



Asset / Liability Study

City of Jacksonville Police & Fire Pension Fund

May 25, 2018

Introduction

- The Jacksonville Police and Fire Pension Plan is a contributory defined benefit pension plan established under Section 401(a) of the Internal Revenue Code.
 - Effective October 1, 2017, the Plan was closed to new entrants.
- To embark upon this study, Summit utilized the Plan's actuarial valuation report as of October 1, 2017 produced by GRS Retirement Consulting.
- The specific sections of this presentation include:
 - An Executive Summary showing key messages from the Study.
 - A 30-year baseline projection which forecasts the expected path of assets, liabilities, funded status, benefit payments and contributions.
 - An analysis of the impact of various portfolios upon critical metrics such as evolution of market value, funded status, and cumulative contributions using a 30-year investment time horizon.
 - A recommendation regarding an appropriate portfolio to adopt, given the FIAC and Board's collective risk posture.

Executive Summary

- The purpose of this Asset/Liability Study is to analyze the current asset allocation policy in the context of the recently updated actuarial valuation (liabilities) and the current investment environment (assets). The goals of the study are to:
 - Establish a “baseline” summarizing the expected evolution of the Plan’s assets and liabilities over time.
 - The baseline uses current plan assets and liabilities, along with the plan provisions and assumptions modeled over 30 years. Projected annual benefit payments grow from \$178 million to \$409 million over the 30-year projection period.
 - Total contributions decline from \$143 million to \$110 million, until 2031 when the Surtax proceeds begin to be applied to the Plan. At the end of the 30-year projection period, the total annual contributions are approximately \$205 million.
 - Outline the application of the Pension Liability Surtax and its impact on the Plan.
 - Recognition of the present value of the Surtax significantly reduces the City Contributions and increase net cash outflow which impacts Plan liquidity.
 - Review current capital market assumptions.
 - The Study utilizes Summit’s 30-year capital market assumptions, net of fees and volatility. Because of current capital market valuations, even the 30-year expected return assumptions remain below historic averages for some asset classes.

Executive Summary (continued)

- Review and stress test the current target asset allocation and risk levels of the portfolio.
 - The Study uses stochastic modeling, incorporating volatility of expected asset returns, along with scenario analysis to examine the impact of adverse financial events.
 - A 7% total portfolio return is achievable when alpha is considered. Under the “worst case” scenario, the Minimum Liquidity Ratio is triggered, requiring related contributions.
- Identify any enhancements to the current asset allocation that should be considered from a risk/return perspective.
 - An allocation to small cap should be incorporated into the international equity portfolio.
 - Increasing private investments (private equity/debt, private natural resources, and private non-core real estate) can raise expected return , but such increase must be considered against the Plan’s liquidity needs in a stressed environment.
- Recommend a target asset allocation for adoption by the FIAC and Board of Trustees.
 - Due to the decrease in contributions, portfolio liquidity needs will dictate available options to alternative assets.
 - Allocation to private investments should be implemented using a “best idea” approach without strategic weights to each type of private investment. Private investments in aggregate should not exceed a target of 10% of total assets at this time.

Overview of Asset/Liability Study

■ Pension Model:

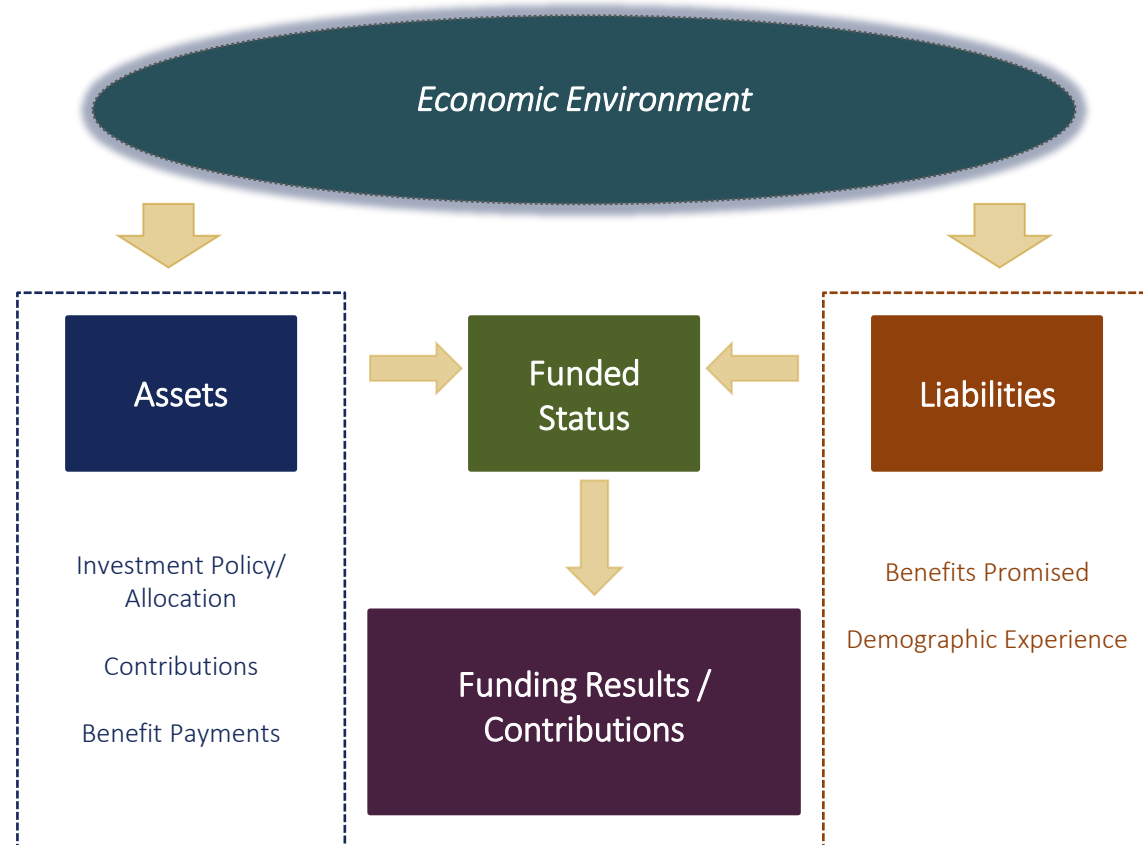
- Valuation results were as of October 1, 2017 (Plan Year 2018).
- Census data was utilized as of July 1, 2017.
- The Plan closed to new entrants on October 1, 2017.
 - As such, the study assumes a declining active population.

■ Baseline Projection:

- Deterministic outcomes based on the actuary's predetermined set of assumptions, including liability assumptions and expected asset return.
- A discount rate of 7% is assumed to remain static throughout the projection period.
- Assets are assumed to earn an annual return of 7%.
- Study incorporates the evolution of active participants into the DROP program, per the actuary's assumptions.

■ Stochastic Analysis:

- Incorporates volatile asset returns utilizing Summit's current capital market assumptions.



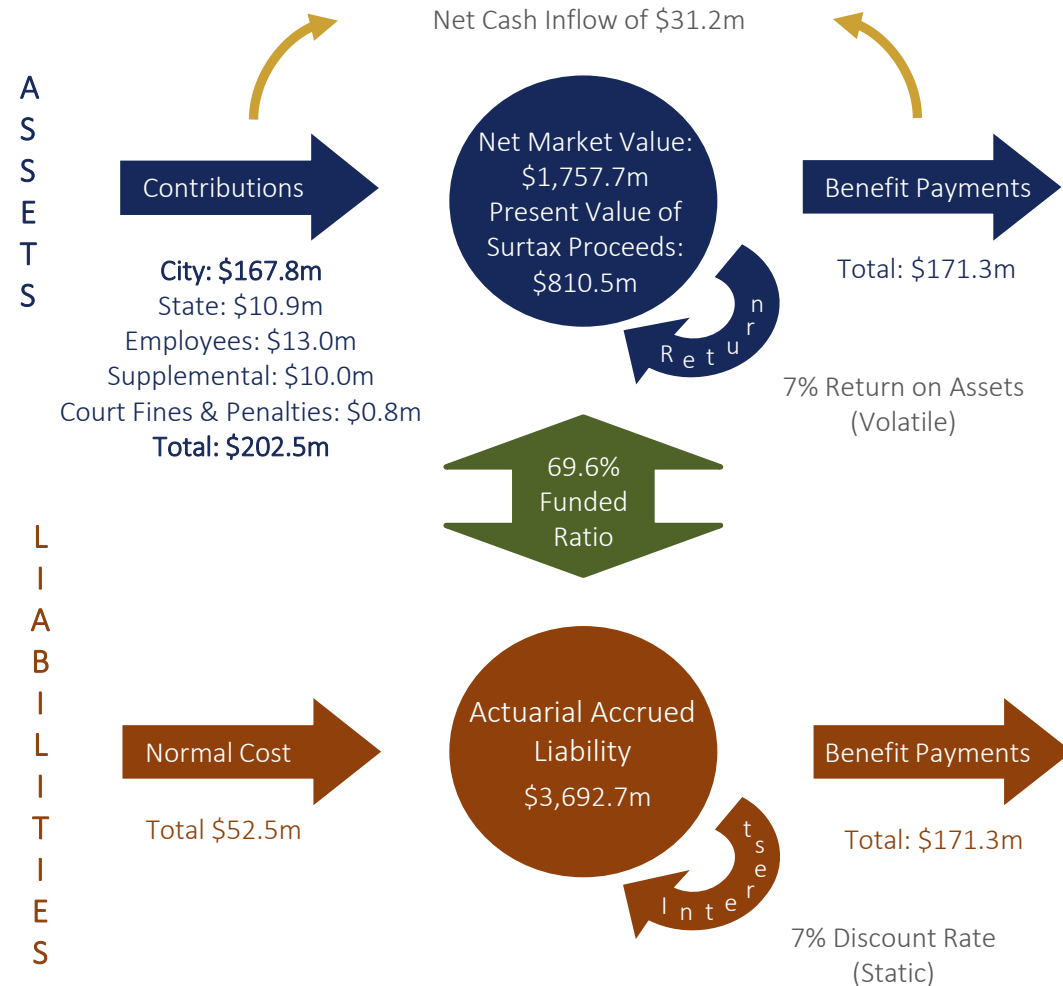
Overview of Pension Liability Surtax

- Florida Statute 112.64(6) authorized the application of proceeds of the Pension Liability Surtax to reduce the unfunded liability of the Plan.
 - Ordinance 2017-257 outlines the application of the Surtax for the City of Jacksonville's three defined benefit pension funds: the Police and Fire Pension Fund, the Correction Officers Fund, and the General Employee Pension Fund.
 - The Pension Liability Surtax will begin on January 1 immediately following the expiration of The Better Jacksonville ½-cent Sales Tax; recognition of funds into the Plan will begin no later than January 1, 2031. The Surtax will remain in effect no longer than 30 years and is eligible for termination prior if the Plans become fully funded.
- Specifically, Ordinance 2017-257 implemented changes required to reflect the present value of the Pension Liability Surtax.
 - Recognition of the Surtax offsets the Plan's current Unfunded Actuarial Accrued Liability (UAAL) by the present value of the future revenue stream to be received in calendar years 2031 through 2060.
 - This results in a significant reduction in annual contributions to the Plan in fiscal years 2018 through 2030, delaying the Plan's projected full funding date. As you will see later in the Study, this will also effect the Plan's net cash flow and liquidity needs of the Plan's investable assets.
 - The application of the Minimum Liquidity Ratio outlined in Ordinance 2017-259 is intended to prevent insolvency of the Plan in the event of financial stress (addressed in further detail later in the presentation).
- This study assumes Surtax revenue will grow at 4.25% per year. The Plan will begin to receive 62.5% of the Surtax proceeds in calendar year 2031.

