505,577	$1,631,947,762	$31,827,755,864
Present value of future normal costs	6,999,875,655	206,426,455	508,770,220	7,715,072,330
Present value of future contributions to amortize unfunded actuarial liability	6,775,858,360	14,833,833	24,385,596	6,815,077,789
Total Net Assets	$43,289,036,540	$903,765,865	$2,165,103,578	$46,357,905,983
LIABILITIES				
Present Value of Future Benefits:				
Retired Members and Beneficiaries	$19,516,533,248	$341,195,487	$801,836,796	$20,659,565,531
Active Members	22,924,170,748	552,278,832	1,315,348,540	24,791,798,120
Inactive Members	848,332,544	10,291,546	47,918,242	906,542,332
Total Liabilities	$43,289,036,540	$903,765,865	$2,165,103,578	$46,357,905,983

EXHIBIT 11

PROJECTED UNFUNDED ACTUARIAL LIABILITY ON JUNE 30, 2019

	Regular Membership	Sheriffs & Deputies	Protection Occupation
1. FYE 2019 Required Contribution Rate	15.73%	19.52%	17.02%
2. Normal Cost Rate	10.49%	16.85%	15.22%
3. Contribution Rate Applied to Fund the UAL for FYE 2019 (1) - (2)	5.24%	2.67%	1.80%
4. Unfunded Actuarial Liability/(Surplus) on June 30, 2018	$ 6,775,858,360	$ 14,833,833	$ 24,385,596
5. Expected Payroll for FYE 2019	$ 7,815,927,502	$ 119,826,920	$ 366,478,767
6. Projected UAL on June 30, 2019 [(4) x 1.07] - [(3) x (5) x $1.07^{.5}$]	$ 6,826,521,872	$ 12,562,738	$ 19,268,993

EXHIBIT 12

UAL AMORTIZATION BASES
REGULAR MEMBERS

Amortization Bases	Original Amount	Remaining Payments	Projected July 1, 2019 Balance	Annual Payment*
2014 Initial UAL	$ 5,592,056,086	26	$ 5,959,084,968	$ 357,382,830
2015 Experience	(193,648,198)	17	(192,403,659)	(15,338,869)
2016 Experience	21,763,596	18	21,687,879	1,659,279
2017 Experience	(158,062,524)	19	(157,506,466)	(11,598,999)
2017 Assumption Changes	1,435,708,789	19	1,430,658,025	105,355,683
2018 Experience	(310,129,854)	20	(310,129,854)	(22,041,702)
2018 Assumption Changes	75,130,979	20	75,130,979	5,339,746
Total			**$ 6,826,521,872**	**$ 420,757,968**

* Payment amount reflects mid-year timing.

1. Total UAL Amortization Payments	$	420,757,968
2. Projected Payroll for FYE 2019	$	7,815,927,502
3. Projected Payroll for FYE 2020 (2) x 1.0325	$	8,069,945,146
4. UAL Amortization Payment Rate (1) / (3)		5.21%

Note: Based on the Actuarial Amortization Method, adopted by the Investment Board, annual net experience gains/losses are amortized over a new, closed 20-year period.

EXHIBIT 13

UAL AMORTIZATION BASES
SHERIFFS & DEPUTIES

Amortization Bases	Original Amount	Remaining Payments	Projected July 1, 2019 Balance	Annual Payment*
2014 Initial UAL	$ 27,848,921	26	$ 29,676,756	$ 1,779,797
2015 Experience	(6,576,758)	17	(6,534,491)	(520,945)
2016 Experience	(1,325,410)	18	(1,320,799)	(101,051)
2017 Experience	(1,155,794)	19	(1,151,728)	(84,815)
2017 Assumption Changes	29,533,033	19	29,429,137	2,167,203
2018 Experience	(8,393,018)	20	(8,393,018)	(596,513)
2018 Assumption Changes	(29,143,119)	20	(29,143,119)	(2,071,274)
Total			**$ 12,562,738**	**$ 572,402**

* Payment amount reflects mid-year timing.

1. Total UAL Amortization Payments	$	572,402
2. Projected Payroll for FYE 2019	$	119,826,920
3. Projected Payroll for FYE 2020 (2) x 1.0325	$	123,721,295
4. UAL Amortization Payment Rate (1) / (3)		0.46%

Note: Based on the Actuarial Amortization Method, adopted by the Investment Board, annual net experience gains/losses are amortized over a new, closed 20-year period.

EXHIBIT 14

UAL AMORTIZATION BASES
PROTECTION OCCUPATION

Amortization Bases	Original Amount	Remaining Payments	Projected July 1, 2019 Balance	Annual Payment*
2017 Initial UAL	$ 37,219,648	19	$ 37,088,711	$ 2,731,265
2018 Experience	(12,116,416)	20	(12,116,416)	(861,144)
2018 Assumption Changes	(5,703,302)	20	(5,703,302)	(405,348)
Total			**$ 19,268,993**	**$ 1,464,773**

* Payment amount reflects mid-year timing.

1. Total UAL Amortization Payments	$	1,464,773
2. Projected Payroll for FYE 2019	$	366,478,767
3. Projected Payroll for FYE 2020 (2) x 1.0325	$	378,389,327
4. UAL Amortization Payment Rate (1) / (3)		0.39%

Note: Based on the Actuarial Amortization Method, adopted by the Investment Board, annual net experience gains/losses are amortized over a new, closed 20-year period.

EXHIBIT 15

ANALYSIS OF CONTRIBUTION RATE

The actuarial cost method used to determine the required level of annual contributions by the employees and the employers to support the expected benefits is the Entry Age Normal Cost Method. Under this method, the total cost is comprised of the normal cost rate and the unfunded actuarial liability payment. The payment to amortize the unfunded actuarial liability is determined as a level percentage of payroll, based on the Actuarial Amortization Method, adopted by the Investment Board. This method was revised by the Investment Board in September 2013 (see Appendix C). The contribution rate developed in this exhibit is based on the Funding Policy and the June 30, 2018 actuarial valuation and applies to the fiscal year beginning July 1, 2019 and ending June 30, 2020.

	Regular Membership	Sheriffs & Deputies	Protection Occupation
1. Normal Cost Rate	10.49%	16.85%	15.22%
2. UAL Contribution Rate for FY 2020	5.21%	0.46%	0.39%
3. Funded Ratio as of June 30, 2018	81.3%	97.9%	98.5%
Funded Ratio as of June 30, 2017	80.4%	93.0%	97.8%
Funded Ratio as of June 30, 2016	82.9%	96.4%	100.9%
4. UAL Contribution Rate Applicable for FY 2020** (2) if positive	5.21%	0.46%	0.39%
5. Actuarial Contribution Rate for FY 2020 (1) + (4)	15.70%	17.31%	15.61%
6. Required Contribution Rate for FY 2019	15.73%	19.52%	17.02%
7. Required Contribution Rate for FY 2020*	15.73%	19.02%	16.52%
Employer Contribution Rate	9.44%	9.51%	9.91%
Employee Contribution Rate	6.29%	9.51%	6.61%

* The Required Contribution Rate is the Actuarial Contribution Rate, but not more than 1% greater than the prior year's Required Contribution Rate for Regular Members, nor lower than the prior year's Required Contribution Rate unless the difference is at least 0.50% and the funded ratio is at least 95%, in which case the Required Contribution Rate is the prior year's Required Contribution Rate less 0.50% for all groups.

** The UAL Contribution Rate is allowed to be negative only if the funded ratio was at least 110% in each of the past three years.

EXHIBIT 16

UNFUNDED ACTUARIAL LIABILITY AMORTIZATION SCHEDULE
REGULAR MEMBERS

This schedule illustrates the funding of the UAL over the remaining amortization period assuming all assumptions are met in the future (no experience gains or losses).

Fiscal Year Ending June 30	Projected Active Member Payroll	Unfunded Actuarial Liability (BOY)	Annual Contributions	
			Dollars	% of Payroll
	--------------	$ in millions	---------------	
2020	8,070	6,827	421	5.21
2021	8,332	6,869	434	5.21
2022	8,603	6,901	449	5.21
2023	8,883	6,920	463	5.21
2024	9,171	6,925	478	5.21
2025	9,469	6,915	494	5.21
2026	9,777	6,888	510	5.21
2027	10,095	6,843	526	5.21
2028	10,423	6,778	543	5.21
2029	10,762	6,690	561	5.21
2030	11,111	6,578	579	5.21
2031	11,473	6,439	598	5.21
2032	11,845	6,271	618	5.21
2033	12,230	6,071	638	5.21
2034	12,628	5,837	658	5.21
2035	13,038	5,564	680	5.21
2036	13,462	5,251	702	5.21
2037	13,900	4,892	751	5.40
2038	14,351	4,458	773	5.38
2039	14,818	3,970	626	4.22
2040	15,299	3,601	678	4.43
2041	15,797	3,153	700	4.43
2042	16,310	2,650	722	4.43
2043	16,840	2,088	746	4.43
2044	17,387	1,463	770	4.43
2045	17,952	769	795	4.43
2046	18,536	0	0	0.00

SECTION V

HISTORICAL FUNDING AND OTHER INFORMATION

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In this section, we provide some historical information regarding the funding progress of the System. These exhibits retain some of the information that used to be required for accounting purposes and are included because they provide relevant information on the System's historical funding.

EXHIBIT 17

SUMMARY OF VALUATION MEMBERSHIP

	June 30, 2018	June 30, 2017
Active Employees:		
Vested	98,237	98,675
Not yet vested	72,139	71,234
Total active employees	170,376	169,909
Retirees and beneficiaries currently receiving benefits*	120,755	117,508
Inactive vested members entitled to benefits but not yet receiving them	25,693	25,984
Inactive, nonvested members entitled to a refund of contributions**	44,330	41,971

* Retired/reemployed members are included in retiree counts, but not the active or inactive counts. Counts are 10,601 for 2018 and 10,787 for 2017.

** Includes deceased vested inactive members with employee contributions still held by the System.

EXHIBIT 18

SCHEDULE OF FUNDING PROGRESS

Actuarial Valuation Date	Net Actuarial Value of Assets (a)	Actuarial Liability (AL) (b)	Unfunded AL (UAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (P/R) (c)	UAL as a Percentage of Covered P/R [(b-a)/c]
6/30/03	$16,120,476,011	$17,987,374,960	1,866,898,949	89.62%	$4,881,100,238	38.25%
6/30/04	16,951,942,539	19,128,410,606	2,176,468,067	88.62%	5,072,027,906	42.91%
6/30/05	17,951,490,071	20,240,098,667	2,288,608,596	88.69%	5,236,860,886	43.70%
6/30/06	19,144,036,519	21,651,122,419	2,507,085,900	88.42%	5,523,863,321	45.39%
6/30/07	20,759,628,415	23,026,113,782	2,266,485,367	90.16%	5,781,706,199	39.20%
6/30/08	21,857,423,183	24,522,216,589	2,664,793,406	89.13%	6,131,445,367	43.46%
6/30/09	21,123,979,941	26,018,593,823	4,894,613,882	81.19%	6,438,643,124	76.02%
6/30/10	21,537,458,560	26,468,419,650	4,930,961,090	81.37%	6,571,182,005	75.04%
6/30/11	22,575,309,199	28,257,080,114	5,681,770,915	79.89%	6,574,872,719	86.42%
6/30/12	23,530,094,461	29,446,197,486	5,916,103,025	79.91%	6,786,158,720	87.18%
6/30/13	24,711,096,187	30,498,342,320	5,787,246,133	81.02%	6,880,131,134	84.12%
6/30/14	26,460,428,085	32,004,456,088	5,544,028,003	82.68%	7,099,277,280	78.09%
6/30/15	27,915,379,103	33,370,318,731	5,454,939,628	83.65%	7,326,348,141	74.46%
6/30/16	29,033,696,587	34,619,749,147	5,586,052,560	83.86%	7,556,515,720	73.92%
6/30/17	30,472,423,914	37,440,382,029	6,967,958,115	81.39%	7,863,160,443	88.62%
6/30/18	31,827,755,864	38,642,833,653	6,815,077,789	82.36%	7,983,219,527	85.37%

Note: Includes all three membership groups.

EXHIBIT 19

SCHEDULE OF EMPLOYER CONTRIBUTIONS

The Employer Actuarial Contribution Rate (ACR) is determined as a rate of pay as part of the annual valuation. The dollar amounts displayed in this table are based on analysis by IPERS each year to consider the actual contributions received (using the actual contribution rate in effect) and then determining what the ACR amount would have been on the same payroll.

	Actuarial Contribution Rate (ACR)				Percentage of ACR Contributed			
Fiscal Year Ending	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
6/30/03	$270,363,338	$5,670,239	$13,738,478	$289,772,054	99.2%	100.0%	100.0%	99.2%
6/30/04	309,006,609	5,489,797	14,263,836	328,760,242	90.3%	100.0%	100.0%	90.9%
6/30/05	341,552,685	6,236,611	15,391,729	363,181,025	84.7%	100.0%	100.0%	85.6%
6/30/06	364,424,911	6,228,675	16,888,833	387,542,419	82.7%	100.0%	100.0%	83.8%
6/30/07	387,578,925	6,577,652	17,723,013	411,879,590	82.2%	100.0%	100.0%	83.3%
6/30/08	408,882,080	6,301,171	17,644,966	432,828,217	96.4%	100.0%	100.0%	87.2%
6/30/09	441,951,764	6,365,911	24,736,688	473,054,363	86.9%	100.0%	100.0%	87.8%
6/30/10	467,839,274	6,725,778	27,328,184	501,893,236	88.7%	100.0%	100.0%	89.5%
6/30/11	530,692,453	7,994,058	29,711,050	568,397,561	81.1%	100.0%	100.0%	82.3%
6/30/12	528,525,785	8,999,273	30,864,449	568,389,507	98.1%	100.0%	100.0%	98.2%
6/30/13	573,480,969	9,246,766	32,118,873	614,846,608	97.8%	100.0%	100.0%	98.0%
6/30/14	596,983,323	9,583,512	32,434,713	639,001,548	100.0%	100.0%	100.0%	100.0%
6/30/15	602,423,393	9,588,844	32,548,775	644,561,012	102.1%	102.4%	101.7%	101.9%
6/30/16	618,051,508	9,427,481	32,612,466	660,091,455	103.7%	110.4%	102.2%	103.7%
6/30/17	628,387,062	9,507,927	33,623,646	671,518,635	105.0%	110.1%	102.4%	105.0%
6/30/18	641,386,156	9,753,998	33,724,988	684,865,142	104.7%	108.3%	102.6%	104.7%

EXHIBIT 20

EXPECTED BENEFIT PAYMENTS

The following table shows the expected benefit payments to be made over the next 20 years. These payments include those expected to be made to current retirees and beneficiaries, current active members, and current deferred vested members (included in the active values) if all actuarial assumptions are met in future years. The benefits reflected include expected refunds and death benefits as well as retirement benefit payments.

These payouts do not include any current non-vested inactive members, any future members, or any FED payments.

Fiscal Year End	Actives at 6/30/18	Retirees at 6/30/18	Total
2019	$166,744,000	$2,053,503,000	$2,220,247,000
2020	306,494,000	2,019,709,000	2,326,203,000
2021	445,948,000	1,983,652,000	2,429,600,000
2022	583,684,000	1,946,054,000	2,529,738,000
2023	720,328,000	1,906,355,000	2,626,683,000
2024	855,253,000	1,864,726,000	2,719,979,000
2025	989,084,000	1,820,811,000	2,809,895,000
2026	1,127,198,000	1,775,009,000	2,902,207,000
2027	1,266,610,000	1,727,083,000	2,993,693,000
2028	1,405,774,000	1,676,793,000	3,082,567,000
2029	1,545,816,000	1,624,752,000	3,170,568,000
2030	1,686,469,000	1,571,083,000	3,257,552,000
2031	1,827,304,000	1,515,367,000	3,342,671,000
2032	1,968,139,000	1,457,680,000	3,425,819,000
2033	2,111,524,000	1,398,082,000	3,509,606,000
2034	2,255,042,000	1,336,675,000	3,591,717,000
2035	2,397,728,000	1,273,578,000	3,671,306,000
2036	2,538,459,000	1,208,943,000	3,747,402,000
2037	2,681,193,000	1,142,957,000	3,824,150,000
2038	2,824,227,000	1,075,855,000	3,900,082,000

Note: Cash flows are the expected future non-discounted payments to current members. These numbers exclude refund payouts to current non-vested inactives and assume future retirees elect the normal form of annuity payment (Option 2) and future withdrawals elect refunds according to valuation assumptions. All three membership groups are included.

