August 1, 2024

Members of the Pension Review Subcommittee:

In response to questions received, PERA staff has prepared the attached information.

Please let us know if any members would like to discuss this information in greater detail.

Thank you,

Andrew Roth
Chief Executive Officer/Executive Director

1. Contributions
   a. **History of Contribution Rates**
      a. See the *Schedule of Contribution Rate History* from the 2023 ACFR (pages 243-248) for most recent 18 years of contribution history.
      b. See the *Schedule of Contribution Rate History* from the 2021 ACFR (pages 246-254) for additional history in excess of 20 years.

2. Investments
   a. ***Asset Liability Study -*** *(Attach A/L Study presentations given from Aon to Board thus far)*
      - Current rate of return and capital market assumptions by asset class w/ long-term target allocations and expected 30-year returns

Below please find the current return and volatility assumptions. Additional information can be found in the various attached A/L study decks.

Asset Class	Long-Term Asset Allocation	Expected Nominal Return	Expected Risk
Global Equity	54.0	7.4	18.7
Fixed Income	23.0	4.2	5.2
Private Equity	8.5	10.1	20.5
Real Estate	8.5	6.5	20.3
Alternatives	6.0	6.6	8.1
Total Fund	100.0	7.43	12.67

- Liquidity Questions - *(note Section 3, Liquidity Analysis, in Aon's recent ALM presentation)*

- Asset class benchmarks and explanations - *(Attach 2023 ACFR (pg. 126 – footnote))*
  - (Sharf): I'd like to know how the private equity benchmark is determined to be appropriate. That is, what is the benchmark itself compared to in order to see whether or not it's an appropriate aggregate comparison for PERA's private equity valuations.

Unlike equities and fixed income, there is no "perfect" benchmark for private equity. Most plans utilize either a self-reported peer benchmark or a cost of capital/opportunity cost benchmark. PERA uses the opportunity cost of capital approach via the MSCI ACWI IMI plus a premium of 150 bps (see footnote on page 126 of 2023 ACFR). The PERA Board worked with their investment consultant to determine that this is an appropriate benchmark for PERA – it accounts for the premium of investing in private equity in lieu of global equities. PERA is a long-term investor and it is useful to analyze this benchmark over a long time horizon vs. the volatility of short-term time periods. The Board's investment consultant provides a secondary peer benchmark by which we evaluate our program against applicable peer programs. The

benchmarks are reviewed as part of the ongoing asset/liability process to ensure they remain applicable. Below is a snapshot from Aon's 4th quarter performance report that shows the peer universe comparison (Burgiss Pooled Average).

	Allocation		Performance (%)				
	Market Value ($000)	%	1 Quarter	1 Year	3 Year	5 Year	10 Year
Private Equity	5,358,075.8	8.7	2.6	4.7	10.9	13.2	12.0
Private Equity Custom Benchmark			*11.6*	*23.4*	*7.2*	*13.3*	*12.4*
Burgiss Pooled Average			*2.6*	*6.0*	*10.2*	*13.6*	*12.2*

- (Kolker): Wants information about what PERA is benchmarking against (to add on to 2a). Like which benchmarks is PERA using (by name)?

Please see page 126 of the 2023 ACFR.

- Timeline of PERA Board reporting and decision-making.

The ongoing asset/liability study kicked-off at the September 2023 Board Planning Session. The Board received updates and provided input at the November 2023, January, March, and June 2024 Board Meetings. It is anticipated the Board will approve any changes to the asset allocation at the September 2024 Board Planning Session. The presentations are all attached.

b. Proxy Voting Policy – *(Attach* redline and final revised version of policy)

- (Sharf): During testimony, PERA said that it used academic studies to inform its votes on such policies as diversity and ESG. I would also like to know what the criteria are for which studies are used, whether or not policies are reversed when those studies are retracted, and what concerns PERA has about the replication crisis in the academic social science literature.

PERA may use empirical evidence to inform its proxy voting policies. When reviewing academic research, PERA staff considers the source, publication, methodology, and robustness of the literature review and its body of evidence. Studies that replicate prior research may be reviewed but are not given more weight in PERA's considerations. As a long-term investor, PERA is interested in examinations of factors that may contribute to shareholder returns over long time periods. This often precludes emergent themes that may arise for shareholder vote, as most empirical evidence pertains to long-standing matters of corporate governance. The long-term focus may also weed out studies that are later retracted or proved erroneous. PERA is also member to forums on corporate governance led by leading universities such as Stanford and Harvard. This membership provides opportunity to discuss research and real-world market applications with authors, corporate representatives, fellow institutional investors, and other participants. While academic research can contribute to PERA's expectations for long-term investment returns, it is not the only source of information PERA uses to inform vote decisions. The PERA Board's Proxy Voting Policy is also informed by the ever-evolving proxy record, global stewardship and governance codes, PERA's investment theses, expert insights, and economic, corporate, and shareholder developments. As markets and empirical evidence change, PERA is poised to adapt its voting policies in continued support of its singular investment objective of maximizing long-term, risk-adjusted returns for the benefit of the PERA membership.

