

INVESTMENT PERFORMANCE SUMMARY

OFFICE OF THE TREASURER & CASH MANAGEMENT POLICY BOARD

Month Ending December 31, 2019

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BOSTON | ATLANTA | CHARLOTTE | CHICAGO | DETROIT | LAS VEGAS | PORTLAND | SAN FRANCISCO

CALENDAR YEAR INDEX PERFORMANCE

	2013	2014	2015	2016	2017	2018	2019	Q1	Q2	Q3	Q4	Dec.	5yr	10yr
Reserve Custom Index	0.12%	1.10%	0.86%	1.15%	1.00%	1.88%	6.62%	2.19%	2.71%	1.48%	0.10%	-0.01%	2.28%	1.95%
Endowment Custom Index	14.46%	5.43%	-0.07%	5.71%	14.52%	-5.07%	20.01%	8.63%	3.75%	1.26%	5.15%	1.77%	6.63%	7.39%
3-Month Treasury Bill	0.05%	0.03%	0.03%	0.27%	0.84%	1.86%	2.26%	0.60%	0.61%	0.57%	0.46%	0.14%	1.05%	0.56%
6-Month Treasury Bill	0.10%	0.06%	0.10%	0.40%	0.88%	1.91%	2.38%	0.61%	0.63%	0.60%	0.51%	0.16%	1.13%	0.62%
BAML 1-3 Yr Govt/Credit A+	0.55%	0.72%	0.66%	1.06%	0.70%	1.65%	3.83%	1.10%	1.47%	0.66%	0.56%	0.23%	1.57%	1.45%
BAML 1-5 Yr Govt/Credit A+	0.10%	1.42%	1.07%	1.30%	1.02%	1.50%	4.62%	1.41%	1.86%	0.83%	0.44%	0.18%	1.89%	1.99%
BAML 5-10 Yr Govt/Credit A+	-3.82%	6.61%	1.95%	1.95%	2.98%	0.59%	9.04%	3.13%	3.75%	2.21%	-0.30%	-0.23%	3.26%	4.45%
BBrg Barclays US Aggregate	-2.02%	5.97%	0.55%	2.65%	3.54%	0.01%	8.72%	2.94%	3.08%	2.27%	0.18%	-0.07%	3.05%	3.75%
BC Municipal Bond	-2.55%	9.05%	3.30%	0.25%	5.45%	1.28%	7.54%	2.90%	2.14%	1.58%	0.74%	0.31%	3.53%	4.34%
BC US Corp High Yield	7.44%	2.45%	-4.47%	17.13%	7.50%	-2.08%	14.32%	7.26%	2.50%	1.33%	2.61%	2.00%	6.13%	7.57%
BC Long Treasuries	-12.66%	25.07%	-1.21%	1.33%	8.53%	-1.84%	14.83%	4.67%	6.03%	7.92%	-4.12%	-2.79%	4.13%	7.01%
BC US Long Credit	-6.62%	16.39%	-4.56%	10.22%	12.21%	-6.76%	23.36%	7.86%	7.02%	5.62%	1.18%	0.10%	6.31%	7.99%
MSCI World Index	26.68%	4.94%	-0.87%	7.51%	22.40%	-8.71%	27.67%	12.48%	4.00%	0.53%	8.56%	3.00%	8.74%	9.47%

Source: Bloomberg, Barclays, Alerian, Nareit, MSCI, JP Morgan, Credit Suisse, Thomson One



