



Cavanaugh Macdonald
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Teachers' and State Employees' Retirement System Actuarially Determined Employer Contributions (ADEC) Projections for the State System

January 31, 2019 Board of Trustees Meeting

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Valuation Results

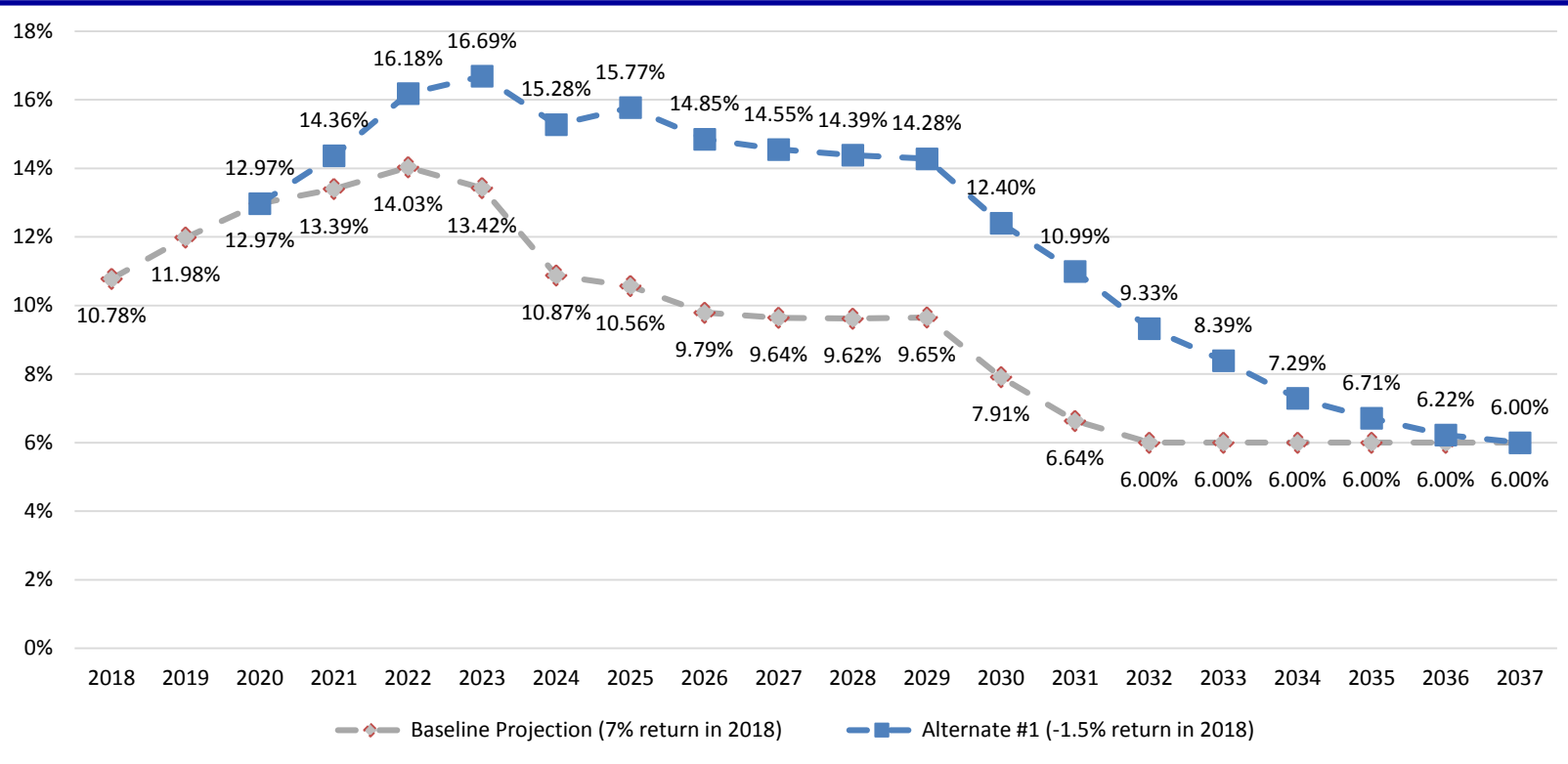
Projections



- Projections of contribution requirements and funded status into the future can be helpful planning tools for stakeholders. This section provides such projections. The projections of the actuarial valuation are known as deterministic projections. Deterministic projections are based on one scenario in the future. The baseline deterministic projection is based on December 31, 2017 valuation results as assumptions.
- Key Projection Assumptions
 - Valuation interest rate of 7.00% for all years in conjunction with direct rate smoothing of the employer contribution rate over a 3-year period beginning July 1, 2019.
 - 7.00% investment return on market value of assets
 - Actuarial assumptions and methods as described in Appendix D. All future demographic experience is assumed to be exactly realized.
 - The contribution rate under the Employer Contribution Rate Stabilization Policy (ECRSP) is contributed until fiscal year ending 2022.
 - The actuarially determined employer contribution rate is contributed for fiscal years ending 2023 and beyond.
 - 0% increase in the total active member population
 - No cost-of-living adjustments granted
 - Future pay increases based on long-term salary increase assumptions
- The ECRSP adopted by the Board of Trustees on January 21, 2016 requires that recommended contributions be 0.35% of payroll greater than the appropriated contribution during the prior year, with the following bounds: (1) contributions may not be less than the actuarially determined employer contribution (ADEC) rate and (2) contributions may not be greater than a contribution determined using the same assumptions used to calculate the ADEC but using a discount rate equal to the long-term Treasury bond yield.
- In addition, we have provided one alternate deterministic projection. The alternate deterministic projection is based on the same assumptions as the baseline deterministic projection except that it is based asset return of -1.5% for calendar year 2018. The preliminary return of -1.5% for calendar year 2018 was provided by RSD Staff.