- Can you provide any examples of the impact our proxy votes had?

Proxy voting is a formal feedback tool used by companies and their shareholders to express their positions on matters that can affect profitability and investment returns.

While proxy voting is one tool PERA can use to signal its interests to portfolio companies, it is nearly impossible to measure the impact of PERA's proxy votes on corporate behavior and investment returns. Just as there are a variety of factors that affect financial performance, there are a variety of factors that limit the impact of proxy voting, including:

- PERA is unlikely to hold enough shares to have a significant influence on corporate behavior.
- Proposals may be non-binding, meaning companies do not have to act based on majority shareholder support and can take actions that fall beyond the scope of shareholder ballots.
- It can take time for shareholders to come to consensus on which actions a company should take (see PERA Remains Engaged Through Proxy Voting example on page 27 of the 2024 Investment Stewardship Report).

Despite the limitations of measuring outcomes, PERA views the right to vote as an asset of the plans to be managed under fiduciary care. We exercise the right to vote to encourage the alignment of corporate management's interests with the financial interests of long-term shareholders, in support of our mission.

For more information and examples from PERA's vote record, please see the *2024 Investment Stewardship Report*.

3. Actuarial
    a. Signal Light Report
        - Summary of enhancements from Signal Light Report 2.0 to 3.0 (Attach excerpt of 2024 Signal Light Report – Executive Summary (pgs. 9-11))
            - (Sharf): I'd like to know what additional enhancements are being considered for a prospective Signal Light Report 4.0.

PERA Staff and Segal typically engage during the final stages of the annual actuarial valuation process to discuss possible enhancements to the upcoming Signal Light Reporting process. For example, in 2019 PERA and Segal discussed incorporating stochastic analysis, which was included in the July 2020 Signal Light Report. Following the incorporation of stochastic modeling, PERA and Segal focued on including consideration of the AAP, which occurred in phases:

- 2021: One-year view – What would it take to trigger an AAP adjustment next year (in the following year)?
- 2022: 10-year view – What is the probability of triggering an AAP during the next 10 years? In this model, each year the AAP was considered in isolation (not considering possible prior AAP adjustments).
- 2024: The 2024 Report reflects the most significant advancements to date, as all projections (10-year and 30-year stochastic analyses) consider possible AAP adjustments during each year while reflecting possible adjustment in prior years. Additional enhancements include:
    - All projections incorporate possible future changes to the AED and SAED contribution rates (reflecting the manner in which they are adjusted based on funded status.)
    - An additional outlook regarding the "67% probability of meeting target date funding expectations", performed per division trust fund.
    - A composite calculation regarding the "67% probability of meeting target date funding expectations", considering all five division trust funds.

- Future Signal Light Reporting (4.0): Segal and PERA will refine enhancement ideas during April – June of 2025. Possible enhancements include :
    - Proposed Enhancement 1: Clarifying language and/or improved graphics within Chapter 4, “Sensitivity on Other Assumptions”. At the end of this section Segal attempts to describe and assess the impact of full recognition of actuarial demographic experience as noted during the 2016 – 2019 study period (speaking directly to GRS’s concern noted in their 2021 Assumption Review).
        - This analysis was added in the 2022 Signal Light Report to illustrate the potential impact and risk associated with more severe demographic losses (than expected) into the future. T
    - Proposed Enhancement 2: Improved verbiage and graphics related to the “67% probability of meeting target date funding expectations”.

b. Amortization Period Differences

- Response to exchange of amortizing liabilities over 30 years vs. 25 years

    PNYX was provided the Board’s Pension Funding Policy on March 1, 2024.

    The amortization method as stated in the Board’s Pension Funding Policy, by design, amortizes the "Legacy UAAL" captured as of December 31, 2017 (to align with enactment of the AAP mechanism), over a fixed, declining 30-year period—the targeted funding period as stated in SB 18-200.

    Any UAAL related to the Legacy UAAL (such as a funding deficiency or surplus) is amortized over that same 30-year closed period. The declining period just happened to be 25 years as of December 31, 2022, 24 years as of December 31, 2023, and will be 23 years as of December 31, 2024, etc. The Board recognizes funding deficiencies as in relation to the Legacy UAAL, as that was the defined issue targeted to be solved through the adoption of the AAP mechanism. Likewise, any excess/surplus funding is seen as a direct reflection of increased contributions (via the AED, SAED, and AAP) that are specifically targeting PERA’s UAAL.

