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# Graystone Consulting

Asset Allocation & Distribution Policy Study May 2017 Wichita, KS Service Office 8301 E 21st St N STE 150 Wichita KS 67206

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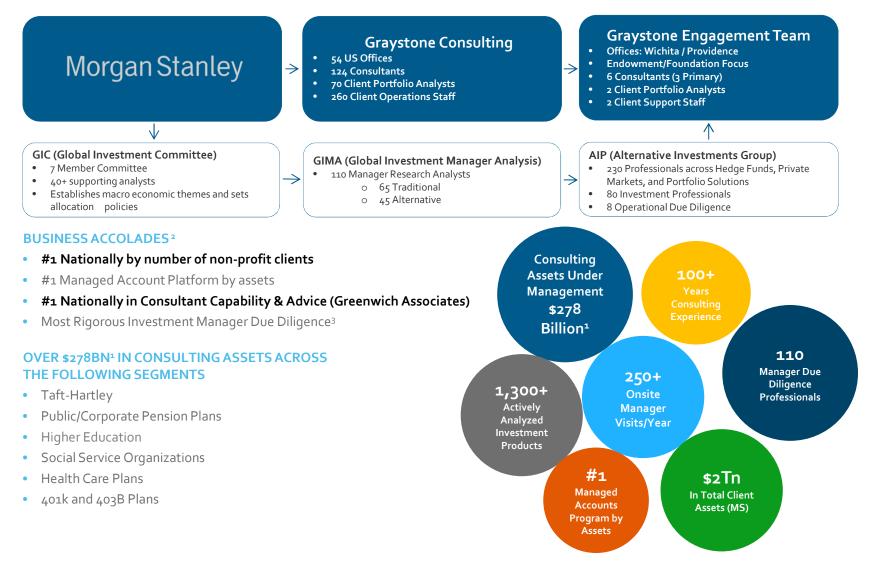


# **Graystone Consulting**

Institutional Consulting Services



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1. As of December 31, 2016

2. Morgan Stanley Wealth Management. Unless otherwise noted, the source for these statistics is Plan Sponsor Magazine, 2012 Consultants Survey.

3. FundFire Survey, 2014.

# Meet the Team Graystone Consulting Service Team



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\*Please see important Disclaimers page for important information about the risk of investing in alternative investments

# **Our Process** A Client Focused Fiduciary Responsibility – Following UPMIFA

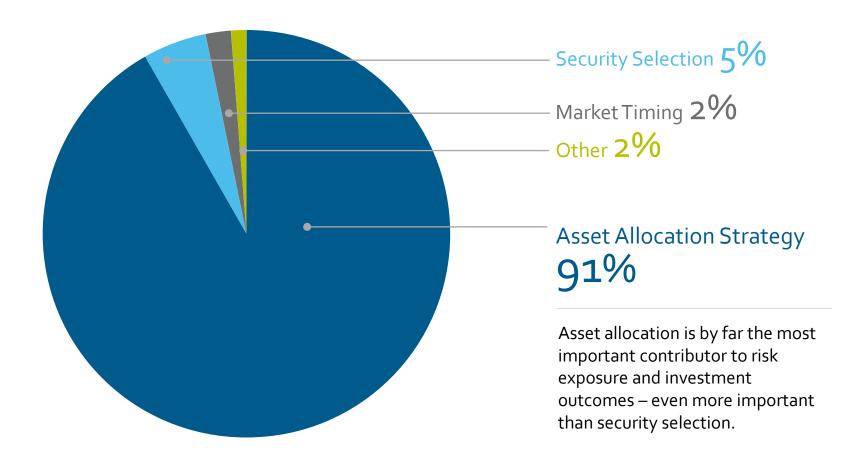


#### Step 2: Investment Policy Statement Detailed asset liability analysis • Criteria to select asset classes, styles Step 1: Organizational Assessment Step 3: Asset Allocation Study Suitable risk/return benchmarks • Organizational history and vision • Utilize resources of the firm for insights Procedures Total enterprise philosophy Policy adherence evaluation • Process to upgrade / replace funds Investment objectives Dynamic portfolio construction Duties and responsibilities recommendations Asset/liability structure Models based on historic analysis Liquidity requirements Benefit: Policy statement /projected future trends tailored to your criteria • Time horizon and risk tolerance Capital Markets Sales/Trading informs decisions **Benefit: Comprehensive analysis** Benefit: Customized informs decisions allocation **Endowments and Foundations** Step 6: Ongoing Review Step 4: Manager Selection Present investment results at committee Manager evaluation tools used to make board meetings informed decisions Step 5: Reporting & Communication Regularly review investment and • Open architecture manager searches • Performance measurement and risk analysis spending policy statements and • Leverage 100+ dedicated manager analysis investment selections Educational presentations customized to professionals Board expertise • Provide ongoing capital markets • Work with your investment committee on intelligence to committees and boards Access to the depth and breadth of our manager recommendations firm's research Ongoing educational events to meet your • Fee analysis and negotiation needs Technical center to produce customized reporting Benefit: Unbiased and unparalleled analysis Sophisticated asset allocation studies & Benefit: Reflects latest market analysis portfolio analytics **Benefit: Customized reports**

For illustrative purposes only.



# Asset Allocation: A Key Contributor to Performance



Source: Roger G. Ibbotson. Does Asset Allocation Policy Explain 10, 90 or 100 Percent of Performance? Financial Analyst Journal, January/February 2000; Brinson, Singer and Beebower. Determination of Performance II: An Update, Financial Analyst Journal, May/June 1991. Based on US pension-fund data from 1977 to 1987.