Note: The Minimum Liquidity Ratio requires the Plan to consider funding at least \$110 million in contributions in the event the ratio of the Plan's assets to annual benefit payments drops below 5.0.

Plan Summary as of October 1, 2017

- Funded status of the Plan was 69.6%.
 - $\text{Funded Status} = (\text{NMV} + \text{PV Surtax Proceeds}) / \text{AAL}$
 - NMV (Net Market Value) is the “Investable Portfolio”, and does not include the PV Surtax Proceeds.
 - Excluding PV Surtax Proceeds, the funded status is 47.6%.
- Assets decline due to benefits paid and from negative investment returns. Assets increase due to contributions made, as well as from positive investment returns.
- The AAL declines as benefits are paid, and increases as new benefits are earned (normal cost) and over time by the discount rate.
- Net cash outflow is the difference between benefit payments and contributions. This amount must be covered by investment earnings or liquidation of a portion of the “Investable Portfolio”.

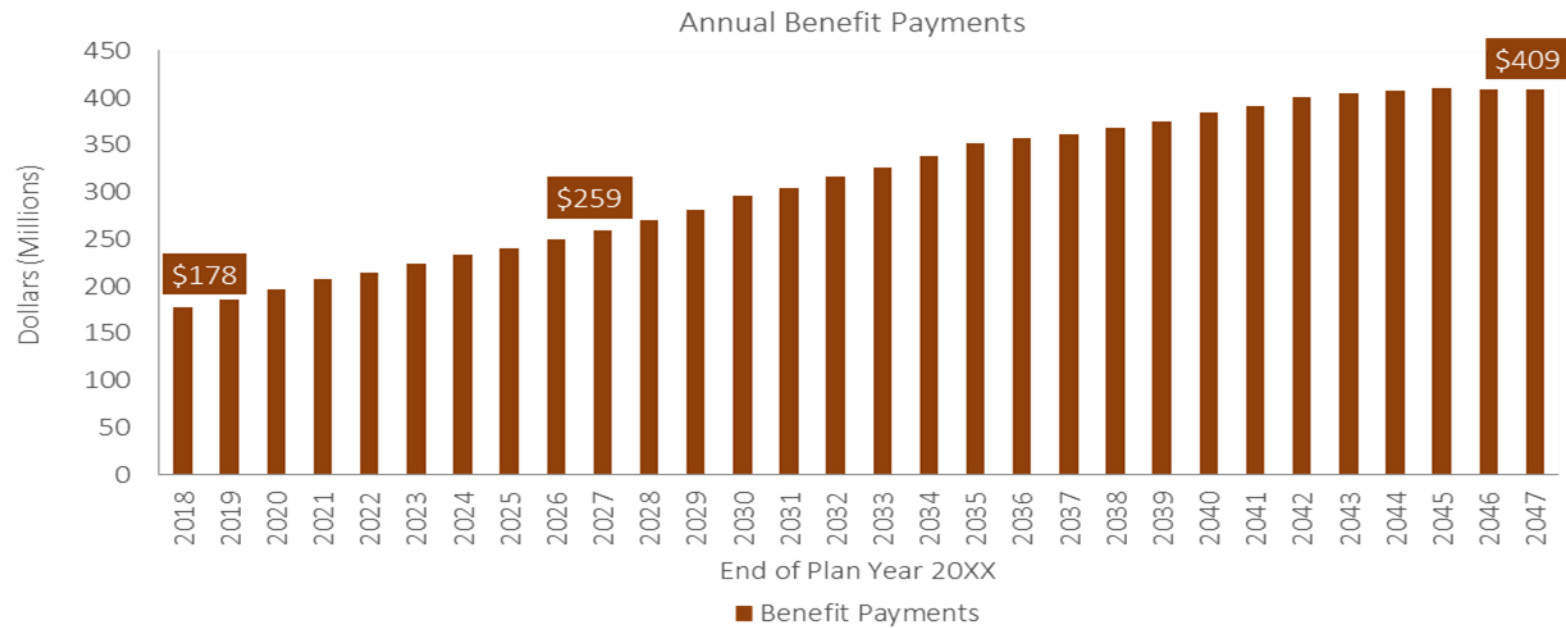


Note: The numbers presented above are based on the Plan's Actuarial Valuation Report as of October 1, 2017. Contributions are shown as of October 1, 2017 resulting in a net positive cash flow to the Plan of \$31.2 million.

Assumptions and Additional Considerations

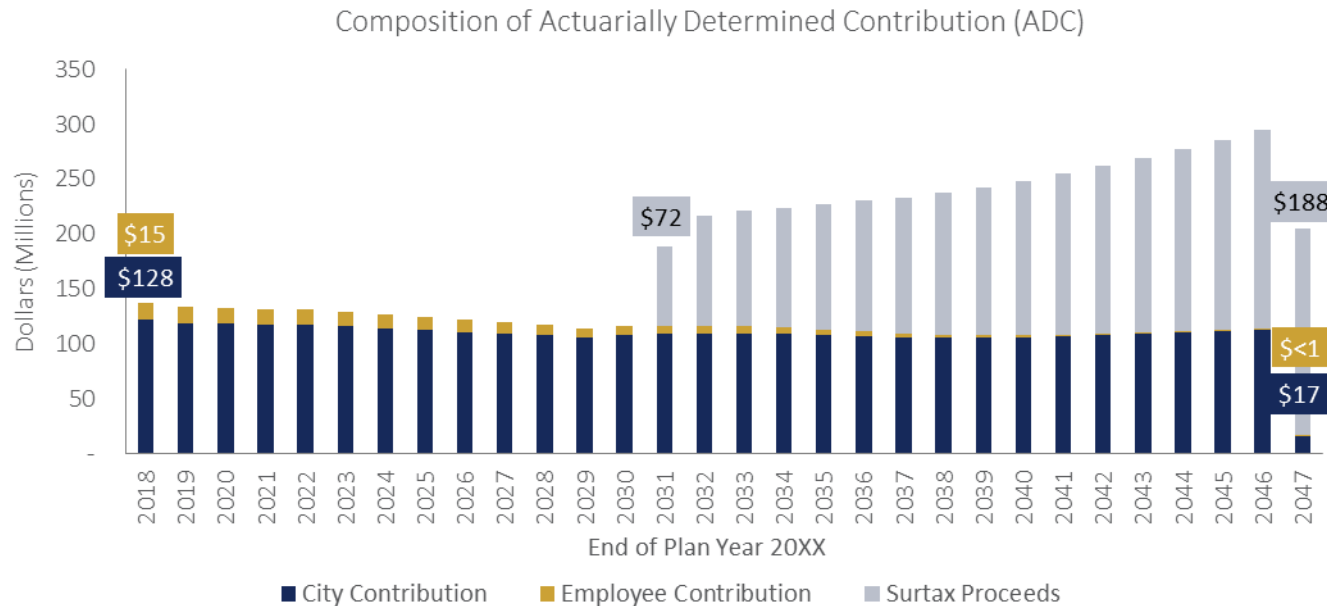
- “Investable Portfolio” is defined as the portion of the market value of the financial assets that can truly be invested. In other words, it excludes the present value of Surtax proceeds.
 - Although the present value of the Surtax proceeds will be considered in the baseline projection of liabilities and related critical metrics, it is not an investable asset and therefore not included in the asset allocation analysis.
- Population Assumptions:
 - 95% of active employees will participate in the DROP program for five years.
 - Other assumptions are consistent with those utilized within the actuarial valuation.
- Present Value of Surtax Proceeds Assumptions:
 - Assumes a 4.25% growth rate in Surtax revenue throughout the projection period, with the Plan receiving 62.5% of proceeds beginning in calendar year 2031.
- Liquidity Ratio Rule: If the ratio of Investable Portfolio/annual benefit payments in any given year drops below 5.0, the City must contribute a minimum of \$110 million or the amount needed to bring the ratio to up to 5.0.
 - This will materially impact the downside results within the stochastic modeling section of this study.
- The next section of the asset/liability study will summarize the results of the baseline projection.
 - The baseline projection will span a total of 30 years, in order to fully address the impact of the Pension Liability Surtax.

Benefit Payments



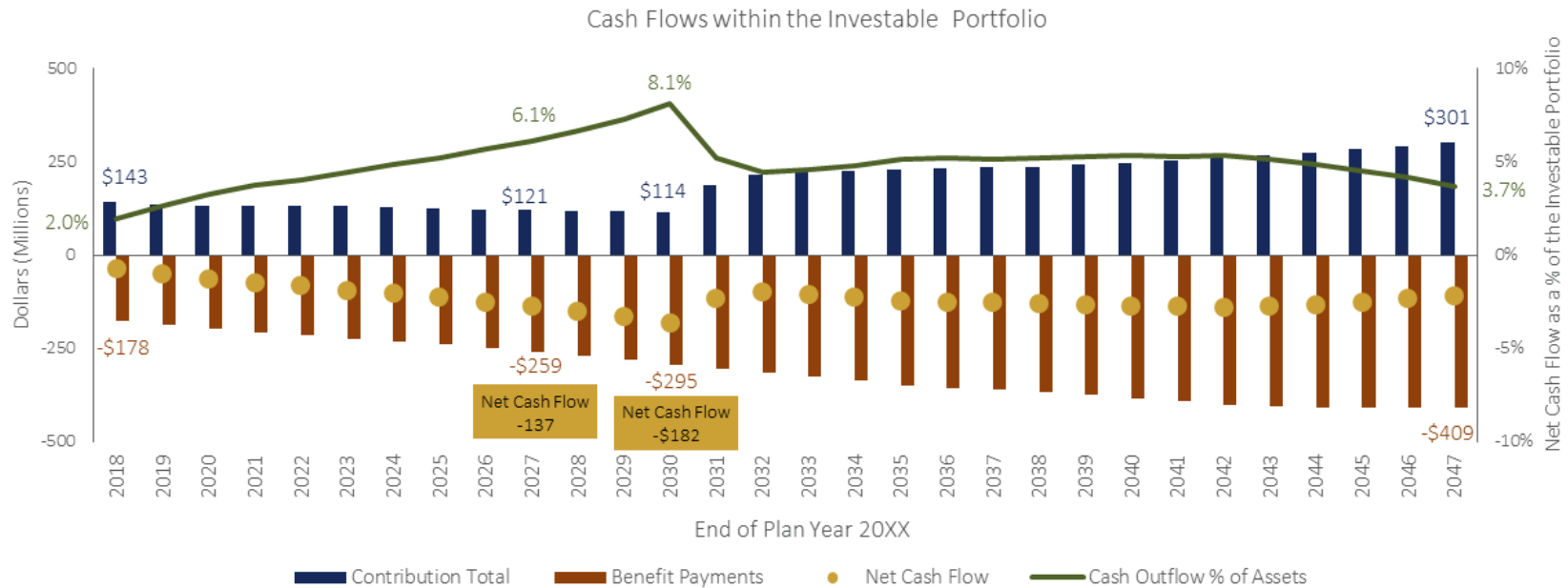
- The projected annual benefit payments begin at \$178 million in the first year and grow to \$409 million at the end of the projection, increasing by almost 130% over the 30-year projection period.
 - Cumulative benefit payments over the 10- and 30-year projection periods are estimated to be \$2.2 billion and \$9.3 billion, respectively.

