Callan

November 13, 2019

City of El Paso Employees Retirement Trust

2019 Asset-Liability Study

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Agenda

Introduction and Process Overview

Asset Allocation

Plan Liabilities

Asset-Liability Modeling

Recommendation

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Introduction and Process Overview

Overview

The City of El Paso Employees Retirement Trust is 80% funded on a market value basis based on Buck's September 1, 2018 actuarial valuation

Plan contributions are based on current statutory policy and fixed at a set percentage of payroll

Callan asset-liability simulations project a median funded ratio of 84% in 2028 under the current investment policy

- More aggressive investment policies result in incrementally higher funded status in the median case
- However, aggressive policies result in lower funded status in downside scenarios

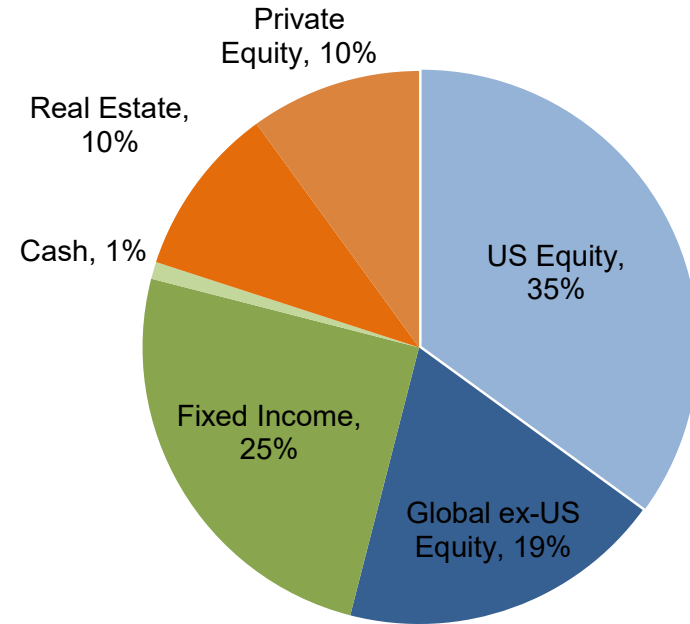# El Paso Current Target Asset Allocation and Financial Position

The current target asset allocation is a diversified structure, with investments in private equity and private real estate

In broad terms:

54% Public Equity

26% Fixed Income

20% Alternatives

Private Equity, 10%
Real Estate, 10%
Cash, 1%
US Equity, 35%
Fixed Income, 25%
Global ex-US Equity, 19%

Expected Return* = 6.91%

Expected Risk = 13.81%

* 10-year annualized return projection

Starting Point for Analysis	
Market Value of Assets (MVA)	$820m
Actuarial Accrued Liability (AAL)*	$1,021m
Funded Status (MVA/AAL)	80%

* This reflects the September 1, 2018 AAL valued at a 7.5% discount rate

The Importance of Asset Allocation

The number one task

Asset allocation is the primary determinant of investment return and asset volatility

Asset allocation is the process of determining the optimal allocation of a portfolio among broad asset classes based upon, among other factors:

- Investment goals
- Time horizon
- Liquidity needs
- Capital market expectations
- Liability characteristics
- Risk tolerance

Elements of an appropriate target asset allocation include:

- Identifying asset classes for inclusion (avoid overlaps and minimize gaps)
- Special considerations such as fees, size or capacity constraints, liquidity requirements
- Rebalancing discipline

Goal of the Asset-Liability Study

The goal of an asset-liability study is to establish a long-term strategic asset allocation target

An appropriate asset allocation will depend on the Plan Sponsor's investment objectives:

- Minimize costs over the long run (long-term goal)
  - How much return generation (from beta and alpha) is necessary to lower contributions and/or improve funded status?

- Minimize funded status volatility (short-term goal)
  - How much risk reduction to reduce funded status volatility?

The strategic asset allocation target should be an optimal balance between sustainable funded status volatility and minimization of contributions over the long run

The strategic asset allocation will vary by the unique circumstances of the Plan Sponsor

- No "one-size-fits-all" solution exists
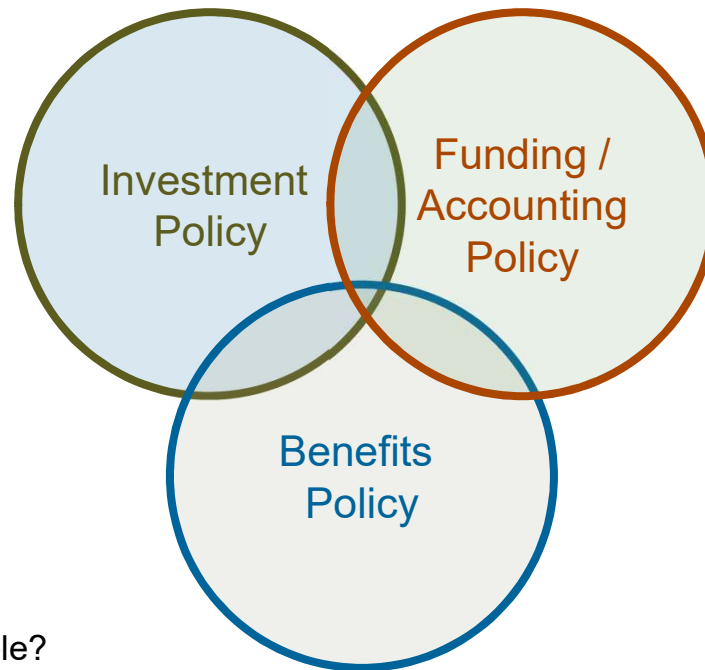
Three Key Strategic Policies

We evaluate the interaction of the three key policies that govern a pension plan with the goal of establishing the best investment policy.

Investment Policy

- How will the assets supporting the benefits be invested?
- What risk and return objectives?
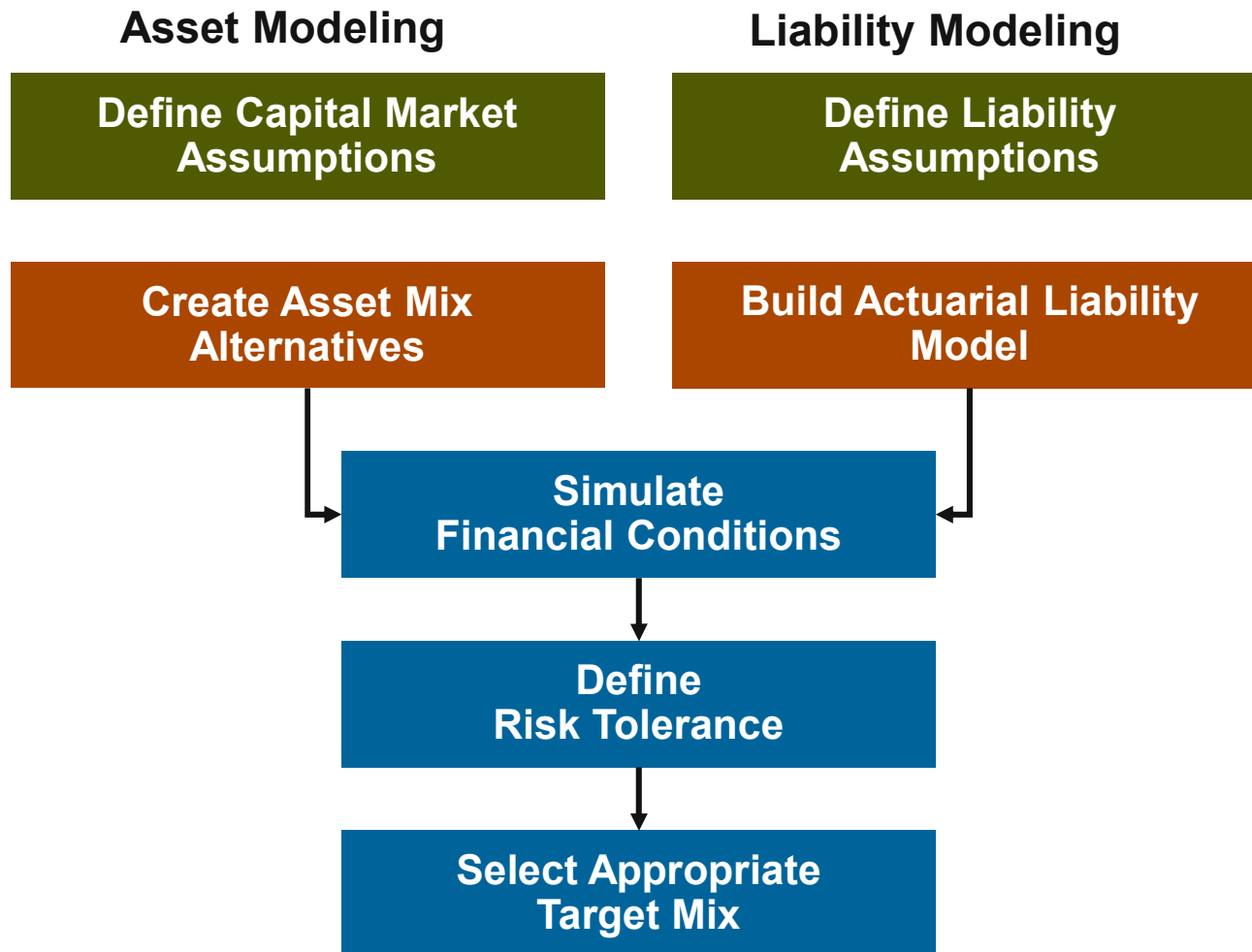- How to manage cash flows?