RISK CONSIDERATIONS

While actuarial assumptions allow for a projection of how future contributions and investment returns will meet the cash flow needs for future benefit payments, actual experience will not unfold exactly as anticipated by the assumptions. In this section, we discuss some of the risk factors that can have a significant impact – good or bad – on the actuarial projection of liability and contribution rates.

There are a number of risks inherent in the funding of a defined benefit plan. These include:

- economic risks, such as investment return and inflation;
- demographic risks such as mortality, payroll growth, aging population including impact of baby boomers, and retirement ages; and
- external risks such as the regulatory and political environment.

The most significant risk factor is investment return because of the volatility of returns and the size of plan assets compared to payroll (see Exhibit 20). A perusal of historical rates over 10-20 years reveals that the actual return each year is rarely close to the average return for the same period. This is an expected result given the underlying capital market assumptions and the asset allocation.

A key demographic risk for all retirement systems, including IPERS, is improvements in mortality (longevity) greater than anticipated. While the actuarial assumptions reflect small, continuous improvements in mortality experience and these assumptions are refined every experience study, the risk arises because there is a possibility of some sudden shift, perhaps from a significant medical breakthrough that could quickly increase liabilities, Likewise, there is some possibility of a significant public health crisis that could result in a significant number of additional deaths in a short time period, would also be significant, although more easily absorbed.

Finally, the projections for funding anticipate a stable employment level, i.e., active member count remains the same. A significant change in the employment level of governmental employees, perhaps resulting from a sustained decline in the Iowa population over time, could have an adverse impact on the System's funding status.

As a plan matures and the funded status changes, the risk factors may change. The following three exhibits summarize some historical information that helps indicate how certain key risk metrics have changed over time.

EXHIBIT 21

HISTORICAL LEVERAGE RATIO

As a retirement system matures, the size of the market value of assets increases relative to the covered payroll of active members, on which the System is funded. The size of the plan assets relative to covered payroll, sometimes referred to as a leverage ratio, is an important indicator of the contribution risk for the System. The higher this ratio, the more sensitive a plan's contribution rate is to investment return volatility.

	Market Value of Assets ($ Millions)			Covered Payroll ($ Millions)			Leverage Ratio		
Fiscal Year End	Regular Members	Sheriffs & Deputies	Protection Occupation	Regular Members	Sheriffs & Deputies	Protection Occupation	Regular Members	Sheriffs & Deputies	Protection Occupation
6/30/09	$16,592.7	$312.5	$698.1	$6,059.4	$85.9	$293.3	2.74	3.64	2.38
6/30/10	18,375.9	353.3	809.7	6,180.7	84.8	305.7	2.97	4.17	2.65
6/30/11	21,365.7	422.9	983.8	6,185.9	90.5	298.5	3.45	4.67	3.30
6/30/12	21,567.5	437.4	1,019.9	6,377.4	93.3	315.5	3.38	4.69	3.23
6/30/13	23,137.3	484.5	1,134.8	6,473.8	93.6	312.7	3.57	5.18	3.63
6/30/14	26,157.8	559.3	1,321.5	6,679.7	97.7	321.9	3.92	5.72	4.11
6/30/15	26,480.4	578.3	1,371.1	6,893.3	100.5	332.6	3.84	5.76	4.12
6/30/16	26,341.4	588.1	1,396.9	7,114.9	105.9	335.8	3.70	5.56	4.16
6/30/17	28,575.3	649.7	1,554.2	7,405.5	109.5	348.2	3.86	5.93	4.46
6/30/18	29,962.9	693.6	1,658.1	7,515.6	115.2	352.4	3.99	6.02	4.71

EXHIBIT 21

HISTORICAL LEVERAGE RATIO
(continued)

	Leverage Ratio			Increase in ACR with a Return 10% Lower than Assumed		
Fiscal Year End	Regular Members	Sheriffs & Deputies	Protection Occupation	Regular Members	Sheriffs & Deputies	Protection Occupation
6/30/09	2.74	3.64	2.38	1.47%	1.95%	1.28%
6/30/10	2.97	4.17	2.65	1.59%	2.24%	1.42%
6/30/11	3.45	4.67	3.30	1.85%	2.50%	1.77%
6/30/12	3.38	4.69	3.23	1.81%	2.51%	1.73%
6/30/13	3.57	5.18	3.63	1.91%	2.78%	1.95%
6/30/14	3.92	5.72	4.11	2.10%	3.07%	2.20%
6/30/15	3.84	5.76	4.12	2.68%	4.02%	2.21%
6/30/16	3.70	5.56	4.16	2.58%	3.88%	2.23%
6/30/17	3.86	5.93	4.46	2.74%	4.21%	3.17%
6/30/18	3.99	6.02	4.71	2.84%	4.28%	3.35%

Note: The impact of asset smoothing is not reflected in the impact on the ACR.

EXHIBIT 22

HISTORICAL CASH FLOWS

Plans with negative cash flows will experience increased sensitivity to investment return volatility. Cash flows, for this purpose, are measured as contributions less benefit payments and expenses. If the System has negative cash flows and then experiences returns below the assumed rate, there are fewer assets to be reinvested to earn the higher returns that typically follow. While any negative cash flow will produce such a result, it is typically a negative cash flow of more than 5% of MVA that causes significant concerns. While this is not a concern for IPERS at this time, it is important to monitor this metric so that any trends can be identified.

Fiscal Year End	Market Value of Assets (MVA)	Contributions	Benefit Payments and Expenses	Net Cash Flow	Net Cash Flow as a Percent of MVA
6/30/07	$22,624,387,015	$574,604,219	$1,066,549,966	($491,945,747)	(2.17%)
6/30/08	21,844,112,206	634,189,547	1,120,978,091	(486,788,544)	(2.23%)
6/30/09	17,603,316,618	695,559,397	1,191,706,184	(496,146,787)	(2.82%)
6/30/10	19,538,971,423	755,210,092	1,283,181,315	(527,971,223)	(2.70%)
6/30/11	22,772,344,651	789,353,899	1,460,600,613	(671,246,714)	(2.95%)
6/30/12	23,024,773,746	942,394,013	1,554,642,740	(612,248,727)	(2.66%)
6/30/13	24,756,663,715	1,019,108,941	1,661,824,635	(642,715,694)	(2.60%)
6/30/14	28,038,549,893	1,082,521,228	1,768,869,433	(686,348,205)	(2.45%)
6/30/15	28,429,834,829	1,115,600,029	1,882,337,766	(766,737,737)	(2.70%)
6/30/16	28,326,433,656	1,176,666,912	1,965,566,274	(788,899,362)	(2.79%)
6/30/17	30,779,116,326	1,182,392,100	2,077,514,238	(895,122,138)	(2.91%)
6/30/18	32,314,588,595	1,202,788,183	2,194,788,155	(991,999,972)	(3.07%)

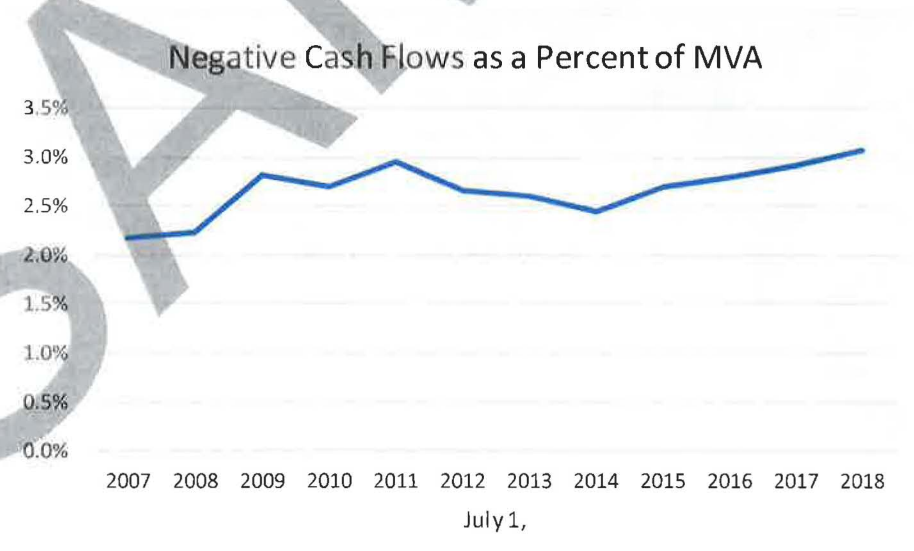

EXHIBIT 23

LIABILITY MATURITY MEASUREMENTS

Most public sector retirement systems have been in operation for many years. As a result, they have aging plan populations indicated by an increasing ratio of retirees to active members and a growing percentage of retiree liability. The retirement of the baby boomers over the next 10-15 years is expected to further exacerbate the aging of the retirement system population. With more of the total liability residing with retirees, investment volatility has a greater impact on the funding of the system since it is more difficult to restore the system financially after losses occur when there is comparatively less payroll over which to spread costs.

The retirement system is also growing larger with respect to the sponsoring entities, as can be seen by the ratio of actuarial liability to payroll.

Projections provide the most effective way of analyzing the impact of these changes on future funding measures, but studying several key metrics from the valuation can also provide some valuable insight.

Regular Members

Fiscal Year End	Retiree Liability (a)	Total Actuarial Liability (b)	Retiree Percentage (a) / (b)	Covered Payroll (c)	Ratio (b) / (c)
6/30/07	$8,941,802,561	$22,023,863,090	40.6%	$5,510,430,731	4.00
6/30/08	9,611,150,768	23,332,771,315	41.2%	5,763,634,079	4.05
6/30/09	10,238,166,793	24,733,483,621	41.4%	6,059,370,512	4.08
6/30/10	11,293,531,095	25,080,605,814	45.0%	6,180,689,916	4.06
6/30/11	12,698,425,109	26,752,154,635	47.5%	6,185,889,267	4.32
6/30/12	13,573,602,957	27,852,385,453	48.7%	6,377,421,205	4.37
6/30/13	14,329,968,181	28,799,324,938	49.8%	6,473,818,092	4.45
6/30/14	15,230,657,798	30,204,846,287	50.4%	6,679,683,181	4.52
6/30/15	16,028,939,271	31,451,851,955	51.0%	6,893,254,991	4.56
6/30/16	16,768,695,428	32,577,657,593	51.5%	7,114,861,564	4.58
6/30/17	18,304,044,337	35,176,950,577	52.0%	7,405,484,923	4.75
6/30/18	19,516,533,248	36,289,160,885	53.8%	7,515,600,156	4.83

EXHIBIT 23
(continued)

Sheriffs & Deputies

Fiscal Year End	Retiree Liability (a)	Total Actuarial Liability (b)	Retiree Percentage (a) / (b)	Covered Payroll (c)	Ratio (b) / (c)
6/30/07	$105,514,847	$345,220,872	30.6%	$78,112,455	4.42
6/30/08	119,881,091	374,066,361	32.0%	81,485,774	4.59
6/30/09	150,926,387	412,167,101	36.6%	85,935,900	4.80
6/30/10	169,436,571	447,627,643	37.9%	84,755,693	5.28
6/30/11	185,018,412	475,559,019	38.9%	90,506,138	5.25
6/30/12	195,188,608	502,716,830	38.8%	93,265,452	5.39
6/30/13	223,706,198	533,033,438	42.0%	93,607,893	5.69
6/30/14	240,964,615	556,135,092	43.3%	97,693,639	5.69
6/30/15	266,693,628	591,002,036	45.1%	100,469,418	5.88
6/30/16	281,179,979	624,791,635	45.0%	105,868,170	5.90
6/30/17	325,186,602	691,205,752	47.0%	109,516,368	6.31
6/30/18	341,195,487	697,339,410	48.9%	115,222,566	6.05

Protection Occupation

Fiscal Year End	Retiree Liability (a)	Total Actuarial Liability (b)	Retiree Percentage (a) / (b)	Covered Payroll (c)	Ratio (b) / (c)
6/30/07	$169,925,365	$657,029,820	25.9%	193,163,013	3.40
6/30/08	191,726,385	815,378,913	23.5%	286,325,514	2.85
6/30/09	234,387,583	872,943,101	26.9%	293,336,712	2.98
6/30/10	306,902,663	940,186,193	32.6%	305,736,396	3.08
6/30/11	368,833,144	1,029,366,460	35.8%	298,477,314	3.45
6/30/12	383,175,993	1,091,095,203	35.1%	315,472,063	3.46
6/30/13	446,902,048	1,165,983,944	38.3%	312,705,149	3.73
6/30/14	503,104,371	1,243,474,709	40.5%	321,900,460	3.86
6/30/15	547,545,074	1,327,464,740	41.2%	332,623,732	3.99
6/30/16	607,529,406	1,417,299,919	42.9%	335,785,986	4.22
6/30/17	705,541,965	1,572,225,700	44.9%	348,159,152	4.52
6/30/18	801,836,796	1,656,333,358	48.4%	352,396,805	4.70

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APPENDIX A

SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

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APPENDIX A

SUMMARY STATISTICS ON SYSTEM MEMBERSHIP

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RECONCILIATION OF ACTIVE MEMBERS

Below is a summary of the changes in active members (excluding retired re-employed members) between June 30, 2017 and June 30, 2018.

	Regular Membership	Sheriffs & Deputies	Protection Occupation	Total
6/30/2017 Starting count	161,315	1,594	7,000	169,909
New actives	16,054	60	726	16,840
Returning actives	2,623	3	55	2,681
Nonvested Terminations	(7,237)	(14)	(172)	(7,423)
Elected Refund	(3,166)	(20)	(170)	(3,356)
Vested Terminations	(2,707)	(16)	(179)	(2,902)
Total Withdrawals	(13,110)	(50)	(521)	(13,681)
Deaths	(185)	0	(2)	(187)
Disability Retirements	(71)	(1)	(10)	(82)
AE Benefits	(226)	0	(1)	(227)
Service Retirements	(4,625)	(30)	(218)	(4,873)
Total Retirements	(4,922)	(31)	(229)	(5,182)
Other/transfer	(70)	62	4	(4)
6/30/2018 Ending count	161,705	1,638	7,033	170,376

HISTORICAL SUMMARY OF MEMBERS

The following table displays selected historical data (including Regular, Sheriffs and Deputies, and Protection Occupation groups) as available.

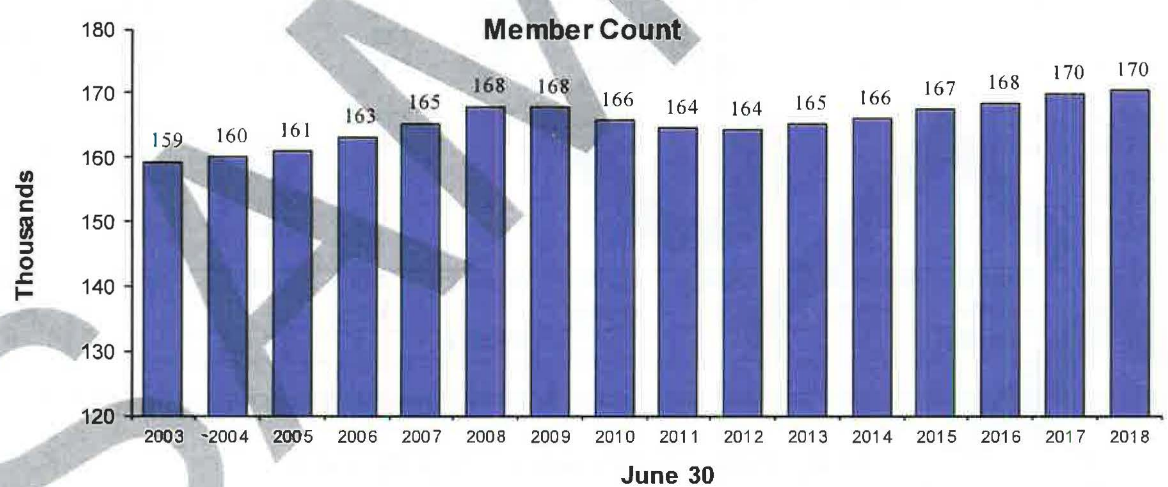
Valuation Date June 30	Total Count	Number	Average					Number			Active/Retired Ratio
			Age	Entry Age	Service	Annual Pay ($)	% Change	Retired Reemployed	Inactive Vested	Retired	
1994	216,989	141,423	44.2			22,968	1.6%			54,295	2.60
1995	216,973	144,912	44.1			23,322	1.5%			56,353	2.57
1996	221,891	147,431	44.2			25,218	8.1%			57,914	2.55
1997	224,357	147,736	44.6	33.1	11.5	26,031	3.2%		28,377	59,320	2.49
1998	241,767	148,917	44.7	33.2	11.5	26,767	2.8%		31,202	61,648	2.42
1999	250,168	152,440	44.8	33.4	11.4	27,322	2.1%	4,853	34,332	63,396	2.40
2000	249,970	153,039	44.8	33.2	11.6	29,032	6.3%	5,050	31,219	65,712	2.33
2001	255,963	154,610	45.0	33.5	11.5	30,341	4.5%	4,886	32,650	68,703	2.25
2002	264,974	158,467	45.1	33.8	11.3	32,119	5.9%	5,387	34,792	71,715	2.21
2003	268,813	159,310	45.2	33.8	11.4	31,950	-0.5%	6,126	35,375	74,128	2.15
2004	272,573	160,003	45.4	33.8	11.6	33,082	3.5%	6,438	35,788	76,782	2.08
2005	267,214	160,876	45.6	33.8	11.8	34,066	3.0%	6,592	26,919	79,419	2.03
2006	271,007	163,052	45.7	34.0	11.7	35,475	4.1%	8,044	25,918	82,037	1.99
2007	276,421	165,216	45.7	34.0	11.7	36,615	3.2%	7,848	26,435	84,770	1.95
2008	282,778	167,823	45.7	34.1	11.6	38,515	5.2%	8,523	27,626	87,309	1.92
2009	294,076	167,691	46.0	34.2	11.8	40,326	4.7%	8,427	28,240	89,718	1.87
2010	287,611	165,626	46.0	34.1	11.9	40,635	0.8%	8,347	28,472	93,513	1.77
2011	291,825	164,436	45.8	34.1	11.7	40,782	0.4%	8,321	29,077	98,312	1.67
2012	294,996	164,200	45.8	34.2	11.6	42,223	3.5%	8,265	29,119	101,677	1.61
2013	299,793	165,095	45.7	34.1	11.6	42,404	0.4%	9,925	28,443	104,640	1.58
2014	302,558	165,911	45.7	34.1	11.6	44,225	4.3%	9,931	28,713	107,934	1.54
2015	306,154	167,368	45.6	34.1	11.5	45,247	2.3%	10,295	27,659	111,127	1.51
2016	309,572	168,372	45.5	34.0	11.5	46,399	2.5%	10,608	26,960	114,240	1.47
2017	313,401	169,909	45.4	34.1	11.3	47,425	2.2%	10,787	25,984	117,508	1.45
2018	316,824	170,376	45.3	34.0	11.3	47,989	1.2%	10,601	25,693	120,755	1.41

Note: The Total Count figure represents the number of members valued in this report. The Retired Reemployed figure represents the number of members who have both an in-pay record and a not-in-pay record.

