

***Investment Policy Statement,
Objectives, and Guidelines***

of

***the Commonwealth of Pennsylvania
Public School Employees' Retirement Board***

As adopted by
the Board of Trustees
on December 7, 2016

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Table of Contents

- I. Introduction and Purpose
 - Purpose
 - The Board
 - Mission of the Board
 - Fiduciary Standard
 - Implementation
- II. Roles and Responsibilities
 - The Board
 - Investment Office Staff
 - Office of Financial Management
 - Investment Consultants
 - State Treasurer
 - Investment Managers
- III. Investment Objectives
- IV. Strategic Asset Allocation
 - Asset Class Rebalancing
 - Investment Structure
 - Index Portfolio Rebalancing
 - Cash
 - Allocation Approval Process
 - Securities Lending Program
 - Long Term Target Allocation
 - Current Target Allocation
- V. Performance Objectives
 - Policy Index
- VI. Risk Management and Controls
 - Risk Objectives
 - Constraints
 - Investment Manager Target Ranges
 - Private Market Discretionary Structure Capital Limits
 - Investment Manager Objectives and Guidelines
 - Derivatives Policy
 - Securities Lending Program Policy
 - Policy Regarding Placement Agents
 - Public Markets Emerging Investment Manager Program Policy
 - Qualified Independent Representative (QIR) Policy

- VII. Monitoring and Reporting
 - Selection of Investment Managers
 - Public Markets excluding PMEIM Program
 - Private Markets, including Private Debt, Private Equity, Venture Capital and Real Estate
 - PMEIM Program
 - Termination of Investment Managers
 - Oversight Updates and Reports
- VIII. Definitions

I. Introduction and Purpose

Purpose of Investment Policy Statement

The purpose of this Investment Policy Statement (the “Policy”) is to provide clear guidelines for the management of the assets by or on behalf of the Board. This Policy establishes policies and guidelines for the investment practices of the Board. The Board shall endeavor to review and revise the Policy annually and make changes as necessary. The Policy outlines objectives, goals, restrictions, and responsibilities to assure that:

1. The Board, Staff, Investment Consultants, Investment Managers, and the State Treasurer clearly understand the objectives and policies of the Board and the System;
2. The Investment Managers shall be given guidance and limitations on the investment of the System’s assets; and,
3. The Board has a meaningful basis for evaluating the investment performance of individual Investment Managers, as well as for evaluating overall success in meeting its objectives.

The System shall at all times be managed in accordance with all applicable state and federal laws, rules, and regulations.

The Board

The Board was established on July 18, 1917, under the provisions of Pamphlet Law 1043, No. 343. It was most recently established by state law as an independent administrative board of the Commonwealth, which acts as a board of trustees, exercising exclusive control and management of the System, including the investment of its assets. Membership in the System is mandatory for nearly all qualifying public school employees in the Commonwealth of Pennsylvania. The Board administers a governmental cost-share multiple-employer plan that provides retirement allowances and other benefits to members. As part of the Board’s function, it has the responsibility for the implementation of investment policy, Asset Allocation, retention of Investment Managers, and ongoing supervision of investment results. The Board is also responsible for establishing policies with respect to fees and commissions for all Investment Consultants, Investment Managers, and agents to the plan assets. The Board has fifteen members including the Commonwealth’s Secretary of Education, the State Treasurer, the Executive Director of the Pennsylvania School Boards Association, two members appointed by the Governor, six elected members (three from among the System’s certified members, one from among the System’s non-certified members, one from among the System’s annuitants, and one from among school board members in

Pennsylvania), two members from the Senate, and two members from the House of Representatives.

Mission of Board

The Board and the employees of the System serve the members and stakeholders of the System by:

- Prudently investing the assets of the System;
- Maintaining a financially sound System;
- Providing timely and accurate payment of benefits;
- Clearly communicating members' and employers' rights and responsibilities;
- and
- Effectively managing the resources of the System.

Fiduciary Standard

As fiduciaries, the members of the Board and Staff must act solely in the interests of the members of the System and for the exclusive benefit of the System's members. In performance of their duties, the members of the Board and Staff delegated with investment authority shall act in accordance with the Prudent Investor Standard.

In performance of their duties for the System, Outside Service Providers shall act in accordance with the Prudent Expert Standard.

Implementation

Investment Office Staff Implementation Policies are Policies implemented pursuant to the discretion granted to IOS by the Board and are organized into three broad categories – Program Policies, Committee Policies, and Operational Policies. The Board will be provided access to each IOS Implementation Policy and material revisions thereto.

II. Roles and Responsibilities

The Board relies on Investment Office Staff and others in executing its investment functions. Each entity's role as fiduciary are identified below to ensure clear lines of communication, operational efficiency, and accountability in all aspects of the System's operation.

- **The Board:** The Board has the responsibility of managing the investment process and setting the Asset Allocation. The Board, through the Investment Committee with the assistance of Staff, contracts with External Portfolio Managers and Investment Consultants, monitors the performance of investments; ensures funds are invested in accordance with Board policies; studies, recommends, and implements policy and operational procedures that will enhance the investment program of the System; and ensures that proper internal controls are developed to safeguard the assets of the System.
- **Investment Office Staff (IOS):** IOS is responsible for the day-to-day administration of the investment operations of the System in accordance with Board policies as well as for reporting to the Board. Major items included in the day-to-day administration are working with and monitoring the performance of the outside service providers; developing, implementing, and monitoring the Asset Allocation plan; direct investment in and trading of securities; recommendation and oversight of Investment Managers; reporting of investment results, including both performance and assets held; oversight of the proxy voting process; and governmental and regulatory reporting.
- **Office of Financial Management (OFM):** OFM is responsible for processing, monitoring, and recording all investment transactions as well as supporting the day-to-day administration of the investment operations of the System in accordance with Board policies. OFM prepares daily, monthly and quarterly reports and analysis for IOS and the Board on cash management, the net asset value of the System, Asset Allocation, Investment Manager fees, and securities class action recoveries. OFM is also responsible for various regulatory and government reporting of investments, including the System's Comprehensive Annual Financial Report. In addition, OFM is the primary liaison with the State Treasurer's office on daily cash movement and treasury operations, oversees the Custodian Bank and the IAASP and interfaces with the Investment Managers, brokers and Investment Consultants on investment accounting and operational issues.
- **Investment Consultants:** Investment Consultants shall have the responsibility of assisting the Board and Staff in managing the investment process. The Board shall determine their specific responsibilities, which shall be set forth in their respective contracts with the Board.
- **State Treasurer:** The State Treasurer is the legal custodian of not only the System's assets but also those of the entire Commonwealth. The State Treasurer has subcontracted the custodian function to the Custodian Bank for the Commonwealth,

including the System. The Custodian Bank holds all cash and securities (except for those held in partnerships, commingled funds, mutual funds, etc.), and regularly accounts for these holdings to the System.

- ***Investment Managers:*** All External Investment Managers shall be retained pursuant to written contracts. Investment Managers shall construct and manage investment portfolios consistent with the investment philosophy and disciplines for which the Board retained them and their specific investment guidelines, all of which shall be set forth in their Investment Objectives and Guidelines with the Board. They shall buy and sell securities and modify the asset mix within their stated guidelines. The guidelines shall be subject to periodic amendment at the discretion of the Board and IOS. The Board believes that investment decisions are best made when not restricted by excessive procedure. Therefore, full discretion shall be delegated to the Investment Managers to carry out investment policy within their stated guidelines, as amended. Investment Managers shall comply with the specific limitations, guidelines, and philosophies stated herein and within the Addendum(s) to the Investment Objectives and Guidelines assigned to them, or as expressed in written amendments thereto. Investment Managers shall communicate to Staff, in writing, any developments that may affect the System's portfolio within five business days of occurrence. Examples of such events include, but are not limited to, the following:
 - A significant change in the Investment Manager's investment philosophy;
 - A change in the ownership structure of the firm;
 - A loss of one or more key portfolio management personnel; and/or,
 - Any occurrence that might adversely impact the management, professionalism, integrity, or financial position of the firm.

III. Investment Objectives

The overall objective of the System is to provide benefits to its members through a carefully planned and well-executed investment program.

IV. Strategic Asset Allocation

The Board believes that the level of Risk assumed by the System is largely determined by the Board's strategic Asset Allocation plan. The Board, in determining its long-term Asset Allocation, shall take the following factors into consideration:

- The System's investment time horizon;
- The demographics of the plan participants and beneficiaries;
- The cash flow requirements of the System;
- The actuarial assumptions approved by the Board;
- The funded status of the System;
- The Board's willingness and ability to take Risk; and,
- The employers' (Commonwealth and school districts) financial strength.

In establishing the Asset Allocation for the System, the Board considers capital market expectations for expected return, volatility, and asset class correlations as prepared by its general Investment Consultant. The current long-term, top-down Asset Allocation targets of the Board, based on the market value of the System's assets, are below.

Monthly, OFM will prepare the Moneyline Report of Investment Asset Values and post on the Board's secure intranet web site. The Moneyline Report will present the month-end Asset Allocation of the System as compared to the Asset Allocation plan targets approved by the Board.

Asset Class Rebalancing

The Board is responsible for the System's Asset Allocation decisions and will meet to review target allocations at least annually or more frequently as needed based on market conditions. Until such time as the Board changes allocations, it will be necessary to periodically rebalance the portfolio as a result of market value fluctuations. The Board delegates to the CIO the duty of implementing such rebalancing. IOS will review the Asset Allocation on a monthly basis. Any asset class that falls outside the policy ranges described in the Risk Management and Controls section will be rebalanced to within the policy range within a reasonable and prudent period of time by the CIO. The CIO has the authority to tactically allocate between asset classes as long as the amount allocated to each asset class is within the policy ranges.

Asset Allocation rebalancing may be accomplished by using the cash markets or through the use of Derivative securities. When feasible, index funds will be used to facilitate rebalancing to minimize the transition time frame and costs to implement. Any account may be increased or decreased to achieve the rebalancing objective based on the judgment of the CIO. When a rebalancing is required, consideration will be given to the unique characteristics of each asset class, the degree of over/underweight, liquidity characteristics, current market conditions, and any other relevant considerations to ensure prudence and care.

The purpose of this structured rebalancing policy is to provide a disciplined approach to Asset Allocation.

Investment Structure

Annually, the general Investment Consultant shall provide the Board with the recommended investment structure of the System. The investment structure includes, among other things, the Investment Managers approved by the Board as well as the pro forma targets as a percentage of the total fund by Investment Manager. These target percentages represent the portion of the total fund allocated to each Investment Manager for investment management. IOS shall, when able and within a reasonable period of time, implement the investment structure within the target ranges noted in the Risk Management and Controls section. The CIO shall have discretion in the timing of such implementation and have discretion in implementing changes, taking into account factors including transaction costs and liquidity.

IOS shall endeavor to invest any underweight in private real estate in public market real estate securities until such a time as the money is invested by a private real estate fund. In addition, IOS shall invest any underweight in private markets (private debt, private equity, and venture capital), in public market equities until the money is allocated to and invested by an alternative investment fund. Should either private real estate or private markets be overweight versus target, then IOS shall reduce the allocation to the public market real estate securities/public market equities allocation.

Index Portfolio Rebalancing

Throughout the year, the index portfolios need to rebalance positions to minimize the tracking error of the portfolios. At times, rebalancing may lead to inefficient buying and selling of securities. To minimize the costs associated with rebalancing the portfolios, the CIO shall have discretion to fund the internally managed index accounts, as necessary, with additional cash consistent with the Asset Allocation.

Cash

The System currently has cash outflows (primarily benefit payments) in excess of cash inflows (primarily contributions and investment income received). In addition, Frictional Cash is minimized in the System through the commingling of the cash in various investment portfolios and reallocation of excess cash through the Asset Allocation plan. Therefore, there will be various points in time where the CIO will need to increase cash through allocation reductions to meet the liquidity needs of the System. As such, the CIO shall have the discretion to raise cash from any of the public market equity or fixed income portfolios as he considers prudent. The CIO shall consider the current positioning of the Asset Allocation, liquidity, cost, etc. in determining where to raise cash.

Allocation Approval Process

For internal control purposes, all Investment Manager fundings, including but not limited to those for new Investment Managers, private market investment managers' capital calls, index portfolio rebalancing, termination of Investment Managers, and cash flow related activities initiated by the CIO, will be reviewed, audited for compliance with the Investment Policy Statement, Objectives, and Guidelines, and approved by OFM. Once approved, OFM will process and execute all allocations with the State Treasurer and its Custodian Bank. Monthly, the OFM will prepare and post on the Board's secure intranet web site a report of allocation changes that will detail each allocation increase and decrease.

Securities Lending Program

The Securities Lending Program Policy is more fully described in the [Risk Management and Controls](#) section.

Long-Term Target Allocation

The Long-Term Target Allocation shown below represents the long-term strategic allocation that is intended to be achieved over a period beyond the next year. In addition to maintaining an attractive risk-adjusted return profile, it takes into consideration the liquidity needs of PSERS, particularly relative to the current allocation to illiquid asset classes, which typically cannot be changed prudently in the short term. The Current Target Allocation represents the target allocation against which the PSERS portfolio will be managed commencing October 1, 2017. For the purposes of performance reporting and measurement, the focus is on the Current Target Allocation. Staff and the Investment Consultant reexamine the Current Target Allocation on an annual basis and present to the Board recommended changes, as needed, based on changing liquidity circumstances and opportunities in the marketplace.

	Long-Term Target Allocation	Policy Range	
		Low	High
Equity Exposure			
Publicly-traded Global Equity	20.00%		
Private Markets	15.00%		
Total Equity Exposure	35.00%	25.00%	45.00%
Fixed Income Exposure			
Investment Grade	11.00%		
Credit-Related	10.00%		
Inflation Protected	15.00%		
Total Fixed Income Exposure	36.00%	26.00%	46.00%
Real Asset Exposure			
Infrastructure	8.00%		
Commodities	8.00%		
Real Estate	10.00%		
Total Real Asset Exposure	26.00%	16.00%	36.00%
Risk Parity	10.00%	5.00%	15.00%
Absolute Return	10.00%	5.00%	15.00%
Opportunity Allocation¹	0.00%	0.00%	5.00%
Net Leverage			
Cash	3.00%		
Leverage	(20.00%)		
Net Leverage	(17.00%)	10.00%	(30.00%)
TOTAL	100.00%		

The Policy Ranges for the Target Allocation represent rebalancing triggers and tactical allocation constraints around the target allocations. For purposes of this analysis, cash and cash equivalents held in each Investment Manager's portfolio will be considered fully invested based on that advisor's objectives (i.e. cash in an equity Investment Manager's account will be considered as part of the Publicly-traded Global Equity in the table above). For classification purposes, cash equivalents include fixed income securities maturing in less than one year.

