



# Update to Audit Committee on Potential Refunding Transactions

October 18, 2019

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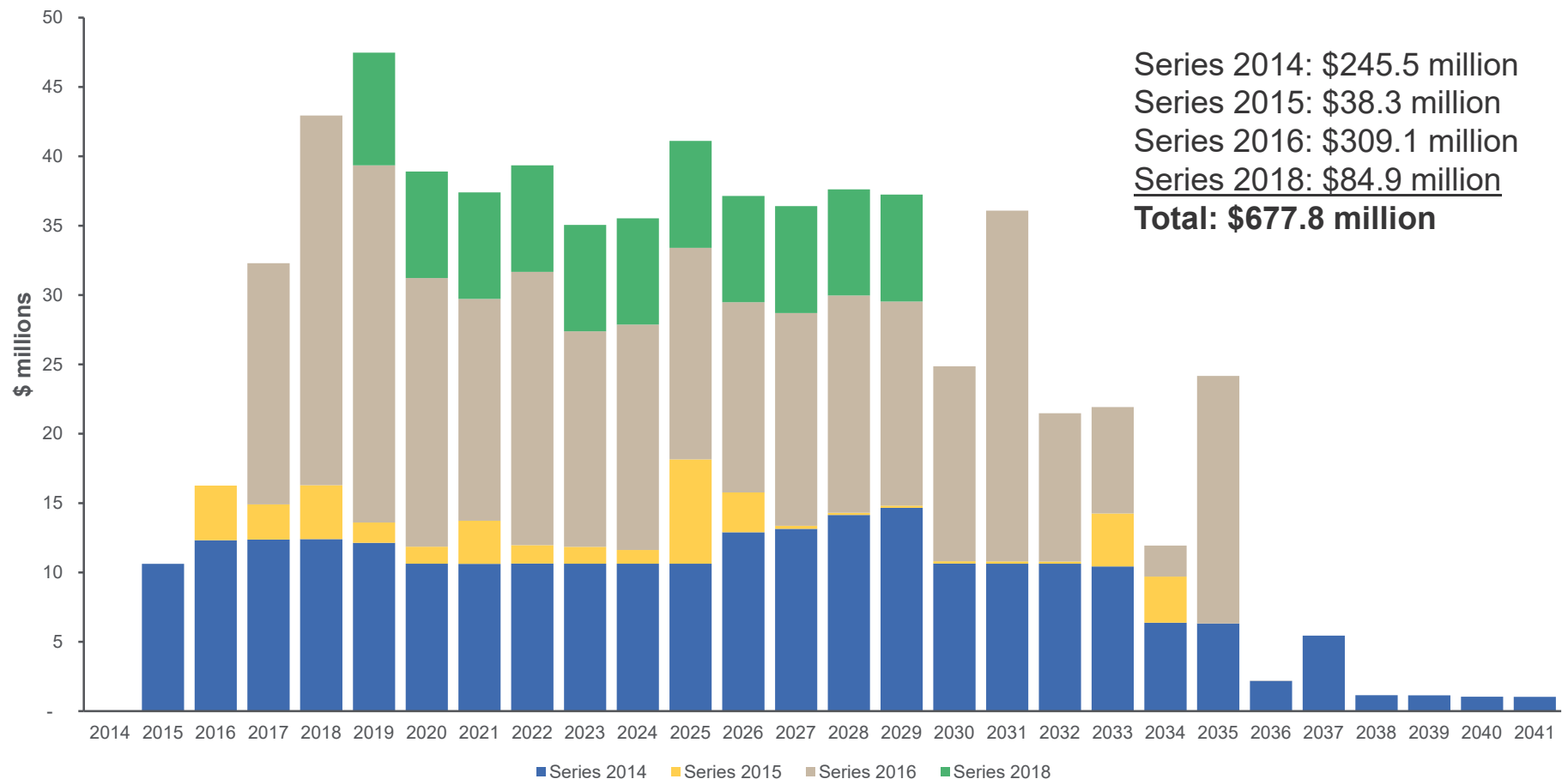
## Summary and Recommendation

- While tax-exempt advance refundings are no longer allowable under current tax law, historically low interest rates have created an opportunity to attain significant savings on a taxable basis for a large universe of bonds
- PFM now recommends pursuing a taxable advance refunding of potentially \$375 million water and \$675 million sewer bonds
  - Market volatility continues but interest rates have moved to historic lows, creating substantial additional value for GLWA
  - Passage of time now also brings tax-exempt forward delivery bonds into viable consideration as well
  - GLWA should consider portfolio approach to manage significant tradeoffs that exist between taxable advance refundings (or forward delivery tax-exempt refunding) now versus tax-exempt current refundings later
- Among water and sewer credits, GLWA can consider up to \$450 million of forward delivery bonds and up to \$1 billion of taxable advance refunding bonds
  - Water system has viable candidates for \$375 million of either tax-exempt forward delivery bonds or taxable advance refunding bonds
  - Sewer system has viable candidates for \$85 million of tax-exempt forward delivery bonds and \$590 million of taxable advance refunding bonds
- Given lead time of 3-5 months for underwriter procurement and to prepare bond offering, beginning preparations now will give GLWA most flexibility to execute when advantageous and meeting Board-adopted guidelines for the transaction



## History of Debt Service Savings Achieved Since 2014

Through the leadership of the Authority's management team, the financing team has been able to achieve nearly \$678 million of cash flow debt service savings for the systems since the tender and refunding transaction in 2014

