

ANNUAL

Investment Plan

FOR THE YEAR ENDED JUNE 30, 2018



School Employees Retirement System of Ohio
Serving the People Who Serve Our Schools®

Annual Investment Plan
For The Year Ended June 30, 2018
School Employees Retirement System of Ohio



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Executive Summary

EXECUTIVE SUMMARY

The Board's Statement of Investment Policy (SIP) requires the Chief Investment Officer to prepare and present to the Board for its approval an Annual Investment Plan (Plan). The following document outlines the recommended Plan for Fiscal Year (FY) 2018.

As in prior years, the Plan reviews the economic environment based upon consensus reports from leading sources, SERS' asset allocation target and long-term performance objective for each portfolio, last year's objectives and accomplishments, a review of the market conditions over the last year and objectives for FY2018. Implementation Guidelines for each asset class portfolio are included to provide further details on how each portfolio will be managed in the coming year relative to portfolio construction parameters and risk limits. **This Plan is meant to be a living document subject to adjustment during the year.** If circumstances change or opportunities arise during the year, items will be discussed with the Board which may lead to intra-year changes to the Plan or Strategy Statements.

REVIEW OF FY2017 OBJECTIVES AND IMPLEMENTATION

The general objectives of the Investment Department for FY2017 were as follows:

- *Continue to implement and achieve Strategic Plan objectives*

The strategic goals are value added performance, strong risk management and cost effectiveness. As of March 31, 2017 the Total Fund FYTD net return of 9.22% exceeded the benchmark by 0.81% and three and five year returns exceed the benchmark by 0.49% and 0.33%. Active risk is being monitored and managed and is currently at 0.75% for the Total Fund, well below the policy target in light of current market valuations. Costs have been reduced in equities and hedge funds (MAS).

All asset classes exceeded their respective benchmark returns in the FYTD period except US Equity and marginally in the case of Real Assets. US Equity underperformance has persisted over longer periods and reversing this trend will be a focus for FY2018.

- *On-board the new General Investment Consultant*

A half day meeting was held at SERS with Wilshire Associates to review the investment policies and reports on the Total Fund and individual asset classes on performance and structures as well as risk reports. The needs of SERS relative to Wilshire's research in individual asset classes were also discussed. SERS' Staff is engaged with Wilshire asset class specialists to review strategies and manager line-up. The Wilshire team has been very engaged in the Asset/Liability review.

- *Conduct a new asset/liability study, review role of MAS (hedge funds) and implement any asset allocation changes*

Staff began the Asset Liability review in September with discussions on expected returns and other assumptions and this was updated in January. Staff and Wilshire reviewed various options for the asset mix with the Board and conducted an educational session with the Board in April. Following this work, Staff is recommending that the Board retain the current asset allocation policy at this time.

- *Conduct a search for a new Multi-Asset Strategies Consultant as current contract expires*

The RFP search for a new MAS consultant was deferred until the conclusion of the Asset/Liability review. The current contract has been extended to December 31, 2017. A new search will commence in the fall of 2017.

FY2018 OBJECTIVES

- Strategic Objectives – the Strategic Objectives for managing the portfolio remain the same: a) value added returns through effective portfolio design and investment selection, b) risk management and c) cost effectiveness.

The focus in FY2018 will be to a) reverse the underperformance in US Equity, b) review the strategy and portfolio construction in MAS to improve risk/return characteristics and lower fees and c) continue to develop the Opportunistic portfolio.

- Consultant Engagement – continue to engage Wilshire on portfolio strategy and structure in asset classes and on Investment Committee recommendations.
- Conduct an RFP search for a new Multi-Asset Strategies consultant.
- Continue to develop and engage the Investment team.

CONCLUSION

The US economy is in the eighth year of expansion since the last recession and likely entering a late cycle phase. Values are at or above normal in most assets. Staff will be seeking to add value through investment selection decisions and allocation bets will be muted except the current underweight in fixed income and overweight in opportunistic investments.

Staff appreciates the support and guidance received from the Board in FY2017 and looks forward to working with the Board in FY2018 for another successful year.

ACKNOWLEDGEMENTS

SERS is very fortunate to have an experienced and deep Investment Staff. The following individuals contributed to this report.

- Economic Outlook – Farouki Majeed and Hai Yen Le
- Global Equities – Lisa Michalowski and Alex Durbin
- Global Private Equity – Steve Price and Phil Sisson
- Multi Asset Strategies – Judi Masri and Jason Naber
- Global Fixed Income – Judi Masri and Jason Naber
- Global Real Assets – Nancy Turner and Phil Roblee
- Cash Equivalents – Judi Masri
- Opportunistic and Tactical – Farouki Majeed, Phil Roblee, Phil Sisson and Steve Price
- Overlay Program – Farouki Majeed, Hai Yen Le, Nancy Turner and Alex Durbin
- Investment Risk Management and Analytics – Hai Yen Le
- Investment Operations – Terri Martin and Katie Swank

We would appreciate the opportunity to review the Annual Investment Plan with you at the June 2017 Board meeting. If you have any questions or comments before then, please call.

Respectfully submitted,



Farouki A. Majeed
Chief Investment Officer

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Economic Outlook

ECONOMIC OUTLOOK

This outlook section summarizes forecasts from several respected sources to help set economic expectations for FY2018.

International Monetary Fund (IMF)

Economic conditions are divergent across the globe. Europe and Japan are in a monetary easing phase to shore up growth and low inflation, while the US is on a muted tightening phase as unemployment and inflation are at or nearing Fed targets. Growth has been modest in the US and slightly improved in other developed regions. Growth in emerging market countries is improving, although the level is still lower than its pre-crisis (2008) rate. Global GDP forecasts for 2017 are expected to be slightly higher than in 2016. The large dislocation in oil prices that occurred in 2015 stabilized during 2016 as supply and demand came into balance. Bond yields are at historic lows in major markets and are expected to go up slightly in the US as the Fed continues to tighten.

Global growth in 2016 was 3.1%. Global GDP is projected to grow at 3.5% in 2017 and 3.6% in 2018, reflecting a modest increase from current levels. The US is projected to grow at 2.3% in 2017 and 2.5% in 2018, significantly higher than 1.6% in 2016. Advanced economies are expected to grow at 2.0% in both 2017 and 2018, slightly higher than 1.7% achieved in 2016. The Euro region growth is expected to be steady at 1.7% in 2016 and 1.7% in 2017 and then 1.6% in 2018. Recent quantitative easing measures by the European Central Bank and stable oil prices are expected to maintain growth. Emerging market and developing countries are projected to grow faster at 4.5% in 2017 and 4.8% in 2018, compared to 4.1% in 2016.

Annual Percent Change in Output	2016 (e)	2017(proj)	2018(proj)
World	3.1%	3.5%	3.6%
US	1.6%	2.3%	2.5%
Advanced Economies	1.7%	2.0%	2.0%
Emerging and Developing Economies	4.1%	4.5%	4.8%

Source: International Monetary Fund World Economic Outlook, April 2017

Overall, in most advanced countries economic output, while improved, still remains below potential. In the US the economy is maturing amid the markets are approaching the late cycle. The emerging market economies remain vulnerable to external shocks and contain high risks from higher corporate debt and rising non-performance loans. This combined with low inflation expectations, particularly in Europe, presents a challenging environment for investment returns.

Blue Chip Economic Indicators

The forecast for US GDP growth is 2.3% in 2017 and 2.4% in 2018.

The unemployment rate is expected to remain at 4.6% in 2017 and then decrease to 4.4% in 2018. Inflation rose in 2016 from 1.4% in January to 2.1% in December before seasonal adjustment and is projected to increase to 2.5% in 2017 and 2.3% in 2018. The US Treasury 10 year yield is forecast at 2.6% in 2017 and then increasing to 3.1% in 2018.

The consensus forecast for Eurozone real GDP growth is 1.6% in 2017 and 2018. The forecast for China is 6.4% in 2017 and 6.0% in 2018. Japan is forecasted to grow at 1.1% in 2017 and 0.8% in 2018.

The consensus forecast is for moderate economic growth with inflation and interest rates ticking up slightly from current levels.

Period	Real GDP Growth	Inflation Rate CPI	T-Bill 3-Mo.	T-Note 10-Yr.	Pre-tax Corporate Profits
2013	1.7%	1.6%	0.1%	2.4%	1.7%
2014	2.4%	1.8%	0.0%	2.5%	5.9%
2015	2.6%	1.1%	0.1%	2.2%	-3.0%
2016	1.6%	1.3%	0.3%	1.8%	n/a
2017 Forecast	2.3%	2.5%	0.9%	2.7%	5.0%
2018 Forecast	2.4%	2.3%	1.7%	3.1%	4.2%

Source: Blue Chip Economic Indicators, March 10, 2017

A comparison of forecasts is in the table below:

Comparison of Real GDP Growth Rate Forecasts			
Geographic Area	Forecaster	2017	2018
US	IMF	2.3%	2.5%
	Blue Chip	2.3%	2.4%
	NABE	2.3%	2.5%
	OECD	2.4%	2.8%
Eurozone	IMF	1.7%	1.6%
	Blue Chip	1.6%	1.6%
	OECD	1.6%	1.6%

Sources: Blue Chip Economic Indicators, March 10, 2017; International Monetary Fund World Economic Outlook Update, April 2017; National Association of Business Economics Outlook, March 2017; and Organization for Economic Co-operation and Development (OECD) Interim Economic Outlook March 2017

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Portfolio Write-Ups

GLOBAL EQUITIES

INVESTMENT STRATEGY

SERS invests in equity securities to earn a premium over government treasury bonds, which is compensation for assuming the relatively higher risk inherent in public equity securities. Global equities add diversification, liquidity and inflation protection to the SERS portfolio.

SERS' Statement of Investment Policy sets the Global Equities target allocation as follows:

	Target	Permissible Range
Global Equities	45%	35% - 55%

The allocation within Global Equities is as follows:

	Target	Permissible Range
US Equity Portfolio	50%	40% - 60%
Non-US Equity Portfolio	50%	40% - 60%

The performance objectives of the Global Equities portfolio are as follows:

1. US Equities: Exceed the return on the Russell 3000 Index, net of manager fees. The target excess return is 20 basis points over three-year rolling periods.
2. Non-US Equities: Exceed the return on the MSCI All Country World Free, excluding the United States Index (net of dividends reinvested), net of manager fees. The target excess return is 50 basis points over three-year rolling periods.

REVIEW OF FY2017 OBJECTIVES AND IMPLEMENTATION

FY2017 Annual Investment Plan objectives and related activities are as follows:

- *Monitor the risk and return characteristics of the Global Equity Portfolio to ensure compliance with the portfolio's Implementation Guidelines.*

Risk and return characteristics of the Global Equity Portfolio were generally compliant with the Implementation Guidelines over the year. As of December 31, 2016, the allocation to Global Equities was 44.9% split between the US and Non-US at 22.5% and 22.4%, respectively. Active risk for the US portfolio stayed within the permissible range although it was closer to the lower band with an average of 1.1% for the year. The Non-US portfolio fell outside of its targeted range of 2% - 4% as it stayed fairly constant at 1.1% over the year, due in part to the large passive exposure.

