SIEMENS
Ingenuity for life

City of Bellaire

Annual Performance Assurance Report

Annual Period 1: September 1, 2019 – August 31, 2020

Submitted: July 2021

Siemens Industry, Inc. All rights reserved

Performance Contracting Agreement
Performance Assurance Overview

Client:	**City of Bellaire** 7008 South Rice Ave. Bellaire, TX 77401-4495
Client Contact:	**Michael Leech, Director of Public Works** Phone: (713) 201-3379 Email: MLeech@bellairetx.gov
Contract Date:	**August 29, 2016** *Amendment 1: April 17, 2018* *Amendment 2: July 12, 2018*
Construction Period:	**August 29, 2016 – August 31, 2019**
Performance Guarantee Period:	**September 1, 2019 – August 31, 2039**
Performance Guarantee Term:	**20 Years**
Current Annual Period:	**September 1, 2019 – August 31, 2020**
Siemens Contacts:	**Mark Castañeda, EPS Client Service Manager** Phone: (972) 206-7530 Email: mark.castaneda@siemens.com **Tehesia Powell, Performance Assurance Engineer** Phone: 972-983-4404 Email: tehesia.powell@siemens.com

Siemens Industry, Inc. All rights reserved

TABLE OF CONTENTS

1. Executive Summary 5

2. Performance Assurance Overview 6

2.1. Measurement & Verification Methods 6
2.2. Guaranteed Savings 7
2.3. Baseline Data 9
2.4. Contracted Baseline (Post-Retrofit) Data 14
2.5. Utility Rate Structures & Escalation Rates 19

3. Performance Assurance Results 23

3.1. Summary of Realized & Guaranteed Savings 23
3.2. Option A Energy Savings 24
3.2.1. Water Meter Replacement 24
3.2.2. Blower and Aeration Efficiency Improvements 28
3.2.3. WWTP Digester Blower Replacement 29
3.3. Operational Savings 30

Appendix A: FIM Measurements 31

Appendix A.1. Water Meter Calculations & Detailed Accuracy Test Results 31

Appendix B: Annual Inspection Report 32

Siemens Industry, Inc. All rights reserved

INDEX OF TABLES AND FIGURES

Table 1: Cost Savings by Annual Period 5
Table 2: Energy Savings for Annual Period 1 5
Table 3: Guaranteed Savings (Units) 7
Table 4: Guaranteed Savings (Cost) 8
Table 5: Guaranteed Cost Savings by FIM & Option Type for Annual Period 1 9
Table 6: Source of Operational Savings 9
Table 7: Baseline Energy Consumption by Location 10
Table 8: Baseline Operating Parameters 10
Table 9: Baseline Accuracies for the Length of the Performance Guarantee 11
Table 10: Contracted Baseline (Post-Retrofit) Operating Parameters 15
Table 11: Contract Annual Period 1 Utility Rates 19
Table 12: Water Rates for the Performance Guarantee Period 19
Table 13: Annual Period 1 Savings Variance by FIM 23
Table 14: Option A Savings for Annual Period 1 24
Table 15: Water Meter Quantities and Types by Size 24
Table 16: Water Meter Replacement Savings for Annual Period 1 25
Table 17: Water Meter Accuracy Test Results Summary for Annual Period 1 25
Table 18: Meter Accuracy Comparison for Annual Period 1 26
Table 19: Water Meter Calculations for Annual Period 1 26
Table 20: Blower and Aeration Efficiency Improvements Savings for Annual Period 1 28
Table 21: Post-Retrofit Aeration Blower Demand Comparison 29
Table 22: WWTP Digester Blower Replacement FIM Savings for Annual Period 1 29
Table 23: Post-Retrofit Digester Blower Demand Comparison 30
Table 24: Operational Savings for Annual Period 1 30
Table 25: Detailed Water Accuracy Test Results for Annual Period 1 31

Figure 1: Annual Period 1 Cost Savings by Type 23

Siemens Industry, Inc. All rights reserved

1. Executive Summary

Siemens Industry, Inc. (Siemens) is pleased to provide the City of Bellaire (the City) with this Annual Period 1 Performance Assurance Report. This report details the energy performance of the project implemented by comparing Annual Realized Savings to the Guaranteed Annual Savings for the current Annual Period. The Performance Contracting Agreement (Contract) guaranteed **$655,253** in Savings for Annual Period 1. Annual Realized Savings for Annual Period 1 amounted to **$695,713**, which included **$568,913** in Measured & Verified Savings and **$126,800** in Operational Savings. The total Annual Realized Savings for Annual Period 1 exceeded the Guaranteed Annual Savings by **$40,460**, or 6% **(Table 1)**.

Table 1: Cost Savings by Annual Period

Performance Period	Realized Energy Savings	Operational Savings	Annual Realized Savings	Guaranteed Annual Savings	Savings Excess / Shortfall
1	$568,913	$126,800	$695,713	$655,253	$40,460

Annual Realized Savings in energy units achieved in Annual Period 1 include reductions in electric energy and electric demand consumption, and billable water usage increase **(Table 2)**.

Table 2: Energy Savings for Annual Period 1

Savings Type	Electric Energy Savings (kWh)	Electric Demand Savings (kW)	Increased Billable Water and Sewer (hgal)
Total Realized Savings	(45,373)	(79)	1,175,551
Total Guaranteed Savings	604,333	0	1,010,474
Variance	(649,706)	(79)	165,077

A list of the Facility Improvement Measures (FIMs) implemented as part of this project is presented below:

- Water Meter Replacement
- Blower and Aeration Efficiency Improvements
- WWTP Digester Blower Replacement
- WWTP Main Lift Station Rehabilitation
- WWTP RAS Pump Replacement & WAS Controls

Siemens Industry, Inc. All right reserved

2. Performance Assurance Overview

2.1. Measurement & Verification Methods

There are five measurement and verification ("M&V") options to measure and verify energy/utility Savings. Options A through and including D are established using the IPMVP concepts. Option E is stipulated savings based on industry accepted engineering standards and is the Option used for purposes of calculating Operational Savings. The individual options are described in further detail below. Note that per the Contract, only Options A and E are used in the calculation of energy Savings for this project.

Option A: Retrofit Isolation (Key Parameter Measurement) - Savings are determined by field measurement of the key performance parameter(s) which define the energy use of the FIM's affected system(s) and/or the success of the Project. Measurement frequency ranges from short-term to continuous, depending on the expected variations in the measured parameter and the length of the reporting period. Parameters not selected for field measurement are estimated. Estimates can be based on historical data, manufacturer's specifications, or engineering judgment. Documentation of the source or justification of the estimated parameter is required. The plausible savings error arising from estimation rather than measurement is evaluated. If applicable, the predetermined schedule for data collection, evaluation, and reporting is defined in Contract Exhibit A, Article 3-Performance Assurance Services Program.

Option B: Retrofit Isolation (All Parameter Measurement) - Savings are determined by field measurement of the energy use of the FIM-affected system. Measurement frequency ranges from short-term to continuous, depending on the expected variations in the savings and the length of the reporting period. If applicable, the predetermined schedule for data collection, evaluation, and reporting is defined in Contract Exhibit A, Article 3-Performance Assurance Services Program.

Option C: Whole Facility - Savings are determined by measuring energy use at the whole facility or sub-facility level. Continuous measurements of the entire facility's energy usage are taken throughout the reporting period. If applicable, the predetermined schedule for data collection, evaluation, and reporting is defined in Contract Exhibit A, Article 3-Performance Assurance Services Program.

Option D: Calibrated Simulation - Savings are determined through simulation of the energy use of the whole facility, or of a sub-facility. Simulation routines are demonstrated to adequately model actual energy performance measured in the facility. This option usually requires considerable skill in calibrated simulation. If applicable, the predetermined schedule for data collection, evaluation, and reporting is defined in Contract Exhibit A, Article 3-Performance Assurance Services Program.

Siemens Industry, Inc. All right reserved

Option E: Stipulated - This Option is the method of measurement and verification applicable to FIMs consisting either of Operational Savings or where the end use capacity or operational efficiency; demand, energy consumption or power level; or manufacturer's measurements, industry standard efficiencies or operating hours are known in advance, and used in a calculation or analysis method that will stipulate the outcome. Both the City and Siemens agree to the stipulated inputs and outcome(s) of the analysis methodology. Based on the established analytical methodology the Savings stipulated will be achieved upon completion of the FIM and no further measurements or calculations will be performed during the Performance Guarantee Period. If applicable, the methodology and calculations to establish Savings value are defined in Contract Exhibit C, Section 4.6.

2.2. Guaranteed Savings

The following section reiterates the contract Guaranteed Annual Savings for the FIMs installed at the City, as found in Articles 1 and 2 of Contract Exhibit C – Performance Assurance. Neither Amendment 1 nor Amendment 2 affected the guaranteed annual energy savings for the Performance Guarantee Period which are shown in **Table 3**.

Table 3: Guaranteed Savings (Units)

Performance Period	Electric Energy Savings (kWh/yr)	Electric Demand Savings (kW/yr)*	Increased Billable Water and Sewer** (hgal)
1	604,333	0	1,010,474
2	604,333	800	1,058,753
3	604,333	800	1,101,791
4	604,333	800	1,148,032
5	604,333	800	1,194,279
6	604,333	800	1,173,354
7	604,333	800	1,193,488
8	604,333	800	1,213,706
9	604,333	800	1,234,008
10	604,333	800	1,254,395
11	604,333	800	1,274,865
12	604,333	800	1,295,418
13	604,333	800	1,275,926
14	604,333	800	1,295,129
15	604,333	800	1,314,409
16	604,333	800	1,333,766
17	604,333	800	1,353,199
18	604,333	800	1,372,708
19	604,333	800	1,392,292

Siemens Industry, Inc. All right reserved

20	604,333	800	1,411,953

*Billable Usage Increase means the additional gallons or dollars that are generated by the installation of the Water Meter Replacement FIM. This value is calculated by using the Baseline consumption for the meter population, the existing utiltiy rates, and the existing and proposed meter accuracy test results.
**Increased billable water and sewer volumes from Annual Period 16 onward are stipulated values and verified under M&V Option E during Annual Periods 16 through 20.