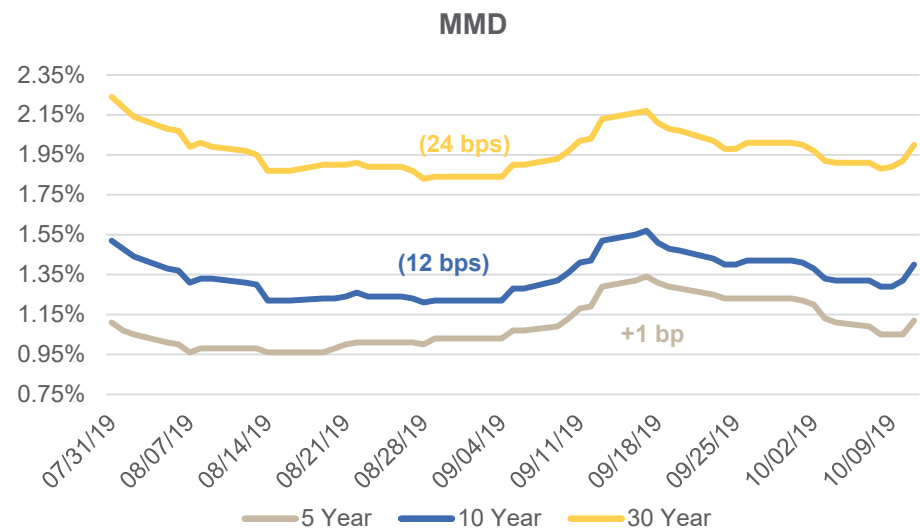
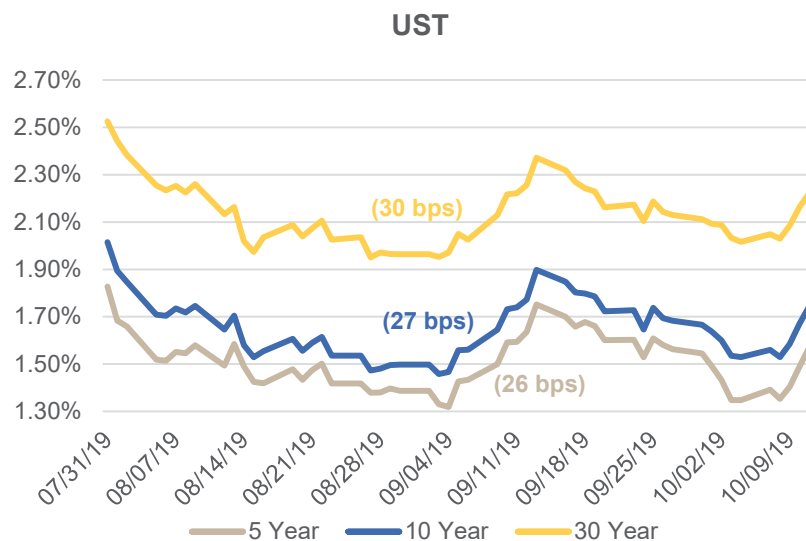


Note: debt service savings is shown on a cash flow basis.



