Thomas Toth
Managing Director, Wilshire Consulting

July 27, 2017

Mr. Henry Jones
Chair of the Investment Committee
California Public Employees' Retirement System
400 Q Street
Sacramento, CA 95814

Re: Trust Level Portfolio Management Program Review

Dear Mr. Jones,

You requested Wilshire's annual review of the Trust Level Portfolio Management (TLPM) program. Wilshire engaged in onsite discussion with the Managing Investment Director, reviewed Staff materials and discussed the structure and goals of the TLPM program with Staff at all levels. ***Wilshire views the build out of the Trust Level Portfolio Management team positively and feel that it is well positioned to add value to the Total Fund. The evaluation incorporates the view that the TLPM program will continue to evolve and time is required to increase our conviction.***

Overview

TLPM is the evolution of the Asset Allocation & Risk Management function, with the goal of improving and formalizing the decision-making process at the Total Fund level. Its primary objective is to produce investment returns that help meet CalPERS' commitments at a reasonable level of risk.

Our program review covers the following areas of due diligence, which are then summarized in the Wilshire Manager Research evaluation framework:

- Organizational structure, governance model
- Environmental, Social and Governance (ESG) integration
- Strategy - research, analysis, model development, implementation
- Performance

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Governance and Organizational Structure

TLPM is governed by the CalPERS Total Fund Investment Policy, which provides the framework under which CalPERS' assets are managed. This is an important point as the decisions made and implemented by TLPM will need to be in accordance with established policies, which provides guidelines for what is, and is not, allowable.

ESG Integration

Environmental, Social, and Governance issues are a prime example of the importance of establishing cross asset class expertise as these risks can impact various components of the portfolio. A holistic view of the impacts of ESG factors should provide efficiencies and increased scale to make CalPERS' engagement on these issues more impactful. Further, a multi-asset class approach can protect against the risk of not propagating strategies around ESG as broadly as possible or, worse, working at cross purposes.

Strategy

TLPM has three primary responsibilities:

Strategic Asset-Liability Management – coordination of the regular CalPERS' strategic asset allocation process. This would include analyzing capital market assumptions, evaluation of risk targets and risk tolerance, benchmarking, and research into alternative approaches to asset allocation.

Dynamic Asset Allocation – implementation of a Total Fund Overlay which can encompass strategic exposures, liquidity management, replication, rebalancing, and active portfolio management. In addition, multi-asset class strategies and partnerships are overseen by TLPM.

Portfolio Strategy Research – ongoing examination of macro-economic factors, long term trends in capital markets, and ESG issues impacting the Total Fund would be handled by the team. In addition, potential enhancements to CalPERS' ability to model valuation factors, liabilities, and regime shifts fall into this category. TLPM also works to develop and coordinate long term strategic plans and ensure alignment with INVO

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2020. TLPM also handles strategic partnerships in a variety of areas such as academia, asset management, and industry groups to further knowledge sharing.

Performance

Assessing the performance of TLPM is complicated by the fact that the Program affects all facets of the CalPERS portfolio, including Total Fund return as driven by the asset allocation. The table below provides one picture of the impact of TLPM on a relative basis. Over the last fiscal year, TLPM strategies have detracted 3 basis points of excess return primarily from external partnership impacts. Importantly, as discussed in the Staff materials, the external strategic partnerships have been adjusted to better align with portfolio priorities.

Allocation management, which captures the impact of strategy over and underweights, was additive to performance by 9 basis points over the last year. More specifically, the overweight to public equity and underweight to income added value at the allocation management level.

	Average Weight 5 Year	Program Excess Return (bps)		Contribution to Plan Excess (bps)		Volatility of Contribution
		1 Year	5 Year	1 Year	5 Year	5 Year
Public Program Contribution				**(11)**	**21**	**20**
Global Equity	51.8%	(42)	4	(22)	(1)	16
Income	18.3%	38	73	8	13	10
Inflation	6.0%	36	53	3	3	4
Liquidity	3.3%	36	(15)	2	(0)	1
Sec Lending	0.0%	3	4	3	4	0
TLPM	0.4%			(3)	(1)	2
External MAC	0.4%	(464)	(237)	(2)	(1)	2
Completion Overlay (Pilot)	0.0%	(172)		(0)	(0)	0
Volatility Harvesting	0.0%	(248)		(0)	0	0
Risk Mitigation	0.0%			(1)	(0)	0
Other Plan Level	1.6%			(1)	3	4
Private Program Contribution				**(4)**	**(25)**	**106**
Private Equity	9.4%	(251)	(222)	(17)	(21)	53
Real Assets	10.4%	118	(23)	13	(4)	43
Allocation Management				**9**	**5**	**12**
Public Proxy Performance				**(1)**	**(7)**	**26**
Private Equity	0.7%			(5)	(3)	19
Real Assets	1.7%			4	(5)	14
Other				**-**	**-**	**-**
Total Excess Return (bps)				**(6)**	**(7)**	**120**

Evaluation Scoring

The evaluation framework aligns with Wilshire's structure for assessing important aspects of an investment organization. The objective of our investment due diligence is

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to gauge whether an investment program like TLPM invests in-line with stated objectives and has the potential to generate excess risk-adjusted returns over a reasonable investment time horizon. Predominant weighting is given to qualitative factors that we believe are supportive of strong performance going forward.