The guaranteed cost Savings for each Annual Period (Table 4) are extrapolated from the guaranteed energy Savings by multiplying the energy unit Savings by the Baseline utility rates including the stipulated Escalation Rates.

Table 4: Guaranteed Savings (Cost)

Performance Period	Energy/Utility Savings	Billable Water/Sewer Increase	Operational Savings	Total Savings
1	$36,720	$491,733	$126,800	$655,253
2	$42,729	$523,007	$130,604	$696,340
3	$44,010	$552,523	$134,522	$731,055
4	$45,331	$584,410	$138,558	$768,299
5	$46,691	$617,133	$142,715	$806,538
6	$48,091	$615,366	$146,996	$810,453
7	$49,534	$635,333	$151,406	$836,273
8	$51,020	$655,806	$155,948	$862,774
9	$52,551	$676,796	$160,626	$889,974
10	$54,127	$698,315	$165,445	$917,888
11	$55,751	$720,375	$170,409	$946,535
12	$57,424	$742,988	$175,521	$975,933
13	$59,146	$742,888	$180,786	$982,821
14	$60,921	$765,412	$186,210	$1,012,543
15	$62,748	$788,492	$191,796	$1,043,036
16	$64,631	$812,137	$197,550	$1,074,319
17	$66,570	$836,363	$203,477	$1,106,409
18	$68,567	$861,180	$209,581	$1,139,328
19	$70,624	$886,602	$215,869	$1,173,094
20	$72,743	$912,641	$222,345	$1,207,729
Total	**$1,109,929**	**$14,119,500**	**$3,407,163**	**$18,636,593**

*Increased billable water and sewer volumes from Annual Period 16 onward are stipulated values and verified under M&V Option E during Annual Periods 16 through 20.

The Performance Guarantee does not operate to guarantee savings per-FIM. Rather, the calculation of savings is based on aggregate performance of all the FIMs contained in the project (Table 5).

Siemens Industry, Inc. All right reserved

Table 5: Guaranteed Cost Savings by FIM & Option Type for Annual Period 1

Facility Improvement Measure	Option A Savings	Total Energy/Utility Savings	Operational Savings	Total Savings
Water Meter Replacement	$491,733	$491,733	$76,800	$568,533
Blower and Aeration Efficiency Improvements	$35,459	$35,459	$15,000	$50,459
WWTP Digester Blower Replacement	$1,261	$1,261	$12,500	$13,761
WWTP Main Lift Station Rehabilitation	$0	$0	$10,000	$10,000
WWTP RAS Pump Replacement & WAS Controls	$0	$0	$12,500	$12,500
Total	$528,453	$528,453	$126,800	$655,253

The City and Siemens affirmed that the Operational Savings are Stipulated Savings for the purposes of calculating Annual Realized Savings. Operational Savings are not measured or monitored during the Performance Guarantee Period (Table 6). The contractual Escalation Factor applied to Operational Savings is 3%.

Table 6: Source of Operational Savings

Description	First Annual Period Savings	Operational Savings Persistence (Years)	Annual Period Savings Begin
Cancellation of 3rd party Meter Reading Contract = Cost Reduction	$76,800	20	1
Reduction in maintenance labor and replacement materials due to aeration system rehabilitation and new blowers.	$15,000	20	1
Reduction in maintenance labor and replacement materials due to digester upgrades, new blowers, and new MECC equipment.	$12,500	20	1
Reduction in maintenance labor and replacement materials due to pump & motor upgrades, new piping, new controls, and new MECC equipment.	$10,000	20	1
Reduction in maintenance labor and replacement materials due to pump & motor upgrades, new controls and new valves.	$12,500	20	1
Total	$126,800		

2.3. Baseline Data

The Baseline Period is the period of time for which data was provided to Siemens to derive baseline measurements. The Baseline Period was established between February 2015 and January 2016. Table 7 outlines the average annual utility consumption during the Baseline Period as found in Article 5 of Contract Exhibit C – Performance Assurance.

Siemens Industry, Inc. All right reserved

Table 7: Baseline Energy Consumption by Location

Location	Facility Improvement Measure	Electric Energy Consumption (kWh)	Electric Demand Consumption (kW)
Waste Water Treatment Plant	WWTP Aeration System	2,374,560	4,626
Waste Water Treatment Plant	WWTP Digester Blowers	414,918	49
Total		2,789,478	4,675

The operating practices during the Baseline Period determined the utility consumption. Table 8 shows the Baseline (pre-retrofit) operating meter accuracy and consumption. Table 9 shows the baseline accuracies for the length of the Performance Guarantee.

Table 8: Baseline Operating Parameters

Description	Existing Consumption at 100% Accuracy (hgal)	Existing Meter Accuracy %	Existing Consumption (hgal)
Water - Residential - 5/8" - Tier 1	661,337	76.00%	502,616
Water - Residential - 5/8" - Tier 2	993,178	76.00%	754,815
Water - Residential - 5/8" - Tier 3	412,417	76.00%	313,437
Water - Residential - 3/4" - Tier 1	520,372	94.40%	491,231
Water - Residential - 3/4" - Tier 2	1,176,732	94.40%	1,110,835
Water - Residential - 3/4" - Tier 3	772,823	94.40%	729,545
Water - Residential - 1" - Tier 1	450,131	87.70%	394,765
Water - Residential - 1" - Tier 2	1,175,803	87.70%	1,031,179
Water - Residential - 1" - Tier 3	1,218,674	87.70%	1,068,777
Water - Residential - 1.5" - Tier 1	971	96.80%	940
Water - Residential - 1.5" - Tier 2	2,460	96.80%	2,381
Water - Residential - 1.5" - Tier 3	2,274	96.80%	2,201
Water - Residential - 2" - Tier 1	1,184	93.90%	1,112
Water - Residential - 2" - Tier 2	2,142	93.90%	2,011
Water - Residential - 2" - Tier 3	354	93.90%	332
Non-Residential - 5/8" - Tier 1	69,284	76.00%	52,656
Non-Residential - 5/8" - Tier 2	621	76.00%	472
Non-Residential - 3/4" - Tier 1	39,369	94.40%	37,164
Non-Residential - 3/4" - Tier 2	0	94.40%	0
Non-Residential - 1" - Tier 1	193,169	87.70%	169,409
Non-Residential - 1" - Tier 2	54,571	87.70%	47,859
Non-Residential - 1.5" - Tier 1	32,158	96.80%	31,129
Non-Residential - 1.5" - Tier 2	12,447	96.80%	12,049
Non-Residential - 2" - Tier 1	221,649	93.90%	208,128
Non-Residential - 2" - Tier 2	131,760	93.90%	123,723
Sprinkler - 5/8" - Tier 1	205,095	76.00%	155,872
Sprinkler - 5/8" - Tier 2	967	76.00%	735
Sprinkler - 3/4" - Tier 1	579,989	94.40%	547,510

Siemens Industry, Inc. All right reserved

Description	Existing Consumption at 100% Accuracy (hgal)	Existing Meter Accuracy %	Existing Consumption (hgal)
Sprinkler - 3/4" - Tier 2	8,112	94.40%	7,658
Sprinkler - 1" - Tier 1	412,587	87.70%	361,839
Sprinkler - 1" - Tier 2	11,751	87.70%	10,306
Sprinkler - 1.5" - Tier 1	61,159	96.80%	59,202
Sprinkler - 1.5" - Tier 2	58,387	96.80%	56,519
Sprinkler - 2" - Tier 1	84,745	93.90%	79,576
Sprinkler - 2" - Tier 2	87,121	93.90%	81,807
Total	9,655,794		8,449,790

Table 9: Baseline Accuracies for the Length of the Performance Guarantee

Item	Description	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1	Water - Residential - 5/8" - Tier 1	76.00%	76.00%	75.50%	75.00%	74.50%	74.00%	73.50%	73.00%
2	Water - Residential - 5/8" - Tier 2	76.00%	76.00%	75.50%	75.00%	74.50%	74.00%	73.50%	73.00%
3	Water - Residential - 5/8" - Tier 3	76.00%	76.00%	75.50%	75.00%	74.50%	74.00%	73.50%	73.00%
4	Water - Residential - 3/4" - Tier 1	94.40%	94.40%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%
5	Water - Residential - 3/4" - Tier 2	94.40%	94.40%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%
6	Water - Residential - 3/4" - Tier 3	94.40%	94.40%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%
7	Water - Residential - 1" - Tier 1	87.70%	87.70%	87.20%	86.70%	86.20%	85.70%	85.20%	84.70%
8	Water - Residential - 1" - Tier 2	87.70%	87.70%	87.20%	86.70%	86.20%	85.70%	85.20%	84.70%
9	Water - Residential - 1" - Tier 3	87.70%	87.70%	87.20%	86.70%	86.20%	85.70%	85.20%	84.70%
10	Water - Residential - 1.5" - Tier 1	96.80%	96.80%	96.30%	95.80%	95.30%	94.80%	94.30%	93.80%
11	Water - Residential - 1.5" - Tier 2	96.80%	96.80%	96.30%	95.80%	95.30%	94.80%	94.30%	93.80%
12	Water - Residential - 1.5" - Tier 3	96.80%	96.80%	96.30%	95.80%	95.30%	94.80%	94.30%	93.80%
13	Water - Residential - 2" - Tier 1	93.90%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%	90.90%
14	Water - Residential - 2" - Tier 2	93.90%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%	90.90%
15	Water - Residential - 2" - Tier 3	93.90%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%	90.90%
16	Non-Residential - 5/8" - Tier 1	76.00%	76.00%	75.50%	75.00%	74.50%	74.00%	73.50%	73.00%
17	Non-Residential - 5/8" - Tier 2	76.00%	76.00%	75.50%	75.00%	74.50%	74.00%	73.50%	73.00%
18	Non-Residential - 3/4" - Tier 1	94.40%	94.40%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%
19	Non-Residential - 3/4" - Tier 2	94.40%	94.40%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%

