

Trust Level Portfolio Management Annual Program Review

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Managing Investment Director

August 14, 2017

Trust Level Portfolio Management | Executive Summary

1. First Annual Program Review

- Business model transparency
- From Asset Allocation & Risk Management (AARM) to Trust Level Portfolio Management (TLPM)
- Asset allocation is the dominant determinant of portfolio risk and return (Investment Belief 6)

2. TLPM Role Supports Investment Office (INVO) 2020 Vision

- More formal trust level investment decision making
- Supports independent risk analytics and oversight function led by Investment Risk & Performance (IRP)

3. Integrated Behavior (not siloed)

- Strategic management and business planning to enable cross-Enterprise/INVO diversity of talent

Performance | For Period Ending June 30, 2017

Allocation Management Excess Returns Attribution (Annualized)

	Avg Weight Year	5	Contribution to Plan Excess (bps)				Volatility of Contribution
			FYTD	1 Year	3 Year	5 Year	5 Year
Total Excess Return (bps)			(15)	(15)	(22)	23	134
Public Program Contribution			12	12	22	34	21
PUBLIC EQUITY	52.4%		(11)	(11)	(1)	10	17
INCOME	17.8%		22	22	13	16	11
INFLATION	5.1%		(5)	(5)	3	3	4
LIQUIDITY	3.2%		1	1	0	(1)	2
SELENDING	0.0%		4	4	4	3	0
OTHER	2.1%		0	0	2	3	3
Private Program Contribution			(39)	(39)	(30)	(25)	120
PRIVATE EQUITY	10.4%		(44)	(44)	(16)	(21)	62
REALASSETS	10.2%		4	4	(14)	(5)	46
Allocation Management			3.4	3.4	(0.8)	6.0	13
Public Proxy Performance			10	10	(10)	(10)	27
PRIVATE EQUITY	0.8%		4	4	(0)	(6)	20
REALASSETS	1.5%		6	6	(10)	(5)	13
Other/Residual			(1)	(1)	(2)	18	15

Business Update | Accomplishments & Initiatives

2016-2017 Major Accomplishments

- Established TLPM Business Model and Strengthened Team: Investment Director, Investment Manager, Associate Investment Managers, and Investment Officers
- Transitioned External Multi-Asset Class Partner Portfolio to TLPM
- Board Adopted Asset Liability Management (ALM) Policy
- Established Public/Private Asset Class Roles, Benchmarks, Segments
- Implemented “Pilot” Strategic Trust Level Portfolio Overlay

2017-2018 Major Initiatives

- Transition Counterparty Risk Oversight to IRP
- Develop Governance, Policy, and Operating Model for Total Fund Liquidity and Leverage Management
- Implement Board Adopted Strategic Asset Allocation Targets/Ranges
- Explore Total Fund Currency, and Inflation Strategies
- Refine Strategic Trust Level Portfolio Overlay

Appendix

Review Outline

Investment Beliefs Key		7									
I. Program Overview		8-12									
Strategic Plan & INVO 2020 Vision	9	Yellow				Green				Yellow	
Trust Level Portfolio Management	10					Green	Green	Green			Green
Portfolio Priorities	11		Green				Yellow	Green			
Governance	12	Yellow		Green							Green
II. Investment Review		13-20									
Strategic ALM 4-Year Cycle	14	Yellow		Yellow			Green			Yellow	Green
Strategic Asset Allocation	15-16		Green			Yellow	Green	Green			
Allocation Management	17							Green		Yellow	
Dynamic Asset Allocation	18-20				Yellow	Yellow	Green		Green		Green
III. Business Review		21-31									
Business Philosophy	22		Green				Green			Yellow	Green
Staffing Overview	23-24										Green
Functional Organization Chart	25-28				Yellow	Green			Green		Green
Policy & Delegations Review	29-31					Green					Green

Investment Beliefs Map

1. Liabilities
2. Long-Term Horizon
3. Stakeholders
4. Three Forms of Capital
5. Accountability
6. Strategic Allocation
7. Risk Reward
8. Costs Matter
9. Multi-faceted Risk
10. Resources/Process

