PUBLIC SCHOOL RETIREMENT SYSTEM
OF THE CITY OF ST. LOUIS

MINUTES OF THE BOARD OF TRUSTEES REGULAR MEETING

February 25, 2019

I. ROLL CALL AND ANNOUNCEMENT OF A QUORUM

The February meeting of the Board of Trustees of the Public School Retirement System of the City of St. Louis (PSRSSTL) was called to order at around 4:30 p.m., Monday, February 25, 2019. The meeting was held in the 2nd floor boardroom of the PSRSSTL office building located at 3641 Olive Street, St. Louis, Missouri. Joseph Clark, Chairman of the Board of Trustees, was the presiding officer.

Roll Call was taken and Trustees Paula Bentley, Joseph Clark, Louis Cross, Sheila Goodwin, Yvette Levy, Bobbie Richardson, Justin Stein and Rick Sullivan were present. The Board of Trustees had a quorum at the meeting. Trustee Christina Bennett joined the meeting in progress. Trustees Angela Banks and Darnetta Clinkscale were absent.

Executive Director, Andrew Clark, PSRSSTL Attorney Representative, Matt Gierse, PSRSSTL Actuary, Troy Jaros, and an interested party were also in attendance.

II. APPROVAL OF MINUTES FROM LAST MEETING

Sheila Goodwin made a motion, seconded by Bobbie Richardson, to approve the minutes of the Board of Trustees Regular Meeting of December 17, 2018.

By voice vote, motion carried.

III. SEATING OF NEW MEMBERS

The Chairman congratulated and welcomed Justin Stein on being elected as an Active Non-Teacher Trustee, and Christina Bennett on being reappointed as a school board Trustee.

IV. READING OF COMMUNICATIONS TO THE BOARD OF TRUSTEES

None

V. PRESENTATIONS BY INTERESTED PARTIES

Retiree, Erma Nevels, expressed concerns over the lack of a COLA. The Chairman corrected Ms. Nevels on misstating a fact regarding the parties responsible for granting a COLA.

VI. CONSENT AGENDA

Louis Cross made a motion, seconded by Sheila Goodwin, to approve the Retirements and Benefits of January and February 2019.

By voice vote, motion carried.

Paula Bentley made a motion, seconded by Sheila Goodwin, to approve the Refunds and Bills of December 2018 and January 2019.

By voice vote, motion carried.

VII. UNFINISHED BUSINESS

None

VIII. REPORT OF THE CHAIRPERSON

The Chairperson informed the Trustees that Committees and Chair appointments for 2019 will be confirmed by the next Board of Trustees regular meeting.

IX. REPORT OF THE EXECUTIVE DIRECTOR

The Executive Director informed the board that Trustee Darnetta Clinkscale is non-compliant with the Code of Ethics Policy for not filing an annual disclosure statement by the deadline.

X. REPORT OF THE INVESTMENT CONSULTANT

None

XI. REPORT OF THE ACTUARY

The Actuary presented information on an Updated Cost Analysis for Legislative Plan Changes. The update included comparisons on the impact of the legislation based on 2017 and 2018 Actuarial Valuation data, and estimated data values as of January 1, 2019. The Actuary emphasized that the updated cost analysis illustrates the impacts of the changes based on investment performance for good and bad years or 2017 and 2018, respectively. The Attorney added that the cost analysis was updated for legal reasons. The Actuary concluded the report by answering questions and concerns from the Trustees.

XII. REPORTS OF COMMITTEES OF THE BOARD OF TRUSTEES

The Chairman asked for reports from the Committees.

<u>Benefits Committee</u>

None

<u>Trustee Business Committee</u>

None

Investment Committee

Joe Clark, Chair of the Investment Committee, reported on the meeting of February 21, 2019, and informed the Trustees that one recommendation was being brought forward by the Committee for consideration by the Trustees.

Sheila Goodwin made a motion, seconded by Bobbie Richardson, to adopt Asset Allocation Policy Mix 2 as presented by the Investment Consultant and as recommended by the Investment Committee.

There was discussion regarding the recommendation until the Chairman called the question.

A roll call vote was taken.

Christina Bennett	No	Paula Bentley	Yes	Joseph Clark	Yes
Louis Cross	Yes	Sheila Goodwin	Yes	Yvette Levy	Yes
Bobbie Richardson	Yes	Justin Stein	Yes	Rick Sullivan	Abstain

With seven yes votes, one no vote and one abstention, motion carried.

Legislative, Rules & Regulations Committee

None

Professional Contracts Committee

Bobbie Richardson, Chair of the Professional Contracts Committee, informed the Trustees that a meeting will be scheduled on Tuesday, March 5, 2019, at 4:30 p.m., to discuss the status of the Investment Consulting Services RFP.

XIII. NEW BUSINESS

Trustee Richard Sullivan asked about Trustees being named in lawsuits. The Attorney responded by stating that the issue would be addressed in closed session under the Report of the Attorney.

XIV. REPORT OF THE ATTORNEY

The Attorney asked the Chairman for a motion to close the meeting to discuss legal matters.

Louis Cross made a motion, seconded by Rick Sullivan, to close the meeting, and that all records and votes, to the extent permitted by law, pertaining to and/or resulting from this closed meeting be closed under R.S.Mo. § 610.021(1), for the purpose of having a confidential or privileged communication with the legal counsel for the PSRSSTL.

A roll call vote was taken.

Christina Bennett	Yes	Paula Bentley	Yes	Joseph Clark	Yes
Louis Cross	Yes	Sheila Goodwin	Yes	Yvette Levy	Yes
Bobbie Richardson	Yes	Justin Stein	Yes	Rick Sullivan	Yes

With nine yes votes, motion carried, and the meeting closed around 5:13 p.m.

Louis Cross made a motion, seconded by Sheila Goodwin, to open the meeting.

A roll call vote was taken.

Christina Bennett	Yes	Paula Bentley	Yes	Louis Cross	Yes
Sheila Goodwin	Yes	Yvette Levy	Yes	Bobbie Richardson	Yes
Justin Stein	Yes	Rick Sullivan	Yes		

With eight yes votes, motion carried, and the meeting opened at around 6:05 p.m.

XV. ADJOURNMENT

Around the time of adjournment, Trustee Christina Bennett, asked Bobbie Richardson, Chair of the Professional Contracts Committee to designate as telephonic the meeting being scheduled for March 5, 2019. The Chair of the Committee agreed to notice the meeting as telephonic.

Louis Cross made a motion, seconded by Sheila Goodwin, to adjourn the meeting.

By voice vote, motion carried, and the meeting adjourned at around 6:05 p.m.

Attachments:

- Retirements & Benefits: January and February 2019
- Refunds & Bills: December 2018 and January 2019
- Presentation and Updated Cost Analysis for Legislative Changes
- PSRSSTL Capital Market Review and Assumptions & Asset Mixes for Consideration

To be Authorized and Approved
by the Board of Trustees

APPLICATIONS FOR RETIREMENT

NAME \ POSITION	RETIREMENT DATE	RETIREMENT TYPE	CREDITED SERVICE	FINAL AVG SALARY	MONTHLY BENEFIT
Pamela Braun Teacher Assistant	12/1/2018	Normal	13.9265	$31,421.51	$729.32
Nancy Briggs Teacher	12/1/2018	Normal	18.4444	$57,236.34	$1,759.49
Lillie Bryant-Simpson Teacher	12/1/2018	Normal	12.7222	$30,187.23	$400.05
Tyrone Van Buren Custodian	12/1/2018	Early	7.5122	$36,921.76	$418.61

To be Authorized and Approved
by the Board of Trustees

APPLICATIONS FOR RETIREMENT

NAME \ POSITION	RETIREMENT DATE	RETIREMENT TYPE	CREDITED SERVICE	FINAL AVG SALARY	MONTHLY BENEFIT
Shaun Albright Recruitment Office Assistant	1/1/2019	Normal	12.1261	$26,029.04	$324.05
Lee Brown Teacher	1/1/2019	Early	13.5278	$61,598.45	$1,265.36
Susan Fletcher Nurse	1/1/2019	Normal	9.9250	$25,566.69	$215.95
Janice Jackson Teacher	1/1/2019	Normal	17.7333	$37,138.30	$1,097.64
Joseph Jones Coordinator VICC	1/1/2019	Early	7.4087	$120,728.63	$1,149.95
Eleanor Patton Safety Officer	1/1/2019	Normal	30.0000	$62,184.17	$3,109.21
Kimberly Schilli	1/1/2019	Early	19.8222	$51,041.24	$1,371.05
Margaret Yehling Teacher	1/1/2019	Normal	27.0833	$67,421.29	$3,043.32

Distributions - December, 2018

CHECK NUMBER	CHECK DATE	LAST NAME	FIRST NAME/MI	GROSS PAY	FEDERAL TAXES W/H	NET PAY	A(ctive) R(etired)	D(eath) S(eparation)	NOTES
074818	12/10/18	BELL	TATYANA	4,802.58	960.52	3,842.06	A	S	CA
074819	12/10/18	COLE	ALEXANDRIA	9,248.65	1,849.73	7,398.92	A	S	CA
074820	12/10/18	HARTIG	CARLEY	7,556.21	1,511.24	6,044.97	A	S	PREMIER
074821	12/10/18	HAYS	HEATHER	7,917.37	1,583.47	6,333.90	A	S	LPA
074822	12/10/18	JONES	JASMINE	4,288.34	857.67	3,430.67	A	S	EAGLE
074823	12/10/18	KENNARD	BRANDON O	1,418.91	283.78	1,135.13	A	S	KIPP
074824	12/10/18	KILMADE	JOSEPH	2,854.97	570.99	2,283.98	A	S	EAGLE
074825	12/10/18	NICOLAY	GENEVIEVE	3,794.01		3,794.01	A	S	PAIDIEA
074826	12/10/18	SMITH	MURIEL	10,000.00		10,000.00	A	S	NSCS
074827	12/10/18	SMITH	MURIEL	5,703.72	1,140.74	4,562.98	A	S	NSCS
074828	12/10/18	BLACK	CRISHON	3,274.65	654.93	2,619.72	A	S	
074829	12/10/18	CHRISTENSEN	DAVID	8,000.00		8,000.00	A	S	
074830	12/10/18	CHRISTENSEN	DAVID	4,407.71	881.54	3,526.17	A	S	
074831	12/10/18	DAVIS	PEGGY	1,347.58	269.52	1,078.06	A	S	
074832	12/10/18	GANIM	KRISHNA	763.26	152.65	610.61	A	S	
074833	12/10/18	HARLEN	ANTOINETTE	11,951.28	2,390.26	9,561.02	A	S	
074834	12/10/18	HENSON	NANNETTE	2,570.98	514.20	2,056.78	A	S	
074835	12/10/18	KEATON	BETTY M	10,342.02	2,068.40	8,273.62	A	S	
074836	12/10/18	MATTHIESEN	AMANDA	70,362.17	14,072.43	56,289.74	A	S	
074837	12/10/18	POWELL	VERONICA N	8,366.24	1,673.25	6,692.99	A	S	
074838	12/10/18	ROBINSON	PATRICE	7,514.53	1,502.91	6,011.62	A	S	
074839	12/14/18	ANTLES	MEGAN	5,029.89	1,005.98	4,023.91	A	S	CA
074840	12/14/18	WALLACE	ARNECIA	4,797.89	959.58	3,838.31	A	S	CA
074841	12/14/18	WALTERS	JAMES	25,333.20	5,066.64	20,266.56	A	S	CA
074842	12/14/18	WILLIAMS	ANDERSON	1,523.06	304.61	1,218.45	A	S	LFL
074843	12/14/18	SCHALLERT	LESA	5,959.65	1,191.93	4,767.72	A	S	
074844	12/14/18	SCHUCK	JENNIFER A	8,848.97		8,848.97	A	S	
074845	12/14/18	DAUGHHETEE	SHERRA	3,213.96	642.79	2,571.17	A	S	
			TOTAL	**$ 241,191.80**	**$ 42,109.76**	**$ 199,082.04**			

