Volume II – ECM/Cost Submission (Re-Bid)

Response to Request for Quotes for A Guaranteed Energy Savings Project At:

Pennsylvania Department of General Services (DGS) – Capitol Complex, Harrisburg, PA (Re-Bid)

Project No. GESA 2019-2 (REBID)
Contract No. DGS GESA 2019-2 REBID

Commonwealth of Pennsylvania
Department of General Services
Harrisburg, PA

 April 17, 2020

Submitted by:

Company Name: McClure Company
Company Address: 4101 North Sixth Street, Harrisburg, PA 17110
Contact Person: Jonathan Zeller, Account Executive
                           (484) 560-8437 (phone)
                           (717) 236-5239 (fax)
                           jonzeller@mcclureco.com

Table of Contents

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
GSBPSAS-147 (2009 Ed.)   Bond No. AIA-35492

CONSTRUCTION BID BOND
(Please Complete All Blanks)

KNOW ALL MEN BY PRESENTS, that we, McClure Company _____ (hereinafter
called the "Principal") as Principal and Arch Insurance Company _____
a corporation duly organized under the laws of the State of Missouri _____
(hereinafter called the "Surety") as Surety, are held and firmly bound unto The Department of
General Services, Harrisburg, Pennsylvania (hereinafter called the "Obligee"), in the sum of Ten
(10%) Percent of the ECM/Cost Submittal Amount for the payment of which sum, well and truly
to be made, we, the said Principal, and the said Surety, bind ourselves, our heirs, our
administrators, successors, and assigns, jointly and severally firmly by these presents.

Sealed with our seals and dated this 17th ___ day of April _____ A.D.

Two Thousand and Twenty _____ .

WHEREAS the Principal has submitted a bid upon Contract
No. GESA - 2019-2 _____
For Guaranteed Energy Savings Project _____
Department of General Services, Capitol Complex, Harrisburg, Pennsylvania _____

NOW, THEREFORE, the conditions of these obligations are such that if the Principal shall not
withdraw its bid prior to the expiration of the award period after the opening of the bids; and
shall comply with all requirements set forth in the "Quote" and the "Instructions to Bidders;" and
if the said contract be awarded to the Principal and the Principal shall, within such time as may
be specified, enter into the contract in writing, and give bond, with Surety acceptable to the
Obligee, covering the faithful performance of the said contract and payment of claims for labor,
material, and equipment rental, all of which shall be supplied on the forms as specified by said
Obligee; or if the Principal shall fail to do so, pay to the Obligee the lesser of the following
amounts: 1) the amount of this bond as herein above set forth, or 2) the difference between the
amount specified in the Principal's bid and such larger amount for which the Obligee may in
good faith contract with another party to perform the work covered by said bid, then this
obligation shall be void; otherwise to remain in full force and effect.

WITNESS (OR ATTEST IF A CORPORATION)   **PRINCIPAL** McClure Company

_____   _____

                                             (CORPORATE SEAL)

SURETY Arch Insurance Company
_____
Kristen D. Pedrick, Attorney-in-Fact

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON BLUE BACKGROUND.

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated. Not valid for Note, Loan, Letter of Credit, Currency Rate, Interest Rate or Residential Value Guarantees.

POWER OF ATTORNEY

Know All Persons By These Presents:

That the Arch Insurance Company, a corporation organized and existing under the laws of the State of Missouri, having its principal administrative office in Jersey City, New Jersey (hereinafter referred to as the "Company") does hereby appoint:

Kristen D. Pedrick and Robert N. Striewig, Jr. of Mechanicsburg, PA (EACH)

its true and lawful Attorney(s)in-Fact, to make, execute, seal, and deliver from the date of issuance of this power for and on its behalf as surety, and as its act and deed:

Any and all bonds, undertakings, recognizances and other surety obligations, in the penal sum not exceeding Ninety Million Dollars ($90,000,000.00).

This authority does not permit the same obligation to be split into two or more bonds In order to bring each such bond within the dollar limit of authority as set forth herein.

The execution of such bonds, undertakings, recognizances and other surety obligations in pursuance of these presents shall be as binding upon the said Company as fully and amply to all intents and purposes, as if the same had been duly executed and acknowledged by its regularly elected officers at its principal administrative office in Jersey City, New Jersey.

This Power of Attorney is executed by authority of resolutions adopted by unanimous consent of the Board of Directors of the Company on September 15, 2011, true and accurate copies of which are hereinafter set forth and are hereby certified to by the undersigned Secretary as being in full force and effect:

"VOTED, That the Chairman of the Board, the President, or the Executive Vice President, or any Senior Vice President, of the Surety Business Division, or their appointees designated in writing and filed with the Secretary, or the Secretary shall have the power and authority to appoint agents and attorneys-in-fact, and to authorize them subject to the limitations set forth in their respective powers of attorney, to execute on behalf of the Company, and attach the seal of the Company thereto, bonds, undertakings, recognizances and other surety obligations obligatory in the nature thereof, and any such officers of the Company may appoint agents for acceptance of process."

This Power of Attorney is signed, sealed and certified by facsimile under and by authority of the following resolution adopted by the unanimous consent of the Board of Directors of the Company on September 15, 2011:

VOTED, That the signature of the Chairman of the Board, the President, or the Executive Vice President, or any Senior Vice President, of the Surety Business Division, or their appointees designated in writing and filed with the Secretary, and the signature of the Secretary, the seal of the Company, and certifications by the Secretary, may be affixed by facsimile on any power of attorney or bond executed pursuant to the resolution adopted by the Board of Directors on September 15, 2011, and any such power so executed, sealed and certified with respect to any bond or undertaking to which it is attached, shall continue to be valid and binding upon the Company.
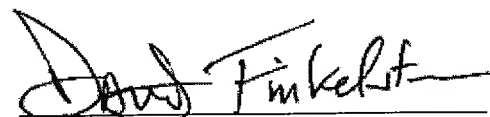
In Testimony Whereof, the Company has caused this instrument to be signed and its corporate seal to be affixed by their authorized officers, this 12th day of March, 2020.

Attested and Certified

Arch Insurance Company

Patrick K. Nails, Secretary
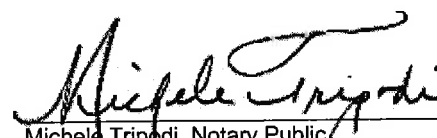
David M. Finkelstein, Executive Vice President

STATE OF PENNSYLVANIA SS

COUNTY OF PHILADELPHIA SS

I, Michele Tripodi, a Notary Public, do hereby certify that Patrick K. Nails and David M. Finkelstein personally known to me to be the same persons whose names are respectively as Secretary and Executive Vice President of the Arch Insurance Company, a Corporation organized and existing under the laws of the State of Missouri, subscribed to the foregoing instrument, appeared before me this day in person and severally acknowledged that they being thereunto duly authorized signed, sealed with the corporate seal and delivered the said instrument as the free and voluntary act of said corporation and as their own free and voluntary acts for the uses and purposes therein set forth.

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
MICHELE TRIPODI, Notary Public
City of Philadelphia, Phila. County
My Commission Expires July 31, 2021
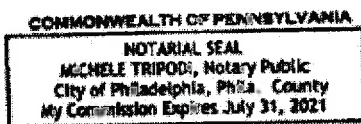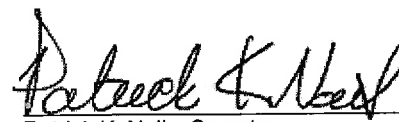
Michele Tripodi, Notary Public
My commission expires 07/31/2021

CERTIFICATION

I, Patrick K. Nails, Secretary of the Arch Insurance Company, do hereby certify that the attached Power of Attorney dated March 12, 2020 on behalf of the person(s) as listed above is a true and correct copy and that the same has been in full force and effect since the date thereof and is in full force and effect on the date of this certificate; and I do further certify that the said David M. Finkelstein, who executed the Power of Attorney as Executive Vice President, was on the date of execution of the attached Power of Attorney the duly elected Executive Vice President of the Arch Insurance Company.

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the Arch Insurance Company on this 17th day of April, 2020.

Patrick K. Nails, Secretary

This Power of Attorney limits the acts of those named therein to the bonds and undertakings specifically named therein and they have no authority to bind the Company except in the manner and to the extent herein stated.

PLEASE SEND ALL CLAIM INQUIRIES RELATING TO THIS BOND TO THE FOLLOWING ADDRESS:

Arch Insurance – Surety Division
3 Parkway, Suite 1500
Philadelphia, PA 19102

2-6.D.1 Investment Grade Audit (IGA)

D.1-a Investment Grade Audit Scope

Provided below is a clear and thorough description of the scope-of-work that McClure Company proposes to further investigate and develop during the Investment Grade Audit (IGA). The description includes systems covered, personnel involved, methodology for the calculation of the energy baseline, and schedule with milestones.