- *Monitor the changes made to the investment structure within the Global Equity Portfolio to confirm alignment with SERS investment philosophy. Ensure that FY2016 modifications are meeting expectations and that assets are optimally allocated within appropriate risk tolerance and return expectations.*

While the Global Equity Portfolio has underperformed its custom benchmark half way through the fiscal year, performance was mixed between the two sub-portfolios. Although the changes made in FY2016 to the US portfolio resulted in a more risk-reduced, balanced portfolio, as expected, performance mid-way through FY2017 has fallen short relative to its benchmarks. The first two quarters post-rebalance were positive and paralleled expectations but the risk-on environment in the 2Q FY2017 proved far too challenging given the risk reduction undertaken during the 2016 restructure and though absolute returns were quite strong, they fell short relative to the benchmark. Conversely, changes made to the Non-US portfolio in FY2016 were accretive in that funding an additional emerging market (EM) strategy added value to the portfolio since its initial funding.

- *Monitor the Global Equity Portfolio to ensure that country exposure, management mix, capitalization weight, and style orientation is appropriate and make recommendations as necessary.*

Nearly \$1.2 billion has been transitioned within the Global Equity Portfolio during the first three quarters of FY2017. Proceeds from redemptions were used to neutralize exposures stylistically, geographically and within capitalization ranges. A US small cap value manager was added to the portfolio which helped mitigate a style imbalance by reducing the value underweight. In addition, Staff initiated a search via RFP to evaluate US multi-factor strategies and assess the potential effects such strategies may have on the current portfolio. Staff plans to have a prepared recommendation to the Investment Committee by fiscal year end.

- *Implement changes to the Global Equity Portfolio that result from the Board's FY2017 Asset Allocation review.*

There have been no approved changes to the FY 2017 allocation to date, however, Staff is prepared to implement any modifications required in the global equity portfolio

MARKET REVIEW AND OUTLOOK

Cumulative Periods through March 31, 2017	Annualized				
	FYTD	1 Year	3 Year	5 Year	10 Year
Russell - 3000 Index	15.04%	18.07%	9.76%	13.19%	7.54%
Russell - 3000 Growth Index	15.35%	16.27%	10.90%	13.22%	9.04%
Russell - 3000 Value Index	14.73%	19.97%	8.58%	13.08%	5.94%
Russell - 1000 Index	14.52%	17.43%	9.99%	13.26%	7.58%
Russell - 2000 Index	21.60%	26.22%	7.22%	12.35%	7.12%
MSCI - AC World Index (\$Net)	13.91%	15.04%	5.07%	8.37%	4.00%
MSCI - AC World Ex-USA Index (\$Net)	13.87%	13.13%	0.56%	4.36%	1.35%
MSCI - World Ex USA Index (\$Net)	13.12%	11.93%	0.35%	5.38%	1.13%
MSCI - Emerging Markets Index (\$Net)	16.44%	17.21%	1.17%	0.80%	2.72%

Source: Wilshire Compass

Fiscal years begin July 1 and end on June 30

Global equity markets delivered solid returns in 2016. The broad market, as measured by the MSCI All Country World Index (net dividends), was up 7.9% for the calendar year. While performance was mixed between quarters, particularly in non-US markets, the strong returns delivered by global equity markets were largely driven by the consistently positive performance of the domestic market. Emerging economies rebounded over the year after a long stagnation. After posting (14.9%) in 2015, the MSCI Emerging Market Index ended 2016 at a stellar 11.2% return.

Given the economic environment at the beginning of the year, 2016 was very positive for the broad US equity market as it marked the eighth consecutive year the Russell 3000 Index (SERS' Policy Benchmark for the US Equity Portfolio) posted positive returns. Absent first quarter 2016, when small capitalization stocks were down 1.5%, every quarter ended in positive territory regardless of size or style (using Russell broad market indices as proxies). Small capitalization stocks, boosted by a second half rally, were up 21.3% for the year while larger companies returned 12.1%. Though yield and stability prevailed the first half of the year, improvement in global economic activity in the second half set stage for a risk-on environment that triggered a rotation out of defensive and into pro-cyclical sectors. While all sectors delivered positive returns for the year, dispersion was fairly wide ranging from 29.8% (Materials) to 3.5% (Health Care).

Performance was fairly mixed in international markets in 2016. Developed markets faced headwinds over the first half of the year as political uncertainty and anemic economic forecasts negatively impacted investor sentiment. A strong third quarter, assisted by a falling dollar, provided a much needed boost to the MSCI World ex-USA Index (net, USD), which ended the year with a 2.8% return. Emerging market equities underwent a noteworthy revitalization in 2016, stimulated by the economic and financial

stabilization in China and a dovish Federal Reserve, but it was the recovery in commodity prices that had the most significant influence. Despite a volatile 4th quarter when the Index was down 4.2%, the MSCI Emerging Markets Index ended calendar year 2016 at an impressive 11.2%.

Driven by the revitalization of economic growth, global equity markets were optimistic starting out the New Year and both broad domestic and international markets generated remarkably solid returns in the first quarter. Though improvement in the economic outlook has been encouraging, there is no shortage of global macro events creating uncertainty and it remains unclear whether the recent optimism and positive momentum is sustainable. Asset prices in the US, already elevated from low rates and vast liquidity, were driven even higher as markets quickly priced in potential upside from the new Administration's promise of tax reform, deregulation and infrastructure spending. In Europe, stimulative monetary policy and a weak euro have provided the foundation for its nascent recovery and geopolitical risks are high in light of major elections that will be held in several core Eurozone countries this year. Unpredictability surrounding political moves both in the US and abroad are likely to have major economic and financial effects on the global economy. Until much of this uncertainty is discharged, prospects for volatility are high and markets will likely be choppy through much of the year.

FY2018 OBJECTIVES

Staff will focus on the following objectives during FY2018:

- Monitor the risk and return characteristics of the Global Equity Portfolio to ensure compliance with the portfolio's Implementation Guidelines.
- Monitor the investment structure within the Global Equity Portfolio to confirm alignment with SERS investment philosophy. Ensure that FY2017 modifications are meeting expectations and that assets are optimally allocated within appropriate risk tolerance and return expectations.
- Monitor the Global Equity Portfolio to ensure that country exposure, management mix, capitalization weight and style orientation is appropriate and make recommendations as necessary.
- Address underperformance in US Equity.

GLOBAL PRIVATE EQUITY

INVESTMENT STRATEGY

SERS invests in private equity to provide risk adjusted returns in excess of those provided by publicly-traded equities.

SERS' Statement of Investment Policy sets the Private Equity target allocation as follows:

	Target	Permissible Range
Global Private Equity	10%	5% – 15%

The performance objective for private equity is to provide returns in excess of the Burgiss All Private Equity Benchmark.

REVIEW OF FY2017 OBJECTIVES AND IMPLEMENTATION

The FY2017 Annual Investment Plan objectives and related activities are as follows:

- *Increase and maintain the private equity portfolio near its asset allocation target – 10% of the Total Fund subject to identifying opportunities that meet SERS investment criteria.*

Staff has reviewed approximately 100 potential private equity opportunities resulting in six commitments to date totaling \$200 million. The market value is approximately \$1.3 billion as of April 10, 2017, or 9.5% of the Total Fund.

- *Review the private equity portfolio strategy and structure and develop a plan to improve risk and return characteristics of the portfolio, achieve fee reductions and optimize manager counts as appropriate.*

To date the Investment Committee has approved six private equity commitments that are diversified by sector, strategy, geographic focus and investment size. In addition, the average management fee of these new commitments is 1.4% compared to the industry average of 2.0%. All commitments were to existing managers which will maintain the portfolio's manager count at 26 through the end of fiscal year 2016. Staff believes the addition of these six new commitments to the portfolio will improve the risk and return characteristics of the portfolio over the long-term. In addition, staff chose not to pursue additional investments with two current managers that have yet to generate performance that meets SERS' expectations.

- *Actively seek co-investment opportunities where appropriate with current SERS private equity general partners who meet co-investment criteria, as outlined in the private equity co-investment guidelines.*

Staff was proactive throughout the fiscal year in communicating to general partners SERS' interest in co-investment. As a result staff reviewed several co-investment opportunities with existing general partners that met SERS' co-investment criteria. After careful review, due diligence and consideration, it was determined that one opportunity would improve both the risk and return characteristics of the portfolio. Following funding in October 2016, there are now two active co-investments in the SERS private equity portfolio. Staff is currently reviewing a second co-investment opportunity and anticipates making a formal decision prior to the end of the fiscal year.

- *Research and identify new managers who offer compelling opportunities and return expectations that may replace current managers who no longer meet SERS investment criteria.*

Throughout the fiscal year staff reviewed approximately 100 potential opportunities and met with several potential new managers. To date the potential new managers reviewed have not met SERS' investment criteria and return expectations.

PORTFOLIO COMPOSITION

	Commitments as of March 31, 2017	Target Range
Buyout	77%	55 – 95%
Venture Capital	5%	0% 15%
Special Situations	18%	10 - 35%
Domestic	75%	55 – 85%
International	25%	15 – 45%

CURRENT MARKET CONDITIONS AND OUTLOOK

2016 felt very similar to the past several years in the private equity markets. The industry continued to be characterized by higher valuations for investment opportunities, a large appetite for private equity from limited partners, robust fund raising environment and hefty cash flow as distributions outpaced capital calls for the sixth straight year. The main difference between 2015 and 2016 in the private equity markets was the modest decrease in exit activity. Although still one of the strongest periods for exits over the last 20 years, exits slowed from more than 1,600 company exits totaling more than \$400 billion in 2015 to just over 1,000 company exits totaling close to \$330 billion in 2016. The steady flow of distributions returning capital to limited partners resulted in another solid year for fundraising as investors searched for opportunities to redeploy capital. A total of 830 private equity funds raised \$347 billion in 2016 driving the level of dry powder, capital available for investments, up to \$820 billion. Although 2016 was again a great year to be a seller, asset valuations continued to rise which in turn increased purchase multiples on private equity investment targets. However, the combination of the solid exit activity and fundraising figures mentioned above resulted in a steady level of investment activity across the asset class with private equity firms completing 3,900 purchases for \$319 billion. The level of investment activity at increased purchase valuations underscores the importance of identifying and backing high quality private equity managers that remain disciplined in their process, due diligence and selection criteria throughout investment cycles.

Nonetheless, as illustrated in the below table private equity continues to generate solid performance over all periods.

Performance for Periods Ended March 31, 2017				
Fund Type	1-Year	3-Years	5-Years	10-Years
SERS Private Equity	11.73%	15.35%	15.87%	11.22%
Burgiss Benchmark	8.93%	8.96%	11.71%	8.93%

Source: Burgiss All Private Equity Index

Similar to last year, the outlook for private equity in 2017 is less clear. The industry may be influenced by a wide range of factors including increased valuations, central bank policy changes in the U.S., global trade slowing and corporate margins nearing their peak. Although it is too early to tell what impact these issues may have on the private equity market, in general it is expected that fundraising and exit activity will both level off a bit in 2017. Additionally, as was mentioned earlier, the recent strength of the private equity market has resulted in increased price expectations for sellers. As a result, private equity firms are currently paying more to acquire new portfolio companies. However, private equity firms with finely tuned strategies and repeatable value-creation models will prosper. Top quartile private equity managers find ways to overcome problems, generate returns for their limited partners and earn the capability to raise additional funds. With this in mind the outlook for the SERS private equity portfolio is favorable. Current market conditions reflect positively on the style of investing employed by the general partners that make up the core of the SERS private equity portfolio. Quality

investments can be identified in the current market; however, finding these companies requires patience, discipline and the ability to fully understand the operations of the target company. Additionally, value can be created in these companies through hands-on, proactive and experienced management teams. SERS' private equity portfolio is comprised primarily of general partners who have demonstrated their ability to identify, create value and exit companies in all market environments.