# We Think About Asset Allocation on Three Levels

Secular Forecasts	20-year time horizon based on long-term mean reversion
Strategic Forecasts	7-year time horizon based on current macro regime (business cycle, relative valuations, volatility and correlation trends)
Tactical Outlook	1-year outlook based on marginal changes in economic, geo- political, fundamental, technical and near-term risk indicators

#### Source: Morgan Stanley Wealth Management GIC



# GIC Forecasts of Capital Market Returns

As of March 30, 2017

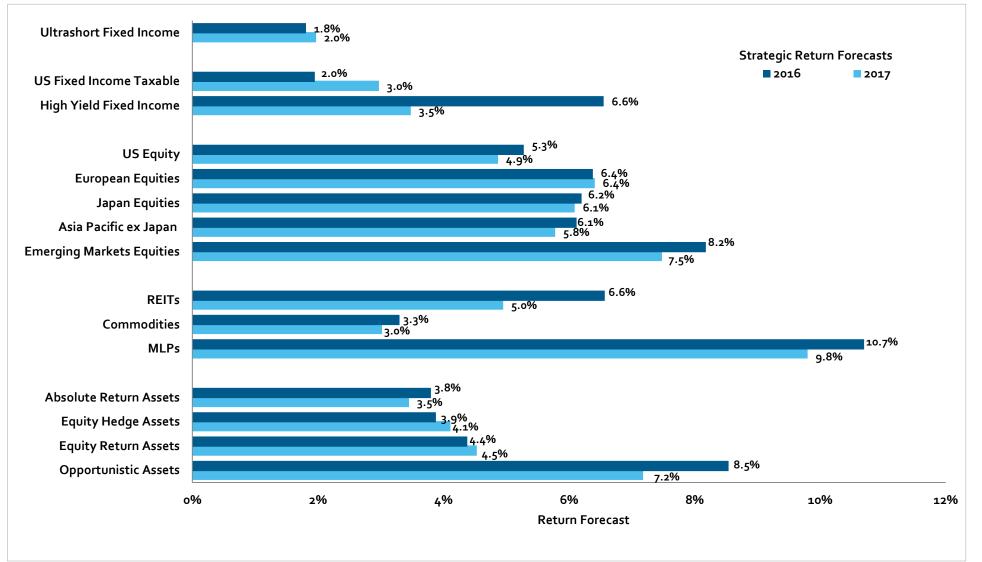
- Annually, the GIC updates its estimates of annual expected returns, correlations, and volatility for asset classes over two time horizons (20-year and 7-year).
- These forecasts are integrated into scenario-based planning tools, asset-liability studies and used to drive our asset allocation models.
- The seven-year strategic forecasts are only modestly changed from last year, as much of the improvement is already reflected in current asset prices. The notable changes are a slight reduction in our US equity forecast and a decline in our Emerging Markets return forecasts.
- Given the recent rise in rates and the improving long-term outlook for continued interest rate normalization from recent lows, both our broad fixed income forecast and our ultrashort fixed income forecast have risen.

Source: Morgan Stanley Wealth Management GIC



# 2016 versus 2017 (7-Year) Strategic Return Forecasts

As of March 30, 2017



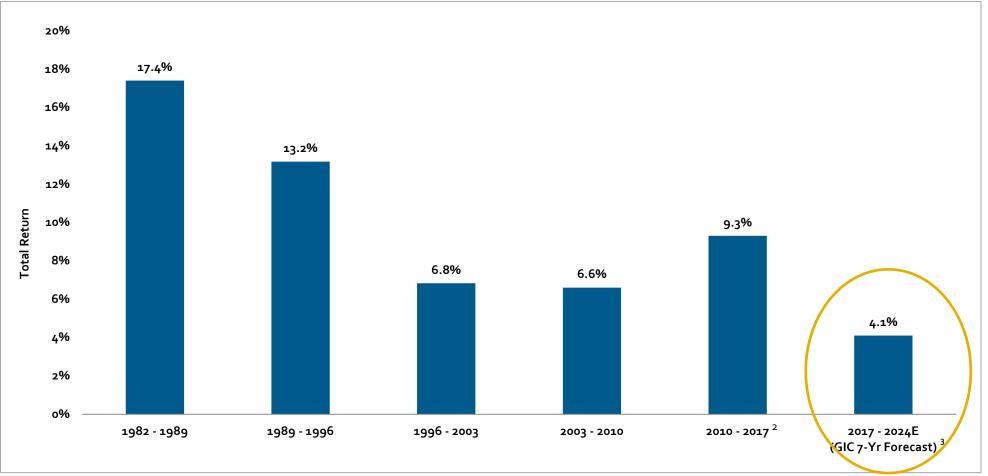
Source: Morgan Stanley Wealth Management GIC. Data as of March 10, 2017 Ultrashort Fixed Income represented by 90-day T-bills, US Fixed Income Taxable by Bloomberg Barclays US Aggregate Index, High Yield Fixed Income by Barclays US Corporate High Yield Index. All other others are based on proprietary models. Past performance is no guarantee of future results. Estimates of future performance are based on assumptions that may not be realized. This material is not a solicitation of any offer to buy or sell any security or other financial instrument or to participate in any trading strategy. Please refer to important information, disclosures and qualifications at the end of this material.



# Our Seven-Year Estimates Also Suggest a 4.1% Return in a 60% Stock / 40% Bond Portfolio

Annualized Total Return for 60% US Stock / 40% US Bond Portfolio<sup>1</sup>

As of March 30, 2017



Source: Bloomberg, Morgan Stanley Wealth Management GIC. (1) US stocks represented by the Russell 1000 Index and US bonds represented by the Barclays US Aggregate Index. (2)Through March 30, 2017. (3) Forecasts are based on capital market assumptions as published in the GIC's *Inputs for GIC Asset Allocation: Annual Update of Capital Market Assumptions*, March 31, 2017. 2017E begins with January 2017 data.

# Capital Markets Assumptions



Various Firms

#### Industry- Wide Forecasted Returns

5-10 Year Forecasts (Arithmetic)

	Morgan						Expected	25 Year
	Stanley	JPMorgan	Blackrock	UBS	BNY	Mercer	Return Average	Historical
US Equity	4.9%	7.3%	5.4%	7.1%	7.2%	5.8%	6.3%	9.8%
Developed International Equity	6.3%	8.0%	7.3%	9.4%	6.9%	7.6%	7.6%	6.0%
Emerging Markets Equity	7.5%	11.5%	8.4%	8.8%	8.9%	8.9%	9.0%	8.6%
US Core Fixed Income (BBC Agg.)	3.0%	3.1%	2.8%	2.8%	2.5%	3.0%	2.9%	6.2%
High Yield Fixed Income	3.5%	6.1%	3.4%	4.8%	5.9%	4.8%	4.8%	9.0%
Private Equity	7.6%	9.9%	7.8%	12.0%	9.1%	9.9%	9.4%	NA
Hedge Funds	4.5%	5.0%	3.0%	5.5%			4.5%	NA
60 / 40 Traditional Portfolio (US)	4.1%	5.6%	4.4%	5.4%	5.3%	4.7%	4.9%	8.4%
Inflation	2.0%	2.3%	2.4%	2.0%	2.5%	2.0%	2.2%	2.0%
Real Return	2.1%	3.3%	2.0%	3.4%	2.8%	2.7%	2.7%	6.4%
Forecast Range (Years)	7	10	5	10	10	10		
Forecast Date	Mar-17	Jan-17	Jan-17	Feb-17	2016	Jan-16		