Composition of Contributions



- By Ordinance, the Plan reflects the present value of the Surtax proceeds as an asset, reducing current required contributions.
- Cumulative total contributions (including future Surtax proceeds) over the 10- and 30-year projection periods are estimated to be \$1.3 billion and \$5.7 billion, respectively.
 - Cumulative city contributions are expected to be \$1.15 billion (10 years) and \$3.19 billion (30 years).
- The Surtax proceeds are expected to be received beginning in calendar year 2031, and are treated as a contribution to the Plan.
- Part of the ADC is paid by the Plan's active and DROP employees each year, so that the City is not responsible for contributing the entire amount.
 - The 30-year projection shows the employee contribution amount as decreasing to almost zero, due to the closed status of the Plan.
 - City contributions decrease dramatically in plan year 2047 because the Plan is projected to be fully funded after recognizing the Surtax proceeds.

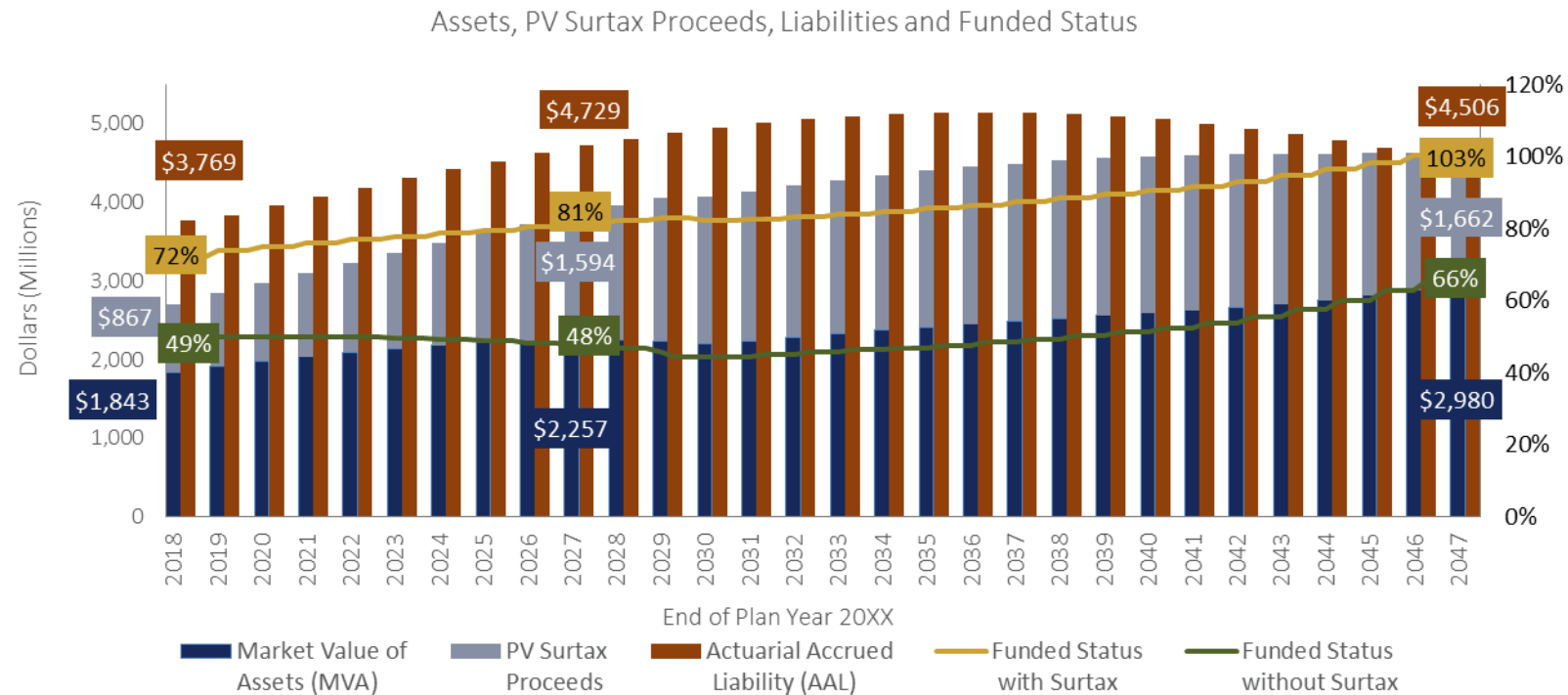
Liquidity Needs and Net Cash Flows



- Cash inflows decrease until 2030 due to decreased contributions, and are offset by increasing cash outflows resulting in a negative net cash flow.
- Aggregate net cash outflows as a percentage of the market value of assets is a measure of the liquidity needs required to be sourced from the Investable Portfolio (through income generated or sale of assets).
- This metric begins the projection at a very manageable 2.0%, peaks at 8.1% (which will require careful liquidity management, implemented in conjunction with periodic rebalancing), and drops thereafter to 3.7% at the end of the projection period.
- Beginning in plan year 2031 when Surtax proceeds are first recognized, net cash outflow declines immediately.
- Cash outflow increases slightly until 2042, then decreases to \$107 million by 2047 as the Plan matures.
- Contribution policy becomes restrictive and will affect asset allocation decisions. Portfolio liquidity, accomplished through portfolio construction, needs to be a primary focus given the dramatic increase in liquidity needs spanning 2018-2030 (before the Surtax proceeds commence).

Note: Cash outflow is the difference between benefit payments and contributions. Contributions presented are the Actuarially Determined Contribution (ADC), which includes contributions made by the City, State, and Employees. Cash outflow is presented as a percent of the Investable Portfolio.

Assets, Present Value of Surtax Proceeds, Liabilities and Funded Status

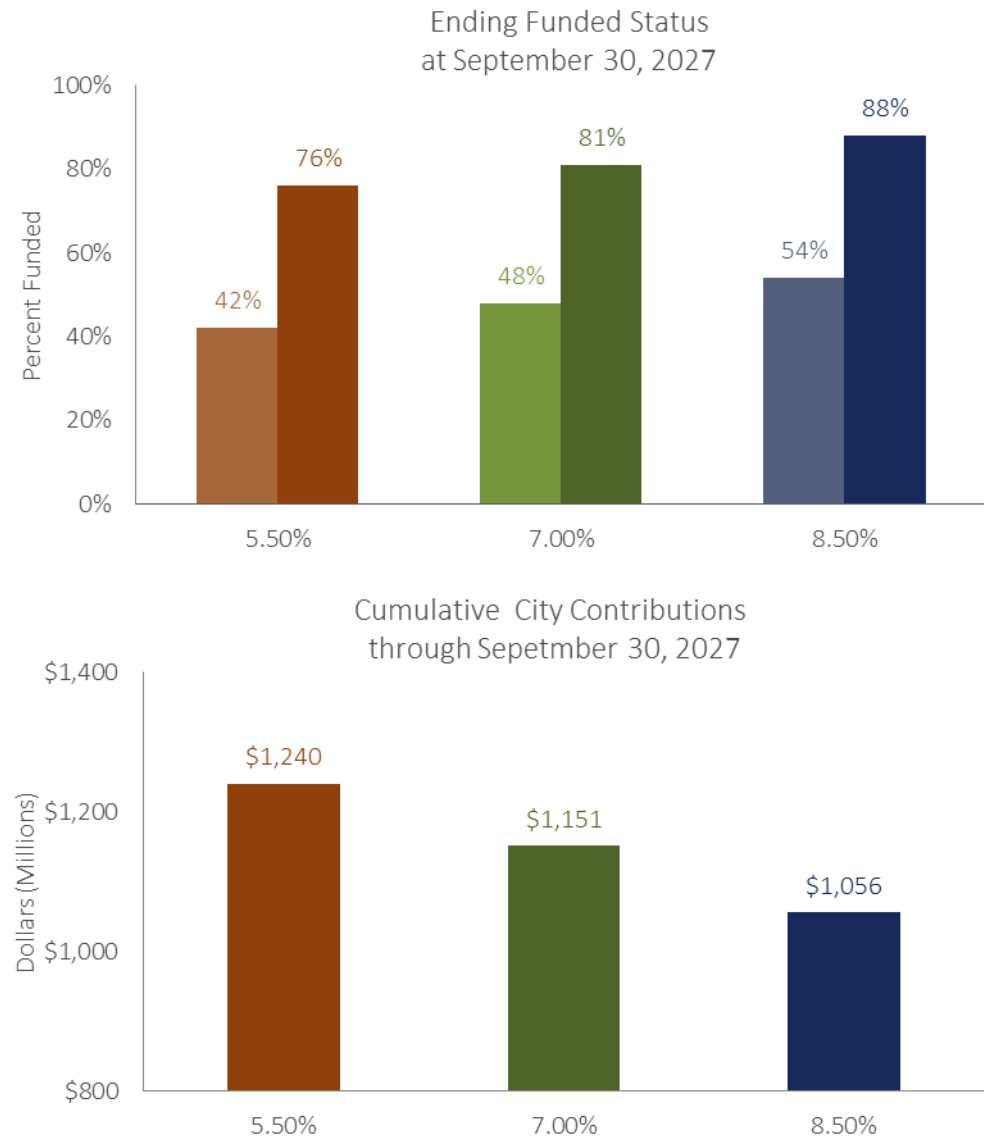
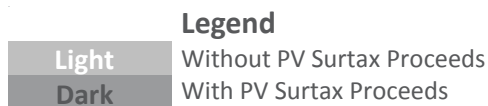


- Important metrics are shown with and without considering the present value of the Surtax proceeds.
- Without considering the present value of Surtax proceeds, funded status improves over the 30-year period from 49% in 2018, to 66% in 2047.
 - This implies that at a 7% assumed asset return, the Surtax proceeds through 2060 *will be necessary* to fully fund the Plan.
- Considering the present value of Surtax proceeds, funded status improves meaningfully over the 30-year period from 72% in 2018, to 103% in 2047.
- The present value of Surtax proceeds is providing a much improved projected funded status.
- Liabilities are projected to increase steadily, peaking in 2036.

Note: Assets are assumed to earn 7%, and the PV of Surtax Proceeds are discounted at 7%.

