South Central Connecticut Regional Water Authority
90 Sargent Drive, New Haven, Connecticut
Or
****Call in (*audio only*)**
+1 469-965-2517,,16321007#   United States, Dallas
Phone Conference ID: 163 210 07#

AGENDA

Regular Meeting of Thursday, January 25, 2024 at 12:30 p.m.

A. Safety Moment

B. Public Comment: The time limit granted to each speaker shall be three (3) minutes. Residents and customers may address the Board

C. Meet as Pension & Benefit Committee: C. LaMarr

1. Discussion re RFI: R. Kowalski and J. Bauer - *Upon 2/3 vote, convene in executive session pursuant to C.G.S. Section 1-200(6)(E) to discuss matters covered by Section 1-210(b)(5)(A), pertaining to trade secrets.*
2. Approve Minutes – October 26, 2023 meeting
3. Quarterly Investment Performance Review – Pension and VEBA: S. Kelliher, J. McLaughlin and A. Kantapin
4. IPS Update

D. Consent Agenda

1. Approve Minutes – December 21, 2023 meeting
2. Capital Budget Authorization – February 2024
3. Capital Budget Transfer Notifications (no action required) – February 2024
4. Monthly Financial Report – December 2023
5. Accounts Receivable Update – December 2023

E. Finance: R. Kowalski

1. Type B3 Amendments

F. Business Updates: L. Bingaman

1. RWAY/CIS Update
2. Monthly Business Highlights

G. Reports on RPB Committee meetings

H. *Possible consideration and action regarding PFAS 3M class action settlement - *Upon 2/3 vote, convene in a possible executive session pursuant to C.G.S. Section 1-200(6)(B) to discuss matters pertaining to litigation.*

I. Application for Lake Whitney Water Treatment Plant Chemical Systems Improvement Project (Application): S. Lakshminarayanan and O. Kelly

1. Presentation and discussion of Application
2. Affidavit regarding confidential information within said Application
3. Motion for Protective Order for confidential information within said Application
4. Protective Order concerning confidential information within said Application for submission to the Representative Policy Board (RPB)
5. Consider and act on recommendation to submit Application to the RPB

J. Consider Possible Acquisition – *Upon 2/3 vote, convene in executive session pursuant to C.G.S. Section 1-200(6)(E) to discuss matters covered by Section 1-210(b)(5)(B), pertaining to commercial and financial information*

K. Meet as Compensation Committee: K. Curseaden

1. Approve Minutes – August 24, 2023 special meeting
2. 6-Month CEO FY 2024 Strategic Priorities Update - *Upon 2/3 vote, convene in executive session pursuant to C.G.S. Section 1-200(6)(E) to discuss matters covered by Section 1-210(b)(5)(A), pertaining to trade secrets.*

L. Act on matters arising from Committee meetings

** Members of the public may attend the meeting in person or by conference call. To view meeting documents please visit http://tinyurl.com/3httm38z. For questions, contact the board office at 203-401-2515 or by email at jslubowski@rwater.com.

**RPB Member (G. Malloy) is excused at Item H*

SAFETY MOMENT

Slow down! It's harder to control or stop your vehicle on a slick or snow-covered surface. In fact, in 2021, an estimated 121,156 police-reported crashes occurred when there were snow/sleet conditions at the time of the crash. On the road, increase your following distance enough to have plenty of time to stop for vehicles ahead and keep your vehicle stocked with safety items.

Tap Into Safety
Regional Water Authority

<u>What to do in an emergency</u>:

- Stay in your car
- Let your car be seen with bright markers
- Be mindful of carbon monoxide poisoning

<u>Safety Technologies:</u>

- Know whether your vehicle has an antilock brake system
- Check headlights, brake lights, turn signals & emergency flashers
- Inspect oil and wiper fluid levels before driving
- Check tires for damage, inflation levels and tread quality

Safety is a core company value at the Regional Water Authority .
It is our goal to reduce workplace injuries to zero.

Regional Water Authority

South Central Connecticut Regional Water Authority
Pension & Benefit Committee

Minutes of the October 26, 2023 Meeting

The regular meeting of the South Central Connecticut Regional Water Authority ("RWA") Pension & Benefit Committee took place on Thursday, October 26, 2023 at the South Central Connecticut Regional Water Authority, 90 Sargent Drive, New Haven, Connecticut, and via remote access. Chairwoman LaMarr presided.

Present: Committee – Mss. LaMarr and Sack, and Messrs. Borowy, Curseaden, and Ricozzi
Management – Mss. Kowalski and Calo, and Messrs. Bingaman, Hill, and Lakshminarayanan
RPB – Mr. Levine
Morgan Stanley – Messrs. Kelliher, McLaughlin, and Kantapin
Staff – Mrs. Slubowski

The Chair called the meeting to order at 12:31 p.m.

On motion made by Mr. Borowy, and seconded by Mr. Ricozzi, the Committee voted unanimously to approve the minutes of its meeting held on July 27, 2023.

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

Messrs. Kelliher, McLaughlin and Kantapin of Morgan Stanley, RWA's Plan Advisor, reported on the Authority's investment performance for the pension plans and the Voluntary Employees' Beneficiary Association (VEBA), for the period ended September 30, 2023, which included:

- Market commentary
- Asset allocations
- Investment returns
- Updated liability analysis

Mr. Kantapin provided the two-year review of the RWA's Investment Policy Statement ("IPS") including goals and objectives, roles and responsibilities, and monitoring for all plans.

The Committee also discussed market opportunities, annual service costs, primary objective, risk, and asset rebalancing. After review and discussion, it was the consensus of the Committee to make edits to the IPS language for consideration at its next regular meeting or at a special meeting.

At 1:43 p.m., Messrs. Kelliher, McLaughlin and Kantapin withdrew from the meeting and on motion made by Mr. Ricozzi, and seconded by Ms. Sack, the Committee voted unanimously to recess the meeting.

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

At 4:51 p.m., the Committee reconvened and Ms. Calo and Messrs. Hill and Lakshminarayanan withdrew from the meeting. On motion made by Mr. Borowy, seconded by Ms. Sack, the Committee voted to go into executive session pursuant to C.G.S. Section 1-200(6)(E) to discuss matters covered by Section 1-210(b)(5)(A), pertaining to trade secrets. Present in executive session were Authority members, Mr. Bingaman, and Mss. Kowalski and Slubowski.

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

At 5:15 p.m., the Committee came out of executive Session. No votes were taken in, or as a result of, executive session. On motion made by Ms. Sack, seconded by Mr. Ricozzi, and unanimously carried, the meeting adjourned.

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

Catherine LaMarr, Chairwoman

THE KELLIHER CORBETT GROUP
AT MORGAN STANLEY

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Regional Water Authority
Tapping the Possibilities

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Discussion Outline & Agenda

	Section
Market Commentary	I.
Asset Allocation & Investment Matrices	II.
Investment Results	III.
Appendix - Investment Policy Statement (IPS) - Investment Holdings Analysis	IV.

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Market Commentary

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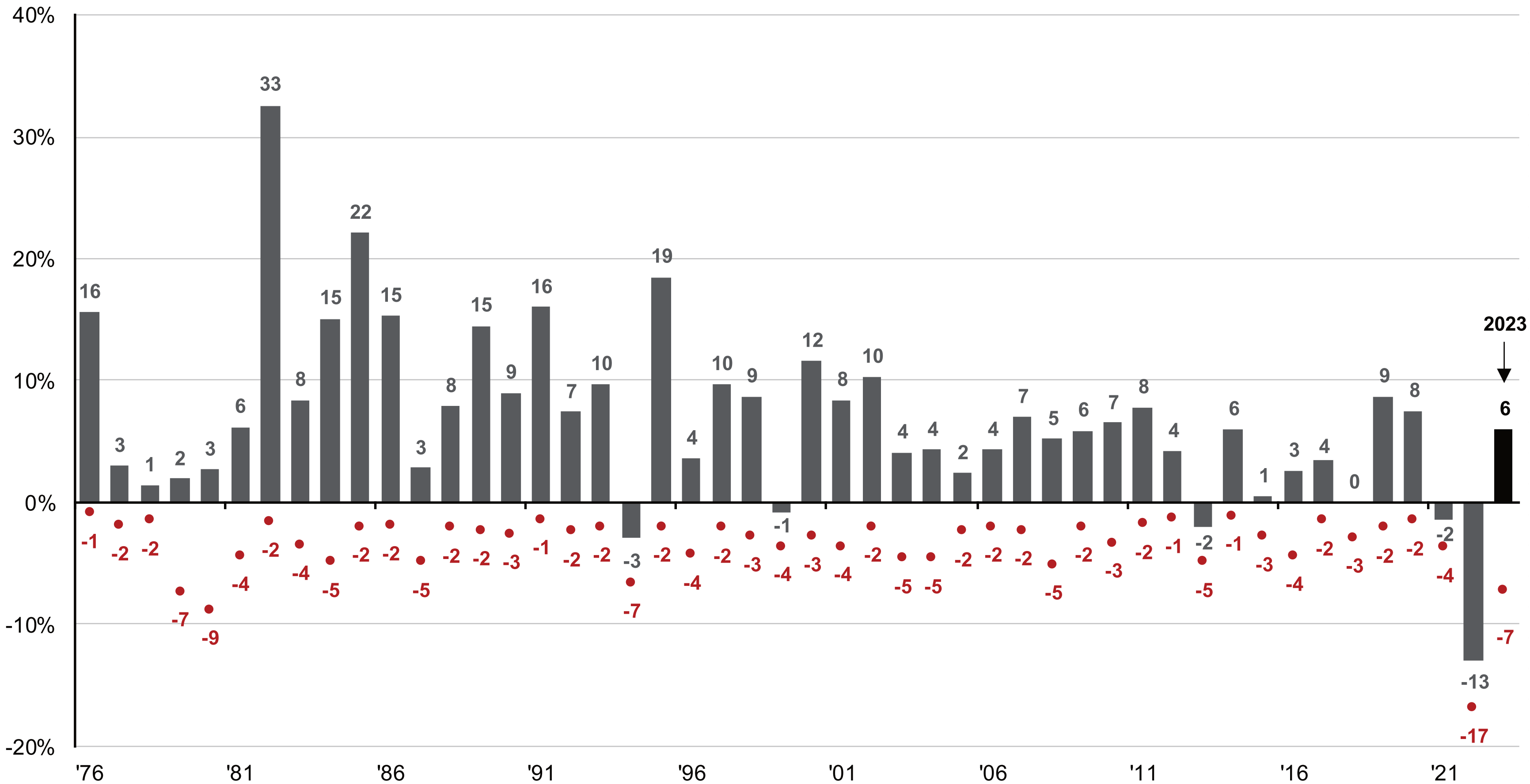
Tapping the Possibilities

Bloomberg U.S. Agg. annual returns and intra-year declines

Fixed Income

Bloomberg U.S. Aggregate intra-year declines vs. calendar year returns

Despite average intra-year drops of 3.4%, annual returns were positive in 43 of 48 years



Source: Bloomberg, FactSet, J.P. Morgan Asset Management.
Returns are based on total return. Intra-year drops refers to the largest market drops from a peak to a trough during the year. For illustrative purposes only. Returns shown are calendar year returns from 1976 to 2023, over which time period the average annual return was 6.6%. Returns from 1976 to 1989 are calculated on a monthly basis; daily data are used afterward.
Guide to the Markets – U.S. Data are as of December 31, 2023.

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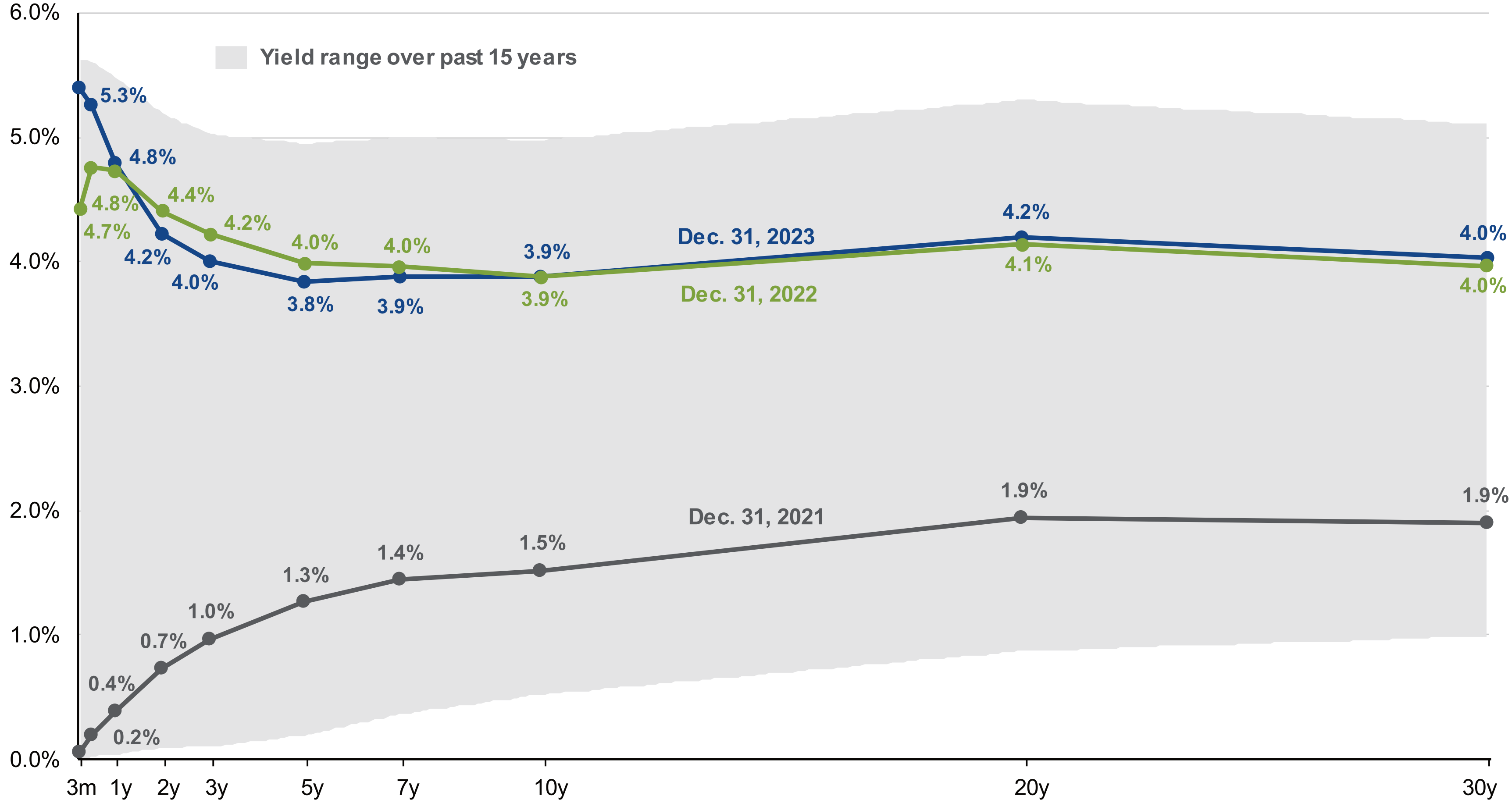
Fixed Income

Yield curve

U.S. Treasury yield curve



Source: FactSet, Federal Reserve, J.P. Morgan Asset Management.
Guide to the Markets – U.S. Data are as of December 31, 2023.

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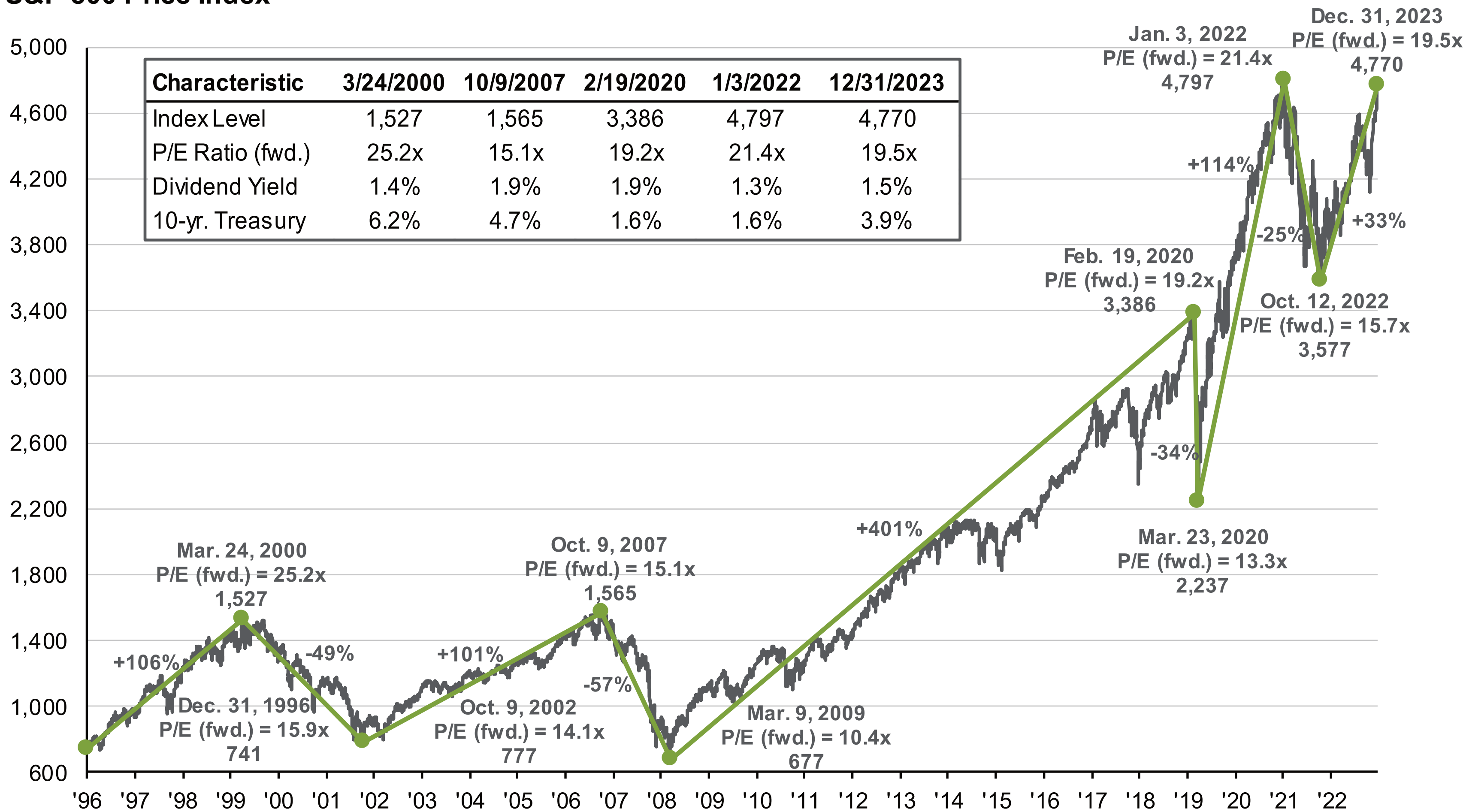
S&P 500 Index at inflection points

S&P 500 Price Index

Characteristic	3/24/2000	10/9/2007	2/19/2020	1/3/2022	12/31/2023
Index Level	1,527	1,565	3,386	4,797	4,770
P/E Ratio (fwd.)	25.2x	15.1x	19.2x	21.4x	19.5x
Dividend Yield	1.4%	1.9%	1.9%	1.3%	1.5%
10-yr. Treasury	6.2%	4.7%	1.6%	1.6%	3.9%



Source: Compustat, FactSet, Federal Reserve, Refinitiv Datastream, Standard & Poor's, J.P. Morgan Asset Management.
Dividend yield is calculated as consensus estimates of dividends for the next 12 months, divided by most recent price, as provided by Compustat. Forward price-to-earnings ratio is a bottom-up calculation based on IBES estimates and FactSet estimates since January 2022. Returns are cumulative and based on S&P 500 Index price movement only, and do not include the reinvestment of dividends. Past performance is not indicative of future returns.
Guide to the Markets – U.S. Data are as of December 31, 2023.

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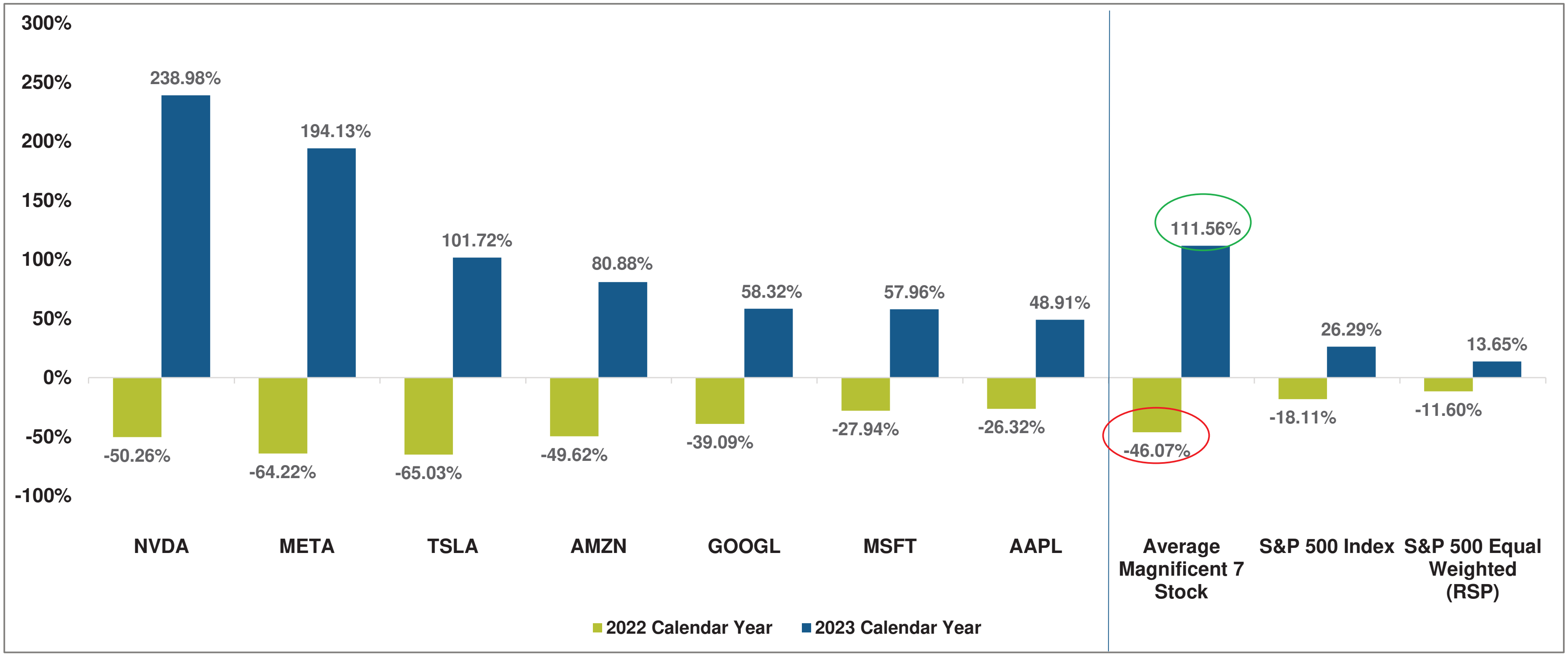
The "Magnificent 7" Stocks Drove Equity Market Performance Throughout 2023

As of December 31, 2023



Source: Morningstar

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.

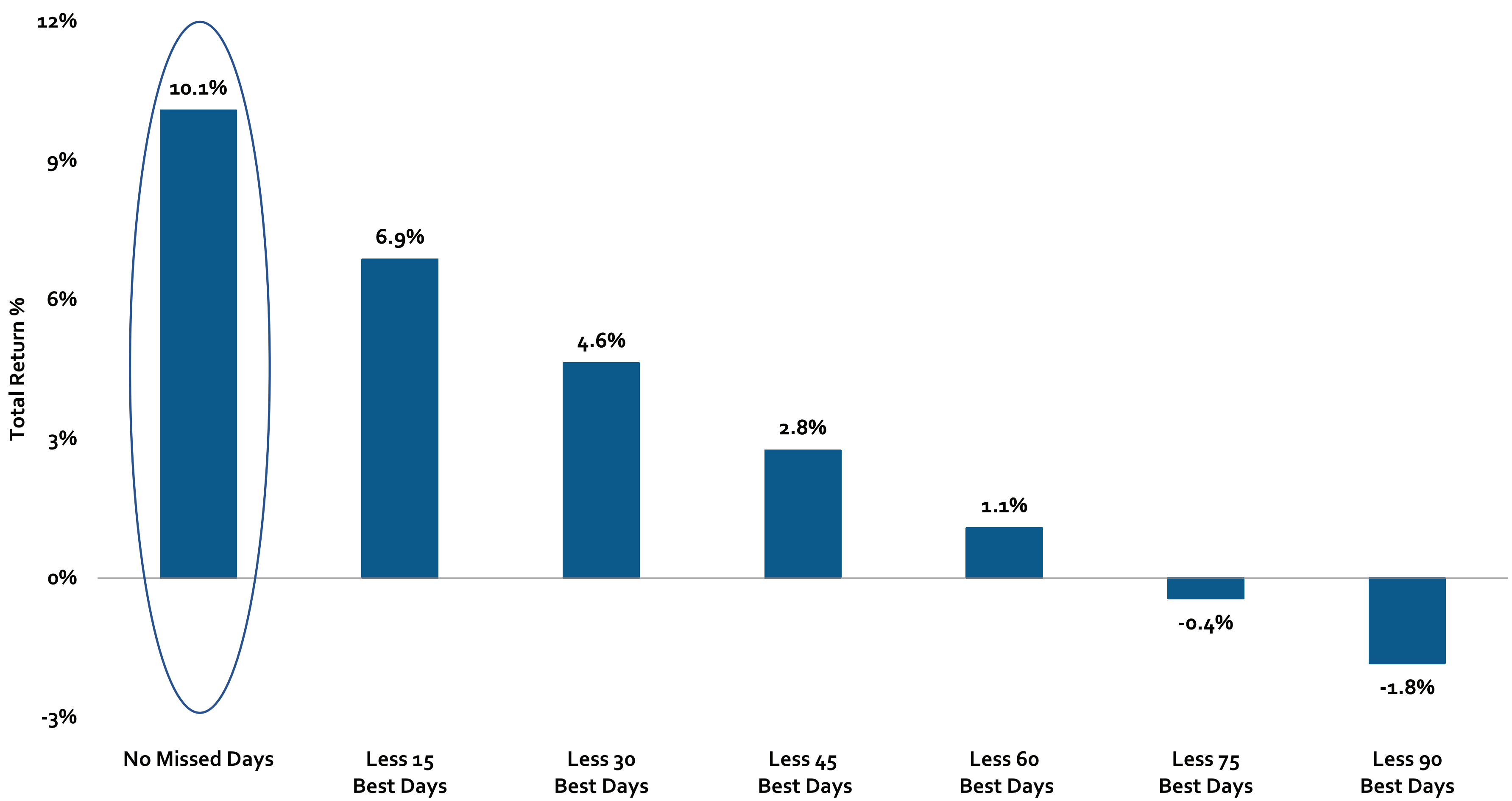
An investment cannot be made directly in a market index

CRC #: 6016285

Effect of Timing on Annualized Returns

Annualized Total Returns of S&P 500 (1990-2022)

As of December 5, 2023



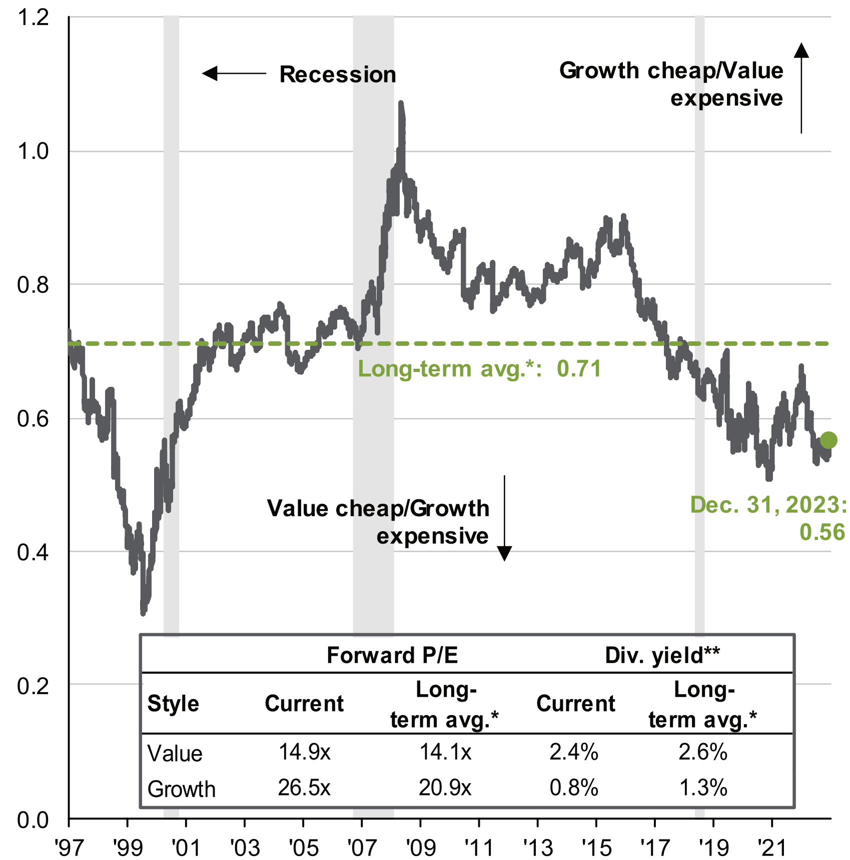
Source: Bloomberg, Morgan Stanley Wealth Management GIO. Note: Best days are defined as the days with the highest single-day returns in the S&P 500.

Equities

Value vs. Growth: Valuations and interest rates

Value vs. Growth relative valuations

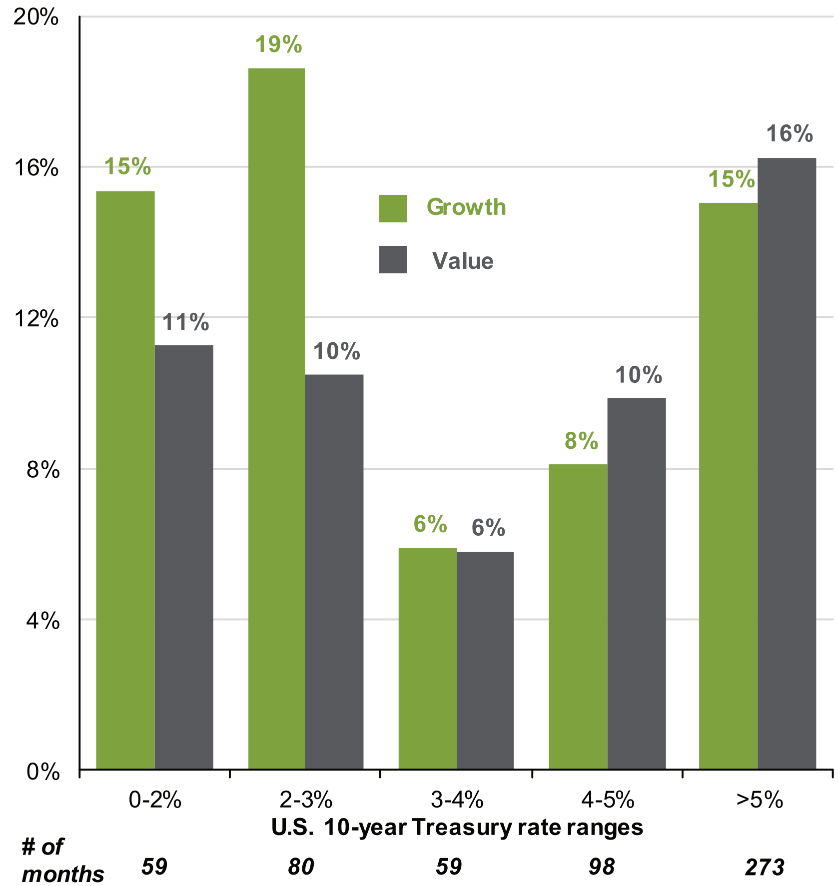
Rel. fwd. P/E ratio of Value vs. Growth, 1997 - present



	Forward P/E		Div. yield**	
Style	Current	Long-term avg.*	Current	Long-term avg.*
Value	14.9x	14.1x	2.4%	2.6%
Growth	26.5x	20.9x	0.8%	1.3%

Value vs. Growth in different interest rate environments

Annualized total return by 10-year Treasury rate ranges, 1979 - present



Source: FactSet, FTSE Russell, NBER, J.P. Morgan Asset Management.
Growth is represented by the Russell 1000 Growth Index and Value is represented by the Russell 1000 Value Index. (Left) *Long-term averages are calculated monthly since December 1997. **Dividend yield is calculated as the next 12-month consensus dividend divided by most recent price. (Right) Returns are calculated by annualizing the average monthly performance during each interest rate range.
Guide to the Markets – U.S. Data are as of December 31, 2023.

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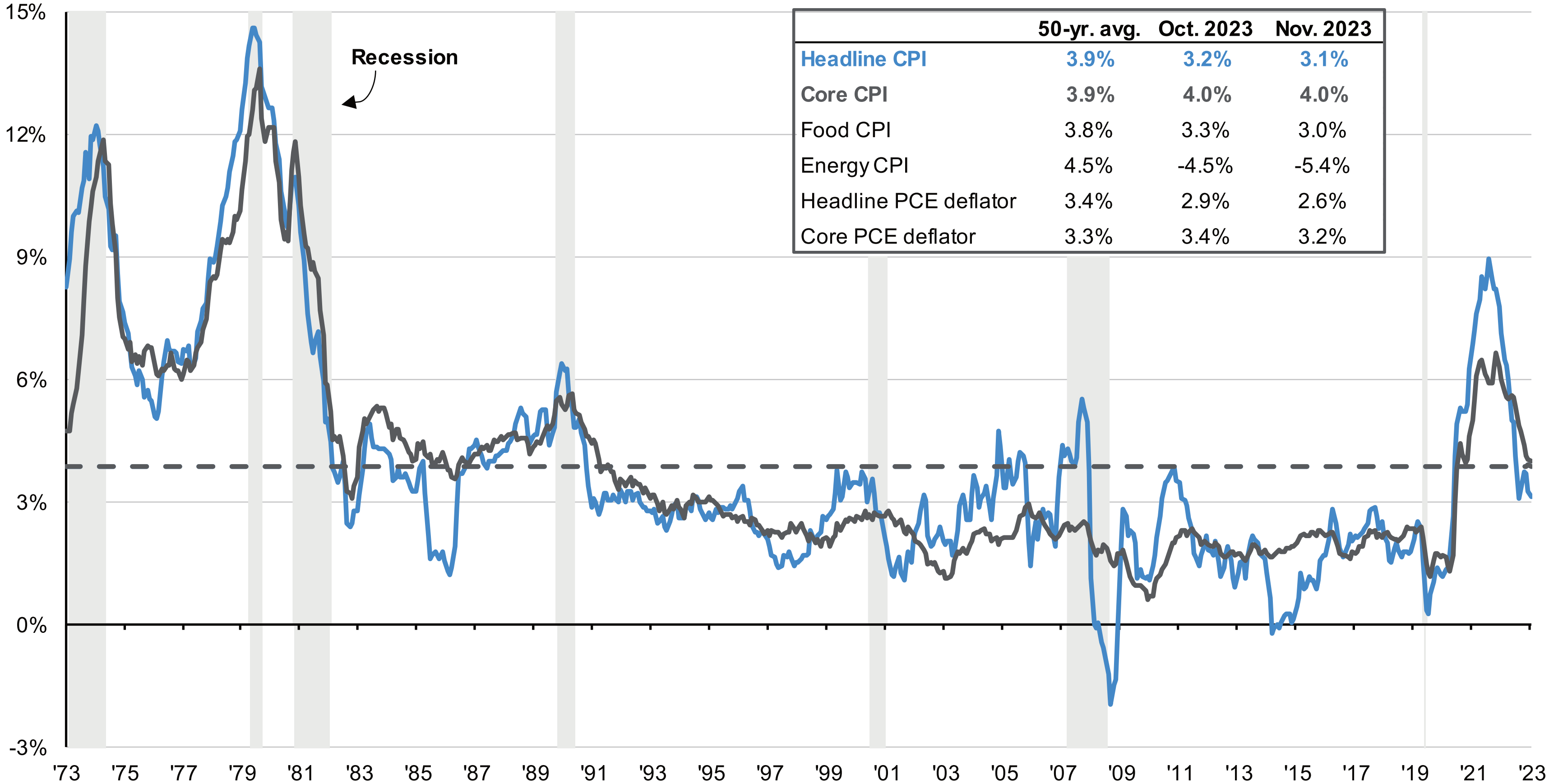
Inflation

CPI and core CPI

% change vs. prior year, seasonally adjusted



	50-yr. avg.	Oct. 2023	Nov. 2023
Headline CPI	3.9%	3.2%	3.1%
Core CPI	3.9%	4.0%	4.0%
Food CPI	3.8%	3.3%	3.0%
Energy CPI	4.5%	-4.5%	-5.4%
Headline PCE deflator	3.4%	2.9%	2.6%
Core PCE deflator	3.3%	3.4%	3.2%

Source: BLS, FactSet, J.P. Morgan Asset Management.
CPI used is CPI-U and values shown are % change vs. one year ago. Core CPI is defined as CPI excluding food and energy prices. The Personal Consumption Expenditure (PCE) deflator employs an evolving chain-weighted basket of consumer expenditures instead of the fixed-weight basket used in CPI calculations.
Guide to the Markets – U.S. Data are as of December 31, 2023.