Siemens Industry, Inc. All right reserved

Item	Description	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
20	Non-Residential - 1" - Tier 1	87.70%	87.70%	87.20%	86.70%	86.20%	85.70%	85.20%	84.70%
21	Non-Residential - 1" - Tier 2	87.70%	87.70%	87.20%	86.70%	86.20%	85.70%	85.20%	84.70%
22	Non-Residential - 1.5" - Tier 1	96.80%	96.80%	96.30%	95.80%	95.30%	94.80%	94.30%	93.80%
23	Non-Residential - 1.5" - Tier 2	96.80%	96.80%	96.30%	95.80%	95.30%	94.80%	94.30%	93.80%
24	Non-Residential - 2" - Tier 1	93.90%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%	90.90%
25	Non-Residential - 2" - Tier 2	93.90%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%	90.90%
26	Sprinkler - 5/8" - Tier 1	76.00%	76.00%	75.50%	75.00%	74.50%	74.00%	73.50%	73.00%
27	Sprinkler - 5/8" - Tier 2	76.00%	76.00%	75.50%	75.00%	74.50%	74.00%	73.50%	73.00%
28	Sprinkler - 3/4" - Tier 1	94.40%	94.40%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%
29	Sprinkler - 3/4" - Tier 2	94.40%	94.40%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%
30	Sprinkler - 1" - Tier 1	87.70%	87.70%	87.20%	86.70%	86.20%	85.70%	85.20%	84.70%
31	Sprinkler - 1" - Tier 2	87.70%	87.70%	87.20%	86.70%	86.20%	85.70%	85.20%	84.70%
32	Sprinkler - 1.5" - Tier 1	96.80%	96.80%	96.30%	95.80%	95.30%	94.80%	94.30%	93.80%
33	Sprinkler - 1.5" - Tier 2	96.80%	96.80%	96.30%	95.80%	95.30%	94.80%	94.30%	93.80%
34	Sprinkler - 2" - Tier 1	93.90%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%	90.90%
35	Sprinkler - 2" - Tier 2	93.90%	93.90%	93.40%	92.90%	92.40%	91.90%	91.40%	90.90%

Item	Description	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
1	Water - Residential - 5/8" - Tier 1	72.50%	72.00%	71.50%	71.00%	70.50%	70.00%	69.50%	69.00%
2	Water - Residential - 5/8" - Tier 2	72.50%	72.00%	71.50%	71.00%	70.50%	70.00%	69.50%	69.00%
3	Water - Residential - 5/8" - Tier 3	72.50%	72.00%	71.50%	71.00%	70.50%	70.00%	69.50%	69.00%
4	Water - Residential - 3/4" - Tier 1	90.90%	90.40%	89.90%	89.40%	88.90%	88.40%	87.90%	87.40%
5	Water - Residential - 3/4" - Tier 2	90.90%	90.40%	89.90%	89.40%	88.90%	88.40%	87.90%	87.40%
6	Water - Residential - 3/4" - Tier 3	90.90%	90.40%	89.90%	89.40%	88.90%	88.40%	87.90%	87.40%
7	Water - Residential - 1" - Tier 1	84.20%	83.70%	83.20%	82.70%	82.20%	81.70%	81.20%	80.70%
8	Water - Residential - 1" - Tier 2	84.20%	83.70%	83.20%	82.70%	82.20%	81.70%	81.20%	80.70%
9	Water - Residential - 1" - Tier 3	84.20%	83.70%	83.20%	82.70%	82.20%	81.70%	81.20%	80.70%
10	Water - Residential - 1.5" - Tier 1	93.30%	92.80%	92.30%	91.80%	91.30%	0.00%	0.00%	0.00%
11	Water - Residential - 1.5" - Tier 2	93.30%	92.80%	92.30%	91.80%	91.30%	0.00%	0.00%	0.00%
12	Water - Residential - 1.5" - Tier 3	93.30%	92.80%	92.30%	91.80%	91.30%	0.00%	0.00%	0.00%
13	Water - Residential - 2" - Tier 1	90.40%	89.90%	89.40%	88.90%	88.40%	0.00%	0.00%	0.00%

Siemens Industry, Inc. All right reserved

14	Water - Residential - 2" - Tier 2	90.40%	89.90%	89.40%	88.90%	88.40%	0.00%	0.00%	0.00%
15	Water - Residential - 2" - Tier 3	90.40%	89.90%	89.40%	88.90%	88.40%	0.00%	0.00%	0.00%
16	Non-Residential - 5/8" - Tier 1	72.50%	72.00%	71.50%	71.00%	70.50%	70.00%	69.50%	69.00%
17	Non-Residential - 5/8" - Tier 2	72.50%	72.00%	71.50%	71.00%	70.50%	70.00%	69.50%	69.00%
18	Non-Residential - 3/4" - Tier 1	90.90%	90.40%	89.90%	89.40%	88.90%	88.40%	87.90%	87.40%
19	Non-Residential - 3/4" - Tier 2	90.90%	90.40%	89.90%	89.40%	88.90%	88.40%	87.90%	87.40%
20	Non-Residential - 1" - Tier 1	84.20%	83.70%	83.20%	82.70%	82.20%	81.70%	81.20%	80.70%
21	Non-Residential - 1" - Tier 2	84.20%	83.70%	83.20%	82.70%	82.20%	81.70%	81.20%	80.70%
22	Non-Residential - 1.5" - Tier 1	93.30%	92.80%	92.30%	91.80%	91.30%	0.00%	0.00%	0.00%
23	Non-Residential - 1.5" - Tier 2	93.30%	92.80%	92.30%	91.80%	91.30%	0.00%	0.00%	0.00%
24	Non-Residential - 2" - Tier 1	90.40%	89.90%	89.40%	88.90%	88.40%	0.00%	0.00%	0.00%
25	Non-Residential - 2" - Tier 2	90.40%	89.90%	89.40%	88.90%	88.40%	0.00%	0.00%	0.00%
26	Sprinkler - 5/8" - Tier 1	72.50%	72.00%	71.50%	71.00%	70.50%	70.00%	69.50%	69.00%
27	Sprinkler - 5/8" - Tier 2	72.50%	72.00%	71.50%	71.00%	70.50%	70.00%	69.50%	69.00%
28	Sprinkler - 3/4" - Tier 1	90.90%	90.40%	89.90%	89.40%	88.90%	88.40%	87.90%	87.40%
29	Sprinkler - 3/4" - Tier 2	90.90%	90.40%	89.90%	89.40%	88.90%	88.40%	87.90%	87.40%
30	Sprinkler - 1" - Tier 1	84.20%	83.70%	83.20%	82.70%	82.20%	81.70%	81.20%	80.70%
31	Sprinkler - 1" - Tier 2	84.20%	83.70%	83.20%	82.70%	82.20%	81.70%	81.20%	80.70%
32	Sprinkler - 1.5" - Tier 1	93.30%	92.80%	92.30%	91.80%	91.30%	0.00%	0.00%	0.00%
33	Sprinkler - 1.5" - Tier 2	93.30%	92.80%	92.30%	91.80%	91.30%	0.00%	0.00%	0.00%
34	Sprinkler - 2" - Tier 1	90.40%	89.90%	89.40%	88.90%	88.40%	0.00%	0.00%	0.00%
35	Sprinkler - 2" - Tier 2	90.40%	89.90%	89.40%	88.90%	88.40%	0.00%	0.00%	0.00%

Item	Description	Year 16	Year 17	Year 18	Year 19	Year 20
1	Water - Residential - 5/8" - Tier 1	68.50%	68.00%	67.50%	67.00%	66.50%
2	Water - Residential - 5/8" - Tier 2	68.50%	68.00%	67.50%	67.00%	66.50%
3	Water - Residential - 5/8" - Tier 3	68.50%	68.00%	67.50%	67.00%	66.50%
4	Water - Residential - 3/4" - Tier 1	86.90%	86.40%	85.90%	85.40%	84.90%
5	Water - Residential - 3/4" - Tier 2	86.90%	86.40%	85.90%	85.40%	84.90%
6	Water - Residential - 3/4" - Tier 3	86.90%	86.40%	85.90%	85.40%	84.90%
7	Water - Residential - 1" - Tier 1	80.20%	79.70%	79.20%	78.70%	78.20%
8	Water - Residential - 1" - Tier 2	80.20%	79.70%	79.20%	78.70%	78.20%