Source: Morgan Stanley: CIE, JPMorgan, UBS, BNY, Blackrock, Mercer

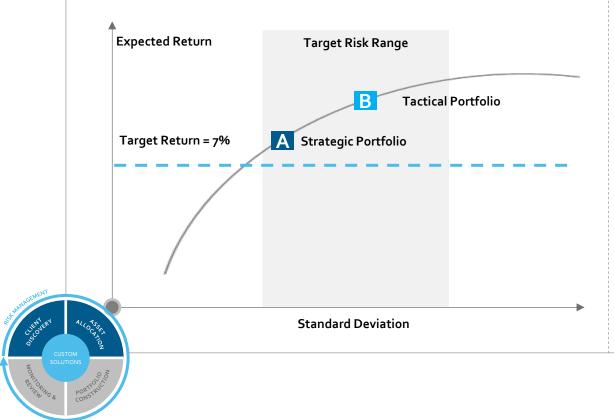


# Asset Allocation: Customized to Your Objectives

Work to Enhance Expected Return While Managing Risk

## ESTABLISH YOUR RETURN AND RISK TARGETS

- Based on Capital Market Assumptions developed by the GIC
- Determine risk tolerance bands and benchmarks
- Assign active risk and return targets

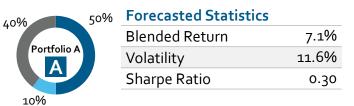


## **DEFINE CONSTRAINTS**

Min	Max
10%	20%
5%	10%
12%	22%
20%	30%

- Establish desired asset classes
- Monitor for market drift
- Rebalance and adjust portfolio to target

## **OPTIMIZE STRATEGIC ALLOCATION**



## **APPLY TACTICAL OVERLAY**

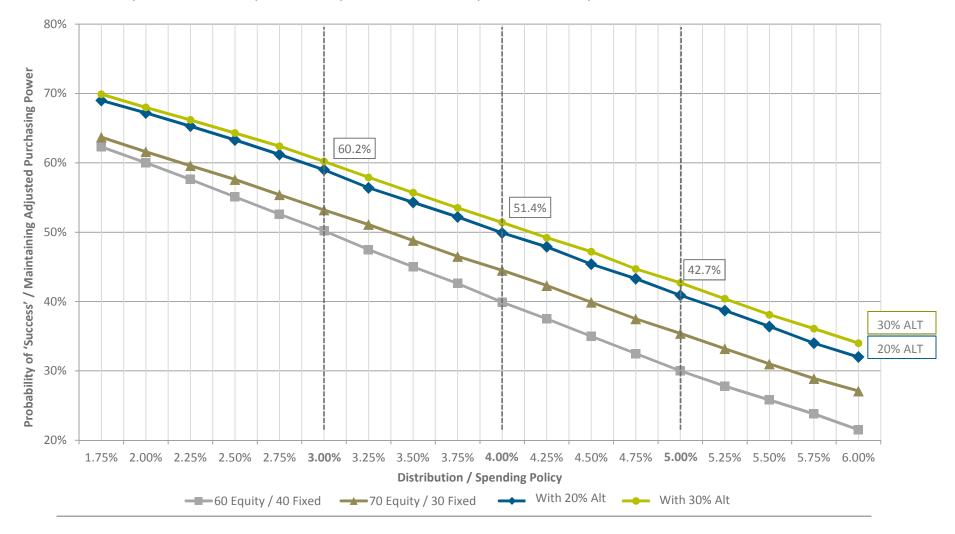
45%	Forecasted Statistics	
35%	Blended Return	7.6%
Portfolio B	Volatility	10.8%
	Sharpe Ratio	0.37
20%		

#### For Illustrative Purposes Only

# Probability of "Success" at Various Spending Levels



Reduced capital markets expectations place distribution policies under pressure...

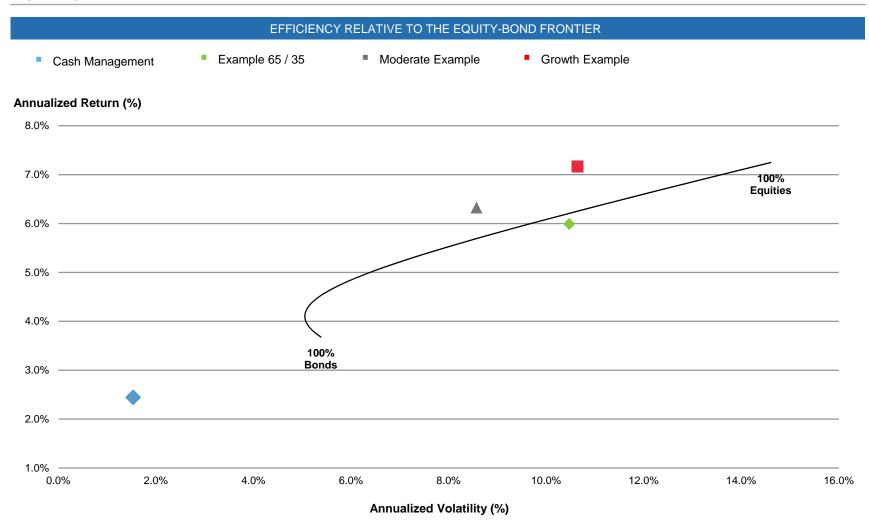


IMPORTANT: Assumed inflation rate of 2.00%. Please see the Appendix for important disclosures about this presentation.