Sensitivity Analysis – The Impact of Asset Return Upon Funded Status and Contributions

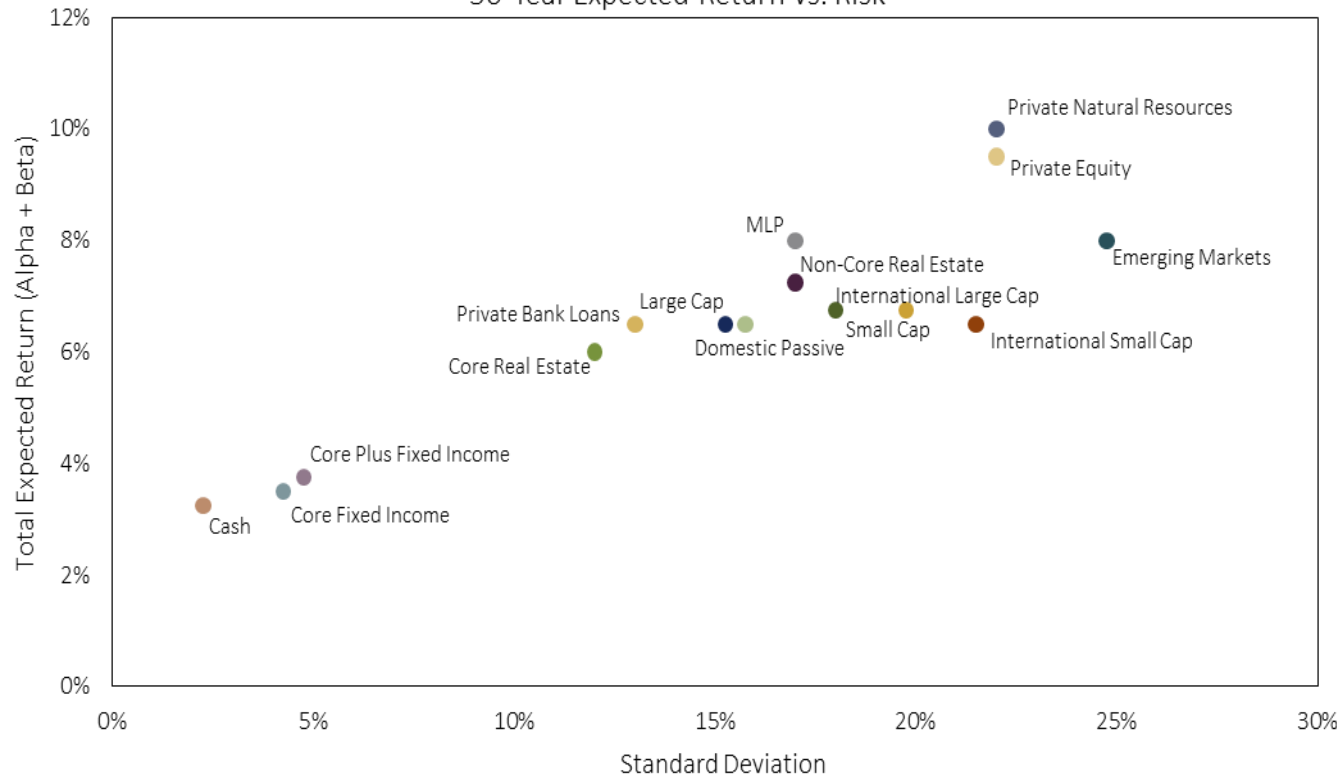
- The charts to the right illustrate the impact of investment return upon ending funded status and cumulative city contributions over the 10-year projection period.
- Compared to the baseline (7.0% asset return):
 - A 5.5% investment return results in a 5% decrease in funded status and \$89 million more in cumulative contributions.
 - An 8.5% investment return results in a 7% increase in funded status and \$95 million less in cumulative contributions.
- Not taking enough portfolio risk to achieve 7% will delay the full funding date and increase contributions.



Note: Assumes all Surtax proceeds are received throughout the projection.

Capital Market Assumptions as of December 31, 2017

30-Year Expected Return vs. Risk



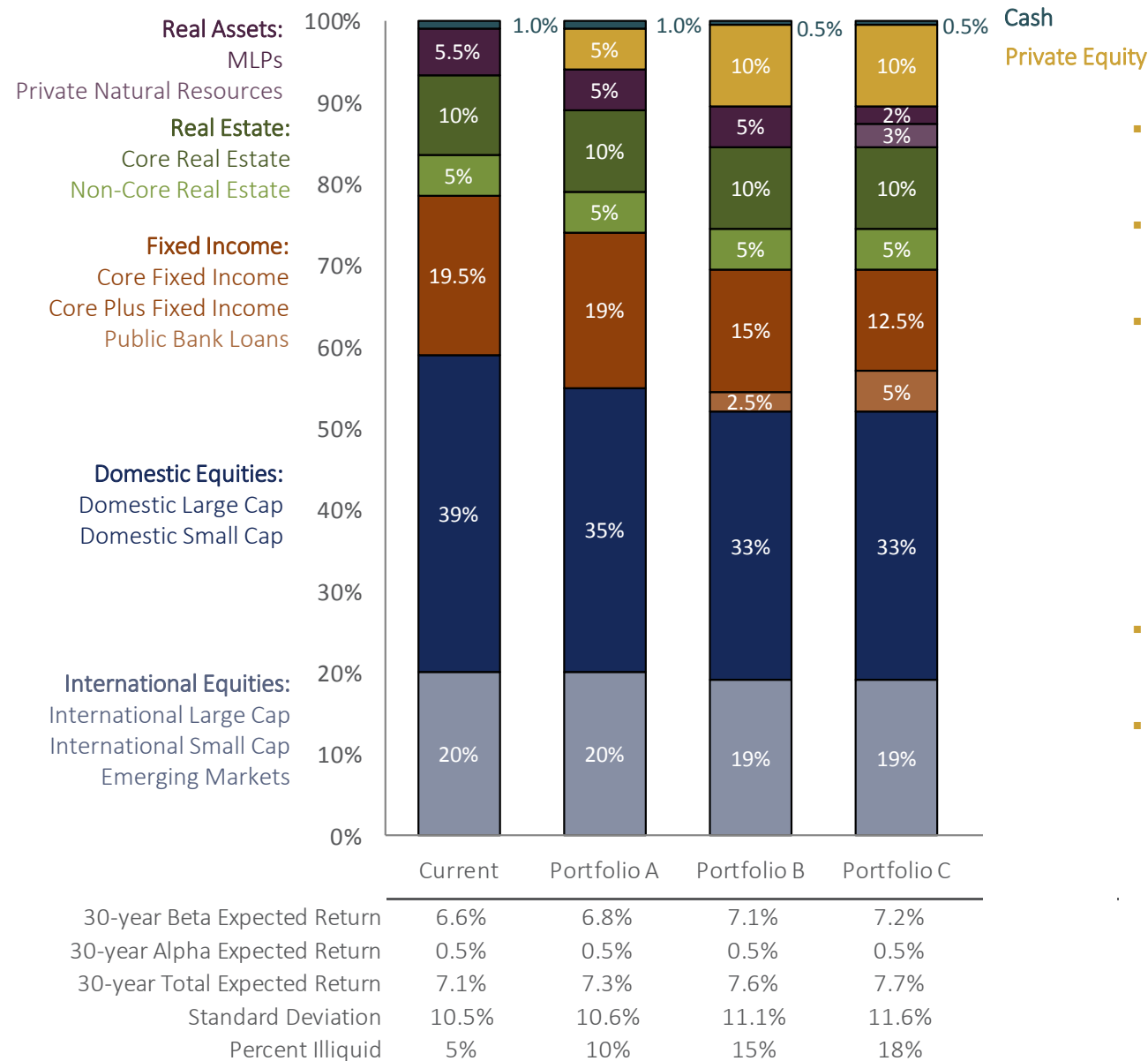
- Summit's capital market assumptions are illustrated below and to the left.
- Asset class assumptions are geometric (shown net of volatility and net of fees), and use a 30-year investment horizon.

Asset Class	Beta Expected	Expected	Total Expected	Standard	Comments Regarding Return Assumptions
	Return	Alpha	Return	Deviation	
Large Cap	6.5%	0.3%	6.8%	15.3%	Long-term Expected, Fundamental Components
Small Cap	6.8%	0.8%	7.5%	19.8%	Long-term Expected, Fundamental Components
International Large Cap	6.8%	0.8%	7.5%	18.0%	Long-term Expected, Fundamental Components
International Small Cap	6.5%	0.8%	7.3%	21.5%	Long-term Expected, Fundamental Components
Emerging Markets	8.0%	0.8%	8.8%	24.8%	Long-term Expected, Fundamental Components
Non-Core Real Estate	7.3%	1.0%	8.3%	17.0%	Current Cap Rate + NOI Growth + Liquidity Premium + Leverage Adj
MLP	8.0%	0.8%	8.8%	17.0%	Distribution Yield + NOI Growth
Private Natural Resources	10.0%	1.0%	11.0%	22.0%	Royalty Trust Yield + Liquidity Premium + Leverage Adj
Private Equity	9.5%	1.0%	10.5%	22.0%	Base Return (Small Cap) + Liquidity Premium + Leverage Adj
Domestic Passive	6.5%	n/a	6.5%	15.8%	Long-term Expected, Fundamental Components
Cash	3.3%	n/a	3.3%	2.3%	Current Yield Curve
Core Fixed Income	3.5%	0.3%	3.8%	4.3%	Current Yield Curve
Core Plus Fixed Income	3.8%	0.5%	4.3%	4.8%	Current Yield Curve
Core Real Estate	6.0%	0.3%	6.3%	12.0%	Current Cap Rate + NOI Growth + Leverage Adj
Private Bank Loans	6.5%	0.8%	7.3%	13.0%	Cash + Volatility Adjusted Net Alpha

Asset Class Restrictions

- Florida Statutes, especially Chapters 112.661 and 215.47, outline several restrictions including, but not limited to:
 - No more than 25% of the assets may be allocated toward:
 - Certain mortgage securities;
 - Various investment grade state and municipal securities;
 - Real property, both public and private;
 - Investment grade fixed income obligations of foreign governments and agencies, foreign corporations, or foreign commercial entities;
 - US dollar denominated obligations issued by foreign governments and agencies, foreign corporations, or foreign commercial entities; and
 - Corporate obligations and securities of any kind of foreign corporations or a foreign commercial entity having its principal office located in any foreign country – not including US dollar denominated securities listed and traded on a US exchange.
 - Non-US corporate bonds traded outside the US shall be counted toward the 25% limit.
 - No more than 80% of the assets may be allocated to:
 - Domestic equity securities listed on nationally recognized exchanges; and
 - Domestic corporate bonds.
 - No more than 5% in any other form of investment, if deemed appropriate and subject to other restrictions (State Investment Advisory Council).
 - ADRs are permissible in domestic equity portfolios but limited to 15% of manager's portfolio per the investment policy.
- The statutory restrictions are reflected in the investment policy.
- Local ordinances may be passed to provide greater investment flexibility than that which is contained in Chapters 112.661 and 215.47 of Florida Statutes.
 - Section 121.116 of the Ordinance Code authorized the Board to invest in alternative investments including private equity, private debt, and private natural resource strategies.
 - This section prohibits investment in hedge funds.