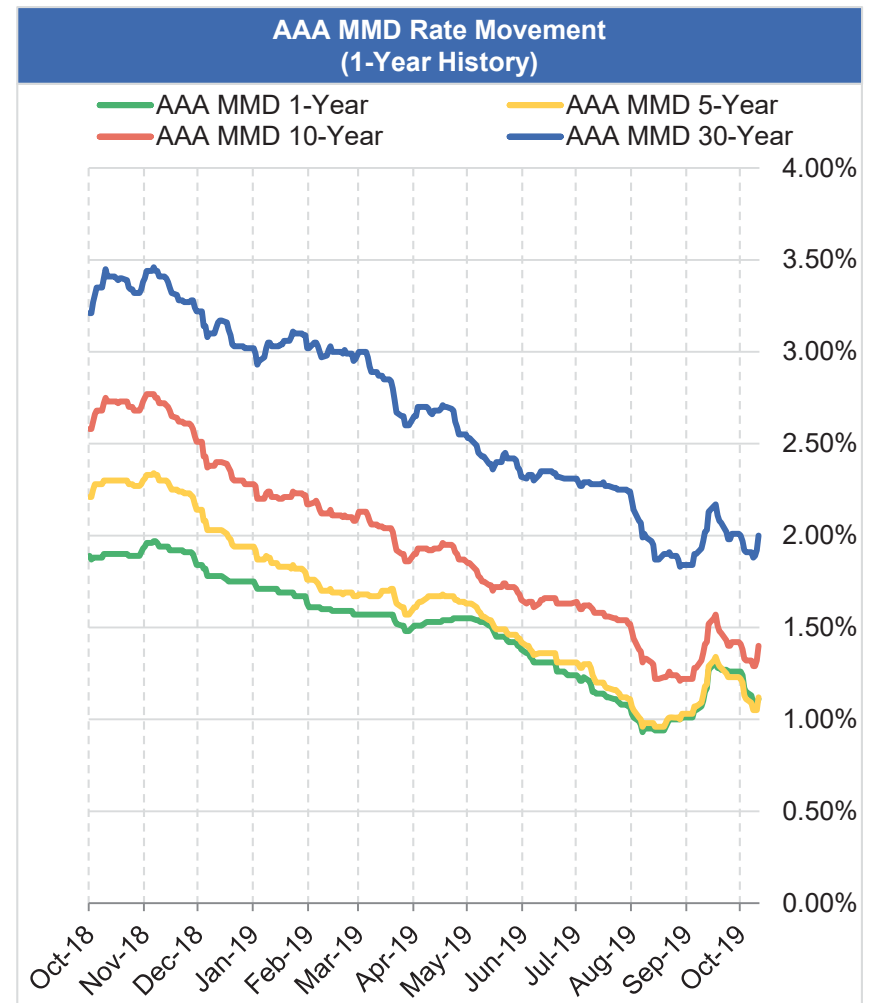
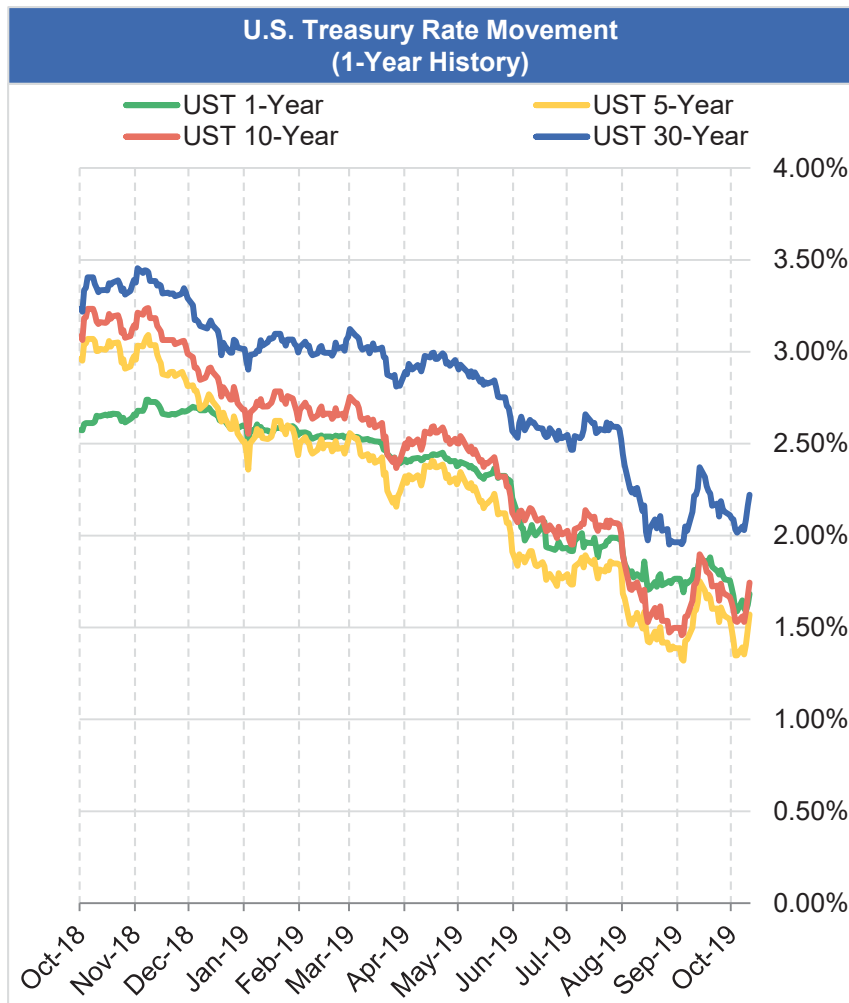
## Significant Market Movements – July 31 to October 15

- Significant decline in rates kicked off by the cut in the federal funds rate at the July FOMC meeting and accelerated by the trade situation between the U.S. and China
  - Tensions surrounding trade war with China continue to drive market
  - Recent poor Chinese and German economic data have fanned fears of a global slowdown
- The 30yr UST and MMD maturities have both reached and set new historic lows in the past month
- The federal funds futures market currently prices a 72% chance of a 25bps rate decrease at the October FOMC meeting
- MMD has underperformed Treasuries in the past month with significant decreases in treasuries echoed by more modest declines in MMD