FY2018 OBJECTIVES

Staff will focus on the following objectives during FY2018:

- Maintain the private equity portfolio near its asset allocation target – 10% of the Total Fund subject to identifying opportunities that meet SERS' investment criteria.
- Review the private equity portfolio strategy and structure and develop a plan to improve risk and return characteristics of the portfolio, achieve fee reductions and optimize manager counts as appropriate.
- Actively seek co-investment opportunities where appropriate with current SERS' private equity general partners who meet co-investment criteria, as outlined in the private equity co-investment guidelines.
- Research and identify new managers who offer compelling opportunities and return expectations that may replace current managers who no longer meet SERS' investment criteria.

MULTI-ASSET STRATEGIES

INVESTMENT STRATEGY

The role of the Multi-Asset Strategies portfolio (MAS) is to generate consistent returns with managed volatility and beta to global equities, resulting in risk diversification and downside protection to the Total Fund.

SERS' Statement of Investment Policy sets the Multi-Assets Strategies target allocation as follows:

	Target	Permissible Range
Multi-Asset Strategies	10%	5% – 15%

The long-term performance objective for MAS is the three month US Treasury Bill plus 4.5% net of fees. The long-term volatility target for MAS is to be less than 50% of global equity volatility measured over a three year period. The correlation of MAS returns to global equity returns should be 0.75 or less and the beta of MAS to global equity should be 0.30 or less.

The performance benchmark for the MAS portfolio is the HFRI Fund of Funds Composite Index plus 1.0% annually, calculated on a time-weighted basis.

REVIEW OF FY2017 OBJECTIVES AND IMPLEMENTATION

The FY2017 Annual Investment Plan objectives and related activities are as follows:

- *Perform a search for a hedge fund consultant, as our current consultant's contract, Aksia, expires on December 31, 2016.*

The current hedge fund consultant contract has been extended until December 31, 2017, to allow for the asset allocation study to be finalized in Q2 2017. The search will now be conducted in H2 2017.

- *Evaluate liquid alternative hedge fund strategies as an alternative way of accessing the most liquid hedge fund strategies.*

During the course of FY2017, Staff has met and continues to meet with managers offering liquid alternative hedge fund strategies as a way to survey the breadth of offerings in this area. Staff will continue to evaluate the universe of managers in to FY2018 and potentially add a manager if it fits with the portfolio's current strategy and allocation size.

- *Review the portfolio's current strategy and allocation.*

Staff and the consultants have been reviewing different strategies for the portfolio. The different options considered are lower equity/credit beta and correlation portfolios, flexible liquidity funds that allow the fund to allocate to more opportunistic strategies over time and exposure to liquid alternative hedge fund strategies to lower portfolio fees.

- *Monitor the MAS portfolio ensuring the appropriate risk, return and characteristics. If needed, make allocation adjustments, including new fundings or terminations, among managers and sectors that improve risk-adjusted returns and manage costs.*

Staff performs on-going analysis of the risk and return characteristics of the portfolio. Staff is actively making adjustments to the portfolio to address outsized positions and sectors. Event Driven performance has led performance in FY2017 and Staff has placed redemptions to reduce its size in the portfolio. Staff terminated one manager in December 2016 due to poor performance. Staff is also evaluating new uncorrelated strategies that serve to diversify portfolio risk.

Staff engaged each MAS manager in a discussion about aligning fees with performance. Several managers came back to SERS with myriad proposals to align fees by locking up capital for one to three years, which will allow SERS to continue to lower portfolio management and incentive fees.

CURRENT MARKET CONDITIONS AND OUTLOOK

Fiscal year to date performance for the HFRI Fund of Funds Composite Index as of March 31, 2017, is 5.64%. HFRI sector index performance for the same period is as follows: Event Driven, 10.45%; Equity Long/Short, 10.01%; Relative Value, 7.19% and Macro, (1.82%).

To date, event driven strategies have led returns in fiscal year 2017 as credit and equity markets have provided a positive backdrop. Restructurings in the energy sector and the pro-growth and de-regulation policies prioritized by the new administration also began to impact US markets. Equity long/short strategies have also been strong with directional, fundamental value and healthcare strategies contributing the biggest gains. Relative value strategies have steadily been adding value benefiting from long/short credit, capital structure/fixed income arbitrage strategies and quantitative strategies appear to have stabilized as risk factor volatility has decreased. Finally, macro strategies were mixed with themes like Brexit, the developed markets rate sell-off in the fall, long USD and the post-US election move higher in equities adding and detracting from returns.

The market environment going forward is characterized by expectations of higher volatility and price/cross-asset dispersion driven by the transition from monetary to fiscal policy, the pace of rate hikes in the US, upcoming elections in Europe and geo-political tensions in Asia and the Middle East. Given this outlook, global macro managers are well suited to capitalize on this potential regime shift as the strategy's liquidity profile provides flexibility to react to volatility around these events. High equity valuations and tight credit spreads in the US also warrant a reduction in higher equity and credit beta strategies like some long-biased equity long/short and event driven managers, but favoring low net stock pickers, market neutral strategies and long/short credit. Less correlated and diversifying strategies like relative value and multi-strategy should also help to lower the market directionality of the portfolio and benefit from cross-asset dispersion.

FY2018 OBJECTIVES

Staff will focus on the following objectives in FY2018:

- Perform a search for a hedge fund consultant in H2 2017, as our current consultant's contract expires on December 31, 2017.
- Determine if additional multi-strategy funds are suitable for the MAS strategy and if so, perform a manager search.
- Monitor the MAS portfolio ensuring the appropriate risk, return and characteristics. Improve risk-adjusted returns and fee efficiency by making allocation adjustments, including new strategies or terminations, between managers and sectors. .

GLOBAL FIXED INCOME

INVESTMENT STRATEGY

SERS invests in fixed income assets for the primary purpose of risk diversification and decreasing the overall risk of the investment plan. Fixed income assets may include sovereign debt securities, global corporates, securitized securities, private placements, convertibles, derivatives and currency.

SERS' Statement of Investment Policy sets the Fixed Income target allocation as follows:

	Target	Permissible Range
Global Fixed Income	19%	12% – 26%

The performance objective for the fixed income portfolio is to exceed the Bloomberg Barclays Capital US Aggregate Bond Index, net of manager fees, by 40 basis points over rolling three year periods.

REVIEW OF FY2017 OBJECTIVES AND IMPLEMENTATION

The FY2017 Annual Investment Plan objectives and related activities are as follows:

- *Complete the US government fixed income search.*

CS McKee was funded a total of \$100 million in cash and securities during June and July 2016. Inception-to-date performance began August 1, 2016.

- *Implement any FY2017 asset allocation changes, if necessary.*

Allocation changes will be implemented, if necessary, after the new asset allocation plan is approved.

- *Realign managers within the Fixed Income portfolio according to the new Implementation Guidelines with the aim of reducing equity risk and portfolio volatility in fixed income. If needed, complete a new manager search that further reduces equity risk and portfolio volatility.*

Several changes were implemented during the fiscal year to comply with the new Implementation Guidelines as follows:

1. CS McKee's US government mandate initial funding was completed in July 2016.
 2. Dodge & Cox was reclassified from the core to core plus composite effective July 1, 2016.
 3. A new core fixed income search was conducted, issuing an RFP in July 2016. Loomis Core Disciplined Alpha was approved by the Investment Committee in October and the mandate was funded in December 2016.
 4. Aberdeen Asset Management's core plus mandate was terminated to fund the new Loomis Core account.
- *Monitor the fixed income portfolio ensuring the appropriate risk, return and characteristics given that spreads are widening, tracking error has been increasing and future expected returns will be low.*

The fixed income portfolio outperformed its benchmark by 176 basis points this fiscal year through February 2017. The portfolio also outperformed its benchmark for one, three, five and ten years for the period ending February 2017. Portfolio outperformance is primarily due to corporate and emerging market debt spread compression. After spread widening during the first couple months of 2016, most fixed income spread sectors experienced tightening during the remainder of the calendar year. Performance was also enhanced by a short duration stance as interest rates rose during FY2017 through March.

Three-year rolling tracking error remained stable at about 1.4% during the fiscal year. Such low tracking error is mainly being driven by the lack of market volatility. Staff also attempts to reduce portfolio risk via manager and strategy diversification.

- *Make any necessary guideline or mandate adjustments to manager agreements.*

One core plus manager Investment Manager Agreement was fully renegotiated during the year.

CURRENT MARKET CONDITIONS AND OUTLOOK

The Bloomberg Barclays Capital US Aggregate Bond Index returned (1.74%) for FY2017 through March. US Treasuries was the worst performing sector posting a (3.46%) return through March 2017 as interest rates began to rise. The benchmark 10-year US Treasury yield increased from 1.47% in July 2016 to 2.39% as of March 31, 2017. Residential mortgages returned (0.92%) from July 2016 through March 2017. High yield credit was the best performing sector returning 10.30%, while Investment grade corporates recorded a (0.26%) return. Finally, emerging market debt local currency posted a 1.87% return for FY2017 through March.

The Fed has raised rates two times during FY2017 with two 25 basis point increases in December and March increasing current rates to 0.75% - 1.00%. Due to continued labor market strength and expected growth policies by the new Trump administration, the Fed may raise rates a minimum of two more times in 2017. With the market also expecting rates to rise, performance is expected to be negative in most fixed income sectors. Only those sectors with enough income to offset rising rates will post positive absolute returns, assuming spreads do not widen. All fixed income sectors are trading through their ten-year historical averages, so it will be difficult for investment managers to add value via credit selection, but smart duration tactics could add value. Emerging markets may have turned the corner with a better energy picture, but rising US rates may be an emerging market currency headwind.

FY2018 OBJECTIVES

Staff will focus on the following objectives in FY2018:

- Monitor the fixed income portfolio ensuring the appropriate risk, return and characteristics given that spreads are at ten year historical tight, tracking error has been low and future expected returns are low.
- Tactically manage core and core plus allocations to enhance risk and return.
- Evaluate the current fixed income portfolio, in conjunction with Wilshire. Staff wants to ensure the portfolio is following its implementation guidelines, confirm strategy diversification, discuss manager allocation and review manager universe evaluations with Wilshire. If needed, complete a new manager search to better align the portfolio with implementation guidelines.
- Make any necessary guideline or mandate adjustments to manager agreements.

GLOBAL REAL ASSETS

INVESTMENT STRATEGY

The role of SERS' global real assets portfolio is to provide a stable income return from tangible assets, to be a partial inflation hedge over the long term and to provide low correlation to equities.

SERS' Statement of Investment Policy sets the Global Real Assets target allocation as follows:

	Target	Permissible Range
Global Real Assets	15%	10% – 20%

The performance objective for global real assets is to produce net of fee returns in excess of the NCREIF Property Index ("NPI"), one quarter in arrears, over a market cycle, with the income component of the return comprising a significant portion of the total return.

