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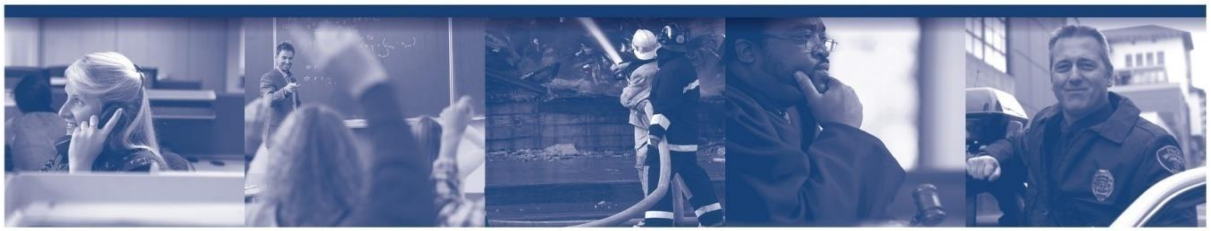
Omaha School Employees' Retirement System
Educational Session on Actuarial Methods

Presented by: Cavanaugh Macdonald Consulting
June 3, 2021



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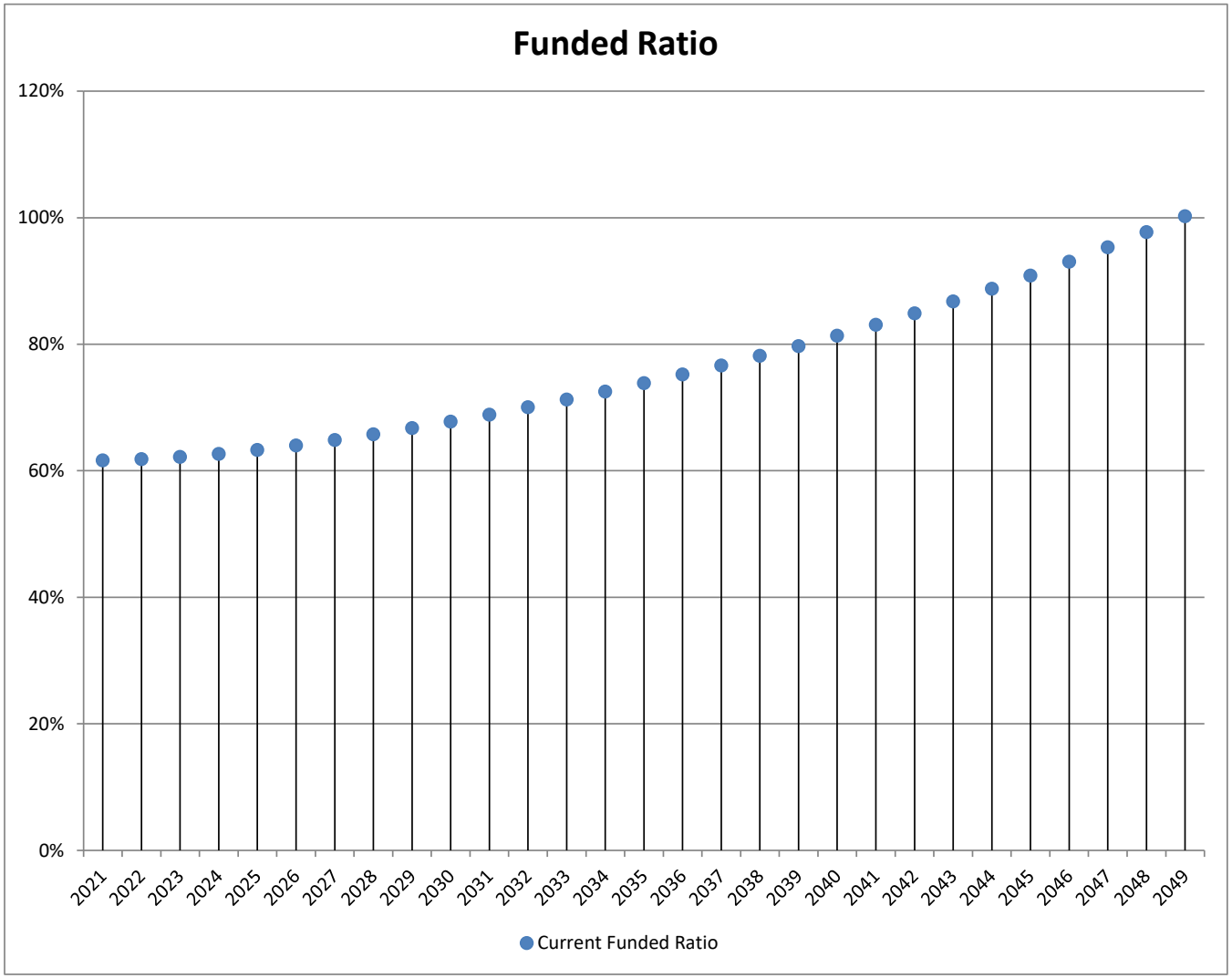
Discussion Topics