TOTAL FUND PERFORMANCE DETAIL - NET OF FEES

	Market Value (\$)	% of Portfolio	1 Mo (%)	3 Mo (%)	Fiscal YTD (%)	1 Yr (%)	2 Yrs (%)	3 Yrs (%)	4 Yrs (%)	5 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Delaware Total Consolidation	2,662,578,285	100.00	0.09	0.38	1.66	5.62	3.58	2.97	2.52	2.14	1.46	2.15	Jan-05
Total Liquidity & Reserve	2,586,796,149	97.15	0.02	0.23	1.54	5.20	3.54	2.74	--	--	--	2.49	Nov-16
Total Liquidity	613,707,557	23.05	0.18	0.54	1.21	2.92	2.44	2.00	1.75	1.48	0.99	1.83	Jan-05
PFM Asset Management	308,005,366	11.57	0.16	0.55	1.21	2.88	2.44	2.00	1.79	1.53	--	1.29	Jun-13
Wilmington Liquidity	305,702,191	11.48	0.19	0.54	1.20	2.95	2.43	1.93	1.67	1.44	1.01	4.16	Jan-85
Total Reserve	1,973,088,592	74.10	-0.02	0.12	1.61	6.63	4.24	3.22	2.75	2.36	1.84	2.49	Jan-05
<i>Reserve Custom Index</i>			<u>-0.01</u>	<u>0.10</u>	<u>1.58</u>	<u>6.62</u>	<u>4.22</u>	<u>3.14</u>	<u>2.64</u>	<u>2.28</u>	<u>1.95</u>	<u>2.68</u>	<i>Jan-05</i>
Over/Under			-0.01	0.02	0.03	0.01	0.02	0.08	0.11	0.08	-0.11	-0.19	
JPM Intermediate	481,816,839	18.10	0.23	0.55	1.23	4.05	2.78	2.26	2.02	1.80	--	1.54	Jun-13
<i>J.P. Morgan Custom Index</i>			<u>0.23</u>	<u>0.56</u>	<u>1.22</u>	<u>3.83</u>	<u>2.69</u>	<u>2.12</u>	<u>1.88</u>	<u>1.67</u>	<u>1.64</u>	<u>1.45</u>	<i>Jun-13</i>
Blackrock Financial Mangement	486,482,529	18.27	0.19	0.43	1.34	4.78	--	--	--	--	--	3.82	Mar-18
<i>Blackrock Custom Index</i>			<u>0.18</u>	<u>0.44</u>	<u>1.27</u>	<u>4.62</u>	<u>3.14</u>	<u>2.43</u>	<u>2.10</u>	<u>1.85</u>	<u>1.73</u>	<u>3.71</u>	<i>Mar-18</i>
Chandler Asset Management	505,057,798	18.97	-0.14	-0.04	2.02	8.79	5.48	4.05	3.38	2.86	--	2.39	Jun-13
Lazard Financial Management	499,731,426	18.77	-0.36	-0.43	1.82	8.85	--	--	--	--	--	6.26	Mar-18
<i>Chandler/Lazard Custom Index</i>			<u>-0.23</u>	<u>-0.30</u>	<u>1.90</u>	<u>9.04</u>	<u>5.53</u>	<u>4.00</u>	<u>3.28</u>	<u>2.79</u>	<u>2.20</u>	<u>6.33</u>	<i>Mar-18</i>
Total Endowment	75,782,136	2.85	2.48	5.88	5.98	19.88	5.70	9.18	8.53	--	--	6.65	Aug-15
<i>Endowment Custom Index</i>			<u>1.77</u>	<u>5.15</u>	<u>6.48</u>	<u>20.01</u>	<u>6.73</u>	<u>9.27</u>	<u>8.37</u>	<u>6.63</u>	<u>7.39</u>	<u>6.82</u>	<i>Aug-15</i>
Over/Under			0.71	0.73	-0.50	-0.13	-1.03	-0.09	0.16			-0.17	
SEI Funds	26,275,282	0.99	2.26	5.85	6.54	20.71	5.99	9.62	9.48	--	--	7.64	Aug-15
MSIFT Global Strategist	24,350,513	0.91	2.86	6.13	5.52	18.06	5.20	8.88	8.05	--	--	5.98	Aug-15
JP Morgan Diversified	25,155,918	0.94	2.34	5.68	5.84	20.83	5.53	9.50	8.66	--	--	6.86	Aug-15
Cash Account	423	0.00	0.15	0.44	0.93	2.08	1.76	1.36	1.10	--	--	0.99	Aug-15

Notes: Net of Fees. Results for periods longer than one year are annualized.

Performance history through 12/2015 is from BNY Mellon. NEPC Performance start date is January 2016. Fiscal Year end is June 30.

Reserve Custom Index consists of 25% ICE BofAML 1-5 Yrs AAA-A US Corp & Govt TR / 25% ICE BofAML 1-3 Yrs AAA-A US Corp & Govt / 50% ICE BofA ML US Gov/Credit 5-10 Yrs A Rated and Above, as of 4/1/2018. Prior to this, the index comprised 75% ICE BofAML 1-5 Yrs AAA-A US Corp & Govt TR / 25% ICE BofAML 6 Months US T-Bills TR.

Endowment Custom Index consists of 60% MSCI World Index/40% BBgBarc US Aggregate.