¹The Opportunity Allocation is reserved for attractive or innovative strategies that may not fit into the Current or Long-Term Target Allocation but offer a compelling return enhancement and/or diversification benefit (risk reduction). Funding for these investments may come from any other part of the asset allocation, including leverage.

Current Target Allocation

The current long-term, top-down Target Allocation of the Board, based on the market value of the System's assets as of October 1, 2017, subject to the provisions discussed below:

	Cash		Current Target Allocation	Policy Range	
	Markets	Leverage		Low	High
Equity Exposure					
Publicly-traded Global Equity	19.00%		19.00%		
Private Markets	15.00%		15.00%		
Total Equity Exposure	34.00%	0.00%	34.00%	24.00%	44.00%
Fixed Income Exposure					
Investment Grade	6.00%	3.00%	9.00%		
Credit-Related	11.00%		11.00%		
Inflation Protected	7.00%	8.00%	15.00%		
Total Fixed Income Exposure	24.00%	11.00%	35.00%	25.00%	45.00%
Real Asset Exposure					
Infrastructure	5.50%	0.50%	6.00%		
Commodities	4.00%	4.00%	8.00%		
Real Estate	10.50%	0.50%	11.00%		
Total Real Asset Exposure	20.00%	5.00%	25.00%	15.00%	35.00%
Risk Parity	9.00%	1.00%	10.00%	5.00%	15.00%
Absolute Return	10.00%		10.00%	5.00%	15.00%
Opportunity Allocation¹	0.00%		0.00%	0.00%	5.00%
Net Leverage					
Cash	3.00%		3.00%		
Financing Cost of Leverage		(17.00%)	(17.00%)		
Net Leverage	3.00%	(17.00%)	(14.00%)	10.00%	(28.00%)
TOTAL	100.00%	0.00%	100.00%		

Cash markets represent investments which are fully-funded by cash. Leverage represents economic exposures obtained generally through derivative exposure, other forms of financing, or leveraged funds. For example, exposure to Gold can be obtained with very little cash through the swap market.

The portfolio will be managed against the Current Target Allocation shown in the table above. The use of leverage within asset classes as shown reflects how leverage is currently deployed within the PSERS portfolio. It is not intended to be a target leverage allocation. Staff continually monitors the marketplace for opportunities to improve portfolio efficiency. Leverage may be deployed across any asset class in the portfolio where it is prudent to do so, based on efficient use of leverage within the constraints of the Policy Range and maximum net leverage permissible under this Policy.

The Policy Ranges for the Asset Allocation represent rebalancing triggers and tactical allocation constraints around the target allocations. For purposes of this analysis, cash and cash equivalents held in each Investment Manager's portfolio will be considered fully invested based on that advisor's objectives (i.e. cash in an equity Investment Manager's account will be considered as part of the Publicly-traded Global Equity in the table above). For classification purposes, cash equivalents include fixed income securities maturing in less than one year.

¹The Opportunity Allocation is reserved for attractive or innovative strategies that may not fit into the Current or Long-Term Target Allocation but offer a compelling return enhancement and/or diversification benefit (risk reduction). Funding for these investments may come from any other part of the asset allocation, including leverage.

V. Performance Objectives

The overall return objective is to realize a return sufficient to achieve funding adequacy on an inflation-adjusted basis. Funding adequacy is achieved when the actuarial market value of assets is at least equal to the System's projected benefit obligations. The System has a return objective of meeting or exceeding the actuarial rate (currently 7.25%) over the long-term. In addition, the Board has the following broad objectives:

- The assets of the System shall be invested to maximize the returns for the level of Risk taken; and,
- The System shall strive to achieve a return that exceeds the Policy Index.

Policy Index

The Board adopts the following weighted policy benchmarks to measure the performance of the System beginning October 1, 2017, subject to footnotes 1 & 4:

	Policy Weight	
Equity Exposure		
Publicly-traded Global Equity		
MSCI USA IMI Gross Index	7.40% ¹	
MSCI ACWI Ex USA IMI with Developed Market Currencies (75% Hedged to USD) Index Net	11.10%	
MSCI Emerging Markets Index IMI Net	0.50%	
Private Markets		
Burgiss Total Return, one-quarter lagged ²	15.00% ¹	
Total Equity Exposure	34.00%	
Fixed Income Exposure		
Investment Grade		
Barclays Capital U.S. Aggregate Index	5.00%	
Barclays Capital Global Aggregated GDP-weighted Developed Market ex-U.S. (Hedged to USD) Index	1.00%	
Barclays Capital U.S. Aggregate Long Treasury Index	3.00%	
Credit-Related		
Barclays Capital EM Local Currency – Government - MV Weighted (Unhedged) - 10% Country Cap Index	1.00%	
Barclays Capital U.S. High Yield Index	10.00%	
Inflation Protected		
Barclays Capital World Government Inflation-Linked Bond Index (Hedged to USD)	15.00%	
Total Fixed Income Exposure	35.00%	

Real Asset Exposure

Infrastructure

S&P MLP Index	4.00%
FTSE Developed Core Infrastructure 50/50 (Hedged to USD) Index Net	2.00%

Commodities

Bloomberg Commodity Index	5.00%
Bloomberg Commodity Gold Subindex	3.00%

Real Estate

Private

NFI and Burgiss Total Return, one- quarter lagged ³	10.00% ⁴
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Publicly-traded

FTSE EPRA/NAREIT Developed Index (Hedged to USD) Net	1.00% ⁴
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Total Real Asset Exposure

25.00%

Risk Parity

Custom Benchmark ⁵	10.00%
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Absolute Return

3-Month LIBOR + 3.50%	10.00%
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Net Leverage

Cash

Merrill Lynch U.S. Treasury Bill 0 - 3 Months	3.00%
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Financing Cost of Leverage⁶

3-Month LIBOR	(17.00%)
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Net Leverage

(14.00%)

TOTAL

100.00%

Footnotes to Policy Index:

¹ As the Private Markets allocation is funded (or distributions received) and/or the allocation increases/decreases due to the total market value of the Fund changing, the Publicly-traded Global Equity policy weight (specifically, the combination of MSCI USA IMI Gross Index and MSCI ACWI Ex USA IMI with Developed Market Currencies hedged to USD Index policy weights) will be proportionately and conversely revised to reflect these changes using a 60-40 split between the ex. USA (60%) and USA (40%) indices. For example, if the allocation to Private Markets increases by 100 basis points due to a change in the market value of the total Fund in the fourth quarter, then starting with the first quarter the policy weight will include this 100 basis points increase in the Private Markets benchmark and the Publicly-traded Global Equity policy weights will also be proportionately reduced by 100 basis points. Adjustments to the Private Markets policy weight will be completed in 50 basis point increments (adjustment will be made to the nearest 0.50%) on a quarterly basis.

Footnotes to Policy Index (continued):

² The benchmark returns are calculated using the rolling 5-year (20 quarters) total returns obtained from Burgiss Private IQ relevant universe (i.e. Generalist, Expansion Capital, Buyout, Debt, Infrastructure, Natural Resources, Secondary Fund of Funds, and North America-focused Venture Capital).

³ PSERS weights each of the real estate investment strategies actual net asset values of the System's private real estate investments quarterly to produce a customized, blended benchmark return. The NFI-ODCE (NCREIF Open-end Diversified Core Equity) is used for the core strategy whereas returns for value-added and opportunistic strategies are calculated using the total returns obtained from Burgiss Private IQ. This provides a single blended Real Estate policy benchmark return for the System.

⁴ As the Private Real Estate allocation is funded (or distributions received) and/or the allocation increases/decreases due to the total market value of the Fund changing, the Publicly-traded Real Estate policy weight will be proportionately and conversely revised to reflect these changes. For example, if the allocation to Private Real Estate increases by 100 basis points due to a change in the market value of the total Fund in the fourth quarter, then starting with the first quarter the policy weight will include this 100 basis points increase in the Private Real Estate benchmark and the Publicly-traded Real Estate policy weight will also be proportionately reduced by 100 basis points. Adjustments to the Private Real Estate policy weight will be completed in 50 basis point increments (adjustment will be made to the nearest 0.50%) on a quarterly basis.

⁵ Custom benchmark is structure as follows: MSCI ACWI (\$Net) (50%); Barclays Capital U.S. Treasury Index (75%); Barclays Capital World Inflation Linked Bond Index Hedged (55%); Bloomberg Commodity Index (Total Return) (15%); Bloomberg Gold Subindex (5%); and 3-Month LIBOR (-100%).

⁶ Financing Cost of Leverage represents the amount of leverage embedded in the asset allocation. Financing may be deployed across any asset class in the portfolio where it is prudent to do so, based on efficient use of leverage within the constraints of the policy range and maximum net leverage permissible under this Policy.

VI. Risk Management and Controls

Risk Objectives

1. The assets of the System shall be diversified to minimize the Risk of losses within any one asset class, investment type, industry or sector exposure, maturity date, or geographic location. Failure to do so could seriously impair the System's ability to achieve its funding and long-term investment goals and objectives; and,
2. The System's assets shall be invested so that the probability of investment losses (as measured by the Policy Index) in excess of 15% in any one year is no greater than 2.5% (or two standard deviations below the expected return).

Constraints

1. The System shall maintain adequate liquidity to meet required benefit payments to the System's beneficiaries.
2. The System's assets shall be invested in a manner that is consistent with the System's long-term investment horizon.
3. As a tax-exempt investor, the System's assets may be invested without distinction between returns generated from income and returns generated from capital gains.

Investment Manager Target Ranges

All allocations to individual Investment Manager portfolios shall be subject to the limits established by the Board through the Current Target Allocation in the **Strategic Asset Allocation** section. IOS is permitted to manage the allocation of capital to each Investment Manager portfolio within the target ranges to of the total fund noted below. The CIO shall have discretion on the timing of reducing any Investment Manager portfolio exceeding the maximum ranges approved below. However, the CIO is not permitted to allocate additional capital to those portfolios currently above the target ranges.

	Target Capital Ranges as a Percentage of the Total Fund
<u>Equity Portfolios:</u>	
Public Markets U.S. Equity Portfolios	
Internally Managed S&P 500 Index	0.0% - 20.0%
Internally Managed S&P 400 Index	0.0% - 5.0%
Internally Managed S&P 600 Index	0.0% - 5.0%
Internally Managed Synthetic Beta Replication ¹	0.0% - 5.0%
Public Markets Non-U.S. Equity Portfolios	
Internally Managed MSCI ACW Index ex. U.S.	0.0% - 15.0%
Internally Managed MSCI World Small Cap Index ex. U.S.	0.0% - 2.5%
Internally Managed MSCI Emerging Markets Index	0.0% - 2.5%
Non-U.S. Equity	0.0% - 2.5%
Non-U.S. Small Cap Equity	0.0% - 1.0%
Emerging Markets Equity	0.0% - 1.0%
Internally Managed Synthetic Beta Replication ¹	0.0% - 5.0%
<u>Fixed Income Portfolios:</u>	
Investment Grade Portfolios	
Internally Managed U.S. Core Fixed Income	0.0% - 5.0%
U.S. Core Plus or Non-U.S. Developed Fixed Income	0.0% - 3.0%
Internally Managed U.S. Long Treasuries	0.0% - 3.0%
Internally Managed Synthetic Beta Replication ¹	0.0% - 5.0%
Credit-Related Portfolios	
Emerging Market Fixed Income	0.0% - 1.5%
U.S. High Yield Fixed Income	0.0% - 2.0%
Specialty Finance Debt Strategy	0.0% - 1.0%
Multi-Sector Fixed Income Portfolios	
Inflation Protected (TIPS) Portfolios	
Internally Managed U.S. TIPS	0.0% - 20.0%
U.S. and Non-U.S. TIPS	0.0% - 8.0%
Internally Managed Synthetic Beta Replication ¹	0.0% - 2.0%

¹ The maximum amount of internally managed synthetic beta replication will be 11% of the total fund (excludes beta synthetically replicated within the actively managed and indexed Separate Account portfolio).

Target Capital Ranges
as a percentage
of the Total Fund

Real Asset Portfolios:

Infrastructure Portfolios

Externally Managed Enhanced and Full Discretion	0.0% - 2.0%
Open-end Infrastructure Fund Investments	0.0% - 2.0%
Internally Managed U.S. Master Limited Partnership Index	0.0% - 5.0%
Internally Managed Infrastructure Index Portfolio	0.0% - 5.0%
Internally Managed Synthetic Beta Replication ¹	0.0% - 2.0%

Commodities Portfolios

Externally Managed Full Discretion and Enhanced Index Commodity	0.0% - 2.0%
Internally Managed Enhanced Commodities Index Portfolio	0.0% - 7.0%
Internally Managed Gold Index Portfolio	0.0% - 5.0%
Internally Managed Synthetic Beta Replication ¹	0.0% - 2.0%

Real Estate Portfolios

Externally Managed U.S., Non-U.S., and Global PTRES	0.0% - 1.0%
Open-end Real Estate Fund Investments	0.0% - 1.0%
Internally Managed PTRES Index Portfolio	0.0% - 5.0%
Internally Managed Synthetic Beta Replication ¹	0.0% - 2.0%

Risk Parity Portfolios:

Externally Managed Risk Parity Portfolios	0.0% - 4.0%
Internally Managed Risk Parity Portfolio	0.0% - 15.0%

Absolute Return Portfolios:

0.0% - 2.0%

Short Duration Fixed Income Portfolios:

Internally Managed LIBOR-Plus Short-Term Investment Pool	0.0% - 10.0%
Externally Managed LIBOR-Plus Short-Term Investment Pool	0.0% - 5.0%
Externally Managed Short Duration Non-Agency RMBS Portfolios	0.0% - 2.0%
Internally Managed Short-Term Investment Pool	No limit

Foreign Currency Hedge Overlay: Up to 100% of the Foreign Currency Exposure²

Public Markets In-House Co-Investment Program

\$100 million

- \$25 million limit for each initial investment
- \$10 million limit for follow-on investments

Internally Managed Synthetic Beta Replication represents market exposures in the various asset classes achieved through Derivative exposures such as futures, options, swaps, etc. IOS will synthetically achieve beta exposures to either assist in a transition from one actively managed portfolio to another or to generate alpha. It excludes synthetic beta replication within the actively managed and indexed Separate Account portfolios.

¹ The maximum amount of internally managed synthetic beta replication will be 11% of the total fund (excludes beta synthetically replicated within the actively managed and indexed Separate Account portfolio).

² The Total Fund (both public market and private market) foreign currency exposure may be hedged up to 100% back to the U.S. dollar.