- Follow up items from May meeting (January 1, 2021 valuation results)
  - Projection showing future funded ratios
  - Returns on market value of assets needed in 2021 to produce a 7.0% or 7.5% return on actuarial assets

- Actuarial methods include:
  - Actuarial cost method
  - Asset valuation method
  - UAAL Amortization method

Actuarial Projections
(assuming all current assumptions are met)



Assuming all current assumptions are met, System will reach:

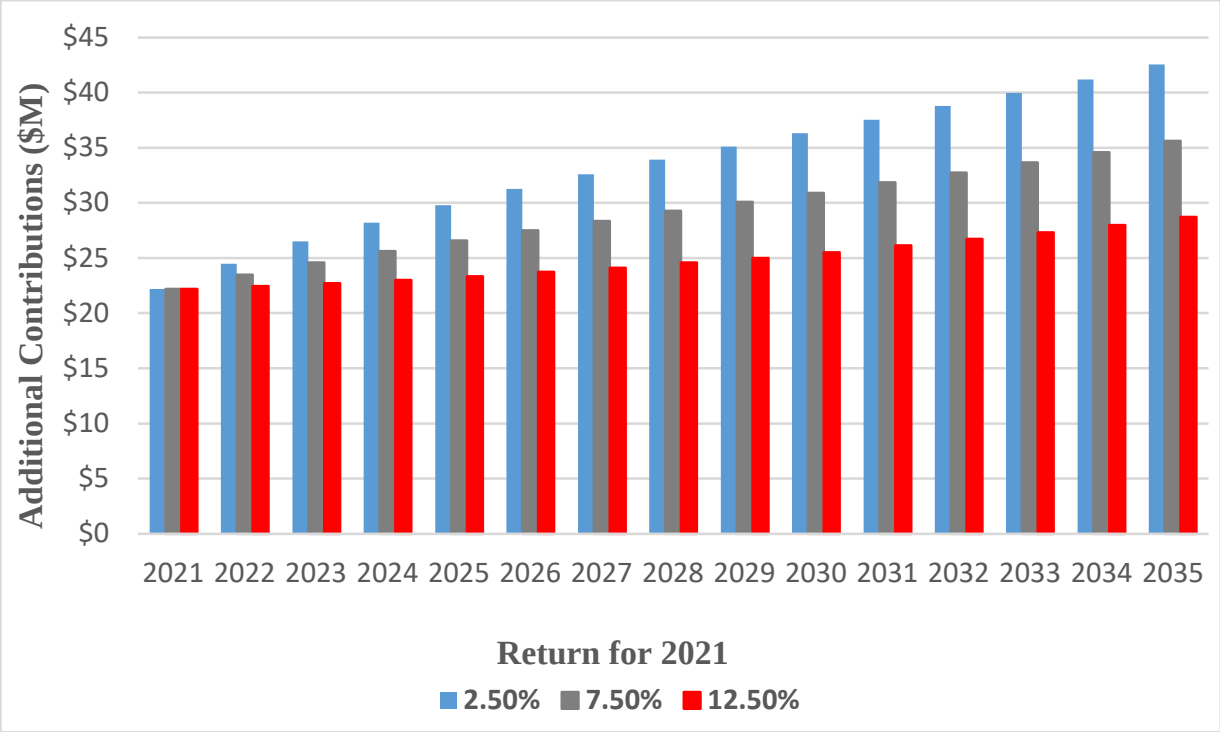
- 70% funded in 2032
- 80% funded in 2040
- 90% funded in 2045
- 100% funded in 2049

Actuarial Projection Results

Year	MVA ($M)	AVA ($M)	AAL ($M)	UAAL ($M)	Funded Ratio
2021	1,405	1,468	2,381	914	61.6%
2026	1,765	1,786	2,791	1,005	64.0%
2031	2,244	2,251	3,269	1,018	68.9%
2036	2,857	2,859	3,802	943	75.2%
2041	3,639	3,640	4,383	743	83.1%
2046	4,696	4,697	5,049	353	93.0%
2051	6,058	6,058	5,843	(215)	103.7%

Assumes all assumptions are met, including the 7.5% investment return, every year in the future.

Additional District Contribution
Under Different 2021 Return Scenarios



A return of 12.50% on market value in 2021 would create a 7.50% return on the actuarial value of assets.

This would decrease the expected Additional District contribution by around $1M ($22.5M) for 2022.

Note an equal movement in the opposite direction, 2.50%, in 2021 would increase the expected Additional District contribution by around $1M ($24.5M) for 2022.