Distributions - January, 2019

CHECK NUMBER	CHECK DATE	LAST NAME	FIRST NAME/MI	GROSS PAY	FEDERAL TAXES W/H	NET PAY	A(ctive) R(etired)	D(eath) S(eparation)	NOTES
071925	07/27/16	BETTS	SYMANTHA	(20,000.00)		(20,000.00)	A	S	VOID & REISSUE
074894	01/14/19	BRELAND	RACHEL	2,402.11	480.42	1,921.69	A	S	PREM
074896	01/14/19	DAVIS	MARBLE	1,366.47	273.29	1,093.18	A	S	KIPP
074897	01/14/19	DONELSON	MARLENE	947.68	189.54	758.14	A	S	CA
074898	01/14/19	HAYNES	BRANDON	5,045.20		5,045.20	A	S	KIPP
074899	01/14/19	MCNERNEY	KELLY	2,361.64		2,361.64	A	S	CGMCS SCPA
074900	01/14/19	REHBEIN	ELIZABETH	2,381.91		2,381.91	A	S	KIPP
074901	01/14/19	REYES	ALEJANDRA	4,767.93	953.59	3,814.34	A	S	KIPP
074902	01/14/19	RYAN	NEAL	2,142.66		2,142.66	A	S	KIPP
074903	01/14/19	TORRINI	RUDOLPH	674.32	134.86	539.46	A	S	PREM
074904	01/14/19	BUCKLEY	JENNIFER G	40,637.74		40,637.74	A	S	
074905	01/14/19	HARRIS	TERESA	12,378.54	2,475.71	9,902.83	A	S	
074906	01/14/19	JONES	EDMUND V	2,740.27		2,740.27	A	S	
074907	01/14/19	JONES	TIFFANY	7,233.43	1,446.69	5,786.74	A	S	
074908	01/14/19	LANGNESS	BRIANNA	1,383.02		1,383.02	A	S	
074909	01/14/19	LAWRENCE	CHARMAINE	29,583.96	5,916.79	23,667.17	A	S	
074910	01/14/19	PRICE III	GEORGE S	1,712.80	342.56	1,370.24	A	S	
074911	01/14/19	RAGGETTE	DENISE	1,108.58	221.72	886.86	A	S	
074912	01/14/19	SMITH	CARLON	4,444.88	888.98	3,555.90	A	S	
074913	01/14/19	CHINNI	SHANE	3,239.26	647.85	2,591.41	A	S	KIPP
074932	01/25/19	BROWN	FREDERICK	5,804.98		5,804.98	A	S	CA
074933	01/25/19	BROWN	JESSICA M	3,354.05		3,354.05	A	S	CA KIPP
074934	01/25/19	CAVDAR	ABDULLAH S	13,333.24	2,666.65	10,666.59	A	S	GSA
074935	01/25/19	CLARK	BROOK R	639.69	127.94	511.75	A	S	KIPP
074936	01/25/19	DAVIS	RAMIA	4,288.06	857.61	3,430.45	A	S	KIPP
074937	01/25/19	DOWNS	ERIN	7,134.44		7,134.44	A	S	LFL
074938	01/25/19	ENGLAND	TAM W	20,401.19		20,401.19	A	S	AQS-GC, GCAA, SLPS
074939	01/25/19	GRAMKE	ERICA	1,024.15	204.83	819.32	A	S	LSMS
074940	01/25/19	HARGIS	LILIA K	17,131.64		17,131.64	A	S	EAGLE SLPS
074941	01/25/19	MCELROY	CHERIE	4,683.64	936.73	3,746.91	A	S	PREM SCPA
074942	01/25/19	PASTOR	JOSEPH	2,451.27		2,451.27	A	S	PREM
074943	01/25/19	POWERS	STACY	4,858.86	971.77	3,887.09	A	S	CA
074944	01/25/19	VAUGHN	SANDRA	18,283.81	3,656.76	14,627.05	A	S	IESM, HLSG
074945	01/25/19	WANG	OLIVIA	9,277.86	1,855.57	7,422.29	A	S	SLLIS

Distributions - January, 2019

CHECK NUMBER	CHECK DATE	LAST NAME	FIRST NAME/MI	GROSS PAY	FEDERAL TAXES W/H	NET PAY	A(ctive) R(etired)	D(eath) S(eparation)	NOTES
074946	01/25/19	WILLHITE	CIARA	3,505.09	701.02	2,804.07	A	S	KIPP SLPS
074947	01/25/19	WILLIBA	MALYNDA	438.40	87.68	350.72	A	S	CA
074948	01/25/19	WRIGHT	ASHELY	2,361.20		2,361.20	A	S	PREC
074949	01/25/19	ABERCROMBIE	JAMIA	1,725.35	345.07	1,380.28	A	S	
074950	01/25/19	BROWNLEE	AINTWON	3,567.67	713.53	2,854.14	A	S	
074951	01/25/19	BYRD	DEKYSHA N	3,485.31	697.06	2,788.25	A	S	
074952	01/25/19	CULLEN	ESTHER A	2,487.93	497.59	1,990.34	A	S	
074953	01/25/19	DAVIS	LASHONDA	7,834.35	1,566.87	6,267.48	A	S	
074954	01/25/19	EBERHART	ALLEN	1,438.70	287.74	1,150.96	A	S	
074955	01/25/19	GRIFFIN	GENEVIEVE	9,042.71	1,808.54	7,234.17	A	S	
074956	01/25/19	GLOVER	TONY	27,137.07	5,427.41	21,709.66	A	S	
074957	01/25/19	MILLER	TRILINDA	29,499.75	5,899.95	23,599.80	A	S	
074958	01/25/19	ROBINSON	NORMAN	5,649.47	1,129.89	4,519.58	A	S	
074959	01/25/19	STAFFORD	BENJAMIN	1,171.50	234.30	937.20	A	S	
074960	01/25/19	STIGERS	JOSHUA	30,520.92		30,520.92	A	S	
074961	01/25/19	THOMAS	SHARON	3,915.34	783.07	3,132.27	A	S	
074962	01/25/19	WHITT	MELVIN	2,689.43	537.89	2,151.54	A	S	
074963	01/25/19	WOTEN	GAYLEN	391.11	78.22	312.89	A	S	
074964	01/25/19	BETTS	SYMANTHA	20,000.00		20,000.00	A	S	VOID & REISSUE
			TOTAL	**$ 376,080.58**	**$ 46,045.69**	**$ 330,034.89**			

Public School Retirement System of the City of St. Louis
Checks Written During the Month of December, 2018

Payee	Ck. Number	Description	Amount
Date Paid December 5, 2018			
Ameren Missouri	74797	Electric Service	2,248.08
Office Essentials	74798	Office Supplies	527.11
Republic Services #346	74799	Trash Pick-Up	177.55
OffsiteDataSync	74800	Online Backups	321.50
Minuteman Press	74801	Fall Newsletters, Envelopes	2,494.14
ACC Business	74802	Telephone Fiberoptics	529.76
Specialty Mailing	74803	Service - Election Mailing	805.32
Specialty Mailing	74804	Service - Fall Newsletter	930.92
Jupiter Consulting Services, LLC	74805	Programming Consulting	8,253.00
FreedomVoice	74806	Telephone Service	388.24
Crossroad Courier, Inc.	74807	Courier Service	7.49
Konika Minolta Business Solutions USA Inc.	74808	Service - Copier C364E	826.84
Arthur J. Gallagher Risk Mgmt. Services, Inc.	74809	Public Official Bond - Louis C. Cross, III, Treas.	1,296.00
The Hartford	74810	Business Owners, Workers Compensation	17,196.00
Mellon Capital Management Corporation	74811	3rd Quarter 2018 Management Fee	65,254.41
Mellon Capital Management Corporation	74812	3rd Quarter 2018 Management Fee	673.48
NEPC, LLC	74813	3rd Quarter 2018 Consulting Fee	33,612.37
NEPC, LLC	74814	3rd Quarter 2018 Alt. Investment Mgmt. Fee	12,500.00
Board of Education St. Louis Benefits Trust	74815	Office Employees Insurance - Dental	212.33
Board of Education St. Louis Benefits Trust	74816	Office Employees Insurance - Vision	15.55
Board of Education St. Louis Benefits Trust	74817	Office Employees Insurance - Life	135.35
Date Paid December 7, 2018			
Office Payroll	ACH	Office Payroll	11,082.80
AXA Equitable	ACH	457 Contributions	2,070.00
Date Paid December 19, 2018			
Absopure Water Company	74846	Water Cooler Service	132.65
Blade Technologies, Inc.	74847	Professional Services	1,426.84
Crossroads Courier, Inc.	74848	Courier Service	7.22
Charter Communications	74849	Charter Internet and Voice	189.96
Specialty Mailing	74850	Postage - Daily Pickup	190.00
Specialty Mailing	74851	Postage - Election Notice	1,898.67
Hartnett Gladney Hetterman, L.L.C.	74852	Legal Fees	3,783.50
Office Essentials	74853	Office Supplies	943.40
The Berwyn Group	74854	Death Check Verification Services	50.00
AT&T	74855	Monthly Service Charge	243.63
MSD	74856	Sewer Service	57.68
Randy Elam	74857	License Renewal - Website Backup Tool	40.00
Jupiter Consulting Services, LLC	74858	Programming Consulting	3,150.00
Gallagher Benefit Services, Inc.	74859	Group Ins. Consulting Services Monthly Fee	3,320.25
Buck Global, LLC	74860	Actuarial & Consulting Services - November 2018	6,166.00
Microtek Document Imaging Systems, Inc.	74861	Imaging Hosting - November 2018, Scanning	508.99
BuildingStars STL Operations, Inc.	74862	Janitorial Services	1,386.00
Minuteman Press	74863	Envelopes	122.75
MVP Security LLC - SRG	74864	July thru December Parking - 2 Employees	780.00
Purchase Power	74865	Postage	500.00
Pitney Bowes Global Financial Services LLC	74866	Lease Charges	1,410.00
Pitney Bowes, Inc.	74867	Postage Supplies	153.42
NCTR	74868	2019 Membership - Annual Renewal	2,000.00
Tiffany Jones	74869	Earned and Unused Vacation	436.76
Date Paid December 21, 2018			
Office Payroll	ACH	Office Payroll	11,082.80
AXA Equitable	ACH	457 Contributions	2,070.00
Diana S. Daugherty, Chapter 13 Trustee	74870	Case No. xx-xx907	400.00
		TOTAL	**$204,008.76**

Public School Retirement System of the City of St. Louis
Checks Written During the Month of January, 2019

Payee	Ck. Number	Description	Amount
Date Paid January 4, 2019			
Office Payroll	ACH	Office Payroll	9,928.36
AXA Equitable	ACH	457 Contributions	2,040.00
Date Paid January 7, 2019			
Ameren Missouri	74871	Electric Service	2,476.62
Office Essentials	74872	Office Supplies	275.96
Republic Services #346	74873	Trash Pick-Up	177.55
OffsiteDataSync	74874	Online Backups	321.50
ACC Business	74875	Telephone Fiberoptics	529.76
Specialty Mailing	74876	Service - Ballot Mailing	2,328.56
Crossroad Courier, Inc.	74877	Courier Service	20.63
BuildingStars STL Operations, Inc.	74878	Janitorial Supplies	834.57
MVP Security LLC - SRG	74879	January 2019 Parking - 2 Employees	130.00
GCI Security, Inc.	74880	Security Guard 12/17/2018	144.00
Shred-It USA	74881	Document Shredding	91.49
Gregory F.X. Daly, Collector of Revenue	74882	City Earnings Tax - Fourth Quarter 2018	894.40
Andrew Clark	74883	Office Supplies	27.27
American Solutions For Business	74884	1099R Forms and Envelopes	889.22
CBRE - 608844	74885	Management Fee - December 2018	1,138.47
CBRE - 608844	74886	Engineer Services	271.13
St. Louis Mat & Linen Company	74887	Floor Mats	241.50
Delta Pest Stl Inc.	74888	Pest Control	100.00
Weber Fire and Safety	74889	Annual Inspection, Maintenance	317.58
Systematic Financial Management, LP	74890	4th Quarter 2018 Management Fee	64,960.75
Board of Education St. Louis Benefits Trust	74891	Office Employees Insurance - Dental	185.95
Board of Education St. Louis Benefits Trust	74892	Office Employees Insurance - Vision	11.65
Board of Education St. Louis Benefits Trust	74893	Office Employees Insurance - Life	125.20
Date Paid January 18, 2019			
Office Payroll	ACH	Office Payroll	10,025.30
AXA Equitable	ACH	457 Contributions	2,040.00
Date Paid January 22, 2019			
Absopure Water Company	74914	Water Cooler Service	53.85
Blade Technologies, Inc.	74915	Professional Services	1,293.34
Crossroads Courier, Inc.	74916	Courier Service	14.45
Charter Communications	74917	Charter Internet and Voice	189.96
Hartnett Gladney Hetterman, L.L.C.	74918	Legal Fees	5,264.00
Office Essentials	74919	Office Supplies	797.79
The Berwyn Group	74920	Death Check Verification Services	2,000.00
AT&T	74921	Monthly Service Charge	252.74
MSD	74922	Sewer Service	57.68
Gallagher Benefit Services, Inc.	74923	Group Ins. Consulting Services Monthly Fee	3,320.25
Buck Global, LLC	74924	Actuarial & Consulting Services - December 2018	4,874.00
BuildingStars STL Operations, Inc.	74925	Janitorial Services	1,386.00
Purchase Power	74926	Postage	500.00
Freedom Voice	74927	Telephone Service	388.24
Windstream Communications	74928	Telephone, Data	88.68
Piedmont Investment Advisors, LLC	74929	4th Quarter 2018 Management Fee	8,633.85
TCW Asset Management Company	74930	4th Quarter 2018 Management Fee	49,359.18
Progress Investment Management Co., LLC	74931	4th Quarter 2018 Management Fee	75,020.37
Date Paid January 31, 2019			
Specialty Mailing	74965	Postage - 1099R Mailing	2,428.11
Republic Services #346	74966	Trash Pick-Up	177.55
MAPERS	74967	Plan Sponsor Membership Dues - 2019	100.00
		TOTAL	**$256,727.46**

Public School Retirement System of the City of St. Louis, Missouri

Updated Cost Analysis for Legislative Plan Changes

February 25, 2019

BUCK

Summary of Plan Changes

- **A summary of the changes in plan provisions contained in CCS HCS SS SB 62 are as follows:**

  1. Reduce the "Rule of 85" unreduced retirement from age plus service equal to 85 to 80 (i.e. change it to a "Rule of 80").

  2. Change the percent of pay benefit multiplier from 2.00% of Average Final Compensation to 1.75% of Average Final Compensation for members hired on or after January 1, 2018.

  3. For employees hired before January 1, 2018, change the employee contribution requirement from a flat 5.0% of compensation to 9.0% in 0.5% annual increments. For employees hired on or after January 1, 2018, the employee contribution requirement will be a flat 9.0% immediately upon entering the system.

  4. The employer contribution rate will be set at a flat 16.0% of covered payroll for Plan Year 2018. This contribution rate shall be decreased by 0.5% in each subsequent Plan Year until reaching 9.0% of covered payroll. After this, the employer contribution rate will remain at 9.0% of covered payroll.

