



Investment Grade Audit

Guaranteed Energy Performance Savings Contract

RFP #15-002



Presented to:

City of Temple Terrace

11250 North 56th Street, Room 301
Temple Terrace, FL 33617

Presented by:

ABM Building & Energy Solutions

9326 Florida Palm Drive
Tampa, FL 33619

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Executive Summary

ABM is pleased to provide this Performance Based Retrofit and Service Analysis to the City of Temple Terrace. The purpose of this analysis is to identify performance based retrofit and service opportunities that will provide for new equipment, lower cost of operations, energy efficiency, improved indoor air quality and ease of operations.

The analysis consisted of detailed site surveys, staff and user interviews, utility bill analysis, operating cost analysis, data logging and evaluation of energy conservation measures (ECMs) or other upgrades to improve the overall operations of the facilities.

Buildings included in this Study:

Facility	Address	Gross Square Feet
City Hall	11250 N 56th Street	31,886
Recreation Center	6610 Whiteway Drive	48,347
Library	202 Bullard Parkway	20,195
Lightfoot Center	10901 N 56th Street	11,200
Public Works	11210 North 53rd Street	26,975
Fire Station #1	124 Bullard Parkway	12,375
Fire Station #2	2 Telecom Parkway	11,301
Water Treatment Plant	6009 Whiteway Drive	15,191

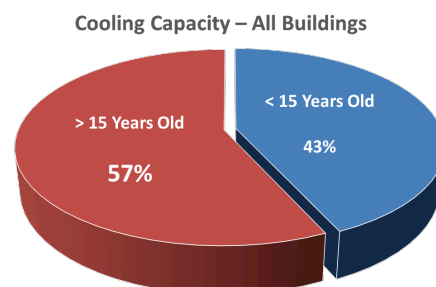
The study also included an analysis of the Commercial Water Meters scheduled for eventual replacement by the water utility.

Major findings included in this document include details of the aging infrastructure throughout the city. Many of the systems are well beyond useful life and have not been adequately maintained. These outdated systems are inefficient and provide for energy savings opportunities once upgraded and properly maintained.

The analysis also uncovered a significant lack of resources, both quantity and quality, necessary to maintain the city infrastructure, specifically the HVAC (Heating, Ventilation and Air Conditioning) in City Buildings. The maintenance staff is resourced well below the norm for cities with comparable infrastructure. The lack of resources has led to a dependency on vendors for even minor repairs. The limited in-house technical competency and previous procurement processes have led to numerous instances of outside (lowest cost) vendors misdiagnosing problems and performing unnecessary or improper repairs. In some cases, internal protection devices on HVAC equipment have been bypassed, eliminating designed protection for more expensive components. In other cases, services

rendered have impacted the ability to properly control indoor air quality in public facing facilities.

The aging HVAC Infrastructure is perhaps the most significant finding in this report, as 57% of the facility cooling capacity is older than 15 years old. According to ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) the effective useful life of properly maintained air conditioning equipment is 15 years in Florida.



ABM tracked the HVAC service calls during the analysis period and the city averaged one repair call (Air Conditioning not working or insufficient cooling) every 6.9 days from April through October. These failures were, for the most part, occurring on the older HVAC systems. While many of the failures were due to age, a large number of failures could easily be attributed to a lack of proper maintenance.

During the analysis, several systems were identified as severely outdated, bypassed or turned off, including:

- Outside air HVAC unit at City Hall has been non-functional for many years and needs replacement
- Outside Air unit at Lightfoot is off awaiting repairs
- Multi-circuited HVAC systems not operating properly at the Family Recreation Center, including Gym #3 which is nonfunctional pending repair/replacement
- Library HVAC not operating to cool sufficiently or control humidity

In this study, a financial solution to these technical problems has been identified, where the savings will be sufficient to pay for the necessary upgrades and ongoing maintenance services within the existing budget without adding any new taxpayer burden. The Financial Summary section provides all of the details regarding cost and savings of this program.

Baseline Utility Analysis

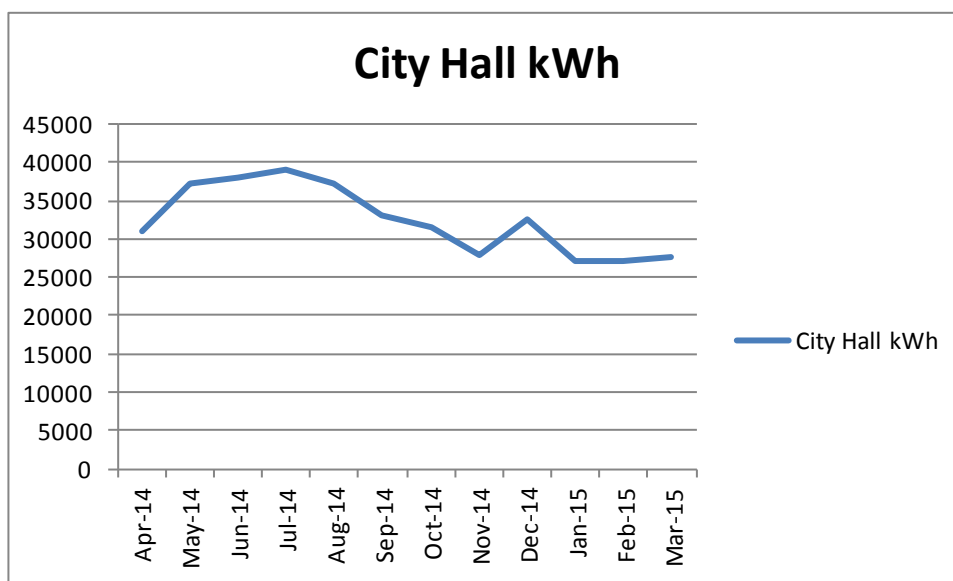
The tables below show the utility baseline from Apr 2014 through Mar 2015 as well as the utility rates for CITY OF TEMPLE TERRACE for the buildings in question. Actual utility bills for the baseline periods are examined and summarized to come up with the baseline shown below

Building / Facility	Area [Sq.ft]	Elec Usage (kWh/yr)	Elec Cost (\$/yr)	Nat Gas (CCF)	Nat Gas (\$)	Total Utility
City Hall	31,886	404,240	\$ 41,007.00	126	\$ 664.43	\$ 41,671
Rec Center	48,347	1,084,239	\$ 108,535.00	10,087	\$ 3,740.47	\$ 112,275
Library	20,195	395,240	\$ 38,227.00			\$ 38,227
Lightfoot	11,200	137,640	\$ 15,480.00			\$ 15,480
Public Works	26,975	299,040	\$ 28,976.00			\$ 28,976
Water Treatment Plant	15,191	1,819,200	\$ 152,779.00			\$ 152,779
Fire Station -1	12,375	194,516	\$ 17,638.00			\$ 17,638
Fire Station -2	11,301	70,680	\$ 7,528.00			\$ 7,528
TOTAL	177,470	4,404,795	\$ 410,170.00	10,213	\$ 4,404.90	\$ 414,574.90

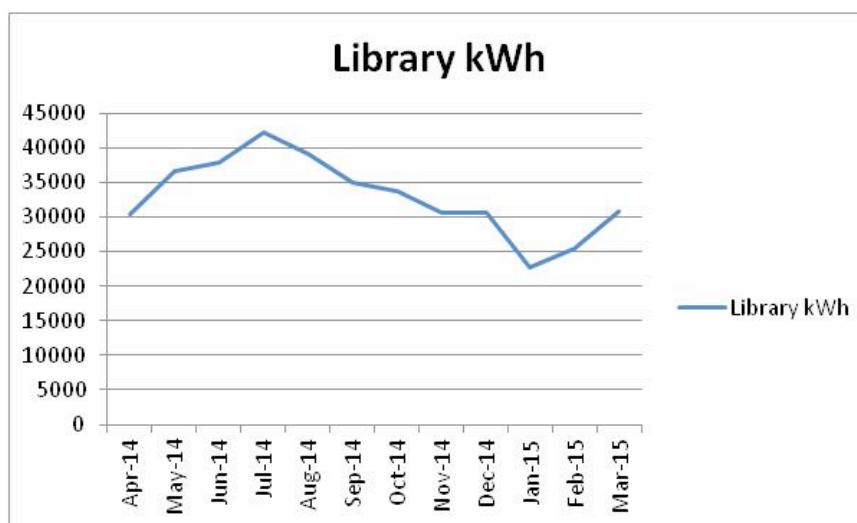
The table below shows the utility rates from Tampa electric. Most of the facilities are served by Tampa Electric as the electric provider and are on GSD-360 rate schedule which is a General Service –Demand. Below rates are calculated in accordance with the twenty-first revised sheet no 6.080.

Building	Elec (\$/kWh)	\$/kW
City Hall	\$ 0.10	\$ 10.85
Rec Center	\$ 0.08	\$ 10.79
Library	\$ 0.07	\$ 10.85
Lightfoot	\$ 0.07	\$ 10.76
Public Works	\$ 0.07	\$ 10.82
Water Treatment Plant	\$ 0.06	\$ 10.82
Fire Station -1	\$ 0.07	\$ 10.92
Fire Station -2	\$ 0.11	\$ 10.90

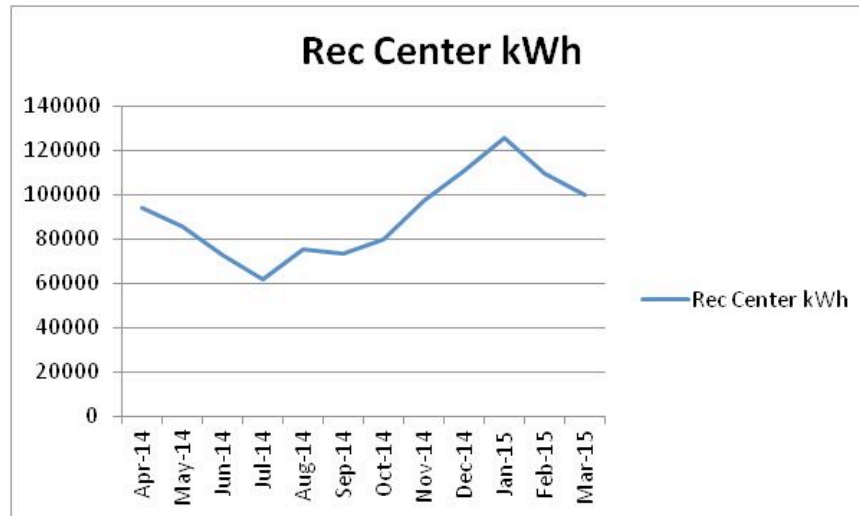
Once we have the annual numbers we typically dig into the past few years to determine if anything significant has changed. During our site visits ABM took readings for the indoor CO2 concentration levels and found City Hall to be above 1200 ppm range indicating poor indoor air quality (IAQ). It was noted that the outside air unit has not been operational for many years. As a result, a baseline adjustment was made to the utility usage for the base period of 2014 through Mar 2015. The above table reflects these adjustments.



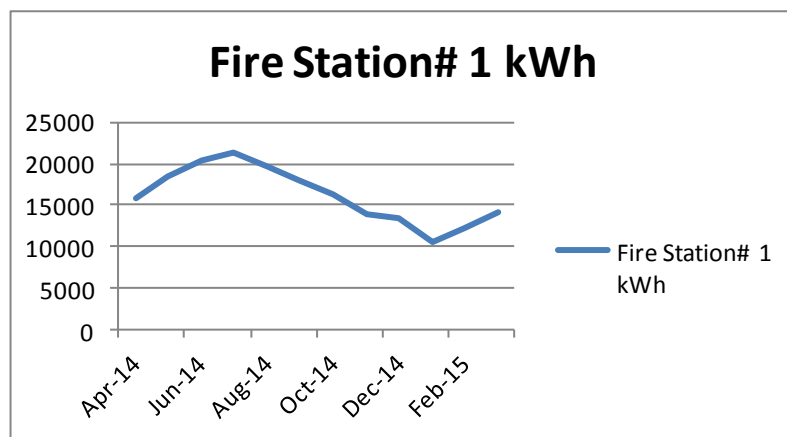
The above graph shows the electric usage profile for City Hall. This building is conditioned by split DX Air handling Units (AHUs) and Heat Pumps. The constant year round load and 24/7 operation for two out three floors results in a relatively flat and fairly consistent usage pattern throughout the year with a slight dip during winter months. This graph includes the baseline adjustment for the non-operational outdoor air unit.

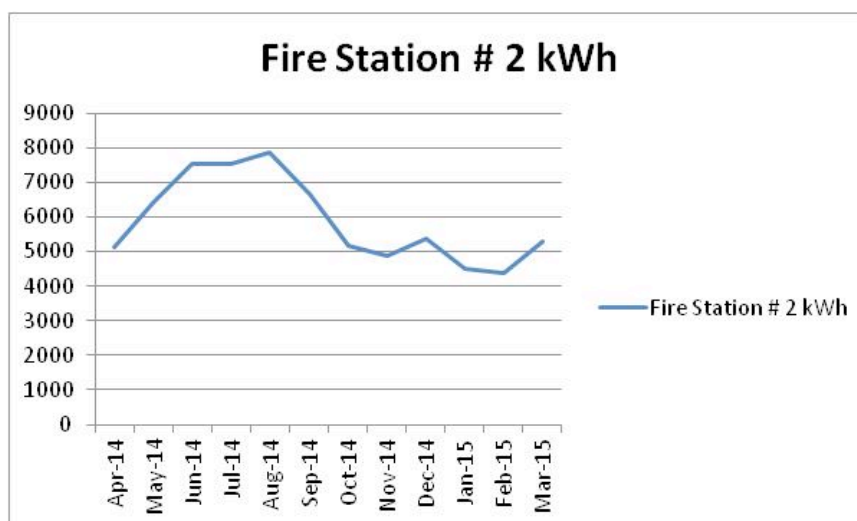


The above graph shows the electric usage for the Library for the baseline period. The Library is conditioned by multiple split air handling units with electric duct heaters and as expected the electric usage is higher in summer months due to the cooling and dehumidification load compared to minimal heating load in winter.

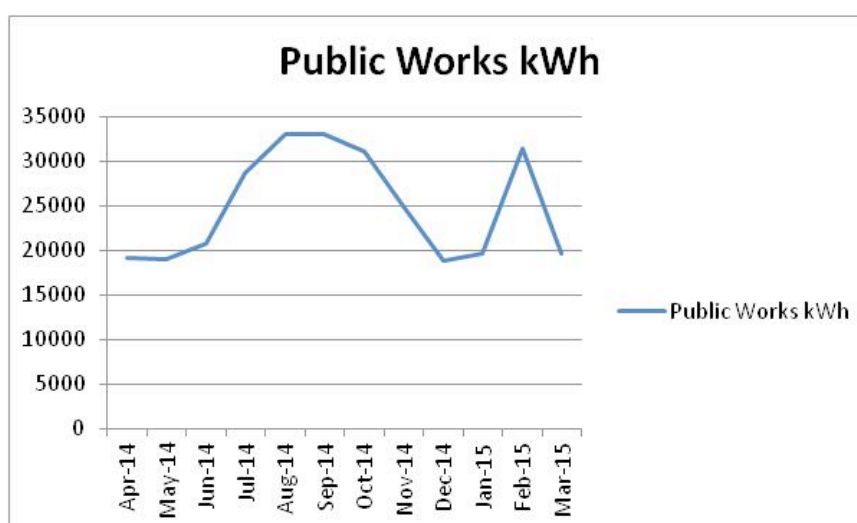


The Recreation Center usage spike in the winter can be attributed to the duct heaters that are used to preheat the large quantities of outside air for gyms during the winter months.

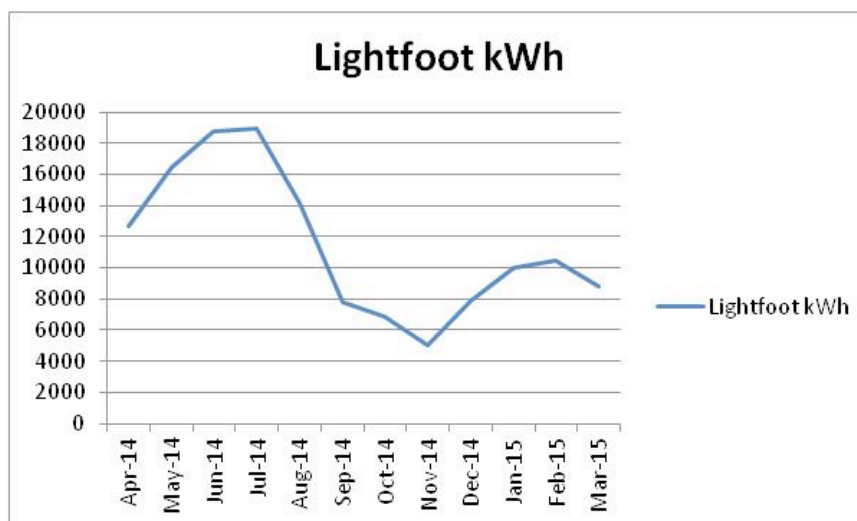




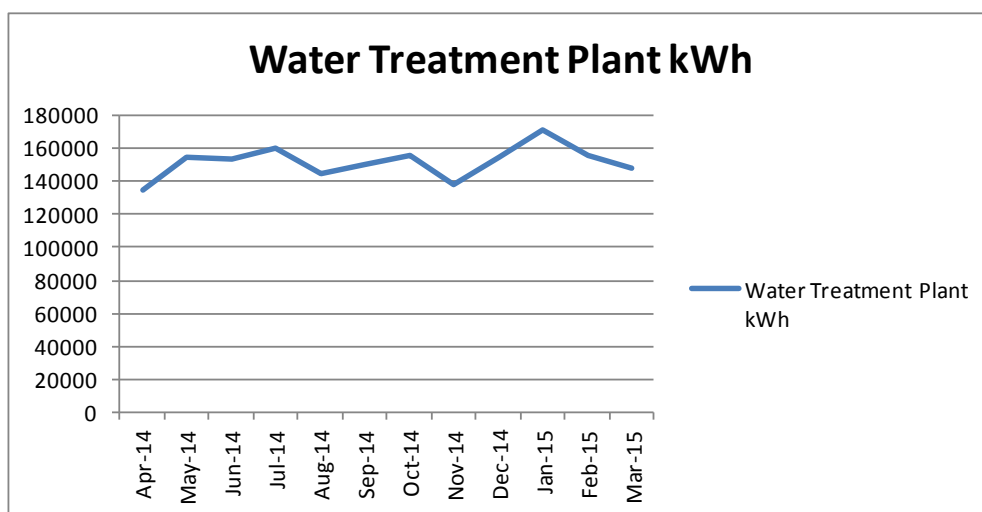
The electric usage for both the fire stations follow similar trends. High cooling and dehumidification load in summers can be attributed to the higher electric usage in summer time compared to the winter months.



The above graph shows the electric usage for the Public Works building with summer spike due to high cooling loads. The winter spike in the month of February can likely be attributed to the electric duct heaters used to condition the outdoor air or there could have been simultaneous heating and cooling at the same time.



Lightfoot Senior Center electric usage peaks in summer months due the high cooling and dehumidification loads. The low electric usage in the milder Oct-Nov months seems to be consistent with the weather patterns of the Tampa area. The winter peaks are much smaller due to the fact that air handling units can work in heat pump mode during the winter months.



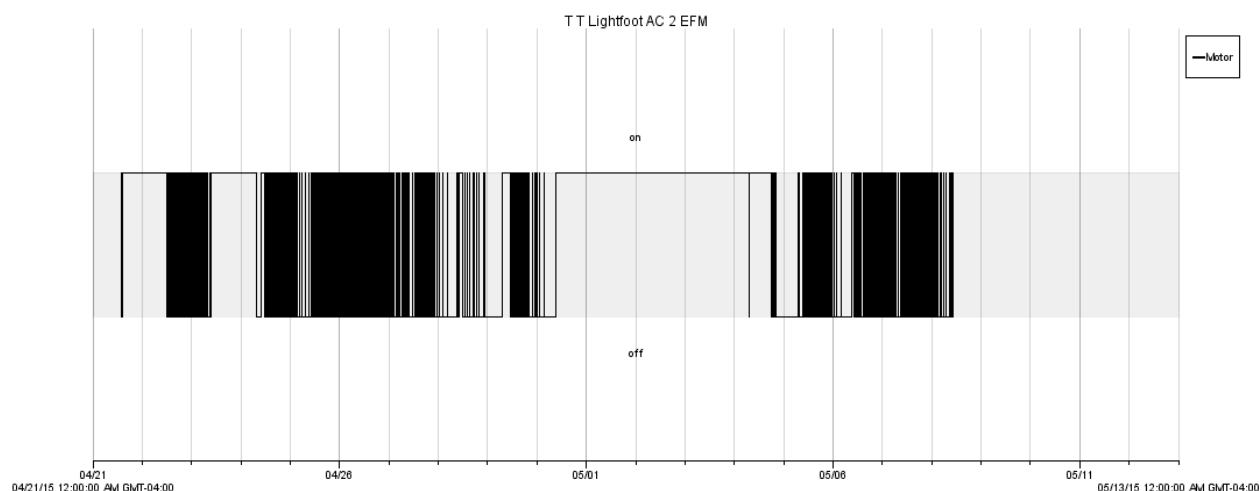
The Water Treatment Plant electric usage shows a relatively flat electric profile throughout the year because the primary consumption is for the water treatment process and all the pumping associated with it.

These graphs still show a good correlation between the electric usage and the outdoor temperatures for the facilities and form the basis of analysis for ABM's energy modeling tools.

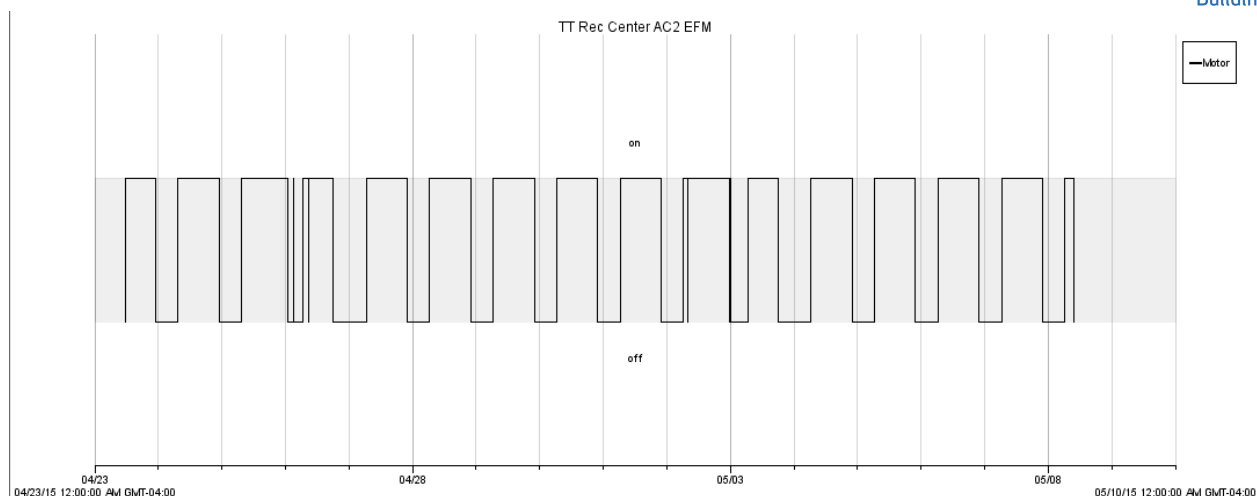
Data Logging

ABM uses interval data recorders (data loggers) to confirm the actual operations of equipment and controls. For the City of Temple Terrace facilities we deployed loggers in several waves to get a good idea of when things were operating and what those operating parameters were. We will highlight a couple of the charts here to illustrate our findings.