## U.S. Treasury & AAA MMD Rate Movement

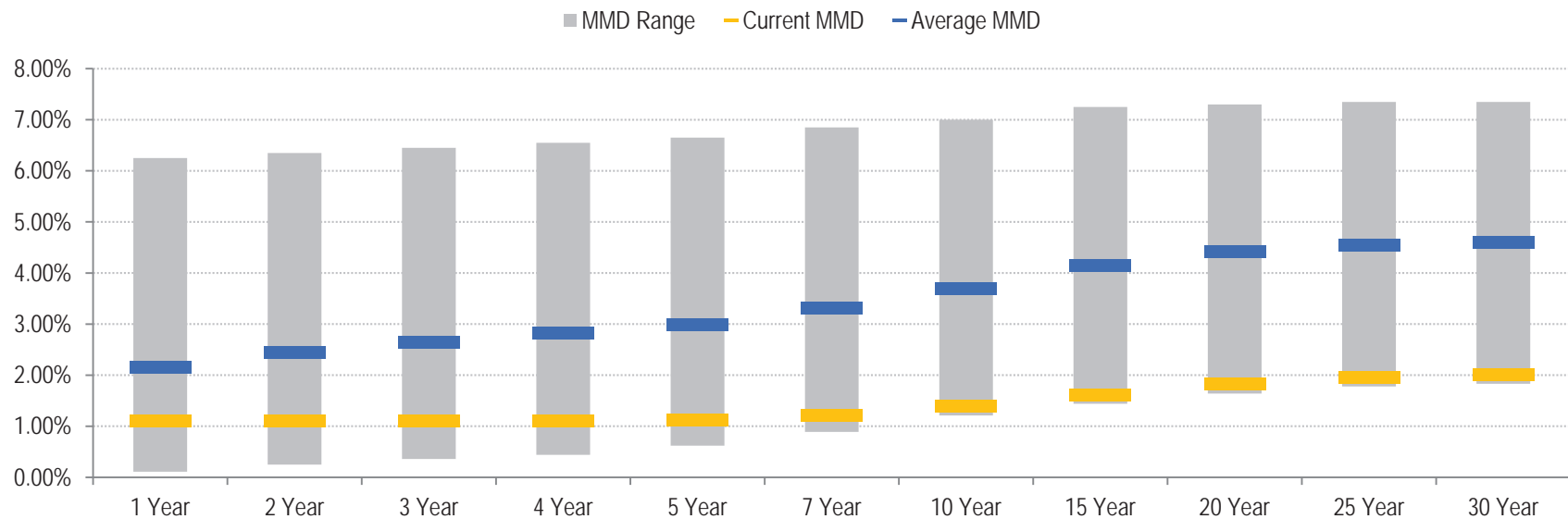


Source: Thomson Reuters



## AAA MMD Position Since Inception

30 Year History of AAA MMD Rate Position  
(October 12, 1989 to October 11, 2019)



Statistic	1 Year	2 Year	3 Year	4 Year	5 Year	7 Year	10 Year	15 Year	20 Year	25 Year	30 Year
10/11/2019	1.11%	1.10%	1.10%	1.11%	1.12%	1.21%	1.40%	1.61%	1.82%	1.95%	2.00%
Average	2.15%	2.44%	2.64%	2.82%	2.99%	3.32%	3.69%	4.15%	4.41%	4.55%	4.59%
Spread to Avg.	-1.04%	-1.34%	-1.54%	-1.71%	-1.87%	-2.11%	-2.29%	-2.54%	-2.59%	-2.60%	-2.59%
Minimum	0.11%	0.25%	0.36%	0.44%	0.62%	0.89%	1.21%	1.44%	1.64%	1.78%	1.83%
Spread to Min.	1.00%	0.85%	0.74%	0.67%	0.50%	0.32%	0.19%	0.17%	0.18%	0.17%	0.17%
Maximum	6.25%	6.35%	6.45%	6.55%	6.65%	6.85%	7.00%	7.25%	7.30%	7.35%	7.35%
Spread to Max.	-5.14%	-5.25%	-5.35%	-5.44%	-5.53%	-5.64%	-5.60%	-5.64%	-5.48%	-5.40%	-5.35%
Percent of Market Days Lower	36.75%	31.46%	28.50%	22.37%	13.03%	5.69%	0.60%	0.48%	0.45%	0.50%	0.50%



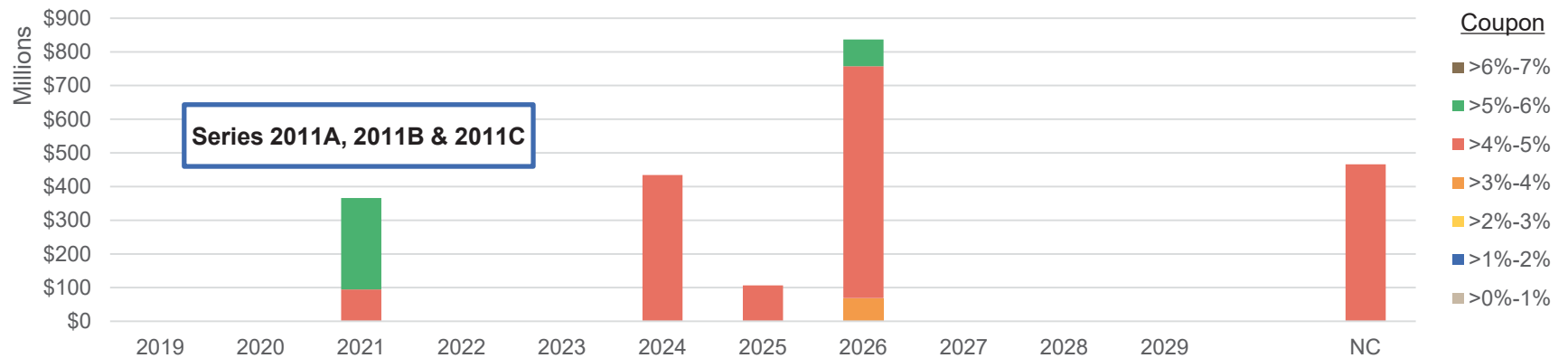
## Interest Rate Forecasts

Bond Yield Forecast (As of October 15, 2019)							
Average Forecasts	Current	Q4 19	Q1 20	Q2 20	Q3 20	Q4 20	Q1 21
30-Year UST	2.16%	2.11%	2.15%	2.22%	2.28%	2.34%	2.42%
10-Year UST	1.69%	1.66%	1.72%	1.80%	1.85%	1.87%	1.97%
2-Year UST	1.55%	1.55%	1.57%	1.58%	1.60%	1.62%	1.66%
3M LIBOR	2.00%	1.86%	1.79%	1.76%	1.75%	1.76%	1.77%
Fed Funds Target Rate (Upper)	2.00%	1.75%	1.65%	1.60%	1.55%	1.55%	1.55%
Fed Funds Target Rate (Lower)	1.75%	1.51%	1.38%	1.33%	1.31%	1.30%	1.32%