Impact on January 1, 2018 Valuation Results

- Below is a summary of the contribution amount before and after the changes contained in CCS HCS SS SB 62

	Old Plan Provisions	Rule of 80 Only	All Plan Changes
Unfunded frozen actuarial accrued liability	236,139,939	252,241,956	252,911,307
a - Increase in EAN accrued liability	-	16,102,017	16,771,368
Normal cost contribution	26,057,446	27,711,887	21,038,975
AAL contribution	24,329,252	25,988,226	26,057,188
Recommended Employer Contribution	50,386,698	53,700,113	47,096,163
a - Contribution Rate	18.96%	20.21%	17.72%
Recommneded Contribution by Employer Type:			
Board of Education	37,140,486	39,582,834	34,715,003
Retirement System	105,444	112,378	98,558
Charter Schools	13,140,768	14,004,901	12,282,602
Total	50,386,698	53,700,113	47,096,163

- If Rule of 80 were the only change, the contribution increases
  - Contribution amount increases by $3.3 million. Contribution rate increases by 1.25%.
  - Members expected to retire sooner – benefits paid longer
- With all changes incorporated, the contribution decreases
  - Contribution amount decreases by $3.3 million. Contribution rate decreases by 1.24%.
  - Primarily due to normal cost contribution going down, which reflects higher future participant contributions.
- Comparison to previous results based on January 1, 2017 valuation:
  - Only Rule of 80 results pretty similar
  - All changes results have a $1.0 million larger contribution decrease

Impact on Future Financial Health of the Plan

- Below is a summary of the projected funded ratio in 2034, along with the cumulative shortfall in contributions:

	Old Plan Provisions	Rule of 80 Only	All Plan Changes
Funded Ratio	93.76%	93.88%	92.05%
Cumulative Contribution Shortfall	-	-	44,542,000

- Only reflecting Rule of 80 change comes out slightly better than current plan
  - This is due to higher contribution rates and additional investment returns
- All changes reflected have a negative impact on future status of the plan
  - Funded ratio is 1.7% lower
  - Total contribution shortfall is $44.5 million
- Comparison to previous results based on January 1, 2017 valuation:
  - Funded ratio after 15 years with all plan changes is 12.0% higher
    - 92.05% vs. 80.06%
  - Cumulative contribution shortfall is $188.0 million lower
    - $44.5 million shortfall vs. $232.5 million shortfall
  - This is primarily due to the better than expected market return in 2017
    - 15.22% vs. 7.50% assumed
- The above results are assuming assumptions are realized. Adverse plan experience will add to the negative impact of all plan changes.

Impact on Future Financial Health of the Plan using Estimated Assets as of January 1, 2019

- Below is a summary of the projected funded ratio in 2034, along with the cumulative shortfall in contributions:

	Old Plan Provisions	Rule of 80 Only	All Plan Changes
Funded Ratio	89.53%	89.89%	72.15%
Cumulative Contribution Shortfall	-	-	451,269,000

- Estimated assets as of January 1, 2019 based on the following:
    - Actual market value as of November 30, 2018
    - Assumed 0% return from November 30 through December 31
    - Actual December benefit payments and contributions are reflected
- One year of poor returns has a negative impact on future status of the plan:
    - Compared to results using the expected asset return in 2018
        - Funded ratio is 19.9% lower in 2034
        - Cumulative contribution shortfall is $406.7 million higher

Disclosures

The cost analysis results in this presentation were developed for the Public School Retirement System of the City of St. Louis ("PSRS") by Buck using generally accepted actuarial principles and techniques in accordance with all applicable Actuarial Standards of Practice (ASOPs).

- The cost analysis results are based on member data and financial information as provided by the PSRS staff. We reviewed the data for reasonableness and consistency with data for the prior valuation, but performed no audit of the data.

- The cost analysis results are based on the assumptions as those shown in the cost analysis letter with exhibits, dated January 18, 2019.

- Future actuarial measurements may differ significantly from the current measurements shown in this presentation due to plan experience differing from that anticipated by the economic and demographic assumptions, changes expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions, applicable law or regulations. An analysis of the potential range of such future differences is beyond the scope of the valuations summarized here.

- Use of these cost analysis results for any other purpose may not be appropriate and may result in mistaken conclusions due to failure to understand applicable assumptions, methodologies, or inapplicability of the valuation results for that purpose. Because of the risk of misinterpretation of actuarial results, Buck should be asked to review any statement to be made on the basis of the results contained in this presentation. Conduent will not accept any liability for any such statement made without such prior review.

- Troy Jaros is a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. He meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this presentation. He is available to answer any questions on the material contained in this presentation, or to provide explanations or further details as may be appropriate.

9401 James Avenue
Suite 140
Bloomington, MN 55431

January 18, 2019

Mr. Andrew Clark
Executive Director
PSRS of the City of St. Louis
3641 Olive Street, Suite 300
St. Louis, MO 63108-3601

RE: Public School Retirement System of the City of St. Louis - Section 105.665 Cost Statement – Updated from previous letter dated December 12, 2017

Dear Members of the Public School Retirement System of the City of St. Louis Board:

The purpose of this letter is to provide the Public School Retirement System of the City of St. Louis Board with an updated cost statement that may be required under the Missouri Revised Statute Section 105.665 in connection with the changes contained in CCS HCS SS SB 62 or other legislation containing the same provisions. This statement is updated for two reasons:

1. Reflect the census data and actuarial valuation results as of January 1, 2018
2. Reflect a comparison using the actuarial results as of January 1, 2018, but also using an estimated January 1, 2019 asset value reflecting assumed returns in 2018.

A summary of the changes in plan provisions contained in CCS HCS SS SB 62 that are subject to this statement are as follows:

1. Reduce the "Rule of 85" unreduced retirement from age plus service equal to 85 to 80 (i.e. change it to a "Rule of 80").
2. Change the percent of pay benefit multiplier from 2.00% of Average Final Compensation to 1.75% of Average Final Compensation for members hired on or after January 1, 2018.
3. For employees hired before January 1, 2018, change the employee contribution requirement from a flat 5.0% of compensation to 9.0% in 0.5% annual increments. For employees hired on or after January 1, 2018, the employee contribution requirement will be a flat 9.0% immediately upon entering the system.
4. The employer contribution rate will be set at a flat 16.0% of covered payroll for Plan Year 2018. This contribution rate shall be decreased by 0.5% in each subsequent Plan Year until reaching 9.0% of covered payroll. After this, the employer contribution rate will remain at 9.0% of covered payroll.

Our updated cost statement, numbered to correspond with Section 105.665, follows below:

1. The level normal cost of plan benefits previously in effect would have been $26,057,446 or 9.80% of expected mid-year covered payroll, as presented in Exhibit 1.

2. The contribution amount for the Unfunded Actuarial Accrued Liability would have been $24,329,252 or 9.16% of expected mid-year covered payroll as presented in Exhibit 1. The amortization period used to determine this amount was 18 years.

3. The total required contribution amount from items one and two above is $50,386,698 or 18.96% of expected mid-year covered payroll.

4. The total contribution rate under the previous plan provisions as defined in item three above would have been paid by all of the employers in the Plan.

5. The plan's actuarial value of assets was $899,816,911 as of January 1, 2018, the market value of assets was $914,082,259, the actuarial accrued liability under the Entry Age Normal cost method would have been $1,249,241,347, and the funded ratio would have been 72.03%.

6. The total required pre-change contribution amount would have been $50,386,698, or 18.96% of expected mid-year covered payroll. This amount was determined assuming that the changes in the plan provisions were not effective with the January 1, 2018 actuarial valuation. The calculation of this amount is presented in Exhibit I. The total required post-change contribution amount, determined as of the January 1, 2018 valuation was $47,096,163, or 17.72% of expected mid-year covered payroll. This amount was determined assuming all applicable plan provisions and assumptions as indicated in the January 1, 2018 actuarial valuation.

7. A 15-year projection of annual plan costs and funded ratios is presented in Exhibit II. There are three different projection results shown: i) using the old plan provisions, ii) only reflecting changing the Rule of 85 to the Rule of 80, and iii) reflecting all plan changes contained in CCS HCS SS SB 62.

8. CCS HCS SS SB 62 mandates employer contributions as 16.0% in the first year of implementation, 15.5% in the second year, 15.0% in the third year, 14.5% in the fourth year, 14.0% in the fifth year, 13.5% in the sixth year, 13.0% in the seventh year, 12.5% in the eighth year, 12.0% in the ninth year, 11.5% in the tenth year, 11.0% in the eleventh year, 10.5% in the twelfth year, 10.0% in the thirteenth year, 9.5% in the fourteenth year, or 9.0% in the fifteenth year or any year thereafter.

9. The proposed plan changes will impair the ability of the plan to meet the obligations due to the employer contribution being lower than the actuarially determined contribution in years when the statutory employer contribution rate is lower than the actuarially determined contribution rate. The total amount of the shortfall of employer contributions through 2034 is projected to be $44,542,000.

10. Exhibit III presents the three projections as above: i) using the old plan provisions, ii) only reflecting changing the Rule of 85 to the Rule of 80, and iii) reflecting all plan changes contained in CCS HCS SS SB 62, but with estimated January 1, 2019 asset values. The estimated asset value reflects actual market value as of November 30, 2018 and rolls forward to January 1, 2019 assuming a 0% return for December. Actual benefit payments and contributions in December were reflected in this calculation.

    This exhibit displays the impact of a year with asset returns lower than the assumed 7.50% rate of return. For the projection period, we are now showing a shortfall of employer contributions through 2034 as $451,269,000 compared to the $44,542,000 above assuming a 7.50% return in 2018. In comparison, the projected funded ratio in 2034 under this scenario is 72.15% compared to the 92.05% assuming a 7.50% return in 2018.

11. The actuarial assumptions used in the January 1, 2018 actuarial valuation are presented in Exhibit IV. Any assumptions used for the projections that are not listed in Exhibit IV are included with the projection results in Exhibit II and Exhibit III.

12. The Actuary's certification is below.

13. The actuarial funding method used in preparing the valuation along with the method applied in amortizing the Unfunded Actuarial Accrued Liability is described in Exhibit IV.

In preparing the actuarial valuation and this cost analysis, we have employed generally accepted actuarial methods and assumptions, in conjunction with employee data and financial information provided to us by the System, to determine a sound value for the System liability. The employee data has not been audited, but it has been reviewed and found to be consistent, both internally and with prior years' data. The validity of the cost analysis results is dependent upon the accuracy of the data and financial information provided.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the System and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under the System. The actuary performs an analysis of System experience periodically and recommends changes if, in the opinion of the actuary, assumption changes are needed to more accurately reflect expected future experience. The Experience Study for the period January 1, 2011 to December 31, 2015 was prepared by Buck and approved by the Board for use beginning with the January 1, 2017 actuarial valuation and will remain in effect for valuation purposes until such time as the Board adopts revised assumptions. The next Experience Study will be based on the period from January 1, 2016 to December 31, 2020 and upon approval by the Board will be the basis of valuations performed from January 1, 2022 through January 1, 2026. A summary of all assumptions and methods used are as described in this report.

Where presented, references to "funded percent" and "unfunded accrued liability" typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities.

Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

Future contribution requirements may differ from those determined in the cost analysis because of:

(1) differences between actual experience and anticipated experience based on the assumptions;

(2) changes in actuarial assumptions or methods;

(3) changes in statutory provisions;

(4) differences between actuarially required contributions and actual contributions. Due to the limited scope of the assignment, we did not perform an analysis of the potential range of future contributions other than incorporating updated asset return information for 2018.

The undersigned meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein, and is available to answer questions regarding this report.

I believe that the assumptions and methods used for these estimates are individually and in aggregate, reasonable and in combination represent a best estimate of anticipated experience under the plan. I believe that this report conforms with the requirements of the Missouri statutes, and where applicable, other federal and accounting laws, regulations and rules, as well as actuarial principles and practices in accordance with all Actuarial Standards of Practice (ASOPs).