BlackRock Custom Index consists of 100% ICE BofAML 1-5 Yrs AAA-A US Corp & Govt TR.

J.P. Morgan Custom Index consists of 100% ICE BofAML 1-3 Yrs AAA-A US Corp & Govt.

Chandler/Lazard Custom Index consists of ICE BofAML US Gov/Credit 5-10 Yrs A Rated and Above.



YIELD AND DURATION POSITIONING

Liquidity Portfolio Yield and Duration Analysis							
Portfolio					Benchmark		
	Portfolio Value	% of Assets	Yield	Duration		Yield	Duration
PFM \$	308,005,366	11.9%	1.86%	0.57	6-Month Treasury Bill	1.56%	0.48
Wilmington Trust \$	305,702,191	11.8%	1.83%	0.73	6-Month Treasury Bill	1.56%	0.48
Total Liquidity \$	613,707,557	23.7%	1.85%	0.65	6-Month Treasury Bill	1.56%	0.48

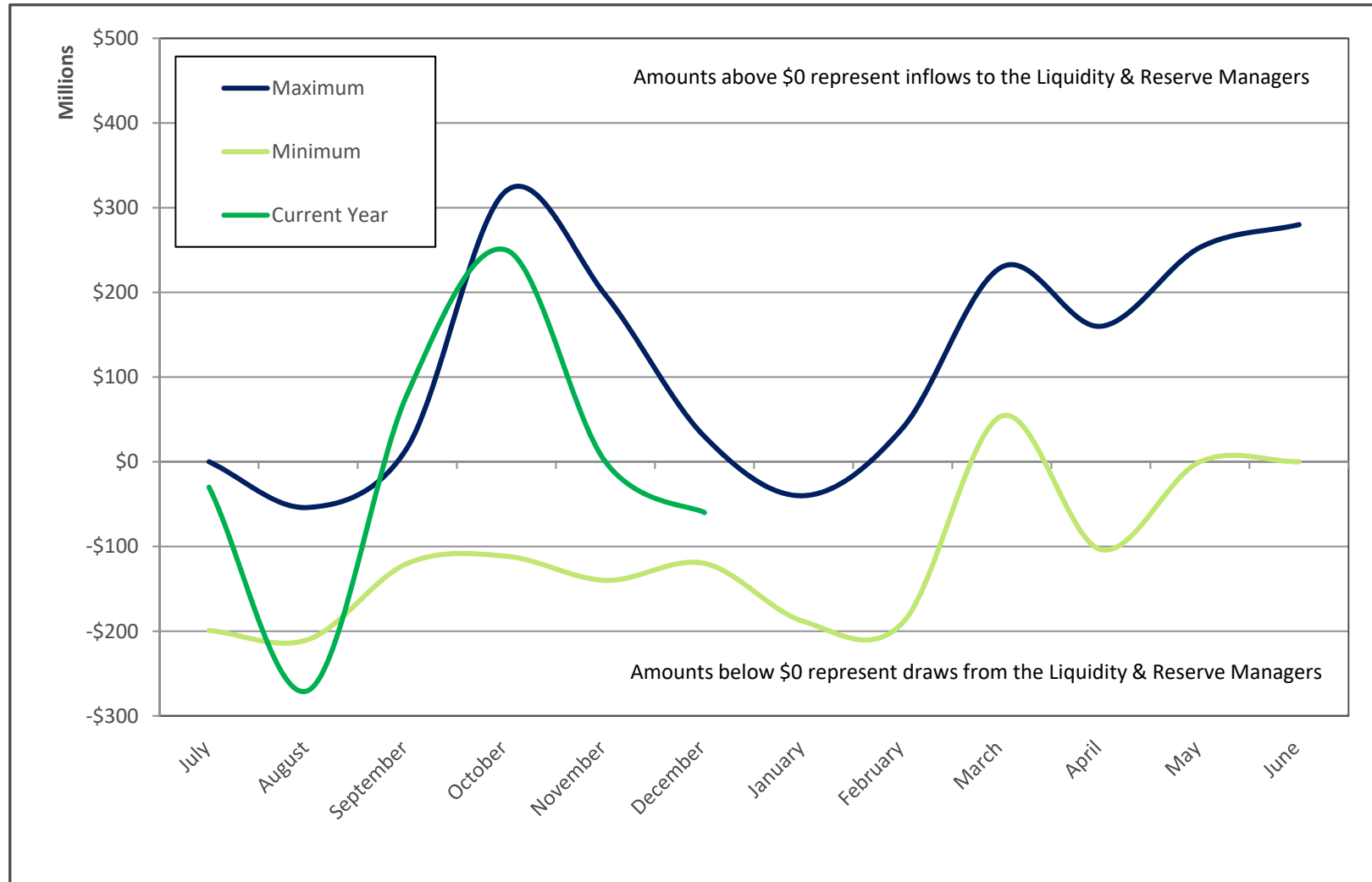
Reserve Portfolio Yield and Duration Analysis							
Portfolio					Benchmark		
	Portfolio Value	% of Assets	Yield	Duration		Yield	Duration
JP Morgan \$	481,816,839	18.6%	1.73%	1.82	BAML 1-3 Yr Govt/Credit A+	1.67%	1.85
BlackRock \$	486,482,529	18.8%	1.78%	2.52	BAML 1-5 Yr Govt/Credit A+	1.71%	2.58
Chandler \$	505,057,798	19.5%	2.08%	6.02	BAML 5-10 Yr Govt/Credit A+	2.02%	6.38
Lazard \$	499,731,426	19.3%	1.97%	6.35	BAML 5-10 Yr Govt/Credit A+	2.02%	6.38
Total Reserve \$	1,973,088,592	76.3%	1.89%	4.22	Custom Reserve Benchmark	1.86%	4.30