McClure Company's systematic approach to a guaranteed energy saving project is divided into three major phases:

1. *Scoping Audit Phase / RFQ*: McClure will conduct an initial feasibility study of DGS sites. The study includes, but is not limited to, a review of the utility bills, site surveys, interview of major stakeholders and personnel, preliminary energy conservation cost / savings estimates, and financial models. From this information, McClure assembles a list of recommended energy conservation measures (ECMs), based upon cost effectiveness, the needs of the facility, and the goals of DGS. This RFQ Response is the result of the scoping audit phase.
2. *Investment Grade Audit (IGA) Phase:* The Investment Grade Audit is a detailed study of the energy conservation measures identified and selected by DGS. Detailed within the sections below, McClure Company will perform an Investment Grade Audit in accordance with the RFQ and timeline schedule requirements.
3. *Final Scope Selection & Design Phase:* McClure Company will complete the final engineering and design phase for all ECMs requiring engineering design and will properly coordinate with the Commonwealth for the review and approval process.

Outlined below is McClure's approach towards conducting the IGA for the DGS – Capitol Complex GESA project.

D.1-a.1 Systems Covered

In consideration of the Core ECMs defined by the RFQ and the goals of both the Commonwealth and DGS, McClure Company proposes the below listed ECMs as the "**Base**" underlined self-funded program for RFQ evaluation. This Base scope addresses twelve (12) of the "Core ECMs" defined by the RFQ and includes nine (9) additional measures that provide increased economic, technical and environmental benefits. In addition to this Base program, McClure has also developed an "**Base Alternate**" GESA program that addresses all fifteen (15) Core ECMs and includes twelve (12) additional, innovative measures generating additional savings and benefits for the Commonwealth.

Base Program - 12 Core ECMs + 9 Additional Innovative Measures	
System Covered (DGS Capitol Complex GESA Project)	**Investment Grade Audit (IGA) Process Overview**
ECM-1: LED Lighting Upgrades	Audit fixture counts, light levels, voltage, wattage and fixture/ballast equipment types
	Record operation and maintenance items and hours of occupancy per space
	Select new fixtures based upon facility goals, feedback, and cost effectiveness
ECM-3: Weatherization	Identify key areas of high building infiltration/exfiltration and any physical deficiencies
	Account for impact on DGS operations, and if needed, adjust accordingly
	Estimate requirements for weather stripping, caulking, sheathing and sealing
ECM-4: BMS Control Optimization	Evaluate existing controls and systems capabilities of all facilities
	Evaluate systems usage
	Select control system and optimization strategy to fit design
ECM-5: Rachel Carson Temperature Master Diffuser Upgrades	Evaluate existing temp master diffusers for repair or replacement
	Evaluate system usage and potential for recommissioning
	Evaluate condition of existing systems for adaptive reuse opportunities
ECM-6: Rachel Carson Pneumatic HVAC System Upgrades	Audit sites for all existing DWH heaters
	Develop strategy to upgrade domestic water heaters to higher efficiency or fuel source
	Develop plan for upgrades and installation strategy for identified locations
ECM-7: Rachel Carson Steam Loop Removal	Confirm strategy to safely disconnect from existing steam loop
	Verify long-term heating plan and potential economic options
	Conduct detailed HVAC & MEP systems audit to confirm existing systems operations

Base Program - 12 Core ECMs + 9 Additional Innovative Measures	
System Covered (DGS Capitol Complex GESA Project)	**Investment Grade Audit (IGA) Process Overview**
ECM-8: Rachel Carson Domestic Water Pump Replacements	Conduct detailed HVAC & MEP systems audit to confirm existing systems operations
	Confirm sizing
	Select optimum systems and run-time strategies to achieve energy savings
ECM-9: Finance VFDs for HVAC Motors	Verify HVAC motors targeted for VFD installation
	Confirm motor sizing
	Select optimum systems and run-time strategies to achieve energy savings
ECM-10: Irvis Water Waster to DX/Water Coil	Confirm "water waster" targeted for new Dx unit for installation
	Develop cost analysis model to determine which unit is most advantageous
	Select optimum system to achieve energy savings
ECM-11: Records Center Summer Condensing Boiler Installation	Evaluate impact of ECM to facility's operation and archive preservation
	Evaluate existing system and obtain current sequence of operation
	Confirm new boiler sizing and installation location and logistics
ECM-12:18th and Herr Decentralized Heating System	Evaluate existing system and obtain current sequence of operation
	Confirm new boiler sizing and installation location and logistics
	Confirm optimum control strategy and integration plan to front-end system
ECM-14:Agriculture Boiler Replacement	Evaluate locations and logistics for new natural gas boiler installation
	Develop cost analysis model for conversion and confirm plan for new natural gas line runs
	Select optimization control system strategy
ECM-17: Irvis FCU Controls	Evaluate and confirm system usage, occupied / unoccupied settings with local override options
	Select control system and optimization strategy to fit design
	Select optimum system and strategy for local DGS operations that achieve energy savings
ECM-19:22nd & Forster Convert Electric AHU to Hot Water	Evaluate and confirm air flows for design
	Select new equipment
	Select optimization control strategy
ECM-20:22nd & Forster VFDs for Fans	Conduct detailed audit of all fans, evaluating conditions and system functionality
	Evaluate existing systems to identify strategies that minimize/control run times
	Select optimization control system strategy
ECM-21:Plumbing Improvements	Audit all existing fixtures, including flows and conditions
	Develop operational and maintenance baseline
	Select new fixtures based upon facility goals, feedback, and cost effectiveness
ECM-22:Steam Trap Replacements	Conduct audit of existing steam systems and identify type and quantities of failed traps
	Develop strategy to repair &/or replace failed traps
ECM-23:Electrical Transformer Upgrades	Conduct full facility audit, including the collection of detailed information on all applicable transformers
	Develop implementation plan with facility
ECM 24:Boiler Controls	Evaluate existing controls and systems capabilities of all facilities
	Evaluate systems usage
	Select control system and optimization strategy to fit design
ECM 25: Rachel Carson Insulation Covers	Field survey all locations with remaining scope
	Verify size and access to valves, equipment, and missing locations
	Design/size final covers for installation
ECM 26: Rachel Carson Chiller Optimization	Review existing design and current control operation
	Evaluate existing equipment and ability for enhanced control or additional equipment
	Design operational control

D.1-a.2 Personnel

Our in-house energy auditing and development team consists of seasoned professional engineers (P.E.s) and analysts with decades of PA GESA industry experience. They have audited and developed over 200 successful GESA solutions representing millions of square feet of facility space; many of these projects serving other PA State Agency and municipal type clients. McClure Company's IGA will be managed and lead by Chris Stultz (Project Development Manager), with support from selected specialist contractors for lighting, building envelope, solar, and electrical related measures. In addition, Brian Moore (Engineering Manager) and Christina Domanski (Building Automation System Engineer) will provide overview of the mechanical and control related scope. Richard Skinner (M&V) and Andrew McKenna (Commissioning Manager) will begin the commissioning plan in this phase as well. This team will be overseen by Shayne Homan (Vice President of Energy Services) and Jon Zeller (Account Executive).

D.1-a.3 Methodology

McClure Company's systematic approach towards undertaking the Investment Grade Audit includes, but is not limited to:

- Kickoff meeting with the Commonwealth and DGS to review McClure's RFQ Response
- Analysis of utility bills, past Measurement and Verification studies and overall facility benchmarking
- Selecting Energy Conservation Measures (ECMs) that meet the needs and goals of DGS
- Collection of general information for each building (square footage, floors, hours, etc.)
- Site surveys of all buildings at each DGS site, with a focus on the major/Core or selected ECMs
- Understanding of the operating characteristics of existing lighting, environment control, and HVAC (heating/cooling/distribution) systems
- Identify any additional cost saving opportunities that may have a cost-effective impact to the program
- Conceptualize and determine the feasibility of the ECMs identified
- Iterative review with DGS and the Commonwealth to show progress and ensure goals are met
- Perform simple payback and life cycle cost analysis on each ECM and the associated equipment/technology
- Internal design peer reviews, estimating reviews, and 360° risk reviews completed by the project team
- Provide definitive cost and savings estimates for proposed final ECMs
- Complete a final project cash flow with revised cost/savings for each identified and selected ECM
- Final review with DGS and the Commonwealth.

D.1-a.4 Schedule Milestones

Below is a table summarizing the Investment Grade Audit schedule milestones. As specified by the RFQ, McClure will deliver its final IGA report to the Commonwealth within 60 calendar days of the date on the Commonwealth's Notice of Selection. Please also see our more comprehensive project schedule included with **Volume 1: Technical Proposal**, which incorporates our IGA schedule and key project milestones.