Sincerely,

Troy Jaros, FSA, EA, MAAA, FCA
Director, Retirement Actuary

St. Louis PSRS
Determination of Employer Contribution
2018

		Old Plan Provisions	Rule of 80 Only	All Plan Changes
1.	Actuarial present value of future benefits			
a.	Active participants			
	i. Retirement benefits	378,041,210	400,526,731	401,152,551
	ii. Vested withdrawal benefits	54,162,592	51,265,454	51,489,121
	iii. Refund of contributions	7,565,257	7,565,257	8,055,910
	iv. Survivor benefits	4,902,546	4,493,199	4,509,859
	v. Disability benefits	11,831,337	10,981,304	10,984,219
	Total	456,502,942	474,831,945	476,191,660
b.	Retired participants and beneficiaries	901,926,852	901,926,852	901,926,852
c.	Inactive participants			
	i. Vested participants	25,299,400	25,299,400	25,299,400
	ii. Nonvested participants	7,779,159	7,779,159	7,779,159
	Total	33,078,559	33,078,559	33,078,559
d.	Total actuarial present value of future benefits	1,391,508,353	1,409,837,356	1,411,197,071
2.	Unfunded frozen actuarial accrued liability as of January 1, 2018	236,139,939	252,241,956	252,911,307
3.	Actuarial value of assets as of December 31, 2017	899,816,911	899,816,911	899,816,911
4.	Actuarial present value of future participant contributions	88,398,847	85,615,575	127,776,813
5.	Actuarial present value of future employer normal costs (1)(d) - (2) - (3) - (4), not less than $0	167,152,656	172,162,914	130,692,040
6.	Actuarial present value of future covered compensation of current participants	1,767,976,934	1,712,311,502	1,712,311,502
7.	Employer normal cost rate, (5) / (6)	9.45%	10.05%	7.63%
8.	Total covered payroll	265,773,659	265,773,659	265,773,659
9.	Normal cost for 2018	25,115,611	26,710,253	20,278,530
10.	Normal cost contribution for 2018 (9) adjusted for interest to end of year	26,057,446	27,711,887	21,038,975
11.	AAL contribution for 2018	24,329,252	25,988,226	26,057,188
12.	Recommend Employer Contribution for 2018	50,386,698	53,700,113	47,096,163
Recommended Contribution by Employer Type				
	Board of Education	37,140,486	39,582,834	34,715,003
	Retirement System	105,444	112,378	98,558
	Charter Schools	13,140,768	14,004,901	12,282,602
		50,386,698	53,700,113	47,096,163

Public School Retirement System of the City of St. Louis
January 1, 2018 Projections

Baseline Projection - Old Plan Provisions Before Changes
(numbers in thousands)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Liabilities																	
Present Value of Futre Benefits	1,391,508	1,385,496	1,389,744	1,394,089	1,399,595	1,405,241	1,411,659	1,419,403	1,428,420	1,439,802	1,452,707	1,467,600	1,484,546	1,502,369	1,523,002	1,546,053	1,570,799
Entry Age Normal (EAN) Accrued Liability	1,249,241	1,240,855	1,242,915	1,245,318	1,248,889	1,252,427	1,256,525	1,261,835	1,268,323	1,277,013	1,287,097	1,298,941	1,312,679	1,327,178	1,344,307	1,363,632	1,384,425
Funded Percent*	72.03%	73.43%	74.38%	75.30%	76.30%	77.38%	78.54%	79.79%	81.10%	82.50%	83.97%	85.49%	87.07%	88.68%	90.35%	92.04%	93.76%
Salary																	
Legacy	265,774	228,793	203,433	184,749	170,483	159,472	149,945	141,218	133,188	125,702	118,733	111,831	105,201	98,830	92,534	86,331	80,145
New Employees	-	35,960	62,852	84,530	102,534	118,125	132,724	146,853	160,629	174,247	187,603	201,010	214,393	227,752	241,203	254,721	268,428
Total	265,774	264,753	266,285	269,279	273,017	277,597	282,669	288,071	293,817	299,949	306,336	312,841	319,594	326,582	333,737	341,052	348,573
Employee Contribution Rates																	
Legacy	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
New Employees	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Employer Contribution Rates																	
Calculated Rate	19.10%	18.96%	18.00%	17.54%	17.11%	16.65%	16.17%	15.66%	15.17%	14.67%	14.18%	13.70%	13.22%	12.77%	12.31%	11.86%	11.42%
Statutory Rate	19.10%	18.96%	18.00%	17.54%	17.11%	16.65%	16.17%	15.66%	15.17%	14.67%	14.18%	13.70%	13.22%	12.77%	12.31%	11.86%	11.42%
Employee Contributions																	
Legacy	13,289	11,440	10,172	9,237	8,524	7,974	7,497	7,061	6,659	6,285	5,937	5,592	5,260	4,942	4,627	4,317	4,007
New Employees	-	1,798	3,143	4,227	5,127	5,906	6,636	7,343	8,031	8,712	9,380	10,051	10,720	11,388	12,060	12,736	13,421
Total Employee Contributions	13,289	13,238	13,315	13,464	13,651	13,880	14,133	14,404	14,690	14,997	15,317	15,643	15,980	16,330	16,687	17,053	17,428
Employer Contributions																	
Statutory	50,763	50,197	47,931	47,231	46,713	46,220	45,708	45,112	44,572	44,003	43,438	42,859	42,250	41,704	41,083	40,449	39,807
Assets																	
Market Value (MVA)	914,082	929,538	946,524	962,818	980,661	999,105	1,018,801	1,040,386	1,063,725	1,089,896	1,118,115	1,148,781	1,182,028	1,216,753	1,254,879	1,295,961	1,339,331
Actuarial Value (AVA)	899,817	911,119	924,534	937,756	952,958	969,130	986,872	1,006,776	1,028,671	1,053,599	1,080,749	1,110,496	1,142,953	1,176,998	1,214,539	1,255,119	1,298,057
Contribution Development for Following Year																	
Amortization Period	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
Plan Changes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unfunded Actuarial Accrued Liability**	236,140	230,087	221,253	213,245	204,702	195,471	185,487	174,718	163,242	150,938	137,796	123,792	108,849	93,005	76,111	58,208	39,283
Amortization of UAAL	24,329	24,389	24,203	24,158	24,113	24,055	23,979	23,884	23,782	23,662	23,526	23,372	23,190	22,988	22,724	22,383	21,878
Normal Cost	26,057	23,266	22,516	21,903	21,357	20,823	20,294	19,815	19,327	18,859	18,434	17,981	17,607	17,212	16,862	16,560	16,274
Annual Required Contribution***	50,387	47,655	46,719	46,061	45,471	44,878	44,274	43,699	43,109	42,521	41,959	41,353	40,797	40,200	39,587	38,943	38,152
Contribution Rate	18.96%	18.00%	17.54%	17.11%	16.65%	16.17%	15.66%	15.17%	14.67%	14.18%	13.70%	13.22%	12.77%	12.31%	11.86%	11.42%	10.95%

* Using EAN Liability and AVA
**Includes any plan changes
***May differ from summing due to rounding

Projection Assumptions:

(1) New Entrants: Active membership assumed to stay at the January 1, 2018 level throughout projection (5,138 active members), New Entrants coming into the plan have the average characteristics of new employees over the last five years.

(2) Expenses: Plan expenses paid are assumed to remain at the 2017 level ($1,614,000)

(3) Expense & Contingency Reserve: The expense & contingency reserve is assumed to remain at the January 1, 2018 level ($30,751,000)

(4) Deferred Vested Members: Deferred vested members are assumed to receive 150% of their account balance at age 65.

(5) Non-vested Terminated Members: Non-vested terminated members are assumed to receive 100% of their account balance at age 65.

Public School Retirement System of the City of St. Louis
January 1, 2018 Projections

Rule of 80 Projection - Rule of 85 changed to Rule of 80
(numbers in thousands)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Liabilities																	
Present Value of Futre Benefits	1,409,837	1,405,707	1,411,498	1,417,199	1,423,870	1,430,512	1,437,767	1,446,258	1,455,919	1,467,749	1,480,814	1,495,696	1,512,468	1,529,987	1,550,218	1,572,773	1,597,039
Entry Age Normal (EAN) Accrued Liability	1,265,343	1,258,951	1,262,661	1,266,498	1,271,299	1,275,846	1,280,760	1,286,804	1,293,886	1,302,955	1,313,095	1,324,835	1,338,305	1,352,389	1,369,032	1,387,743	1,407,931
Funded Percent*	71.11%	72.35%	73.40%	74.42%	75.52%	76.69%	77.94%	79.27%	80.67%	82.14%	83.67%	85.26%	86.90%	88.58%	90.31%	92.08%	93.88%
Salary																	
Legacy	265,774	227,841	201,848	182,543	167,773	156,246	146,294	137,238	128,729	120,648	113,059	105,748	98,779	92,045	85,573	79,153	72,836
New Employees	-	36,535	63,827	85,889	104,194	120,080	134,956	149,314	163,404	177,342	191,037	204,666	218,236	231,792	245,340	259,036	272,874
Total	265,774	264,376	265,675	268,432	271,967	276,326	281,250	286,552	292,133	297,990	304,096	310,414	317,015	323,837	330,913	338,189	345,710
Employee Contribution Rates																	
Legacy	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
New Employees	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Employer Contribution Rates																	
Calculated Rate	19.10%	20.21%	19.32%	18.84%	18.37%	17.87%	17.35%	16.82%	16.28%	15.75%	15.23%	14.72%	14.23%	13.75%	13.27%	12.80%	12.33%
Statutory Rate	19.10%	20.21%	19.32%	18.84%	18.37%	17.87%	17.35%	16.82%	16.28%	15.75%	15.23%	14.72%	14.23%	13.75%	13.27%	12.80%	12.33%
Employee Contributions																	
Legacy	13,289	11,392	10,092	9,127	8,389	7,812	7,315	6,862	6,436	6,032	5,653	5,287	4,939	4,602	4,279	3,958	3,642
New Employees	-	1,827	3,191	4,294	5,210	6,004	6,748	7,466	8,170	8,867	9,552	10,233	10,912	11,590	12,267	12,952	13,644
Total Employee Contributions	13,289	13,219	13,283	13,421	13,599	13,816	14,063	14,328	14,606	14,899	15,205	15,520	15,851	16,192	16,546	16,910	17,286
Employer Contributions																	
Statutory	50,763	53,431	51,328	50,573	49,960	49,379	48,797	48,198	47,559	46,933	46,314	45,693	45,111	44,528	43,912	43,288	42,626
Assets																	
Market Value (MVA)	914,082	929,276	948,775	967,613	987,846	1,008,477	1,030,170	1,053,662	1,078,826	1,106,566	1,136,035	1,167,811	1,202,036	1,237,692	1,276,716	1,318,657	1,363,002
Actuarial Value (AVA)	899,817	910,858	926,785	942,552	960,143	978,502	998,241	1,020,053	1,043,772	1,070,269	1,098,669	1,129,526	1,162,961	1,197,938	1,236,377	1,277,815	1,321,727
Contribution Development for Following Year																	
Amortization Period	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
Plan Changes	16,102	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unfunded Actuarial Accrued Liability**	252,242	249,111	239,914	231,255	221,977	211,937	201,118	189,476	176,990	163,652	149,430	134,264	118,129	100,962	82,666	63,274	42,727
Amortization of UAAL	25,988	26,406	26,244	26,198	26,148	26,082	26,000	25,901	25,785	25,655	25,512	25,349	25,167	24,954	24,681	24,331	23,796
Normal Cost	27,712	24,659	23,815	23,115	22,460	21,874	21,301	20,751	20,216	19,725	19,246	18,808	18,419	18,009	17,681	17,368	17,109
Annual Required Contribution***	53,700	51,064	50,060	49,314	48,609	47,956	47,301	46,652	46,001	45,380	44,757	44,157	43,585	42,963	42,362	41,699	40,905
Contribution Rate	20.21%	19.32%	18.84%	18.37%	17.87%	17.35%	16.82%	16.28%	15.75%	15.23%	14.72%	14.23%	13.75%	13.27%	12.80%	12.33%	11.83%

* Using EAN Liability and AVA
**Includes any plan changes
***May differ from summing due to rounding

Projection Assumptions:

(1) New Entrants: Active membership assumed to stay at the January 1, 2018 level throughout projection (5,138 active members), New Entrants coming into the plan have the average characteristics of new employees over the last five years.

(2) Expenses: Plan expenses paid are assumed to remain at the 2017 level ($1,614,000)

(3) Expense & Contingency Reserve: The expense & contingency reserve is assumed to remain at the January 1, 2018 level ($30,751,000)

(4) Deferred Vested Members: Deferred vested members are assumed to receive 150% of their account balance at age 65.

(5) Non-vested Terminated Members: Non-vested terminated members are assumed to receive 100% of their account balance at age 65.

Public School Retirement System of the City of St. Louis
January 1, 2018 Projections