SUMMARY OF ACTIVE MEMBERS

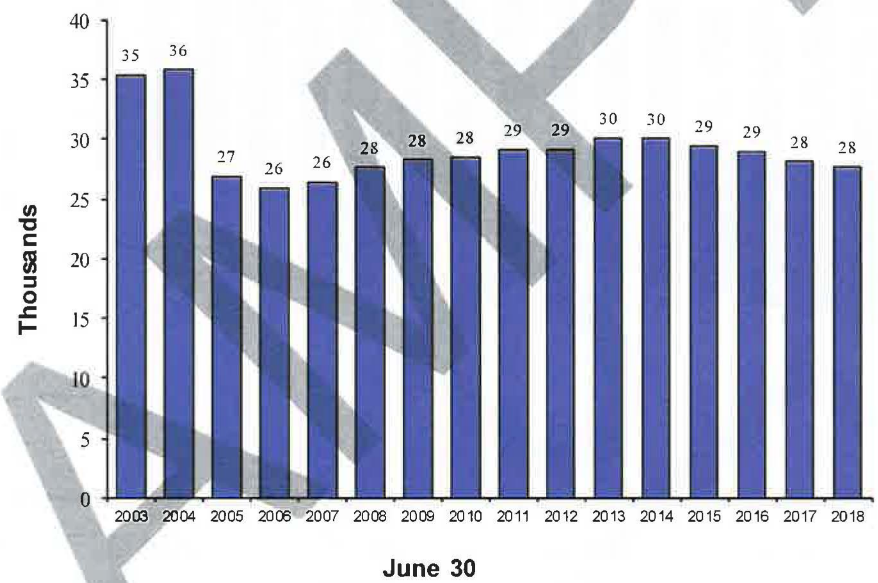
	Regular Membership	Sheriffs & Deputies	Protection Occupations	Total 6/30/2018	Total 6/30/2017	Percent Change
Total Active Members	161,705	1,638	7,033	170,376	169,909	0.3
Projected Covered Payroll* (millions)	$7,695	$118	$364	$8,176	$8,058	1.5
Average Age	45.5	41.0	41.4	45.3	45.4	(0.2)
Average Entry Age	34.2	26.5	30.5	34.0	34.1	(0.3)
Average Earnings	$47,586	$71,807	$51,712	$47,989	$47,425	1.2
Retired Reemployed	8,342	115	182	8,639	8,673	(0.4)

*Payroll figures as of June 30 are actual amounts paid during the prior fiscal year, increased by the assumed salary increase factor for the upcoming fiscal year.



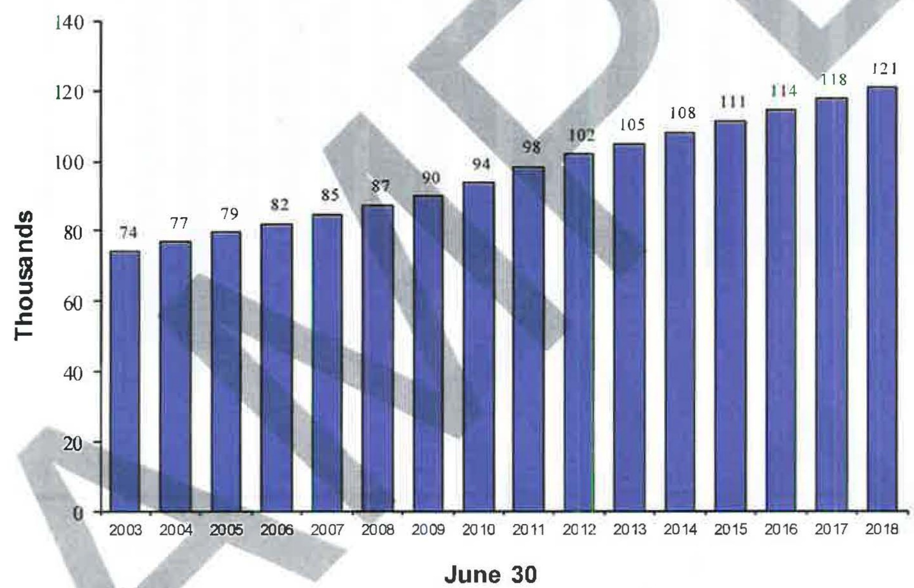
SUMMARY OF INACTIVE VESTED MEMBERS

	Regular Membership	Sheriffs & Deputies	Protection Occupations	Total 6/30/2018	Total 6/30/2017	Percent Change
Inactive Vested	24,648	104	941	25,693	25,984	(1.1%)
Inactive Retired Reemployed	1,898	19	45	1,962	2,114	(7.2%)
Total Inactive Vested	26,546	123	986	27,655	28,098	(1.6%)



SUMMARY OF RETIRED MEMBERS AND BENEFICIARIES

Regular Membership	Sheriffs & Deputies	Protection Occupations	Total 6/30/2018	Total 6/30/2017	Percent Change
116,782	988	2,985	120,755	117,508	2.8%



AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2018 FOR ACTIVE MEMBERS*

Males and Females - Regular Membership

Years of Service

	0 to 5		5 to 10		10 to 15		15 to 20		20 to 25		25 to 30		30 to 35		35 to 40		40 and over		Total	
Age	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary
Under 25	6,905	18,829	65	25,437	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	6,970	18,891
25-29	11,188	33,130	3,012	43,172	52	37,992	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	14,252	35,270
30-34	7,390	34,361	6,859	48,694	2,211	54,216	29	45,772	0	NA	0	NA	0	NA	0	NA	0	NA	16,489	43,005
35-39	6,762	33,831	4,540	48,204	5,888	59,198	1,799	61,999	17	51,834	0	NA	0	NA	0	NA	0	NA	19,006	47,805
40-44	5,680	32,091	3,895	44,417	3,575	55,766	4,522	65,616	1,221	69,065	8	57,884	0	NA	0	NA	0	NA	18,901	49,529
45-49	4,651	31,646	3,537	42,285	3,464	51,382	3,098	61,196	3,960	70,086	965	70,685	17	62,836	1	77,597	0	NA	19,693	51,349
50-54	3,873	31,129	2,885	38,340	3,298	45,583	3,217	52,514	2,754	62,796	3,074	72,059	1,046	72,527	39	63,286	0	NA	20,186	50,690
55-59	3,936	28,739	2,697	37,843	2,894	42,575	3,400	46,455	3,160	52,700	2,486	62,590	2,522	71,883	928	68,421	67	60,562	22,090	48,316
60-64	4,016	21,067	2,408	33,653	2,087	41,208	2,326	45,720	2,311	49,994	1,788	55,399	1,157	64,194	987	70,725	529	64,810	17,609	42,645
65-69	3,270	13,599	1,834	22,145	983	31,883	748	41,177	582	44,920	455	49,881	309	58,096	174	64,960	291	74,128	8,646	28,555
70 & over	3,321	16,594	1,641	14,855	805	13,453	277	17,151	83	24,889	33	36,442	17	44,717	8	64,357	20	48,493	6,205	16,209
Totals	60,992	28,376	33,373	40,925	25,257	49,470	19,416	55,003	14,088	60,049	8,809	64,563	5,068	69,299	2,137	69,099	907	67,126	170,047	43,449

*Including retired/reemployed members

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2018 FOR ACTIVE MEMBERS*

Males and Females - Sheriffs and Deputies

Years of Service

	0 to 5		5 to 10		10 to 15		15 to 20		20 to 25		25 to 30		30 to 35		35 to 40		40 and over		Total	
Age	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary
Under 25	40	46,150	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	40	46,150
25-29	128	55,137	74	63,010	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	202	58,021
30-34	67	55,456	118	63,808	71	66,891	2	55,548	0	NA	0	NA	0	NA	0	NA	0	NA	258	62,423
35-39	34	58,632	42	67,297	129	70,048	59	70,044	1	100,320	0	NA	0	NA	0	NA	0	NA	265	68,261
40-44	17	51,664	31	64,737	42	70,794	120	73,525	48	76,463	1	57,276	0	NA	0	NA	0	NA	259	71,077
45-49	13	56,326	11	66,467	32	67,832	58	72,624	102	74,507	34	80,247	1	59,709	0	NA	0	NA	251	72,645
50-54	17	22,674	12	64,855	13	68,817	26	71,966	54	73,180	70	78,974	18	74,918	1	81,897	0	NA	211	70,331
55-59	22	17,659	6	54,507	3	39,786	13	74,703	24	72,405	19	84,129	29	80,305	5	115,607	0	NA	121	66,522
60-64	21	13,939	14	27,679	2	63,381	12	65,030	1	50,669	10	83,373	14	71,759	11	73,565	14	84,203	99	55,196
65-69	13	13,597	7	11,667	6	15,619	0	NA	0	NA	1	102,928	0	NA	2	78,906	1	81,008	30	23,130
70 & over	5	8,830	4	20,605	6	41,936	2	19,915	0	NA	0	NA	0	NA	0	NA	0	NA	17	24,589
Totals	377	46,447	319	60,857	304	67,156	292	71,717	230	74,393	135	80,363	62	76,479	19	85,630	15	83,990	1,753	64,957

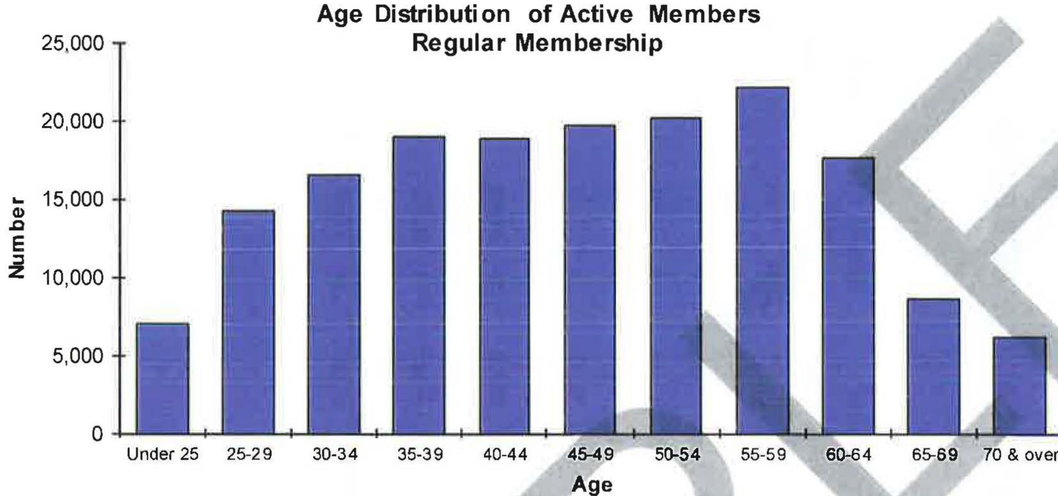
*Including retired/reemployed members

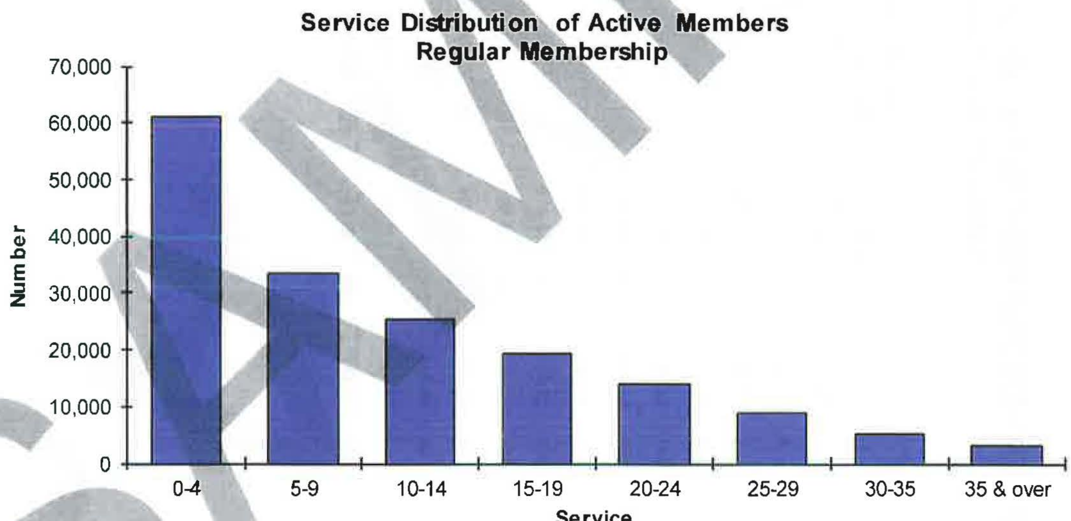
AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2018 FOR ACTIVE MEMBERS*

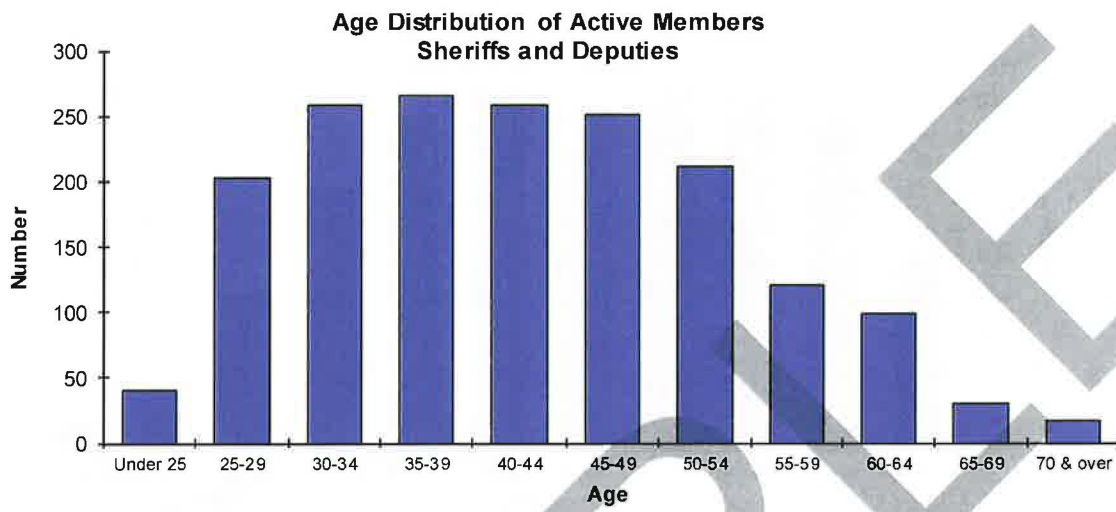
Males and Females - Protection Occupation