#### Graystone Consulting\*\*

## STATISTICAL COMPARISON - HYPOTHETICAL EFFICIENCY ANALYSIS\*

#### Report Prepared for San Bernardino

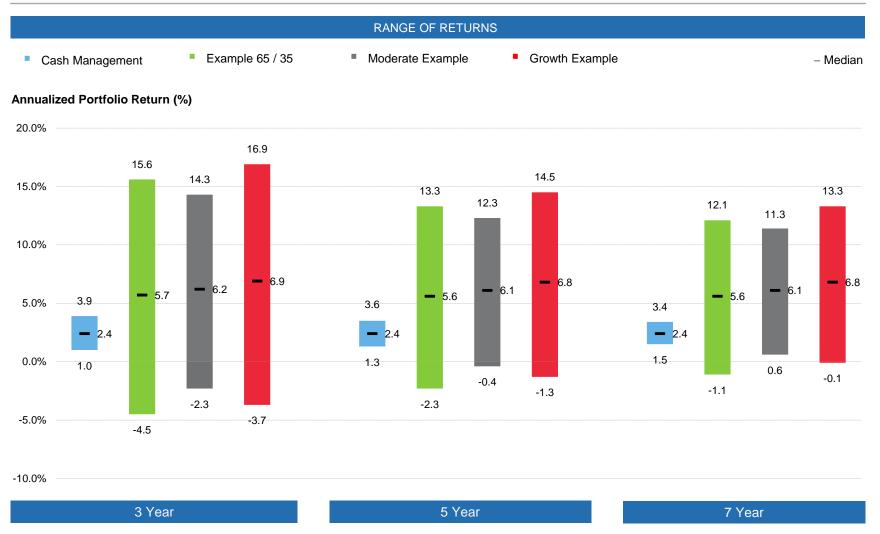


**Notes**: The 'Equity-Bond Frontier', plotted here for comparison, represents the efficiency of a full spectrum of bond and equity portfolios that vary by their proportion of each from 100% bonds to 100% equities. \*All figures based on assumptions of risk and return detailed on pages 4-6 of the Appendix. Please see the Glossary in the Appendix for definitions of certain terms used above.

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## STATISTICAL COMPARISON - HYPOTHETICAL RANGE OF RETURNS AT 3 HORIZONS

#### Report Prepared for San Bernardino



Source: Global Investment Committee

All figures above arebased on assumptions of risk and return detailed on pages 4-6 of the Appendix. Please see the Glossary in the Appendix for definitions of certain terms used above.



# **Distribution Policy Analyis**

5.0% Annual Spending CPI = 2.0% Example \$150,000,000 Portfolio



# SIMULATION ANALYSIS - PORTFOLIO VALUE: CASH MANAGEMENT

Report Prepared for San Bernardino

END OF HORIZ	ON VALUE		REBALANCING & DISTRIBUTION POLICY
5th Percentile	\$101,140,603	Rebalancing Policy	Annual Rebalancing to Target.
ledian	\$93,668,370		
th Percentile	\$86,799,997	Planned Distributions & Contributions	5.0% of Portfolio Value per annum. It is assumed that Distributions are taken from th portfolio at the end of each year.
Probability>Target*	0.0%	•••••	
		HYPOTHETICA	AL RANGE OF PORTFOLIO VALUES BY YEAR (
<2%	2% 4% 6%	8% 10%	• Target End of Horizon Value: \$150,0
	2% 4% 6%	8% 10%	• Target End of Horizon Value: \$150,0 \$1 \$1 \$1 \$1
	2% 4% 6%	8% 10%	\$1
	2% 4% 6%	8% 10%	\$1- \$1- \$12 \$12 \$12 \$12

Graphic depicts the hypothetically plausible range of the Current Portfolio's value over the course of the investment horizon based on assumptions of risk and return detailed on pages 4-6 of the Appendix and assumptions as per the "Simulation Analysis; Assumptions" slide. More darkly shaded areas imply a greater likelihood that the portfolio's value will lie in that range at that point in the horizon than more lightly shaded ones. Please see the Glossary in the Appendix for definitions of certain terms used above.

# SIMULATION ANALYSIS - PORTFOLIO VALUE: EXAMPLE 65 / 35

Report Prepared for San Bernardino

VALUE \$208,154,633 \$126,196,329 \$73,349,900	Rebalancing Policy Planned		EBALANCING & DISTRI	BUTION POLICY	
\$126,196,329	Policy	Annual Rebal	ancing to Target.		
	Planned				
\$73,349,900	Planned				
	Distributions & Contributions		olio Value per annum. It i e end of each year.	is assumed that Distributions a	are taken from the
29.1%	Contributions				
	HYPOTHETICA	L RANGE OF POR	TFOLIO VALUES BY YE	AR	(\$M
4% 6%	8% 10%	Current Portfolio V 99 <sup>th</sup> Percentile Median 1 <sup>st</sup> Percentile	alue	Target End of Horizo	on Value: \$150,000,
					\$236.0
					\$216.0 \$196.0
					\$176.
					<b></b> \$156.
					\$136.
			1 1	Ť Ť	\$96.0
					\$76.0
Year 2	Ye	ar 4	Year 6	Year 8	¥56.01 Year 10
	4% 6%	HYPOTHETICA	HYPOTHETICAL RANGE OF POR 4% 6% 8% 10% 99th Percentile Median 1st Percentile 4 Year 2 Year 4	HYPOTHETICAL RANGE OF PORTFOLIO VALUES BY DE 4% 6% 8% 10% 99th Percentile Median 1st Percentile Year 2 Year 4 Year 6	HYPOTHETICAL RANGE OF PORTFOLIO VALUES BY YEAR

Graphic depicts the hypothetically plausible range of the Example 65 / 35's value over the course of the investment horizon based on assumptions of risk and return detailed on pages 4-6 of the Appendix and assumptions as per the "Simulation Analysis; Assumptions" slide. More darkly shaded areas imply a greater likelihood that the portfolio's value will lie in that range at that point in the horizon than more lightly shaded ones. Please see the Glossary in the Appendix for definitions of certain terms used above.