Siemens Industry, Inc. All right reserved

Item	Description	Year 16	Year 17	Year 18	Year 19	Year 20
9	Water - Residential - 1" - Tier 3	80.20%	79.70%	79.20%	78.70%	78.20%
10	Water - Residential - 1.5" - Tier 1	0.00%	0.00%	0.00%	0.00%	0.00%
11	Water - Residential - 1.5" - Tier 2	0.00%	0.00%	0.00%	0.00%	0.00%
12	Water - Residential - 1.5" - Tier 3	0.00%	0.00%	0.00%	0.00%	0.00%
13	Water - Residential - 2" - Tier 1	0.00%	0.00%	0.00%	0.00%	0.00%
14	Water - Residential - 2" - Tier 2	0.00%	0.00%	0.00%	0.00%	0.00%
15	Water - Residential - 2" - Tier 3	0.00%	0.00%	0.00%	0.00%	0.00%
16	Non-Residential - 5/8" - Tier 1	68.50%	68.00%	67.50%	67.00%	66.50%
17	Non-Residential - 5/8" - Tier 2	68.50%	68.00%	67.50%	67.00%	66.50%
18	Non-Residential - 3/4" - Tier 1	86.90%	86.40%	85.90%	85.40%	84.90%
19	Non-Residential - 3/4" - Tier 2	86.90%	86.40%	85.90%	85.40%	84.90%
20	Non-Residential - 1" - Tier 1	80.20%	79.70%	79.20%	78.70%	78.20%
21	Non-Residential - 1" - Tier 2	80.20%	79.70%	79.20%	78.70%	78.20%
22	Non-Residential - 1.5" - Tier 1	0.00%	0.00%	0.00%	0.00%	0.00%
23	Non-Residential - 1.5" - Tier 2	0.00%	0.00%	0.00%	0.00%	0.00%
24	Non-Residential - 2" - Tier 1	0.00%	0.00%	0.00%	0.00%	0.00%
25	Non-Residential - 2" - Tier 2	0.00%	0.00%	0.00%	0.00%	0.00%
26	Sprinkler - 5/8" - Tier 1	68.50%	68.00%	67.50%	67.00%	66.50%
27	Sprinkler - 5/8" - Tier 2	68.50%	68.00%	67.50%	67.00%	66.50%
28	Sprinkler - 3/4" - Tier 1	86.90%	86.40%	85.90%	85.40%	84.90%
29	Sprinkler - 3/4" - Tier 2	86.90%	86.40%	85.90%	85.40%	84.90%
30	Sprinkler - 1" - Tier 1	80.20%	79.70%	79.20%	78.70%	78.20%
31	Sprinkler - 1" - Tier 2	80.20%	79.70%	79.20%	78.70%	78.20%
32	Sprinkler - 1.5" - Tier 1	0.00%	0.00%	0.00%	0.00%	0.00%
33	Sprinkler - 1.5" - Tier 2	0.00%	0.00%	0.00%	0.00%	0.00%
34	Sprinkler - 2" - Tier 1	0.00%	0.00%	0.00%	0.00%	0.00%
35	Sprinkler - 2" - Tier 2	0.00%	0.00%	0.00%	0.00%	0.00%

2.4. Contracted Baseline (Post-Retrofit) Data

The Contracted Baseline is the post-retrofit facility operating profile based on parameters described in Article 7 of Contract Exhibit C – Performance Assurance, which the City is responsible

Siemens Industry, Inc. All right reserved

for maintaining throughout the Performance Guarantee Period. Those parameters include the following:

- Water quality at or above average quality over the most recent 12-month period;
- Source of water supply at or above average quality water over the most recent 12-month period from previous source of water supply used;
- Water distribution integrity at or above Baseline maintenance levels; and,
- Meter/AMR system compatibility with the new system.

These parameters are relied upon by Siemens for the calculation of Guaranteed Annual Savings. **Table 10** shows the Contracted Baseline (post-retrofit) operating parameters that were implemented under the Contract. As established in Article 3 of Contract Exhibit C – Performance Assurance, the City must provide Siemens with accurate facility operating information as soon as information becomes available, such as any Material Change that may increase or decrease energy usage.

Table 10: Contracted Baseline (Post-Retrofit) Operating Parameters

Item	Description	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1	Water - Residential - 5/8" - Tier 1	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
2	Water - Residential - 5/8" - Tier 2	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
3	Water - Residential - 5/8" - Tier 3	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
4	Water - Residential - 3/4" - Tier 1	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
5	Water - Residential - 3/4" - Tier 2	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
6	Water - Residential - 3/4" - Tier 3	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
7	Water - Residential - 1" - Tier 1	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
8	Water - Residential - 1" - Tier 2	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
9	Water - Residential - 1" - Tier 3	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
10	Water - Residential - 1.5" - Tier 1	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%
11	Water - Residential - 1.5" - Tier 2	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%
12	Water - Residential - 1.5" - Tier 3	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%
13	Water - Residential - 2" - Tier 1	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%
14	Water - Residential - 2" - Tier 2	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%
15	Water - Residential - 2" - Tier 3	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%
16	Non-Residential - 5/8" - Tier 1	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%

Siemens Industry, Inc. All right reserved

17	Non-Residential - 5/8" - Tier 2	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
18	Non-Residential - 3/4" - Tier 1	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
19	Non-Residential - 3/4" - Tier 2	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
20	Non-Residential - 1" - Tier 1	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
21	Non-Residential - 1" - Tier 2	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
22	Non-Residential - 1.5" - Tier 1	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%
23	Non-Residential - 1.5" - Tier 2	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%
24	Non-Residential - 2" - Tier 1	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%
25	Non-Residential - 2" - Tier 2	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%
26	Sprinkler - 5/8" - Tier 1	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
27	Sprinkler - 5/8" - Tier 2	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
28	Sprinkler - 3/4" - Tier 1	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
29	Sprinkler - 3/4" - Tier 2	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
30	Sprinkler - 1" - Tier 1	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
31	Sprinkler - 1" - Tier 2	97.98%	97.98%	97.98%	97.98%	97.98%	97.98%	97.23%	96.93%
32	Sprinkler - 1.5" - Tier 1	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%
33	Sprinkler - 1.5" - Tier 2	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%
34	Sprinkler - 2" - Tier 1	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%
35	Sprinkler - 2" - Tier 2	97.98%	97.98%	97.98%	97.23%	96.93%	96.64%	96.35%	96.06%

Item	Description	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
1	Water - Residential - 5/8" - Tier 1	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
2	Water - Residential - 5/8" - Tier 2	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
3	Water - Residential - 5/8" - Tier 3	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
4	Water - Residential - 3/4" - Tier 1	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
5	Water - Residential - 3/4" - Tier 2	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
6	Water - Residential - 3/4" - Tier 3	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
7	Water - Residential - 1" - Tier 1	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
8	Water - Residential - 1" - Tier 2	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
9	Water - Residential - 1" - Tier 3	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
10	Water - Residential - 1.5" - Tier 1	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%
11	Water - Residential - 1.5" - Tier 2	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%

Siemens Industry, Inc. All right reserved

12	Water - Residential - 1.5" - Tier 3	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%
13	Water - Residential - 2" - Tier 1	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%
14	Water - Residential - 2" - Tier 2	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%
15	Water - Residential - 2" - Tier 3	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%
16	Non-Residential - 5/8" - Tier 1	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
17	Non-Residential - 5/8" - Tier 2	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
18	Non-Residential - 3/4" - Tier 1	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
19	Non-Residential - 3/4" - Tier 2	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
20	Non-Residential - 1" - Tier 1	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
21	Non-Residential - 1" - Tier 2	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
22	Non-Residential - 1.5" - Tier 1	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%
23	Non-Residential - 1.5" - Tier 2	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%
24	Non-Residential - 2" - Tier 1	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%
25	Non-Residential - 2" - Tier 2	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%
26	Sprinkler - 5/8" - Tier 1	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
27	Sprinkler - 5/8" - Tier 2	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
28	Sprinkler - 3/4" - Tier 1	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
29	Sprinkler - 3/4" - Tier 2	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
30	Sprinkler - 1" - Tier 1	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
31	Sprinkler - 1" - Tier 2	96.64%	96.35%	96.06%	95.78%	95.49%	95.20%	94.92%	94.63%
32	Sprinkler - 1.5" - Tier 1	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%
33	Sprinkler - 1.5" - Tier 2	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%
34	Sprinkler - 2" - Tier 1	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%
35	Sprinkler - 2" - Tier 2	95.78%	95.49%	95.20%	94.92%	94.63%	0.00%	0.00%	0.00%

Item	Description	Year 16	Year 17	Year 18	Year 19	Year 20
1	Water - Residential - 5/8" - Tier 1	94.35%	94.06%	93.78%	93.50%	93.22%
2	Water - Residential - 5/8" - Tier 2	94.35%	94.06%	93.78%	93.50%	93.22%
3	Water - Residential - 5/8" - Tier 3	94.35%	94.06%	93.78%	93.50%	93.22%
4	Water - Residential - 3/4" - Tier 1	94.35%	94.06%	93.78%	93.50%	93.22%
5	Water - Residential - 3/4" - Tier 2	94.35%	94.06%	93.78%	93.50%	93.22%
6	Water - Residential - 3/4" - Tier 3	94.35%	94.06%	93.78%	93.50%	93.22%

Siemens Industry, Inc. All right reserved

7	Water - Residential - 1" - Tier 1	94.35%	94.06%	93.78%	93.50%	93.22%
8	Water - Residential - 1" - Tier 2	94.35%	94.06%	93.78%	93.50%	93.22%
9	Water - Residential - 1" - Tier 3	94.35%	94.06%	93.78%	93.50%	93.22%
10	Water - Residential - 1.5" - Tier 1	0.00%	0.00%	0.00%	0.00%	0.00%
11	Water - Residential - 1.5" - Tier 2	0.00%	0.00%	0.00%	0.00%	0.00%
12	Water - Residential - 1.5" - Tier 3	0.00%	0.00%	0.00%	0.00%	0.00%
13	Water - Residential - 2" - Tier 1	0.00%	0.00%	0.00%	0.00%	0.00%
14	Water - Residential - 2" - Tier 2	0.00%	0.00%	0.00%	0.00%	0.00%
15	Water - Residential - 2" - Tier 3	0.00%	0.00%	0.00%	0.00%	0.00%
16	Non-Residential - 5/8" - Tier 1	94.35%	94.06%	93.78%	93.50%	93.22%
17	Non-Residential - 5/8" - Tier 2	94.35%	94.06%	93.78%	93.50%	93.22%
18	Non-Residential - 3/4" - Tier 1	94.35%	94.06%	93.78%	93.50%	93.22%
19	Non-Residential - 3/4" - Tier 2	94.35%	94.06%	93.78%	93.50%	93.22%
20	Non-Residential - 1" - Tier 1	94.35%	94.06%	93.78%	93.50%	93.22%
21	Non-Residential - 1" - Tier 2	94.35%	94.06%	93.78%	93.50%	93.22%
22	Non-Residential - 1.5" - Tier 1	0.00%	0.00%	0.00%	0.00%	0.00%
23	Non-Residential - 1.5" - Tier 2	0.00%	0.00%	0.00%	0.00%	0.00%
24	Non-Residential - 2" - Tier 1	0.00%	0.00%	0.00%	0.00%	0.00%
25	Non-Residential - 2" - Tier 2	0.00%	0.00%	0.00%	0.00%	0.00%
26	Sprinkler - 5/8" - Tier 1	94.35%	94.06%	93.78%	93.50%	93.22%
27	Sprinkler - 5/8" - Tier 2	94.35%	94.06%	93.78%	93.50%	93.22%
28	Sprinkler - 3/4" - Tier 1	94.35%	94.06%	93.78%	93.50%	93.22%
29	Sprinkler - 3/4" - Tier 2	94.35%	94.06%	93.78%	93.50%	93.22%
30	Sprinkler - 1" - Tier 1	94.35%	94.06%	93.78%	93.50%	93.22%
31	Sprinkler - 1" - Tier 2	94.35%	94.06%	93.78%	93.50%	93.22%
32	Sprinkler - 1.5" - Tier 1	0.00%	0.00%	0.00%	0.00%	0.00%
33	Sprinkler - 1.5" - Tier 2	0.00%	0.00%	0.00%	0.00%	0.00%
34	Sprinkler - 2" - Tier 1	0.00%	0.00%	0.00%	0.00%	0.00%
35	Sprinkler - 2" - Tier 2	0.00%	0.00%	0.00%	0.00%	0.00%