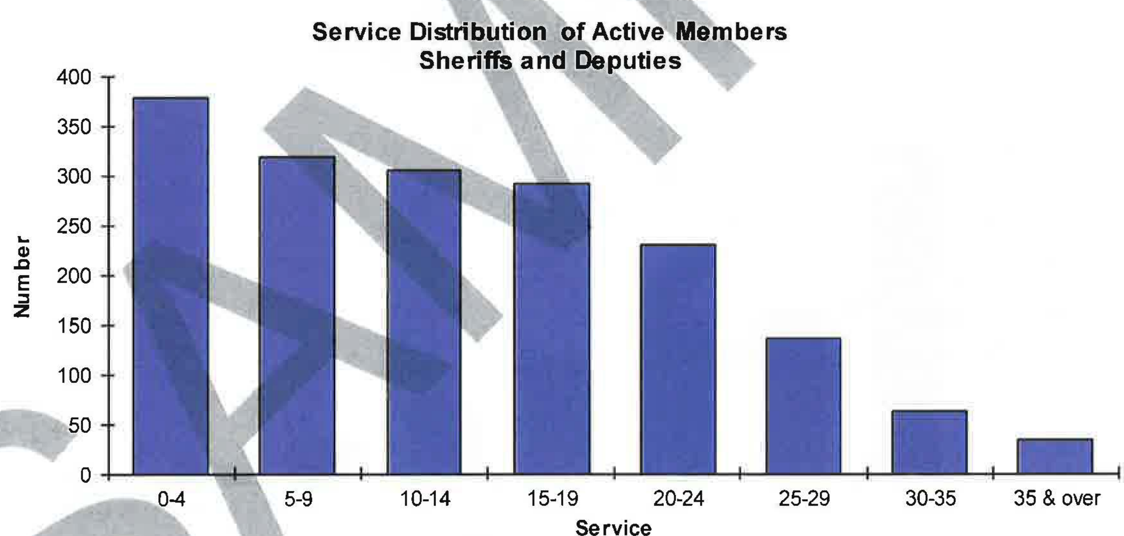
	Years of Service																			
	0 to 5		5 to 10		10 to 15		15 to 20		20 to 25		25 to 30		30 to 35		35 to 40		40 and over		Total	
Age	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary	No.	Avg. Salary
Under 25	505	28,860	10	38,471	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	515	29,047
25-29	707	37,215	157	46,470	9	58,925	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	873	39,103
30-34	401	37,340	351	50,724	162	56,505	2	46,714	0	NA	0	NA	0	NA	0	NA	0	NA	916	45,879
35-39	263	33,811	230	49,851	347	58,551	108	60,525	1	68,162	0	NA	0	NA	0	NA	0	NA	949	49,821
40-44	208	35,705	157	46,627	193	57,378	234	60,757	87	63,881	3	67,923	0	NA	0	NA	0	NA	882	51,927
45-49	146	34,982	134	46,071	174	54,326	194	58,922	219	63,751	60	67,245	2	73,272	0	NA	0	NA	929	54,152
50-54	101	34,490	106	43,016	126	55,619	168	58,416	156	64,993	147	68,104	50	69,581	0	NA	0	NA	854	56,785
55-59	89	35,423	74	43,703	105	51,144	127	56,861	103	60,789	66	63,507	83	68,132	22	66,479	3	64,604	672	54,676
60-64	79	24,028	52	37,628	60	47,787	81	52,934	46	51,701	39	49,923	18	57,905	27	79,690	6	72,770	408	46,484
65-69	45	12,021	25	22,296	25	38,931	18	42,302	15	58,512	5	63,312	4	60,627	7	63,611	5	57,794	149	33,584
70 & over	37	16,537	21	12,158	3	23,734	1	12,844	5	17,076	1	2,513	0	NA	0	NA	0	NA	68	15,281
Totals	2,581	33,697	1,317	46,323	1,204	55,497	933	58,280	632	62,229	321	64,509	157	67,295	56	72,490	14	65,671	7,215	47,783

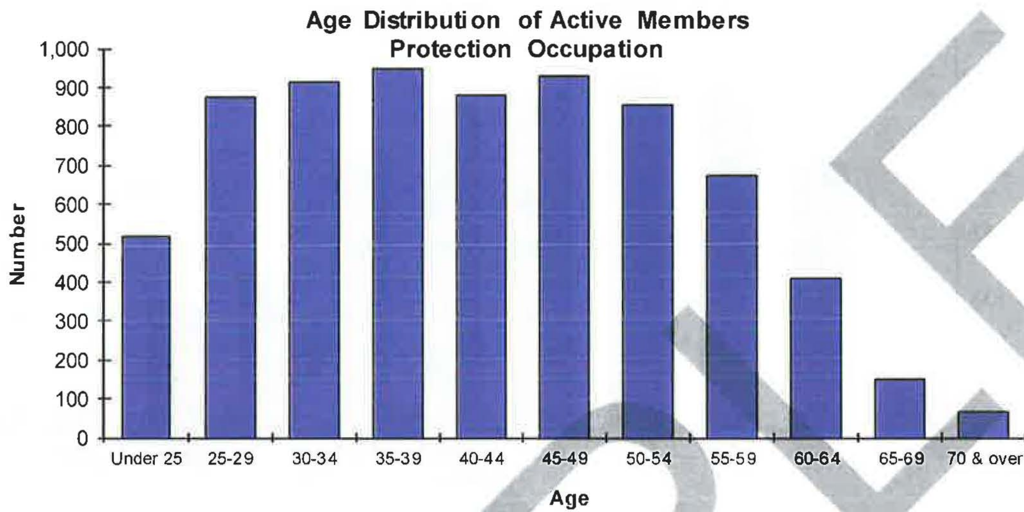
*Including retired/reemployed members

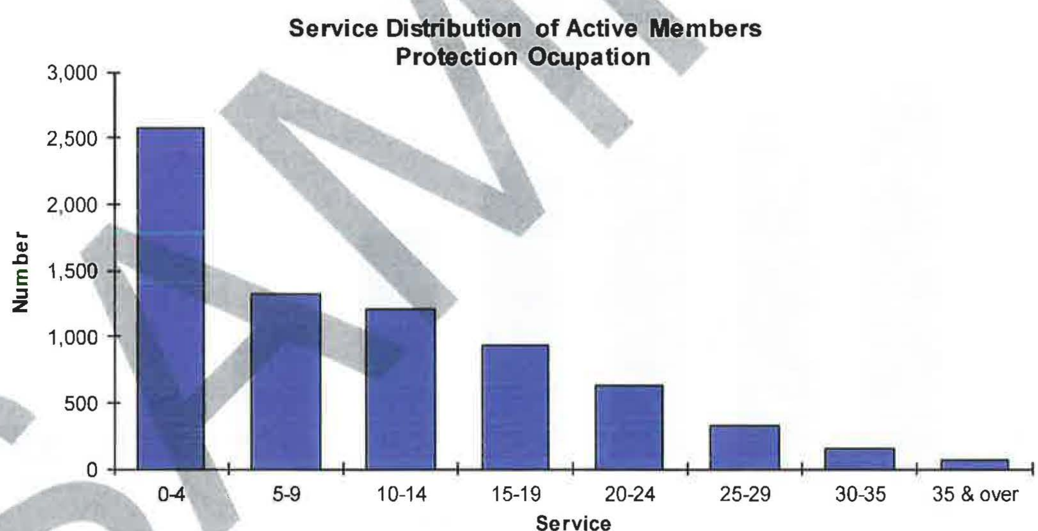

Age Distribution of Active Members
Regular Membership
25,000
20,000
15,000
10,000
5,000
0
Number
Under 25
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70 & over
Age


Service Distribution of Active Members
Regular Membership
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
Number
0-4
5-9
10-14
15-19
20-24
25-29
30-35
35 & over
Service


Age Distribution of Active Members
Sheriffs and Deputies
Number
300
250
200
150
100
50
0
Under 25
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70 & over
Age


Service Distribution of Active Members
Sheriffs and Deputies
Number
400
350
300
250
200
150
100
50
0
0-4
5-9
10-14
15-19
20-24
25-29
30-35
35 & over
Service


Age Distribution of Active Members
Protection Occupation
Number
1,000
900
800
700
600
500
400
300
200
100
0
Under 25
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70 & over
Age


Service Distribution of Active Members
Protection Ocupation
Number
3,000
2,500
2,000
1,500
1,000
500
0
0-4
5-9
10-14
15-19
20-24
25-29
30-35
35 & over
Service

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2018 FOR INACTIVE VESTED MEMBERS*

Males and Females - Regular Membership

Years of Service

Age	0 to 5		5 to 10		10 to 15		15 to 20		20 to 25		25 to 30		30 to 35		35 to 40		40 and over		Total	
	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.
Under 25	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA
25-29	9	10,315	70	23,331	1	24,822	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	80	21,885
30-34	145	23,050	668	29,799	73	37,441	1	28,083	0	NA	0	NA	0	NA	0	NA	0	NA	887	29,322
35-39	415	25,779	1,287	32,449	421	40,591	33	37,808	2	56,408	0	NA	0	NA	0	NA	0	NA	2,158	32,859
40-44	325	24,443	1,317	31,130	561	41,196	198	47,141	15	35,657	0	NA	0	NA	0	NA	0	NA	2,416	33,908
45-49	386	24,469	1,496	27,292	781	34,826	351	44,388	114	52,986	10	42,563	0	NA	0	NA	0	NA	3,138	31,714
50-54	401	21,447	1,844	23,849	1,020	28,534	484	39,937	203	46,411	82	64,323	12	50,853	1	72,707	0	NA	4,047	28,760
55-59	477	18,240	2,025	20,494	1,129	24,791	583	30,774	256	35,874	103	43,642	27	51,866	3	62,012	0	NA	4,603	24,201
60-64	1,059	13,448	1,707	18,147	845	20,730	401	23,051	167	35,878	42	31,213	5	65,436	5	46,418	1	57,576	4,232	18,880
65-69	2,124	9,812	860	11,155	274	16,728	123	18,231	51	23,480	12	28,432	3	108,761	1	28,170	2	82,825	3,450	11,397
70 & over	1,181	6,578	237	7,434	76	8,416	27	7,159	11	18,449	1	34,724	1	46,129	0	NA	1	54,210	1,535	6,972
Totals	6,522	14,056	11,511	23,711	5,181	28,950	2,201	34,139	819	39,909	250	47,529	48	56,463	10	51,900	4	69,359	26,546	24,027

*Including inactive retired/reemployed members

AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2018 FOR INACTIVE VESTED MEMBERS*

Males and Females - Sheriffs and Deputies

Years of Service

	0 to 5		5 to 10		10 to 15		15 to 20		20 to 25		25 to 30		30 to 35		35 to 40		40 and over		Total	
Age	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.
Under 25	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA
25-29	0	NA	2	59,385	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	2	59,385
30-34	3	50,992	3	36,618	1	52,259	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	7	45,013
35-39	4	41,461	14	43,468	4	42,785	1	14,356	0	NA	0	NA	0	NA	0	NA	0	NA	23	41,734
40-44	3	45,144	8	44,187	12	44,616	4	57,493	0	NA	0	NA	0	NA	0	NA	0	NA	27	46,455
45-49	1	36,099	5	43,302	6	48,927	3	40,571	4	63,015	1	50,216	0	NA	0	NA	0	NA	20	48,508
50-54	2	25,353	7	38,400	3	45,875	3	49,745	3	64,273	0	NA	0	NA	0	NA	0	NA	18	44,399
55-59	5	9,105	1	33,367	2	41,275	2	54,048	1	59,539	0	NA	0	NA	0	NA	0	NA	11	29,916
60-64	3	14,703	4	40,846	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	7	29,642
65-69	4	6,778	0	NA	0	NA	1	18,420	0	NA	0	NA	0	NA	0	NA	0	NA	5	9,106
70 & over	1	880	0	NA	2	1,783	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	3	1,482
Totals	26	25,334	44	42,562	30	42,536	14	45,842	8	63,052	1	50,216	0	NA	0	NA	0	NA	123	40,682

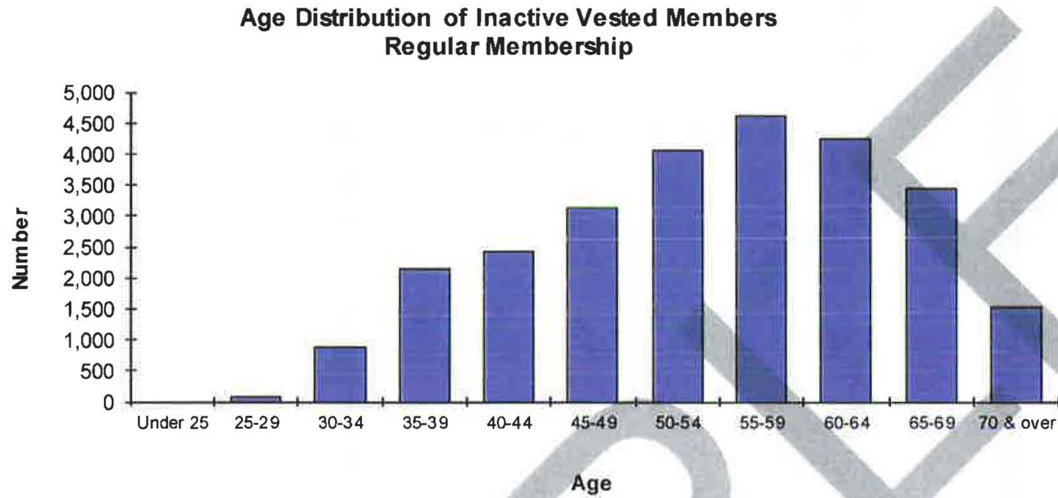
*Including inactive retired/reemployed members

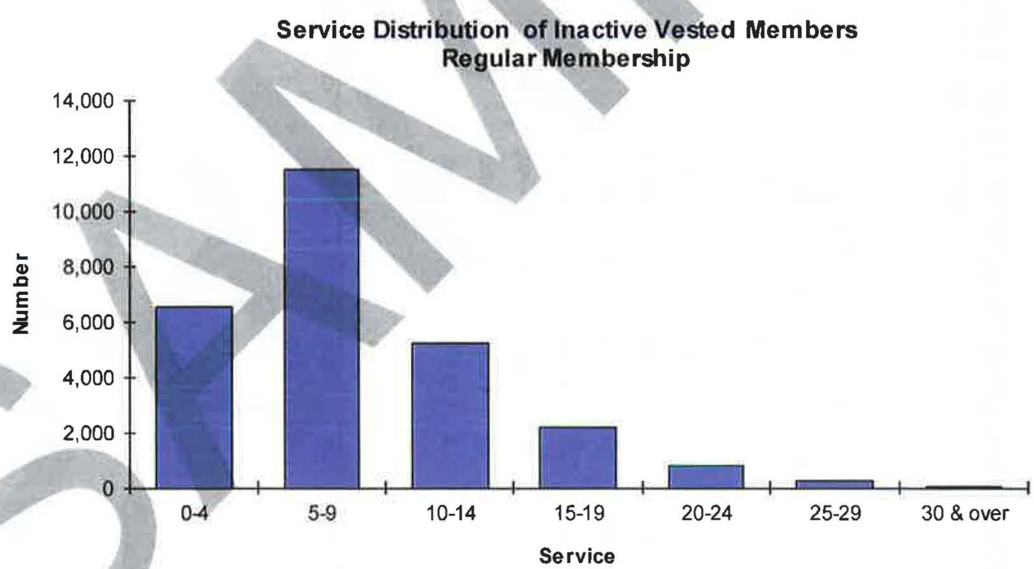
AGE AND SERVICE DISTRIBUTION AS OF JUNE 30, 2018 FOR INACTIVE VESTED MEMBERS*

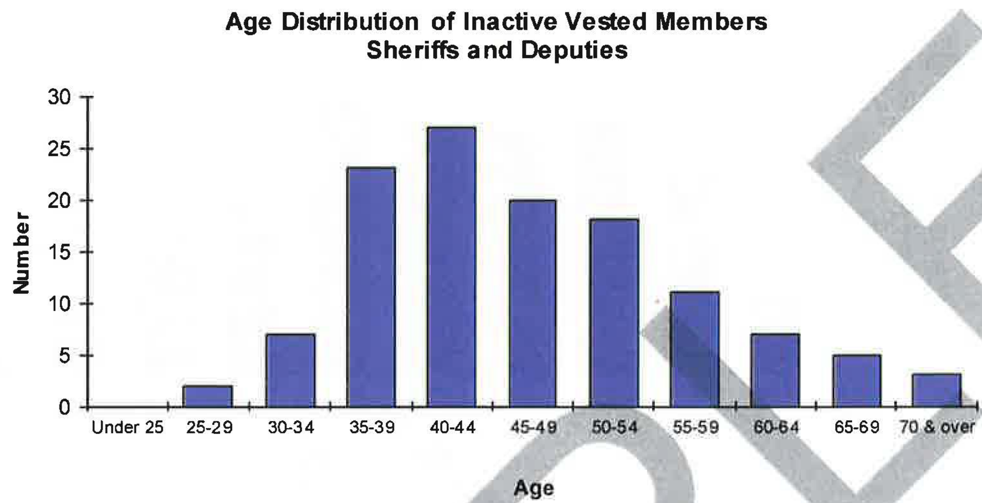
Males and Females - Protection Occupation