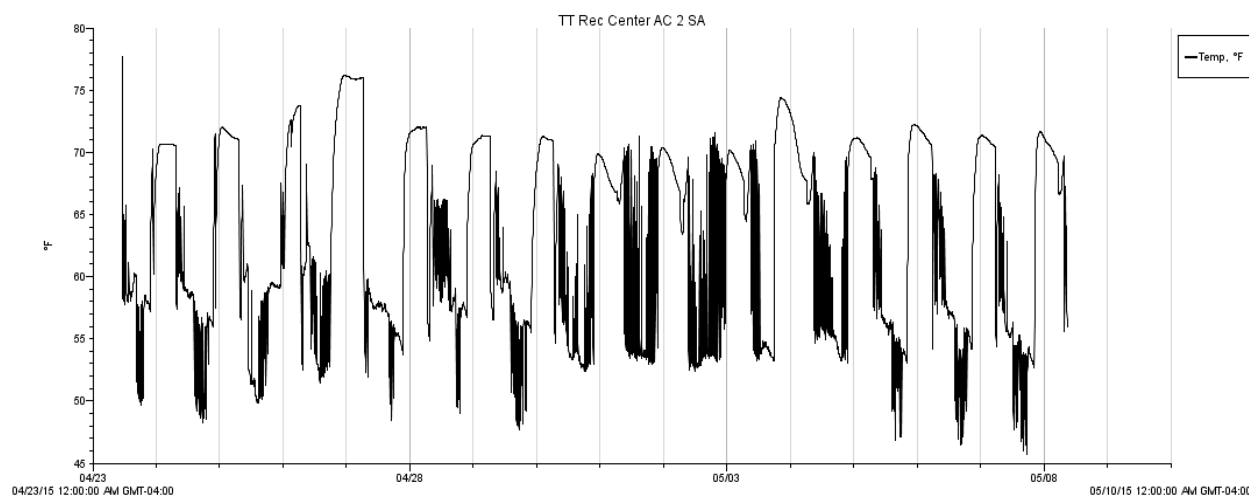
Data loggers come in a variety of configurations. For the project with City of Temple Terrace, we used 4-channel loggers, space temperature/relative humidity loggers, motor on-off loggers and lighting loggers. These variables tell a great deal of information on the overall efficiency and runtimes of the HVAC systems in the buildings. We set these loggers up to record temperatures every 5 minutes for three weeks. While onsite, we also deployed space temperature loggers in common areas to find out if the HVAC system actually reacted like it was under good temperature and schedule control. Several Motor on-off state loggers were also deployed on supply fan motors and pump motors to get an idea on the actual runtime of the Air Handling Units (AHUs) or the Roof Top Units (RTUs). Finally, we deployed several lighting and occupancy sensors loggers to get the lighting runtime for a typical week of operation as well as the actual occupied periods for the spaces where these loggers were deployed. We'll get into the details of our findings in the next few paragraphs.



The above plot is from a motor on-off data logger that was placed on the supply air fan motor for the unit AC-2 at Lightfoot. The existing schedule and runtime of the air handling units is calculated from this information and then compared against what the actual schedule should be to match the building usage.



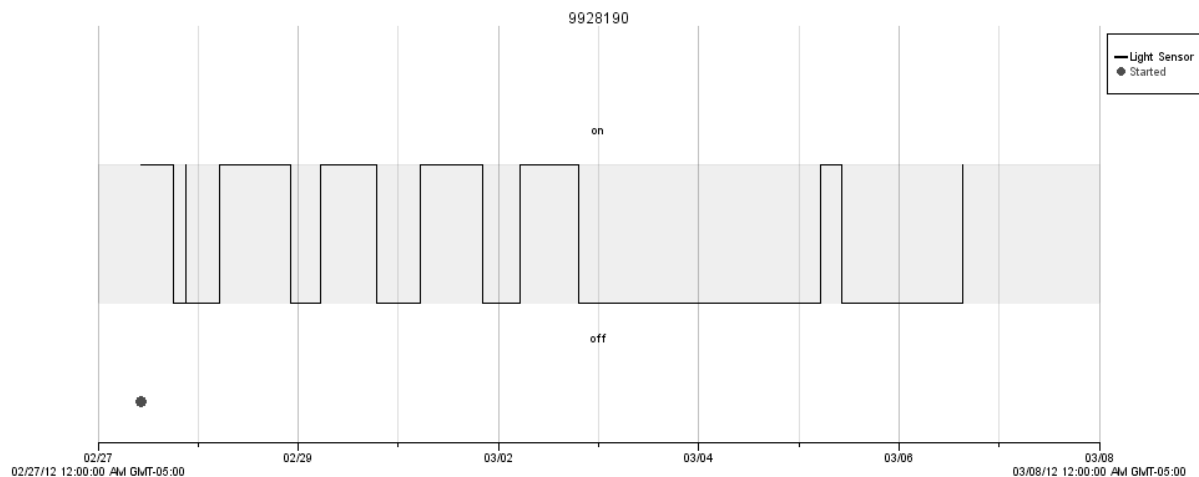
A similar plot from the recreation center motor on-off data logger gives detailed information on when this unit comes on and how many hours it stays on during the day. This logging was done from April 23, 2015 through May 08, 2015 and ensures good trend data has been captured for both week days and weekend days for the savings analysis.



A temperature logger (data taken during the same period as above) shows the supply temperature for an air handling unit (AHU) serving the Family Recreation Center gym. Looking at the temperature logger data, it is very easy to ascertain the runtime, supply temperature and relative humidity for these air handling units. These variables are used in the energy savings calculations to calculate the guaranteed savings for the project.

Our final logger type utilized for City of Temple Terrace is the lighting data loggers. Lighting loggers' record changes in state (when the light switches from "on" to "off" and vice

versa) and places a time stamp on that event. We use the lighting loggers to confirm our observations and interviews with building occupants regarding lighting runtime, arguably the single biggest variable in lighting energy calculations. We'll go over those calculations next. We measured restrooms, offices, hallways, and common areas to get a good example of when the lights actually run in these spaces. The following is a sample lighting logger output file:



Actual “ON” and “OFF” times can be calculated from this data to determine actual run hours. The graph above shows one full week of data logging. The ticks at the bottom of the graph are the different days. As you can see from the graph, the lights for this space typically turn on each morning and don’t turn off until the end of each day. The data from all of the loggers is then compiled into an easily referenced format as shown in the following table.

Area Type Averages				Normalized Weekly Lights On				Normalized Weekly Occupied						
Area Type		Qty	Watts	Peak	Off	Shldr 1	Shldr 2	Total	Peak	Off	Shldr 1	Shldr 2	Total	% sav
Classroom	CR	2	1035	45.57	0	0	0	45.57	23.03	0	0	0	23.03	49.47
Gym	G	1	4800	79.29	0	0	0	79.29	38.82	0	0	0	38.82	51.03
Hallway	H	2	173	89.31	0	0	0	89.31	61.27	0	0	0	61.27	31.4
Library	LI	1	2200	168	0	0	0	168	42.27	0	0	0	42.27	74.84
Office	O	1	290	44.79	0	0	0	44.79	26.43	0	0	0	26.43	40.99
Restroom	R	2	90	106.02	0	0	0	106.02	44.65	0	0	0	44.65	57.88
Building Average for 9 rooms			1098	86.31	0	0	0	86.31	40.73	0	0	0	40.73	52.81

This type of data logging was performed for each building to calculate the existing lighting runtime and the amount (%) of time the lighting is on when spaces are unoccupied. This data, coupled with lighting fixture power (kW) measurements, was used to calculate the lighting savings.

Calculations

With the understanding of a few key principles and the definition of the variables in question, we can determine what the annual energy savings should be for each of the measures that we plan to implement. There is a fine balance between being aggressive with the savings estimate and being overly conservative. Forecasting accurate savings is key in these projects because too much promised savings means the client is frustrated and the contractor has tarnished their reputation in a very competitive market. On the other hand, if the savings are too conservative, then the client may not choose to implement upgrades and projects that would have been beneficial to the facility and the budget.

Savings Measurement & Verification Calculation Formulas

General Details:

1. TMY3 Bin Weather Data for Tampa International Airport (USAF # 722110) was used for energy savings calculations
2. Energy cost savings are calculated using the rates calculated from the baseline utility data:

$$\text{Annual MMBTU Saved} * \$/\text{MMBTU}$$

3. Heating and Cooling Design Temps are from ASHRAE Design values
4. Balance Point (BP) of the buildings is estimated based on the building type and usage
5. HOBO Data Loggers were used to verify the equipment runtime, space temps/RH levels, lighting runtime and occupancy.
6. Motor wattage and current measurements were performed to get the actual motor loading and power draw used in the energy savings calculations
7. Basic equations and formulae used are included here, for actual detailed Calculations, Bin methodology was used.

Lighting Savings

The existing lighting kW baseline is calculated by counting and recording each individual fixture on a room by room, area by area basis and recording their individual wattage. The existing fixture wattages are then multiplied by the number of fixtures and tabulated to determine the KW connected load. This will serve as the existing baseline for lighting connected load and lighting consumption. After determining a list of proposed ECMs the same calculations are conducted for the proposed lighting. Each proposed upgrade is counted and recorded and each individual retrofit type will be allocated the new wattage to determine the new KW; the annual run hours are applied to determine the new annual kWh consumption. HOBO Lighting and Occupancy loggers/ personnel interviews were

used to get the lighting runtime. The runtime for lighting will be included on space by space basis in the lighting audit included in the appendix.

The total lighting system kW demand savings is calculated by taking the existing system kW demand less the proposed system kW demand. The total kWh savings is also calculated by taking the existing kWh less the proposed kWh. The calculation is represented by the following equation:

$$\text{Total kW Demand Savings} = \sum [\text{Existing kW Demand} - \text{Proposed kW Demand}]$$

$$\text{Total kWh Savings} = \sum [\text{Existing kWh} - \text{Proposed kWh}]$$

The sum total of the lighting savings is the total kWh and kW demand dollar savings.

$$\text{Total kW Demand Dollars Savings}^* = \sum [\text{kW Demand Savings} * \text{kW Utility Rate} * 12 \text{ Months}]$$

$$\text{Total kWh Dollars Savings} = \sum [\text{kWh Savings} * \text{kWh Utility Rate}]$$

$$\text{Total kWh Dollars Savings} = \sum [\text{kWh Savings} * \text{kWh Utility Rate}]$$

Equipment Scheduling (Controls Upgrade)

Calculations are performed using the "bin method" where monthly weather data is sorted into discrete groups (bins) of weather conditions. Each bin contains the number of average hours of occurrence during a month or year of a particular range of weather condition.

The existing heating and cooling equipment usage is calculated on a bin-hour/temperature basis by setting up a calculation of the net heating and cooling energy that will be required to maintain comfortable environmental conditions. This technique varies for each type of HVAC system such as: single zone constant volume with reheat; single zone variable air volume with reheat; multi-deck constant volume; dual duct multi-zone constant volume; or single zone DX cooling with baseboard independent heating. Each of these systems requires different equations to evaluate energy use during occupied and unoccupied hours. ABM Building Services typically develops customized spreadsheets to calculate energy requirements for each zone and system type of a building. The formula developed considers the following:

- Zone loads based on occupied and unoccupied periods at various outdoor air temperatures and interior heat loads

- HVAC system operating parameters that provide the necessary heating, cooling and ventilation rates needed to meet the zone loads through a combination of air quantity, discharge air temperature, and outdoor air cfm
- Sum the annual heating, cooling and fan energy for each temperature bin for each zone.
- Sum all zones and compare with annual HVAC energy consumption based on utility bills, after subtracting lighting, equipment and other electrical and thermal loads unrelated to the HVAC systems.

Calculation Methodology

1. Motor Use Data Loggers (HOBO Motor on/off) and Temperature Relative Humidity Data Loggers (temp/RH) were used along with Outdoor Air Temps to determine the runtime and set points of the equipment.
2. The equipment load is assumed to vary linearly with OAT (Outdoor Air Temp) with Balance Point (BP) being the temperature where the building is in equilibrium with no heating or cooling need. Based on this relationship using the bin-hours, % Loading is calculated for each bin with equipment being 100% loaded at design load and no load at the assumed balance point.
3. Actual power measurements of the RTUs were taken to calculate the average kW/Ton.
4. The building operating hours are specific to each building. The difference between the existing equipment schedule and actual (or proposed) schedule results in savings. The difference between the existing and proposed annual bin hours are used to come up with the annual unoccupied hours (shutdown period in the formula below) used to calculate the scheduling savings.
5. Cooling Set point of 80-85 F and Heating Unoccupied Set point of 55-60 F shall be maintained during Unoccupied Hours. Extra equipment runtime to maintain these temps during night/weekend was taken into account while calculating savings.

$$Cooling\ Savings = \left(\frac{shutdown}{period} \right) \times \%Loading \times \left[\frac{\left(\frac{max.}{tons} \right) \times 12000}{EER} \right] \times \left(\frac{existing}{night\ loading} \right) - \left(\frac{proposed}{night\ loading} \right)$$

Equipment Upgrade

1. HOBO Motor on/off and Temp/RH loggers were used along with Outdoor Air Temps to determine the runtime and set points of the equipment.
2. The equipment load is assumed to vary linearly with OAT (Outdoor Air Temp) with Balance Point (BP) being the temp when the building is in equilibrium with no heating or cooling need.
3. Existing EER is calculated based on the actual power measurements of the pertinent equipment and post EER is obtained from the nameplate data of the existing equipment and cut sheet for proposed new equipment.
4. Equipment Upgrade Savings were only taken for the Occupied Period.

$$\text{Cooling Savings} = \left(\frac{\text{demand}}{\text{savings}} \right) \times \left(\frac{\text{oper.}}{\text{period}} \right)$$

$$= K \times F \times G = L$$

$$\text{Demand Savings} = \left(\frac{\text{load}}{\text{factor}} \right) \times \text{tons} \times 12 \times \left[\frac{1}{\text{exist EER}} - \frac{1}{\text{new EER}} \right]$$

$$\text{Load Factor} = \frac{\text{present cooling energy}}{\left(\text{tons} \times \frac{12}{\text{exist EER}} \times \left(\frac{\text{oper.}}{\text{period}} \right) \right)}$$

Variable Frequency Drives (VFDs) on Fans and Pool Pumps

1. Hobo loggers were used to determine the runtime of the equipment.
2. Actual power measurements were taken for the fan motors and pool pump motors to ensure accurate baseline kW.

3. Savings for VFDs were calculated only during the occupied runtime.
4. Percent (%) loading on the motor was assumed based on the typical building type and occupancy patterns to simulate the actual load on the pump or fan motor.

Calculation Methodology

The Existing Pump kW = Pump BHP x 0.746/Motor Efficiency. Measured values were used based on the motor amp draws and voltage readings.

Existing Pump kWh = Existing Pump kW x Full Load Heating Hours

Where:

- Pump BHP = GPM x Head/(3960 x Pump Efficiency) OR Pump HP x % Pump Loading
- Full Load Heating Hours = Heating Bin Hours x % Heating Load
- Proposed Pump kW = (Existing Pump kW x % Flow ^ VFD Exponent) / VFD Efficiency
- Proposed Pump kWh = Proposed Pump kW x Heating Bin Hour
- kW Saved per Year = (Existing Pump kW – Proposed Pump kW) x 12 months per Year
- kWh Saved per Year = Existing Pump kWh – Proposed Pump kWh

$$Fan Savings = \left(\frac{fan}{HP} \right) \times 0.746 \times \left(1 - \left(\frac{avg.\%}{load} \right)^3 \right) \times \left(\frac{operating}{period} \right)$$

Outdoor Air Adjustment

- The amount of outdoor air 'required' was calculated based on the ASHRAE 62
- Co2 readings and damper positions were taken into account for the baseline adjustment for outdoor air
- The difference between the actual OA and the required OA is Δcfm

Calculation Methodology

- Average Winter Outdoor Temperature (below balance point temperature) = AWO
- Annual Hours Below Balance Point Temperature (from Bin or Hourly Data) = AHB
- Average Space Set point Temperature = ASST
- Pre-Retrofit CFM = 0
- Post-Retrofit CFM = Based on ASHRAE 62 (depending on the sq-ft and occupancy of each school)
- Total Annual BTUs adjusted = CFM Savings x 1.08 x (ASST – AWO) x AHB

$$\text{Cooling Adjustment}[kWh] = \text{Ton} - \text{hr} / \text{cfm} \times \Delta \text{cfm} \times \text{kw} / \text{Ton}$$

Building Envelope Upgrades

From the ASHRAE fundamentals handbook, the equation for heat transfer estimation is:

$$q = 1.08 * Q * \Delta T$$

Where:

- q = heat loss/gain, measured in Btu/hr.
- 1.08 is a conversion factor accounting for the density of air (~ 0.075 lb./ft³ at sea level), the specific heat of air (0.24 Btu/lb./°F) and a conversion from minutes to hours (60)
- ΔT is the temperature difference between the outdoors and the building set point.
- Q is the rate of airflow rate

Airflow rate is calculated as:



$$Q = A \cdot \sqrt{C_s \Delta T + C_w \cdot V^2}$$

Where:

- Q is the airflow rate
- A is the gap area (as recorded in the survey)
- Cs is the stack coefficient
- Cw is the wind coefficient
- V is the average wind speed

The stack and wind coefficients are dependent on building height and are available as table lookups provided from ASHRAE. Average wind speed is obtained from NOAA comparative climactic data for locations throughout the U.S. Temperature bin data, obtained from a software package called BinMaker Pro which utilizes climactic design data obtained from ASHRAE. For each temperature bin, the heat loss/gain equation is applied and the summation of outputs from these equations provides an estimate of the heat transfer characteristics for a particular building.



Facility Analysis

The objective of this technical site assessment is to demonstrate how a customized guaranteed energy savings project was developed for the city of Temple Terrace. This project will reduce the energy consumption of the facilities and will also enable the replacement of existing mechanical equipment that is beyond its useful life.

ABM Building Services conducted detailed, onsite surveys of the Temple Terrace buildings that were included within the Letter of Intent / Report Agreement. These surveys focused on lighting; heating, ventilating, and air conditioning (HVAC) equipment; building automation; and facility operations that impact energy usage and operating costs. We evaluated the energy consumption (propane, electric & water), building control strategies, condition of the existing equipment, existing lighting technology, security, and building envelope.



This information was obtained by making direct observations of the operation of each building and its energy consuming equipment. We also reviewed the internal uses by people and miscellaneous “plug load” equipment such as copiers, computers, vending machines, etc. Additionally, the operation and occupant schedules for each facility and major equipment loads were determined. We had discussions with the city staff regarding the operating systems, building envelopes, recent modifications or renovations, planned changes, and normal operation of each building.

We performed an evaluation as to the feasibility of implementing energy conservation measures (ECMs) to reduce building energy costs, provide a better working environment for the staff, and improve the overall operations of the facilities. These ECMs were evaluated from the standpoint of applicability to each building, impact on the working environment, construction costs, and resulting savings. These financial figures are then rolled into a Pro-forma cash flow to determine the overall financial impact of the program.

The technical site assessment is broken down by building and includes each energy conservation measure (ECM) recommended to produce an energy project. The building by building information is presented in the following order:

City Hall

- ECM-3 Controls
- ECM-4 HVAC Upgrades
- ECM-5 Lighting Upgrades (LED)
- ECM-6 Building Envelope and new Windows
- ECM-17 Commissioning

Family Recreational Complex

- ECM-3 Controls
- ECM-4 HVAC Upgrades
- ECM-5 Lighting Upgrades (LED)
- ECM-6 Building Envelope
- ECM-8 Pool Filter and Pumps Upgrades
- ECM-17 Commissioning

Library

- ECM-3 Controls
- ECM-4 HVAC Upgrades
- ECM-5 Lighting Upgrades (LED)
- ECM-6 Building Envelope
- ECM-17 Commissioning

Lightfoot Recreation Center

- ECM-3 Controls
- ECM-4 HVAC Upgrades
- ECM-5 Lighting Upgrades (LED)
- ECM-6 Building Envelope
- ECM-17 Commissioning

Public Works

- ECM-3 Controls
- ECM-4 HVAC Upgrades
- ECM-5 Lighting Upgrades (LED)
- ECM-6 Building Envelope
- ECM-17 Commissioning

Water Treatment Plant

- ECM-3 Controls
- ECM-4 HVAC Upgrades
- ECM-5 Lighting Upgrades (LED)
- ECM-6 Building Envelope and New Windows

ECM-17 Commissioning
ECM-20 Lightning Suppression

Fire Station #1

ECM-3 Controls
ECM-4 HVAC Upgrades
ECM-5 Lighting Upgrades (LED)
ECM-6 Building Envelope
ECM-17 Commissioning

Fire Station #2

ECM-3 Controls
ECM-4 HVAC Upgrades
ECM-5 Lighting Upgrades (LED)
ECM-6 Building Envelope
ECM-17 Commissioning

Water Meters

Commercial Water Meters

Preliminary Project Timeline

[illegible]

City Hall



Estimated City Hall Energy

Current Costs	\$ 41,671
Current \$/SF	\$ 1.31
Post - ABM Costs	\$ 37,556
Post - ABM \$/SF	\$ 1.18

ECM Number: ECM-3

ECM Title: Controls

Existing Conditions:

The HVAC controls at the City Hall are comprised of conventional thermostats. Each of the 12 main air conditioning systems are controlled by a room thermostat. There is currently no night set back or occupancy scheduling available with these thermostats. All of the existing thermostat control is performed at the device by anyone who may have access.

Proposed ECM:

ABM proposes to replace existing thermostats with new, BacNet DDC, open protocol, user friendly, graphics based system. Temperature/humidity sensors will be installed in the areas served by the twelve (12) main systems. These sensors will report back to the main controller that will allow an authorized operator to monitor and control the related equipment. ABM will also communicate with the new outside air unit via an OEM BacNet communications card. The main controller will be a computer based program with the following features:

- Graphics based display
- Occupancy / Vacancy scheduling
- Night set back program
- Remote temperature adjustments

ABM will also provide and install web based communicating thermostats for the 9-11 unit and the Server Room unit. ABM will provide a monitoring point for the building restroom exhaust fan. Our proposed scope of work will include:

- Units 1 thru 12: We will provide and install one controller per four units. We will also provide and install 12 temp/humid sensors in the building. All 12 units will be

controlled to an occ/unocc schedule. Night setback during unoccupied hours will be implemented.

- We will tie-in to the new outside air unit via an OEM BacNet communications card.
- We will also provide and install communicating thermostats for the 9-11 unit and the Server Room unit.
- We will provide a monitoring point for the exhaust fan.