Total Liquidity & Reserve Portfolio Yield and Duration Analysis							
Portfolio					Benchmark		
	Portfolio Value	% of Assets	Yield	Duration		Yield	Duration
Total Liquidity & Reserve \$	2,586,796,149	100.0%	1.88%	3.37	Weighted Average	1.78%	3.34

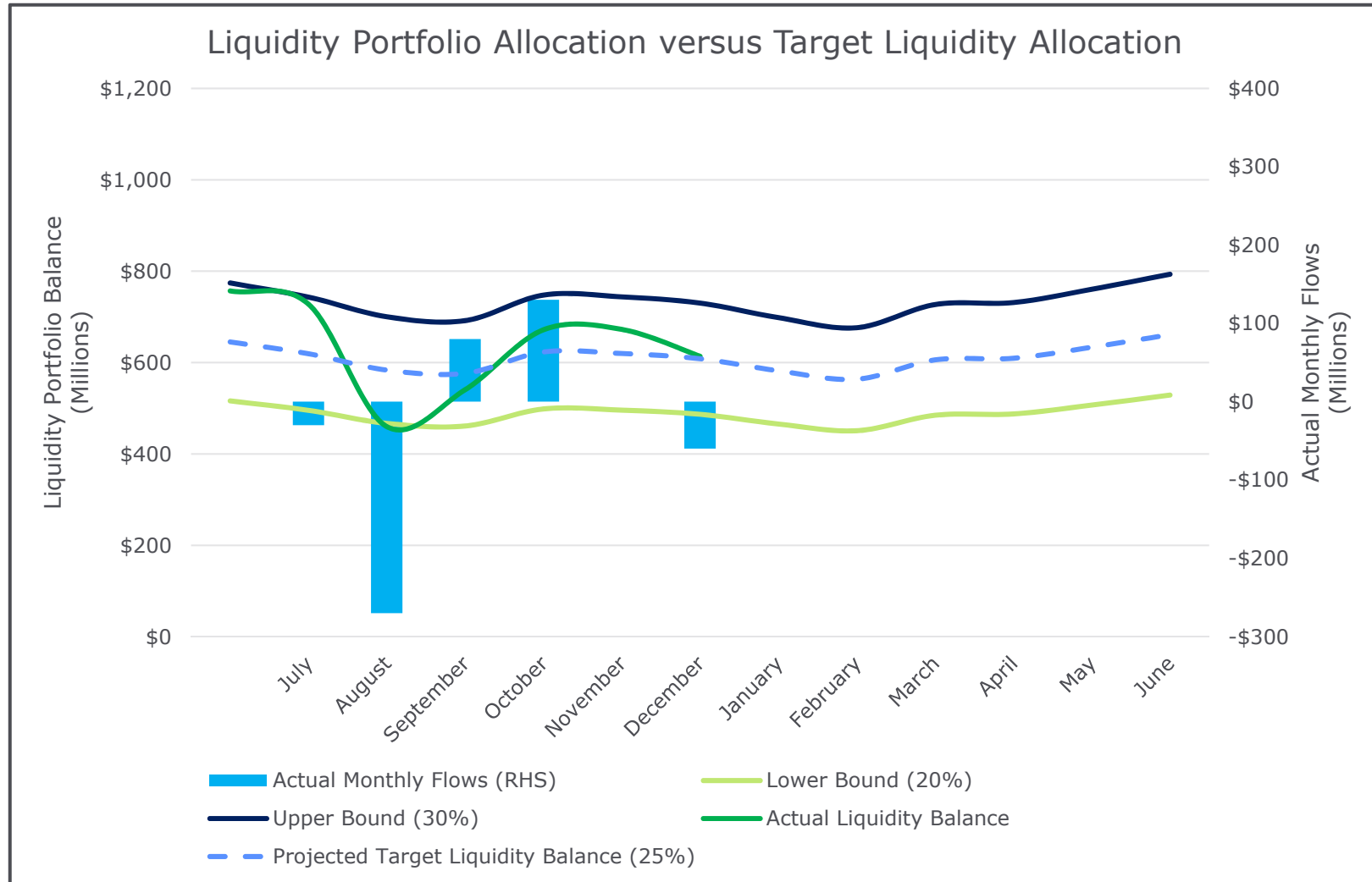
Source: Bloomberg, Barclays, Alerian, Nareit, MSCI, JP Morgan, Credit Suisse, Thomson One