Private Market and Real Estate Discretionary Structure Capital Limits

All allocations to individual Private Market and Real Estate Discretionary Structure (i.e. Co-Investment and Secondary Investment) strategies shall be subject to the limits established by the Board through the Current Target Allocation in the Strategic Asset Allocation section. IOS is permitted to manage the allocation of capital to each Private Market and Real Estate strategy up to the capital limits noted below. The CIO shall have discretion on the timing of reducing any strategy exceeding the limits approved below. However, the CIO is not permitted to allocate additional capital to those strategies currently above the limits.

	<u>Capital Limits</u>
<u>Private Markets:</u>	
Private Markets In-House Co-Investment and Secondary Investments	\$750 million
<ul style="list-style-type: none"> • \$25 million limit for each initial investment • \$25 million limit for each secondary investment • \$10 million limit for follow-on investments 	
Private Debt In-House Co-Investment and Secondary Investments	\$100 million
<ul style="list-style-type: none"> • \$25 million limit for each initial investment • \$25 million limit for each secondary investment • \$10 million limit for follow-on investments 	
<u>Real Estate:</u>	
Farmland Investments	\$100 million
Real Estate In-House Co-Investment and Secondary Investments	\$300 million
<ul style="list-style-type: none"> • \$25 million limit for each initial investment • \$25 million limit for each secondary investment • \$10 million limit for follow-on investments 	
<u>Infrastructure:</u>	
Infrastructure In-House Co-Investment and Secondary Investments	\$500 million
<ul style="list-style-type: none"> • \$100 million limit for each investment 	
<u>Other:</u>	
Private Markets and Real Estate Pennsylvania In-House Co-Investments	\$250 million
<ul style="list-style-type: none"> • \$25 million limit for each initial investment • \$10 million limit for follow-on investments 	

Investment Manager Objectives and Guidelines

A. Separate Account Policies and Guidelines

The following represent general portfolio guidelines that are applicable to all Investment Manager Separate Account portfolios.

Adherence to Investment Style

Each Investment Manager is expected to adhere to the investment philosophy and style that was presented to the Board, IOS, and Investment Consultant at the time of its hiring and as set forth in its contract with the Board.

Measurement Process

Passive Investment Managers

Each portfolio shall be measured on a total return basis (yield plus appreciation). On a one-year and three-year annualized rolling return basis, results will be judged, net of all manager fees and transaction costs, versus a pre-established performance band based on the liquidity, volatility, and difficulty in replicating of the benchmark assigned.

Active Investment Managers

Each portfolio shall be measured on a total return basis (yield plus appreciation). On a one-year and three-year annualized rolling return basis, results will be judged as follows, net of all manager fees and transaction costs:

- A. Relative performance versus a relevant peer Investment Manager universe selected by IOS:
 - 1. Median and above Acceptable
 - 2. Below median Unacceptable; Watch Closely

- B. Information Ratio (excess return/excess Risk vs. the Benchmark assigned to the Investment Manager) as follows:
 - 1. Information Ratio \geq assigned level¹ Acceptable
 - 2. Information Ratio $<$ assigned level¹ Unacceptable; Watch Closely

Quarterly performance shall be evaluated to monitor progress toward attainment of these goals. It is understood that there are likely to be short-term periods during which performance deviates from market indexes. During such times, greater emphasis shall be placed on performance comparisons with Investment Managers employing similar styles. The IOS, the CIO, and the Investment Consultant shall

¹ The assigned level will be provided in the addendum to the guidelines for each mandate.

monitor firms experiencing poor short-term performance or disruption at the organizational level. These include changes of ownership, significant personnel changes and substantial deviation from their investment style.

Investment Management Fees

Invoices for investment management fees shall be submitted to the System by each External Portfolio Manager on a quarterly basis. Fees will be paid out of the External Portfolio Manager's account as administered by OFM. External Portfolio Managers are responsible for having sufficient cash available to cover the amount of the quarterly investment management fee. The CIO, or a DCIO in the CIO's absence, shall have discretion to waive this provision for any External Portfolio Manager. On a quarterly basis, OFM will prepare a report of investment management fees to be posted on the Board's secure intranet web site.

Brokerage Commissions

Equity Investment Managers

Brokerage commissions are a plan asset and, as such, shall be monitored by the System. The Investment Managers are obligated to seek best execution on all trades.

Investment Managers trading U.S. equities shall be required to execute trades through the System's Trading Desk unless otherwise approved by the CIO or a DCIO in the CIO's absence.

U.S. equity Investment Managers not trading through the System's Trading Desk and non-U.S. equity Investment Managers shall be required to participate in the System's commission recapture program. The System has retained a Commission Recapture Agent to manage this program and the Investment Managers are required to send monthly reports to the Commission Recapture Agent indicating the commissions directed to each broker, including non-designated brokers. Best efforts must be made to execute trades through commission recapture brokers for initial and subsequent fundings and partial liquidations. **All commissions generated through the System's approved commission recapture brokers are considered to be directed trades and should be so communicated by the Investment Manager to the broker.**

Commissions recaptured by the System shall be remitted to the restricted revenue account held by the State Treasurer on behalf of the System unless otherwise required by law. The monies in this account shall be used to support the investment operations of the System. All expenditures from the account shall follow the rules established for any other expenditure of the System.

The Investment Managers are permitted to enter into Soft-dollar Arrangements for commissions not executed through the System's Trading Desk or through the System's approved commission recapture brokers provided that:

- Such arrangements are consistent with applicable law and best execution obligations;
- All amounts paid for brokerage and related services are reasonable; and,

- The Investment Manager submits an annual report to the System within six weeks of the end of each calendar year that contains:
 1. A list of each soft dollar broker with which the Investment Manager executes trades on behalf of the System and, for each such broker, the amount of soft dollars that have accrued to the Investment Manager as a result of trading activity on behalf of the System;
 2. An item-by-item listing of the expenditure of said soft dollars, with the cost associated with each expenditure;
 3. A description of the manner in which the cost of each such expenditure was allocated to the System; and,
 4. An explanation of how the System benefited for each such expenditure.

Fixed Income Investment Managers

Fixed income Investment Managers shall use their best efforts to execute trades and all new issue designations with the System's Commission Recapture Agent. National Association of Securities Dealers' rule 2740, "Selling Concessions, Discounts, and Other Allowances," regarding new issue designations preclude the remittance of selling concessions recaptured to be remitted to the System. Those selling concessions, however, may be used to pay for qualified investment research.

Proxies

All proxies shall be voted by the System in accordance with the Board's U.S. and Non-U.S. Proxy Voting Guidelines. Should the Investment Manager have a strongly held position on specific proxy issues as they relate to holdings in the portfolio managed by it, the Investment Manager should state its positions in writing to the CIO for consideration.

The Board, through the Corporate Governance Committee of the Board, has adopted a separate U.S. Proxy Voting Policy and a separate Non-U.S. Proxy Voting Policy. These policies are carried out by a third-party proxy-voting agent that has been retained by the Board and are located at the following web link:
www.psers.state.pa.us/invest/invest.htm.

Class Actions

The Board or its appointed delegate shall be responsible for the filing of all necessary papers or documentation regarding class action settlements proposed or received as a result of holdings in the System. Investment Managers shall promptly forward any papers or documentation received by it regarding class actions to the Board.

Mutual/Commingled Funds and Unit Investment Trusts

Mutual funds (both closed and open-ended), Commingled Funds, Unit Investment Trusts, ETFs, or any equivalent fund type funds are prohibited investment vehicles without the express permission of the CIO or a DCIO in the CIO's absence.

Market-Driven Breaches

The System recognizes that the portfolio will always be subject to fluctuations in market value. Market-driven breaches of the guidelines (breaches that occur due to market fluctuations) shall not be considered a violation of the guidelines as long as the Investment Manager corrects these breaches within 10 business days of the breach (unless an extended period of time is granted elsewhere in the guidelines and/or written permission is received from the CIO providing an extended period of time). Active breaches (breaches that occur due to purchase and sale activity) shall be considered a violation of the guidelines and must be corrected as soon as prudently possible. Consistent patterns of active breaches may be cause for termination.

Insurance

External Investment Managers managing Separate Accounts are required to carry both errors and omissions (E&O) insurance and fidelity bond coverage. The insurer from which the Investment Manager obtains coverage must have a financial strength rating of A- or better and a financial size category rating of VII or higher, both by A.M. Best. The fidelity bond must name the Board as either a loss-payee or additional insured party. To the extent that such terms can be obtained, both the E&O insurance and fidelity bond should contain a provision or endorsement that the insurance carrier shall provide the Board with written notice at least 30 days prior to any cancellation or material policy change. In the event that either (i) the External Investment Manager's insurance carrier refuses to agree in writing to provide such notice after best efforts by the External Portfolio Manager or (ii) the External Portfolio Manager's insurance carrier expressly disavows liability for its failure to provide such notice, the External Portfolio Manager shall assume the duty to provide such notice to the Board. In the event that the External Portfolio Manager fails to provide such notice, the External Portfolio Manager shall be liable to the System for losses incurred by the Board that could have been covered by E&O insurance or a fidelity bond but for the cancellation or change of coverage. Insurance coverage may be in the name of the Investment Manager's parent organization as long as the Investment Manager is named in that policy or bond as an insured party.

The External Portfolio Manager is required to maintain E&O coverage amounting to at least 1 percent of assets under management for the System. The External Portfolio Manager must maintain a fidelity bond coverage amounting to at least 0.5 percent of cumulative assets under management for the System. The minimum amount of E&O and fidelity bond coverage shall be \$500,000. The maximum deductible on both the Errors and Omissions coverage and the Fidelity Bond must be either: (a) no greater than \$500,000 if the External Portfolio Manager has less than \$1 billion in firmwide assets under management and no greater than \$1 million if the External Portfolio Manager has \$1 billion or more in firmwide assets under management, or (b) no greater than 10 percent of the External Portfolio Manager's retained earnings (equity) as disclosed in the External Portfolio Manager's annual audited balance sheet which must be provided to the Board annually in a timely fashion.

For purposes of evaluating the sufficiency of insurance coverage, the System considers coverage and deductible amounts of the parent company when applicable.

Derivatives

The Board's objectives for using Derivatives are to manage and/or reduce the Risk of the overall investment portfolio in an efficient manner. Through the use of Derivatives, the complex Risks that are bound together in traditional cash market investments can be separated and managed independently. If used appropriately, derivative contracts can be a productive component of an investor's portfolio by reducing Risk and/or providing a cheaper, more efficient way to obtain market exposure or to expand the opportunity set in which qualified investment managers seek to add value. Unless written permission is obtained from the CIO, or a DCIO in the CIO's absence, or unless otherwise specified in the portfolio specific guidelines, derivative investments, including but not limited to, forwards, futures, interest only and principal only strips, options, structured notes, swaps, etc. are prohibited.

Communications

Written and/or oral reports must be supplied by the Investment Manager, in sufficient detail and with supporting commentary, so the CIO and DCIO's are apprised of status and any changes in philosophy or investment strategy. Periodic meetings shall be held with the Investment Manager to discuss performance results, economic outlook, investment strategy, organizational changes and other pertinent matters.

The Board requires continual awareness of the System's activity and position, both absolute and relative. To accomplish this, the following shall be provided by the public market Investment Managers:

A. Promptly -

1. When requested by the Staff - a complete listing of all holdings, pending trades, transaction history and any additional related information.
2. Notification to the CIO, DCIO's, and the Compliance Officer of any compliance exceptions as they relate to these policies and applicable amendments.
3. Notification to the CIO, DCIO's, and the Compliance Officer of any material personnel or organizational changes that could affect the management of the System's portfolio.

B. Daily - To the Custodian Bank, OFM, and the IAASP:

1. On a daily basis all trades, including foreign currency exchange transactions, must be sent via e-mail to OFM and IAASP in a Microsoft

Excel-readable formatted file. The trade file should include, but not be limited to, the following: Custodian Account Number, Buy/Sell indicator, Broker Identification Code, Broker Name, Trade Date, Settle Date, Ticker, CUSIP, Security Description, Shares, Price, Principal, Commission, Fees, and Net Amount (all monetary amounts to be provided in base and local currency).

- C. On an as needed basis** - information for the State Treasurer's staff to perform their pre-audit function.
- D. Monthly** - To the Investment Consultant, CIO, DCIO's, Compliance Officer, and OFM:
 - 1. End of month valuations in accordance with the System's requested format or, if PSERS does not request a specific format, the Investment Manager's usual format, containing cost and market valuations by security (including FX forward and spot positions), holdings by sector segmentation, transaction summary register (purchases, sales, dividends/interest, other distributions/receipts), and holdings by country, with cost and market valuation in local currency and in U.S. dollar terms. These reports shall be in electronic form (i.e. Microsoft Excel, Adobe Acrobat files, etc.) and shall be sent via e-mail to the System and the System's general or designated Investment Consultant unless written permission is received from the CIO to send reports other than by e-mail.
- E. Monthly** - To the DCIO's, Compliance Officer, and OFM:
 - 1. Total commissions incurred by broker, and segregated by those in the Commission Recapture Program and those not in the Commission Recapture Program.
 - 2. Performance reports for the month, quarter-to-date, year-to-date, rolling one-year, rolling three-year, and portfolio-to-date (since inception) as well as the benchmark performance figures for each of those periods. Information is to be sent via e-mail to a designated Internet address within five business days from the end of each month.
- F. Monthly** - To Custodian Bank, OFM, and IAASP:
 - 1. Each Investment Manager is required to complete a month-end reconciliation of its account balance to the balance per the Custodian Bank. A reconciliation template in the form of a Microsoft Excel spreadsheet shall be sent via e-mail from the Custodian Bank not later than the seventh business day of the following month. The Investment Manager is required to transmit its reconciliation via e-mail to the Custodian Bank and OFM by the third business day (not later than the tenth business day of the following month) following receipt of the reconciliation template. The Custodian Bank in those cases where there are variances between the Investment Manager and the Custodian Bank above a certain threshold and the Custodian Bank is deemed to be

incorrect will issue a letter restating the month-end net asset value of the account. Restated net asset values will be used for performance and billing purposes.

2. The final or closed account holdings and amounts, including cash and pending trades, must be sent via e-mail to OFM and IAASP in a Microsoft Excel-readable formatted file. The holdings spreadsheet should include at least the following headings and information: custodian account number, CUSIP, security description, shares, base cost, local cost, base market value, and local market value.

G. Quarterly - To the DCIO's and Compliance Officer:

1. Provide written confirmation of adherence to these Investment Objectives and Guidelines in the format provided by the System within 30 days after the end of each calendar quarter. Consistent patterns of failing to complete the compliance certifications within 30 days after the end of each calendar quarter may be cause for termination.
2. Provide a detailed attribution of returns for the portfolio for the previous quarter and year versus the established benchmark for the portfolio within 30 days after the end of each calendar quarter.
3. Provide a quarterly report showing the dispersion of the System's returns versus a representative composite return for the quarter, rolling one-year, rolling three-year, and since inception in a format provided by the DCIO's within 45 days after the end of each calendar quarter.