Note: A return of 10.50% on market value in 2021 would create a 7.00% return on the actuarial value of assets.

Projections assume that the 7.5% assumed return is met in all years other than 2021.

OSERS' Funding Policy

Actuarial Cost Method

- Allocates the cost of projected pensions among past, current, and future periods of service

Asset Smoothing Method

- Develops the value of assets used in the actuarial valuation (actuarial value of assets)
- Recognizes variations in actual versus expected returns over a period of time

Amortization Method

- Allocates the cost of benefit changes, assumption changes, and actuarial experience (gains and losses) over future years
- Payment schedule to systematically fund the unfunded actuarial accrued liability

Actuarial Standards of Practice (ASOP)

- Professional guidance issued by the Actuarial Standards Board
  - As credentialed actuaries, we are required to follow ASOPs
  - Provides guidance to actuaries about the process and considerations in the selection of assumptions used in valuing pension benefits
- ASOP 44: guidance on asset valuation methods
- ASOP 4: guidance on cost method and amortization
- Also consider guidance from other sources including GFOA, Conference of Consulting Actuaries and Society of Actuaries

Actuarial Cost Method

- Current Method is Entry Age Normal (EAN)
  - Most common cost method used by public plans
  - Allocates the members' liability over years of service
    - Portion allocated to past service is called Actuarial Accrued Liability
    - Portion allocated to current year of service is the normal cost
    - Portion allocated to future years of service is called present value of future normal costs
  - Normal cost rate is developed as a level percent of payroll over the member's expected working career
    - Payroll is assumed to increase so the dollar amounts of normal cost also increase
  - Required cost method for GASB 67/68 calculations (avoid doing two valuations)

Asset Smoothing Method

- Market value of assets (MVA) is not used directly in the valuation
- Asset valuation method used to smooth the effect of market fluctuations
- Smoothed assets are called "*Actuarial Value of Assets"* (AVA)
- Valuation calculations generally use the Actuarial Value of Assets
  - Funded ratio: Actuarial Assets / Actuarial Liability
  - Unfunded Actuarial Accrued Liability
  - Actuarial Contribution Rate/Additional District Contribution

Actuarial Standard of Practice Number 44

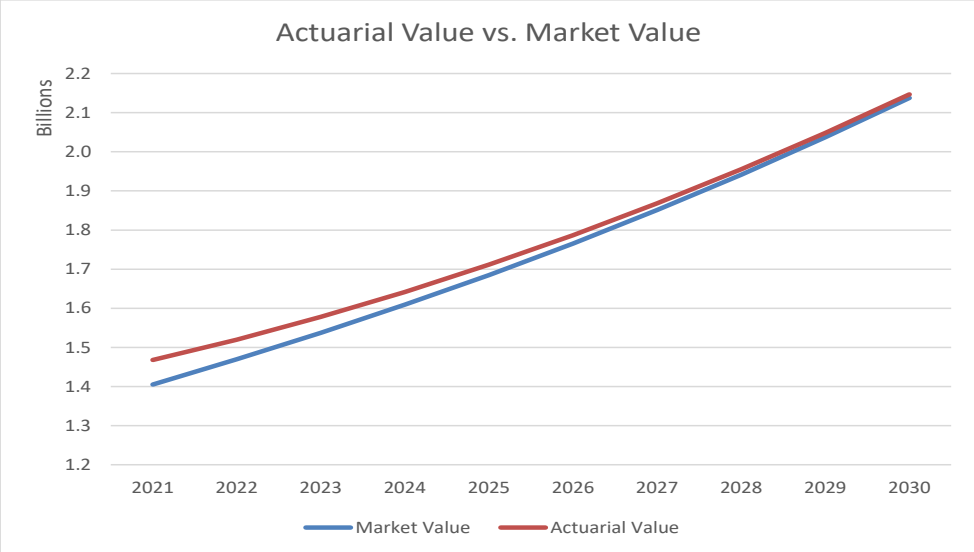
- Actuarial Value of Assets should bear a reasonable relationship to the Market Value of Assets

- Should be likely to satisfy both of the following:
  - Produce values within a reasonable range around MVA, and
  - Recognize differences from MVA in a reasonable amount of time

- In lieu of both of the above, either of the below can be satisfied:
  - A sufficiently narrow range around the MVA, or
  - Recognize differences from MVA in a sufficiently short period

OSERS Asset Smoothing Method

- Current Method is 75% of Expected Value + 25% of Market Value
  - Recognizes
    1. Expected investment income on the actuarial value of assets
    2. 25% of the difference between actual market value and the expected value of assets is recognized
  - If all assumptions are met:
    - Actuarial value converges to market value asymptotically



Alternate Asset Smoothing Method

- Example of the Closed 5-Year Smoothing Method using actual OSERS returns
  - Recognizes difference in actual vs expected return evenly over a reasonable time period

