Board of Trustees

WISCONSIN RETIREMENT SYSTEM

INVESTMENT POLICY

Updated

December 12, 2018

Table of Contents

I. INTRODUCTION

The State of Wisconsin Investment Board ("SWIB") is an independent state agency responsible for the management and investment of all funds entrusted to it, including assets of the Wisconsin Retirement System ("WRS"), the State Investment Fund, and the assets of various other state agencies and programs. In its role as investment manager for these funds, SWIB is held to a high standard of fiduciary duty by the Wisconsin Statutes.

SWIB was created by the Wisconsin Legislature for the sole purpose of providing professional investment management of trusts and public funds under its control pursuant to the prudent expert standard of fiduciary duty found in Section 25.15(2) of the Wisconsin Statutes. The Board of Trustees (the "Board" or "Trustees") has established the investment policy set forth herein for the WRS, pursuant to a comprehensive and ongoing evaluation of the appropriate risk and return standards for the WRS.

This Board of Trustees WRS Investment Policy ("WRS Investment Policy") is intended to assist in development of a diversified portfolio of investments, tailored to accomplish the purpose of the WRS within acceptable risk parameters. This WRS Investment Policy represents a delegation of standing authority to SWIB staff within the organization to promote efficient and cost effective operations of the two WRS trust funds. In addition to the WRS funds managed by SWIB staff, external managers are used for certain active and passive investment strategies. This document will be reviewed periodically and updated as necessary by the Board to reflect changes in SWIB's investment strategy and to reflect best industry practices for prudent investors.

Accordingly, the Trustees hereby delegate to the Executive Director/Chief Investment Officer ("ED/CIO") and the investment staff of SWIB standing authority to make prudent investments pursuant to this WRS Investment Policy and to sections 15.02(4) and 25.15(2) of the Wisconsin Statutes and section IB 2.02 of the Wisconsin Administrative Code. The ED/CIO shall identify and delegate in writing the individual professional investment staff members who have authority to manage each of the specific asset classes and internal portfolios and who have authority to direct, hire, and terminate external managers.

In addition to this WRS Investment Policy, the Trustees have also adopted the State Investment Fund and Various Funds Investment Policy and Guidelines ("SIF & VF Investment Policy") to govern the administration of the other funds that the Board manages pursuant to the Wisconsin Statutes. Further, the Trustees have delegated to SWIB's Investment Committee the establishment and maintenance of guidelines for the management of internal WRS portfolios and for external managers of WRS assets pursuant to the Investment Committee Investment Guidelines ("IC Guidelines"). Such IC Guidelines are hereby delegated to the Investment Committee or investment staff, as applicable, as part of the standing authority delegated pursuant to this WRS Investment Policy and the Investment Committee's charter approved by the Trustees.

II. WISCONSIN RETIREMENT SYSTEM

The assets of the WRS constitute a large majority of the total funds invested by SWIB. The retirement funds are invested globally in both long-term and short-term investments, across a wide range of asset types and classes. Pursuant to the Wisconsin Statutes, WRS assets are divided into two funds---a Core Retirement Investment Trust and a Variable Retirement Investment Trust. The Core Fund is a broadly diversified portfolio of stocks, bonds, non-public securities, real estate and other holdings. The Variable Fund is an equity-focused portfolio primarily invested in global stocks.

A. Core Retirement Investment Trust ("Core Fund")

The Core Fund is a pooled fund consisting of the retirement contributions made by and on behalf of participants in the WRS. Participants include state, school, and local government employees (with the exception of the City and County of Milwaukee). All participant contributions are invested in the Core Fund unless the participant has elected to contribute to the Variable Fund. (Wis. Stat. § 40.04(7))

B. Variable Retirement Investment Trust ("Variable Fund")

The Variable Fund, like the Core Fund, is a pooled fund consisting of retirement contributions made by or on behalf of the participants of the WRS. An active participant can elect to credit 50% of the total future monthly retirement contributions made by or on behalf of the participant to the Variable Fund, with the balance going to the Core Fund. The purpose of the Variable Fund is to permit participants to increase their exposure to the public equity markets beyond the allocation to public equities in the Core Fund. However, unlike the Core Fund, the Variable Fund does not pursue diversification across a variety of different asset classes and could be subject to greater volatility of earnings. (Wis. Stat. § 25.17(5))

III. STATEMENT OF PURPOSE AND INVESTMENT PHILOSOPHY

This WRS Investment Policy is intended to summarize the fundamental investment objectives, philosophies, and directives relative to the implementation and oversight of the investment of the WRS assets managed by SWIB. Key areas are elaborated upon and general investment guidelines are articulated. The WRS Investment Policy is intended to provide an outline of the common and critical components of successful administration of a large pool of public assets. Supplemental policies and guidelines pertaining to derivatives use, rebalancing assets, and portfolio-specific guidelines are set forth within the IC Guidelines maintained and approved by SWIB's Investment Committee.

A. Broad Investment Objectives

SWIB's overall objectives in managing WRS assets are:

1. To maximize long-term investment returns with a prudent level of risk to ensure that sufficient funds are available to meet pension fund obligations;
2. To seek aggregate returns in excess of the Core Fund's and Variable Fund's benchmarks over all cumulative time periods constructed with a prudent level of risk; and
3. To comply with all applicable fiduciary and legal standards.