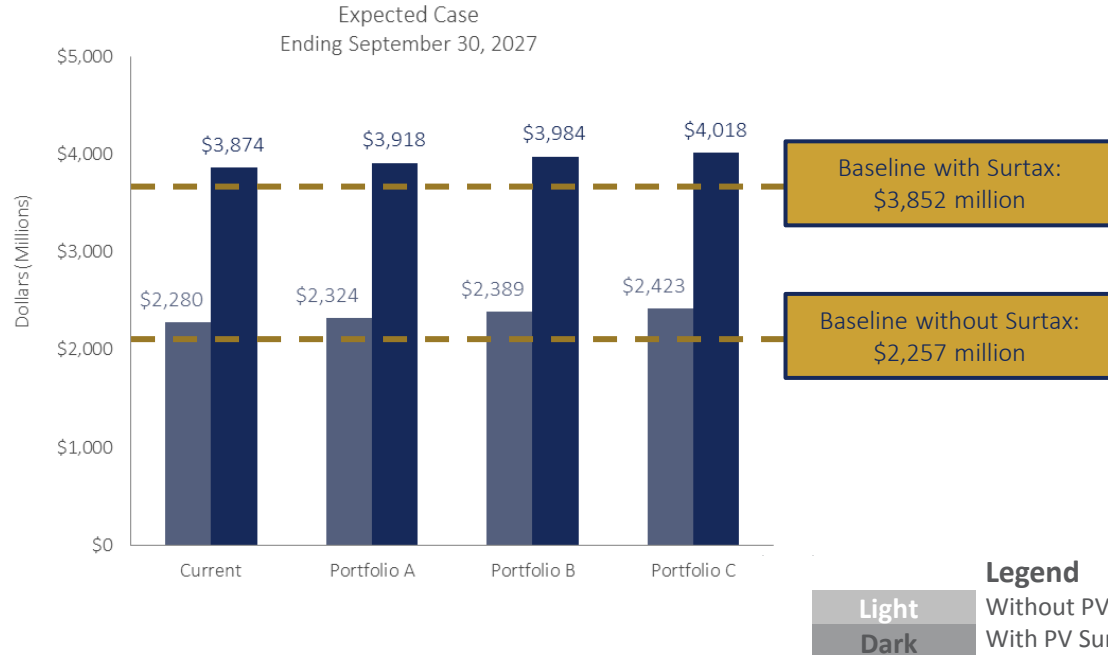
Asset Allocation Mixes



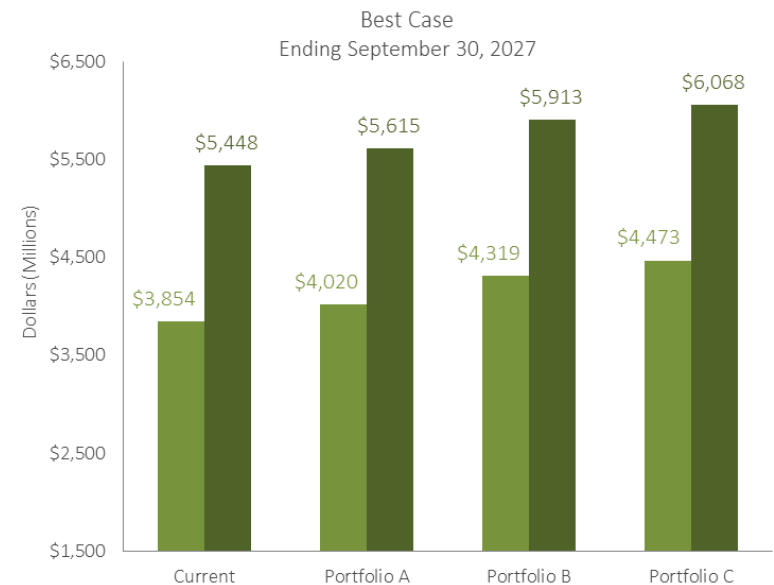
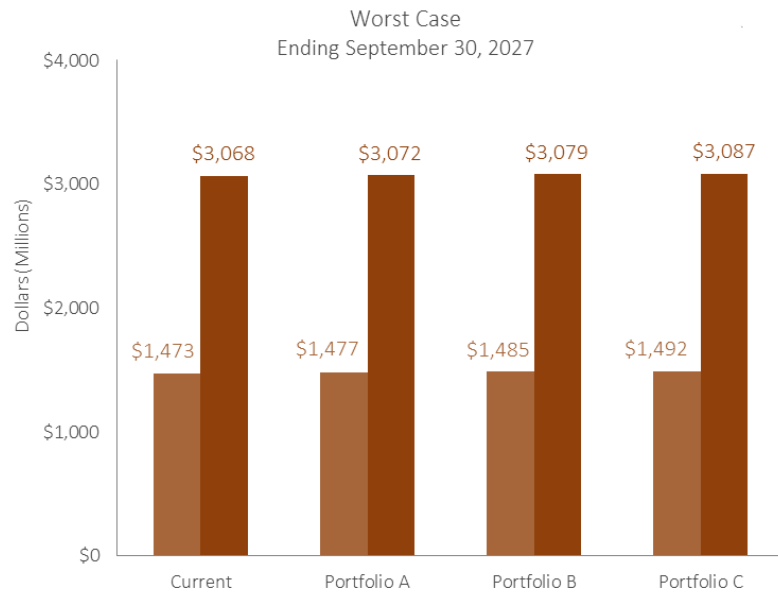
- The chart to the left utilizes Summit's 30-year expected return and volatility assumptions.
- The Current Portfolio has an expected return of 7.1% with manager alpha, and a standard deviation of 10.5%.
- Portfolios A, B, and C progressively add illiquid investments to enhance returns.
 - The addition of private equity, private natural resources, and non-core real estate decreases liquidity within the portfolio options.
 - Portfolio illiquidity is increased from 5% to 18% across the portfolios considered.
- Subsequent pages contain the stochastic analysis over 10- and 30-year projection periods.
- 10,000 trials were ran to produce a range of outcomes for three metrics:
 - Market Value
 - Cumulative City Contributions
 - Funded Status

Note: Summit's 30-year expected return assumptions are net of fees and volatility.

10-Year Projection Period: Market Value

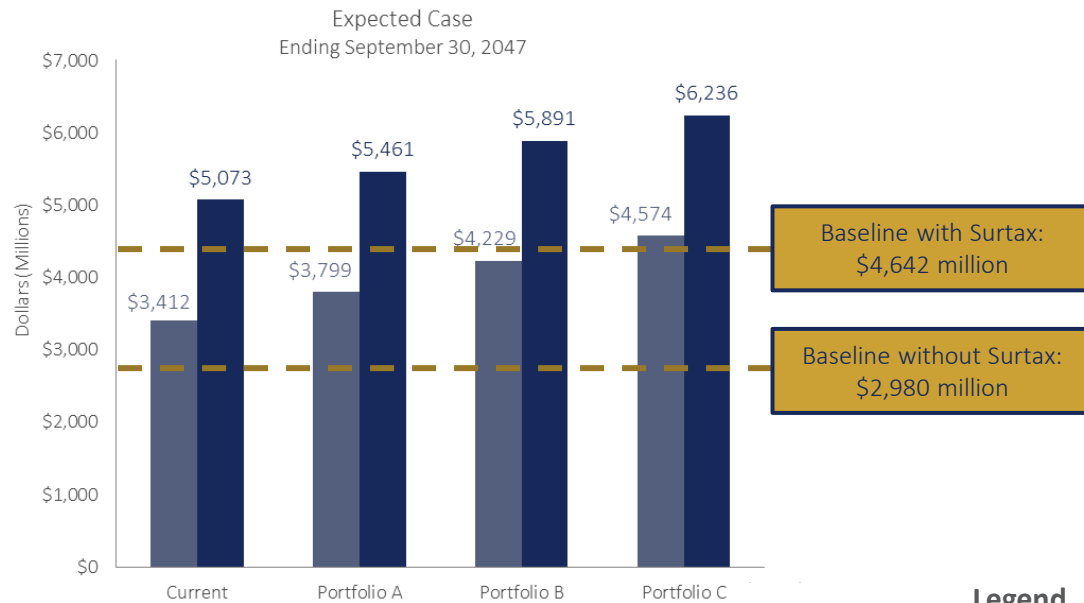


- All four portfolios produce an expected ending market value that is higher than the baseline.
- Must consider asset performance *and* cumulative contributions, which in tandem drive the size of the assets.
- Worst case scenario market values are similar across all portfolios due to the Liquidity Ratio Rule having a similar impact upon all four portfolios.

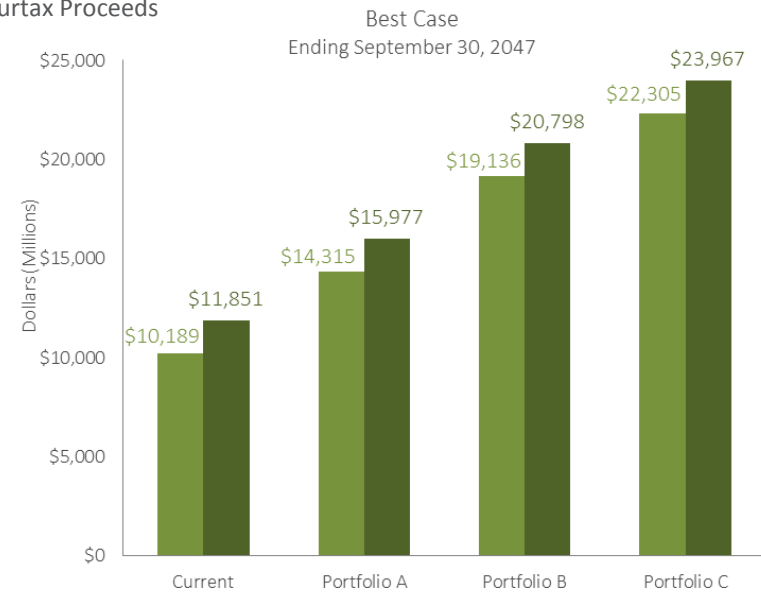
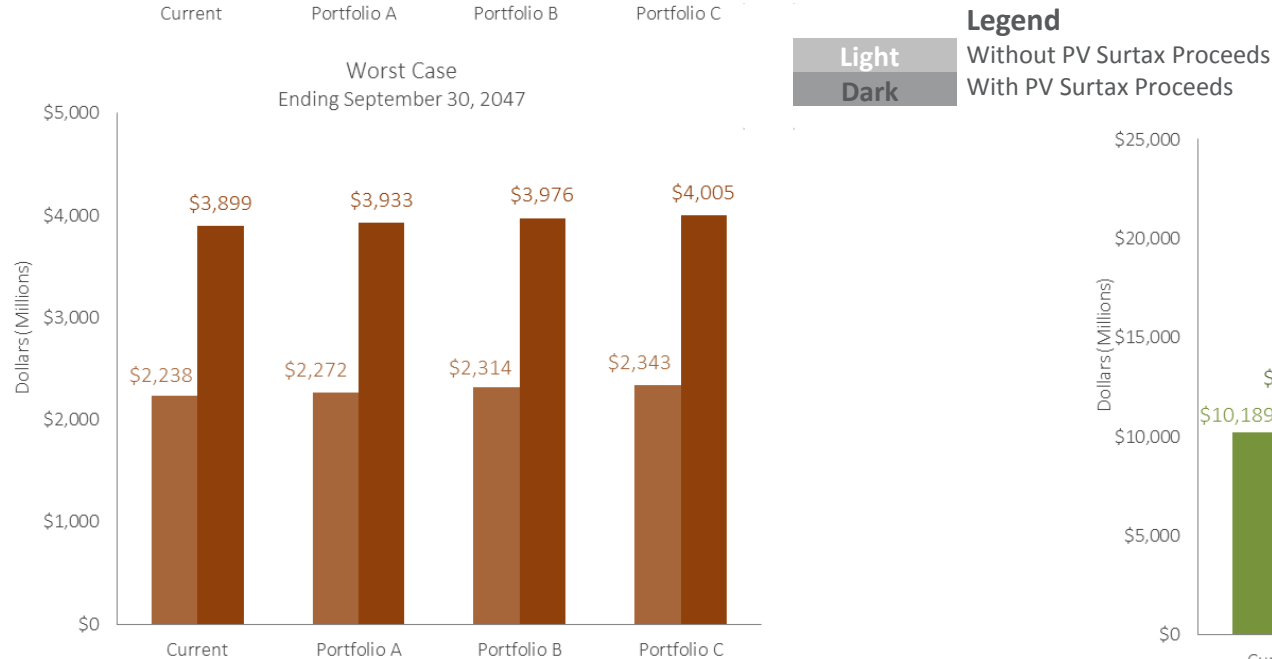