REVIEW OF FY2017 OBJECTIVES AND IMPLEMENTATION

The FY2017 Annual Investment Plan objectives and related activities are as follows:

- *As legacy non-core real estate funds liquidate and distributions are received, maintain the 15% asset allocation to Real Assets in accordance with the Statement of Investment Policy and asset class implementation guidelines.*

As anticipated, total distributions exceeded total contributions by approximately \$40 million during 2016 but Real Assets did maintain its 15% allocation during the fiscal year due to increases in value and capital funded from commitments made in prior years. Unfunded commitments to Real Assets are \$225 million. Allocations within the Real Assets portfolio to core strategies, non-core strategies and REITs were within the guidelines at 80%, 17% and 3% respectively.

- *Continue to improve the risk return characteristics of the global real assets portfolio, reduce fees, and realign manager line-up as needed.*

Activities during the fiscal year to improve the risk return characteristics of Real Assets included real estate redemptions, currency hedges and further fee reductions. Approximately \$60 million was redeemed from both private and public real estate managers during the fiscal year. These redemptions have been used to fund and commit to infrastructure managers. Over the medium term, infrastructure has a slightly higher return objective than real estate. Also during the fiscal year, SERS largest global infrastructure manager placed a currency hedge on all non-US holdings, significantly reducing the currency risk in the Real Assets portfolio. Finally, fees for Real Assets continue to decline, ending 2016 at 98 basis points. In 2012, fees were 140 basis points for the Real Assets portfolio, which then consisted only of real estate, predominately non-core real estate.

- *Research other asset types that meet the objectives of the global real assets portfolio.*

SERS explored timber, farmland and liquid real assets to determine whether their inclusion in the portfolio could be favorable. Nothing definitive has yet resulted from the research.

CURRENT MARKET CONDITIONS AND OUTLOOK

After seven consecutive years of outstanding returns for commercial and multi-family properties, real estate returns are showing signs of "returning to normal" (long term average) levels. SERS' Real Asset portfolio returned 9.07% net of fees in 2016 versus an NPI return of 9.22% gross of fees. This compares to a three-year annualized return of 11.58% net of fees for SERS versus 11.31% gross of fees for NPI as of December 31, 2016.

Market fundamentals in most real estate sectors remain strong, while reduced transaction volumes indicate that capital market activity has abated in all but a few key markets. Fundraising by private real estate managers fell by 24% in the last year. Industrial is the most favored real estate sector, driven

primarily by fulfillment and warehousing demand. Investor appetite for multi-family has subsided, except in select urban subsectors. After a multi-year run as a top real estate sector, office now is near the bottom. From 2015 to 2016 office portfolio sales, which are a bell weather for institutional interest, fell 45%. The retail sector continues to suffer, as seemingly endless headlines herald the closing of major retail stores around the country.

The outlook for real assets for the remainder of 2017 is positive, particularly for infrastructure, but single-digit returns are likely. Transaction activity for commercial real estate continues to decline. Return expectations for real assets over the next year range from 7-9% gross of fees.

FY2018 OBJECTIVES

Staff will focus on the following objectives in FY2018:

- Explore benchmark alternatives for the Real Assets portfolio. NCREIF's ODCE index has become the most common institutional benchmark for commercial real estate.
- Improve risk-return characteristics of the Real Assets portfolio in terms of manager line-up and weights as well as the allocation between real estate and infrastructure.
- Explore new real asset opportunities (infrastructure, natural resources, etc.) and recommend new asset types as warranted.

CASH EQUIVALENTS

INVESTMENT STRATEGY

SERS invests in cash equivalents for the purpose of earning market returns on cash held for benefits and expenses and to provide short-term cash needed to fund other asset classes. Cash equivalents are fixed income assets with maturities of less than 270 days and may include US government, asset-backed, corporate and high quality money market-type securities.

SERS' Statement of Investment Policy sets the cash equivalent target allocation as follows:

	Target	Permissible Range
Cash Equivalents	1%	0% – 5%

The performance objective for cash equivalents is to exceed the return on 30-day US Treasury Bills.

REVIEW OF FY2017 OBJECTIVES AND IMPLEMENTATION

The FY2017 Annual Investment Plan objectives and related activities are as follows:

- *Research and monitor commercial paper credits and money market funds.*

Staff utilizes Fitch Ratings and Bloomberg to stay current on commercial paper credits and the short-term market. Fitch provides updated credit and industry analysis. Bloomberg provides market news and issuer updates.

- *Evaluate opportunities to improve the cash management system and maintain liquidity requirements.*

Fidelity's institutional money market fund continued to provide SERS the best yield at the highest quality Staff could find for cash investments. During FY2017, Staff worked with both Fidelity and Huntington National Bank to transfer short-term investments from a money market fund that was deemed "retail" by new government guidelines to an institutional prime fund. Due to the same government regulations, Fidelity only offers daily contributions and redemptions within their government money markets, so Staff tracks government and prime fund balances, keeping a minimal balance in the lower-yielding government fund. Staff projects a three-month operating cash forecast to manage cash balances and to plan redemptions in conjunction with SERS' asset allocation guidelines.

CURRENT MARKET CONDITIONS AND OUTLOOK

The Federal Reserve (Fed) only raised interest rates one time in 2016 with a 25 basis point increase in December 2016 to 0.50 – 0.75%. This December increase was followed by another 25 basis point increase in March 2017 to 0.75% - 1.00%. Due to continued labor market strength and expected growth policies by the new Trump administration, the Fed may raise rates a minimum of two more times in 2017. US Treasury yields started to rise before the December 2016 rate increase with the US Treasury ten-year climbing 82 basis points alone during the fourth quarter from 1.62% to 2.44% before falling down to 2.39% as of March 31, 2017.

FY2018 OBJECTIVES

Staff will focus on the following objectives in FY2018:

- Research and monitor commercial paper credits and money market funds.
- Evaluate opportunities to improve the cash management system and maintain liquidity requirements.

OPPORTUNISTIC AND TACTICAL INVESTMENTS

INVESTMENT STRATEGY

SERS invests in opportunistic investments for the purpose of earning returns above the Total Fund Policy Benchmark return for investments that do not fit within the existing asset classes. The investments are defined as tactical or non-traditional investment opportunities. Such investments may involve capitalizing on short-term market dislocations or other unique situations or innovative strategies including tactical allocation.

SERS' Statement of Investment Policy sets the Opportunistic investments target allocation as follows:

	Target	Permissible Range
Opportunistic Investments	0%	0% – 5%

The performance objective for opportunistic investments is to exceed the return of the Total Fund Policy Benchmark.

REVIEW OF FY2017 OBJECTIVES AND IMPLEMENTATION

- *Identify possible opportunistic investments for the Fund that would exceed Total Fund return objective. If attractive strategies are found, implement the investments.*

SERS has made two investments to date, totaling committed capital of \$110 million. The new funds include a Global direct lending fund and a U.S.-focused direct lending fund.

- *Monitor the opportunistic portfolio, considering the portfolio's return and risk objectives.*

As of March 31, 2017 the portfolio consists of 11 investments with a total net asset value of \$327 million. Unfunded commitments are approximately \$202 million. The portfolio's yield has increased to nearly 4% as the portfolio matures.

CURRENT MARKET CONDITIONS AND OUTLOOK

The opportunistic portfolio has made investments in funds that seek to take advantage of market dislocations or don't fit within the risk and return objectives of other asset classes. Several themes have arisen in the portfolio including financial deleveraging, distressed assets, structured credit, financial restructuring, private credit, energy and peripheral European market opportunities.

Global GDP growth has accelerated in recent months and is expected to remain positive over the next year. Risk assets have performed well recently and the outlook continues to be bullish as long as the economy grows at a reasonably robust pace.

Oil prices have been very volatile over the past 12 months, as crude prices fell into the mid-\$20s per barrel in February 2016 before rallying past \$50 per barrel by the end of the calendar year. Prices have stabilized in Q1 2017 in the \$50 range, which has been positive for energy companies. As a result, SERS' energy investments have performed well this fiscal year after underperforming in FY 2016.

The outlook for Europe is uncertain as a number of contradictory themes play out over the course of the year. On the one hand, key economic indicators show that a recovery is underway as GDP growth has accelerated in recent periods. In addition the unemployment rate has decreased from nearly 12% in 2014 to 9.8% by the end of 2016. However, politics and the rise of populism are likely to remain a significant factor over the coming year. Elections in Germany and France, as well as the ongoing Brexit negotiations could negatively impact European markets. As a result, Staff will continue to monitor the European exposure within the Opportunistic portfolio.

The investment landscape for direct lending (private lending) in the U.S. remains attractive, driven by the self-reinforcing influences of bank regulatory pressure and capital markets volatility. Positive attributes of direct lending include seniority in the capital structure, interest rate protection and stable cash yield.

FY2018 OBJECTIVES

Staff will focus on the following objectives in FY2018:

- Search for possible opportunistic investments for the Fund that would exceed the Total Fund return objective. This will be accomplished through the evaluation of markets, strategies and specific funds that offer compelling risk-adjusted returns. Investments that pass initial screening will undergo detailed due diligence prior to staff recommendation.
- Monitor the existing portfolio and make changes as necessary to improve the risk and return objectives of the portfolio.

OVERLAY PROGRAM

INVESTMENT STRATEGY

SERS invests in overlay strategies that trade derivatives of the Total Fund's underlying asset exposures and currency exchange rates to enhance Total Fund portfolio's efficiency. The overlay program includes tactical rebalancing and active currency strategies.

The tactical rebalancing strategy aims to add value to the Total Fund performance through active allocations (long/short) across stocks and bonds by exploiting short term macro market dislocations while keeping the Total Fund asset allocation within the range allowable by the Investment Policy. The active currency strategies aim to add value and risk diversification to the Total Fund by utilizing short term inefficiency at the foreign exchange markets and low correlation of the strategies to the major asset classes such as US equity and fixed income and manage currency risk.

The program is fully tactical; exposures to any overlay strategies in this program are not required by the Strategic Investment Policy.

The overlay program is targeted to add 20 to 40 bps of return and 20 to 40 bps of risk to the Total Fund's performance on a three to five year horizon. Tracking errors of the tactical rebalancing strategy and the currency program are expected in the ranges of 5 to 15 bps and 2 to 4%, respectively.

FY2017 ACTIVITIES:

- Finished the onboarding process of the currency mandate hired in the FY 2016 search
- Launched another active currency search and completed it with hiring two additional strategies
- Developed a diversified, risk controlled active currency portfolio
- Monitoring the tactical rebalancing strategy

FY2018 OBJECTIVES

Staff will focus on the following objectives in FY2018:

Actively monitor the overlay program to improve the program's risk and return characteristics

INVESTMENT RISK MANAGEMENT AND ANALYTICS

Investment Risk Management and Analytics is responsible for provision and communication of diligent, thorough, timely and forward-looking investment risk analytics and other investment analytics to the Board and Investment Staff.

REVIEW OF FY2017 OBJECTIVES AND IMPLEMENTATION:

The FY2017 Annual Investment Plan objectives and related activities are as follows:

- *Provide risk forecast and analyses of the Total Fund and asset classes of the Fund.*

Staff utilized the risk system to generate risk analyses of the Total Fund and asset classes. The risk analyses based on SERS' investment holdings provide forecast volatility of returns of portfolios. The analyses also provide portfolio risk decomposition by holdings as well as by factors.

- *Continue to report risk of the Total Fund to the Board on a quarterly basis.*

Staff reported volatility of the Total Fund's returns, providing risk decomposition not only by asset classes but also by major market risk factor groups such as equity, pure private equity, fixed income private real estate and currency.