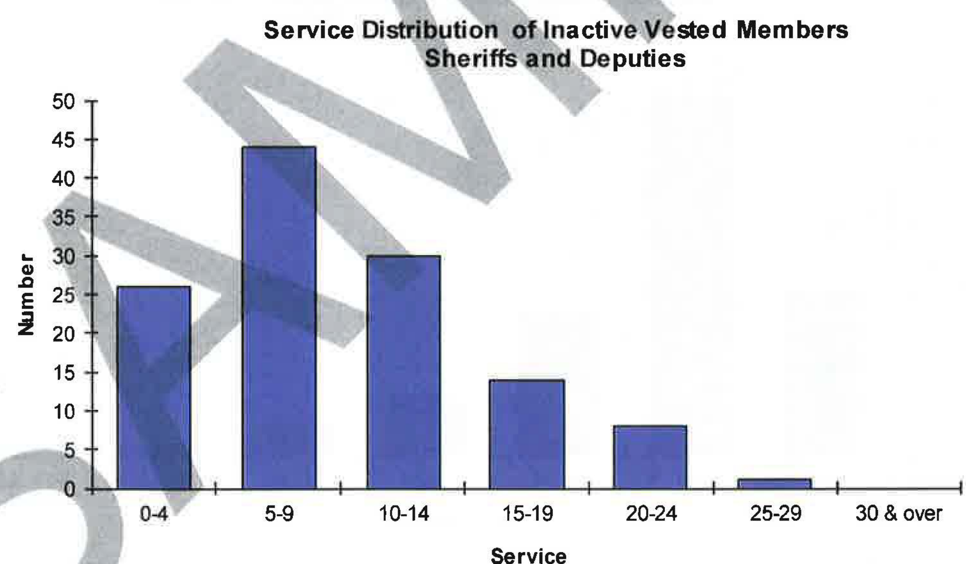
	Years of Service																			
	0 to 5		5 to 10		10 to 15		15 to 20		20 to 25		25 to 30		30 to 35		35 to 40		40 and over		Total	
Age	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.	No.	Avg. Sal.
Under 25	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA
25-29	22	31,112	21	27,814	1	34,664	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	44	29,619
30-34	31	23,992	74	30,729	8	43,796	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	113	29,806
35-39	27	19,517	86	26,864	29	37,298	5	38,428	0	NA	0	NA	0	NA	0	NA	0	NA	147	27,966
40-44	10	29,406	80	22,369	29	30,752	18	40,312	2	32,027	0	NA	0	NA	0	NA	0	NA	139	27,087
45-49	9	22,365	65	21,583	38	24,748	17	44,119	13	49,507	5	48,817	0	NA	0	NA	0	NA	147	28,451
50-54	8	15,402	55	18,699	47	23,047	21	34,393	20	50,580	8	52,315	1	100,695	0	NA	0	NA	160	28,050
55-59	26	12,934	37	17,244	25	24,640	9	25,022	3	2,732	1	28,757	0	NA	0	NA	0	NA	101	18,341
60-64	44	9,041	23	7,907	8	17,623	5	13,906	3	12,658	0	NA	0	NA	0	NA	0	NA	83	9,978
65-69	26	13,951	13	4,306	1	8,198	2	3,813	1	60,103	0	NA	0	NA	0	NA	0	NA	43	11,503
70 & over	7	9,559	2	2,016	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	0	NA	9	7,882
Totals	210	17,797	456	22,520	186	27,674	77	34,966	42	43,465	14	49,383	1	100,695	0	NA	0	NA	986	24,811

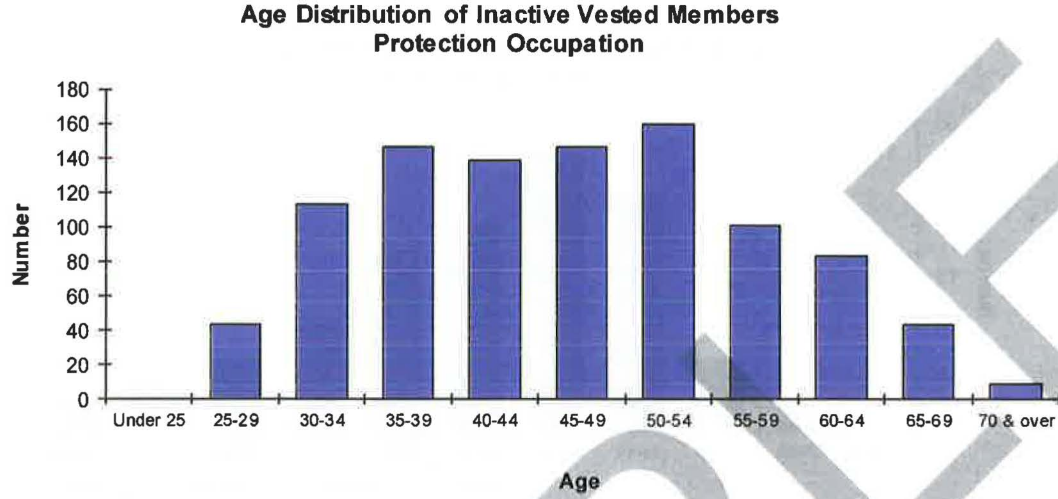
*Including inactive retired/reemployed members

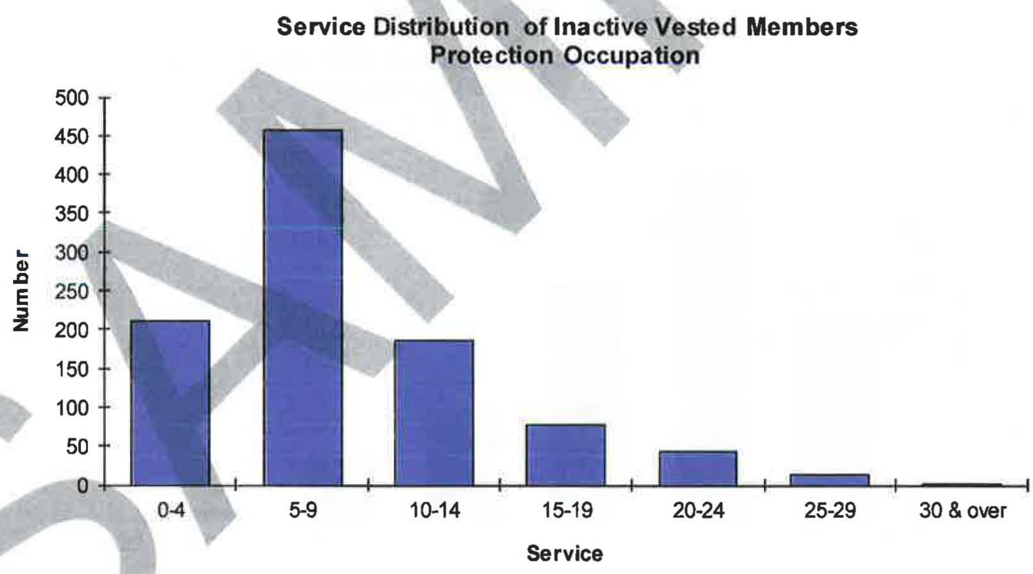

Age Distribution of Inactive Vested Members
Regular Membership
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
Number
Under 25
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70 & over
Age


Service Distribution of Inactive Vested Members
Regular Membership
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Number
0-4
5-9
10-14
15-19
20-24
25-29
30 & over
Service


Age Distribution of Inactive Vested Members
Sheriffs and Deputies
Number
30
25
20
15
10
5
0
Under 25
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70 & over
Age


Service Distribution of Inactive Vested Members
Sheriffs and Deputies
Number
50
45
40
35
30
25
20
15
10
5
0
0-4
5-9
10-14
15-19
20-24
25-29
30 & over
Service


Age Distribution of Inactive Vested Members
Protection Occupation
Number
180
160
140
120
100
80
60
40
20
0
Under 25
25-29
30-34
35-39
40-44
45-49
50-54
55-59
60-64
65-69
70 & over
Age


Service Distribution of Inactive Vested Members
Protection Occupation
Number
500
450
400
350
300
250
200
150
100
50
0
0-4
5-9
10-14
15-19
20-24
25-29
30 & over
Service

ANALYSIS OF RETIREES AND BENEFICIARIES

Males and Females - Regular Membership

	Number of Members and Beneficiaries									Average
					Contingent			Period		Annual
Age	Option 1	Option 2	Option 3	Option 4	Beneficiary	Option 5	Option 6	Certain	Total	Benefit
Under 40	4	1	5	0	57	0	8	11	86	$8,300
40 to 44	9	6	5	2	27	0	4	4	57	7,255
45 to 49	21	15	3	9	44	3	10	5	110	8,343
50 to 54	67	43	11	12	95	10	40	2	280	10,680
55 to 59	824	812	294	307	207	316	1,228	12	4,000	21,754
60 to 64	2,630	3,138	1,251	1,006	397	1,079	4,387	17	13,905	23,125
65 to 69	5,447	6,370	3,232	1,954	699	2,179	7,439	36	27,356	21,175
70 to 74	5,486	6,080	3,715	1,837	931	2,226	5,382	26	25,683	17,524
75 to 79	4,363	4,116	2,761	1,812	1,022	1,866	2,067	18	18,025	13,920
80 to 84	3,638	2,934	1,735	1,942	1,064	1,632	375	9	13,329	11,135
85 to 89	2,416	1,935	936	1,154	873	961	49	2	8,326	8,392
90 to 94	1,219	1,147	438	459	461	422	2	0	4,148	6,307
95 to 99	324	442	135	89	130	176	1	0	1,297	5,090
100 & up	15	95	17	7	14	32	0	0	180	4,660
Counts	26,463	27,134	14,538	10,590	6,021	10,902	20,992	142	116,782	$16,661
% of Total	22.7%	23.2%	12.4%	9.1%	5.2%	9.3%	18.0%	0.1%	100.0%	

ANALYSIS OF RETIREES AND BENEFICIARIES

Males and Females - Sheriffs and Deputies

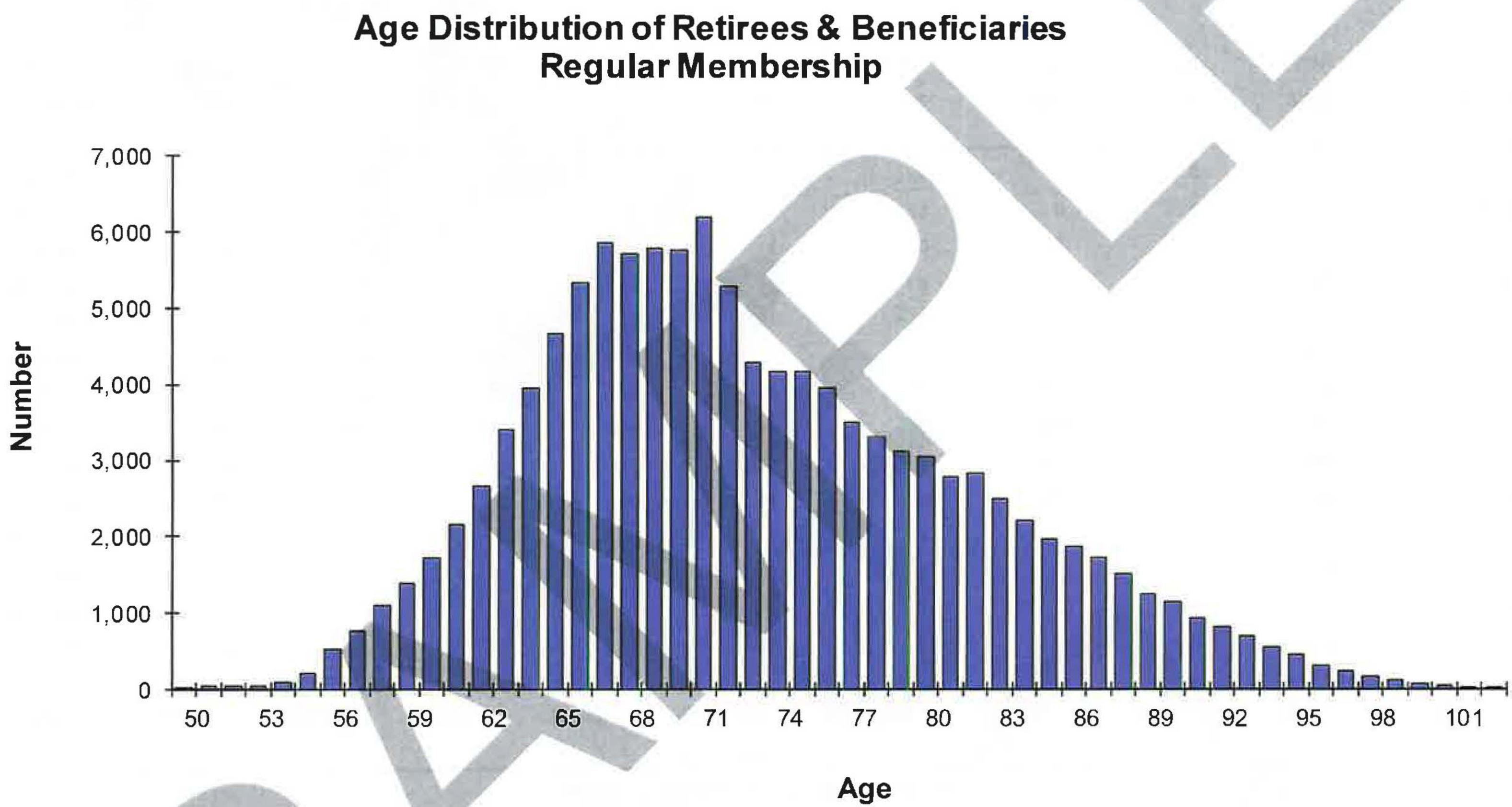
Age	Option 1	Option 2	Option 3	Option 4	Contingent Beneficiary	Option 5	Option 6	Period Certain	Total	Average Annual Benefit
	Number of Members and Beneficiaries									
Under 40	1	0	1	0	1	0	0	0	3	$23,729
40 to 44	0	0	0	0	2	0	2	0	4	17,944
45 to 49	2	0	0	1	1	0	0	0	4	32,127
50 to 54	13	11	1	14	2	4	28	0	73	42,652
55 to 59	20	13	10	28	5	6	48	0	130	39,785
60 to 64	33	29	16	44	13	12	75	0	222	38,980
65 to 69	42	25	14	34	9	12	97	1	234	33,029
70 to 74	36	16	15	27	14	7	38	0	153	27,591
75 to 79	18	10	3	21	11	5	12	0	80	23,261
80 to 84	15	3	3	19	8	3	4	0	55	16,594
85 to 89	2	4	3	6	6	1	0	0	22	11,256
90 to 94	2	1	0	1	3	0	0	0	7	10,780
95 to 99	0	1	0	0	0	0	0	0	1	9,619
100 & up	0	0	0	0	0	0	0	0	0	NA
Counts	184	113	66	195	75	50	304	1	988	$32,659
% of Total	18.6%	11.4%	6.7%	19.7%	7.6%	5.1%	30.8%	0.1%	100.0%	