B. Key Investment Philosophies

1. Investment returns are a function of risk; thus, losses are inevitable. The optimal SWIB strategic asset allocation policy should reflect a probability of losses that is consistent with SWIB's investment return expectations.
2. Asset classes and sub-asset classes are broadly defined to gain exposure to the entire investable opportunity set and capture the greatest depth of available investment opportunities to the extent they offer a risk-return trade-off commensurate with SWIB's return objectives and risk tolerance.
3. Through quantitative asset/liability modeling and qualitative evaluation, an appropriate strategic asset allocation mix can be selected. Application of a rebalancing regimen after allowing a predetermined amount of "drift" around targets effectively contains allocation risk and can add value by enforcing an efficient allocation at the asset class level.
4. A well-diversified asset mix in the Core Fund historically has been a favorable position for meeting long-term objectives, recognizing that strategies will not always appear to add value over shorter time frames. It is essential to hold to the investment program during difficult times, and the diversified asset mix should mitigate the impact of negative market environments.
5. Including an allocation to passive investments within major asset classes is a relatively efficient way to provide benchmark returns, adjust risk within the overall fund, provide a liquid and low cost pool of assets, and facilitate timely fund rebalancing.
6. Positive returns can be gained from active management and supplement the returns earned from the allocation to passive investments. Over the long term, active management can add value beyond market-neutral benchmarks at the asset class, sector, and security levels by exploiting market inefficiencies and their resulting valuation opportunities.
7. Risk management and performance benchmarking are integral to the entire investment process. SWIB manages and monitors risk at multiple levels. The primary risk resulting from WRS drawdowns is lower dividend annuities and higher employee and employer contributions. Fund-level absolute and relative return volatility are other key risks that affect the WRS.
8. Ex-ante (forecasted) and ex-post (actual) total fund risk, and component contributions to risk, are assessed and considered in the structuring of the investment program and monitored by SWIB staff. Performance benchmarking compares actual investment results to expected results.
9. Fund and portfolio results are most appropriately measured against investable market indices, representing neutral, or passive, market positions. Peer comparisons are fraught with difficulties due to differences in liability structure, investment style, risk preferences, and inconsistencies over time and are generally used as secondary comparisons. Results are evaluated on the basis of investment return as well as return for the level of assumed risk.

10. Cost optimization is a component of investment results, and costs are optimized through lower-cost internal management, external fee negotiations, and a focus on net performance. Maintenance of an internal team of investment professionals is an appropriate strategy to optimize costs and retain better control of the assets compared to outsourcing asset management. When SWIB does use external managers, it negotiates competitive fee arrangements that are driven by pay for performance metrics.

IV. RESPONSIBILITIES

SWIB's investment responsibilities break down into these primary areas:

- **A.** Setting the Asset Allocation and Investment Strategy
- **B.** Asset Allocation Rebalancing
- **C.** Establishing the Active Risk Target
- **D.** Risk Monitoring and Compliance; Waivers
- **E.** Investment Performance Monitoring and Benchmarking
- **F.** Cost Management and Optimization

The roles for each of SWIB's fiduciaries with respect to these responsibilities are outlined in Section V.

A. Setting the Asset Allocation and Investment Strategy

The SWIB Trustees undertake an in-depth review of the strategic asset allocation plan for the WRS every other year, including asset/liability modeling, to determine a suitable target allocation for each asset class included in the Core Fund and the Variable Fund (subject to the statutory restrictions of the Variable Fund). These reviews contemplate a long-term time horizon over which potential results are evaluated. This exercise is not an attempt to predict short-term market movements, but to better understand the long-term impacts of poor, normal, and above average market results. In the "off year" of the two-year cycle, structural asset allocation adjustments and other funding initiatives are considered. In addition to the potential future market impact, SWIB Trustees also contemplate the impact of actuarial analysis, the soundness of investment return and risk expectations, and the asset allocation policies of its peers.

The recommended asset allocation targets are approved on an annual basis in the asset allocation memorandum attached to this WRS Investment Policy as *Appendix 1*. Each year upon approval by the Board, *Appendix 1* shall be updated without amendment to this WRS Investment Policy. The recommended asset allocation targets and Trustee-approved financial leverage (for the Core Fund) constitute the policy portfolio for each of the Core Fund and Variable Fund (each the "Policy Portfolio").

Portfolios within each of the approved asset classes will be structured in a manner that attempts to effectively cover the universe represented by appropriate benchmarks and provide adequate flexibility to deviate from the benchmarks to generate active returns by taking active risk. This is accomplished through the active risk budgeting process approved by the Investment Committee for each asset class. Index funds and actively managed portfolios will be combined in a manner that attempts to accomplish desired performance objectives within acceptable risk parameters.

B. Asset Allocation Rebalancing

When a major liquid asset class (i.e., Total Public Equities, Total Public Fixed Income, or Inflation Sensitive Assets) falls outside of a rebalance range approved annually by the Board, as reflected in *Appendix 1*, as of a month end, a mandatory rebalancing will be initiated. A rebalancing task force, consisting of the ED/CIO, Managing Director of Asset and Risk Allocation (ARA), and the managing directors (or heads of) of each major asset class, will review and approve the mandatory rebalancing. In a mandatory rebalancing, an asset class in excess of its target will be adjusted to a level recommended by the ED/CIO and Managing Director of ARA so that the asset class is returned to a level within its target allocation range.

The ED/CIO and Managing Director of ARA may also from time to time initiate discretionary rebalancing pursuant to procedures described in the IC Guidelines to use or reduce active risk or to minimize asset allocation drift from the Policy Portfolio. Whenever a rebalancing is triggered (mandatory or discretionary), a plan will be developed whereby specific dollar amounts will be considered for movement based on the degree of the over/underweight, liquidity characteristics, and current market conditions.

WRS asset allocations will be reviewed at least monthly for potential rebalancing. When feasible, index funds may also be used to facilitate rebalancing to minimize opportunity and trading costs. Derivative securities may be used to implement adjustments. When active portfolios are used in a rebalance, portfolio managers will be consulted and included in the process.