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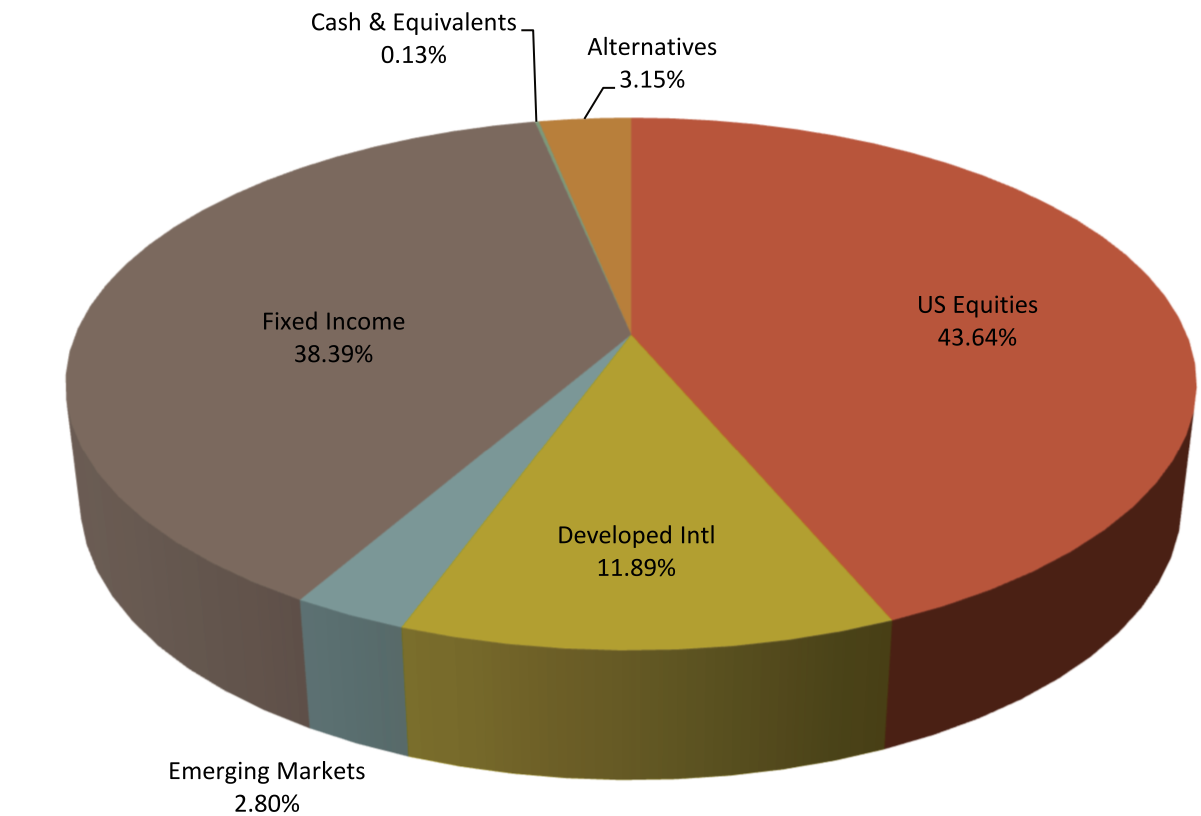
Asset Allocation & Investment Matrices

Regional Water Authority
Tapping the Possibilities

SCCT Regional Water Authority - Salary & Union Plans

Current Allocation

Portfolio Value: $71,966,460



Total Equity

58.33%

% of Total Equity

US Equity	=	74.82%
Intl Equity	=	25.18%

% of Intl Equity

Developed Intl	=	80.96%
Emerging Markets	=	19.04%

Russell 3000 Style Analysis*

Value	=	22.00%
Core	=	33.00%
Growth	=	45.00%

US Equity Style Analysis*

Value	=	26.00%
Core	=	42.90%
Growth	=	31.10%

Assets as of 12/31/2023

Asset Allocation does not assure a profit or protect against loss in declining financial markets
The information and data contained in this report are from sources considered reliable,
but their accuracy and completeness is not guaranteed. This report has been prepared for illustrative purposes only
and is not intended to be used as a substitute for monthly transaction statements you receive on a regular basis
from Morgan Stanley & Co. Incorporated Please compare the data on this document carefully with your monthly statements
to verify its accuracy. The Company strongly encourages you to consult with your own accountants or other
advisors with respect to any tax questions."

*Equity Style Analysis provided by Morningstar "Asset Scan"

Data Source: Morgan Stanley & Morningstar

SCCT Regional Water Authority - Salary & Union Plans
Asset Allocation Matrix Summary
As of 12/31/2023

Benchmark vs Actual

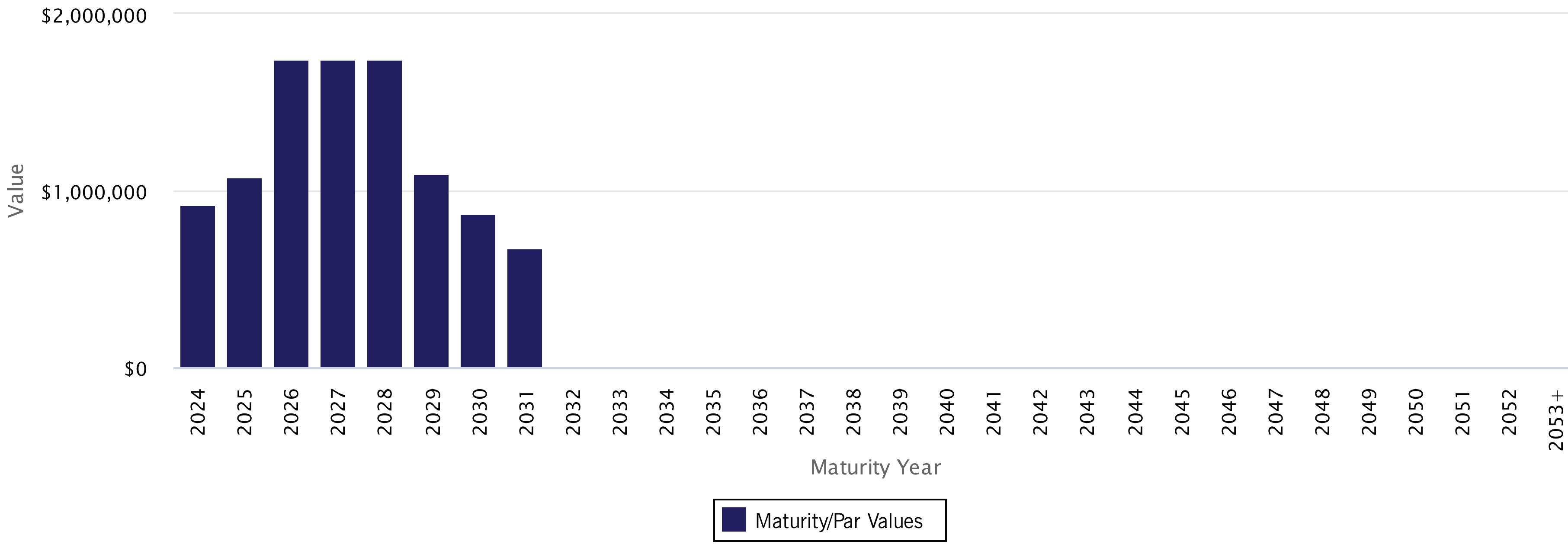
	Benchmark	Actual	+/-
Russell 3000	42.00%	43.65%	1.65%
MSCI ACWI ex US	15.00%	14.40%	-0.60%
Bloomberg US Aggregate	31.00%	38.17%	7.17%
FTSE WGBI	3.00%	0.00%	-3.00%
HFRI FOF	5.00%	2.24%	-2.76%
Global Real Estate	2.00%	0.91%	-1.09%
Cash & Equivalents/T-Bills	2.00%	0.63%	-1.37%
Total	100.00%	100.00%	0.00%

This information and data is being provided at your request and is from sources considered reliable, but their accuracy and completeness is not guaranteed. It has been prepared for illustrative purposes only and is not intended to be used as a substitute for the transaction statements you receive from Morgan Stanley Smith Barney LLC. Please compare the data on this document carefully with your transaction statements to verify its accuracy.

BOND MATURITY DISTRIBUTION GRAPH

SALARY 447-XXX450 - Portfolio Management RPM - RPM DB Trustee Directed | **As of January 17, 2024 | Reporting Currency: USD**

BOND MATURITY DISTRIBUTION GRAPH



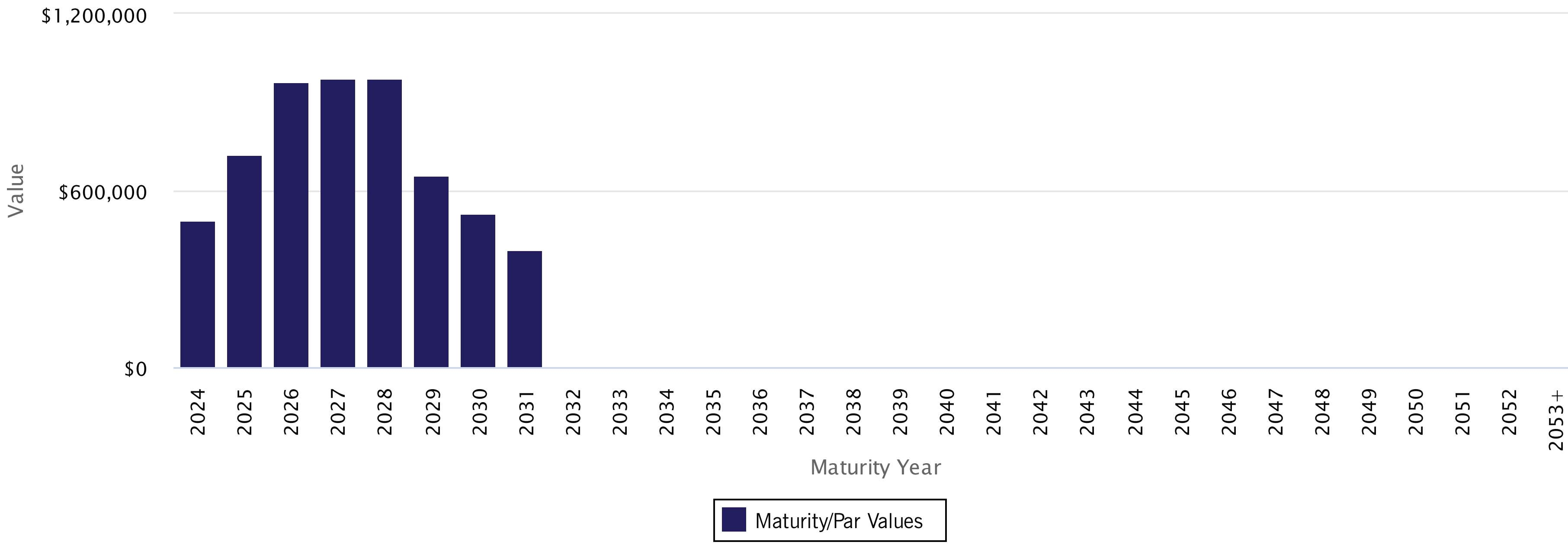
Year	Maturity/Par Values ($)	% of Maturity/Par Value	# of Issues	Year	Maturity/Par Values ($)	% of Maturity/Par Value	# of Issues	Year	Maturity/Par Values ($)	% of Maturity/Par Value	# of Issues
2024	925,000.00	9.34	4	2034	-	-	0	2044	-	-	0
2025	1,075,000.00	10.86	6	2035	-	-	0	2045	-	-	0
2026	1,750,000.00	17.68	8	2036	-	-	0	2046	-	-	0
2027	1,750,000.00	17.68	8	2037	-	-	0	2047	-	-	0
2028	1,750,000.00	17.68	9	2038	-	-	0	2048	-	-	0
2029	1,100,000.00	11.11	6	2039	-	-	0	2049	-	-	0
2030	875,000.00	8.84	4	2040	-	-	0	2050	-	-	0
2031	675,000.00	6.82	3	2041	-	-	0	2051	-	-	0
2032	-	-	0	2042	-	-	0	2052	-	-	0
2033	-	-	0	2043	-	-	0	2053+	-	-	0

The Bond Maturity Distribution Graph does not include bonds held in mutual funds or ETFs, or bonds for which this information is not available.

As of January 17, 2024 | Reporting Currency: USD

BOND MATURITY DISTRIBUTION GRAPH

BOND MATURITY DISTRIBUTION GRAPH



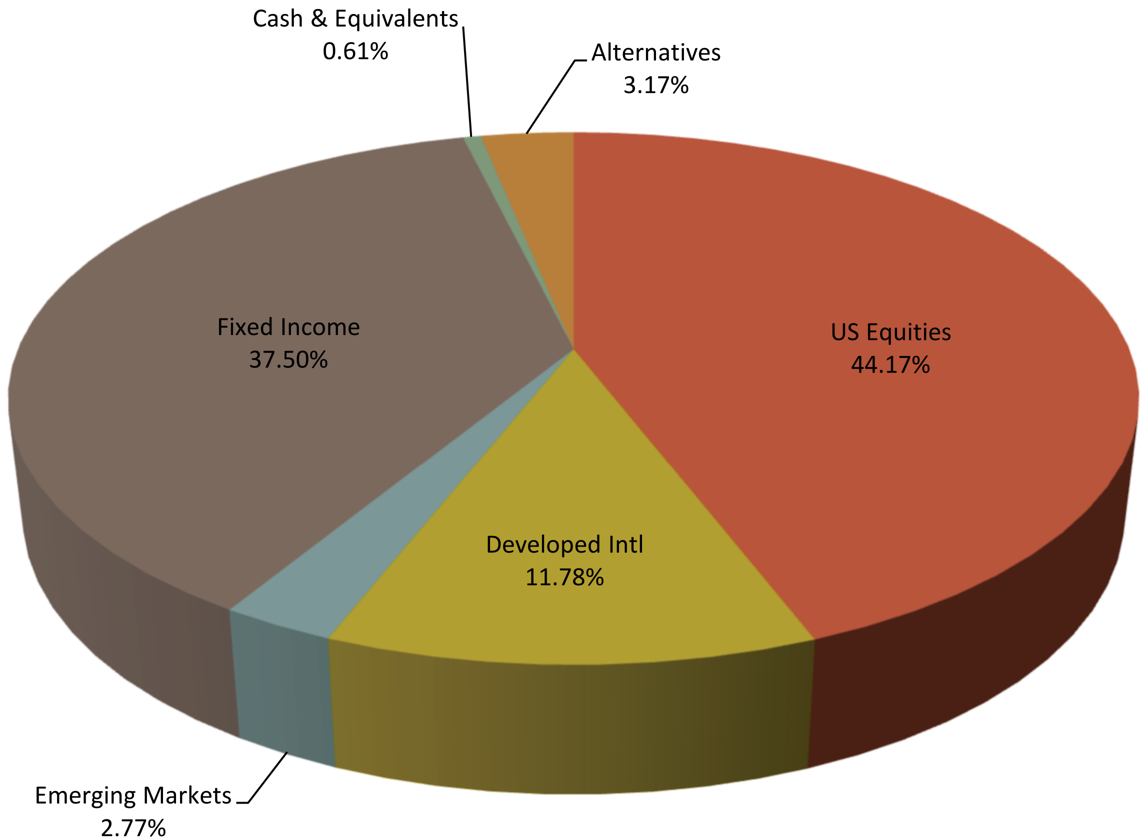
Year	Maturity/Par Values ($)	% of Maturity/Par Value	# of Issues	Year	Maturity/Par Values ($)	% of Maturity/Par Value	# of Issues	Year	Maturity/Par Values ($)	% of Maturity/Par Value	# of Issues
2024	500,000.00	8.71	3	2034	-	-	0	2044	-	-	0
2025	725,000.00	12.63	6	2035	-	-	0	2045	-	-	0
2026	972,000.00	16.93	8	2036	-	-	0	2046	-	-	0
2027	985,000.00	17.15	8	2037	-	-	0	2047	-	-	0
2028	985,000.00	17.15	9	2038	-	-	0	2048	-	-	0
2029	650,000.00	11.32	6	2039	-	-	0	2049	-	-	0
2030	525,000.00	9.14	4	2040	-	-	0	2050	-	-	0
2031	400,000.00	6.97	3	2041	-	-	0	2051	-	-	0
2032	-	-	0	2042	-	-	0	2052	-	-	0
2033	-	-	0	2043	-	-	0	2053+	-	-	0

The Bond Maturity Distribution Graph does not include bonds held in mutual funds or ETFs, or bonds for which this information is not available.

SCCT Regional Water Authority - VEBA Plan

Current Allocation

Portfolio Value: $9,470,662



Total Equity

58.72%

% of Total Equity

US Equity	= 75.21%
Intl Equity	= 24.79%

% of Intl Equity

Developed Intl	= 80.96%
Emerging Markets	= 19.04%

Russell 3000 Style Analysis*

Value	= 22.00%
Core	= 33.00%
Growth	= 45.00%

US Equity Style Analysis*

Value	= 25.81%
Core	= 43.02%
Growth	= 31.17%

Assets as of 12/31/2023

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*Equity Style Analysis provided by Morningstar "Asset Scan"

Data Source: Morgan Stanley & Morningstar

SCCT Regional Water Authority - VEBA Plan
Asset Allocation Matrix Summary
As of 12/31/2023

Benchmark vs Actual

	Benchmark	Actual	+/-
Russell 3000	42.00%	44.17%	2.17%
MSCI ACWI ex US	15.00%	14.27%	-0.73%
Bloomberg US Aggregate	31.00%	37.47%	6.47%
FTSE WGBI	3.00%	0.00%	-3.00%
HFRI FOF	5.00%	2.29%	-2.71%
Global Real Estate	2.00%	0.88%	-1.12%
Cash & Equivalents/T-Bills	2.00%	0.92%	-1.08%
Total	100.00%	100.00%	0.00%

Morgan Stanley

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AT MORGAN STANLEY

Investment Results

Regional Water Authority
Tapping the Possibilities

SCCT Regional Water Authority
Fourth Quarter Investment Results
September 30, 2023 - December 31, 2023

Account Number	Account Type	Beg. Asset Value 30-Sep-2023	Net Deposits/Withdrawals	Transfers	Net Invested	Ending Asset Value 31-Dec-2023	Net $ Gain/Loss	Gain/Loss (net) %	Gain/Loss (gross) %
447-xxx450	Salaried	$41,636,281	$0	$54,841	$41,691,122	$45,170,155	$3,479,033	8.35%	8.45%
447-xxx451	Union	$24,688,617	$0	$37,962	$24,726,579	$26,796,305	$2,069,725	8.37%	8.47%
447-xxx456	VEBA	$8,724,438	$0	$0	$8,724,438	$9,470,662	$746,224	8.55%	8.65%
axx15a	Matrix Trust (Salaried)	$344,210	($152,770)	$0	$191,440	$191,440	$0	-	-
axx15b	Matrix Trust (Union)	$125,805	($76,009)	$0	$49,796	$49,796	$0	-	-
axx16	Matrix Trust(VEBA)	$734,880	($173,141)	($92,803)	$468,937	$468,937	$0	-	-
Consolidated		$76,254,232	($401,919)	$0	$75,852,312	$82,147,295	$6,294,983	8.38%	8.48%

September 30, 2023 - December 31, 2023

Actuarial Assumed Rate of Return

Actuarial Assumed Rate of Return (Current): 6.75% x (3/12)	1.69%
Guidelines/Benchmarks - Market Cap Weighted	
Least Equity Risk: 34% R3000, 11% MSCI ACWxUS, 39% Bloomberg Agg, 4% FTSE WGBI, 9% HFRI FOF, 1% Global RE, 2% T-Bills	8.69%
Strategic: 42% R3000, 15% MSCI ACWxUS, 31% Bloomberg Agg, 3% FTSE WGBI, 5% HFRI FOF, 2% Global RE, 2% T-Bills	9.42%
Most Equity Risk: 44% R3000, 16% MSCI ACWxUS, 16% Bloomberg Agg, 2% FTSE WGBI, 15% HFRI FOF, 5% Global RE, 2% T-Bills	9.51%
Guidelines/Benchmarks - Equal Weighted	
Least Equity Risk: 34% S&P 500 Equal Weighted, 11% MSCI ACWxUS, 39% Bloomberg Agg, 4% FTSE WGBI, 9% HFRI FOF, 1% Global RE, 2% T-Bills	8.62%
Strategic: 42% S&P 500 Equal Weighted, 15% MSCI ACWxUS, 31% Bloomberg Agg, 3% FTSE WGBI, 5% HFRI FOF, 2% Global RE, 2% T-Bills	9.34%
Most Equity Risk: 44% S&P 500 Equal Weighted, 16% MSCI ACWxUS, 16% Bloomberg Agg, 2% FTSE WGBI, 15% HFRI FOF, 5% Global RE, 2% T-Bills	9.42%

Russell 3000	12.07%
S&P 500	11.69%
S&P 500 Equal Weight	11.87%
Russell 1000 Value	9.50%
Russell 1000	11.96%
Russell 1000 Growth	14.16%
Russell 2000	14.03%
MSCI All Country World ex. US	9.75%
MSCI EAFE	10.42%
MSCI EM	7.86%
Bloomberg Aggregate	6.82%
Bloomberg Govt/Credit Intermediate	4.56%
HFRI Fund of Funds Index	3.88%
DJ Global World Real Estate	15.55%
FTSE WGBI Index	8.08%
30 Day T-Bill	1.38%

Performance for accounts held outside of Morgan Stanley are calculated using simple math

Data Source: Morgan Stanley & Morningstar

SCCT Regional Water Authority
Year to Date Investment Results
December 31, 2022 - December 31, 2023

Account Number	Account Type	Beg. Asset Value 31-Dec-2022	Net Deposits/Withdrawals	Transfers	Net Invested	Ending Asset Value 31-Dec-2023	Net $ Gain/Loss	Gain/Loss (net) %	Gain/Loss (gross) %
447-xxx450	Salaried	$39,989,740	$0	$311,670	$40,301,410	$45,170,155	$4,868,745	12.06%	12.47%
447-xxx451	Union	$23,779,677	$0	$95,041	$23,874,719	$26,796,305	$2,921,586	12.26%	12.67%
447-xxx456	VEBA	$8,443,859	$0	$0	$8,443,859	$9,470,662	$1,026,803	12.16%	12.57%
axx15a	Matrix Trust (Salaried)	$46,129	$276,844	($131,533)	$191,440	$191,440	$0	-	-
axx15b	Matrix Trust (Union)	$15,732	$2,532	$31,533	$49,796	$49,796	$0	-	-
axx16	Matrix Trust(VEBA)	$584,218	$191,430	($306,711)	$468,937	$468,937	$0	-	-
Consolidated		$72,859,355	$470,806	$0	$73,330,161	$82,147,295	$8,817,134	12.14%	12.55%

December 31, 2022 - December 31, 2023

Actuarial Assumed Rate of Return

Actuarial Assumed Rate of Return (Current): 6.75% x (12/12)	6.75%

Guidelines/Benchmarks - Market Cap Weighted

Least Equity Risk: 34% R3000, 11% MSCI ACWxUS, 39% Bloomberg Agg, 4% FTSE WGBI, 9% HFRI FOF, 1% Global RE, 2% T-Bills	13.72%
Strategic: 42% R3000, 15% MSCI ACWxUS, 31% Bloomberg Agg, 3% FTSE WGBI, 5% HFRI FOF, 2% Global RE, 2% T-Bills	15.75%
Most Equity Risk: 44% R3000, 16% MSCI ACWxUS, 16% Bloomberg Agg, 2% FTSE WGBI, 15% HFRI FOF, 5% Global RE, 2% T-Bills	16.50%

Guidelines/Benchmarks - Equal Weighted

Least Equity Risk: 34% S&P 500 Equal Weighted, 11% MSCI ACWxUS, 39% Bloomberg Agg, 4% FTSE WGBI, 9% HFRI FOF, 1% Global RE, 2% T-Bills	9.61%
Strategic: 42% S&P 500 Equal Weighted, 15% MSCI ACWxUS, 31% Bloomberg Agg, 3% FTSE WGBI, 5% HFRI FOF, 2% Global RE, 2% T-Bills	10.67%
Most Equity Risk: 44% S&P 500 Equal Weighted, 16% MSCI ACWxUS, 16% Bloomberg Agg, 2% FTSE WGBI, 15% HFRI FOF, 5% Global RE, 2% T-Bills	11.18%

Russell 3000	25.96%
S&P 500	26.29%
S&P 500 Equal Weight	13.87%
Russell 1000 Value	11.46%
Russell 1000	26.53%
Russell 1000 Growth	42.68%
Russell 2000	16.93%
MSCI All Country World ex. US	15.62%
MSCI EAFE	18.24%
MSCI EM	9.83%
Bloomberg Aggregate	5.53%
Bloomberg Govt/Credit Intermediate	5.24%
HFRI Fund of Funds Index	6.83%
DJ Global World Real Estate	9.34%
FTSE WGBI Index	5.19%
30 Day T-Bill	5.13%

Performance for accounts held outside of Morgan Stanley are calculated using simple math

Data Source: Morgan Stanley & Morningstar

SCCT Regional Water Authority
Fiscal Year Investment Results
May 31, 2023 - December 31, 2023

Account Number	Account Type	Beg. Asset Value 31-May-2023	Net Deposits/Withdrawals	Transfers	Net Invested	Ending Asset Value 31-Dec-2023	Net $ Gain/Loss	Gain/Loss (net) %	Gain/Loss (gross) %
447-xxx450	Salaried	$42,115,960	$0	($504,089)	$41,611,872	$45,170,155	$3,558,283	8.52%	8.75%
447-xxx451	Union	$24,833,519	$0	($158,529)	$24,674,990	$26,796,305	$2,121,315	8.58%	8.81%
447-xxx456	VEBA	$8,731,841	$0	$0	$8,731,841	$9,470,662	$738,822	8.46%	8.69%
axx15a	Matrix Trust (Salaried)	$137,558	($546,118)	$600,000	$191,440	$191,440	$0	-	-
axx15b	Matrix Trust (Union)	$539	($175,743)	$225,000	$49,796	$49,796	$0	-	-
axx16	Matrix Trust(VEBA)	$532,809	$98,510	($162,382)	$468,937	$468,937	$0	-	-
Consolidated		$76,352,226	($623,350)	$0	$75,728,876	$82,147,295	$6,418,420	8.53%	8.76%

May 31, 2023 - December 31, 2023

Actuarial Assumed Rate of Return	
Actuarial Assumed Rate of Return (Current): 6.75% x (7/12)	3.94%
Guidelines/Benchmarks - Market Cap Weighted	
Least Equity Risk: 34% R3000, 11% MSCI ACWxUS, 39% Bloomberg Agg, 4% FTSE WGBI, 9% HFRI FOF, 1% Global RE, 2% T-Bills	8.53%
Strategic: 42% R3000, 15% MSCI ACWxUS, 31% Bloomberg Agg, 3% FTSE WGBI, 5% HFRI FOF, 2% Global RE, 2% T-Bills	9.84%
Most Equity Risk: 44% R3000, 16% MSCI ACWxUS, 16% Bloomberg Agg, 2% FTSE WGBI, 15% HFRI FOF, 5% Global RE, 2% T-Bills	10.74%
Guidelines/Benchmarks - Equal Weighted	
Least Equity Risk: 34% S&P 500 Equal Weighted, 11% MSCI ACWxUS, 39% Bloomberg Agg, 4% FTSE WGBI, 9% HFRI FOF, 1% Global RE, 2% T-Bills	8.12%
Strategic: 42% S&P 500 Equal Weighted, 15% MSCI ACWxUS, 31% Bloomberg Agg, 3% FTSE WGBI, 5% HFRI FOF, 2% Global RE, 2% T-Bills	9.33%
Most Equity Risk: 44% S&P 500 Equal Weighted, 16% MSCI ACWxUS, 16% Bloomberg Agg, 2% FTSE WGBI, 15% HFRI FOF, 5% Global RE, 2% T-Bills	10.20%
Russell 3000	15.83%
S&P 500	15.17%
S&P 500 Equal Weight	14.60%
Russell 1000 Value	13.08%
Russell 1000	15.76%
Russell 1000 Growth	18.15%
Russell 2000	16.98%
MSCI All Country World ex. US	10.35%
MSCI EAFE	10.70%
MSCI EM	8.69%
Bloomberg Aggregate	3.00%
Bloomberg Govt/Credit Intermediate	2.98%
HFRI Fund of Funds Index	5.68%
DJ Global World Real Estate	13.09%
FTSE WGBI Index	3.45%
30 Day T-Bill	3.19%

Performance for accounts held outside of Morgan Stanley are calculated using simple math

Data Source: Morgan Stanley & Morningstar

SCCT Regional Water Authority
Trailing Five Year Investment Results
December 31, 2018 - December 31, 2023

Account Number	Account Type	Beg. Asset Value 31-Dec-2018	Net Deposits/Withdrawals	Transfers	Net Invested	Ending Asset Value 31-Dec-2023	Net $ Gain/Loss	Gain/Loss (net) %	Gain/Loss (gross) %
447-xxx450	Salaried	$30,370,008	$0	$1,349,997	$31,720,005	$45,170,155	$13,450,150	7.47%	7.87%
447-xxx451	Union	$19,480,341	$0	($1,043,245)	$18,437,096	$26,796,305	$8,359,209	7.52%	7.92%
447-xxx456	VEBA	$5,904,957	$0	$920,695	$6,825,652	$9,470,662	$2,645,011	7.25%	7.65%
447-xxx626*	Skybridge (Salaried)	$630,172	$0	($704,240)	($74,069)	$0	$74,069	2.25%	2.25%
447-xxx627*	Skybridge (Union)	$423,144	$0	($472,852)	($49,708)	$0	$49,708	2.25%	2.25%
axx15a	Matrix Trust (Salaried)	$500,000	($448,201)	$139,641	$191,440	$191,440	$0	-	-
axx15b	Matrix Trust (Union)	$350,000	($2,410,765)	$2,110,561	$49,796	$49,796	$0	-	-
axx16	Matrix Trust(VEBA)	$284,962	$2,484,532	($2,300,557)	$468,937	$468,937	$0	-	-
Consolidated		$57,943,584	($374,434)	$0	$57,569,150	$82,147,295	$24,578,146	7.37%	7.76%

	Gain/Loss (net) %	Gain/Loss (gross) %
2020 Trailing Five Year Returns (12/31/2015 - 12/31/2020)	**9.09%**	**9.50%**
2021 Trailing Five Year Returns (12/31/2016 - 12/31/2021)	**9.86%**	**10.27%**
2022 Trailing Five Year Returns (12/31/2017 - 12/31/2022)	**3.82%**	**4.20%**

December 31, 2018 - December 31, 2023

Actuarial Assumed Rate of Return

Actuarial Assumed Rate of Return (Current): 6.75%	6.75%
Actuarial Assumed Rate of Return (Prior to 5/31/2021): 7.00%	7.00%

Guidelines/Benchmarks - Market Cap Weighted

Least Equity Risk: 34% R3000, 11% MSCI ACWxUS, 39% Bloomberg Agg, 4% FTSE WGBI, 9% HFRI FOF, 1% Global RE, 2% T-Bills	6.85%
Strategic: 42% R3000, 15% MSCI ACWxUS, 31% Bloomberg Agg, 3% FTSE WGBI, 5% HFRI FOF, 2% Global RE, 2% T-Bills	8.09%
Most Equity Risk: 44% R3000, 16% MSCI ACWxUS, 16% Bloomberg Agg, 2% FTSE WGBI, 15% HFRI FOF, 5% Global RE, 2% T-Bills	8.94%

Guidelines/Benchmarks - Equal Weighted

Least Equity Risk: 34% S&P 500 Equal Weighted, 11% MSCI ACWxUS, 39% Bloomberg Agg, 4% FTSE WGBI, 9% HFRI FOF, 1% Global RE, 2% T-Bills	6.38%
Strategic: 42% S&P 500 Equal Weighted, 15% MSCI ACWxUS, 31% Bloomberg Agg, 3% FTSE WGBI, 5% HFRI FOF, 2% Global RE, 2% T-Bills	7.51%
Most Equity Risk: 44% S&P 500 Equal Weighted, 16% MSCI ACWxUS, 16% Bloomberg Agg, 2% FTSE WGBI, 15% HFRI FOF, 5% Global RE, 2% T-Bills	8.33%

Russell 3000	15.16%
S&P 500	15.69%
S&P 500 Equal Weight	13.77%
Russell 1000 Value	10.91%
Russell 1000	15.52%
Russell 1000 Growth	19.50%
Russell 2000	9.97%
MSCI All Country World ex. US	7.08%
MSCI EAFE	8.16%
MSCI EM	3.69%
Bloomberg Aggregate	1.10%
Bloomberg Govt/Credit Intermediate	1.59%
HFRI Fund of Funds Index	5.24%
DJ Global World Real Estate	3.37%
FTSE WGBI Index	-1.39%
30 Day T-Bill	1.84%

Performance for accounts held outside of Morgan Stanley are calculated using simple math *447-xxx626 closed May 2022 *447-xxx627 closed July 2022

The information and data contained in this report are from sources considered reliable, but their accuracy and completeness is not guaranteed. This report has been prepared for illustrative purposes only and is not intended to be used as a substitute for monthly transaction statements you receive on a regular basis from Morgan Stanley & Co. Incorporated Please compare the data on this document carefully with your monthly statements to verify its accuracy. The Company strongly encourages you to consult with your own accountants or other advisors with respect to any tax questions.

Data Source: Morgan Stanley & Morningstar

SCCT Regional Water Authority
Trailing Eight Year Investment Results
December 31, 2015 - December 31, 2023

Account Number	Account Type	Beg. Asset Value 31-Dec-2015	Net Deposits/Withdrawals	Transfers	Net Invested	Ending Asset Value 31-Dec-2023	Net $ Gain/Loss	Gain/Loss (net) %	Gain/Loss (gross) %
447-xxx450	Salaried	$22,078,953	$0	$5,877,554	$27,956,508	$45,170,155	$17,213,647	6.61%	7.02%
447-xxx451	Union	$16,143,219	$0	($466,430)	$15,676,790	$26,796,305	$11,119,515	6.64%	7.05%
447-xxx456	VEBA	$2,919,401	$0	$3,195,838	$6,115,239	$9,470,662	$3,355,423	6.41%	6.82%
447-xxx626*	Skybridge (Salaried)	$0	$0	($153,806)	($153,806)	$0	$153,806	3.64%	3.64%
447-xxx627*	Skybridge (Union)	$0	$0	($107,539)	($107,539)	$0	$107,539	3.64%	3.64%
axx15a	Matrix Trust (Salaried)	$202,978	$4,514,852	($4,526,390)	$191,440	$191,440	$0	-	-
axx15b	Matrix Trust (Union)	$147,576	($1,603,371)	$1,505,591	$49,796	$49,796	$0	-	-
axx16	Matrix Trust(VEBA)	$269,858	$5,523,898	($5,324,819)	$468,937	$468,937	$0	-	-
Consolidated		$41,761,987	$8,435,378	$0	$50,197,365	$82,147,295	$31,949,930	6.56%	6.95%

December 31, 2015 - December 31, 2023

Actuarial Assumed Rate of Return	
Actuarial Assumed Rate of Return (Current): 6.75%	6.75%
Actuarial Assumed Rate of Return (Prior to 5/31/2021): 7.00%	7.00%
Guidelines/Benchmarks - Market Cap Weighted	
Least Equity Risk: 34% R3000, 11% MSCI ACWxUS, 39% Bloomberg Agg, 4% FTSE WGBI, 9% HFRI FOF, 1% Global RE, 2% T-Bills	5.98%
Strategic: 42% R3000, 15% MSCI ACWxUS, 31% Bloomberg Agg, 3% FTSE WGBI, 5% HFRI FOF, 2% Global RE, 2% T-Bills	7.03%
Most Equity Risk: 44% R3000, 16% MSCI ACWxUS, 16% Bloomberg Agg, 2% FTSE WGBI, 15% HFRI FOF, 5% Global RE, 2% T-Bills	7.58%
Guidelines/Benchmarks - Equal Weighted	
Least Equity Risk: 34% S&P 500 Equal Weighted, 11% MSCI ACWxUS, 39% Bloomberg Agg, 4% FTSE WGBI, 9% HFRI FOF, 1% Global RE, 2% T-Bills	5.56%
Strategic: 42% S&P 500 Equal Weighted, 15% MSCI ACWxUS, 31% Bloomberg Agg, 3% FTSE WGBI, 5% HFRI FOF, 2% Global RE, 2% T-Bills	6.51%
Most Equity Risk: 44% S&P 500 Equal Weighted, 16% MSCI ACWxUS, 16% Bloomberg Agg, 2% FTSE WGBI, 15% HFRI FOF, 5% Global RE, 2% T-Bills	7.05%

Russell 3000	12.80%
S&P 500	13.23%
S&P 500 Equal Weight	11.58%
Russell 1000 Value	9.41%
Russell 1000	13.07%
Russell 1000 Growth	16.30%
Russell 2000	8.99%
MSCI All Country World ex. US	6.10%
MSCI EAFE	6.15%
MSCI EM	5.74%
Bloomberg Aggregate	1.46%
Bloomberg Govt/Credit Intermediate	1.63%
HFRI Fund of Funds Index	3.45%
DJ Global World Real Estate	3.82%
FTSE WGBI Index	0.12%
30 Day T-Bill	1.51%

Performance for accounts held outside of Morgan Stanley are calculated using simple math

*447-xxx626 open from April 2016 to May 2022

*447-xxx627 open from April 2016 to July 2022

Data Source: Morgan Stanley & Morningstar

Morgan Stanley

THE KELLIHER CORBETT GROUP
AT MORGAN STANLEY

Appendix

Regional Water Authority
Tapping the Possibilities

Morgan Stanley

THE KELLIHER CORBETT GROUP
AT MORGAN STANLEY

Investment Policy Statement (IPS)

≈ Regional Water Authority
Tapping the Possibilities

South Central Connecticut Regional Water Authority

South Central Connecticut Regional Water Authority Salaried Employees' Retirement Plan, South Central Connecticut Regional Water Authority Retirement Plan, and South Central Connecticut Regional Water Authority Retired Employees' Contributory Welfare Trust (VEBA)

INVESTMENT POLICY STATEMENT

07/07/2021

TABLE OF CONTENTS

South Central Connecticut Regional Water Authority
EXECUTIVE SUMMARY

Plans Names: This Investment Policy Statement covers three separate portfolios for the South Central Connecticut Regional Water Authority ("the Plans")

1. South Central Connecticut Regional Water Authority Salaried Employees' Retirement Plan
2. South Central Connecticut Regional Water Authority Retirement Plan
3. South Central Connecticut Regional Water Authority Retired Employees' Contributory Welfare Trust (VEBA)

Plan Trustee: Broadridge Matrix Trust Company

Primary Investment Custodian: Morgan Stanley & Co

Pension Payroll Custodian: Broadridge Matrix Trust Company

Plan Administrator: Regional Water Authority Board

Plan Actuary: The Angell Pension Group, Inc.