# SIMULATION ANALYSIS - PORTFOLIO VALUE: MODERATE EXAMPLE

Report Prepared for San Bernardino

END OF HO	DRIZ	ZON \	/ALUE					RE	BALANCING & E	DISTRIBUT	ION POLICY		
5th Percentile		4	\$200,98	82,672	Reba Policy	ancing /		Annual Rebal	ancing to Target.				
ledian		9	\$132,79	3,515									
th Percentile		:	\$85,599	9,834		ed butions & ibutions	1		olio Value per ann e end of each yea		sumed that Distributi	ions are taken	from the
robability>Targe	t*		31.9	1%	Conti	ibutions							
					HYF	POTHETIC	AL R/	ANGE OF POR	TFOLIO VALUES	BY YEAR			(\$MI
<2%		2%	4%	6%	8%	10%	Ţ	rrent Portfolio Va 99 <sup>th</sup> Percentile Median 1 <sup>st</sup> Percentile	alue		Target End of	Horizon Value:	\$150,000,0
													\$229.0
													\$209.0
													\$189.0
													\$169.0
	Ŧ												\$149.0
					1								\$129.
									<u> </u>		Ť L		\$109.0 \$89.0
Initial Value			Yea	ar 2		Va	ear 4		Year 6		Year 8	,	\$69.01 Year 10
ource: Global Invest	men	t Corr		41 <b>Z</b>		Ĩ	Jul 4		i cai u			Adjusted for as	

Graphic depicts the hypothetically plausible range of the Mod's value over the course of the investment horizon based on assumptions of risk and return detailed on pages 4-6 of the Appendix and assumptions as per the "Simulation Analysis; Assumptions" slide. More darkly shaded areas imply a greater likelihood that the portfolio's value will lie in that range at that point in the horizon than more lightly shaded ones. Please see the Glossary in the Appendix for definitions of certain terms used above.



# SIMULATION ANALYSIS - PORTFOLIO VALUE: GROWTH EXAMPLE

Report Prepared for San Bernardino

END OF HORIZ			REBALANCING & DISTRIBUTION POLICY
15th Percentile	\$234,942,258	Rebalancing Policy	<ul> <li>Annual Rebalancing to Target.</li> </ul>
ledian	\$141,284,967		
ith Percentile	\$82,067,206	Planned Distributions & Contributions	<ul> <li>5.0% of Portfolio Value per annum. It is assumed that Distributions are taken from the portfolio at the end of each year.</li> </ul>
Probability>Target*	42.7%	Contributions	
		HYPOTHETICA	AL RANGE OF PORTFOLIO VALUES BY YEAR (\$M
<2%	2% 4% 6%	8% 10%	Current Portfolio Value 99 <sup>th</sup> Percentile Median 1 <sup>st</sup> Percentile 1 <sup>st</sup> Percentile
			\$262
			\$212
			<b>\$</b> 162
			ž ž ž ž ž ž ž Š <sup>\$112</sup>
r			\$62.0

Graphic depicts the hypothetically plausible range of the Growth's value over the course of the investment horizon based on assumptions of risk and return detailed on pages 4-6 of the Appendix and assumptions as per the "Simulation Analysis; Assumptions" slide. More darkly shaded areas imply a greater likelihood that the portfolio's value will lie in that range at that point in the horizon than more lightly shaded ones. Please see the Glossary in the Appendix for definitions of certain terms used above.



## SIMULATION ANALYSIS - SUMMARY

#### Report Prepared for San Bernardino

		END OF HORIZON VALUE		
	Cash Management	Example 65 / 35	Moderate Example	Growth Example
95th Percentile	\$101,140,603	\$208,154,633	\$200,982,672	\$234,942,258
Median	\$93,668,370	\$126,196,329	\$132,793,515	\$141,284,967
5th Percentile	\$86,799,997	\$73,349,900	\$85,599,834	\$82,067,206
Probability>Target*	0.0%	29.1%	31.9%	42.7%

\* Target End of Horizon Value = \$150,000,000

	AV	ERAGE ANNUAL DISTRIBUTI	IONS	
	Cash Management	Example 65 / 35	Moderate Example	Growth Example
95th Percentile	\$6,337,015	\$9,595,720	\$9,351,307	\$10,309,490
Median	\$6,053,305	\$7,060,677	\$7,248,152	\$7,501,478
5th Percentile	\$5,782,477	\$5,122,736	\$5,564,443	\$5,402,018

		AVERAGE RETURN		
	Cash Management	Example 65 / 35	Moderate Example	Growth Example
95th Percentile	3.2%	10.9%	10.6%	12.3%
Median	2.4%	5.5%	6.1%	6.7%
5th Percentile	1.7%	-0.0%	1.5%	1.1%

Return Calculated on a Time-Weighted basis.

\* Targets reflect client stated goals, rather than GIC investment criteria

**Results adjusted for assumed inflation.** For assumptions underlying these projections, please refer to the "Simulation Analysis; Purpose and Methodology" and "Simulation Analysis; Assumptions" slides, and pages 4-6 of the Appendix.



# **Distribution Policy Analysis**

4% Annual Spending CPI = 2.0% Example \$150,000,000 Portfolio



# SIMULATION ANALYSIS - PORTFOLIO VALUE: CASH MANAGEMENT

Report Prepared for San Bernardino

END OF HORIZ	ZON VALUE			REBALANCING & DISTRIBUTION POLICY	
5th Percentile	\$112,305,705	Rebalancing Policy	<ul> <li>Annual R</li> </ul>	ebalancing to Target.	
ledian	\$104,008,597				
th Percentile	\$96,382,012	Planned Distributions & Contributions		ortfolio Value per annum. It is assumed that Distribution at the end of each year.	ons are taken from the
Probability>Target*	0.0%				
		HYPOTHETICA	L RANGE OF F	PORTFOLIO VALUES BY YEAR	(\$MM
<2%	2% 4% 6%	8% 10%		• Target End of I	Horizon Value: \$150,000,0
	270 470 070			• Target End of I	Horizon Value: \$150,000,00
				• Target End of I	
				• Target End of I	\$143.0i \$133.0i \$123.0i
				• Target End of I	<b> (</b> \$143.0M

Graphic depicts the hypothetically plausible range of the Current Portfolio's value over the course of the investment horizon based on assumptions of risk and return detailed on pages 4-6 of the Appendix and assumptions as per the "Simulation Analysis; Assumptions" slide. More darkly shaded areas imply a greater likelihood that the portfolio's value will lie in that range at that point in the horizon than more lightly shaded ones. Please see the Glossary in the Appendix for definitions of certain terms used above.