Milestone	Timeline
Kick-off Meeting upon Selection	**July 2020**
Investment Grade Audit (IGA)	**July-September 2020**
Interim IGA Review Meeting (s)	**July-September 2020**
Final IGA Review	**October 2020**
GESA Contract Execution	**November 2020**

D.1-a.5 Energy Baseline

The baseline for this project was calculated using utility data provided by PA DGS. The usage was analyzed on a monthly basis and totaled for the year. The baseline was selected for all provided utilities as 2018, the most recent and complete data available across all utilities. During analysis, some data is missing from key accounts for proper baseline determination at select facilities. These baselines have been estimated based on similar buildings or historic information to provide information background to the potential savings at the facility. The baselines for each site have been selected as the most comprehensive and recent information available at the time of this submission and should be revised as part of the IGA. The values modified for baselines and energy rates are as listed below.

- Finance Building Water/Sewer Rate- calculated rate exceeds expected value based on surrounding facilities and usages. The rate has been adjusted down.
- Irvis (South Office) Building Steam Usage/Rate- no data was provided. Consumption was based on a usage per square foot of surrounding facilities with similar utilities and the rate at those facilities was used.
- Records Center Water/Sewer Rate- calculated rate exceeds expected value based on surrounding facilities, likely do to a fixed or annual sewer rate. The rate has been adjusted down.
- 18th & Herr Complex Water Sewer Rate- calculated rate exceeds expected value based on surrounding facilities, likely do to a fixed or annual sewer rate. The rate has been adjusted down.

During the IGA, a full review of the baseline reports and acceptance by PA DGS will be required to verify the usage amounts for all DGS sites as there is known missing utility data which required calculated assumptions for rates as detailed in **"*Attachment 1: Energy Baseline*"**

As part of the IGA, other circumstances which require the baseline to be adjusted will be evaluated. These circumstances include, but are not limited to, changes in the facilities use, changes in occupancy, adjustments for weather compared to the baseline heating and cooling degree days as provided by NOAA, and modification to the outside air ventilation flow rates as required by code.

The anticipated utility unit cost is the annual cost divided by the annual usage for the baseline period or as provided in the RFQ or subsequent addenda. Please find McClure's established baseline usages and rates provided in **"*Attachment 1: Energy Baseline*"** located at the end of this proposal.

D.1-a.6 Investment Grade Audit Fee - $25,000

Based upon the scope of our proposed DGS – Capitol Complex Base GESA program, and with the understanding that, upon selection by DGS as its ESCO partner, McClure will be tasked to provide IGA services to all DGS selected facilities, McClure has estimated the total cost to complete a comprehensive IGA Report for all DGS Capitol Complex sites to be $25,000. McClure has established a reasonable cost for preparing an Investment Grade Audit for this scope-of-work in compliance with the methodology discussed within this Cost Submission.

Energy Conservation Measures (ECMs)

Table 1 below presents a summary listing of our proposed Base and Base Alternate GESA programs. McClure's Base GESA program is a fully self-funded program utilizing guaranteed energy savings, O&M "Material" savings, and Act 129 rebate funding. Our Base Alternate program utilizes a limited level of "Energy Related Cost Savings" to supplement guaranteed energy savings to address all fifteen (15) Core ECMs and twelve (12) additional capital improvement needs. *All upgrades proposed under McClure's Base and Base Alternate GESA programs can be discussed during the interview process and explored further during the IGA.*

Table 1 – Summary: Base Self-Funded and Base Alternate ECMs By Site

ECM ID#	"Base" Core Program	"Base Alternate" Program	Energy Conservation Measure (ECM)	Rachel Carson	Finance Building	Irvis Building	State Records Center	18th & Herr Complex	Agriculturtal Building	Agricultural Vet Laboratory	22nd & Forester St, Office
			Table 1 Base Core & Base Alternate ECMs - By Site & Program Option PA DGS - Capitol Complex GESA ECM Summary			Scope-of-Work Presented by Site and Program Option					
1	X	X	LED Lighting Upgrades	X	X	X	X	X	X	X	X
2		X	Lighting Controls	X	X	X	X	X	X	X	X
3	X	X	Weatherization	X	X	X	X	X	X	X	X
4	X	X	BMS Control Optimization	X	X	X	X	X	X	X	X
5	X	X	Rachel Carson Temperature Master Diffuser Upgrades	X							
6	X	X	Rachel Carson Pneumatic HVAC System Upgrades	X							
7	X		Rachel Carson Steam Loop Removal	X							
7A		X	Rachel Carson Steam Loop Removal - CHP / HW Conversion	X							
8	X	X	Rachel Carson Domestic Water Pump Replacements	X							
9	X	X	Finance VFDs for HVAC Motors		X						
10	X	X	Irvis Water Waster to DX/Water Coil			X					
11	X	X	Records Center Summer Condensing Boiler Installation				X				
12	X	X	18th and Herr Decentralized Heating System Installation					X			
12A		X	18th and Herr Water Source Heat Pump Replacements					X			
13		X	18th and Herr Geothermal Installation (Tent Building)					X			
14	X	X	Agriculture Boiler Replacement						X		
15		X	Agriculture Geothermal						X		
16		X	Finance Steam Loop Removal/Disconnection		X						
17	X	X	Irvis FCU Controls			X					
18		X	Records Center VFD Pumping			X					
19	X	X	22nd & Forster Convert Electric AHU to Hot Water								X
20	X	X	22nd & Forster VFDs for Fans								X
21	X	X	Plumbing Improvements	X		X	X	X	X	X	X
22	X	X	Steam Trap Replacements		X	X					
23	X	X	Electrical Transformer Upgrades	X	X	X	X		X	X	
24	X	X	Boiler Controls				X			X	X
25	X	X	Rachel Carson Insulation Covers	X							
26	X	X	Rachel Carson Chiller Optimization	X							
27		X	Finance Window A/C Control System		X						

Environmental & Economic Impact Summary – Base GESA Program: Through the implementation of the ECMs comprising our proposed Base GESA program, DGS will also realize significant greenhouse gas, environmental, and economic benefits as detailed below. McClure will update and track all environmental & economic benefits generated by this GESA program as the final program scope-of-work is defined through the IGA process.

Environmental Benefits Projected Greenhouse Gas (GhG) Emmission & Carbon Footprint Reductions *Annual Avoided Emission Production*							
Utility & Unit	Annual Unit Savings	Annual GHG Emission Reductions (Lbs.)	Cars Not Driven	Gallons of Gasoline Not Consumed	Pounds of Coal Not Burned	Houses Powered	Acres of Trees Planted
Electric (kWh)	3,853,428	6,006,555	589	306,575	3,002,056	314	3,558
Natural Gas (CCF)	35,416	413,116	40	21,085	206,474	21	245
Totals (Annual):		6,419,671	629	327,660	3,208,530	335	3,803
Total (18 Year):		115,554,078	11,322	5,897,880	57,753,540	6,030	68,454

Local Economic Benefits – Projected New Jobs Created	
New Direct, Indirect, &/or Induced Jobs	100 - 110

D.1-b Energy Conservation Measures (ECMs)

After analysis of the utility data, the inspections conducted of each DGS site, and consideration of all four (4) original DGS issued Bulletins and two (2) subsequent Re-Bid Bulletins, McClure Company has prepared a Base <u>self-funded</u> GESA program that encompasses twelve (12) Core ECMs described under Appendix S of the RFQ and nine (9) additional energy saving measures. In addition to our Base program, McClure also includes an Base Alternate program, which combines guaranteed energy savings with a level of Energy Related Costs Savings to implement <u>all</u> fifteen (15) Core ECMs and additional innovative measures. The additional ECMs included within both our Base and Base Alternate programs address additional deferred maintenance and capital improvement needs, complement the proposed Core ECMs, and provide added savings and value to DGS over the long-term.

Table 2 on the following page outlines McClure's Base and Base Alternate GESA programs. These programs utilize a responsible level of annually applied energy savings, Energy Related Cost savings (*under "Base Alternate"*), and O&M "Material" type savings. Act 129 energy rebate dollars are also included to help buy-down overall installation costs. Detailed information relating to the Core ECMs addressed under our proposal can be found in D.1-b.1. Information on our proposed "Additional" ECMs not already included in the core project can be found in section D.1.g. All detailed energy savings calculations for our proposed Base ECMs can be found in "***Attachment 2 – Energy Calculations***".

