

BOND PRICING

**City of Manitowoc (AA-)
General Obligation Refunding Bonds (CR) - FINAL
BQ; Noncallable**

Bond Component	Maturity Date	Amount	Rate	Yield	Price	Premium (-Discount)
Serial Bond:						
	02/01/2021	385,000	2.000%	1.500%	100.601	2,313.85
	02/01/2022	385,000	2.000%	1.550%	100.977	3,761.45
	02/01/2023	395,000	2.000%	1.600%	101.249	4,933.55
	02/01/2024	405,000	3.000%	1.650%	105.479	22,189.95
	02/01/2025	415,000	3.000%	1.700%	106.465	26,829.75
	02/01/2026	75,000	3.000%	1.800%	107.029	5,271.75
	02/01/2027	75,000	3.000%	1.900%	107.386	5,539.50
	02/01/2028	80,000	3.000%	2.000%	107.542	6,033.60
	02/01/2029	80,000	3.000%	2.100%	107.506	6,004.80
	02/01/2030	80,000	3.000%	2.200%	107.283	5,826.40
		2,375,000				88,704.60

Dated Date	11/12/2019	
Delivery Date	11/12/2019	
First Coupon	08/01/2020	
Par Amount	2,375,000.00	
Premium	88,704.60	
Production	2,463,704.60	103.734931%
Underwriter's Discount	(23,750.00)	(1.000000%)
Purchase Price	2,439,954.60	102.734931%
Accrued Interest		
Net Proceeds	2,439,954.60	

SOURCES AND USES OF FUNDS

**City of Manitowoc (AA-)
General Obligation Refunding Bonds (CR) - FINAL
BQ; Noncallable**

Dated Date 11/12/2019
Delivery Date 11/12/2019

Sources:

Bond Proceeds:	
Par Amount	2,375,000.00
Net Premium	88,704.60
	<u>2,463,704.60</u>
Income:	
Estimated Investment Earnings (2.00%)	10,621.11
	<u>2,474,325.71</u>

Uses:

Refunding Escrow Deposits:	
Cash Deposit	2,420,000.00
Cost of Issuance:	
S&P Rating Fee	11,500.00
Q&B Bond Counsel	9,500.00
Q&B Disclosure Counsel	5,500.00
Official Statement & Clearing	3,500.00
Day Loan	65.97
	<u>30,065.97</u>
Underwriter's Discount:	
Underwriter's Discount	23,750.00
Other Uses of Funds:	
Rounding	509.74
	<u>2,474,325.71</u>

BOND DEBT SERVICE

**City of Manitowoc (AA-)
General Obligation Refunding Bonds (CR) - FINAL
BQ; Noncallable**

Period Ending	Principal	Coupon	Interest	Debt Service	Annual Debt Service
11/12/2019					
08/01/2020			42,878.89	42,878.89	42,878.89
02/01/2021	385,000	2.000%	29,800.00	414,800.00	
08/01/2021			25,950.00	25,950.00	440,750.00
02/01/2022	385,000	2.000%	25,950.00	410,950.00	
08/01/2022			22,100.00	22,100.00	433,050.00
02/01/2023	395,000	2.000%	22,100.00	417,100.00	
08/01/2023			18,150.00	18,150.00	435,250.00
02/01/2024	405,000	3.000%	18,150.00	423,150.00	
08/01/2024			12,075.00	12,075.00	435,225.00
02/01/2025	415,000	3.000%	12,075.00	427,075.00	
08/01/2025			5,850.00	5,850.00	432,925.00
02/01/2026	75,000	3.000%	5,850.00	80,850.00	
08/01/2026			4,725.00	4,725.00	85,575.00
02/01/2027	75,000	3.000%	4,725.00	79,725.00	
08/01/2027			3,600.00	3,600.00	83,325.00
02/01/2028	80,000	3.000%	3,600.00	83,600.00	
08/01/2028			2,400.00	2,400.00	86,000.00
02/01/2029	80,000	3.000%	2,400.00	82,400.00	
08/01/2029			1,200.00	1,200.00	83,600.00
02/01/2030	80,000	3.000%	1,200.00	81,200.00	
08/01/2030					81,200.00
	2,375,000		264,778.89	2,639,778.89	2,639,778.89