C. Establishing the Active Risk Target

As part of the strategic asset allocation, the Trustees approve a fund level active risk target for the WRS. Active risk represents a measurement of the added risk of actively investing the assets rather than replicating the benchmark to achieve returns beyond market returns. The active risk target for the Core Fund is 120 bps +/- 60 bps. The active risk target for the Variable Fund is 60 bps +/- 30 bps. Guidelines for individual portfolios will be constructed so that the aggregate risk of the portfolios is within the range established for the fund level risk objective. The Investment Committee approves an active risk budget that allocates the active risk target to the Core Trust Fund's portfolios and monitors the allocation of active risk.

D. Risk Monitoring and Compliance; Waivers

Risk is a consideration and factor in the management of the WRS assets, and risk is considered throughout the investment process from asset allocation to performance evaluation. SWIB's risk management policy is detailed in Section VI.

The ARA Division will also measure soft risk parameters established by the IC Guidelines for asset classes and portfolios. Soft risk parameters refer to desired characteristics and/or risk exposures. Investment staff are permitted to deviate from soft risk parameters in pursuit of excess return. However, anything outside of the soft risk parameters will be discussed with the Investment Committee to determine whether the exposure should be maintained. All such Investment Committee discussions will be documented in the Investment Committee's meeting minutes.

Portfolio managers are responsible for the compliance of their portfolios with this WRS Investment Policy, IC Guidelines, as well as the Wisconsin Statutes and Administrative Code. SWIB's Compliance division will review portfolios and asset classes monthly for compliance with investment guidelines. Portfolios out of compliance with guidelines will be brought into compliance immediately, or a plan for doing so or a waiver will be discussed and approved by the ED/CIO pursuant to the IC Guidelines. Violations and the status of any remediation plans or waivers will be discussed at the next scheduled Enterprise Risk and Compliance Committee meeting and reported to the Investment Committee, and documented in the minutes for such meetings.

E. Investment Performance Monitoring and Benchmarking

The Trustees will review investment performance at least quarterly. Performance reviews will be conducted compared to the benchmarks approved by the Trustees. Quarterly results will be evaluated to review progress toward longer term objectives. It is understood that there are likely to be intermittent periods when portfolio performance deviates from market indexes. During such times, comparisons with specific peer groups also will be considered. A third-party performance benchmarking consultant analyzes SWIB's performance in comparison to its peers, and the Trustees shall review such analysis quarterly.

F. Cost Management and Optimization

Costs reduce investment returns. SWIB is committed to managing the WRS in a prudent and cost-efficient manner. Retaining internal investment management of a significant amount of SWIB assets is key to managing costs efficiently. External management fees are negotiated to ensure that manager interests are aligned with SWIB and that SWIB's net performance is optimized. Fees for all individual vendors and external managers are reported to Trustees for their review by SWIB management on a quarterly basis. A third-party cost benchmarking consultant is retained by SWIB management to analyze SWIB's costs in comparison to peers and the net of cost value-added given the level of risk taken.

V. ROLES AND RESPONSIBILITIES OF SWIB FIDUCIARIES

The following section provides the delineation of roles and responsibilities among SWIB's fiduciaries. Each employee of SWIB also has a definitive job description which describes all of the employee's specific job responsibilities, and the Trustees have a governance manual that outlines all responsibilities for the Trustees. This section supplements both. Below, the primary investment management responsibilities as they relate to each person's fiduciary obligations are highlighted for purposes of defining those fiduciary obligations and where the roles are distinctive and where they overlap.

Trustees

SWIB Trustees are fiduciaries of the WRS. Trustees are responsible for the overall professional investment management of the assets entrusted to them under Wisconsin state law. Trustees must manage the investment of trust assets pursuant to the prudent expert standard as set forth in Section 25.15(2) of the Wisconsin Statutes. The Trustees have the following investment responsibilities:

- Establish and approve this WRS Investment Policy
- Review and approve:
    - asset allocation for the Policy Portfolio as recommended by the Board's Asset Allocation Consultant, Investment Committee, ED/CIO, and Managing Director, ARA
    - sub-asset class allocation policy for public equities and public fixed income asset classes
    - the mandatory rebalancing trigger for major asset classes
    - the total fund absolute risk exposure through approving the asset allocation policy and active risk target
    - total fund policy-level financial leverage (as established by the asset allocation)
    - total fund active risk target and range
    - total fund, asset class and portfolio performance benchmarks, as recommended by the Board's Benchmark Committee and Benchmark Consultant
    - incentive compensation payments based on investment performance, as recommended by the Board's Compensation Committee
    - SWIB's total cost of management budget, as recommended by the Board's Audit and Finance Committee
- Delegate the establishment and approval of portfolio-specific investment guidelines to the Investment Committee through the IC Guidelines
- Through updates and reports provided at board meetings, monitor and be informed of:
    - investment performance and risk metrics of the WRS
    - investment performance against a simplified reference portfolio used to evaluate the efficacy of the Policy Portfolio's complexity and diversification
    - significant investment strategy and processes and infrastructure implemented to enable them
    - spending on investment activities

    - approved actions and recommendations arising out of Board Committees and the Investment Committee
- Approve the Investment Committee Charter

<u>Executive Director/Chief Investment Officer</u>

The ED/CIO assists the Trustees in meeting their fiduciary and statutory duties by monitoring issues and trends and making recommendations to the Trustees. The ED/CIO is also responsible for establishing investment strategy, investment priorities, achieving investment performance targets and managing the associated investment risks. In addition to the overall management of the agency and duties prescribed by statute, the ED/CIO has the following responsibilities:

- Implements the investment strategy approved by the Board
- Develops, identifies and leads strategic initiatives to enable SWIB's investment strategy
- Identifies and reports issues or risks related to the investment policy or strategy to the Board
- Leads the organization and evaluates its performance against its annual objectives
- Leads the SWIB Management Council and evaluates their performance
- Leads the investment staff and evaluates their performance
- Serves as Chairperson of the Investment Committee and sets the Investment Committee agenda
- Reports the business of the Investment Committee to the Board and presents quarterly market trends and other macroeconomic conditions
- Recommends, with the Managing Director, ARA, the WRS Policy Portfolio to the Investment Committee and the Board
- Designs and approves the implementation of the Policy Portfolio approved by the Board and by doing so sets overall investment direction, strategies and priorities for each asset class
- Determines the implementation of the Policy Portfolio set by the Board by approving the allocation between:
    - active versus passive management, and
    - internal versus external management
- Approves the portfolios established or eliminated in each internal asset class
- Reviews each investment division's strategy prior to its presentation to, and approval by, the Investment Committee
- Approves the monthly asset allocation memo which details the movement of assets across all portfolios

- Approves the implementation of mandatory and discretionary rebalancing
- Approves investment portfolio commitments at varying thresholds for private markets and funds alpha (PMFA) investments
- Develops, with the Managing Director, ARA and Managing Director (or head) of each asset class, the appropriate active risk target for each asset class and the active risk budget prior to its presentation to, and approval by, the Investment Committee
- Manages and monitors risk at both the total fund and asset class level
- Develops, recommends, and approves exposure management implementation strategies pursuant to the IC Guidelines
- Approves all internal strategies for achieving fund level financial leverage
- Monitors and manages liquidity risk and approves the implementation of internal leverage strategies
- Approves all new derivatives counterparties
- Collaborates with the Deputy Executive Director and Human Resources division regarding talent acquisition, development and retention
- Ensures the appropriate implementation of the incentive compensation program approved by the Board
- Ensures that prudent investment processes are implemented and works with the Section 25.167 CIO to monitor investment staff compliance with investment policies and guidelines
- Ensures, with the Section 25.167 CIO, that operating procedures have been developed and implemented that are intended to ensure that investment policies and guidelines are followed
- Ensures, with the Section 25.167 CIO, that investments are completely and accurately reported on all management and financial reports and that any information requested by the Board is provided on a timely basis

Management Council

The Management Council was established by the Board as an advisory council to assist the ED/CIO in leading the organization. It consists of the ED/CIO, the Deputy Executive Director/Chief Administrative Officer, the Agency Business Director, the Chief Technology & Operations Officer and a representative of the investment management staff appointed by the ED/CIO for a six-month term.

- Assists the ED/CIO in implementing SWIB’s investment strategy
- Assists the ED/CIO in developing, identifying and leading key initiatives to enable SWIB’s investment strategy
- Assists the ED/CIO in identifying and reporting issues or risks related to the investment policy or strategy to the Board

Section 25.167 CIO

The Section 25.167 CIO is an investment management staff member designated by the ED/CIO to assist with the fulfillment of certain statutory duties. The ED/CIO retains oversight of those responsibilities delegated to the Section 25.167 CIO, which include the following:

- Monitors activities of the investment staff for compliance with investment policies and guidelines
- Develops and implements operating procedures that are intended to ensure that investment policies and guidelines are followed
- Ensures that investments are completely and accurately reported on all management and financial reports and that any information requested by the Board is provided on a timely basis

Investment Committee

The Investment Committee provides oversight of SWIB's investments within the parameters established by the Board. The Investment Committee is comprised of the ED/CIO, Managing Director of ARA, the Managing Director or head of each major asset class in which SWIB invests, a Private Markets Portfolio Manager appointed by the ED/CIO, and three investment staff members appointed by the ED/CIO. The Investment Committee has the following investment responsibilities which are also outlined in its charter approved by the Board:

- Establishes and approves the IC Guidelines, which includes portfolio-level guidelines for all internally managed portfolios
- Fulfills the duties and purposes set forth in its charter approved by the Trustees
- Reviews and Approves:
  - the active risk budget, and the Net Economic Value Added, for the Core Fund and Variable Fund
  - the investment strategy for each division
  - passive external manager guidelines and waivers therefrom
  - the use of new investment instruments or initiatives, including derivatives and leverage, in all SWIB portfolios
- Reviews and Monitors:
  - implementation of active risk budget
  - soft risk parameters for all internal portfolios
  - strategies and trades in the exposure management portfolios and the over and underweights to asset and sub-asset classes
  - sources of absolute and active risk through regular review of monthly risk reports

- Reviews and Recommends to the Trustees:
    - any proposed changes to this WRS Investment Policy
    - the annual asset allocation plan and strategies and any proposed changes during the year
    - annual benchmark recommendations from Board's Benchmark Consultant
- Sets the procedures for rebalancing included in the IC Guidelines
- Delegates approval for active external managers' guidelines to the PMFA Division

<u>Managing Director, Asset and Risk Allocation (ARA)</u>

The Managing Director, ARA maintains the quantitative analysis and research that supports the policy allocation of capital and risk. The Managing Director, ARA has the following investment responsibilities:

- Recommends with the ED/CIO and the Board's Asset Allocation Consultant the WRS Policy Portfolio to the Trustees and Investment Committee
- Heads the rebalancing task force to consider and approve the implementation of mandatory and discretionary rebalancing and coordinates rebalancing and monthly cash flow activities
- Directs, in consultation with the ED/CIO, the internally managed portfolios to modify their risk profile based on changes in the capital markets and total policy risk
- Develops, recommends, and approves exposure management implementation strategies pursuant to the IC Guidelines
- Manages the passive external manager relationships
- Oversees risk monitoring for the WRS and ensures risk management measures are implemented
- Determines appropriate contingency plans and risk mitigation actions for stressed market environments or when Core Fund or Variable Fund risk levels exceed expectations
- In conjunction with the ED/CIO, monitors and manages liquidity risk and implements internal leverage strategies

<u>Managing Directors and Division Heads</u>

The primary responsibility of each managing director and division head is to develop an overall divisional strategy and assure that the portfolios within the division are successfully managed. The managing directors and division heads have the following responsibilities:

- Report quarterly to the Board regarding performance and market trends
- In collaboration with the ED/CIO, determine an efficient and achievable division strategy