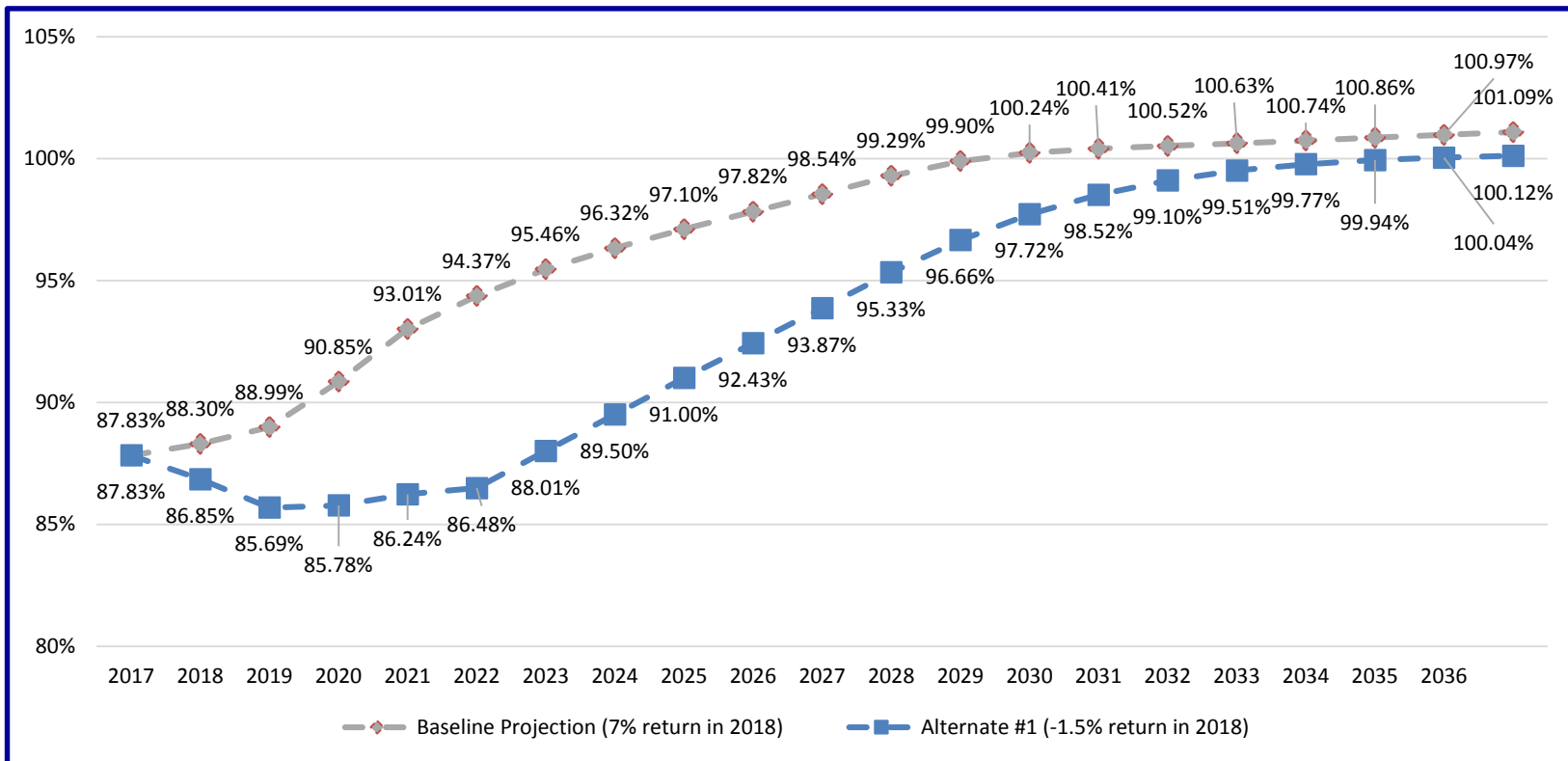
Valuation Results

Projected Contribution Rates



Estimated returns were 8.5% lower than expected. As a result we are projecting that the unfunded actuarial accrued liability will be higher resulting in a higher employer contribution rates.

Projected Funded Ratio



Estimated returns were 8.5% lower than expected. As a result we are projecting that the unfunded actuarial accrued liability will be higher resulting in a higher employer contribution rates.

Certification



Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. Because of limited scope, Cavanaugh Macdonald performed no analysis of the potential range of such future differences, except for some limited analysis in financial projections or required disclosure information. Results prior to December 31, 2017 were provided by the prior consulting actuary.

We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this report. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions about it.

Larry Langer, ASA, EA, FCA, MAAA
Principal and Consulting Actuary

Jonathan T. Craven, ASA, EA, FCA, MAAA
Consulting Actuary

APPENDIX

Fiscal Year Contribution Projection Baseline