    Thus, whether a funding deficiency or surplus, the gain/loss item is amortized over the same declining 30-year period as the Legacy UAAL as of Dec 31, 2017. As stated above, this amortization structure was “by design” and reflective of the AAP mechanism.

    Any "new UAAL" resulting from experience, not related to the Legacy UAAL, is amortized over a new closed 30-year period, as of each funding actuarial valuation.

c. Differences between PNYX and PERA in looking at the cost of long-term liabilities associated with new hires

- (Doney): I not sure where this would be covered, but it appears that PNYX looked at the cost of long term liabilities associated with new hires differently than PERA. So current cash flow from contributions compared to the long term liabilities.
    - Correct. The PERA Board and their actuarial service provider (currently Segal) view all PERA plan liabilities from a long-term perspective.
    - “New Entrant” or new member losses as reported by any of the typical, existing actuarial valuation systems may need to better assess offsetting gains on those same new members. The PNYX report comments that contributions from

the New Members, "…that have not been anticipated in the valuation…offset about 77% of the new entrant loss". Segal believes there are additional gains that may be offsetting at least a portion of the remaining (23% as estimated by PNYX) loss.

- In 2020, when completing the 2020 Experience Analysis Report, Segal and PERA discussed improving methods to deal with new member losses within the 2024 Experience Analysis. The stated goal was to consider better methods to anticipate new member losses and or improve methods of capturing actual new member losses considering all sources of possible offsetting gains (also not immediately or easily recognized within the valuation system).
- PERA's Governance Procedures require the Board to commission an Experience Analysis to assess how well the Board's actuarial assumptions are performing when compared to the actual behaviors of the members and employers as well as economic markets. This periodic analysis helps recalibrate the long-term assumptions (adjusting them as necessary every four-to-five years) to better estimate the long-term liabilities of the plan. This approach also allows for an opportunity to capture experience over cyclical periods of hiring/salary practices typically noted in governmental employment.
- Given the periodic recalibration of PERA's actuarial assumptions, no reoccurring gain or loss trend is expected to continue beyond a four- to five-year period as the assumptions driving such gains or losses will be reviewed and appropriately adjusted within each Experience Analysis Study.
- To ensure perspective, in the year 2020 as Segal was conducting PERA's Experience Analysis (July – October), most State employees had just been sent home to work – and virtually no one knew what the future would bring; thus, the actuaries used appropriate caution in contemplating adjustments to certain assumption recommendations.
- Also, in 2021, Segal discussed accelerating the 2024 scheduled Experience Analysis as recommended in the 2021 GRS Assumption Review with both the Pension Reivew Subcommittee and the Board.
    - If accelerated to 2022, the 2020 and 2021 experience likely would be highly affected by the pandemic and perhaps not indicative of future experience. Thus, the Board instructed Segal to stay on the expected four-year cycle.
- The Board realizes that each assumption set of all demographic categories may not result in perfect alignment with the behaviors of the membership, hiring or salary adjustment decisions of the employers, or trends in investment markets, which is why the Board directs that an Experience Analysis occurs every four-to five years (typically, every four years for the last 24 years) to capture and adjust for such fluctuations in their long-term assumptions.

d. Summary of how Actuarial Experience Review is conducted and how information is used.

- (Kolker): a definitive identification of how the demographics study is conducted, in addition to how the demographics are used, in layman's terms.

- Following is a brief summary representing the significant amount of work entailed when conducting an Experience Analysis. The typical steps taken are as follows:
    - Collect experience data from last 4-5-year period

        - Demographic data (retirement, withdrawal/termination, disability, death, salary increases)
        - Economic data (investment return, real rate of return, inflation, etc.)
    - Discuss any anticipated population changes, known shifts in hiring practices and/or salary increases
        - This step is more challenging for work on public plans where numerous and varied employers and employee career paths often are involved with regard to large, consolidated pension systems, where the actuarial firm's client/principal is/are not the employer(s), but rather the administrator of the plan.
    - Research any externally available information that may be helpful or enlightening
    - Analyze collected data for emerging trends, considering credibility
    - Compare expected experience (based on actuarial assumptions) to actual experience and develop ratios of "actual-to-expected".
        - Ratios above 1.0 indicate more actual experience than expected and a potential need to decrease rates
        - Ratios below 1.0 indicate less actual experience than expected and a potential need to increase rates
    - Proposed modifications are developed and recommended assumptions are presented to the Board for adoption to use in the next actuarial valuation.
- Below is a discussion provided by Segal describing each major actuarial assumption considered in the actuarial valuation calculation system, which assesses the plan liabilities.
    - There are six primary demographic assumptions used in the actuarial valuation.
        - One affects members in payment status (both current and future pensioners) and that is post-retirement mortality.
        - Four affect active members and are used to estimate how long active members are expected to work and when they are expected to leave active status:
            - rates of retirement,
            - rates of withdrawal,
            - rates of disability incidence, and
            - rates of active mortality.