Funding / Accounting Policy

- How will the benefits be paid for (funded)?
- What actuarial discount rate?
- How will deficits be paid for?
- How will costs be recognized?

Benefits Policy

- What type/kind of benefits?
- What level of benefit?
- When and to whom are they payable?

Investment Policy

Funding / Accounting Policy

Benefits Policy

Callan Asset-Liability Process

Assets and liabilities are evaluated and tested separately, then integrated into a single model

Asset Modeling

Liability Modeling

Define Capital Market Assumptions

Define Liability Assumptions

Create Asset Mix Alternatives

Build Actuarial Liability Model

Simulate Financial Conditions

Define Risk Tolerance

Select Appropriate Target Mix

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Asset Allocation

How are Capital Market Projections Constructed?

Annual process to update 10-year projections

● Evaluate current environment and economic outlook

● Examine relations between economy and historical asset class performance

● Create 10-year risk, return, and correlation projections

● Test projections for reasonable results

Projections cover most broad asset classes and inflation:

● Broad domestic equity

● International equity

● Domestic fixed income

● International fixed income

● Alternative investments
  ➢ Private Equity
  ➢ Real Estate

● Cash

● Inflation

Incorporates both advanced quantitative modeling as well as qualitative expertise

Equity Forecasts

Overview

Fundamental Relationship

**Equity Return =**   **Capital Appreciation**   **+ Income**

Real Earnings Growth + Inflation

U.S. Equity (S&P 500) forecasted at 7.00%; Non-US Equity at 7.25%

- Building up US equity returns from long-term fundamentals, we arrive at 7.00%
  - Real earnings growth is linked to real GDP growth over long horizons; we forecast real GDP of 2.25% over the next decade
  - Inflation(CPI-U) forecasted at 2.25%
    - *Consistent with Fed's inflation target*
    - *Consistent with realized inflation over past two decades*
    - *In line with the market-based forecast of breakeven inflation (yield difference between Treasuries and TIPS)*
  - Income return of 2.50% from dividend yield and share buybacks
  - Small premium for Non-US over domestic stems from valuation considerations and emerging market growth potential

U.S. versus International Equity Performance Is Historically Cyclical

Cumulative Relative Returns of S&P 500 vs. MSCI EAFE (Dec 1971 to June 2019)
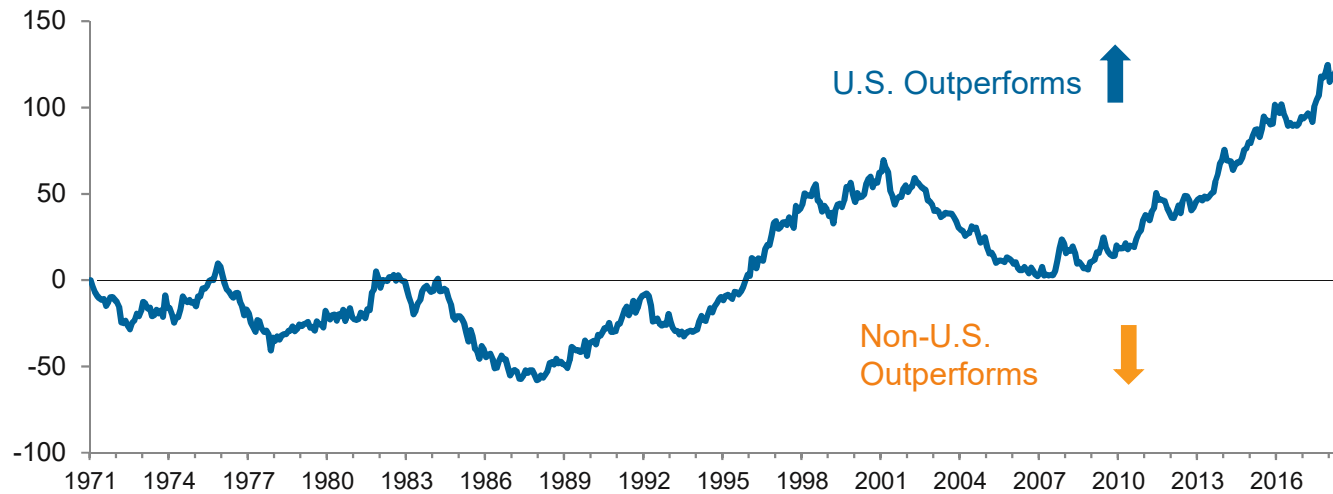
Relative performance of US versus International Equity has been cyclical throughout history

- International Outperformance:'70s to the late '80s

- United States Outperformance: Late '80s to the Tech bubble

- International Outperformance: Tech bubble to the Global Financial Crisis

- United States Outperformance: Global Financial Crisis to ?

Fixed Income Forecasts

Overview

Fundamental Relationship

Bond Return = Income + Capital Appreciation + Roll Return

Broad U.S. Fixed Income projected at 3.75%

- Starting yields have significantly increased as a result of Fed moving to normalize monetary policy

- Expect modest rise in yields over the forecast horizon, increasing income return

- Gradually rising yields will result in modest capital losses but a second-order effect relative to income return

- Little impact from changing credit spreads

- Projected steepening of the yield curve to a "normal" term structure will cause roll returns to increase over time
  - When the yield curve slopes upward, the price of a bond increases over time as its time to maturity shrinks because it is progressively discounted at lower interest rates

Alternative Investment Forecasts

Private equity and private real estate

- **Private equity projected at 8.50% return**
  - Private equity is driven by similar economic factors as public equity
  - Private equity is modeled with a premium relative to public markets reflecting greater risk and leverage
  - Recognize there is a wide range of potential results across implementations
    - *The best managers far outperform the worst managers in any given period*

- **Private real estate projected at 6.25% return**
  - Cap rates continued to decline in 2018
  - Stylized equity beta of roughly .85 after adjusting for leverage
  - Another asset class where proper implementation is paramount

Relationship Between Expected Return and Risk – Capital Market Line

Visualizing Callan's 2019-2028 Capital Market Assumptions
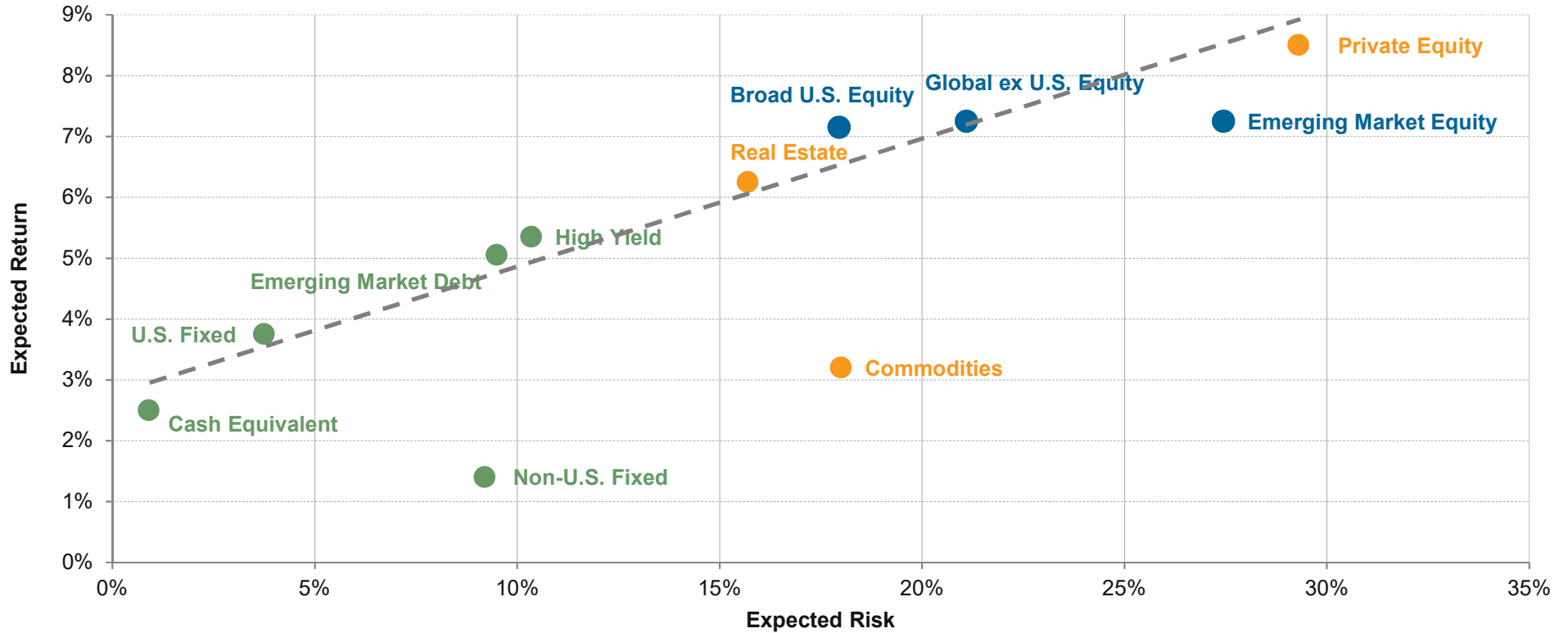
Our forecasts link expected return to risk