Investment Beliefs Key

	Short Name	Investment Belief
1	Liabilities	Liabilities must influence the asset structure
2	Long-Term Horizon	A long time investment horizon is a responsibility and an advantage
3	Stakeholders	CalPERS investment decisions may reflect wider stakeholder views
4	Three Forms of Capital	Long-term value creation requires effective management of three forms of capital: financial, physical, and human
5	Accountability	CalPERS must articulate its investment goals and performance measure and ensure clear accountability for their execution
6	Strategic Allocation	Strategic asset allocation is the dominant determinant of portfolio risk and return
7	Risk Reward	CalPERS will take risk only where we have a strong belief we will be rewarded
8	Costs Matter	Costs matter and need to be effectively managed.
9	Multi-faceted Risk	Risk to CalPERS is multi-faceted and not fully captured through measures such as volatility or tracking error
10	Resources / Process	Strong processes and teamwork and deep resources are needed to achieve CalPERS' goals and objectives

I. Program Overview

Program Role | Execute CalPERS Strategic Plan & INVO 2020 Vision



CalPERS 2017-22 Strategic Goal

Strengthen the long-term sustainability of the pension fund

Investment Office Mission (Generate Returns to Pay Benefits)

Manage portfolio in a cost effective, transparent, and risk-aware manner

Vision

- **Investment Beliefs and CalPERS Core Values:** principles underlying our investment decisions
- Operate with a focus on **repeatable, predictable, and scalable** portfolios and practices
- Seek **alignment of interests** with our primary stakeholders, our business partners, and ourselves
- Use clearly articulated **performance, risk, and cost metrics** to evaluate our value-add to the funds
- Investment and business activities are supported by a **solid platform of effective risk management and controls.**



Program Role | Trust Level Portfolio Management



INVO 2020 Vision Steps: (2016-17 Enhanced Governance and Organizational Structure)
More formal trust level investment decision making

Trust Level Portfolio Management

Strategic Asset-Liability Management

Dynamic Asset Allocation

Portfolio Strategy Research & Development

Growth

Income

Real Assets

Inflation

Liquidity

Independent Investment Risk & Performance Oversight

Investment Risk Analytics

Investment Performance Analytics

Program Role | Implement Portfolio Priorities

Specific to CalPERS, implementable, and will influence portfolio construction:

1. Protect the Funded Ratio
(mitigate severe drawdowns)
2. Stabilize Employer Contribution Rates
(manage overall volatility)
3. Achieve Long-term Required Rate of Return
(over the long run, but not in every market environment)

“Asset allocation is the dominant determinant of portfolio risk and return”
Investment Belief 6

Program Role | Convene, Collaborate, and Implement

Enable strong processes, teamwork and diverse resources.

CalPERS Board of Administration

Board Committees: Investment (IC), and Finance & Administration (FAC)

Asset Liability Management Advisory Committee (ALMAC)

Chair: Chief Financial Officer

Membership: Investment, Actuarial, Financial, Legal, Communications & Stakeholder Relations Offices

INVO Members: Chief Investment Officer, Chief Operating Investment Officer, TLPM Managing Investment Director

Investment Management Committee

Chair: Chief Investment Officer

Operating Committee

Chair: Chief Operating Investment Officer

Investment Strategy Group (ISG)

Chair: Managing Investment Director, TLPM

Four ISG Subcommittees

Portfolio Allocation: Provides organized approach to making asset class rebalance and dynamic position decisions

Risk & Attribution: Ensures that investment risks are intended, understood, and compensated

Investment Review: Non-core programs, business models, assets and investments

Governance & Sustainability: Integration of ESG risk considerations into the investment-decision making process