            In effect, these four assumptions are used to estimate a member's length of service and the estimated age at which they begin to collect a pension.
        - The last primary assumption estimates how an active member's salary grows over their career, which is used to estimate the amount of a member's pension (along with estimated service).
    - The recommended assumption for post-retirement mortality is typically based on published mortality tables, which were derived from a large dataset of public plan retirees and surviving spouse mortality experience. Public systems with large enough experience (such as PERA) can apply adjustments to the standard published tables to provide a more tailored "fit". It is common practice for these adjustments to be applied to match actual experience over the experience study period, to the extent that "credible" data exists. A sub-

component of post-retirement mortality is an assumption that defines how mortality rates are expected to improve in future years subsequent to the experience study (a "mortality improvement scale"). Most public systems do not have sufficient data to apply a plan-specific adjustment and so it is common for an unadjusted published mortality improvement scale to be use. The combination of the mortality base table(s) – with or without plan-specific adjustment – along with mortality improvement scale is used to estimate how long pensioners and survivors will receive pension payments during their expected lifetimes.

- The four assumptions that are used to estimate how and when a member leaves active service are typically constructed based on a review of active experience over the study period combined with the current assumption, which is reflective of past experience prior to the study period. Recent data is blended with legacy assumptions in a way that best reflects expectations for the long-term future. In some cases, recent data and legacy assumptions are blended equally and in other cases more or less weighting may be applied to recent experience depending on professional judgment. The goal for these active decrement assumptions is to make broad "course corrections" to current assumptions based on trends identified in actual experience over the study period.
- In a similar way, the salary increase assumption for active members is typically determined as a blend of recent data and past experience prior to the study period. The actuary will attempt to isolate non-inflationary increases in pay (e.g., merit, seniority, etc.) from underlying inflationary increases and develop recommended non-inflationary increases, which are added to the long-term inflation assumption. In other words, a 4% salary increase in a year associated with high inflation may indicate a trend towards low merit/seniority salary increases. A 4% salary increase in a year associated with low inflation may indicate the opposite. These recent trends are blended with the legacy assumption in a manner similar to the other demographic assumptions to arrive at a recommendation. This recommendation may be adjusted using professional judgment based on input on outside factors, which may present a different perspective of salary increases into the future that are different than what historical data suggests.

e. Automatic Adjustment Provision (AAP) - (Attach 2023 ACFR pgs. 173 – 174))

- Summary detail on AAP including summary table of triggers since enactment
  - Please see the attached excerpt taken from the 2023 PERA ACFR.

f. ***Addressing 24-51.1-101(4)(d)***

"(d) review semi-annually the planned reduction of the unfunded liability of the public employees' retirement association. If full funding will not be achieved by 2048, the subcommittee shall make additional recommendations to the commission, the joint budget committee, and the general assembly to achieve full funding by 2048. If, upon that review, the subcommittee determines that the association does not have at least a ***sixty-seven percent likelihood of achieving full funding by 2048****, then the association shall provide recommendations to the subcommittee for policy changes that would return the association to fully funded status by 2048. Notwithstanding section 24-1-136 (11)(a)(i), the subcommittee shall annually report to the general assembly regarding whether or not the association is on track to achieve full funding by 2048 and if not, the corrective actions recommended by the*

subcommittee or the association to rectify the shortfall."

One of the statutory requirements of the Pension Review Subcommittee is to determine whether PERA has "a sixty-seven percent likelihood of achieving full funding by 2048." It should be noted, this statutory language seems to also equate whether PERA is on track to full funding to whether PERA has a sixty-seven percent likelihood of achieving full funding by 2048. These are separate and distinct questions.

Due to enhancements made to the Signal Light Report over the past number of years by PERA, one of the items includes a look at this calculation and what the likelihood percentage is based on any given financial year. While this year's results show that some of PERA's divisions exceed the 67% threshold, the association as a whole and all divisions combined, do not.

Another important point with regard to the "67% threshold," now enshrined in the most recent Signal Light Report, is the benchmark of a "67% probability of PERA achieving full funding by 2048." Please note, the 67% probability threshold does not necessarily coordinate and may even conflict with the structure of the Automatic Adjust Provision test and any resulting adjustments also legislated within SB 18-200.

Current statutory language also calls for recommendations to be made if the "67% threshold" is not met. The only two levers available that could be modified to change PERA's funded status and the likelihood of reaching full funding are modifications to contributions and/or benefit levels; the automatic adjustment provision, already in place, is the appropriate mechanism to do so. Another potential consideration for legislation that the Pension Review Subcommittee may wish to consider to increase the likelihood percentage would be legislation to index the annual direct distribution payment made to PERA to some kind of inflationary metric. This was a provision that was initially discussed as part of SB18-200, but ultimately did not get included in the final version of the bill.