Note: The charts above show projected market value of assets as of September 30, 2027 using stochastic forecasting at the best (5th percentile), expected (50th percentile), and worst (95th percentile) case scenarios.

30-Year Projection Period: Market Value



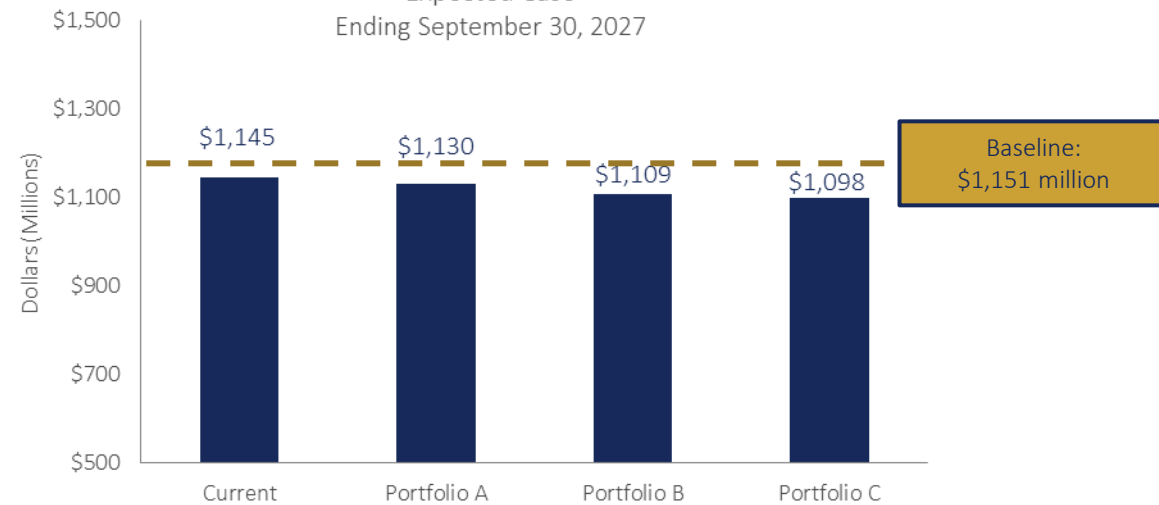
- The resulting pattern is similar to the 10-year projection:
 - All four portfolios produce an expected ending market value that is higher than the baseline.
 - Worst case scenario is similar across all portfolios due to the Liquidity Ratio Rule having a similar impact upon all four portfolios.



Note: The charts above show projected market value of assets as of September 30, 2047 using stochastic forecasting at the best (5th percentile), expected (50th percentile), and worst (95th percentile) case scenarios.

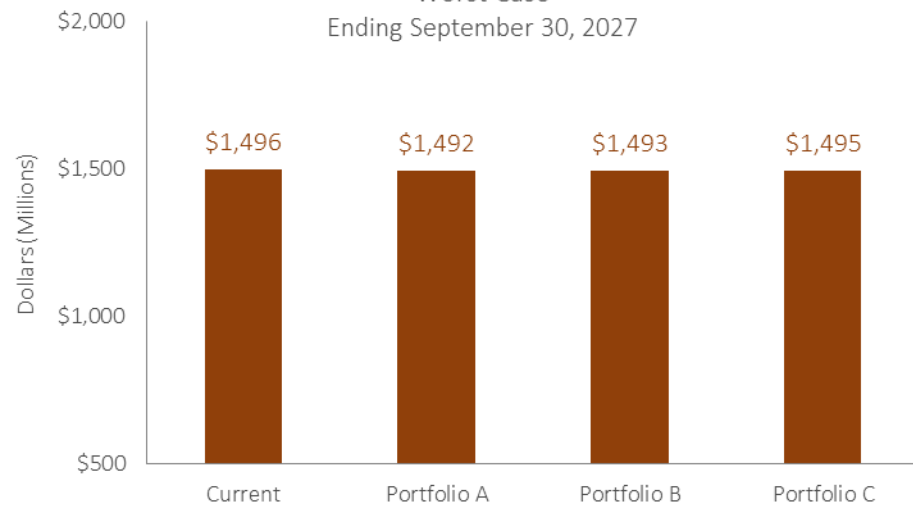
10-Year Projection Period: Cumulative City Contributions

Expected Case
Ending September 30, 2027

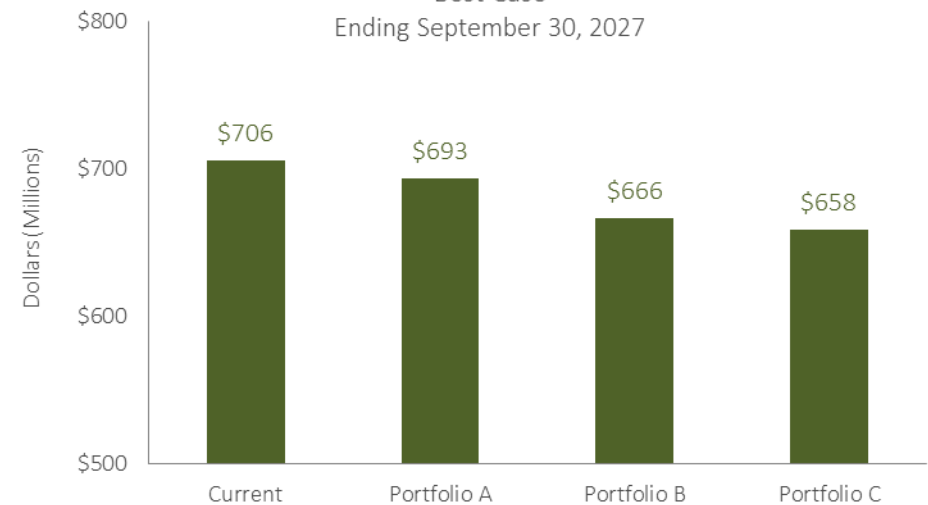


- All four portfolios produce an expected cumulative contribution pattern that is lower than the baseline.
 - This is due to each portfolio having an expected return greater than the baseline return assumption of 7.0%.
- Worst case cumulative contributions are similar across all portfolios.