BOND SUMMARY STATISTICS

**City of Manitowoc (AA-)
General Obligation Refunding Bonds (CR) - FINAL
BQ; Noncallable**

Dated Date	11/12/2019
Delivery Date	11/12/2019
First Coupon	08/01/2020
Last Maturity	02/01/2030
Arbitrage Yield	1.761238%
True Interest Cost (TIC)	2.013021%
Net Interest Cost (NIC)	2.061919%
All-In TIC	2.336999%
Average Coupon	2.732163%
Average Life (years)	4.080
Weighted Average Maturity (years)	4.136
Par Amount	2,375,000.00
Bond Proceeds	2,463,704.60
Total Interest	264,778.89
Net Interest	199,824.29
Bond Years from Dated Date	9,691,180.56
Bond Years from Delivery Date	9,691,180.56
Total Debt Service	2,639,778.89
Maximum Annual Debt Service	440,750.00
Average Annual Debt Service	258,309.43

Bond Component	Par Value	Price	Average Coupon	Average Life	Average Maturity Date	Duration	PV of 1 bp change
Serial Bond	2,375,000.00	103.735	2.732%	4.080	12/11/2023	7.408	952.50
	2,375,000.00			4.080			952.50

	TIC	All-In TIC	Arbitrage Yield
Par Value	2,375,000.00	2,375,000.00	2,375,000.00
+ Accrued Interest			
+ Premium (Discount)	88,704.60	88,704.60	88,704.60
- Underwriter's Discount	(23,750.00)	(23,750.00)	
- Cost of Issuance Expense		(30,065.97)	
- Other Amounts			
Target Value	2,439,954.60	2,409,888.63	2,463,704.60
Target Date	11/12/2019	11/12/2019	11/12/2019
Yield	2.013021%	2.336999%	1.761238%

SAVINGS

**City of Manitowoc (AA-)
General Obligation Refunding Bonds (CR) - FINAL
BQ; Noncallable**

Date	Prior Debt Service	Refunding Debt Service	Savings	Annual Savings	PV Factor	Present Value to 11/12/2019 @ 2.3369993%
08/01/2020	40,214.69	42,878.89	(2,664.20)	(2,664.20)	0.983422998	(2,620.04)
02/01/2021	495,214.69	414,800.00	80,414.69		0.972064429	78,168.26
08/01/2021	33,120.05	25,950.00	7,170.05	87,584.74	0.960837051	6,889.25
02/01/2022	498,120.05	410,950.00	87,170.05		0.949739351	82,788.83
08/01/2022	25,323.74	22,100.00	3,223.74	90,393.79	0.938769828	3,026.35
02/01/2023	505,323.74	417,100.00	88,223.74		0.927927005	81,865.19
08/01/2023	17,275.94	18,150.00	(874.06)	87,349.68	0.917209416	(801.70)
02/01/2024	517,275.94	423,150.00	94,125.94		0.906615616	85,336.05
08/01/2024	8,892.82	12,075.00	(3,182.18)	90,943.76	0.896144174	(2,851.69)
02/01/2025	528,892.82	427,075.00	101,817.82		0.885793678	90,189.58
08/01/2025		5,850.00	(5,850.00)	95,967.82	0.875562731	(5,122.04)
02/01/2026		80,850.00	(80,850.00)		0.865449951	(69,971.63)
08/01/2026		4,725.00	(4,725.00)	(85,575.00)	0.855453975	(4,042.02)
02/01/2027		79,725.00	(79,725.00)		0.845573452	(67,413.34)
08/01/2027		3,600.00	(3,600.00)	(83,325.00)	0.835807050	(3,008.91)
02/01/2028		83,600.00	(83,600.00)		0.826153450	(69,066.43)
08/01/2028		2,400.00	(2,400.00)	(86,000.00)	0.816611349	(1,959.87)
02/01/2029		82,400.00	(82,400.00)		0.807179460	(66,511.59)
08/01/2029		1,200.00	(1,200.00)	(83,600.00)	0.797856509	(957.43)
02/01/2030		81,200.00	(81,200.00)		0.788641239	(64,037.67)
08/01/2030				(81,200.00)		
	2,669,654.48	2,639,778.89	29,875.59	29,875.59		69,899.16