CASH FLOWS – FISCAL YEAR 2020



LIQUIDITY BALANCE – FISCAL YEAR 2020



MONTH ENDED DECEMBER 31, 2019

Change in Market Value Month Ending December 31, 2019										
	Beginning Market Value	Contributions	Withdrawals	Fees	Income	Unrealized Gain (Loss)	Realized Gain (Loss)	Amortization / Accretion	Ending Market Value	
Liquidity Managers										
PFM Asset Management	\$ 337,504,575	\$ -	\$ (30,000,000)	\$ -	\$ 453,298	\$ (12,122)	\$ 5,228	\$ 54,387	\$ 308,005,366	
Wilmington Liquidity	\$ 335,103,215	\$ -	\$ (30,000,000)	\$ -	\$ 465,067	\$ 22,454	\$ 1,590	\$ 109,865	\$ 305,702,191	
Total Liquidity Managers	\$ 672,607,790	\$ -	\$ (60,000,000)	\$ -	\$ 918,365	\$ 10,332	\$ 6,818	\$ 164,252	\$ 613,707,557	
Reserve Managers										
BlackRock Financial Management	\$ 485,571,884	\$ -	\$ -	\$ -	\$ 881,968	\$ (14,113)	\$ 61,689	\$ (18,899)	\$ 486,482,529	
Chandler Asset Management	\$ 505,788,966	\$ -	\$ -	\$ -	\$ 1,048,593	\$ (2,001,645)	\$ 171,560	\$ 50,323	\$ 505,057,798	
JPM Intermediate	\$ 480,687,453	\$ -	\$ -	\$ -	\$ 837,448	\$ 208,561	\$ 99,683	\$ (16,307)	\$ 481,816,839	
Lazard Asset Management	\$ 501,520,701	\$ -	\$ -	\$ -	\$ 1,023,445	\$ (3,647,743)	\$ 861,889	\$ (26,867)	\$ 499,731,426	
Total Reserve Managers	\$ 1,973,569,004	\$ -	\$ -	\$ -	\$ 3,791,454	\$ (5,454,939)	\$ 1,194,822	\$ (11,750)	\$ 1,973,088,592	
Total Liquidity & Reserve Managers	\$ 2,646,176,794	\$ -	\$ (60,000,000)	\$ -	\$ 4,709,819	\$ (5,444,607)	\$ 1,201,639	\$ 152,502	\$ 2,586,796,149	
Land & Water Endowment										
SEI Funds	\$ 25,682,093	\$ 11,546	\$ -	\$ -	\$ 366,935	\$ (70,913)	\$ 285,622	\$ -	\$ 26,275,282	
MSIFT Global Strategist	\$ 23,661,505	\$ 11,546	\$ -	\$ -	\$ 323,278	\$ 260,684	\$ 93,500	\$ -	\$ 24,350,513	
JP Morgan Diversified	\$ 24,568,504	\$ 11,546	\$ -	\$ -	\$ 214,311	\$ (1,260,206)	\$ 1,621,763	\$ -	\$ 25,155,918	
Cash Account	\$ 421	\$ -	\$ -	\$ -	\$ 2	\$ -	\$ -	\$ -	\$ 423	
Total Land & Water Endowment	\$ 73,912,523	\$ 34,638	\$ -	\$ -	\$ 904,526	\$ (1,070,436)	\$ 2,000,886	\$ -	\$ 75,782,136	
Total	\$ 2,720,089,317	\$ 34,638	\$ (60,000,000)	\$ -	\$ 5,614,345	\$ (6,515,042)	\$ 3,202,525	\$ 152,502	\$ 2,662,578,285	