II. Investment Review

Strategic Asset-Liability Management | 4-Year ALM Cycle Milestones

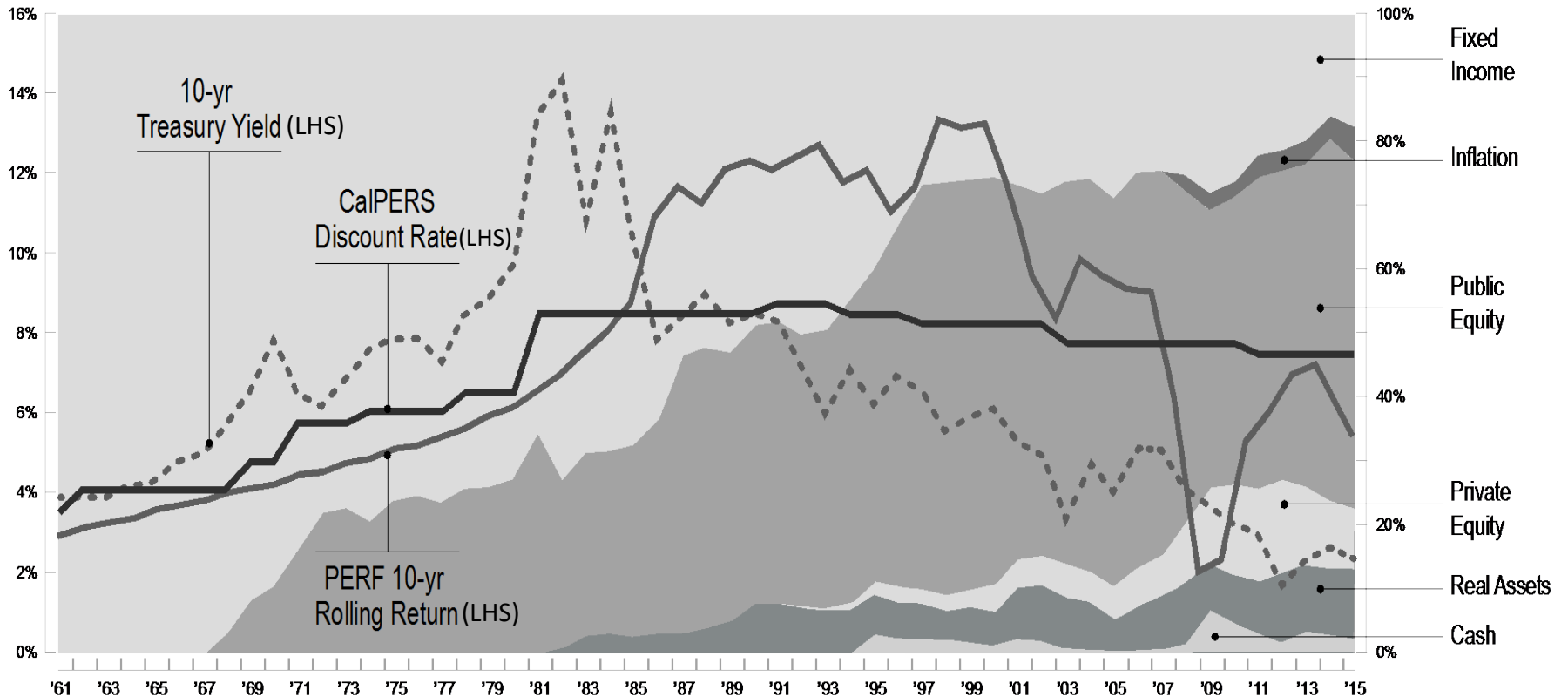
ALMAC coordinates planning of the Board's Asset Liability Management (ALM) Policy 4-Year cycle. TLPM manages the Investment Committee's authority to conduct strategic asset allocation, set the target rate of return, and select the asset allocation mix.