Savings Summary

PV of savings from cash flow	69,899.16
Plus: Refunding funds on hand	509.74
Net PV Savings	<u>70,408.90</u>

SUMMARY OF REFUNDING RESULTS

**City of Manitowoc (AA-)
General Obligation Refunding Bonds (CR) - FINAL
BQ; Noncallable**

Dated Date	11/12/2019
Delivery Date	11/12/2019
Arbitrage yield	1.761238%
Escrow yield	0.000000%
Value of Negative Arbitrage	
Bond Par Amount	2,375,000.00
True Interest Cost	2.013021%
Net Interest Cost	2.061919%
All-In TIC	2.336999%
Average Coupon	2.732163%
Average Life	4.080
Weighted Average Maturity	4.136
Duration	3.877
Par amount of refunded bonds	2,420,000.00
Average coupon of refunded bonds	4.674733%
Average life of refunded bonds	3.288
Remaining weighted average maturity of refunded bonds	3.288
PV of prior debt to 11/12/2019 @ 2.336999%	2,479,787.79
Net PV Savings	70,408.90
Percentage savings of refunded bonds	2.909459%

SUMMARY OF BONDS REFUNDED

**City of Manitowoc (AA-)
General Obligation Refunding Bonds (CR) - FINAL
BQ; Noncallable**

Bond	Maturity Date	Interest Rate	Par Amount	Call Date	Call Price
Taxable General Corporate Purpose Bonds, Series 2010A (Build America Bonds - Direct Payment):					
LEVY	02/01/2021	4.650%	380,000.00	02/01/2020	100.000
	02/01/2022	5.000%	385,000.00	02/01/2020	100.000
	02/01/2023	5.000%	400,000.00	02/01/2020	100.000
	02/01/2024	5.000%	415,000.00	02/01/2020	100.000
	02/01/2025	5.100%	430,000.00	02/01/2020	100.000
			2,010,000.00		
Taxable General Corporate Purpose Bonds (Build America Bonds - Direct Payment):					
TID16	02/01/2021	4.650%	75,000.00	02/01/2020	100.000
	02/01/2022	5.000%	80,000.00	02/01/2020	100.000
	02/01/2023	5.000%	80,000.00	02/01/2020	100.000
	02/01/2024	5.000%	85,000.00	02/01/2020	100.000
	02/01/2025	5.100%	90,000.00	02/01/2020	100.000
			410,000.00		
			2,420,000.00		

DEBT SERVICE TO CALL AND TO MATURITY
City of Manitowoc (AA-)
General Obligation Refunding Bonds (CR) - FINAL
BQ; Noncallable

Date	Refunded Principal	Refunded Interest	Redemption Premium	Debt Service to Call Date	Principal	Interest	Refunded Debt Service
02/01/2020	2,420,000.00			2,420,000.00			
08/01/2020						59,963.75	59,963.75
02/01/2021					455,000.00	59,963.75	514,963.75
08/01/2021						49,385.00	49,385.00
02/01/2022					465,000.00	49,385.00	514,385.00
08/01/2022						37,760.00	37,760.00
02/01/2023					480,000.00	37,760.00	517,760.00
08/01/2023						25,760.00	25,760.00
02/01/2024					500,000.00	25,760.00	525,760.00
08/01/2024						13,260.00	13,260.00
02/01/2025					520,000.00	13,260.00	533,260.00
	2,420,000.00	0.00	0.00	2,420,000.00	2,420,000.00	372,257.50	2,792,257.50