Staff reported forecast tracking error of the Total Fund, providing analyses upon how much active allocation to each asset class in the Fund and active selection of each asset class portfolio contributed to the volatility of the excess returns of the Total Fund. Over the calendar year 2016, the forecast tracking error was in the range of 67 bps to 111 bps. The risk contribution from asset allocation deviation had been minimum with an average a 2 bps reduction of the tracking error of the Fund.

- *Communicate asset class portfolio's risk with asset class investment officer(s) and discuss any potential changes of the portfolio structure on a quarterly basis.*

Staff discussed risk profile of asset class portfolios with each asset class team. The discussion was focused on i) trend and level of forecast risks, ii) portfolio's risk structure in terms of manager line-up and factor tilts and iii) portfolio's sensitivity to market movements. The discussion assisted the asset class team to manage their portfolio fairly risk balanced and minimize unintended risk bets.

- *Provide return attribution analysis of Total Fund and asset classes of the Fund to the Investment Strategy Team.*

Staff reported monthly return attribution analysis of the Total Fund, analyzing effects of active weight and alpha generation of each asset class. The analyses were presented to the Investment Strategy Team.

Staff also delivers attribution reports of each asset class portfolio analyzing contribution of each account within an asset class to the Investment Strategy Team.

- *Perform other portfolio and market analyses and research as needed.*

Staff conducted analyses of overlapped holdings and active shares of the public equity managers as well as the US Equity and Non-US Equity portfolios. Staff also conducted portfolio and market analyses as needed or upon requests.

FY2018 OBJECTIVES:

Staff will focus on the following objectives in FY2018:

- Provide risk forecast and analyses of the Total Fund and asset class portfolios.

- Continue to report risk of the Total Fund to the Board on a quarterly basis.
- Communicate asset class portfolio's risk with asset class investment officer(s) and discuss any potential changes of the portfolio structure on a quarterly basis.
- Provide return attribution analysis of Total Fund and asset classes of the Fund to the Investment Strategy Team.
- Provide return attribution analysis of Total Fund and asset classes of the Fund to the Investment Strategy Team.
- Perform other portfolio and market analyses and research as needed.

INVESTMENT OPERATIONS

The Investment Operations area is responsible for managing administrative activities for the Investment department, assist the CIO and staff of investment officers and provide reports and information to Staff and the Board. The objectives for FY2018 will remain consistent with those from FY2017 as these three broad categories reflect the primary duties of Investment Operations.

REVIEW OF FY2017 OBJECTIVES AND IMPLEMENTATION

The FY2017 Annual Investment Plan objectives and related activities are as follows:

- *Coordinate, assist, and participate in organizational initiatives including Policies, Procedures and Practices; Fiduciary Audit; fiscal budget; Subject Matter Experts (SMEs); and Corporate Emergency Preparedness Project (CEPP).*

Investment Operations assisted with revisions to the Investment Department Policies, Procedures and Practices and coordinated with the Internal Auditor to compile and provide information in response to the Fiduciary Audit. Staff prepared and analyzed the fiscal budget for executive approval as well as participated in and provided feedback in relation to SME and CEPP activities.

- *Perform Secretarial duties and attend meetings for the Investment Committee, Strategy Team and Board meetings including establishing meeting dates and agendas, organizing and distributing documents to team members, producing reports and taking minutes.*

Operations attended all Investment Committee, Strategy Team and Board meetings. Agendas and documents were prepared and distributed and minutes were taken and distributed in a timely manner. Staff assisted with processing documents associated with hiring, terminating and redeeming of managers.

- *Assist with projects for the CIO and Investment officers including onboarding of the General Investment Consultant, updating the Statement of Investment Policy as needed, revising the Annual Investment Plan, coordinating the search for a new Hedge Fund Consultant and new managers as needed, and aiding with special projects for Staff.*

Operations worked with staff to ensure a smooth transition to onboard the new General Investment Consultant, coordinated revisions and produced the FY2017 Annual Investment Plan, updated the annual OASBO report, assisted with new manager searches throughout the fiscal year and participated in the system-wide Records Management Project. The search for a new Hedge Fund consultant was postponed until FY2018.

FY2018 OBJECTIVES:

Staff will focus on the following objectives in FY2018:

- Coordinate, assist and participate in organizational initiatives including Policies, Procedures and Practices; fiscal budget; Subject Matter Experts (SMEs); and Corporate Emergency Preparedness Project (CEPP).
- Perform Secretarial duties and attend meetings for the Investment Committee, Strategy Team and Board meetings including establishing meeting dates and agendas, organizing and distributing documents to team members, producing reports and taking minutes.
- Assist with projects for the CIO and Investment officers including updating the Statement of Investment Policy as needed, revising the Annual Investment Plan, coordinating the search for a new Hedge Fund Consultant and new managers as needed and aiding with special projects for Staff.



**Implementation
Guidelines**

Global Equity Implementation Guidelines

I. ROLE

The role of Global Equities is to earn the equity risk premium over US Treasury bonds by investing in common stock of publicly-listed companies.

II. ASSET ALLOCATION

	Target	Range	
		Minimum	Maximum
Global Equity	45%	35%	55%
US Equity (USE)	22.5%	17.5%	27.5%
Non-US Equity (NUSE)	22.5%	17.5%	27.5%

III. BENCHMARK:

The Global Equity benchmark is a composite benchmark comprised of:

US Equity Portfolio	50%	Russell 3000 Index
Non-US Equity Portfolio	50%	MSCI All Country World ex-US Index (\$net)

IV. PERFORMANCE OBJECTIVE

The annualized return objective, net of management fees, is as follows:

	Excess Return Target (over 3-year rolling periods)
US Equity Portfolio	20 basis points over USE benchmark
Non-US Equity Portfolio	50 basis points over Non-USE benchmark

V. PORTFOLIO DESIGN AND CONSTRUCTION GOALS:

The USE and NUSE portfolios are constructed using a multi-manager line-up and a combination of active and passive strategies to deliver risk adjusted performance relative to their respective benchmarks. Portfolio design will consider risk/return characteristics, manager count and investment management fees.

VI. PERMISSIBLE INVESTMENTS

Security Type	US Equity Portfolio	Non-US Equity Portfolio
Common Stock	Y	Y
Stock Treated as Common Stock	Y	Y
Preferred Stock	Y	Y
Convertible Rights	Y	Y
Warrants	Y	Y
Depository Receipts	Y	Y
REITS	Y	Y
Rule 144a Issues	Y	Y
Private Placement	Y	Y
IPOs	Y	Y
Commingled Funds	Y	Y
Exchange Traded Funds	Y	Y
Futures	N	Y
Options	N	Y
Currency Forwards	N	Y
Currency Futures	N	Y
Currency Options	N	Y
Country Funds	N	Y

VII. RISK MANAGEMENT

	Active Risk Target
US Equity Portfolio	Tracking Error of 1.5% with a range of 1% to 2%
Non-US Equity Portfolio	Tracking Error of 2.5% within a range of 2% to 4%

US Equity Implementation Guidelines			
	Investment Benchmark	Target Allocation	Permissible Range
US Equity Allocation	Russell 3000 Index	22.50%	17.5% - 27.5%
Portfolio Structure			
Capitalization			
Large Cap Equity	Russell 1000 Index	Neutral to BM	+/- 15%
Large Cap Active	Manager Specific	40%	30% - 50%
Large Cap Passive	Russell 1000 Index	60%	50% - 70%
Small Cap Equity	Russell 2000 Index	Neutral to BM	+/- 10%
Small Cap Active	Manager Specific	100%	n/a
Style			
Growth	Manager Specific	Neutral to BM	+/- 10%
Value	Manager Specific	Neutral to BM	+/- 10%
Portfolio Risk/Return Characteristics			
Total Expected Excess Return	Russell 3000 Index	0.20%	
Total Expected Tracking Error	Russell 3000 Index	1.50%	1% - 2%

Factors such as currency, sector and country limits are manager specific and outlined in each manager's Investment Guidelines. Aggregate portfolio characteristics such as P/E, B/P, yield, size, etc., shall be within a reasonable range of the US equity benchmark.

Non-US Equity Implementation Guidelines			
	Investment Benchmark	Target Allocation	Permissible Range
Non-US Equity Allocation	MSCI All Country World ex-U.S. Index (\$net)	22.50%	17.5% - 27.5%
Broad Market Exposure			
Developed Markets Active	Manager Specific	60%	50% - 70%
Developed Markets Passive	MSCI World ex U.S. Index (\$net)	40%	30% - 50%
Emerging Markets Active	MSCI Emerging Markets Index (\$net)	100%	+/- 10%
Portfolio Structure			
Capitalization			
Large Cap Equity	Manager Specific	BM Weight	+/- 15%
Small to Mid Cap Equity	Manager Specific	BM Weight	+/- 15%
Small Cap Equity	Manager Specific	BM Weight	+/- 15%
Micro Cap Equity	Manager Specific	BM Weight	+/- 5%
Style			
Growth	Manager Specific	Neutral to BM	+/- 15%
Value	Manager Specific	Neutral to BM	+/- 15%
Portfolio Risk/Return Characteristics			
Total Expected Excess Return	MSCI All Country World ex-U.S. Index (\$net)	0.50%	
Total Expected Tracking Error	MSCI All Country World ex-U.S. Index (\$net)	2.50%	2% -4%

Factors such as currency, sector and country limits are manager specific and are outlined in each manager's Investment Guidelines. Aggregate portfolio characteristics such as P/E, B/P, yield, size, etc., shall be within a reasonable range of the Non-US equity benchmark.

Global Private Equity Implementation Guidelines

I. ROLE

SERS invests in private equity to provide returns in excess of those provided by publicly-traded equities to compensate for private equity's liquidity and concentration risk.

II. ASSET ALLOCATION

The private equity target asset allocation is established with periodic asset allocation studies. The most recent asset allocation study authorized a 10% allocation target to private equity with a range of 5-15%.

III. BENCHMARK

Private equity performance is benchmarked to the Burgiss All Private Equity benchmark.

IV. PERFORMANCE OBJECTIVE

The performance objective for private equity is to provide net returns in excess of the SERS Global Equity portfolio over time periods five years and longer.

V. PORTFOLIO DESIGN AND CONSTRUCTION

Capital allocation among the various market segments is a critical driver for the long-term success of the private equity portfolio. Capital allocation risk is controlled in a portfolio structure incorporating long-term sub assets target allocations.

Long-term sub-asset target exposure is detailed below:

	Target	Range	
		Minimum	Maximum
Buyout			
Small/Middle	60%	50%	70%
Large/Mega	15%	5%	25%
Total Buyout	75%	55%	95%
Venture Capital	0%	0%	10%
Special Situations	25%	5%	35%
Total	100%		
Domestic	75%	55%	85%
International	25%	15%	45%
Total	100%		
Primary Commitments	100%	80%	100%
Fund of Funds	0%	0%	15%
Co-Investments	0%	0%	10%
Total	100%		

The portfolio is tilted toward buyout investments and does not have a target allocation to venture capital due to higher risk and manager selection issues. Within buyouts the preference is for small and middle market managers with a significant value creation approach and away from larger firms with a financial engineering approach.