H. Annually - The Investment Manager is expected to visit IOS in Harrisburg to provide an update on the firm, provide a portfolio overview, staff changes, etc.

I. Other - To the Investment Consultant, CIO, and DCIO's:

Immediate telephone and/or letter advice should be forthcoming from the Investment Manager when information of an important nature, such as a change in ownership of the advisor, a change in the portfolio manager(s) managing the System's portfolio, or unusual market activity (oil embargo, monetary crisis, etc.) that is causing, or may cause, material impact on the System.

Portfolio Specific Guidelines

The portfolio specific guidelines are included as an addendum to this document. The following are the various addendums (by letter and by name), one of which will be assigned to each Separate Account portfolio or program:

Equity Guidelines:

U.S. Equity Guidelines

E INTERNALLY MANAGED INDEXED PORTFOLIOS
E1 INTERNALLY MANAGED ALPHA GENERATION PROGRAM
E2 EQUITY REBALANCING PROGRAM

Non-U.S. Equity Guidelines

E INTERNALLY MANAGED INDEXED PORTFOLIOS
M NON-U.S. EQUITIES
N NON-U.S. SMALL CAP EQUITIES
O EMERGING MARKETS EQUITIES
O1 EMERGING MARKETS SMALL CAP EQUITIES

Currency Guidelines

P PASSIVE CURRENCY HEDGING OVERLAY PROGRAM

Other

X4 PUBLIC MARKETS IN-HOUSE CO-INVESTMENT POLICY

Fixed Income Guidelines:

Investment Grade Guidelines:

I U.S. CORE PLUS FIXED INCOME PORTFOLIOS
I-2 COLLATERALIZED LOAN OBLIGATION FIXED INCOME PORTFOLIOS
J FIXED INCOME REBALANCING PROGRAM
Q NON-U.S. DEVELOPED MARKETS FIXED INCOME PORTFOLIOS
I-1 INTERNALLY MANAGED U.S. LONG TREASURIES FIXED INCOME PORTFOLIO

Credit-Related Guidelines:

Q1 EMERGING MARKETS FIXED INCOME PORTFOLIOS
K U.S. HIGH YIELD FIXED INCOME PORTFOLIOS
K1 RESIDENTIAL MORTGAGE BACKED SECURITIES PORTFOLIOS

Inflation Protected Guidelines:

L INTERNALLY-MANAGED TREASURY INFLATION PROTECTION SECURITIES PORTFOLIOS

Other

X4 PUBLIC MARKETS IN-HOUSE CO-INVESTMENT POLICY

Real Asset Guidelines:

Master Limited Partnership Guidelines

B U.S. MASTER LIMITED PARTNERSHIP PORTFOLIOS
E INTERNALLY MANAGED INDEXED PORTFOLIOS

Infrastructure Guidelines – Public

E INTERNALLY MANAGED INDEXED PORTFOLIOS

Commodity Guidelines

H FULL DISCRETION COMMODITY PROGRAM
H1 ENHANCED COMMODITY INDEX PROGRAM

H2 INTERNALLY MANAGED ENHANCED COMMODITY INDEX PORTFOLIO

Real Estate Guidelines – Public

E INTERNALLY MANAGED INDEXED PORTFOLIOS

Other

X4 PUBLIC MARKETS IN-HOUSE CO-INVESTMENT POLICY

Risk Parity Guidelines:

G INTERNALLY MANAGED OPTIMAL LIQUID BETA PORTFOLIO

Short-Term Investment Pool Guidelines

Y INTERNALLY-MANAGED SHORT-TERM INVESTMENT POOL

Y1 LIBOR-PLUS SHORT TERM INVESTMENT POOLS

Y2 SHORT DURATION NON-AGENCY RMBS PORTFOLIOS

Y3 ULTRA-SHORT HIGH YIELD PORTFOLIOS

Investment Policies Deviations

This Policy is intended to state the position of the Board concerning investments in the various approved asset classes. While a prudent investor could adopt policies that would subject the fund to more Risk, the policies adopted herein are statements of the level of Risk that the Board is currently willing to accept consistent with its fiduciary obligation to support the present and future pension obligations of the System.

The following procedures should be employed when there is a variation between adopted policies and actual practice:

1. When an Investment Manager is given permission to invest in a particular manner pursuant to an exception to the policies granted by the CIO, or a DCIO in the CIO's absence, as explicitly permitted in the guidelines, that permission shall be given in writing to the Investment Manager and reported to the Investment Committee by way of posting on the Board's secure intranet web site. Notification is provided to the Board regarding the availability of these reports.
2. When an Investment Manager violates a policy, the CIO (in the interest of preserving capital), or a DCIO in the CIO's absence, may give the Investment Manager reasonable time to liquidate the position that is violative of the policy or the CIO, or a DCIO in the CIO's absence, may allow an exception to the policy. When appropriate, the Investment Manager shall be notified in writing of its liability in the event of a loss. In all cases, the Investment Committee shall be notified at its next meeting of any material violation and the action taken by the CIO. Exceptions to the guidelines permitted by the CIO shall be reported to the Investment Committee via posting on the Board's secure intranet web site. Notification is provided to the Board regarding the availability of these reports.

3. When an Investment Manager wishes (a) to invest in a manner inconsistent with specific Board policies, (b) the investment is not covered by paragraph (1) and (c) the CIO believes that under the circumstances the proposed investment is appropriate notwithstanding the Board policies, the CIO shall grant a waiver of Board policy and report material waivers to the Investment Committee at its next meeting. All waivers granted shall be reported to the Investment Committee via posting on the Board's secure intranet web site. Notification is provided to the Board regarding the availability of these reports.
4. The Board may waive any of its limitations on any investments if the need for a waiver is specifically referred to in the materials presented to the Investment Committee and the Board and any discussion of that waiver is included in the minutes of the Investment Committee and the Board.

The CIO shall notify the Investment Committee and the Board of the waivers currently in effect and the waivers issued since the previous update through a posting on the Board's secure intranet web site.

Review and Amendments

The Board shall review Investment Manager compliance with this Policy and any addendum related to the Investment Manager's mandate plus any amendments thereto.

In the application and implementation of the Investment Policy Statement, Objectives, and Guidelines, the CIO has the authority to interpret the guidelines to meet individual portfolio needs and to determine the appropriateness of any investment. On material policy issues and amounts, the CIO and/or the Executive Director, in conjunction with the Chair of the Investment Committee and/or Chair of the Board, will evaluate and determine the appropriateness of any investment. All interpretations of material policy issues and dollar amounts will be reported to the Investment Committee at the next regularly scheduled meeting.

If at any time the Investment Manager believes that the objectives cannot be met, or the guidelines constrict performance, the CIO, or a DCIO in the CIO's absence, should be notified in writing. The Investment Manager shall be encouraged to suggest changes in these guidelines as necessary. By signature the Investment Manager shall agree to these Investment Policy Statement, Objectives, and Guidelines and shall perform in accordance therewith.

B. Absolute Return Policies and Guidelines

The following represents the Absolute Return Policy

X2 ABSOLUTE RETURN POLICY
Other
X4 PUBLIC MARKETS IN-HOUSE CO-INVESTMENT POLICY

C. Private Market Policies and Guidelines

The following represent Private Market program policies and guidelines.

Pennsylvania Mortgage Program Guidelines

R PENNSYLVANIA MORTGAGE PROGRAM GUIDELINES & PROCEDURES

Real Estate Guidelines – Private

S OPEN-END REAL ESTATE FUND INVESTMENTS

U CLOSED-END OPPORTUNISTIC AND VALUE-ADDED REAL ESTATE INVESTMENTS

V REAL ESTATE PROGRAM

W FARMLAND INVESTMENT PROGRAM

X3-RE REAL ESTATE IN-HOUSE CO-INVESTMENT AND SECONDARY INVESTMENT POLICY

X-5 PRIVATE MARKETS AND REAL ESTATE PENNSYLVANIA IN-HOUSE CO-INVESTMENT INVESTMENT POLICY

Private Market Guidelines

X PRIVATE INVESTMENT AND VENTURE CAPITAL POLICY

X1 PRIVATE DEBT POLICY

X3-PD PRIVATE DEBT IN-HOUSE CO-INVESTMENT AND SECONDARY INVESTMENT POLICY

X3-PM PRIVATE MARKETS IN-HOUSE CO-INVESTMENT AND SECONDARY INVESTMENT POLICY

X-5 PRIVATE MARKETS AND REAL ESTATE PENNSYLVANIA IN-HOUSE CO-INVESTMENT INVESTMENT POLICY

Derivatives Policy

Objective and Investment Standards

The Board's objectives for using Derivatives are to manage and/or reduce the Risk of the overall investment portfolio in an efficient manner. Through the use of Derivatives, the complex Risks that are bound together in traditional cash market investments can be separated and managed independently. If used appropriately, derivative contracts can be a productive component of an investor's portfolio by reducing Risk and/or providing a cheaper, more efficient way to obtain market exposure or to expand the opportunity set in which qualified investment managers seek to add value.

Permitted Uses of Derivatives

Consistent with the objectives set out in this Policy, Derivative applications may be used by Investment Managers engaged to manage the asset allocation and/or Separate Account portfolios to:

- Implement investment strategies in a lower cost and more efficient manner;
- Implement overlay strategies in search of alpha (i.e. excess return);
- Replicate the return of a passive benchmark (i.e. market return);
- Efficiently manage the Asset Allocation by altering the System's market exposure (Systematic or Market Risk) in lieu of trading the underlying cash market securities through purchases or short sales, or both, of appropriate derivatives;
- Construct portfolios with Risk and return characteristics that could not be created with cash market securities consistent with the objectives in this Policy;
- Hedge and control Risks so that the System's risk-return profile is more closely aligned with the System's targeted risk-return profile through purchases or short sales, or both, of appropriate derivatives; and/or,
- Facilitate transition trading when holdings must be rebalanced or reallocated among permissible investments as a result of changes to applicable benchmark indexes or policy changes.

The only authorized uses of Derivative transactions are:

- to support efficient portfolio management and/or reduction of Risk in portfolios;
- or,
- to implement investment strategies authorized by this Policy more effectively or at a lower cost than would be possible in the cash market.

Investment Managers may not engage in Derivative applications that are inconsistent with their general and portfolio specific guidelines, as amended.

Prohibited Uses of Derivatives

Derivatives may not be used for any activity whose primary purpose is speculation while materially increasing the Risk to the System. Derivatives are considered speculative if their uses have no material relation to the general and portfolio specific guidelines, as amended, and their use is not reasonably and substantially intended to produce efficiency in portfolio management and/or reduce market, credit, or liquidity Risks applicable to the portfolio. Derivatives may not be used for circumventing limitations or restrictions imposed by this Policy or applicable regulatory requirements.

The term to expiration or delivery date or roll period of an OTC Derivative instrument may not exceed two years unless otherwise specified below.

Scope of Policy

Except where specifically noted, this Derivatives Policy applies to all Derivatives transactions executed by IOS and Investment Managers. This Policy does not apply to registered or private investment funds, including commingled funds.

Securities Lending Program Policy

OBJECTIVES AND GOALS

The Board (“PSERS”) has implemented a Securities Lending Program (“Program”) that is designed to generate a consistent or growing stream of incremental income through conservative securities lending practices. The design of this Securities Lending Program Policy (“Policy”) ensures that the Investment Office Staff and the Lending Agent have sufficient flexibility in managing investment risks and returns associated with the operation and oversight of the Program.

ROLES AND RESPONSIBILITIES

The assignment of Program responsibilities amongst the Board, Investment Office Staff, General Investment Consultant, and Lending Agent is summarized below.

Board of Trustees and Investment Committee

- Approve PSERS’ Securities Lending Program Policy;
- Approve Lending Agent; and
- Review Program performance annually, or more frequently as appropriate.

Investment Office Staff

- Negotiate and execute appropriate agreements with Lending Agent;
- Manage the risk tolerances by modifying Program criteria when prudent due to evolving market conditions, changes to PSERS’ assets and/or liquidity, or other relevant factors; and
- Manage the day to day operations of the Program, including but not limited to:
 - Monitoring Lending Agent’s compliance with Program guidelines on an ongoing basis;
 - Entering and withdrawing portfolios from the Program;
 - Approving lending markets;
 - Approving Counterparties with respect to loans of securities and investments of cash collateral in repurchase agreements (“Repo”), including the authority to approve non-traditional counterparties; and
 - Approving or amending the types of permissible collateral in connection with loans of securities and investments of cash collateral in Repos and the appropriate levels of collateralization for each, in addition to those identified in this Policy, when prudent, due to evolving market conditions, changes to PSERS’ assets and/or liquidity, or other relevant factors.
- Review this Policy not less than annually and recommend changes to the Board;

- Conduct due diligence analysis of Lending Agent, assessing criteria such as corporate strength, dedicated personnel and systems, procedures, and controls;
- Authorize lending agent to accept various types of collateral in connection with loans of securities and investments of cash collateral in Repos and set forth the appropriate levels of collateralization for each, in addition to those identified in this Policy, when prudent, due to evolving market conditions, changes to PSERS' assets and/or liquidity, or other relevant factors;
- Ensure that the program does not impede or interfere with the management of PSERS' investment portfolios by notifying the Lending Agent as soon as practicable of impending manager transitions, asset reallocations, and other material events in the portfolio; and
- Preserve PSERS' voting rights for loaned securities by notifying Lending Agent as soon as practicable of the desire to vote particular holdings.

General Investment Consultant

- Make recommendations to Board and Investment Office Staff regarding Lending Agent, structure of the Program, and any aspect of this Policy.

Lending Agent

- Implement and manage the Program consistent with applicable policies, agreements, and written instructions from PSERS;
- Perform its responsibilities as a fiduciary to PSERS, in a manner consistent with that of a professional securities lending agent using the care, skill, prudence and diligence under the circumstances then prevailing that a professional securities lending agent acting in like capacity and familiar with such matters would use, all in accordance with applicable federal and state laws;
- Provide written confirmation of compliance to these objectives and guidelines in the format provided by the Fund within 30 days from the end of each calendar quarter;
- Provide timely and comprehensive reporting as required by the Board and Investment Office Staff;

- Pay to PSERS all revenues earned, net of any Lending Agent fees, on a monthly basis; and
- Provide information to Investment Office Staff regarding the demand for securities, which may be of value to portfolio managers.

SECURITIES LENDING PROGRAM GUIDELINES

The Board has established the following Program guidelines which shall be set forth in the Agency Securities Lending Agreement and implemented by Lending Agent, subject to further instruction from Investment Office Staff where permitted in this Policy.