Plan Advisor: The Kelliher Corbett Group at Morgan Stanley

Primary Objectives: 1) Milestone goal of being fully funded, for the pension plans by end of Fiscal Year 2025, excluding ongoing plan service costs, subject to prevailing market conditions
2) To achieve a long-term rate of return that meets the assumed actuarial rate of return

Target Rate of Return: To meet the assumed actuarial rate of return

Time Horizon: Aligned with actuarial liabilities of the South Central Connecticut Regional Water Authority Pension plans and VEBA

Asset Allocation:

Asset Class	**Minimum**	**Maximum**	**Preferred**
Equities	45%	60%	55%
Fixed Income	20%	45%	30%
Alternative/Hedge/Balanced	5%	20%	15%

The maximum allowable allocation to illiquid securities is 10%
When investing in alternative investments, the VEBA plan permits the use of liquid investments only

Cash Limits: The investor wishes to maintain sufficient liquidity to fund benefit obligations

Restrictions: Average bond quality rated Investment Grade or Better (excluding mutual fund/ETFs)
Maximum Average Bond Maturity: 20 years
Maximum Individual Bond Maturity: 30 years
Maximum Portion of Portfolio in a Single Diversified Fund: 20%
Maximum Portion of Portfolio in a Single Security/Individual Company: 3% (excluding U.S. Government Securities)

Meeting Frequency: Quarterly

INVESTMENT POLICY DISCUSSION

What Is an Investment Policy Statement?

An Investment Policy Statement (IPS) describes the investment philosophies and investment management procedures to be utilized for the funds as further described below, as well as the long-term goals for the Plans:

1. South Central Connecticut Regional Water Authority Salaried Employees' Retirement Plan
2. South Central Connecticut Regional Water Authority Retirement Plan
3. South Central Connecticut Regional Water Authority Retired Employees' Contributory Welfare Trust (VEBA)

The Need for an Investment Policy Statement

The principle reason for developing an investment policy statement and for putting it in writing is to memorialize the strategy, goals, and objectives of the funds. Without an investment policy statement, in times of market turmoil, investors are often inclined to make impromptu investment decisions that are inconsistent with prudent investment management principles. This investment policy statement is intended to provide a well thought out framework from which sound investment decisions can be made.

Steps to Take to Establish an Investment Policy Statement

1. Assess your financial situation—identify your goals and needs.
2. Determine your tolerance for risk and your time horizon.
3. Set long-term investment objectives.
4. Identify any restrictions on the portfolio and its assets.
5. Determine the asset classes and appropriate mix (the "Asset Allocation") to maximize the likelihood of achieving the investment objectives at the lowest level of risk.
6. Determine the investment methodology to be used with regards to investment (manager) selection, rebalancing, buy-sell disciplines, portfolio reviews and reporting, etc.
7. Implement the decisions.

Definitions

1. "Regional Water Authority Board" shall refer to the decision making body established to administer the portfolio.

2. "Pension and Benefit Committee" shall refer to the assigned board members responsible for making recommendations to the Regional Water Authority Board.

3. "Pension Review Committee" shall refer to a group of senior management, designated by the Authority, whose role is limited and excludes non-routine and discretionary matters.

4. "Investment Manager" shall mean any individual, or group of individuals, employed to manage the investments of all or part of the portfolio's assets.

5. "Advisor" shall mean any individual, or organization employed to provide advisory services, including advice on investment objectives and/or asset allocation, manager search and performance monitoring.

6. "Fiduciary" shall mean any individual or group of individuals that exercise discretionary authority or control over the fund management or any authority or control over management, disposition or administration of portfolio assets.

This Investment Policy Statement:

❖ Establishes the Regional Water Authority Board's expectations, objectives and guidelines in the investment of the portfolio's assets.

❖ Creates the framework for a well-diversified asset mix that can be expected to generate acceptable long-term returns at a level of risk suitable to the Regional Water Authority Board, including:

- describing an appropriate risk posture for the investment of the portfolios
- specifying the target asset allocation policy
- establishing investment guidelines regarding the selection of investment managers, permissible securities and diversification of assets
- specifying the criteria for evaluating the performance of the portfolio's assets

❖ Defines the responsibilities of the Pension and Benefit Committee, Regional Water Authority Board, Advisor and Investment Manager(s).

❖ Encourages effective communication between the Advisor, Investment Manager(s) and the Pension and Benefit Committee.

This investment policy statement is intended to be a summary of an investment philosophy and the procedures that provide guidance for the Regional Water Authority Board. The investment policies described in this investment policy statement should be dynamic. These policies should reflect the Regional Water Authority Board's current status and philosophy regarding the investment of the portfolio. These policies will be reviewed and revised periodically to ensure they adequately reflect any changes related to the portfolio, to the Regional Water Authority Board or the capital markets.

It is understood that there can be no guarantee about the attainment of the goals or investment objectives outlined herein.

INTRODUCTION

One of the important purposes of this Investment Policy Statement (IPS) is to establish a clear understanding as to the investment goals, objectives and management policies applicable to the Plans.

OVERVIEW COMMENTARY

Investor Information:

Plan Names: South Central Connecticut Regional Water Authority Salaried Employees' Retirement Plan, South Central Connecticut Regional Water Authority Retirement Plan, and South Central Connecticut Regional Water Authority Retired Employees' Contributory Welfare Trust (VEBA).

90 Sargent Dr.
New Haven, CT 06511

Authorized Decision Makers

The authorized decision maker(s) for the assets under this investment policy statement and their capacity is: Regional Water Authority Board, of which a majority must approve any decisions.

Others who should receive a copy of this Investment Policy Statement:

President of Organization
Regional Water Authority Board
Pension and Benefit Committee
Members of the Pension Review Committee
Plan Advisor
Plan Actuary
Plan Auditor

Sponsor Entity:

South Central Connecticut Regional Water Authority
90 Sargent Drive
New Haven, CT 06511

Plan Trustee:

Broadridge Matrix Trust Company
717 17th Street, Suite 1300
Denver, CO 80202

Primary Investment Custodian:

Morgan Stanley & Co.

Pension Payroll Custodian:

Broadridge Matrix Trust Company

Plan Administrator:

Regional Water Authority Board

Plan Actuary:

The Angell Pension Group, Inc.
88 Boyd Avenue
East Providence, RI 02914
401-438-9250

Plan Advisor:

The Kelliher Corbett Group at Morgan Stanley
141 Longwater Drive, Suite 102
Norwell, MA 02061
877-535-4437

OVERVIEW

INVESTOR CIRCUMSTANCES

The South Central Connecticut Regional Water Authority established the Plans for the benefit of its employees. The Plans are intended to provide eligible employees with a vehicle to receive benefits for their retirement. The Plans are qualified employee benefit plans intended to comply with all applicable federal laws and regulations, including the Internal Revenue Code of 1986, as amended.

INVESTMENT OBJECTIVES

The investment objectives addressed in this investment policy statement represent the portfolio's overall investment objectives.

The Regional Water Authority Board's objectives for the investment portfolios are:

1) Milestone goal is to be fully funded, for the pension plans, by the end of Fiscal Year 2025, excluding ongoing plan service costs, subject to prevailing market conditions.
2) To achieve a long-term rate of return that meets the assumed actuarial rate of return.

TIME HORIZON

It is the intent that the investment horizon for this portfolio is aligned with the actuarial liabilities of the Plans.

ANTICIPATED WITHDRAWALS

Withdrawals will begin immediately.

For the withdrawals beginning immediately, the frequency with which they will occur will be as needed to fund benefit obligations.

Capital values fluctuate, especially so over shorter periods of time. The investor recognizes that the possibility of capital loss does exist. However, historical data suggests that the risk of principal loss can be minimized if the long-term investment mix employed under this investment policy statement is maintained over a holding period of at least five years.

TAX POLICY

Tax minimization is not a concern for this investment portfolio.

RISK TOLERANCE

Investment theory and historical capital market return data suggest that, over long periods of time, there is a relationship between the level of investment risk assumed and the level of return that can be expected. In general, in order to attain higher returns one must accept higher risk (e.g. volatility of return).

Given this relationship between risk and return, a fundamental step in determining the investment policy statement for the portfolio is the determination of the amount of risk the Regional Water Authority Board can tolerate.

A comfort level with investment risk influences how aggressively or conservatively a portfolio can be invested. Like a scale, risk needs to be balanced with the need for returns to achieve the investment goals. The Regional Water Authority Board desires long-term investment performance sufficient to meet the objectives. The Regional Water Authority Board understands that to achieve such performance the portfolio may experience periods of decline. The Regional Water Authority Board further understands that in a severe market, the potential recovery period could be extensive.

Although the Regional Water Authority Board prefers to limit the portfolio's volatility, they understand there will be fluctuations in the portfolios. The total portfolios should be less volatile than the global equity markets.

ASSET ALLOCATION

Academic research offers considerable evidence that the asset allocation decision far outweighs security selection and market timing in its impact on portfolio variability and performance. After reviewing the long-term performance and risk characteristics of various asset classes and balancing the risk and rewards of market behavior, the following asset classes were selected to achieve the objectives of the Plans' portfolios.

Asset Class	Minimum	Maximum	Preferred
Equities	45%	60%	55%
Fixed Income	20%	45%	30%
Alternative/Asset Allocation	5%	20%	15%

The maximum allowable allocation of the aggregate portfolio to illiquid securities is 10%
When investing in alternative investments, the VEBA plan permits the use of liquid investments only

Portfolio Returns and Volatility

The Regional Water Authority Board' willingness to accept risk and their expectation for investment growth have a direct bearing on the rate of return objective for this portfolio.

It should be recognized that the portfolio will invest in a variety of securities and that the actual weighting of these securities can and will vary. It is also important to note that future returns of the securities with the portfolio and the portfolio itself can be expected to vary from the historical returns.

The portfolio's historical rate of return is not a guarantee of future investment returns, nor an indication of expectation regarding future results. Future returns could differ significantly and capital loss is possible. This investment policy statement shall not be construed as offering a guarantee.

Updated Allocations

Over time, it may be desirable to amend the basic allocation. Changes to asset allocation targets and ranges must be approved by resolution(s) of the Regional Water Authority Board. When such changes are made, updates will be considered part of this investment policy statement.

Rebalancing Procedures

From time to time, market conditions may cause the portfolio's investment in various asset classes to vary from the approved allocation. To remain consistent with the asset allocation guidelines established by this investment policy statement, the Advisor shall periodically review the portfolio and each asset class in which the portfolio is invested.

This portfolio will be rebalanced periodically as follows: when the portfolio exceeds the minimum or maximum constraints (reviewed quarterly), or as determined by the Advisor.

Adjustment in the Target Allocation

Modifications to the approved allocation may be needed from time to time for a variety of reasons. When such a change to the approved allocation needs to occur, it shall only be made via an Authority resolution.

FREQUENCY OF INVESTMENT POLICY STATEMENT REVIEW

The Regional Water Authority Board recognizes that all investments go through cycles and therefore there will be periods of time in which the investment objectives are not met or when specific managers fail to meet their expected performance expectations. The Regional Water Authority Board accepts the principle that, in the absence of specific circumstances requiring immediate action, patience and a longer-term perspective will be employed when evaluating investment performance.

The Advisor and Pension and Benefit Committee will meet at least bi-annually to review and update this investment policy statement.

LIQUIDITY

Investor's liquidity requirements are: an amount sufficient to fund benefit obligations

The length for which these needs apply is described as: aligned with the actuarial liabilities of the Plans.

DIVERSIFICATION AND INVESTMENT CONSTRAINTS

Investment of the Plans shall be limited to securities in the following categories:

Investment Types
Individual Stocks or Bonds
Open-ended Mutual Funds
Closed-end Mutual Funds
Exchange Traded Funds
Managed Separate Accounts
Investment Partnerships (liquid only permitted in VEBA)
Hedge Funds/Hedge Fund of Funds (liquid only permitted in VEBA)
Private Equity/Private Equity Funds/Private Equity Fund of Funds

Portfolio Limitations and Restrictions

The portfolio’s average bond rating must be investment grade or better (excluding mutual fund/ETFs)

Maximum average bond maturity: 20 year(s).
Maximum individual bond maturity: 30 year(s).
Maximum portion of portfolio in a single diversified fund: 20%.
Maximum portion of portfolio in a single security/individual company: 3% (excluding U.S. government securities)

SELECTION/RETENTION CRITERIA FOR INVESTMENTS

Investment Management Selection

Investment managers (including mutual funds, separate account managers and limited partnership sponsors) shall be chosen using the following criteria:

- Past performance, considered relative to other investments having the same investment objective. Consideration shall be given to both performance rankings over various time frames and consistency of performance
- The historical volatility and downside risk of each proposed investment
- The likelihood of future investment success, relative to other opportunities
- Length of time the fund/manager has been in existence and length of time it has been under the direction of the current manager(s) and whether or not there have been material changes in the manager's organization and personnel
- Costs relative to other funds with like objectives and investment styles
- The manager's adherence to investment style and size objectives
- Size of the proposed fund
- How well each proposed investment complements other assets in the portfolio
- The current economic environment

INVESTMENT MONITORING AND CONTROL PROCEDURES

Benchmarks

The following benchmarks will be used to evaluate performance:

Asset Class	**Index**
Broad US Equities	Russell 3000
US Large Cap Equities	S&P 500
US Mid-Cap Equities	Russell Mid-Cap
US Small Cap Equities	Russell 2000
Broad International Equities	MSCI ACWI ex. USA
Developed International Equities	MSCI EAFE
Emerging Market Equities	MSCI Emerging Markets
Domestic Fixed Income	BBgBarc US Aggregate Bond/BBgBarc US Gov't/Credit Interm.
Global Fixed Income	FTSE World Global Bond Index
Hedge Funds	HFRI Hedge Fund of Funds Index
Global Real Estate	DJ Global World Real Estate
Real Assets	Morningstar US Real Assets
Commodities	S&P GSCI
Cash	BC Treasury Bill 1-3 Month

Reports

- The investment custodian shall provide South Central Connecticut Regional Water Authority management with monthly statements for each account held by the Plans and subject to this investment policy statement. Such reports shall show values for each asset and all transactions affecting assets within the portfolio, including additions and withdrawals.
- The Advisor shall provide Pension and Benefit Committee the following management reports on a periodic basis:
    - Portfolio performance results over varying time periods
    - Performance results of comparative benchmarks, including the current actuarial assumed rate of return, over varying time periods
    - Review of current asset allocation versus policy guidelines
    - Recommendations to add cost effective alternatives
    - Recommendations to reduce risk while maintaining return
    - Recommendations for changes of the above

Meetings and Communication between Pension and Benefit Committee and Advisor

As a matter of course, the Advisor shall keep The Pension and Benefit Committee apprised of any material changes in the Advisor's outlook, recommended investment policy, and tactics for performing duties and achieving policy objectives.

In addition, Advisor shall meet with Pension and Benefit Committee approximately quarterly to review and explain the portfolio's investment results and any related issues. Advisor shall also be available on a reasonable basis for telephone and email communication as needed.

DUTIES AND RESPONSIBILITIES

The Advisor

The Advisor is a Registered Advisor under Morgan Stanley Smith Barney LLC and shall act as the advisor to the Regional Water Authority Board until the Regional Water Authority Board decides otherwise.

Morgan Stanley Smith Barney LLC places paramount importance on the delivery of objective, unbiased investment advice. This commitment is reinforced in all business practices, and Morgan Stanley Smith Barney LLC culture and values demand unabashed client advocacy.

While it is inevitable that conflicts may exist within a firm of Morgan Stanley Smith Barney LLC's size and breadth, there are policies and procedures in place to protect against the eventuality that such conflicts will impact the independence of the advisory process. Morgan Stanley Smith Barney LLC fully discloses all material conflicts of interest in a Form ADV Brochure.

Advisor shall be responsible for:

- ❖ Assisting in the development and periodic review of the investment policy statement.
- ❖ Designing and implementing an appropriate asset allocation plan consistent with the investment objectives, time horizon, risk profile, guidelines and constraints outlined in this statement.
- ❖ Advising the Pension and Benefit Committee about the selection of and the allocation of asset categories.
- ❖ Identifying specific assets and investment managers within each asset category.
- ❖ Providing “due diligence”, or research, on the Investment Manager(s).
- ❖ Monitoring the performance of all selected assets the advisor consults to for the Plans.
- ❖ Recommending changes to this investment policy statement.
- ❖ Periodically reviewing the suitability of the investments for the Pension and Benefit Committee.
- ❖ Being available to meet with the Pension and Benefit Committee at least quarterly.
- ❖ Being available at such other times within reason at the Pension and Benefit Committee' request.
- ❖ Preparing and presenting appropriate reports.

Discretion and Title

- ❖ Advisor will have discretionary control to invest the Plans’ funds within the parameters of this investment policy statement.
- ❖ Advisor shall have no authority to withdraw funds from the Plans, except to cover payment of previously agreed to fees or at investor's and/or Trustee’s specific direction.
- ❖ Advisor may not change the Plans’ investment policy statement, including the targeted asset allocation, without Regional Water Authority Board's prior approval.

The Regional Water Authority Board

Regional Water Authority Board shall be responsible for:

- ❖ The oversight of the portfolios.
- ❖ Defining and authorizing the investment objectives and policies of the portfolios.
- ❖ Authorizing any changes as they pertain to this investment policy statement. Such changes must be approved by resolution(s) of the Regional Water Authority Board.
- ❖ Directing Advisor to make changes in investment policy and to oversee and to approve or disapprove Advisor's recommendations with regards to policy, guidelines, and objectives on a timely basis.

- ❖ Providing Advisor with all relevant information on the Plans' financial conditions and risk tolerances and shall notify Advisor promptly of any changes to this information.
- ❖ Being responsible for executing the investment policy statement.
- ❖ Compliance with South Central Connecticut Regional Water Authority's Code of Ethics

The Pension Review Committee

Pension Review Committee is authorized and empowered to act as management's Committee, with instructions to defer final action on non-routine or discretionary matters until they have consulted with the Pension and Benefits Committee.

The Pension and Benefit Committee

Pension and Benefit Committee shall have the following duties and responsibilities:

- ❖ Review the funding policy and investment policy and objectives for the Plans based upon the recommendations of the Advisor.
- ❖ Monitor asset management and investment performance of the Plans through oversight of the Advisor.
- ❖ Monitor actuarial assumptions used to estimate the projected liabilities of the Plans.
- ❖ Make recommendations to the Regional Water Authority Board for changes and amendments to the Plans.
- ❖ Monitor the general administration and maintenance of the Plans through collaborative oversight with management.
- ❖ Perform any other duties or responsibilities delegated to the Committee by the Regional Water Authority Board

The Plan Administrator shall be responsible for:

1. Keeping the Plans' documents in compliance with current laws
2. Providing reports to all participants
3. Preparing all required tax and regulatory returns and documents

The Investment Manager(s)

Each Investment Manager will have full discretion to make all investment decisions for assets placed under its jurisdiction, while observing and operating within all policies, guidelines, constraints, and philosophies as outlined in this statement. Specific responsibilities of the Investment Manager(s) include:

- Discretionary investment management including decisions to buy, sell, or hold individual securities, and to alter asset allocation within the guidelines established in this statement.
- Reporting, on a timely basis, periodic investment performance results.
- Communicating any major changes to economic outlook, investment strategy, or any other factors, which affect implementation of investment process, or the investment objective progress of the Fund's investment management.
- Informing the Advisor regarding any qualitative change to investment management organization: Examples include changes in portfolio management personnel, ownership structure, investment policy statement, etc.
- Voting proxies on behalf of the Plans, and being in compliance with U.S. Securities and Exchange Commission requirements.

Proxy Voting

A member of the Pension Review Committee is empowered to exercise proxy-voting rights.

ADOPTION

Adopted by the below signed:

Date: ____

David J. Borowy, Chairperson:

____

Morgan Stanley

THE KELLIHER CORBETT GROUP
AT MORGAN STANLEY

Investment Holdings Analysis

Regional Water Authority
Tapping the Possibilities

Mutual Funds/ETFs

Results

Data as of 12/31/2023	Morningstar Category	Market Returns (%) 3 Month	YTD	1-Yr	3-Yr	5-Yr	10-Yr	$ Assets	% of Total
Cash & Equivalents									
Cash & Equivalents		-	-	-	-	-	-	$ 153,596	0.19%
Fixed Income									
Vanguard Short-Term Treasury ETF	Short Government	2.55	4.31	4.31	-0.13	1.24	0.99	$ 163,324	0.20%
Cat: Short Government	**Short Government**	**2.87**	**4.18**	**4.18**	**-0.76**	**0.91**	**0.90**		
Guggenheim Limited Duration Instl	Short-Term Bond	3.32	7.27	7.27	0.96	2.37	2.51	$ 317,203	0.39%
Vanguard Short-Term Bond ETF	Short-Term Bond	3.41	4.91	4.91	-0.64	1.50	1.37	$ 277,272	0.34%
Cat: Short-Term Bond	**Short-Term Bond**	**3.34**	**5.73**	**5.73**	**0.14**	**1.88**	**1.58**		
American Funds Bond Fund of Amer F2	Intermediate Core Bond	6.76	4.98	4.98	-3.01	1.86	2.21	$ 2,257,301	2.77%
Cat: Intermediate Core Bond	**Intermediate Core Bond**	**6.47**	**5.59**	**5.59**	**-3.27**	**1.05**	**1.66**		
American Funds Strategic Bond F-2	Intermediate Core-Plus Bond	5.66	1.82	1.82	-4.04	2.50	-	$ -	0.00%
DoubleLine Total Return Bond I	Intermediate Core-Plus Bond	6.43	5.33	5.33	-2.63	0.34	1.83	$ -	0.00%
Fidelity Advisor® Total Bond I	Intermediate Core-Plus Bond	6.95	7.20	7.20	-2.30	2.28	2.54	$ 2,273,779	2.79%
Loomis Sayles Core Plus Bond Y	Intermediate Core-Plus Bond	7.28	6.12	6.12	-3.00	1.93	2.36	$ 2,534,504	3.11%
Cat: Intermediate Core-Plus Bond	**Intermediate Core-Plus Bond**	**6.77**	**6.22**	**6.22**	**-2.99**	**1.48**	**1.93**		
PIMCO Income I2	Multisector Bond	5.87	9.21	9.21	1.02	3.30	4.34	$ 5,499,046	6.75%
Cat: Multisector Bond	**Multisector Bond**	**5.68**	**8.13**	**8.13**	**0.10**	**2.93**	**2.83**		
Idx: Bloomberg US Agg Bond TR USD	**-**	**6.82**	**5.53**	**5.53**	**-3.31**	**1.10**	**1.81**		
Idx: Bloomberg US Govt/Credit Interm TR USD	**-**	**4.56**	**5.24**	**5.24**	**-1.63**	**1.59**	**1.72**		
Idx: FTSE WGBI USD	**-**	**8.08**	**5.19**	**5.19**	**-7.18**	**-1.39**	**-0.31**		
Sub-Total Fixed Income								$ 13,322,428	16.36%
US Equity									
Columbia Dividend Income Inst	Large Value	8.65	10.52	10.52	9.88	12.87	10.53	$ 4,362,664	5.36%
Vanguard Value ETF	Large Value	9.07	9.26	9.26	10.62	11.73	9.73	$ 5,800,600	7.12%
Cat: Large Value	**Large Value**	**9.68**	**11.63**	**11.63**	**9.74**	**11.37**	**8.39**		
Invesco S&P 500® Equal Weight ETF	Large Blend	11.81	13.65	13.65	9.13	13.57	10.12	$ 3,814,815	4.68%
Vanguard Total Stock Market ETF	Large Blend	12.16	26.03	26.03	8.45	15.07	11.44	$ 7,594,598	9.33%
Cat: Large Blend	**Large Blend**	**11.25**	**22.32**	**22.32**	**8.83**	**14.26**	**10.55**		
MFS Massachusetts Inv Gr Stk I	Large Growth	12.08	24.34	24.34	8.41	17.00	13.03	$ 3,592,425	4.41%
Vanguard Russell 1000 Growth ETF	Large Growth	14.18	42.63	42.63	8.80	19.42	14.76	$ 2,587,533	3.18%
Cat: Large Growth	**Large Growth**	**13.83**	**36.74**	**36.74**	**4.68**	**15.74**	**12.03**		
Schwab US Mid-Cap ETF™	Mid-Cap Blend	11.79	16.67	16.67	4.89	11.14	8.85	$ 1,673,987	2.06%
Cat: Mid-Cap Blend	**Mid-Cap Blend**	**11.48**	**16.00**	**16.00**	**6.83**	**11.96**	**8.28**		
Idx: Russell 3000 TR USD	**-**	**12.07**	**25.96**	**25.96**	**8.54**	**15.16**	**11.48**		
Idx: S&P 500 TR USD	**-**	**11.69**	**26.29**	**26.29**	**10.00**	**15.69**	**12.03**		
Idx: Russell 1000 Value TR USD	**-**	**9.50**	**11.46**	**11.46**	**8.86**	**10.91**	**8.40**		
Idx: Russell 1000 TR USD	**-**	**11.96**	**26.53**	**26.53**	**8.97**	**15.52**	**11.80**		
Idx: Russell 1000 Growth TR USD	**-**	**14.16**	**42.68**	**42.68**	**8.86**	**19.50**	**14.86**		
Idx: Morningstar DYF TR USD	**-**	**4.26**	**1.87**	**1.87**	**9.26**	**8.01**	**7.78**		
Sub-Total US Equity								$ 29,426,623	36.13%

Green = exceeds peer group
Yellow = trails peer group
Red = fails to meet criteria (on watch/remove and/or replacement)

Orange = Fund position only held in VEBA
Green = Fund added in Q4
Red = Fund removed in Q4

Assets as of 12/31/2023
See last page for important disclosure/disclaimer
For financial professional and qualified plan sponsor use only

Data Source: Morgan Stanley & Morningstar

Mutual Funds/ETFs

Results

Data as of 12/31/2023	Morningstar Category	3 Month	YTD	1-Yr	3-Yr	5-Yr	10-Yr	$ Assets	% of Total
Global/International Equity									
MFS Intl Diversification I	Foreign Large Blend	8.84	14.33	14.33	0.69	8.19	5.41	$ 3,222,045	3.96%
Vanguard Total International Stock ETF	Foreign Large Blend	9.97	15.56	15.56	1.81	7.39	4.12	$ 3,584,826	4.40%
Cat: Foreign Large Blend	**Foreign Large Blend**	**9.81**	**16.25**	**16.25**	**2.43**	**7.62**	**3.98**		
American Funds Europacific Growth F2	Foreign Large Growth	10.34	15.92	15.92	-2.77	7.92	4.79	$ 3,225,751	3.96%
Vs. Index (MSCI ACWI Ex USA NR USD)	-	10.34	15.92	15.92	-2.77	7.92	4.79		
Cat: Foreign Large Growth	**Foreign Large Growth**	**12.14**	**16.18**	**16.18**	**-2.05**	**8.42**	**5.02**		
First Eagle Global I	Global Allocation	7.43	13.07	13.07	6.05	9.31	6.36	$ 3,360,744	4.13%
Cat: Global Allocation	**Global Allocation**	**8.07**	**10.72**	**10.72**	**2.67**	**6.09**	**4.02**		
Idx: MSCI ACWI Ex USA NR USD	-	**9.75**	**15.62**	**15.62**	**1.55**	**7.08**	**3.83**		
Idx: MSCI ACWI NR USD	-	**11.03**	**22.20**	**22.20**	**5.75**	**11.72**	**7.93**		
Idx: MSCI EAFE NR USD	-	**10.42**	**18.24**	**18.24**	**4.02**	**8.16**	**4.28**		
Idx: MSCI EM NR USD	-	**7.86**	**9.83**	**9.83**	**-5.08**	**3.69**	**2.66**		
Sub-Total Global/International Equity								$ 13,393,366	16.45%
Balanced									
American Funds American Balanced F2	Moderate Allocation	9.91	14.23	14.23	5.29	9.14	7.77	$ 3,770,232	4.63%
Janus Henderson Balanced I	Moderate Allocation	9.47	15.43	15.43	4.14	9.63	8.01	$ 3,709,055	4.55%
Cat: Moderate Allocation	**Moderate Allocation**	**8.60**	**13.78**	**13.78**	**3.43**	**8.16**	**6.07**		
Idx: Bloomberg US Agg Bond TR USD	-	**6.82**	**5.53**	**5.53**	**-3.31**	**1.10**	**1.81**		
Idx: S&P 500 TR USD	-	**11.69**	**26.29**	**26.29**	**10.00**	**15.69**	**12.03**		
Sub-Total Balanced								$ 7,479,287	9.18%
Alternative									
BlackRock Event Driven Equity Instl	Event Driven	3.65	5.37	5.37	2.42	4.15	4.61	$ 1,215,672	1.49%
Cat: Event Driven	**Event Driven**	**2.66**	**5.38**	**5.38**	**1.67**	**4.41**	**2.99**		
JPMorgan Hedged Equity I	Options Trading	5.60	16.06	16.06	6.57	9.37	7.56	$ 106,411	0.13%
Cat: Options Trading	**Options Trading**	**6.85**	**17.57**	**17.57**	**5.36**	**7.12**	**3.62**		
Cohen & Steers Global Realty I	Global Real Estate	14.55	10.73	10.73	1.69	5.08	5.36	$ 1,246,204	1.53%
Cat: Global Real Estate	**Global Real Estate**	**15.09**	**10.24**	**10.24**	**0.68**	**3.58**	**3.68**		
Idx: S&P 500 TR USD	-	**11.69**	**26.29**	**26.29**	**10.00**	**15.69**	**12.03**		
Idx: Bloomberg US Agg Bond TR USD	-	**6.82**	**5.53**	**5.53**	**-3.31**	**1.10**	**1.81**		
Idx: Russell 3000 TR USD	-	**12.07**	**25.96**	**25.96**	**8.54**	**15.16**	**11.48**		
Idx: MSCI ACWI NR USD	-	**11.03**	**22.20**	**22.20**	**5.75**	**11.72**	**7.93**		
Idx: DJ Global World Real Estate TR USD	-	**15.55**	**9.34**	**9.34**	**0.13**	**3.37**	**4.28**		
Sub-Total Alternative								$ 2,568,287	3.15%
Total								$ 66,343,587	81.47%

Market Returns (%): 3 Month, YTD, 1-Yr, 3-Yr, 5-Yr, 10-Yr

● Green = exceeds peer group
● Yellow = trails peer group
☐ Red = fails to meet criteria (on watch/remove and/or replacement)

Data Source: Morgan Stanley & Morningstar

Assets as of 12/31/2023

See last page for important disclosure/disclaimer

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Mutual Funds/ETFs

Statistics

Data as of 12/31/2023	Prospectus Net Expense Ratio	Prospectus Adj Expense Ratio	Beta 3 Yr vs. S&P or BBg Agg	Alpha 3 Yr vs. S&P or BBg Agg	Std Dev 3 Yr	R2 3 Yr vs. S&P or BBg Agg	P/E Ratio	P/B Ratio	Geo Avg Mkt Cap $MM	Mstar Risk 5 Yr
Fixed Income										
Vanguard Short-Term Treasury ETF	0.04	0.04	0.23	-1.29	2.17	68	-	-	-	Below Avg
Cat: Short Government	**0.62**	**0.62**	**0.31**	**-1.46**	**2.70**	**74**	**19.5**	**2.9**	**77215**	**0.0**
Guggenheim Limited Duration Instl	0.49	0.48	0.35	0.47	2.93	84	-	0.3	114	Average
Vanguard Short-Term Bond ETF	0.04	0.04	0.39	-0.89	3.16	86	-	-	-	Average
Cat: Short-Term Bond	**0.65**	**0.65**	**0.34**	**-0.37**	**2.96**	**78**	**19.2**	**2.9**	**6618**	**0.0**
American Funds Bond Fund of Amer F2	0.33	0.33	0.99	0.26	7.17	99	-	-	-	Average
Cat: Intermediate Core Bond	**0.58**	**0.58**	**0.97**	**-0.13**	**7.12**	**98**	**34.3**	**1.8**	**256**	**0**
American Funds Strategic Bond F-2	0.43	0.43	1.02	-0.61	7.69	90	-	-	1516	Above Avg
DoubleLine Total Return Bond I	0.49	0.49	0.88	-0.05	6.49	94	-	-	-	Low
Fidelity Advisor® Total Bond I	0.50	0.50	0.99	0.98	7.26	97	4.5	1.5	8429	Average
Loomis Sayles Core Plus Bond Y	0.49	0.49	1.10	0.94	8.04	98	-	-	-	Above Avg
Cat: Intermediate Core-Plus Bond	**0.76**	**0.76**	**0.99**	**0.27**	**7.32**	**95**	**-**	**-**	**-**	**0.0**
PIMCO Income I2	0.72	0.60	0.77	3.04	6.26	80	-	-	5692	Average
Cat: Multisector Bond	**0.98**	**0.98**	**0.70**	**1.70**	**6.10**	**67**	**-**	**-**	**-**	**0.0**
US Equity										
Columbia Dividend Income Inst	0.65	0.65	0.80	1.20	15.12	86	19.0	3.5	159563	Low
Vanguard Value ETF	0.04	0.04	0.81	1.92	15.90	79	17.1	2.6	109242	Below Avg
Cat: Large Value	**0.90**	**0.90**	**0.85**	**0.96**	**16.83**	**78**	**16.5**	**2.5**	**115528**	**0.0**
Invesco S&P 500® Equal Weight ETF	0.20	0.20	1.00	-0.63	18.45	89	19.7	2.8	38470	High
Vanguard Total Stock Market ETF	0.03	0.03	1.01	-1.46	17.73	99	22.5	3.8	146925	Above Avg
Cat: Large Blend	**0.79**	**0.79**	**0.96**	**-0.77**	**17.37**	**94**	**22.7**	**4.7**	**282660**	**0.0**
MFS Massachusetts Inv Gr Stk I	0.46	0.46	1.01	-1.45	18.19	95	30.3	6.0	202089	Below Avg
Vanguard Russell 1000 Growth ETF	0.08	0.08	1.12	-1.56	20.79	90	33.0	10.9	427931	Average
Cat: Large Growth	**0.96**	**0.96**	**1.10**	**-5.21**	**21.07**	**86**	**31.3**	**8.0**	**440358**	**0.0**
Schwab US Mid-Cap ETF™	0.04	0.04	1.04	-4.73	19.76	85	16.9	2.5	9736	Above Avg
Cat: Mid-Cap Blend	**0.91**	**0.91**	**0.98**	**-2.54**	**19.11**	**81**	**16.2**	**2.8**	**11573**	**0.0**

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Orange = Fund position only held in VEBA

Green = Fund added in Q4, Red = Fund removed in Q4

The Prospectus Adjusted Operating Expense Ratio is the percentage of fund assets paid for operating expenses and management fees. The expense ratio typically includes the following types of fees: accounting, administrator, advisor, auditor, board of directors, custodial, distribution (12b-1), legal, organizational, professional, registration, shareholder reporting, sub-advisor, and transfer agency. The ratio does reflect fee waivers in effect during the time period, and does not include interest and dividends on borrowed securities. The expense ratio does not reflect the fund's brokerage costs or any investor sales charges.