Five Milestones Describe 4-Year ALM Cycle



Strategic Asset Allocation | CalPERS Historical Allocation

Discount Rate, 10yr Rolling Return, and 10yr US Treasury Yield



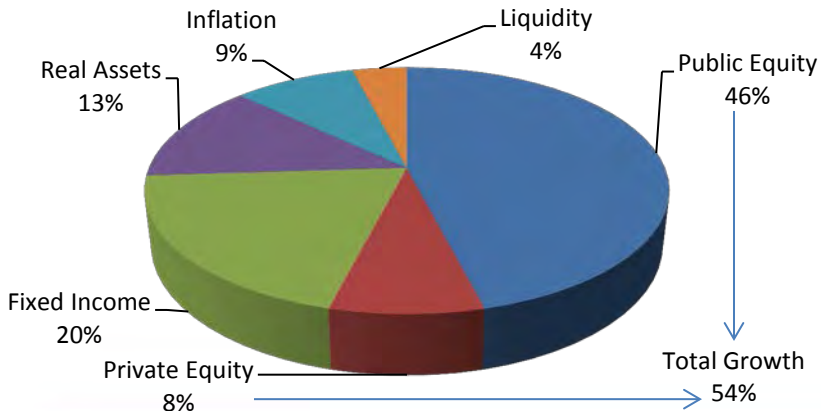
Data Source:

- CalPERS Comprehensive Annual Financial Reports (CAFR) for Discount rate, 10yr rolling returns and allocation
- Bloomberg for 10YR US Treasury Constant Maturity Rate (H15T10Y)
- Inflation asset class was not provided as a separate line item in the 2014 & 2015 CAFRs. Used the asset allocations from the INVO AA-Spreadsheet.

Strategic Asset Allocation | Policy* Targets, Ranges, & Benchmarks

Asset Class	Interim Target	Policy Range Relative to Target	Benchmark
Total Growth	54%	+/- 7%	85.2% Public Equity Benchmark 14.8% Private Equity Benchmark
Public Equity	46%	+/- 7%	100% (FTSE All-World, All Cap)
Private Equity	8%	+/- 4%	67% (FTSE U.S. Total Market Index) 33% (FTSE All-World ex U.S. TMI) } +3%
Fixed Income	20%	+/- 5%	90% (Bloomberg Barclays Long Liabilities) 10% (Bloomberg Barclays International Fixed Income GDP weighted ex-US)
Real Assets	13%	+/- 5%	84.6% (Exceed NCREIF ODCE, net of fees) 7.7% (Consumer Price Index+4%, lagged one quarter) 7.7% (NCREIF Timberland)
Inflation	9%	+/- 3%	75% (Inflation-Linked Bond Index) 25% (Standard & Poor's GSCI Total Return Index)
Liquidity	4%	+3%/-6%	100% (91-day Treasury Bill)

Interim Strategic Asset Allocation



Program	Target Forecast Annual Tracking Error
Asset Allocation	75 basis points
Total Fund	150 basis points

Allocation Management | For Period Ending June 30, 2017

Excess Returns Attribution (Annualized)

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Dynamic Asset Allocation | Strategic Trust Level Overlay Portfolio

Trust Level Strategic Overlay Portfolio Benchmarked to Total Fund Policy

Strategic Completion Overlay *\$\$ Funded*

Purpose:

1. Liquidity Management
2. Leverage Management
3. Strategic Exposure Management (Allocation Control, Rebalancing)

Dynamic Allocation Overlay *Unfunded* No Benchmark

Purpose:

1. Active Allocation Management

Opportunistic Strategies

Growth

Target	Range
54%	+/-7%

Income

Target	Range
20%	+/-5%

Real Assets

Target	Range
13%	+/-5%

Inflation

Target	Range
9%	+/-3%

Liquidity

Target	Range
4%	+3%/-6%

Dynamic Asset Allocation | Multi-Asset Class (MAC) Partner Strategies

1. Mitigate Severe Drawdowns (Protect the Funded Ratio)

Left Tail Risk Mitigation Strategy

2. Manage Overall Volatility (Volatility Targeting)

Volatility Targeting Strategy

3. Achieve Long-term Required Rate of Return (Dynamic Asset Allocation)

Current Partners: AQR Capital Management; and, Standard Life Investments

Dynamic Asset Allocation | MAC Partner Knowledge Transfer

To Influence:

More formal strategic and dynamic asset allocation decision making

- Multi-asset portfolio construction and systematic rebalancing
- Risk assumptions and management methodologies

Staff intellectual rigor and experience (*strong processes and teamwork*)