● For example, investors demand a greater return from private equity than public equity as compensation for higher risk

Callan's 2019 Capital Market Assumptions

Summary of Callan's Long-Term Capital Market Projections (2019 – 2028)

Asset Class	Index	EXPECTED RETURN		EXPECTED RISK
		1-Year Arithmetic	10-Year Geometric*	Standard Deviation
Equities				
Broad Domestic Equity	Russell 3000	8.50%	7.15%	17.95%
Large Cap	S&P 500	8.25%	7.00%	17.10%
Small/Mid Cap	Russell 2500	9.55%	7.25%	22.65%
Global ex-US Equity	MSCI ACWI ex USA	9.20%	7.25%	21.10%
International Equity	MSCI World ex USA	8.70%	7.00%	19.75%
Emerging Markets Equity	MSCI Emerging Markets	10.70%	7.25%	27.45%
Fixed Income				
Short Duration	Bloomberg Barclays 1-3 Yr G/C	3.40%	3.40%	2.10%
Domestic Fixed	Bloomberg Barclays Aggregate	3.75%	3.75%	3.75%
Long Duration	Bloomberg Barclays Long G/C	4.25%	3.75%	10.65%
TIPS	Bloomberg Barclays TIPS	3.80%	3.75%	5.05%
High Yield	Bloomberg Barclays High Yield	5.75%	5.35%	10.35%
Non-US Fixed	Bloomberg Barclays Glbl Agg ex US	1.80%	1.40%	9.20%
Emerging Market Debt	EMBI Global Diversified	5.40%	5.05%	9.50%
Other				
Real Estate	NCREIF ODCE	7.30%	6.25%	15.70%
Private Equity	Cambridge Private Equity	12.40%	8.50%	29.30%
Commodities	Bloomberg Commodity	4.75%	3.20%	18.00%
Cash Equivalents	90-Day T-Bill	2.50%	2.50%	0.90%
Inflation	CPI-U		2.25%	1.50%

Asset classes in blue are part of the Plan's current target investment allocation

Most capital market expectations represent passive exposure (beta only); however, return expectations for private real estate and private equity reflect active management because no effective market proxies exist

All return expectations are net of fees

* 10-Year annualized return

2019 Capital Market Expectations—Correlation Matrix

		Broad	Lg Cap	Sm/Mid	GlobxUS	Int'l Eq	Emerge	Sht Dur	Dom Fix	Long D	TIPS	Hi Yield	NUS Fix	EMD	Real Est	Pvt Eqt	Comm	Cash Eq	Inflation
1	Broad Domestic Equity	1.00																	
2	Large Cap	1.00	1.00																
3	Small/Mid Cap	0.96	0.93	1.00															
4	Global ex-US Equity	0.85	0.84	0.84	1.00														
5	International Equity	0.81	0.80	0.80	0.99	1.00													
6	Emerging Markets Equity	0.87	0.86	0.86	0.94	0.88	1.00												
7	Short Duration	-0.23	-0.22	-0.26	-0.25	-0.23	-0.28	1.00											
8	Domestic Fixed	-0.11	-0.10	-0.15	-0.14	-0.12	-0.17	0.88	1.00										
9	Long Duration	0.11	0.11	0.10	0.08	0.09	0.04	0.74	0.93	1.00									
10	TIPS	-0.05	-0.04	-0.08	-0.06	-0.05	-0.09	0.56	0.64	0.53	1.00								
11	High Yield	0.64	0.63	0.62	0.63	0.61	0.62	-0.13	0.02	0.19	0.06	1.00							
12	Non-US Fixed	0.01	0.01	0.00	0.07	0.05	0.10	0.48	0.53	0.54	0.40	0.12	1.00						
13	EMD	0.57	0.57	0.55	0.57	0.54	0.58	-0.04	0.10	0.20	0.18	0.60	0.01	1.00					
14	Real Estate	0.74	0.73	0.72	0.71	0.68	0.70	-0.13	-0.04	0.17	0.00	0.56	-0.05	0.47	1.00				
15	Private Equity	0.92	0.92	0.88	0.88	0.86	0.86	-0.30	-0.23	-0.01	-0.14	0.55	0.06	0.45	0.66	1.00			
16	Commodities	0.15	0.15	0.15	0.16	0.16	0.16	-0.22	-0.10	-0.04	0.12	0.10	0.15	0.19	0.20	0.18	1.00		
17	Cash Equivalents	-0.04	-0.03	-0.08	-0.04	-0.01	-0.10	0.30	0.10	-0.04	0.12	-0.11	0.00	-0.07	-0.06	0.00	0.07	1.00	
18	Inflation	-0.01	-0.02	0.02	0.01	0.00	0.03	-0.20	-0.28	-0.29	0.10	0.07	-0.10	0.00	0.10	0.06	0.40	0.00	1.00

Relationships between asset classes are as important, or more important, than the levels of individual asset class assumptions

These relationships will have a large impact on the generation of efficient asset mixes using mean-variance optimization

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Efficient Frontier
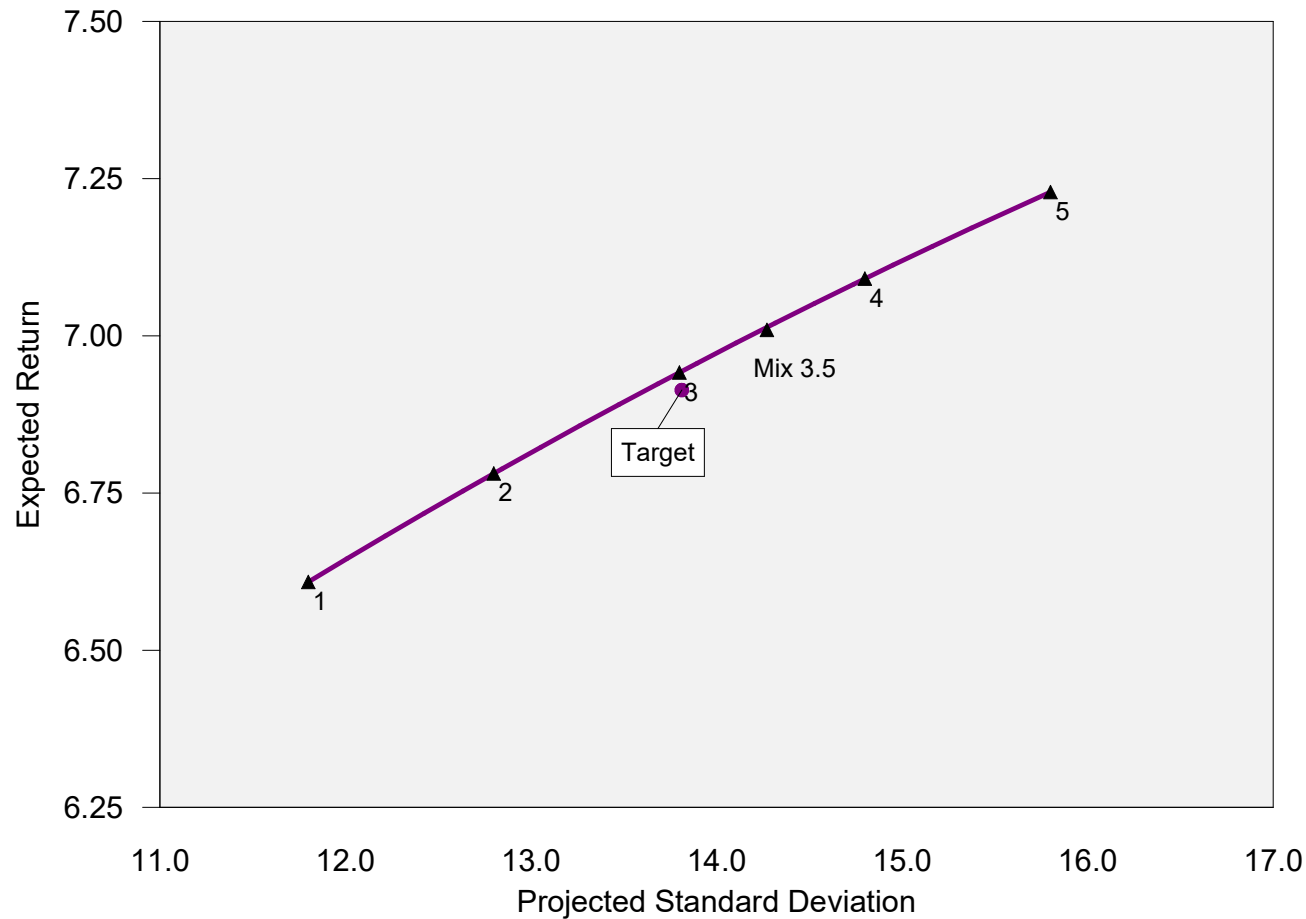
- A series of optimal mixes at different levels of expected return and risk is depicted