Worst Case
Ending September 30, 2027

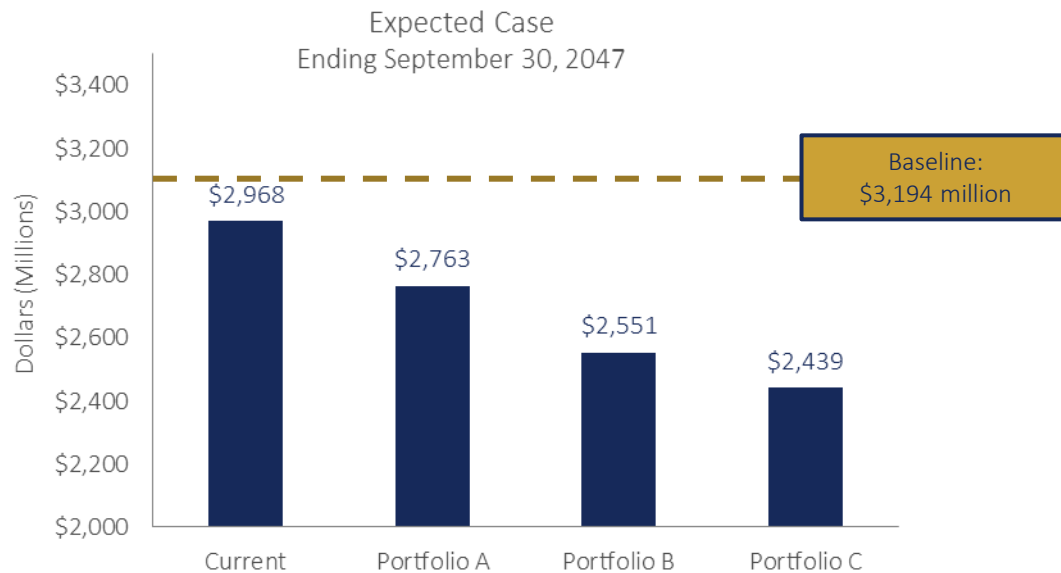


Best Case
Ending September 30, 2027

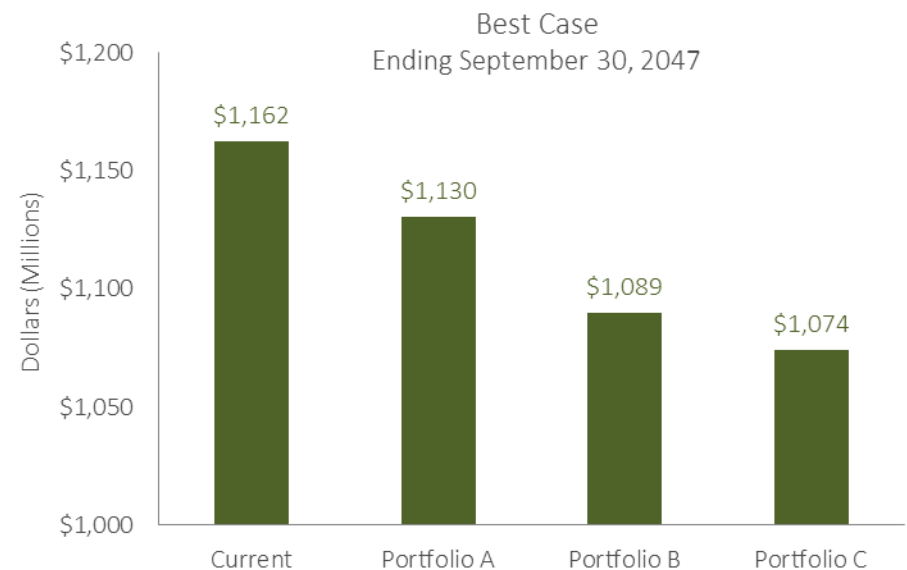
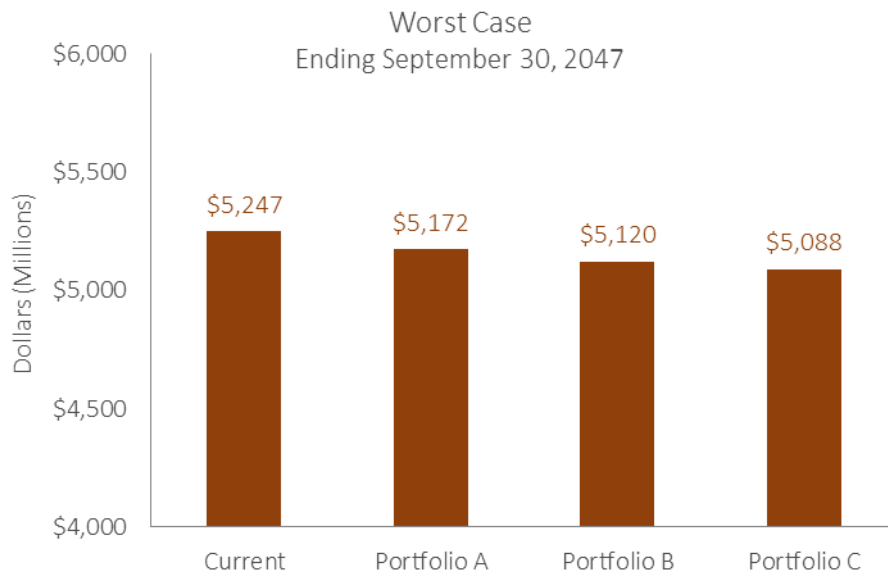


Note: The charts above include any liquidity contributions, projected through September 30, 2027 using stochastic forecasting at the best (5th percentile), expected (50th percentile), and worst (95th percentile) case scenarios.

30-Year Projection Period: Cumulative City Contributions

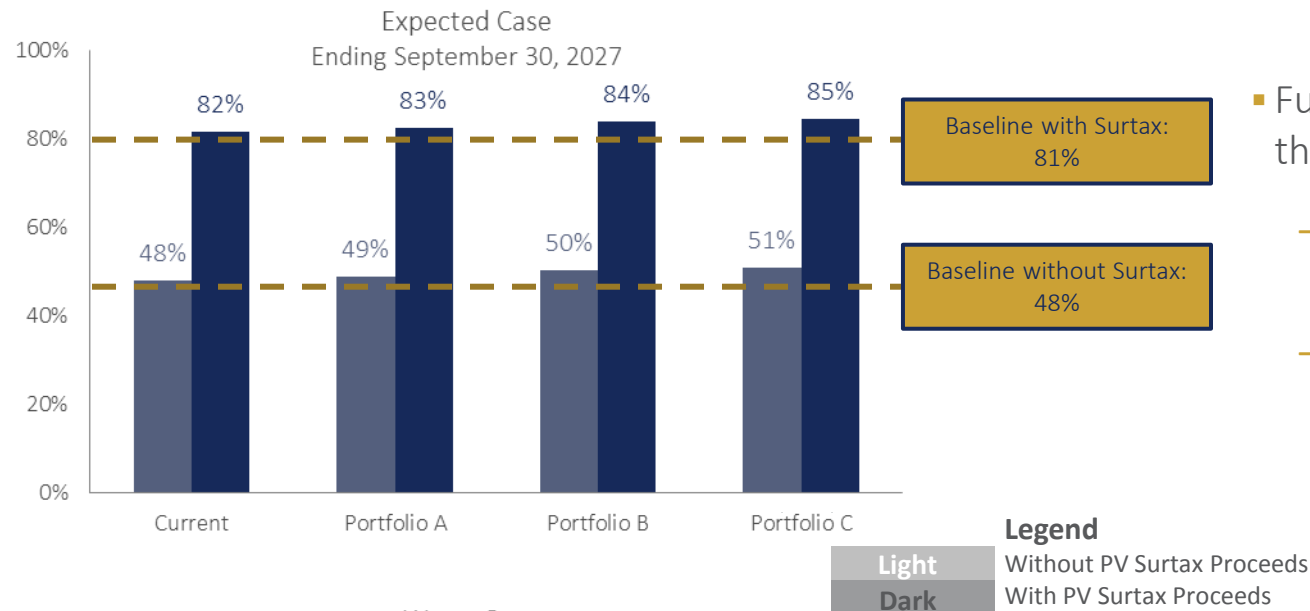


- The resulting pattern is similar to the 10-year projection:
 - All four portfolios produce an expected cumulative contribution pattern that is lower than the baseline.
 - Worst case cumulative contributions are similar across all portfolios due to the Liquidity Ratio Rule.

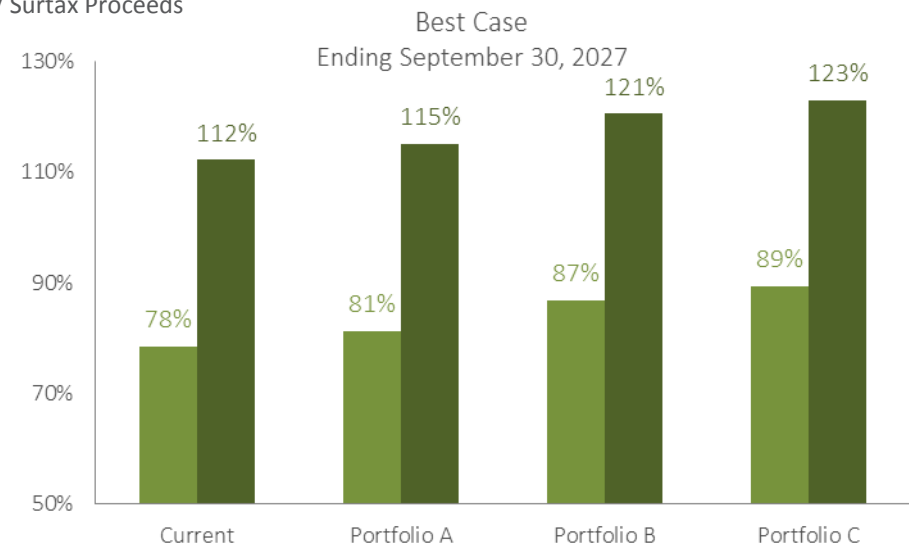
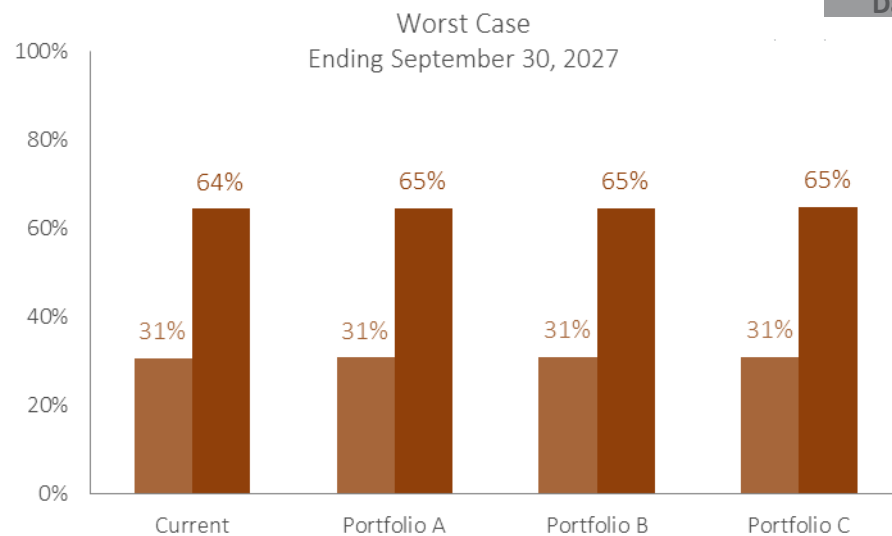


Note: The charts above include any liquidity contributions, projected through September 30, 2047 using stochastic forecasting at the best (5th percentile), expected (50th percentile), and worst (95th percentile) case scenarios.

10-Year Projection Period: Funded Status

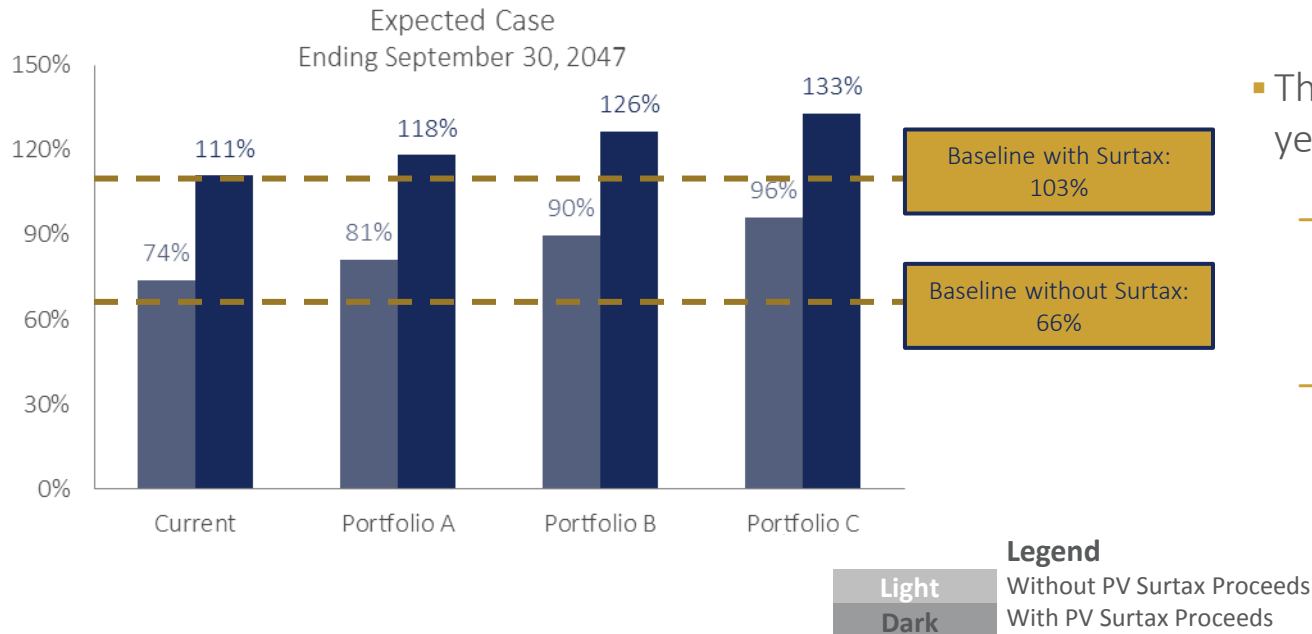


- Funded status will move in lock-step with the market value slides shown previously.
- All four portfolios produce an expected ending funded status that is higher than the baseline.
- Worst case funded status metrics are similar across all portfolios due to the Liquidity Ratio Rule.