Data Source: Morgan Stanley & Morningstar

Mutual Funds/ETFs

Statistics

Data as of 12/31/2023	Prospectus Net Expense Ratio	Prospectus Adj Expense Ratio	Beta 3 Yr vs. S&P or BBg Agg	Alpha 3 Yr vs. S&P or BBg Agg	Std Dev 3 Yr	R2 3 Yr vs. S&P or BBg Agg	P/E Ratio	P/B Ratio	Geo Avg Mkt Cap $MM	Mstar Risk 5 Yr
Global/International Equity										
MFS Intl Diversification I	0.83	0.83	0.99	-0.83	16.52	96	14.0	1.8	35214	Below Avg
Vanguard Total International Stock ETF	0.07	0.07	1.02	0.32	16.78	99	13.6	1.6	28594	Average
Cat: Foreign Large Blend	**0.92**	**0.92**	**1.01**	**0.97**	**17.08**	**92**	**13.4**	**1.8**	**56576**	**0**
American Funds Europacific Growth F2	0.57	0.57	1.06	-4.09	17.93	93	18.4	2.8	56542	Average
Cat: Foreign Large Growth	**1.03**	**1.03**	**1.12**	**-3.10**	**19.88**	**85**	**21.2**	**3.3**	**64615**	**0**
First Eagle Global I	0.86	0.86	1.03	3.99	13.62	87	16.7	1.9	56634	Above Avg
Cat: Global Allocation	**1.16**	**1.16**	**0.94**	**0.60**	**12.39**	**87**	**15.8**	**2.1**	**77127**	**0**
Balanced										
American Funds American Balanced F2	0.36	0.36	0.95	3.09	11.99	96	18.6	3.6	154083	Below Avg
Janus Henderson Balanced I	0.66	0.66	0.98	2.05	12.59	92	23.6	5.3	269364	Average
Cat: Moderate Allocation	**1.04**	**1.04**	**0.95**	**1.32**	**12.23**	**92**	**20.6**	**3.3**	**143484**	**0**
Alternative										
BlackRock Event Driven Equity Instl	1.27	1.27	0.14	-0.66	3.81	40	22.8	3.4	22963	Average
Cat: Event Driven	**1.70**	**1.70**	**0.15**	**-1.35**	**5.37**	**23**	**22.2**	**2.0**	**5907**	**0**
JPMorgan Hedged Equity I	0.58	0.58	0.50	2.11	9.30	78	23.2	4.2	255664	Average
Cat: Options Trading	**0.98**	**0.98**	**0.54**	**0.80**	**9.97**	**81**	**22.9**	**4.4**	**342255**	**0**
Cohen & Steers Global Realty I	0.90	0.90	1.10	-3.83	19.72	84	26.6	1.5	18126	Average
Cat: Global Real Estate	**1.12**	**1.12**	**1.08**	**-4.79**	**19.47**	**83**	**22.4**	**1.3**	**15604**	**0**

See last page for important disclosure/disclaimer

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The Prospectus Adjusted Operating Expense Ratio is the percentage of fund assets paid for operating expenses and management fees. The expense ratio typically includes the following types of fees: accounting, administrator, advisor, auditor, board of directors, custodial, distribution (12b-1), legal, organizational, professional, registration, shareholder reporting, sub-advisor, and transfer agency. The ratio does reflect fee waivers in effect during the time period, and does not include interest and dividends on borrowed securities. The expense ratio does not reflect the fund's brokerage costs or any investor sales charges.

Data Source: Morgan Stanley & Morningstar

The performance shown in the preceding pages represents past performance. Past performance is no guarantee of future results and current performance may be higher or lower than the performance shown above. Investment returns, yields and principal value will fluctuate so that an investor's shares, when redeemed, may be worth more or less than their original cost. Returns of less than a year are cumulative and are not annualized and are calculated from January 1 of the reporting year. Average annual total returns are annualized and assume the reinvestment of all distributions at net asset value and the deductions of fund expenses. Data is from sources deemed reliable, however no guarantee may be made to their accuracy.

The information contained herein was prepared by your Financial Advisor and does not represent an official statement of your account at the Firm (or other outside custodians, if applicable). Please refer to your monthly statement for a complete record of your transactions, holdings and balances.

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Assets as of 12/31/2023
Data Source: Morningstar; as of 12/31/2023

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Glossary of Terms

Accrued Income: The dividends and interest earned but not yet received at both the beginning and end of each reporting period.

Advisory Account: An investment advisory relationship is designed for clients who prefer that their Financial Advisor act as an investment consultant, with their assets invested in a mutual fund asset allocation program or in a Advisory account that is directed by a professional money manager either at Morgan Stanley or at an external money management firm. There are important differences in your relationship with your Financial Advisor and Morgan Stanley in brokerage accounts and in advisory accounts. Additional information about these differences is available at http://www.morganstanley.com/ourcommitment

Annualized Standard Deviation: A measure of volatility, it quantifies how much a series of numbers, such as portfolio returns, deviates around its average. Since it measures the portfolio's investment volatility, the account's gross rate of return is used.

Brokerage Account: In a brokerage relationship, your Financial Advisor will work with you to facilitate the execution of securities transactions on your behalf. Your Financial Advisor also provides investor education and professional, personalized information about financial products and services in connection with these brokerage services. You can choose how you want to pay for these services and you will receive the same services regardless of which pricing option you choose. There are important differences in your relationship with your Financial Advisor and Morgan Stanley in brokerage accounts and in advisory accounts. Additional information about these differences is available at http://www.morganstanley.com/ourcommitment

Comparative Indices: A complete description of the comparative indices included in this Performance Report is available upon request.

Dollar-Weighted Return: Rate of return calculation methodology that reflects both the timing and magnitude of external contributions and withdrawals and measures the portfolio's performance. The return for each month is calculated as the average return on all dollars invested.

Gross Return: The return of the portfolio before the deduction of fees/commissions and other expenses.

Net Contributions/Withdrawals: The total value of capital contributed to or withdrawn from the account during the reporting period. The dollar amount represented by contribution or withdrawal transactions is excluded from the calculation of Portfolio Appreciation.

Net Invested Capital: The sum of the Total Beginning Value and the net of additional capital Contributions and Withdrawals for each reporting period.

Net Portfolio Appreciation: The total dollar gain/loss of the portfolio for each reporting period. The Net Portfolio Appreciation includes the impact of income received and is calculated as the difference between Net Invested Capital and Total Ending Value.

Net Return: The return of the portfolio for the period reduced by the amount of fees/commissions paid. The net of fees return is calculated gross of certain custody fees.

Time-Weighted Return: Rate of return calculation methodology that eliminates the impact of external contributions and withdrawals to the portfolio value and measures the manager's performance. Portfolio returns are calculated at least monthly and individual monthly returns are geometrically linked to calculate total cumulative return.

Total Beginning Value: The total market value of the portfolio, valued on a trade date basis, at the beginning of each reporting period. The Total Beginning Value includes Accrued Income.

Total Ending Value: The total market value of the portfolio, valued on a trade date basis, at the end of each reporting period. The Total Ending Value includes Accrued Income.

Weighted Average: The average in which each yield to be averaged is assigned a weight. These weightings determine the relative importance or frequency of each yield on the average.

This report is not an official account statement. The information in this report is not complete without the required disclaimer and glossary, which you should read carefully

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J.P. Morgan Asset Management – Index definitions

All indexes are unmanaged and an individual cannot invest directly in an index. Index returns do not include fees or expenses.

Equities:

The **Dow Jones Industrial Average** is a price-weighted average of 30 actively traded blue-chip U.S. stocks.

The **MSCI ACWI (All Country World Index)** is a free float-adjusted market capitalization weighted index that is designed to measure the equity market performance of developed and emerging markets.

The **MSCI EAFE Index(Europe, Australasia, Far East)**is a free float-adjusted market capitalization index that is designed to measure the equity market performance of developed markets, excluding the US & Canada.

The **MSCI Emerging Markets Index** is a free float-adjusted market capitalization index that is designed to measure equity market performance in the global emerging markets.

The **MSCI Europe Index** is a free float-adjusted market capitalization index that is designed to measure developed market equity performance in Europe.

The **MSCI Pacific Index** is a free float-adjusted market capitalization index that is designed to measure equity market performance in the Pacific region.

The **Russell 1000 Index**® measures the performance of the 1,000 largest companies in the Russell 3000.

The **Russell 1000 Growth Index**® measures the performance of those Russell 1000 companies with higher price-to-book ratios and higher forecasted growth values.

The **Russell 1000 Value Index**® measures the performance of those Russell 1000 companies with lower price-to-book ratios and lower forecasted growth values.

The **Russell 2000 Index**® measures the performance of the 2,000 smallest companies in the Russell 3000 Index.

The **Russell 2000 Growth Index**® measures the performance of those Russell 2000 companies with higher price-to-book ratios and higher forecasted growth values.

The **Russell 2000 Value Index**® measures the performance of those Russell 2000 companies with lower price-to-book ratios and lower forecasted growth values.

The **Russell 3000 Index**® measures the performance of the 3,000 largest U.S. companies based on total market capitalization.

The **Russell Midcap Index**® measures the performance of the 800 smallest companies in the Russell 1000 Index.

The **Russell Midcap Growth Index** ® measures the performance of those Russell Midcap companies with higher price-to-book ratios and higher forecasted growth values. The stocks are also members of the Russell 1000 Growth index.

The **Russell Midcap Value Index** ® measures the performance of those Russell Midcap companies with lower price-to-book ratios and lower forecasted growth values. The stocks are also members of the Russell 1000 Value index.

The **S&P 500 Index** is widely regarded as the best single gauge of the U.S. equities market. The index includes a representative sample of 500 leading companies in leading industries of the U.S. economy. The **S&P 500 Index** focuses on the large-cap segment of the market; however, since it includes a significant portion of the total value of the market, it also represents the market.

Fixed income:

The **Bloomberg 1-3 Month U.S. Treasury Bill Index** includes all publicly issued zero-coupon US Treasury Bills that have a remaining maturity of less than 3 months and more than 1 month, are rated investment grade, and have $250 million or more of outstanding face value. In addition, the securities must be denominated in U.S. dollars and must be fixed rate and non convertible.

The **Bloomberg Global High Yield Index** is a multi-currency flagship measure of the global high yield debt market. The index represents the union of the US High Yield, the Pan-European High Yield, and Emerging Markets (EM) Hard Currency High Yield Indices. The high yield and emerging markets sub-components are mutually exclusive. Until January 1, 2011, the index also included CMBS high yield securities.

The **Bloomberg Municipal Index**: consists of a broad selection of investment-grade general obligation and revenue bonds of maturities ranging from one year to 30 years. It is an unmanaged index representative of the tax-exempt bond market.

The **Bloomberg US Dollar Floating Rate Note (FRN) Index** provides a measure of the U.S. dollar denominated floating rate note market.

The **Bloomberg US Corporate Investment Grade Index** is an unmanaged index consisting of publicly issued US Corporate and specified foreign debentures and secured notes that are rated investment grade (Baa3/BBB or higher) by at least two ratings agencies, have at least one year to final maturity and have at least $250 million par amount outstanding. To qualify, bonds must be SEC-registered.

The **Bloomberg US High Yield Index** covers the universe of fixed rate, non-investment grade debt. Eurobonds and debt issues from countries designated as emerging markets (sovereign rating of Baa1/BBB+/BBB+ and below using the middle of Moody's, S&P, and Fitch) are excluded, but Canadian and global bonds (SEC registered) of issuers in non-EMG countries are included.

The **Bloomberg US Mortgage Backed Securities Index** is an unmanaged index that measures the performance of investment grade fixed-rate mortgage backed pass-through securities of GNMA, FNMA and FHLMC.

The **Bloomberg US TIPS Index** consists of Inflation-Protection securities issued by the U.S. Treasury.

The **J.P. Morgan Emerging Market Bond Global Index(EMBI)**includes U.S. dollar denominated Brady bonds, Eurobonds, traded loans and local market debt instruments issued by sovereign and quasi-sovereign entities.

The **J.P. Morgan Domestic High Yield Index** is designed to mirror the investable universe of the U.S. dollar domestic high yield corporate debt market.

The **J.P. Morgan Corporate Emerging Markets Bond Index Broad Diversified (CEMBI Broad Diversified)**is an expansion of the **J.P. Morgan Corporate Emerging Markets Bond Index (CEMBI)**. The CEMBI is a market capitalization weighted index consisting of U.S. dollar denominated emerging market corporate bonds.

The **J.P. Morgan Emerging Markets Bond Index Global Diversified (EMBI Global Diversified)** tracks total returns for U.S. dollar-denominated debt instruments issued by emerging market sovereign and quasi-sovereign entities: Brady bonds, loans, Eurobonds. The index limits the exposure of some of the larger countries.

The **J.P. Morgan GBI EM Global Diversified** tracks the performance of local currency debt issued by emerging market governments, whose debt is accessible by most of the international investor base.

The **U.S. Treasury Index** is a component of the U.S. Government index.

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J.P. Morgan Asset Management – Definitions

Other asset classes:

The **Alerian MLP Index** is a composite of the 50 most prominent energy Master Limited Partnerships (MLPs) that provides investors with an unbiased, comprehensive benchmark for the asset class.

The **Bloomberg Commodity Index** and related sub-indices are composed of futures contracts on physical commodities and represents twenty two separate commodities traded on U.S. exchanges, with the exception of aluminum, nickel, and zinc

The **Cambridge Associates U.S. Global Buyout and Growth Index®** is based on data compiled from 1,768 global (U.S. & ex –U.S.) buyout and growth equity funds, including fully liquidated partnerships, formed between 1986 and 2013.

The **CS/Tremont Hedge Fund Index** is compiled by Credit Suisse Tremont Index, LLC. It is an asset-weighted hedge fund index and includes only funds, as opposed to separate accounts. The Index uses the Credit Suisse/Tremont database, which tracks over 4500 funds, and consists only of funds with a minimum of US$50 million under management, a 12-month track record, and audited financial statements. It is calculated and rebalanced on a monthly basis, and shown net of all performance fees and expenses. It is the exclusive property of Credit Suisse Tremont Index, LLC.

The **HFRI Monthly Indices (HFRI)** are equally weighted performance indexes, utilized by numerous hedge fund managers as a benchmark for their own hedge funds. The HFRI are broken down into 4 main strategies, each with multiple sub strategies. All single-manager HFRI Index constituents are included in the HFRI Fund Weighted Composite, which accounts for over 2200 funds listed on the internal HFR Database.

The **NAREIT EQUITY REIT Index** is designed to provide the most comprehensive assessment of overall industry performance, and includes all tax-qualified real estate investment trusts (REITs) that are listed on the NYSE, the American Stock Exchange or the NASDAQ National Market List.

The **NFI-ODCE**, short for NCREIF Fund Index -Open End Diversified Core Equity, is an index of investment returns reporting on both a historical and current basis the results of 33 open-end commingled funds pursuing a core investment strategy, some of which have performance histories dating back to the 1970s. The NFI-ODCE Index is capitalization-weighted and is reported gross of fees. Measurement is time-weighted.

Definitions:

Investing in **alternative assets** involves higher risks than traditional investments and is suitable only for sophisticated investors. Alternative investments involve greater risks than traditional investments and should not be deemed a complete investment program. They are not tax efficient and an investor should consult with his/her tax advisor prior to investing. Alternative investments have higher fees than traditional investments and they may also be highly leveraged and engage in speculative investment techniques, which can magnify the potential for investment loss or gain. The value of the investment may fall as well as rise and investors may get back less than they invested.

Bonds are subject to interest rate risks. Bond prices generally fall when interest rates rise.

Investments in **commodities** may have greater volatility than investments in traditional securities, particularly if the instruments involve leverage. The value of commodity-linked derivative instruments may be affected by changes in overall market movements, commodity index volatility, changes in interest rates, or factors affecting a particular industry or commodity, such as drought, floods, weather, livestock disease, embargoes, tariffs and international economic, political and regulatory developments. Use of leveraged commodity-linked derivatives creates an opportunity for increased return but, at the same time, creates the possibility for greater loss.

Derivatives may be riskier than other types of investments because they may be more sensitive to changes in economic or market conditions than other types of investments and could result in losses that significantly exceed the original investment. The use of derivatives may not be successful, resulting in investment losses, and the cost of such strategies may reduce investment returns.

Distressed Restructuring Strategies employ an investment process focused on corporate fixed income instruments, primarily on corporate credit instruments of companies trading at significant discounts to their value at issuance or obliged (par value) at maturity as a result of either formal bankruptcy proceeding or financial market perception of near term proceedings.

Investments in **emerging markets** can be more volatile. The normal risks of investing in foreign countries are heightened when investing in emerging markets. In addition, the small size of securities markets and the low trading volume may lead to a lack of liquidity, which leads to increased volatility. Also, emerging markets may not provide adequate legal protection for private or foreign investment or private property.

The price of **equity** securities may rise, or fall because of changes in the broad market or changes in a company's financial condition, sometimes rapidly or unpredictably. These price movements may result from factors affecting individual companies, sectors or industries, or the securities market as a whole, such as changes in economic or political conditions. Equity securities are subject to "stock market risk" meaning that stock prices in general may decline over short or extended periods of time.

Equity market neutral strategies employ sophisticated quantitative techniques of analyzing price data to ascertain information about future price movement and relationships between securities, select securities for purchase and sale. Equity Market Neutral Strategies typically maintain characteristic net equity market exposure no greater than 10% long or short.

Global macro strategies trade a broad range of strategies in which the investment process is predicated on movements in underlying economic variables and the impact these have on equity, fixed income, hard currency and commodity markets.

International investing involves a greater degree of risk and increased volatility. Changes in currency exchange rates and differences in accounting and taxation policies outside the U.S. can raise or lower returns. Some overseas markets may not be as politically and economically stable as the United States and other nations.

There is no guarantee that the use of **long and short positions** will succeed in limiting an investor's exposure to domestic stock market movements, capitalization, sector swings or other risk factors. Using long and short selling strategies may have higher portfolio turnover rates. Short selling involves certain risks, including additional costs associated with covering short positions and a possibility of unlimited loss on certain short sale positions.

Merger arbitrage strategies which employ an investment process primarily focused on opportunities in equity and equity related instruments of companies which are currently engaged in a corporate transaction.

Mid-capitalization investing typically carries more risk than investing in well-established "blue-chip" companies. Historically, mid-cap companies' stock has experienced a greater degree of market volatility than the average stock.

Price to forward earnings is a measure of the price-to-earnings ratio (P/E) using forecasted earnings. **Price to book value** compares a stock's market value to its book value. **Price to cash flow** is a measure of the market's expectations of a firm's future financial health. **Price to dividends** is the ratio of the price of a share on a stock exchange to the dividends per share paid in the previous year, used as a measure of a company's potential as an investment.

Real estate investments may be subject to a higher degree of market risk because of concentration in a specific industry, sector or geographical sector. Real estate investments may be subject to risks including, but not limited to, declines in the value of real estate, risks related to general and economic conditions, changes in the value of the underlying property owned by the trust and defaults by borrower.

Relative Value Strategies maintain positions in which the investment thesis is predicated on realization of a valuation discrepancy in the relationship between multiple securities.

Small-capitalization investing typically carries more risk than investing in well-established "blue-chip" companies since smaller companies generally have a higher risk of failure. Historically, smaller companies' stock has experienced a greater degree of market volatility than the average stock.

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J.P. Morgan Asset Management – Risks & disclosures

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Unless otherwise stated, all data are as of December 31, 2023 or most recently available.

Guide to the Markets – U.S.

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J.P.Morgan
ASSET MANAGEMENT

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Morgan Stanley's investment advisory programs may require a minimum asset level and, depending on your specific investment objectives and financial position, may not be appropriate for you. Please see the Morgan Stanley Smith Barney LLC program disclosure brochure (the "Morgan Stanley ADV") for more information in the investment advisory programs available. The Morgan Stanley ADV is available at www.morganstanley.com/ADV.

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Global Investment Manager Analysis (GIMA) Focus List, Approved List and Tactical Opportunities List; Watch Policy. GIMA uses two methods to evaluate investment products in applicable advisory programs: **Focus** (and investment products meeting this standard are described as being on the Focus List) and **Approved** (and investment products meeting this standard are described as being on the Approved List). In general, Focus entails a more thorough evaluation of an investment product than Approved. Sometimes an investment product may be evaluated using the Focus List process but then placed on the Approved List instead of the Focus List. Investment products may move from the Focus List to the Approved List, or vice versa. GIMA may also determine that an investment product no longer meets the criteria under either process and will no longer be recommended in investment advisory programs (in which case the investment product is given a "Not Approved" status). GIMA has a '**Watch**" policy and may describe a Focus List or Approved List investment product as being on "Watch" if GIMA identifies specific areas that (a) merit further evaluation by GIMA and (b) may, but are not certain to, result in the investment product becoming "Not Approved." The Watch period depends on the length of time needed for GIMA to conduct its evaluation and for the investment manager or fund to address any concerns. Certain investment products on either the Focus List or Approved List may also be recommended for the **Tactical Opportunities List** based in part on tactical opportunities existing at a given time. The investment products on the Tactical Opportunities List change over time. For more information on the Focus List, Approved List, Tactical Opportunities List and Watch processes, please see the applicable Form ADV Disclosure Document for Morgan Stanley Wealth Management. Your Financial Advisor or Private Wealth Advisor can also provide upon request a copy of a publication entitled "Manager Selection Process."

The **Global Investment Committee** is a group of seasoned investment professionals who meet regularly to discuss the global economy and markets. The committee determines the investment outlook that guides our advice to clients. They continually monitor developing economic and market conditions, review tactical outlooks and recommend model portfolio weightings, as well as produce a suite of strategy, analysis, commentary, portfolio positioning suggestions and other reports and broadcasts.

The GIC Asset Allocation Models are not available to be directly implemented as part of an investment advisory service and should not be regarded as a recommendation of any Morgan Stanley investment advisory service. The GIC Asset Allocation Models do not represent actual trading or any type of account or any type of investment strategies and none of the fees or other expenses (e.g. commissions, mark-ups, mark-downs, advisory fees, fund expenses) associated with actual trading or accounts are reflected in the GIC Asset Allocation Models which, when compounded over a period of years, would decrease returns.

Adverse Active AlphaSM 2.0 is a patented screening and scoring process designed to help identify high-quality equity and fixed income managers with characteristics that may lead to future outperformance relative to index and peers. While highly ranked managers performed well as a group in our Adverse Active Alpha model back tests, not all of the managers will outperform. Please note that this data may be derived from back-testing, which has the benefit of hindsight. In addition, highly ranked managers can have differing risk profiles that might not be appropriate for all investors.

Our view is that Adverse Active Alpha is a good starting point and should be used in conjunction with other information. Morgan Stanley Wealth Management's qualitative and quantitative investment manager due diligence process are equally important factors for investors when considering managers for use through an investment advisory program. Factors including, but not limited to, manager turnover and changes to investment process can partially or fully negate a positive Adverse Active Alpha ranking. Additionally, highly ranked managers can have differing risk profiles that might not be appropriate for all investors.

The proprietary **Value Score** methodology considers an active investment strategies' value proposition relative to its costs. From a historical quantitative study of several quantitative markers, Value Score measures perceived forward-looking benefit and computes (1) "fair value" expense ratios for most traditional investment managers across 40 categories and (2) managers' perceived "excess value" by comparing the fair value expense ratios to actual expense ratios. Managers are then ranked within each category by their excess value to assign a Value Score. Our analysis suggests that greater levels of excess value have historically corresponded to attractive subsequent performance.

For more information on the ranking models, please see Adverse Active AlphaSM 2.0: Scoring Active Managers According to Potential Alpha and Value Score: Scoring Fee Efficiency by Comparing Managers' "Fair Value" and Actual Expense Ratios. The whitepapers are available from your Financial Advisor or Private Wealth Advisor. ADVERSE ACTIVE ALPHA is a registered service mark of Morgan Stanley and/or its affiliates. U.S. Pat. No. 8,756,098 applies to the Adverse Active Alpha system and/or methodology.

Additionally, highly ranked managers can have differing risk profiles that might not be appropriate for all investors. For more information on AAA, please see the Adverse Active Alpha Ranking Model and Selecting Managers with Adverse Active Alpha whitepapers. The whitepaper are available from your Financial Advisor or Private Wealth Advisor. ADVERSE ACTIVE ALPHA is a registered service mark of Morgan Stanley and/or its affiliates. U.S. Pat. No. 8,756,098 applies to the Adverse Active Alpha system and/or methodology.

The Global Investment Manager Analysis (GIMA) Services Only Apply to Certain Investment Advisory Programs GIMA evaluates certain investment products for the purposes of some – but not all – of Morgan Stanley Smith Barney LLC's investment advisory programs (as described in more detail in the applicable Form ADV Disclosure Document for Morgan Stanley Wealth Management). If you do not invest through one of these investment advisory programs, Morgan Stanley Wealth Management is not obligated to provide you notice of any GIMA Status changes even though it may give notice to clients in other programs.

Strategy May Be Available as a Separately Managed Account or Mutual Fund Strategies are sometimes available in Morgan Stanley Wealth Management investment advisory programs both in the form of a separately managed account ("SMA") and a mutual fund. These may have different expenses and investment minimums. Your Financial Advisor or Private Wealth Advisor can provide more information on whether any particular strategy is available in more than one form in a particular investment advisory program. Generally, investment advisory accounts are subject to an annual asset-based fee (the "Fee") which is payable monthly in advance (some account types may be billed differently). In general, the Fee covers Morgan Stanley investment advisory services, custody of securities with Morgan Stanley, trade execution with or through Morgan Stanley or its affiliates, as well as compensation to any Morgan Stanley Financial Advisor.

In addition, each account that is invested in a program that is eligible to purchase certain investment products, such as mutual funds, will also pay a Platform Fee (which is subject to a Platform Fee offset) as described in the applicable ADV brochure. Accounts invested in the Select UMA program may also pay a separate Sub-Manager fee, if applicable.

If your account is invested in mutual funds or exchange traded funds (collectively "funds"), you will pay the fees and expenses of any funds in which your account is invested. Fees and expenses are charged directly to the pool of assets the fund invests in and are reflected in each fund's share price. These fees and expenses are an additional cost to you and would not be included in the Fee amount in your account statements. The advisory program you choose is described in the applicable Morgan Stanley Smith Barney LLC ADV Brochure, available at www.morganstanley.com/ADV.

Morgan Stanley or Executing Sub-Managers, as applicable, in some of Morgan Stanley's Separately Managed Account ("SMA") programs may effect transactions through broker-dealers other than Morgan Stanley or our affiliates. In such instances, you may be assessed additional costs by the other firm in addition to the Morgan Stanley and Sub-Manager fees. Those costs will be included in the net price of the security, not separately reported on trade confirmations or account statements. Certain Sub-Managers have historically directed most, if not all, of their trades to outside firms. Information provided by Sub-Managers concerning trade execution away from Morgan Stanley is summarized at: www.morganstanley.com/wealth/investmentsolutions/pdfs/adv/sotresponse.pdf. For more information on trading and costs, please refer to the ADV Brochure for your program(s), available at www.morganstanley.com/ADV, or contact your Financial Advisor / Private Wealth Advisor.

Conflicts of Interest: GIMA's goal is to provide professional, objective evaluations in support of the Morgan Stanley Wealth Management investment advisory programs. We have policies and procedures to help us meet this goal. However, our business is subject to various conflicts of interest. For example, ideas and suggestions for which investment products should be evaluated by GIMA come from a variety of sources, including our Morgan Stanley Wealth Management Financial Advisors and their direct or indirect managers, and other business persons within Morgan Stanley Wealth Management or its affiliates. Such persons may have an ongoing business relationship with certain investment managers or mutual fund companies whereby they, Morgan Stanley Wealth

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Morgan Stanley charges each fund family we offer a mutual fund support fee, also called a "revenue-sharing payment," on client account holdings in fund families according to a tiered rate that increases along with the management fee of the fund so that lower management fee funds pay lower rates than those with higher management fees.

Consider Your Own Investment Needs: The model portfolios and strategies discussed in the material are formulated based on general client characteristics including risk tolerance. This material is not intended to be an analysis of whether particular investments or strategies are appropriate for you or a recommendation, or an offer to participate in any investment. Therefore, clients should not use this material as the sole basis for investment decisions. They should consider all relevant information, including their existing portfolio, investment objectives, risk tolerance, liquidity needs and investment time horizon. Such a determination may lead to asset allocation results that are materially different from the asset allocation shown in this profile. Talk to your Financial Advisor about what would be an appropriate asset allocation for you, whether Morgan Stanley Pathway Funds is an appropriate program for you.

No obligation to notify – Morgan Stanley Wealth Management has no obligation to notify you when the model portfolios, strategies, or any other information, in this material changes.

For index, indicator and survey definitions referenced in this report please visit the following: https://www.morganstanley.com/wealth-investmentsolutions/wmir-definitions

The Morgan Stanley Pathway Funds, Firm Discretionary UMA Model Portfolios, and other asset allocation or any other model portfolios discussed in this material are available only to investors participating in Morgan Stanley Consulting Group advisory programs. For additional information on the Morgan Stanley Consulting Group advisory programs, see the applicable ADV brochure, available at www.morganstanley.com/ADV or from your Morgan Stanley Financial Advisor or Private Wealth Advisor. To learn more about the Morgan Stanley Pathway Funds, visit the Funds' website at https://www.morganstanley.com/wealth-investmentsolutions/cgcm. Consulting Group is a business of Morgan Stanley.

Morgan Stanley Pathway Program Asset Allocation Models There are model portfolios corresponding to five risk-tolerance levels available in the Pathway program. Model 1 is the least aggressive portfolio and consists mostly of bonds. As the model numbers increase, the models have higher allocations to equities and become more aggressive. Pathway is a mutual fund asset allocation program. In constructing the Pathway Program Model Portfolios, Morgan Stanley Wealth Management uses, among other things, model asset allocations produced by Morgan Wealth Management's Global Investment Committee (the "GIC"). The Pathway Program Model Portfolios are specific to the Pathway program (based on program features and parameters, and any other requirements of Morgan Stanley Wealth Management's Consulting Group). The Pathway Program Model Portfolios may therefore differ in some respects from model portfolios available in other Morgan Stanley Wealth Management programs or from asset allocation models published by the Global Investment Committee.

The type of mutual funds and ETFs discussed in this presentation utilizes nontraditional or complex investment strategies and/or derivatives. Examples of these types of funds include those that utilize one or more of the below noted investment strategies or categories or which seek exposure to the following markets: (1) commodities (e.g., agricultural, energy and metals), currency, precious metals; (2) managed futures; (3) leveraged, inverse or inverse leveraged; (4) bear market, hedging, long-short equity, market neutral; (5) real estate; (6) volatility (seeking exposure to the CBOE VIX Index). Investors should keep in mind that while mutual funds and ETFs may, at times, utilize nontraditional investment options and strategies, they should not be equated with unregistered privately offered alternative investments. Because of regulatory limitations, mutual funds and ETFs that seek alternative-like investment exposure must utilize a more limited investment universe. As a result, investment returns and portfolio characteristics of alternative mutual funds and ETFs may vary from traditional hedge funds pursuing similar investment objectives. Moreover, traditional hedge funds have limited liquidity with long "lock-up" periods allowing them to pursue investment strategies without having to factor in the need to meet client redemptions and ETFs trade on an exchange. On the other hand, mutual funds typically must meet daily client redemptions. This differing liquidity profile can have a material impact on the investment returns generated by a mutual fund or ETF pursuing an alternative investing strategy compared with a traditional hedge fund pursuing the same strategy.

Nontraditional investment options and strategies are often employed by a portfolio manager to further a fund's investment objective and to help offset market risks. However, these features may be complex, making it more difficult to understand the fund's essential characteristics and risks, and how it will perform in different market environments and over various periods of time. They may also expose the fund to increased volatility and unanticipated risks particularly when used in complex combinations and/or accompanied by the use of borrowing or "leverage."

Please consider the investment objectives, risks, fees, and charges and expenses of mutual funds, ETFs, closed end funds, unit investment trusts, and variable insurance products carefully before investing. The prospectus contains this and other information about each fund. To obtain a prospectus, contact your Financial Advisor or Private Wealth Advisor or visit the Morgan Stanley website at www.morganstanley.com. Please read it carefully before investing.

Money Market Funds: You could lose money in money market funds. Although money market funds classified as government funds (i.e., money market funds that invest 99.5% of total assets in cash and/or securities backed by the U.S government) and retail funds (i.e., money market funds open to natural person investors only) seek to preserve value at $1.00 per share, they cannot guarantee they will do so. The price of other money market funds will fluctuate and when you sell shares they may be worth more or less than originally paid. Money market funds may impose a fee upon sale or temporarily suspend sales if liquidity falls below required minimums. During suspensions, shares would not be available for purchases, withdrawals, check writing or ATM debits. A money market fund investment is not insured or guaranteed by the Federal Deposit Insurance Corporation or other government agency. The Fund's sponsor has no legal obligation to provide financial support to the Fund, and you should not expect that the sponsor will provide financial support to the Fund at any time.

Investors should carefully consider the investment objectives, risks, charges and expenses of a money market fund before investing. The prospectus contains this and other information about the money market fund. To obtain a prospectus, contact your Financial Advisor or visit the money market fund company's website. Please read the prospectus carefully before investing.

Exchange Funds are private placement vehicles that enable holders of concentrated single-stock positions to exchange those stocks for a diversified portfolio. Investors may benefit from greater diversification by exchanging a concentrated stock position for fund shares without triggering a taxable event. These funds are available only to qualified investors and may only be offered by Financial Advisors who are qualified to sell alternative investments. Before investing, investors should consider the following:
- Dividends are pooled
- Investors may forfeit their stock voting rights
- Investment may be illiquid for several years
- Investments may be leveraged or contain derivatives
- Significant early redemption fees may apply
- Changes to the U.S. tax code, which could be retroactive (potentially disallowing the favorable tax treatment of exchange funds)
- Investment risk and potential loss of principal

KEY ASSET CLASS CONSIDERATIONS AND OTHER RISKS

Investing in the markets entails the risk of market volatility. The value of all types of investments, including stocks, mutual funds, exchange-traded funds ("ETFs"), closed-end funds, and unit investment trusts, may increase or decrease over varying time periods. To the extent the investments depicted herein represent **international securities**, you should be aware that there may be additional risks associated with international investing, including foreign economic, political, monetary and/or legal factors, changing currency exchange rates, foreign taxes, and differences in financial and accounting standards. These risks may be magnified in **emerging markets and frontier markets**. Some funds also invest in foreign securities, which may involve currency risk. There is no assurance that the fund will achieve its investment objective. **Small- and mid-capitalization companies** may lack the financial resources, product diversification and competitive strengths of larger companies. In addition, the securities of small- and mid-capitalization companies may not trade as readily as, and be subject to higher volatility than, those of larger, more established companies. The value of **fixed income securities** will fluctuate and, upon a sale, may be worth more or less than their original cost or maturity value. Bonds are subject to interest rate risk, call risk, reinvestment risk, liquidity risk, and credit risk of the issuer. **High yield bonds** are subject to additional risks such as increased risk of default and greater volatility because of the lower credit quality of the issues. In the case of **municipal bonds**, income is generally exempt from federal income taxes. Some income may be subject to state and local taxes and to the federal alternative minimum tax. Capital gains, if any, are subject to tax. **Treasury Inflation Protection Securities' (TIPS)** coupon payments and underlying principal are automatically increased to compensate for inflation by tracking the consumer price index (CPI). While the real rate of return is guaranteed, TIPS tend to offer a low return. Because the return of TIPS is linked to inflation, TIPS may significantly underperform versus conventional U.S.

Treasuries in times of low inflation. There is no guarantee that investors will receive par if TIPS are sold prior to maturity. The returns on a portfolio consisting primarily of **environmental, social, and governance-aware investments ("ESG")** may be lower or higher than a portfolio that is more diversified or where decisions are based solely on investment considerations. Because ESG criteria exclude some investments, investors may not be able to take advantage of the same opportunities or market trends as investors that do not use such criteria. The companies identified and investment examples are for illustrative purposes only and should not be deemed a recommendation to purchase, hold or sell any securities or investment products. They are intended to demonstrate the approaches taken by managers who focus on ESG criteria in their investment strategy. There can be no guarantee that a client's account will be managed as described herein. **Options** and margin trading involve substantial risk and are not appropriate for all investors. Besides the general investment risk of holding securities that may decline in value and the possible loss of principal invested, **closed-end funds** may have additional risks related to declining market prices relative to net asset values (NAVs), active manager underperformance and potential leverage. Closed-end funds, unlike open-end funds, are not continuously offered. There is a one-time public offering and once issued, shares of closed-end funds are sold in the open market through a stock exchange. Shares of closed-end funds frequently trade at a discount from their NAV which may increase investors' risk of loss. The risk of loss due to this discount may be greater for investors expecting to sell their shares in a relatively short period after completion of the public offering. This characteristic is a risk separate and distinct from the risk that a closed-end fund's net asset value may decrease as a result of investment activities. NAV is total assets less total liabilities divided by the number of shares outstanding. At the time an investor purchases or sells shares of a closed-end fund, shares may have a market price that is above or below NAV. Portfolios that invest a large percentage of assets in only one industry **sector** (or in only a few sectors) are more vulnerable to price fluctuation than those that diversify among a broad range of sectors.

Structured Investments are complex and not appropriate for all investors. An investment in Structures Investments involve risks. These risks can include but are not limited to: (1) Fluctuations in the price, level or yield of underlying instruments, interest rates, currency values and credit quality, (2) Substantial or total loss of principal, (3) Limits on participation in appreciation of underlying instrument, (4) Limited liquidity, (5) Issuer credit risk and (6) Conflicts of Interest. There is no assurance that a strategy of using structured product for wealth preservation, yield enhancement, and/or interest rate risk hedging will meet its objectives.

Alternative investments may be either traditional alternative investment vehicles, such as hedge funds, fund of hedge funds, private equity, private real estate and managed futures or, non-traditional products such as mutual funds and exchange-traded funds that also seek alternative-like exposure but have significant differences from traditional alternative investments. Alternative investments often are speculative and include a high degree of risk. Investors could lose all or a substantial amount of their investment. Alternative investments are appropriate only for eligible, long-term investors who are willing to forgo liquidity and put capital at risk for an indefinite period of time. They may be highly illiquid and can engage in leverage and other speculative practices that may increase the volatility and risk of loss. Alternative Investments typically have higher fees than traditional investments. Investors should carefully review and consider potential risks before investing. Certain of these risks may include but are not limited to: 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 a fund; 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; and Risks associated with the operations, personnel, and processes of the manager. Further, opinions regarding Alternative Investments expressed herein may differ from the opinions expressed by Morgan Stanley Wealth Management and/or other businesses/affiliates of Morgan Stanley Wealth Management.

Certain information contained herein may constitute forward-looking statements. Due to various risks and uncertainties, actual events, results or the performance of a fund may differ materially from those reflected or contemplated in such forward-looking statements. Clients should carefully consider the investment objectives, risks, charges, and expenses of a fund before investing.

Alternative investments involve complex tax structures, tax inefficient investing, and delays in distributing important tax information. Individual funds have specific risks related to their investment programs that will vary from fund to fund. Clients should consult their own tax and legal advisors as Morgan Stanley Wealth Management does not provide tax or legal advice.