- The current target portfolio is modestly below the efficient frontier and Mix 3

Optimal Asset Mixes

	Target	Mix 1	Mix 2	Mix 3	Mix 3.5	Mix 4	Mix 5
Broad US Equity	35%	25%	28%	30%	31%	32%	34%
Global Ex-US Equity	19%	17%	19%	20%	21%	22%	23%
Fixed Income	25%	37%	32%	27%	24%	21%	16%
Cash	1%	1%	1%	1%	1%	1%	1%
Real Estate	10%	9%	9%	10%	10%	11%	12%
Private Equity	10%	11%	11%	12%	13%	13%	14%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Total Equity	54%	42%	47%	50%	52%	54%	57%
Total Fixed Income	26%	38%	33%	28%	25%	22%	17%
Total Alternatives	*20%*	*20%*	*20%*	*22%*	*23%*	*24%*	*26%*

Mix Characteristics

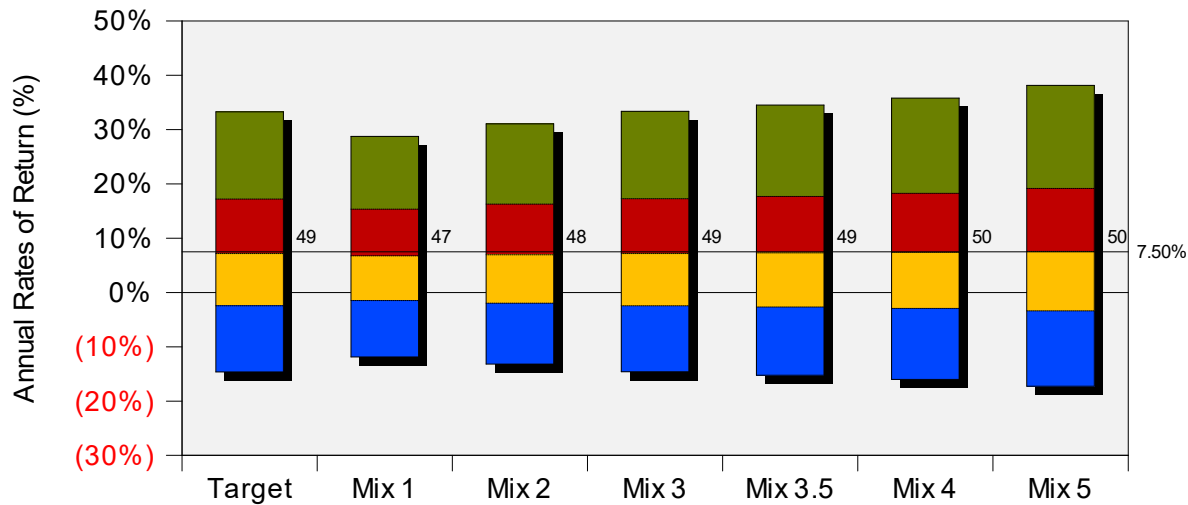|	Target	Mix 1	Mix 2	Mix 3	Mix 3.5	Mix 4	Mix 5
Expected Return*	6.91%	6.61%	6.78%	6.94%	7.00%	7.09%	7.22%
Standard Deviation	13.81%	11.80%	12.80%	13.80%	14.27%	14.80%	15.80%
Sharpe Ratio	0.32	0.35	0.33	0.32	0.32	0.31	0.30

* 10 year annualized return

- The fixed income allocation is the "dial" that sets total portfolio risk across the mixes

Private equity allocation is constrained to maximum of 25% of public equity allocation. Cash minimum allocation of 1% for plan liquidity needs.

Single Year Asset Return Projections

Range of Projected Rates of Return
Projection Period: 1 Year

	Target	Mix 1	Mix 2	Mix 3	Mix 3.5	Mix 4	Mix 5
5th Percentile	33.3%	28.8%	31.1%	33.4%	34.5%	35.8%	38.2%
25th Percentile	17.2%	15.3%	16.3%	17.3%	17.7%	18.3%	19.2%
Median	7.2%	6.8%	7.0%	7.2%	7.3%	7.4%	7.6%
75th Percentile	(2.4%)	(1.5%)	(2.0%)	(2.4%)	(2.7%)	(2.9%)	(3.4%)
95th Percentile	(14.6%)	(11.9%)	(13.2%)	(14.6%)	(15.2%)	(16.0%)	(17.3%)
Prob > 7.50%	49%	47%	48%	49%	49%	50%	50%

Note: Chart reflects return distribution in any single year over the next ten years

Ten-Year Asset Return Projections

Range of Projected Rates of Return
Projection Period: 10 Years
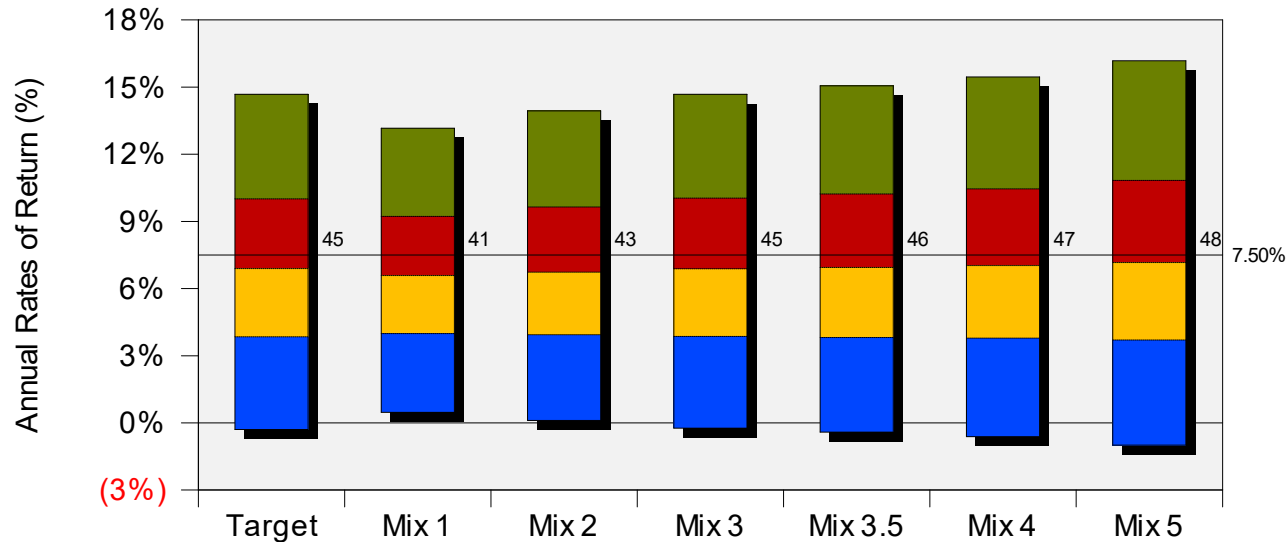
	Target	Mix 1	Mix 2	Mix 3	Mix 3.5	Mix 4	Mix 5
5th Percentile	14.7%	13.2%	13.9%	14.7%	15.1%	15.5%	16.2%
25th Percentile	10.0%	9.2%	9.6%	10.0%	10.2%	10.5%	10.8%
Median	6.9%	6.6%	6.7%	6.9%	6.9%	7.0%	7.2%
75th Percentile	3.8%	4.0%	3.9%	3.9%	3.8%	3.8%	3.7%
95th Percentile	(0.3%)	0.5%	0.1%	(0.2%)	(0.4%)	(0.6%)	(1.0%)
Prob > 7.50%	45%	41%	43%	45%	46%	47%	48%

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Plan Liabilities

Actuarial Liability Model

- Callan's liability model is based on the September 1, 2018 actuarial valuation report prepared by Buck

- Employer Funded Policy: 14.05% of pay (consistent with current statutory policy)

- Employee Contributions: Remain at 8.95% of pay

- Simulations start on September 1, 2018 and run ten years through September 1, 2028

Starting Point for Analysis	
Market Value of Assets (MVA)	$820m
Actuarial Accrued Liability (AAL)	$1,021m
Funded Status (MVA/AAL)	80%