Baseline Projection (7% return in 2018)

Fiscal Year Ending	Employer Contribution Rate	Employer Contributions	Member Contributions	Benefit Payments
6/30/2020	12.97%	2,024,964,000	936,520,000	4,456,849,000
6/30/2021	13.39%	2,144,622,000	960,644,000	4,684,775,000
6/30/2022	14.03%	2,306,482,000	986,276,000	4,823,304,000
6/30/2023	13.42%	2,266,537,000	1,013,186,000	4,966,622,000
6/30/2024	10.87%	1,887,338,000	1,041,291,000	5,116,120,000
6/30/2025	10.56%	1,885,196,000	1,070,682,000	5,275,680,000
6/30/2026	9.79%	1,797,531,000	1,101,468,000	5,448,263,000
6/30/2027	9.64%	1,821,095,000	1,133,575,000	5,625,536,000
6/30/2028	9.62%	1,870,529,000	1,167,072,000	5,808,545,000
6/30/2029	9.65%	1,933,195,000	1,202,098,000	5,997,685,000
6/30/2030	7.91%	1,632,265,000	1,238,612,000	6,190,400,000
6/30/2031	6.64%	1,411,780,000	1,276,641,000	6,388,056,000
6/30/2032	6.00%	1,316,332,000	1,316,332,000	6,590,283,000
6/30/2033	6.00%	1,357,720,000	1,357,720,000	6,795,185,000
6/30/2034	6.00%	1,400,853,000	1,400,853,000	6,998,955,000
6/30/2035	6.00%	1,445,887,000	1,445,887,000	7,202,487,000
6/30/2036	6.00%	1,492,941,000	1,492,941,000	7,403,862,000
6/30/2037	6.00%	1,542,131,000	1,542,131,000	7,600,143,000