Footnotes:

Values provided by Northern Trust and are reconciled to the audited custodian reports.

Income is a product of income received during the month plus accrued income.

Numbers may not add due to rounding.



FISCAL YEAR TO DATE

	Change in Market Value Fiscal Year-to-Date Through December 31, 2019								
	Beginning Market Value	Contributions	Withdrawals	Fees	Income	Unrealized Gain (Loss)	Realized Gain (Loss)	Amortization / Accretion	Ending Market Value
Liquidity Managers									
PFM Asset Management	\$ 379,459,861	\$ 190,000,000	\$ (265,000,000)	\$ (142,080)	\$ 3,300,506	\$ (214,973)	\$ 431,947	\$ 170,104	\$ 308,005,366
Wilmington Liquidity	\$ 377,298,107	\$ 190,000,000	\$ (265,000,000)	\$ (148,175)	\$ 2,893,824	\$ (583,742)	\$ 525,236	\$ 716,941	\$ 305,702,191
Total Liquidity Managers	\$ 756,757,968	\$ 380,000,000	\$ (530,000,000)	\$ (290,255)	\$ 6,194,330	\$ (798,715)	\$ 957,182	\$ 887,045	\$ 613,707,557
Reserve Managers									
BlackRock Financial Management	\$ 450,402,164	\$ 30,000,000	\$ -	\$ (145,981)	\$ 5,268,720	\$ 257,849	\$ 849,104	\$ (149,326)	\$ 486,482,529
Chandler Asset Management	\$ 465,725,064	\$ 30,000,000	\$ -	\$ (144,173)	\$ 6,037,966	\$ 2,817,824	\$ 281,630	\$ 339,487	\$ 505,057,798
JPM Intermediate	\$ 446,232,523	\$ 30,000,000	\$ -	\$ (159,711)	\$ 5,008,496	\$ (846,737)	\$ 1,567,903	\$ 14,364	\$ 481,816,839
Lazard Asset Management	\$ 461,513,160	\$ 30,000,000	\$ -	\$ (236,930)	\$ 5,829,240	\$ (3,036,221)	\$ 5,551,580	\$ 110,599	\$ 499,731,426
Total Reserve Managers	\$ 1,823,872,911	\$ 120,000,000	\$ -	\$ (686,795)	\$ 22,144,422	\$ (807,286)	\$ 8,250,217	\$ 315,123	\$ 1,973,088,592
Total Liquidity & Reserve Managers	\$ 2,580,630,879	\$ 500,000,000	\$ (530,000,000)	\$ (977,050)	\$ 28,338,752	\$ (1,606,001)	\$ 9,207,399	\$ 1,202,168	\$ 2,586,796,149
Land & Water Endowment									
SEI Funds	\$ 24,666,596	\$ 13,444	\$ (16,833)	\$ (42,659)	\$ 568,190	\$ 790,756	\$ 295,788	\$ -	\$ 26,275,282
MSIFT Global Strategist	\$ 23,080,612	\$ 13,444	\$ (16,833)	\$ -	\$ 325,791	\$ 854,168	\$ 93,330	\$ -	\$ 24,350,513
JP Morgan Diversified	\$ 23,772,475	\$ 13,444	\$ (16,833)	\$ -	\$ 320,936	\$ (555,634)	\$ 1,621,529	\$ -	\$ 25,155,918
Cash Account	\$ 413	\$ 5,695	\$ (5,695)	\$ -	\$ 10	\$ -	\$ -	\$ -	\$ 423
Total Land & Water Endowment	\$ 71,520,096	\$ 46,027	\$ (56,194)	\$ (42,659)	\$ 1,214,927	\$ 1,089,290	\$ 2,010,647	\$ -	\$ 75,782,136
Total	\$ 2,652,150,975	\$ 500,046,027	\$ (530,056,194)	\$ (1,019,709)	\$ 29,553,679	\$ (516,711)	\$ 11,218,046	\$ 1,202,168	\$ 2,662,578,285

Footnotes:

Values provided by Northern Trust and are reconciled to the audited custodian reports.