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Key Callan Assumptions	
Nominal Return	6.91% (Target Mix)
Price Inflation	2.25%
Real Asset Return	4.66%

Key Actuarial Assumptions	
Investment Return	7.50%
Price Inflation	3.00%
Real Asset Return	4.50%

Sources: Buck 2018 Actuarial Valuation and Experience Study, Callan

Plan Membership
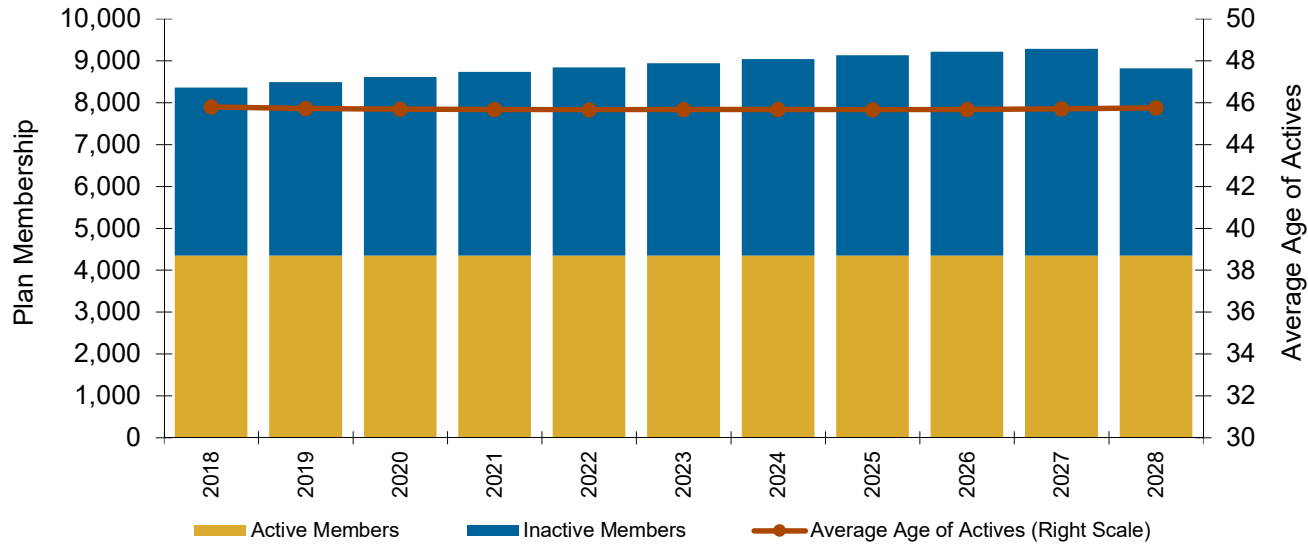
Projections are based on an "open group"

- Future new hires replace exits due to retirement, death, disability, and withdrawal

- A constant active membership implies 0% workforce growth

Average age of active members is 46

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Callan Expected Funded Status Projection

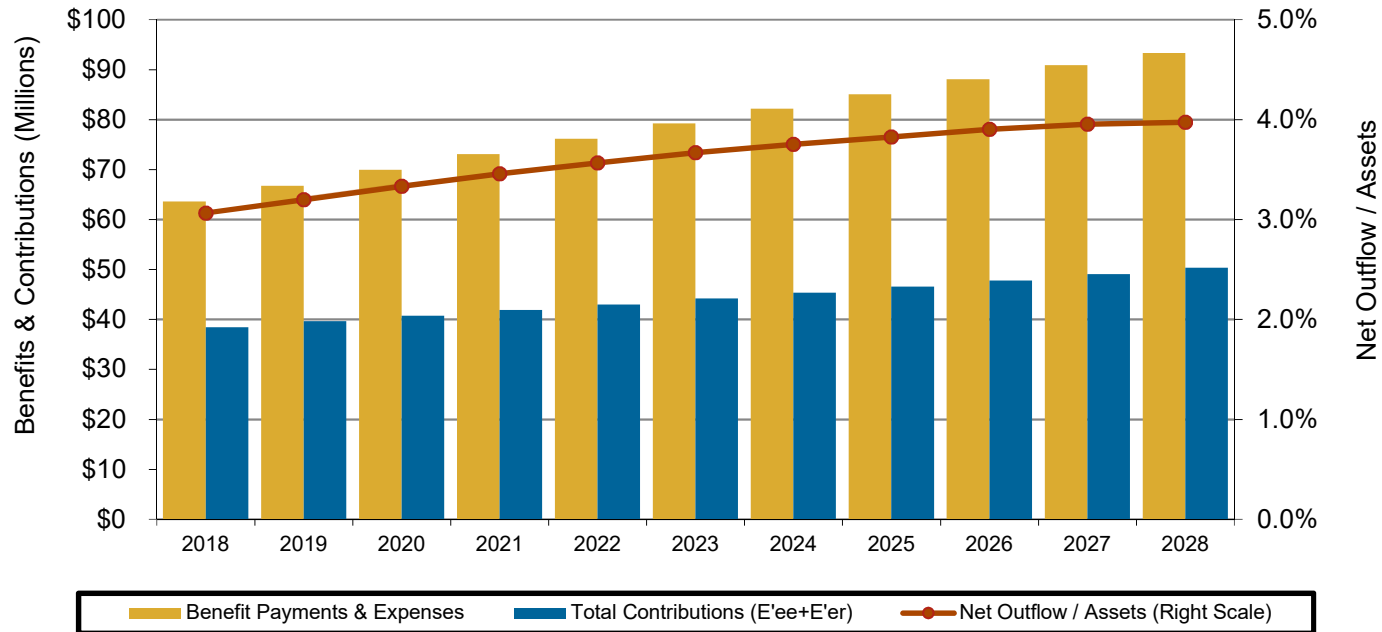Based on current target expected return of 6.91%
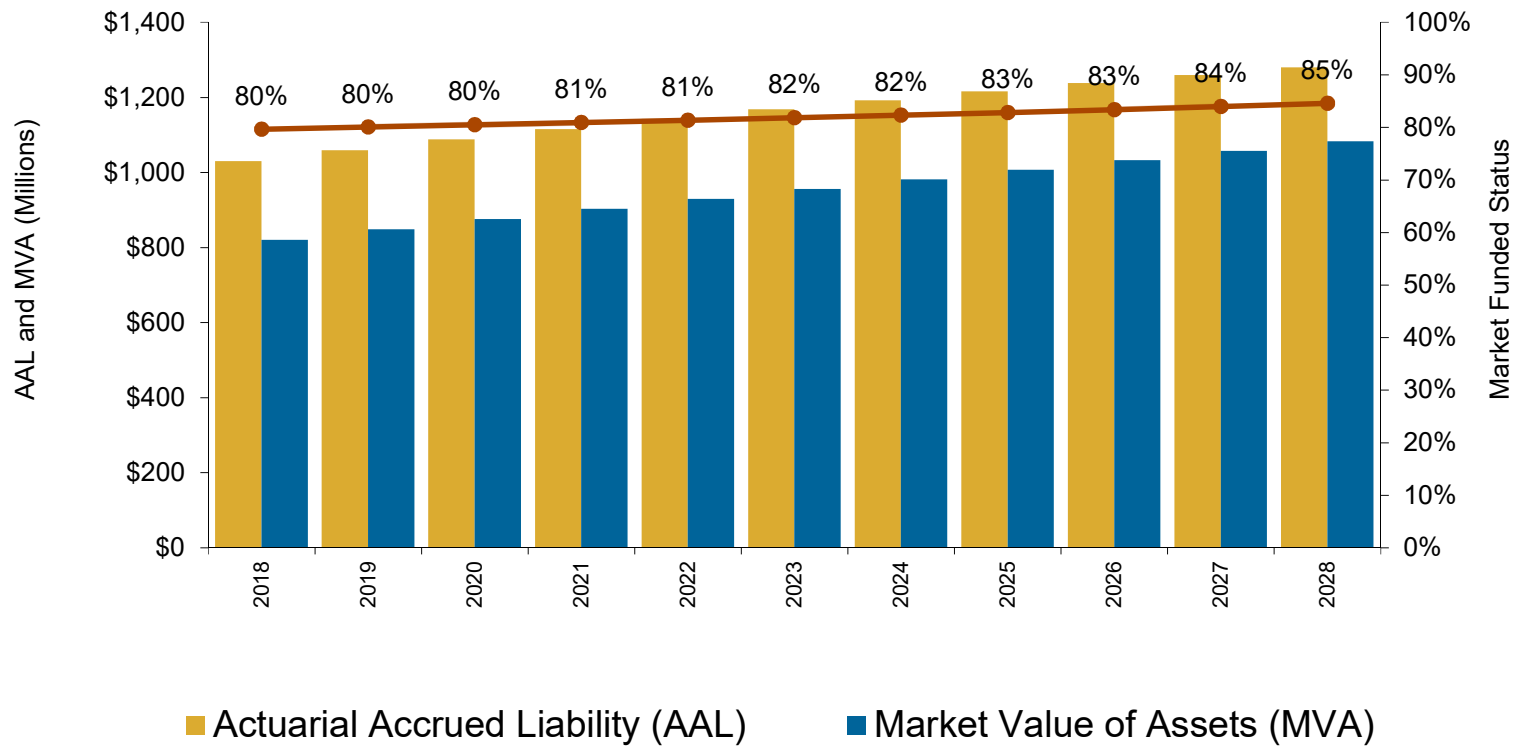
Funded ratio, on average, gradually increases over time