Table 2
PA DGS - Capitol Complex GESA
Program Options Summary - Scope, Costs and Savings Totals

ECM ID/#	Energy Conservation Measure (ECM) / Scope	Installed Costs	Total Annual Savings	Base GESA	Base Alternate GESA
ECM-1	LED Lighting Upgrades	$1,623,220	$171,742		
ECM-2	Lighting Controls	$1,932,189	$20,572		
ECM-3	Weatherization	$120,933	$24,426		
ECM-4	BMS Control Optimization	$96,556	$97,000		
ECM-5	Rachel Carson Temperature Master Diffuser Upgrades	$697,899	$12,627		
ECM-6	Rachel Carson Pneumatic HVAC System Upgrades	$619,178	$6,048		
ECM-7	Rachel Carson Steam Loop Removal	$500,326	$25,124		
ECM-7A	Rachel Carson Steam Loop Removal - CHP / HW Conversion	$769,385	$34,739		
ECM-8	Rachel Carson Domestic Water Pump Replacements	$72,923	$0		
ECM-9	Finance VFDs for HVAC Motors	$100,344	$2,916		
ECM-10	Irvis Water Waster to DX/Water Coil	$34,124	$5,679		
ECM-11	Records Center Summer Condensing Boiler Installation	$109,451	$2,563		
ECM-12	18th and Herr Decentralized Heating System Installation	$594,057	$10,345		
ECM-12A	18th and Herr Water Source Heat Pump Replacements	$735,329	$3,743		
ECM-13	18th and Herr Geothermal Installation (*Tent Building*)	$558,185	$4,220		
ECM-14	Agriculture Boiler Replacement	$168,955	$4,747		
ECM-15	Agriculture Geothermal	$1,887,195	$7,557		
ECM-16	Finance Steam Loop Removal/Disconnection	$742,500	$175,322		
ECM-17	Irvis FCU Controls	$83,638	$4,659		
ECM-18	Records Center VFD Pumping	$23,027	$255		
ECM-19	22nd & Forster Convert Electric AHU to Hot Water	$77,038	$5,037		
ECM-20	22nd & Forster VFDs for Fans	$44,122	$7,645		
ECM-21	Plumbing Improvements	$133,917	$26,689		
ECM-22	Steam Trap Replacements	$329,180	$42,217		
ECM-23	Electrical Transformer Upgrades	$594,792	$37,464		
ECM-24	Boiler Controls	$83,519	$13,502		
ECM-25	Rachel Carson Insulation Covers	$41,085	$7,211		
ECM-26	Rachel Carson Chiller Optimization	$112,292	$11,696		
ECM-27	Finance Window A/C Control System	$59,606	$58,282		

		Total Installation Costs with Bond($):		$6,283,224	$12,525,085
		Project Contingency ($):		$124,751	$248,893
		Consultant Fee ($):		$0	$0
		Energy Savings (18 Year Total):		$10,548,191	$16,226,443
		Act 129 Energy Rebates (Total):		$148,681	$206,938
		O&M "Material" Savings (18 Year Total):		$366,962	$1,070,654
		Energy Related Cost Savings (18 Year Total):		$0	$1,200,000
		Total Program Savings (18 Year Total):		$11,063,834	$18,704,035

D.1-b.1 Recommended "Core Energy Conservation Measures"

ECM-1: LED Lighting Upgrades

Existing Conditions

Lighting throughout the studied facilities was surveyed and identified to be a majority T8 fluorescent technology utilizing 25W-32W linear tubes on the interior of the buildings. In select areas, compact fluorescents or incandescent were used for specialty or down lighting, along with a few LED lamps. Much of the lighting on the exterior of the buildings utilize Metal Halide, Mercury Vapor and High Intensity Discharge (HID) technology which is becoming obsolete and is very energy intensive. Select exterior fixtures had been updated with fluorescent or LED technology.

Proposed Solution

McClure Company is proposing to retrofit the existing exterior fixtures with new LED fixtures or, in applicable cases, re-lamp with LED lamps. Approximately 100 new fixtures are proposed. Linear fluorescent interior fixtures are proposed to be re-lamped with direct wired, self-ballasted LED tubes. Select fixtures are scheduled for de-lamping from (3) or (4) fluorescent lamps to (2) LED self-ballasted lamps including installation of a reflector kit. Specialty and down lighting is scheduled to receive LED lamp replacements as able. Approximately 525 new interior fixtures will be installed to replace fixtures incompatible with LED lamp replacements or to replace damaged existing fixtures.

Assumptions

No corrections to existing code violations or deficiencies were found during survey, however, these system deficiencies will be brought to the attention of the customer at the conclusion of the Investment Grade Audit. Scope includes cost for EPA approved recycling of fluorescent and HID lamps/ballasts. New LED lamps to be direct wired to existing fixture socket as existing fixtures are in good, serviceable condition unless otherwise noted.

Preliminary Lighting Burn Hours:

Burn Code	Area Description	Est. Average Hours BEFORE/AFTER
A	AUDITORIUM	2088
CF	CONFERENCE ROOM	2088
CR	CLASSROOM, TRAINING	2284
FC	FITNESS CENTER	2704
H	HALLWAY	3863
JC	JANITOR CLOSET	728
JC-ES	JANITOR CLOSET - EXISITNG OCC SENSOR	418
K	KITCHEN	1827
L	CAFETERIA	2268
LR	LOCKER ROOM	3863
M	MECHANICAL ROOM	3863
M-ES	MECHANICAL ROOM - EXISTING OCC SENSOR	3090
O	OFFICE	2340
O-ES	OFFICE - EXISTING OCC SENS	1872
EXO	EXTENDED OFFICE HOURS 12HR DAY	4380
RC	MEDIA CENTER	2088
RR	RESTROOM	3863
RR-ES	RESTROOM - EXISTING OCC SENSOR	1159
RRP	PRIVATE RESTROOM	522
RRP-ES	PRIVATE RESTROOM - EXISTING OCC SENSOR	418
S	STORAGE	728
S-ES	STORAGE - EXISTING OCC SENSOR	418
Z-TT	VACANT	500
VEND	VENDING MACHINES	8760
Z-EX	24 HOURS 7 DAYS - EXISTING SENSOR	6132
W	WAREHOUSE - OCC SENS	1827
EX	EXTERIOR	4380
Z	24 HOURS 7 DAYS	8760
AGRI	8:00AM - 4:00PM MONDAY THROUGH FRIDAY	2080

Annual Savings / Benefits

Energy savings are calculated using wattage reductions from the manufacturer's provided specification sheets for the applicable lamp. These reductions are multiplied by the stipulated hours provided to generate the kWh savings. The cost savings are calculated using this kWh savings multiplied by each buildings baseline electric rate.

Savings:
- 2,031,238 kWh

ECM-3: Weatherization

Existing Conditions

The facilities were surveyed for areas of infiltration that would result in unnecessary load for the mechanical system. Infiltration can be defined as unregulated outside air entering a building unintentionally. This air must be treated (heated or cooled) by the building's heating or cooling system to maintain acceptable indoor temperatures.

Common areas of infiltration include worn or missing door weather stripping, gaps along the interface of the roof and wall, insulation of attic spaces, air sealing of attic spaces, and air sealing any penetration between interior and exterior areas.

Proposed Solution

McClure Company is proposing to reduce the amount of infiltration air and increase critical insulation areas as detailed above. Please reference Attachment 3 – Supplemental ECM Information and Documentation for details and locations within the facility.

Assumptions

Calculations are based on ASHRAE Method for estimating air infiltration using a degree day calculation.

Annual Savings / Benefits

This measure will reduce the untreated infiltration of outdoor air and loss of conditioned interior air resulting in a more stable interior environment.

Savings:
- 93,416 kWh
- 7,115 CCF Natural Gas
- 432 Mlbs Steam

ECM-4: BMS Optimization

Existing Conditions

The facilities were surveyed to identify shortfalls within the existing buildings control systems, primarily Automated Logic. Several items were identified throughout the facilities as opportunities, such as hot water reset, economizer control, and demand control ventilation. Additionally, facility setpoints, setbacks and sequencing provide opportunity to better match occupied loads to true building occupancy.

Proposed Solution

McClure Company is proposing several control changes in the facilities depending on existing equipment and control sequences. In locations with hot water heating systems, a hot water reset schedule will be modified or implemented to reduce boiler firing rates. Air side economizer control provides cooling to spaces in place of using electricity for compressors depending on the existing outside air supply design. Many jurisdictions now require air side economizer cooling by the building code and economizer control is required by ASHRAE 90.1-2004 for all new equipment with cooling capacities greater than eleven tons in Pennsylvania. Modifications to the existing operating hours and setpoints/setbacks to better match the existing facility use have also been analyzed.

In addition to the modifications to the sequences, a new, user friendly interface is proposed. The new system will be web based and open protocol, while being able to communicate with the existing BMS controls already in place across the facilities listed in the RFQ.

Assumptions

Calculations are based on the reduced run time of equipment from assumed hours of operation and adjustments to setpoints/setbacks based on those allowable within the RFQ.

Annual Savings / Benefits

This measure will reduce run time of equipment resulting in savings.

Savings:

- 538,363 kWh
- 23,500 CCF Natural Gas
- 1,265 Mlbs Steam

ECM-5: Rachel Carson TempMaster Diffuser Upgrades

Existing Conditions

The Rachel Carson building utilizes approximately 2,700 TempMaster diffusers as part of the conditioned air HVAC system. The diffusers are a first generation type variable air volume (VAV) system utilizing localized control to modulate airflow from the diffuser. Over time the internal components of the system fail, and parts are difficult to replace. As the diffusers fail, they become a constant volume device which often causes temperature complaints within the space.