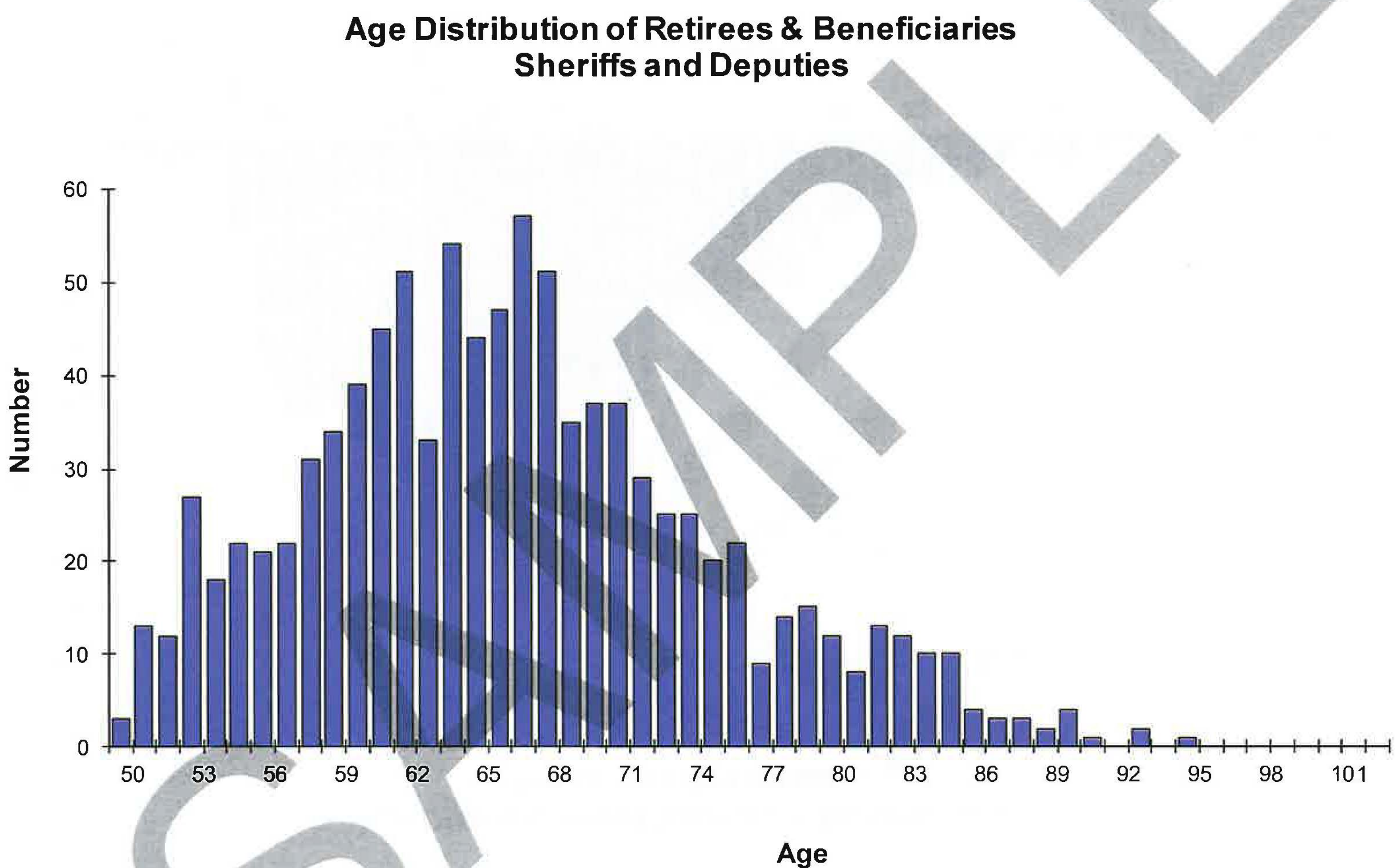
ANALYSIS OF RETIREES AND BENEFICIARIES

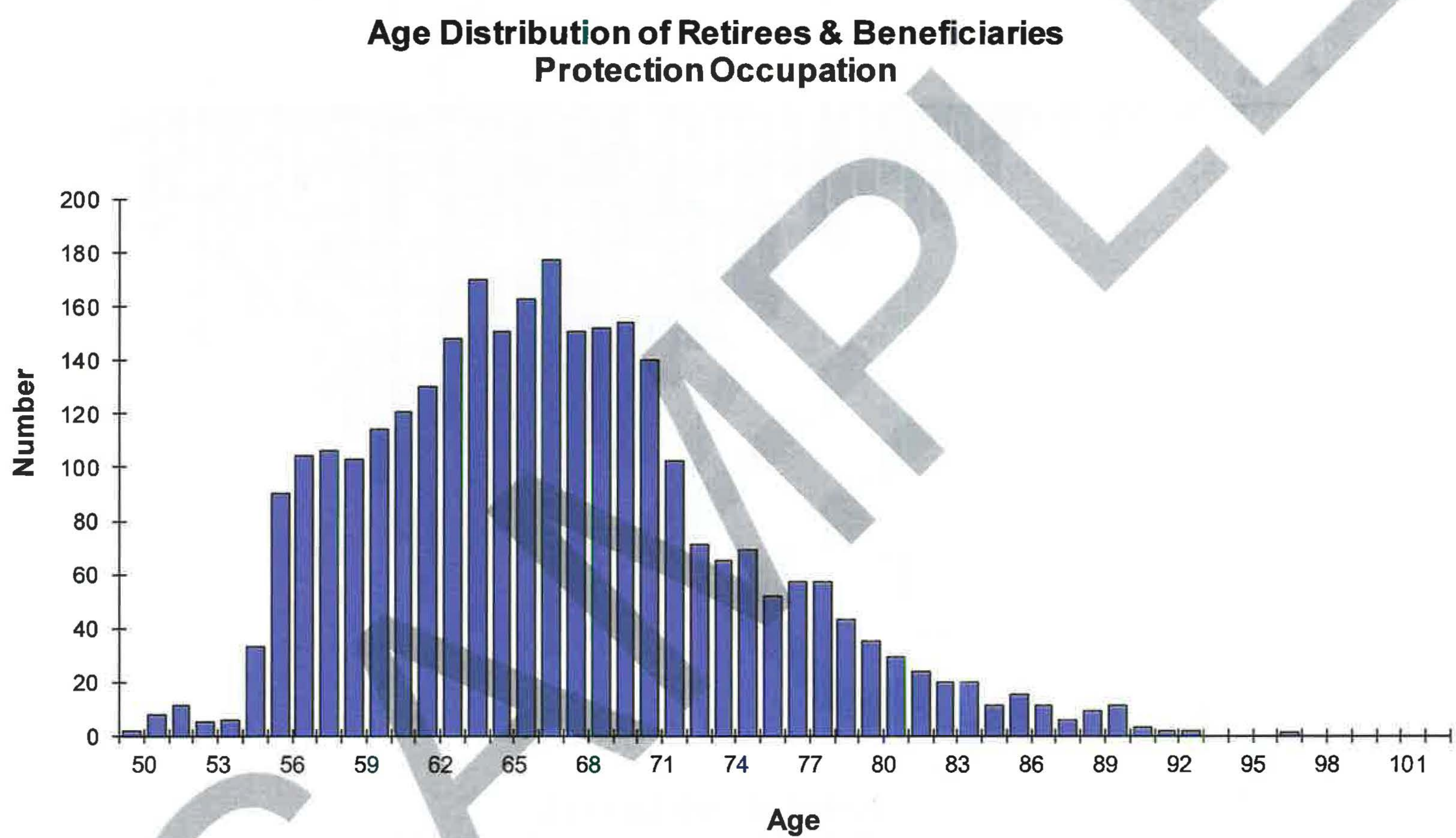
Males and Females - Protection Occupation

Number of Members and Beneficiaries

Age	Option 1	Option 2	Option 3	Option 4	Contingent Beneficiary	Option 5	Option 6	Period Certain	Total	Average Annual Benefit
Under 40	0	1	0	2	3	0	0	0	6	$18,305
40 to 44	1	0	0	1	1	1	2	0	6	29,558
45 to 49	2	0	1	4	3	2	6	1	19	23,604
50 to 54	6	1	6	6	4	2	7	0	32	21,453
55 to 59	63	61	35	89	14	15	157	2	436	32,859
60 to 64	132	85	33	117	26	33	257	0	683	30,431
65 to 69	150	154	56	118	35	30	250	1	794	26,303
70 to 74	111	94	42	79	29	31	146	0	532	21,192
75 to 79	58	42	26	53	33	11	55	0	278	16,976
80 to 84	33	10	6	39	21	11	8	0	128	13,746
85 to 89	9	2	1	18	17	5	0	0	52	11,685
90 to 94	6	1	1	6	4	0	0	0	18	9,785
95 to 99	0	0	0	0	0	1	0	0	1	2,683
100 & up	0	0	0	0	0	0	0	0	0	NA
Counts	571	451	207	532	190	142	888	4	2,985	$25,446
% of Total	19.1%	15.1%	6.9%	17.8%	6.4%	4.8%	29.7%	0.1%	100.0%	


Age Distribution of Retirees & Beneficiaries
Regular Membership
Number
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
50
53
56
59
62
65
68
71
74
77
80
83
86
89
92
95
98
101
Age


Age Distribution of Retirees & Beneficiaries
Sheriffs and Deputies
Number
60
50
40
30
20
10
0
50
53
56
59
62
65
68
71
74
77
80
83
86
89
92
95
98
101
Age


Age Distribution of Retirees & Beneficiaries
Protection Occupation
Number
200
180
160
140
120
100
80
60
40
20
0
50
53
56
59
62
65
68
71
74
77
80
83
86
89
92
95
98
101
Age

SUMMARY OF DATA FILE RECONCILIATION

The following table reconciles the data we received from IPERS to the final membership counts used in the valuation.

Records on the in-pay data file	120,987
Removed those no longer entitled to benefits	(250)
Added those still entitled to benefits	18
Records used in the valuation	120,755
Records on the not-in-pay data file	251,026
Records removed because the member has received all benefits	(26)
Records used in the valuation*	251,000

* These records are allocated as follows:

Active members	170,376
Retired, reemployed members	8,639
Vested inactive members	27,655
Nonvested inactive members	44,330
Total	251,000

Nonvested inactive members include deceased vested inactive members with employee contributions still held by the System. Records that had no remaining benefit or had passed away prior to the valuation date were removed.

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APPENDIX B

SUMMARY OF PLAN PROVISIONS

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Chapter 97B of the Iowa code sets out the IPERS provisions, which are briefly summarized as follows:

Participation:	In general, the System covers people in non-federal public employment within the State of Iowa. Membership is mandatory if a person is in covered employment. Exceptions to this are set out in the law. Notable exceptions are those covered by another public system in Iowa (such as judges, state patrol, and policemen and firemen in cities having civil service), employees of the Regents' institutions, and employees of the community colleges who elect alternative coverage.
Service Credit:	A member will receive membership credit for service rendered after July 4, 1953 (special rules apply to service before this date). Service is counted to the complete quarter of a calendar year. A member will not receive credit for more than four quarters of service in a calendar year regardless of the number of employers reporting covered wages for that member. A calendar year is the 12-month period beginning January 1 and ending December 31. Members may purchase service under specified conditions. To make such a purchase, the member must pay the actuarial cost of such service.

REGULAR MEMBERS:

Average Salary:	The average of the member's highest three years of covered wages. Effective July 1, 2012 the average of a member's highest five years of covered wages, but not less than the member's highest three years as of June 30, 2012, if vested at that time.

Age and Service Requirements for Benefits:

Normal Retirement	Earliest of the first day of the month of the member's 65^{th} birthday, age 62 with 20 years of service or Rule of 88 (age plus service equals/exceeds 88), with a minimum of age 55.
Early Retirement	First day of any month starting with the month of the member's 55^{th} birthday but preceding the normal retirement date.
Inactive Vested Benefit	Four years of service (seven years effective July 1, 2012). Prior to July 1, 2005 inactive members could become eligible for a vested benefit merely by reaching age 55.
Pre-retirement Death Benefit	Upon death of a member before benefits have started.
Disability Benefit	Upon meeting requirements to be vested, if the active or inactive member begins receiving federal Social Security disability or Railroad Retirement disability benefits.

Retirement Benefits:

Normal Retirement	An annuity equal to 2% of Average Salary for each year of service up to 30 years plus 1% of AS for each of the next 5 years of service. Maximum years of service recognized for benefit accrual purposes is 35 with a resulting maximum benefit of 65% of Average Salary.
Early Retirement	An annuity, determined in the same manner as for normal retirement. However, a reduction of 0.25% per month is applied for each month the benefit commences prior to normal retirement age (based on service at early retirement). Effective July 1, 2012, the reduction changed to 0.50% per month and applies to each month that the benefit commences before age 65. Transition rules apply if members have service both before and after July 1, 2012.
Pre-retirement Death Benefits	Beneficiaries of members may receive a lump sum determined by a formula that includes how much the member contributed to IPERS, years of service, highest year's salary, and other factors. Beneficiaries may have the option of receiving a monthly benefit based on the present value of the member's accrued benefit at death.
Disability Benefits	An annuity, payable immediately, equal to the Normal Retirement Benefit without an early retirement adjustment.

Termination Benefits:

Less than four* years of Service (Nonvested)	A refund of all of the member's accumulated contributions.
Four* or more years of Service (Vested)	At the member's election either: (1) a refund of all of the member's accumulated contributions plus a portion (years of service divided by 30) of the employer's contributions with interest, or (2) a deferred benefit determined in the same manner as for normal retirement. Payments can begin at normal or early retirement. * Effective July 1, 2012 seven years of service for those not vested at that time.

Form of Annuity: The base form, or normal form, is a life annuity with a guaranteed return of employee contributions (Option 2).

Optional Forms of Payment:	*Option 1:* The member specifies a dollar amount, in $1,000 increments, that the member wishes to have paid to a designated beneficiary following the death of the member. The death benefit will be in the form of a single payment and cannot exceed the amount of a member's own accumulated contributions to IPERS, and it cannot lower the member's benefit as calculated under Option 2 by more than 50%. *Option 3:* After the member's death, all benefits cease. *Option 4:* The member receives a reduced monthly benefit so that a lifetime monthly benefit may be provided after the member's death to the person named by the member as the contingent annuitant. The member specifies what benefit the contingent annuitant will receive after the death of the member. The monthly benefit can be the same as the member's monthly benefit or three-fourths, one-half, or one-fourth of the amount. These choices may be restricted if the contingent annuitant is not the member's spouse and is more than ten years younger than the member. *Option 5:* If the member dies before ten full years (120 months of payments) have ended, the member's beneficiary will receive a monthly benefit for the remainder of the ten years. Members who have attained age 90 as of the first month of entitlement are not allowed to select this option. *Option 6:* The member receives a reduced monthly benefit so that a lifetime monthly benefit may be provided after the member's death to the person named by the member as the contingent annuitant. In addition, the monthly amounts are also reduced to pay for a pop-up feature. The pop-up feature provides that if the contingent annuitant dies before the member, the member's benefit will pop back up to what it would have been under IPERS Option 2, and death benefits may be payable to the member's designated beneficiary if certain conditions are met.
Actuarial Equivalent Lump Sum Payment:	If a vested member is entitled to receive a benefit and it is less than $50 per month under Option 2, the member shall receive a retirement benefit in an actuarial equivalent lump sum payment. The lump sum will include the member's and employer's accumulated contributions.
Post-retirement Benefit Increases:	Annual dividends are paid to those retired prior to July 1, 1990. Effective with the November 2000 dividend payment, the dividend is adjusted by the least of the following percentages: (1) the change in the CPI, (2) percentage certified to by the actuary as affordable by the System, and (3) 3%.

Favorable Experience Dividend (FED):

For members who retired after June 30, 1990, a favorable experience dividend (FED) reserve account has been established under Iowa Code §97B.49F(2). The main purpose of this account is to help offset the negative effects of postretirement inflation. All members and beneficiaries who receive a monthly allowance qualify for favorable experience dividend payments. Each November, IPERS determines if a FED payment should be paid the following January subject to the following conditions:

- The member must be retired one year.
- The FED rate cannot exceed 3%.
- The FED payment will be issued in a lump sum in January.
- The FED payment is not guaranteed.

The formula is as follows:
(December's Monthly benefit) X (12 months) X (Rate) X (Full calendar years retired) = FED

Source of Funds:

Regular Membership:

Contribution Rates

Time Period	Employees**	Employer	Total
Prior to 7/1/07	3.70%	5.75%	9.45%
7/1/07 – 6/30/08	3.90%	6.05%	9.95%
7/1/08 – 6/30/09	4.10%	6.35%	10.45%
7/1/09 – 6/30/10	4.30%	6.65%	10.95%
7/1/10 – 6/30/11	4.50%	6.95%	11.45%
7/1/11 – 6/30/12	5.38%	8.07%	13.45%
7/1/12 and later	Determined by Contribution Rate Funding Policy*		

*Change in contribution rate cannot exceed 1.0% per year.
**Employee rate is 40% of total contribution rate.