● In the Callan baseline scenario, funded ratio increases to 85% by September 1, 2028

Expected Cash Flow Profile

Net Cash Outflow: (Benefits-Contributions)/ Assets

Plan is expected to have moderate net outflows over the next decade

● Net outflow is expected to slowly increase to roughly 4% of asset base by 2028

● Recall asset base is expected to grow over decade, buoyed by contributions

● Projection assumes the current funding policy is followed each year

This liquidity profile is supportive of a one-quarter allocation to illiquid alternative assets

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Asset-Liability Modeling

Simulate Financial Condition
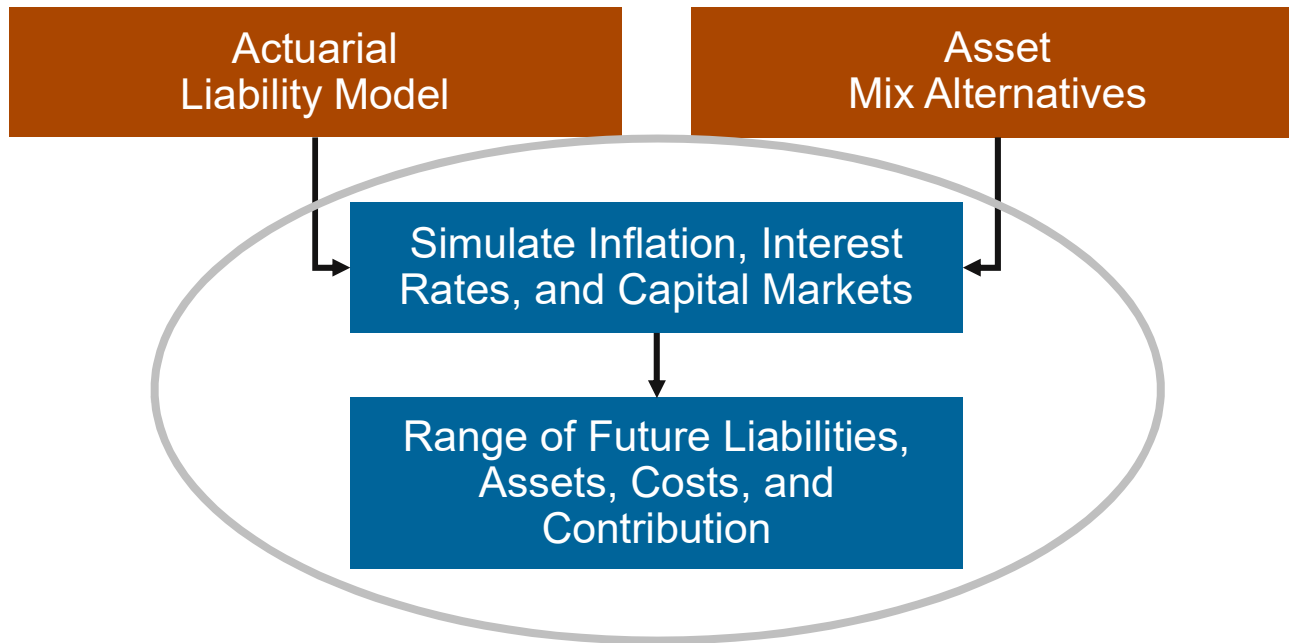
Our model generates 2,000 simulations per year, per asset mix, to capture possible future economic scenarios and their effect on the portfolio

The simulation results were then ranked from highest to lowest to develop probability distributions

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Market Value of Assets for Current Target Mix

Asset growth = Contributions – Benefit payments + Investment earnings
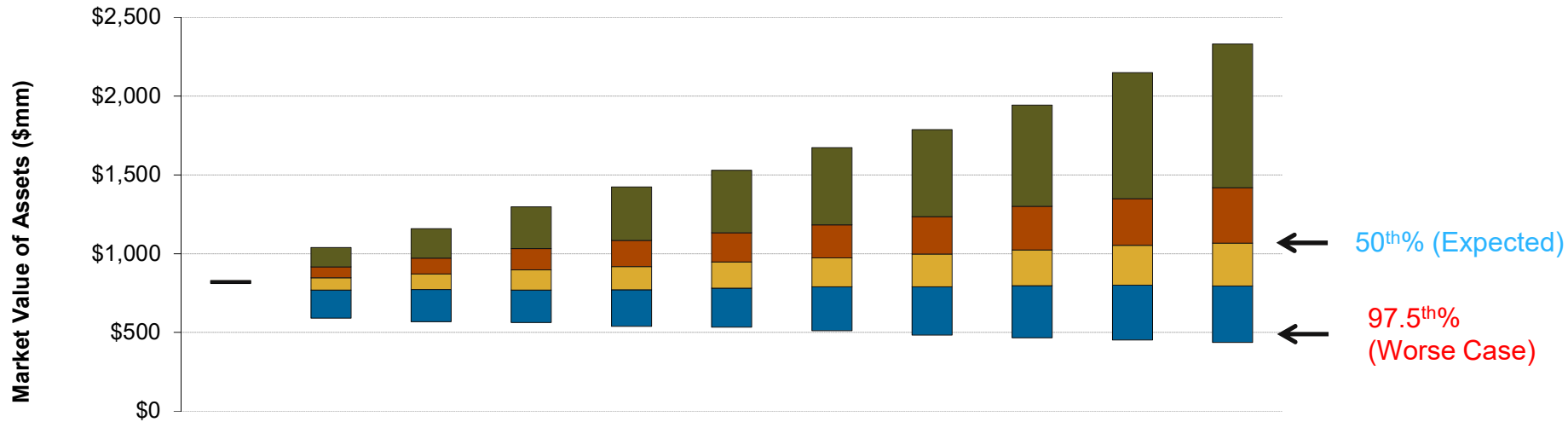
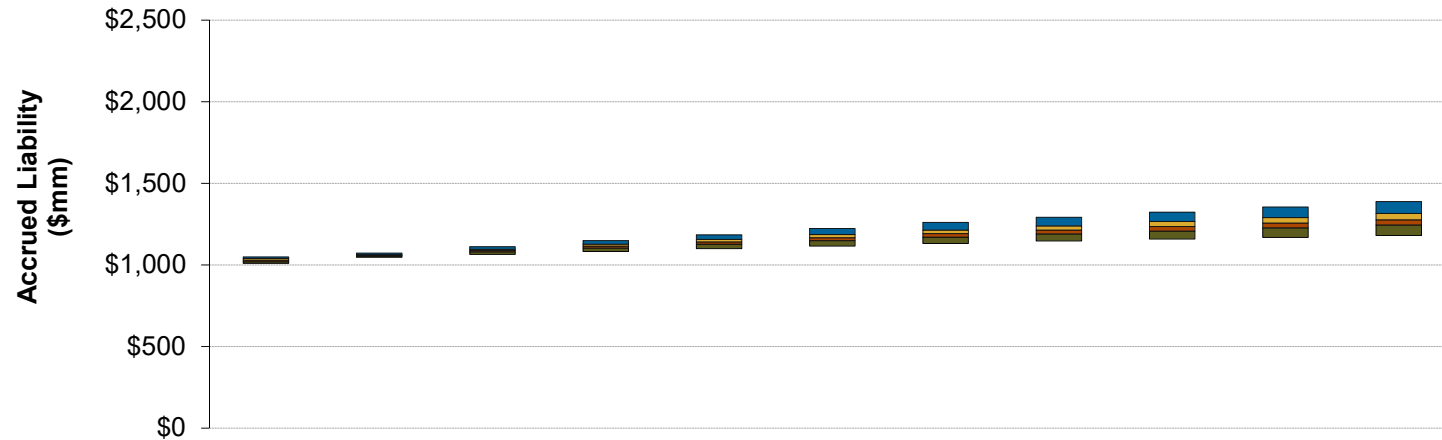| Percentile	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
2.5th	$820	$1,039	$1,158	$1,297	$1,423	$1,529	$1,673	$1,787	$1,943	$2,150	$2,331
25th	820	917	971	1,031	1,084	1,132	1,182	1,234	1,301	1,350	1,418
50th	820	847	872	897	918	947	974	998	1,023	1,053	1,067
75th	820	769	772	769	771	781	789	789	797	801	796
97.5th	820	590	568	563	538	533	510	484	466	452	436
Range		448	590	734	885	996	1,163	1,303	1,478	1,698	1,895