The summary scoring table below is followed by comments on the rationale for the current evaluation across the model's six distinct components.

CalPERS Trust Level Portfolio Management		**Tier**	**Letter**
Total Qualitative Score		**4th**	**B**
	Weight	**Tier**	**Letter**
Organization	**20%**	**5th**	**C**
FIRM	***50%***	**7th**	**D**
Quality and Stability of Senior Management			
Quality of Organization			
Ownership/Incentives			
TEAM	***50%***	**3rd**	**B**
Stability of Investment Professionals			
Quality of Team			
Commitment to Improvement			
Information Gathering	**20%**	**3rd**	**B**
Information Resources			
Depth of Information			
Breadth of Information			
Forecasting	**20%**	**5th**	**C**
Clear & Intuitive Forecasting Approach			
Repeatable Process			
Strength, Clarity, and Intuitiveness of Valuation Methodology			
Forecasting Success			
Unique Forecasting Approach			
Portfolio Construction	**20%**	**3rd**	**B**
Risk Budgeting/Control			
Defined Buy/Sell Discipline			
Consistency of Portfolio Characteristics			
Implementation	**10%**	**3rd**	**B**
Resources			
Liquidity			
Compliance/Trading/Monitoring			
Attribution	**10%**	**4th**	**B**
Depth of Attribution			
Integration of Attribution			

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Organization: Firm

The score reflects the level of turnover at key management positions, with the impending departure of the CIO and a new COIO. Scoring in this area can improve as continuity increases. CalPERS faces some unique organizational risks that for-profit enterprises have greater flexibility in managing. There is a lack of long-term “ownership” opportunities such as direct ownership, phantom stock and other incentive-based compensation packages. These long-term forms of incentives are common within private sector investment organizations and can serve as significant retention incentives. The absence of such compensation tools can expose the organization to the increased risk of losing intellectual capital at both the Investment Office Senior Staff level and the senior management level within TLPM to asset managers and other financial institutions. Ensuring that CalPERS as an organization has the tools necessary to recruit and retain qualified, diverse candidates should be a strong focus in line with Investment Belief #10 - Resources and Process. CalPERS as an organization, is clearly aware of this as evidenced by the ongoing discussion over incentive packages and the willingness to consider changes to recruit and retain investment talent.

Organization: Team

The TLPM team includes nineteen individuals including a dedicated Managing Investment Director, with twenty-one approved positions. The MID is a member of the Asset Liability Management Advisory Committee (ALMAC) as well as the chairperson of the Investment Strategy Group (ISG). The ISG includes four subcommittees on portfolio allocation, risk & attribution, investment review, and governance & sustainability, which draw from the collective expertise of senior INVO staff. Wilshire believes the MID’s role in the cross-asset class committees is a strong positive for better integration of INVO staff views on total fund portfolio positioning.

The MID is supported by an Investment Director, five Investment Managers, one Associate Investment Manager and eleven Investment Officers of varying seniority. At this point, the TLPM team is appropriately resourced for the work they are tasked to accomplish. Wilshire views the size of the team as a positive reflection of the importance that decision-making at the Total Fund level can have on overall investment performance. Our discussion with TLPM included members of varying seniority, which provided a broad view of the investment process and its day-to-day implementation. Of particular note, team members maintain multi-functional responsibilities requiring interaction with multiple senior INVO managers. Further, regular discussion ensures that project timelines are met or adjusted as necessary. Resource management is well

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coordinated and communication appears strong internally. Wilshire is impressed with the quality of the team and are confident in their ability to effectuate TLPM's stated investment objectives.

There are currently two open positions at the Associate Investment Manager (AIM) level, which play an important role in supporting the senior team and will be crucial in maintaining the quality of investment process over the long-term. While the TLPM team continues to look for outstanding candidates for open positions, compensation bands constrain its ability to attract candidates especially with competition from both local and national financial organizations.