Income is a product of income received during the month plus accrued income.

Numbers may not add due to rounding.



DEFAC PROJECTION

	DEFAC Current Year	Δ From Previous Observation	FY 21	FY 21 Δ From Previous Observation	FY 22	FY 22 Δ From Previous Observation	FY 23	FY 23 Δ From Previous Observation	FY 24	FY 24 Δ From Previous Observation
	<u>Totals</u>		<u>Totals</u>		<u>Totals</u>		<u>Totals</u>		<u>Totals</u>	
Total Interest	\$63,222,267	\$1,791,411	\$44,773,350	(\$538,606)	\$44,308,514	(\$195,941)	\$43,678,692	\$133,623	\$42,931,620	\$465,060
Total Sweep Income	\$2,386,143	\$3,820	\$1,958,000	-	\$1,958,000	-	\$1,958,000	-	\$1,958,000	-
Change in Market Value	\$7,898,627	\$721,513	\$10,821,520	(\$2,880,993)	\$10,374,031	(\$8,766,118)	\$6,676,242	(\$9,064,079)	\$1,494,321	(\$9,458,328)
Less: School Special Fund Interest Payments	(\$24,970,403)	(\$1,538,382)	(\$20,000,000)	-	(\$20,000,000)	-	(\$20,000,000)	-	(\$20,000,000)	-
Less: Banking Services	(\$4,396,600)	-	(\$4,616,430)	-	(\$4,847,252)	-	(\$5,089,614)	-	(\$5,344,095)	-
Less: Investment Manager Fees	(\$2,077,502)	(\$296)	(\$2,085,676)	(\$308)	(\$2,085,676)	(\$308)	(\$2,085,676)	(\$308)	(\$2,085,676)	(\$308)
DEFAC Projection	\$42,062,533	\$978,067	\$30,850,764	(\$3,419,908)	\$29,707,618	(\$8,962,366)	\$25,137,644	(\$8,930,764)	\$18,954,171	(\$8,993,575)

As of 12/31/2019

The blended benchmark yield declined modestly during the month, causing the current year market value to increase

Interest rate expectations increased in FY22 through FY24, negatively impacting future year market values

Future 1-year rate expectations: FY21: 1.56%, FY22: 1.62%, FY23: 1.66%, FY24: 1.72%



ASSUMPTIONS FOR DEFAC PROJECTION

Net Cash Flows – Assumed to be net neutral over the course of each fiscal year and follow historical seasonality patterns, FY 21 through FY 24 each follow the previous year’s cash flow pattern

Changes in Yield – Actual changes reflected as they are realized, projected changes based on forward yield curve at 1 year and 5 year forward points

Interest – Actual interest reflected as it is realized, projected interest calculated as projected yield times projected market value

Banking Services – Flat estimate of \$366,383 per month; projected to increase 5% annually

School and Special Fund Interest Payments – Actual payments reflected as realized, projected payments calculated based on \$1B average balance and a range-bound rate as implied by the trailing 12M liquidity and liquidity & reserve returns

Investment Manager Fees – Estimated as 8.2 bps per year of assets under management

Information Disclaimer

- Past performance is no guarantee of future results.
- All investments carry some level of risk. Diversification and other asset allocation techniques are not guaranteed to ensure profit or protect against losses.
- NEPC's source for portfolio pricing, calculation of accruals, and transaction information is the plan's custodian bank. Information on market indices and security characteristics is received from other sources external to NEPC. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.
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Reporting Methodology

- The client's custodian bank is NEPC's preferred data source unless otherwise directed. NEPC generally reconciles custodian data to manager data. If the custodian cannot provide accurate data, manager data may be used.
- Trailing time period returns are determined by geometrically linking the holding period returns, from the first full month after inception to the report date. Rates of return are annualized when the time period is longer than a year. Performance is presented gross and/or net of manager fees as indicated on each page.
- For managers funded in the middle of a month, the "since inception" return will start with the first full month, although actual inception dates and cash flows are taken into account in all Composite calculations.
- This report may contain forward-looking statements that are based on NEPC's estimates, opinions and beliefs, but NEPC cannot guarantee that any plan will achieve its targeted return or meet other goals.