VI. PERMISSIBLE INVESTMENTS

Investment Structure

Limited partnership Interests	Y
Discretionary Managers investing in Private Equity Partnerships	Y
Co-Investments	Y
Separate Accounts	Y

Investment Type

Buyouts	Y
Venture Capital	Y
Special Situations (secondary interests, distressed debt or equity, mezzanine, co-investments, energy, etc.)	Y

Buyout

Net Expected Return 10-15%, Moderate Risk

Capital is typically invested in more established companies, those further along the business life cycle having relatively predictable cash flows and the ability to raise capital along the entire capital structure, including secured and unsecured debt. Buyouts are targeted to represent 75% of the private equity portfolio.

Venture Capital

Net Expected Return: 15-25%, High Risk

Venture capital equity is targeted at companies in the earliest phases of a business life cycle. Companies may be classified as seed, early, middle and late stage and are characterized by their inability to access public equity and other forms of capital such as secured and unsecured debt. These companies have uncertain revenues and a need for cash to build their businesses and are subject to high failure rates. Venture capital is targeted to represent 0% of the portfolio.

Special Situations

Net Expected Return: 10-20%, Moderate Risk

Many private equity opportunities have characteristics of buyout or venture capital but have enough differences as to require separate classification. These investments include energy, distressed debt, mezzanine, opportunity and secondary funds. Special situations is targeted to represent 25% of the portfolio.

Co-Investments

Net Expected Return: 15-20%, Moderate Risk

Co-Investments are direct investment in a single asset of a multi-asset fund, made alongside the Fund's investment in the asset. Typically co-investments are offered on more attractive economic terms and shorter time frames than those of the Fund. Co-Investments are targeted to represent up to 10% of the portfolio.

VII. RISK MANAGEMENT

The primary risk management tool in private equity is industry diversification as well as extensive due diligence of prospective investments. Monitoring is managed through a combination of quantitative and qualitative constraints. The following sections identify the most significant risks with private equity investments and the method of control.

Liquidity

Private equity investments are illiquid and typically have expected holding periods of 10-12 years. Investments are typically held until maturity and selling prior to maturity typically results in a discount to fair market value. Liquidity risk is managed by minimizing the possibility of forced sales that may arise from exceeding maximum exposure limits or lowering asset allocation exposure limits.

Geography

Geographic risk is controlled through a long-term international target exposure of 25% by market value.

Vintage Risk

Vintage reflects the year of first capital draw and vintage risk refers to the variability of private equity commitments over time. The investment pacing model controls the short and long-term private equity commitment amounts and attempts to minimize vintage risk while achieving targeted exposure. Commitments will be dependent on the availability of investments that meet SERS' investment criteria and will not be driven by the target investment pace in any given year.

Manager Risk

Manager risk consists of two elements, managing the exposure within a partnership and controlling the number of general partners in our private equity portfolio. Partnership exposure is controlled by limiting the commitment size within a partnership and the maximum commitment to a partnership will be 25% of a fund's size. The 25% limit does not apply to funds committed to a discretionary manager or a separate account. The maximum market value exposure to a single manager is targeted to be less than 20% of the portfolio. The optimum number of general partners in the portfolio varies with time.

Firm Risk

Firm risk is the exposure to a private equity general partner and is controlled by limiting the maximum commitment to funds operated by a general partner and its affiliates.

Currency

The private equity program accepts the currency risks consistent with the geographic constraints. Private equity partnerships generally do not hedge currency risk and the private equity program will not implement currency hedges.

Industry

Typically, private equity partnerships are permitted to invest in a wide variety of industries. Industry risk is controlled primarily through appropriate diversification across classes and subclasses.

Leverage

General partners invest capital from private equity partnerships throughout the capital structure of firms. The capital markets control the maximum leverage available to the general partners and limited partners control leverage exposure through partnership selection and portfolio construction.

Multi-Asset Strategies Implementation Guidelines

I. ROLE

The role of the Multi-Asset Strategies portfolio (MAS) is to generate consistent returns with managed volatility and beta to global equities, resulting in risk diversification and downside protection to the Total Fund.

II. ASSET ALLOCATION

The MAS asset allocation is established with periodic asset allocation studies. The most recent asset allocation approved by the Board authorized a 10% allocation target with a permissible range of 5% to 15%.

III. BENCHMARK

MAS performance is benchmarked to the HFRI Fund of Funds Composite Index plus 1.0% annually and will be calculated on a time-weighted basis.

IV. PERFORMANCE AND VOLATILITY OBJECTIVE

The long-term performance objective for MAS is the three month Citi US Treasury Bill plus 4.5% net of fees. The long-term volatility target for MAS is to be less than 50% of global equity volatility measured over a three year period. The correlation of the MAS returns to global equity returns should be 0.75 or less and the beta of the MAS to global equity returns should be 0.30 or less.

V. PORTFOLIO DESIGN AND CONSTRUCTION

MAS will be classified as having Directional and Non-Directional strategies. Exposures ranges are shown below:

Sector	Three-Year Equity Beta*	Allocation Range
Non-Directional	< 0.25	50% - 80%
Directional	> 0.25	20% - 50%

*In cases where the Fund's three year equity beta is close to 0.25, Staff may incorporate additional relevant factors/information in categorizing a fund as directional or non-directional.

In order to be properly diversified, the following broad sector ranges have been established to allow the portfolio to be optimally positioned based on the forward looking return environment. Staff intends to manage the exposures by capitalizing on opportunities and market environments in which each sector has the greatest opportunity set.

Sector	Range
Long/Short Equity	10 – 25%
Event Driven	20 – 35%
Relative Value	20 – 35%
Tactical Trading	10 – 25%
Multi-Strategy	10 – 25%

VI. INVESTMENT STYLES

Investment strategies may utilize the following investment styles:

Long/Short Equity: strategies that involve buying some equity securities and short-selling of others. Several investment philosophies and styles may be executed this way. Portfolios are primarily constructed in this way to reduce volatility and market exposure.

Event Driven: strategies that most commonly seek to profit from corporate action, political change or technical market disruptions. Event Driven investors will take long or short positions in a wide range of securities on the basis of their views on events such as mergers, takeovers, liquidations, bankruptcies, legislative changes, spin-offs, special dividends, liquidations, index reconstitutions and others. .

Relative Value: strategies that attempt to extract value from the normalization of mispriced relationships between instruments. These strategies include fixed income, convertibles, quantitative equities and volatility RV.

Tactical Trading: strategies which make directional trades within fixed income, equities, commodities, and/or currencies. The strategy group is typically split between discretionary (fundamental, technical-based) and systematic (model-based) managers.

Multi-Strategy: investing in more than one strategy, often utilizing long-only investments with lower fees. The goal is typically to diversify risk and/or allow the manager to increase allocations to strategies it believes have a better opportunity set, focus on the allocation of risk rather than the allocation of capital or access common liquid alternative strategies.

VII. PERMISSIBLE INVESTMENTS

Permissible investments in the MAS portfolio include:

- a. Active investment strategies that apply non-traditional portfolio management techniques including, but not restricted to shorting securities, leverage, arbitrage and creating synthetic exposures using financial instruments.
- b. Active investment strategies that focus on the allocation of risk (usually defined as volatility) rather than the allocation of capital.
- c. Active investment strategies that tactically allocate across asset classes and/or geographical regions depending upon the relative attractiveness of the respective asset classes.
- d. All types of investible securities or derivative instruments in equities, fixed income, commodities, foreign exchange and insurance-linked products.

VIII. RISK MANAGEMENT

Leverage

Leverage will be prudent for the given strategy and consistent with the fund's offering memorandum. Managers are not required to maintain a constant leverage ratio and may adjust the fund's leverage according to their views on the risks and returns of their portfolio or for various other reasons. No leverage will be permitted at the MAS portfolio level.

Liquidity

Liquidity will be monitored regularly to ensure the portfolio can be reduced or rebalanced within a reasonable timeframe. As with some funds where lower fees may be obtained in exchange for a longer lockup of capital, Staff may elect longer lockups for funds if overall portfolio liquidity is sufficient. Funds in the MAS portfolio may have soft, hard or rolling lockup periods of three years or less, although most lockup periods will be one year or less. Most funds in the MAS portfolio will have monthly or quarterly redemptions, but such periodic liquidity is not required.

Operational/Business Risk

The operational or business risks of each investment will be carefully considered and evaluated. Operational considerations that may create risks include but are not limited to back-office staffing levels, service providers, pricing policies and procedures, anti- money laundering and transfer agency information, systems and technology, trading cash management, disaster recovery, regulatory, compliance, personnel backgrounds, financial statements, fund documents and firm policies and procedures.

Limits

- a. No more than 7% of the MAS net asset value will be allocated to a single fund at time of purchase and no single fund will exceed 10% of MAS net asset value at any time.
- b. No more than 15% of the MAS net asset value will be allocated to multiple funds of a single manager.

Global Fixed Income Implementation Guidelines

I. ROLE

The primary role of diversified fixed income is to reduce the overall risk of the investment plan. Fixed income securities should provide stable income returns through yield oriented assets. Fixed income provides risk reduction through lower correlations to the investment program.

II. ASSET ALLOCATION

The global fixed income allocation is established with periodic asset allocation studies. The most recent asset allocation study authorized a 19% market value exposure to global fixed income with a range of 12-26%.

III. BENCHMARK

Global fixed income performance is benchmarked to the Bloomberg Barclays Capital US Aggregate Bond Index for the asset class.

IV. PERFORMANCE OBJECTIVE

The annualized return objective for the global fixed income portfolio is 40 basis points net of fees above the benchmark over rolling three year periods broken into the following strategies:

Strategy	Expected Return	Tracking Error	Benchmark
Core	20 basis points	1 - 2%	Bloomberg Barclays Capital US Aggregate Bond Index
Core Plus	60 basis points	2 - 4%	Bloomberg Barclays Capital US Aggregate Bond Index
Dedicated Emerging Market Debt	100 basis points	1.5 – 2.5%	50% JPM GBI-EM Global Diversified; 50% JPM EMBI Global Diversified Index
Total Portfolio	40 basis points	2-3%	Bloomberg Barclays Capital US Aggregate Bond Index

V. PORTFOLIO DESIGN AND CONSTRUCTION

SERS seeks to obtain broad fixed income market exposure to gain diversification while receiving income. The portfolio is 100% externally managed in active strategies, in broad mandates of core, core plus and emerging market debt strategies. Core mandates invest primarily in benchmark type securities. Core sector weightings can deviate from the benchmark, depending on external manager's market views and strategies. Core plus mandates allow investments in all sectors of the Barclays Capital US Aggregate Bond Index along with additional allocations to the extended sectors of high yield, Non-US debt and emerging market debt. Dedicated emerging market debt invests in hard US dollar and foreign currency denominated emerging market sovereign debt along with allocating to emerging corporates.

Below are the current sector exposure limits and assigned allocation benchmarks:

	Range		Benchmark
	Minimum	Maximum	
Core	30%	70%	Bloomberg Barclays Capital US Aggregate
Core Plus	30%	70%	Bloomberg Barclays Capital US Aggregate
Dedicated Emerging Market Debt	0%	5%	50% JPM GBI-EM Global Diversified; 50% JPM EMBI Global Diversified Index

VI. PERMISSIBLE INVESTMENTS

Security Type	Core	Core Plus	Dedicated Emerging Market Debt
Governments:			
US Treasuries and Agencies	Y	Y	Y
Sovereigns in US \$	Y	Y	Y
Sovereigns in local currency	N	Y	Y
Corporates:			
US Corporates	Y	Y	N
Non-US Corporates in US \$	Y	Y	Y
Non-US Corporates in local currency	N	Y	Y
High Yield	N	Y	Y
Bank Loans	N	Y	Y
Mortgages	Y	Y	N
Municipals	Y	Y	N
Other:			
144 (A)s	Y	Y	Y
Commingled Funds	Y	Y	Y
Currency	N	Y	Y
Derivatives	N	Y	Y
Money Markets	Y	Y	Y
Repurchase Agreements	Y	Y	Y

VII. RISK MANAGEMENT

The following risk factors are controlled through limits specified in each manager's Investment Manager Agreement (IMA) and Investment Guidelines. Duration, sector and credit risk are reviewed on a total portfolio basis quarterly by SERS:

Interest Rate

Controlled by duration band limits around the benchmark duration.