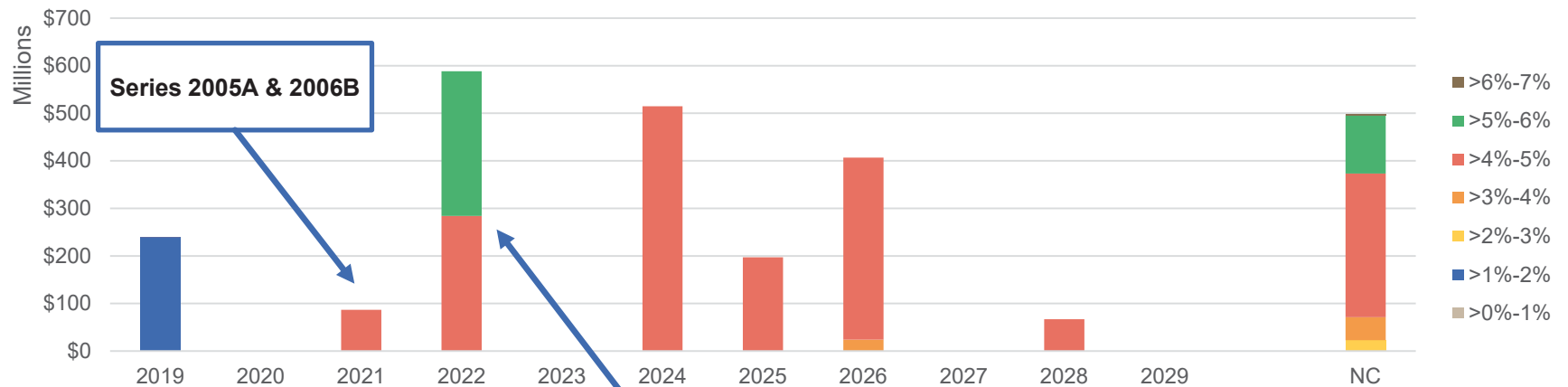


## Fixed Rate Par Call Options

Distribution of Par Call Options on Water Debt (Senior & Second Lien)



Distribution of Par Call Options on Sewer Debt (Senior & Second Lien)







## GLWA Refunding Candidate Summary

Water							
Senior Lien							
Series Name	Indenture	Lien	Tax Status	Coupons	Outstanding (\$000s)	Next Call Date	Callable Par (\$000s)
Series 2011A Senior	Water	Senior	Tax-Exempt	5.00 – 5.75	293,970	7/1/2021	289,605
Series 2011B Senior	Water	Senior	Taxable	6.00	3,950	7/1/2021	2,295
Series 2011C Senior	Water	Senior	Tax-Exempt	4.50 – 5.25	75,145	7/1/2021	74,125
					<b>373,065</b>		<b>373,065</b>
Sewer							
Senior Lien							
Series Name	Indenture	Lien	Tax Status	Coupons	Outstanding (\$000s)	Next Call Date	Callable Par (\$000s)
Series 2012A Senior	Sewer	Senior	Tax-Exempt	5.00 – 5.25	495,175	7/1/2022	437,795
Series 2014C-1 Senior	Sewer	Senior	Tax-Exempt	5.00	123,220	7/1/2022	123,200
Series 2014C-2 Senior	Sewer	Senior	AMT	5.00	27,470	7/1/2022	27,450
					<b>645,865</b>		<b>588,445</b>
Second Lien							
Series Name	Indenture	Lien	Tax Status	Coupons	Outstanding (\$000s)	Next Call Date	Callable Par (\$000s)
Series 2005A Sec.(Call Mod) <sup>1</sup>	Sewer	Second	Tax-Exempt	5.00	31,785	7/1/2021	31,785
Series 2006B Sec.(Call Mod) <sup>2</sup>	Sewer	Second	Tax-Exempt	5.00	55,000	7/1/2021	55,000
					<b>86,785</b>		<b>86,785</b>

Note: excludes series of debt with callable amounts of \$100,000 or less outstanding.

1. The call date on \$31.8 million of the series 2005A Sewer Bonds was modified to July 1, 2021.

2. The call date on \$55.0 million of the Series 2006B Sewer Bonds was modified to July 1, 2021.



## Comparison of Savings Opportunities

Water System												
Candidate				Taxable Advance Refunding			Tax-Exempt Forward Refunding			Future Tax-Exempt Current Refunding		
Series	Lien	Refunded Par	Call Date	Gross Savings (\$000s)	PV Savings (\$000s)	PV Savings (%)	Gross Savings (\$000s)	PV Savings (\$000s)	PV Savings (%)	Gross Savings (\$000s)	PV Savings (\$000s)	PV Savings (%)
Series 2011A	Senior	289,605	7/1/2021	81,236	63,606	21.96%	102,584	65,720	22.69%	124,928	79,737	27.53%
Series 2011B	Senior	2,295	7/1/2021	462	419	18.26%	N/A	N/A	N/A	N/A	N/A	N/A
Series 2011C	Senior	74,125	7/1/2021	13,650	11,246	15.17%	17,527	11,929	16.09%	21,716	14,728	19.87%
<b>Total Water</b>		<b>366,025</b>		<b>95,348</b>	<b>75,271</b>	<b>20.56%</b>	<b>120,111</b>	<b>77,649</b>	<b>21.21%</b>	<b>146,644</b>	<b>94,465</b>	<b>25.81%</b>