Interests in alternative investment products are offered pursuant to the terms of the applicable offering memorandum, are distributed by Morgan Stanley Smith Barney LLC and certain of its affiliates, and (1) are not FDIC-insured, (2) are not deposits or other obligations of Morgan Stanley or any of its affiliates, (3) are not guaranteed by Morgan Stanley and its affiliates, and (4) involve investment risks, including possible loss of principal. Morgan Stanley Smith Barney LLC is a registered broker-dealer, not a bank.

A majority of Alternative Investment managers reviewed and selected by GIMA pay or cause to be paid an ongoing fee for distribution from their management fees to Morgan Stanley Wealth Management in connection with Morgan Stanley Wealth Management clients that purchase an interest in an Alternative Investment and in some instances pay these fees on the investments held by advisory clients. Morgan Stanley Wealth Management rebates such fees that are received and attributable to an Investment held by an advisory client and retains the fees paid in connection with investments held by brokerage clients. Morgan Stanley Wealth Management has a conflict of interest in offering alternative investments because Morgan Stanley Wealth Management or our affiliates, in most instances, earn more money in your account from your investments in alternative investments than from other investment options.

It should be noted that the majority of hedge fund indexes are comprised of hedge fund manager returns. This is in contrast to traditional indexes, which are comprised of individual securities in the various market segments they represent and offer complete transparency as to membership and construction methodology. As such, some believe that hedge fund index returns have certain biases that are not present in traditional indexes. Some of these biases inflate index performance, while others may skew performance negatively. However, many studies indicate that overall hedge fund index performance has been biased to the upside. Some studies suggest performance has been inflated by up to 260 basis points or more annually depending on the types of biases included and the time period studied. Although there are numerous potential biases that could affect hedge fund returns, we identify some of the more common ones throughout this paper.

Self-selection bias results when certain manager returns are not included in the index returns and may result in performance being skewed up or down. Because hedge funds are private placements, hedge fund managers are able to decide which fund returns they want to report and are able to opt out of reporting to the various databases. Certain hedge fund managers may choose only to report returns for funds with strong returns and opt out of reporting returns for weak performers. Other hedge funds that close may decide to stop reporting in order to retain secrecy, which may cause a downward bias in returns.

Survivorship bias results when certain constituents are removed from an index. This often results from the closure of funds due to poor performance, "blow ups," or other such events. As such, this bias typically results in performance being skewed higher. As noted, hedge fund index performance biases can result in positive or negative skew. However, it would appear that the skew is more often positive. While it is difficult to quantify the effects precisely, investors should be aware that idiosyncratic factors may be giving hedge fund index returns an artificial "lift" or upwards bias.

Hedge Funds of Funds and many funds of funds are private investment vehicles restricted to certain qualified private and institutional investors. They are often speculative and include a high degree of risk. Investors can lose all or a substantial amount of their investment. They may be highly illiquid, can engage in leverage and other speculative practices that may increase volatility and the risk of loss, and may be subject to large investment minimums and initial lockups. They involve complex tax structures, tax-inefficient investing and delays in distributing important tax information. Categorically, hedge funds and funds of funds have higher fees and expenses than traditional investments, and such fees and expenses can lower the returns achieved by investors. Funds of funds have an additional layer of fees over and above hedge fund fees that will offset returns. An investment in an **exchange-traded fund** involves risks similar to those of investing in a broadly based portfolio of equity securities traded on an exchange in the relevant securities market, such as market fluctuations caused by such factors as economic and political developments, changes in interest rates and perceived trends in stock and bond prices. An investment in a **target date portfolio** is subject to the risks attendant to the underlying funds in which it invests, in these portfolios the funds are the Consulting Group Capital Market funds. A target date portfolio is geared to investors who will retire and/or require income at an approximate year. The portfolio is managed to meet the investor's goals by the pre-established year or "target date." A target date portfolio will transition its invested assets from a more aggressive portfolio to a more conservative portfolio as the target date draws closer. An investment in the target date portfolio is not guaranteed at any time, including, before or after the target date is reached. **Managed futures** investments are speculative, involve a high degree of risk, use significant leverage, are generally illiquid, have substantial charges, subject investors to conflicts of interest, and are appropriate only for the risk capital portion of an investor's portfolio. Managed futures investments do not replace equities or bonds but rather may act as a complement in a well diversified portfolio. Managed Futures are complex and not appropriate for all investors.

Virtual Currency Products (Cryptocurrencies)

Buying, selling, and transacting in Bitcoin, Ethereum or other digital assets ("Digital Assets"), and related funds and products, is highly speculative and may result in a loss of the entire investment. Risks and considerations include but are not limited to:

- Digital Assets have only been in existence for a short period of time and historical trading prices for Digital Assets have been highly volatile. **The price of Digital Assets could decline rapidly, and investors could lose their entire investment.**

- Certain Digital Asset funds and products, allow investors to invest on a more frequent basis than investors may withdraw from the fund or product, and interests in such funds or products are generally not freely transferrable. This means that, particularly given the volatility of Digital Assets, an investor will have to bear any losses with respect to its investment for an extended period of time and will not be able to react to changes in the price of the Digital Asset once invested (for example, by seeking to withdraw) as quickly as when making the decision to invest. Such Digital Asset funds and products, are intended only for persons who are able to bear the economic risk of investment and who do not need liquidity with respect to their investments.

- Given the volatility in the price of Digital Assets, the net asset value of a fund or product that invests in such assets at the time an investor's subscription for interests in the fund or product is accepted may be significantly below or above the net asset value of the product or fund at the time the investor submitted subscription materials.

- Certain Digital Assets are not intended to function as currencies but are intended to have other use cases. These other Digital Assets may be subject to some or all of the risks and considerations set forth herein, as well as additional risks applicable to such Digital Assets. Buyers, sellers and users of such Digital Assets should thoroughly familiarize themselves with such risks and considerations before transacting in such Digital Assets.

- The value of Digital Assets may be negatively impacted by future legal and regulatory developments, including but not limited to increased regulation of such Digital Assets. Any such developments may make such Digital Assets less valuable, impose additional burdens and expenses on a fund or product investing in such assets or impact the ability of such a fund or product to continue to operate, which may materially decrease the value of an investment therein.

- Due to the new and evolving nature of digital currencies and the absence of comprehensive guidance, many significant aspects of the tax treatment of Digital Assets are uncertain. Prospective investors should consult their own tax advisors concerning the tax consequences to them of the purchase, ownership and disposition of Digital Assets, directly or indirectly through a fund or product, under U.S. federal income tax law, as well as the tax law of any relevant state, local or other jurisdiction.

- Over the past several years, certain Digital Asset exchanges have experienced failures or interruptions in service due to fraud, security breaches, operational problems or business failure. Such events in the future could impact any fund's or product's ability to transact in Digital Assets if the fund or product relies on an impacted exchange and may also materially decrease the price of Digital Assets, thereby impacting the value of your investment, regardless of whether the fund or product relies on such an impacted exchange.

- Although any Digital Asset product and its service providers have in place significant safeguards against loss, theft, destruction and inaccessibility, there is nonetheless a risk that some or all of a product's Digital Asset could be permanently lost, stolen, destroyed or inaccessible by virtue of, among other things, the loss or theft of the "private keys" necessary to access a product's Digital Asset.

- Investors in funds or products investing or transacting in Digital Assets may not benefit to the same extent (or at all) from "airdrops" with respect to, or "forks" in, a Digital Asset's blockchain, compared to investors who hold Digital Assets directly instead of through a fund or product. Additionally, a "fork" in the Digital Asset blockchain could materially decrease the price of such Digital Asset.

- Digital Assets are not legal tender, and are not backed by any government, corporation or other identified body, other than with respect to certain digital currencies that certain governments are or may be developing now or in the future. No law requires companies or individuals to accept digital currency as a form of payment (except, potentially, with respect to digital currencies developed by certain governments where such acceptance may be mandated). Instead, other than as described in the preceding sentences, Digital Asset products' use is limited to businesses and individuals that are willing to accept them. If no one were to accept digital currencies, virtual currency products would very likely become worthless.

- Platforms that buy and sell Digital Assets can be hacked, and some have failed. In addition, like the platforms themselves, digital wallets can be hacked, and are subject to theft and fraud. As a result, like other investors have, you can lose some or all of your holdings of Digital Assets.

- Unlike US banks and credit unions that provide certain guarantees of safety to depositors, there are no such safeguards provided to Digital Assets held in digital wallets by their providers or by regulators.

- Due to the anonymity Digital Assets offer, they have known use in illegal activity, including drug dealing, money laundering, human tracking, sanction evasion and other forms of illegal commerce. Abuses could impact legitimate consumers and speculators; for instance, law enforcement agencies could shut down or restrict the use of platforms and exchanges, limiting or shutting of entirely the ability to use or trade Digital Asset products.

- Digital Assets may not have an established track record of credibility and trust. Further, any performance data relating to Digital Asset products may not be verifiable as pricing models are not uniform.

- Investors should be aware of the potentially increased risks of transacting in Digital Assets relating to the risks and considerations, including fraud, theft, and lack of legitimacy, and other aspects and qualities of Digital Assets, before transacting in such assets.

- The exchange rate of virtual currency products versus the USD historically has been very volatile and the exchange rate could drastically decline. For example, the exchange rate of certain Digital

Assets versus the USD has in the past dropped more than 50% in a single day. Other Digital Assets may be affected by such volatility as well.

- Digital Asset exchanges have limited operating and performance histories and are not regulated with the same controls or customer protections available to more traditional exchanges transacting equity, debt, and other assets and securities. There is no assurance that a person/exchange who currently accepts a Digital Asset as payment will continue to do so in the future.

- The regulatory framework of Digital Assets is evolving, and in some cases is uncertain, and Digital Assets themselves may not be governed and protected by applicable securities regulators and securities laws, including, but not limited to, Securities Investor Protection Corporation coverage, or other regulatory regimes.

- Morgan Stanley Smith Barney LLC or its affiliates (collectively, "Morgan Stanley") may currently, or in the future, offer or invest in Digital Asset products, services or platforms. The proprietary interests of Morgan Stanley may conflict with your interests.

- The foregoing list of considerations and risks are not and do not purport to be a complete enumeration or explanation of the risks involved in an investment in any product or fund investing or trading in Digital Assets.

Asset allocation and diversification do not assure a profit or protect against loss in declining financial markets. Past performance is no guarantee of future results. Actual results may vary.

Rebalancing does not 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.

Indices are unmanaged and investors cannot directly invest in them. They are not subject to expenses or fees and are often comprised of securities and other investment instruments the liquidity of which is not restricted. A particular investment product may consist of securities significantly different than those in any index referred to herein. Composite index results are shown for illustrative purposes only, generally do not represent the performance of a specific investment, may not, for a variety of reasons, be an appropriate comparison or benchmark for a particular investment and may not necessarily reflect the actual investment strategy or objective of a particular investment. Consequently, comparing an investment to a particular index may be of limited use.

To obtain **Tax-Management Services**, a client must complete the Tax-Management Form, and deliver the signed form to Morgan Stanley. For more information on Tax-Management Services,

including its features and limitations, please ask your Financial Advisor for the Tax Management Form. Review the form carefully with your tax advisor. Tax-Management Services: (a) apply only to equity investments in separate account sleeves of client accounts; (b) are not available for all accounts or clients; and (c) may adversely impact account performance. Tax-management services do not constitute tax advice or a complete tax-sensitive investment management program. There is no guarantee that tax-management services will produce the desired tax results.

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The Morgan Stanley Goals-Planning System (GPS) includes a brokerage investment analysis tool. While securities held in a client's investment advisory accounts may be included in the analysis, the reports generated from the GPS Platform are not financial plans nor constitute a financial planning service. A financial plan generally seeks to address a wide spectrum of a client's long-term financial needs, and can include recommendations about insurance, savings, tax and estate planning, and investments, taking into consideration the client's goals and situation, including anticipated retirement or other employee benefits. Morgan Stanley Smith Barney LLC ("Morgan Stanley") will only prepare a financial plan at a client's specific request using Morgan Stanley approved financial planning software. Investing in financial instruments carries with it the possibility of losses and that a focus on above-market returns exposes the portfolio to above-average risk. Performance aspirations are not guaranteed and are subject to market conditions. High volatility investments may be subject to sudden and large falls in value, and there could be a large loss on realization which could be equal to the amount invested. **IMPORTANT**: The projections or other information provided by the Morgan Stanley Goals Planning System regarding the likelihood of various investment outcomes (including any assumed rates of return and income) are hypothetical in nature, do not reflect actual investment results, and are not guarantees of future results. Morgan Stanley does not represent or guarantee that the projected returns or income will or can be attained.

A LifeView Financial Goal Analysis ("Financial Goal Analysis") or LifeView Financial Plan ("Financial Plan") is based on the methodology, estimates, and assumptions, as described in your report, as well as personal data provided by you. It should be considered a working document that can assist you with your objectives. Morgan Stanley makes no guarantees as to future results or that an individual's investment objectives will be achieved. The responsibility for implementing, monitoring and adjusting your Financial Goal Analysis or Financial Plan rests with you. After your Financial Advisor delivers your report to you, if you so desire, your Financial Advisor can help you implement any part that you choose; however, you are not obligated to work with your Financial Advisor or Morgan Stanley.

Important information about your relationship with your Financial Advisor and Morgan Stanley Smith Barney LLC when using LifeView Goal Analysis or LifeView Advisor. When your Financial Advisor prepares and delivers a Financial Goal Analysis (i.e., when using LifeView Goal Analysis), they will be acting in a brokerage capacity. When your Financial Advisor prepares a Financial Plan (i.e., when using LifeView Advisor), they will be acting in an investment advisory capacity with respect to the delivery of your Financial Plan. This Investment Advisory relationship will begin with the delivery of the Financial Plan and ends thirty days later, during which time your Financial Advisor can review the Financial Plan with you. To understand the differences between brokerage and advisory relationships, you should consult your Financial Advisor, or review our "Understanding Your Brokerage and Investment Advisory Relationships," brochure available at https://www.morganstanley.com/wealth-relationshipwithms/pdfs/understandingyourrelationship.pdf

We may act in the capacity of a broker or that of an advisor. As your broker, we are not your fiduciary and our interests may not always be identical to yours. Please consult with your Financial Advisor or Private Wealth Advisor to discuss our obligations to disclose to you any conflicts we may from time to time have and our duty to act in your best interest. We may be paid both by you and by others who compensate us based on what you buy. Our compensation, including that of your Financial Advisor or Private Wealth Advisor, may vary by product and over time.

Investment and services offered through Morgan Stanley Smith Barney LLC, Member SIPC.

GLOBAL INVESTMENT COMMITTEE (GIC) ASSET ALLOCATION MODELS: The Asset Allocation Models are created by Morgan Stanley Wealth Management's GIC.

HYPOTHETICAL MODEL PERFORMANCE (GROSS): Hypothetical model performance results do not reflect the investment or performance of an actual portfolio following a GIC Strategy, but simply reflect actual historical performance of selected indices on a real-time basis over the specified period of time representing the GIC's strategic and tactical allocations as of the date of this report. The past performance shown here is simulated performance based on benchmark indices, not investment results from an actual portfolio or actual trading. There can be large differences between hypothetical and actual performance results achieved by a particular asset allocation or trading strategy. Hypothetical performance results do not represent actual trading and are generally designed with the benefit of hindsight. Actual performance results of accounts vary due to, for example, market factors (such as liquidity) and client-specific factors (such as investment vehicle selection, timing of contributions and withdrawals, restrictions and rebalancing schedules). Clients would not necessarily have obtained the performance results shown here if they had invested in accordance with any GIC Asset Allocation Model for the periods indicated. Despite the limitations of hypothetical performance, these hypothetical performance results allow clients and Financial Advisors to obtain a sense of the risk/return trade-off of different asset allocation constructs. The hypothetical performance results in this report are calculated using the returns of benchmark indices for the asset classes, and not the returns of securities, fund or other investment products. Models may contain allocations to Hedge Funds, Private Equity and Private Real Estate. The benchmark indices for these asset classes are not issued on a daily basis. When calculating model performance on a day for which no benchmark index data is issued, we have assumed straight line growth between the index levels issued before and after that date.

FEES REDUCE THE PERFORMANCE OF ACTUAL ACCOUNTS: None of the fees or other expenses (e.g. commissions, mark-ups, mark-downs, fees) associated with actual trading or accounts are reflected in the GIC Asset Allocation Models. The GIC Asset Allocation Models and any model performance included in this presentation are intended as educational materials. Were a client to use these models in connection with investing, any investment decisions made would be subject to transaction and other costs which, when compounded over a period of years, would decrease returns. Information regarding Morgan Stanley's standard advisory fees is available in the Form ADV Part 2, which is available at www.morganstanley.com/adv. The following hypothetical illustrates the compound effect fees have on investment returns: For example, if a portfolio's annual rate of return is 15% for 5 years and the account pays 50 basis points in fees per annum, the gross cumulative five-year return would be 101.1% and the five-year return net of fees would be 96.8%. Fees and/or expenses would apply to clients who invest in investments in an account based on these asset allocations, and would reduce clients' returns. The impact of fees and/or expenses can be material.

Variable annuities are long-term investments designed for retirement purposes and may be subject to market fluctuations, investment risk, and possible loss of principal. All guarantees, including optional benefits, are based on the financial strength and claims-paying ability of the issuing insurance company and do not apply to the underlying investment options. Optional riders may not be able to be purchased in combination and are available at an additional cost. Some optional riders must be elected at time of purchase. Optional riders may be subject to specific limitations, restrictions, holding periods, costs, and expenses as specified by the insurance company in the annuity contract. If you are investing in a **variable annuity** through a tax-advantaged retirement plan such as an IRA, you will get no additional tax advantage from the variable annuity. Under these circumstances, you should only consider buying a variable annuity because of its other features, such as lifetime income payments and death benefits protection. Taxable distributions (and certain deemed distributions) are subject to ordinary income tax and, if taken prior to age 59½, may be subject to a 10% federal income tax penalty. Early withdrawals will reduce the death benefit and cash surrender value.

Equity securities may fluctuate in response to news on companies, industries, market conditions and general economic environment. **Ultrashort-term fixed income** asset class is comprised of fixed income securities with high quality, very short maturities. They are therefore subject to the risks associated with debt securities such as credit and interest rate risk.

Master Limited Partnerships (MLPs) are limited partnerships or limited liability companies that are taxed as partnerships and whose interests (limited partnership units or limited liability company units) are traded on securities exchanges like shares of common stock. Currently, most MLPs operate in the energy, natural resources or real estate sectors. Investments in MLP interests are subject to the risks generally applicable to companies in the energy and natural resources sectors, including commodity pricing risk, supply and demand risk, depletion risk and exploration risk. Individual MLPs are publicly traded partnerships that have unique risks related to their structure. These include, but are not limited to, their reliance on the capital markets to fund growth, adverse ruling on the current tax treatment of distributions (typically mostly tax deferred), and commodity volume risk. The potential tax benefits from investing in MLPs depend on their being treated as partnerships for federal income tax purposes and, if the MLP is deemed to be a corporation, then its income would be subject to federal taxation at the entity level, reducing the amount of cash available for distribution to the fund which could result in a reduction of the fund's value. MLPs carry interest rate risk and may underperform in a rising interest rate environment. MLP funds accrue deferred income taxes for future tax liabilities associated with the portion of MLP distributions considered to be a tax-deferred return of capital and for any net operating gains as well as capital appreciation of its investments; this deferred tax liability is reflected in the daily NAV, and, as a result, the MLP fund's after-tax performance could differ significantly from the underlying assets even if the pre-tax performance is closely tracked.

Investing in commodities entails significant risks. Commodity prices may be affected by a variety of factors at any time, including but not limited to, (i) changes in supply and demand relationships, (ii) governmental programs and policies, (iii) national and international political and economic events, war and terrorist events, (iv) changes in interest and exchange rates, (v) trading activities in commodities and related contracts, (vi) pestilence, technological change and weather, and (vii) the price volatility of a commodity. In addition, the commodities markets are subject to temporary distortions or other disruptions due to various factors, including lack of liquidity, participation of speculators and government intervention. **Physical precious metals** are non-regulated products. Precious metals are speculative investments, which may experience short-term and long term price volatility. The value of precious metals investments may fluctuate and may appreciate or decline, depending on market conditions. Unlike bonds and stocks, precious metals do not make interest or dividend payments. Therefore, precious metals may not be appropriate for investors who require current income. Precious metals are commodities that should be safely stored, which may impose additional costs on the investor.

REITs investing risks are similar to those associated with direct investments in real estate: property value fluctuations, lack of liquidity, limited diversification and sensitivity to economic factors such as interest rate changes and market recessions. Risks of **private real estate** include: illiquidity; a long-term investment horizon with a limited or nonexistent secondary market; lack of transparency;

volatility (risk of loss); and leverage. Principal is returned on a monthly basis over the life of a **mortgage-backed security.** Principal prepayment can significantly affect the monthly income stream and the maturity of any type of MBS, including standard MBS, CMOs and Lottery Bonds. **Asset-backed securities** generally decrease in value as a result of interest rate increases, but may benefit less than other fixed-income securities from declining interest rates, principally because of prepayments.

Yields are subject to change with economic conditions. Yield is only one factor that should be considered when making an investment decision. **Credit ratings** are subject to change. **Duration**, the most commonly used measure of bond risk, quantifies the effect of changes in interest rates on the price of a bond or bond portfolio. The longer the duration, the more sensitive the bond or portfolio would be to changes in interest rates. The majority of $25 and $1000 par **preferred securities** are "callable" meaning that the issuer may retire the securities at specific prices and dates prior to maturity. Interest/dividend payments on certain preferred issues may be deferred by the issuer for periods of up to 5 to 10 years, depending on the particular issue. The investor would still have income tax liability even though payments would not have been received. Price quoted is per $25 or $1,000 share, unless otherwise specified. Current yield is calculated by multiplying the coupon by par value divided by the market price. The initial interest rate on a **floating-rate security** may be lower than that of a fixed-rate security of the same maturity because investors expect to receive additional income due to future increases in the floating security's underlying reference rate. The reference rate could be an index or an interest rate. However, there can be no assurance that the reference rate will increase. Some floating-rate securities may be subject to call risk. The market value of **convertible bonds** and the underlying common stock(s) will fluctuate and after purchase may be worth more or less than original cost. If sold prior to maturity, investors may receive more or less than their original purchase price or maturity value, depending on market conditions. Callable bonds may be redeemed by the issuer prior to maturity. Additional call features may exist that could affect yield. Some $25 or $1000 **par preferred securities** are QDI (Qualified Dividend Income) eligible. Information on QDI eligibility is obtained from third party sources. The dividend income on QDI eligible preferreds qualifies for a reduced tax rate. Many traditional 'dividend paying' perpetual preferred securities (traditional preferreds with no maturity date) are QDI eligible. In order to qualify for the preferential tax treatment all qualifying preferred securities must be held by investors for a minimum period – 91 days during a 180 day window period, beginning 90 days before the ex-dividend date.

Companies paying **dividends** can reduce or cut payouts at any time.

Nondiversification: For a portfolio that holds a concentrated or limited number of securities, a decline in the value of these investments would cause the portfolio's overall value to decline to a greater degree than a less concentrated portfolio. The **indices selected by Morgan Stanley Wealth Management** to measure performance are representative of broad asset classes. Morgan Stanley Wealth Management retains the right to change representative indices at any time. Because of their narrow focus, **sector investments** tend to be more volatile than investments that diversify across many sectors and companies.

Growth investing does not guarantee a profit or eliminate risk. The stocks of these companies can have relatively high valuations. Because of these high valuations, an investment in a growth stock can be more risky than an investment in a company with more modest growth expectations. **Value investing** does not guarantee a profit or eliminate risk. Not all companies whose stocks are considered to be value stocks are able to turn their business around or successfully employ corrective strategies which would result in stock prices that do not rise as initially expected .

Any type of **continuous or periodic investment plan** does not assure a profit and does not protect against loss in declining markets. Since such a plan involves continuous investment in securities regardless of fluctuating price levels of such securities, the investor should consider his financial ability to continue his purchases through periods of low price levels.

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Broadridge Matrix Trust Company

Plan Administrator:

Regional Water Authority Board

Plan Actuary:

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OVERVIEW

INVESTOR CIRCUMSTANCES

The South Central Connecticut Regional Water Authority established the Plans for the benefit of its employees. The Plans are intended to provide eligible employees with a vehicle to receive benefits for their retirement. The Plans are qualified employee benefit plans intended to comply with all applicable federal laws and regulations, including the Internal Revenue Code of 1986, as amended.

INVESTMENT OBJECTIVES

The investment objectives addressed in this investment policy statement represent the portfolio's overall investment objectives.

The Regional Water Authority Board's objectives for the investment portfolios are:

1) Milestone goal is to be fully funded, for the pension plans, by the end of Fiscal Year 2025, excluding ongoing plan service costs, subject to prevailing market conditions and business considerations, including but not limited to the rate impact, competing funding needs for capital projects, and/or increasing operating expenses, the debt coverage impact, and other such considerations.
2) To achieve a long-term rate of return that meets the assumed actuarial rate of return.

South Central Connecticut Regional Water Authority
Minutes of the December 21, 2023 Meeting

The regular meeting of the South Central Connecticut Regional Water Authority ("RWA" or "Authority") took place on Thursday, December 21, 2023, via remote access. Chair Borowy presided.

Present: **Authority Members Present** – Messrs. Borowy, Curseaden and Ricozzi, and Mss. LaMarr and Sack
Management – Mss. Kowalski and Calo, and Messrs. Bingaman, Hill, Lakshminarayanan, and Singh
Moran Consulting, Inc. – Mr. Moran and Ms. Dolan
RPB – Mr. Levine
Staff – Mrs. Slubowski

Chair Borowy called the meeting to order at 12:30 p.m. He reviewed the safety moment distributed to members.

Chair Borowy offered the opportunity for members of the public to comment. There were no members of the public present at the meeting.

At 12:30 p.m., on motion made Ms. LaMarr, and seconded by Mr. Ricozzi, the Authority voted to recess the meeting to meet as the Audit-Risk Committee.

Borowy	Aye
Curseaden	Absent
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

At 12:46 p.m., Mr. Curseaden entered the meeting.

At 1:36 p.m., the Authority reconvened.

On motion made by Ms. Sack, and seconded by Mr. Ricozzi, the Authority voted to approve, adopt, or receive as appropriate the following items in the Consent Agenda:

1. Minutes of the November 16, 2023 regular meeting, December 1, 2023 special meeting, and the December 8, 2023 special meeting.
2. Approved the Capital Budget Authorization for January 2024.

   RESOLVED, that the Vice President & Chief Financial Officer is authorized to submit to the Trustee one or more requisitions in an aggregate amount not to exceed $4,300,000 for the month of January 2024 for transfer from the Construction Fund for capital expenditures. Each such requisition shall contain or be accompanied by a certificate identifying such requisition and stating that the amount to be withdrawn pursuant to such requisition is a proper charge to the Construction Fund. Such requisitions are approved notwithstanding the fact that amounts to be withdrawn for a particular project may exceed the amount indicated for such month and year in the current Capital Improvement Budget but will not cause the aggregate amount budgeted for fiscal year 2024 for all Capital Improvement Projects to be exceeded. In the absence of the Vice President & Chief Financial Officer, the Controller is authorized to sign in her place.
3. Capital Budget Transfer Notifications for January 2024.

4. Accounts Receivable update for the period ended November 30, 2023.
5. Key Performance Indicators.
6. RPB Quarterly Dashboard Report.
7. Acquisition of 3.5+ acres at 175 Cherry Hill Road, Branford

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

[Break from 1:36 p.m. to 1:45 p.m.]

At 1:45 p.m., Mr. Levine entered the meeting.

Ms. Kowalski, the RWA's Vice President & Chief Financial Officer, reviewed the quarterly financial report for the 2nd quarter of FY 2024, which included:

- Balance Sheet
- Revenues, expenses, and changes in net position
- Operating and maintenance expenses and key variances
- FY 2023 capital expenditures and projections
- Investment earnings report
- Year to date cash flow

Ms. Kowalski reported that the RWA was looking for approval of the resolutions for the Derby Tank for the Drinking Water State Revolving Funding, which would allow the RWA to enter into a PLO and subsidy. Mr. Ricozzi moved for approval of the following resolutions:

> **WHEREAS,** on November 15, 2018, the Authority adopted and on March 21, 2019, the Representative Policy Board (the "RPB") approved the resolutions which established the general terms and provisions of the Authority's bonds which may be issued as project loan obligations in one or more series delivered to the State of Connecticut (the "State") in the aggregate principal amount not to exceed $5,100,000 (the "Bonds") to (i) finance or refinance the cost of the construction of a water storage tank in Derby, Connecticut which was in addition to approximately $813,000 previously approved and spent on preliminary expenditures, (ii) finance the funding of reserve funds held under the Water System Revenue Bond Resolution, General Bond Resolution adopted by the Authority and approved by the RPB on July 31, 1980, as amended and supplemented (the "General Bond Resolution") and (iii) pay costs of issuance of the Bonds (the "Derby Water Storage Tank Project"); and
>
> **WHEREAS**, the Authority wishes to provide for the issuance, sale and delivery of the Authority's Bonds issued as a project loan obligation to be delivered to the State for the Derby Water Storage Tank Project (the "PLO") and approve the Project Loan and Subsidy Agreement by and between the State and the Authority related to the Derby Water Storage Tank Project (the "Loan Agreement").
>
> **NOW THEREFORE BE IT RESOLVED,** that the President/Chief Executive Officer and the Vice President and Chief Financial Officer and any one of them may apply to the State Department of Public Health for eligibility and funding of the Derby Water Storage Tank Project and sign such applications and any other documents which may be necessary or desirable to apply

for eligibility of and to apply for and obtain financial assistance for the Derby Water Storage Tank Project from the State's Drinking Water Fund Program and that any such action taken prior hereto is hereby ratified and confirmed; and

BE IT FURTHER RESOLVED, that the Chairperson or Vice Chairperson and President/Chief Executive Officer or Vice President and Chief Financial Officer be authorized (i) to issue, sell and deliver the PLO in a total amount not to exceed $5,100,000, and (ii) to determine the principal amount, date, date of maturity, interest rate, form and other details of the PLO, pursuant to the Act and the General Bond Resolution or any other provisions of law thereto enabling; and

BE IT FURTHER RESOLVED, that the Authority hereby approves the Supplemental Resolution authorizing the issuance of the PLO substantially in the form attached hereto as Exhibit A, with such changes, omissions, insertions and revisions as the Chairperson or Vice Chairperson and President/Chief Executive Officer or Vice President and Chief Financial Officer shall deem advisable and which shall be as set forth in one or more Certificates of Determination attached thereto: and

BE IT FURTHER RESOLVED, that for the purposes of providing to the Authority the loan and grant from the State, the Authority hereby approves the Loan Agreement substantially in the form as the President/Chief Executive Officer or Vice President and Chief Financial Officer shall deem advisable and the approval of the Authority shall conclusively be determined from any of their signatures thereon: and

BE IT FURTHER RESOLVED, that the Chairperson, Vice Chairperson, President/Chief Executive Officer and Vice President and Chief Financial Officer, or any one of them, are hereby authorized to execute and deliver such documents as may be necessary or desirable to issue and deliver the PLO, including but not limited to, the Loan Agreement, and to take such actions or to designate other officials or employees of the Authority to take such actions and execute such documents in connection with the issuance, sale and delivery of the PLO as are determined necessary or advisable and in the best interests of the Authority and that the execution of such documents shall be conclusive evidence of such determination: and

BE IT FURTHER RESOLVED, that the Chairperson, Vice Chairperson, President/Chief Executive Officer or Vice President and Chief Financial Officer, or any one of them are hereby authorized to accept such grants from the State for the Derby Water Storage Tank Project as set forth in the Loan Agreement and to apply the proceeds of the grant to the Derby Water Storage Tank Project, as applicable.

Ms. LaMarr seconded the motion, the Chair called for the vote:

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

Ms. Kowalski requested approval of the General Bond Resolutions, which would remove the 10% book depreciation cap currently in place to allow for flexibility. Ms. LaMarr moved for approval of the following resolutions:

WHEREAS, the South Central Connecticut Regional Water Authority (the "Authority") adopted its Water System Revenue Bond Resolution, General Bond Resolution, on July 31, 1980 (as amended and supplemented by the 1986 Supplemental Resolution adopted March 10 1986, the 1996 Supplemental Resolution adopted June 20, 1996, the 2000 Supplemental Resolution adopted June 21, 2000, the 2001 Supplemental Resolution adopted November 21, 2001, the 2003 Supplemental Resolution adopted May 6, 2003, the 2008 Supplemental Resolution adopted January 16, 2008, the 2010 Series A Supplemental Resolution adopted February 17, 2010, the 2010 Supplemental Resolution adding Covenants adopted August 23, 2010, the 2010 Supplemental Resolution on Depreciation Expense adopted August 23, 2010, the 2012 Supplemental Resolution adopted November 20, 2012, the 2013 Supplemental Resolution adopted December 19, 2013, the 2018 Supplemental Indenture to Amend the General Bond Resolution adopted August 16, 2018 and the 2020 Supplemental Resolution to Amend the General Bond Resolution, Adopted January 16, 2020) (the "General Bond Resolution"); and

WHEREAS, Section 901-(3) of the General Bond Resolution provides that the Authority may at any time adopt a resolution supplementing the General Bond Resolution to add to the limitations and restrictions in the [General Bond] Resolution, other limitations and restrictions thereafter to be observed by the Authority which are not contrary to or inconsistent with the [General Bond] Resolution as theretofore in effect; and

WHEREAS, the definition of Depreciation Expense in the General Bond Resolution defines Depreciation as that amount for the last fiscal year reported on the Authority's last audited Financial Statements under "Statements of Revenues, Expenses and Changes in Net Position" labeled Depreciation; and

WHEREAS, the General Bond Resolution provides that for each application to the RPB for an increase in rates, Depreciation Expense shall increase by no greater than the monthly equivalent of 10% of Depreciation for such period until the Depreciation Expense equals Depreciation; and

WHEREAS, the Authority has determined that for each application to the RPB for an increase in rates, it may desire to increase Depreciation Expense by more than the monthly equivalent of 10% of Depreciation and to continue to increase such Depreciation Expense until such Depreciation Expense equals more than the prior fiscal year Depreciation; and

WHEREAS, the Authority desires to amend the definition of Depreciation Expense to allow it to increase Depreciation Expense by more than the monthly equivalent of 10% of Depreciation until Depreciation equals more than the prior fiscal year Depreciation.

NOW THEREFORE BE IT RESOLVED by the South Central Connecticut Regional Water Authority that:

1. Section 102 of the General Bond Resolution is hereby amended to delete the definition of Depreciation Expense and replace it with the following definition:

   "Depreciation Expense" means, from time to time, that amount for the last fiscal year reported on the Authority's last audited Financial Statements under "Statements of Revenue, Expenses and Changes in Net Position" labeled Depreciation (the "Depreciation"), provided, however, that in connection with the issuance of the first Series of Bonds after the Twenty-fifth Series Bonds and the 2010 Series A Bonds were issued, Depreciation Expense shall be no less than $1,000,000 and no greater than 10% of the Depreciation and for each subsequent approved application to the RPB for an increase in rates to comply with Section 619 hereof (the "Approved Rate

Applications"), Depreciation Expense shall increase by no less than $55,555 per month for the time period covered in such Approved Rate Applications and no greater than the monthly equivalent of 110% of Depreciation for such period, until the Depreciation Expense equals 110% of Depreciation, provided, however, that such increase may be less than $55,555 per month if an increase of $55,555 per month would cause Depreciation Expense to exceed 110% of Depreciation. *(as added by 2010 Supplemental Resolution regarding Depreciation Expense, adopted August 23, 2010, 2020 Supplemental Resolution to amend the General Bond Resolution, adopted January 16, 2020 and 2023 Supplemental Resolution to amend the General Bond Resolution, adopted December 21, 2023.)*

2. Capitalized terms used herein and not otherwise defined shall have the definitions as set forth in the General Bond Resolution.

3. This Supplemental Resolution shall be effective upon the filing with the Trustee (a) consent of the Credit Facility Provider, (b) a copy of this Supplemental Resolution certified by an Authorized Officer and (c) a Counsel's Opinion, all in accordance with Section 901 of the General Bond Resolution.

Authority members discussed the need for the proposed depreciation change to increase internally generated funds. Depreciation expense included in rates is still well below book depreciation. As an example, this change may be used when RWA's pension plans are "fully funded" as this will be an opportunity to increase depreciation, without a rate impact. This would result in an increase to the internally generated funds available for the construction fund. Approval of the resolution would ultimately position the RWA for the near and long term with the ability to further increase internally generated funds available for the construction fund, lowering debt and debt financing requirements.

After discussion, Mr. Ricozzi seconded the motion, the Chair called for the vote:

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

The Chair stated it would be appropriate to elect Authority officers, including the board Chair, for the 2024 calendar year. Ms. Sack moved for adoption of the following resolutions:

RESOLVED, that Mr. Borowy, be re-elected as Chairman for a two-year term effective January 1, 2024, and until a successor is elected and has qualified; and

RESOLVED, that Mr. Curseaden, be re-elected as Vice Chairman for a one-year term effective January 1, 2024, and until a successor is elected and has qualified; and

FURTHER RESOLVED, that Ms. LaMarr, be re-elected as Secretary/Treasurer for a one-year term effective January 1, 2024, and until a successor is elected and has qualified.

Mr. Ricozzi seconded the motion, the Chair called for the vote:

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

Authority members reported on recent Representative Policy Board ("RPB") committee meetings and assignments were made for the first quarter 2024 RPB Committee meetings.