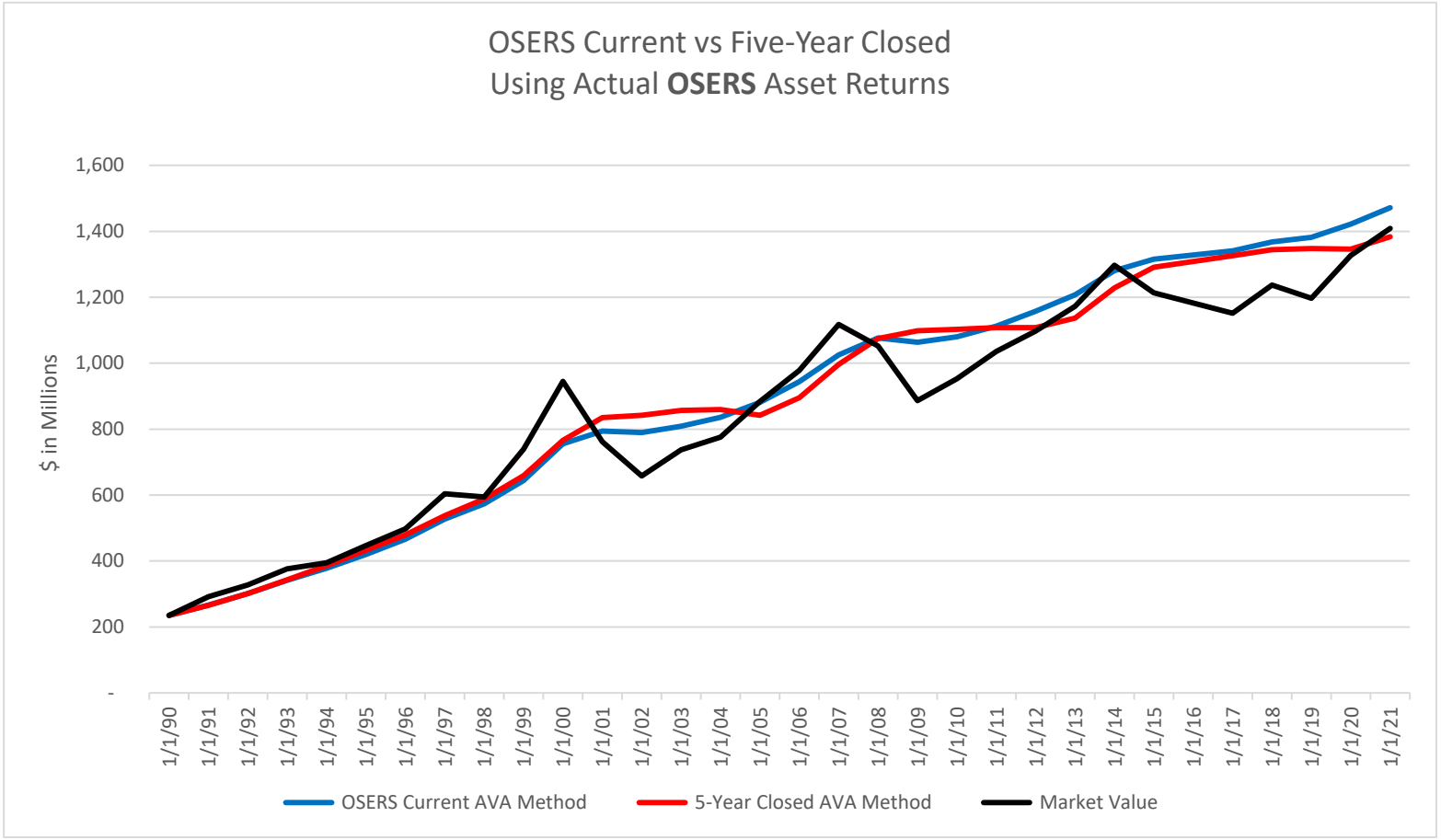
1. Return to be Spread

Plan Year Ending	Return to be Spread	Unrecognized Percent	Unrecognized Return
2020	$21,181,246	80%	$16,944,997
2019	74,166,899	60%	44,500,139
2018	(104,991,443)	40%	(41,996,577)
2017	31,302,756	20%	6,260,551
			$25,709,110

2. Total Market Value of Assets as of Jan 1, 2021 $1,405,393,000

3. Total Actuarial Value of Assets as of Jan 1, 2021 $1,379,683,890
   [2 - 1]

Comparison of OSERS Current Method and Five-year Closed Smoothing Method



Comparison uses actual asset information going back to 9/1/1991. However, this is for illustrative purposes only, as this does not reflect OSERS reset of AVA to MVA in the 2007 valuation.

Actuarial Value of Assets follows a similar pattern under both methodologies.