Siemens Industry, Inc. All right reserved

2.5. Utility Rate Structures & Escalation Rates

The City and Siemens agreed that the energy cost savings for each Annual Period are calculated by multiplying the realized energy Savings in units by the Annual Period's stipulated contract utility rate and applying the appropriate Escalation Rates, not the Annual Period's actual utility rate. The Annual Period 1 contract utility rates are established in Article 6 of Contract Exhibit C – Performance Assurance. An Escalation Rate of 3% for electricity and 1.5% for water/sewer is applied to the contract utility rates annually beginning in Annual Period 1. The current Annual Period's contract utility rates are provided in **Table 11**. **Table 12** shows water rates for the entire Performance Guarantee Period.

Table 11: Contract Annual Period 1 Utility Rates

Location	Electric Energy ($/kWh)	Electric Demand ($/kW)
Waste Water Treatment Plant	$0.0626	$6.1144

Table 12: Water Rates for the Performance Guarantee Period

Item	Description	Baseline	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
1	Water - Residential - 5/8" - Tier 1	$0.390	$0.396	$0.402	$0.408	$0.414	$0.420	$0.426	$0.433
2	Water - Residential - 5/8" - Tier 2	$0.490	$0.497	$0.505	$0.512	$0.520	$0.528	$0.536	$0.544
3	Water - Residential - 5/8" - Tier 3	$0.590	$0.599	$0.608	$0.617	$0.626	$0.636	$0.645	$0.655
4	Water - Residential - 3/4" - Tier 1	$0.390	$0.396	$0.402	$0.408	$0.414	$0.420	$0.426	$0.433
5	Water - Residential - 3/4" - Tier 2	$0.490	$0.497	$0.505	$0.512	$0.520	$0.528	$0.536	$0.544
6	Water - Residential - 3/4" - Tier 3	$0.590	$0.599	$0.608	$0.617	$0.626	$0.636	$0.645	$0.655
7	Water - Residential - 1" - Tier 1	$0.390	$0.396	$0.402	$0.408	$0.414	$0.420	$0.426	$0.433
8	Water - Residential - 1" - Tier 2	$0.490	$0.497	$0.505	$0.512	$0.520	$0.528	$0.536	$0.544
9	Water - Residential - 1" - Tier 3	$0.590	$0.599	$0.608	$0.617	$0.626	$0.636	$0.645	$0.655
10	Water - Residential - 1.5" - Tier 1	$0.390	$0.396	$0.402	$0.408	$0.414	$0.420	$0.426	$0.433
11	Water - Residential - 1.5" - Tier 2	$0.490	$0.497	$0.505	$0.512	$0.520	$0.528	$0.536	$0.544
12	Water - Residential - 1.5" - Tier 3	$0.590	$0.599	$0.608	$0.617	$0.626	$0.636	$0.645	$0.655
13	Water - Residential - 2" - Tier 1	$0.390	$0.396	$0.402	$0.408	$0.414	$0.420	$0.426	$0.433
14	Water - Residential - 2" - Tier 2	$0.490	$0.497	$0.505	$0.512	$0.520	$0.528	$0.536	$0.544
15	Water - Residential - 2" - Tier 3	$0.590	$0.599	$0.608	$0.617	$0.626	$0.636	$0.645	$0.655

Siemens Industry, Inc. All right reserved

16	Non-Residential - 5/8" - Tier 1	$0.515	$0.523	$0.531	$0.539	$0.547	$0.555	$0.563	$0.572
17	Non-Residential - 5/8" - Tier 2	$0.590	$0.599	$0.608	$0.617	$0.626	$0.636	$0.645	$0.655
18	Non-Residential - 3/4" - Tier 1	$0.515	$0.523	$0.531	$0.539	$0.547	$0.555	$0.563	$0.572
19	Non-Residential - 3/4" - Tier 2	$0.590	$0.599	$0.608	$0.617	$0.626	$0.636	$0.645	$0.655
20	Non-Residential - 1" - Tier 1	$0.515	$0.523	$0.531	$0.539	$0.547	$0.555	$0.563	$0.572
21	Non-Residential - 1" - Tier 2	$0.590	$0.599	$0.608	$0.617	$0.626	$0.636	$0.645	$0.655
22	Non-Residential - 1.5" - Tier 1	$0.515	$0.523	$0.531	$0.539	$0.547	$0.555	$0.563	$0.572
23	Non-Residential - 1.5" - Tier 2	$0.590	$0.599	$0.608	$0.617	$0.626	$0.636	$0.645	$0.655
24	Non-Residential - 2" - Tier 1	$0.515	$0.523	$0.531	$0.539	$0.547	$0.555	$0.563	$0.572
25	Non-Residential - 2" - Tier 2	$0.590	$0.599	$0.608	$0.617	$0.626	$0.636	$0.645	$0.655
26	Sprinkler - 5/8" - Tier 1	$0.350	$0.355	$0.361	$0.366	$0.371	$0.377	$0.383	$0.388
27	Sprinkler - 5/8" - Tier 2	$0.400	$0.406	$0.412	$0.418	$0.425	$0.431	$0.437	$0.444
28	Sprinkler - 3/4" - Tier 1	$0.350	$0.355	$0.361	$0.366	$0.371	$0.377	$0.383	$0.388
29	Sprinkler - 3/4" - Tier 2	$0.400	$0.406	$0.412	$0.418	$0.425	$0.431	$0.437	$0.444
30	Sprinkler - 1" - Tier 1	$0.350	$0.355	$0.361	$0.366	$0.371	$0.377	$0.383	$0.388
31	Sprinkler - 1" - Tier 2	$0.400	$0.406	$0.412	$0.418	$0.425	$0.431	$0.437	$0.444
32	Sprinkler - 1.5" - Tier 1	$0.350	$0.355	$0.361	$0.366	$0.371	$0.377	$0.383	$0.388
33	Sprinkler - 1.5" - Tier 2	$0.400	$0.406	$0.412	$0.418	$0.425	$0.431	$0.437	$0.444
34	Sprinkler - 2" - Tier 1	$0.350	$0.355	$0.361	$0.366	$0.371	$0.377	$0.383	$0.388
35	Sprinkler - 2" - Tier 2	$0.400	$0.406	$0.412	$0.418	$0.425	$0.431	$0.437	$0.444

Item	Description	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
1	Water - Residential - 5/8" - Tier 1	$0.439	$0.446	$0.453	$0.459	$0.466	$0.473	$0.480	$0.488
2	Water - Residential - 5/8" - Tier 2	$0.552	$0.560	$0.569	$0.577	$0.586	$0.595	$0.604	$0.613
3	Water - Residential - 5/8" - Tier 3	$0.665	$0.675	$0.685	$0.695	$0.705	$0.716	$0.727	$0.738
4	Water - Residential - 3/4" - Tier 1	$0.439	$0.446	$0.453	$0.459	$0.466	$0.473	$0.480	$0.488
5	Water - Residential - 3/4" - Tier 2	$0.552	$0.560	$0.569	$0.577	$0.586	$0.595	$0.604	$0.613
6	Water - Residential - 3/4" - Tier 3	$0.665	$0.675	$0.685	$0.695	$0.705	$0.716	$0.727	$0.738
7	Water - Residential - 1" - Tier 1	$0.439	$0.446	$0.453	$0.459	$0.466	$0.473	$0.480	$0.488
8	Water - Residential - 1" - Tier 2	$0.552	$0.560	$0.569	$0.577	$0.586	$0.595	$0.604	$0.613
9	Water - Residential - 1" - Tier 3	$0.665	$0.675	$0.685	$0.695	$0.705	$0.716	$0.727	$0.738
10	Water - Residential - 1.5" - Tier 1	$0.439	$0.446	$0.453	$0.459	$0.466	$0.473	$0.480	$0.488