Information & Forecasting

Research activities with implications across the Total Fund will be coordinated and driven by TLPM. Wilshire views this line of responsibility as important in establishing ownership and accountability. The expectation is that this research will draw on strategic partnerships as well as internal Investment Office (INVO) expertise. Wilshire is comfortable that the team has the appropriate expertise and industry contacts to manage the information gathering process. The onsite discussion focused on topics such as data management, consistency of the strategy research process, and industry literature coverage. While this remains a work in progress and the team would like to be more efficient in terms of information dissemination, it is apparent there is a strong process of improvement within the TLPM Program.

Finally, strategic & business planning and human capital management are an important component of all of CalPERS' internal programs. TLPM is aware of this and incorporate regular updates for the Investment Committee as well as ongoing discussions with Wilshire.

Portfolio Construction

TLPM's role in both strategic and dynamic asset allocation work means that portfolio construction considerations will be a dominant driver of results moving forward. Wilshire feels the TLPM team has demonstrated the expertise and experience necessary to properly plan and execute this process to help CalPERS meet its long-term commitments.

The team has long experience managing the strategic asset allocation process, from setting capital market expectations with input from various market participants to modeling alternative policy portfolios for discussion. In the last fiscal year, TLPM

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conducted the PERF asset allocation study, which set new target asset class weights, and was directly involved in the asset allocation process for the Affiliate Funds.

The strategic asset allocation process aligns well with Investment Beliefs 2, 6, and 7. Wilshire believes that the process can improve through greater integration of liability information within the ALM process and through continued collaboration with the actuarial office. The successful conclusion of the SAA process resulted in a portfolio expected to meet the discount rate target of 7% over a long-term time horizon at an acceptable level of risk.

Dynamic asset allocation is another key area of responsibility, one where there has been progress made, and which is expected to evolve and advance over time. Wilshire has provided input into the overlay program as one component of this responsibility. Any dynamic strategies will be rigorously tested to increase the probability that they are additive to the portfolio's return and/or provide risk mitigation. In discussion with the MID, considerable emphasis was placed on the importance of examining potential dynamic strategies to ferret out datamining pitfalls or strategies without an explainable economic rationale. Finally, any tilts within the portfolio will be vetted by committees such as the ISG and will fall within the policy ranges established by the Investment Committee. Regular reviews of the performance of TLPM activities should include the rationale for establishing positions away from the strategic targets and attribution to examine strategy effectiveness.

Further, dynamic asset allocation also encompasses the strategic relationships with outside partners. Information-sharing and knowledge transfer is a key benefit of the strategic relationships as the team works to implement repeatable and scalable dynamic portfolio construction strategies. TLPM has been successful at evolving the external multi-asset class mandates to better align with the portfolio priorities. These priorities include mitigating severe drawdowns, managing overall volatility, and achieving the required rate of return over the long-term. Some of the external strategies have the potential to provide liquidity in times of market stress, helping reduce the need to sell assets at inopportune times to fund necessary cash flows.

Implementation

TLPM is responsible for planning and overseeing the implementation of the approved asset allocation targets. Staff have been very vigilant in providing a roadmap for this implementation and utilizing the expertise of INVO Staff across asset classes. At this

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point, implementation is proceeding at pace and Wilshire is comfortable with the process for monitoring and adjusting course if necessary.

As a component of a process for improvement, TLPM is working to build out a framework for managing Total Fund liquidity and leverage management. Striving to improve efficiencies and the cost of managing liquidity and portfolio exposures are important benefits that can be provided by the overlay program and requires robust trading and operational procedures. TLPM is aware of this and working to establish and refine procedures, including setting up risk reporting utilizing available risk tools. The strategic completion overlay pilot has been funded at $1.0 billion, with a strong build out over the past twelve months. The tracking error of the pilot program has been reasonable and within expectations.

Wilshire views the progression of implementation protocols positively. Staff's phased implementation plan for the overlay program is indicative of how the MID foresees new strategies emanating from TLPM. This pilot program provides Staff the opportunity to identify implementation challenges, refine various procedural issues and can ensure that robust processes are in place prior to fully scaling a TLPM program.

Attribution

It will be important to determine the criteria upon which attribution assessments will be made at the end of any evaluation period as objective feedback will be critical for Staff to gain comfort that it is prepared to move forward with full implementation and/or to determine what additional enhancements would be required to move to that stage.

Wilshire is comfortable with the level of attribution provided by TLPM but reiterates that the impact of the Program extends beyond just its contribution to excess return.

Conclusion

Wilshire views the continued build out of the Trust Level Portfolio Management team in a positive light. While the roles, strategies, and processes are likely to evolve going forward, establishing more formal responsibilities should aid in improving decision making at the Total Fund level. This has the potential to improve outcomes when looked at through the lenses of both risk and return over time.

Should you require anything further or have any questions, please do not hesitate to contact us.

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Best regards,

Thomas Toth
Managing Director