- Review and approve the implementation of mandatory and discretionary rebalancing
- Implement and monitor the division's strategy, and, as applicable, approve investment recommendations for the PMFA division
- Report annually to the Investment Committee and Board regarding the division's strategy (may be delegated to Investment Managers as applicable)
- Monitor risk and performance of the division
- Assure compliance with all investment policies, guidelines and risk controls
- Manage, and evaluate performance of, employees within the division
- Manage and implement improvements to the investment analysis process for and asset management within each portfolio within each division

Investment Portfolio Managers and Managing Analysts ("Investment Managers")

The primary responsibility of each Investment Manager is to invest assets in accordance with written guidelines established by the Investment Committee and in accordance with the policies and guidelines established by the Trustees. The Investment Managers have the following responsibilities:

- Manage the portfolios in accordance with the guidelines and objectives contained within IC Guidelines
- Develop and present asset class strategy for Investment Committee approval
- Exercise full investment discretion with respect to the purchase, sale and ongoing management of assets within their respective guidelines to achieve established objectives subject to direction from the ED/CIO and Managing Director, ARA regarding appropriate risk levels
- Implement active risk budgets
- Manage and monitor drawdown levels and implement risk drawdown controls

Board Consultants with Investment Responsibilities

Asset Allocation Consultant

- Annually, conduct analysis and evaluation of SWIB's asset allocation plan and provide SWIB staff and Trustees with any recommendations for adjustments
- Every two years, present full review of asset-liability modeling process, results and recommendations for strategic asset allocation targets for the Core and Variable Trust Funds to SWIB staff and Trustees and coordinate with Wisconsin Department of Employee Trust Funds' actuaries to ascertain the liabilities of the WRS

Benchmark Consultants

- Annually, and throughout the year as necessary, review staff-recommended benchmark changes or benchmark changes resulting from updates to the asset allocation or investment strategy changes. Make a recommendation regarding any modifications or updates to any benchmarks or new provisional benchmarks to the Investment Committee and Benchmark Committee.

- Every three to five years, conduct a comprehensive benchmark review. Align benchmarks to the investment strategies and asset allocation. Consider staff-recommended benchmark changes. Make a recommendation regarding any modifications or updates to any benchmarks to the Investment Committee and Benchmark Committee.

Staff Consultants

- Pursuant to the Board Consultant Services Policy, SWIB staff hire consultants for the Private Equity, Real Estate, Hedge Fund and Beta One Portfolios. These consultants may be terminated by the Board. These consultants make recommendations in accordance with the SWIB Investment Committee WRS Investment Guidelines.
- Staff consultants provide updates to SWIB investment staff regarding developments involving SWIB's investments and provide commentary regarding the impacts of such developments.
- Staff consultants meet once a year with the Board's Strategic Planning and Corporate Governance Committee to report on their view of the applicable WRS portfolio and present relevant market commentary.

VI. TOTAL FUND INVESTMENT RISK MANAGEMENT POLICY

A. Introduction

Risk is a consideration and factor in the management of the WRS assets, and risk is considered throughout the investment process from asset allocation to performance evaluation. Risk management is integral to SWIB's investment processes and is guided by this Policy. However, risk evolves through time as markets and investment strategies change. SWIB also strives to evolve its risk monitoring to better analyze, measure, quantify, and report risks over time.

B. Risk Management Philosophy

Risk must be taken to achieve sufficient returns to meet financial obligations for the various funds under the purview of SWIB. Risk is viewed from multiple perspectives. It is most commonly viewed as the loss of capital or of not meeting objectives within the designated time frame. It is deconstructed between systematic (i.e., market) and unsystematic, or specific risk, at the total fund, asset class and portfolio levels. The sources and types of risk inherent in any strategy are evaluated and acknowledged prior to implementation. However, even with the most sophisticated risk measurement techniques, extreme events cannot easily be measured in advance. Accordingly, risk models may only provide limited predictive qualities but should provide investment professionals opportunities to test and challenge investment strategies and assumptions prior to implementation. Post implementation, investment risks are managed, measured, and monitored at all relevant levels. Benchmarking is employed to determine whether risks taken achieve expected rewards.

C. Risk Management Objectives

The primary investment risk SWIB seeks to manage is drawdowns to the Core Fund and Variable Fund that could cause reduction in participant dividends, create volatility in contributions from both employers and employees, or cause the WRS to be less then fully funded. SWIB's investment strategy is designed to take intentional risk, called active risk, and achieve investment results commensurate with the levels of risk taken. Expectations for active return earned per unit of active risk taken are set and monitored for all portfolios. A risk budgeting approach will be employed to set active risk targets for each asset class. Unintended risk due to asset allocation drift or other factors is to be minimized where feasible from an implementation and cost perspective. Risk will be managed through implementation of investment guidelines, multiple approaches to diversification, and investment risk analyses and measurement. Pursuant to SWIB's statutory fiduciary standard under Section 25.15(2)(b) SWIB shall "diversify investments to minimize the risk of large losses, unless under the circumstances it is clearly prudent not to do so." Diversification is a significant tool to manage risk.

Risks that are assessed generally will include (but are not limited to):

1. Market risk: risk of drawdowns or swings in volatility
2. Valuation risk: trending towards or reaching extremes (e.g., historically wide credit spreads), pricing integrity
3. Event risk: e.g., sovereign downgrade, Lehman bankruptcy, Asian currency crisis, etc.
4. Liquidity risk: ability to quickly raise funds to support leveraged and synthetic exposures, asset/liability mismatch
5. Counterparty risk: risk of counterparty defaulting or otherwise not meeting their obligation to SWIB
6. Operational risk: risk of failure in risk measurement/monitoring processes, systems or personnel responsible for managing and/or monitoring risk exposures

D. Risk Measurement

The ARA Division will measure investment risk using multiple metrics on both an absolute and relative basis at all relevant levels (i.e. total fund, asset class and portfolio level). In addition, downside risk metrics identified through stress testing and scenario analyses will be employed. Financial and economic analysis will also be undertaken to better understand the current and potential risks of non-public markets.