Siemens Industry, Inc. All right reserved

Item	Description	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
11	Water - Residential - 1.5" - Tier 2	$0.552	$0.560	$0.569	$0.577	$0.586	$0.595	$0.604	$0.613
12	Water - Residential - 1.5" - Tier 3	$0.665	$0.675	$0.685	$0.695	$0.705	$0.716	$0.727	$0.738
13	Water - Residential - 2" - Tier 1	$0.439	$0.446	$0.453	$0.459	$0.466	$0.473	$0.480	$0.488
14	Water - Residential - 2" - Tier 2	$0.552	$0.560	$0.569	$0.577	$0.586	$0.595	$0.604	$0.613
15	Water - Residential - 2" - Tier 3	$0.665	$0.675	$0.685	$0.695	$0.705	$0.716	$0.727	$0.738
16	Non-Residential - 5/8" - Tier 1	$0.580	$0.589	$0.598	$0.607	$0.616	$0.625	$0.634	$0.644
17	Non-Residential - 5/8" - Tier 2	$0.665	$0.675	$0.685	$0.695	$0.705	$0.716	$0.727	$0.738
18	Non-Residential - 3/4" - Tier 1	$0.580	$0.589	$0.598	$0.607	$0.616	$0.625	$0.634	$0.644
19	Non-Residential - 3/4" - Tier 2	$0.665	$0.675	$0.685	$0.695	$0.705	$0.716	$0.727	$0.738
20	Non-Residential - 1" - Tier 1	$0.580	$0.589	$0.598	$0.607	$0.616	$0.625	$0.634	$0.644
21	Non-Residential - 1" - Tier 2	$0.665	$0.675	$0.685	$0.695	$0.705	$0.716	$0.727	$0.738
22	Non-Residential - 1.5" - Tier 1	$0.580	$0.589	$0.598	$0.607	$0.616	$0.625	$0.634	$0.644
23	Non-Residential - 1.5" - Tier 2	$0.665	$0.675	$0.685	$0.695	$0.705	$0.716	$0.727	$0.738
24	Non-Residential - 2" - Tier 1	$0.580	$0.589	$0.598	$0.607	$0.616	$0.625	$0.634	$0.644
25	Non-Residential - 2" - Tier 2	$0.665	$0.675	$0.685	$0.695	$0.705	$0.716	$0.727	$0.738
26	Sprinkler - 5/8" - Tier 1	$0.394	$0.400	$0.406	$0.412	$0.418	$0.425	$0.431	$0.438
27	Sprinkler - 5/8" - Tier 2	$0.451	$0.457	$0.464	$0.471	$0.478	$0.485	$0.493	$0.500
28	Sprinkler - 3/4" - Tier 1	$0.394	$0.400	$0.406	$0.412	$0.418	$0.425	$0.431	$0.438
29	Sprinkler - 3/4" - Tier 2	$0.451	$0.457	$0.464	$0.471	$0.478	$0.485	$0.493	$0.500
30	Sprinkler - 1" - Tier 1	$0.394	$0.400	$0.406	$0.412	$0.418	$0.425	$0.431	$0.438
31	Sprinkler - 1" - Tier 2	$0.451	$0.457	$0.464	$0.471	$0.478	$0.485	$0.493	$0.500
32	Sprinkler - 1.5" - Tier 1	$0.394	$0.400	$0.406	$0.412	$0.418	$0.425	$0.431	$0.438
33	Sprinkler - 1.5" - Tier 2	$0.451	$0.457	$0.464	$0.471	$0.478	$0.485	$0.493	$0.500
34	Sprinkler - 2" - Tier 1	$0.394	$0.400	$0.406	$0.412	$0.418	$0.425	$0.431	$0.438
35	Sprinkler - 2" - Tier 2	$0.451	$0.457	$0.464	$0.471	$0.478	$0.485	$0.493	$0.500

Item	Description	Year 16	Year 17	Year 18	Year 19	Year 20
1	Water - Residential - 5/8" - Tier 1	$0.495	$0.502	$0.510	$0.518	$0.525
2	Water - Residential - 5/8" - Tier 2	$0.622	$0.631	$0.641	$0.650	$0.660
3	Water - Residential - 5/8" - Tier 3	$0.749	$0.760	$0.771	$0.783	$0.795
4	Water - Residential - 3/4" - Tier 1	$0.495	$0.502	$0.510	$0.518	$0.525

Siemens Industry, Inc. All right reserved

Item	Description	Year 16	Year 17	Year 18	Year 19	Year 20
5	Water - Residential - 3/4" - Tier 2	$0.622	$0.631	$0.641	$0.650	$0.660
6	Water - Residential - 3/4" - Tier 3	$0.749	$0.760	$0.771	$0.783	$0.795
7	Water - Residential - 1" - Tier 1	$0.495	$0.502	$0.510	$0.518	$0.525
8	Water - Residential - 1" - Tier 2	$0.622	$0.631	$0.641	$0.650	$0.660
9	Water - Residential - 1" - Tier 3	$0.749	$0.760	$0.771	$0.783	$0.795
10	Water - Residential - 1.5" - Tier 1	$0.495	$0.502	$0.510	$0.518	$0.525
11	Water - Residential - 1.5" - Tier 2	$0.622	$0.631	$0.641	$0.650	$0.660
12	Water - Residential - 1.5" - Tier 3	$0.749	$0.760	$0.771	$0.783	$0.795
13	Water - Residential - 2" - Tier 1	$0.495	$0.502	$0.510	$0.518	$0.525
14	Water - Residential - 2" - Tier 2	$0.622	$0.631	$0.641	$0.650	$0.660
15	Water - Residential - 2" - Tier 3	$0.749	$0.760	$0.771	$0.783	$0.795
16	Non-Residential - 5/8" - Tier 1	$0.654	$0.663	$0.673	$0.683	$0.694
17	Non-Residential - 5/8" - Tier 2	$0.749	$0.760	$0.771	$0.783	$0.795
18	Non-Residential - 3/4" - Tier 1	$0.654	$0.663	$0.673	$0.683	$0.694
19	Non-Residential - 3/4" - Tier 2	$0.749	$0.760	$0.771	$0.783	$0.795
20	Non-Residential - 1" - Tier 1	$0.654	$0.663	$0.673	$0.683	$0.694
21	Non-Residential - 1" - Tier 2	$0.749	$0.760	$0.771	$0.783	$0.795
22	Non-Residential - 1.5" - Tier 1	$0.654	$0.663	$0.673	$0.683	$0.694
23	Non-Residential - 1.5" - Tier 2	$0.749	$0.760	$0.771	$0.783	$0.795
24	Non-Residential - 2" - Tier 1	$0.654	$0.663	$0.673	$0.683	$0.694
25	Non-Residential - 2" - Tier 2	$0.749	$0.760	$0.771	$0.783	$0.795
26	Sprinkler - 5/8" - Tier 1	$0.444	$0.451	$0.458	$0.464	$0.471
27	Sprinkler - 5/8" - Tier 2	$0.508	$0.515	$0.523	$0.531	$0.539
28	Sprinkler - 3/4" - Tier 1	$0.444	$0.451	$0.458	$0.464	$0.471
29	Sprinkler - 3/4" - Tier 2	$0.508	$0.515	$0.523	$0.531	$0.539
30	Sprinkler - 1" - Tier 1	$0.444	$0.451	$0.458	$0.464	$0.471
31	Sprinkler - 1" - Tier 2	$0.508	$0.515	$0.523	$0.531	$0.539
32	Sprinkler - 1.5" - Tier 1	$0.444	$0.451	$0.458	$0.464	$0.471
33	Sprinkler - 1.5" - Tier 2	$0.508	$0.515	$0.523	$0.531	$0.539
34	Sprinkler - 2" - Tier 1	$0.444	$0.451	$0.458	$0.464	$0.471
35	Sprinkler - 2" - Tier 2	$0.508	$0.515	$0.523	$0.531	$0.539

Siemens Industry, Inc. All right reserved

3. Performance Assurance Results

3.1. Summary of Realized & Guaranteed Savings

Annual Realized Savings for Annual Period 1 amounted to **$695,713**, comprised of **$568,913,** in Option A and **$126,800** in Operational Savings. These cost and energy savings are summarized by location in Figure 1 and by FIM and Option Type in Table 13. Annual Realized Savings exceeded the Guaranteed Annual Savings of **$655,253** by **$40,460**. The following sections detail the Savings associated with each FIM under their respective option types.

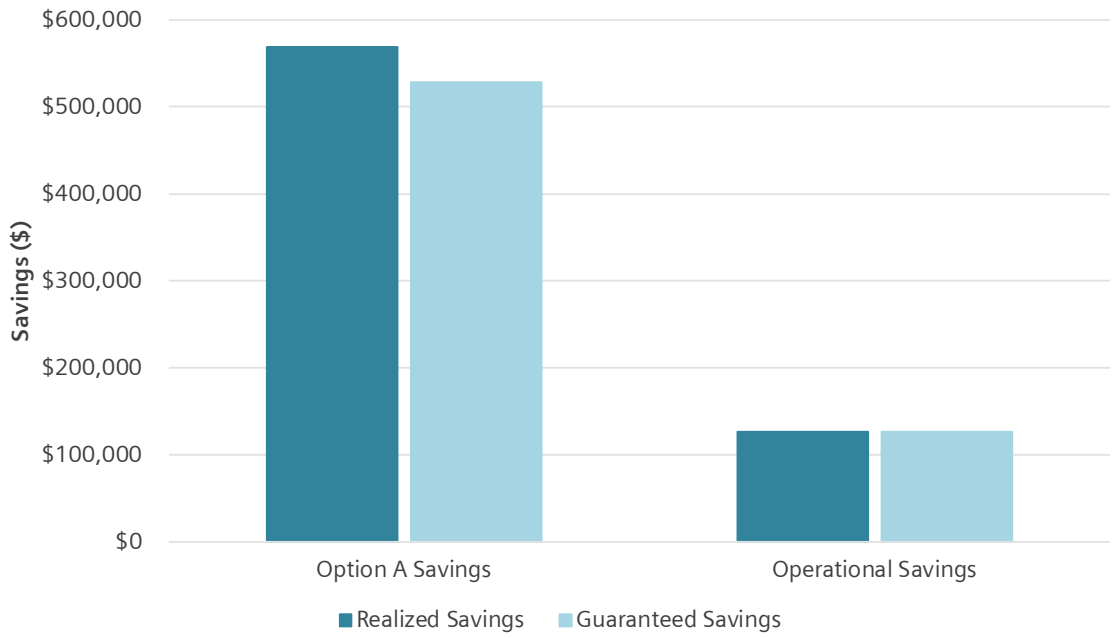

Figure 1: Annual Period 1 Cost Savings by Type

Table 13: Annual Period 1 Savings Variance by FIM

Facility Improvement Measure	Realized Option A Savings	Operational Savings	Total Realized Savings	Total Guaranteed Savings	Savings Variance
Water Meter Replacement	$572,238	$76,800	$649,038	$568,533	$80,505
Blower and Aeration Efficiency Improvements	$23,822	$15,000	$38,822	$50,459	($11,638)
WWTP Digester Blower Replacement	($27,147)	$12,500	($14,647)	$13,761	($28,407)
WWTP Main Lift Station Rehabilitation	$0	$10,000	$10,000	$10,000	$0
WWTP RAS Pump Replacement & WAS Controls	$0	$12,500	$12,500	$12,500	$0
Total	$568,913	$126,800	$695,713	$655,253	$40,460

Siemens Industry, Inc. All right reserved

3.2. Option A Energy Savings

Realized Option A Savings for the current Annual Period amounted to **$568,913**, which exceeded the guaranteed **$528,453** in Savings by **$40,460**, or 8%. Option A FIMs include Water Meter Replacement, Blower and Aeration Efficiency Improvements, and WWTP Digester Blower Replacement (Table 14).