General

- All loans shall be terminable at will at PSERS' discretion (subject to normal settlement) unless approved in advance by Investment Office Staff;
- The terms of each individual loan must be economically beneficial to PSERS;
- Lending Agent shall allocate loan opportunities to PSERS in an equitable manner in comparison to loan opportunities allocated to other Lending Agent clients;
- All public market securities will be considered eligible for lending in the Program unless otherwise determined by Investment Office Staff;
- The Lending Agent shall identify on its books and records all loan, collateral and cash collateral investment positions held on behalf of PSERS.
- The Lending Agent shall manage investments of cash collateral on behalf of PSERS on a separate account basis;
- Lending Agent shall use its best efforts to preserve PSERS' voting rights for all loaned securities when requested by Investment Office Staff to do so;
- Lending Agent shall cooperate in PSERS' review of Program performance, providing all information and records to PSERS as it may, in its sole discretion, reasonably determine to be necessary for the determination as to the continuation of the contract term;
- Lending Agent shall provide indemnification in a form acceptable to PSERS protecting against counterparty insolvency risk with respect to loans of securities and investments of cash collateral in repurchase agreements; and
- Investment Office Staff shall establish written cash collateral investment guidelines which shall be disclosed to repo counterparties for the purpose of demonstrating Lending Agent's authority to invest cash collateral on behalf of PSERS.

Counterparties and Limits

- Lending Agent shall monitor the creditworthiness of Counterparties and place prudent limits on the total exposure applicable to each. Notwithstanding the foregoing:
 - The maximum loan exposure to any single Counterparty shall not exceed 25% of the total of all PSERS loans made by Lending Agent.

- The maximum exposure to any single counterparty for repurchase agreements made with cash collateral shall be 25%; and
- No less than annually, Lending Agent shall provide an updated list of potential Counterparties for approval by PSERS. PSERS reserves the right to add or strike Counterparties from the list at any time or place other specific limitations regarding loan or reinvestment transactions with any individual Counterparty.

Collateral and Valuation Procedures for Loans of Securities

- Lending Agent shall be solely responsible for the management of collateral;
- Unless otherwise authorized by Investment Office Staff, only US dollar cash is permitted as collateral for any loan;
- Subject to market practice and regulation, and prior to or simultaneously with the transfer of securities to a Counterparty in connection with a loan of securities, the Lending Agent shall obtain collateral on PSERS' behalf ("initial collateral margin"). At the time of delivery by the Counterparty, the amount of cash collateral shall be not less than 102 percent of the aggregate market value of the loaned securities for domestic securities and foreign securities that are denominated in the same currency as the collateral provided by the Counterparty ("matching currency"). Furthermore, the amount of cash Collateral shall be not less than 105 percent of the aggregate market value of the loaned securities for foreign securities that are not denominated in the same currency as the collateral provided by the Counterparty ("non-matching currency");

Thereafter, the Lending Agent shall, on each business day, determine the market value of PSERS' securities subject to a loan transaction relative to collateral received in respect of such loan. The Lending Agent shall, as required, demand from the relevant Counterparty additional collateral according to specific daily margin maintenance levels and procedures set forth in the Securities Lending Agreement ("ongoing margin maintenance");

- The collateral margin shall include accrued interest and accrued rebate; and
- Lending Agent shall be permitted to calculate collateral margin at the loan level and/or at the aggregate Counterparty level.

Repo Reinvestment Activity, Permissible Collateral Types, Segregation of Collateral

- Investments of cash collateral in repurchase agreements shall be made pursuant to tri-party repo collateral schedules customized to PSERS' risk tolerances. Investment Office Staff shall approve in writing the permissible collateral types;
- Investments of cash collateral in repurchase agreements shall be confirmed at the trade level with Counterparties as having been made on behalf of PSERS; and
- Lending Agent shall credit cash and repo collateral to segregated account(s) established for the benefit PSERS and held by an authorized collateral custodian. Collateral accounts shall be labeled to reflect PSERS' ownership rights over the account in the event of business disruption or a contingency situation, including the insolvency of the Lending Agent.

Policy Regarding Placement Agents

A. Scope

This policy is intended to apply broadly to all of the types of External Portfolio Managers, including without limitation, investment advisors or managers, separate account managers, general partners, and any other entities or persons that manage funds or assets for or on behalf of the System. The Board believes that the disclosure of Placement Agent relationships, compensation, and fees paid by all External Portfolio Managers helps to prevent impropriety or the appearance of impropriety and provides transparency to the investment process.

B. Policy

External Portfolio Managers shall not cause the Board to bear directly or indirectly any Placement Agent fee or expense, finder's fee, or any similar fee or expense regardless of whether a Placement Agent was used in connection with either an investment by the Board or with an investment by any other investor. In the event that the External Portfolio Manager passes on any such fee or expense to the Board, the External Portfolio Manager shall immediately provide a dollar-for-dollar offset against the management fee or other form of remuneration that the External Portfolio Manager charges to the Board until the full amount of such fee is offset.

C. Disclosures

Prior to being considered by the Board for retention, each External Portfolio Manager shall provide (i) a statement as to whether or not the External Portfolio Manager or any of its principals, employees, agents, or affiliates has compensated or agreed to compensate, directly or indirectly, any person or entity to act as a Placement Agent in connection with any investment by the Board, and (ii) if a Placement Agent was retained in connection with any investment by the Board, then the following additional disclosures may be required to the extent Staff deems relevant and appropriate under the circumstances:

- ⇒ a resume for each officer, partner, or principal of the Placement Agent (and any employee providing similar services) detailing the person's education, professional designations, regulatory licenses, and investment and work experience, with a section that specifically notes whether such person is a current or former Board member or PSERS employee or Investment Consultant, or a member of the immediate family of any such person;
- ⇒ a description of any and all compensation or other consideration of any kind provided or agreed to be provided to a Placement Agent, including the nature, timing, and value thereof. Compensation to Placement Agents applies only to compensation to third parties who are retained to solicit investments or who are paid based upon investment commitments secured by such third parties;
- ⇒ a description of services performed or to be performed by the Placement Agent with respect to the investment by the Board;
- ⇒ a statement as to whether the Placement Agent is utilized by the External Portfolio Manager with all prospective clients or only with a subset of the External Portfolio Manager's prospective clients;

- ⇒ a copy of any and all agreements between the External Portfolio Manager and the Placement Agent;
- ⇒ the names of any current or former Board members, Staff, or Investment Consultants who suggested the retention of the Placement Agent;
- ⇒ a statement as to whether the Placement Agent or any of its affiliates are registered with the Securities and Exchange Commission, the Financial Industry Regulatory Association, or any similar regulatory agency in a country other than the United States. The statement should include the details of such registration or an explanation of why no registration is required;
- ⇒ a statement as to whether the Placement Agent or any of its affiliates is registered as a lobbyist with any state (and if so, include a listing of the states) or national government; and
- ⇒ any other information deemed pertinent and requested by Board members or Staff.

D. Contracts

The contract between the System and External Portfolio Manager shall include one of the following provisions based on applicability:

- If a Placement Agent has been used in connection with either an investment by the Board or any other investor, a provision that the External Portfolio Manager shall not cause the System to bear directly or indirectly any Placement Agent fee or expense, finder's fee, or any similar fee or expense, and in the event that any such fee or expense is passed on to the Board, the External Portfolio Manager shall immediately provide a dollar-for-dollar offset against the management fee or other form of remuneration that the External Portfolio Manager charges to the Board until the full amount of such fee or expense is offset; or
- If a Placement Agent has not been used in connection with an engagement for services or an investment by any investor, an express, written confirmation that the External Portfolio Manager did not use a Placement Agent or pay any Placement Agent fee or expense, finder's fee or any similar fee or expense in connection with an engagement for its services or an investment by the Board or any other investor.

E. Changes

External Portfolio Managers are required to provide an update of any changes to any of the information specified above within 30 calendar days of the occurrence of the change, and any such change shall immediately be subject to the requirements of this policy.

F. Remedies

Any material omission or inaccuracy by the External Portfolio Manager may result in the following:

- PSERS shall have the discretion to claim reimbursement or payment by the External Portfolio Manager of an amount at least equal to the greater of the management or advisory fees paid to the External Portfolio Manager by the PSERS for up to the previous two years and an amount equal to the amounts paid or promised to be paid to the Placement Agent by the External Portfolio Manager.

- To the extent that PSERS has the discretion to terminate its agreement with the External Portfolio Manager, PSERS shall have the discretion to immediately terminate the agreement without penalty.
- In the case of limited partnerships, limited liability companies, and other commingled investment vehicles in which PSERS does not have unilateral termination rights, PSERS shall have the discretion to cease making further capital contributions for new investments (and paying fees on uncalled commitments) to the limited partnership, limited liability company or any other investment vehicle, but shall remain responsible for payments relating to existing investments.
- In the event that PSERS is subject to lockup terms, PSERS shall have the discretion to immediately redeem its interest from the fund without penalty and without regard to such lockup terms.

Public Markets Emerging Investment Manager Program Policy

I. OBJECTIVES AND GOALS

Consistent with the Board's fiduciary responsibilities, the Pennsylvania Public School Employees' Retirement System (PSERS, System, or Fund) has established the Public Markets Emerging Investment Manager Program (PMEIM Program) to:

1. Locate and fund managers with successful histories of generating positive alpha with Risk commensurate with the alpha generated (positive Risk adjusted returns);
2. Provide a source of potential managers for the main fund; and,
3. Assist public market emerging investment management firms with positive Risk adjusted returns grow through use of the System's name in the manager's marketing efforts.

The Board has allocated up to \$1.0 billion to the PMEIM Program. Funding for each investment manager will come from assets allocated within the main fund similar to or most closely related to the investment manager's mandate. The maximum number of investment managers in the program at any one time shall not exceed 10. The program may run with less than 10 investment managers.

II. PUBLIC MARKETS EMERGING INVESTMENT MANAGER PROGRAM CRITERIA

Investment Manager desiring to participate in the program must meet the following required criteria:

- ◆ Firms must be registered under the Investment Advisors Act of 1940 or be exempt therefrom (and will maintain such registration or exemption);
- ◆ Firms must provide transparency of positions and transactions;
- ◆ Firms must provide at least quarterly liquidity;
- ◆ Firms, the portfolio manager, or any combination thereof must have a three-year historical, performance record verified by at least one consultant or accounting firm in accordance with Global Investment Performance Standards (GIPS);
- ◆ Firms considered to provide Equity, Commodity or Absolute Return exposure must have no more than \$1.5 billion of total assets under management when hired (existing investment managers will be terminated within a reasonable period of time from the PMEIM Program when the total assets under management exceeds \$3.0 billion);
- ◆ Firms considered to provide Fixed Income exposure must have no more than \$3.0 billion of total assets under management when hired (existing investment managers will be terminated within a reasonable period of time from the PMEIM Program when the total assets under management exceeds \$6.0 billion);
- ◆ For performance-based fee accounts, the managers must exceed both a hurdle rate and a high water mark before they can earn the performance-based fee.

Preference will be given to investment managers deemed by Investment Office Staff (IOS) as able to meet the objectives, goals, and required criteria noted above plus having one or more of the following characteristics:

- ◆ Pennsylvania investment management firms headquartered or incorporated within the Commonwealth; and/or,
- ◆ Minority- or women-owned investment management firms approved by the Office of Minority and Women Business Enterprise in accordance with the criteria established by Executive Order No. 1987-18 and 4 Pennsylvania Code, Section 68.204.

Please note: *Firms applying for participation under the status of a Women and/or Minority Owned Business must contact the Office of Minority & Women Business Enterprise at (717) 783-3119 to obtain the proper certification material.*

III. ADMINISTRATION OF THE PUBLIC MARKETS EMERGING INVESTMENT MANAGER PROGRAM

IOS has the authority to hire and fund any investment manager meeting the objectives, goals, and criteria set forth above as long as capacity exists within the PMEIM Program. IOS has authority to invest in any type of business organization or investment fund (including, without limitation, Separate Accounts and limited partnerships) that meets the liquidity and transparency guidelines set forth in this Policy. The PMEIM Program is prohibited from investing in investment vehicles that primarily include private equity, private debt, venture capital or private real estate instruments. Investments in Absolute Return strategies are subject to manager selection requirements within the Absolute Return Policy (Addendum X2).

The Emerging Manager Portfolio Manager (EMPM) is responsible for administering the PMEIM Program. The EMPM will meet with managers that appear to meet the objectives, goals, and criteria of the PMEIM Program. Any investment manager considered for hiring into the PMEIM Program will meet with the Internal Review Committee (IRC). The IRC will review each manager considered for inclusion in the PMEIM Program and provide feedback to the EMPM. IOS approval required to hire any manager into the PMEIM Program include the EMPM, the EMPM's supervisor, and the CIO.

IOS is required to obtain Board approval in instances when the CIO, EMPM's supervisor, and EMPM locate (or have retained) an exceptional investment manager that does not meet one or more of the above required criteria. In these cases, IOS shall present to the Board the specific reasons for hiring the investment manager. Upon approval of the Board, IOS shall have the authority to fund the investment manager subject to VI. Fundings, which is described later.

The EMPM's responsibilities also include either recommending the investment manager for inclusion in the main fund or terminating the investment manager. Investment managers hired into the PMEIM Program will continue in the program for generally three- to five-years. If the investment manager generates strong Risk adjusted returns, IOS will use best efforts, in conjunction with the General Investment Consultant and the Board, to make a place in the main fund for that investment manager. IOS and the General Investment Consultant will consider things such as the investment manager's assets under management and projected ability to continue generating strong Risk adjusted returns in the future. An investment manager may be terminated by the EMPM, with approval from the EMPM's supervisor and the CIO, if that investment manager is underperforming, not generating strong Risk adjusted returns, not meeting the criteria to move into the main fund, changes their investment process, has personnel turnover, or any other reason which is deemed by IOS to be in the best interests of the System.

IV. INVESTMENT GUIDELINES

Each investment manager shall manage its portfolio within the constraints of the contract entered into between the investment manager and the Board, the Investment Policy Statement, Objectives and Guidelines, any applicable addendum, and any applicable amendments thereto. IOS shall have authority to negotiate the investment contract with the investment manager, including the investment guidelines.

V. INSURANCE

All of the standard insurance provisions set forth in the Investment Policy Statement, Objectives and Guidelines, except for the maximum deductibles, will apply to the investment manager until the investment manager is either managing over \$100 million for the Emerging Manager Program or is moved out of the Emerging Manager Program into the main fund. The maximum deductible for both the Error and Omissions Insurance and the Fidelity Bond is the greater of 10% of audited retained earnings or:

<u>Asset Size</u>	<u>Maximum Deductible</u>
\$0 - \$50 million	\$50,000
\$50 - \$75 million	\$100,000
\$75 – 100 million	\$200,000

VI. FUNDINGS

Board approval is required for total capital allocations exceeding \$100 million. Investment strategy limitations are consistent with IPS constraints. The EMPM, the EMPM's supervisor, and the CIO will determine the amount of the initial allocation and each subsequent allocation to each investment manager.