Date	Principal Called
02/01/2020	2,420,000.00
	2,420,000.00

PROOF OF ARBITRAGE YIELD

**City of Manitowoc (AA-)
General Obligation Refunding Bonds (CR) - FINAL
BQ; Noncallable**

Date	Debt Service	Total	PV Factor	Present Value to 11/12/2019 @ 1.7612381249%
08/01/2020	42,878.89	42,878.89	0.987463581	42,341.34
02/01/2021	414,800.00	414,800.00	0.978843697	406,024.37
08/01/2021	25,950.00	25,950.00	0.970299058	25,179.26
02/01/2022	410,950.00	410,950.00	0.961829009	395,263.63
08/01/2022	22,100.00	22,100.00	0.953432897	21,070.87
02/01/2023	417,100.00	417,100.00	0.945110077	394,205.41
08/01/2023	18,150.00	18,150.00	0.936859910	17,004.01
02/01/2024	423,150.00	423,150.00	0.928681762	392,971.69
08/01/2024	12,075.00	12,075.00	0.920575003	11,115.94
02/01/2025	427,075.00	427,075.00	0.912539010	389,722.60
08/01/2025	5,850.00	5,850.00	0.904573166	5,291.75
02/01/2026	80,850.00	80,850.00	0.896676859	72,496.32
08/01/2026	4,725.00	4,725.00	0.888849481	4,199.81
02/01/2027	79,725.00	79,725.00	0.881090431	70,244.93
08/01/2027	3,600.00	3,600.00	0.873399112	3,144.24
02/01/2028	83,600.00	83,600.00	0.865774933	72,378.78
08/01/2028	2,400.00	2,400.00	0.858217308	2,059.72
02/01/2029	82,400.00	82,400.00	0.850725655	70,099.79
08/01/2029	1,200.00	1,200.00	0.843299400	1,011.96
02/01/2030	81,200.00	81,200.00	0.835937971	67,878.16
	2,639,778.89	2,639,778.89		2,463,704.60

Proceeds Summary

Delivery date	11/12/2019
Par Value	2,375,000.00
Premium (Discount)	88,704.60
Target for yield calculation	<u>2,463,704.60</u>

FORM 8038 STATISTICS

**City of Manitowoc (AA-)
General Obligation Refunding Bonds (CR) - FINAL
BQ; Noncallable**

Dated Date 11/12/2019
Delivery Date 11/12/2019

Bond Component	Date	Principal	Coupon	Price	Issue Price	Redemption at Maturity
Serial Bond:						
	02/01/2021	385,000.00	2.000%	100.601	387,313.85	385,000.00
	02/01/2022	385,000.00	2.000%	100.977	388,761.45	385,000.00
	02/01/2023	395,000.00	2.000%	101.249	399,933.55	395,000.00
	02/01/2024	405,000.00	3.000%	105.479	427,189.95	405,000.00
	02/01/2025	415,000.00	3.000%	106.465	441,829.75	415,000.00
	02/01/2026	75,000.00	3.000%	107.029	80,271.75	75,000.00
	02/01/2027	75,000.00	3.000%	107.386	80,539.50	75,000.00
	02/01/2028	80,000.00	3.000%	107.542	86,033.60	80,000.00
	02/01/2029	80,000.00	3.000%	107.506	86,004.80	80,000.00
	02/01/2030	80,000.00	3.000%	107.283	85,826.40	80,000.00
		2,375,000.00			2,463,704.60	2,375,000.00

	Maturity Date	Interest Rate	Issue Price	Stated Redemption at Maturity	Weighted Average Maturity	Yield
Final Maturity	02/01/2030	3.000%	85,826.40	80,000.00		
Entire Issue			2,463,704.60	2,375,000.00	4.1357	1.7612%

Proceeds used for accrued interest	0.00
Proceeds used for bond issuance costs (including underwriters' discount)	53,815.97
Proceeds used for credit enhancement	0.00
Proceeds allocated to reasonably required reserve or replacement fund	0.00
Proceeds used to refund prior tax-exempt bonds	2,420,000.00
Proceeds used to refund prior taxable bonds	0.00
Remaining WAM of prior tax-exempt bonds (years)	3.2876
Remaining WAM of prior taxable bonds (years)	0.0000
Last call date of refunded tax-exempt bonds	02/01/2020

2011 Form 8038 Statistics

Proceeds used to currently refund prior issues	2,420,000.00
Proceeds used to advance refund prior issues	0.00
Remaining weighted average maturity of the bonds to be currently refunded	3.2876
Remaining weighted average maturity of the bonds to be advance refunded	0.0000