Table 14: Option A Savings for Annual Period 1

Facility Improvement Measure	Electric Energy Savings (kWh)	Electric Demand Savings (kW)	Increased Billable Water and Sewer (hgal)	Realized Savings	Guaranteed Savings	Savings Variance
Water Meter Replacement	0	0	1,175,551	$572,238	$491,733	$80,505
Blower and Aeration Efficiency Improvements	335,818	459	0	$23,822	$35,459	($11,638)
WWTP Digester Blower Replacement	(381,192)	(538)	0	($27,147)	$1,261	($28,407)
Total	**(45,373)**	(79)	**1,175,551**	**$568,913**	**$528,453**	**$40,460**

3.2.1. Water Meter Replacement

Siemens replaced existing Rockwell, Sensus, and Badger water meters with new Neptune T-10 and HPT water meters and R900i registers. A new Neptune ARB Fixed Base R900i AMI system was also installed, which involved the installation of three (3) new data collectors and integration of the new AMI system with the new billing software to enhance the billing process. Table 15 summarizes the water meter quantities and types by size that were installed.

Table 15: Water Meter Quantities and Types by Size

Size	Type	Quantity
Short 3/4"	Neptune T-10 PD Meter with R900i Register & Antenna	5,400
1"	Neptune T-10 PD Meter with R900i Register & Antenna	2,125
1.5"	Neptune T-10 PD Meter with R900i Register & Antenna	45
2"	Neptune T-10 PD Meter with R900i Register & Antenna	78
2"	Neptune HPT Turbine Meter with R900i Register & Antenna	1
2"	Neptune Compound Meter with R900i Registers & Antennas	5
3"	Neptune HPT Turbine Meter with R900i Register & Antenna	1
3"	Neptune Compound Meter with R900i Registers & Antennas	6
4"	Neptune HPT Turbine Meter with R900i Register & Antenna	2
4"	Neptune Compound Meter with R900i Registers & Antennas	17
6"	Neptune Compound Meter with R900i Registers & Antennas	4

Siemens Industry, Inc. All right reserved

Savings result from increased billable water and sewer resulting from improved water meter accuracy. Total increased billable water usage due to the Water Meter Replacement FIM amount to **$572,238**, which exceeds the guarantee of **$491,733** by **$80,505**, or 16% (Table 16).

Table 16: Water Meter Replacement Savings for Annual Period 1

Realized Savings		Guaranteed Savings		Savings Variance
Increased Billable Water and Sewer (hgal)	Realized Billable Water/Sewer Increase	Increased Billable Water and Sewer (hgal)	Guaranteed Billable Water/Sewer Increase	
1,175,551	$572,238	1,010,474	$491,733	$80,505

Savings are verified by performing annual accuracy testing on a random sample of ¾", 1", 1.5" and 2" water meters as one aggregated population not to exceed 11 meters. If a meter size class is not represented in the sample, the sample size will be increased by randomly selecting one additional meter from that size class for accuracy testing. To select meters for testing, Siemens requested the water meter database from the City. Siemens then randomly selected 13 meters so that the sample represented all meter sizes.

Table 17 shows the meters selected for testing and a summary of the resulting tested accuracies. See Appendix A.1. for an explanation of the calculation of average weighted efficiency and the detailed test results at each flow rate. The ¾" meter with serial number 53939002 tested below the manufacturer's guaranteed accuracy at the minimum flow rate. Therefore, Siemens recommends that the City have this meter replaced under warranty. The weighted average meter accuracy of each meter exceeded the guaranteed meter accuracy.

Table 17: Water Meter Accuracy Test Results Summary for Annual Period 1

Account #	Address	Meter #	Meter Size	Weighted Average Meter Accuracy (%)
55-7180-00	4436 DOROTHY	53940395	3/4"	100.00%
66-3450-01	5306 EVERGREEN	54115425	3/4"	99.70%
76-2940-03	549 S 3RD ST	53937722	3/4"	100.70%
75-1290-00	4924 CEDAR	53939002	3/4"	99.00%
85-2310-00	5007 TAMARISK	53937007	3/4"	99.90%
86-1310-04	4522 LARCH LN	54115748*	3/4"	98.90%
86-1330-04	4524 LARCH LN	54115549	3/4"	99.10%
77-2250-00	4914 HOLLY	53939311	3/4"	99.90%
76-1900-02	107 BELLAIRE CT	53932937	1"	99.90%
67-2720-01	5304 PINE ST	54112755	1"	100.00%
86-0450-02	4310 COMPTON CIR	54116591	1"	100.70%
78-1220-01	P.O. BOX 2440	60990940	1 1/2"	98.40%
78-3255-03	P O BOX 2440	61019099	2"	99.70%

*Per PVI, the actual meter number located at this address was 54115748 instead of 54115550.

Siemens Industry, Inc. All right reserved

In order to perform the revenue calculations for increased billable usage, Siemens averaged the tested accuracies for all meter sizes. As seen in Table 18, the average accuracy exceeded the expected accuracy.

Table 18: Meter Accuracy Comparison for Annual Period 1

Meter Size	Existing Meter Accuracy (%)	Proposed Meter Accuracy (%)	Average Measured Meter Accuracy (%)
3/4", 1", 1 1/2" & 2"	89.76%	97.98%	99.68%

These average accuracies were then used in the revenue calculations to determine the total increased billable water (Table 19).

Table 19: Water Meter Calculations for Annual Period 1

Description	Existing Consumption at 100% Accuracy (hgal)	Existing Meter Accuracy %	Existing Consumption (hgal)	Measured New Meter Accuracy %	Consumption Billed with New Meters (hgal)	Annual Consumption Increase (hgal)	Annual Consumption Increase ($)
Water - Residential - 5/8" - Tier 1	661,337	76.00%	502,616	99.68%	659,251	156,635	$62,004
Water - Residential - 5/8" - Tier 2	993,178	76.00%	754,815	99.68%	990,045	235,230	$116,992
Water - Residential - 5/8" - Tier 3	412,417	76.00%	313,437	99.68%	411,116	97,679	$58,495
Water - Residential - 3/4" - Tier 1	520,372	94.40%	491,231	99.68%	518,731	27,500	$10,886
Water - Residential - 3/4" - Tier 2	1,176,732	94.40%	1,110,835	99.68%	1,173,021	62,186	$30,928
Water - Residential - 3/4" - Tier 3	772,823	94.40%	729,545	99.68%	770,386	40,841	$24,457
Water - Residential - 1" - Tier 1	450,131	87.70%	394,765	99.68%	448,711	53,946	$21,355
Water - Residential - 1" - Tier 2	1,175,803	87.70%	1,031,179	99.68%	1,172,094	140,915	$70,084
Water - Residential - 1" - Tier 3	1,218,674	87.70%	1,068,777	99.68%	1,214,830	146,053	$87,464
Water - Residential - 1.5" - Tier 1	971	96.80%	940	99.68%	968	28	$11
Water - Residential - 1.5" - Tier 2	2,460	96.80%	2,381	99.68%	2,452	71	$35

Siemens Industry, Inc. All right reserved

Description	Existing Consumption at 100% Accuracy (hgal)	Existing Meter Accuracy %	Existing Consumption (hgal)	Measured New Meter Accuracy %	Consumption Billed with New Meters (hgal)	Annual Consumption Increase (hgal)	Annual Consumption Increase ($)
Water - Residential - 1.5" - Tier 3	2,274	96.80%	2,201	99.68%	2,267	66	$39
Water - Residential - 2" - Tier 1	1,184	93.90%	1,112	99.68%	1,181	69	$27
Water - Residential - 2" - Tier 2	2,142	93.90%	2,011	99.68%	2,135	124	$62
Water - Residential - 2" - Tier 3	354	93.90%	332	99.68%	352	20	$12
Non-Residential - 5/8" - Tier 1	69,284	76.00%	52,656	99.68%	69,066	16,410	$8,578
Non-Residential - 5/8" - Tier 2	621	76.00%	472	99.68%	619	147	$88
Non-Residential - 3/4" - Tier 1	39,369	94.40%	37,164	99.68%	39,244	2,080	$1,088
Non-Residential - 3/4" - Tier 2	0	94.40%	0	99.68%	0	0	$0
Non-Residential - 1" - Tier 1	193,169	87.70%	169,409	99.68%	192,560	23,151	$12,101
Non-Residential - 1" - Tier 2	54,571	87.70%	47,859	99.68%	54,399	6,540	$3,917
Non-Residential - 1.5" - Tier 1	32,158	96.80%	31,129	99.68%	32,057	928	$485
Non-Residential - 1.5" - Tier 2	12,447	96.80%	12,049	99.68%	12,408	359	$215
Non-Residential - 2" - Tier 1	221,649	93.90%	208,128	99.68%	220,950	12,822	$6,702
Non-Residential - 2" - Tier 2	131,760	93.90%	123,723	99.68%	131,345	7,622	$4,564
Sprinkler - 5/8" - Tier 1	205,095	76.00%	155,872	99.68%	204,448	48,576	$17,257
Sprinkler - 5/8" - Tier 2	967	76.00%	735	99.68%	964	229	$93
Sprinkler - 3/4" - Tier 1	579,989	94.40%	547,510	99.68%	578,160	30,650	$10,888
Sprinkler - 3/4" - Tier 2	8,112	94.40%	7,658	99.68%	8,087	429	$174
Sprinkler - 1" - Tier 1	412,587	87.70%	361,839	99.68%	411,286	49,447	$17,566
Sprinkler - 1" - Tier 2	11,751	87.70%	10,306	99.68%	11,714	1,408	$572
Sprinkler - 1.5" - Tier 1	61,159	96.80%	59,202	99.68%	60,966	1,764	$627
Sprinkler - 1.5" - Tier 2	58,387	96.80%	56,519	99.68%	58,203	1,684	$684
Sprinkler - 2" - Tier 1	84,745	93.90%	79,576	99.68%	84,478	4,902	$1,742