Sewer System												
Candidate				Taxable Advance Refunding			Tax-Exempt Forward Refunding			Tax-Exempt Current Refunding		
Series	Lien	Refunded Par	Call Date	Gross Savings (\$000s)	PV Savings (\$000s)	PV Savings (%)	Gross Savings (\$000s)	PV Savings (\$000s)	PV Savings (%)	Gross Savings (\$000s)	PV Savings (\$000s)	PV Savings (%)
Series 2012A	Senior	437,795	7/1/2022	83,099	70,826	16.18%	N/A	N/A	N/A	166,861	108,946	24.89%
Series 2014C-1	Senior	123,200	7/1/2022	25,634	20,408	16.56%	N/A	N/A	N/A	50,008	28,436	23.08%
Series 2014C-2	Senior	27,450	7/1/2022	5,704	4,543	16.55%	N/A	N/A	N/A	9,492	5,401	19.68%
<b>Total Senior</b>		<b>588,445</b>		<b>114,437</b>	<b>95,777</b>	<b>16.28%</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>226,361</b>	<b>142,783</b>	<b>24.26%</b>

Series	Lien	Refunded Par	Call Date	Gross Savings (\$000s)	PV Savings (\$000s)	PV Savings (%)	Gross Savings (\$000s)	PV Savings (\$000s)	PV Savings (%)	Gross Savings (\$000s)	PV Savings (\$000s)	PV Savings (%)
Series 2005A	Second	31,785	7/1/2021	7,144	6,014	18.92%	9,134	6,391	20.11%	11,349	7,940	24.98%
Series 2006B	Second	55,000	7/1/2021	12,442	10,338	18.80%	15,795	10,912	19.84%	19,905	13,595	24.72%
<b>Total Second</b>		<b>86,785</b>		<b>19,586</b>	<b>16,352</b>	<b>18.84%</b>	<b>24,929</b>	<b>17,303</b>	<b>19.94%</b>	<b>30,444</b>	<b>21,535</b>	<b>24.81%</b>

<b>Total Sewer</b>		<b>675,230</b>		<b>134,023</b>	<b>112,129</b>	<b>16.60%</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>256,805</b>	<b>164,318</b>	<b>24.34%</b>
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Assumptions: Matched lien refunding with Delivery Date of January 1, 2020; Interest rates as of September 5, 2019; Maturity by Maturity savings structure; SLGS escrow; issuance costs of \$5/bond. All figures present valued at Taxable Advance Yields to January 1, 2020. Future current refunding savings calculated using current tax-exempt rates. Forward refunding assumes an 18 month forward period with 3.5bps of premium per month. Tax-exempt refunding bonds issued with 5% premium coupon structure and 01 year par call; taxable refunding bonds issued with par coupon structure and 10 year par call.