SHERIFFS/DEPUTIES AND PROTECTION OCCUPATION:

Average Salary:

The average of the member's highest three years of covered wages

Age and Service Requirements for Benefits:

Normal Retirement

Generally age 55. However, a member of the Sheriffs and Deputy Sheriffs may retire at age 50 with 22 years of service.

Inactive Vested Benefit	Four years of service. Prior to July 1, 2005 inactive members could become eligible for vested benefits merely by reaching age 55.
Pre-retirement Death Benefit	Upon death of a member before benefits have started.
Disability Benefit	Upon meeting requirements to be vested, (i) if the active or inactive member begins receiving federal Social Security or Railroad Retirement disability benefits, or (ii) upon being determined by IPERS to be disabled under the provisions of Iowa Code section 97B.50A. The disability benefits under Iowa Code section 97B.50A must be applied for through IPERS within one (1) year after termination of employment. Benefits under Iowa Code section 97B.50A may be paid for in-service disability or ordinary disability.

Retirement Benefits:

Normal Retirement	60% of Average Salary after completion of 22 years of service, plus an additional 1.5% of Average Salary for years of service greater than 22 but not more than 30. Maximum formula is 72% of Average Salary.
Pre-retirement Death Benefit	Beneficiaries of members may receive a lump sum determined by a formula that includes how much the member contributed to IPERS, years of service, highest year's salary, and other factors. Beneficiaries may have the option of receiving a monthly benefit based on the present value of the member's accrued benefit at death.
Disability Benefits	An annuity, payable immediately, equal to the Normal Retirement Benefit, without an adjustment. The benefit is the greater of the Normal Retirement Benefit and either 50% (for ordinary disability) or 60% (for in-service disability) of Average Salary.

Termination Benefits:

Less than four years of Service (Non-vested)	A refund of all of the member's accumulated contributions.
Four or more years of Service (Vested)	At the member's election either: (1) a refund of all of the member's accumulated contributions plus a portion (years of service divided by 22) of the employer's contributions with interest, or

(2) a deferred benefit determined in the same manner as for normal retirement. Payments begin at normal retirement.

Form of Annuity:

The base form, or normal form, is a life annuity with a guaranteed return of employee contributions (Option 2).

Optional Forms of Payment:

Option 1: The member specifies a dollar amount, in $1,000 increments, that the member wishes to have paid to a designated beneficiary following the death of the member. The death benefit will be in the form of a single payment and cannot exceed the amount of a member's own accumulated contributions to IPERS, and it cannot lower the member's benefit as calculated under Option 2 by more than 50%.

Option 3: After the member's death, all benefits cease.

Option 4: The member receives a reduced monthly benefit so that a lifetime monthly benefit may be provided after the member's death to the person named by the member as the contingent annuitant. The member specifies what benefit the contingent annuitant will receive after the death of the member. The monthly benefit can be the same as the member's monthly benefit or three-fourths, one-half, or one-fourth of the amount. These choices may be restricted if the contingent annuitant is not the member's spouse and is more than ten years younger than the member.

Option 5: If the member dies before ten full years (120 months of payments) have ended, the member's beneficiary will receive a monthly benefit for the remainder of the ten years. Members who have attained age 90 as of the first month of entitlement are not allowed to select this option.

Option 6: The member receives a reduced monthly benefit so that a lifetime monthly benefit may be provided after the member's death to the person named by the member as the contingent annuitant. In addition, the monthly amounts are also reduced to pay for a pop-up feature. The pop-up feature provides that if the contingent annuitant dies before the member, the member's benefit will pop back up to what it would have been under IPERS Option 2, and death benefits may be payable to the member's designated beneficiary if certain conditions are met.

Level Income Payment Option: A Level Income payment alternative is authorized for members of the Sheriffs and Deputies group and the Protection Occupation group. This alternative applies to all IPERS retirement options listed above except Option 6. The Level Income payment alternative permits a member to receive a relatively level income both before and after age 62 when benefits from IPERS and Social Security are combined. Higher IPERS benefits are paid prior to age 62. When the member reaches age 62, the member's IPERS benefit is permanently reduced. This amount is determined when the member retires and is not recomputed based on the actual Social Security benefit.

Actuarial Equivalent Lump Sum Payment: If a vested member is entitled to receive a benefit and it is less than $50 per month under Option 2, the member shall receive a retirement benefit in an actuarial equivalent lump sum payment. The lump sum will include the member's and employer's accumulated contributions.

Post-retirement Benefit Increases: Annual dividends are paid to those retired prior to July 1, 1990. Effective with the November 2000 dividend payment, the dividend is adjusted by the least of the following percentages: (1) the change in the CPI, (2) percentage certified to by the actuary as affordable by the System, and (3) 3%.

Favorable Experience Dividend (FED): For members who retired after June 30, 1990, a favorable experience dividend (FED) reserve account has been established under Iowa Code §97B.49F(2). The main purpose of this account is to help offset the negative effects of postretirement inflation. All members and beneficiaries who receive a monthly allowance qualify for favorable experience dividend payments. Each November, IPERS determines if a FED payment should be paid the following January subject to the following conditions:

- The member must be retired one year.
- The FED rate cannot exceed 3%.
- The FED payment will be issued in a lump sum in January.
- The FED payment is not guaranteed.

The formula is as follows:
(December's Monthly benefit) x (12 months) x (Rate) x (Full calendar years retired) = FED

Source of Funds:

Sheriffs and Deputies: Determined by Contribution Rate Funding Policy. Employees contribute 50% and employers contribute 50%.

Protection Occupation: Determined by Contribution Rate Funding Policy. Employees contribute 40% and employers contribute 60%.

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APPENDIX C

ACTUARIAL ASSUMPTIONS AND METHODS

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Sound financing of any retirement system requires that benefits accruing to its members shall be paid for during their active working lifetime so that when a member (or his beneficiary) becomes entitled to a benefit, the monies necessary to provide such benefit shall be on hand. In this way, the cost of benefits for present active members will not become a liability to future members and taxpayers.

The principal purpose of an actuarial valuation is to calculate, on the basis of certain assumptions, the present value of benefits that are payable in the future from the system to present members (and their beneficiaries) and the present value of future contributions to be made by the members and their employers. Having calculated such present values, the level of annual contribution to the system required to fund (or pay for) the benefits, in accordance with the above stated principle of sound financing, may be determined.

VALUATION ASSUMPTIONS

Retirement System contribution requirements and actuarial present values are calculated by applying experience assumptions to the benefit provisions and census (member) information of the Retirement System, using the actuarial cost method.

The principal areas of risk which require experience assumptions about future activities of the Retirement System are:

- long-term rates of investment return to be generated by the assets of the system
- patterns of pay increases to members
- rates of mortality among members, retirants and beneficiaries
- rates of withdrawal of active members
- rates of disability among active members
- the age patterns of actual retirements

In making a valuation, the monetary effect of each assumption is calculated for as long as a present member survives -- a period of time which can be as long as a century.

Actual experience of the Retirement System will not coincide exactly with assumed experience. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experiences. The result is a continual series of adjustments to the computed contribution rate, or alternatively to the amortization period for the unfunded actuarial liability.

From time to time, one or more of the assumptions are modified to reflect experience trends (but not random or temporary year to year fluctuations). A complete review of the actuarial assumptions was completed in 2018, based on experience from 2014-2017. A review of the economic actuarial assumptions was completed in 2017, followed by a review of the demographic assumptions that was completed in 2018. The Investment Board has adopted and approved the use of the economic assumptions presented in the 2017 Economic Experience Study, as well as the demographic assumptions presented in the 2018 Demographic Experience Study. The following is a summary of the assumptions and methods used in the valuation:

ECONOMIC ASSUMPTIONS:

Rate of Inflation (effective June 30, 2017)

2.60% per annum

Rate of Crediting Interest on Contribution Balances (effective June 30, 2017)

3.50% per annum, compounded annually

Rate of Investment Return (effective June 30, 2017)

7.00% per annum, compounded annually, net of expenses.

Wage Growth Assumption (effective June 30, 2017)

3.25% per annum based on 2.60% inflation assumption and 0.65% real wage inflation.

Payroll Increase Assumption (effective June 30, 2017)

3.25% per year

Cost of Living Adjustments Assumption (effective June 30, 2017)

2.60% for members who retired before July 1, 1990. No cost-of-living adjustments are assumed to be granted to future retirees

DEMOGRAPHIC ASSUMPTIONS:

Rates of Mortality

Pre-Retirement (effective June 30, 2018)

State		
	Male	RP-2014 Employee Table, Generational using MP-2017, setback 4 years
	Female	RP-2014 Employee Table, Generational using MP-2017, setback 4 years
School		
	Male	RP-2014 Employee Table, Generational using MP-2017, setback 4 years
	Female	RP-2014 Employee Table, Generational using MP-2017, setback 8 years
Other		
	Male	RP-2014 Employee Table, Generational using MP-2017, setback 3 years
	Female	RP-2014 Employee Table, Generational using MP-2017, setback 4 years
Sheriffs/Deputies and Protection Occupation		
	Male	RP-2014 Employee Table, Generational using MP-2017, setback 3 years
	Female	RP-2014 Employee Table, Generational using MP-2017, setback 4 years

5% of active deaths are assumed to be service related for non-regular members.

Post-Retirement (effective June 30, 2018)

State	RP-2014 Healthy Annuitant, Generational using MP-2017
Male	8.5% increase in rates above age 75
Female	No age adjustment
School	RP-2014 Healthy Annuitant, Generational using MP-2017
Male	2 Year setback, 10% decrease in rates below age 75, 20% increase above age 75
Female	2 Year setback, 25% decrease below age 75, 10% increase above age 75
Other	RP-2014 Healthy Annuitant, Generational using MP-2017
Male	1 Year set forward,10% decrease below age 75, 8% increase above age 75
Female	1 Year setback, 10% decrease below age 75, 5% increase above age 75
Sheriffs/Deputies and Protection Occupation	RP-2014 Healthy Annuitant, Generational using MP-2017
Male	1 Year set forward, 10% increase above age 75
Female	No age adjustment
Beneficiaries:	Same as members
Disabled Members	RP-2014 Disabled Mortality, Generational using MP-2017
Male	3 Year age set forward
Female	5 Year age set forward

Retirement Rates (effective June 30, 2018)

Upon meeting the requirements for early retirement, the following rates apply to Regular Members:

	Assumed Retirement Rates – Early		
Age	State	School	Other
55	5.0%	6.0%	4.0%
56	5.0%	6.0%	4.0%
57	5.0%	6.0%	4.0%
58	5.0%	7.0%	4.0%
59	5.0%	8.0%	5.0%
60	5.0%	10.0%	5.0%
61	15.0%	15.0%	10.0%
62	15.0%	15.0%	15.0%
63	15.0%	15.0%	15.0%
64	15.0%	15.0%	15.0%

Upon reaching the requirements for normal retirement (unreduced benefits), the following rates apply:

	Assumed Retirement Rates – Select Unreduced		
Age	State	School	Other
55	20.0%	25.0%	20.0%
56	15.0%	25.0%	20.0%
57	15.0%	25.0%	17.0%
58	15.0%	25.0%	20.0%
59	15.0%	25.0%	20.0%
60	15.0%	25.0%	17.0%
61	20.0%	33.0%	20.0%
62	40.0%	40.0%	30.0%
63	35.0%	30.0%	25.0%
64	30.0%	30.0%	30.0%
65	30.0%	30.0%	30.0%

	Assumed Retirement Rates – Ultimate Unreduced		
Age	State	School	Other
55	15.0%	20.0%	12.0%
56	15.0%	20.0%	12.0%
57	15.0%	20.0%	12.0%
58	15.0%	20.0%	12.0%
59	15.0%	21.0%	12.0%
60	15.0%	23.0%	15.0%
61	20.0%	28.0%	20.0%
62	40.0%	35.0%	30.0%
63	30.0%	30.0%	20.0%
64	30.0%	30.0%	25.0%
65	30.0%	45.0%	40.0%
66	30.0%	35.0%	30.0%
67	20.0%	25.0%	20.0%
68	20.0%	25.0%	20.0%
69	35.0%	40.0%	40.0%
70	100.0%	100.0%	100.0%

	Assumed Retirement Rates	
Age	Sheriffs and Deputies	Protection Occupation
50	17.0%	
51	15.0%	
52	15.0%	
53	15.0%	
54	15.0%	
55	15.0%	25.0%
56	15.0%	10.0%
57	15.0%	10.0%
58	15.0%	10.0%
59	15.0%	10.0%
60	15.0%	10.0%
61	15.0%	15.0%
62	30.0%	30.0%
63	30.0%	25.0%
64	30.0%	25.0%
65	100.0%	100.0%

Terminated vested members are assumed to retire at age 62 (55 for Sheriffs/Deputies and Protection Occupation groups).

For Regular membership, retired reemployed members are assumed to retire at a rate of 25% per year until age 80 when all are assumed to retire.

All retirees are assumed to elect a modified cash refund annuity (Option 2).

Rates of Disablement (effective June 30, 2018)

	Assumed Rates					
	Males			Females		
Age	State	School	Other	State	School	Other
27	0.020%	0.020%	0.020%	0.020%	0.020%	0.020%
32	0.020%	0.020%	0.020%	0.020%	0.020%	0.020%
37	0.030%	0.034%	0.030%	0.030%	0.030%	0.030%
42	0.050%	0.056%	0.050%	0.040%	0.040%	0.040%
47	0.100%	0.098%	0.110%	0.070%	0.070%	0.070%
52	0.180%	0.142%	0.260%	0.180%	0.130%	0.160%
57	0.260%	0.230%	0.500%	0.310%	0.190%	0.280%
62	0.340%	0.318%	0.720%	0.500%	0.260%	0.400%

Assumed Rates
Sheriffs/Deputies
Protection Occupation

Age	Rate
27	0.130%
32	0.130%
37	0.130%
42	0.150%
47	0.200%
52	0.240%
57	0.320%
62	0.430%

Rates of Termination of Employment (effective June 30, 2018)

Regular Membership

	Male			Female		
Years of Service	State	School	Other	State	School	Other
1	11.00%	14.20%	19.00%	11.00%	14.20%	19.99%
5	4.75%	6.60%	7.50%	4.75%	6.60%	8.35%
10	2.25%	2.70%	4.10%	2.25%	2.70%	4.93%
15	1.60%	1.70%	2.64%	1.60%	1.70%	3.36%
20	1.10%	1.20%	2.10%	1.10%	1.20%	2.66%
25	0.80%	1.00%	1.60%	0.80%	1.00%	1.98%
30	0.80%	1.00%	1.10%	0.80%	1.00%	1.30%

Sheriffs/Deputies and Protection Occupation

Age	Sheriffs/Deputies	Protection Occupation
1	4.00%	10.00%
5	1.00%	6.50%
10	1.00%	3.50%
15	1.00%	2.20%
20	1.00%	1.45%
25	1.00%	1.00%
30	1.00%	1.00%

Probability of Electing a Deferred Vested Benefit (effective June 30, 2018)

	Regular Membership					
	Male			Female		
Years of Service	State	School	Other	State	School	Other
5	62.0%	74.0%	62.0%	56.0%	80.0%	70.0%
10	71.0%	79.0%	71.0%	62.0%	80.0%	73.0%
15	76.0%	84.0%	76.0%	72.0%	85.0%	80.0%
20	81.0%	89.0%	81.0%	82.0%	90.0%	85.0%
25	86.0%	94.0%	86.0%	92.0%	95.0%	90.0%
30	90.0%	95.0%	90.0%	100.0%	100.0%	90.0%

Years of Service	Sheriffs/Deputies and Protection Occupation Rate
5	53.0%
10	65.0%
15	85.0%
20	95.0%
25	100.0%
30	100.0%

Rates of Salary Increase* (effective June 30, 2018)

	Annual Increase			
Years of Service	State	School	Other	Sheriffs/Deputies and Protection Occupation
1	14.25%	16.25%	14.25%	16.25%
5	7.75%	5.75%	5.35%	5.75%
10	5.50%	4.55%	4.55%	4.55%
15	4.45%	3.75%	4.05%	4.05%
20	3.85%	3.40%	3.75%	3.75%
25	3.60%	3.25%	3.65%	3.75%
30	3.35%	3.25%	3.65%	3.25%
35+	3.25%	3.25%	3.25%	3.25%

* Includes 3.25 % wage growth

ACTUARIAL COST METHOD (adopted 1996)

The actuarial cost method is a procedure for allocating the actuarial present value of pension plan benefits and expenses to time periods. The method used for the valuation is known as the entry age normal actuarial cost method. Under this method, a total contribution rate is determined which consists of two parts: (i) the normal cost rate and (ii) the unfunded actuarial liability (UAL) rate. The entry age normal cost method has the following characteristics:

(i) The annual normal costs for each individual active member are sufficient to accumulate the value of the member's pension at time of retirement.