Qualified Independent Representative (QIR) Policy

This policy is effective immediately upon adoption.

I. Introduction.

This document sets forth the policy of Commonwealth of Pennsylvania, Public School Employees' Retirement System ("PSERS") with respect to the selection of qualified independent representatives ("QIRs") (as defined in the rules of the Commodity Futures Trading Commission ("CFTC")) and their involvement in swaps entered into by PSERS ("this Policy"). This Policy with respect to QIRs enables PSERS to permit Swap Dealers ("SDs") and Major Swap Participants ("MSPs") to comply with the CFTC's external business conduct rules.

II. Background.

- A. Based on PSERS' classification as a non-ERISA Special Entity under CFTC Rule 23.401(c)(2) or (4), each SD or MSP that wishes to enter into swap agreements with PSERS must, as a consequence of CFTC Rule 23.450, and as a precondition to proposing a particular transaction to PSERS, have a reasonable basis to believe that PSERS has a qualified independent representative that:
1. has sufficient knowledge to evaluate the transaction and its risks;
 2. is not subject to a statutory disqualification;
 3. is independent of the SD or MSP;
 4. undertakes a duty to act in the best interests of PSERS;
 5. makes appropriate and timely disclosures to PSERS;
 6. evaluates, consistent with any guidelines provided by PSERS, the fair pricing and appropriateness of the transaction; and
 7. is subject to restrictions on certain political contributions imposed by the CFTC, the Securities and Exchange Commission ("SEC"), or a self-regulatory organization subject to the jurisdiction of the CFTC or the SEC; provided however, that this criteria shall not apply if the representative is an employee of PSERS.^{1/}
- B. CFTC Rule 23.450 further provides a safe harbor pursuant to which a SD or MSP is deemed (without further duty of inquiry in the absence of contradictory facts) to have a reasonable basis to believe that PSERS has a QIR if the following conditions are met:
1. PSERS represents in writing to the SD or MSP that:
 - a. it has complied in good faith with written policies and procedures reasonably designed to ensure that it has selected a QIR that satisfies the applicable requirements of the CFTC rules, and

1/ The CFTC's rules contemplate that a QIR for PSERS may be a PSERS employee or a third party.

- b. that such policies and procedures provide for ongoing monitoring of the performance of such QIR consistent with the requirements of the CFTC rules.
2. The QIR represents in writing to PSERS and any relevant SD or MSP that it:
- a. has policies and procedures reasonably designed to ensure that it satisfies the QIR requirements;
 - b. meets the independence test in CFTC Rule 23.450; and
 - c. is legally obligated to comply with the requirements for being a QIR by agreement, condition of employment, law, rule, regulation, or other enforceable duty.

III. QIR Qualifications. No person may act as a QIR for PSERS unless such person meets the following qualifications:

- A. Such person has sufficient knowledge to evaluate the risks, fair pricing and appropriateness of swaps consistent with PSERS' Investment Policy Statement;
- B. If such person is a legal entity:
 - 1. it does not own 10% or more of the capital of any SD or MSP; and
 - 2. no SD or MSP owns 10% or more of the capital of such person.
- C. Such person is not directly or indirectly, through one or more persons, controlled by, in control of, or under common control with an SD or MSP.
- D. Such person has not solicited or accepted orders (or supervised persons so engaged) on behalf of an SD or MSP within one year of its proposed designation as a QIR.
- E. Such person was not referred, recommended or introduced to PSERS by a SD or MSP within one year of its proposed designation as a QIR.
- F. Such person is not subject to a statutory disqualification.²
- G. Such person discloses all material conflicts of interest that could reasonably affect its judgment or decision making for PSERS, and complies with policies and procedures designed to mitigate such conflicts of interest.
- H. The compensation of the QIR is not contingent on the execution by PSERS of a specific swap with a particular swap dealer.

2/ See Exhibit A attached hereto.

- I. If such person is not an employee of PSERS, he, she or it must be subject to restrictions on political contributions imposed by the CFTC, the SEC or a self-regulatory organization subject to the jurisdiction of the CFTC or the SEC.

IV. QIR Policy.

- A. The Public School Employees' Retirement System has designated the person(s) listed on Exhibit B as the QIR for PSERS.
- B. The QIR is authorized as part of his or her employment duties to make, if true, the QIR representations necessary to enable a SD or MSP to have the benefit of the safe harbor in CFTC Rule 23.450.
- C. With respect to any swap required to be approved by the QIR, the QIR must evaluate the risks, fair pricing and appropriateness of the swap, and ensure that the swap complies with all requirements set forth in the PSERS Derivatives Policy.
- D. With respect to any Swap previously approved by a QIR, the relevant QIR must monitor the performance of the Swap.
- E. The QIR must act in the best interests of PSERS, and must disclose all material conflicts of interest that could reasonably affect his or her judgment or decision making on behalf of PSERS in a timely manner.
- F. The QIR must inform PSERS if it becomes subject to a statutory disqualification or otherwise ceases to have the qualifications to be a QIR set forth in this Policy.
- G. PSERS will assess the QIR's compliance with this Policy on an ongoing basis.

EXHIBIT A (to the QIR Policy)

The following provisions of Section 8a(2) and (3) of the Commodity Exchange Act set forth the circumstances under which a person may be deemed to be subject to statutory disqualification by the CFTC

(2) upon notice, but without a hearing and pursuant to such rules, regulations, or orders as the Commission may adopt, to refuse to register, to register conditionally, or to suspend or place restrictions upon the registration of, any person and with such a hearing as may be appropriate to revoke the registration of any person—

(A) if a prior registration of such person in any capacity has been suspended (and the period of such suspension has not expired) or has been revoked;

(B) if registration of such person in any capacity has been refused under the provisions of paragraph (3) of this section within five years preceding the filing of the application for registration or at any time thereafter;

(C) if such person is permanently or temporarily enjoined by order, judgment, or decree of any court of competent jurisdiction (except that registration may not be revoked solely on the basis of such temporary order, judgment, or decree), including an order entered pursuant to an agreement of settlement to which the Commission or any Federal or State agency or other governmental body is a party, from

(i) acting as a futures commission merchant, introducing broker, floor broker, floor trader, commodity trading advisor, commodity pool operator, associated person of any registrant under this chapter, securities broker, securities dealer, municipal securities broker, municipal securities dealer, transfer agent, clearing agency, securities information processor, investment adviser, investment company, or affiliated person or employee of any of the foregoing or

(ii) engaging in or continuing any activity where such activity involves embezzlement, theft, extortion, fraud, fraudulent conversion, misappropriation of funds, securities or property, forgery, counterfeiting, false pretenses, bribery, gambling, or any transaction in or advice concerning contracts of sale of a commodity for future delivery, concerning matters subject to Commission regulation under section 4 or 19 of this Act, or concerning securities;

(D) if such person has been convicted within ten years preceding the filing of the application for registration or at any time thereafter of any felony that

(i) involves any transactions or advice concerning any contract of sale of a commodity for future delivery, or any activity subject to Commission regulation under section 4 or 19 of this Act, or concerning a security,

(ii) arises out of the conduct of the business of a futures commission merchant, introducing broker, floor broker, floor trader, commodity trading advisor, commodity pool operator, associated person of any registrant under this Act, securities broker, securities dealer, municipal securities broker, municipal securities dealer, transfer agent, clearing agency, securities information

processor, investment adviser, investment company, or an affiliated person or employee of any of the foregoing,

(iii) involves embezzlement, theft, extortion, fraud, fraudulent conversion, misappropriation of funds, securities or property, forgery, counterfeiting, false pretenses, bribery, or gambling, or

(iv) involves the violation of section 152, 1001, 1341, 1342, 1343, 1503, 1623, 1961, 1962, 1963, or 2314, or chapter 25, 47, 95, or 96 of title 18, United States Code, or section 7201 or 7206 of the Internal Revenue Code;

(E) if such person, within ten years preceding the filing of the application or at any time thereafter, has been found in a proceeding brought by the Commission or any Federal or State agency or other governmental body, or by agreement of settlement to which the Commission or any Federal or State agency or other governmental body is a party,

(i) to have violated any provision of this chapter, the Securities Act of 1933 [15 U.S.C. 77a et seq.], the Securities Exchange Act of 1934 [15 U.S.C. 78a et seq.], the Public Utility Holding Company Act of 1935, the Trust Indenture Act of 1939 [15 U.S.C. 77aaa et seq.], the Investment Advisers Act of 1940 [15 U.S.C. 80b-1 et seq.], the Investment Company Act of 1940 [15 U.S.C. 80a-1 et seq.], the Securities Investors Protection Act of 1970 [15 U.S.C. 78aaa et seq.], the Foreign Corrupt Practices Act of 1977, chapter 96 of title 18, or any similar statute of a State or foreign jurisdiction, or any rule, regulation, or order under any such statutes, or the rules of the Municipal Securities Rulemaking Board where such violation involves embezzlement, theft, extortion, fraud, fraudulent conversion, misappropriation of funds, securities or property, forgery, counterfeiting, false pretenses, bribery, or gambling, or

(ii) to have willfully aided, abetted, counseled, commanded, induced, or procured such violation by any other person;

(F) if such person is subject to an outstanding order of the Commission denying privileges on any registered entity to such person, denying, suspending, or revoking such person's membership in any registered entity or registered futures association, or barring or suspending such person from being associated with a registrant under this chapter or with a member of a registered entity or with a member of a registered futures association;

(G) if, as to any of the matters set forth in this paragraph and paragraph (3), such person willfully made any materially false or misleading statement or omitted to state any material fact in such person's application or any update thereto; or

(H) if refusal, suspension, or revocation of the registration of any principal of such person would be warranted because of a statutory disqualification listed in this paragraph:

Provided, That such person may appeal from a decision to refuse registration, condition registration, suspend, revoke or to place restrictions upon registration made pursuant to

the provisions of this paragraph in the manner provided in sections 9 and 15 of this title; and

Provided, further, That for the purposes of paragraphs (2) and (3) of this section, "principal" shall mean, if the person is a partnership, any general partner or, if the person is a corporation, any officer, director, or beneficial owner of at least 10 per centum of the voting shares of the corporation, and any other person that the Commission by rule, regulation, or order determines has the power, directly or indirectly, through agreement or otherwise, to exercise a controlling influence over the activities of such person which are subject to regulation by the Commission;

(3) to refuse to register or to register conditionally any person, if it is found, after opportunity for hearing, that –

(A) such person has been found by the Commission or by any court of competent jurisdiction to have violated, or has consented to findings of a violation of, any provision of this chapter, or any rule, regulation, or order thereunder (other than a violation set forth in paragraph (2) of this section), or to have willfully aided, abetted, counseled, commanded, induced, or procured the violation by any other person of any such provision;

(B) such person has been found by any court of competent jurisdiction or by any Federal or State agency or other governmental body, or by agreement of settlement to which any Federal or State agency or other governmental body is a party,

(i) to have violated any provision of the Securities Act of 1933 [15 U.S.C. 77a et seq.], the Securities Exchange Act of 1934 [15 U.S.C. 78a et seq.], the Public Utility Holding Company Act of 1935, the Trust Indenture Act of 1939 [15 U.S.C. 77aaa et seq.], the Investment Advisers Act of 1940 [15 U.S.C. 80b-1 et seq.], the Investment Company Act of 1940 [15 U.S.C. 80a-1 et seq.], the Securities Investors Protection Act of 1970 [15 U.S.C. 78aaa et seq.], the Foreign Corrupt Practices Act of 1977, or any similar statute of a State or foreign jurisdiction, or any rule, regulation, or order under any such statutes, or the rules of the Municipal Securities Rulemaking Board or

(ii) to have willfully aided, abetted, counseled, commanded, induced, or procured such violation by any other person;

(C) such person failed reasonably to supervise another person, who is subject to such person's supervision, with a view to preventing violations of this chapter, or of any of the statutes set forth in subparagraph (B) of this paragraph, or of any of the rules, regulations, or orders thereunder, and the person subject to supervision committed such a violation: Provided, That no person shall be deemed to have failed reasonably to supervise another person, within the meaning of this subparagraph if:

(i) there have been established procedures, and a system for applying such procedures, which would reasonably be expected to prevent and detect, insofar as practicable, any such violation by such other person and

- (ii) such person has reasonably discharged the duties and obligations incumbent upon that person, as supervisor, by reason of such procedures and system, without reasonable cause to believe that such procedures and system were not being complied with;
- (D) such person pleaded guilty to or was convicted of a felony other than a felony of the type specified in paragraph (2)(D) of this section, or was convicted of a felony of the type specified in paragraph (2)(D) of this section more than ten years preceding the filing of the application;
- (E) such person pleaded guilty to or was convicted of any misdemeanor which:
- (i) involves any transaction or advice concerning any contract of sale of a commodity for future delivery or any activity subject to Commission regulation under section 6c or 23 of this title or concerning a security,
 - (ii) arises out of the conduct of the business of a futures commission merchant, introducing broker, floor broker, floor trader, commodity trading advisor, commodity pool operator, associated person of any registrant under this chapter, securities broker, securities dealer, municipal securities broker, municipal securities dealer, transfer agent, clearing agency, securities information processor, investment adviser, investment company, or an affiliated person or employee of any of the foregoing,
 - (iii) involves embezzlement, theft, extortion, fraud, fraudulent conversion, misappropriation of funds, securities or property, forgery, counterfeiting, false pretenses, bribery, or gambling,
 - (iv) involves the violation of section 152, 1341, 1342, or 1343 or chapter 25, 47, 95, or 96 of title 18, or section 7203, 7204, 7205, or 7207 of title 26;
- (F) such person was debarred by any agency of the United States from contracting with the United States;
- (G) such person willfully made any materially false or misleading statement or willfully omitted to state any material fact in such person's application or any update thereto, in any report required to be filed with the Commission by this chapter or the regulations thereunder, in any proceeding before the Commission or in any registration disqualification proceeding;
- (H) such person has pleaded *nolo contendere* to criminal charges of felonious conduct, or has been convicted in a State court, in a United States military court, or in a foreign court of conduct which would constitute a felony under Federal law if the offense had been committed under Federal jurisdiction;
- (I) in the case of an applicant for registration in any capacity for which there are minimum financial requirements prescribed under this chapter or under the rules or regulations of the Commission, such person has not established that such person meets such minimum financial requirements;

(J) such person is subject to an outstanding order denying, suspending, or expelling such person from membership in a registered entity, a registered futures association, any other self-regulatory organization, or any foreign regulatory body that the Commission recognizes as having a comparable regulatory program or barring or suspending such person from being associated with any member or members of such registered entity, association, self-regulatory organization, or foreign regulatory body;

(K) such person has been found by any court of competent jurisdiction or by any Federal or State agency or other governmental body, or by agreement of settlement to which any Federal or State agency or other governmental body is a party,

(i) to have violated any statute or any rule, regulation, or order thereunder which involves embezzlement, theft, extortion, fraud, fraudulent conversion, misappropriation of funds, securities or property, forgery, counterfeiting, false pretenses, bribery, or gambling or

(ii) to have willfully aided, abetted, counseled, commanded, induced or procured such violation by any other person;

(L) such person has associated with such person any other person and knows, or in the exercise of reasonable care should know, of facts regarding such other person that are set forth as statutory disqualifications in paragraph (2) of this section, unless such person has notified the Commission of such facts and the Commission has determined that such other person should be registered or temporarily licensed;

(M) there is other good cause; or

(N) any principal, as defined in paragraph (2) of this section, of such person has been or could be refused registration:

Provided, That pending final determination under this paragraph, registration shall not be granted: Provided further, That such person may appeal from a decision to refuse registration or to condition registration made pursuant to this paragraph in the manner provided in sections 9 and 15 of this title.