Proposed Solution

McClure Company is proposing to install approximately 220 VAV damper boxes in the branch ductwork and decommissioning the operation of the TempMaster diffusers. The existing diffusers will have the operating components and controls removed, with new controls tied back to the VAV damper boxes. Multiple diffusers will be "zoned" together to be served by single VAV damper boxes. New controls will be included for the VAV damper boxes and tied to the proposed BMS controls.

Assumptions

Existing diffuser bodies are in good condition and can be abandon in place with operating components removed. Zoning of the system based on provided existing drawings and grouping of diffusers for space usages. Calculations are based on reducing air flow through the VAV damper boxes to account for failing TempMaster diffusers, as well as increased controllability through integration of the VAV damper boxes to the BMS controls. McClure has assumed approximately 25% of the existing diffusers have been repaired, replaced, or upgraded.

Annual Savings / Benefits

This measure will allow for the existing central air handling units to become variable air flow utilizing the existing VFD's to a larger extent then currently feasible with the failing diffuser system.

Savings:

- 139,513 kWh

ECM-6: Rachel Carson Pneumatic HVAC System Upgrades

Existing Conditions

The exiting control system at the Rachel Carson building is a mix of direct digital (DDC) or electronic controls and pneumatic devices. In general, the overall BMS controls are digital/electronic, but are communicating to pneumatically activated end devices, such as valves, thermostats, and damper actuators. This mix of system styles is common to the original construction of the building, however, is difficult to maintain the accuracy of controls capable from the BMS with the maintenance intense pneumatic system.

Proposed Solution

McClure Company is proposing to replace the pneumatically activated end devices with new DDC components that can be tied into the existing BMS infrastructure, along with installation of building controllers. When combined with ECM 4, this will provide a holistic digital/electronic control system without the need for the pneumatic infrastructure. Included with the upgrade is exiting to remain VAV boxes and air handling units. Central plant controls are included as part of ECM 7 and 28.

Assumptions

Existing to remain dampers, valves, and controllers are in operable condition and can be integrated into the proposed BMS. Calculations are based on the reduced run time of equipment from assumed hours of operation and adjustments to setpoints/setbacks based on those allowable within the RFQ. No savings from steam was calculated as ECM 7 proposes to remove that system from use.

Annual Savings / Benefits

This measure will reduce run time of equipment resulting in savings.

Savings:
- 3,776 kWh
- 7,185 CCF Natural Gas

ECM-7: Rachel Carson Steam Loop Removal

Existing Conditions

The Rachel Carson building currently utilizes utility provided steam as a heating fuel source for part of the facility's load. A high efficiency gas-fired boiler plant was installed on the ground floor in 2007. Based on preliminary reviews of operation, the boiler plant is capable of serving the entire facility's heating load. Very few pieces of equipment are steam fired, as most steam is converted to hot water and distributed throughout the facility. Two large air handling units and the domestic hot water system are steam fired. The utility steam is a high unit cost ($/MMBTU) fuel source when compared to alternative heating systems, especially given there is a high efficiency natural gas boiler plant already within the facility.

Proposed Solution

McClure Company is proposing to disconnect the utility steam service at ground level and modify the existing piping to utilize the ground floor high efficiency boilers previously installed. The existing steam infrastructure (pressure reducing stations, steam to hot water converters, condensate recovery and steam fired domestic hot water units) will be removed. New gas fired domestic water heaters will be installed on the 4th floor. New gas piping shall be routed up to the 4th floor to serve the water heaters. The water heaters will be sidewall vented. The existing steam coils for the central air handling units will be replaced with new hot water coils and near piping.

Assumptions

Based on existing information, the central hot water boiler plant can operate as the primary heating source for the facility. The existing utility agreement for steam is unknown, any penalties or fees associated with disconnection of service have not been included. Existing steam infrastructure is largely abandoned in place except for what is contained in the 4th floor mechanical room. This includes items like the steam vent riser from the first floor up through the roof and the steam distribution risers at the central core of the building. This steam infrastructure will be capped and abandoned in place.

Annual Savings / Benefits

This measure will switch the utility steam heating source to the existing natural gas central boiler plant.

Savings:
- -(18,309) CCF Natural Gas
- 1,644 Mlbs Steam

ECM-8: Rachel Carson Domestic Water Pump Replacement

Existing Conditions

The existing domestic water booster pump system is original to the building and approaching the end of its useful life. Ongoing maintenance issues are present and there is concern over equipment failure.

Proposed Solution

McClure Company is proposing to replace the domestic water booster pump system in kind with a new duplex pump skid. The new pump system will be integrated into the proposed BMS from ECM 4 and 6.

Assumptions

The proposed system is a one for one replacement of the old system.

Annual Savings / Benefits

No energy savings have been included for the scope of work at this time. Future investigation into energy savings opportunities is recommended during the IGA, such as advanced control sequences and variable speed pumping based on pressure requirements.

ECM-9: Finance VFDs for HVAC Motors

Existing Conditions

The Finance Building is largely conditioned from distributed air handling equipment throughout the building. Much of the equipment has been retrofit over time from steam to hot water and in its current operation, generally treats outdoor air. When considering the implementation of ECM 4, it is possible to vary the supply volume of air through speed control of the existing motors. Limited drawings were available for the systems and the existing supply fan horsepower has been listed below:

- Supply Fan #1 – 7.5 HP
- Supply Fan #2 – 20 HP
- Supply Fan #3 – 20 HP
- Supply Fan #4- 7.5 HP
- Supply Fan #5 – 10 HP
- Supply Fan #6 – 30 HP
- Supply Fan #7 – 30 HP
- Supply Fan #8 – 15 HP
- Supply Fan #A – 7.5 HP
- Supply Fan #B – 7.5 HP

Proposed Solution

McClure Company proposes to install VFDs and the necessary controlling devices and sequences to allow for variable air flow through speed control of the supply fans. Evaluation of the existing exhaust fans has shown many are of fractional horsepower resulting in limited additional savings or serve areas requiring the existing exhaust air flow, thus prohibiting speed control on the motors.

Assumptions

McClure has assumed the existing electrical infrastructure is adequate to serve the proposed VFDs and the existing motors are capable to accept VFDs. Also assumed is the fan horsepower based on existing details of duct sizes and air flows. Design assumptions include the ability to vary the air volume based on duct size and equipment, along with installation of controls to meet code requirements.

Annual Savings / Benefits

This measure will vary the speed of the above motors resulting in savings.

Savings:
- 39,581 kWh

ECM-10: Irvis Water Waster to DX/Water Coil

Existing Conditions

At the Irvis Building, a packaged unit provides cooling to a filming/studio space. The existing unit is antiquated and uses now obsolete R22 refrigerant. While operational, the primary concern is the use of domestic water from the utility to cool the compressor in a once through system. Water from the utility main is piped through the unit for heat rejection and then discarded into the sanitary sewer system, a highly inefficient system.

Proposed Solution

McClure Company proposes to replace the unit with a new similarly sized unit that utilizes local chilled water supply piping and a chilled water coil for cooling. The new equipment will be integrated into the existing control system along with optimization through ECM 4.

Assumptions

McClure has assumed the average flow rate to be approximately 4 GPM during equipment operation based on site surveys and equipment size. The 4 GPM of utility supplied water is a once through and discarded flow that would be saved by changing cooling technologies. No increase in equipment size has been assumed as the new unit will be of the same capacity.

Annual Savings / Benefits

This measure will remove the compressor and the once through water cooling of the compressor resulting in the following savings.

Savings:
- 4,253 kWh
- 146 kGal Water

ECM-11: Records Building Summer Condensing Boiler

Existing Conditions

The Records Building is used to both store State records and provide office space for State personnel. The existing heating system utilizes a 2,396 MBH input, natural gas-fired Weil-McLain boiler to provide hot water to air handling units and ceiling mounted unit heaters during the winter months. During the summer months the boiler is used to provided hot water reheat to the air handling units serving the records storage section. This allows for dehumidification within the space.

Proposed Solution

McClure Company is proposing to add a natural gas-fired condensing boiler for the purpose of providing reheat hot water in the summer. However, the new condensing boiler will be sized appropriately to handle the winter load of the building which will provide further savings opportunities. The existing Weil-McLain boiler will be existing to remain and only be used as a backup heat source for redundancy.

Assumptions

McClure Company has assumed utilizing a condensing boiler with the same size characteristics as the Weil-McLain will be sufficient for complete winter heating. Design assumptions include sufficient gas pressure and venting availability for the condensing boiler and control integration.

Annual Savings / Benefits

Energy and conservation savings associated with this measure result from the increased efficiency of the boiler system.