(ii) Each annual normal cost is a constant percentage of the member's year by year projected compensation rates.

The entry age normal actuarial cost method allocates the actuarial present value of each member's projected benefits on a level basis over the member's compensation rates between the entry age of the member and the assumed exit ages.

ACTUARIAL AMORTIZATION METHOD (adopted 2013)

The portion of the actuarial present value of benefits allocated to the valuation year is called the normal cost. The portion of the actuarial present value of benefits not provided for by the actuarial present value of future normal costs is called the actuarial liability. Deducting the actuarial value of assets from the actuarial liability determines the unfunded actuarial liability (UAL). The one-year lag between the valuation date and the date the contribution rate is effective is reflected in calculating the corresponding amortization payment. The UAL is amortized according to the Actuarial Amortization Method adopted by the Investment Board and summarized below:

1. Amortization payments will be calculated as a level percentage of payroll.
2. For the actuarial valuation prepared as of June 30, 2013, the amortization period of the UAL shall be 30-year open for all membership groups.
3. For the actuarial valuation prepared as of June 30, 2014:
   a. The UAL for each membership group shall be amortized over a 30-year closed period.
   b. This will be designated as the initial UAL base for subsequent valuations and it will be amortized over the remaining years of the 30-year closed period set on June 30, 2014.
4. For each valuation subsequent to June 30, 2014, annual net experience gains/losses for each membership group will be amortized over a new, closed 20-year period.
5. Subsequent plan amendments or changes in actuarial assumptions or methods that create a change in the UAL will be amortized over a demographically appropriate period selected by the Investment Board at the time that the change is incurred.
6. The dollar amount of the UAL payment for purposes of computing the UAL component of the actuarial and required contribution rate will be the sum of the amortization payments for each amortization schedule divided by the total projected payroll. Unless the plan has been 110 percent funded for the current and prior two years, a negative amortization payment shall be ignored.

7. If the valuation shows that the group has surplus, the prior amortization bases will be eliminated and one base equal to the amount of surplus shall be established. The amortization period of a surplus shall be a 30-year open period for all groups.

ACTUARIAL VALUE OF ASSETS SMOOTHING METHOD (adopted 2007)

The market value of assets, representing a fair value of System assets, may not necessarily be the best measure of the System's ongoing ability to meet its obligations.

To arrive at a suitable value for the actuarial valuation, a technique for determining the actuarial value of assets is used which dampens volatility in the market value while still indirectly recognizing market value. The specific technique follows:

Step 1: Determine the expected value of plan assets at the current valuation date using the actuarial assumption for investment return applied to the prior actuarial value and the actual receipts and disbursements of the fund for the previous 12 months.

Step 2: Subtract the expected value determined in Step 1 from the total market value of the Fund at the current valuation date.

Step 3: Multiply the difference between market and expected values determined in Step 2 by 25%.

Step 4: Add the expected value of Step 1 and the product of Step 3 to determine the actuarial value of assets.

Step 5: Verify the preliminary actuarial value of assets in Step 4 is not more than 120% of the market value of assets nor less than 80% of the market value. If it is, adjust the actuarial value of assets so it falls within the 80% - 120% corridor.

TECHNICAL VALUATION PROCEDURES

Data Procedures

In-pay members:

If a birth date is not available, the member is assumed to be 80. If a retirement date is also not available, the member is assumed to have retired at 65.

If a beneficiary birth date is needed but not supplied, husbands are assumed to be 3 years older than wives.

Not in-pay members:

If a birth date is not available, the member is assumed to be the average age of the members with the same status.

If gender is not provided, regular members are assumed to be female and Sheriffs/Deputies and Protection Occupation members are assumed to be male.

Salaries for first year members are annualized based on the number of quarters with wages.

Membership Transfers

IPERS provides a code in the valuation data to indicate that a member is in a membership group (regular, Sheriffs and Deputies and Protection Occupation) different from that on the prior valuation date. The actuarial liability for these members is calculated under the assumptions and provisions of the prior membership group. A preliminary funded ratio (before asset transfer) is determined for the three membership groups. Assets are then transferred from the prior to the current membership group based on the funded ratio of the prior group times the actuarial liability of the member in the prior group. Then, the members are revalued in the current membership group for purposes of valuation calculations.

Other Valuation Procedures

No actuarial accrued liability in excess of the unclaimed member contribution balance is held for nonvested, inactive members. Inactive vested members who have died are treated in the same manner.

The wages used in the projection of benefits and liabilities are considered earnings for the current year ending June 30, increased by the salary scale.

The calculations for the actuarial contribution rate are determined as of mid-year. This is a reasonable estimate since contributions are made throughout the year.

The projected IRC Section 415 limit for active participants was not valued. The impact was assumed to be *de minimus*.

The compensation limitation under IRC Section 401(a)(17) is considered in this valuation.

No future additions to, or payments from, the Favorable Experience Dividend Reserve Account or the Active Member Supplemental Accounts are reflected in the valuation.

DEFINITION OF TERMS

Accrued Service	Service credited under the system that was rendered before the date of the actuarial valuation.
Actuarial Assumptions	Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the actuarial present value of retirement system benefits between future normal cost and actuarial accrued liability. Sometimes referred to as the "actuarial funding method."
Actuarial Equivalent	A single amount or series of amounts of equal value to another single amount or series of amounts computed on the basis of a given set of actuarial assumptions.
Actuarial Liability	The difference between the actuarial present value of system benefits and the actuarial value of future normal costs. Also referred to as "accrued liability" or "actuarial accrued liability."
Actuarial Present Value	The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest and by probabilities of payment.
Amortization	Paying off an interest-discounted amount with periodic payments of interest and principal, as opposed to paying off with lump sum payment.
Experience Gain (Loss)	The difference between actual experience and actuarial assumptions anticipated experience during the period between two actuarial valuation dates.
Normal Cost	The actuarial present value of retirement system benefits allocated to the current year by the actuarial cost method.

Unfunded Actuarial Liability

The difference between actuarial liability and the actuarial value of assets. Sometimes referred to as "unfunded accrued liability" or "unfunded liability".

Most retirement systems have unfunded actuarial liability. They arise anytime new benefits are added and anytime an actuarial loss is realized.

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APPENDIX D

CONTRIBUTION RATE FUNDING POLICY

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Background:
IPERS is charged with setting a "Required Contribution Rate" for each membership category within IPERS that will discharge its liabilities. Iowa Code §97B.11(3)(d) provides the basic framework for implementing this charge by stating:

> The Required Contribution Rate that is set by the system for a membership category shall be the contribution rate the system actuarially determines, based upon the most recent actuarial valuation of the system and using the actuarial methods, assumptions, and funding policy approved by the Investment Board, is the rate required by the system to discharge its liabilities as a percentage of the covered wages of members in that membership category. However, the Required Contribution Rate set by the system for members in regular service for a fiscal year shall not vary by more than one percentage point from the Required Contribution Rate for the prior fiscal year.

Goal:
To establish policy and procedures in setting contribution rates that combined with investment income will fund the benefits specified in Chapter 97B of the Iowa Code.

To move towards fully funding the benefits (100 percent or greater funded ratio) in as expeditious manner as is reasonable within the guidelines acknowledged herein.

Procedure:
The Investment Board shall retain a consulting actuary to conduct an annual actuarial valuation of assets and liabilities. The consulting actuary shall use the entry age normal cost method and all other actuarial assumptions and methods approved by the Investment Board.

In the annual valuation process, the consulting actuary shall calculate an Actuarial Contribution Rate and a Required Contribution Rate pursuant to this policy. Each shall be calculated as a level percent of pay.

There is a one-year lag between the completion of an annual actuarial valuation report and the fiscal year to which the contribution rates calculated therein are applied. Therefore, the Actuarial Contribution Rate and the Required Contribution Rate declared in the annual valuation process are applicable to the fiscal year immediately following the completion of the valuation report (for example the rates declared in the report presented to the Investment Board in December 2013 are applicable to the rates for the fiscal year beginning July 1, 2014).

Actuarial Contribution Rate (ACR):
1. ACR is the combined employer and employee contribution rate that is the minimum rate necessary to fund the benefits using the actuarial assumptions and methods approved by the Investment Board.

2. A separate ACR shall be determined for each membership group within IPERS according to this policy.

3. The ACR shall consist of:

    a. Normal cost and an amortization payment (not less than zero) of any unfunded actuarial liability.
    b. Normal cost may only be offset by a negative amortization payment after a membership group has attained a funded ratio of 110 percent or greater for 3 consecutive years.

Required Contribution Rate:

1. The Required Contribution Rate is the combined employer and employee rate payable pursuant to this policy and Iowa Code §97B.11(3)(d).

2. The Required Contribution Rate shall be determined by comparing the ACR determined in the annual valuation process to the Required Contribution Rate of the previous year.

   a. If the ACR is less than the previous Required Contribution Rate by fewer than 50 basis points, then the Required Contribution Rate shall remain unchanged from the previous year.

   b. If the ACR is less than the previous Required Contribution Rate by 50 basis points or more, then the Required Contribution Rate shall be lowered by 50 basis points provided the funded ratio of the membership group is 95 percent or higher.

   c. If the ACR is greater than the Required Contribution Rate of the previous year, then the Required Contribution Rate shall be:

      i. Increased to be equal to ACR for Sheriffs and Deputies.
      ii. Increased to be equal to ACR for Protection Occupation Members.
      iii. Increased to be equal to ACR for Regular Members, or one percentage point greater than the prior year's Required Contribution Rate, whichever is smaller.

Policy Guidelines:
In adopting actuarial assumptions and methods to be used in setting contribution rates, the Investment Board shall strive to provide a balance among the following:

1. Stability in contribution rates (such as use of smoothing and amortization schedules that do not produce dramatic swings in the required contributions from year to year).

2. Disciplined funding approach (such as requiring full payment of normal cost and an amortization payment towards the unfunded actuarial liability and deferring decreases in contribution rates until strong funded ratios are attained).

3. Interperiod equity (such as shortening the amortization schedule when reasonable and amortization of retroactive benefit enhancements over a reasonable time period such as the average working lifetime for active members and the average life expectancy of retired members).

4. Support an affordable, sustainable plan (in consultation with the Benefits Advisory Committee review affordability of required contribution rates and/or the benefit provisions).

5. At a minimum, this policy will be reviewed in conjunction with the quadrennial experience study.

IOWA PUBLIC EMPLOYEES' RETIREMENT SYSTEM
CERTIFICATION

This Addendum is being prepared solely for the purpose of providing the information required under Chapter 97 D.5 of the Iowa code. Calculations are based on the following prescribed methods:

Actuarial cost method: Entry Age Normal
Amortization method: Level percent of payroll
Amortization period: 30 years, open period

All other assumptions, methodologies, and System provisions used are consistent with those used in the June 30, 2018 valuation for the Iowa Public Employees' Retirement System.

The results shown in this Addendum may not be consistent with those in the June 30, 2018 valuation. The June 30, 2018 valuation results were determined in accordance with generally accepted actuarial principles and practices that are consistent with the Actuarial Standards of Practice promulgated by the Actuarial Standards Board and the applicable Guides to Professional Conduct, amplifying opinion and supporting recommendations of the American Academy of Actuaries. The results shown in this Addendum are not necessarily based on the methodologies adopted by the System.

We are available to answer any questions on the material contained in this report, or to provide explanations or further details as may be appropriate.

The undersigned credentialed actuaries meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained in this report.

Patrice Beckham

Patrice A. Beckham, FSA, EA, FCA, MAAA

October 29, 2018
Date

Brent A. Banister

Brent A. Banister, PhD, FSA, EA, FCA, MAAA

October 29, 2018
Date

IOWA PUBLIC EMPLOYEES' RETIREMENT SYSTEM
SUMMARY OF VALUATION RESULTS UNDER PRESCRIBED METHODOLOGY
PER CHAPTER 97 D.5

This addendum report has been prepared to present the results of a valuation of the Iowa Public Employees' Retirement System as of June 30, 2018, based on the prescribed methodology under Chapter D.5.

The unfunded actuarial accrued liability has been amortized as a level percent of payroll over 30 years. The payroll growth assumption used was 3.25%.

A summary of results from the current and the prior valuation follows.

	Regular Membership Actuarial Valuation as of	
	June 30, 2018	June 30, 2017
Summary of Costs		
Normal cost	10.49%	10.40%
UAL amortization	4.67%	4.86%
Total	15.16%	15.26%
Less Employee Contribution Rate	(6.29%)	(6.29%)
Employer Required Contribution Rate	8.87%	8.97%
Funded Status		
Actuarial liability	$36,289,160,885	$35,176,950,577
Actuarial value of assets	29,513,302,525	28,292,788,895
Unfunded actuarial liability	$6,775,858,360	$6,884,161,682
Funded Ratio	81.3%	80.4%
Asset Values		
Market value of assets (MVA)	$29,962,905,119	$28,575,257,607
Actuarial Value of Assets (AVA)	29,513,302,525	28,292,788,895
MVA/AVA	102%	101%

	Sheriffs and Deputies Actuarial Valuation as of	
	June 30, 2018	**June 30, 2017**
Summary of Costs		
Normal cost	16.85%	16.85%
UAL amortization	0.56%	2.34%
Total	17.41%	19.19%
Less Employee Contribution Rate	(9.51%)	(9.76%)
Employer Required Contribution Rate	7.90%	9.43%
Funded Status		
Actuarial liability	$697,339,410	$691,205,752
Actuarial value of assets	682,505,577	642,509,070
Unfunded actuarial liability	$14,833,833	$48,696,682
Funded Ratio	97.9%	93.0%
Asset Values		
Market value of assets (MVA)	$693,572,370	$649,668,861
Actuarial Value of Assets (AVA)	682,505,577	642,509,070
MVA/AVA	102%	101%

	Protection Occupation Group* Actuarial Valuation as of	
	June 30, 2018	June 30, 2017
Summary of Costs		
Normal cost	15.22%	16.31%
UAL amortization	0.28%	0.55%
Total	15.50%	16.86%
Less Employee Contribution Rate	(6.61%)	(6.81%)
Employer Required Contribution Rate	8.89%	10.05%
Funded Status		
Actuarial liability	$1,656,333,358	$1,572,225,700
Actuarial value of assets	1,631,947,762	1,537,125,949
Unfunded actuarial liability	$24,385,596	$35,099,751
Funded Ratio	98.5%	97.8%
Asset Values		
Market value of assets (MVA)	$1,658,111,106	$1,554,189,858
Actuarial Value of Assets (AVA)	1,631,947,762	1,537,125,949
MVA/AVA	102%	101%

* Includes all public safety members other than Sheriffs and Deputies.

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PROPRIETARY INFORMATION

www.CavMacConsulting.com

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 Contact Information	
Bidder Name:	Cavanaugh Macdonald Consulting, LLC
Bidder Address:	3550 Busbee Parkway, Suite 250 Kennesaw, GA 30144
Contact Person & Title:	Patrice Beckham, Principal and Consulting Actuary
E-mail Address:	patb@cavmacconsulting.com
Telephone Number (Office):	(402) 905-4461
Telephone Number (Cellular):	(402) 630-4122
Fax Number:	(402) 905-4464

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 State Contact Information	
Bidder Name:	Cavanaugh Macdonald Consulting, LLC.
Bidder Address:	3802 Raynor Parkway, Suite 202 Bellevue, NE 68123
Contact Person & Title:	Patrice Beckham, Principal and Consulting Actuary
E-mail Address:	PatB@CavMacConsulting.com
Telephone Number (Office):	(402) 905-4461
Telephone Number (Cellular):	(402) 630-4122
Fax Number:	(402) 905-4464

CAVANAUGH MACDONALD CONSULTING, LLC.

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Warren Averett
CPAs AND ADVISORS

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PROPRIETARY INFORMATION

www.CavMacConsulting.com

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 Contact Information	
Bidder Name:	Cavanaugh Macdonald Consulting, LLC
Bidder Address:	3550 Busbee Parkway, Suite 250 Kennesaw, GA 30144
Contact Person & Title:	Patrice Beckham, Principal and Consulting Actuary
E-mail Address:	patb@cavmacconsulting.com
Telephone Number (Office):	(402) 905-4461
Telephone Number (Cellular):	(402) 630-4122
Fax Number:	(402) 905-4464

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 State Contact Information	
Bidder Name:	Cavanaugh Macdonald Consulting, LLC.
Bidder Address:	3802 Raynor Parkway, Suite 202 Bellevue, NE 68123
Contact Person & Title:	Patrice Beckham, Principal and Consulting Actuary
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