Sample of a Web based thermostat



An existing thermostat

ECM Number: ECM-4

ECM Title: HVAC Upgrades

Existing Conditions:

The HVAC systems at the City Hall are comprised of twelve (12) split systems. These systems are all in good condition and will not be replaced as part of this project. In addition, there is a roof mounted unit that is designed to provide fresh air to all of the other 12 systems. This unit has not been operational in many years. There are other smaller systems, including one for the dispatch area and one for the phone/server room.

Proposed ECM:

ABM proposes to replace the roof mounted fresh air unit with a new 100% outside air unit. We will also replace the three small systems, including the window unit that is in the north side wall, with new ductless split systems. Phase protection will be installed on all three phase roof mounted equipment. The new outside air roof top unit will also include a Global Plasma Solutions device that will allow for maximum energy efficiency. A performance evaluation and functional testing will be performed on all equipment that is not being replaced.

The six (6) main restrooms will be provided with one (1) new electric hand dryer in each restroom. The paper towel dispensers will be removed.



Our proposed scope of work will include:

- Shut power off and provide appropriate lock-out tag-out requirements for the 1.5 ton, 2 ton and Addison roof top unit.
- Reclaim R-22 from a 1.5 ton split system, a 2 ton split system and the Addison outside air roof top unit.
- Disconnect and remove all three systems.
- Provide crane service to remove the old Addison roof top unit and set the new Addison roof top unit.
- Provide and install new 1.5 ton and 2 ton ductless split systems and Addison roof top unit.
- Reconnect all refrigerant piping.
- Reconnect electrical service.
- Evacuate and charge system with refrigerant.
- Disconnect and remove the second floor window unit.
- Provide and install a new 1 ton ductless split system.
- Provide all necessary refrigerant piping and insulation.
- New electrical service will be installed by an ABM provided electrician.
- Provide and install phase protection on all three phase roof mounted equipment.
- Provide and install Global Plasma Solutions device on the new Addison roof top unit.
- Perform a complete system start-up and check out of all new systems.
- Perform a preventive maintenance and functional testing on the 12 systems that are not being replaced which serve the remainder of the facility.

Existing Roof Top
100% Outside Air Unit



ECM Number: ECM-5

ECM Title: Lighting Upgrades (LED) and Occupancy Sensors

Existing Conditions:

The internal lighting at the City Hall has already been changed out to LED. Some lighting controls have also been added. The exterior lighting has not been upgraded.

Proposed ECM:

The exterior lighting at the City Hall consists of a mixture of fluorescent, high intensity discharge, and incandescent fixtures. ABM proposes to replace or retrofit these inefficient exterior fixtures with new LED exterior fixtures and LED retrofit kits per the table below.



Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
City Hall	Interior	First Floor	8760	110	LED:BDR:DVR-LED:32W:BOARD:DRIVE-LED:DRIVER-1	2 X 4 Volumetric-Recessed	Do Nothing	Do Nothing	110
City Hall	Interior	Second Floor	2340	110	LED:BDR:DVR-LED:32W:BOARD:DRIVE-LED:DRIVER-1	2 X 4 Volumetric-Recessed	Do Nothing	Do Nothing	110
City Hall	Interior	Third Floor	8760	110	LED:BDR:DVR-LED:32W:BOARD:DRIVE-LED:DRIVER-1	2 X 4 Volumetric-Recessed	Do Nothing	Do Nothing	110
City Hall	Exterior	Wall	4380	8	MV-MV:100W-1	Wall Globe-Moulded Lens-Wall	Replace	Deco - D458/LED/20/50/UNV/BZ - 20W (19199) (679)	8
City Hall	Exterior	Stairway	4380	9	CFL:PIN-CF13W:TWIN:2PIN-CFL/PREHEAT:MAGNETIC-1	"Kena" Type Wall Fixture-Wall	Retrofit	Terralux - SR95/A/118/40/R/8W (19201) (679)	9
City Hall	Exterior	Stairway	4380	1	CFL:SCREW-CFL23W:PAR38:MEDIUM-2	Flood-No Lens-wall	Replace	EConolight - E/WW/1L/11/NWP - 11W (19203) (679)	1
City Hall	Exterior	Wall	4380	1	MV-MV:175W-HID:TRANS:MAGNETIC-1	Barn Light-Moulded Lens-Wall Arm	Replace	DECO - DBARN-30-NW-UNV-30W (19223) (679)	1
City Hall	Exterior	Canopy	4380	2	INCAND-INC:65W:BR30-1	Coiled/Open-Recessed	Replace	Cree - CR6/800L/40/12/GU24 - 12W (19205) (679)	2
City Hall	Exterior	Parking Lot	4380	4	HPS:HPS:250W-HID:TRANS:MAGNETIC-1	Cobra Head-	Do Nothing	Do Nothing	4
City Hall	Exterior	Parking Lot	4380	2	HPS:HPS:250W-HID:TRANS:MAGNETIC-1	Cobra Head-	Do Nothing	Do Nothing	2

ECM Number: ECM-6.1

ECM Title: Building Envelope

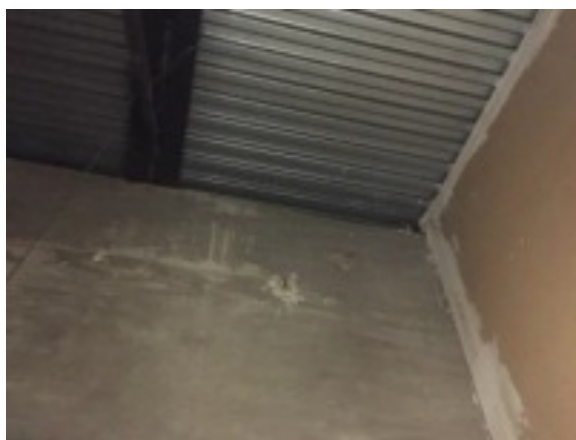
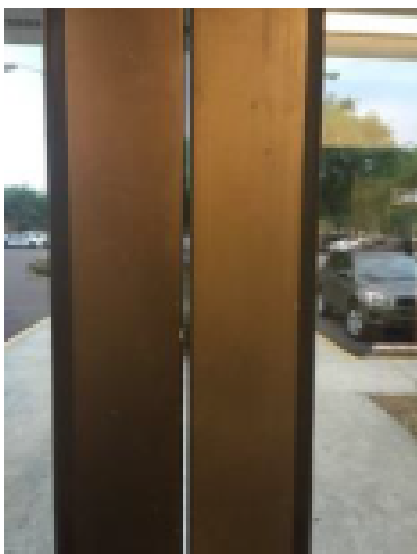
Existing Conditions:

Infiltration of unconditioned air and exfiltration of condition air will lead to higher energy costs. The City Hall has not performed a building envelope analysis or envelope modifications.

Proposed ECM:

ABM proposes to weather-strip and seal opening in the building to help reduce or eliminate infiltration and exfiltration of air.

- Weather-strip and seal four, first floor, exterior doors.
- Weather-strip and seal six, other area, and exterior doors.
- Seal roof and wall joints with two-part foam. Approximately 625 feet.



ECM Number: ECM-6.2

ECM Title: Windows

Existing Conditions:

The existing windows in the City Hall are all original. There are numerous areas throughout the building where water is infiltrating into the building from around the windows. This was confirmed during our site visit and conversations with city employees. There are many



issues that result from the moisture intrusion: buckets to capture water during heavy rain, water stained ceiling tiles that need to be replaced, carpet cleaned, sheet rock repair and additional painting. The costs associated with labor hours required to address these water issues could not be calculated, but was assumed to be significant. Perhaps most importantly is the potential for both acute and chronic health problems due to indoor air quality issues in the building.

Proposed ECM:

ABM proposes to replace all of the windows in the City Hall with new, double pane, energy efficient windows. New automated motion sensing doors will replace the existing automatic doors facing the parking lot. New doors will replace the doors facing the street. The new window and door specifications are:

- Aluminum Curtain wall to be YKK-AP YCW 750OG, Dark Bronze Anodized Finish Plus, 1" Solarbronze Tinted Insulated Glass Units with Solarban 70XL #3 surface.
- Aluminum Storefront Doors to be YKK-AP 35D Medium Stile, Dark Bronze Anodized



Finish Plus, 1" Solarbronze Tinted Insulated Glass Units with Solarban 70XL #3 surface.

- Door Hardware:

East Entrance to have First Choice 3690 CVR Panic Exit Devices, YKK Standard Top and Bottom Off-set Pivot Hinges, YKK Smart Series Push Pull Handles, CRL PR-70 Surface Mounted Closers, 10" Bottom Rails (ADA Required), and YKK Saddle Thresholds. West Entrance to have YKK Standard Center Pivots for (1) in swing and (1) out swing door with Stanley Magic Force Swing Door



Operators, Stanley SU-100 Motion Sensors, Mag-locks, Stanley 36"H x 42"L floor Guard Rails, YKK Smart Series Push Pull Handles, 10" Bottom Rails (ADA Required), and YKK Saddle Thresholds.

- Glazing System Performance is based on NFRC Standard Size and calculates as follows to meet or exceed 2010 Florida Energy Code.
- U-Factor 0.43
- SHGC 0.25
- VT 0.34
- Spandrel Glass is included at all areas as existing and includes Bronze Frit #4 surface and included Fire-Proofing and Insulation at spandrel/Floor Slab edges.
- Included in this scope of work is the removal and replacement of the existing bookshelves, dry wall and other window coverings.



Family Recreation Complex



Estimated Family Recreation Energy

Current Costs	\$ 112,275
Current \$/SF	\$ 2.32
Post- ABM Costs	\$ 67,233
Post - ABM \$/SF	\$ 1.39

ECM Number: ECM-3

ECM Title: Controls

Existing Conditions:

The HVAC controls at the Family Recreation Complex are comprised of a Johnson Controls Metasys system. This existing system is not set up to control all of the equipment in the building. There are many pieces of equipment that are being operated by conventional type thermostats. The occupancy scheduling programmed for equipment being controlled was not optimized for the current usage of the facility. The existing control system is very difficult to use. During the evaluation phase, ABM provided assistance to modify system scheduling. Software programming can only be modified by the manufacturer.

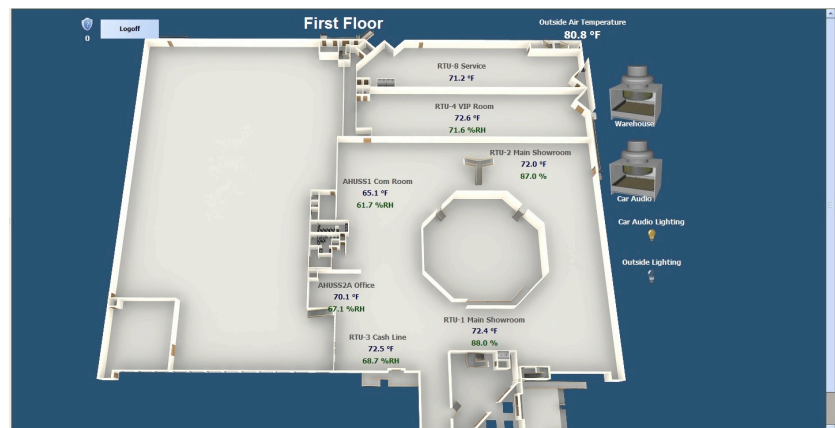
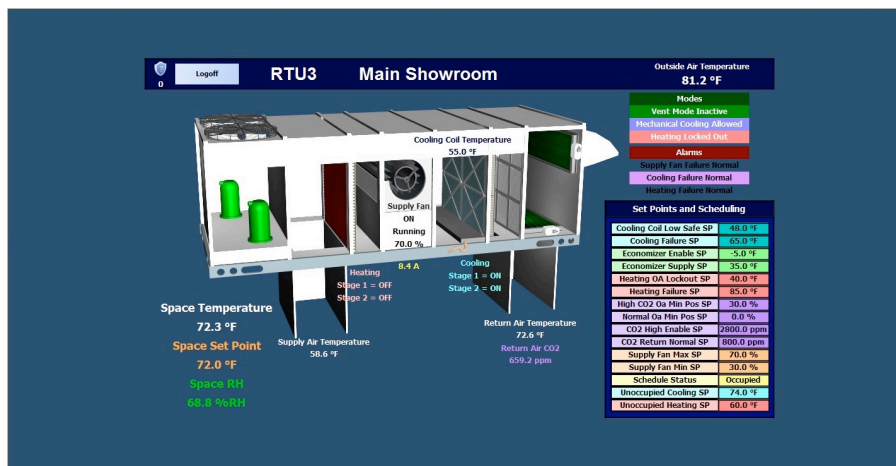
Proposed ECM:

ABM proposes to replace the existing control system with a new, BacNet DDC, open protocol, user friendly, graphics based system. Temperature/humidity sensors will be installed in the areas served by the four main systems. These sensors will report back to the main controller that will allow an authorized operator to monitor and control the related equipment. The main controller will be a computer based program with the following features:

- Graphics based display
- Occupancy / Vacancy scheduling
- Night set back program
- ABM will provide and install controllers on all four large systems (Units 1 – 4). ABM will also provide and install room temp/humid sensors and return air CO2 sensors. Light sensors will be installed in the gyms to determine occupied mode. Units will be controlled to an occ/unocc schedule or will turn on if the lights are on. The indoor fans will be two speed, controlled based on the staging of the condensing units.

Outside air dampers will be modulated based on return air CO2. Night setback during unoccupied hours will be implemented.

- ABM will also provide and install hard wired communicating thermostats for the remaining seven systems.



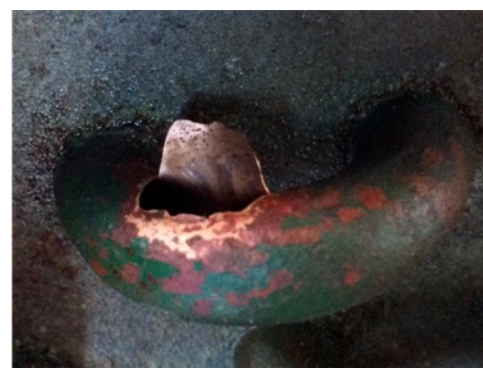
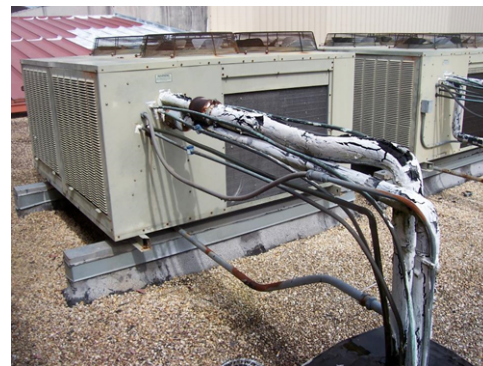
ECM Number: ECM-4

ECM Title: HVAC Upgrades

Existing Conditions:

The HVAC systems at the Family Recreation Center are comprised of 11 systems. There are four large systems that serve the gyms and 7 additional units serving the remainder of the facility.

The systems serving the gym have 2 cooling stages where the second stage comes on when the cooling demand is high. Three of these systems are 18 years old and are in poor condition. The second cooling stage is non-functional in all three of the older units, which leads to temperatures not reaching set point during high demand. The units are also less energy efficient while running all the time. There is visible deterioration of the condensing coils which impacts efficiency. There have also been major coolant leaks due to material fatigue that have caused system downtime. These systems have also been modified over the years: safety controls have been by-passed, operating controls have been jumped out, hot-gas reheats have been by-passed, condenser coils are deteriorated, plus moisture in the refrigeration system and fan blowers are rusting. All of these systems are currently operating with R-22 refrigerant that is not environmentally friendly and is becoming obsolete. The remaining seven systems are in good condition.



Proposed ECM:

ABM proposes to replace three (of the four) large gym systems with new equipment of equal capacity. ABM also proposes to modify one large system (Unit #2) for more efficient control. The weight room system will also be replaced. The remaining systems will not be replaced. Phase protection will be installed on all three phase condensing units. A performance evaluation and functional testing will be performed on all equipment that is not being replaced.

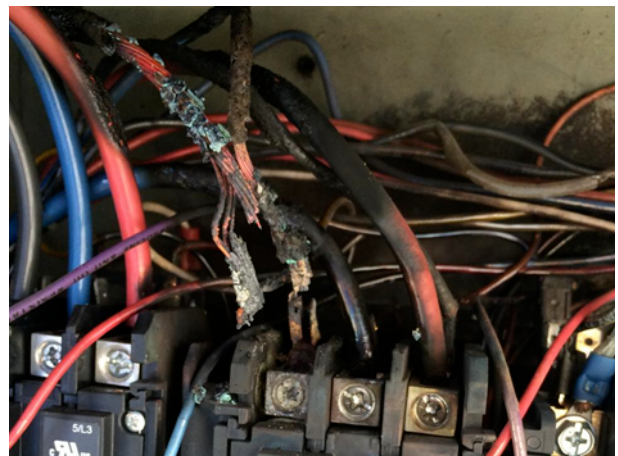
Our proposed scope of work will include:

- Shut power off and provide appropriate lock-out tag-out requirements for the three Addison units and the 7.5 ton split system.
- Reclaim R-22 from the three 35 ton Addison split systems and the 7.5 ton split system.
- Disconnect and remove all four systems.
- Provide crane service to remove the old Addison condensing units and to set the new Addison condensing units.
- Provide and install three new 35 ton Addison units and one 7.5 ton split system.
- Reconnect all refrigerant piping.
- Provide and install the necessary duct transitions.
- Reconnect electrical service.
- Evacuate and charge systems with refrigerant.
- Reclaim R-22 from Unit #2. Provide and install the necessary hot gas control devices.
- Provide and install a new variable frequency drive on system 2.
- Evacuate and charge the system with refrigerant.
- Provide and install phase protection on all three phase condensing units.
- Perform a complete start-up and check out of all new systems.

- Perform a preventive maintenance and functional testing on the systems not being replaced.



Some of the issues with the existing systems



An existing Thermostat

ECM Number: ECM-5

ECM Title: Lighting Upgrades (LED) and Occupancy Sensors

Existing Conditions:

The lighting at the Family Recreation Center has not been upgraded to LED. There are fluorescent lamps throughout the facility and compact fluorescent lamps scatter around.

The metal halide lamps in the gyms are very inefficient and have long “warm up” times that causes staff to turn them on well before the gyms are being used. The bulbs typically fail within a few years and city staff need to secure a lift in order to perform a bulb replacement.



Proposed ECM:

The new lighting for the Family Recreation Center will be a complete LED retrofit. The gyms will also receive new high bay LED fixtures. This will impact not only energy costs, but also operating costs as well. The existing lighting will be changed to new LED via retrofit kits and fixture replacement per the included table.

Our proposed scope will include:

- The Main Rec Center has a few exterior lighting fixtures that are proposed to be changed to LED fixtures.
- New LED fixtures for the gyms are included as well. Interior LED lamp retrofits are included in the scope, however the majority of the fluorescent fixtures will be replaced with new LED fixtures.
- Three additional Exterior Walkway lights will be added to the Family Recreation Center main entrance.



Gym Replacement Fixture



Room Replacement Fixture



Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Family Recreation Center	Exterior	Entrance Walkway	4368	3	No Existing-No Existing-0		Install	Econolight Cree - E-BR3L27U5K - 27W (19279) (679)	3
Family Recreation Center	Tennis Bldg. Interior	Interior	1000	2	LF:T8-F32T8-ELEC:STD/NORM:BF-2		Do Nothing	Do Nothing	2
Family Recreation Center	Exterior	Parking Lot	4380	1	HPS-HPS:250W-HID:TRANS:MAGNETIC-1	Cobra Head-Moulded Lens-Pole Arm	Do Nothing	Do Nothing	1
Family Recreation Center	Exterior	Parking Lot	4380	6	HPS-HPS:250W-HID:TRANS:MAGNETIC-1	Cobra Head-Moulded Lens-Pole Arm	Do Nothing	Do Nothing	6
Family Recreation Center	Exterior	By Artwork	4380	2	MH-MH:175W-HID:TRANS:MAGNETIC-1	"Kim" GFL-Clear-Ground	Replace	Cree - 47W ground mtd flood incl cement work - 47W (19247) (679)	2
Family Recreation Center	Exterior	Parking Lot	4380	1	HPS-HPS:250W-HID:TRANS:MAGNETIC-1	Cobra Head-Moulded Lens-Pole Arm	Replace	Cree - XSP2-B-HT-3ME-B-40K-US-JL-BZ-BLS - 101W (19243) (679)	1
Family Recreation Center	Exterior	Parking Lot	4380	1	HPS-HPS:250W-HID:TRANS:MAGNETIC-1	Cobra Head-Moulded Lens-Pole Arm	Replace	Cree - XSP2-B-HT-4ME-B-40K-US-JL-BZ-BLS - 101W (19245) (679)	1
Family Recreation Center	Exterior	Flagpole	8760	1	MH-MH:400W-HID:TRANS:MAGNETIC-1	Flood-Clear-Yoke Mount	Replace	Cree - 70W flood on new pole on existing concrete base - 70W (19249) (679)	1
Family Recreation Center	Exterior	Exterior	4380	1	MV-MV:175W-HID:TRANS:MAGNETIC-1	Bam Light-Moulded Lens-Wall Arm	Replace	DECO - DBARN-30-NW-UNV-30W (19223) (679)	1
Family Recreation Center	Exterior	Exterior Ceiling	4380	3	INCAND-INC:75W:A-1	Drum/Globe-Frosted-Surface	Replace	Allumen8 - ECFL50LSACUA - 10W (19251) (679)	3
Family Recreation Center	Exterior	Exterior Ceiling	4380	1	CFL:SCREW-CFL13W:TWIST:MEDIUM-EB-1	Drum/Globe-Frosted-ceiling	Replace	Allumen8 - ECFL50LSACUA - 10W (19251) (679)	1
Family Recreation Center	Exterior	Exterior Wall	3640	4	CFL:SCREW-CFL13W:TWIST:MEDIUM-EB-1	Drum-Frosted-wall	Replace	Deco - D410-LED-10W-UNV-BZ - 10W (16915)	4
Family Recreation Center	Exterior	Exterior Eaves	3640	3	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Vapor Tight-1X4-Moulded Lens-Surface	Replace	Cree - XSPW wall packs plus conduit and W/P J-boxes - 42W (19253) (679)	3
Family Recreation Center	Exterior	Exterior Pool Area	3640	2	MH-MH:175W-HID:TRANS:MAGNETIC-1	Post Top Acom-Pole	Replace	Cree - Acom post top LED Retrofit kit BXRA - 67W (19255) (679)	2
Family Recreation Center	Exterior	Exterior Pool Area	3640	5	MH-MH:175W-HID:TRANS:MAGNETIC-1	Flood-Hubbell-Trunion	Replace	Cree - FLD-EDG roof flood on custom bracket - 47W (19257) (679)	5
Family Recreation Center	Exterior	Exterior Pool Area	3640	1	QUARTZ-QUARTZ:500W:DOUBLE:END-1	Flood-Clear-Ground	Remove	Remove (2)	1
Family Recreation Center	Exterior	Exterior Pool Ceiling	8760	5	CFL:PIN-CF13W:TWIN:2PIN-CFL/PREHEAT:MAGNETIC-3	Drum-Surface	Replace	Allumen8 - ECFL50LSACUA - 10W (19251) (679)	5
Family Recreation Center	Exterior	Exterior Pool Ceiling	8760	5	CFL:PIN-CF13W:TWIN:2PIN-CFL/PREHEAT:MAGNETIC-3	Drum-Surface	Replace	Allumen8 - ECFL50LSACUA - 10W (19251) (679)	5
Family Recreation Center	Exterior	Exterior Pool Ceiling	8760	5	CFL:PIN-CF13W:TWIN:2PIN-CFL/PREHEAT:MAGNETIC-3	Drum-Surface	Remove	Remove (2)	5
Family Recreation Center	Exterior	Exterior Pool Ceiling	8760	4	CFL:PIN-CF13W:TWIN:2PIN-CFL/PREHEAT:MAGNETIC-3	Drum-Surface	Remove	Remove (2)	4

Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Family Recreation Center	Main Bldg. Interior	Main Lobby	4915	17	CFL:SCREW-CFL23W:TWIST:MEDIUM-EB-1	Recessed Fixture-	Relamp	American Lighting - 7WA19LED - 7W	17
Family Recreation Center	Main Bldg. Interior	Main Lobby	4915	8	LF:T8-F32T8-ELEC:STD/NORM:BF-3	2X4 Troffer-	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	8
Family Recreation Center	Main Bldg. Interior	Main Lobby	4915	11	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Strip-4 foot-No Lens-In Soffit	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	11
Family Recreation Center	Main Bldg. Interior	Main Lobby	4915	3	CFL:PIN-CF18W:QUAD:2PIN-CFL/PREHEAT:MAGNETIC-3	Pendant Custom Fixt-	Do Nothing	Do Nothing	3
Family Recreation Center	Main Bldg. Interior	Main Lobby	4915	2	LF:T8-F32T8-ELEC:STD/NORM:BF-3	2X4 Troffer-	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Family Recreation Center	Main Bldg. Interior	Main Bldg. Corridor	8760	5	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Wrap-4 foot-	Replace	ALUMEN8E - CF/L50/LH/AC/U - 31W (19213) (679)	5
Family Recreation Center	Main Bldg. Interior	Main Bldg. Corridor	8760	3	CFL:PIN-CF13W:TWIN:2PIN-CFL/PREHEAT:MAGNETIC-3	Drum-	Replace	ALUMEN8E - CF/L50/LH/AC/U - 31W (19213) (679)	3
Family Recreation Center	Main Bldg. Interior	Main Bldg. Corridor	8760	4	CFL:PIN-CF13W:TWIN:2PIN-CFL/PREHEAT:MAGNETIC-3	Drum-	Remove	Remove (2)	4
Family Recreation Center	Main Bldg. Interior	Life Guard Room	2600	3	LF:T8-F32T8-4	Troffer-2X4-	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	3
Family Recreation Center	Main Bldg. Interior	Pool Equip. Room 1	2600	1	CFL:SCREW-CFL23W:TWIST:MEDIUM-EB-1	Keyless-	Replace	ALUMEN8E - CF/L50/LH/AC/U - 31W (19213) (679)	1
Family Recreation Center	Main Bldg. Interior	Pool Equip. Room 2	2600	1	CFL:SCREW-CFL23W:TWIST:MEDIUM-EB-1	Keyless-	Replace	ALUMEN8E - CF/L50/LH/AC/U - 31W (19213) (679)	1
Family Recreation Center	Main Bldg. Interior	Pool Equip. Room 3	2600	1	CFL:SCREW-CFL23W:TWIST:MEDIUM-EB-1	Keyless-	Replace	ALUMEN8E - CF/L50/LH/AC/U - 31W (19213) (679)	1
Family Recreation Center	Main Bldg. Interior	Pool Equip. Room 4	2600	1	CFL:SCREW-CFL23W:TWIST:MEDIUM-EB-1	Keyless-	Replace	ALUMEN8E - CF/L50/LH/AC/U - 31W (19213) (679)	1
Family Recreation Center	Main Bldg. Interior	Pool Equip. Room 5	2600	1	CFL:SCREW-CFL23W:TWIST:MEDIUM-EB-1	Keyless-	Replace	ALUMEN8E - CF/L50/LH/AC/U - 31W (19213) (679)	1
Family Recreation Center	Main Bldg. Interior	Workout Room	4915	9	LF:T8-F32T8-4	Box-4 foot-Surface	Replace	Cree - LS4-40L-40K - 44W (19263) (679)	9
Family Recreation Center	Main Bldg. Interior	Workout Room	4915	20	LF:T8-F32T8-4	Troffer-2X4-	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	20
Family Recreation Center	Main Bldg. Interior	Workout Room	4915	4	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Strip-4 foot-	Replace	Cree - LS4-40L-40K - 44W (19263) (679)	4
Family Recreation Center	Main Bldg. Interior	Workout Room	4915	4	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Wrap-4 foot-	Replace	Cree - LS4-40L-40K - 44W (19263) (679)	4
Family Recreation Center	Main Bldg. Interior	Workout Room	4915	3	LF:T8-F32T8-4	Troffer-2X4-	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	3
Family Recreation Center	Main Bldg. Interior	Workout Room	3750	6	LF:T8-F32T8-4	Troffer-2X4-	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	6
Family Recreation Center	Main Bldg. Interior	Workout Room	3750	9	LF:T8-F32T8-4	Troffer-2X4-	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	9
Family Recreation Center	Main Bldg. Interior	Workout Room	3750	9	LF:T8-F32T8-4	Troffer-2X4-	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	9
Family Recreation Center	Main Bldg. Interior	Mechanical Rooms	1000	16	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Strip-4 foot-	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	16
Family Recreation Center	Tennis Bldg. Interior	Office	3750	2	LF:T8-F32T8-4	Troffer-2X4-	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Family Recreation Center	Tennis Bldg. Interior	Bathroom	3750	1	LF:T8-F32T8-4	Troffer-2X4-	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	1
Family Recreation Center	Gym Interior	Gym Lobby	3750	15	LF:T8-F32T8-ELEC:STD/NORM:BF-3	2X4 Troffer-	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	15
Family Recreation Center	Gym Interior	Restrooms	4940	24	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Box-1X4-Surface	Replace	CM-CWC-1/Hard lid kit tuned down to 35 watt (19287) (679)	24

Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Family Recreation Center	Gym Interior	Restrooms	4940	6	LF:T8-F32T8- ELEC:STD/NORM:BF-2	Wrap-4 foot-	Replace	Cree - WS4/- 47L/40K/10V/FD/50W (19211) (679)	6
Family Recreation Center	Gym Interior	Gym 1	3822	20	MH-MH:400W- HID:TRANS:MAGNETIC-1	Square Low Bay-	Replace	240W, Acrylic lens, hi lo sensor - 240W (19277) (679)	20
Family Recreation Center	Gym Interior	Gym 2	3822	20	MH-MH:400W- HID:TRANS:MAGNETIC-1	Square Low Bay-	Replace	240W, Acrylic lens, hi lo sensor - 240W (19277) (679)	20
Family Recreation Center	Gym Interior	Gym 3	3822	15	MH-MH:400W- HID:TRANS:MAGNETIC-1	Square Low Bay-	Replace	240W, Acrylic lens, hi lo sensor - 240W (19277) (679)	15
Family Recreation Center	Gym Interior	Gym 4	3822	20	MH-MH:400W- HID:TRANS:MAGNETIC-1	Round High Bay-	Replace	240W, Acrylic lens, hi lo sensor - 240W (19277) (679)	20
Family Recreation Center	Courts	Tennis Bldg. Exterior	1000	2	LF:T8-F32T8- ELEC:STD/NORM:BF-2	Strip-4 foot-	Do Nothing	Do Nothing	2
Family Recreation Center	Courts	Tennis Courts	1000	48	MH-MH:1000W- HID:TRANS:MAGNETIC-1	Standard Lights-	Do Nothing	Do Nothing	48
Family Recreation Center	Courts	Basketball Court	1000	16	MH-MH:400W- HID:TRANS:MAGNETIC-1	Hubbel Flood-	Do Nothing	Do Nothing	16
Family Recreation Center	Courts	Racquetball Court	1000	12	MH-MH:400W- HID:TRANS:MAGNETIC-1	Sports Flood-	Do Nothing	Do Nothing	12

ECM Number: ECM-6

ECM Title: Building Envelope

Existing Conditions:

Infiltration of unconditioned air and exfiltration of condition air will lead to higher energy costs. The Family Recreation Center has not performed a building envelope analysis or envelope modifications. There is a known issue of outside air infiltrating through the wall into the fitness center.

Proposed ECM:

ABM proposes to weather-strip and seal openings in the building to help reduce or eliminate infiltration and exfiltration of air.

- Weather-strip and seal 33, first floor, exterior doors.
- Side wall joints to be sealed. Approximately 10 feet.



ECM Number: ECM-8

ECM Title: Pool Filtration System

Existing Conditions:

The existing pool filtration system at the Family Recreation Complex uses a Diamitacious Earth (DE) type filtering system. These type systems are obsolete and the resulting backwash from these systems is considered a hazardous waste and must be disposed of accordingly. The existing pool pumps currently run continuously. They are also located in a pit in the pump/filter room. This makes servicing the pumps very difficult. They are also prone to flooding.

Proposed ECM:

The proposed renovation provides a complete turn-key conversion from a manual DE filtration system to a semi-automatic permanent media hi-rate filter system. It also converts energy saving motor control of pool pumping system to one that is directly controlled via the BECSys5 control system for dramatic peak and off-peak energy savings. The open architecture communications package will enable remote monitoring and control, 24/7 log keeping, and a powerful alert notification package. This renovation will also include the conversion to an all-in-one chemical treatment system which provides all the calcium, bicarbonate and uses 1/10th of the acid of a traditional treatment package.

This new system will include:

- A conversion to an all-in-one chemical treatment system which provides all the calcium, bicarbonate and uses 1/10th of the acid of a traditional treatment package.
- BECSys5 Chemical Controller – Ethernet – VFD-CP-1 Circuit
- SIGNET 8" PVC Saddle w/adaptor
- Paddlewheel lo flow sensor
- Automatic water level control package



- ASCO 1 solenoid valve
- Level transmitter
- Pulsar IV chlorination system, 360 lb/day – includes booster pump
- National 48" FRP, 32 sqft Horizontal filter
- 6" Facepipe Mini-Link, FRP
- 2-15 hp self-priming pumps
- Department of Health engineering and permitting



Existing Pool Pumps



Existing DE Filtration System

Library



Estimated Library Energy

Current Costs	\$ 38,227
Current \$/SF	\$ 1.89
Post –ABM Costs	\$ 18,589
Post –ABM \$/SF	\$ 0.92

ECM Number: ECM-3

ECM Title: Controls

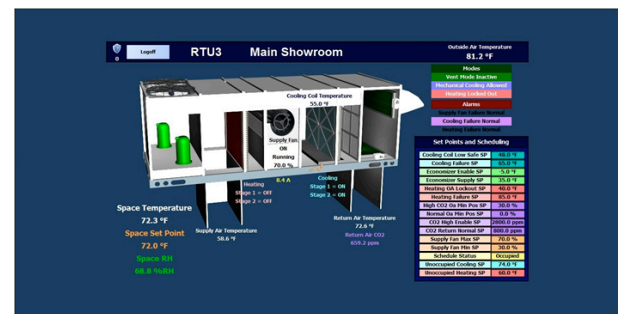
Existing Conditions:

The HVAC controls at the Library are comprised of a small control system that is not fully functional. Much of the existing control system has been disconnected, leaving thermostats wired to a clocks with no time set in them. There is currently no night set back or occupancy scheduling programmed for the equipment. The operation of the existing equipment has resulted in well documented humidity issues.

Proposed ECM:

ABM proposes to replace the existing control system with a new, BacNet DDC, open protocol, user friendly, graphics based system. Temperature/humidity sensors will be installed in the areas served by the four main systems. These sensors will report back to the main controller that will allow an authorized operator to monitor and control the related equipment. The main controller will be a computer based program with the following features:

- Graphics based display
- Occupancy / Vacancy scheduling
- Night set back program
- ABM will provide and install controllers on all four systems. We will also provide and install room temp/humid sensors and return air CO2 sensors. The Controls, combined with the HVAC Upgrades (ECM-4) and proper HVAC Maintenance will eliminate the humidity issues within the Library. Units will be controlled to an occ/unocc schedule. The indoor fans on units 1, 2 and 3 will be two speed, controlled based on the staging of the condensing units.



Outside air dampers will be modulated based on return air CO2. Night setback during unoccupied hours will be implemented.

- ABM will also provide status monitoring of exhaust fans 1 & 2.



ECM Number: ECM-4

ECM Title: HVAC Upgrades

Existing Conditions:

The HVAC systems at the Library are comprised three large systems and one smaller system that serve the entire facility. All four of these systems are 18 years old and are in poor condition and operate inefficiently. We have found refrigerant leaks, burnt wiring and condenser coils deteriorating. And outside air ducts are in poor condition. All of these systems are currently operating with R-22 refrigerant that is not environmentally friendly and is becoming obsolete.

Proposed ECM:

ABM proposes to replace the condensing units on each of the four systems with similar capacity units. We will also replace the indoor evaporator coils with new coils. Hot gas by-pass will be added to the systems which will allow the systems to be run more efficiently. Phase protection will be installed on all three phase condensing units.

The two (2) main restrooms will be provided with one (1) new electric hand dryer in each restroom. The existing hand dryers will be removed.



Our proposed scope of work will include:

- Shut power off and provide appropriate lock-out tag-out requirements for all four systems.
- Reclaim R-22 from all four systems.
- Disconnect and remove all condensing units from the roof.
- Disconnect and remove all evaporator coils.
- Provide crane service to remove all condensing units from the roof and to set all of the new condensing units.
- Provide and install two new ten ton condensing units on systems #1 and #2.
- Provide and install one new six ton condensing unit on system #3.
- Provide and install one new ten ton condensing unit on system #4.
- Provide and install new evaporator coils in all four systems.
- Provide new variable frequency drives for the electrician to install on all four systems.
- Provide and install the necessary control devices to allow all four systems to have hot gas by-pass.
- Reconnect all refrigerant piping.
- Reconnect electrical service.
- Evacuate and charge the systems with refrigerant.
- Provide and install phase protection on all three phase condensing units.
- Perform a complete start-up and check out of all new systems.

Some of the issues with the existing systems



One of the existing thermostats



ECM Number: ECM-5

ECM Title: Lighting Upgrades (LED) and Occupancy Sensors

Existing Conditions:

The lighting at the Library is a combination of fluorescent lamps, wall sconces and incandescent exterior fixtures.

Proposed ECM:

The new lighting for the Library will be a complete LED retrofit. Fluorescent lamps and incandescent lamps will be changed to new LED. The HID loading dock fixtures will also be replaced.

Our proposed scope is listed in the table below and will include:

- Fluorescent lamps will be replaced with LED lamps.
- Incandescent lamps will be replaced with LED lamps.
- Exterior HID and incandescent fixtures will be replaced with HID.
- Occupancy controls have also been proposed where appropriate. These controls will keep lighting turned off in unoccupied areas saving significant additional usage costs over and above the savings due to the fixture replacement or retrofit.



Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Library	Library Exterior	Exterior Parking Lot	4380	9	MH-MH:250W-HID:TRANS:MAGNETIC-1		Do Nothing	Do Nothing	9
Library	Library Exterior	Exterior Parking Lot	4380	2	MH-MH:250W-HID:TRANS:MAGNETIC-1		Do Nothing	Do Nothing	2
Library	Library Interior	Library	4160	146	UFL-F31T8/U:1.58INSPACE-ELECTRONIC-3	2X2-Parabolic-Recess	Replace	Cree - ZR22-32L-40K-CMA-CWC-1-21w (19281) (679)	146
Library	Library Interior	Library	4160	183	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-1X4-Parabolic-Recessed	Replace	Cree - ZR14-40L-40K-CMA-CM-CWC-1-35W (19283) (679)	183
Library	Library Interior	Library	4160	18	UFL-F31T8/U:1.58INSPACE-ELECTRONIC-3	2X2-Parabolic-Recess	Replace	Cree - ZR22-40L-40K-CMA-CM-CWC-1-EB14 - 35W (19225) (679)	18
Library	Library Interior	Library	4160	14	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-1X4-Parabolic-Recessed	Replace	Cree - ZR14-40L-40K-CMA-CM-CWC-1-EB14 - 44W (19227) (679)	14
Library	Library Interior	Library	4160	78	UFL-F32T8/U6-ELECTRONIC-2	2X2-Parabolic-Recess	Replace	Cree - ZR22-32L-40K-CMA-CWC-1-21w (19281) (679)	78
Library	Library Interior	Library	4160	12	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Strip-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	12
Library	Library Interior	Library	4160	12	INCAND-INC:60W:A-1	Wall Sconce-Wall	Replace	Cree - A19-75W-27K - 14W (19229) (679)	12
Library	Library Exterior	Entry	4380	8	INCAND-INC:150W:A-1	8-in Can-Recessed	Replace	435016/Indoor/Outdoor/Dimmable Par 38 - 15W (19207) (679)	8
Library	Library Exterior	Entry	4380	6	INCAND-INC:75W:PAR38-1	Wall Wash-No Lens-Wall	Replace	435016/Indoor/Outdoor/Dimmable Par 38 - 15W (19207) (679)	6
Library	Library Exterior	Book Return	4380	1	MH-PSMH:150W-HID:TRANS:MAGNETIC-1	16" square-Moulded Lens-Recessed	Retrofit	Terralux - L/08/D/08-40-12-R2-13W (19209) (679)	1
Library	Library Exterior	Loading Dock	4380	1	INCAND-INC:150W:A-1	Cylinder Pendant -No Lens-Suspended	Replace	435016/Indoor/Outdoor/Dimmable Par 38 - 15W (19207) (679)	1
Library	Library Exterior	Loading Dock	4380	1	INCAND-INC:75W:PAR38-2	Par holder-	Replace	Cree - WS4/-47L/40K/10V/FD/50W (19211) (679)	1
Library	Library Exterior	Bullard Pkwy Flagpole	4380	1	INCAND-INC:75W:PAR38-1	Par holder-Ground	Replace	P2 - new flood LED fixture - 21W (19235) (679)	1
Library	Library Exterior	Bullard Pkwy Flagpole	4380	1	INCAND-INC:75W:PAR38-1	Par holder-Ground	Remove	Remove (2)	1
Library	Library Exterior	Hard Pkwy Covered P	4380	5	INCAND-INC:150W:A-1	Cylinder Pendant -No Lens-Suspended	Replace	435016/Indoor/Outdoor/Dimmable Par 38 - 15W (19207) (679)	5
Library	Library Exterior	Hard Pkwy Covered P	4380	1	MH-PSMH:70W-HID:TRANS:MAGNETIC-1	Canopy Square-Prismatic-Surface	Replace	ALUMEN8E - CF/L50/LH/AC/U - 31W (19213) (679)	1
Library	Library Exterior	Hard Pkwy Covered P	4380	2	CFL:PIN-CF18W:QUAD:2PIN-CFL/PREHEAT:MAGNETIC-1	Wallpack-Prismatic-Wall	Retrofit	Terralux - L/04/D/08/40/12/R2/7W (19215) (679)	2
Library	Library Exterior	Exterior Along Broadway	4380	2	MH-PSMH:150W-HID:TRANS:MAGNETIC-1	Wallpack-Moulded Lens-Wall	Replace	SEC/EDG/4M/WM/04/E/U L/BZ/525/ML/70W (19217) (679)	2
Library	Library Exterior	Exterior Broadway Entrance	4380	1	INCAND-INC:75W:PAR38-2	Par holder-	Replace	SEC/EDG/4M/WM/02/E/U L/BZ/700/50W (19219) (679)	1
Library	Library Exterior	Sign 1 at Bullard & Br	4380	1	QUARTZ-QUARTZ:150W:DOUBLE:END-1	Flood-Ground	Replace	ECONOLITE - E/GL4F03N2W/36W (19221) (679)	1
Library	Library Exterior	mt. Sign 2 at Main Entrance	4380	2	QUARTZ-QUARTZ:150W:DOUBLE:END-1	Flood-Ground	Replace	E/GL4F03N2W plus electrical repairs - 36W (19237) (679)	2
Library	Library Exterior	mt. Sign 3 at Rear Entrance	4380	2	QUARTZ-QUARTZ:150W:DOUBLE:END-1	Flood-Ground	Replace	E/GL4F03N2W plus electrical repairs - 36W (19237) (679)	2

ECM Number: ECM-6

ECM Title: Building Envelope

Existing Conditions:

Infiltration of unconditioned air and exfiltration of condition air will lead to higher energy costs. The Library has not performed a building envelope analysis or envelope modifications.

Proposed ECM:

ABM proposes to weather-strip and seal openings in the building to help reduce or eliminate infiltration and exfiltration of air.

- Weather-strip and seal seven, first floor, exterior doors.
- Seal roof and wall joints with two-part foam. Approximately 450 feet.



Lightfoot Recreation Center



Estimated Lightfoot Energy

Current Costs	\$ 15,480
Current \$/SF	\$ 1.38
Post- ABM Costs	\$ 13,188
Post - ABM \$/SF	\$ 1.18

ECM Number: ECM-3

ECM Title: Controls

Existing Conditions:

The HVAC controls at the Lightfoot Recreation Center are comprised of five conventional type thermostats. One thermostat for each system. There is currently no night set back or occupancy scheduling programmed for the equipment. All of the existing thermostat control is performed at the device by anyone who may have access.

Proposed ECM:

ABM proposes to replace the existing thermostats with new, Web based thermostats. These new thermostats will have the capability for remote monitoring. This can be accomplished by most smart devices. These thermostats will also allow for remote scheduling and temperature set point adjustment and will have the following features:

- Occupancy / Vacancy scheduling
- Night set back program
- Remote temperature adjustments

ABM will provide and install communicating thermostats on the four main units with network connection. ABM will also interlock unit 1 (MAU) to enable based on occupancy.



Sample of a Web based thermostat

ECM Number: ECM-4

ECM Title: HVAC Upgrades

Existing Conditions:

The HVAC systems at the Lightfoot Recreation Center are comprised four large systems that serve the entire facility. Three of these systems are 18 years old and are in poor condition and operate inefficiently. One system is only 8 years old and is in good condition. All of these systems are currently operating with R-22 refrigerant that is not environmentally friendly and is becoming obsolete. There is also an outside air unit that is only 7 years old but is not operational.

Proposed ECM:

ABM proposes to replace the three largest systems with new equipment of equal capacity. We will also make the outside air unit operational. This is critical to providing fresh air to the facility. A Global Plasma Solutions device that will allow for the reduction in outside air will be installed on the smallest system only. Phase protection will be installed on all three phase condensing units. A performance evaluation and functional testing will be performed on all equipment that is not being replaced.

The four (4) main restrooms will be provided with one (1) new electric hand dryer in each restroom. The paper towel dispensers will be removed.