Savings:
- 2,541 CCF Natural Gas

ECM-12: 18th & Herr Complex Decentralized Heating System Installation

Existing Conditions

The 18th and Herr Complex is comprised of (4) different buildings. They include the Arsenal Building, Tent Building, Boiler House, and Garages. Currently the Boiler house utilizes (2) boilers to produce steam that serves all (4) buildings directly or through conversion to hot water within the buildings.

The Arsenal Building uses the steam to heat the storage spaces with steam radiators. The rest of the building is heated with hot water radiators and air handlers. Hot water is generated from a steam to hot water heat exchanger within the building.

The Tent Building is comprised of a water source heat pump (WSHP) system with 100% outdoor air (OA) fan coil units (FCU). The FCUs use steam to preheat the OA prior to entering the WSHP's. The water loop that serves the WSHP is tempered with a heat exchanger between the steam system and WSHP loop.

The Garages utilizes steam radiators to provide heat in the winter.

Proposed Solution

McClure Company is proposing to decentralize the existing heating system by creating new systems for each of the locations.

The Arsenal Building will have (2) natural gas-fired condensing boilers installed to provide hot water heat to the entire building. The existing hot water pumps shall remain and will be provided with new variable frequency drives (VFD). Any

existing steam equipment will be converted to hot water. This will eliminate the need for a steam to hot water heat exchanger in the building and provide a more efficient heating system.

The Tent Building will continue to use WSHP's but the water loop will now be served by a new natural gas hot water boiler with a heat exchanger. The OA FCUs will be replaced and the new will provide ventilation air to the space. This change will eliminate the steam from the building.

The Garages will have new gas-fired unit heaters installed which will remove the need for the steam radiators.

Assumptions
McClure Company has assumed the existing steam piping infrastructure is in operational condition and can be reused for hot water piping as needed, as well as reusing existing miscellaneous steam heating coils with hot water to provide adequate heating to the space without replacement of the coil. Also assumed is sufficient gas pressure and utility's ability to provide gas service to each location without setting of any new meters. Existing terminal equipment not scheduled for replacement is assumed to be in good operational condition and will not require rebalancing (air or water).

Annual Savings / Benefits
Energy and conservation savings associated with this measure result from the increased efficiency of the hot water system.

Savings:
- 16,767 kWh
- 8,910 CCF Natural Gas

ECM-14: Agriculture Boiler Replacement

Existing Conditions
The Agriculture Building is primarily served by a WSHP system. The WSHP water loop utilizes a fluid cooler and electric boilers to temper the water in order to maintain optimum efficiency within the units. The building does have natural gas service, however the boilers in the building are still electric. It is recommended to replace the 1973 electric boilers with natural gas fired equipment.

Proposed Solution
McClure Company is proposing to replace the (2) existing electric boilers that serve the WSHP water loop with (2) natural gas fired condensing boilers. The existing boiler piping and pumps will remain.

Assumptions
McClure Company assumed the existing equipment is in good operational condition and the boilers are being replaced as a fuel switch only. Existing central plant controls are compatible with the new factory mounted boiler controls. McClure assumed that the gas service is of sufficient capacity to provide uninterruptible service for the new boilers, allowing for natural gas as the single fuel source.

Annual Savings / Benefits
Energy and conservation savings associated with this measure result from the increased efficiency of the boiler serving the WSHP system.

Savings:
- 117,516 kWh
- -(5,076) CCF Natural Gas

ECM-17: Irvis FCU Controls

Existing Conditions
The Irvis Building is largely conditioned by fan coil units (FCUs). The existing piping and coil configuration is non-typical but operates in a two-pipe change over arrangement with a four pipe supply network, thus only allowing hot or chilled water to flow through the same coil at one time. The existing units have limited, localized control that requires access to the unit. Units are often left running as it is difficult to access the fan control and there is no master control system for the FCUs. Approximately 321 units are currently in operation at the facility.

Proposed Solution

McClure Company is proposing to install inline, WIFI enabled, power control devices for each of the units that will allow for a system wide integration of the FCUs. The new devices will be installed in or adjacent to the units and allow for master schedule control of the unit fans. During unoccupied conditions, the unit fan will cycle off, and while the coil will still be active, there will be reduced energy use with the unit acting as a convector and not a powered unit. Additionally, given the metering capability of the outlets, when connected to the central control platform through the wireless network, not only will energy usage be available to the staff, but units that operate 24/7 (likely user selected minimum/maximum setpoints) can be corrected to proper setpoints.

Assumptions

Installation and operation of the controllable devices require a WIFI network. It has been assumed for this submission an adequate network exists within the facility to communicate between the devices and the central control platform. The central control platform will be integrated into the proposed BMS from ECM 4. McClure has assumed that no code deficiencies exist. If any are found during the IGA, they will be presented to the owner.

Annual Savings / Benefits

This measure will reduce run time of equipment resulting in savings.

Savings:
- 63,234 kWh

ECM-19: 22nd & Forster Convert Electric AHU to Hot Water

Existing Conditions

The 22nd & Forster Building is primarily served by multi-zone air handling units (AHU). The AHU's are 4-pipe utilizing hot water from the boiler plant and chilled water from the chiller plant. However, AHU #5 is slightly different and is not connected to the hot water system. It utilizes electric duct coils to provide heat to the space. With hot water piping close by it is recommended to replace the electric coils with new hot water coils.

Proposed Solution

AHU #5 operates as a cooling-only unit with heating provided at the existing electric duct coils. The existing electric coils in the ductwork will be removed and replaced with hot water coils. Hot water piping will be extended from its nearest location to the duct coil locations.

Assumptions

McClure Company has assumed the nearby hot water piping will provide sufficient flow for the heating needs of the AHU and the pumping system is able to handle the additional pressure drop of the hot water coils. Additionally, it has been assumed that the existing unit and controls are in good operational condition and will not require additional air balancing, so it will operate in the same conditions as before, only using hot water coils in place of the electric duct heaters. Expansion of the existing controller to include valve points has been assumed.

Annual Savings / Benefits

Energy savings associated with this measure result from the retrofit hot water coils compared to the previous electric duct coils.

Savings:
- 124,141 kWh
- -(5,362) CCF Natural Gas

ECM-20: 22nd & Forster VFD's for Fans

Existing Conditions

The 22nd & Forster Building is primarily served by multi-zone air handling units (AHU). Two of the AHUs have been replaced recently and operate as variable air volume (VAV) units. The other (4) AHU's are constant volume meaning they do not modulate airflow. With this system, temperature control is more difficult because the unit cannot modulate to meet space temperature demand.

Proposed Solution

McClure Company proposes to retrofit (4) existing AHU fan motors with variable frequency drives (VFD).

Assumptions

McClure Company has assumed the existing AHU's are in good operational condition and the fan motors are able to operate with a VFD, even if on a limited range. Existing controls are adequate for variable air flow monitoring and no water side balancing is required.

Annual Savings / Benefits

Energy and conservation savings associated with this measure result from installing VFDs on the AHU fan motors.

Savings:

- 91,299 kWh of Electric

ECM-21: Plumbing Improvements

Existing Conditions

Plumbing upgrades were included in a previous phase of work at various buildings throughout the Capitol Complex. However, additional upgrades at 7 of the 8 sites provide additional savings opportunities that were not included in the previous phases of work.

During the preliminary walk throughs and through the provided drawings, restroom fixtures were audited for counts, types, and flow rates. Field verification during the walk throughs were extrapolated to unseen fixtures identified on the drawings. Most existing toilet fixtures are 1.6 GPF (gallon per flush), however, there are significant amounts of 3.5 GPF valves or low flow china paired with high flow valves. Nearly all urinals are low flow at 1.0 GPF or lower. Another large opportunity is for existing sinks that can be retrofit with low flow aerators. Below are the preliminary fixture types by building.

Site	Existing Fixture Quantities					Retrofit Fixture Quantities				
	Toilet	Urinal	Lavatory Faucet	Other Faucet	Shower	Toilet	Urinal	Lavatory Faucet	Other Faucet	Shower
18th and Herr	15	7	16	2	-	-	-	15	2	-
22nd & Forster	30	12	31	3	1	2	-	14	3	-
Agriculture	37	16	36	1	-	37	-	36	1	-
Agriculture Vet Lab	16	4	17	13	6	10	-	13	11	-
Arsenal (18th & Herr Complex)	17	8	15	3	4	4	-	4	2	-
Finance	97	28	100	-	-	-	-	-	-	-
Irvis (South Office)	49	15	62	-	2	27	-	21	-	-
Rachel Carson	125	32	123	-	-	42	-	12	-	-
Records Center	10	4	12	2	-	5	-	8	2	-
Totals	**396**	**126**	**412**	**24**	**13**	**127**	**-**	**123**	**21**	**-**

Proposed Solution

McClure Company is proposing the following:

- Replace (43) flushometer toilets like for like with new 1.28 GPF fixtures and valves
- Retrofit (84) flushometer low flow china toilets with new lower flow, 2.4 GPF flushometers
- Retrofit (123) sinks with 0.5 GPM aerators
- Retrofit (21) hand sinks with new 1.5 GPM aerators

Assumptions

McClure Company has assumed a like for like fixture upgrade. While any work to existing ADA fixtures scheduled for upgrades is included no additional work for ADA compliance has been included. The like for like upgrade also assumes no

additional tile or masonry work. Preliminary quantities assumed require field verification during the IGA, as limited time and drawings were available to develop the full scope. Savings calculations are dependent on the volume of water used, quantity of occupants, and frequency of use. These values have been estimated based on similar buildings or from data provided during the RFQ and Addenda.