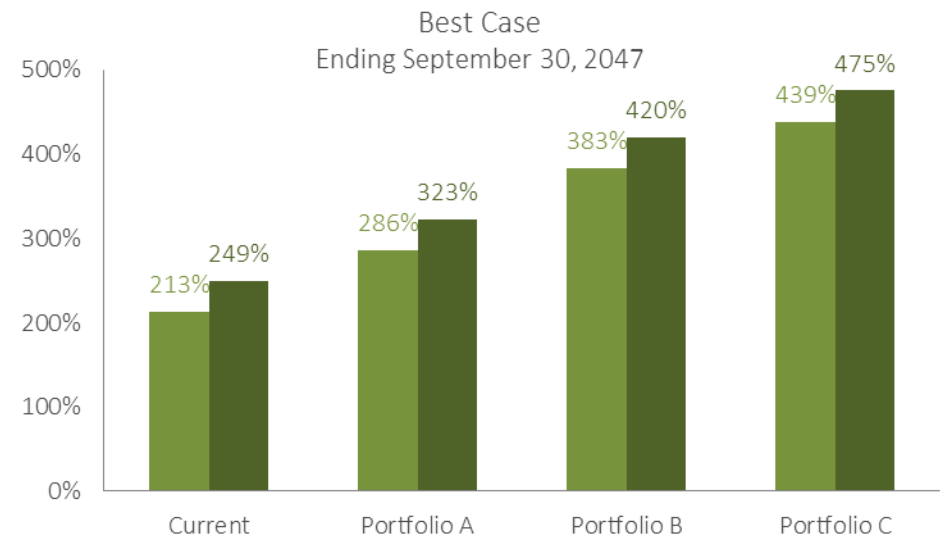
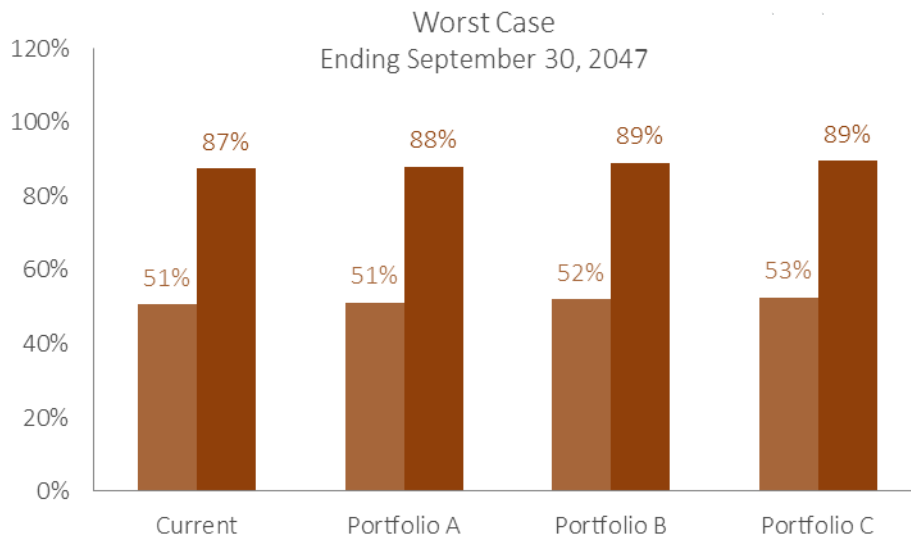


Note: The charts above show projected funded status as of September 30, 2027 using stochastic forecasting at the best (5th percentile), expected (50th percentile), and worst (95th percentile) case scenarios.

30-Year Projection Period: Funded Status

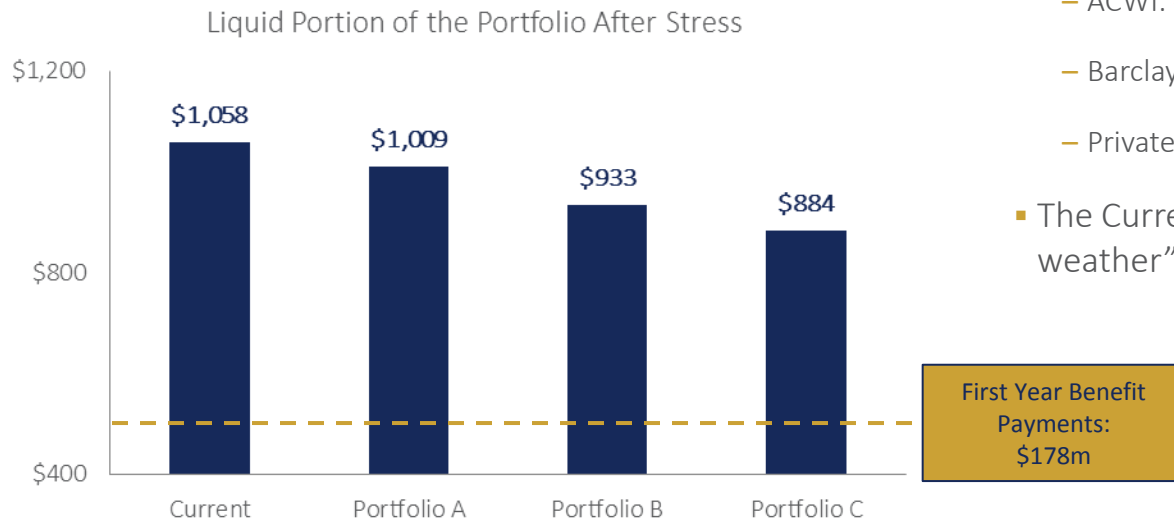
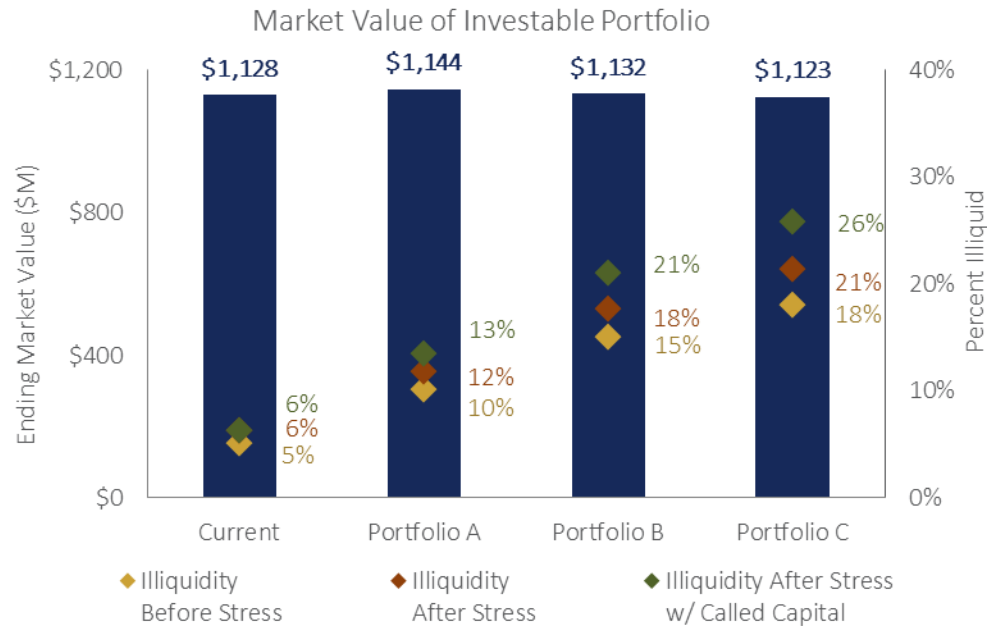


- The resulting pattern is similar to the 10-year projection:
 - All four portfolios produce an expected ending funded status that is higher than the baseline.
 - Worst case funded status metrics are similar across all portfolios due to the Liquidity Ratio Rule.



Note: The charts above show projected funded status as of September 30, 2047 using stochastic forecasting at the best (5th percentile), expected (50th percentile), and worst (95th percentile) case scenarios.

Portfolio Liquidity In a Perfect Storm



- Not surprisingly, the prior six pages indicate better results by assuming more risk in the expected case.
- However, those pages do not indicate worse downside by assuming more risk, this is due to the Liquidity Ratio Rule – the City is adding capital during market downturns.
- Those riskier portfolios do have other types of risk, specifically liquidity risk.*
- The charts to the left simulate each portfolio if the distress experienced during Global Financial Crisis were to begin on the 1st day of Plan Year 2018. Examples below indicate a sample of returns among asset classes during that period.
 - ACWI: -51%.
 - Barclays Aggregate: +6%.
 - Private Equity: -27%.
- The Current Portfolio provides substantially more of an “all-weather” liquidity profile than Portfolios A, B or C.

*Liquidity of Investable Portfolio is not taken into consideration when determining the Liquidity Ratio Rule. In other words, when the Liquidity Ratio Rule is reviewed, Private Assets are considered in the Investable Portfolio. The assumed market value for each portfolio before the stress event was \$1,757.7 million, the beginning market for Plan Year 2018.

Recommendations

- Adjust the Policy Target Allocation between the Recommended Portfolio on the following page.
 - Achieves the 7.0% return objective.
 - Does not assume an inordinate amount of risk (volatility).
 - Possesses appropriate diversification characteristics.
 - Possesses an appealing liquidity profile.
 - Too high of an allocation to illiquid assets could threaten the near-term ability to pay benefit payments or trigger the minimum liquidity ratio, which is exacerbated under the current funded status environment.
 - Allocation to private investments should be implemented using a “best idea” approach without strategic weights to each type of private investment. Private investments in aggregate should not exceed a target of 10% of total assets at this time.

Target Asset Allocation Recommendation by FIAC

Current		Recommended with 10% Private Assets	
	Allocation	Δ	Allocation
Domestic			
Large Cap	31.4%	-0.4%	31.0%
Small Cap	7.6%	-1.6%	6.0%
International Equity			
Large Cap	14.0%	-2.0%	12.0%
Small Cap		+2.0%	2.0%
Emerging	6.0%		6.0%
Fixed Income			
Cash	1.0%	-0.5%	0.5%
Core	4.0%		4.0%
Core Plus	15.5%		15.5%
Real Estate			
Core	10.0%		10.0%
Real Assets			
MLPs	5.5%	-2.5%	3.0%
Private Investments			
Non-Core RE	5.0%	+5.0%	10.0%
Private Natural Resources		+2.0%	2.0%
Private Equity		+3.0%	3.0%
Total	100%		100%
Expected Return (Beta)			
	6.6%		6.6%
Alpha			
	0.5%		0.6%
Total Return			
	7.1%		7.3%
Standard Deviation			
	10.5%		10.8%
Liquid			
	85.0%		80.0%
Semi-Liquid			
	10.0%		10.0%
Illiquid			
	5.0%		10.0%

Next Steps

- Answer Questions
- Perform any necessary refinement of the asset liability study
- Adopt the final Target Asset Allocation
- Amend the IPS
- FIAC recommends the Target Asset Allocation and IPS to the Board for approval
- FIAC reviews and changes manager implementation as necessary

Disclosures

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