Our proposed scope of work will include:

- Shut power off and provide appropriate lock-out tag-out requirements for split systems 2, 4 and 5.
- Reclaim R-22 from all three split systems.
- Disconnect and remove all three systems.
- Provide crane service to remove the old condensing units and to set the new condensing units.
- Provide and install three new 10 ton split systems.
- Reconnect all refrigerant piping.

- Provide and install the necessary duct transitions.
- Reconnect electrical service.
- Evacuate and charge systems with refrigerant.
- Provide and install new parts to make the Desert Aire unit operational. This will include a new compressor, contactors, wiring and misc. other supplies.
- Evacuate and charge the system with refrigerant.
- Provide and install phase protection on all three phase condensing units.
- Provide and install a Global Plasma Solutions device on the Desert Aire unit.
- Perform a complete start-up and check out of all new systems.
- Perform a preventive maintenance and functional testing of the remaining 2 systems.



This facility has various types of thermostats



The outside air unit that is not operational

ECM Number: ECM-5

ECM Title: Lighting Upgrades (LED) and Occupancy Sensors

Existing Conditions:

The lighting at the Lightfoot Recreation Center is a combination of fluorescent tubes and compact fluorescent lamps.

Proposed ECM:

The new lighting for the Lightfoot Recreation Center will be a complete LED retrofit. All fluorescent lamps will be changed to new LED.

Our proposed scope is listed in the table below and will include:

- Fluorescent lamps will all be replaced with LED lamps.
- Occupancy controls have also been proposed where appropriate. These controls will keep lighting turned off in unoccupied areas saving significant additional usage costs over and above the savings due to the fixture replacement or retrofit.



Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Library	Library Exterior	Exterior Parking Lot	4380	9	MH-MH:250W-HID:TRANS:MAGNETIC-1		Do Nothing	Do Nothing	9
Lightfoot Recreation Center	Area	Lobby	3640	4	CFL:PIN-CF18W:QUAD:2PIN-CFL/PREHEAT:MAGNETIC-3	Decorative-Frosted-Pendant	Do Nothing	Do Nothing	4
Lightfoot Recreation Center	Area	Lobby	3640	4	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	4
Lightfoot Recreation Center	Area	Receptionist	3640	6	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	6
Lightfoot Recreation Center	Area	Janitors	1000	1	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Lightfoot Recreation Center	Area	Chairs storage	1000	4	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-2X4-Prismatic-Recessed	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	4
Lightfoot Recreation Center	Area	Men	2600	1	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-4 foot-Prismatic-Recessed	Replace	CM-CWC-1/Hard lid kit tuned down to 35 watt (19287) (679)	1
Lightfoot Recreation Center	Area	Women	2600	1	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-4 foot-Prismatic-Recessed	Replace	CM-CWC-1/Hard lid kit tuned down to 35 watt (19287) (679)	1
Lightfoot Recreation Center	Area	Electrical	1000	6	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	6

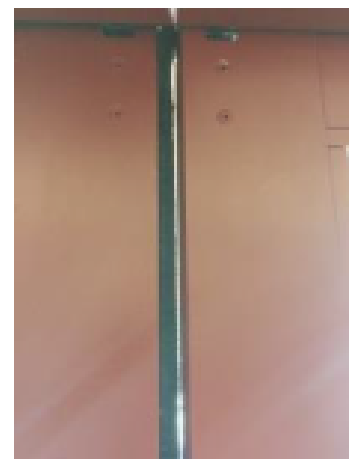
Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Lightfoot Recreation Center	Area	Ceramics	1040	9	LF:T8-F32T8-ELEC:STD/NORM:BF-3	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	9
Lightfoot Recreation Center	Area	Storage	1000	2	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	2
Lightfoot Recreation Center	Area	126 activity	3640	12	LF:T8-F32T8-ELEC:STD/NORM:BF-3	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	12
Lightfoot Recreation Center	Area	126 activity	3640	2	CFL:PIN-CF18W:QUAD:2PIN-CFL/PREHEAT:MAGNETIC-3	Decorative-Frosted-Pendant	Do Nothing	Do Nothing	2
Lightfoot Recreation Center	Area	126 activity	3640	4	CFL:PIN-CF26W:QUAD:2PIN-CFL/PREHEAT:MAGNETIC-1	Wall Sconce-Clear-Wall	Do Nothing	Do Nothing	4
Lightfoot Recreation Center	Area	126 activity	3640	6	CFL:PIN-CF32W:TRIPLE:4PIN-ELECTRONIC-1	6-in Can-No Lens-Recessed	Do Nothing	Do Nothing	6
Lightfoot Recreation Center	Area	127 storage	1000	1	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Lightfoot Recreation Center	Area	125 mechanical	1000	1	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Lightfoot Recreation Center	Area	Hallway	3640	4	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	4
Lightfoot Recreation Center	Area	Lunch room	3640	4	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	4
Lightfoot Recreation Center	Area	Lunch room	3640	12	CFL:PIN-CF32W:TRIPLE:4PIN-ELECTRONIC-1	6-in Can-No Lens-Recessed	Do Nothing	Do Nothing	12
Lightfoot Recreation Center	Area	Lunch room	3640	16	LF:T8-F32T8-ELEC:STD/NORM:BF-3	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	16
Lightfoot Recreation Center	Area	Lunch room	3640	4	CFL:PIN-CF18W:QUAD:2PIN-CFL/PREHEAT:MAGNETIC-3	Decorative-Frosted-Pendant	Do Nothing	Do Nothing	4
Lightfoot Recreation Center	Area	Hallway	3640	3	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	3
Lightfoot Recreation Center	Area	Hallway	3640	2	CFL:PIN-CF32W:TRIPLE:4PIN-ELECTRONIC-1	6-in Can-No Lens-Recessed	Do Nothing	Do Nothing	2
Lightfoot Recreation Center	Area	Women	2600	3	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-1X4-Prismatic-Recessed	Replace	Cree - ZR14-40L-40K-CMA-CM-CWC-1-35W (19283) (679)	3
Lightfoot Recreation Center	Area	Men	2600	3	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-1X4-Prismatic-Recessed	Replace	Cree - ZR14-40L-40K-CMA-CM-CWC-1-35W (19283) (679)	3
Lightfoot Recreation Center	Area	116 shower	2600	1	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-1X4-Prismatic-Recessed	Replace	Cree - ZR14-40L-40K-CMA-CM-CWC-1-35W (19283) (679)	1
Lightfoot Recreation Center	Area	117 arts crafts	1820	7	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	7
Lightfoot Recreation Center	Area	119 office	2600	2	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Lightfoot Recreation Center	Area	Hallway	3640	1	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	1
Lightfoot Recreation Center	Area	Kitchen	3640	2	LF:T8-F32T8-ELEC:STD/NORM:BF-3	Wrap-1X4-Prismatic-Surface	Relamp	LUXUL-(3L)Q2LUX/4ft/40K/FROST ED-51W	2
Lightfoot Recreation Center	Area	109 billiards	3640	14	LF:T8-F32T8-ELEC:STD/NORM:BF-3	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	14
Lightfoot Recreation Center	Area	125 mechanical	1000	1	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Lightfoot Recreation Center	Area	125 mechanical	1000	1	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Lightfoot Recreation Center	Area	Exterior	4380	14	CFL:PIN-CF32W:TRIPLE:4PIN-ELECTRONIC-1	6-in Can-No Lens-Recessed	Do Nothing	Do Nothing	14
Lightfoot Recreation Center	Area	Exterior	4380	14	CFL:PIN-CF32W:TRIPLE:4PIN-ELECTRONIC-1	Wallpack-Clear-Wall	Do Nothing	Do Nothing	14
Lightfoot Recreation Center	Area	Exterior	4380	5	MH-MH:400W-HID:TRANS:MAGNETIC-1	Shoe Box-Mogul-Clear-Pole Arm	Do Nothing	Do Nothing	5
Lightfoot Recreation Center	Area	Computers	3640	3	LF:T8-F32T8-ELEC:STD/NORM:BF-3	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	3

ECM Number: ECM-6

ECM Title: Building Envelope

Existing Conditions:

Infiltration of unconditioned air and exfiltration of condition air will lead to higher energy costs. The Lightfoot Recreation Center has not performed a building envelope analysis or envelope modifications.



Proposed ECM:

ABM proposes to weather-strip and seal openings in the building to help reduce or eliminate infiltration and exfiltration of air.

- Weather-strip and seal eight, first floor, exterior doors.
- Seal roof and wall joints with two-part foam. Approximately 325 feet.
- Seal roof and wall joints with one-part foam. Approximately 150 feet.



Public Works



Estimated Public Works Energy

Current Costs	\$ 28,976
Current \$/SF	\$ 1.07
Post- ABM Costs	\$ 18,212
Post - ABM \$/SF	\$ 0.68

ECM Number: ECM-3

ECM Title: Controls

Existing Conditions:

The HVAC controls at the Public Works are comprised of five conventional type thermostats. One thermostat for each system. There is currently no night set back or occupancy scheduling programmed for the equipment. All of the existing thermostat control is performed at the device by anyone who may have access.

Proposed ECM:

ABM proposes to replace the existing thermostats with new, Web based thermostats. These new thermostats will have the capability for remote monitoring. This can be accomplished by most smart devices. This can be accomplished by any smart device. These thermostats will also allow for remote scheduling and temperature set point adjustment and will have the following features:

- Occupancy / Vacancy scheduling
- Night set back program
- Remote temperature adjustments

ABM will provide and install communicating thermostats on all five units with network connection. We will also provide and install outside air damper actuators on all units and interlock with the compressor.



Sample of a Web based thermostat

ECM Number: ECM-4

ECM Title: HVAC Upgrades

Existing Conditions:

The HVAC systems in the Public Works Building are comprised five small systems that serve the entire facility. All of these systems are 3 years old and are in good condition.

Proposed ECM:

ABM proposes to install a Global Plasma Solutions device that will allow for the reduction in outside air on all five systems. Phase protection will be installed on all three phase condensing units. A performance evaluation and functional testing will be performed on all equipment.

The two (2) main restrooms will be provided with one (1) new electric hand dryer in each restroom. The paper towel dispensers will be removed.

Our proposed scope of work will include:

- Perform a preventive maintenance and functional testing of the five split systems.
- Adjust the manual outside air dampers on five systems to correct levels.
- Install Global Plasma Solutions device on five systems.
- Provide and install phase protection on all three phase condensing units.
- Provide and install a new 8 inch supply duct and grille for the Engineering office.
- Rebalance the areas where the customer currently has spot coolers installed.
- Provide a comfort balance on air handling unit for the Engineering office.

All of the systems are operated by conventional thermostats



ECM Number: ECM-5

ECM Title: Lighting Upgrades (LED) and Occupancy Sensors

Existing Conditions:

The lighting at the Public Works is a combination of fluorescent tubes, compact fluorescent lamps and metal halide in the shop/warehouse areas.

Proposed ECM:

The new lighting for the Public Works will be a complete LED retrofit. All fluorescent tubes and compact fluorescent lamps will be changed to new LED lamps. The metal halide fixtures will also be replaced with LED high bay fixtures.

Our proposed scope is listed in the table below and will include:

- Fluorescent tubes and compact fluorescent lamps will be replaced with LED lamps.
- Metal halide fixtures in the shop/warehouse areas will be replaced with high bay LED fixtures.
- Occupancy controls have also been proposed where appropriate. These controls will keep lighting turned off in unoccupied areas saving significant additional usage costs over and above the savings due to the fixture replacement or retrofit.



Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Public Works	Area	Lobby	3360	10	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	10
Public Works	Area	Director	2756	4	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	4
Public Works	Area	Deputy director	2756	4	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	4
Public Works	Area	Asst director	2756	4	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	4
Public Works	Area	Records	2756	4	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	4
Public Works	Area	Conference	2756	6	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	6
Public Works	Area	Hallway	3360	7	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	7
Public Works	Area	Engineering	2756	6	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	6
Public Works	Area	City Engineer	2756	3	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	3
Public Works	Area	Men	4836	2	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	2
Public Works	Area	Men	4836	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Vanity-4 foot-Prismatic-Wall	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Public Works	Area	Janitors	1000	1	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	1
Public Works	Area	Women	4836	1	CFL:SCREW-CFL13W:TWIST:MEDIUM-EB-1	6-in Can-Prismatic-recessed	Relamp	American Lighting - 7WA19LED - 7W	1
Public Works	Area	Women	4836	2	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	2
Public Works	Area	Women	4836	2	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Vanity-4 foot-Prismatic-Wall	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	2
Public Works	Area	Storage	1000	1	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	1
Public Works	Area	Sanitation Eng.	2756	5	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	5
Public Works	Area	Hallway	3360	15	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	15
Public Works	Area	Training	2756	12	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	12
Public Works	Area	Maintenance Shop	2600	11	MH-MH:400W-HID:TRANS:MAGNETIC-1	High Bay-Mogul-No Lens-Pendant	Replace	240W, Acrylic lens, hi lo sensor - 240W (19277) (679)	11
Public Works	Area	Maintenance Shop	2600	4	MH-PSMH:175W-HID:TRANS:MAGNETIC-1	Wallpack-Mogul-Prismatic-Wall	Replace	CREE - SEC/EDG/4M/WM/04/E/U L/BZ/525/ML/70W (17511)	4
Public Works	Area	Hazard storage	1000	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Public Works	Area	Shop office	2756	4	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	4
Public Works	Area	Hallway	3360	6	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	6
Public Works	Area	Office	2756	6	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(4L)Q2LUX/4ft/40K/FROST ED-68W	6
Public Works	Area	Women's locker	4836	1	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	1

Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Public Works	Area	Women's locker	4836	3	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	3
Public Works	Area	Men locker	4836	2	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	2
Public Works	Area	Men locker	4836	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Vanity-4 foot-Prismatic-Wall	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Public Works	Area	Men locker	4836	2	CFL:SCREW-CFL13W:TWIST:MEDIUM-EB-1	6-in Can-Prismatic-recessed	Relamp	American Lighting - 7WA19LED - 7W	2
Public Works	Area	Storage	2600	5	MH-MH:400W-HID:TRANS:MAGNETIC-1	High Bay-Mogul-No Lens-Pendant	Replace	240W, Acrylic lens, hi lo sensor - 240W (19277) (679)	5
Public Works	Area	Blueprint	2756	15	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	15
Public Works	Area	Office	2756	4	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR2440L40K-CMACMCWC1 - 44W (15821)	4
Public Works	Area	Garage storage	2600	6	MH-MH:400W-HID:TRANS:MAGNETIC-1	High Bay-Mogul-No Lens-Pendant	Replace	240W, Acrylic lens, hi lo sensor - 240W (19277) (679)	6
Public Works	Area	Storage	1000	1	CFL:PIN-CF13W:TWIN:2PIN-CFL/PREHEAT:MAGNETIC-3	Round-	Retrofit	Terralux - S8 8in round LED drum retrofit kit - 15W	1
Public Works	Area	Street signs	2600	2	MH-MH:400W-HID:TRANS:MAGNETIC-1	High Bay-Mogul-No Lens-Pendant	Replace	240W, Acrylic lens, hi lo sensor - 240W (19277) (679)	2
Public Works	Area	Lawn mower storage	2600	6	MH-MH:400W-HID:TRANS:MAGNETIC-1	Wallpack-Mogul-Prismatic-Wall	Replace	240W, Acrylic lens, hi lo sensor - 240W (19277) (679)	6
Public Works	Area	Office	2756	2	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	2
Public Works	Area	Electrical	1000	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Public Works	Area	Hazard	1000	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Public Works	Area	Work shop	2600	10	MH-MH:400W-HID:TRANS:MAGNETIC-1	High Bay-Mogul-No Lens-Pendant	Replace	240W, Acrylic lens, hi lo sensor - 240W (19277) (679)	10
Public Works	Area	Exterior	4380	12	INCAND-INC:150W:A-1	8-in Can-Frosted-No Lens-Recessed	Replace	435016/Indoor/Outdoor/Dimmable Par 38 - 15W (19207) (679)	12
Public Works	Area	Exterior	4380	14	MH-MH:400W-HID:TRANS:MAGNETIC-1	Shoe Box-Mogul-Clear-Pole Arm	Replace	Cree - OSQ_A_NM_5ME_A_57K_UL_BZ_R - 112W	14
Public Works	Area	Exterior	4380	2	QUARTZ-QUARTZ:500W:DOUBLE:END-1	Flood-Clear-Ground	Replace	Cree - FLD-EDG-40-YM-04-E-UL-BZ-525-70W (19267) (679)	2
Public Works	Area	Exterior	4380	5	MH-MH:250W-HID:TRANS:MAGNETIC-1	Wallpack-Mogul-Clear-Wall	Replace	Cree - XSPW_A_0_3_M_C_U_Z_P - 42W	5
Public Works	Area	Exterior sheds	1000	17	LF:T12-F96T12:SINGLEPIN-MAG-2	Strip-8 foot-No Lens-Surface	Relamp	(4)Q2LUX/4ft/40K/FROST ED (1)QHE/4x32/ISN (1)Kit-68W	17

ECM Number: ECM-6

ECM Title: Building Envelope

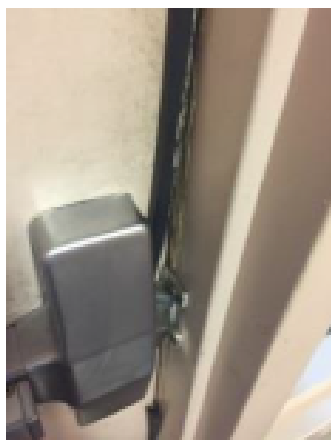
Existing Conditions:

Infiltration of unconditioned air and exfiltration of conditioned air will lead to higher energy costs. The Public Works building has not had a previous building envelope analysis or envelope modifications.

Proposed ECM:

ABM proposes to weather-strip and seal openings in the building to help reduce or eliminate infiltration and exfiltration of air.

- Weather-strip and seal three, first floor, exterior doors.



Water Treatment Plant



Estimated Water Treatment Plant Energy

Current Costs	\$ 152,779
Current \$/SF	\$ 10.06
Post- ABM Costs	\$ 144,855
Post - ABM \$/SF	\$ 9.54

ECM Number: ECM-3

ECM Title: Controls

Existing Conditions:

The HVAC controls at the Water Treatment Plant are comprised of four conventional type thermostats, one for each system. There is currently no night set back or occupancy scheduling programmed for the equipment. All of the existing thermostat control is performed at the device by anyone who may have access.

Proposed ECM:

ABM proposes to replace the existing thermostats with new, Web based thermostats. These new thermostats will have the capability for remote monitoring. This can be accomplished by any smart device. These thermostats will also allow for remote scheduling and temperature set point adjustment and will have the following features:

- Occupancy / Vacancy scheduling
- Night set back program
- Remote temperature adjustments

ABM will provide and install communicating thermostats on all four units with network connection.



Sample of a Web based thermostat

ECM Number: ECM-4

ECM Title: HVAC Upgrades

Existing Conditions:

The HVAC systems at the Water Treatment Plant are comprised four small systems that serve the entire facility. All of these systems are over 10 years and are in poor condition. All of these systems are currently operating with R-22 refrigerant that is not environmentally friendly and is becoming obsolete.

Proposed ECM:

ABM proposes to replace all four of the existing air conditioning systems with new systems of equal capacity.

Our proposed scope of work will include:

- Shut power off and provide appropriate lock-out tag-out requirements for all four split systems.
- Reclaim R-22 from all four split systems.
- Disconnect and remove all systems.
- Provide and install four new (2, 2.5, 3 and 5 ton) split systems.
- Reconnect all refrigerant piping.
- Provide and install the necessary duct transitions.
- Reconnect electrical service.
- Evacuate and charge the system with refrigerant.
- Perform a complete start-up and check out of all new systems.

One of the systems to be replaced



ECM Number: ECM-5

ECM Title: Lighting Upgrades (LED) and Occupancy Sensors

Existing Conditions:

The lighting at the Water Treatment Plant is a combination of some minimal amount of LED, fluorescent tubes, incandescent lamps and metal halide in exterior areas.

Proposed ECM:

The new lighting for the Water Treatment Plant will be a complete LED retrofit. All fluorescent tubes and incandescent lamps will be changed to new LED lamps. The metal halide fixtures will also be replaced with LED fixtures.

Our proposed scope is listed in the table below and will include:

- Fluorescent tubes and incandescent lamps will all be replaced with LED.
- Metal halide fixtures in the exterior areas will be replaced with high bay LED fixtures.
- Occupancy controls have also been proposed where appropriate. These controls will keep lighting turned off in unoccupied areas saving significant additional usage costs over and above the savings due to the fixture replacement or retrofit.



Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Water Treatment Plant	Area	Entry	2600	6	LF:T8-F32T8-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	6
Water Treatment Plant	Area	Entry	2600	2	LF:T12-F34T12/ES-MAG-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Water Treatment Plant	Area	Office	2600	3	LF:T8-F32T8-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	3
Water Treatment Plant	Area	Restroom	2600	1	INCAND-INC:60W:A-1	Globe-Frosted-Frosted-Wall	Relamp	American Lighting - 7WA19LED - 7W	1
Water Treatment Plant	Area	Office	2600	2	LF:T8-F32T8-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Water Treatment Plant	Area	Conference	2600	5	LF:T8-F32T8-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	5
Water Treatment Plant	Area	Deputy director	2600	2	LF:T8-F32T8-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Water Treatment Plant	Area	Office	2600	2	LF:T8-F32T8-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Water Treatment Plant	Area	Office	2600	1	LF:T12-F34T12/ES-MAG-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	1
Water Treatment Plant	Area	Entry Stairs	8760	2	UFL-F34T12/U6-F40T12:MAGNETIC-2	2X2-Prismatic-Recess	Replace	Cree - ZR22-32L-40K-CMA-CWC-1-21w (19281) (679)	2
Water Treatment Plant	Area	Entry Stairs	8760	1	LF:T8-F32T8-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	1
Water Treatment Plant	Area	File room 2nd floor	2600	8	LF:T12-F34T12/ES-MAG-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	8
Water Treatment Plant	Area	Closet	1000	1	INCAND-INC:100W:A-1	Keyless Socket-Frosted-No Lens-Wall	Relamp	American Lighting - 7WA19LED - 7W	1
Water Treatment Plant	Area	Room locked	2600	2	LF:T12-F34T12/ES-MAG-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Water Treatment Plant	Area	Men	2600	1	UFL-F34T12/U6-F40T12:MAGNETIC-2	2X2-Prismatic-Recess	Replace	Cree - ZR22-32L-40K-CMA-CWC-1-21w (19281) (679)	1
Water Treatment Plant	Area	Men	2600	5	LF:T8-F32T8-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	5
Water Treatment Plant	Area	Locked	2600	3	LF:T12-F34T12/ES-MAG-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	3
Water Treatment Plant	Area	Shop	2600	3	LF:T12-F96T12/ES:SINGLEPIN-MAG-2	Industrial Strip-8 foot-No Lens-Surface	Relamp	(4)Q2LUX/4ft/40K/FROST ED (1)QHE/4x32/ISN (1)Kit-68W	3
Water Treatment Plant	Area	Shop	2600	2	LF:T8-F32T8-4	Industrial Strip-8 foot-No Lens-Suspended	Relamp	LUXUL- (4L)Q2LUX/4ft/40K/FROST ED-68W	2
Water Treatment Plant	Area	Shop	2600	2	LF:T12-F34T12/ES-MAG-2	Vapor Tight-4 foot-Clear-Suspended	Relamp	LUXUL- (2L)Q2LUX/4ft/40K/FROST ED-34W	2
Water Treatment Plant	Area	Shop	1000	34	MV-MV:400W-HID:TRANS:MAGNETIC-1	High Bay-Mogul-No Lens-Surface	Remove	Remove and Cap Fixture	34
Water Treatment Plant	Area	Exterior	4380	3	MH-MH:175W-HID:TRANS:MAGNETIC-1	Security-Medium-Clear-Wall Arm	Replace	DECO - DBARN-30-NW-UNV-30W (19223) (679)	3
Water Treatment Plant	Area	Exterior	4380	2	CFL:SCREW-CFL13W:TWIST:MEDIUM-EB-1	Square-Frosted-recessed	Relamp	American Lighting - 7WA19LED - 7W	2
Water Treatment Plant	Area	Chlorine bldg	8760	9	LF:T12-F34T12/ES-MAG-2	Industrial Strip-4 foot-No Lens-Surface	Relamp	LUXUL- (2L)Q2LUX/4ft/40K/FROST ED-34W	9
Water Treatment Plant	Area	Chlorine bldg	8760	1	LF:T12-F34T12/ES-MAG-2	Vapor Tight-4 foot-Clear-Suspended	Relamp	LUXUL- (2L)Q2LUX/4ft/40K/FROST ED-34W	1
Water Treatment Plant	Area	Chlorine bldg	8760	1	LF:T12-F34T12/ES-MAG-4	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL- (4L)Q2LUX/4ft/40K/FROST ED-68W	1

Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Water Treatment Plant	Area	Exterior	4380	1	INCAND-INC:60W:A-1	Jelly Jar-Frosted-Frosted-Wall	Relamp	American Lighting - 7WA19LED - 7W	1
Water Treatment Plant	Area	Exterior	4380	11	INCAND-INC:60W:A-1	Jelly Jar-Frosted-Frosted-Wall	Relamp	American Lighting - 7WA19LED - 7W	11
Water Treatment Plant	Area	Phosphoric acid	4380	1	CFL:PIN-CF26W:QUAD:4PIN-CFL/PREHEAT:MAGNETIC-1	Jelly Jar-Clear-Wall	Replace	Deco - D410-LED-10W-UNV-BZ - 10W (16915)	1
Water Treatment Plant	Area	Phosphoric acid	8760	2	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Industrial Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	2
Water Treatment Plant	Area	Lime pump	4380	1	CFL:PIN-CF26W:QUAD:4PIN-CFL/PREHEAT:MAGNETIC-1	Jelly Jar-Clear-Wall	Replace	Deco - D410-LED-10W-UNV-BZ - 10W (16915)	1
Water Treatment Plant	Area	Lime pump	8760	3	INCAND-INC:60W:A-1	Globe-Frosted-Frosted-Wall	Relamp	American Lighting - 7WA19LED - 7W	3
Water Treatment Plant	Area	Tools?	4380	2	INCAND-INC:60W:A-1	Globe-Frosted-Frosted-Wall	Do Nothing	Do Nothing	2
Water Treatment Plant	Area	Exterior	4380	4	MV-MV:175W-HID:TRANS:MAGNETIC-1	Cutoff Round-Mogul-Prismatic-Pole	Replace	Deco - D822-LED-60-50-UNV-SL-60W (19269) (679)	4
Water Treatment Plant	Area	Exterior	4380	4	INCAND-INC:300W:A-1	Flood-Spot-Clear-Surface	Relamp	American Lighting - 7WA19LED - 7W	4
Water Treatment Plant	Area	Treatment office	5096	4	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	4
Water Treatment Plant	Area	Testing room	5096	5	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	5
Water Treatment Plant	Area	Restroom	2600	1	INCAND-INC:60W:A-2	Vanity-Frosted-Frosted-Wall	Replace	Deco - DWB-LED-D222-UNV-WH-40W (19271) (679)	1
Water Treatment Plant	Area	Restroom	2600	1	INCAND-INC:60W:A-2	Vanity-Frosted-Frosted-Wall	Replace	Deco - DWB-LED-D222-UNV-WH-40W (19271) (679)	1
Water Treatment Plant	Area	Main office	5096	4	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	4
Water Treatment Plant	Area	Storage bldg	2600	4	LF:T12-F34T12/ES-MAG-2	Industrial Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	4
Water Treatment Plant	Area	Truck shop	2600	28	LF:T12-F96T12/ES:SINGLEPIN-MAG-2	Industrial Strip-8 foot-No Lens-Surface	Relamp	(4)Q2LUX/4ft/40K/FROST ED (1)QHE/4x32/ISN (1)Kit-68W	28
Water Treatment Plant	Area	Truck shop	4380	3	MH-MH:400W-HID:TRANS:MAGNETIC-1	Flood-Mogul-Clear-Knuckle Mount	Replace	Cree - FLD-EDG roof flood on custom bracket - 47W (19257) (679)	3
Water Treatment Plant	Area	Stairs	2600	3	LF:T8-F32T8-4	Industrial Strip-8 foot-No Lens-Suspended	Relamp	LUXUL-(4L)Q2LUX/4ft/40K/FROST ED-68W	3
Water Treatment Plant	Area	Breakroom	2600	2	LF:T12-F34T12/ES-MAG-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Water Treatment Plant	Area	Pvc shed	1000	2	LF:T12-F34T12/ES-MAG-2	Industrial Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	2
Water Treatment Plant	Area	Jpstairs storage office	2600	4	LF:T12-F34T12/ES-MAG-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	4
Water Treatment Plant	Area	Exterior	4380	3	INCAND-INC:100W:PAR38-2	Flood-Flood-No Lens-Surface	Replace	435016/Indoor/Outdoor/DI mmable Par 38 - 15W (19207) (679)	3
Water Treatment Plant	Area	Fluoride	4380	2	INCAND-INC:60W:A-1	Jelly Jar-Frosted-Frosted-Wall	Relamp	American Lighting - 7WA19LED - 7W	2

ECM Number: ECM-6

ECM Title: Building Envelope

Existing Conditions:

Infiltration of unconditioned air and exfiltration of condition air will lead to higher energy costs. The Water Treatment Plant has not performed a building envelope analysis or envelope modifications.

Proposed ECM:

ABM proposes to weather-strip and seal openings in the building to help reduce or eliminate infiltration and exfiltration of air.

- Weather-strip and seal three, first floor, exterior doors.



ECM Number: ECM-20

ECM Title: Lightning Suppression

Existing Conditions:

The Water Treatment Plant experiences frequent lightning strikes. These strikes cause computers to fail, motors burn out and other system failures. These failures can lead to system downtime and significant cost to the city.

Proposed ECM:

ABM proposes to install a lightning suppression system that will protect the entire facility. This lightning suppression system will be installed in a centrally located area of the facility. It will be mounted above the highest point and must be grounded. This is a passive device that requires no power. Our proposed scope of work will be:

- Provide and install one Halo lightning protection device at the highest point in the center of the facility.
- Provide and install proper grounding cable.



ECM Number: Non-ECM

ECM Title: Window Replacement

Existing Conditions:

There are four broken windows in buildings at the Water Treatment Plant. As part of this program ABM will replace these four windows.

Our proposed scope of work will be:

- ABM will provide and install (2) 36 x 60 and (2) 32 x 46 inch windows to replace the existing damaged windows.



Fire Station #1



Estimated Fire Station #1 Energy

Current Costs	\$ 17,638
Current \$/SF	\$ 1.43
Post- ABM Costs	\$ 14,000
Post - ABM \$/SF	\$ 1.13

ECM Number: ECM-3

ECM Title: Controls

Existing Conditions:

The HVAC controls at Fire Station #1 are comprised of four conventional type thermostats. One thermostat for each system. There are also 2 ductless split systems that are controlled at the unit. There is currently no night set back or occupancy scheduling programmed for the equipment. All of the existing thermostat control is performed at the device by anyone who may have access.

Proposed ECM:

ABM proposes to replace the existing thermostats with new, Web based thermostats. These new thermostats will have the capability for remote monitoring. This can be accomplished by any smart device. Another feature of these thermostats is they will also allow for remote scheduling and temperature set point adjustment. These thermostats will have the following features:

- Occupancy / Vacancy scheduling
- Night set back program
- Remote temperature adjustments

ABM will provide and install communicating thermostats on all four units with network connection. The two small ductless split systems are not included in the thermostat replacement.



Sample of a Web based thermostat

ECM Number: ECM-4

ECM Title: HVAC Upgrades

Existing Conditions:

There are six small HVAC systems that serve Fire Station #1. The four largest systems are over 20 years old and are in poor condition. All of these systems are currently operating with R-22 refrigerant that is not environmentally friendly and is becoming obsolete.

Proposed ECM:

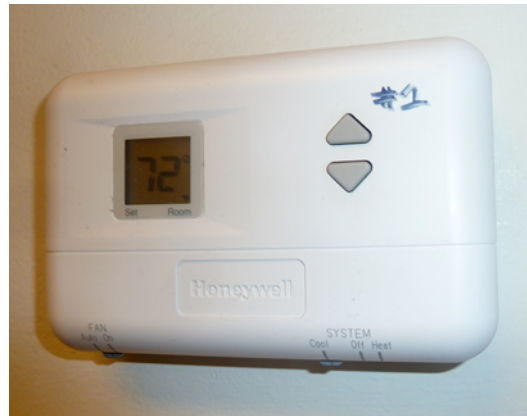
ABM proposes to replace four of the existing air conditioning systems that provide comfort cooling, with new systems of equal capacity. The two small ductless split systems will not be replaced. ABM proposes to install a Global Plasma Solutions device that will allow for the reduction in outside air on all four systems. A performance evaluation and functional testing will be performed on all equipment.

Our proposed scope of work will include:

- Shut power off and provide appropriate lock-out tag-out requirements for split systems 1, 2, 3 and 4.
- Reclaim R-22 from all four split systems.
- Disconnect and remove all four systems.
- Provide crane service to remove the old condensing units and to set the new condensing units.
- Provide and install four new (2, 2.5 3 and 4 ton) split systems.
- Reconnect all refrigerant piping.
- Provide and install the necessary duct transitions.
- Reconnect electrical service.
- Evacuate and charge systems with refrigerant.
- Provide and install a Global Plasma Solutions device on three systems.
- Perform a complete start-up and check out of all new systems.

- Perform a preventive maintenance and functional testing of the remaining 2 systems.

One of the existing thermostats



One of the systems to be replaced

ECM Number: ECM-5

ECM Title: Lighting Upgrades (LED) and Occupancy Sensors

Existing Conditions:

The lighting at Fire Station #1 is a combination of fluorescent tubes, wall packs and flood lamps.

Proposed ECM:

The new lighting for Fire Station #1 will be a complete LED retrofit. Fluorescent tubes, wall packs and flood lamps will be changed to LED.

Our proposed scope is listed in the table below and will include:

- Fluorescent tubes, wall packs and flood lamps will all be replaced with LED.
- Occupancy controls have also been proposed where appropriate. These controls turned off lighting in unoccupied areas saving significant additional usage costs.

Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Fire Station #1	Area	Front door canopy	4380	2	CFL:PIN-CF26W:QUAD:2PIN-CFL/PREHEAT:MAGNETIC-2	Drum-Prismatic-Surface	Replace	Allumen8 - ECFL50LSACUA - 10W (19251) (679)	2
Fire Station #1	Area	Front door canopy	3120	1	No Existing-No Existing-0	Drum-Prismatic-Surface	Do Nothing	Do Nothing	1
Fire Station #1	Area	Building front	4380	2	HPS-HPS:100W-HID:TRANS:MAGNETIC-1	Wallpack-Medium-Prismatic-Wall	Replace	Cree - XSPW_A_0_3_M_C_U_Z_P - 42W	2
Fire Station #1	Area	Building front	4380	8	INCAND-INC:75W:PAR38-1	8-in Can-Spot-No Lens-Recessed	Relamp	American Lighting - 7WA19LED - 7W	8
Fire Station #1	Area	Building front	4380	2	HPS-HPS:100W-HID:TRANS:MAGNETIC-1	Wallpack-Medium-Prismatic-Wall	Replace	Cree - XSPW_A_0_3_M_C_U_Z_P - 42W	2
Fire Station #1	Area	Building front	4380	1	HPS-HPS:100W-HID:TRANS:MAGNETIC-1	Wallpack-Medium-Prismatic-Wall	Replace	Cree - XSPW_A_0_3_M_C_U_Z_P - 42W	1
Fire Station #1	Area	Flagpole	4380	1	CFL:SCREW-CFL23W:TWIST:MEDIUM-EB-1	Flood-No Lens-wall	Replace	435016/Indoor/Outdoor/Dimmable Par 38 - 15W (19207) (679)	1
Fire Station #1	Area	Bay door area	4380	2	QUARTZ-QUARTZ:150W:DOUBLE:END-1	Wallpack-Clear-Surface	Replace	Cree - XSPW_A_0_3_M_C_U_Z_P - 42W	2
Fire Station #1	Area	Bay door	4380	8	CFL:PIN-CF26W:QUAD:2PIN-CFL/PREHEAT:MAGNETIC-2	Drum-Prismatic-Surface	Replace	Allumen8 - ECFL50LSACUA - 10W (19251) (679)	8
Fire Station #1	Area	Building side	4380	1	HPS-HPS:250W-HID:TRANS:MAGNETIC-1	Wallpack-Mogul-Prismatic-Wall	Replace	Cree - XSPW_A_0_3_M_C_U_Z_P - 42W	1
Fire Station #1	Area	Parking lot	4380	2	HPS-HPS:250W-HID:TRANS:MAGNETIC-1	Cobra Head-Mogul-Prismatic-Pole Arm	Do Nothing	Do Nothing	2
Fire Station #1	Area	Parking lot	4380	2	HPS-HPS:100W-HID:TRANS:MAGNETIC-1	Cobra Head-Mogul-Prismatic-Pole Arm	Do Nothing	Do Nothing	2
Fire Station #1	Area	Entry lobby	4380	1	UFL-F32T8/U6-ELECTRONIC-2	Troffer-2X2-Prismatic-Recessed	Replace	Cree - ZR22 2X2 LED 32L WITH SMARTCAST - 35W (14987)	1
Fire Station #1	Area	Reception	3120	4	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMACMC-WC1-35W (19285) (679)	4

Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Fire Station #1	Area	Reception	3120	1	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	1
Fire Station #1	Area	Office	3120	2	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Fire Station #1	Area	Hall	3120	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	1
Fire Station #1	Area	Office	3120	1	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	1
Fire Station #1	Area	Office	3120	1	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	1
Fire Station #1	Area	Office	3120	3	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	3
Fire Station #1	Area	Office	3120	4	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	4
Fire Station #1	Area	Office	3120	1	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	1
Fire Station #1	Area	Hall	3120	3	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	3
Fire Station #1	Area	Electric	1456	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Industrial Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Fire Station #1	Area	Stair lobby	3120	4	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	4
Fire Station #1	Area	Stair lobby	3120	1	LF:T8-F17T8-ELEC:STD/NORM:BF-2	Wrap-2 foot-Prismatic-Surface	Relamp	Luxul-(2)E8N2F40G-20W	1
Fire Station #1	Area	Classroom	1000	9	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	9
Fire Station #1	Area	Dispatch	3120	2	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Fire Station #1	Area	Dispatch	3120	2	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	2
Fire Station #1	Area	Storage	1456	2	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	2
Fire Station #1	Area	Division Chief	3120	2	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Fire Station #1	Area	Men	5096	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Fire Station #1	Area	Men	5096	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Vanity-4 foot-Prismatic-Wall	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Fire Station #1	Area	Women	5096	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Fire Station #1	Area	Women	5096	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Vanity-4 foot-Prismatic-Wall	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Fire Station #1	Area	Truck bay	3120	12	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Vapor Tight-8 foot-Prismatic-Surface	Relamp	LUXUL-(4L)Q2LUX/4ft/40K/FROST ED-68W	12

Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Fire Station #1	Area	Laundry	3120	1	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Vapor Tight-8 foot-Prismatic-Surface	Relamp	LUXUL-(4L)Q2LUX/4ft/40K/FROST ED-68W	1
Fire Station #1	Area	Storage	1456	2	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	2
Fire Station #1	Area	Upstairs area	1456	1	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	1
Fire Station #1	Area	Upstairs area	1456	4	LF:T8-F32T8-ELEC:STD/NORM:BF-2	Industrial Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	4
Fire Station #1	Area	Oxygen storage	1456	1	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Vapor Tight-8 foot-Prismatic-Surface	Relamp	LUXUL-(4L)Q2LUX/4ft/40K/FROST ED-68W	1
Fire Station #1	Area	2nd floor lobby	3120	5	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	5
Fire Station #1	Area	Dayroom	4344	19	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	19
Fire Station #1	Area	Captain office	3120	2	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Fire Station #1	Area	Office	3120	2	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	2
Fire Station #1	Area	2nd hall	3120	7	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	7
Fire Station #1	Area	Sleeping rooms	1456	6	INCAND-INC:60W:A-2	Flood-Spot-No Lens-Wall	Relamp	American Lighting - 7WA19LED - 7W	6
Fire Station #1	Area	Men	5096	7	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Wrap-4 foot-Prismatic-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	7
Fire Station #1	Area	Men	5096	1	CFL:SCREW-CFL23W:TWIST:MEDIUM-EB-1	6-in Can-No Lens-recessed	Relamp	American Lighting - 7WA19LED - 7W	1
Fire Station #1	Area	Women	5096	2	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Fire Station #1	Area	Conference	3120	4	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	4

ECM Number: ECM-6

ECM Title: Building Envelope

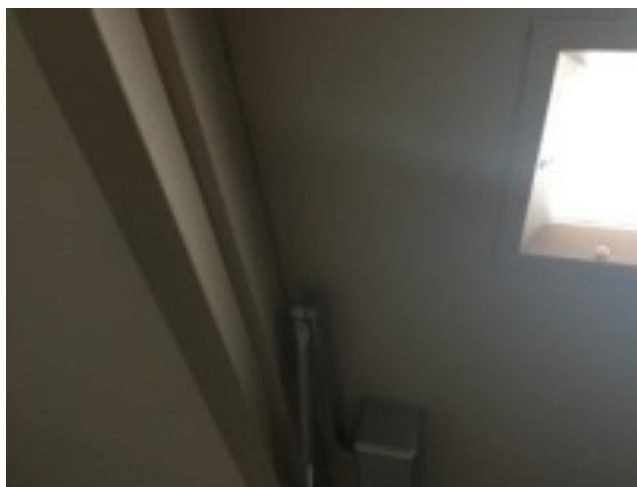
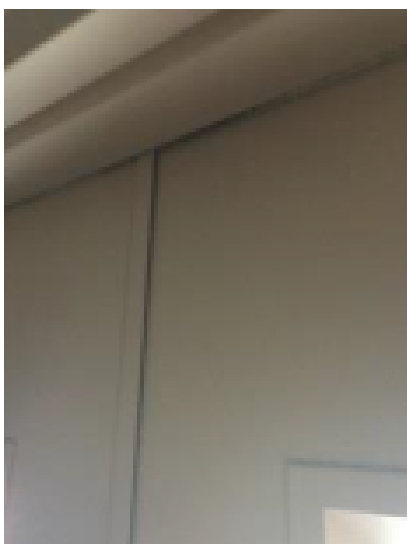
Existing Conditions:

Infiltration of unconditioned air and exfiltration of condition air will lead to higher energy costs. The Water Treatment Plant has not performed a building envelope analysis or envelope modifications.

Proposed ECM:

ABM proposes to weather-strip and seal openings in the building to help reduce or eliminate infiltration and exfiltration of air.

- Weather-strip and seal five, first floor, exterior doors.
- Weather-strip and seal one, second floor, exterior door.
- Seal roof and wall joints with two-part foam. Approximately 325 feet.



Fire Station #2



Estimated Fire Station #2 Energy

Current Costs	\$ 7,638
Current \$/SF	\$ 0.67
Post- ABM Costs	\$ 4,021
Post - ABM \$/SF	\$ 0.36

ECM Number: ECM-3

ECM Title: Controls

Existing Conditions:

The HVAC controls at Fire Station #2 are comprised of three conventional type thermostats. One thermostat for each system. There is currently no night set back or occupancy scheduling programmed for the equipment. All of the existing thermostat control is performed at the device by anyone who may have access.

Proposed ECM:

ABM proposes to replace the existing thermostats with new, Web based thermostats. These new thermostats will have the capability for remote monitoring. This can be accomplished by any smart device. Another feature of these thermostats is they will also allow for remote scheduling and temperature set point adjustment. These thermostats will have the following features:

- Occupancy / Vacancy scheduling
- Night set back program
- Remote temperature adjustments

ABM will provide and install communicating thermostats on all three units with network connection.



Sample of a Web based thermostat

ECM Number: ECM-4

ECM Title: HVAC Upgrades

Existing Conditions:

The HVAC systems at Fire Station #2 are comprised two small systems and one larger system that serve the entire facility. The two small systems are 8 years and are in good condition. The third system is 19 years old and in poor condition. These systems are currently operating with R-22 refrigerant that is not environmentally friendly and is becoming obsolete.

Proposed ECM:

ABM proposes to replace the one larger system with a new system of equal capacity. The two small smaller systems will not be replaced. ABM proposes to install a Global Plasma Solutions device that will allow for the reduction in outside air on all three systems. A performance evaluation and functional testing will be performed on all equipment.

Our proposed scope of work will include:

- Shut power off and provide appropriate lock-out tag-out requirements for one 15 ton split system.
- Reclaim R-22 from split system.
- Disconnect and remove the 15 ton system.
- Provide crane service to remove the old condensing unit and to set the new condensing unit.
- Provide and install one new 15 ton split system.
- Reconnect all refrigerant piping.
- Provide and install the necessary duct transitions.
- Reconnect electrical service.
- Evacuate and charge systems with refrigerant.
- Provide and install a Global Plasma Solutions device on three systems.

- Perform a complete start-up and check out of all new systems.
- Perform a preventive maintenance and functional testing of the remaining 2 systems.



One of the existing thermostat:

The unit that is scheduled for replacement



ECM Number: ECM-5

ECM Title: Lighting Upgrades (LED) and Occupancy Sensors

Existing Conditions:

The lighting at Fire Station #2 is a combination of fluorescent tubes, wall packs and compact fluorescent lamps.

Proposed ECM:

The new lighting for Fire Station #2 will be a complete LED retrofit. All fluorescent tubes, wall packs and compact fluorescent lamps will be changed to new LED lamps.

Our proposed scope is listed in the table below and will include:

- Fluorescent tubes, wall packs and compact fluorescent replaced with LED.
- Occupancy controls have also been proposed where appropriate. These controls will keep lighting turned off in unoccupied areas saving significant additional usage costs over and above the savings due to the fixture replacement or retrofit.

Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Fire Station #2	Area	Front door	4380	1	INCAND-INC:75W:PAR38-2	Flood-Spot-No Lens-Surface	Replace	Cree - XSPW_A_0_3_M_C_U_Z_P - 42W	1
Fire Station #2	Area	Flagpole	4380	2	CFL:SCREW-CFL23W:PAR38:MEDIUM-1	Flood-Clear-recessed	Replace	Cree - FLD-EDG-40-YM-04-E-UL-BZ-525-70W (19267) (679)	2
Fire Station #2	Area	Back door	4380	1	INCAND-INC:75W:PAR38-2	Flood-Spot-No Lens-Wall	Replace	Cree - XSPW_A_0_3_M_C_U_Z_P - 42W	1
Fire Station #2	Area	Back door	4380	1	INCAND-INC:60W:A-1	Jelly Jar-Frosted-Clear-Wall	Relamp	American Lighting - 7WA19LED - 7W	1
Fire Station #2	Area	Dispatch	3120	4	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	4
Fire Station #2	Area	Sleep	1456	1	LF:T12-F34T12/ES-MAG-2	Troffer-1X4-Prismatic-Recessed	Replace	Cree - ZR14-40L-40K-CMA-CM-CWC-1-35W (19283) (679)	1
Fire Station #2	Area	Men	5096	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-1X4-Prismatic-Recessed	Replace	Cree - ZR14-40L-40K-CMA-CM-CWC-1-35W (19283) (679)	1
Fire Station #2	Area	Women	5096	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-1X4-Prismatic-Recessed	Replace	Cree - ZR14-40L-40K-CMA-CM-CWC-1-35W (19283) (679)	1
Fire Station #2	Area	Women	5096	1	INCAND-INC:60W:A-2	Vanity-Spot-No Lens-Wall	Relamp	American Lighting - 7WA19LED - 7W	1
Fire Station #2	Area	Hall	3120	3	CFL:PIN-CF26W:QUAD:2PIN-CFL/PREHEAT:MAGNETIC-1	6-in Can-No Lens-Recessed	Replace	CREE CR6-625-35K-12-GU24	3
Fire Station #2	Area	Classroom	3120	6	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	6

Location	Area	Room	Burn	Qty	Current	KitAttributes	Action	Proposed	Qty
Fire Station #2	Area	Dayroom	4344	8	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	8
Fire Station #2	Area	Medical closet	1456	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-1X4-Prismatic-Recessed	Replace	Cree - ZR14-40L-40K-CMA-CM-CWC-1-35W (19283) (679)	1
Fire Station #2	Area	Dayroom hall	3120	6	CFL:PIN-CF26W:QUAD:2PIN-CFL/PREHEAT:MAGNETIC-1	6-in Can-No Lens-Recessed	Replace	CREE CR6-625-35K-12-GU24	6
Fire Station #2	Area	Above stove	1456	1	INCAND-INC:60W:A-1	Jelly Jar-Frosted-Clear-Wall	Relamp	American Lighting - 7WA19LED - 7W	1
Fire Station #2	Area	Office	3120	1	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	1
Fire Station #2	Area	Office	3120	1	CFL:SCREW-CFL13W:TWIST:MEDIUM-EB-1	Drum-Frosted-ceiling	Relamp	Sylvania - LED7A19/DIM/0/827/G3 - 7W	1
Fire Station #2	Area	Sleep	1456	2	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Fire Station #2	Area	Uniform storage	1456	1	LF:T12-F34T12/ES-MAG-2	Industrial Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Fire Station #2	Area	Women	5096	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-1X4-Prismatic-Recessed	Replace	Cree - ZR14-40L-40K-CMA-CM-CWC-1-35W (19283) (679)	1
Fire Station #2	Area	Women	5096	1	CFL:SCREW-CFL13W:TWIST:MEDIUM-EB-1	Drum-Frosted-ceiling	Relamp	Sylvania - LED7A19/DIM/0/827/G3 - 7W	1
Fire Station #2	Area	Janitors	1456	1	CFL:SCREW-CFL13W:TWIST:MEDIUM-EB-1	Drum-Frosted-ceiling	Relamp	Sylvania - LED7A19/DIM/0/827/G3 - 7W	1
Fire Station #2	Area	Weight room	3120	4	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	4
Fire Station #2	Area	Weight room	3120	2	CFL:PIN-CF26W:QUAD:2PIN-CFL/PREHEAT:MAGNETIC-1	6-in Can-No Lens-Recessed	Replace	CREE CR6-625-35K-12-GU24	2
Fire Station #2	Area	Restrooms	5096	4	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-1X4-Prismatic-Recessed	Replace	Cree - ZR14-40L-40K-CMA-CM-CWC-1-35W (19283) (679)	4
Fire Station #2	Area	Restrooms	5096	1	INCAND-INC:60W:A-2	Vanity-Spot-No Lens-Wall	Relamp	American Lighting - 7WA19LED - 7W	1
Fire Station #2	Area	Sleep	1456	3	INCAND-INC:60W:A-2	Flood-Spot-No Lens-Wall	Relamp	American Lighting - 7WA19LED - 7W	3
Fire Station #2	Area	Bay hall	3120	2	LF:T8-F32T8-ELEC:STD/LOW:BF-4	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Fire Station #2	Area	Electric	1456	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Industrial Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Fire Station #2	Area	Air handler	1456	1	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Industrial Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	1
Fire Station #2	Area	Air station	1456	2	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2
Fire Station #2	Area	Work area	3120	2	LF:T12-F34T12/ES-MAG-2	Industrial Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	2
Fire Station #2	Area	Storage	1456	6	LF:T12-F34T12/ES-MAG-2	Industrial Strip-4 foot-No Lens-Surface	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	6
Fire Station #2	Area	Hose tower	1456	3	LF:T12-F34T12/ES-MAG-2	Vapor Tight-4 foot-Clear-Wall	Relamp	LUXUL-(2L)Q2LUX/4ft/40K/FROST ED-34W	3
Fire Station #2	Area	Truck bay	3120	12	LF:T12-F96T12/HO-MAG-2	Vapor Tight-8 foot-Clear-Surface	Replace	Cree - WS4/-47L/40K/10V/FD/50W (19211) (679)	12
Fire Station #2	Area	Room	3120	2	CFL:PIN-CF26W:QUAD:2PIN-CFL/PREHEAT:MAGNETIC-1	6-in Can-No Lens-Recessed	Replace	CREE CR6-625-35K-12-GU24	2
Fire Station #2	Area	Gear	1456	2	LF:T8-F32T8-ELEC:STD/LOW:BF-2	Troffer-2X4-Prismatic-Recessed	Replace	Cree - ZR24-40L-40K-CMA-CMC-WC1-35W (19285) (679)	2

ECM Number: ECM-6

ECM Title: Building Envelope

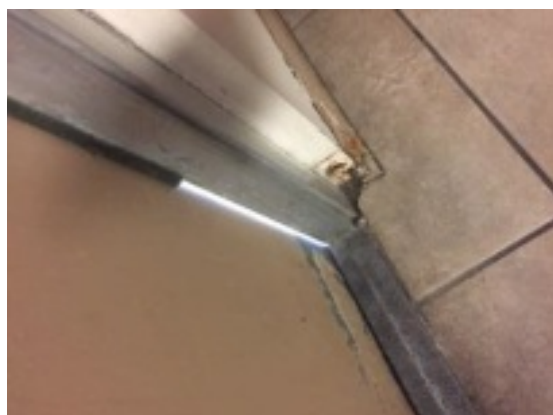
Existing Conditions:

Infiltration of unconditioned air and exfiltration of condition air will lead to higher energy costs. The Water Treatment Plant has not performed a building envelope analysis or envelope modifications.

Proposed ECM:

ABM proposes to weather-strip and seal openings in the building to help reduce or eliminate infiltration and exfiltration of air.

- Weather-strip and seal ten, first floor, exterior doors.
- Seal roof and wall joints with two-part foam. Approximately 200 feet.



Commercial Water Meters

The City of Temple Terrace has implemented a city wide water meter replacement initiative, converting to modern radio read technology. Numerous residential and commercial meter have already been replaced. The city has requested an evaluation of the replacement of the remaining commercial meters. Many of the commercial meters have not been replaced due to the complexity and the resources required to complete, while maintaining current water utility operations. While the residential meters can be swapped out seamlessly by city employees in crews of two, the commercial meters could require larger crews and require more work than a simple swap of the meter. Listed below is our proposed scope for this initiative:

- This scope was created using city provided information, a partial survey and estimates from this information. This scope covers the quantities and types listed below.
- Unless otherwise defined below, the meters will be replaced like for like. Installation of gate valves, bypasses, or vault modifications is not included but can be provided at an additional cost.
- After meter installation, warranty coverage will be within 2' of the meter either upstream or downstream. Any leaks or repairs needed after installation in this 2' zone will be repaired at no additional charge. Any leaks or repairs needed outside of this 2' zone will be the responsibility of the city.

Commercial meters to be replaced:

- 2" Neptune Compound Meter with R900i Registers (includes pipe mods) Qty of 7
- 3" Neptune Compound Meter with R900i Registers Qty of 1
- 3" Neptune Compound Meter with R900i Registers Qty of 4
- 6" Neptune Fire Service Compound Meter with R900i Registers Qty of 16
- 8" Neptune Fire Service Compound Meter with R900i Registers Qty of 4

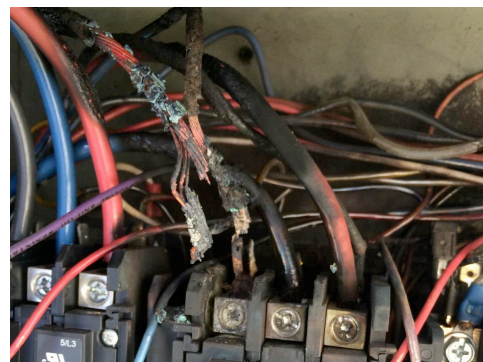
Water Meters to be Replaced

Master meter	Address	Meter size	SOW
Rudco properties / sweetbay	8775 Temple Terrace	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
Central park	7500 Central park	6x3 3 inch	6" Neptune HP Protectus III SS Fire Service Meter
Riverchase I LLC	6445 W riverchase	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
Riverchase II LLC	6901 TT hwy	3 inch	3" Neptune TruFlo Compound Meter & 3" Strainer
Riverchase III LLC	6901 TT hwy	8 x4 inch	8" Neptune HP Protectus III SS Fire Service Meter
Brentwood apt's	8741 Grove	3 inch	3" Neptune TruFlo Compound Meter & 3" Strainer
milan properties	9385 N 56th	3 inch	3" Neptune TruFlo Compound Meter & 3" Strainer
The Falls	13400 Abror lane	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
Winn dixie complex	9501 Fowler	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
Doral oaks	105 Sunnyside dr.	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
lamplighter	8415 E fowler	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
Laurel oaks apts	8781 orange leaf	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
Cameo Broadwalk apts /	8800 boradwalk trail	8x4 inch	8" Neptune HP Protectus III SS Fire Service Meter
Fishermans landing	11700 fishermans point	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
Meadowood condo's	7922 Citrus	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter

Terrace trace apt's	91350 Talina Lane	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
Victoria Terrace	11407 56th	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
Terrace oaks / counsils way	10320 counsils way	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
Fishermans landing	11700 fishermans point	6x3 inch	Duplicate Account; Only 1 Meter Found Here
Village oaks	8425 Montarvail	8x4 inch	8" Neptune HP Protectus III SS Fire Service Meter
The Preserves	13301 sanctuary cove	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
Verizon Building	7701 telecom drive	8x4 inch	8" Neptune HP Protectus III SS Fire Service Meter
Hillsbrough county MM	301 & Jefferson	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
Holiday inn express	Telecom dr.	3 inch turb	3" Neptune TruFlo Compound Meter & 3" Strainer
intellacenter	Telecom dr.	3 x5/8 inch	3" Neptune TruFlo Compound Meter
Tampa oaks II	8410 tampa oaks	8x4	Detector Check Found Here; Do Not Do
University east shopping	9504 fowler	6x3 inch	6" Neptune HP Protectus III SS Fire Service Meter
osprey - Tampa oaks I	12802 Tampa oaks blvd	2 inch	2" Neptune TruFlo Compound Meter
Terrace club aprtments / HH	7402 Heritage Hills dr.	2 inch	2" Neptune TruFlo Compound Meter
Country acre's apt's	100400 Davis rd.	2 inch	2" Neptune TruFlo Compound Meter
El malke Apt,s	11301 n 53rd st	2 inch	2" Neptune TruFlo Compound Meter
LSC investors /terrace vilage	10906 N 56th st.	2 inch	2" Neptune TruFlo Compound Meter
the Gables - MCNA	10902 n 53rd st	2 inch	2" Neptune TruFlo Compound Meter
Topical Apartments	old temple terrace hwy	2 inch	2" Neptune TruFlo Compound Meter

Ongoing Professional Support and Training

Numerous failures of existing equipment can be attributed to lack of maintenance, including burn wires, contactor failures, refrigerant leaks and even some compressor failures. By implementing a proactive preventive maintenance program, the city will ensure the projected annual energy savings and protect the integrity of the assets installed. According to the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), the number one way for a facility to sustain energy savings is through a structured maintenance program.



ABM has customized a Guaranteed Professional Maintenance program that will provide for ongoing HVAC support services, which have been funded from the savings.

As part of the project, we will create operating and maintenance manuals that include warranty information, submittals, parts lists, recommended service intervals, etc. It is our recommendation to have ABM take over full service/responsibility for the installed HVAC systems and manage this for Temple Terrace.

A preventive maintenance program is vital in minimizing energy consumption and a major factor in overall life-cycle cost of the mechanical systems in the city's infrastructure. It is critical that the maintenance work be performed on a fixed schedule and should reflect unique characteristics of the buildings as well as accommodate future changes to a facility. This important and key component of accountability within



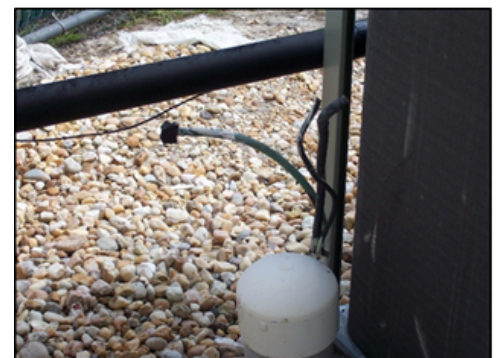
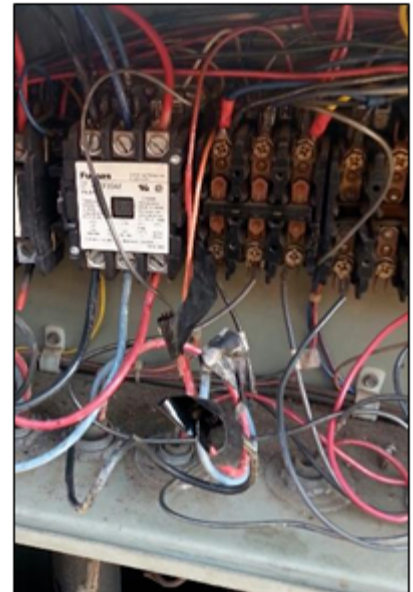
ABM's energy savings performance contracting program is the development of a co-authored, long-term maintenance and training action plan, based upon the type of maintenance currently being performed, the tools that are being utilized, and the city of

Temple Terrace maintenance goals. A good maintenance program assures equipment will last longer, operate properly, and use less energy.

ABM requires all HVAC systems to be properly maintained at a specified level. When effective maintenance is not incorporated into the program and into facility operations, anticipated savings and maximum equipment life are not likely to be sustained.

ABM fully understands the vital role ongoing support and training has in achieving energy savings, and also its relationship to meeting the requirements of a building and its comfort systems. We additionally recognize that training can easily be the forgotten energy savings measure. Experience has shown us that the manner in which the energy systems are operated can cause up to a 20% variation in the energy usage. That is why it is so critical that Temple Terrace's staff understand the operating procedures for the new equipment and their role in maintaining savings. Consequently, ABM will involve your facility staff members over the course of the program, gathering their input through the study, design and construction phases to ensure that they are both knowledgeable and committed to the success of the energy savings performance contracting program.

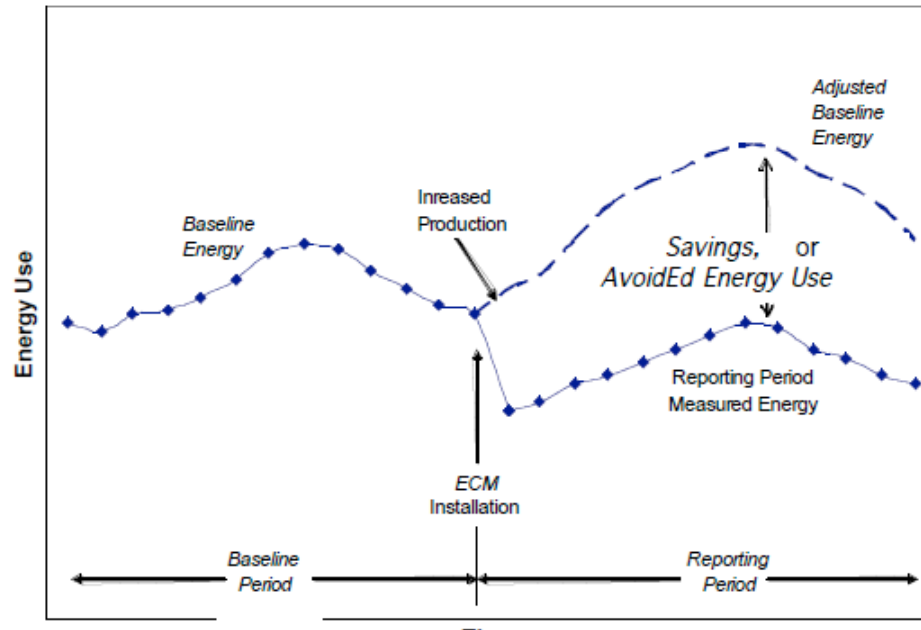
We intend to team with the city of Temple Terrace staff to ensure that maximum savings and equipment lifespans are achieved. Our training will include a structured program on each technology installed.



Measurement and Verification

Measurement & Verification Options

The below diagram showcases the concept behind the measurement & verification procedure (i.e.-demonstrate the savings to SCPS).



M&V approaches are divided into two general types: retrofit isolation and whole-facility. Retrofit isolation methods look only at the affected equipment or system independent of the rest of the facility; whole-facility methods consider the total energy use and de-emphasize specific equipment performance. There are four options for verification of savings:

- Option A - Retrofit Isolation – Key parameter is measured for short term and other parameters are estimated.
- Option B - Retrofit Isolation – All parameters are measured for short term or continuously.
- Option C – Whole Facility - Savings are determined by measuring energy use at the whole facility or sub-facility level. Typically continuous measurement is required for twelve months.
- Option D - Calibrated Simulation - Savings are determined through simulation of the energy use of the whole facility, or of a sub-facility.

One primary difference in these approaches is where the boundary of the energy conservation measure is drawn. All energy used within the boundary must be considered. Options A and B are retrofit isolation methods; Option C is a whole-facility method; Option D can be used as either, but is usually applied as a whole-facility method.

The choice of an option has the following considerations:

- Boundary of impact – specific device consumption or whole facility/ sub facility
- Saving Potential Vs Investment in M&V
- Operating Cycle – constant change or periodic variation in savings
- Adjustments can be simple (Retrofit Isolation) or complex (whole facility)

Based on Operational Energy Conservation Measures identified and considerations stated above, the most efficient and applicable option(s) will be chosen from the above. The following is a brief overview of the measurement and verification methodologies applicable to the improvement measures. ABM shall apply these methodologies, as more fully detailed in the guidelines and standards of the International Measurement and Verification Protocol (IPMVP) and/or the Federal Energy Management Program (FEMP)

OPTION A – RETROFIT ISOLATION WITH KEY PARAMETER MEASUREMENT

M&V Option A involves a retrofit or system level M&V assessment. The approach is intended for retrofits where key performance factors (e.g., end-use capacity, demand, power) or operational factors (e.g., lighting operational hours, cooling ton-hours) can be spot- or short-term-measured during the baseline and post-installation periods. Any factor not measured is estimated based on assumptions, analysis of historical data, or manufacturer's data.

All end-use technologies can be verified using Option A. However, the accuracy of this option is generally inversely proportional to the complexity of the measure. Thus, the savings from a simple lighting retrofit will typically be more accurately estimated with Option A than the savings from a more complicated chiller retrofit.

Properly applied, an Option A approach:

- Ensures that baseline conditions have been properly defined



- Confirms that the proper equipment/systems were installed and that they have the potential to generate predicted savings
- Verifies that the installed equipment/systems continue to have the capacity to yield the predicted savings during the term of the Agreement

Option A can be applied when identifying that the potential to generate savings is the most critical M&V issue, including situations where:

- The magnitude of savings is low for the entire project or a portion of the project to which Option A is applied.
- The risk of not achieving savings is low.
- The independent variables that drive energy use are not difficult or expensive to measure, and are not expected to change.
- Interactive effects can be reasonably estimated or ignored
- Long-term measurements are not warranted
- The agency is willing to accept some uncertainty

OPTION B – RETROFIT ISOLATION WITH ALL PARAMETER MEASUREMENT

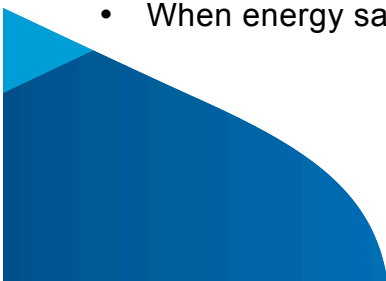
M&V Option B is a retrofit isolation or system-level approach. The approach is intended for retrofits with performance factors (e.g., end-use capacity, demand, power) and operational factors (lighting operational hours, cooling ton-hours) that can be measured at the component or system level and where long-term performance needs to be verified. It is similar to Option A, but uses periodic or continuous metering of all energy quantities, or all parameters needed to calculate energy, during the performance period. This approach provides the greatest accuracy in the calculation of savings, but increases the performance-period M&V cost.

The Option B approach ensures the same items as Option A, but also:

- Determines energy savings using periodic or continuous measurement of energy use or all parameters needed to calculate energy use during the term of the Agreement.

Option B is typically used when any or all of these conditions apply:

- When energy savings values per individual measure are desired



- When interactive effects can be estimated using methods that do not involve long-term measurements
- When the independent variables that affect energy use are not complex and excessively difficult or expensive to monitor
- When operational data on the equipment is available through control systems
- When sub-meters already exist that record the energy use of subsystems under consideration (e.g., a separate sub-meter for heating ventilation and air-conditioning (HVAC) systems)

ABM will use the listed M&V protocols per ECM as shown in the table below.

ECM	M&V Option
Lighting Upgrades	A
Energy Management System Improvements	B
VFD on AHU Fans and Pool Pumps	B
HVAC Equipment Upgrades	B
Building Envelope & Window Upgrades	A

Financial Summary

As part of the audit process, we have reviewed current utility spending, repair and maintenance costs, the capital plan and its five year impact, plus the mounting deferred maintenance liability facing the city.

Additional financial information contained in this section, including construction costs, cash flow analysis and savings projections have been developed in a collaborative effort with the City of Temple Terrace. All financial figures have been reviewed and accepted by the city staff with the oversight of the City Manager.