# SIMULATION ANALYSIS - PORTFOLIO VALUE: EXAMPLE 65 / 35

Report Prepared for San Bernardino

<2%       2%       4%       6%       8%       10%       Image: Current Portfolio Value       9gh Percentile       • Target End of Horizon Value: \$150,0         Probability       Image: Current Portfolio       1# Percentile       \$2         Image: Current Portfolio       1# Percentile       \$2         Image: Current Portfolio       1# Percentile       \$2         Image: Current Portfolio       \$2       \$2         Image: Current Portfolio       1# Percentile       \$2         Image: Current Portfolio       \$2       \$2         Image: Current Portfolio       Image: Current Portfolio       \$2         Image: Current Portfolio       Image: Current Portfolio <t< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th></t<>							
Policy       Policy       Annual Rebalancing to Target.         Median       \$140,127,379         Bith Percentile       \$81,447,133       Planned Distributions & Contributions       4.0% of Portfolio Value per annum. It is assumed that Distributions are taken from th portfolio at the end of each year.         Probability>Target*       41.9%       HYPOTHETICAL RANGE OF PORTFOLIO VALUES BY YEAR       (Internet Portfolio Value Tobability)         Current Portfolio Value       Target End of Horizon Value: \$150,0         Tobability       1# Percentile       \$2         Starget End of Horizon Value: \$150,0       14         Starget End of Horizon Value: \$150,0       \$2         Starget End of Horizon Value: \$150,0       14         Starget End of Horizon Value: \$150,0       14         Starget End of Horizon Value: \$150,0       14         Percentile       \$2         Starget End of Horizon Value: \$150,0       14         Starget End of Horizon Value: \$150,0       15         Starget End of Horizon Value End End End End End E	END OF HORIZ	ZON VALUE		REB	ALANCING & DISTR	RIBUTION POLICY	
Bith Percentile       \$81,447,133       Planned Distributions & Contributions       • 4.0% of Portfolio Value per annum. It is assumed that Distributions are taken from the portfolio at the end of each year.         Probability>Target*       41.9%       • HYPOTHETICAL RANGE OF PORTFOLIO VALUES BY YEAR       ()         Current Portfolio Value       99 <sup>th</sup> Percentile       • Target End of Horizon Value: \$150,0         Probability       • Target End of Horizon Value: \$150,0         Start       • Target End of Horizon Value: \$150,0	5th Percentile	\$231,133,214		Annual Rebalan	ncing to Target.		
th Percentile       \$81,447,133       Distributions & Contributions         Probability>Target*       41.9%       Protection value per annum. It is assumed that Distributions are taken from the portfolio value per annum. It is assumed that Distributions are taken from the portfolio at the end of each year.         Probability>Target*       41.9%       Protection value per annum. It is assumed that Distributions are taken from the portfolio value per annum. It is assumed that Distributions are taken from the portfolio at the end of each year.         Probability       Image: Current Portfolio Value       Protection Value:	ledian	\$140,127,379					
Probability>Target* 41.9%     HYPOTHETICAL RANGE OF PORTFOLIO VALUES BY YEAR     41.9%     Current Portfolio Value     99h Percentile      • Target End of Horizon Value: \$150,0   1# Percentile     \$2        1# Percentile     \$2     1# Percentile     \$2	oth Percentile	\$81,447,133	<b>Distributions &amp;</b>				
2%       2%       4%       6%       8%       10%         Probability       99 <sup>th</sup> Percentile       99 <sup>th</sup> Percentile       • Target End of Horizon Value: \$150,0         1st Percentile       1st Percentile       \$2         1st Percentile       \$2         1st Percentile       \$2	Probability>Target*	41.9%	oonnaar				
2% 2% 4% 6% 8% 10%     99 <sup>th</sup> Percentile     Median     1 <sup>st</sup> Percentile     (2 + 1)     (2 +			HYPOTHETICA	L RANGE OF PORTF	FOLIO VALUES BY Y	′EAR	(\$MN
		2% 4% 6%	8% 10%	<ul><li>99<sup>th</sup> Percentile</li><li>♦ Median</li></ul>	Ie	Target End of Ho	rizon Value: \$150,000,0
							\$262.0
							\$212.0
	·						\$162.0
				Ĭ	ł	Ī	\$112.0
Year 2     Year 4     Year 6     Year 8     Year 10	Initial Value	Year 2	Ye	ar 4	Year 6	Year 8	\$62.0M Year 10

Graphic depicts the hypothetically plausible range of the Example 65 / 35's value over the course of the investment horizon based on assumptions of risk and return detailed on pages 4-6 of the Appendix and assumptions as per the "Simulation Analysis; Assumptions" slide. More darkly shaded areas imply a greater likelihood that the portfolio's value will lie in that range at that point in the horizon than more lightly shaded ones. Please see the Glossary in the Appendix for definitions of certain terms used above.



# SIMULATION ANALYSIS - PORTFOLIO VALUE: MODERATE EXAMPLE

Report Prepared for San Bernardino

END OF HORIZ	ON VALUE		RE	EBALANCING & DISTI	RIBUTION POLICY	
th Percentile	\$223,169,528	Rebalancing Policy	Annual Rebail	ancing to Target.		
edian	\$147,452,841					
n Percentile	\$95,049,360	Planned Distributions & Contributions		rtfolio Value per annum. It is assumed that Distributions are taken from the end of each year.		
obability>Target*	47.5%					
		HYPOTHETICA	AL RANGE OF POR	TFOLIO VALUES BY `	YEAR	(\$MI
<2%	2% 4% 6%	8% 10%	Current Portfolio Va 99 <sup>th</sup> Percentile Median 1 <sup>st</sup> Percentile	alue	Target End of Ho	rizon Value: \$150,000,0
						\$257.0
						\$237.0
						\$217.0
						\$197.0
_						\$157.
<u> </u>	ł					\$137.
				<u><u></u></u>	i i	\$117.
					± .	L \$97.0
nitial Value	Year 2	N/-	ar 4	Year 6	Year 8	\$77.0N Year 10

Graphic depicts the hypothetically plausible range of the Mod's value over the course of the investment horizon based on assumptions of risk and return detailed on pages 4-6 of the Appendix and assumptions as per the "Simulation Analysis; Assumptions" slide. More darkly shaded areas imply a greater likelihood that the portfolio's value will lie in that range at that point in the horizon than more lightly shaded ones. Please see the Glossary in the Appendix for definitions of certain terms used above.