Annual Savings / Benefits

This measure will reduce water use as well as the amount of domestic hot water (DHW) needed.

Savings:
- 1,294 kWh
- 448 CCF Natural Gas
- 29 Mlbs Steam
- 986 kGal Water

ECM-22: Steam Trap Replacements

Existing Conditions

For this RFQ, a preliminary steam trap audit was conducted on the facilities currently utilizing steam (18th and Herr, Finance, Irvis, and Rachel Carson). However, through various other EMCs steam is being removed as a heating source at two of these facilities, Rachel Carson through ECM-7 and 18th and Herr through ECM-14. Additionally, in the Base Alternate Program proposed, the steam service to the Finance Building will also be removed via ECM-18. For the Base Program, steam trap replacement has been isolated to the Finance and Irvis Buildings.

The preliminary steam trap audit documented basic applications and quantities in areas available for survey. Those not easily accessed were estimated based on floor plans, equipment, and provided steam trap inventory provided by DGS.

Proposed Solution

McClure Company is proposing to replace the existing steam traps with approximately (27) new mechanical traps and approximately (605) thermostatic traps will be retrofit with new inserts and caps. While the existing traps undergo an annual inspection process, whole scale replacement will ensure the operation of the traps through continued maintenance inspections.

Assumptions

Calculations are based on reduced steam/condensate losses from trap failure. It was assumed that 5% of the traps were plugged (failed closed), 5% blowing (failed open), and 10% leaking. A detailed steam system audit will be required during the IGA to determine the actual failed traps and may be provided to DGS for use in their maintenance program. While all traps are included in the replacement, final study may find that recently replaced or newer traps may not require replacement with the existing annual inspection. Steam system on/off times were estimated based on temperature bin analysis for Harrisburg, PA and information provided during the RFQ.

Annual Savings / Benefits

Energy and conservation savings associated with this measure are the result of reduced steam/condensate losses in the systems.

Savings:
- 1,665 Mlbs Steam

ECM-23: Electrical Transformer Upgrades

Existing Conditions

Dry type transformers are simple pieces of equipment used to convert higher voltage, grid electricity to the lower voltage electricity required at various points within the facility. The equipment is always under some load and never actually off, as they are constantly providing the necessary "step down" of voltage to the building's circuits. While the task each transformer performs is straightforward and there are no actual moving parts, transformers vary widely on their efficiency, largely based on their vintage and construction materials. The inefficiency of the transformer is presented in the amount of waste heat it creates during the "step down" process and equates to lost electrical energy from the conversion, especially during lightly loaded operation.

The following quantities of transformers were determined for each building:

- Rachel Carson   (22)
- Finance Building   (20)
- Irvis Building   (11)

- Records Center   (3)
- Agriculture   (6)
- Agriculture Vet Lab (5)

Proposed Solution

McClure Company is proposing to upgrade the (67) existing building dry type transformers located during the survey and drawing review to new, high efficiency transformers. The replacement, high efficiency, custom built transformers utilize higher quality internal components, in this case aluminum cores, and optimized internal configurations to combat inefficiencies in the operation of the unit. The basis of design for the replacement transformers meet the US Department of Energy's Candidate Standard Level three (CSL-3), the level of efficiency deemed to provide the lowest lifecycle cost of the unit and surpass all minimum requirements of EPACT2005. The new transformers will also exceed NEMA TP-1 efficiency.

The high efficiency units will be custom built to the same approximate size as those being removed to minimize on any reconfigurations or space loss.

Assumptions

McClure has assumed the existing electrical infrastructure is adequate to serve the proposed transformers and the existing transformers are sized appropriately for the load they currently serve. Transformer quantities have been developed from the provided electrical drawings and site surveys. Buildings where electrical drawings were not provided, transformer quantities were extrapolated based on the buildings with complete information.

Annual Savings / Benefits

Energy savings associated with this measure result from the retrofit new high efficiency transformers compared to the previous transformers.

Savings:

- 459,810 kWh

ECM-24: Boiler Controls

Existing Conditions

For buildings with existing hot water heating systems (State Records Center, Agricultural Vet Laboratory, and 22nd & Forster St. Complex) that are not undergoing significant central plant upgrades, McClure is proposing a boiler load monitoring system used for sequencing operation based on actual load and not maintaining control dead band.

Closed loop hot water boilers run at all times in a range of between approximately 120º F and 180º F. Once this targeted temperature is achieved, the boiler shuts off and cools for a "dead band" period of approximately 5 to 10 degrees. Once the "dead band" is reached the boiler will purge out all combustible materials, as well as any remaining heat in the boiler and fire once again until it reaches the targeted temperature. This recurring boiler firing occurs continuously, even on warmer days when no heat is required. This inefficiency increases energy spend due to boiler dry cycling.

Proposed Solution

McClure Company is proposing to install an advanced load monitoring system in line with the exiting building controls, effectively intercepting the fire signal from the BMS to the boiler controller. This system will provide sequencing for the system based on calls for heat rather than maintaining dead band operation, effectively lowering the number of boiler firings. The advanced load monitoring system is a boiler control microprocessor that determines a legitimate request for heat or if the boiler is "dry cycling" to meet dead band. If a legitimate need exists, the boiler fires and operates as normal. If the request is determined to maintain dead band, the system holds the call by increasing the dead band range (to eliminate firing but protect the boiler from thermal shock) or initiates a timer for 15 minutes, releasing the call for whichever criteria is met first. The system is checking the conditions approximately every 10 seconds.

Assumptions

Savings are based on the reduced number of firings for each boiler through calculations accounting for the increased dead band control. Boilers are assumed to fire at the rate and efficiency specified on the nameplates with savings from eliminating the number cycles per day. Design assumptions include the existing boilers and controls being of operable conditions for installation and integration of the new load monitoring system, along with the applicable sensors for control.

Annual Savings / Benefits

This measure will reduce run time of equipment resulting in savings.

Savings:

- 14,465 CCF Natural Gas

ECM-25: Rachel Carson Insulation Covers

Existing Conditions

Preliminary surveys of all buildings showed relatively good insulation coverings for heating piping, valves, strainers, and other heating distribution equipment. However, at the Rachel Carson building there were approximately (29) locations with missing or damaged insulation that would benefit from adding removable insulation covers. These locations were isolated to the 4th floor mechanical space.

Proposed Solution

McClure Company is proposing to install (29) insulation covers on various heating equipment in the 4th floor mechanical space. Energy-saving, custom-manufactured thermal jacket systems will be installed on the un-insulated heating system valves and fittings identified. These prefabricated, two-piece jackets are fastened with straps and D-ring fasteners (or stainless steel wire ties for smaller covers that cannot accommodate D-ring fasteners). The jackets are easy to remove and re-install if maintenance work is required on the valve or fitting. Each jacket will be custom made for the specific valve or fitting and will be marked as such with the valve or fitting identifier embossed on a stainless steel label on the jacket.

Assumptions

McClure Company has assumed the equipment selected for insulation covers is in good operable condition and does not require any work to maintain operation. Final counts and measurements will be required during IGA as some valves may become obsolete with implementation of other ECMs.

Annual Savings / Benefits

Energy savings from this measure result from providing insulation on uninsulated or low insulated heating equipment.

Savings:

- 299 Mlbs Steam

ECM-26: Rachel Carson Chiller Optimization

Existing Conditions

Rachel Carson building is currently served by (2) 800 nominal ton Trane Centravac chillers original to construction. While in good operation condition and fairly efficient even by today's standards, added controls and technology can be applied to improve the chillers performance.

Proposed Solution

Similar to the load monitoring system proposed for the above heating plants, the optimization control uses advanced feedback loops to determine proper setbacks and operating parameters to maximize the efficiency of the chilled water plant. Through the use of relational control algorithms and variable speed devices, the chilled water plant can maintain the necessary comfort conditions while operating at its peak efficiency.

Assumptions

McClure Company has assumed typical chilled water loading profiles for the building type and the performance of the chillers based on manufacturer's specifications. Design assumptions include the ability for the chilled water temperature to fluctuate and for renewal of license for the optimization software.

Annual Savings / Benefits

Energy savings from this measure result from increasing the efficiency of the chilled water plant through control sequence modifications.