Proposed Plan Projection - All Changes Reflected (Rule of 80, 1.75% Multiplier, and Employee and Employer Contributions)
(numbers in thousands)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Liabilities																	
Present Value of Futre Benefits	1,411,197	1,406,755	1,412,059	1,416,975	1,422,574	1,427,653	1,433,300	1,439,972	1,447,656	1,457,405	1,468,196	1,480,524	1,494,595	1,509,101	1,526,142	1,545,244	1,565,781
Entry Age Normal (EAN) Accrued Liability	1,266,013	1,259,264	1,262,421	1,265,396	1,268,972	1,271,870	1,275,027	1,279,174	1,284,213	1,291,075	1,298,808	1,307,928	1,318,573	1,329,586	1,342,922	1,358,059	1,374,392
Funded Percent*	71.07%	72.44%	72.93%	73.58%	74.38%	75.31%	76.39%	77.60%	78.95%	80.39%	81.89%	83.46%	85.08%	86.76%	88.48%	90.25%	92.05%
Salary																	
Legacy	265,774	227,841	201,848	182,543	167,773	156,246	146,294	137,238	128,729	120,648	113,059	105,748	98,779	92,045	85,573	79,153	72,836
New Employees	-	36,535	63,827	85,889	104,194	120,080	134,956	149,314	163,404	177,342	191,037	204,666	218,236	231,792	245,340	259,036	272,874
Total	265,774	264,376	265,675	268,432	271,967	276,326	281,250	286,552	292,133	297,990	304,096	310,414	317,015	323,837	330,913	338,189	345,710
Employee Contribution Rates																	
Legacy	5.50%	6.00%	6.50%	7.00%	7.50%	8.00%	8.50%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
New Employees	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Employer Contribution Rates																	
Calculated Rate	19.10%	17.72%	16.36%	15.85%	15.32%	14.80%	14.26%	13.73%	13.21%	12.69%	12.21%	11.75%	11.31%	10.92%	10.59%	10.35%	10.28%
Statutory Rate	19.10%	16.00%	15.50%	15.00%	14.50%	14.00%	13.50%	13.00%	12.50%	12.00%	11.50%	11.00%	10.50%	10.00%	9.50%	9.00%	9.00%
Shortfall in Statutory Rate	0.00%	-1.72%	-0.86%	-0.85%	-0.82%	-0.80%	-0.76%	-0.73%	-0.71%	-0.69%	-0.71%	-0.75%	-0.81%	-0.92%	-1.09%	-1.35%	-1.28%
Employee Contributions																	
Legacy	14,618	13,670	13,120	12,778	12,583	12,500	12,435	12,351	11,586	10,858	10,175	9,517	8,890	8,284	7,702	7,124	6,555
New Employees	-	3,288	5,744	7,730	9,377	10,807	12,146	13,438	14,706	15,961	17,193	18,420	19,641	20,861	22,081	23,313	24,559
Total Employee Contributions	14,618	16,958	18,864	20,508	21,960	23,307	24,581	25,789	26,292	26,819	27,368	27,937	28,531	29,145	29,783	30,437	31,114
Employer Contributions																	
Calculated	50,763	46,847	43,464	42,546	41,665	40,896	40,106	39,344	38,591	37,815	37,130	36,474	35,854	35,363	35,044	35,003	35,539
Statutory	50,763	42,300	41,180	40,265	39,435	38,686	37,969	37,252	36,517	35,759	34,971	34,146	33,287	32,384	31,437	30,437	31,114
Shortfall in Statutory Contribution	-	(4,547)	(2,284)	(2,281)	(2,230)	(2,210)	(2,137)	(2,092)	(2,074)	(2,056)	(2,159)	(2,328)	(2,567)	(2,979)	(3,607)	(4,566)	(4,425)
Cumulative Shortfall Amount	-	(4,547)	(6,831)	(9,112)	(11,342)	(13,552)	(15,689)	(17,781)	(19,855)	(21,911)	(24,070)	(26,398)	(28,965)	(31,944)	(35,551)	(40,117)	(44,542)
Assets																	
Market Value (MVA)	914,082	930,587	942,656	956,095	971,596	987,880	1,005,888	1,026,306	1,048,996	1,074,176	1,100,938	1,129,827	1,160,973	1,193,254	1,228,586	1,266,472	1,306,342
Actuarial Value (AVA)	899,817	912,169	920,666	931,034	943,892	957,905	973,959	992,697	1,013,942	1,037,879	1,063,573	1,091,543	1,121,898	1,153,499	1,188,247	1,225,630	1,265,067
Contribution Development for Following Year																	
Amortization Period	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
Plan Changes	16,771	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unfunded Actuarial Accrued Liability**	252,911	242,916	236,967	230,325	222,917	214,702	205,575	195,511	184,443	172,343	159,217	145,046	129,787	113,460	96,061	77,591	58,063
Amortization of UAAL	26,057	25,749	25,922	26,093	26,259	26,422	26,576	26,726	26,871	27,018	27,183	27,385	27,651	28,043	28,681	29,837	32,337
Normal Cost	21,039	17,500	16,180	15,039	13,995	12,987	12,051	11,119	10,214	9,368	8,550	7,729	6,973	6,249	5,562	4,912	4,268
Annual Required Contribution***	47,096	43,249	42,102	41,132	40,254	39,409	38,627	37,845	37,085	36,385	35,733	35,114	34,623	34,292	34,242	34,749	36,605
Contribution Rate	17.72%	16.36%	15.85%	15.32%	14.80%	14.26%	13.73%	13.21%	12.69%	12.21%	11.75%	11.31%	10.92%	10.59%	10.35%	10.28%	10.59%

* Using EAN Liability and AVA
**Includes any plan changes
***May differ from summing due to rounding

Projection Assumptions:

(1) New Entrants: Active membership assumed to stay at the January 1, 2018 level throughout projection (5,138 active members), New Entrants coming into the plan have the average characteristics of new employees over the last five years.

(2) Expenses: Plan expenses paid are assumed to remain at the 2017 level ($1,614,000)

(3) Expense & Contingency Reserve: The expense & contingency reserve is assumed to remain at the January 1, 2018 level ($30,751,000)

(4) Deferred Vested Members: Deferred vested members are assumed to receive 150% of their account balance at age 65.

(5) Non-vested Terminated Members: Non-vested terminated members are assumed to receive 100% of their account balance at age 65.

Public School Retirement System of the City of St. Louis
January 1, 2018 Projections
Current Asset Info used for Estimated Assets as of January 1, 2019
Baseline Projection - Old Plan Provisions Before Changes
(numbers in thousands)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Liabilities																	
Present Value of Futre Benefits	1,391,508	1,385,496	1,389,744	1,394,089	1,399,595	1,405,241	1,411,659	1,419,403	1,428,420	1,439,802	1,452,707	1,467,600	1,484,546	1,502,369	1,523,002	1,546,053	1,570,799
Entry Age Normal (EAN) Accrued Liability	1,249,241	1,240,855	1,242,915	1,245,318	1,248,889	1,252,427	1,256,525	1,261,835	1,268,323	1,277,013	1,287,097	1,298,941	1,312,679	1,327,178	1,344,307	1,363,632	1,384,425
Funded Percent*	72.03%	71.98%	71.51%	71.31%	71.48%	71.96%	72.72%	73.73%	74.95%	76.37%	77.95%	79.67%	81.50%	83.41%	85.40%	87.45%	89.53%
Salary																	
Legacy	265,774	228,793	203,433	184,749	170,483	159,472	149,945	141,218	133,188	125,702	118,733	111,831	105,201	98,830	92,534	86,331	80,145
New Employees	-	35,960	62,852	84,530	102,534	118,125	132,724	146,853	160,629	174,247	187,603	201,010	214,393	227,752	241,203	254,721	268,428
Total	265,774	264,753	266,285	269,279	273,017	277,597	282,669	288,071	293,817	299,949	306,336	312,841	319,594	326,582	333,737	341,052	348,573
Employee Contribution Rates																	
Legacy	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
New Employees	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Employer Contribution Rates																	
Calculated Rate	19.10%	18.96%	19.03%	19.50%	19.76%	19.81%	19.67%	19.39%	19.01%	18.55%	18.03%	17.47%	16.88%	16.28%	15.66%	15.02%	14.37%
Statutory Rate	19.10%	18.96%	19.03%	19.50%	19.76%	19.81%	19.67%	19.39%	19.01%	18.55%	18.03%	17.47%	16.88%	16.28%	15.66%	15.02%	14.37%
Employee Contributions																	
Legacy	13,289	11,440	10,172	9,237	8,524	7,974	7,497	7,061	6,659	6,285	5,937	5,592	5,260	4,942	4,627	4,317	4,007
New Employees	-	1,798	3,143	4,227	5,127	5,906	6,636	7,343	8,031	8,712	9,380	10,051	10,720	11,388	12,060	12,736	13,421
Total Employee Contributions	13,289	13,238	13,315	13,464	13,651	13,880	14,133	14,404	14,690	14,997	15,317	15,643	15,980	16,330	16,687	17,053	17,428
Employer Contributions																	
Statutory	50,763	50,197	50,674	52,509	53,948	54,992	55,601	55,857	55,855	55,641	55,232	54,653	53,948	53,168	52,263	51,226	50,090
Assets																	
Market Value (MVA)	914,082	835,510	845,444	856,899	872,077	889,612	909,868	933,176	959,220	988,835	1,021,112	1,056,297	1,094,403	1,134,252	1,177,654	1,224,125	1,272,884
Actuarial Value (AVA)	899,817	893,153	888,867	888,093	892,753	901,244	913,721	930,339	950,630	975,297	1,003,320	1,034,846	1,069,804	1,106,947	1,148,021	1,192,490	1,239,529
Contribution Development for Following Year																	
Amortization Period	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
Plan Changes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unfunded Actuarial Accrued Liability**	236,140	230,087	224,070	218,598	211,952	204,072	194,943	184,653	173,241	160,702	147,037	132,273	116,395	99,383	81,194	61,856	41,410
Amortization of UAAL	24,329	24,389	24,511	24,764	24,967	25,114	25,202	25,242	25,239	25,193	25,103	24,973	24,797	24,564	24,242	23,786	23,062
Normal Cost	26,057	25,985	27,406	28,441	29,119	29,492	29,620	29,529	29,264	28,879	28,413	27,848	27,223	26,564	25,900	25,229	24,556
Annual Required Contribution***	50,387	50,374	51,917	53,205	54,086	54,606	54,822	54,770	54,503	54,072	53,517	52,821	52,020	51,128	50,142	49,015	47,618
Contribution Rate	18.96%	19.03%	19.50%	19.76%	19.81%	19.67%	19.39%	19.01%	18.55%	18.03%	17.47%	16.88%	16.28%	15.66%	15.02%	14.37%	13.66%

* Using EAN Liability and AVA
**Includes any plan changes
***May differ from summing due to rounding

Projection Assumptions:

(1) New Entrants: Active membership assumed to stay at the January 1, 2018 level throughout projection (5,138 active members), New Entrants coming into the plan have the average characteristics of new employees over the last five years.

(2) Expenses: Plan expenses paid are assumed to remain at the 2017 level ($1,614,000)

(3) Expense & Contingency Reserve: The expense & contingency reserve is assumed to remain at the January 1, 2018 level ($30,751,000)

(4) Deferred Vested Members: Deferred vested members are assumed to receive 150% of their account balance at age 65.

(5) Non-vested Terminated Members: Non-vested terminated members are assumed to receive 100% of their account balance at age 65.

(6) January 1, 2019 Estimated Assets: Actual MVA as of November 30, 2018 rolled forward to January 1, 2019 using a 0% return, along with actual December benefit payments and contributions.

Public School Retirement System of the City of St. Louis
January 1, 2018 Projections
Current Asset Info used for Estimated Assets as of January 1, 2019
Rule of 80 Projection - Rule of 85 changed to Rule of 80
(numbers in thousands)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Liabilities																	
Present Value of Futre Benefits	1,409,837	1,405,707	1,411,498	1,417,199	1,423,870	1,430,512	1,437,767	1,446,258	1,455,919	1,467,749	1,480,814	1,495,696	1,512,468	1,529,987	1,550,218	1,572,773	1,597,039
Entry Age Normal (EAN) Accrued Liability	1,265,343	1,258,951	1,262,661	1,266,498	1,271,299	1,275,846	1,280,760	1,286,804	1,293,886	1,302,955	1,313,095	1,324,835	1,338,305	1,352,389	1,369,032	1,387,743	1,407,931
Funded Percent*	71.11%	70.94%	70.60%	70.53%	70.82%	71.42%	72.29%	73.41%	74.74%	76.25%	77.90%	79.69%	81.59%	83.56%	85.62%	87.74%	89.89%
Salary																	
Legacy	265,774	227,841	201,848	182,543	167,773	156,246	146,294	137,238	128,729	120,648	113,059	105,748	98,779	92,045	85,573	79,153	72,836
New Employees	-	36,535	63,827	85,889	104,194	120,080	134,956	149,314	163,404	177,342	191,037	204,666	218,236	231,792	245,340	259,036	272,874
Total	265,774	264,376	265,675	268,432	271,967	276,326	281,250	286,552	292,133	297,990	304,096	310,414	317,015	323,837	330,913	338,189	345,710
Employee Contribution Rates																	
Legacy	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
New Employees	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Employer Contribution Rates																	
Calculated Rate	19.10%	20.21%	20.36%	20.84%	21.08%	21.11%	20.93%	20.61%	20.19%	19.69%	19.13%	18.53%	17.91%	17.27%	16.61%	15.95%	15.27%
Statutory Rate	19.10%	20.21%	20.36%	20.84%	21.08%	21.11%	20.93%	20.61%	20.19%	19.69%	19.13%	18.53%	17.91%	17.27%	16.61%	15.95%	15.27%
Employee Contributions																	
Legacy	13,289	11,392	10,092	9,127	8,389	7,812	7,315	6,862	6,436	6,032	5,653	5,287	4,939	4,602	4,279	3,958	3,642
New Employees	-	1,827	3,191	4,294	5,210	6,004	6,748	7,466	8,170	8,867	9,552	10,233	10,912	11,590	12,267	12,952	13,644
Total Employee Contributions	13,289	13,219	13,283	13,421	13,599	13,816	14,063	14,328	14,606	14,899	15,205	15,520	15,851	16,192	16,546	16,910	17,286
Employer Contributions																	
Statutory	50,763	53,431	54,091	55,941	57,331	58,332	58,866	59,058	58,982	58,674	58,174	57,520	56,777	55,927	54,965	53,941	52,790
Assets																	
Market Value (MVA)	914,082	835,510	847,976	862,017	879,699	899,589	922,068	947,522	975,585	1,007,004	1,040,747	1,077,237	1,116,496	1,157,402	1,201,804	1,249,179	1,298,965
Actuarial Value (AVA)	899,817	893,153	891,399	893,211	900,376	911,220	925,921	944,685	966,995	993,467	1,022,955	1,055,785	1,091,897	1,130,097	1,172,171	1,217,544	1,265,609
Contribution Development for Following Year																	
Amortization Period	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
Plan Changes	16,102	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unfunded Actuarial Accrued Liability**	252,242	249,111	242,784	236,747	229,409	220,772	210,782	199,561	187,137	173,532	158,754	142,790	125,645	107,293	87,681	66,861	44,802
Amortization of UAAL	25,988	26,406	26,558	26,820	27,024	27,169	27,249	27,280	27,263	27,204	27,104	26,959	26,768	26,519	26,179	25,711	24,951
Normal Cost	27,712	27,429	28,804	29,771	30,389	30,676	30,726	30,562	30,248	29,803	29,247	28,631	27,990	27,282	26,607	25,929	25,251
Annual Required Contribution***	53,700	53,835	55,363	56,592	57,413	57,845	57,976	57,842	57,511	57,008	56,350	55,589	54,758	53,801	52,786	51,640	50,202
Contribution Rate	20.21%	20.36%	20.84%	21.08%	21.11%	20.93%	20.61%	20.19%	19.69%	19.13%	18.53%	17.91%	17.27%	16.61%	15.95%	15.27%	14.52%

* Using EAN Liability and AVA
**Includes any plan changes
***May differ from summing due to rounding

Projection Assumptions:

(1) New Entrants: Active membership assumed to stay at the January 1, 2018 level throughout projection (5,138 active members), New Entrants coming into the plan have the average characteristics of new employees over the last five years.