Mr. Curseaden reported on the meeting of the Joint Committee for Enabling Legislation ("Joint Committee") that took place earlier in the week. The Committee met to discuss comments recommended by RPB committee members. The Authority, RPB and management were in agreement with the proposed changes and the Committee was able to reach a consensus to increase the Authority board from five to seven members and implement term limits to four consecutive terms. After discussion, Mr. Curseaden noted that the Committee voted to forward the proposed changes to the enabling legislation to the RPB. He moved for approval of the following resolutions for approval to forward the proposed changes to the legislature for its 2024 session and recommendation to the RPB in support of the modifications as discussed at the RPB Committee meetings and at the Joint Committee meeting:

> **WHEREAS,** on November 30, 2023 the Joint Committee on Enabling Legislation ("Joint Committee") met at a special meeting to review and discuss proposed changes to the enabling legislation of the South Central Connecticut Regional Water Authority ("Authority or RWA"), which included technical corrections, spelling, critical amendments, and various other updates, where it was determined that members of the Authority, members of the RPB, and management would work together on the proposed changes, and that this topic would be on the December meeting agenda for each RPB Committee; and
>
> **WHEREAS,** members of the RPB, members of the Authority, and management worked together to discuss and refine proposed amendments; and
>
> **WHEREAS,** on December 20, 2023, the Joint Committee met at a special meeting to review comments and input from the December RPB committee meetings; and after a thorough review of the updated proposed changes, the Joint Committee voted to recommend the changes to the RPB at its December 21, 2023 regular meeting; and
>
> **WHEREAS,** the RPB has reviewed the proposed changes to the enabling legislation, but has no other statutory obligations or authority; and
>
> **WHEREAS,** at its meeting on December 21, 2023, the RPB consensus regarding the proposed changes to the RWA's enabling legislation is that they are reasonable and supported, and voted in favor of the proposed changes for submission by the RWA to the legislature for the 2024 session.
>
> **NOW THEREFORE BE IT:**
>
> **RESOLVED**, that the proposed amendments to the South Central Connecticut Regional Water Authority's enabling legislation attached hereto as Exhibit A are hereby approved; and:
>
> **RESOLVED FURTHER**, that management is hereby authorized to take such actions in connection with the proposed legislative amendments that are determined to be necessary or advisable, and in the best interest of the Authority provided that any such actions do not fundamentally alter the overall intent of the proposal.

Authority members discussed effective dates, term requirements for new members, and municipal outreach.

Mr. Ricozzi stated that comments suggested by Atty. Donofrio, Office of Consumer Affairs, and the Authority, RPB, and management's willingness to consider his suggestions assisted with the consensus in support of the proposed changes.

Ms. LaMarr seconded the motion. The Chair called for the vote:

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

At 2:28 p.m., Mr. Moran and Ms. Dolan entered the meeting and Mr. Levine withdrew from the meeting.

Mr. Bingaman, the RWA's President & Chief Executive Officer, introduced Mr. Moran and Ms. Dolan from Moran Consulting, Inc., who provided an update on Delivering Service Excellence Training & Initiative at the RWA, a training program designed to set new standards, improve internal and external interaction, and improve the culture of the organization for high performing teams, which included:

- Alignment with RWA's Five-Year Strategic Plan
- 9 Elements of a High-Performance Service Culture
- Six Point Service Plan Ties to CEO's Vision & Strategic Plan
- Key Takeaways from Employee Survey
- Next Steps and Expected Outcomes
- FY 2024 Global Metrics

At 3:30 p.m., Mr. Moran and Ms. Dolan withdrew from the meeting.

Mr. Singh also provided an RWAY/Customer Information System Update, which included:

- Schedule and Cost Impact
- Key Milestones and Focus Areas
- Next Steps

Mr. Bingaman, the RWA's President & Chief Executive Officer, reported on the progress of the RWA's partnership with the Yale Center for Innovation to create a water innovation center. He stated that earlier in the month he met with a professor involved in the Center for Innovation, and the director of corporate relations and strategy, to discuss working together in the water industry to develop technologies that deal with emerging contaminants and regulations such as PFAS, invasive species, and alternative energy.

At 4:01 p.m., on motion made by Mr. Curseaden, and seconded by Mr. Ricozzi, the Authority voted to go into executive session to discuss matters pursuant to C.G.S. 1-200(6)(E) for matters covered by Section 1-210(b)(9), pertaining to strategy or negotiations with respect to collective bargaining. Present in executive session were Authority members, Messrs. Bingaman, Hill, Lakshminarayanan, Singh, and Mss. Kowalski, Calo and Slubowski.

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

At 4:18 p.m., the Authority reconvened. No votes were taken in, or as a result of, executive session. On motion made Ms. LaMarr, and seconded by Mr. Ricozzi, the Authority voted to recess the meeting to meet as the Commercial Business Committee.

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

At 5:18 p.m., the Authority reconvened. On motion made by Mr. Curseaden, and seconded by Ms. LaMarr, the Authority voted to adjourn the meeting.

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

Respectfully submitted,

____

Catherine E. LaMarr, Secretary

Attachment:

1. Exhibit A, Changes to the RWA's Enabling Legislation for submission to the legislative session in 2024.

Regional Water Authority

South Central Connecticut Regional Water Authority
90 Sargent Drive, New Haven, Connecticut 06511-5966 203.562.4020
http://www.rwater.com

MEMORANDUM

TO: David J. Borowy
Kevin J. Curseaden
Catherine E. LaMarr
Mario Ricozzi
Suzanne C. Sack

FROM: Rochelle Kowalski
Vice President & Chief Financial Officer

DATE: January 19, 2024

SUBJECT: Capital budget authorization request for February 2024

Attached for your meeting on January 25, 2024, is a copy of the resolution authorizing expenditures against the capital improvement budget for February 2024. The amount of the requested authorization, for funds held by the trustee, is $4,700,000.

This would result in projected expenditures through February 2024 of $29,312,096 or 51% of the total 2024 fiscal year capital budget, including State and Redevelopment.

Attachment

RESOLVED That the Vice President & Chief Financial Officer is authorized to submit to the Trustee one or more requisitions in an aggregate amount not to exceed $4,700,000 for the month of February 2024 for transfer from the Construction Fund for capital expenditures. Each such requisition shall contain or be accompanied by a certificate identifying such requisition and stating that the amount to be withdrawn pursuant to such requisition is a proper charge to the Construction Fund. Such requisitions are approved notwithstanding the fact that amounts to be withdrawn for a particular project may exceed the amount indicated for such month and year in the current Capital Improvement Budget but will not cause the aggregate amount budgeted for fiscal year 2024 for all Capital Improvement Projects to be exceeded. In the absence of the Vice President & Chief Financial Officer, the Controller is authorized to sign in her place.

South Central Connecticut Regional Water Authority
90 Sargent Drive, New Haven, Connecticut 06511-5966 203-562-4020
http://www.rwater.com

TO:

David J. Borowy
Kevin J. Curseaden
Catherine E. LaMarr
Mario Ricozzi
Suzanne C. Sack

FROM: Rochelle Kowalski

DATE: January 19, 2024

SUBJECT: Capital Budget Transfers

The status of all capital projects is reviewed on a monthly basis. In an effort to obtain efficiencies in our capital program, any anticipated unspent funds are reallocated to support reprioritized projects or existing projects. Below is a summary of the attached capital budget transfers and amendments.

	Available Funds	Reallocation of Project/Funds
Lake Whitney Dam & Spillway Improvements	$150,000	West River Water Treatment Plant Rooftop Air Handling Unit
Lake Whitney Dam & Spillway Improvements	$105,000	West River Water Treatment Plant Building Management System
Beach Avenue Right of Way, East Haven	$230,000	Good of Service Pipe
Country Lane, Milford, Capital Pipe Replacement	$30,000	Good of Service Pipe

CAPITAL BUDGET AMENDMENT REQUEST

		Type	Log	Mo/Yr
Request Date:	1/11/2024			
Requesting Division:	Operations	B2	24-19	Jan/24
Requested By:	Charles Gaura			

Transfer From:

Account Number:			
Project Description:	Lake Whitney Dam & Spillway Improvements		
A) Original Budget		$	1,500,000
B) Total Previous Transfers (In or Out)		$	370,000
C) This Transfer		$	150,000
D) Revised Budget (A+/-B-C)		$	980,000
E) Estimated Project Costs		$	600,000
F) Remaining Funds Available for Transfer, if any (D-E)		$	380,000

Explanation why funds are available:
The project will be underspent in FY 2024 related to the time required to perform necessary evaluations related to upstream and downstream construction as well as risk mitigation measures using Early Contractor Involvement.

Transfer To:

Account Number:	To Be Created		
Project Description:	WRWTP Rooftop Air Handling Unit		
A) Original Budget		$	-
B) Previous Transfers (In or Out)		$	-
C) Revised Budget (A+/-B)		$	-
D) Amount to be Transferred		$	150,000
E) Proposed Revised Budget (C+D)		$	150,000

Explanation why funds are needed:
This amendment will fund the replacement of an existing rooftop air handling unit at the West River Water Treatment Plant. This unit is 20 years old, and has exceeded its expected life cycle. This unit has experienced several refrigerant leaks. Replacement will make heating and cooling more efficient. This particular air handler serves the laboratory area at the plant, where temperatures and humidity can effect lab analysis. Total cost for replacement is estimated at $150,000.

Approvals As Required By Type	Signature	Date
1) Requesting Vice President/Director	***approved at CMC***	***1/11/2024***
2) Donor Vice President/Director	***approved at CMC***	***1/11/2024***
3) Vice President - Finance & CFO	***approved at CMC***	***1/11/2024***
4) Chief Executive Officer	Larry Bingaman	1/18/2024
5) Authority Members	Copy of minutes attached if required	

Rev 6/02

CAPITAL BUDGET AMENDMENT REQUEST

		Type	Log	Mo/Yr
Request Date:	1/11/2024			
Requesting Division:	Operations	B2	24-20	Jan/24
Requested By:	Charles Gaura			

Transfer From:

Account Number:		
Project Description:	Lake Whitney Dam & Spillway Improvements	
A) Original Budget	$	1,500,000
B) Total Previous Transfers (In or Out)	$	520,000
C) This Transfer	$	105,000
D) Revised Budget (A+/-B-C)	$	875,000
E) Estimated Project Costs	$	600,000
F) Remaining Funds Available for Transfer, if any (D-E)	$	275,000

Explanation why funds are available:

The project will be underspent in FY 2024 related to the time required to perform necessary evaluations related to upstream and downstream construction as well as risk mitigation measures using Early Contractor Involvement.

Transfer To:

Account Number:	To Be Created	
Project Description:	WRWTP Building Management System	
A) Original Budget	$	-
B) Previous Transfers (In or Out)	$	-
C) Revised Budget (A+/-B)	$	-
D) Amount to be Transferred	$	105,000
E) Proposed Revised Budget (C+D)	$	105,000

Explanation why funds are needed:

This amendment will fund the installation of a building management system (BMS) at the West River Water Treatment Plant, which will allow Facilities Management personnel to remotely monitor and control the function of the HVAC system at the plant. Facilities will be able to make adjustments to the system and determine the need for a service call without having to travel to the plant. This installation will bring West River Water Treatment Plant in line with the other three surface water plants, which have building monitoring systems. Total cost for the project is estimated at $105,000.

Approvals As Required By Type	Signature	Date
1) Requesting Vice President/Director	*approved at CMC*	*1/11/2024*
2) Donor Vice President/Director	*approved at CMC*	*1/11/2024*
3) Vice President - Finance & CFO	*approved at CMC*	*1/11/2024*
4) Chief Executive Officer	Larry Bingaman	1/18/2024
5) Authority Members	Copy of minutes attached if required	

Rev 6/02

CAPITAL BUDGET AMENDMENT REQUEST

Request Date:	1/11/2024	Type Log Mo/Yr
Requesting Division:	Operations	B2 24-20 Jan/24
Requested By:	Charles Gaura	

Transfer From:

Account Number:		
Project Description:	Lake Whitney Dam & Spillway Improvements	
A) Original Budget	$	1,500,000
B) Total Previous Transfers (In or Out)	$	520,000
C) This Transfer	$	105,000
D) Revised Budget (A+/-B-C)	$	875,000
E) Estimated Project Costs	$	600,000
F) Remaining Funds Available for Transfer, if any (D-E)	$	275,000

Explanation why funds are available:

The project will be underspent in FY 2024 related to the time required to perform necessary evaluations related to upstream and downstream construction as well as risk mitigation measures using Early Contractor Involvement.

Transfer To:

Account Number:	To Be Created	
Project Description:	WRWTP Building Management System	
A) Original Budget	$	-
B) Previous Transfers (In or Out)	$	-
C) Revised Budget (A+/-B)	$	-
D) Amount to be Transferred	$	105,000
E) Proposed Revised Budget (C+D)	$	105,000

Explanation why funds are needed:

This amendment will fund the installation of a building management system (BMS) at the West River Water Treatment Plant, which will allow Facilities Management personnel to remotely monitor and control the function of the HVAC system at the plant. Facilities will be able to make adjustments to the system and determine the need for a service call without having to travel to the plant. This installation will bring West River Water Treatment Plant in line with the other three surface water plants, which have building monitoring systems. Total cost for the project is estimated at $105,000.

Approvals As Required By Type	Signature	Date
1) Requesting Vice President/Director	***approved at CMC***	**1/11/2024**
2) Donor Vice President/Director	***approved at CMC***	**1/11/2024**
3) Vice President - Finance & CFO	***approved at CMC***	**1/11/2024**
4) Chief Executive Officer	Larry Bingaman	1/18/2024
5) Authority Members	Copy of minutes attached if required	

Rev 6/02

CAPITAL BUDGET AMENDMENT REQUEST

Request Date:	1/11/2024	Type	Log	Mo/Yr
Requesting Division:	Engineering & Environmental Services	B2	24-21	Jan/24
Requested By:	Thomas Adamo			

Transfer From:

Account Number:		
Project Description:	Beach Avenue Right-of-Way, East Haven	
A) Original Budget	$	-
B) Total Previous Transfers (In or Out)	$	243,500
C) This Transfer	$	230,000
D) Revised Budget (A+/-B-C)	$	13,500
E) Estimated Project Costs	$	6,000
F) Remaining Funds Available for Transfer, if any (D-E)	$	7,500

Explanation why funds are available:

Project progress has been on hold as a result of delays related to obtaining the necessary Army Corps of Engineers permitting. Project has been rebudgeted for FY 2025.

Transfer To:

Account Number:	001-000-107144-51XXXX	
Project Description:	Good of Service Pipe	
A) Original Budget	$	200,000
B) Previous Transfers (In or Out)	$	-
C) Revised Budget (A+/-B)	$	200,000
D) Amount to be Transferred	$	230,000
E) Proposed Revised Budget (C+D)	$	430,000

Explanation why funds are needed:

Amendment 1 of 2: This amendment will fund the installation of additional good of service pipe. This category of pipe is installed to eliminate dead ends in the distribution system to improve water quality. It is typically installed in conjunction with paid-for developer pipe, but is also installed when a dead end within the distribution system is identified. Installations are planned for Carrington Street in Hamden, Smith Farm Road and Salemme Lane in Orange, and Flint Street in New Haven. These projects are being accelerated from future budget years. Total cost estimated with current good of service installations is $460,000.

Approvals As Required By Type	Signature	Date
1) Requesting Vice President/Director	***approved at CMC***	***1/11/2024***
2) Donor Vice President/Director	***approved at CMC***	***1/11/2024***
3) Vice President - Finance & CFO	***approved at CMC***	***1/11/2024***
4) Chief Executive Officer	Larry Bingaman	1/18/2024
5) Authority Members	Copy of minutes attached if required	

Rev 6/02

CAPITAL BUDGET AMENDMENT REQUEST

Request Date:	1/11/2024	Type	Log	Mo/Yr
Requesting Division:	Engineering & Environmental Services	B1	24-22	Jan/24
Requested By:	Thomas Adamo			

Transfer From:
Account Number:

Project Description:	Country Lane, Milford - Capital Pipe Replacement	
A) Original Budget	$	612,433
B) Total Previous Transfers (In or Out)	$	-
C) This Transfer	$	30,000
D) Revised Budget (A+/-B-C)	$	582,433
E) Estimated Project Costs	$	491,000
F) Remaining Funds Available for Transfer, if any (D-E)	$	91,433

Explanation why funds are available:
Project was completed under budget.

Transfer To:

Account Number:	001-000-107144-51XXXX	
Project Description:	Good of Service Pipe	
A) Original Budget	$	200,000
B) Previous Transfers (In or Out)	$	230,000
C) Revised Budget (A+/-B)	$	430,000
D) Amount to be Transferred	$	30,000
E) Proposed Revised Budget (C+D)	$	460,000

Explanation why funds are needed:
Amendment 2 of 2: This amendment will fund the installation of additional good of service pipe. This category of pipe is installed to eliminate dead ends in the distribution system to improve water quality. It is typically installed in conjunction with paid-for developer pipe, but is also installed when a dead end within the distribution system is identified. Installations are planned for Carrington Street in Hamden, Smith Farm Road and Salemme Lane in Orange, and Flint Street in New Haven. These projects are being accelerated from future budget years. Total cost estimated with current good of service installations is $460,000.

Approvals As Required By Type	Signature	Date
1) Requesting Vice President/Director	***approved at CMC***	***1/11/2024***
2) Donor Vice President/Director	***approved at CMC***	***1/11/2024***
3) Vice President - Finance & CFO	***approved at CMC***	***1/11/2024***
4) Chief Executive Officer	Larry Bingaman	1/18/2024
5) Authority Members	Copy of minutes attached if required	

Rev 6/02

REGIONAL WATER AUTHORITY

REVIEW OF FINANCIAL DATA
December 31, 2023 (FY 2024)

STATEMENT OF REVENUES, EXPENSES AND CHANGES IN NET POSITION

Operating Revenues
FY24 revenue for water, including wholesale and fire service, is under budget by $2,450k (approx. 3.0%).
Metered water revenue is under budget by $2,417k (approx. 3.3%) primarily due to lower consumption.

Total net other revenue is $737k over budget primarily due to other water revenues being higher and other proprietary expense being lower than budget.

Operating Expenses
Operating and Maintenance Expenses are currently under budget due to the following:

Payroll is under budget primarily due to head count under runs, partially offset by O&M/non-O&M mix.	$	(228,000)
Employee Benefits are under budget due to timing.		(63,000)
Administrative Building is under budget due to timing.		(56,000)
Transportation is under budget primarily due to lower body repairs and gasoline and diesel fuel expense.		(135,000)
Pump Power is under budget primarily due to weather related lower production.		(267,000)
Chemicals Expense is over budget primarily due to timing.		87,000
Road Repairs are under budget due to lower than anticipated costs and timing.		(136,000)
Postage is under budget primarily due to timing.		(257,000)
Collection Expense is under budget due to lower year-to-date bank fees and collection related expenses, including higher than budgeted rebilling.		(294,000)
Business Improvement is under budget primarily due to timing.		(208,000)
Outside Services is running under budget in multiple areas.		(579,000)
Insurance is over budget due to reserve requirements and timing.		100,000
Training and continued education is under budget due to the timing of the service excellence training, lower tuition reimbursement, and other net under runs.		(133,000)
Central Lab/Water Quality is under budget primarily due to the mix between internal and outside lab services.		(73,000)
Info. Technology Licensing & Maintenance Fees are under budget primarily due to timing.		(339,000)
Maintenance & Repairs are under budget primarily related to water treatment and engineering.		(290,000)
All Other		(192,000)
		(3,063,000)

Interest Income
Interest Income is above budget primarily due to higher investment earnings.

PROJECTED MAINTENANCE TEST
The projected coverage is 1.17 with no shortfall.

REGIONAL WATER AUTHORITY
STATEMENTS OF REVENUES, EXPENSES AND CHANGES IN NET POSITION
FOR THE MONTHS ENDING DECEMBER 31, 2023

	FY 2023 Actual	FY 2024 Budget	FY 2024 Actual	(Under)Over Budget
Operating revenues				
Metered water revenues	$ 70,298	$ 72,553	$ 70,136	$ (2,417)
Fire service	7,571	7,933	7,970	37
Wholesale	845	675	605	(70)
Other revenue - water	2,377	2,282	2,755	473
Other revenue - proprietary	5,557	6,732	6,777	45
Total operating revenues	86,647	90,175	88,242	(1,933)
Operating expenses				
Operating and maintenance expense	33,329	40,685	37,622	(3,063)
Expense associated with other revenue - water	1,273	1,251	1,290	39
Expense associated with other revenue - proprietary	2,426	2,545	2,287	(258)
Provision for uncollectible accounts	99	350	0	(350)
Depreciation	13,540	14,175	14,177	2
Payment in lieu of taxes	5,043	5,359	5,288	(70)
Amortization Pension Outflows/Inflows	1,294	793	793	0
Amortization OPEB Outflows/Inflows	(349)	(525)	(525)	0
Total operating expenses	56,654	64,633	60,932	(3,701)
Operating income	29,993	25,542	27,310	1,769
Nonoperating income and (expense)				
Interest income	3,817	4,392	6,382	1,990
(Loss) Gain on disposal of assets		(875)	(16)	859
Realized and unrealized (losses) gains on investments			-	-
Interest expense	(13,031)	(12,932)	(12,850)	82
Amortization of bond discount, premium, issuance cost and deferred losses	1,821	1,675	1,681	6
Amortization of Goodwill			-	-
Intergovernmental revenue	490		441	441
Contributions to related entities			(2,095)	(2,095)
Total nonoperating income and (expense) before captial contributions	(6,904)	(7,741)	(6,457)	1,284
Income (expense) before contributions	23,089	$ 17,801	20,853	$ 3,053
Capital contributions	610		586	
Change in net assets	23,700		21,438	
Total net assets - beginning of fiscal year	251,989		283,445	
Total net assets - end of reporting month	$ 275,688		$ 304,884	

FY 2024 MAINTENANCE TEST (Budget vs. Projected)	Budget @114%	Projected @114%	(Under)Over @114%
Revenue Collected:			
Water sales	129,136	126,836	(2,300)
Interest Income	3,371	5,000	1,629
BABs Subsidy	657	657	-
Other Net	8,468	8,768	300
Common Non-Core	(375)	(375)	-
Total	141,257	140,886	(371)
Less:			
Operating and maintenance expenses	(69,318)	(68,487)	831
Depreciation	(8,875)	(8,875)	-
PILOT (A)	(9,100)	(8,900)	200
Net Avail for Debt Service (B)	$ 53,964	$ 54,624	$ 660
Debt Service Payments (C)	$ 47,207	46,607	$ (600)
Debt Service @ 114% (D)	$ 53,816	53,132	$ (684)
Difference (B-D)	$ 148	$ 1,492	
RSF, Growth and/or General Fund (D)	-		
Coverage	114%	117%	

REGIONAL WATER AUTHORITY
OPERATING AND MAINTENANCE EXPENSE
DECEMBER 31, 2023

		PERIOD ENDING DECEMBER 31, 2023			
		FY 2023 Actual	**FY 2024 Budget**	**FY 2024 Actual**	**(Under) Over**
1	Payroll	$ 13,780	$ 14,824	$ 14,596	$ (228)
2	Employee Benefits	3,760	4,500	4,437	(63)
	Pension Contributions	1,555	2,251	2,251	0
3	Administrative Building	561	626	570	(56)
4	General & Administrative	897	980	963	(17)
5	Transportation	391	550	415	(135)
6	Tools & Stores	184	206	210	4
7	Utilities & Fuel	856	967	947	(20)
8	Material From Inventory	140	196	149	(47)
9	Pump Power Purchased	1,667	1,877	1,610	(267)
10	Chemicals	1,636	2,248	2,335	87
11	Road Repairs	164	216	80	(136)
14	Postage	147	291	34	(257)
15	Printing & Forms	24	46	27	(19)
17	Collection Expense	516	841	547	(294)
18	Business Improvement	33	370	162	(208)
19	Public/Customer Information	116	138	127	(11)
20	Outside Services	1,636	3,000	2,421	(579)
21	Insurance Premiums	875	985	1,085	100
22	Worker's Compensation, pre-Churchill	(3)	29	19	(9)
23	Damages	48	41	35	(6)
24	Training & Cont. Education	116	334	201	(133)
25	Authority Fees	81	99	75	(24)
26	Consumer Counsel	27	35	22	(13)
27	RPB Fees	62	99	60	(39)
28	Organizational Dues	120	74	84	10
29	Donations	13	19	24	5
34	Central Lab/Water Quality	176	243	170	(73)
40	Environmental Affairs	44	61	52	(9)
44	Info. Technology Licensing & Maintenance Fees	1,504	2,123	1,784	(339)
45	Maintenance and Repairs	2,043	2,281	1,991	(290)
46	Regulatory Asset Amortization	160	135	136	1
		$ 33,329	$ 40,685	$ 37,622	$ (3,063)

South Central Regional Water Authority

Analysis of Accounts Receivable ("A/R")
($000 omitted)

Total Accounts Receivable Aging (in days)

	Dec 2023	Nov 2023	Oct 2023	Sept 2023	Aug 2023	Jul 2023	June 2023	May 2023	April 2023	March 2023	Feb 2023	Jan 2023	Dec 2022
Under 30	$ 6,728	$ 7,585	$ 6,745	$ 8,369	$ 6,504	$ 8,725	$ 7,293	$ 5,586	$ 6,922	$ 4,954	$ 5,926	$ 6,550	$ 6,158
31-60	1,976	1,888	1,591	1,568	1,857	1,823	1,183	1,498	1,513	1,615	1,865	1,621	1,910
61-90	935	775	620	783	592	543	650	498	703	786	1,062	1,070	1,053
91-180	1,168	1,062	1,085	1,120	1,060	1,162	1,085	1,171	1,111	1,301	1,583	1,558	1,516
181-360	1,208	1,272	1,320	1,338	1,453	1,393	1,295	1,452	1,458	1,591	1,680	1,890	1,828
More than 1 year	4,462	4,560	4,787	4,815	4,845	4,908	4,682	4,676	4,864	5,036	5,263	5,239	5,085
Sub Total	16,477	17,142	16,148	17,993	16,311	18,554	16,188	14,881	16,571	15,283	17,379	17,928	17,550
Interest due	1,691	1,696	1,703	1,690	1,701	1,681	1,633	1,618	1,627	1,668	1,699	1,674	1,651
Total Gross A/R plus interest	$ 18,168	$ 18,838	$ 17,851	$ 19,683	$ 18,012	$ 20,235	$ 17,821	$ 16,499	$ 18,198	$ 16,951	$ 19,078	$ 19,602	$ 19,201

Aged Accounts Receivable Focus of Collection Efforts

Greater than 60 days:	Dec 2023	Nov 2023	Oct 2023	Sept 2023	Aug 2023	Jul 2023	June 2023	May 2023	April 2023	March 2023	Feb 2023	Jan 2023	Dec 2022
A/R	$ 9,249	$ 9,141	$ 9,270	$ 9,498	$ 9,380	$ 9,431	$ 9,116	$ 9,154	$ 9,509	$ 10,121	$ 11,020	$ 11,172	$ 10,864
Less: Multi-Tenants	(2,061)	(1,752)	(2,106)	(2,415)	(2,398)	(2,412)	(2,035)	(2,435)	(2,868)	(2,705)	(2,806)	(2,923)	(2,831)
Receiverships***	(2,089)	(2,186)	(2,135)	(1,996)	(1,968)	(2,004)	(1,919)	(1,834)	(1,941)	(1,932)	(2,013)	(1,996)	(1,981)
Liens	(1,740)	(1,512)	(1,423)	(1,357)	(1,446)	(1,457)	(1,423)	(1,583)	(1,703)	(1,778)	(1,793)	(1,835)	(1,867)
Total	$ 3,359	$ 3,691	$ 3,606	$ 3,730	$ 3,568	$ 3,558	$ 3,739	$ 3,302	$ 2,997	$ 3,706	$ 4,408	$ 4,418	$ 4,185
	36%	40%	39%	39%	38%	38%	41%	36%	32%	37%	40%	40%	39%

Collection Efforts

	Dec 2023	Nov 2023	Oct 2023	Sept 2023	Aug 2023	Jul 2023	June 2023	May 2023	April 2023	March 2023	Feb 2023	Jan 2023	Dec 2022
Shuts *	$ 70	$ 267	$ 118	$ 68	$ 55	$ 75	$ 65	$ 115	$ 95	$ 167	$ 48	$ 51	$ 61
Red Tags **	-	-	-	3	5	3	17	-	-	-	-	-	-
Receivers	41	49	53	72	33	24	33	47	60	48	71	2	44
Top 100 Collection Calls	103	50	-	7	28	29	20	5	21	41	25	216	-
Other [1]	917	729	1,152	834	865	940	993	1,177	1,507	1,517	1,429	1,346	1,550
Total	$ 1,131	$ 1,095	$ 1,323	$ 984	$ 986	$ 1,071	$ 1,128	$ 1,344	$ 1,683	$ 1,773	$ 1,573	$ 1,615	$ 1,655
* Number of shuts	197	267	377	170	129	199	134	328	212	292	106	134	150
** Number of Red tags	-	-	-	9	22	15	28	-			-	-	-

South Central Connecticut Regional Water Authority
90 Sargent Drive, New Haven, Connecticut 06511-5966 203-562-4020
http://www.rwater.com

TO: David J. Borowy
Kevin J. Curseaden
Catherine E. LaMarr
Mario Ricozzi
Suzanne C. Sack

FROM: Rochelle Kowalski

DATE: January 19, 2024

SUBJECT: Capital Budget Transfer – Type B3 Amendments

As prescribed in the Capital Budget Manual, Exhibit 12, Capital Budget Amendment Procedure, Part 1, Type B Amendment, Item 3, Authority approval is required for a transfer of funds from an existing capital account to either another capital account or a newly created capital account if the value is greater than $500,000.

Lead Service Line Replacements: This amendment will fund the acceleration of vacuum excavation work required to complete the RWA's lead service line inventory. Amendment No. 24-23 will transfer $1,250,000 from the from the Lake Gaillard Water Treatment Plant HVAC Improvements project account to the Lead Service Line Replacement project account.

The following resolution will be necessary to carry out the foregoing:

Resolved: that the Authority approves the transfer of $1,250,000 from the Lake Gaillard Water Treatment Plant HVAC Improvements capital budget account to the Lead Service Line Replacement capital budget account.

Storage Tank DBP Compliance: Bids received to install THM (trihalomethane) removal and booster chlorination systems at the Ford Street Tanks in Milford were higher than anticipated. Amendment No. 24-24 will transfer $750,000 from the Lake Gaillard Water Treatment Plant HVAC Improvements project account to the Storage Tank DPB Compliance project account to facilitate award of the bid.

The following resolution will be necessary to carry out the foregoing:

Resolved: that the Authority approves the transfer of $750,000 from the Lake Gaillard Water Treatment Plant HVAC Improvements capital budget account to Storage Tank DBP Compliance capital budget account.

CAPITAL BUDGET AMENDMENT REQUEST

Request Date:	01/11/2024	Type	Log	Mo/Yr
Requesting Division:	Engineering & Environmental Services	B3	24-23	Jan/24
Requested By:	Sunny Lakshminarayanan			

Transfer From:

Account Number:	001-000-107132-116121	
Project Description:	Improvements	
A) Original Budget	$	2,860,000
B) Total Previous Transfers (In or Out)	$	400,000
C) This Transfer	$	1,250,000
D) Revised Budget (A+/-B-C)	$	1,210,000
E) Estimated Project Costs	$	100,000
F) Remaining Funds Available for Transfer, if any (D-E)	$	1,110,000

Explanation why funds are available:

Due to delays related to CDS funding (e.g., approval related to rquired Buy America, Build America [BABA] waivers), anticipated project schedule was severely impacted. Project has been advertised for bid, and will continue in FY 2025.

Transfer To:

Account Number:	001-000-107143-000057	
Project Description:	Lead Service Line Replacements	
A) Original Budget	$	750,000
B) Previous Transfers (In or Out)	$	-
C) Revised Budget (A+/-B)	$	750,000
D) Amount to be Transferred	$	1,250,000
E) Proposed Revised Budget (C+D)	$	2,000,000

Explanation why funds are needed:

This amendment will fund the acceleration of vacuum excavation work required to complete the RWA's lead service line inventory. Based on recently issued deadlines from the EPA, acceleration of this work is necessary to meet the October 2024 submission deadline for lead service line inventories.

Approvals As Required By Type	Signature	Date
1) Requesting Vice President/Director	*approved at CMC*	*01/11/2024*
2) Donor Vice President/Director	*approved at CMC*	*01/11/2024*
3) Vice President - Finance & CFO	*approved at CMC*	*01/11/2024*
4) Chief Executive Officer	*approved*	*01/15/2024*
5) Authority Members	Copy of minutes attached if required	

Rev 6/02

CAPITAL BUDGET AMENDMENT REQUEST

Request Date:	01/11/2024	Type	Log	Mo/Yr
Requesting Division:	Operations	B3	24-24	Jan/24
Requested By:	Jim Hill			

Transfer From:

Account Number:	001-000-107132-116121	
Project Description:	Improvements	
A) Original Budget	$	2,860,000
B) Total Previous Transfers (In or Out)	$	1,650,000
C) This Transfer	$	750,000
D) Revised Budget (A+/-B-C)	$	460,000
E) Estimated Project Costs	$	100,000
F) Remaining Funds Available for Transfer, if any (D-E)	$	360,000

Explanation why funds are available:

Due to delays related to CDS funding (e.g., approval related to rquired Buy America, Build America [BABA] waivers), anticipated project schedule was severely impacted. Project has been advertised for bid, and will continue in FY 2025.

Transfer To:

Account Number:	001-000-107142-000346	
Project Description:	Storage Tank DBP Compliance	
A) Original Budget	$	200,000
B) Previous Transfers (In or Out)	$	-
C) Revised Budget (A+/-B)	$	200,000
D) Amount to be Transferred	$	750,000
E) Proposed Revised Budget (C+D)	$	950,000

Explanation why funds are needed:

This amendment will fund the installation of THM (trihalomethane) removal and booster chlorination systems at the Ford Street Tanks in Milford. This is an on-going initiative to reduce distribution by-products and meet state regulatory limits through the installation of these systems in our water storage tanks that are not currently equipped with them. Bids for the work at the Ford Street Tanks were received in December and were significantly higher than anticipated. An additional $750,000 is required to award the contract and complete the work.

Approvals As Required By Type	Signature	Date
1) Requesting Vice President/Director	*approved at CMC*	*01/11/2024*
2) Donor Vice President/Director	*approved at CMC*	*01/11/2024*
3) Vice President - Finance & CFO	*approved at CMC*	*01/11/2024*
4) Chief Executive Officer	*approved*	*01/15/2024*
5) Authority Members	Copy of minutes attached if required	

Rev 6/02

CIS/RWAY

Project Summary

High Level Timeline by kay activity

CIS/RWAY Project Health Indicators

Schedule	✓	Updated schedule: Completion M1 Q3 FY25
Capital Budget	✓	~$14.8M (B)
FY24 Spend	✓	~$3.6M
Scope	✓	+ Omni-Channel

Accomplishments

- Completed ETL2 (Extract Transform Load) and data validation
- Completed Integration Design Documents v0.8
- Completed UMAX Configuration v0.8 (less Paymentus)
- Kicked off development sprints
- Omnichannel design sessions kicked off 11/14
- Delivered initial UMAX Configuration (0.8) per PCDs
- **Aligned on updated project schedule**
- ETL 3 load Jan 5 provided critical data for:
  - SmartWorks development
  - BYOD training (reports and insights) - scheduled for Feb 6-7

Decisions, Risks & Issues

- Key Decisions
  - Commercial services self service solution to be developed post-go-live
  - live chat to begin post-go-live not in scope
- Key Risks – Mitigation Plans Underway
  - Assess overlap of resources for IST (Integration System Testing) and training
  - Integrations: providing adequate integration with SmartWorks for IST1
  - ITI component test schedule and development sprint progress
- Key Issues
  - Visibility into ITI development and component testing process
  - Project schedule ownership

Current Activities

- **Determine schedule and cost impact for potential Dec'24 Go-Live Plan**
- ITI Custom Product Development
- **ETL3 Defect Resolution**
- RWA Integration development
- WPCA notifications
- Final design phase tasks: letters, reports and notices; Data Migration documents

Next Steps: Development Phase

- Development of Modifications / Reports / Notices
- Component Testing
- Development of Integration (System) Test Cases
- Training Guide development
- Solution Acceptance

Legend:	✓	On Schedule	!	At Risk	X	Late

B=Budgeted; A=Actual

Regional Water Authority

Application to the Representative Policy Board for Approval of the Chemical Improvements at the Lake Whitney Water Treatment Plant Project

South Central Connecticut Regional Water Authority
January 25, 2024

Application for Approval to the Representative Policy Board of the Chemical Improvements at the Lake Whitney Water Treatment Plant Project

Table of Contents

1. Statement of Application

This application is presented by the South Central Connecticut Regional Water Authority (RWA) to the Representative Policy Board of the South Central Connecticut Regional Water District for approval of the Chemical Improvements at the Lake Whitney Water Treatment Plant Project (WTP). Section 19 of Special Act 77-98, as amended, requires the Representative Policy Board approval before the RWA commences any capital project that will cost more than $2 million. The proposed project will cost approximately $3.1 million.

The Lake Whitney WTP, located in Hamden, Connecticut, was design and constructed in 2004 The treatment plant treats an average 4 million gallons per day (MGD) of water and has a maximum permitted design flow of 15 MGD that is drawn from Lake Whitney. The Lake Whitney WTP is a critical source of water supply and treatment for the New Haven and surrounding areas.

The Lake Whitney WTP utilizes potassium permanganate as an oxidant for pretreatment and sodium hydroxide (caustic) for pH control to prevent corrosion and allow for the efficient use of other treatment chemicals. These systems are necessary to deliver a reliable and quality supply of water to our customers.