# SIMULATION ANALYSIS - PORTFOLIO VALUE: GROWTH EXAMPLE

Report Prepared for San Bernardino

END OF HORIZ	ON VALUE		REBAL	ANCING & DISTRIBUT	TION POLICY	
5th Percentile	\$260,877,976	Rebalancing Policy	<ul> <li>Annual Rebalancii</li> </ul>	ng to Target.		
ledian	\$156,881,680					
th Percentile	\$91,126,759	Planned Distributions & Contributions		Portfolio Value per annum. It is assumed that Distributions are taken from at the end of each year.		are taken from the
robability>Target*	55.2%	Contributions				
		HYPOTHETIC	AL RANGE OF PORTFO	LIO VALUES BY YEAR		(\$MN
<2%	2% 4% 6%	8% 10%	Current Portfolio Value 99th Percentile Median 1st Percentile		Target End of Hor	izon Value: \$150,000,0
						\$269.0
						\$219.0
						\$169.0
	÷.	1	ž ž	i i	łł	\$119.0

Graphic depicts the hypothetically plausible range of the Growth's value over the course of the investment horizon based on assumptions of risk and return detailed on pages 4-6 of the Appendix and assumptions as per the "Simulation Analysis; Assumptions" slide. More darkly shaded areas imply a greater likelihood that the portfolio's value will lie in that range at that point in the horizon than more lightly shaded ones. Please see the Glossary in the Appendix for definitions of certain terms used above.



## SIMULATION ANALYSIS - SUMMARY

#### Report Prepared for San Bernardino

		END OF HORIZON VALUE		
	Cash Management	Example 65 / 35	Moderate Example	Growth Example
95th Percentile	\$112,305,705	\$231,133,214	\$223,169,528	\$260,877,976
Median	\$104,008,597	\$140,127,379	\$147,452,841	\$156,881,680
5th Percentile	\$96,382,012	\$81,447,133	\$95,049,360	\$91,126,759
Probability>Target*	0.0%	41.9%	47.5%	55.2%

\* Target End of Horizon Value = \$150,000,000

	AV	ERAGE ANNUAL DISTRIBUTI	ONS	
	Cash Management	Example 65 / 35	Moderate Example	Growth Example
95th Percentile	\$5,297,890	\$8,072,298	\$7,863,248	\$8,678,555
Median	\$5,057,961	\$5,914,655	\$6,074,112	\$6,292,013
5th Percentile	\$4,829,410	\$4,278,305	\$4,649,518	\$4,513,165

		AVERAGE RETURN		
	Cash Management	Example 65 / 35	Moderate Example	Growth Example
95th Percentile	3.2%	10.9%	10.6%	12.3%
Median	2.4%	5.5%	6.1%	6.7%
5th Percentile	1.7%	-0.0%	1.5%	1.1%

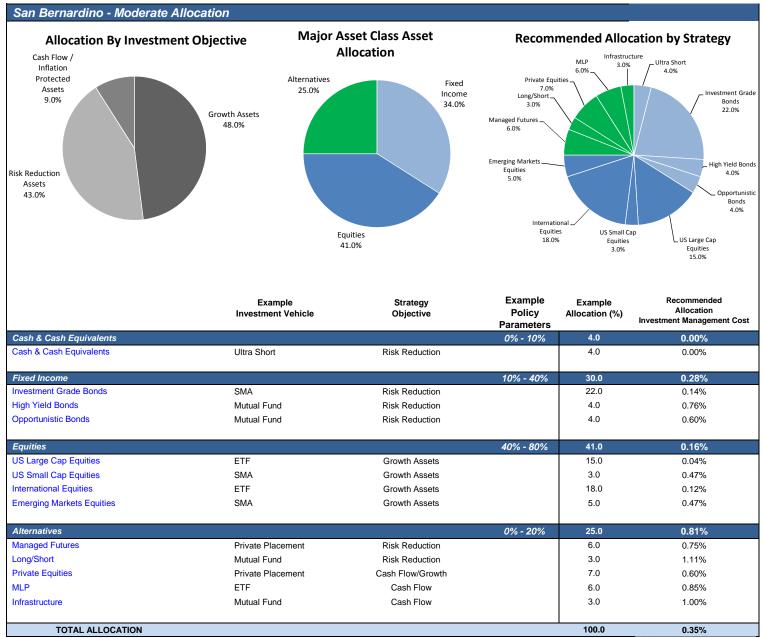
Return Calculated on a Time-Weighted basis.

\* Targets reflect client stated goals, rather than GIC investment criteria

**Results adjusted for assumed inflation.** For assumptions underlying these projections, please refer to the "Simulation Analysis; Purpose and Methodology" and "Simulation Analysis; Assumptions" slides, and pages 4-6 of the Appendix.

### FOR EXAMPLE

## ASSET ALLOCATION ANALYSIS



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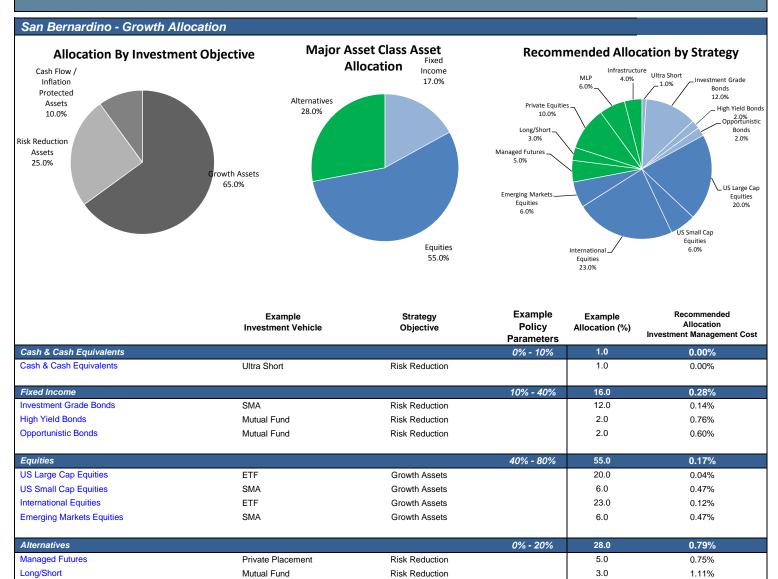
### FOR EXAMPLE

## ASSET ALLOCATION ANALYSIS

**Private Equities** 

Infrastructure

MLP



 TOTAL ALLOCATION
 100.0

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 Gra

Private Placement

Mutual Fund

ETF

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0.60%

0.85%

1.00%

0.36%

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10.0

6.0

4.0

Cash Flow/Growth

Cash Flow

Cash Flow

# SIMULATION ANALYSIS - PURPOSE AND METHODOLOGY

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The Global Investment Committee forecasts long-term asset class returns and volatilities, as well as the asymmetries and extreme events that characterize their return profiles<sup>1</sup>. Estimates of the risk and return of asset classes are not, however, sufficient to estimate the tradeoff between competing strategies. The purpose of Simulation Analysis is to provide such a basis for comparison. Simulation analysis generates thousands of potential evolutions of future capital market outcomes based on risk and return forecasts. These will tend *on average* to adhere to the forecasts of return, but will also depict divergences from the average both up and down with a frequency and to a degree consistent with the chosen model and forecasts of market risk.