Siemens Industry, Inc. All right reserved

Description	Existing Consumption at 100% Accuracy (hgal)	Existing Meter Accuracy %	Existing Consumption (hgal)	Measured New Meter Accuracy %	Consumption Billed with New Meters (hgal)	Annual Consumption Increase (hgal)	Annual Consumption Increase ($)
Sprinkler - 2" - Tier 2	87,121	93.90%	81,807	99.68%	86,847	5,040	$2,046
Total	9,655,794		8,449,790		9,625,341	1,175,551	$572,238

3.2.2. Blower and Aeration Efficiency Improvements

The Blower and Aeration Efficiency Improvements FIM consisted of replacing the two (2) existing 100 hp multi-stage centrifugal blowers with two (2) new high efficiency magnetic bearing turbo blowers with integrated motors. One new blower will be sufficient to fulfill the aeration requirements of the system for the majority of the year, while the other will act as a secondary for instances where extra aeration is required. The coarse bubble diffusers in the pre-aeration basin were replaced with fine bubble diffusers, while the existing fine bubble diffusers in the aeration basin were removed and replaced with new equipment.

Realized Savings for the Blower and Aeration Efficiency Improvements FIM amount to **$23,822**, which falls short of the guarantee of **$35,459** by **($11,638)**, or -33% **(Table 20)**.

Table 20: Blower and Aeration Efficiency Improvements Savings for Annual Period 1

Location	Realized Savings			Guaranteed Savings		Savings Variance
	Electric Energy Savings (kWh)	Electric Demand Savings (kW)	Total Realized Savings	Electric Energy Savings (kWh)	Total Guaranteed Savings	
Waste Water Treatment Plant	335,818	459	$23,822	583,587	$35,459	($11,638)

The savings are verified by comparing the pre-retrofit kW to the post-retrofit kW, which is logged continuously. The kWh savings were calculated from the kW measurements and the annual operating hours .

Dissolved oxygen (DO) level is used to control the volume of air produced by the new aeration blowers. The contractual maximum DO level setpoint of 2.0 mg/l must be maintained in the aeration basin in order to achieve the expected average blower demand. For the majority of Annual Period 1, the average measured aeration blower demand of 83.47 kW exceeded the expected target of 43.54 kW by 92% **(Table 21)**, which suggests the DO level was well above the contractual setpoint of 2.0 mg/l for most of the Annual Period. This resulted in the realized savings falling short of the guarantee for Annual Period 1. Siemens reserves the right to make a baseline adjustment for this FIM in future Annual Periods if the contractual DO level setpoint of 2.0 mg/l is

Siemens Industry, Inc. All right reserved

not maintained by the City resulting in the average measured aeration blower demand exceeding the expected target of 43.54 kW.

Table 21: Post-Retrofit Aeration Blower Demand Comparison

Average Expected Post-Retrofit Demand (kW)	Average Measured Post-Retrofit Demand (kW)
43.54	83.47

3.2.3. WWTP Digester Blower Replacement

The WWTP Digester Blower Replacement FIM consisted of replacing the two (2) existing 100 hp digester blowers with two (2) new 125 hp digester blowers with the same duty conditions.

Realized Savings for the WWTP Digester Blower Replacement FIM amount to -**$27,147**, which falls short of the guarantee of **$1,261** by **($28,407)**, or -2254% **(Table 22)**.

Table 22: WWTP Digester Blower Replacement FIM Savings for Annual Period 1

Location	Realized Savings			Guaranteed Savings		Savings Variance
	Electric Energy Savings (kWh)	Electric Demand Savings (kW)	Total Realized Savings	Electric Energy Savings (kWh)	Total Guaranteed Savings	
Waste Water Treatment Plant	(381,192)	(538)	($27,147)	20,746	$1,261	($28,407)

The savings are verified by comparing the pre-retrofit kW to the post-retrofit kW, which is logged continuously. The kWh savings were calculated from the kW measurements and the annual operating hours.

For the majority of Annual Period 1, the average measured digester blower demand of 93.7 kW exceeded the expected target of 46.2 kW by 103% **(Table 23)**, which suggests the DO level was well above the contractual setpoint of 2.0 mg/l for most of the Annual Period and/or the digester blowers were used to supplement the air flow requirements in the aeration basin, as reported by the City on July 8, 2021. This resulted in the realized savings falling short of the guarantee for Annual Period 1. Siemens reserves the right to make a baseline adjustment for this FIM in future Annual Periods if the contractual DO level setpoint of 2.0 mg/l is not maintained by the City and/or the digester blowers are used to supplement the air flow requirements in the aeration basin resulting in the average measured digester blower demand exceeding the expected target of 46.2 kW.

Siemens Industry, Inc. All right reserved

Table 23: Post-Retrofit Digester Blower Demand Comparison

Average Expected Post-Retrofit Demand (kW)	Average Measured Post-Retrofit Demand (kW)
46.2	93.7

3.3. Operational Savings

In addition to energy savings, the Contract provided operational savings benefits to the City associated with the Water Meter Replacement, Blower and Aeration Efficiency Improvements, WWTP Digester Blower Replacement, WWTP Main Lift Station Rehabilitation, and WWTP RAS Pump Replacement & WAS Controls FIMs **(Table 24)**.

Table 24: Operational Savings for Annual Period 1

Description	Realized Savings
Cancellation of 3rd party Meter Reading Contract = Cost Reduction	$76,800
Reduction in maintenance labor and replacement materials due to aeration system rehabilitation and new blowers.	$15,000
Reduction in maintenance labor and replacement materials due to digester upgrades, new blowers, and new MECC equipment.	$12,500
Reduction in maintenance labor and replacement materials due to pump & motor upgrades, new piping, new controls, and new MECC equipment.	$10,000
Reduction in maintenance labor and replacement materials due to pump & motor upgrades, new controls and new valves.	$12,500
Total	**$126,800**

Siemens Industry, Inc. All right reserved

Appendix A: FIM Measurements

Appendix A.1. Water Meter Calculations & Detailed Accuracy Test Results

Based on AWWA guidelines for meter sampling, a random sample of the meters is selected, removed from service, and delivered to a third-party testing facility. The accuracy tests are based on AWWA standards for testing residential water meters per AWWA Manual M6. For a true test of a water meter at all flow rates, AWWA standards recommend first testing low, medium, and high flow rates and then calculating the aggregate meter efficiency by weighted formula. The three test points (High, Medium, and Low flow) are weighted 15%, 70%, and 15%. The formula for meter accuracy is as follow:

(15% x Measured Efficiency @ High flow)
+ (70% x Measured Efficiency @ Medium flow)
+ (15% x Measured Efficiency @ Low flow)
Average Weighted Efficiency of the Meter*

(*reference: AWWA Meter Manual M6, Fifth Edition; pg 54, "Meter Testing")

Table 25 details the accuracy results for Annual Period 1 at each of the flow rates.

Table 25: Detailed Water Accuracy Test Results for Annual Period 1

Account #	Meter #	Meter Size	Low Flow Meter Accuracy (%)	Medium Flow Meter Accuracy (%)	High Flow Meter Accuracy (%)	Weighted Average Meter Accuracy (%)
55-7180-00	53940395	3/4"	100.0%	100.0%	100.0%	100.0%
66-3450-01	54115425	3/4"	99.0%	100.0%	99.0%	99.7%
76-2940-03	53937722	3/4"	100.0%	101.0%	100.0%	100.7%
75-1290-00	53939002	3/4"	94.0%	100.0%	99.0%	99.0%
85-2310-00	53937007	3/4"	99.0%	100.0%	100.0%	99.9%
86-1310-04	54115748*	3/4"	98.0%	99.0%	99.0%	98.9%
86-1330-04	54115549	3/4"	95.0%	100.0%	99.0%	99.1%
77-2250-00	53939311	3/4"	99.0%	100.0%	100.0%	99.9%
76-1900-02	53932937	1"	99.0%	100.0%	100.0%	99.9%
67-2720-01	54112755	1"	100.0%	100.0%	100.0%	100.0%
86-0450-02	54116591	1"	100.0%	101.0%	100.0%	100.7%
78-1220-01	60990940	1 1/2"	95.0%	99.0%	99.0%	98.4%
78-3255-03	61019099	2"	99.0%	100.0%	99.0%	99.7%

*Per PVI, the actual meter number for this meter was 54115748 instead of 54115550.

Siemens Industry, Inc. All right reserved

Appendix B: Annual Inspection Report

No annual inspection was conducted during Annual Period 1 due to the backdating of the Certificate of Final Completion, however they will be done in future Annual Periods.

Siemens Industry, Inc. All right reserved