FORM 8038 STATISTICS

**City of Manitowoc (AA-)
General Obligation Refunding Bonds (CR) - FINAL
BQ; Noncallable**

Refunded Bonds

Bond Component	Date	Principal	Coupon	Price	Issue Price
Taxable General Corporate Purpose Bonds, Series 2010A (Build America Bonds - Direct Payment):					
LEVY	02/01/2021	380,000.00	4.650%	100.000	380,000.00
LEVY	02/01/2022	385,000.00	5.000%	100.000	385,000.00
LEVY	02/01/2023	400,000.00	5.000%	100.000	400,000.00
LEVY	02/01/2024	415,000.00	5.000%	100.000	415,000.00
LEVY	02/01/2025	<u>430,000.00</u>	5.100%	100.000	<u>430,000.00</u>
		2,010,000.00			2,010,000.00
Taxable General Corporate Purpose Bonds (Build America Bonds - Direct Payment):					
TID16	02/01/2021	75,000.00	4.650%	100.000	75,000.00
TID16	02/01/2022	80,000.00	5.000%	100.000	80,000.00
TID16	02/01/2023	80,000.00	5.000%	100.000	80,000.00
TID16	02/01/2024	85,000.00	5.000%	100.000	85,000.00
TID16	02/01/2025	<u>90,000.00</u>	5.100%	100.000	<u>90,000.00</u>
		410,000.00			410,000.00
		2,420,000.00			2,420,000.00

	Last Call Date	Issue Date	Remaining Weighted Average Maturity
Taxable General Corporate Purpose Bonds, Series 2010A (Build America Bonds - Direct Payment)	02/01/2020	08/01/2018	3.2841
Taxable General Corporate Purpose Bonds (Build America Bonds - Direct Payment)	02/01/2020	08/01/2018	3.3048
All Refunded Issues	02/01/2020		3.2876

BOND DEBT SERVICE

**City of Manitowoc (AA-)
General Obligation Refunding Bonds - TID 16 Portion**

Period Ending	Principal	Coupon	Interest	Debt Service
08/01/2020			8,417.50	8,417.50
08/01/2021			11,700.00	11,700.00
08/01/2022			11,700.00	11,700.00
08/01/2023			11,700.00	11,700.00
08/01/2024			11,700.00	11,700.00
08/01/2025			11,700.00	11,700.00
08/01/2026	75,000	3.000%	10,575.00	85,575.00
08/01/2027	75,000	3.000%	8,325.00	83,325.00
08/01/2028	80,000	3.000%	6,000.00	86,000.00
08/01/2029	80,000	3.000%	3,600.00	83,600.00
08/01/2030	80,000	3.000%	1,200.00	81,200.00
	390,000		96,617.50	486,617.50

BOND SUMMARY STATISTICS**City of Manitowoc (AA-)
General Obligation Refunding Bonds - TID 16 Portion**

Dated Date	11/12/2019
Delivery Date	11/12/2019
First Coupon	08/01/2020
Last Maturity	02/01/2030
Arbitrage Yield	1.761238%
True Interest Cost (TIC)	2.153484%
Net Interest Cost (NIC)	2.230697%
All-In TIC	2.317192%
Average Coupon	3.000000%
Average Life (years)	8.258
Weighted Average Maturity (years)	8.259
Par Amount	390,000.00
Bond Proceeds	418,676.05
Total Interest	96,617.50
Net Interest	71,841.45
Bond Years from Dated Date	3,220,583.33
Bond Years from Delivery Date	3,220,583.33
Total Debt Service	486,617.50
Maximum Annual Debt Service	86,000.00
Average Annual Debt Service	47,616.83

Bond Component	Par Value	Price	Average Coupon	Average Life	Average Maturity Date	Duration	PV of 1 bp change
Serial Bond	390,000.00	107.353	3.000%	8.258	02/14/2028	7.408	305.45
	390,000.00			8.258			305.45

	TIC	All-In TIC	Arbitrage Yield
Par Value	390,000.00	390,000.00	390,000.00
+ Accrued Interest			
+ Premium (Discount)	28,676.05	28,676.05	28,676.05
- Underwriter's Discount	(3,900.00)	(3,900.00)	
- Cost of Issuance Expense		(4,937.15)	
- Other Amounts			
Target Value	414,776.05	409,838.90	418,676.05
Target Date	11/12/2019	11/12/2019	11/12/2019
Yield	2.153484%	2.317192%	1.761238%