Fiscal Year Contribution Projection Alternate #1



Alternate #1 (-1.5% return in 2018)

Fiscal Year Ending	Employer Contribution Rate	Employer Contributions	Member Contributions	Benefit Payments
6/30/2020	12.97%	2,024,964,000	936,520,000	4,456,849,000
6/30/2021	14.36%	2,299,814,000	960,644,000	4,684,775,000
6/30/2022	16.18%	2,660,112,000	986,276,000	4,823,304,000
6/30/2023	16.69%	2,818,395,000	1,013,186,000	4,966,622,000
6/30/2024	15.28%	2,650,981,000	1,041,291,000	5,116,120,000
6/30/2025	15.77%	2,814,169,000	1,070,682,000	5,275,680,000
6/30/2026	14.85%	2,726,147,000	1,101,468,000	5,448,263,000
6/30/2027	14.55%	2,749,348,000	1,133,575,000	5,625,536,000
6/30/2028	14.39%	2,798,367,000	1,167,072,000	5,808,545,000
6/30/2029	14.28%	2,860,705,000	1,202,098,000	5,997,685,000
6/30/2030	12.40%	2,559,481,000	1,238,612,000	6,190,400,000
6/30/2031	10.99%	2,338,647,000	1,276,641,000	6,388,056,000
6/30/2032	9.33%	2,046,122,000	1,316,332,000	6,590,283,000
6/30/2033	8.39%	1,898,967,000	1,357,720,000	6,795,185,000
6/30/2034	7.29%	1,702,722,000	1,400,853,000	6,998,955,000
6/30/2035	6.71%	1,617,299,000	1,445,887,000	7,202,487,000
6/30/2036	6.22%	1,547,894,000	1,492,941,000	7,403,862,000
6/30/2037	6.00%	1,542,131,000	1,542,131,000	7,600,143,000

Asset and Liability Projection Baseline



Baseline Projection (7% return in 2018)