- Repeatable, predictable, and scalable portfolio construction strategies

Internally managed trust level (*costs matter*)

- Overlay strategies
- Ancillary strategies

III. Business Review

Business Philosophy: Trust Level Portfolio Management

Committed to enhanced transparency, accountability, and the highest ethical standards



Enabling:

People

- To meet beneficiary and employer needs through trust level investment decision making
 - Respected by Enterprise and Investment Office partners
 - Relevance and connection to strategic planning

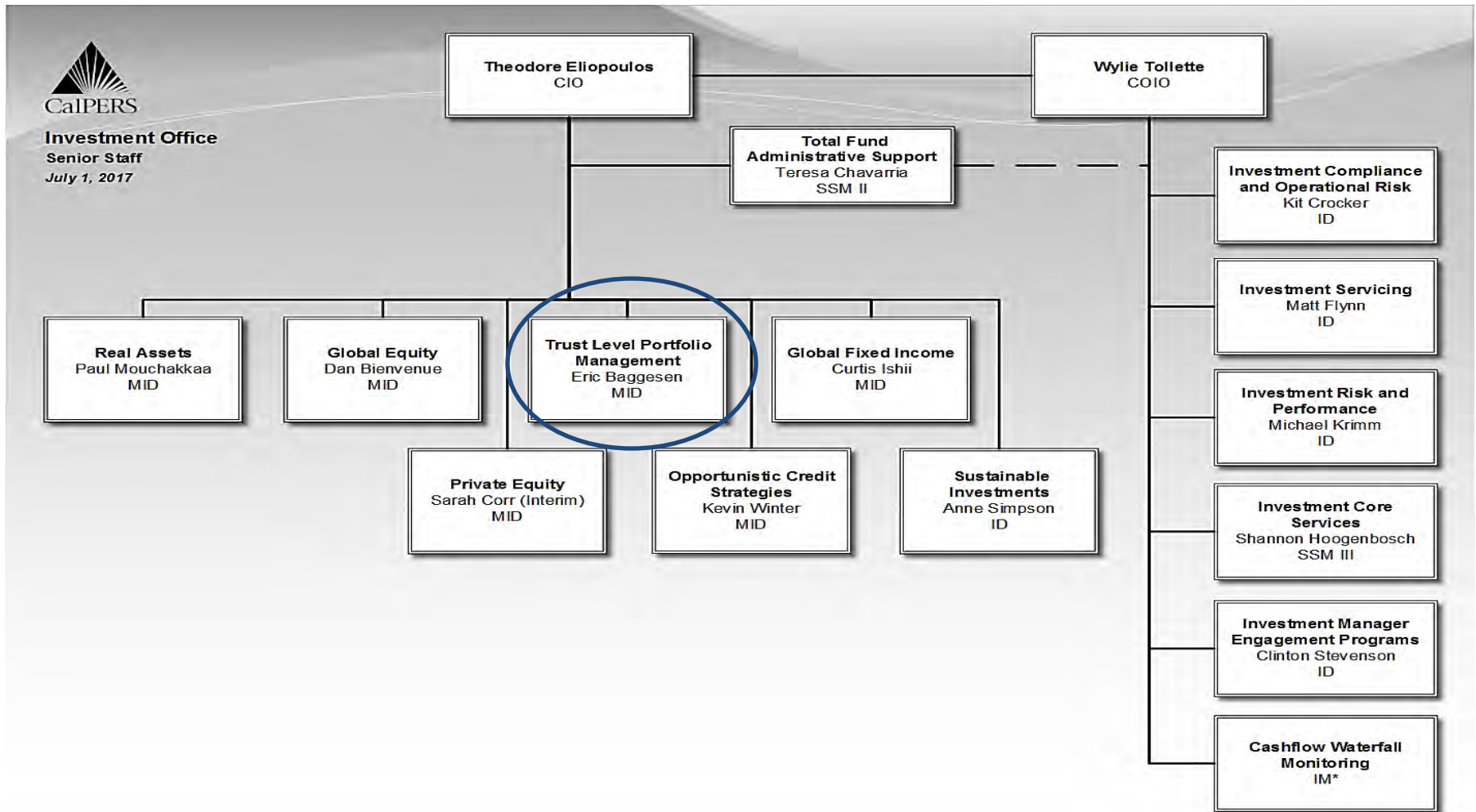
Operational Effectiveness

- To support innovative thought leadership which advance disciplined asset allocation processes
 - Implement sustainable, risk-aware strategic and dynamic asset allocation strategies