E. Risk Monitoring and Reporting

The Investment Committee will monitor investment risk to evaluate sources of risk, and changes to sources of risk, on a regular basis. In particular, regular stress testing and scenario analysis by the ARA Division enables SWIB to identify potential weaknesses, or 'tail risks', in the investment program given extreme market environments that have occurred in the past. Risk monitoring will be conducted on both an absolute and relative risk basis. Assets that cannot be readily modeled will be subject to unique review process to better ascertain the risks. Reports will be assembled and reviewed by SWIB's Investment

Committee at least quarterly and will generally include summaries of key risk exposures and risk attribution and summaries of stress test and scenario analyses results.

F. Risk Mitigation

SWIB's strategic asset allocation reflects SWIB's philosophy that market risks must be taken to ensure sufficient asset growth to meet SWIB's financial obligations. However, SWIB is cognizant of the fact that large drawdowns can significantly negatively impact funded status and future contributions. Thus, SWIB has adopted drawdown risk controls for internally managed, public markets strategies, which comprise the majority of SWIB's assets. The controls call for instituting action to adjust the risk of a portfolio if the portfolio's benchmark relative returns fall below a pre-specified downside trigger. Appropriate mitigating actions would be deployed at either the portfolio level or the Core Trust Fund Level.

G. Risk Resources

SWIB is committed to conducting periodic assessments of its analytic and personnel risk resources to ensure that SWIB maintains adequate tools and skills to sufficiently support a robust risk management framework.

VII. GENERAL INVESTMENT GUIDELINES

The following compulsory guidelines are applicable to all internally managed portfolios. Individual portfolio guidelines are included in the IC Guidelines.

1. All investment decisions are subject to all applicable federal and state statutes and administrative rules and are subject to the prudent expert fiduciary standard as set forth in Wis. Stat. § 25.15(2).
2. SWIB shall attempt to invest in organizations that adhere to prevailing local and national laws and generally accepted standards of conduct including the respect of human rights (Wis. Admin. Code s. IB 2.02 (7)). SWIB will exercise its fiduciary duty to vote all proxies pursuant to its ownership in publicly held companies in accordance with the Board's Corporate Governance Policy.
3. Portfolios may utilize cash instruments or derivatives in their investment strategy. All investments used will be subjected to the risk analysis and monitoring processes at the portfolio, asset class and fund levels.

ASSET ALLOCATION

Overview and Recommendations for 2019

December 12, 2018

David Villa
Executive Director/Chief Investment Officer

Edwin Denson
Managing Director, Asset & Risk Allocation

In Consultation with NEPC and the Investment Committee

2019 RECOMMENDATIONS SUMMARY

Strategic Asset Allocation Targets and Ranges

2019 Core Trust Fund recommendation and expectations:

	Policy Targets*	Ranges*
Public Equity	**49.0%**	**43.0 - 55.0%**
Public Fixed Income	**24.5%**	**18.5 - 30.5%**
Inflation Sensitive Assets	**15.5%**	**10.5 - 20.5%**
Private Equity/Debt	**9.0%**	**6.0 - 12.0%**
Real Estate	**8.0%**	**5.0 - 11.0%**
Multi-Asset	**4.0%**	**1.0 - 7.0%**
Total (Including Leverage)	**110.0%**	
5-7 Yr. Expected Return	***6.0%***	
30 Yr. Expected Return	***7.3%***	
Expected Standard Deviation	***11.8%***	
5-7 Yr. Expected Sharpe Ratio	***0.34***	
Target Active Risk	**120bps +/-60bps**	

The Board of Trustees' external asset allocation consultant, NEPC, provided the following capital market assumptions used to develop the asset allocation recommendation and expectations:

Asset Class	Long Term Expected Return	5-7 Year Expected Return	Standard Deviation
Public Equity	**8.1%**	**6.9%**	**18.0%**
Public Fixed Income	**4.0%**	**2.8%**	**5.8%**
Inflation Sensitive Assets	**3.8%**	**3.3%**	**6.5%**
Private Equity/Debt	**9.4%**	**8.0%**	**22.1%**
Real Estate	**6.5%**	**5.7%**	**13.0%**
Multi-Asset	**6.7%**	**5.3%**	**10.3%**

* Policy Targets and Ranges will vary from the above table. This is due to the Asset Allocation Corridor Treatment which requires that Multi-Asset, Private Equity, and Real Estate asset class Policy Targets be derived from actual AUM, and then corresponding Policy Targets and Ranges for Public Equities and Public Fixed Income are adjusted. Mandatory rebalancing for Public Equities and Public Fixed Income as set forth in the Board of Trustees WRS Investment Policy is not triggered by the ranges in the above table, but by these adjusted ranges.

- The recommended 2019 Policy Target of 49% for Public Equity is 1% lower than the 2018 target, and the recommended 2019 Policy Target of 9% for Private Equity/Debt is 1% higher than the 2018 target.
- The recommended 2019 Ranges for Public Equity and Public Fixed Income of +/-6% relative to Policy Target are wider than the 2018 ranges of approximately +/-3% relative to target.
- The Target Active Risk of 120 basis points +/- 60 basis points will be maintained for the Core Trust Fund for 2019.
- The recommended 2019 Targets may be implemented at any time after approval by the Board of Trustees as determined and approved by the ED/CIO, subject to market factors and operational readiness.