Fiscal Year Ending	Market Value of Assets	Actuarial Value of Assets	Accrued Liability	Unfunded Accrued Liability	Funded Ratio
12/31/2017	70,607,887,000	69,568,451,000	79,209,348,000	9,640,897,000	87.83%
12/31/2018	73,463,767,000	72,215,103,000	81,785,287,000	9,570,185,000	88.30%
12/31/2019	76,466,939,000	75,009,048,000	84,293,453,000	9,284,405,000	88.99%
12/31/2020	79,719,464,000	78,927,348,000	86,877,459,000	7,950,111,000	90.85%
12/31/2021	83,280,439,000	83,280,439,000	89,539,869,000	6,259,430,000	93.01%
12/31/2022	87,081,778,000	87,081,778,000	92,279,351,000	5,197,573,000	94.37%
12/31/2023	90,775,393,000	90,775,393,000	95,089,598,000	4,314,205,000	95.46%
12/31/2024	94,370,934,000	94,370,934,000	97,974,148,000	3,603,214,000	96.32%
12/31/2025	98,011,749,000	98,011,749,000	100,935,177,000	2,923,429,000	97.10%
12/31/2026	101,708,300,000	101,708,300,000	103,973,776,000	2,265,476,000	97.82%
12/31/2027	105,534,755,000	105,534,755,000	107,093,723,000	1,558,969,000	98.54%
12/31/2028	109,519,226,000	109,519,226,000	110,299,773,000	780,547,000	99.29%
12/31/2029	113,481,624,000	113,481,624,000	113,595,501,000	113,877,000	99.90%
12/31/2030	117,268,143,000	117,268,143,000	116,987,681,000	(280,462,000)	100.24%
12/31/2031	120,978,914,000	120,978,914,000	120,487,506,000	(491,407,000)	100.41%
12/31/2032	124,749,068,000	124,749,068,000	124,105,337,000	(643,731,000)	100.52%
12/31/2033	128,661,087,000	128,661,087,000	127,855,173,000	(805,914,000)	100.63%
12/31/2034	132,734,017,000	132,734,017,000	131,754,892,000	(979,125,000)	100.74%
12/31/2035	136,988,494,000	136,988,494,000	135,823,874,000	(1,164,620,000)	100.86%
12/31/2036	141,447,994,000	141,447,994,000	140,084,910,000	(1,363,085,000)	100.97%
12/31/2037	146,126,474,000	146,126,474,000	144,551,541,000	(1,574,933,000)	101.09%

Asset and Liability Projection

Alternate #1



Alternate #1 (-1.5% return in 2018)

Fiscal Year Ending	Market Value of Assets	Actuarial Value of Assets	Accrued Liability	Unfunded Accrued Liability	Funded Ratio
12/31/2017	70,607,887,000	69,568,451,000	79,209,348,000	9,640,897,000	87.83%
12/31/2018	67,546,693,000	71,031,688,000	81,785,287,000	10,753,599,000	86.85%
12/31/2019	70,135,670,000	72,228,023,000	84,293,453,000	12,065,430,000	85.69%
12/31/2020	72,945,006,000	74,519,720,000	86,877,459,000	12,357,739,000	85.78%
12/31/2021	76,031,769,000	77,215,184,000	89,539,869,000	12,324,685,000	86.24%
12/31/2022	79,806,932,000	79,806,932,000	92,279,351,000	12,472,420,000	86.48%
12/31/2023	83,690,755,000	83,690,755,000	95,089,598,000	11,398,843,000	88.01%
12/31/2024	87,690,762,000	87,690,762,000	97,974,148,000	10,283,386,000	89.50%
12/31/2025	91,852,532,000	91,852,532,000	100,935,177,000	9,082,646,000	91.00%
12/31/2026	96,106,505,000	96,106,505,000	103,973,776,000	7,867,271,000	92.43%
12/31/2027	100,529,401,000	100,529,401,000	107,093,723,000	6,564,322,000	93.87%
12/31/2028	105,152,065,000	105,152,065,000	110,299,773,000	5,147,708,000	95.33%
12/31/2029	109,797,328,000	109,797,328,000	113,595,501,000	3,798,173,000	96.66%
12/31/2030	114,314,513,000	114,314,513,000	116,987,681,000	2,673,168,000	97.72%
12/31/2031	118,702,131,000	118,702,131,000	120,487,506,000	1,785,375,000	98.52%
12/31/2032	122,991,056,000	122,991,056,000	124,105,337,000	1,114,281,000	99.10%
12/31/2033	127,229,990,000	127,229,990,000	127,855,173,000	625,182,000	99.51%
12/31/2034	131,455,431,000	131,455,431,000	131,754,892,000	299,462,000	99.77%
12/31/2035	135,741,466,000	135,741,466,000	135,823,874,000	82,408,000	99.94%
12/31/2036	140,143,196,000	140,143,196,000	140,084,910,000	(58,286,000)	100.04%
12/31/2037	144,730,339,000	144,730,339,000	144,551,541,000	(178,799,000)	100.12%