The expected outcome is the 50th percentile, a 50/50 chance of occurrence

The worse case scenario is the 97.5th percentile; a 1 in 40 chance of occurrence

- For example, there is a 1 in 40 chance (2.5% probability) that the 9/1/2028 market value of assets will be $436m or less with the current target asset allocation policy

Actuarial Liability

Percentile	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
97.5th	$1,030	$1,072	$1,111	$1,149	$1,185	$1,223	$1,260	$1,291	$1,323	$1,355	$1,387
75th	1,030	1,063	1,095	1,127	1,157	1,185	1,213	1,239	1,266	1,291	1,316
50th	1,030	1,059	1,088	1,115	1,142	1,167	1,191	1,214	1,236	1,257	1,277
25th	1,030	1,055	1,080	1,104	1,127	1,149	1,171	1,190	1,209	1,226	1,244
2.5th	1,030	1,047	1,065	1,083	1,100	1,116	1,131	1,147	1,158	1,169	1,180
Range	0	25	46	66	85	107	129	145	165	186	207

The size of the actuarial liability is expected to slowly grow over time

● Drivers include wage growth for current employees and a gradually increasing number of inactives

Evaluating 9/1/2028 Funded Status by Policy Mix
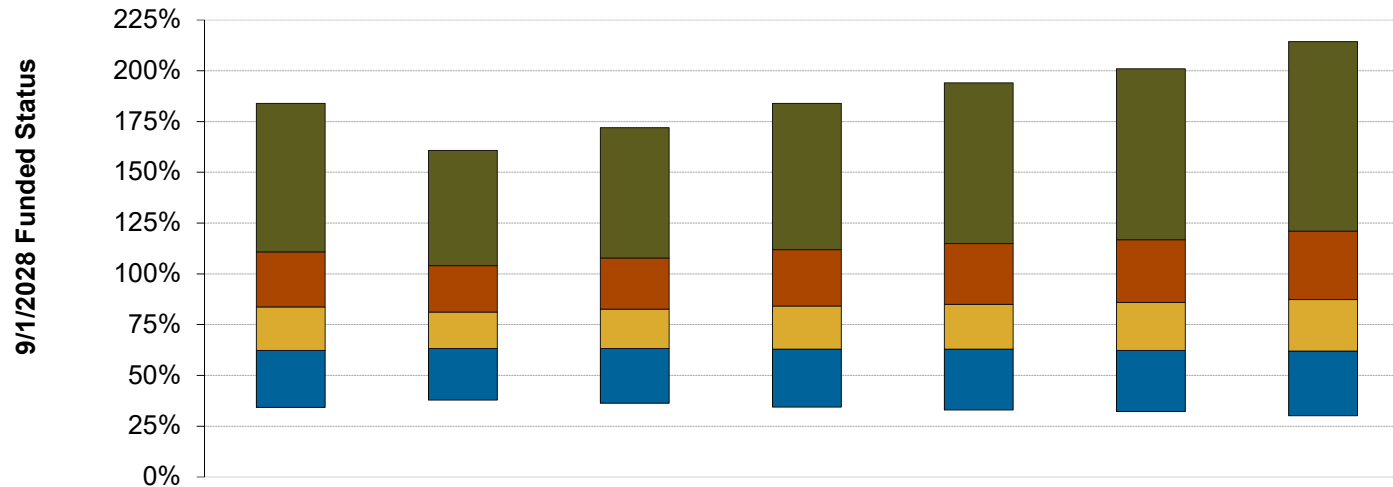
Percentile	Target	Mix 1	Mix 2	Mix 3	Mix 3.5	Mix 4	Mix 5
2.5th	184%	161%	172%	184%	194%	201%	214%
25th	111%	104%	108%	112%	115%	117%	121%
50th	84%	81%	83%	84%	85%	86%	87%
75th	62%	63%	63%	63%	63%	62%	62%
97.5th	34%	38%	36%	34%	33%	32%	30%
Expected Return	6.91%	6.61%	6.78%	6.94%	7.00%	7.09%	7.22%
Standard Deviation	13.81%	11.80%	12.80%	13.80%	14.27%	14.80%	15.80%

Recall the starting funded status is 80%

More aggressive mixes are <u>expected</u> to modestly improve funded status over time; however, they will result in a lower funded status in a worse case scenario (97.5[th] percentile)

Funding ratios in worse case scenario are particularly low because contribution policy is not impacted by declining funded status

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10-Year Cumulative Contributions by Mix
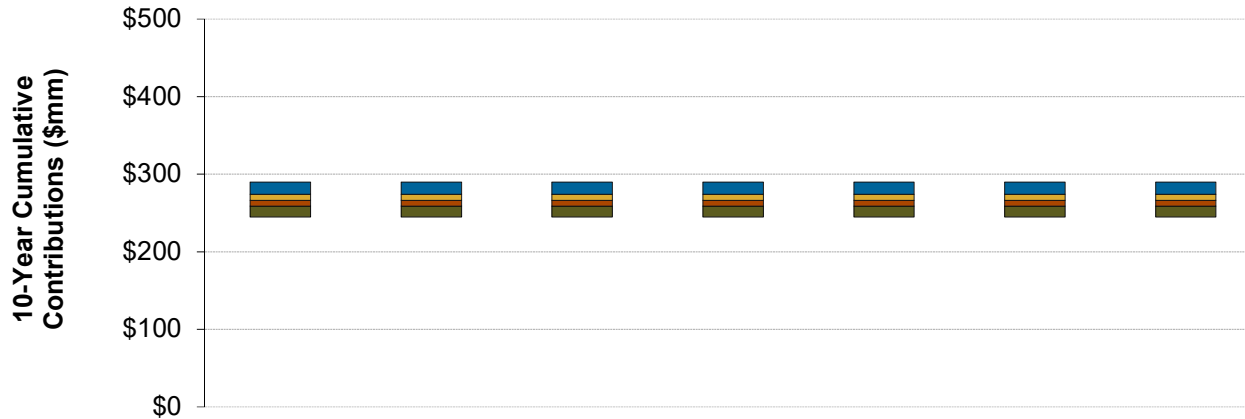
Percentile	Target	Mix 1	Mix 2	Mix 3	Mix 3.5	Mix 4	Mix 5
97.5th	$290	$291	$290	$290	$290	$290	$290
75th	274	274	274	274	274	274	274
50th	266	266	266	266	266	266	266
25th	259	259	259	259	259	259	259
2.5th	245	245	245	245	245	245	245
Expected Return	6.91%	6.61%	6.78%	6.94%	7.00%	7.09%	7.22%
Standard Deviation	13.81%	11.80%	12.80%	13.80%	14.27%	14.80%	15.80%

As contributions are a fixed percentage of payroll, not impacted by asset allocation policy choice

- Modest volatility stems from impact of realized inflation on payrolls

Ultimate Net Cost

Projection Date: September 1, 2028
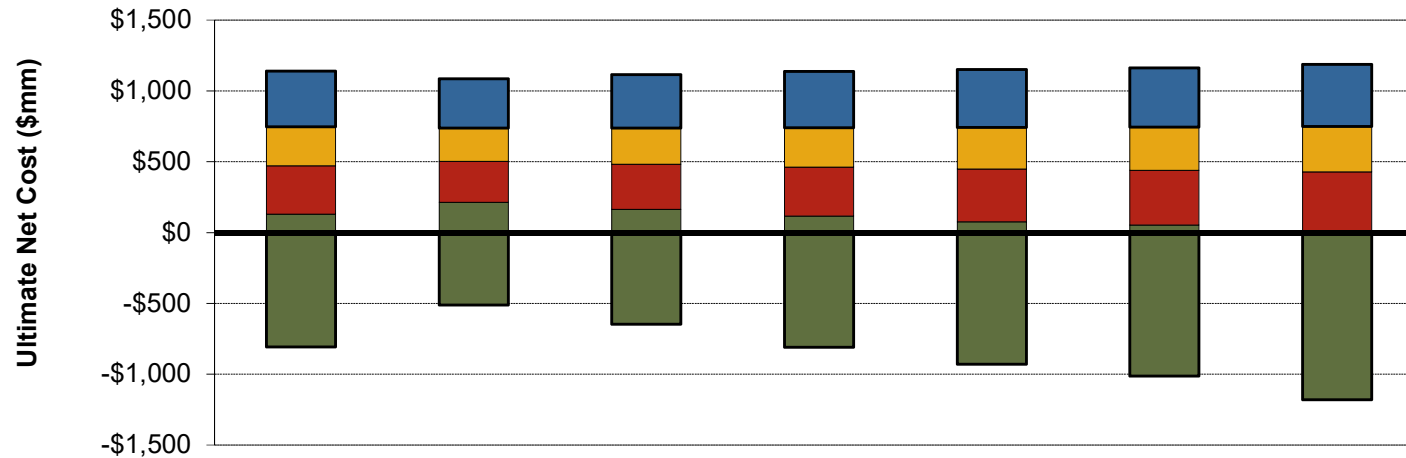
Percentile	Target	Mix 1	Mix 2	Mix 3	Mix 3.5	Mix 4	Mix 5
97.5th	$1,140	$1,085	$1,115	$1,138	$1,153	$1,162	$1,187
75th	747	738	739	740	742	744	750
50th	472	503	483	462	449	440	428
25th	130	214	165	116	76	53	-3
2.5th	-807	-511	-647	-809	-929	-1,012	-1,181
Expected Return	6.91%	6.61%	6.78%	6.94%	7.00%	7.09%	7.22%
Standard Deviation	13.81%	11.80%	12.80%	13.80%	14.27%	14.80%	15.80%