(2) Expenses: Plan expenses paid are assumed to remain at the 2017 level ($1,614,000)

(3) Expense & Contingency Reserve: The expense & contingency reserve is assumed to remain at the January 1, 2018 level ($30,751,000)

(4) Deferred Vested Members: Deferred vested members are assumed to receive 150% of their account balance at age 65.

(5) Non-vested Terminated Members: Non-vested terminated members are assumed to receive 100% of their account balance at age 65.

(6) January 1, 2019 Estimated Assets: Actual MVA as of November 30, 2018 rolled forward to January 1, 2019 using a 0% return, along with actual December benefit payments and contributions.

Exhibit III

Public School Retirement System of the City of St. Louis
January 1, 2018 Projections
Current Asset Info used for Estimated Assets as of January 1, 2019
Proposed Plan Projection - All Changes Reflected
(numbers in thousands)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Liabilities																	
Present Value of Futre Benefits	1,411,197	1,406,755	1,412,059	1,416,975	1,422,574	1,427,653	1,433,300	1,439,972	1,447,656	1,457,405	1,468,196	1,480,524	1,494,595	1,509,101	1,526,142	1,545,244	1,565,781
Entry Age Normal (EAN) Accrued Liability	1,266,013	1,259,264	1,262,421	1,265,396	1,268,972	1,271,870	1,275,027	1,279,174	1,284,213	1,291,075	1,298,808	1,307,928	1,318,573	1,329,586	1,342,922	1,358,059	1,374,392
Funded Percent*	71.07%	70.93%	70.01%	69.34%	68.89%	68.60%	68.49%	68.54%	68.73%	69.02%	69.36%	69.76%	70.21%	70.66%	71.15%	71.66%	72.15%
Salary																	
Legacy	265,774	227,841	201,848	182,543	167,773	156,246	146,294	137,238	128,729	120,648	113,059	105,748	98,779	92,045	85,573	79,153	72,836
New Employees	-	36,535	63,827	85,889	104,194	120,080	134,956	149,314	163,404	177,342	191,037	204,666	218,236	231,792	245,340	259,036	272,874
Total	265,774	264,376	265,675	268,432	271,967	276,326	281,250	286,552	292,133	297,990	304,096	310,414	317,015	323,837	330,913	338,189	345,710
Employee Contribution Rates																	
Legacy	5.50%	6.00%	6.50%	7.00%	7.50%	8.00%	8.50%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
New Employees	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Employer Contribution Rates																	
Calculated Rate	19.10%	17.72%	17.48%	17.91%	18.23%	18.48%	18.66%	18.84%	19.05%	19.36%	19.79%	20.44%	21.40%	22.85%	25.08%	28.68%	35.04%
Statutory Rate	19.10%	16.00%	15.50%	15.00%	14.50%	14.00%	13.50%	13.00%	12.50%	12.00%	11.50%	11.00%	10.50%	10.00%	9.50%	9.00%	9.00%
Shortfall in Statutory Rate	0.00%	-1.72%	-1.98%	-2.91%	-3.73%	-4.48%	-5.16%	-5.84%	-6.55%	-7.36%	-8.29%	-9.44%	-10.90%	-12.85%	-15.58%	-19.68%	-26.04%
Employee Contributions																	
Legacy	14,618	13,670	13,120	12,778	12,583	12,500	12,435	12,351	11,586	10,858	10,175	9,517	8,890	8,284	7,702	7,124	6,555
New Employees	-	3,288	5,744	7,730	9,377	10,807	12,146	13,438	14,706	15,961	17,193	18,420	19,641	20,861	22,081	23,313	24,559
Total Employee Contributions	14,618	16,958	18,864	20,508	21,960	23,307	24,581	25,789	26,292	26,819	27,368	27,937	28,531	29,145	29,783	30,437	31,114
Employer Contributions																	
Calculated	50,763	46,847	46,440	48,076	49,580	51,065	52,481	53,986	55,651	57,691	60,181	63,449	67,841	73,997	82,993	96,993	121,137
Statutory	50,763	42,300	41,180	40,265	39,435	38,686	37,969	37,252	36,517	35,759	34,971	34,146	33,287	32,384	31,437	30,437	31,114
Shortfall in Statutory Contribution	-	(4,547)	(5,260)	(7,811)	(10,145)	(12,379)	(14,512)	(16,734)	(19,134)	(21,932)	(25,210)	(29,303)	(34,554)	(41,613)	(51,556)	(66,556)	(90,023)
Cumulative Shortfall Amount	-	(4,547)	(9,807)	(17,618)	(27,763)	(40,142)	(54,654)	(71,388)	(90,522)	(112,454)	(137,664)	(166,967)	(201,521)	(243,134)	(294,690)	(361,246)	(451,269)
Assets																	
Market Value (MVA)	914,082	835,510	840,448	846,221	853,481	860,907	869,392	879,572	891,258	904,607	918,652	933,870	950,319	966,800	985,148	1,004,777	1,025,019
Actuarial Value (AVA)	899,817	893,153	883,871	877,415	874,158	872,539	873,245	876,736	882,668	891,070	900,859	912,418	925,720	939,495	955,516	973,142	991,663
Contribution Development for Following Year																	
Amortization Period	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
Plan Changes	16,771	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unfunded Actuarial Accrued Liability**	252,911	242,916	240,036	238,965	239,275	240,648	242,765	245,377	248,338	251,551	254,904	258,370	261,889	265,488	269,169	273,003	277,038
Amortization of UAAL	26,057	25,749	26,258	27,072	28,186	29,615	31,384	33,542	36,179	39,435	43,519	48,780	55,794	65,619	80,365	104,980	154,290
Normal Cost	21,039	20,462	21,334	21,862	22,065	21,960	21,593	21,049	20,368	19,539	18,646	17,649	16,643	15,590	14,557	13,509	12,482
Annual Required Contribution***	47,096	46,211	47,592	48,934	50,251	51,576	52,977	54,591	56,547	58,974	62,165	66,429	72,437	81,209	94,922	118,489	166,772
Contribution Rate	17.72%	17.48%	17.91%	18.23%	18.48%	18.66%	18.84%	19.05%	19.36%	19.79%	20.44%	21.40%	22.85%	25.08%	28.68%	35.04%	48.24%

* Using EAN Liability and AVA
**Includes any plan changes
***May differ from summing due to rounding

Projection Assumptions:

(1) New Entrants: Active membership assumed to stay at the January 1, 2018 level throughout projection (5,138 active members), New Entrants coming into the plan have the average characteristics of new employees over the last five years.

(2) Expenses: Plan expenses paid are assumed to remain at the 2017 level ($1,614,000)

(3) Expense & Contingency Reserve: The expense & contingency reserve is assumed to remain at the January 1, 2018 level ($30,751,000)

(4) Deferred Vested Members: Deferred vested members are assumed to receive 150% of their account balance at age 65.

(5) Non-vested Terminated Members: Non-vested terminated members are assumed to receive 100% of their account balance at age 65.

(6) January 1, 2019 Estimated Assets: Actual MVA as of November 30, 2018 rolled forward to January 1, 2019 using a 0% return, along with actual December benefit payments and contributions.

Interest

7.5% per annum, which includes a 2.75% allowance for inflation.

Participant account interest crediting rate

5.0% per annum.

Expenses

The rate of interest assumed is net of expenses.

Mortality – Healthy Lives

Mortality tables issued by the SOA, the RP-2014 Combined Healthy Mortality Table (rolled back to 2006), projected fully generationally using projection scale MP-2015. The mortality assumption for Inactive participants receiving benefits is increased by 10% to account for the higher mortality experienced by the Plan. Rates are shown for pre-commencement in Table 1 and post-commencement in Table 2.

Disability Mortality

RP-2014 Disabled Mortality Table (rolled back to 2006) for disabled retired Members, projected fully generationally using projection scale MP-2015. Rates are shown in Table 6.

Withdrawal

Withdrawals are assumed to occur at rates based on actual experience of the retirement system. During the first five years of membership, withdrawals are assumed to occur at the following rates:

Year of Membership	Non-charter school employees	Charter school employees
1st	25.0%	35.0%
2nd	20.0%	35.0%
3rd	20.0%	35.0%
4th	20.0%	25.0%
5th	15.0%	15.0%

The rates used after the first five years of membership are shown in Table 3.

Salary scale

Salaries are assumed to increase at the rate of 5.0% per year for the first 5 years of employment and 3.50% thereafter.

Disability

Disabilities are assumed to occur at rates based on the actual experience of the retirement system. The rates used are shown in Table 5.

Retirement

Retirements occur at rates based on the actual experience of the retirement system. The age-related rates used are shown in Table 4. The rates are different for those eligible to retire under the Rule of 80 and those not eligible to retire under the Rule of 80.

Family Structure

The probability of a participant being married and the probable number of children are based on a table constructed by the Social Security Administration, modified to reflect the experience of the retirement system. The rates used are shown in Table 7. For married participants, husbands are assumed to be 3 years older than their wives.

Usage of Cash-out Option

Participants terminating in vested status are given the option of taking a refund of their accumulated participant contributions instead of a deferred retirement benefit. Active members who terminate in the future with a vested benefit are assumed to take a deferred vested annuity, unless a refund of contributions and interest is greater than the actuarial present value of their vested deferred benefit.

Future Benefit Increases or Additional Benefits

When funding is adequate, the Board may authorize cost of living adjustments (COLAs), as noted in the summary of plan provisions. This valuation assumes that no future COLAs will be awarded.

Actuarial Method – Frozen Entry Age

The actuarial cost method used by the System is the "frozen entry age actuarial cost method." Under this method, on the initial actuarial valuation date for which the cost method is used, the annual cost accruals (individual normal costs for each participant) are determined as a level percentage of pay for each year from entry age until retirement or termination. The initial Unfunded Frozen Actuarial Accrued Liability (UFAAL) was originally determined as of January 1, 1981. Entry age is determined at the date each participant would have entered the System. The sum of these individual normal costs for all active participants whose attained ages are under the assumed retirement age is the normal cost for the initial plan year. The excess of all normal costs falling due prior to the initial actuarial valuation date, accumulated with interest, over the plan assets establishes the UFAAL.

The UFAAL is only frozen in that it is not adjusted due to experience gains and losses. Instead, gains and losses are reflected through changes in the normal cost accrual rate. The UFAAL does change, increasing due to interest and additional normal costs, and decreasing due to contributions. Any changes to plan provisions or actuarial assumptions results in a change to the UFAAL. The amount of the change is determined by computing the impact in the actuarial accrued liability as of the valuation date coincident with or next following the change.

Normal costs are calculated as the level percentage of pay required to fund the excess of the actuarial present value of future benefits over the sum of the actuarial value of current assets and the remaining UFAAL.

Effective January 1, 2006, UFAAL was reestablished to better reflect an appropriate relationship between the normal cost and the actuarial accrued liability.

The funding requirement for each plan year is the sum of the "normal cost contribution" (equal to the normal cost for that year), plus the "actuarial accrued liability contribution." The "actuarial accrued liability contribution" is the payment required to amortize the UFAAL over 30 years, from January 1, 2006, the date that it was reestablished.

Valuation of Assets

The actuarial value of assets is determined using the assumed yield method of valuing assets. Under the assumed yield asset valuation method, the prior year's actuarial value is increased at the assumed rate of return with appropriate adjustments for contributions and disbursements to produce an expected actuarial value of assets at the end of the year. The expected actuarial value is compared to the market value of assets less the expense and contingency reserve, and 20% of the difference is added to the expected actuarial value. The actuarial value of assets was "fresh-started" as of January 1, 2006 and set equal to the market value of assets as of that date.