Comparison of Asset Valuation Methods

- Both methods effectively smooth the difference between the actual and expected returns
- OSERS Current Method
  - Produces smoother progression of actuarial value of assets
  - “Bounces” back to market value more quickly when strong returns follow low returns
  - Easy to determine the return needed in the current year on market value to meet the assumed return on the actuarial value
  - Not intuitive – often misunderstood as four-year smoothing
- Five-Year Closed Smoothing Method
  - Most common method used by public plans
  - Easy to understand but difficult to anticipate the impact of current year’s return on the actuarial assets

OSERS Current Amortization Policy

- Amortization policy determines the length of time and structure of the contributions required to systematically fund the UAAL
- Components of OSERS Amortization Policy

	Current
Number of amortization bases	Layered bases
Payment methodology	Level percent of payroll
Amortization Period • Number of Years • Open or Closed	Closed 30-year periods beginning 1/1/18

Current Amortization Period is Longer Than Industry Trends

- Considerations
  - Current amortization period and assumptions result in negative amortization for about ten years (dollar amount of UAAL increases)
  - Guidance from outside experts like GFOA, CCA and ASB* all encourage shorter periods, generally 15-20 years
  - Second exposure draft of Actuarial Standard of Practice (ASOP) Number 4
    - UAAL should be amortized over a “reasonable time period” or reduce the outstanding balance by a “reasonable amount” each year
    - Not a bright line test but 30 years is unlikely to be considered “reasonable”

* Government Finance Officers Association, Conference of Consulting Actuaries and Actuarial Standards Board

Recommend Shorter Amortization Periods for New Bases

- Observations
  - Industry trend is to shorter periods
  - Professional guidance is consistently lower than 30 years
  - Final version of ASOP 4 will likely be effective in next few years. Current amortization policy not expected to meet the new standard
- Likely Recommendation
  - Shorten the amortization period for new bases, especially experience gains/losses, to 20-year or 25-year closed periods
  - Existing bases could continue to be amortized on their current schedule
  - Cost impact depends on whether gains or losses occur and the magnitude of each. Shorter periods will recognize variances more quickly and slightly increase volatility in the contribution rate.
  - Legislation passed this year changing the NPERS Plans from closed 30-year amortization to closed 25-year periods

Closing Thoughts

- Actuarial cost method likely to remain Entry Age Normal

- Asset smoothing method: current method is reasonable and acceptable, but alternate (NPERS) method is also reasonable.

- Amortization policy:
  - Layered approach is our preference (no change).
  - Payments as a level percent of payroll are a reasonable approach for funding the UAAL (no change).
  - Board needs to evaluate the current amortization period and consider a shorter period, at least for new bases.

APPENDIX OF SUPPLEMENTAL INFORMATION

Other Sources of Guidance on Funding of Public Pension Plans

- ***Actuarial Funding Policies and Practices for Public Pension Plans***, published by the Conference of Consulting Actuaries' Public Plans Committee

- ***Best Practices: Core Elements of a Funding Policy***, published by the Government Finance Officers Association (GFOA)

- ***Report of the Blue Ribbon Panel on Public Pension Funding***, published by the Society of Actuaries

Amortization Method

- Unfunded Actuarial Accrued Liability (UAAL)
  - Actuarial Liability minus Actuarial Assets
  - In general, UAAL exists due to benefit improvements that have not been fully paid for, experience that is less favorable than expected, assumption changes and any contributions less than full actuarial rate
- Amortization policy determines the length of time and structure of the contributions required to systematically fund the UAAL
- Current Method
  - Amortization Bases: Layered bases
  - Amortization Period: Closed 30 Year Periods (adopted in 2019)
  - Payment Methodology: Level Percent of Payroll

Amortization: Number of Bases

- Amortization Bases
  - Single Base
    - All experience, benefit changes, assumption changes are combined into a single base (UAAL)
    - Significant volatility in the actuarial contribution rate can occur later in the amortization period
    - Tendency to “reset” the period when it gets shorter
  - Separate Bases (“Layers”)
    - Composed of multiple amortization bases, each with its own payment and remaining amortization period
    - Provides transparency regarding “UAAL components”
    - Different layers can be amortized over different periods, to better match demographics. For example:
      - Gains/losses amortized over 15 to 20 years
      - Assumption changes amortized over 25 to 30 years
      - Benefit changes amortized over 10 to 20 years

Amortization Method
"Layers" Example

Amortization Bases	Original Amount	1/1/2021 Remaining Payments	Date of Last Payment	Outstanding Balance as of 1/1/2021	Annual Contribution*
2019 UAAL Base	$ 814,069,000	28	1/1/2048	$ 836,867,236	$ 50,685,914
2020 Experience Base	21,863,793	29	1/1/2049	22,179,615	1,318,443
2021 Experience Base	54,475,149	30	1/1/2050	54,475,149	3,181,591
Total				**$ 913,522,000**	**$ 55,185,948**

* Contribution amount reflects mid-year timing.