Yield Curve Risk

Controlled by duration band limits around the benchmark duration.

Sector Risk

Riskier sectors like high yield, Non-US, non-agency mortgages and CMBS are controlled around set limits with each individual manager. Portfolios are allowed 25% maximum exposure to any one industry.

Credit Risk

Portfolios must maintain a minimum exposure to investment grade securities. In addition, each manager portfolio has an established average weighted credit quality that must be maintained at all times.

Currency Risk

Currency is not hedged from the overall portfolio level. Managers who demonstrate skill are allowed to purchase Non-US securities on a hedged or unhedged basis or take direct currency positions without owning securities.

Issuer Risk

Issuer limits are specified in each IMA investment guidelines.

Liquidity Risk

Accounts have a maximum 144(A) limit without registration rights.

Active Risk

Normal tracking error is expected to be 2-3% over any rolling three year time horizon. During periods of increased volatility, tracking error should not exceed 4% over any rolling three year time horizon.

Global Real Assets Implementation Guidelines

I. ROLE

The role of SERS' global real asset portfolio is to provide a stable income return from tangible assets, to be a partial inflation hedge over the long term and to provide low correlation to equities.

II. ASSET ALLOCATION

SERS' Statement of Investment Policy sets the global real asset target allocation at 15%, with a permissible range of 10% to 20%.

III. BENCHMARK

The global real assets benchmark is the NCREIF Property Index (NPI), one quarter in arrears.

IV. PERFORMANCE OBJECTIVE

The performance objective for global real assets is to produce net of fee returns in excess of the benchmark over a market cycle, with the income component of the return comprising a significant portion of the total return.

V. PORTFOLIO DESIGN AND CONSTRUCTION

The global real assets portfolio is designed to achieve the performance objective, to manage risks and to focus on the overall role of global real assets within the Total Fund. SERS' Global Real Assets Implementation Guidelines set the private market, public market and asset type exposures for global real assets, as shown in the table below.

Strategy	Target	Range	
		Minimum	Maximum
Private Core Real Estate	55%	35%	75%
Private Non-Core Real Estate	15%	5%	25%
Private Infrastructure	20%	10%	30%
Public Market Real Assets	10%	0%	20%

Core real estate investments include substantially leased or fully operational institutional quality properties or projects located in developed markets. The revenue streams from core real estate are generally long duration and comprise a majority of the asset's total return. Core real estate strategies are typically implemented through open-end commingled funds.

Non-core real estate investments include value-added and opportunistic strategies in which properties or projects are re-leased, re-developed, or newly constructed, particularly in developing or transitional markets. This strategy has a higher return expectation, but also comes with greater risk due to the uncertainty of cash flows. Non-core real estate strategies are typically implemented through closed-end commingled funds.

Private infrastructure typically involves the movement of goods, people, water and energy (definition provided by JPMorgan Asset Management). The sectors include but are not limited to transportation, communication, social and regulated assets. Infrastructure revenue streams are typically long-dated, contractual and inflation linked. Private infrastructure is implemented through both open and closed end commingled funds.

Public market real assets are securities of companies whose primary source of revenue comes from the operation of tangible assets, including, but not limited to, real estate (REITs), listed infrastructure, natural resources and master limited partnerships. While more liquid in nature, public market real assets exhibit greater volatility than privately-held real assets. Master limited partnerships, or MLPs, are publicly-traded limited partnerships that derive most of the partnership's cash flows from infrastructure and natural resource assets. The advantage of an MLP is that it combines the tax benefits of a limited partnership with the liquidity of a publicly-traded company.

VI. PERMISSIBLE INVESTMENTS

The underlying investments included in the global real asset portfolio generally are tangible assets, have long term investment horizons or holding periods, produce attractive income returns and cash yields and provide a partial inflation hedge over the long term. Permissible investment structures and types are as follows.

Investment Structure and Type	
Limited Partnership Interests	Y
Co-Investments	Y
Separate Accounts	Y
Commingled Funds	Y
Joint Ventures	Y
Private Real Estate Equity and Debt	Y
Real Estate Investment Trusts (REITs)	Y
Private Infrastructure Equity and Debt	Y
Public Infrastructure Securities and MLPs	Y
Natural Resources and Commodities Land)	Y

VII. RISK MANAGEMENT

Qualitative constraints and quantitative measures are used to manage risk in the global real assets portfolio. The following sections identify the most significant risks with real asset investments and the method of control.

Real Estate Life Cycle Risk

Life cycle risk refers to the stage of an investment's life and generally falls into two categories, operating and non-operating. Operating investments are those that are leased or functioning to a level in which the contractual cash payments are supporting operations. Non-operating investments are those in pre-development, construction, conversion, or in a stage of major releasing. A significant portion of the private market real asset portfolio will be in operating investments in order to achieve global real asset's role.

	Operating	Non-Operating
Target Exposure	≥85%	≤15%
Current Exposure	94%	6%

Real Estate Property Type Risk

Property type risk refers to the level of exposure of the five property type categories in the private market real estate portfolio relative to the NCREIF Property Index. Property type risk will be managed through portfolio design and the use of diversified commingled funds. At least 80% of the private market real estate portfolio will be invested in the four primary property type categories including apartment, industrial, office and retail.

(as of December 31, 2016)	NCREIF Property Index	Private Market Portfolio	Range
Apartment	24%	21%	10% - 30%
Industrial	14%	23%	10% - 30%
Office	37%	30%	20% - 40%
Retail	<u>24%</u>	<u>16%</u>	<u>10% - 30%</u>
<i>Subtotal</i>	<i>99%</i>	<i>90%</i>	<i>85% - 100%</i>
Hotel/Other	<u>1%</u>	<u>10%</u>	5% - 15%
Total	100%	100%	

Real Estate Geographic Risk

Geographic risk can be broken down into two segments: US regional exposure and non-US exposure. US regional exposure refers to the level of exposure of the four US regions in the private market real estate portfolio relative to the NCREIF Property Index.

(as of December 31, 2016)	NCREIF Property Index	Private Market Portfolio	Range
West	38%	39%	20% - 50%
East	33%	31%	20% - 50%
Midwest	9%	9%	5% - 20%
South	<u>20%</u>	<u>21%</u>	10% - 30%
Total	100%	100%	

Global Real Assets Geographic Risk

Non-US exposure refers to the level of exposure of non-US investments in the total global real assets portfolio. Non-US exposure will be limited to 20% of the private market portfolio.

Liquidity Risk

Private market real asset investments are illiquid, with both holding periods and commingled fund terms ranging from 7-10 years or more. Liquidity risk will be managed through target allocations to private and public market real assets as well as through portfolio design.

Leverage Risk

Private market real asset investments typically are acquired with a combination of equity capital and mortgage financing. The amount of leverage per asset or pool of assets depends on debt availability, property type and asset life cycle. The amount of leverage and financing terms ultimately are the responsibility of SERS' external real asset managers and are governed and constrained by partnership agreements. The leverage maximum for the total private market real asset portfolio is 50% of the gross asset value of the private market real asset portfolio. Leverage risk will be managed through target allocations and portfolio design.

Currency Risk

The global real assets program does not hedge currency risk and relies upon its external managers to determine if such hedges are appropriate. Currency risk will be managed through geographic exposure limits, as shown above under geographic risks.

Valuation Risk

The valuation frequency for private market real assets is dependent upon the external managers' internal and external valuation policies, which are reviewed during the operational due diligence process.

Manager Concentration Risk

A single manager utilizing core strategies shall not constitute more than 25% of the net assets of the global real assets program. For non-core strategies, a single fund commitment shall not constitute more than 7% of the net assets of the global real assets program and a single manager with multiple fund commitments, including co-investments, shall not constitute more than 20% of the net assets of the global real assets program.

Opportunistic and Tactical Investments Guidelines

I. ROLE

The role of SERS' opportunistic portfolio is to earn a return above the Total Fund Policy Benchmark return by investing in assets and strategies that do not fit within the existing asset classes. The investments are defined as tactical or non-traditional investment opportunities.

II. ASSET ALLOCATION

SERS' Statement of Investment Policy sets the opportunistic target allocation at 0%, with a range of 0% to 5%.

III. BENCHMARK

The opportunistic benchmark is the Total Fund Policy Benchmark.

IV. PERFORMANCE OBJECTIVE

The performance objective of the opportunistic portfolio is to earn a net of fee return in excess of the Total Fund Policy Benchmark, with a meaningful component of the total return coming from current income.

V. PORTFOLIO DESIGN AND CONSTRUCTION

The opportunistic portfolio may consist of a wide variety of investment types, structures and strategies targeting cash yield as well as price appreciation. Investment strategies include separate accounts, commingled funds, ETFs, co-investments and derivatives.

VI. PERMISSIBLE INVESTMENTS

Permissible investments include, but are not limited to, common stock, preferred stock, debt securities, currencies, commodities, etc.

VII. RISK MANAGEMENT

Leverage

Leverage will be prudent for the given strategy and consistent with the fund's offering memorandum.

Liquidity

Liquidity will be monitored regularly to ensure the portfolio can be traded or rebalanced within a reasonable timeframe. Liquidity risk will be managed through target allocations to private and public market assets as well as through portfolio design.

Currency

The opportunistic portfolio does not directly hedge foreign currency risk and relies upon its external managers to determine if such hedges are appropriate.

Overlay Program Guidelines

I. ROLE

SERS invests in overlay strategies that trade derivatives of the Total Fund's underlying asset exposures and currency exchange rates to enhance Total Fund portfolio's efficiency. The overlay program includes tactical asset allocation rebalancing and active currency strategies.

The tactical rebalancing strategy aims to add value to the Total Fund performance through the allocation deviation while exploiting short term macro market dislocations. The active currency strategies aim to add value and risk diversification to the Total Fund and reduce currency risk of the Total Fund by utilizing short term inefficiency at the foreign exchange markets and low correlation of the strategies to the major asset classes such as US equity and fixed income.

II. ASSET ALLOCATION

0%

III. BENCHMARK

0%

IV. PERFORMANCE OBJECTIVE

The overlay program is expected to add 10 to 20 bps of return and 20 to 40 bps of risk to the Total Fund's performance on a three to five - year horizon.

V. PORTFOLIO DESIGN AND CONSTRUCTION

The mandates are unfunded. The overlay strategies buy (long) or sell (short) futures or forwards contracts to get exposures to desired markets in order to exploit short term inefficiency at the macro markets or currency markets.

Tactical Rebalancing strategy's net exposures, sum of long and short positions, are valued at zero on the initiating position time. Active currency strategies can go either net long or net short US dollar. Both tactical rebalancing and active currency aggregate portfolios are constructed to have no dependency on any single risk factor.