Exhibit IV

Table 1
Mortality Rates for Pre-Commencement
Annual Rates Per 1,000 Members

	Rate			Rate	
Age	Male	Female	Age	Male	Female
20	0.190	0.116	60	2.959	3.365
21	0.203	0.113	61	3.369	3.668
22	0.215	0.114	62	3.704	3.986
23	0.233	0.119	63	4.180	4.314
24	0.251	0.126	64	4.540	4.648
25	0.275	0.134	65	4.892	4.983
26	0.314	0.147	66	5.398	5.314
27	0.327	0.153	67	5.731	5.636
28	0.336	0.162	68	5.858	5.945
29	0.353	0.171	69	6.143	6.240
30	0.380	0.193	70	6.210	6.517
31	0.427	0.239	71	7.026	7.108
32	0.481	0.273	72	8.658	8.290
33	0.540	0.298	73	11.106	10.064
34	0.601	0.319	74	14.369	12.429
35	0.662	0.337	75	18.448	15.385
36	0.720	0.354	76	23.343	18.932
37	0.774	0.369	77	29.054	23.071
38	0.800	0.386	78	35.581	27.801
39	0.821	0.406	79	42.924	33.122
40	0.841	0.442	80	51.083	39.034
41	0.863	0.484	81	58.516	43.204
42	0.890	0.533	82	66.910	47.896
43	0.922	0.586	83	74.584	53.181
44	0.961	0.644	84	84.893	59.146
45	1.005	0.682	85	94.233	67.435
46	1.044	0.719	86	104.477	76.970
47	1.085	0.755	87	118.458	87.853
48	1.128	0.817	88	134.192	97.854
49	1.172	0.883	89	148.298	111.198
50	1.217	0.985	90	167.257	122.890
51	1.262	1.100	91	182.177	134.949
52	1.309	1.271	92	202.142	147.094
53	1.401	1.468	93	218.060	162.763
54	1.503	1.700	94	233.954	174.573
55	1.671	1.969	95	255.453	185.756
56	1.883	2.287	96	271.129	196.137
57	2.132	2.577	97	286.358	210.344
58	2.424	2.817	98	308.123	218.852
59	2.677	3.081	99	322.695	226.123

Table 2
Mortality Rates for Post-Commencement
Annual Rates Per 1,000 Members

	Rate			Rate	
Age	Male	Female	Age	Male	Female
20	0.190	0.116	60	5.656	5.525
21	0.203	0.113	61	6.358	6.166
22	0.215	0.114	62	7.004	6.852
23	0.233	0.119	63	7.918	7.582
24	0.251	0.126	64	8.761	8.372
25	0.275	0.134	65	9.703	9.235
26	0.314	0.147	66	11.004	10.170
27	0.327	0.153	67	12.182	11.175
28	0.336	0.162	68	13.160	12.271
29	0.353	0.171	69	14.537	13.503
30	0.380	0.193	70	15.686	14.919
31	0.427	0.239	71	17.356	16.177
32	0.481	0.273	72	19.271	17.994
33	0.540	0.298	73	21.465	19.543
34	0.601	0.319	74	23.946	21.660
35	0.662	0.337	75	27.356	23.365
36	0.720	0.354	76	30.490	25.743
37	0.774	0.369	77	34.715	29.017
38	0.800	0.386	78	39.486	31.986
39	0.821	0.406	79	44.915	35.314
40	0.841	0.442	80	51.083	39.034
41	0.890	0.484	81	58.516	43.204
42	0.987	0.533	82	66.910	47.896
43	1.133	0.586	83	74.584	53.181
44	1.328	0.644	84	84.893	59.146
45	1.572	0.689	85	94.233	67.435
46	1.864	0.778	86	104.477	76.970
47	2.205	0.912	87	118.458	87.853
48	2.595	1.090	88	134.192	97.854
49	3.034	1.313	89	148.298	111.198
50	3.521	1.580	90	167.257	122.890
51	3.556	1.697	91	182.177	134.949
52	3.546	1.914	92	202.142	147.094
53	3.595	2.193	93	218.060	162.763
54	3.643	2.532	94	233.954	174.573
55	3.798	2.935	95	255.453	185.756
56	4.033	3.418	96	271.129	196.137
57	4.344	3.908	97	286.358	210.344
58	4.758	4.385	98	308.123	218.852
59	5.165	4.929	99	322.695	226.123

Table 3
Withdrawal Rates
Annual Rates Per 1,000 Members

Age	Rate	Age	Rate
20	204.0	45	44.0
21	197.0	46	41.0
22	190.0	47	37.0
23	184.0	48	34.0
24	177.0	49	31.0
25	171.0	50	28.0
26	161.0	51	26.0
27	151.0	52	25.0
28	141.0	53	24.0
29	131.0	54	23.0
30	121.0	55	22.0
31	117.0	56	21.0
32	112.0	57	20.0
33	108.0	58	19.0
34	103.0	59	18.0
35	99.0	60	17.0
36	96.0	61	0.0
37	92.0	62	0.0
38	89.0	63	0.0
39	86.0	64	0.0
40	83.0		
41	75.0		
42	67.0		
43	59.0		
44	52.0		

Table 4
Retirement Rates
Annual Rates Per 1,000 Members

Age	Rule of 80 Rate	Not Rule of 80 Rate
50-51	200.0	N/A
52-59	150.0	N/A
60	200.0	100.0
61	200.0	100.0
62	250.0	150.0
63	250.0	150.0
64	250.0	200.0
65	300.0	350.0
66	300.0	200.0
67	300.0	200.0
68	300.0	200.0
69	300.0	200.0
70 - 71	300.0	300.0
72	1,000.0	1,000.0

Table 5
Disability Rates
Annual Rates Per 1,000 Members

	Rate			Rate	
Age	Males	Females	Age	Males	Females
20	0.00	0.00	45	1.50	1.00
21	0.00	0.00	46	1.60	1.10
22	0.00	0.00	47	1.70	1.20
23	0.00	0.00	48	1.80	1.30
24	0.00	0.00	49	1.90	1.40
25	0.00	0.00	50	2.00	1.50
26	0.00	0.00	51	2.50	1.70
27	0.00	0.00	52	3.00	1.90
28	0.00	0.00	53	3.50	2.10
29	0.00	0.00	54	4.00	2.30
30	0.40	0.40	55	4.50	2.50
31	0.40	0.40	56	4.70	2.60
32	0.40	0.40	57	4.90	2.75
33	0.40	0.40	58	5.10	2.85
34	0.40	0.40	59	5.30	3.00
35	0.40	0.40	60	5.50	3.25
36	0.45	0.45	61	6.00	3.50
37	0.50	0.50	62	6.50	3.50
38	0.60	0.60	63	7.00	3.50
39	0.70	0.70	64	7.50	3.50
40	0.80	0.75	65	0.00	0.00
41	0.95	0.80			
42	1.10	0.85			
43	1.25	0.90			
44	1.40	0.95			

Table 6
Post-Disability Mortality Rates
Annual Rates Per 1,000 Members

	Rate			Rate	
Age	Male	Female	Age	Male	Female
20	0.000	0.000	60	42.042	21.839
21	22.571	7.450	61	43.474	22.936
22	22.571	7.450	62	44.981	24.080
23	22.571	7.450	63	46.584	25.293
24	22.571	7.450	64	48.307	26.600
25	22.571	7.450	65	50.174	28.026
26	22.571	7.450	66	52.213	29.594
27	22.571	7.450	67	54.450	31.325
28	22.571	7.450	68	56.909	33.234
29	22.571	7.450	69	59.613	35.335
30	22.571	7.450	70	62.583	37.635
31	22.571	7.450	71	65.841	40.140
32	22.571	7.450	72	69.405	42.851
33	22.571	7.450	73	73.292	45.769
34	22.571	7.450	74	77.512	48.895
35	22.571	7.450	75	82.067	52.230
36	22.571	7.450	76	86.951	55.777
37	22.571	7.450	77	92.149	59.545
38	22.571	7.450	78	97.640	63.545
39	22.571	7.450	79	103.392	67.793
40	22.571	7.450	80	109.372	72.312
41	22.571	7.450	81	115.544	77.135
42	22.571	7.450	82	121.877	82.298
43	22.571	7.450	83	128.343	87.838
44	22.571	7.450	84	134.923	93.794
45	22.571	7.450	85	141.603	100.203
46	23.847	8.184	86	148.374	107.099
47	25.124	8.959	87	155.235	114.512
48	26.404	9.775	88	162.186	122.464
49	27.687	10.634	89	169.233	130.972
50	28.975	11.535	90	183.408	140.049
51	30.268	12.477	91	199.769	149.698
52	31.563	13.456	92	216.605	159.924
53	32.859	14.465	93	233.662	170.433
54	34.152	15.497	94	250.693	182.799
55	35.442	16.544	95	267.491	194.509
56	36.732	17.598	96	283.905	205.379
57	38.026	18.654	97	299.852	215.240
58	39.334	19.710	98	315.296	223.941
59	40.668	20.768	99	330.207	231.387

Exhibit IV

Table 7
Family Structure

Age Male	Age Female	Age of youngest child	Average number of children	Probability of being married	Probability of children if married
20	17	2	.90	.30	.50
21	18	2	.90	.35	.50
22	19	2	.98	.40	.50
23	20	2	.98	.46	.53
24	21	3	1.05	.53	.56
25	22	3	1.13	.60	.59
26	23	4	1.20	.67	.62
27	24	4	1.28	.74	.65
28	25	4	1.35	.76	.67
29	26	5	1.43	.78	.69
30	27	5	1.50	.80	.71
31	28	6	1.58	.82	.73
32	29	6	1.65	.84	.75
33	30	7	1.80	.85	.76
34	31	7	1.95	.86	.77
35	32	8	2.10	.87	.78
36	33	8	2.10	.87	.79
37	34	9	2.10	.87	.80
38	35	9	2.30	.87	.79
39	36	10	1.95	.87	.78
40	37	10	1.88	.87	.77
41	38	11	1.80	.87	.76
42	39	11	1.73	.87	.75
43	40	11	1.73	.87	.72
44	41	12	1.65	.87	.69
45	42	12	1.65	.86	.66
46	43	12	1.58	.86	.63
47	44	12	1.58	.86	.60
48	45	12	1.50	.85	.56
49	46	12	1.43	.85	.52
50	47	13	1.43	.85	.48
51	48	13	1.35	.85	.44
52	49	13	1.35	.85	.40
53	50	13	1.35	.85	.37
54	51	13	1.35	.84	.34

Table 7
Family Structure
(continued)

Age		Age of youngest child	Average number of children	Probability of being married	Probability of children if married
Male	Female				
55	52	13	1.28	.84	.31
56	53	13	1.28	.83	.28
57	54	13	1.28	.83	.25
58	55	13	1.28	.83	.23
59	56	13	1.20	.82	.21
60	57	13	1.20	.81	.19
61	58	13	1.20	.80	.17
62	59	13	1.20	.79	.15
63	60	13	1.20	.78	.13
64	61	13	1.20	.77	.11
65	62	13	1.13	.76	.09
66	63	13	1.13	.75	.07
67	64	13	1.13	.74	.05
68	65	13	1.13	.73	.04
69	66	13	1.05	.72	.03
70	67	13	1.05	.71	.02
71	68	13	1.05	.70	.01

Public School Retirement System of the City of St. Louis
January 1, 2018 Projections

Proposed Plan Projection - Rule of 85 and All Other Changes (1.75% Multiplier, and Employee and Employer Contributions)
(numbers in thousands)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Liabilities																	
Present Value of Futre Benefits	1,400,269	1,394,817	1,399,451	1,403,910	1,409,257	1,414,266	1,419,991	1,426,852	1,434,813	1,444,999	1,456,423	1,469,595	1,484,625	1,500,175	1,518,332	1,538,524	1,560,148
Entry Age Normal (EAN) Accrued Liability	1,254,694	1,246,641	1,248,864	1,251,168	1,254,299	1,256,988	1,260,120	1,264,347	1,269,592	1,276,837	1,285,186	1,295,118	1,306,690	1,318,731	1,333,136	1,349,346	1,366,754
Funded Percent*	71.72%	73.19%	73.79%	74.57%	75.52%	76.62%	77.87%	79.29%	80.86%	82.52%	84.27%	86.11%	88.01%	89.98%	92.01%	94.09%	96.21%
Salary																	
Legacy	265,774	228,793	203,433	184,749	170,483	159,472	149,945	141,218	133,188	125,702	118,733	111,831	105,201	98,830	92,534	86,331	80,145
New Employees	-	35,960	62,852	84,530	102,534	118,125	132,724	146,853	160,629	174,247	187,603	201,010	214,393	227,752	241,203	254,721	268,428
Total	265,774	264,753	266,285	269,279	273,017	277,597	282,669	288,071	293,817	299,949	306,336	312,841	319,594	326,582	333,737	341,052	348,573
Employee Contribution Rates																	
Legacy	5.50%	6.00%	6.50%	7.00%	7.50%	8.00%	8.50%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
New Employees	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Employer Contribution Rates																	
Calculated Rate	19.10%	16.77%	15.38%	14.80%	14.20%	13.60%	12.96%	12.30%	11.63%	10.94%	10.23%	9.49%	8.69%	7.81%	6.79%	5.52%	3.73%
Statutory Rate	19.10%	16.00%	15.50%	15.00%	14.50%	14.00%	13.50%	13.00%	12.50%	12.00%	11.50%	11.00%	10.50%	10.00%	9.50%	9.00%	9.00%
Shortfall in Statutory Rate	0.00%	-0.77%	0.12%	0.20%	0.30%	0.40%	0.54%	0.70%	0.87%	1.06%	1.27%	1.51%	1.81%	2.19%	2.71%	3.48%	5.27%
Employee Contributions																	
Legacy	14,618	13,728	13,223	12,932	12,786	12,758	12,745	12,710	11,987	11,313	10,686	10,065	9,468	8,895	8,328	7,770	7,213
New Employees	-	3,236	5,657	7,608	9,228	10,631	11,945	13,217	14,457	15,682	16,884	18,091	19,295	20,498	21,708	22,925	24,159
Total Employee Contributions	14,618	16,964	18,880	20,540	22,014	23,389	24,690	25,927	26,444	26,995	27,570	28,156	28,763	29,393	30,036	30,695	31,372
Employer Contributions																	
Calculated	50,763	44,399	40,955	39,853	38,768	37,753	36,634	35,433	34,171	32,814	31,338	29,689	27,773	25,506	22,661	18,826	13,002
Statutory	50,763	42,361	41,274	40,392	39,588	38,863	38,160	37,449	36,727	35,994	35,229	34,413	33,557	32,658	31,705	30,695	31,372
Shortfall in Statutory Contribution	-	(2,038)	319	539	820	1,110	1,526	2,016	2,556	3,180	3,891	4,724	5,784	7,152	9,044	11,869	18,370
Cumulative Shortfall Amount	-	(2,038)	(1,719)	(1,180)	(360)	750	2,276	4,292	6,848	10,028	13,919	18,643	24,427	31,579	40,623	52,492	70,862
Assets																	
Market Value (MVA)	914,082	930,808	943,563	958,068	974,993	993,079	1,013,245	1,036,126	1,061,615	1,089,998	1,120,445	1,153,476	1,189,149	1,226,340	1,266,932	1,310,405	1,356,192
Actuarial Value (AVA)	899,817	912,389	921,572	933,007	947,290	963,104	981,317	1,002,516	1,026,561	1,053,701	1,083,080	1,115,192	1,150,074	1,186,585	1,226,592	1,269,563	1,314,918
Contribution Development for Following Year																	
Amortization Period	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
Plan Changes	5,453	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unfunded Actuarial Accrued Liability**	241,593	229,349	221,181	212,268	202,502	191,867	180,195	167,431	153,532	138,459	122,168	104,598	85,732	65,545	43,981	21,064	(3,248)
Amortization of UAAL	24,891	24,311	24,195	24,047	23,854	23,612	23,295	22,887	22,367	21,706	20,857	19,748	18,265	16,200	13,131	8,100	(1,809)
Normal Cost	19,688	16,398	15,222	14,192	13,285	12,355	11,467	10,610	9,785	8,994	8,200	7,433	6,698	5,963	5,298	4,635	4,014
Annual Required Contribution***	44,579	40,709	39,418	38,240	37,139	35,967	34,762	33,497	32,153	30,699	29,057	27,181	24,963	22,164	18,429	12,735	2,205
Contribution Rate	16.77%	15.38%	14.80%	14.20%	13.60%	12.96%	12.30%	11.63%	10.94%	10.23%	9.49%	8.69%	7.81%	6.79%	5.52%	3.73%	0.63%

* Using EAN Liability and AVA
**Includes any plan changes
***May differ from summing due to rounding

Projection Assumptions:

(1) New Entrants: Active membership assumed to stay at the January 1, 2018 level throughout projection (5,138 active members), New Entrants coming into the plan have the average characteristics of new employees over the last five years.