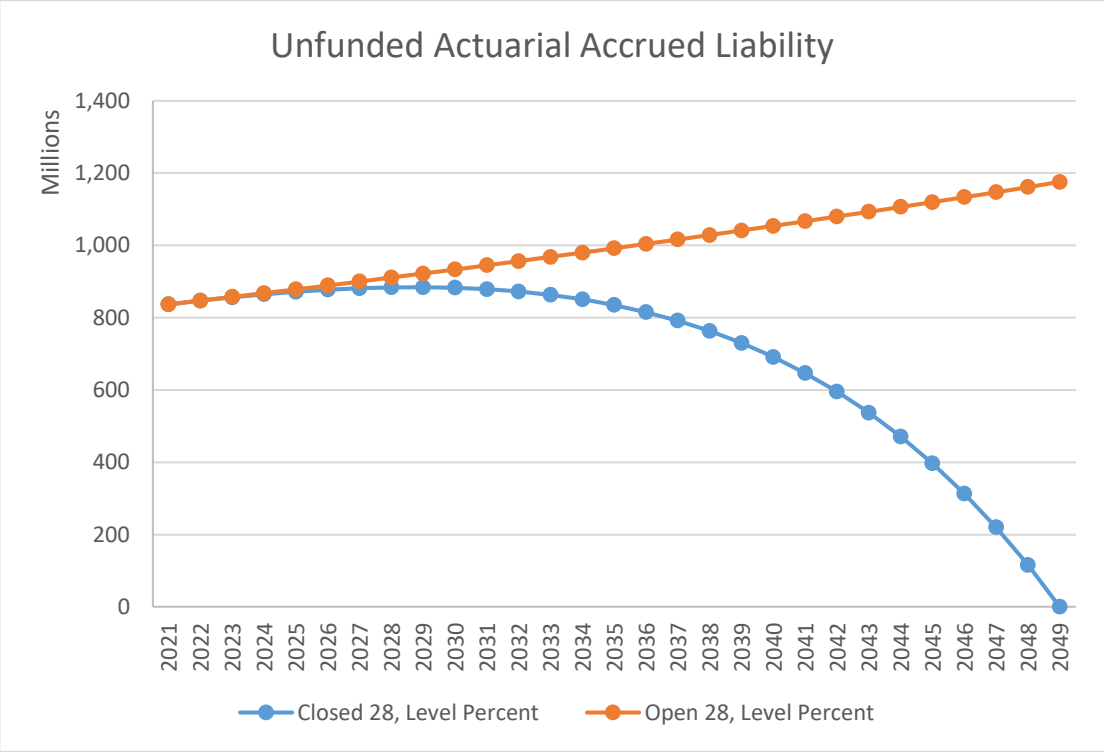
Preliminary recommendation is to retain the current layered amortization bases method.

Amortization Period

- Closed Period
  - Years of payments remaining decreases by 1 in each valuation year
  - Moves plan toward full funding over the amortization period
- Open (Rolling) Period
  - Period remains the same each year
  - “Refinances” debt each year
  - Much slower funding compared to a closed period
  - Common before new GASB rules, but most systems have changed since 2014