SAVINGS

**City of Manitowoc (AA-)
General Obligation Refunding Bonds - TID 16 Portion**

Date	Prior Debt Service	Refunding Debt Service	Savings	Present Value to 11/12/2019 @ 2.3369993%
08/01/2020	6,816.32	8,417.50	(1,601.18)	(1,574.64)
08/01/2021	87,463.19	11,700.00	75,763.19	73,648.98
08/01/2022	89,952.44	11,700.00	78,252.44	74,336.36
08/01/2023	87,269.84	11,700.00	75,569.84	70,154.22
08/01/2024	89,503.41	11,700.00	77,803.41	70,582.93
08/01/2025	91,539.14	11,700.00	79,839.14	70,780.86
08/01/2026		85,575.00	(85,575.00)	(74,013.65)
08/01/2027		83,325.00	(83,325.00)	(70,422.25)
08/01/2028		86,000.00	(86,000.00)	(71,026.30)
08/01/2029		83,600.00	(83,600.00)	(67,469.02)
08/01/2030		81,200.00	(81,200.00)	(64,037.67)
	452,544.34	486,617.50	(34,073.16)	10,959.84

Savings Summary

PV of savings from cash flow	10,959.84
Plus: Refunding funds on hand	1,638.34
Net PV Savings	<u>12,598.18</u>

SUMMARY OF REFUNDING RESULTS**City of Manitowoc (AA-)
General Obligation Refunding Bonds - TID 16 Portion**

Dated Date	11/12/2019
Delivery Date	11/12/2019
Arbitrage yield	1.761238%
Escrow yield	0.000000%
Value of Negative Arbitrage	
Bond Par Amount	390,000.00
True Interest Cost	2.153484%
Net Interest Cost	2.230697%
All-In TIC	2.317192%
Average Coupon	3.000000%
Average Life	8.258
Weighted Average Maturity	8.259
Duration	7.401
Par amount of refunded bonds	410,000.00
Average coupon of refunded bonds	4.677663%
Average life of refunded bonds	3.305
Remaining weighted average maturity of refunded bonds	3.305
PV of prior debt to 11/12/2019 @ 2.336999%	420,206.06
Net PV Savings	12,598.18
Percentage savings of refunded bonds	3.072727%

DEBT SERVICE TO CALL AND TO MATURITY

**City of Manitowoc (AA-)
General Obligation Refunding Bonds - TID 16 Portion**

Date	Refunded Principal	Refunded Interest	Redemption Premium	Debt Service to Call Date	Principal	Interest	Refunded Debt Service
02/01/2020	410,000.00			410,000.00			
08/01/2020						10,163.75	10,163.75
02/01/2021					75,000.00	10,163.75	85,163.75
08/01/2021						8,420.00	8,420.00
02/01/2022					80,000.00	8,420.00	88,420.00
08/01/2022						6,420.00	6,420.00
02/01/2023					80,000.00	6,420.00	86,420.00
08/01/2023						4,420.00	4,420.00
02/01/2024					85,000.00	4,420.00	89,420.00
08/01/2024						2,295.00	2,295.00
02/01/2025					90,000.00	2,295.00	92,295.00
	410,000.00	0.00	0.00	410,000.00	410,000.00	63,437.50	473,437.50

Date	Principal Called
02/01/2020	410,000.00
	410,000.00

BOND DEBT SERVICE

**City of Manitowoc (AA-)
General Obligation Refunding Bonds - Levy Portion**

Period Ending	Principal	Coupon	Interest	Debt Service
08/01/2020			34,461.39	34,461.39
08/01/2021	385,000	2.000%	44,050.00	429,050.00
08/01/2022	385,000	2.000%	36,350.00	421,350.00
08/01/2023	395,000	2.000%	28,550.00	423,550.00
08/01/2024	405,000	3.000%	18,525.00	423,525.00
08/01/2025	415,000	3.000%	6,225.00	421,225.00
	1,985,000		168,161.39	2,153,161.39

BOND SUMMARY STATISTICS**City of Manitowoc (AA-)
General Obligation Refunding Bonds - Levy Portion**