Ultimate Net Cost (UNC) = 10-Year Cumulative Contributions + 9/1/2028 Unfunded Actuarial Liability

UNC captures what is expected to be paid over 10 years plus what is owed at the end of the 10 year period

● Negative numbers indicate the plan is in a surplus position at 9/1/2028

More aggressive mixes lower UNC in the expected case but result in greater UNC in a worse case scenario

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Ultimate Net Cost (UNC)

UNC = 10-Year Cumulative Contributions + 9/1/2028 Unfunded Actuarial Liability
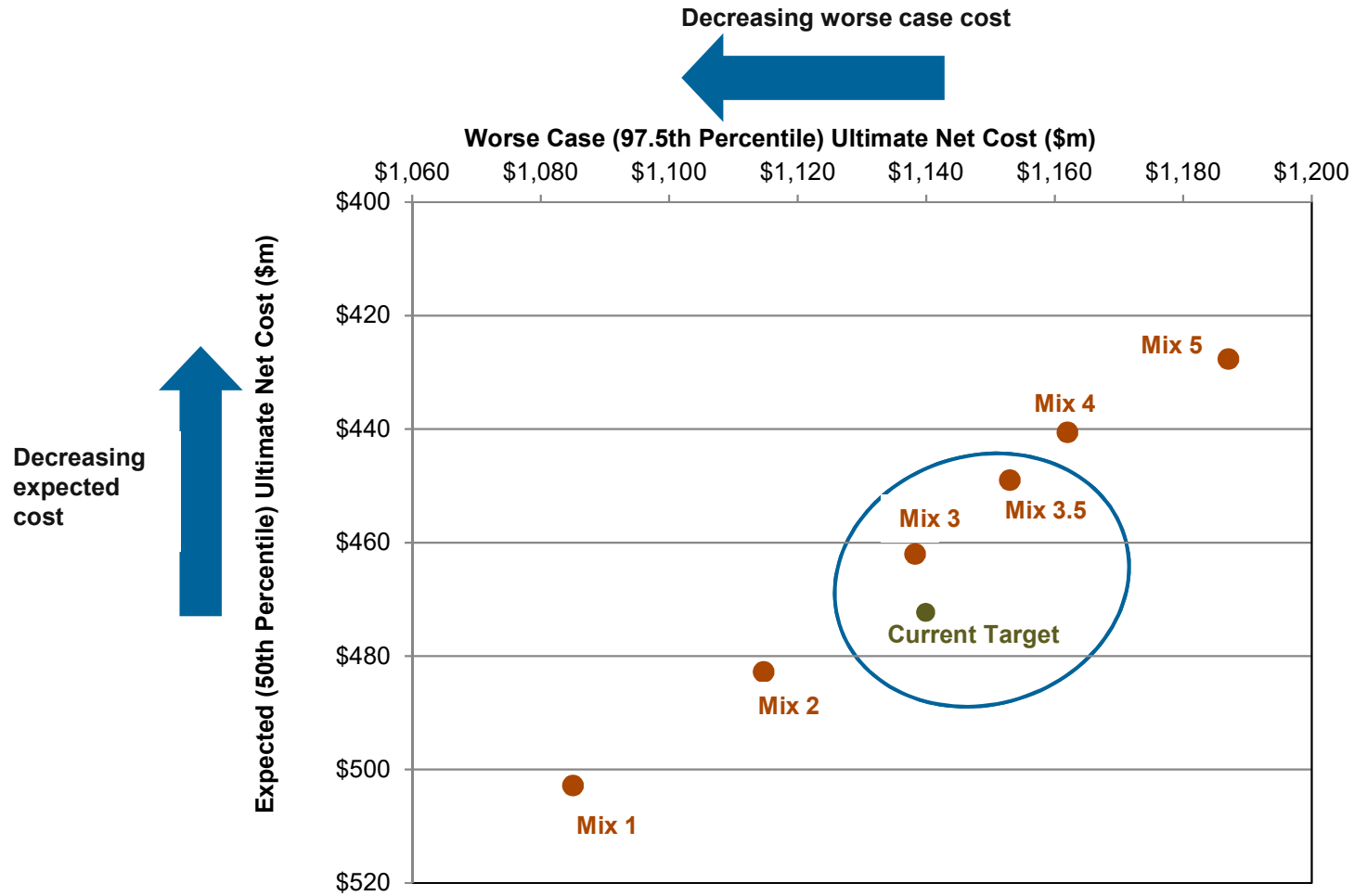
Tradeoff is roughly linear for optimal mixes

Mix 3 reduces expected ultimate net cost by $10m relative to current target with slightly less downside

Mix 3.5 reduces expected ultimate net cost by $23m with moderately increased downside

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Recommendation

Recommendation

Callan recommends either Mix 3 or Mix 3.5:

- Reduces reliance on US public equity markets

- Increases private equity to marginally increase expected return
  - Plan liquidity ample to support modest increase in alternatives

- Mix 3 slightly increases fixed income while Mix 3.5 slightly reduces fixed income

More aggressive mixes such as Mix 4 or Mix 5 significantly increase the impact of equity market drawdowns and are not recommended

	Target	Mix 3	Mix 3.5
Broad US Equity	35%	30%	31%
Global Ex-US Equity	19%	20%	21%
Fixed Income	25%	27%	24%
Cash	1%	1%	1%
Real Estate	10%	10%	10%
Private Equity	10%	12%	13%
Total	**100%**	**100%**	**100%**
Total Equity	54%	50%	52%
Total Fixed Income	26%	28%	25%
Total Alternatives	**20%**	**22%**	**23%**

Mix Characteristics

	Target	Mix 3	Mix 3.5
Expected Return	6.91%	6.94%	7.00%
Standard Deviation	13.81%	13.80%	14.27%
Sharpe Ratio	0.32	0.32	0.32
Expected Funded Ratio (2028)	84%	84%	85%
Worse Case Funded Ratio (2028)	34%	34%	33%
Expected Ultimate Net Cost ($m)	472	462	449
Worse Case Ultimate Net Cost ($m)	1140	1138	1153

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Appendix

Optimal Asset Mixes with Additional Real Estate (Mix 3 More RE)

	Target	Mix 1	Mix 2	Mix 3	Mix 3 More RE	Mix 3.5	Mix 4	Mix 5
Broad US Equity	35%	25%	28%	30%	30%	31%	32%	34%
Global Ex-US Equity	19%	17%	19%	20%	20%	21%	22%	23%
Fixed Income	25%	37%	32%	27%	24%	24%	21%	16%
Cash	1%	1%	1%	1%	1%	1%	1%	1%
Real Estate	10%	9%	9%	10%	15%	10%	11%	12%
Private Equity	10%	11%	11%	12%	10%	13%	13%	14%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**
Total Equity	54%	42%	47%	50%	50%	52%	54%	57%
Total Fixed Income	26%	38%	33%	28%	25%	25%	22%	17%
Total Alternatives	*20%*	*20%*	*20%*	*22%*	*25%*	*23%*	*24%*	*26%*
Mix Characteristics								
Expected Return*	6.91%	6.61%	6.78%	6.95%	6.91%	7.01%	7.10%	7.23%
Standard Deviation	13.81%	11.80%	12.80%	13.80%	13.77%	14.27%	14.80%	15.80%
Sharpe Ratio	0.32	0.35	0.33	0.32	0.32	0.32	0.31	0.30

* 10 year annualized return

● Mix 3 More RE reduces expected return relative to Mix 3 at comparable risk level

Private equity allocation is constrained to maximum of 25% of public equity allocation. Cash minimum allocation of 1% for plan liquidity needs.

Tie Out of Buck and Callan Full Funding Horizon Projections

Comparison of the two models using <u>7.5% assumed investment return and 3% inflation</u>

In this scenario, Buck forecasts the plan will be fully funded in 14 years (2032) while Callan projects 17 years (2035). The incremental difference in time horizon is largely driven by:

1) Callan is incorporating administrative expenses; Buck is not. Removing administrative expenses from Callan's model reduces the projected time horizon from 17 years down to 15 ½ years

2) Callan is using an open group methodology in which new hires are incorporated directly into the projection; Buck's projections are based on 3% salary growth and no new entrants

Callan has discussed this issue directly with Buck and both agree modest differences in methodology compounded over such a long horizon can readily explain the difference

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