2019 Variable Trust Fund recommendation and expectations:

	Policy Targets	Ranges
U.S. Equities	**70.0%**	**65.0-75.0%**
International Equities	**30.0%**	**25.0-35.0%**
	100.0%	
5-7 Yr. Expected Return	***6.3%***	
30 Yr. Expected Return	***8.0%***	
Expected Standard Deviation	***17.6%***	
5-7 Yr. Expected Sharpe Ratio	***0.25***	
Target Active Risk	**60bps +/-30bps**	

- The recommended 2019 Policy Targets and Ranges are unchanged from 2018.
- The Target Active Risk of 60 basis points +/- 30 basis points will be maintained for the Variable Trust Fund for 2019.

2019 ASSET ALLOCATION OVERVIEW

Since the late 1980s, SWIB has conducted an asset allocation exercise annually, leading to policy and funding recommendations at the beginning of each calendar year. In the late 1990s, the process was expanded to include several planning sessions with investment staff, senior staff, consultants, and Trustees. SWIB's process includes a full asset/liability modeling process and discussion sessions with the Board every other year, opening the schedule to consideration of other strategic issues or structural asset allocation adjustments in the "off years." SWIB launched the "off-year" process for the 2019 asset allocation during the October Workshop attended by Trustees, staff, and guest experts.

The key theme from the review and discussion was that the next ten years will be challenging for the fund from a total return perspective, as returns on assets are generally expected to be low relative to longer-term expectations and compared with the years since the financial crisis. The challenges in setting policy are two-fold. First, the fund needs to take levels of total risk over time such that returns are expected to be high enough to avoid slowly depleting the dividend surplus. Second, the fund needs to shy away, to the extent possible, from the type of risk that can lead to negative short-term returns that are large enough to exhaust the dividend surplus in a short period of time, which could also put upward pressure on contribution rates.

For example, if the fund were allocated 100% to U.S. Treasury bills, the risk of a sudden decline in fund value that would exhaust any existing dividend surplus would be negligible. However, the long-run return would be so low that a surplus would be unlikely to exist without significant increases in contributions. Similarly, if the fund were allocated 100% to a highly risky asset like equity, the long run return would likely support healthy average dividend surpluses, but would be subject to high variability, including episodes of exhaustion.

The 2019 asset allocation recommendations at the asset class level address this challenge through the three strategies: (1) maintain leverage of 10%. (2) increase the potential for active return or alpha, and (3) changes to the asset allocation.

1. Leverage, though prospectively less attractive in the current environment than it was when first introduced in 2006, remains an attractive way to help achieve total return objectives in a more diversified manner than simply taking more equity exposure in the asset allocation. The recommendation is to maintain fund-level leverage at 10%.
2. Alpha (return in excess of the policy benchmark) is an important contributor to overall fund return and diversifies risk. In an environment of prospectively lower asset class returns, alpha takes on a relatively more important role in achieving return objectives. To this end, the recommendation is to increase the ranges for Public Equity and Public Fixed Income to +/-6% relative to Policy Target from approximately +/-3% relative to target. This will allow for the Asset and Risk Allocation Team to execute exposure management trades and play a larger role to contribute additional alpha within the existing 120 basis points +/- 60 basis points active risk objective of the Core Trust Fund. The asset allocation consultant, NEPC, has identified that Core Trust Fund tracking error has been below peer levels. Callan has also made similar observations. The active risk budgeting process has identified ways to potentially increase Excess Value Added with a corresponding increase in tracking error.
3. The recommended asset allocation at the asset class level shifts 1% to Private Equity/Debt from Public Equity. This is motivated by both a desire to reduce the Emerging Market equity sub-asset class allocation (described below) for market dynamic reasons and to increase the allocation to an asset class with relatively high expected returns that is managed internally by an investment division that has consistently produced alpha over a long timeframe.

Strategic Sub-Asset Class Allocation Targets

2019 Core Trust Fund recommendation and expectations:

Public Equity	**Policy Target**
Global	**43.0%**
Emerging Market	**3.0%**
Small Cap	**3.0%**
	49.0%

Public Fixed Income	**Policy Target**
Government/Credit	**16.4%**
Global Bonds	**0.0%**
Excess Treasuries	**3.9%**
Long Treasuries	**0.5%**
High Yield Bonds	**1.8%**
EMD (External)	**0.9%**
EMD (Local Currency)	**0.9%**
	24.5%[†]

Recommended changes in the sub-asset class allocation are also driven by alpha and asset allocation considerations.

Emerging Market equities provide an attractive return proposition over the long term; however, they tend to exhibit more heightened correlation to the overall equity market in a market downturn as compared to an upturn/recovery. In addition, both the internal Private Equity/Debt and Small Cap investment teams have consistently produced alpha over a long timeframe. Taking both the asymmetric negative asset class dynamic at a late stage in the business cycle, and the alpha proposition of the alternatives into account, the recommendation is to decrease the Emerging Markets equities target to 3% from 5% and reallocate 1% to the Private Equity/Debt target (as described previously) and 1% to Small Cap, bringing its target to 3% from 2%.

With yields in many developed countries well below US levels and in some large bond markets well below 1.00%, the prospective returns for non-US bonds are very low. The recommendation is to eliminate the Global Bond sub-asset allocation and to reallocate within Public Fixed Income to Excess Treasuries, increasing its target to 3.9% from 2.1%, and High Yield, increasing its target to 1.8% from 1.2%. Though Treasuries and high yield credit are by no means attractive relative to longer-term expectations, they are more attractive than Global Bonds. In addition to the elimination of Global Bonds, within the overall EMD allocation it is recommended to reduce EMD (External) and increase EMD (Local Currency) such that the allocations are equal. The shift to a more balanced allocation between dollar-denominated and local currency debt reflects both a closer alignment to the relative size of each market and to the relative attractiveness of local currency debt.

[†] Sub-asset class targets do not add to Public Fixed Income total in table due to rounding.