Dated Date	11/12/2019
Delivery Date	11/12/2019
First Coupon	08/01/2020
Last Maturity	02/01/2025
Arbitrage Yield	1.761238%
True Interest Cost (TIC)	1.944915%
Net Interest Cost (NIC)	1.977914%
All-In TIC	2.346551%
Average Coupon	2.598854%
Average Life (years)	3.260
Weighted Average Maturity (years)	3.292
Par Amount	1,985,000.00
Bond Proceeds	2,045,028.55
Total Interest	168,161.39
Net Interest	127,982.84
Bond Years from Dated Date	6,470,597.22
Bond Years from Delivery Date	6,470,597.22
Total Debt Service	2,153,161.39
Maximum Annual Debt Service	429,050.00
Average Annual Debt Service	412,526.93

Bond Component	Par Value	Price	Average Coupon	Average Life	Average Maturity Date	Duration	PV of 1 bp change
Serial Bond	1,985,000.00	103.024	2.599%	3.260	02/14/2023	3.153	647.05
	1,985,000.00			3.260			647.05

	TIC	All-In TIC	Arbitrage Yield
Par Value	1,985,000.00	1,985,000.00	1,985,000.00
+ Accrued Interest			
+ Premium (Discount)	60,028.55	60,028.55	60,028.55
- Underwriter's Discount	(19,850.00)	(19,850.00)	
- Cost of Issuance Expense		(25,128.82)	
- Other Amounts			
Target Value	2,025,178.55	2,000,049.73	2,045,028.55
Target Date	11/12/2019	11/12/2019	11/12/2019
Yield	1.944915%	2.346551%	1.761238%

SAVINGS

**City of Manitowoc (AA-)
General Obligation Refunding Bonds - Levy Portion**

Date	Prior Debt Service	Refunding Debt Service	Savings	Present Value to 11/12/2019 @ 2.3369993%
08/01/2020	33,398.37	34,461.39	(1,063.02)	(1,045.40)
08/01/2021	440,871.55	429,050.00	11,821.55	11,408.53
08/01/2022	433,491.35	421,350.00	12,141.35	11,478.81
08/01/2023	435,329.84	423,550.00	11,779.84	10,909.27
08/01/2024	436,665.35	423,525.00	13,140.35	11,901.43
08/01/2025	437,353.68	421,225.00	16,128.68	14,286.68
	2,217,110.14	2,153,161.39	63,948.75	58,939.32

Savings Summary

PV of savings from cash flow	58,939.32
Plus: Refunding funds on hand	(1,128.60)
Net PV Savings	<u>57,810.72</u>

SUMMARY OF REFUNDING RESULTS**City of Manitowoc (AA-)
General Obligation Refunding Bonds - Levy Portion**

Dated Date	11/12/2019
Delivery Date	11/12/2019
Arbitrage yield	1.761238%
Escrow yield	0.000000%
Value of Negative Arbitrage	
Bond Par Amount	1,985,000.00
True Interest Cost	1.944915%
Net Interest Cost	1.977914%
All-In TIC	2.346551%
Average Coupon	2.598854%
Average Life	3.260
Weighted Average Maturity	3.292
Duration	3.146
Par amount of refunded bonds	2,010,000.00
Average coupon of refunded bonds	4.674132%
Average life of refunded bonds	3.284
Remaining weighted average maturity of refunded bonds	3.284
PV of prior debt to 11/12/2019 @ 2.336999%	2,059,581.73
Net PV Savings	57,810.72
Percentage savings of refunded bonds	2.876155%

DEBT SERVICE TO CALL AND TO MATURITY

**City of Manitowoc (AA-)
General Obligation Refunding Bonds - Levy Portion**

Date	Refunded Principal	Refunded Interest	Redemption Premium	Debt Service to Call Date	Principal	Interest	Refunded Debt Service
02/01/2020	2,010,000.00			2,010,000.00			
08/01/2020						49,800.00	49,800.00
02/01/2021					380,000.00	49,800.00	429,800.00
08/01/2021						40,965.00	40,965.00
02/01/2022					385,000.00	40,965.00	425,965.00
08/01/2022						31,340.00	31,340.00
02/01/2023					400,000.00	31,340.00	431,340.00
08/01/2023						21,340.00	21,340.00
02/01/2024					415,000.00	21,340.00	436,340.00
08/01/2024						10,965.00	10,965.00
02/01/2025					430,000.00	10,965.00	440,965.00
	2,010,000.00	0.00	0.00	2,010,000.00	2,010,000.00	308,820.00	2,318,820.00

Date	Principal Called
02/01/2020	2,010,000.00
	2,010,000.00