Performance

- To deliver targeted, risk-adjusted investment returns over the long-term
 - Fiduciary duty is paramount
 - Asset allocation is the dominant determinant of portfolio risk and return
 - Broadly diversified to minimize the effect of short-term losses
 - Prudent risk taking is appropriate within the context of overall diversification

Investment Office Organization Chart



Staffing Overview



Trust Level Portfolio Management Staff

- 1 Managing Investment Director (MID)
- 1 Investment Director (ID)
- 6 Investment Managers (IM)
- 2 Associate Investment Managers (AIM)
- 12 Investment Officers (5-IO3s, 3-IO2s, 4-IO1s)



Position Updates

- 1 New ID (Ron Lagnado)
- 1 New IM (Tom Sampson)
- 2 New AIMs (Ryan Ong, Arvind Rao)
- 2 New IOs (Alex Sakhnyuk, Michael LaRocca)
- 1 Exited IOI (Obtained IO2 with ICOR)
- 4 Admin/Ops Positions Transitioned to Total Fund Admin Support Unit



Recruitments

- 1 Investment Officer (1-IOIII) → Target Start Date: TBD

Functional Organizational Chart

Trust Level Portfolio Management | *Strategic Asset-Liability Management (ALM)*
 Eric Baggesen, Managing Investment Director
 Ron Lagnado, Investment Director

Leadership
 Dianne Sandoval, Investment Manager
 Alison Li, Investment Manager

Key Resources
 Ryan Ong, Associate Investment Manager
 Wilbur Chan, Investment Officer III
 James Chang, Investment Officer III
 Alex Sakhnyuk, Investment Officer I

ALM Policy Implementation

- *INVO Role: 4-Year Cycle (ALMAC)*

Strategic Asset Allocation

- *Implementation (PERF, Affiliates)*
- *Segments*
- *Capital Market Assumptions*
- *Specification of Risk Targets & Tolerances*

Alternative Approaches

- *Benchmark Selection & Development*
- *Portfolio Priority Linkage*
- *Asset & Liability Linkage*

Functional Organizational Chart

Trust Level Portfolio Management | *Dynamic Asset Allocation*

Eric Baggesen, Managing Investment Director

Ron Lagnado, Investment Director

Leadership

Todd Eichman, Investment Manager

Tom Sampson, Investment Manager

Key Resources

Arvind Rao, Associate Investment Manager

Tamara Alexander, Investment Officer III

Alan Seater, Investment Officer III

Ryan Brewer, Investment Officer II

Tumelo Nyoni, Investment Officer I

Cathy Hua, Investment Officer I

Total Fund Portfolio Overlay

- *Liquidity & Leverage*
- *Strategic Exposure (Allocation Control, Systematic Rebalancing)*
- *Synthetic Portfolio Replication*
- *Dynamic Portfolio Management: Active Allocation*

Multi-Asset Class (MAC) Portfolio Strategies

- *Internal MAC Strategies: Systematic, Ancillary Currency and Inflation*
- *External MAC Partner Portfolio: Left Tail Risk Mitigation, Volatility Targeting, Dynamic Asset Allocation*

Functional Organizational Chart

Trust Level Portfolio Management | *Portfolio Strategy Research & Development*

Eric Baggesen, Managing Investment Director

Ron Lagnado, Investment Director

Leadership

Paul Zhang, Investment Manager

Key Resources

Richard Lu, Investment Officer II

Daniel Rodriguez, Investment Officer II

Portfolio Strategy Research

- *Knowledge Transfer (MAC Partners)*
- *Macro Econ (Fiscal, Monetary), Capital Markets, Long-term Trends*
- *ESG Awareness*