Appendix

This appendix describes the Asset Allocation Corridor Treatment, which provides a set of rules for adjusting the Policy Target and Ranges for Public Equity and Public Fixed Income in the likely event that the actual AUM in any of Multi-Asset, Real Estate or Private Equity/Debt deviates from their respective Board of Trustee approved Policy Targets.

A table follows that illustrates the asset allocation corridor treatment in practice, as well as providing granularity regarding the current split between Equity and Debt in the Private Equity/Debt asset class and providing ranges for sub-asset classes. The CIO sets the allocation to Private Debt within Private Equity/Debt. All of the sub-asset class ranges are monitored as soft risk parameters by the Investment Committee. They are shown here for informational purposes for the Board of Trustees.

- Asset Allocation Corridor Treatment:
  - The Multi-Asset Policy Target will be actual AUM when actual AUM is between 1% and 7%. When actual AUM is less than 4%, the difference will be allocated 50% to the Public Equity Policy Target and 50% to the Public Fixed Income Policy Target. When actual AUM is greater than 4%, the difference will be deallocated 50% from the Public Equity Policy Target and 50% from the Public Fixed Income Policy Target.
  - The Real Estate Policy Target will be actual AUM when actual AUM is between 5% and 11%. When actual AUM is less 8%, the difference will be allocated 50% to the Public Equity Policy Target and 50% to the Public Fixed Income Policy Target. When actual AUM is greater than 8%, the difference will be deallocated 50% from the Public Equity Policy Target and 50% from the Public Fixed Income Policy Target.
  - The Private Equity/Debt Policy Target will be actual AUM when actual AUM is between 6% and 12%. When actual AUM is less than 9%, the difference will be allocated 100% to the Public Equity Policy Target. When actual AUM is greater than 9%, the difference will be deallocated 100% from the Public Equity Policy Target.
  - Adjustments to Policy Targets for Public Equity and Public Fixed Income will flow proportionally to their sub-asset class targets.
  - The Ranges for Public Equity and Public Fixed Income will adjust such that their respective Policy Targets remain at the mid-point of their respective ranges.

The table below illustrates an example of the adjustments caused by the Asset Allocation Corridor Treatment using the actual AUM in Private Equity/Debt, Real Estate and Multi-Asset as of October 31, 2018 and the 2019 recommended Policy Targets and Ranges.

Illustrative Example of Corridor Treatment using recommended 2019 Policy Target and Ranges, and October 31, 2018 AUM for Private Equity/Debt, Real Estate and Multi-Asset allocations.

Asset Classes	Pre-Corridor Treatment Target	Pre-Corridor Treatment Range	Post-Corridor Treatment Target	Post-Corridor Treatment Range
Public Equities	**49.0%**	**43.0 - 55.0%**	**49.9%**	**43.9 - 55.9%**
Public Fixed Income	**24.5%**	**18.5 - 30.5%**	**25.5%**	**19.5 - 31.5%**
Inflation Sensitive Assets	**15.5%**	**10.5 - 20.5%**	**15.5%**	**10.5 - 20.5%**
Private Equity/Debt	**9.0%**	**6.0 - 12.0%**	**9.1%**	**6.0 - 12.0%**
Private Equity			**7.7%**	
Private Debt			**1.4%**	
Real Estate	**8.0%**	**5.0 - 11.0%**	**7.5%**	**5.0 - 11.0%**
Multi-Asset	**4.0%**	**1.0 - 7.0%**	**2.6%**	**1.0 - 7.0%**
Total (Including Leverage)	**110.0%**		**110.0%**	

Sub-Asset Classes	Pre-Corridor Target	Soft Risk Parameter Ranges monitored by Investment Committee	Post-Corridor Target	Soft Risk Parameter Ranges monitored by Investment Committee
Public Equity				
Global	**43.0%**	39.0% - 47.0%	**43.8%**	39.8% - 47.8%
Emerging Market	**3.0%**	0.0% - 7.5%	**3.0%**	0.0% - 7.5%
Small Cap	**3.0%**	0.0% - 6.0%	**3.0%**	0.0% - 6.0%
	49.0%		**49.9%**	
Public Fixed Income				
U.S. Investment Grade	**20.8%**	15.8% - 25.8%	**21.6%**	16.6% - 26.6%
Government/Credit	**16.4%**		**17.0%**	
Excess Treasuries	**3.9%**		**4.1%**	
Long Treasuries	**0.5%**		**0.5%**	
High Yield Bonds	**1.8%**	0.0% - 5.5%	**1.9%**	0.0% - 5.6%
EMD	**1.8%**	0.0% - 6.5%	**1.9%**	0.0% - 6.6%
EMD (External)	**0.9%**		**0.9%**	
EMD (Local Currency)	**0.9%**		**0.9%**	
	24.5%		**25.5%**	

Note some sub-totals do not add to totals due to rounding.

In this example the AUM for Private Equity/Debt is slightly higher than the Policy Target, and the AUM for Real Estate and Multi-Asset are lower than Policy Target. These differences result in adjustments to Public Equity and Public Fixed Income targets and ranges, and proportional adjustments to sub-asset allocation targets and soft risk parameter ranges (governed by the Investment Committee). Following the rules for the Asset Allocation Corridor Treatment, the "extra" 0.1% in Private Equity/Debt relative to Policy Target is deallocated from the Public Equity target. The 0.5% shortfall in Real Estate relative to Policy Target is reallocated 0.25% to the Public Equity target and 0.25% to the Public Fixed Income target. The 1.4% shortfall in Multi-Asset relative to Policy Target is reallocated 0.7% to the Public Equity target and 0.7% to the Public Fixed Income target. The net of these reallocations is to increase the Public Equity target 0.9%, with a commensurate shift upward in its range, and a 1.0% increase in the Public Fixed Income target, with a commensurate shift upward in its range. These adjustments to the Public Equity and Public Fixed Income targets flow through proportionally to sub-asset class targets and ranges.