Simulation analysis evaluates what happens to the portfolio across this projected range of future capital market scenarios taking into account planned withdrawals/contributions and rebalancing policy<sup>2</sup>. As cash flows and allocation drift can magnify the impact of market risk, (due to the former's tendency to reduce the effective length of the investment horizon, and the latter's tendency to increase the allocation to risk assets), this step is critical to a deeper understanding of how market risk can affect outcomes.

The results can be used to address<sup>3</sup> questions such as: What post-distribution, net-of-expenses outcomes am I *likely* to experience? What are the upside potential and downside risks to that outcome for a given level of confidence, (i.e. what are the most extreme up- and downside outcomes we would consider materially plausible)? How viable is a given spending policy (do the most frequently observed portfolio values arc downward over the horizon and, if so, how rapidly)? What is the portfolio's sensitivity to changes in the allocation or rebalancing approach?

**NOTES ON THE TERMINOLOGY IN THIS SIMULATION ANALYSIS SECTION: Portfolio Value** refers to the portfolio/trust value during the simulation. *Median End of Horizon Portfolio Value/Remainder Value* lies in the middle of the two halves of simulated values and thus represents the 'most likely' given the analysis assumptions. *95th Percentile End of Horizon Portfolio Value/Remainder Value* represents the 'upside' potential of a given proposal at 95% confidence (i.e., an end-horizon value better than 95% of outcomes), while *5th Percentile End of Horizon Portfolio Value/Remainder Value* represents the 'downside' risk to the proposal at 95% confidence (i.e., an end-horizon value better than 5% of outcomes). *Probability > Target* is the probability that the end-horizon portfolio value/remainder value will be greater than the investor's target portfolio/remainder value. Information about the trajectory of the portfolio over the course of the investment horizon is summarized on the final **Hypothetical Range of Portfolio Value** charts, with darkly shaded areas depicting the most likely path of portfolio value and lightly shaded areas less-likely extreme divergences to the up- and downside.

The following terms are associated with optional reports that may or may not apply to your case: The "Current Portfolio Value Overlay" depicts the range of Current Portfolio Values, and the median Current Portfolio value over the simulated range of the respective Proposed Portfolio Values. Its purpose is to provide a basis of comparison between the Current and Proposed Portfolios. **Distributions** depicts both the amount distributed from a portfolio over the horizon *on average* in the Median, 95th, and 5th percentile of simulated outcomes, as well as the *range* of distributions at the beginning, middle and end of the investment horizon, in the median, 95th, 75th, 25th and 5th percentiles of simulated outcomes. **Hypothetical Average Return** depicts the portfolio's time- or dollar-weighted return on average over the horizon in the Median, 95th, and 5th percentile of simulated outcomes. *Probability* > *Target*/7520 is the probability that the portfolio return will exceed the investor's target value or the trust's 7520 rate.

<sup>1</sup>The methodology used in this analysis entails a more sophisticated modeling of downside or 'event' risk than is commonly applied to simulation analysis in the industry, including the specification of 'fat-tailed' non-normal return distributions. <sup>2</sup> Rebalancing does not assure a profit or protect against a loss in declining financial markets. There may be a potential tax implication with a rebalancing strategy. Investors should consult with their tax advisor before implementing such a strategy. <sup>3</sup> The pertinence of the foregoing analysis to these questions depends significantly on the accuracy of the risk, return, tax and other assumptions detailed on the next slide and on pages 4-60 fthe Appendix. It also depends on the degree to which the returns to selected securities are different from the returns to a portfolio of similarly allocated asset classes. This source of return differences can be very substantial and is not taken into account in either the preceding or the foregoing analysis.



## SIMULATION ANALYSIS - ASSUMPTION

Report Prepared for San Bernardino

#### SIMULATION SUMMARY

The following analysis of the four portfolios outlined on page 4, is based on 10,000 simulations and the following additional assumptions:

Initial Portfolio Value	\$150,000,000
Target Value/Return	Target End of Horizon Value: \$150,000,000.
Investment Horizon	Ten (10) year horizon
Inflation Assumptions	Results adjusted for assumed inflation. Assumed inflation rate: 2.0%
Assumed Rebalancing Policy <sup>1</sup>	Annual Rebalancing to Target.
Planned Distributions & Contributions	4.0% of Portfolio Value per annum. It is assumed that Distributions are taken from the portfolio at the end of each year.

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**FundFire Survey,** February 2011. This survey by FundFire included responses from more than 40 managed account managers who work with various separately managed account (SMA) program sponsors. Managers were asked to rate a number of SMA sponsors on the thoroughness of their manager review process on a scale of one (weakest) to five (toughest).

**Plan Sponsor, September 2011. Includes** both Graystone Consulting and Morgan Stanley Consulting Group. Plan Sponsor magazine submitted questionnaires to 150 retirement plan consulting firms in July 2011. A total of 86 retirement plan consulting firms completed the questionnaire. The top ten consultants are listed by various criteria as reported in the survey. For more information, go to www.plansponsor.com. For the purposes of this survey, "institutional" is defined as any type of retirement plan, including foundations and endowments and other nonprofits. The ranking is not indicative of a firm's future performance. Neither Morgan Stanley Smith Barney LLC nor its affiliated Financial Advisors pay a fee to Plan Sponsor in exchange for this report.

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- loss of all or a substantial portion of the investment due to leveraging, short-selling, or other speculative practices;
- lack of liquidity in that there may be no secondary market for the fund and none is expected to develop;
- volatility of returns;
- restrictions on transferring interests in a fund;
- potential lack of diversification and resulting higher risk due to concentration of trading authority when a single advisor is utilized;
- absence of information regarding valuations and pricing;
- complex tax structures and delays in tax reporting;
- less regulation and higher fees than mutual funds;
- fund of funds often have a higher fee structure than single manager funds as a result of an additional layer of fees; and risks associated with the operations, personnel and processes of the manager

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