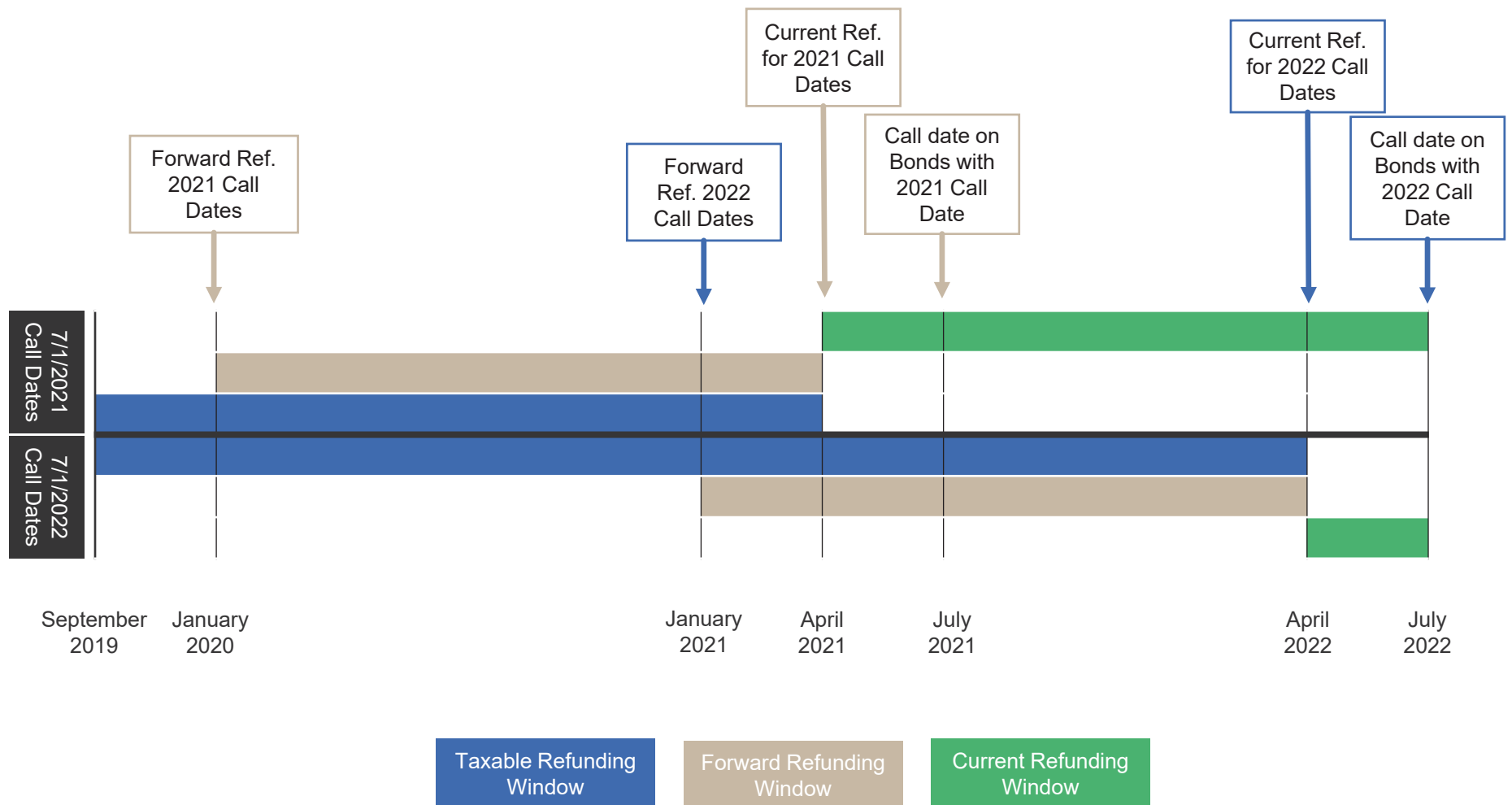
## Considerations and Risks

- Each strategy to extract refunding savings from outstanding debt portfolio comes with a set of trade-offs that should be carefully considered

	Taxable Advance Refunding	Tax-Exempt Current Refunding	Tax-Exempt Forward Refunding	Forward-Starting Interest Rate Swap
<b>Ability to Accomplish Today</b>	✓		✓	✓
<b>Future Obligations</b> (Disclosure, Opinions, etc.)		✓	✓	✓
<b>Interest Rate Risk</b>		✓		
<b>Tax and Credit Risk</b>		✓	✓	✓
<b>Swap-Related (Derivative) Risk</b> (Counterparty, Basis, Liquidity, etc.)				✓
<b>Savings Accrue Immediately</b>	✓			
<b>Maximize <u>Potential</u> Savings</b>		✓		✓
<b>Maximize Value of Future Call Option</b>	✓	✓	✓	
<b>Policy Concerns on Tax-Exemption</b>	✓			



## Potential Refunding Timing





## Taxable Advance Refunding – Water System (as of October 7)

### Savings Summary

- Over \$107 million in gross cashflow savings can be achieved (>\$77 million present value)
- Potential to accelerate savings as desired

### Refunding Candidates

- Includes all callable bonds from Series 2011A/B/C
- Advance refunding on a tax-exempt basis not an option under current tax law

### Assumptions

- Uninsured, matched lien refunding
- Interest rates as of September 5, 2019
- Conservatively assumes no DSRF release
- Contribution of accrued interest from DS fund
- Hypothetical SLGS escrow as of September 5, 2019
- Savings structured for level aggregate savings
- Par coupon structure
- Assumes par call on 1/1/2030
- PV at Bond Yield of 3.17% to 1/1/2020

### Refunding Results

Delivery Date:	1/1/2020
Call Date:	1/1/2030
Refunding Par (\$):	387,600,000
Callable Refunding Par (\$):	323,325,000
Advance Refunded Par (\$):	366,025,000
NPV Savings (\$):	77,250,371
NPV Savings as % :	21.10%
Negative Arbitrage (\$) <sup>1</sup> :	(8,779,862)
Escrow Efficiency <sup>1</sup> :	89.79%
TIC:	3.19%
WAM:	16.8 yrs
Refunded Bonds WAM:	17.6 yrs
PV of 0.01% Change in Interest Rates (\$)	501,766

Date	Prior Net Cashflow (\$)	Refunding DS (\$)	Savings (\$)
6/30/2021	19,091,363	11,824,897	7,266,466
6/30/2022	19,091,363	14,334,547	4,756,816
6/30/2023	19,290,213	14,532,043	4,758,170
6/30/2024	21,235,113	16,475,009	4,760,104
6/30/2025	29,345,550	24,585,588	4,759,963
6/30/2026	27,971,206	23,209,652	4,761,554
6/30/2027	18,032,825	13,274,280	4,758,546
6/30/2028	31,210,650	26,449,643	4,761,008
6/30/2029	21,155,525	16,394,591	4,760,935
6/30/2030	20,940,500	16,180,296	4,760,204
6/30/2031	20,204,225	15,446,639	4,757,586
6/30/2032	20,158,100	15,399,197	4,758,903
6/30/2033	20,002,725	15,245,231	4,757,495
6/30/2034	19,943,275	15,181,749	4,761,526
6/30/2035	19,654,175	14,896,048	4,758,128
6/30/2036	19,600,300	14,838,727	4,761,574
6/30/2037	28,577,925	23,818,051	4,759,874
6/30/2038	42,720,631	37,963,345	4,757,286
6/30/2039	71,625,694	66,867,036	4,758,658
6/30/2040	71,546,513	66,788,066	4,758,447
6/30/2041	71,465,238	66,708,182	4,757,056
6/30/2042	70,117,125	65,359,904	4,757,221
	<b>702,980,231</b>	<b>595,772,716</b>	<b>107,207,515</b>

1. Negative arbitrage and escrow efficiency calculated for illustrative purposes assuming earnings cap on investments at refunding bond yield.