Program Costs

The costs associated with the recommended program are broken down into two components, project (construction) costs and annual performance services. As previously described, the performance services are a required component to maintain the Savings Guarantee that will be provided with the program.

Construction Costs

The total cost of all items recommended in the project component is \$3,604,114:

ECM	Facility	Description of Deliverable	
5	City Hall, Family Recreation Complex, Library, Lightfoot, Public Works, Water Treatment Plant, Fire Station #1, Fire Station #2	Installation of Lighting and Lighting Controls Upgrades	\$963,456
3,4,17	City Hall, Family Recreation Complex, Library, Lightfoot, Public Works, Water Treatment Plant, Fire Station #1, Fire Station #2	HVAC Equipment, Controls, Commissioning and Hand Dryers (City Hall, Library, Lightfoot and Public Works)	\$1,337,213
6	City Hall, Family Recreation Complex, Library, Lightfoot, Public Works, Water Treatment Plant, Fire Station #1, Fire Station #2	Building Envelope and Window Installation	\$645,858
8	Family Recreation Complex	Sand Pool Filter and Pump Modifications	\$120,175
20	Water Treatment Plant	Lightning Suppression	\$20,177
		Commercial Water Meters	\$517,235
		Total	\$3,604,114

The project consists of items that would be paid for out of 2 different funds (Enterprise Fund and General Fund). The cost breakdown per fund is as follows:

- General Fund \$ 2,657,052
- Enterprise Fund \$ 947,062

Performance Services Costs

Annual Performance Services consists of two components, the Measurement and Verification and the Guaranteed HVAC Preventative Maintenance, Training and Repair. The total first year cost of all performance services is \$ 98,197. The program designed by ABM includes the Guaranteed HVAC Preventative Maintenance and Repair Service for the first 5 years and the M&V for the full 15 years.

Year	Measurement and Verification	HVAC Maintenance & Repair	Total
1	\$19,580	\$78,617	\$98,197
2	\$20,167	\$81,828	\$101,995
3	\$20,772	\$84,283	\$105,055
4	\$21,395	\$86,812	\$108,207
5	\$22,037	\$89,416	\$111,453
6	\$22,698		\$22,698
7	\$23,379		\$23,379
8	\$24,081		\$24,081
9	\$24,803		\$24,803
10	\$25,547		\$25,547
11	\$26,314		\$26,314
12	\$27,103		\$27,103
13	\$27,916		\$27,916
14	\$28,754		\$28,754
15	\$29,616		\$29,616

Funding Sources

ABM has identified four independent funding sources that can be incorporated into an Energy Savings Performance Contract that will meet F.S. 489.145 Guidelines: Energy Savings, Operation and Maintenance Savings, Revenue Enhancements and Identified Capital Savings. The table below includes the F.S. 489.145 compliant savings of the recommended upgrades.

Year	Energy, Water or Wastewater Savings (Escalated at 3%)	Operation and Maintenance Savings (Escalated at 3%)	Identified Capital Savings	Revenue Enhancements	Total Annual Savings
0	\$ 19,580	\$ 25,097	\$ -	\$ 61,421	\$ 106,098
1	\$ 97,899	\$ 100,387	\$ 157,464	\$ 175,488	\$ 531,238
2	\$ 100,836	\$ 103,399	\$ 157,464	\$ 175,488	\$ 537,187
3	\$ 103,861	\$ 106,501	\$ 157,464	\$ 175,488	\$ 543,314
4	\$ 106,977	\$ 109,696	\$ 157,464	\$ 175,488	\$ 549,625
5	\$ 110,186	\$ 112,986	\$ 157,464	\$ 175,488	\$ 556,125
6	\$ 113,492	\$ 116,376	\$ 157,464	\$ 175,488	\$ 562,820
7	\$ 116,897	\$ 119,867	\$ 157,464	\$ 175,488	\$ 569,716
8	\$ 120,403	\$ 123,463	\$ 157,464	\$ 175,488	\$ 576,819
9	\$ 124,016	\$ 127,167	\$ 157,464	\$ 175,488	\$ 584,135
10	\$ 127,736	\$ 130,982	\$ 157,464	\$ 175,488	\$ 591,671
11	\$ 131,568	\$ 134,912	\$ -	\$ 175,488	\$ 441,968
12	\$ 135,515	\$ 138,959	\$ -	\$ 175,488	\$ 449,963
13	\$ 139,581	\$ 143,128	\$ -	\$ 175,488	\$ 458,197
14	\$ 143,768	\$ 147,422	\$ -	\$ 175,488	\$ 466,678
15	\$ 148,081	\$ 151,844	\$ -	\$ 175,488	\$ 475,414

Total	\$ 1,840,395	\$ 1,892,186	\$ 1,574,638	\$ 2,693,748	\$ 8,000,967
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*Identified Capital Savings of \$1,574,638 has been averaged over first 10 years

Energy Savings

The First Year Energy Savings of \$97,899 is achieved with the incorporation of all upgrades recommended with this program and will be measured and verified according to the agreed upon Measurement and Verification (M&V) Plan.

Facility	Energy Savings
City Hall	\$ 4,115
Family Recreation Complex	\$ 46,024
Library	\$ 19,638
Lightfoot	\$ 2,291
Public Works	\$ 10,763
Water Treatment Plant	\$ 7,923
Fire Station #1	\$ 3,638
Fire Station #2	\$ 3,507
Total	\$ 97,899

Operation and Maintenance Savings

The First Year Operation and Maintenance Savings of \$100,387 is achieved with the incorporation of all upgrades recommended with this program. This use of Stipulated Savings has been agreed upon with City Staff for inclusion into the program.

Savings Item	Cost Savings
Pool Water	\$ 1,105
Pool Labor	\$ 660
Lighting Labor/Bulbs	\$ 13,822
City Hall Window Water Damage	\$ 2,000
Paper Towels	\$ 300
HVAC Repair / Maintenance	\$ 80,000
City Hall Door Repairs	\$ 2,500
Total	\$ 100,387

Revenue Enhancements

The Revenue Enhancements from the installation of Commercial Water Meters are estimated to be \$175,488 in the First Year. There should also be a measurable reduction in city employee labor hours which is not being captured or used as savings in this program. The Revenue Enhancement analysis has been performed based on the customers and consumption listed in the table below.

Information on Consumption History Report				Calculated
Customer ID	Customer Name	Customer Address	Total Consumption	Total Price
134285	Terrace Walk Plaza	5701 E Fowler Ave	1,845	\$ 22,749
182145	Central Park Apts	7500 Central Park Cir	6,326	\$ 78,000
158805	Normandy Park Apts	11110 N 56th Street (bldg 9)	3,082	\$ 38,001
159265	CNL KOR Riverchase LLC	6445 W Riverchase Dr	10,351	\$ 127,628
159265	CNL KOR Riverchase LLC	6901 Temple Terrace Hwy	8,744	\$ 107,814
191765	Cedar Cove Apt	8741 Grove Ter	1,853	\$ 22,847
189415	Temple Terrace Holdings	9385 N 56th St	132	\$ 1,628
151215	The Falls	13400 Arbor Isle Dr	13,462	\$ 165,986
188615	RMC UE LLC	9501 E Fowler Ave	2,863	\$ 35,301
183065	JMJ Doral Oaks LLC	105 Sunnyside Rd	13,925	\$ 171,695
199915	Lamplighter MHC LLC	8415 E Fowler Ave	24,521	\$ 302,344
203705	LSREF3 Bravo	8781 Orange Leaf Ct	1,885	\$ 23,242
106975	Cameo Development Corp	8800 Boardwalk Trail Dr	11,622	\$ 143,299
173445	Daejan Fisherman Landing	11700 Morris Bridge Rd	4,589	\$ 56,582
60415	Meadowood Condo	7806 Lemonwood Ct	22,877	\$ 282,073
60605	Terrace Trace Apts	9135 Talina Ln	2,085	\$ 25,708
47515	Victoria Terrace Apts	5720 Bratton Dr	12,595	\$ 155,296
61215	Terrace Oake Homeowners	10320 Councils Way	2,478	\$ 30,554
166985	Mid America Apts L.P.	8425 Montravail Cir	5,366	\$ 66,163
50315	Verizon Data Svcs	7701 E Telecom Pkwy	22,441	\$ 276,698
56505	Florida College	119 Glen Arven Ave Halls	4,198	\$ 51,761
167735	Koll Development	12653 Telecom Dr	1,085	\$ 13,378
26745	TT Elementary	124 Flotto Ave	1,081	\$ 13,329
98025	Hillsborough Co B/O/C/C	Jefferson at Hwy 301	3,191	\$ 39,345
178505	Holiday Inn Express	13294 Telecom Dr.	1,805	\$ 22,249
164575	Opus Real Estate	12906 Tampa Oaks Blvd	438	\$ 5,401
180065	Point Plaza Partners	8701 Temple Terrace Hwy	466	\$ 5,746
Total			185,306	\$ 2,279,071

The new revenue has been calculated based on benchmark results (92.3% accuracy) of another Florida city that replaced similar meters. The improved accuracy is expected to provide the 7.7% Revenue Enhancement tabulated below.

New Water Revenue Calculation	Established Baseline	Percent Gain	Expected Increase
Total Revenues	\$ 2,279,071	7.7%	\$ 175,488

Identified Capital Savings

The 5 Year CIP included in the 2016 City Budget was used to establish the Identified Capital Savings. It is of critical importance to note that these are NOT costs associated with delivering the project. These are costs the City would avoid by implementing the program presented in this document. The CIP costs are budgetary values for replacing facilities components in a like for like manner and do not include the cost savings benefits provided by ABM with this program. The CIP Budget also does not necessarily include costs associated with engineering or procurement of these items.

Description	Cost of Five-Year Program	2016	2017	2018	2019	2020
City Hall Improvements	\$514,800		\$514,800			
Fire Station #1	\$23,979		\$23,979			
Fire Station #2	\$12,417		\$12,417			
Library	\$80,850	\$80,850				
Public Works	\$28,339			\$28,339		
Water Treatment Plant	\$11,481			\$11,481		
Parks & Rec	\$31,784					\$31,784
Lightfoot Center	\$25,238				\$25,238	
HVAC Unit 1 Refurbishment	\$55,000	\$55,000				
HVAC Unit 2 Refurbishment	\$55,000	\$55,000				
HVAC Unit 3 Refurbishment	\$25,000	\$25,000				
HVAC Unit 4 Refurbishment	\$25,000	\$25,000				
HVAC Unit Replacement Gym 1	\$120,000	\$120,000				
HVAC Unit Replacement Gym 3	\$120,000	\$120,000				
HVAC Unit Replacement Lobby	\$120,000	\$120,000				
HVAC Unit Replacement Adm. Offices	\$8,000	\$8,000				
HVAC Unit 2 Replacement Lightfoot	\$25,000			\$25,000		
HVAC Unit 4 Replacement Lightfoot	\$25,000			\$25,000		
HVAC Unit 5 Replacement Lightfoot	\$25,000			\$25,000		
3 Ton Air Conditioner Replacement FS#1	\$9,000	\$9,000				
15 Ton Air Conditioner Replacement FS#2	\$45,000	\$45,000				
2.5 Ton Air Conditioner Replacement FS#1	\$7,500	\$7,500				
Outside Air Exchange Unit PW	\$20,000	\$20,000				
Outside Air Exchange Unit - City Hall	\$30,000	\$30,000				
Main Pool Sand Filter Conversion	\$100,000	\$100,000				
Whiteway HVAC Replacement	\$31,250	\$31,250				
Total	\$1,574,638	\$851,600	\$551,196	\$114,820	\$ 25,238	\$ 31,784

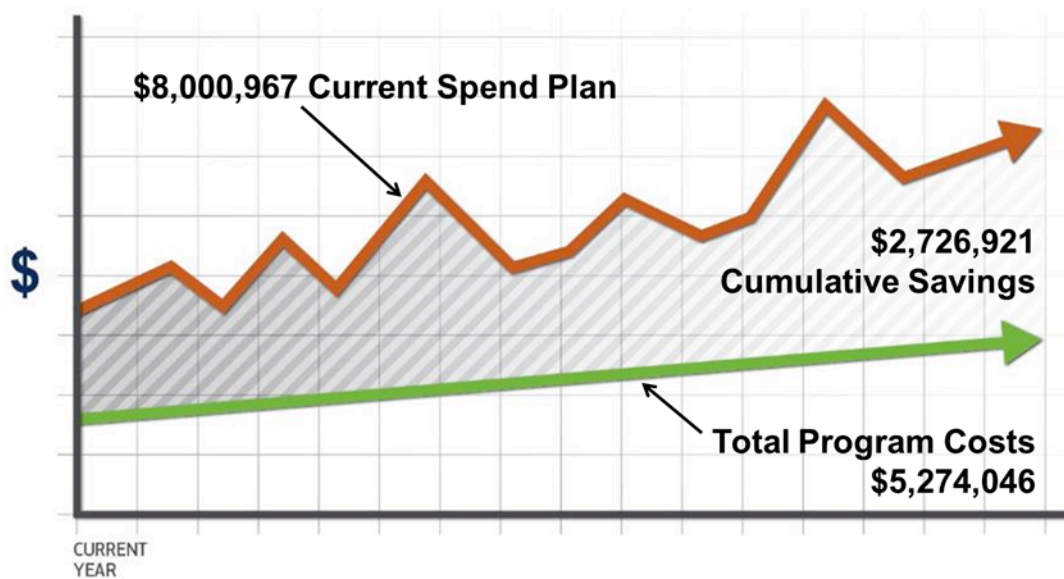
The program can be modeled to use the identified capital savings in many ways. During discussions with the city staff, it was agreed upon to use the average savings across 10 years (\$157,464 / year).

Cash Flow Analysis

At the request of the customer, ABM has developed the two different cash flow models below, one with financing the Construction Costs and the other with the entire project paid for without financing as a cash purchase.

Financed Solution

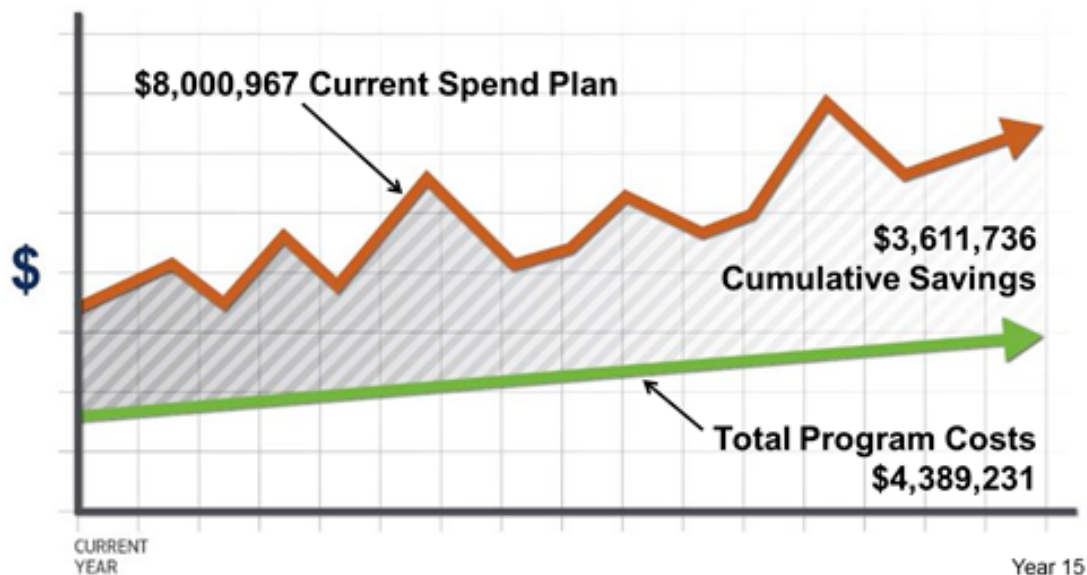
Using the values previously described in this section, the following table and illustration outlines the cash flow of a financed solution, with construction costs (\$3,604,114) paid with loan (using 3% interest).



Term Year	Funding Sources						Program Costs			Program Annual Cash Flow
	Energy Reallocation	Maintenance Savings	CIP Savings	Revenue Generation	Total Funding Production	Used For Payment	Debt Service	Performance Services	Annual Program Costs	
0	\$ 19,580	\$ 25,097	\$ -	\$ 61,421	\$ 106,098	\$ 106,098		\$ -	\$ -	\$ 106,098
1	\$ 97,899	\$ 100,387	\$ 157,464	\$ 175,488	\$ 531,238	\$ 531,238	\$ 299,262	\$ 98,197	\$ 397,459	\$ 133,780
2	\$ 100,836	\$ 103,399	\$ 157,464	\$ 175,488	\$ 537,187	\$ 537,187	\$ 299,262	\$ 101,995	\$ 401,257	\$ 135,930
3	\$ 103,861	\$ 106,501	\$ 157,464	\$ 175,488	\$ 543,314	\$ 543,314	\$ 299,262	\$ 105,055	\$ 404,317	\$ 138,997
4	\$ 106,977	\$ 109,696	\$ 157,464	\$ 175,488	\$ 549,625	\$ 549,625	\$ 299,262	\$ 108,207	\$ 407,468	\$ 142,156
5	\$ 110,186	\$ 112,986	\$ 157,464	\$ 175,488	\$ 556,125	\$ 556,125	\$ 299,262	\$ 111,453	\$ 410,715	\$ 145,410
6	\$ 113,492	\$ 116,376	\$ 157,464	\$ 175,488	\$ 562,820	\$ 562,820	\$ 299,262	\$ 22,698	\$ 321,960	\$ 240,860
7	\$ 116,897	\$ 119,867	\$ 157,464	\$ 175,488	\$ 569,716	\$ 569,716	\$ 299,262	\$ 23,379	\$ 322,641	\$ 247,075
8	\$ 120,403	\$ 123,463	\$ 157,464	\$ 175,488	\$ 576,819	\$ 576,819	\$ 299,262	\$ 24,081	\$ 323,343	\$ 253,476
9	\$ 124,016	\$ 127,167	\$ 157,464	\$ 175,488	\$ 584,135	\$ 584,135	\$ 299,262	\$ 24,803	\$ 324,065	\$ 260,070
10	\$ 127,736	\$ 130,982	\$ 157,464	\$ 175,488	\$ 591,671	\$ 591,671	\$ 299,262	\$ 25,547	\$ 324,809	\$ 266,861
11	\$ 131,568	\$ 134,912	\$ -	\$ 175,488	\$ 441,968	\$ 441,968	\$ 299,262	\$ 26,314	\$ 325,576	\$ 116,393
12	\$ 135,515	\$ 138,959	\$ -	\$ 175,488	\$ 449,963	\$ 449,963	\$ 299,262	\$ 27,103	\$ 326,365	\$ 123,598
13	\$ 139,581	\$ 143,128	\$ -	\$ 175,488	\$ 458,197	\$ 458,197	\$ 299,262	\$ 27,916	\$ 327,178	\$ 131,019
14	\$ 143,768	\$ 147,422	\$ -	\$ 175,488	\$ 466,678	\$ 466,678	\$ 299,262	\$ 28,754	\$ 328,015	\$ 138,663
15	\$ 148,081	\$ 151,844	\$ -	\$ 175,488	\$ 475,414	\$ 475,414	\$ 299,262	\$ 29,616	\$ 328,878	\$ 146,536
Totals	\$ 1,840,395	\$ 1,892,186	\$ 1,574,638	\$ 2,693,748	\$ 8,000,967	\$ 8,000,967	\$ 4,488,928	\$ 785,117	\$ 5,274,046	\$ 2,726,921

Cash Purchase

The greatest financial benefit to the City is a Cash Purchase, the following table and illustration outlines the cash flow of a cash purchase, with construction costs (\$3,604,114) paid from City Fund Balance / Reserves.



Term Year	Funding Sources						Program Costs			Program Annual Cash Flow
	Energy Reallocation	Maintenance Savings	CIP Savings	Revenue Generation	Total Funding Production	Used For Payment	Capital Expense	Performance Services	Annual Program Costs	
0	\$ 19,580	\$ 25,097	\$ -	\$ 61,421	\$ 106,098	\$ 106,098	\$ 3,604,114	\$ -	\$ 3,604,114	\$ (3,498,016)
1	\$ 97,899	\$ 100,387	\$ 157,464	\$ 175,488	\$ 531,238	\$ 531,238	\$ -	\$ 98,197	\$ 98,197	\$ 433,041
2	\$ 100,836	\$ 103,399	\$ 157,464	\$ 175,488	\$ 537,187	\$ 537,187	\$ -	\$ 101,995	\$ 101,995	\$ 435,192
3	\$ 103,861	\$ 106,501	\$ 157,464	\$ 175,488	\$ 543,314	\$ 543,314	\$ -	\$ 105,055	\$ 105,055	\$ 438,259
4	\$ 106,977	\$ 109,696	\$ 157,464	\$ 175,488	\$ 549,625	\$ 549,625	\$ -	\$ 108,207	\$ 108,207	\$ 441,418
5	\$ 110,186	\$ 112,986	\$ 157,464	\$ 175,488	\$ 556,125	\$ 556,125	\$ -	\$ 111,453	\$ 111,453	\$ 444,672
6	\$ 113,492	\$ 116,376	\$ 157,464	\$ 175,488	\$ 562,820	\$ 562,820	\$ -	\$ 22,698	\$ 22,698	\$ 540,122
7	\$ 116,897	\$ 119,867	\$ 157,464	\$ 175,488	\$ 569,716	\$ 569,716	\$ -	\$ 23,379	\$ 23,379	\$ 546,337
8	\$ 120,403	\$ 123,463	\$ 157,464	\$ 175,488	\$ 576,819	\$ 576,819	\$ -	\$ 24,081	\$ 24,081	\$ 552,738
9	\$ 124,016	\$ 127,167	\$ 157,464	\$ 175,488	\$ 584,135	\$ 584,135	\$ -	\$ 24,803	\$ 24,803	\$ 559,332
10	\$ 127,736	\$ 130,982	\$ 157,464	\$ 175,488	\$ 591,671	\$ 591,671	\$ -	\$ 25,547	\$ 25,547	\$ 566,123
11	\$ 131,568	\$ 134,912	\$ -	\$ 175,488	\$ 441,968	\$ 441,968	\$ -	\$ 26,314	\$ 26,314	\$ 415,655
12	\$ 135,515	\$ 138,959	\$ -	\$ 175,488	\$ 449,963	\$ 449,963	\$ -	\$ 27,103	\$ 27,103	\$ 422,860
13	\$ 139,581	\$ 143,128	\$ -	\$ 175,488	\$ 458,197	\$ 458,197	\$ -	\$ 27,916	\$ 27,916	\$ 430,281
14	\$ 143,768	\$ 147,422	\$ -	\$ 175,488	\$ 466,678	\$ 466,678	\$ -	\$ 28,754	\$ 28,754	\$ 437,925
15	\$ 148,081	\$ 151,844	\$ -	\$ 175,488	\$ 475,414	\$ 475,414	\$ -	\$ 29,616	\$ 29,616	\$ 445,798
Totals	\$ 1,840,395	\$ 1,892,186	\$ 1,574,638	\$ 2,693,748	\$ 8,000,967	\$ 8,000,967	\$ 3,604,114	\$ 785,117	\$ 4,389,231	\$ 3,611,736