(2) Expenses: Plan expenses paid are assumed to remain at the 2017 level ($1,614,000)

(3) Expense & Contingency Reserve: The expense & contingency reserve is assumed to remain at the January 1, 2018 level ($30,751,000)

(4) Deferred Vested Members: Deferred vested members are assumed to receive 150% of their account balance at age 65.

(5) Non-vested Terminated Members: Non-vested terminated members are assumed to receive 100% of their account balance at age 65.

Public School Retirement System of the City of St. Louis
January 1, 2018 Projections
Current Asset Info used for Estimated Assets as of January 1, 2019
Proposed Plan Projection - Rule of 85 and All Other Changes
(numbers in thousands)

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Liabilities																	
Present Value of Futre Benefits	1,400,269	1,394,817	1,399,451	1,403,910	1,409,257	1,414,266	1,419,991	1,426,852	1,434,813	1,444,999	1,456,423	1,469,595	1,484,625	1,500,175	1,518,332	1,538,524	1,560,148
Entry Age Normal (EAN) Accrued Liability	1,254,694	1,246,641	1,248,864	1,251,168	1,254,299	1,256,988	1,260,120	1,264,347	1,269,592	1,276,837	1,285,186	1,295,118	1,306,690	1,318,731	1,333,136	1,349,346	1,366,754
Funded Percent*	71.72%	71.64%	70.83%	70.27%	69.94%	69.81%	69.86%	70.09%	70.49%	71.00%	71.58%	72.24%	72.96%	73.71%	74.51%	75.33%	76.16%
Salary																	
Legacy	265,774	228,793	203,433	184,749	170,483	159,472	149,945	141,218	133,188	125,702	118,733	111,831	105,201	98,830	92,534	86,331	80,145
New Employees	-	35,960	62,852	84,530	102,534	118,125	132,724	146,853	160,629	174,247	187,603	201,010	214,393	227,752	241,203	254,721	268,428
Total	265,774	264,753	266,285	269,279	273,017	277,597	282,669	288,071	293,817	299,949	306,336	312,841	319,594	326,582	333,737	341,052	348,573
Employee Contribution Rates																	
Legacy	5.50%	6.00%	6.50%	7.00%	7.50%	8.00%	8.50%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
New Employees	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%	9.00%
Employer Contribution Rates																	
Calculated Rate	19.10%	16.77%	16.48%	16.83%	17.05%	17.19%	17.26%	17.31%	17.37%	17.49%	17.68%	18.03%	18.61%	19.55%	21.05%	23.58%	28.14%
Statutory Rate	19.10%	16.00%	15.50%	15.00%	14.50%	14.00%	13.50%	13.00%	12.50%	12.00%	11.50%	11.00%	10.50%	10.00%	9.50%	9.00%	9.00%
Shortfall in Statutory Rate	0.00%	-0.77%	-0.98%	-1.83%	-2.55%	-3.19%	-3.76%	-4.31%	-4.87%	-5.49%	-6.18%	-7.03%	-8.11%	-9.55%	-11.55%	-14.58%	-19.14%
Employee Contributions																	
Legacy	14,618	13,728	13,223	12,932	12,786	12,758	12,745	12,710	11,987	11,313	10,686	10,065	9,468	8,895	8,328	7,770	7,213
New Employees	-	3,236	5,657	7,608	9,228	10,631	11,945	13,217	14,457	15,682	16,884	18,091	19,295	20,498	21,708	22,925	24,159
Total Employee Contributions	14,618	16,964	18,880	20,540	22,014	23,389	24,690	25,927	26,444	26,995	27,570	28,156	28,763	29,393	30,036	30,695	31,372
Employer Contributions																	
Calculated	50,763	44,399	43,884	45,320	46,549	47,719	48,789	49,865	51,036	52,461	54,160	56,405	59,476	63,847	70,252	80,420	98,088
Statutory	50,763	42,361	41,274	40,392	39,588	38,863	38,160	37,449	36,727	35,994	35,229	34,413	33,557	32,658	31,705	30,695	31,372
Shortfall in Statutory Contribution	-	(2,038)	(2,610)	(4,928)	(6,961)	(8,856)	(10,629)	(12,416)	(14,309)	(16,467)	(18,931)	(21,992)	(25,919)	(31,189)	(38,547)	(49,725)	(66,716)
Cumulative Shortfall Amount	-	(2,038)	(4,648)	(9,576)	(16,537)	(25,393)	(36,022)	(48,438)	(62,747)	(79,214)	(98,145)	(120,137)	(146,056)	(177,245)	(215,792)	(265,517)	(332,233)
Assets																	
Market Value (MVA)	914,082	835,510	841,117	847,939	856,604	865,811	876,432	889,052	903,511	920,036	937,736	957,064	978,005	999,360	1,022,929	1,048,102	1,074,217
Actuarial Value (AVA)	899,817	893,153	884,540	879,133	877,281	877,443	880,285	886,215	894,921	906,498	919,943	935,612	953,406	972,055	993,296	1,016,467	1,040,861
Contribution Development for Following Year																	
Amortization Period	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2
Plan Changes	5,453	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Unfunded Actuarial Accrued Liability**	241,593	229,349	224,198	220,750	218,567	217,325	216,695	216,452	216,419	216,485	216,526	216,472	216,287	215,958	215,435	214,776	214,049
Amortization of UAAL	24,891	24,311	24,525	25,008	25,747	26,745	28,014	29,588	31,529	33,938	36,967	40,870	46,079	53,377	64,322	82,590	119,210
Normal Cost	19,688	19,310	20,278	20,897	21,188	21,168	20,910	20,443	19,845	19,108	18,275	17,365	16,413	15,383	14,369	13,375	12,368
Annual Required Contribution***	44,579	43,621	44,803	45,905	46,934	47,913	48,924	50,031	51,374	53,045	55,242	58,235	62,492	68,760	78,691	95,965	131,578
Contribution Rate	16.77%	16.48%	16.83%	17.05%	17.19%	17.26%	17.31%	17.37%	17.49%	17.68%	18.03%	18.61%	19.55%	21.05%	23.58%	28.14%	37.75%

* Using EAN Liability and AVA
**Includes any plan changes
***May differ from summing due to rounding

Projection Assumptions:

(1) New Entrants: Active membership assumed to stay at the January 1, 2018 level throughout projection (5,138 active members), New Entrants coming into the plan have the average characteristics of new employees over the last five years.

(2) Expenses: Plan expenses paid are assumed to remain at the 2017 level ($1,614,000)

(3) Expense & Contingency Reserve: The expense & contingency reserve is assumed to remain at the January 1, 2018 level ($30,751,000)

(4) Deferred Vested Members: Deferred vested members are assumed to receive 150% of their account balance at age 65.

(5) Non-vested Terminated Members: Non-vested terminated members are assumed to receive 100% of their account balance at age 65.

(6) January 1, 2019 Estimated Assets: Actual MVA as of November 30, 2018 rolled forward to January 1, 2019 using a 0% return, along with actual December benefit payments and contributions.

CAPITAL MARKET REVIEW AND ASSUMPTIONS

PUBLIC SCHOOL RETIREMENT SYSTEM OF THE CITY OF ST LOUIS

PUBLIC SCHOOL RETIREMENT SYSTEM OF THE CITY OF ST. LOUIS

February 2019

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PSRS
PORTFOLIO REVIEW

NEPC, LLC

2019 THEMES AND OPPORTUNITIES

Key Market Themes

Late Cycle Dynamics

Tightening Global Liquidity

China Transitions

Globalization Backlash

Current Opportunities

Rebalance Developed Market Equities

Raise Safe-Haven Fixed Income Exposure

Reduce Lower Quality Credit Exposure

Maintain Overweight to Emerging Market Equities

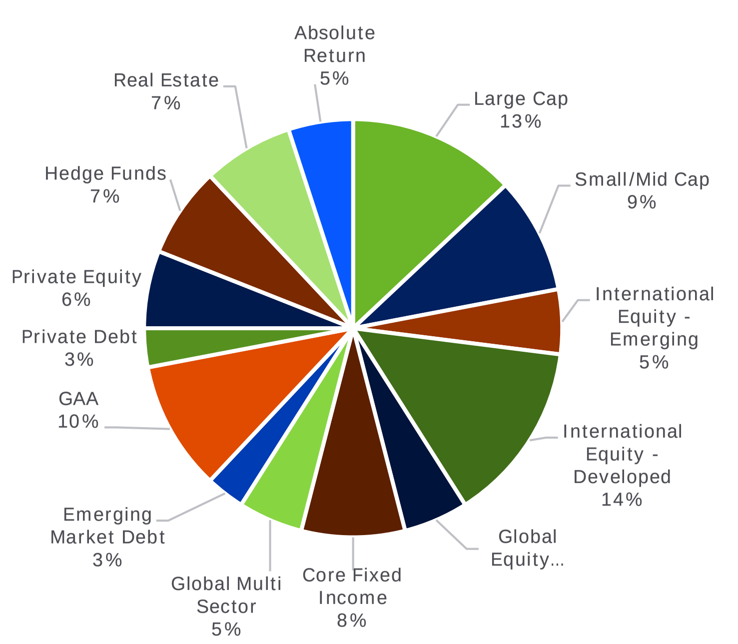
Add Long Volatility Exposure

Fund Public Midstream Energy Exposure

Fund Emerging Local Debt

LONG-TERM TARGET MIX – USING NEPC'S 2019 ASSUMPTIONS

Current Asset Allocation Target



	Actual	Policy	Mix 1	Mix 2
5-7 Years Assumptions				
Expected Return	6.4%	6.7%	6.7%	6.8%
Standard Deviation	12.2%	12.5%	12.6%	12.9%
Sharpe Ratio	0.32	0.33	0.33	0.33
30 Year Assumptions				
Expected Return	7.6%	7.7%	7.8%	7.9%
Sharpe Ratio	0.37	0.38	0.38	0.38

	Actual	Policy	Mix 1	Mix 2
Probability of 1 Year Return	48%	49%	49%	49%
Probability of 10 Year Return	44%	46%	47%	48%
Probability of 15 Year Return	43%	46%	46%	47%
Probability of 7 Year Return	45%	47%	47%	48%

ASSET MIXES FOR CONSIDERATION

Asset Class	Actual (%)*	2018 Policy (%)	Mix 1 (%)	Mix 2 (%)
Global Equity	5.9	5.0	5.0	5.0
Large Cap Equities	17.3	13.0	13.0	13.0
Non-US Equities (Developed)	11.0	14.0	14.0	14.0
Non-US Equities (Emerging)	5.1	5.0	5.0	5.0
Non-US Equities (Emerging Small Cap)	0.0	0.0	**3.0**	**3.0**
Private Equity	3.0	6.0	6.0	**7.0**
Small/Mid Cap Equities	10.2	9.0	9.0	9.0
Total Equities	**52.5**	**52.0**	**55.0**	**56.0**
Emerging Market Debt (Blended)	3.0	3.0	3.0	3.0
Core Bonds	13.0	13.0	13.0	13.0
Global Multi-Sector Fixed Income	4.2	5.0	**4.0**	5.0
Private Debt	1.0	3.0	3.0	3.0
TIPS	0.0	0.0	**5.0**	**3.0**
Total Credit Strategies	**21.2**	**24.0**	**28.0**	**27.0**
Core Real Estate	6.0	7.0	7.0	7.0
Total Real Assets	**6.0**	**7.0**	**7.0**	**7.0**
GAA Total Return	11.5	10.0	5.0	5.0
Hedge Funds	8.0	7.0	5.0	5.0
Total Multi Asset Strategies	**19.5**	**17.0**	**10.0**	**10.0**
Cash	0.7	0.0	0.0	0.0
Total Cash	**0.7**	**0.0**	**0.0**	**0.0**

Expected Return - 5-7 Yr	6.4%	6.7%	6.7%	6.8%
Sharpe Ratio	0.32	0.33	0.33	0.33
Standard Deviation 5-7 Yrs	12.2%	12.5%	12.6%	12.9%
Expected Return - 30 Yr	7.6%	7.7%	7.8%	7.9%
Sharpe Ratio - 30 Yrs	0.37	0.38	0.38	0.38

Addition of Small Cap EME

Addition of TIPS to Fixed Income

Significant reduction in multi-strategy assets

Relative to the current target, both Mix A (+10bps) and Mix B (+20bps) will increase the Plan's 30 year expected return