EXHIBIT B (to the QIR Policy)

James H. Grossman, Jr., CPA, CFA, Chief Investment Officer

VII. Monitoring and Reporting

Selection of Investment Managers

The Board delegates to IOS the authority to conduct Investment Manager searches with the assistance of the appropriate Investment Consultant. No Investment Manager shall be presented to the Board for approval without a recommendation from both IOS and the appropriate Investment Consultant to allocate or commit capital to the Investment Manager. All Investment Managers, excluding PMEIM Program Investment Managers, shall be approved by the Board prior to full execution of a contract. The following are the selection procedures for Public Markets Investment Managers, Private Markets Investment Managers (partnerships), and PMEIM Program Investment Managers.

Public Markets excluding the PMEIM Program

A search for a public market equity, fixed income, commodity, real estate, or other Investment Manager is not conducted until there is a need for an Investment Manager. The following are potential reasons for an Investment Manager search:

- Termination of an existing Investment Manager due to organizational/personnel changes, change in investment process/philosophy, and/or poor performance;
- Expansion of an allocation to an asset class or,
- Addition of a new asset class.

The following are the steps taken to conduct the search:

- The DCIO-Traditional Investments shall be responsible for public market Investment Manager searches.
- IOS shall leverage the appropriate Investment Consultant's research to develop a list of potential Investment Managers to interview for potential inclusion in the System in those areas where sufficient data exists. At times, IOS and the appropriate Investment Consultant will use other means of searching for Investment Managers to meet the needs of the System because a comprehensive database of Investment Managers may not exist (i.e., portable alpha Investment Managers, commodity Investment Managers, etc.).
- IOS and the appropriate Investment Consultant shall review an initial list of Investment Managers. The list shall be narrowed to a manageable number based on the number of Investment Managers needed (short list).
- The Investment Consultant shall prepare a presentation book including a profile of each Investment Manager on the short list, historical performance, the appropriate Investment Consultant's ranking or score, if any, assets under management of the Firm and product, inception date of the firm and product, style/size comparison (if applicable), and correlations of excess returns vs. other potential Investment Managers and existing Investment Managers in the specific mandate.

- Investment Managers on the short list shall be interviewed by IOS (CIO, DCIO-Traditional Investments, Internal Portfolio Manager and/or Senior Investment Analyst, and normally at least one of the other Investment Office Managing Directors based on the mandate) and the appropriate Investment Consultant. Based on the qualitative and quantitative information gathered prior to and during the interview, IOS and the appropriate Investment Consultant come to a consensus as to which Investment Manager(s) best compliments the System's investment program. The factors which may be considered include, but not be limited to:
 - Organizational stability
 - Investment approach and process
 - Competence of staff
 - Expected returns and correlations
 - Integrity
 - Quality of reporting
- The DCIO-Traditional Investments, or other IOS designated by the DCIO-Traditional Investments, shall enter into fee and contract negotiations with each selected Investment Manager. If the DCIO-Traditional Investments is unable to negotiate an acceptable contract, which shall include the System's required contract provisions, the next best choice is selected, and this process continues until the Investment Manager and the System negotiate mutually acceptable contract terms. Once an agreement is reached, the selected Investment Manager(s) is recommended to the Investment Committee and Board for approval within the investment structure.

Private Markets, including Private Debt, Private Equity, Venture Capital and Real Estate

IOS monitors new private market funds coming to the market. The following steps are taken to hire a new Private Markets Investment Manager:

- IOS is contacted regarding new fund or receives a referral from the specialty Investment Consultant.
- IOS will perform an initial screening to evaluate the investment opportunity, including:
 - Size of fund
 - Strategy of fund
 - Fund's deal terms
- If IOS or the specialty Investment Consultant wishes to continue the evaluation, IOS shall arrange to meet with the general partner of the fund under consideration.
- If IOS wants to move forward with more in-depth due diligence, the general partner may be required to sign a Model Letter of Understanding that outlines the following:
 - Specific deal terms required by the Investment Committee;
 - Indemnification contract language; and,
 - Sample side letter language.
- The prospective general partner shall also provide detailed information to IOS and the specialty Investment Consultant that includes:
 - Performance history of the organization and partners
 - Fund strategy

- History of the organization and partners
- References
- The prospective general partner shall also meet with the appropriate specialty Investment Consultant.
- Following both meetings, IOS and the specialty Investment Consultant shall make a determination about whether to proceed.
- If IOS and the specialty Investment Consultant agree to proceed, then (1) the specialty Investment Consultant shall perform detailed due diligence into the prospective fund, (2) IOS may have a follow-up meeting with the general partner, and (3) IOS will complete its due diligence, including a meeting at the general partner's office.
- The goal of the due diligence process is to determine whether to recommend that the System invest in the prospective fund based on the composition of the investment team (including ethical evaluation), verification of past performance, analysis of the process, style, strategy, etc. All factors evaluated will be used in assessing the potential strengths and weaknesses of the prospective fund.
- If IOS decides to invest in the prospective fund, then DCIO-Non-Traditional Investments, or other IOS designated by the DCIO-Non-Traditional Investments enters contract negotiations with the general partner.
- Assuming acceptable terms are agreed upon, the DCIO-Non-Traditional Investments or Internal Portfolio Manager will make a presentation to the Investment Committee. The Investment Committee and the Board are required to approve the investment prior executing a contract with the prospective fund.

PMEIM Program

The PMEIM Program is administered internally by the EMPM. The Public Markets Emerging Investment Manager Program Policy is approved by the Board by inclusion within the Investment Policy, Objectives and Guidelines, above in the Risk Management and Controls section.

Prospective firms are brought to the attention of the EMPM through other institutional investors, financial publications, word-of-mouth, contact directly by the Investment Manager, or the results of screening a database. The EMPM will start the due diligence process on firms that meet the System's required characteristics and qualifications as follows:

- Contact the Investment Manager to have it give a presentation of its product;
- Evaluate prospective Investment Manager based on, among other considerations, philosophy, methodology, past performance, ethical standards; and,
- Perform an on-site visit at the Investment Manager's place of business.

The administration of this Program is more fully documented in the Risk Management and Controls section.

Termination of Investment Managers

The CIO, with concurrence from the Executive Director and the Chair of the Investment Committee and notification of the Board, has authority to terminate an Investment Manager, except a PMEIM Program Investment Manager, for any reason, including, but not limited to, poor performance, personnel changes, organizational changes, deviation from their investment style, compliance violations, and the need for liquidity.

Notwithstanding the preceding, any individual Board member has the right to request to have a termination decision listed on the agenda of the next scheduled Investment Committee meeting for discussion and concurrence by the Investment Committee.

Pending said Investment Committee meeting, no action shall be taken by the CIO to terminate the Investment Manager. The CIO shall inform the Board of the status of the termination at the next scheduled Board meeting. Upon the termination of any Investment Manager, the CIO has the authority to reinvest the proceeds from the terminated Investment Manager with any remaining Investment Manager(s) previously approved by the Board and/or keep the proceeds in the System's cash management account consistent with the Asset Allocation.

PMEIM Program Investment Managers may be terminated for any reason, including, but not limited to, poor performance, personnel changes, organizational changes, deviation from their investment style, and compliance violations. In addition, PMEIM Program Investment Managers whose assets under management exceed the maximum allowable per the Policy are no longer eligible for participation in the PMEIM Program and must either be terminated or, with the approval of the DCIO, CIO, Investment Committee, Board, and General Investment Consultant may be transferred out of the PMEIM Program to the main investment program. The EMPM must receive approval to terminate a PMEIM Program Investment Manager from the EMPM's supervisor and the CIO.

Oversight Updates and Reports

Through the mechanisms described in this section, the Board, via its Investment Committee, receives information necessary to fulfill its fiduciary responsibility of monitoring and overseeing the investment program. The Board's oversight of PSERS' investment program can be considered through a waterfall structure, from high level to the more detailed, and more frequent, degree. Updates and analysis reports are received as formal presentations to the Investment Committee or provided via the Board's intranet site (Diligence). The following reflects the frequency and detail of the information reported to the Board by IOS unless otherwise noted:

At least once every five years the Investment Committee reviews the performance of Investment Consultants through the contracting process.

At least once every three years, or more frequently as needed, the Investment Committee is provided the following information and analysis:

- an asset/liability study prepared and presented by the general Investment Consultant.

On an annual basis the Investment Committee is provided the following information and analysis:

- the strategic Asset Allocation, including the recommended investment structure and Policy Benchmarks, presented by the general Investment Consultant;
- a detailed review of Private Markets, Private Real Estate, and Private Credit; and
- a detailed review of the Securities Lending Program.

Also on an annual basis, the Corporate Governance Committee is provided analysis on proxy voting matters necessary to update PSERS' Proxy Voting Policies.

On a quarterly basis the Investment Committee is provided the following information and analysis:

- market and PSERS' Investment Policy Index performance;
- current asset class tactical allocations; ;
- assets managed internally vs. externally by asset class;
- the asset class, sub-asset class and strategy performance as defined within the Investment Policy Index. IOS will endeavor to present each update twice annually.
- a comprehensive performance report for the total fund that contains the benchmarked performance of Traditional and Absolute Return Investment Program investment managers provided by the general Investment Consultant, via Diligence.
- a presentation of the general Investment Consultant's review of PSERS' total fund investment performance, via Diligence.

- a presentation of the specialty Investment Consultant to the Absolute Return Program's review of PSERS' Absolute Return Program's investment performance, via Diligence.
- performance and exposure reports and presentations for Private Markets, Private Real Estate, and Private Credit by the IOS and specialty Investment Consultants for the Non-traditional Investments, via Diligence.

In addition, the Investment Committee typically schedules several educational sessions each year to ensure it has a sound foundation upon which it carries out its duties.

On an on-going basis, the Investment Committee monitors IOS performance through the monitoring and oversight of the investment program as a whole.

VIII. Definitions

Absolute Return Investment Consultant (ARIC): firm retained by the Board to provide oversight assistance of the Absolute Return Asset Class, as broadly defined in the Absolute Return Policy.

Absolute Return Investment Funds (ARIF): also referred to as hedge funds, are generally open-ended investment funds that issue shares which represent proportional ownership in an investment portfolio. Assets held by ARIF are managed by ARIM.

Absolute Return Investment Managers (ARIM): Investment Managers specific to the Absolute Return Program.

Absolute Return Program (ARP): includes all Absolute Return Investment Funds managed by the Absolute Return Investment Managers.

Applicable Investment Expenses: may include catch-up interest, management fees, organizational expenses, or other expenses payable directly by PSERS outside of its capital commitment not to exceed 15 percent of the amount approved for investment and authorized by IOS.

Asset Allocation: the decision of selecting appropriate weights between broad asset class categories (Private Markets, bonds, cash, commodities, stocks, etc.) in order to produce the desired Risk and return profile for a total fund portfolio. The Asset Allocation decision is the most important investment strategy issue for an investment program.

Benchmark: a standard against which the performance of a security, index, or portfolio can be measured. Also see Index.

Board: The Pennsylvania Public School Employees' Retirement Board.

CBC: Counterparty and Broker/Dealer Committee – committee responsible for the monitoring of Counterparties and broker/dealers as described in the Counterparty and Broker/Dealer Policy

CIO: Chief Investment Officer.

Commingled Fund (CMF): a type of fund consisting of assets from several accounts that are blended together. Sometimes called a pooled fund.

Commission Recapture Agent: the party responsible for administering the Commission Recapture Program on behalf of a fund. See **Exhibit A** for the System's current Commission Recapture Agent.

Commission Recapture Program: a program whereby a pension fund receives "credits" resulting from transactions incurred by the fund's investment managers on their behalf. These transactions may be from commissions (equities) or spreads (fixed income).

Correlation: a statistical measure of how two securities or portfolios move in relation to each other. Correlations can range from negative 1 (perfect negative Correlation) to positive 1 (perfect positive Correlation). A Correlation of 0 indicates that the movements of securities or portfolios are completely random.

Counterparty: the entity that is in the opposing position to a transaction.

Commonwealth: Commonwealth of Pennsylvania.

Custodian Bank: an institution that keeps custody of stock certificates, fixed income securities, and other assets. The System's Custodian Bank has a contract with the State Treasurer, the legal custodian of the System's assets. See **Exhibit A** for the System's current Custodian Bank.

DCIO: Deputy Chief Investment Officer's pf Traditional and Non-Traditional Investments.

Derivative: a financial contract, such as a Forward, Futures, Option, or Swap Contract, whose value depends on the performance of any one or more underlying securities or assets (such as bonds, stocks, financial commodities, currencies, etc.), or index of securities or assets. Derivatives may be purchased through a national exchange or through a direct OTC arrangement with a Counterparty.

Diversification: dividing investments among a variety of securities and/or funds with different Risk, reward, and Correlation statistics so as to minimize Unsystematic Risk.

EMPM: Emerging Manager Program Manager.

EPRA: acronym for the European Public Real Estate Association. EPRA is a common interest group that promotes, develops, and represents the European public real estate sector.

Exchange Traded Funds (ETFs): trust-issued receipts that represent beneficial ownership of a specified group of stocks. ETFs allow the holder to benefit from the ownership of the stocks or bonds in a particular country, industry, sector, group, etc. ETFs include HOLDRS, iShares, SPDRs, etc.

External Portfolio Manager: an individual or firm with whom the Board has a contract to manage an investment portfolio.

Forward Contract: non-standardized contract between two Counterparties for a deliverable commodity or instrument which conveys the obligation to make or take delivery of that commodity or instrument at a future point in time at a specific price.

Frictional Cash: cash that is held by a portfolio that is not benchmarked to the asset allocation category of cash. For example, cash held in an S&P 500 index fund would create a performance variance vs. the S&P 500 index.

FTSE: a company co-owned by The Financial Times and the London Stock Exchange that specializes in index calculation.