VI. PERMISSIBLE INVESTMENTS

The overlay strategies are implemented primarily through equity futures, fixed income futures, currency futures and currency forwards contracts with limited use of currency options.

VII. RISK MANAGEMENT

Exposure management:

- The tactical asset allocation program has an exposure limit of 4% of the Total Fund to each of the following assets: US fixed income, US equity and Non-US equity.
- The active currency program notional value is capped at 75% of the Non-US equity portfolio's value

Counter-party risk management:

- Futures and exchanged traded options are traded at exchanges thus having default risk only to the clearing house while having no credit risk to trade counterparties.
- Forward contacts and over-the-counter options entail default risk of the counterparties. Counterparty risk of these contracts is managed through ISDA (International Swaps and Derivatives Association) and EMIR (European Market Infrastructure Regulation) umbrella agreements with managers.

Volatility management:

- The tactical asset allocation program's tracking error range is 5 to 15 bps.
- All active currency strategies have targeted tracking error equal or less than 4%; the aggregate active currency program's tracking error is expected to be in the range of 2 to 4%.

Cash Equivalents Implementation Guidelines

I. ROLE

Short-term cash should provide liquidity for funding investment capital calls and operational expenses. Cash should be invested in conservative, low risk securities/funds to preserve capital for future expenditures and investments.

II. ASSET ALLOCATION

The cash allocation is established with periodic asset allocation studies. The most recent asset allocation study authorized a 1% exposure to cash with a range of 0-5%.

III. BENCHMARK

The short-term cash benchmark is the Citigroup 30-day Treasury Bill Index.

IV. PERFORMANCE OBJECTIVE

The annualized return objective for the short-term portfolio is five basis points net of fees over the benchmark.

V. PORTFOLIO DESIGN AND CONSTRUCTION

The cash portfolio is designed with preservation of capital in mind. The officer compares daily treasury, commercial paper and money market offerings for new purchases. The cash balance is kept as small as possible to allow for one to three months of expenditures. The average weighted maturity of the portfolio will not exceed 20 days.

Risk is constantly assessed before investment purchases are made in the portfolio. Only top tier commercial paper is purchased. Money market holdings are also reviewed on a regular basis along with choosing a top tier money market provider with a deep credit analyst team and whose short-term investments are important to the organization.

VI. PERMISSIBLE INVESTMENTS

Security Type	
U.S. Treasury Bills	Y
Commercial Paper rated A-1/P-1 or higher	Y
Money Market Funds rated at least A-1/P-1	Y
Unrated Market Funds comparable to a A-1/P-1 sister fund	Y

VII. RISK MANAGEMENT

Liquidity Risk

The weighted average maturity shall not exceed 20 days. All money market funds must provide daily liquidity.

Credit Risk

A commercial paper issuer must be on the approved credit list or approved by the Chief Investment Officer before purchasing. Market and issuer news are reviewed daily by the Senior Investment Officer – Global Fixed Income. Money market funds must regularly send a holdings report to SERS, where it is reviewed on a regular basis.

Issuer Risk

Single issuer commercial paper investments are limited to \$20 million. Related entity commercial paper investments are limited to the lower of 30% of the short-term account or \$40 million. Overnight commercial paper issuer maturities are limited to \$50 million.

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Glossary

GLOSSARY OF TERMS

Active Risk - also known as Tracking Error, describes how a portfolio's performance is different from its benchmark; and is measured by the standard deviation of the differences in returns of the actual portfolio and the benchmark portfolio.

Active Share – the Active Share of a fund represents the percent of portfolio holdings that differ from the (declared) benchmark index holdings.

Alpha – the premium an investment portfolio earns above a certain benchmark (such as the Standard & Poor's 500 Index). A positive alpha indicates the investor earned a return in excess of the index return.

Asset Allocation – broad asset classes and strategies such as equities, fixed-income securities, real assets and multi-asset strategies.

Barclays Capital US Aggregate Bond Index – a market capitalization weighted US bond index published by Barclay's Capital. Most US traded investment grade bonds are represented in the index. The Barclays Capital US Aggregate Bond Index is SERS' global fixed income policy benchmark.

Basis Point – one hundredth of one percent. For example, an addition of 40 basis points to a yield of 7.50 percent would increase the yield to 7.90 percent. Basis points are normally used when quoting yields or returns, alpha, or fees paid to investment managers.

Benchmark – a gauge in the securities market by which investment performance can be measured, such as the Standard & Poor's 500 Index.

Burgiss All Private Equity (BAPE) – BAPE is comprised of data from more than 5,000 private equity funds contributed by limited partners that are Burgiss clients and use Burgiss' web-based institutional portfolio management platform Private i. The benchmark data is sourced from Burgiss' limited partner clients and includes complete transactional and valuation history between the limited partner and their fund investments. Burgiss publishes a detailed breakdown of the dataset every quarter allowing for increased transparency.

Citigroup 30-day T-Bill Index – an index that measures the rate of return for 30-day US Treasury Bills, which are considered representative of the performance of short-term money market instruments. The Citigroup 30-day T-Bill index is SERS' policy benchmark for Cash Equivalents.

Co-investment – a direct investment in a single asset of a multi-asset Fund, made alongside the Fund's investment in the asset; typically involves more attractive terms and shorter time frames than those of the Fund.

Derivatives (Derivative Instruments) – financial instruments (securities or contracts) whose values are derived from underlying financial assets, indices or other instruments. Derivative performance is based on the performance of assets, interest rates, currency exchange rates and various domestic and foreign indices underlying the instruments. The common forms of derivatives are forward, futures, swap and options contracts.

Diversification – spreading a portfolio over many investments to avoid excessive exposure to any one source of risk.

Due Diligence – an investigation or audit of a potential or existing investment.

Equity Investment – claims held by the residual owners of a firm. May also be referred to as common stock. Investments in Real Estate and certain Private Markets classifications may also be considered equity.

Fixed Income Investment – a security issued by a borrower that obligates the issuer to make specified payments to the holder over a specific period. May also be referred to as "debt" or "bonds."

Fund – fund means a limited partnership, trust or commingled investment vehicle in which SERS invests or may invest (e.g., hedge fund, private equity fund, or real estate fund).

Futures Contract: – a form of financial derivatives. In a futures contract, a party is legally committed to buy or sell a particular asset at a predetermined price at a specified future date at a futures exchange.

Global Equities – reflects the consolidation of what had been treated by SERS as US Equity and Non-US Equity asset classes; includes equities of US and non-US origin, equities of various capitalizations (e.g., large cap, small cap, mid cap, etc.), equities from developed, emerging and frontier markets, growth and value equities and passive and active strategies. Investments in Global Equities strategies are made in accordance with investment allocation guidelines established, and amended as necessary, by mutual agreement between the Chief Investment Officer and the Investment Consultant.

Guidelines – refers to an Investment Manager’s “Investment Guidelines,” established between the Investment Manager and Staff as part in an investment management agreement. Guidelines may be general or specific.

Hedge Fund – a private investment partnership or an offshore investment corporation in which the general partner has made a substantial personal investment and whose offering memorandum allows for the Fund to take both long and short positions, using leverage and derivatives and invest in many markets. Hedge funds often use strategies involving program trading, selling short, swaps and arbitrage.

HFRI Fund of Funds Composite Index – published by Hedge Fund Research, Inc., the HFRI Fund of Funds Composite Index is an equally weighted index of over 800 constituent funds of hedge funds, offshore and onshore. Funds in the index must have at least \$50 million under management or must have been trading actively for at least 12 months.

Investment Committee – a committee of qualified investment professionals from SERS’ Investment Department who possess the Ohio State Retirement System Investment Officer license and SERS’ Director of Finance, with clearly defined structure, rules and procedures for reviewing and approving investments in a timely and prudent fashion.

Investment Consultant – any consultant hired by the Board or by Staff to advise or assist with the Investment Program in accordance with the Statement of Investment Policy. Board investment consultants must be approved by the Board. Staff investment consultants shall be approved by the Executive Director.

Investment Manager – a manager or potential manager of SERS assets, both public market and private market. Includes, but is not limited to managers of equity, fixed income, private equity, real estate, hedge funds, commodities and cash.

Investment Staff – members of the investment department of SERS, including the Chief Investment Officer, State Retirement System Investment Officers (SRSIO) and other department personnel.

Leverage – in investments, this is the control of a large amount of money by a smaller amount of money, such as buying on margin. In finance, this is the relationship of debt to equity on a company’s balance sheet in the form of the debt/equity ratio.

Long-term – in the context of SERS liability and investment horizons, long-term is assumed to be 10 years.

Mandate – mandate is the macro or high level strategy employed by a manager. Examples of macro strategies would be US versus Non-US; large cap versus small cap; real estate versus private equity; etc.

Morgan Stanley Capital International – All Country World Free ex-USA Index (\$Net) – an equity index representing 44 developed and emerging countries. “Free” indicates the index reflects actual

investable opportunities for global investors by taking into account local market restrictions on share ownership by foreigners. "Net" indicates that dividends are reinvested after the deduction of withholding taxes applicable to non-resident institutional investors. The MSCI-ACWI ex-USA Index, net of dividends reinvested is SERS' policy benchmark for Non-US Equities.

Multi-Asset Strategies – active investment strategies that aim to generate absolute returns with managed volatility, using all types of investable securities (equities, bonds, commodities, currencies, derivatives, etc.). These strategies typically apply non-traditional portfolio management techniques including, but not restricted to shorting securities, leverage, arbitrage and creating synthetic exposures using financial instruments. Also, funds in this portfolio may tactically allocate across asset classes and/or geographical regions depending upon the relative attractiveness of the respective asset classes. Generally, multi-asset strategies have low to medium correlation with global equities and much lower volatility.

NCREIF Property Index (NPI) – a quarterly time series composite total rate of return measure of investment performance of a very large pool of individual commercial real estate properties acquired in the private market for investment purposes only. The NCREIF Property Index is a component of SERS' Global Real Estate Policy Benchmark.

Opportunistic Investments – refers to compelling tactical or non-traditional investment opportunities that may not fit within the existing asset classes.

Options contract - a form of financial derivatives. In an options contract, two parties (buyer and seller) agree that the buyer, who pays an option premium to the seller, has the right to exercise an option whether or not to buy or sell a particular asset at a specified price at a specified future date.

Investments – refers to compelling tactical or non-traditional investment opportunities that may be short-term or otherwise time-constrained, or may not fit within the risk/return parameters of specific asset classes.

Portfolio – a collection of investments owned, managed, or overseen by an individual or investment manager, a board or an organization. Portfolio can mean a manager account or subset thereof (e.g., Goldman Sachs Core Plus account), an asset class (e.g., US Equity), or the entire fund (e.g., SERS' Total Fund).

Rebalancing – adjusting asset class or portfolio allocations relative to their targets or ranges to adjust for actual or anticipated market movements.

Russell 3000 Index – a market-value weighted equity index published by the Frank Russell Company. The index measures the performance of the 3,000 largest US companies in terms of market capitalization. The Russell 3000 Index is SERS' Domestic Equity Policy Benchmark.

Style – style refers to an investment product, strategy or style offered by an Investment Management Firm and reflects how the assets are invested. For example, value versus growth; core versus value added; quantitative versus fundamental; etc.

Total Fund – Refers to all of SERS' investment assets.

Tracking Error – a divergence between the price behavior of a position or a portfolio and the price behavior of a benchmark.

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