The original designed potassium permanganate system is not operational, and a temporary system has been constructed to meet the current manganese demands. Lake Whitney has seen higher manganese levels in the reservoir causing the potassium permanganate feed system to feed higher concentrations and stay online for longer durations than in the past. Improvement is needed to effectively manage the higher manganese levels and maintain compliance with regulatory standards.

The existing caustic system was part of the original treatment plant construction. One of the two bulk storage tanks is currently out of service due to a tank failure. This reduces the amount of chemical inventory storage, which results in partial and increased frequency of chemical deliveries. Hence, higher delivery costs are being borne as well as potential of overfilling the caustic bulk tank during chemical deliveries causes safety concerns. The existing caustic chemical feed lines are PVC and the RWA has standardized to replace them with stainless steel chemical feed lines on all caustic chemical feed systems. Utilizing stainless steel chemical feed lines has mitigated safety hazards for staff and reduced the number of leaks and corresponding repairs.

The goal of this project is to improve the reliability of plant operations and improve safety for plant operations.

Appendix A contains the 30% design drawings for this project.

This application will provide a description of the project, an explanation of why it is necessary, a discussion of the alternatives considered, and the estimated cost. The accuracy and completeness of this document is critical to the RPB’s ability to make an informed decision on behalf of the RWA’s customers and member communities. The RWA has engaged Tighe & Bond as the consulting engineer for providing engineering design and cost estimation.

2. Description of the Proposed Action

This project will include replacement of the potassium permanganate and caustic chemical feed systems. Each chemical replacement system includes bulk/mix tanks, day tanks, transfer pumps, metering pumps, piping, valves, and instrumentation. The project also includes building modifications necessary to facilitate installation of the new chemical feed systems such as the replacement of the potassium permanganate storage room door, masonry repairs around the door and tank installation efforts, fiberglass platforms and stairs, safety showers, and eye washes for chemical feed systems, chemical resistant coatings for chemical feed system rooms, new electrical lift table and dust collection system for the potassium permanganate system, and miscellaneous plumbing and electrical improvements. Other building improvements wrapped into this project include demolition of the old potassium permanganate system and allowing this room to be used as a future storage room. The original plant made future provision for Aqua Ammonia for disinfection through chloramination (chlorine mixed with ammonia). While chloramination can reduce disinfectant by products, it can elevate lead and copper corrosion as well as degrade natural rubber compounds (as well as create Taste & Odor problems for microbrewers) so there are no plans to implement that technology at any point in the future.

The new caustic system will be installed in the same room as the existing caustic system. To accommodate construction, a temporary chemical feed system for the caustic will be provided to avoid disruption . The potassium permanganate system will be installed in the Future Aqua Ammonia/Storage room which is currently being used for general storage as it will enable additional space for larger mix tanks and easier access for treatment staff. Consequently, no temporary chemical feed system is needed for the potassium permanganate system. This project combines multiple system improvements into one contract thereby increasing system efficiencies across operations, design and construction.

Specifically, the work consists of:

- Demolition of
    - Chemical system bulk tanks, day tanks, concrete pads, containment curb, transfer pumps, metering pumps, re-circulation pumps, weigh scales, supports, piping, and appurtenances.
    - Chemical resistant coating in caustic room.
    - Future Aqua Ammonia Storage room door and frame and miscellaneous equipment (location of the new potassium permanganate system).
    - Existing knockout concrete masonry unit (CMU) walls for new tank installation.
    - Existing Plumbing and emergency eyewash/shower stations.
    - Existing Pump control panels, instrumentation, and all associated conduit and wiring.
- Architectural
    - Installation of new chemical resistant coatings within the secondary containment areas for the caustic room and new potassium permanganate room.
    - Installation of replacement CMU walls and joint sealants for both caustic and new potassium permanganate room, and new door and frame for the new potassium permanganate room.
    - Installation of touch-up and existing potassium permanganate room floor coating.
- Structural
    - Installation of new concrete housekeeping pads for new chemical day tanks and transfer pump.
    - Concrete repairs in existing potassium permanganate room floor.
    - Installation of 4’ wide door and frame for the new potassium permanganate room.
    - Installation of new FRP platforms and stairs around the new potassium permanganate storage.
    - Installation of new FRP mounting table for the potassium permanganate metering pumps

- Mechanical
    - Installation of new chemical bulk tanks, mix tanks, day tanks, transfer pumps, metering pumps, mixers, phosphate dust collection system and lift table, piping, valves, instrumentation, and associated conduit and wiring.
- Plumbing
    - Installation of new miscellaneous piping, backflow preventers, flow switches, and emergency shower and eyewash stations.
- Electrical
    - Installation of new pump control panels, instrumentation, and other miscellaneous electrical modification along with associated conduit and wiring.

3. Need for the Proposed Action

The Lake Whitney WTP is an important component of the RWA's water distribution system as it provides treated water to customers in the New Haven and surrounding areas. Replacing the identified chemical storage and feed systems, along with related building improvements, will improve the reliability and safety of the Lake Whitney WTP and provide consistency with other RWA facilities in line with the mission of the RWA.

Specifically, it has been determined that this project is necessary based on the following reasons:

- Reliability: The caustic and potassium permanganate chemical feed systems, mechanical systems, and electrical systems are at the end of their useful life expectancy. One of the two caustic bulk tanks has failed and needs replacement. This has reduced the available capacity for bulk storage in the caustic system, resulting in more frequent chemical deliveries. In recent years the RWA has increased the dosage of potassium permanganate to address changes in raw water quality. As a result, RWA treatment staff have increased the frequency of potassium permanganate batching, sometimes performing this activity daily. The RWA feels that the increased demand for potassium permanganate will remain the standard operating procedure for the foreseeable future due to water quality issues. The system upgrades, including relocation of the potassium permanganate system into the Aqua Ammonia Storage room (currently used for storage), will increase the bulk storage capacity and as a result reduce the frequency of mixing events.

- Safety: The age and configuration of the existing caustic and potassium permanganate systems increases the likelihood of the RWA treatment staff exposure to hazardous chemicals and increased safety risks. The reduction in bulk storage requires more frequent caustic deliveries. The piping layout around the bulk and day tanks does not meet the RWA's current safety standards. Finally, the aging system is prone to leaks. The existing potassium permanganate room also has several challenges. The existing potassium permanganate room has low overhead clearances, and the existing lighting is not sufficient which contributes to poor working conditions. The current system also lacks a dust collection system which is now an RWA safety standard for mixing dry chemicals. Also, the volume of storage for mixed chemical is insufficient which results in more frequent batching, and the age of the existing potassium permanganate system results in the treatment staff requiring to perform frequent repairs. All of these issues pose concern for the treatment staffs' potential for exposure to these chemicals. The new chemical feed systems will reduce maintenance requirements, provide more chemical storage, improve layouts where possible, and add new alarms and instrumentation to better monitor the systems and implement RWA's safety standards.

- Consistency: Updating and replacing components within the Lake Whitney WTP will result in consistency with other RWA facilities. This will help standardization across all facilities which will contribute to increased efficiencies.

4. Analysis of the Alternatives to the Proposed Action

In determining the best course of action to replace components within the Lake Whitney WTP, Tighe & Bond evaluated several different alternatives. The alternatives included a no action approach or chemical systems replacement approach.

Alternative 1 – No Action: If the facility was not improved and left online, equipment would potentially fail and there would be possible chemical leaks from aging equipment. A failure can result in water quality issues as well as health and safety risks. Failing equipment, piping, and fittings would eventually require replacement in the future. Replacement parts for outdated items would be more expensive and difficult to find and replace and could result in extended shutdowns of the WTP. Additionally, this option does not address the known issues with limited chemical storage or the current chemical system layouts hazards, including: (1) one of the two sodium hydroxide bulk tanks has a leak so only one bulk talk is available for use; (2) potassium permanganate tanks are undersized so operations staff needs to frequently make new batches; and (3) ceiling height in potassium permanganate room is very low so operations staff can't stand straight up when maintaining system components.

Alternative 2 – Chemical Systems Replacement: Replacing with new chemical feed systems would provide a permanent solution for the facility. This approach would result in a reliable and safe water supply for consumers and mitigate the chance of existing chemical feed system component failure. It will also increase the safety for operators by addressing optimal layouts and providing better storage for the potassium permanganate system.

The alternatives analysis concluded that Alternative No. 2 is most favorable in terms of facility reliability, safety, and quality of outcome. The following items were considered to ensure the chemical system replacements were done in a cost-effective manner:

- Room Selection for Potassium Permanganate: RWA carefully evaluated the room options for the potassium permanganate system. Options included keeping the new system in the existing room or moving to another room. Keeping the system in the existing room presented challenges due to low overhead clearances which would limit the size of the tanks that could be installed. Additionally, the low overhead clearances posed a safety risk to treatment staff and resulted in a less ergonomic layout. Of the possible new rooms, the Aqua Ammonia Storage room was selected because it has twice the head room of the existing Potassium Permanganate Storage room, it also offered the opportunity to install larger chemical tanks to meet the storage needs, provide a more ergonomic layout with the inclusion of an electric lift table, and had the least overhead obstructions. The RWA does not have plans to utilize aqua ammonia at the Lake Whitney WTP, so this room is fully available for Potassium Permanganate storage. Some of the layouts considered are included in Appendix B. Lastly, moving the Potassium Permanganate system to a new room would eliminate the need for a temporary chemical feed system because the existing system could remain online until the new system is completely installed and operating successfully.

- Caustic Room Tank Selection: The RWA carefully evaluated the options for bulk storage and day tank sizing for the caustic system. The dimensions of the existing caustic storage tanks exceed the clearances of the WTP interior hallways. Therefore, replacement in kind is not possible without substantial modifications to existing utilities inside the WTP or removing exterior walls. These options were determined to be prohibitively complicated. Therefore, the RWA selected a bulk storage and day tank option that maximized storage, proved a functional layout for treatment staff, and used tanks that could be transported to the room via the interior halls of the WTP with minimal impact to other utilities inside the building. Some of the layouts considered are included in Appendix B.

This alternative also includes other building improvements such as demolition of the existing potassium permanganate equipment to create a new storage room or possible future temporary chemical feed systems. Performing building improvements under the same contract as the work on the chemical systems improvement project is more cost effective as it results in a single contract development and management and single mobilization for the contractor completing the work. Completing the building improvements at a later date may result in disturbance of maintenance and operations. Also, this type of project consolidation is consistent with past recommendations from the Representative Policy Board.

4.1 Business Case Evaluation

A Business Case Evaluation (BCE) comparing the Alternative 2 to the Status Quo (No Action) Alternative was performed by the RWA to demonstrate the benefits of the alternative, and is included in Appendix E, along with the Business Case Evaluation introductory memo with a definition of terms. The BCE was conducted using the comprehensive Triple Bottom Line (TBL) approach, that evaluates life-cycle costs, cost-benefit ratio, risk and social factors (including environmental) to determine the best long-term solution to a problem. The following summarizes the results of the BCE.

1. Life Cycle Cost Projection (LCCP): the Life Cycle Costs Annuitized Cost Stream is $200,166 for Alternative 2. The life cycle costs over the analysis period (20 years) show a decrease in the present value of annual operating and maintenance costs for Alternative 2 (when compared to the Status Quo).

2. Risk Reduction: The Risk Reduction Effectiveness Factor is 0.95 for Alternative 2. The alternative was found to reduce the Risk Cost from the Status Quo. The Risk Cost (annual basis) of the Status Quo is about $260,000. The overall Residual Risk Cost (annual basis) is about $69,000 for Alternative 2.

3. Benefit/Cost: The Benefit/Cost Ratio is a ratio of the benefit value over the cost value. A higher result demonstrates that the project is more cost effective for the benefits it delivers. This calculation allows for the quantification of factors such as environmental and social impact of a project (both during construction and long-term). The Benefit/Cost Ratio for Alternative 2 is a result of 1.59. Ratios higher than 1.0 demonstrate that an alternative has quantifiably higher benefits than costs.

Based on the results of the BCE, Alternative 2, Chemicals Systems Replacement, was determined to best address all aspects of the need for proposed action while balancing the impact of the work as it relates to the TBL concerns.

5. Statement of the Cost to Be Incurred and/or Saved

5.1 Capital Cost

This project will result in a capital expenditure of $3.1 million, which includes a 20% contingency. A breakdown of the capital cost for this project is presented in Table 1 below, and a detailed breakdown of this cost estimate is contained in Appendix C of this application. The project costs presented are based on 30% complete design drawings, prepared in November of 2023. In accordance with cost estimating principles, the project costs have been adjusted for inflation.

For the construction cost estimate, a 20% contingency is included. This is consistent with the American Association of Cost Engineers (AACE) International Recommended Practices and Standards for a Class 2 estimate, which is included in Appendix D. In a Class 2 estimate, the design of the project is expected to be between 30% to 75% complete and accurate within -15% to +20%. The AACE defines contingency as a specific provision for unforeseeable elements of cost within the defined project scope, particularly where experience has shown that unforeseeable costs are likely to occur. The 20% contingency allowance is included at this design stage for uncertainty in bid prices due to escalation of prices and part/equipment shortages that have occurred as a result of the COVID-19 pandemic and as a means to reduce the risk of possible cost overruns.

TABLE 1
Estimated Project Capital Cost

Description	Estimated Cost
Previous Expenditures (through December 2023)	$64,000
Remaining Design Cost	$60,000
Construction Cost	$1,761,864
Escalation to Midpoint of Construction 5% per year	$110,796
Construction with Inflation	$1,872,660
Contingency 20%	$374,532
Construction Phase Engineering Services	$408,500
RWA Costs *(PM, Temp Systems, SCADA Programming & Department Coordination)*	$280,000
Total	$3,059,692
Rounded Total	$3,100,000

5.2 Operation and Maintenance Cost

The new chemical system and building improvements will require standard, periodic maintenance activities that will be in line with industry standards. The RWA may see some time savings at first, due to the new equipment. In addition, the O&M activities for the facility will be similar to the existing facility, since there is no change in use. Therefore, we do not anticipate a change in overall operation and maintenance cost associated with this project.

5.3 Bonds or Other Obligations the RWA Intends to Issue

As a result, the annual cost of this project to a typical residential customer would be approximately $.90 and to an average residential customer approximately $1.19, assuming a conservative financing assumption of RWA bonds, based on project costs of $3.1 million and existing rates.

However, we expect this project to be funded by a combination of funding sources. The construction portion is anticipated to be funded through the Connecticut Department of Public Health's (CTDPH) Drinking Water State Revolving Fund (DWSRF). By utilizing DWSRF funding, the total financing costs associated with this project will be reduced. Internally generated funds may also be used to fund this project.

6. Preliminary Project Schedule and Permitting

6.1 Schedule

The project schedule is presented below.

1.	Preliminary Design:	November 2023
2.	RPB Submission & Approval	January 2024 – May 2024
3.	Final Design	April 2024
4.	Bidding	May 2024
5.	Award	June 2024
6.	Construction	July 2024 to October 2025
7.	Start-up, Optimization, and Completion	October 2025

Assuming construction is completed while the RWA operates a temporary caustic chemical feed system, we anticipate that active construction on this project will occur from July 2024 until October 2025. With the bidding requirements and lead time issues on equipment, it is anticipated that active construction will begin by January 2025.

6.2 Permitting

This project involves replacement of the existing chemical systems. In addition, the building improvements involve replacement and repairs to existing systems. This project will not result in any process changes to the Lake Whitney Water Treatment Plant. For these reasons, we do not believe this project will require permit approvals from the Connecticut Department of Public Health and will only require building permits/approvals from local authorities.

7. Statement of the Facts on Which the Board Is Expected to Rely in Granting the Authorization Sought

- Improves reliability and safety by replacing aging chemical feed system and building equipment/components.
- Improves consistency with other RWA facilities.
- Improves safety for RWA Treatment staff.
- Maintains operations and operating capacity of the Lake Whitney Water Treatment Plant facility, a critical source of potable water for New Haven and surrounding areas.

8. Explanation of Unusual Circumstances Involved in the Application

There were no unusual circumstances involved in this application.

9. Conclusion

The Lake Whitney Water Treatment Plant is a critical source of water supply for New Haven, CT and surrounding areas. The proposed chemical systems replacement and building improvements is a priority project for the RWA and is needed to improve the safety, reliability, and long-term viability of this important water supply treatment source. Further, these improvements will ultimately need to be performed, and delaying the project will likely result in higher future costs as the building systems continue to degrade.

At $3.1 million, the project maximizes the cost and non-cost benefits for the RWA. As such, the RWA has concluded that the proposed action is consistent with and advances the policies and goals of the South Central Connecticut Regional Water Authority.

Appendix C

Engineer’s Opinion of Probable Cost for the Chemical Improvements at the Lake Whitney Water Treatment Plant Project

ENGINEER'S CONCEPTUAL OPINION OF PROBABLE CONSTRUCTION COST Tighe&Bond

Project: **Chemical Improvements at the Lake Whitney Water Treatment Plant (Potassium Permanganate and Caustic Systems)**
Location: **Hamden, CT**

Estimate Type: ☐ Conceptual ☐ Preliminary Design ☑ Design Development ☐ Construction ☐ Change Order 30 % Complete

Prepared By: RRB
Date Prepared: 12/15/2023
T&B Project No.: S1889-A46

Spec. Section	Item No.	Description	Qty	Units	Material/Installed Cost $/Unit	Material/Installed Cost Total	Installation $/Unit	Installation Total	Total
DIVISION 1 - GENERAL CONDITIONS			(Costs included in unit prices in other Divisions)						
	1	10% of Construction Subtotal	1	LS	$133,480	$133,480		$0	$133,480
SUBTOTAL - DIVISION 1						**$133,480**		**$0**	**$133,480**
DIVISION 2 - SITE WORK									
02225	1	Selective Demolition							
	a	Permanganate Room Equipment	1	LS	$7,500	$7,500		$0	$7,500
	b	Caustic Room Equipment	1	LS	$40,000	$40,000		$0	$40,000
	c	Storage Room 114 Equipment	1	LS	$5,000	$5,000		$0	$5,000
	d	Knockout CMU and Relocate Utilities	1	LS	$25,000	$25,000			$25,000
	e	Residual Chemical Disposal	1	LS	$10,000	$10,000		$0	$10,000
	f	Permanganate Room Curb and Pad	1	LS	$6,000	$6,000		$0	$6,000
	g	Electrical Demolition	1	LS	$20,000	$20,000		$0	$20,000
SUBTOTAL - DIVISION 2						**$113,500**		**$0**	**$113,500**
DIVISION 3 - CONCRETE									
03300	1	Cast in Place Concrete							
	a	Housekeeping Pads - Chemical day tanks	1	LS	$3,600	$3,600		$0	$3,600
	b	Housekeeping Pads - Transfer Pumps	1	LS	$1,200	$1,200		$0	$1,200
	c	Concrete Entry into Caustic Room	1	LS	$4,800	$4,800			$4,800
	2	Concrete Repair (e.g. Perm. Room Floor)	1	LS	$12,000	$12,000		$0	$12,000
SUBTOTAL - DIVISION 3						**$21,600**		**$0**	**$21,600**
DIVISION 4 - MASONRY									
04810	1	Unit Masonry Assembly							
	a	Permanganate Room Door Masonry Repairs	20	SF	$75	$1,500		$0	$1,500
	b	Caustic Room Knock-Out Wall	144	SF	$100	$14,400		$0	$14,400
	c	Permanganate Room Knock-Out Wall	36	SF	$100	$3,600		$0	$3,600
SUBTOTAL - DIVISION 4						**$19,500**		**$0**	**$19,500**
DIVISION 5 - METALS									
05500	1	Miscellaneous Metals - 4' Wide Single Door Lintel	1	LS	$1,000	$1,000		$0	$1,000
	2	Miscellaneous Metals - Miscellaneous Items	1	LS	$2,000	$2,000		$0	$2,000
SUBTOTAL - DIVISION 5						**$3,000**		**$0**	**$3,000**
DIVISION 6 - WOOD & PLASTICS									
06600	1	Fiberglass Products							
	a	FRP Platform and Stair into New Perm. Room and FRP Platform to Mix Tanks	1	EA	$42,000	$42,000	$16,800	$16,800	$58,800
	b	FRP Permanganate Metering Pump Tables	2	EA	$2,000	$4,000	$800	$1,600	$5,600
SUBTOTAL - DIVISION 6						**$46,000**		**$18,400**	**$64,400**
DIVISION 7 - THERMAL & MOISTURE PROTECTION									
07920	1	Joint Sealants	1	LS	$7,500	$7,500		$0	$7,500
SUBTOTAL - DIVISION 7						**$7,500**		**$0**	**$7,500**
DIVISION 8 - DOORS & WINDOWS									
08200	1	Metal Doors & Frames							
	a	4' Wide Door & Hardware - Perm. Room	1	EA	$8,000	$8,000		$0	$8,000
SUBTOTAL - DIVISION 8						**$8,000**		**$0**	**$8,000**
DIVISION 9 - FINISHES									
09900	1	Painting							
	a	Touch-Up/Misc Painting	1	LS	$10,000	$10,000		$0	$10,000
	b	New Perm. Room Painting at Door Masonry	1	LS	$500	$500		$0	$500
09960	2	Chemical Resistant Floor Coating							
	a	Sodium Hydroxide Area	1,080	SF	$75	$81,000		$0	$81,000
	b	Existing Perm. Room Floor	200	SF	$75	$15,000		$0	$15,000
SUBTOTAL - DIVISION 9						**$106,500**		**$0**	**$106,500**
DIVISION 10 - SPECIALTIES									
10440	1	Signage	1	LS	$200	$200		$0	$200
SUBTOTAL - DIVISION 10						**$200**		**$0**	**$200**

ENGINEER'S CONCEPTUAL OPINION OF PROBABLE CONSTRUCTION COST Tighe&Bond

Project: **Chemical Improvements at the Lake Whitney Water Treatment Plant (Potassium Permanganate and Caustic Systems)**
Location: **Hamden, CT**

Estimate Type: ☐ Conceptual ☐ Preliminary Design ☑ Design Development ☐ Construction ☐ Change Order 30 % Complete

Prepared By: RRB
Date Prepared: 12/15/2023
T&B Project No.: S1889-A46

Spec. Section	Item No.	Description	Qty	Units	Material/Installed Cost $/Unit	Material/Installed Cost Total	Installation $/Unit	Installation Total	Total
DIVISION 11 - EQUIPMENT									
11010	1	Maintenance Equipment							
	a	Lift Table in New Permanganate Room	1	EA	$13,000	$13,000	$5,200	$5,200	$18,200
11240	2	Metering Pumps							
	a	Permanganate Metering Pumps	2	EA	$10,678	$21,355	$10,678	$21,355	$42,710
	b	Pre Caustic Metering Pumps	3	EA	$7,350	$22,050	$7,350	$22,050	$44,100
	c	Post Caustic Metering Pumps	3	EA	$7,978	$23,935	$7,978	$23,935	$47,870
	d	Post Caustic Metering Pump (low flow)	1	EA	$6,850	$6,850	$6,850	$6,850	$13,700
	e	Metering Pump Control Panels	3	EA	$20,000	$60,000	$20,000	$60,000	$120,000
11242	3	Transfer Pumps, Mixers, & Dust Collection System							
	a	Permanganate Transfer Pump	1	EA	$1,260	$1,260	$1,260	$1,260	$2,520
	b	Caustic Transfer Pump	1	EA	$1,260	$1,260	$1,260	$1,260	$2,520
	c	Transfer Pump Control Panel	2	EA	$4,000	$8,000	$2,000	$4,000	$12,000
	d	Pump Accessories							
		SS back pressure valves	7	EA	$1,800	$12,600	$720	$5,040	$17,640
		SS pressure relief valves	7	EA	$1,800	$12,600	$720	$5,040	$17,640
		SS pulsation dampener	7	EA	$600	$4,200	$240	$1,680	$5,880
		CPVC/PVC back pressure valves	2	EA	$500	$1,000	$200	$400	$1,400
		CPVC/PVC pressure relief valves	2	EA	$600	$1,200	$240	$480	$1,680
		CPVC/PVC pulsation dampener	2	EA	$600	$1,200	$240	$480	$1,680
		Clear PVC calibration columns	9	EA	$150	$1,350	$60	$540	$1,890
		Pressure gauges	9	EA	$300	$2,700	$120	$1,080	$3,780
		PVC y-strainers	9	EA	$500	$4,500	$200	$1,800	$6,300
	e	Permanganate Mix Tank Mixer and Stand	2	EA	$5,500	$11,000	$2,200	$4,400	$15,400
	f	Permanganate Room Dust Collector	1	EA	$25,000	$25,000	$10,000	$10,000	$35,000
SUBTOTAL - DIVISION 11						**$235,060**		**$176,850**	**$411,910**
DIVISION 13 - SPECIAL CONSTRUCTION									
13210	1	Polyethylene Tanks:							
	a	Permanganate Mix Tank - 960 gal	2	EA	$10,900	$21,800	$4,360	$8,720	$30,520
	b	Permanganate Day Tank - 545 gal IMFO	1	EA	$6,600	$6,600	$2,640	$2,640	$9,240
	c	Caustic Bulk Tanks - 3,000 gal IMFO	2	EA	$16,300	$32,600	$6,520	$13,040	$45,640
	d	Caustic Day Tank - 1,250 gal IMFO	1	EA	$11,800	$11,800	$4,720	$4,720	$16,520
	e	Freight Delivery	1	EA	$11,500	$11,500	$4,600	$4,600	$16,100
13420	2	Instrumentation							
	a	Mix/Bulk Tank Level Transmitters	4	EA	$3,000	$12,000	$1,200	$4,800	$16,800
	b	Day Tank Level Transmitters	2	EA	$3,000	$6,000	$1,200	$2,400	$8,400
	c	Day Tank Pressure Transmitters	2	EA	$4,100	$8,200	$1,640	$3,280	$11,480
	d	High Level Switches	6	EA	$1,200	$7,200	$480	$2,880	$10,080
	e	Flood Switches	2	LS	$600	$1,200	$240	$480	$1,680
	f	Emergency Shower Flow Switch	2	EA	$1,000	$2,000	$400	$800	$2,800
SUBTOTAL - DIVISION 13						**$120,900**		**$48,360**	**$169,260**
DIVISION 15 - MECHANICAL									
15050	1	Seals and Sleeves for Piping Between Walls	1	LS	$5,000	$5,000		$0	$5,000
15060	1	Hangers and Supports	1	LS	$20,000	$20,000		$0	$20,000
15104	2	PVC Piping							
	a	1.5" PVC Permangate Pump Discharge Piping	100	LF	$100	$10,000		$0	$10,000
	b	0.5" to 2" PVC Permangate Room Piping	100	LF	$100	$10,000		$0	$10,000
	c	8" PVC Permangate Mix Tank Vent to Dust Coll.	20	LF	$200	$4,000		$0	$4,000
	d	0.5" to 2" PVC Caustic Room Piping	100	LF	$100	$10,000		$0	$10,000
	e	6" PVC Caustic Vent Piping	100	LF	$200	$20,000		$0	$20,000
15105	3	SS Pipe and fittings	300	LF	$250	$75,000	$100	$30,000	$105,000
15109	4	Flexible hose and fittings	1	LS	$1,000	$1,000	$400	$400	$1,400
15110	5	Valves							
	a	0.5" to 2" PVC Valves - Perm. System	25	EA	$250	$6,250	$100	$2,500	$8,750
	b	PVC Motor Operator Valves - Perm System	2	EA	$1,500	$3,000	$600	$1,200	$4,200
	c	0.5" to 2" SS Valves - Caustic System	75	EA	$500	$37,500	$200	$15,000	$52,500
	d	Ductbill Check Valves - Caustic System	2	EA	$200	$400	$80	$160	$560
	e	SS Motor Operator Valves - Caustic System	2	EA	$5,000	$10,000	$2,000	$4,000	$14,000
15120	6	Piping Specialties	1	LS	$20,000	$20,000	$8,000	$8,000	$28,000
	a	3/4" SOV - Perm. Mix Tank Fill	2	EA	$1,000	$2,000	$400	$800	$2,800
15110	7	Plumbing Valves							
	a	Hose Bibbs	2	EA	$100	$200	$60	$120	$320
15140	8	Domestic Piping and Fittings							
	a	Process CW, 2" CU, Perm. Mix Tank Fill	50	FT	$100	$5,000		$0	$5,000

ENGINEER'S CONCEPTUAL OPINION OF PROBABLE CONSTRUCTION COST Tighe&Bond

Project: **Chemical Improvements at the Lake Whitney Water Treatment Plant (Potassium Permanganate and Caustic Systems)**
Location: **Hamden, CT**

Estimate Type: ☐ Conceptual ☐ Construction Prepared By: RRB
☐ Preliminary Design ☐ Change Order Date Prepared: 12/15/2023
☑ Design Development 30 % Complete T&B Project No.: S1889-A46

Spec. Section	Item No.	Description	Qty	Units	Material/Installed Cost $/Unit	Material/Installed Cost Total	Installation $/Unit	Installation Total	Total
	b	Domestic CW, 1-1/2" CU	100	FT	$75	$7,500		$0	$7,500
	c	Backflow Preventer	4	EA	$1,400	$5,600	$560	$2,240	$7,840
15080	9	Insulation for Above, Armacell	150	FT	$10	$1,500		$0	$1,500
15411	10	Emergency Plumbing Fixtures							
	a	Emergency Shower w/ Eyewash (interior)	2	EA	$2,500	$5,000	$750	$1,500	$6,500
SUBTOTAL - DIVISION 15						**$258,950**		**$65,920**	**$324,870**
DIVISION 16 - ELECTRICAL									
16050	1	General Electrical Work - Demo and Mobilization	1	EA	$15,000	$15,000	$0	$0	$15,000
16120	1	Electrical Conduit and Wire	1	EA	$68,000	$69,500	$0	$0	$69,500
16140	1	Wiring Devices	1	EA	$27,600	$27,600	$0	$0	$27,600
16490	1	Control Panels and Accessories	1	EA	$23,000	$23,000	$0	$0	$23,000
16500	1	Luminaires and Accessories	1	EA	$19,000	$19,000	$0	$0	$19,000
SUBTOTAL - DIVISION 16						**$84,500**		**$0**	**$84,500**

SUB-TOTAL				$1,468,220
CONTRACTOR OH&P	@	20%		$293,644
SUB-TOTAL with Contractor OH&P				$1,761,864
Escalation to Mid Point of Construction (Anticipated March 2025) 1.25 Years at 5% per Year (Assumed Notice to Proceed Issued June, 2024)				$1,872,660
CONTINGENCY	@	20%		$293,644
CONSTRUCTION TOTAL				**$2,166,304**
			SAY	**$2,200,000**
ENGINEERING - DESIGN PHASE AND BIDDING				$108,500
ENGINEERING - CONSTRUCTION PHASE				$300,000
PROJECT TOTAL				**$2,574,804**
				$2,600,000

Appendix D

American Association of Cost Engineers (AACE) *Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries*, August 2020

AACE INTERNATIONAL RECOMMENDED PRACTICE

18R-97

COST ESTIMATE CLASSIFICATION SYSTEM - AS APPLIED IN ENGINEERING, PROCUREMENT, AND CONSTRUCTION FOR THE PROCESS INDUSTRIES

AACE INTERNATIONAL

AACE

INTERNATIONAL

AACE International Recommended Practice No. 18R-97

COST ESTIMATE CLASSIFICATION SYSTEM – AS APPLIED IN ENGINEERING, PROCUREMENT, AND CONSTRUCTION FOR THE PROCESS INDUSTRIES

TCM Framework: 7.3 – Cost Estimating and Budgeting

Rev. August 7, 2020

Note: As AACE International Recommended Practices evolve over time, please refer to web.aacei.org for the latest revisions.

Any terms found in AACE Recommended Practice 10S-90, *Cost Engineering Terminology*, supersede terms defined in other AACE work products, including but not limited to, other recommended practices, the *Total Cost Management Framework*, and *Skills & Knowledge of Cost Engineering*.

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AACE® International Recommended Practice No. 18R-97

COST ESTIMATE CLASSIFICATION SYSTEM – AS APPLIED IN ENGINEERING, PROCUREMENT, AND CONSTRUCTION FOR THE PROCESS INDUSTRIES

TCM Framework: 7.3 – Cost Estimating and Budgeting

August 7, 2020

TABLE OF CONTENTS

1. PURPOSE

As a recommended practice (RP) of AACE International, the *Cost Estimate Classification System* provides guidelines for applying the general principles of estimate classification to project cost estimates (i.e., cost estimates that are used to evaluate, approve, and/or fund projects). The *Cost Estimate Classification System* maps the phases and stages of project cost estimating together with a generic project scope definition maturity and quality matrix, which can be applied across a wide variety of industries and scope content.

This recommended practice provides guidelines for applying the principles of estimate classification specifically to project estimates for engineering, procurement, and construction (EPC) work for the process industries. It supplements the generic cost estimate classification RP 17R-97[1] by providing:

- A section that further defines classification concepts as they apply to the process industries.
- A chart that maps the extent and maturity of estimate input information (project definition deliverables) against the class of estimate.

As with the generic RP, the intent of this document is to improve communications among all the stakeholders involved with preparing, evaluating, and using project cost estimates specifically for the process industries.

The overall purpose of this recommended practice is to provide the process industry with a project definition deliverable maturity matrix that is not provided in 17R-97. It also provides an approximate representation of the relationship of specific design input data and design deliverable maturity to the estimate accuracy and methodology used to produce the cost estimate. The estimate accuracy range is driven by many other variables and risks, so the maturity and quality of the scope definition available at the time of the estimate is not the sole determinate of accuracy; risk analysis is required for that purpose.

This document is intended to provide a guideline, not a standard. It is understood that each enterprise may have its own project and estimating processes, terminology, and may classify estimates in other ways. This guideline provides a generic and generally acceptable classification system for the process industries that can be used as a basis to compare against. This recommended practice should allow each user to better assess, define, and communicate their own processes and standards in the light of generally-accepted cost engineering practice.

2. INTRODUCTION

For the purposes of this document, the term *process industries* is assumed to include firms involved with the manufacturing and production of chemicals, petrochemicals, and hydrocarbon processing. The common thread among these industries (for the purpose of estimate classification) is their reliance on process flow diagrams (PFDs), piping and instrument diagrams (P&IDs), and electrical one-line drawings as primary scope defining documents. These documents are key deliverables in determining the degree of project definition, and thus the extent and maturity of estimate input information. This RP applies to a variety of project delivery methods such as traditional design-bid-build (DBB), design-build (DB), construction management for fee (CM-fee), construction management at risk (CM-at risk), and private-public partnerships (PPP) contracting methods.

Estimates for process facilities center on mechanical and chemical process equipment, and they have significant amounts of piping, instrumentation, and process controls involved. As such, this recommended practice may apply to portions of other industries, such as pharmaceutical, utility, water treatment, metallurgical, converting, and similar industries.

Most plants also have significant electrical power equipment (e.g., transformers, switchgear, etc.) associated with them. As such, this RP also applies to electrical substation projects, either associated with the process plant, as part of power transmission or distribution infrastructure, or supporting the power needs of other facilities. This RP excludes power generating facilities and high-voltage transmission.

This RP specifically does not address cost estimate classification in non-process industries such as commercial building construction, environmental remediation, transportation infrastructure, hydropower, "dry" processes such as assembly and manufacturing, "soft asset" production such as software development, and similar industries. It also does not specifically address estimates for the exploration, production, or transportation of mining or hydrocarbon materials, although it may apply to some of the intermediate processing steps in these systems.

The cost estimates covered by this RP are for engineering, procurement, and construction (EPC) work only. It does not cover estimates for the products manufactured by the process facilities, or for research and development work in support of the process industries. This guideline does not cover the significant building construction that may be a part of process plants.

This guideline reflects generally-accepted cost engineering practices. This recommended practice was based upon the practices of a wide range of companies in the process industries from around the world, as well as published references and standards. Company and public standards were solicited and reviewed, and the practices were found to have significant commonalities. [4,5,6,7] These classifications are also supported by empirical process industry research of systemic risks and their correlation with cost growth and schedule slip [8].

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3. COST ESTIMATE CLASSIFICATION MATRIX FOR THE PROCESS INDUSTRIES

A purpose of cost estimate classification is to align the estimating process with project stage-gate scope development and decision-making processes.

Table 1 provides a summary of the characteristics of the five estimate classes. The maturity level of project definition is the sole determining (i.e., primary) characteristic of class. In Table 1, the maturity is roughly indicated by a percentage of complete definition; however, it is the maturity of the defining deliverables that is the determinant, not the percent. The other characteristics are secondary and are generally correlated with the maturity level of project definition deliverables, as discussed in the generic RP [1]. The specific deliverables, and their maturity or status are provided in Table 3. The post sanction (post funding authorization) classes (Class 1 and 2) are only indirectly covered where new funding is indicated. Again, the characteristics are typical but may vary depending on the circumstances.