Portfolio Strategy Development

- *Modeling: Liability, Regime, Valuation, Pacing, Risk Factor*

Functional Organizational Chart

Trust Level Portfolio Management | *Business Planning & Strategic Management*

Eric Baggesen, Managing Investment Director

Ron Lagnado, Investment Director

Leadership

Bill McGrew, Investment Manager

Key Resources

Michael LaRocca, Investment Officer I

CalPERS Strategic Plan

- *5 Year Plan (2017-22) Strategic Initiatives*

INVO 2020 Vision Alignment

- *Business Effectiveness, Capital Allocation, Trust Level Investment Decision Making*
- *Roadmap Initiatives: Cross-Asset Class/Program*

Trust Level Portfolio Management Business Model

- *Workforce Planning*
- *Talent Management, Governance & Operations*

Strategic Partnerships

- *Academic, Asset Owner/Manager, Industry Forums*

Policy Review | Investment Committee

The Total Fund Investment Policy*, adopted by CalPERS Investment Committee, includes Sections which provide the framework for TLPM's management of CalPERS assets. *For FY16-17, TLPM has no material Policy changes or violations to report.*

Total Fund Investment Policy Section	Summary	Reporting Responsibility	Investment Responsibility
Total Fund	Focus on trust level investment decision making	X	X
Investment Beliefs	Provides basis for strategic management	X	X
Governance & Sustainability Strategy	Support achievement of sustainable investment (ESG)	X	
Strategic Asset Allocation (SAA)	Implement SAA targets and ranges based on ALM review	X	X
Investment Risk Management	Manage total fund tracking error limits	X	X
Global Derivatives & Counterparty Risk	Strategic framework for managing use of derivatives		X
Investment Leverage	Sets limits and standards for the use of leverage	X	
Divestment	Economic impact analysis on total fund of divestment activity		X
Opportunistic Program	Report on program investments, returns, risks, and activity	X	X
Terminated Agency Pool	Oversee reporting, rebalancing and restructuring activity	X	X

*<https://www.calpers.ca.gov/docs/total-fund-investment-policy.pdf>

Policy Review | Finance & Administration Committee

The Asset Liability Management* and Funding Risk Mitigation** Policies, adopted by CalPERS Finance & Administration Committee (FAC), fall within the purview of ALMAC and contribute to TLPM's role in strategic asset-liability management.

FAC Policy	Summary	Reporting Responsibility	Investment Responsibility
Asset Liability Management	Seeks to fund System with an integrated view of pension assets and liabilities	X	X
Funding Risk Mitigation	Seeks to reduce CalPERS funding risk over time	X	X

* <https://www.calpers.ca.gov/docs/asset-liability-management-policy.pdf>

** <https://www.calpers.ca.gov/docs/funding-risk-mitigation-policy.pdf>

Delegations Review | Managing Investment Director

The TLPM Managing Investment Director is delegated to act finally on investment and business authorities subject to Investment Committee Policies.

Investment and Business Authorities (Summarized*)

To Allocate Assets	<ul style="list-style-type: none"> • Manage asset allocation within strategic ranges.
To Make Investment Decisions	<ul style="list-style-type: none"> • Transact in public securities. • Make or dispose of investments in private investment vehicles. • Negotiate partnership agreement terms, including fees and compensation. • Undertake action pursuant to investor rights, partnership agreement amendments, consents, and waivers. • Increase or decrease funding of externally managed portfolios. • Select and terminate an external manager. • Negotiate contract terms, fees, and compensation. • Establish a spring-fed pool of external resources to meet program needs. • Conduct and monitor the performance of service providers.
Administrative Management	<ul style="list-style-type: none"> • Conduct and oversee activities required to carry out administrative and management functions.
To Represent CalPERS	<ul style="list-style-type: none"> • Testify on behalf of CalPERS before state and federal legislative committees. • Communicate the Board's policies and positions before outside parties and organizations.

*Delegation No. INV-17-03; Effective June 30, 2017