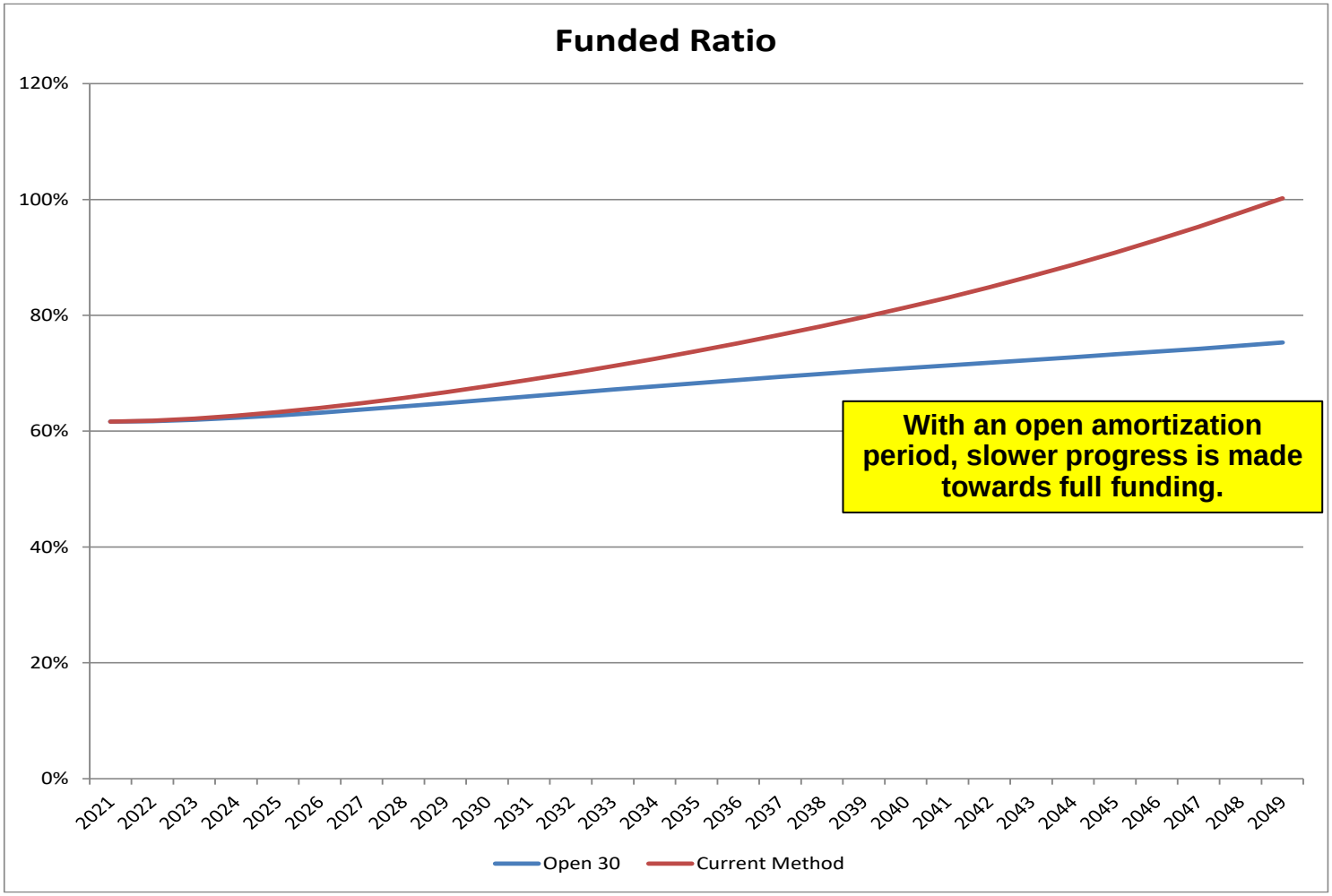
Amortization: Closed vs Open Period

- UAAL Outstanding Balance
  - UAAL continues to increase using an open 28-year period (number of payments left as of 1/1/2021 valuation)



Assumes all actuarial assumptions are met in the future

Amortization: Closed vs Open Period



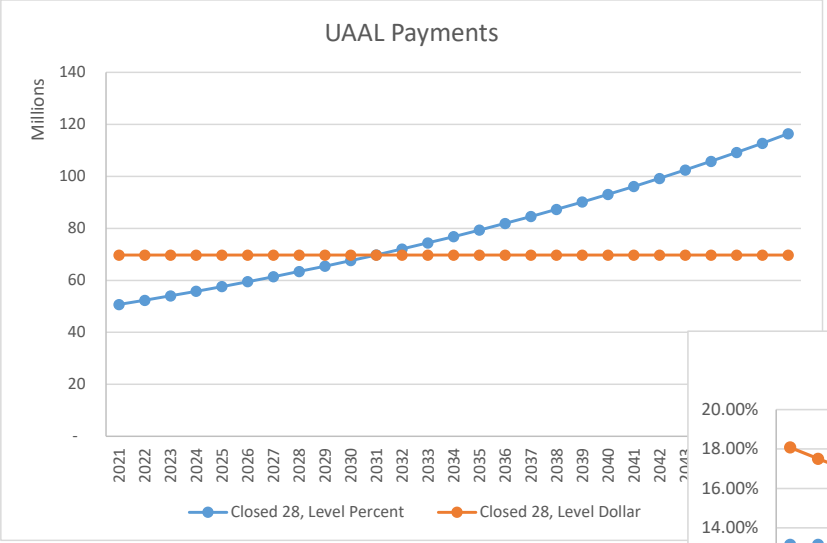
Assumes all actuarial assumptions are met in the future