Futures Contract: a standardized contract for a deliverable commodity or instrument, which conveys the obligation to make or take delivery of that commodity or instrument at a future point in time at a specified price.

Hard-dollar Fees: fees or payments paid to brokerage firms in return for their services.

Hedge: a transaction to reduce the Risk of adverse price movements in an asset. Normally, a Hedge consists of taking an offsetting position in a related security, such as a Futures Contract.

HOLDRS: acronym for Holding Company Depositary Receipts. HOLDRS are EFTs issued by Merrill Lynch & Co., Inc.

IAASP: Investment Accounting Application Service Provider. This represents the outside service provider retained by the Board to provide investment accounting and technology services to the System. See **Exhibit A** for the System's current IAASP.

Index: benchmarks used by the Board to measure the investment performance of each Asset Class. The following are indexes used or referenced by the System:

POLICY INDEX:

Benchmark used by the Board to measure the investment performance of the System.

EQUITY:

MSCI USA IMI Gross: Performance benchmark for publicly traded U.S. stocks. The MSCI USA Investable Market Index (IMI) is designed to measure the performance of the large, mid and small cap segments of the US market. The index covers approximately 99% of the free float-adjusted market capitalization in the US.

MSCI ACWI ex USA IMI with Developed Market Currencies (Hedged to USD) Index Net: Performance benchmark for publicly traded Non-U.S. stocks. This index is a custom global index created for the System by MSCI. The index captures large, mid, and small cap representation across 22 developed markets and 23 emerging market countries. The index covers approximately 99% of the global equity opportunity set outside the US. The returns are calculated net of tax. The index hedges the currency exposure for all of the developed market countries back to the U.S. dollar (USD). The current hedge ratio is 75% of the developed market currency exposure, but can be customized as required by the System. ACWI is an acronym for All-Country World Index. IMI is an acronym for Investable Market Index.

MSCI Emerging Markets Investable Market Index (IMI) Net: Performance benchmark for publicly traded Emerging Markets stocks. The MSCI Emerging Markets IMI captures large, mid and small cap representation across 24 emerging markets countries. The index covers approximately 99% of the free float-adjusted market capitalization in each country. The returns are calculated net of tax.

Burgiss Total Return: Performance benchmark data for Private Markets calculated using the rolling 5-year (20 quarters) total returns obtained from Burgiss Private IQ relevant universe (i.e. Generalist, Expansion Capital, Buyout, Debt, Infrastructure, Natural Resources, Secondary Fund of Funds, and North America-focused Venture Capital).

FIXED INCOME:

Barclays Capital U.S. Aggregate Bond Index: Performance benchmark for publicly traded U.S. investment grade bonds. The index is an index of U.S. government securities, mortgage-backed securities, asset-backed securities, and corporate securities to simulate the universe of bonds in the U.S. fixed income market. The maturity of the bonds in the index is over one year.

Barclays Capital Global Aggregate GDP-weighted Developed Market ex-U.S. (Hedged to USD) Index: Performance benchmark for publicly traded Non-U.S. investment grade bonds. The index is a custom index including bonds eligible for the Barclays Capital Aggregate Developed Markets, excluding U.S. and including Hong Kong, Singapore and Taiwan, GDP weighted by country bloc.

Barclays Capital EM Local Currency – Government – MV Weighted (Unhedged) – 10% Country Cap Index: Performance benchmark for publicly traded emerging market bonds. The index is an index of emerging market government bonds, in which country weighting is limited to 10%.

Barclays Capital U.S. Aggregate Long Treasury Index: Performance benchmark for long Treasury bond allocation.

Barclays Capital U.S. High Yield Index: Performance benchmark for U.S. below investment grade fixed income securities.

Barclays Capital World Government Inflation-Linked Bond (WGILB) Index (Hedged to USD): Performance benchmark for investment grade, government inflation-linked debt consisting of 12 different developed market countries – United Kingdom, Australia, Canada, Sweden, the United States, France, Italy, Japan, Germany, New Zealand, Denmark and Spain.

REAL ASSETS:

Bloomberg Commodity Index: Performance benchmark for commodities is a rolling commodities index composed of futures contracts on eligible physical commodities traded on U.S. exchanges. The index serves as a liquid and diversified benchmark for the commodities asset class.

Bloomberg Commodity Gold Subindex: Performance benchmark composed of the Gold exposures within the Bloomberg Commodity Index.

FTSE EPRA/NAREIT Developed (Hedged to USD) Index Net: Performance benchmark for publicly traded real estate. The FTSE EPRA/NAREIT Developed Index is a composite of the existing EPRA Europe Index, EPRA/NAREIT North America Index, and EPRA/NAREIT Asia Index. The index contains publicly quoted real estate companies that meet the EPRA Rules in countries throughout Europe, North America, and Asia.

FTSE Developed Core Infrastructure 50/50 (Hedged to USD) Index Net: Performance benchmark for publicly traded infrastructure designed to give an industry-defined interpretation of infrastructure and adjusts the exposure of certain infrastructure sub-sectors. The constituent weights revolve around three broad industry sectors: 50% Utilities, 30% Transportation (with rails capped at 7.5%), and 20% mix of other sectors including pipelines, satellites, and communication towers. The index weights are based on investable market capitalization.

S&P MLP Index: Performance benchmark for Master Limited Partnerships (MLP). The S&P MLP Index contains both MLPs and publicly traded limited liability companies, which have a similar legal structure to MLPs, that trade on the NYSE and NASDAQ.

Burgiss Total Return: Performance benchmark for Private Real Estate is calculated using the total returns obtained from Burgiss IQ relevant universe (i.e. value-added and opportunistic real estate). A rolling 5-year (20 quarters) lookback is being built out effective first quarter 2015.

NFI-ODCE (NCREIF Open-end Diversified Core Equity): dataset used for performance measurement of investments in core real estate.

CASH:

Merrill Lynch U.S. Treasury Bill 0-3 Month Index: Performance benchmark for short term cash portfolio.

Information Ratio: a measure of Risk-adjusted excess return used to evaluate active management strategies. The information ratio is calculated by dividing a portfolio's excess return by excess Risk.

Initial Margin: the percentage of the purchase price of a security (that can be purchased on Margin) that the investor must pay for with his or her own cash or marginable securities.

Internal Portfolio Manager: an individual employed by the Board who manages an investment portfolio.

IRC: Internal Review Committee - a committee consisting of the CIO, the DCIO, the EMPM, the Investment Office Directors, and any other IOS as necessary.

Investment Consultant: a third-party firm retained by the Board to provide advice on various investment issues ranging from general advice to advice on specialty asset classes (Absolute Return, Private Markets, or Real Estate). The System's Absolute Return, Private Markets, and

Real Estate Investment Consultants are also referred to as specialty Investment Consultants. The following is a list of current professional service providers to the System.

- Absolute Return Consultant Aksia, LLC
- Commission Recapture Agent BNY Mellon Convergenx
- Custodian Bank BNY Mellon
- Securities Lending Agent Deutsche Bank
- General Investment Consultant AON Hewitt Investment Consulting, Inc.
- Private Markets Investment Consultant Portfolio Advisors, LLC
- Proxy Voting Agent Glass, Lewis & Co., LLC
- Real Estate Investment Consultant Courtland Partners, Ltd.
- IAASP Financial Control Systems, Inc.
- Private Markets, Real Estate, and External Portfolio Managers for “Roster of Investment Managers, Advisors, and Partnerships” located at the following link: www.psers.state.pa.us/investment/invest.htm

Investment Guidelines: an outline of policy or conduct expected in the management of an investment portfolio.

Investment Office Directors: includes the Managing Director of Private Markets & Real Estate, the Managing Director of Equities, the Managing Director of Fixed Income, and the Managing Director of Investment Operations.

Investment Manager: includes both Internal Portfolio Managers and External Portfolio Managers.

IOS: Investment Office Staff. IOS includes all individuals in the CIO’s department.

ISDA: International Swaps and Derivatives Association. ISDA is an association created by the private negotiated derivatives market that represents participating parties. This association helps to improve the private negotiated derivatives market by identifying and reducing Risks in the market.

iShares: ETFs issued by Barclays Global Investors.

Long-term: in the context of the System, long-term represents perpetuity.

Margin: the amount of cash or securities deposited by a customer as a percentage of the current market value of the securities held in an account.

Mark-to-Market: the valuation of a security or other instrument, transaction, or portfolio of the same to current market prices.

Market Risk: the variability of returns due to macroeconomic factors that affect all risky assets. Because it affects all risky assets, it cannot be eliminated through Diversification. Market Risk is also called Systematic Risk.

Modern Portfolio Theory (MPT): theory of trust investment and portfolio management that looks more toward the portfolio as a whole and less toward the prudence of a single investment in the portfolio. MPT assumes that investors: a. use a portfolio approach to evaluate investments; b. are Risk-averse; c. behave rationally; and, d. make unbiased forecasts.

NAREIT: acronym for the National Association of Real Estate Investment Trusts. NAREIT is a trade association that represents U.S. Real Estate Investment Trusts (REITs) and publicly traded real estate companies worldwide.

NFI: acronym for National Council of Real Estate Investment Fiduciaries Fund Index. It is a series of real estate partnership portfolios used to simulate the universe of core and value-added real estate partnerships. The indices are designed to reflect the performance of funds available to U.S. institutional investors, including in private real estate equity / equity-oriented investments, without regard to geographic location.

OFM: Office of Financial Management

Operational Risk: risks for improper monitoring of positions, bad pricing, inadequate software, system failures or human error.

Option Contract: an instrument that conveys the right to the buyer, but not the obligation, to buy or sell a deliverable instrument at a specific price.

OTC: acronym for over-the-counter. OTC securities, derivatives, and other financial instruments are traded in some context other than on a formal or centralized exchange such as the New York Stock Exchange, Chicago Mercantile Exchange, etc.

Outside Service Providers: External Portfolio Managers and Investment Consultants.

Placement Agent: any third-party person or entity hired, engaged, or retained by or acting on behalf of an External Portfolio Manager or on behalf of another Placement Agent specifically as a finder, solicitor, marketer, consultant, broker, lobbyist, or other intermediary to raise money or investments from or to obtain access to the System, directly or indirectly. Regular, full-time employees of External Portfolio Managers shall not be considered Placement Agents within the meaning of this definition, unless a fee is charged to investors for the services of such employees.

PMEIM Program: acronym for the Public Market Emerging Investment Manager Program. This is a program established by the Board to assist emerging investment management firms with positive Risk adjusted returns grow and provide a source of potential managers for the main fund. The PMEIM Program is administered by the EMPM.

Private Markets (formerly Alternative Investments): investments in limited partnerships, limited liability companies, and other entities that invest in private debt, private equity, or venture capital.

Prudent Expert Standard: the exercise of that degree of judgment, skill and care under the circumstances then prevailing which persons of prudence, discretion and intelligence who are expert in such matters exercise in the management of their own affairs not in regard to speculation, but in regard to the permanent disposition of the fund, considering the probable income to be derived therefrom as well as the probable safety of their capital.

Prudent Investor Standard: as articulated in the Board's enabling legislation, the Public School Employees' Retirement Code, "the exercise of that degree of judgment, skill and care under the circumstances then prevailing which persons of prudence, discretion and intelligence who are familiar with such matters exercise in the management of their own affairs not in regard to speculation, but in regard to the permanent disposition of the fund, considering the probable income to be derived therefrom as well as the probable safety of their capital." 24 Pa. C.S. §8521(a).

The Prudent Investor Standard requires a trustee to act prudently and with caution, discretion, loyalty, and care but does not restrict the assets in which the Board can invest. Under the Prudent Investor Standard, which recognizes Modern Portfolio Theory, the Board's investment and management decisions respecting individual assets shall be considered in the context of the portfolio as a whole and as part of an overall investment strategy, and not in isolation. No specific investment or course of action, taken alone, shall be considered inherently prudent or imprudent. This standard recognizes the trade-off between Risk and return.

PTRES: acronym for publicly traded real estate securities.

Risk: the chance that an investment's actual return or market value will be different than expected. This includes the possibility of losing some or all of the original investment. Risk is usually measured by calculating the Standard Deviation of the historical returns or average returns of a specific investment. Risk can also represent the failure of a Counterparty to fulfill its obligations.

Securities Lending Program: an investment program designed to generate incremental income from lending securities to qualified borrowers who provide collateral in exchange for the right to use the securities.

Separate Account: a privately managed account in which the System's investments are managed independent of other investors and in which assets are accounted for in a segregated investment account. Separate Accounts have investments held by the System's Custodian Bank.

Soft-dollar Arrangements: a means of paying brokerage firms for their services through commission revenue, as opposed to through normal payments (Hard-dollar fees).

SPDRs: acronym for Standard & Poor's Depository Receipts; also commonly known as "spiders." Each share of a spider contains one-tenth of the S&P 500 Index. SPDRs ETFs.

Staff: employees of the System.

Standard Deviation: a measure of the dispersion of a set of data from its mean. The more spread apart the data, the higher the standard deviation. Standard Deviation is also known as historical volatility and is used by investors as a gauge for the amount of expected volatility.

State Treasurer: the Treasurer of the Commonwealth of Pennsylvania.

Swap Contract: a contract where the parties agree to exchange the cash flows of the underlying assets in amounts and times specified in the contract.

System: The Pennsylvania Public School Employees' Retirement System.

Systematic Risk: see definition of Market Risk.

Tracking Error: a measure of relative Risk that compares a portfolio's returns to an alternative standard the investor has selected, such as a passive index. The tracking error measure incorporates the effects of all active investment decisions and is defined as the volatility or standard deviation of excess returns.

Trading Desk: represents the group of individuals employed by the Board that generally trades equity securities for investment managers managing U.S. equity portfolios for the Board but can also trade non-U.S. equity securities, futures, options, forwards, etc.

Unit Investment Trust: a registered trust in which a fixed portfolio of income-producing securities are purchased and held to maturity.

Unsystematic Risk: risk that is unique to an asset, derived from its particular characteristics. Unsystematic Risk can be eliminated in a diversified portfolio.

Variation Margin: a variable payment that is made by clearing members to their respective clearing houses based upon the price movements of the futures contracts that these members hold. Variation Margin is paid by clearing members on a daily or intraday basis in order to reduce the Counterparty credit risk exposure created by carrying Future Contracts.

Acknowledgement

We acknowledge the receipt of and agree to be bound by the Investment Policy Statement, Objectives, and Guidelines for the Pennsylvania Public School Employees' Retirement Board approved December 7, 2016 (Last Revised: March 9, 2018), the applicable portfolio specific addendum approved _____, and any amendments thereto.

Investment Manager Firm Name

**Pennsylvania Public School
Employees' Retirement System**

Portfolio Manager Signature

Chief Investment Officer

Portfolio Manager Name

Portfolio Specific Addendum

Date Accepted

Date Proposed