## Taxable Advance Refunding – Sewer System (as of October 7)

### Savings Summary

- Over \$170 million in gross cashflow savings can be achieved (>\$120 million present value)
- Potential to accelerate savings as desired

### Refunding Candidates

- Includes all callable bonds from series 2005A, 2006A, 2012A, 2014C-1 and 2014C-2
- Advance refunding on a tax-exempt basis not an option under current tax law

### Assumptions

- Uninsured, matched lien refunding
- Interest rates as of September 5, 2019
- Conservatively assumes no DSRF release
- Contribution of accrued interest from DS fund
- Hypothetical SLGS escrow as of September 5, 2019
- Savings structured for level aggregate savings by lien
- Par coupon structure
- Assumes par call on 1/1/2030
- PV at Bond Yield of 3.14% to 1/1/2020

### Refunding Results

Delivery Date:	1/1/2020
Call Date:	1/1/2030
Refunding Par (\$):	732,650,000
Callable Refunding Par (\$):	649,330,000
Advance Refunded Par (\$):	675,230,000
NPV Savings (\$):	120,709,254
NPV Savings as % :	17.87%
Negative Arbitrage (\$) <sup>1</sup> :	(27,141,452)
Escrow Efficiency <sup>1</sup> :	81.64%
TIC:	3.14%
WAM:	16.6 yrs
Refunded Bonds WAM:	17.7 yrs
PV of 0.01% Change in Interest Rates (\$)	936,873

Date	Prior Net Cashflow (\$)	Refunding DS (\$)	Savings (\$)
6/30/2021	34,522,363	22,263,259	12,259,104
6/30/2022	34,522,363	27,490,330	7,032,033
6/30/2023	34,522,363	27,489,765	7,032,598
6/30/2024	52,067,488	45,035,075	7,032,412
6/30/2025	33,632,363	26,603,036	7,029,327
6/30/2026	33,631,863	26,600,791	7,031,072
6/30/2027	42,560,650	35,530,648	7,030,002
6/30/2028	35,398,800	28,364,564	7,034,236
6/30/2029	38,892,288	31,862,325	7,029,963
6/30/2030	34,208,413	27,176,686	7,031,727
6/30/2031	38,889,913	31,855,026	7,034,887
6/30/2032	45,769,788	38,738,977	7,030,811
6/30/2033	68,699,413	61,669,854	7,029,559
6/30/2034	29,738,663	22,702,188	7,036,475
6/30/2035	53,965,075	46,933,241	7,031,834
6/30/2036	68,186,813	61,151,863	7,034,950
6/30/2037	51,341,638	44,305,910	7,035,728
6/30/2038	129,464,838	123,692,394	5,772,444
6/30/2039	129,316,281	123,544,919	5,771,362
6/30/2040	129,164,138	123,390,680	5,773,458
6/30/2041	34,117,125	28,345,853	5,771,273
6/30/2042	34,079,375	28,309,212	5,770,163
6/30/2043	34,041,875	28,269,220	5,772,655
6/30/2044	34,006,000	28,236,088	5,769,912
6/30/2045	33,758,375	27,987,420	5,770,955
<b>1,288,498,256</b>			<b>1,117,549,321</b>
			<b>170,948,936</b>

1. Negative arbitrage and escrow efficiency calculated for illustrative purposes assuming earnings cap on investments at refunding bond yield.



## Summary of Key Decision-Making Considerations for a Taxable Advance Refunding

- While taxable bonds lock in a permanent interest rate penalty versus any tax-exempt option, with the elimination of tax-exempt advance refundings municipal issuers have limited other options to “lock in” current rates
- Current taxable rates offer effective refinancing economics of two separate future tax-exempt refundings with 10% PV savings each
- By pursuing a refunding now, GLWA potentially forgoes the opportunity to generate even greater savings later
- Should interest rates increase less than breakeven yield curve movements of approximately 0.50% - 1.60%, higher savings would be generated by a tax-exempt current refunding at each call date
- Future tax-exempt refunding options carry more option value with tax-exempt 5.00% coupons than taxable par coupons
- Alternative options that could generate greater savings for GLWA exist as well – namely forward tax-exempt delivery bonds and use of interest rate swaps – but each has its own limitations
- Forward delivery bonds can typically be completed only within 18 months of the call date, and with a premium to a current refunding transaction and additional disclosure at closing
- Interest rate swaps (and other derivative products) can provide efficient solutions, but come with a set of different business risks and policy considerations
- Despite trade-offs, taxable bonds have extremely strong economics in the current environment and fairly low breakeven yield curve movements to each call date
- Compression vs. tax-exempt rates
- Use of par coupons that increases savings vs. typical 5.00% tax-exempt coupon that is priced to call
- Ability to tax-exempt advance or current refund taxable refunding bonds, once prior tax-exempt bonds are retired



## Potential Refunding Process and Timeline

- October 2019 – Financing team and GLWA staff begin work on transactions
- November 2019 – Appointment of underwriting team; Work on legal and disclosure documents
- December 2019 / January 2020 – Rating Agency meetings
- January 2020 – Audit Committee review and Board approval of documents, including:
  - Preliminary Official Statements
  - Series Ordinances
  - Escrow Agreements
  - Sale Orders
- February 2020 (or thereafter as market conditions permit) – Bond Pricing