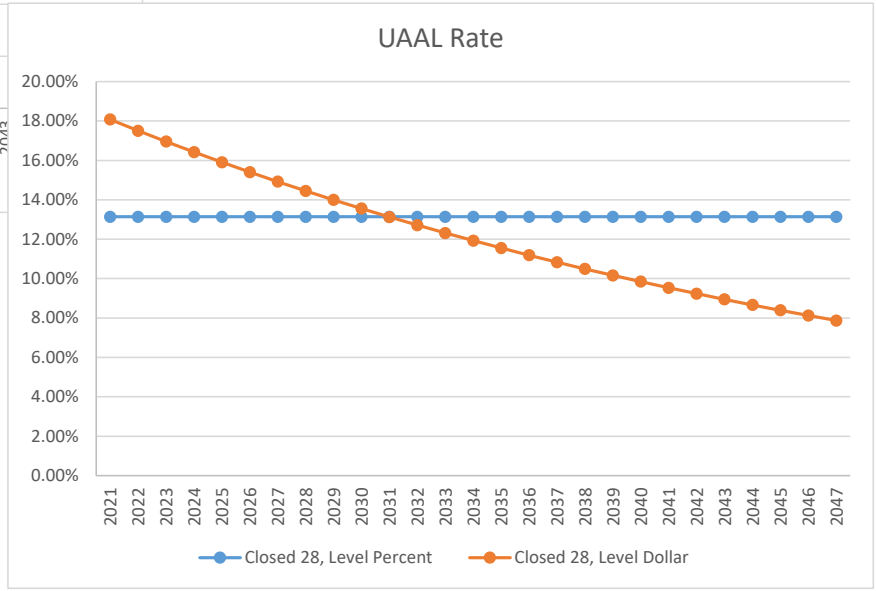
Amortization Payments

- Payment Methodology
  - Level Dollar
    - Fixed dollar amount of payment
    - Similar to home mortgage
    - Each payment includes some payment on the outstanding balance of the debt
  - Level Percent of Payroll
    - Constant *rate of payroll*, assuming all assumptions are met (payroll is assumed to increase)
    - Level percent of payroll is consistent with the calculation of normal cost and funding of the Plan, i.e., contributions are payroll-based
    - Important note: the dollar amount of the UAAL payment increases each year, even if the assumptions are met and there are no new pieces of UAAL
      - If payroll doesn't increase, as assumed, the UAAL contribution rate will increase

Amortization Payments
(Level Dollar vs Level Percent)

- Level Percent of Payroll: Dollar <u>amounts</u> of payments increase each year, but the UAAL rate is level over time

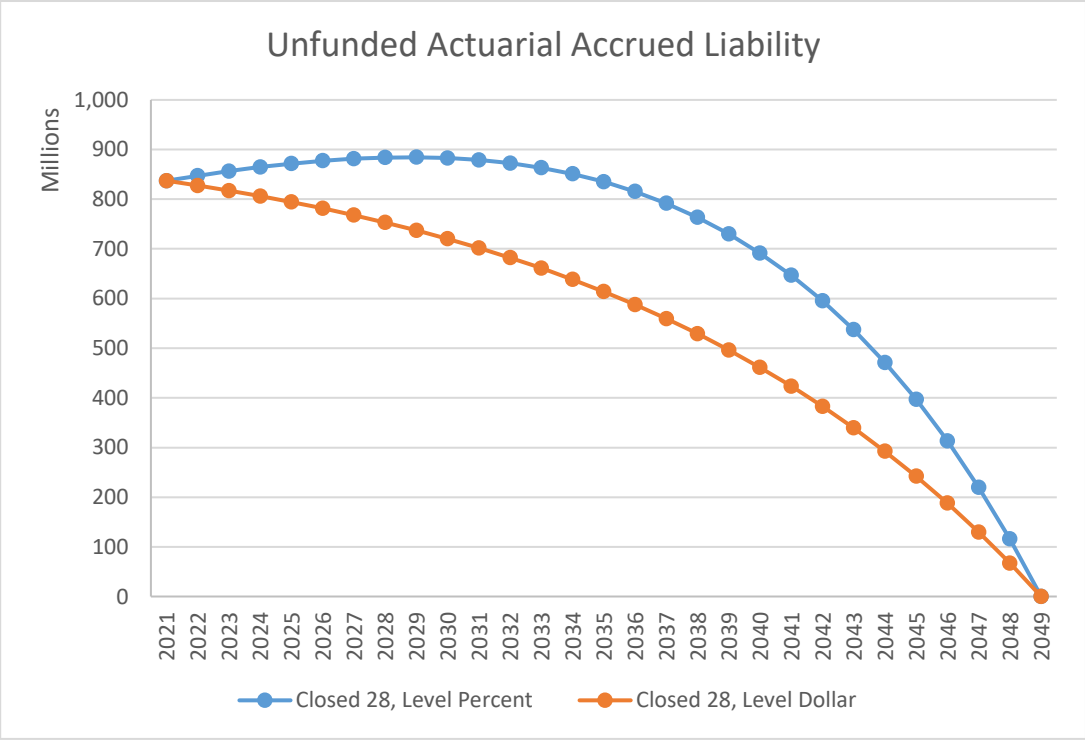




Assumes all actuarial assumptions are met in the future

Amortization Payments
(Level Dollar vs Level Percent)

- UAAL Outstanding Balance
  - Level percent of payroll contributions are less than interest in the early years, so the dollar amount of UAAL increases



Assumes all actuarial assumptions are met in the future