	Primary Characteristic	***Secondary Characteristic***		
ESTIMATE CLASS	**MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES** Expressed as % of complete definition	**END USAGE** Typical purpose of estimate	**METHODOLOGY** Typical estimating method	**EXPECTED ACCURACY RANGE** Typical variation in low and high ranges at an 80% confidence interval
Class 5	0% to 2%	Concept screening	Capacity factored, parametric models, judgment, or analogy	L: -20% to -50% H: +30% to +100%
Class 4	1% to 15%	Study or feasibility	Equipment factored or parametric models	L: -15% to -30% H: +20% to +50%
Class 3	10% to 40%	Budget authorization or control	Semi-detailed unit costs with assembly level line items	L: -10% to -20% H: +10% to +30%
Class 2	30% to 75%	Control or bid/tender	Detailed unit cost with forced detailed take-off	L: -5% to -15% H: +5% to +20%
Class 1	65% to 100%	Check estimate or bid/tender	Detailed unit cost with detailed take-off	L: -3% to -10% H: +3% to +15%

Table 1 – Cost Estimate Classification Matrix for Process Industries

This matrix and guideline outline an estimate classification system that is specific to the process industries. Refer to Recommended Practice 17R-97 [1] for a general matrix that is non-industry specific, or to other cost estimate classification RPs for guidelines that will provide more detailed information for application in other specific industries. These will provide additional information, particularly the *Estimate Input Checklist and Maturity Matrix* which determines the class in those industries. See Professional Guidance Document 01, *Guide to Cost Estimate Classification.* [16]

Table 1 illustrates typical ranges of accuracy ranges that are associated with the process industries. The +/- value represents typical percentage variation at an 80% confidence interval of actual costs from the cost estimate after application of appropriate contingency (typically to achieve a 50% probability of project cost overrun versus underrun) for given scope. Depending on the technical and project deliverables (and other variables) and risks associated with each estimate, the accuracy range for any particular estimate is expected to fall into the ranges identified. However, this does not preclude a specific actual project result from falling outside of the indicated range of ranges identified in Table 1. In fact, research indicates that for weak project systems and complex or otherwise risky projects, the high ranges may be two to three times the high range indicated in Table 1. [17]

In addition to the degree of project definition, estimate accuracy is also driven by other systemic risks such as:

- Level of familiarity with technology.
- Unique/remote nature of project locations and conditions and the availability of reference data for those.
- Complexity of the project and its execution.
- Quality of reference cost estimating data.
- Quality of assumptions used in preparing the estimate.
- Experience and skill level of the estimator.
- Estimating techniques employed.
- Time and level of effort budgeted to prepare the estimate.
- Market and pricing conditions.
- Currency exchange.
- The accuracy of the composition of the input and output process streams.

Systemic risks such as these are often the primary driver of accuracy, especially during the early stages of project definition. As project definition progresses, project-specific risks (e.g. risk events and conditions) become more prevalent and also drive the accuracy range. Another concern in estimates is potential organizational pressure for a predetermined value that may result in a biased estimate. The goal should be to have an unbiased and objective estimate both for the base cost and for contingency. The stated estimate ranges are dependent on this premise and a realistic view of the project. Failure to appropriately address systemic risks (e.g. technical complexity) during the risk analysis process, impacts the resulting probability distribution of the estimated costs, and therefore the interpretation of estimate accuracy.

Figure 1 illustrates the general relationship trend between estimate accuracy and the estimate classes (corresponding with the maturity level of project definition). Depending upon the technical complexity of the project, the availability of appropriate cost reference information, the degree of project definition, and the inclusion of appropriate contingency determination, a typical Class 5 estimate for a process industry project may have an accuracy range as broad as -50% to +100%, or as narrow as -20% to +30%. However, note that this is dependent upon the contingency included in the estimate appropriately quantifying the uncertainty and risks associated with the cost estimate. Refer to Table 1 for the accuracy ranges conceptually illustrated in Figure 1. [18]

Figure 1 also illustrates that the estimating accuracy ranges overlap the estimate classes. There are cases where a Class 5 estimate for a particular project may be as accurate as a Class 3 estimate for a different project. For example, similar accuracy ranges may occur if the Class 5 estimate of one project that is based on a repeat project with good cost history and data and, whereas the Class 3 estimate for another is for a project involving new technology. It is for this reason that Table 1 provides ranges of accuracy values. This allows consideration of the specific circumstances inherent in a project and an industry sector to provide realistic estimate class accuracy range percentages. While a target range may be expected for a particular estimate, the accuracy range should always be determined through risk analysis of the specific project and should never be pre-determined. AACE has recommended practices that address contingency determination and risk analysis methods. [19]

If contingency has been addressed appropriately approximately 80% of projects should fall within the ranges shown in Figure 1. However, this does not preclude a specific actual project result from falling inside or outside of the indicated range of ranges identified in Table 1. As previously mentioned, research indicates that for weak project systems, and/or complex or otherwise risky projects, the high ranges may be two to three times the high range indicated in Table 1.

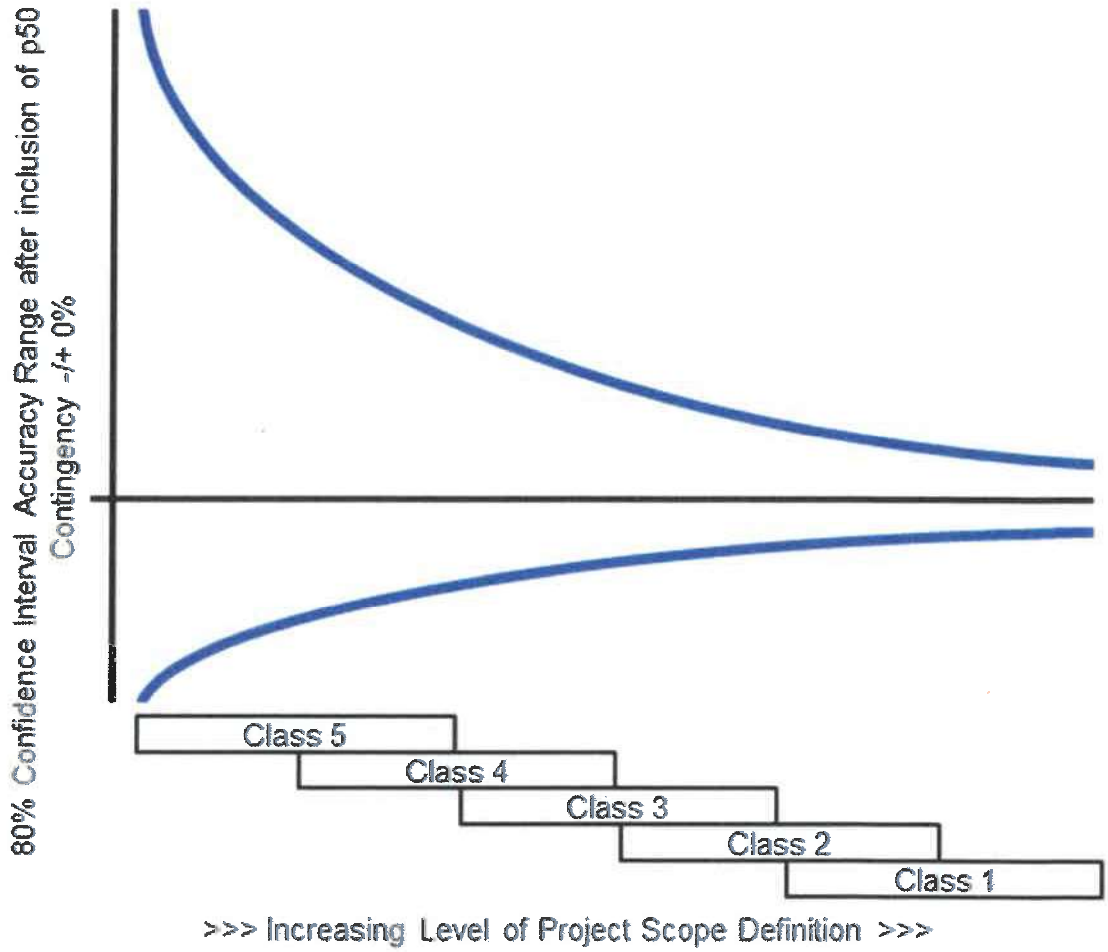

Figure 1 – Illustration of the Variability in Accuracy Ranges for Process Industry Estimates

4. DETERMINATION OF THE COST ESTIMATE CLASS

For a given project, the determination of the estimate class is based upon the maturity level of project definition based on the status of specific key planning and design deliverables. The percent design completion may be correlated with the status, but the percentage should not be used as the class determinate. While the determination of the status (and hence the estimate class) is somewhat subjective, having standards for the design input data, completeness and quality of the design deliverables will serve to make the determination more objective.

5. CHARACTERISTICS OF THE ESTIMATE CLASSES

The following tables (2a through 2e) provide detailed descriptions of the five estimate classifications as applied in the process industries. They are presented in the order of least-defined estimates to the most-defined estimates. These descriptions include brief discussions of each of the estimate characteristics that define an estimate class.

For each table, the following information is provided:

- **Description:** A short description of the class of estimate, including a brief listing of the expected estimate inputs based on the maturity level of project definition deliverables.

- **Maturity Level of Project Definition Deliverables (Primary Characteristic):** Describes a particularly key deliverable and a typical target status in stage-gate decision processes, plus an indication of approximate percent of full definition of project and technical deliverables. Typically, but not always, maturity level correlates with the percent of engineering and design complete.

- **End Usage (Secondary Characteristic):** A short discussion of the possible end usage of this class of estimate.

- **Estimating Methodology (Secondary Characteristic):** A listing of the possible estimating methods that may be employed to develop an estimate of this class.

- **Expected Accuracy Range (Secondary Characteristic):** Typical variation in low and high ranges after the application of contingency (determined at a 50% level of confidence). Typically, this represents about 80% confidence that the actual cost will fall within the bounds of the low and high ranges if contingency appropriately forecasts uncertainty and risks.

- **Alternate Estimate Names, Terms, Expressions, Synonyms:** This section provides other commonly used names that an estimate of this class might be known by. These alternate names are not endorsed by this recommended practice. The user is cautioned that an alternative name may not always be correlated with the class of estimate as identified in Tables 2a-2e.

CLASS 5 ESTIMATE	
Description: Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systematic manner. Class 5 estimates, due to the requirements of end use, may be prepared within a very limited amount of time and with little effort expended—sometimes requiring less than an hour to prepare. Often, little more than proposed plant type, location, and capacity are known at the time of estimate preparation. **Maturity Level of Project Definition Deliverables:** Key deliverable and target status: Block flow diagram agreed by key stakeholders. List of key design basis assumptions. 0% to 2% of full project definition. **End Usage:** Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc.	**Estimating Methodology:** Class 5 estimates generally use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques. **Expected Accuracy Range:** Typical accuracy ranges for Class 5 estimates are -20% to -50% on the low side, and +30% to +100% on the high side, depending on the technological complexity of the project, appropriate reference information and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks. **Alternate Estimate Names, Terms, Expressions, Synonyms:** Ratio, ballpark, blue sky, seat-of-pants, ROM, idea study, prospect estimate, concession license estimate, guesstimate, rule-of-thumb.

Table 2a – Class 5 Estimate

CLASS 4 ESTIMATE	
Description: Class 4 estimates are generally prepared based on limited information and subsequently have fairly wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 15% complete, and would comprise at a minimum the following: plant capacity, block schematics, indicated layout, process flow diagrams (PFDs) for main process systems, and preliminary engineered process and utility equipment lists. **Maturity Level of Project Definition Deliverables:** Key deliverable and target status: Process flow diagrams (PFDs) issued for design. 1% to 15% of full project definition. **End Usage:** Class 4 estimates are prepared for a number of purposes, such as but not limited to, detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to next stage.	**Estimating Methodology:** Class 4 estimates generally use factored estimating methods such as equipment factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, the Miller method, gross unit costs/ratios, and other parametric and modeling techniques. **Expected Accuracy Range:** Typical accuracy ranges for Class 4 estimates are -15% to -30% on the low side, and +20% to +50% on the high side, depending on the technological complexity of the project, appropriate reference information, and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks. **Alternate Estimate Names, Terms, Expressions, Synonyms:** Screening, top-down, feasibility (pre-feasibility for metals processes), authorization, factored, pre-design, pre-study.

Table 2b – Class 4 Estimate

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CLASS 3 ESTIMATE	
Description: Class 3 estimates are generally prepared to form the basis for budget authorization, appropriation, and/or funding. As such, they typically form the initial control estimate against which all actual costs and resources will be monitored. Typically, engineering is from 10% to 40% complete, and would comprise at a minimum the following: process flow diagrams, utility flow diagrams, preliminary piping and instrument diagrams, plot plan, developed layout drawings, and essentially complete engineered process and utility equipment lists. Remedial action plan resulting from HAZOPs is identified. **Maturity Level of Project Definition Deliverables:** Key deliverable and target status: Piping and instrumentation diagrams (P&IDs) issued for design. 10% to 40% of full project definition. **End Usage:** Class 3 estimates are typically prepared to support full project funding requests, and become the first of the project phase control estimates against which all actual costs and resources will be monitored for variations to the budget. They are used as the project budget until replaced by more detailed estimates. In many owner organizations, a Class 3 estimate is often the last estimate required and could very well form the only basis for cost/schedule control.	**Estimating Methodology:** Class 3 estimates generally involve more deterministic estimating methods than conceptual methods. They usually involve predominant use of unit cost line items, although these may be at an assembly level of detail rather than individual components. Factoring methods may be used to estimate less-significant areas of the project. **Expected Accuracy Range:** Typical accuracy ranges for Class 3 estimates are -10% to -20% on the low side, and +10% to +30% on the high side, depending on the technological complexity of the project, appropriate reference information, and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks. **Alternate Estimate Names, Terms, Expressions, Synonyms:** Budget, scope, sanction, semi-detailed, authorization, preliminary control, concept study, feasibility (for metals processes) development, basic engineering phase estimate, target estimate.

Table 2c – Class 3 Estimate

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CLASS 2 ESTIMATE	
Description: Class 2 estimates are generally prepared to form a detailed contractor control baseline (and update the owner control baseline) against which all project work is monitored in terms of cost and progress control. For contractors, this class of estimate is often used as the bid estimate to establish contract value. Typically, engineering is from 30% to 75% complete, and would comprise at a minimum the following: process flow diagrams, utility flow diagrams, piping and instrument diagrams, heat and material balances, final plot plan, final layout drawings, complete engineered process and utility equipment lists, single line diagrams for electrical, electrical equipment and motor schedules, vendor quotations, detailed project execution plans, resourcing and work force plans, etc. **Maturity Level of Project Definition Deliverables:** Key deliverable and target status: All specifications and datasheets complete including for instrumentation. 30% to 75% of full project definition. **End Usage:** Class 2 estimates are typically prepared as the detailed contractor control baseline (and update to the owner control baseline) against which all actual costs and resources will now be monitored for variations to the budget, and form a part of the change management program. Some organizations may choose to make funding decisions based on a Class 2 estimate.	**Estimating Methodology:** Class 2 estimates generally involve a high degree of deterministic estimating methods. Class 2 estimates are prepared in great detail, and often involve tens of thousands of unit cost line items. For those areas of the project still undefined, an assumed level of detail takeoff (forced detail) may be developed to use as line items in the estimate instead of relying on factoring methods. **Expected Accuracy Range:** Typical accuracy ranges for Class 2 estimates are -5% to -15% on the low side, and +5% to +20% on the high side, depending on the technological complexity of the project, appropriate reference information, and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks. **Alternate Estimate Names, Terms, Expressions, Synonyms:** Detailed control, forced detail, execution phase, master control, engineering, bid, tender, change order estimate.

Table 2d – Class 2 Estimate

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CLASS 1 ESTIMATE

Description:
Class 1 estimates are generally prepared for discrete parts or sections of the total project rather than generating this level of detail for the entire project. The parts of the project estimated at this level of detail will typically be used by subcontractors for bids, or by owners for check estimates. The updated estimate is often referred to as the current control estimate and becomes the new baseline for cost/schedule control of the project. Class 1 estimates may be prepared for parts of the project to comprise a fair price estimate or bid check estimate to compare against a contractor's bid estimate, or to evaluate/dispute claims. Typically, overall engineering is from 65% to 100% complete (some parts or packages may be complete and others not), and would comprise virtually all engineering and design documentation of the project, and complete project execution and commissioning plans.

Maturity Level of Project Definition Deliverables:
Key deliverable and target status: All deliverables in the maturity matrix complete. 65% to 100% of full project definition.

End Usage:
Generally, owners and EPC contractors use Class 1 estimates to support their change management process. They may be used to evaluate bid checking, to support vendor/contractor negotiations, or for claim evaluations and dispute resolution.

Construction contractors may prepare Class 1 estimates to support their bidding and to act as their final control baseline against which all actual costs and resources will now be monitored for variations to their bid. During construction, Class 1 estimates may be prepared to support change management.

Estimating Methodology:
Class 1 estimates generally involve the highest degree of deterministic estimating methods, and require a great amount of effort. Class 1 estimates are prepared in great detail, and thus are usually performed on only the most important or critical areas of the project. All items in the estimate are usually unit cost line items based on actual design quantities.

Expected Accuracy Range:
Typical accuracy ranges for Class 1 estimates are
-3% to -10% on the low side, and +3% to +15% on the high side, depending on the technological complexity of the project, appropriate reference information, and other risks (after inclusion of an appropriate contingency determination). Ranges could exceed those shown if there are unusual risks.

Alternate Estimate Names, Terms, Expressions, Synonyms:
Full detail, release, fall-out, tender, firm price, bottoms-up, final, detailed control, forced detail, execution phase, master control, fair price, definitive, change order estimate.

Table 2e – Class 1 Estimate

6. ESTIMATE INPUT CHECKLIST AND MATURITY MATRIX

Table 3 maps the extent and maturity of estimate input information (deliverables) against the five estimate classification levels. This is a checklist of basic deliverables found in common practice in the process industries. The maturity level is an approximation of the completion status of the deliverable. The completion is indicated by the following descriptors:

General Project Data:

- **Not Required (NR):** May not be required for all estimates of the specified class, but specific project estimates may require at least preliminary development.

- **Preliminary (P):** Project definition has begun and progressed to at least an intermediate level of completion. Review and approvals for its current status has occurred.

- **Defined (D):** Project definition is advanced, and reviews have been conducted. Development may be near completion with the exception of final approvals.

Technical Deliverables:

- **Not Required (NR):** Deliverable may not be required for all estimates of the specified class, but specific project estimates may require at least preliminary development.

- **Started (S):** Work on the deliverable has begun. Development is typically limited to sketches, rough outlines, or similar levels of early completion.

- **Preliminary (P):** Work on the deliverable is advanced. Interim, cross-functional reviews have usually been conducted. Development may be near completion except for final reviews and approvals.

- **Complete (C):** The deliverable has been reviewed and approved as appropriate.

MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES	ESTIMATE CLASSIFICATION				
	CLASS 5	CLASS 4	CLASS 3	CLASS 2	CLASS 1
	0% to 2%	1% to 15%	10% to 40%	30% to 75%	65% to 100%
GENERAL PROJECT DATA:					
A. SCOPE:					
Non-Process Facilities (Infrastructure, Ports, Pipeline, Power Transmission, etc.)	P	P	D	D	D
Project Scope of Work Description	P	P	D	D	D
Byproduct and Waste Disposal	NR	P	D	D	D
Site Infrastructure (Access, Construction Power, Camp etc.)	NR	P	D	D	D
B. CAPACITY:					
Plant Production / Facility (includes power facilities)	P	P	D	D	D
Electrical Power Requirements (when not the primary capacity driver)	NR	P	D	D	D

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MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES	ESTIMATE CLASSIFICATION				
	CLASS 5	CLASS 4	CLASS 3	CLASS 2	CLASS 1
	0% to 2%	1% to 15%	10% to 40%	30% to 75%	65% to 100%
C. PROJECT LOCATION:					
Plant and Associated Facilities	P	P	D	D	D
D. REQUIREMENTS:					
Codes and/or Standards	NR	P	D	D	D
Communication Systems	NR	P	D	D	D
Fire Protection and Life Safety	NR	P	D	D	D
Environmental Monitoring	NR	NR	P	P	D
E. TECHNOLOGY SELECTION:					
Process Technology	P	P	D	D	D
F. STRATEGY:					
Contracting / Sourcing	NR	P	D	D	D
Escalation	NR	P	D	D	D
G. PLANNING:					
Logistics Plan	P	P	P	D	D
Integrated Project Plan[1]	NR	P	D	D	D
Project Code of Accounts	NR	P	D	D	D
Project Master Schedule	NR	P	D	D	D
Regulatory Approval & Permitting	NR	P	D	D	D
Risk Register	NR	P	D	D	D
Stakeholder Consultation / Engagement / Management Plan	NR	P	D	D	D
Work Breakdown Structure	NR	P	D	D	D
Startup and Commissioning Plan	NR	P	P/D	D	D
H. STUDIES:					
Environmental Impact / Sustainability Assessment	NR	P	D	D	D
Environmental / Existing Conditions	NR	P	D	D	D
Soils and Hydrology	NR	P	D	D	D
TECHNICAL DELIVERABLES:					
Block Flow Diagrams	S/P	C	C	C	C
Equipment Datasheets	NR/S	P	C	C	C
Equipment Lists: Electrical	NR/S	P	C	C	C

[1] The integrated project plan (IPP), project execution plan (PEP), project management plan (PMP), or more broadly the project plan, is a high-level management guide to the means, methods and tools that will be used by the team to manage the project. The term integration emphasizes a project life cycle view (the term execution implying post-sanction) and the need for alignment. The IPP covers all functions (or phases) including engineering, procurement, contracting strategy, fabrication, construction, commissioning and startup within the scope of work. However, it also includes stakeholder management, safety, quality, project controls, risk, information, communication and other supporting functions. In respect to estimate classification, to be rated as *defined*, the IPP must cover all the relevant phases/functions in an integrated manner aligned with the project charter (i.e., objectives and strategies); anything less is *preliminary*. The overall IPP cannot be rated as *defined* unless all individual elements are defined and integrated.

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MATURITY LEVEL OF PROJECT DEFINITION DELIVERABLES	ESTIMATE CLASSIFICATION				
	CLASS 5	CLASS 4	CLASS 3	CLASS 2	CLASS 1
	0% to 2%	1% to 15%	10% to 40%	30% to 75%	65% to 100%
Equipment Lists: Process / Utility / Mechanical	NR/S	P	C	C	C
Heat & Material Balances	NR	C	C	C	C
Process Flow Diagrams (PFDs)	NR	C	C	C	C
Utility Flow Diagrams (UFDs)	NR	C	C	C	C
Design Specifications	NR	S/P	C	C	C
Electrical One-Line Drawings	NR	S/P	C	C	C
General Equipment Arrangement Drawings	NR	S/P	C	C	C
Instrument List	NR	S/P	C	C	C
Piping & Instrument Diagrams (P&IDs)	NR	S/P	C	C	C
Plot Plans / Facility Layouts	NR	S/P	C	C	C
Construction Permits	NR	S/P	P/C	C	C
Civil / Site / Structural / Architectural Discipline Drawings	NR	S/P	P	C	C
Demolition Plan and Drawings	NR	S/P	P	C	C
Erosion Control Plan and Drawings	NR	S/P	P	C	C
Fire Protection and Life Safety Drawings and Details	NR	S/P	P	C	C
Electrical Schedules	NR	NR/S	P	P/C	C
Instrument and Control Schedules	NR	NR/S	P	P/C	C
Instrument Datasheets	NR	NR/S	P	P/C	C
Piping Schedules	NR	NR/S	P	P/C	C
Piping Discipline Drawings	NR	NR/S	S/P	C	C
Spare Parts Listings	NR	NR	P	P/C	C
Electrical Discipline Drawings	NR	NR	S/P	P/C	C
Facility Emergency Communication Plan and Drawings	NR	NR	S/P	P/C	C
Information Systems / Telecommunication Drawings	NR	NR	S/P	P/C	C
Instrumentation / Control System Discipline Drawings	NR	NR	S/P	P/C	C
Mechanical Discipline Drawings	NR	NR	S/P	P/C	C

Table 3 – Estimate Input Checklist and Maturity Matrix (Primary Classification Determinate)

7. BASIS OF ESTIMATE DOCUMENTATION

The basis of estimate (BOE) typically accompanies the cost estimate. The basis of estimate is a document that describes how an estimate is prepared and defines the information used in support of development. A basis document commonly includes, but is not limited to, a description of the scope included, methodologies used, references and defining deliverables used, assumptions and exclusions made, clarifications, adjustments, and some indication of the level of uncertainty.

The BOE is, in some ways, just as important as the estimate since it documents the scope and assumptions; and provides a level of confidence to the estimate. The estimate is incomplete without a well-documented basis of estimate. See AACE Recommended Practice 34R-05 *Basis of Estimate* for more information [12].

8. PROJECT DEFINITION RATING SYSTEM

An additional step in documenting the maturity level of project definition is to develop a project definition rating system. This is another tool for measuring the completeness of project scope definition. Such a system typically provides a checklist of scope definition elements and a scoring rubric to measure maturity or completeness for each element. A better project definition rating score is typically associated with a better probability of achieving project success.

Such a tool should be used in conjunction with the AACE estimate classification system; it does not replace estimate classification. A key difference is that a project definition rating measures overall maturity across a broad set of project definition elements, but it usually does not ensure completeness of the key project definition deliverables required to meet a specific class of estimate. For example, a good project definition rating may sometimes be achieved by progressing on additional project definition deliverables, but without achieving signoff or completion of a key deliverable.

AACE estimate classification is based on ensuring that key project deliverables have been completed or met the required level of maturity. If a key deliverable that is indicated as needing to be complete for Class 3 (as an example) has not actually been completed, then the estimate cannot be regarded as Class 3 regardless of the maturity or progress on other project definition elements.

An example of a project definition rating system is the *Project Definition Rating Index* developed by the Construction Industry Institute. It has developed several indices for specific industries, such as IR113-2 [13] for the process industry and IR115-2 [14] for the building industry. Similar systems have been developed by the US Department of Energy [15].

9. CLASSIFICATION FOR LONG-TERM PLANNING AND ASSET LIFE CYCLE COST ESTIMATES

As stated in the Purpose section, classification maps the phases and stages of project cost estimating. Typically, in a phase-gate project system, scope definition and capital cost estimating activities flow from framing a business opportunity through to a capital investment decision and eventual project completion in a more-or-less steady, short-term (e.g., several years) project life-cycle process.

Cost estimates are also prepared to support long-range (e.g., perhaps several decades) capital budgeting and/or asset life cycle planning. Asset life cycle estimates are also prepared to support net present value (e.g., estimates for initial capital project, sustaining capital, and decommissioning projects), value engineering and other cost or economic studies. These estimates are necessary to address sustainability as well. Typically, these long-range estimates are based on minimal scope definition as defined for *Class 5*. However, these asset life cycle "conceptual" estimates are prepared so far in advance that it is virtually assured that the scope will change from even the minimal level of definition assumed at the time of the estimate. Therefore, the expected estimate accuracy values reported in Table 1 (percent that actual cost will be over or under the estimate including contingency) are not meaningful because the Table 1 accuracy values explicitly *exclude scope change*. For long-term estimates, one of the following two classification approaches is recommended:

- If the long-range estimate is to be updated or maintained periodically in a controlled, documented life cycle process that addresses scope and technology changes in estimates over time (e.g., nuclear or other licensing may require that future decommissioning estimates be periodically updated), the estimate is rated as *Class 5* and the Table 1 accuracy ranges are assumed to apply for the specific scope included in the estimate at the time of estimate preparation. Scope changes are explicitly excluded from the accuracy range.

- If the long-range estimate is performed as part of a process or analysis where scope and technology change is not expected to be addressed in routine estimate updates over time, the estimate is rated as *Unclassified* or as *Class 10* (if a class designation is required to meet organizational procedures), and the Table 1 accuracy ranges cannot be assumed to apply. The term *Class 10* is specifically used to distinguish these long-range estimates from the relatively short time-frame *Class 5* through *Class 1* capital cost estimates identified in Table 1 and this RP; and to indicate the order-of-magnitude difference in potential expected estimate accuracy due to the infrequent updates for scope and technology. Unclassified (or Class 10) estimates are not associated with indicated expected accuracy ranges.

In all cases, a *Basis of Estimate* should be documented so that the estimate is clearly understood by those reviewing and/or relying on them later. Also, the estimating methods and other characteristics of Class 5 estimates generally apply. In other words, an *Unclassified* or *Class 10* designation must not be used as an excuse for unprofessional estimating practice.

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APPENDIX: UNDERSTANDING ESTIMATE CLASS AND COST ESTIMATE ACCURACY

Despite the verbiage included in the RP, often, there are still misunderstandings that the class of estimate, as defined in the RP above, defines an expected accuracy range for each estimate class. This is incorrect. The RP clearly states that "while a target range may be expected for a particular estimate, the accuracy range should always be determined through risk analysis of the specific project and should never be predetermined." Table 1 and Figure 1 in the RP are intended to illustrate only the general relationship between estimate accuracy and the level of project definition. For the process industries, typical estimate ranges described in RP 18R-97 above are shown as a range of ranges:

- Class 5 Estimate:
  - High range typically ranges from +30% to +100%
  - Low range typically ranges from -20% to -50%
- Class 4 Estimate:
  - High range typically ranges from +20% to +50%
  - Low range typically ranges from -15% to -30%
- Class 3 Estimate:
  - High range typically ranges from +10% to +30%
  - Low range typically ranges from -10% to -20%
- Class 2 Estimate:
  - High range typically ranges from +5% to +20%
  - Low range typically ranges from -5% to -15%
- Class 1 Estimate:
  - High range typically ranges from +3% to +15%
  - Low range typically ranges from -3% to -10%

As indicated in the RP, these +/- percentage members associated with an estimate class are intended as rough indicators of the accuracy relationship. They are merely a useful simplification given the reality that every individual estimate will be associated with a unique probability distribution correlated with its specific level of uncertainty. As indicated in the RP, estimate accuracy should be determined through a risk analysis for each estimate.

It should also be noted that there is no indication in the RP of contingency determination being based on the class of estimate. AACE has recommended practices that address contingency determination and risk analysis methods (for example RP 40R-08, *Contingency Estimating – General Principles* [9]). Furthermore, the level of contingency required for an estimate is not the same as the upper limits of estimate accuracy (as determined by a risk analysis).

The results of the estimating process are often conveyed as a single value of cost or time. However, since estimates are predications of an uncertain future, it is recommended that all estimate results should be presented as a probabilistic distribution of possible outcomes in consideration of risk.

Every estimate is a prediction of the expected final cost or duration of a proposed project or effort (for a given scope of work). By its nature, an estimate involves assumptions and uncertainties. Performing the work is also subject to risk conditions and events that are often difficult to identify and quantify. Therefore, every estimate presented as a single value of cost or duration will likely deviate from the final outcome (i.e., statistical error). In simple terms, this means that every point estimate value will likely prove to be wrong. Optimally, the estimator will analyze the uncertainty and risks and produce a probabilistic estimate that provides decision makers with the probabilities of over-running or under-running any particular cost or duration value. Given this probabilistic nature of an estimate, an estimate should not be regarded as a single point cost or duration. Instead, an estimate actually

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reflects a range of potential outcomes, with each value within this range associated with a probability of occurrence.

Individual estimates should always have their accuracy ranges determined by a quantitative risk analysis study that results in an estimate probability distribution. The estimate probability distribution is typically skewed. Research shows the skew is typically to the right (positive skewness with a longer tail to the right side of the distribution) for large and complex projects. In part, this is because the impact of risk is often unbounded on the high side.

High side skewness implies that there is potential for the high range of the estimate to exceed the median value of the probability distribution by a higher absolute value than the difference between the low range of the estimate and the median value of the distribution.

Figure A1 shows a positively skewed distribution for a sample cost estimate risk analysis that has a point base estimate (the value before adding contingency) of $89.5. In this example, a contingency of $4.5 (approximately 5%) is required to achieve a 50% probability of underrun, which increases the final estimate value after consideration of risk to $93. Note that this example is intended to describe the concepts but not to recommend specific confidence levels for funding contingency or management reserves of particular projects; that depends on the stakeholder risk attitude and tolerance.

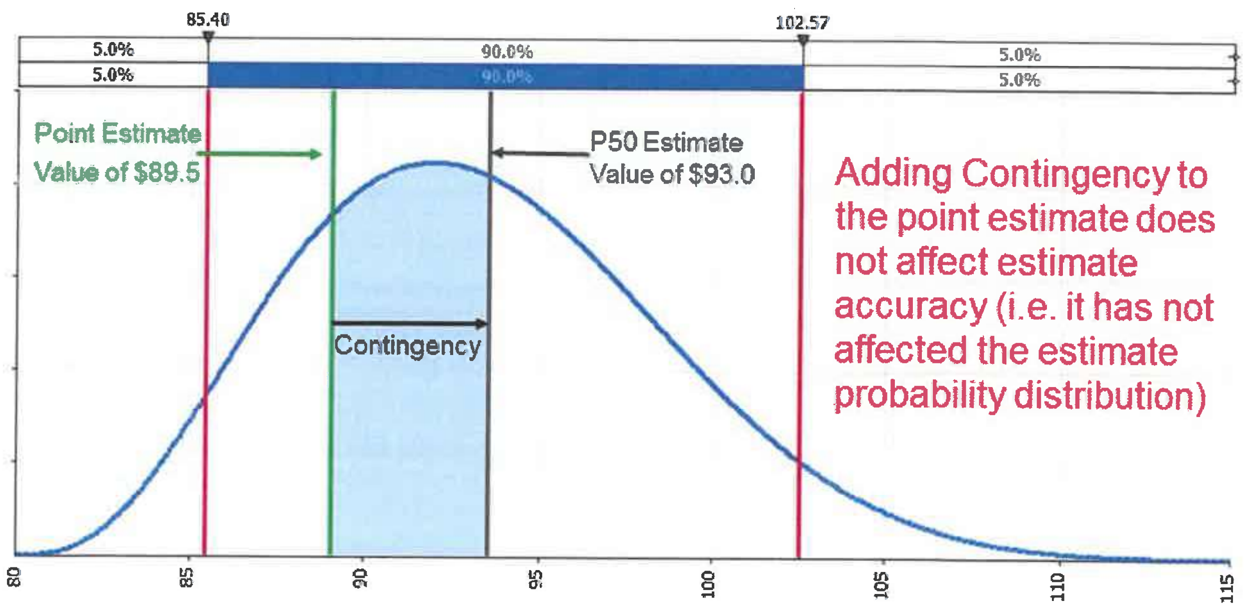

Figure – A1: Example of an Estimate Probability Distribution at a 90% Confidence Interval

Note that adding contingency to the base point estimate does not affect estimate accuracy in absolute terms as it has not affected the estimate probability distribution (i.e., high and low values are the same). Adding contingency simply increases the probability of underrunning the final estimate value and decreases the probability of overrunning the final estimate value. In this example, the estimate range with a 90% confidence interval remains between approximately $85 and $103 regardless of the contingency value.

As indicated in the RP, expected estimate accuracy tends to improve (i.e., the range of probable values narrows) as the level of project scope definition improves. In terms of the AACE International estimate classifications, increasing levels of project definition are associated with moving from Class 5 estimates (lowest level of scope definition) to Class 1 estimates (highest level of scope definition), as shown in Figure 1 of the RP. Keeping in mind that accuracy is an expression of an estimate's predicted closeness to the final actual value; anything included in that final actual cost, be it the result of general uncertainty, risk conditions and events, price escalation, currency or anything else within the project scope, is something that estimate accuracy measures must communicate in some manner. With that in mind, it should be clear why standard accuracy range values are not applicable to individual estimates.

The level of project definition reflected in the estimate is a key risk driver and hence is at the heart of estimate classification, but it is not the only driver of estimate risk and uncertainty. Given all the potential sources of risk and uncertainty that will vary for each specific estimate, it is simply not possible to define a range of estimate accuracy solely based on the level of project definition or class of estimate.

UNAPPROVED

South Central Connecticut Regional Water Authority
Compensation Committee

Minutes of the August 24, 2023 Meeting

A special meeting of the South Central Connecticut Regional Water Authority Compensation Committee took place on Thursday, August 24, 2023, 90 Sargent Drive, New Haven, Connecticut and via remote access. Chair Borowy presided.

Committee members present – Messrs. Borowy, Curseaden, Ricozzi, and Mss. LaMarr and Sack
Management – Mss. Kowalski, Calo and Messrs. Bingaman, Donovan, Hill, Lakshminarayanan and Singh
Willis Towers Watson – Messrs. Wathen and Meng, and Ms. Koch
Staff – Mrs. Slubowski

Chair Borowy called the meeting to order at 12:31 p.m.

On motion duly made by Mr. Ricozzi, seconded by Ms. LaMarr, the Committee voted to approve the minutes of its July 27, 2023 meeting.

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Abstain

At 12:32 p.m., Mss. Kowalski and Messrs. Donovan, Hill, Lakshminarayanan and Singh withdrew from the meeting. On motion made by Mr. Ricozzi, seconded by Ms. LaMarr, the committee voted unanimously to go into executive session pursuant to C.G.S. Section 1-200(6)(E), to discuss matters covered by Section 1-210(b)(5)(A) pertaining to trade secrets and C.G.S. Section 1-200(6)(B), to discuss matters pertaining to personnel. Present in executive session were Authority members, Messrs. Bingaman, Wathen, Weng, and Mss. Calo, Koch and Slubowski.

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

At 1:38 p.m., Messrs. Wathen and Weng, and Ms. Koch withdrew from the meeting.

From 2:10 p.m. to 2:27 p.m., Mr. Bingaman, and Mss. Calo and Slubowski withdrew from the meeting.

At 2:45 p.m., the committee came out of executive session. No votes were taken in executive session

Committee members stated for the record that the presentation provided by Willis Towers Watson was informative and provided a good base for the Committee to make its decision and provided a comprehensive competitive assessment to better understand the marketplace and competitors. In addition, the discussion in executive session was robust and provided various aspects of management's request and reasoning for the Committee's decision.

After discussion, on motion made by Ms. LaMarr, and seconded by Mr. Curseaden, the Committee voted unanimously to recommend to the Authority the Chief Executive Officer's compensation, as presented and discussed in executive session.

At 2:57 p.m., on motion made by Ms. Sack, seconded by Ms. LaMarr, and unanimously carried the meeting adjourned.

Borowy	Aye
Curseaden	Aye
LaMarr	Aye
Ricozzi	Aye
Sack	Aye

David Borowy, Chair