Savings:

- 129,229 kWh

D.1-b.2 Energy Conservation Measures Not Included in Base Program

The upgrades described under this section were each explored, in detail, during the development of our proposal. These measures have not been included in the Base Program at this time due to their higher capital-cost-intensive nature (compared to annual energy savings) and the need for further discussions with DGS to determine the feasibility for the solution at each site. Individual cost and savings information, as available, for each of these measures can be found in Table 2 at the beginning of this section.

Note: The ECMs discussed below are all included within McClure's Base Alternate GESA program along with all base measures except ECM-7, which is replaced with ECM-7A. The additional savings generated by our proposed supplemental ECMs make all Core ECMs possible. The proposed measures described below all remain viable opportunities for consideration and are included under McClure's Base Alternate program.

ECM-2: Lighting Controls

Existing Conditions

Limited lighting control exists within the studied facilities. Nearly all existing lighting controls are stand alone and not connected to the existing BMS controls. At Rachel Carson, there is an existing lighting control system, although its effectiveness is unknown.

Proposed Solution

While listed as a separate ECM scope, ECM 2 ties directly with ECM 1 as a value-added measure. However, given the limited reduction in energy using the proposed lighting systems, this ECM is not included in the base program due to the extended payback. The proposed low voltage lighting control system will implement occupancy sensors in common use spaces such as corridors, restrooms, offices and open office areas, conference rooms, and high use storage areas. The proposed occupancy sensors will be integrated into the existing BMS controls to allow for monitoring of system operation (included as part of ECM 4 BMS Controls Optimization). The control savings are calculated based on the post lamp or fixture retrofit utilizing the proposed wattages. The approximate number of occupancy sensors to be added by site is below:

Facility Name	Approximate Quantity
18th & Herr	28
2221 Forster Street	126
Agriculture	264
Finance Building	341
Irvis Office Building	400
Rachel Carson Building	1392
State Records Center	3
Veterinary Lab	0

Assumptions

No corrections to existing code violations or deficiencies were found during survey, however, these system deficiencies will be brought to the attention of customer at the conclusion of the Investment Grade Audit. Savings are a result of the reduced burns hours through occupancy control only.

Preliminary Lighting Burn Hours:

Burn Code	Area Description	Est. Average Hours WITH SENSORS
A	AUDITORIUM	1462
CF	CONFERENCE ROOM	1462
CR	CLASSROOM, TRAINING	1599
FC	FITNESS CENTER	1893
H	HALLWAY	2704
JC	JANITOR CLOSET	510
JC-ES	JANITOR CLOSET - EXISITNG OCC SENSOR	293
K	KITCHEN	1279
L	CAFETERIA	1588
LR	LOCKER ROOM	2704
M	MECHANICAL ROOM	2704
M-ES	MECHANICAL ROOM - EXISTING OCC SENSOR	2163
O	OFFICE	1638
O-ES	OFFICE - EXISTING OCC SENS	1310
EXO	EXTENDED OFFICE HOURS 12HR DAY	3066
RC	MEDIA CENTER	1462
RR	RESTROOM	2704
RR-ES	RESTROOM - EXISTING OCC SENSOR	811
RRP	PRIVATE RESTROOM	365
RRP-ES	PRIVATE RESTROOM - EXISTING OCC SENSOR	293
S	STORAGE	510
S-ES	STORAGE - EXISTING OCC SENSOR	293
Z-TT	VACANT	350
VEND	VENDING MACHINES	6132
Z-EX	24 HOURS 7 DAYS - EXISTING SENSOR	4292
W	WAREHOUSE - OCC SENS	1279
EX	EXTERIOR	3066
Z	24 HOURS 7 DAYS	6132
AGRI	8:00AM - 4:00PM MONDAY THROUGH FRIDAY	1456

Annual Savings / Benefits

Energy savings are calculated using wattage reductions from the manufacturer's provided specification sheets for the applicable lamp. These reductions are multiplied by the stipulated hours provided to generate the kWh savings. The cost savings are calculated using this kWh savings multiplied by each buildings baseline electric rate.

Savings:

- 244,712 kWh

ECM-7A: Rachel Carson Steam Loop Removal- CHP/HW Conversion

Existing Conditions

As described in ECM-7 above, the Rachel Carson building currently utilizes utility provided steam as a heating fuel source for part of the facility's load while housing a high efficiency gas-fired boiler plant, capable of heating the facility, on the ground floor. Very few pieces of equipment are steam fired, as most steam is converted to hot water and distributed throughout the facility. Two large air handling units and the domestic hot water system are steam fired.

Proposed Solution

As a value-added scope to the steam loop removal detailed in ECM-7 above, McClure Company proposes to install a micro scale combined heat and power (CHP) plant within the 4th floor mechanical room where the existing domestic hot water generators and steam converters are located. The micro CHP system utilizes small scale natural gas fired equipment to generate electricity for use within the building. The location on the 4th floor is advantageous given the adjacent location of the main electrical room. The heat produced from generating the electricity is sent to "buffer" tanks which will supplement

the comfort heating loop. Given the capacity of the existing high efficiency boiler plant already onsite, McClure is only proposing a single unit to be installed. The micro CHP unit is capable to produce about 25 kW of power at peak conditions.

Scope for conversion of steam fired equipment, such as the central air handling units remains consistent with that described in ECM-7 to provide a system heated entirely by hot water with the existing steam service being disconnected.

This scope is considered an alternate to ECM-7 and is a standalone option to remove steam service to the building and convert existing steam fired equipment to hot water.

Assumptions
McClure Company has assumed there is sufficient gas pressure to utilize for the new equipment and that the system can be vented similar through the 4th floor sidewall. Additionally, it has been assumed that the interconnection to the buildings electrical infrastructure can occur in the 4th floor electrical room. Similar assumptions concerning the steam service, abandon in place steam infrastructure, and equipment operation as detailed in ECM-7 apply.

Annual Savings / Benefits
This measure will switch the utility steam heating source to the existing natural gas central boiler plant and utilize the micro CHP plant as the base load heating source.

Savings:

- 133,152 kWh
- -(21,377) CCF Natural Gas
- 1,644 Mlbs Steam

ECM-12A: 18th & Herr Complex Water Source Heat Pump Replacements

Existing Conditions
The Tent Building is comprised of a water source heat pump (WSHP) system with 100% outdoor air fan coil units (FCU). The water loop that serves the WSHP is tempered with a heat exchanger between the steam system and WSHP loop. Some of the WSHP's have been replaced over time but a majority of the units are from the 1990's. It is recommended to install modern WSHP's with extended temperature range that are capable of working within a true geothermal system.

Proposed Solution
McClure Company is proposing to replace all of the WSHP's in the Tent Building with new high efficiency, extended range heat pumps. The existing water loops will be reused as able. This ECM is considered a scope add to ECM-14 and required for ECM 15 implementation.

Assumptions
McClure Company has assumed the existing water loop is in good operable condition and can be reused, including the existing pipe insulation.

Annual Savings / Benefits
Energy and conservation savings associated with this measure result from the increased efficiency of the WSHP system.

Savings:
- 41,577 kWh

ECM-13: 18th & Herr Complex Geothermal Installation

Existing Conditions
The 18th and Herr Complex is comprised of (4) different buildings types. They include the Arsenal Building, Tent Building, Boiler House, and Garages. Currently the Boiler house utilized (2) boilers to produce steam that serves all (4) buildings.

The Arsenal Building uses the steam to heat the storage spaces with steam radiators. The rest of the building is heated with hot water radiators and air handlers which is converted from steam with a heat exchanger.

The Tent Building is comprised of a water source heat pump (WSHP) system with 100% outdoor air fan coil units (FCU). The FCUs use steam to preheat the OA prior to entering the WSHP's. The water loop that servers the WSHP is tempered with a heat exchanger between the steam system and WSHP loop.

The Garages utilized steam radiators to provide heat in the winter.

Proposed Solution
McClure Company studied a solution to provide geothermal heating/cooling to the site. Specifically, this scope is centered around the Tent building which currently utilizes WSHP and is a good candidate for geothermal. While a geothermal system is feasible, the upfront cost to install a well field will overcome the payback criteria needed as part of the base scope of work which is why it has been provided as an alternate item in our Optional program.

The proposed scope would be to install a geothermal well field on site to serve the Tent Building. Due to the site already having an existing fluid cooler and a boiler as detailed within ECM-14, the well field can be reduced in size to decrease the installation cost while also providing energy saving benefits to the system. The system would be considered a hybrid system as it has the ability to utilize both a well field and a fluid cooler/boiler for cooling and heating.

This scope of work requires the inclusion of ECM-14A and is considered a scope add to ECM-14.

Assumptions
McClure Company has assumed the existing site allows for a location to install a well field of necessary size to service the system in both area and thermal conductivity.

Annual Savings / Benefits
Energy and conservation savings associated with this measure result from the increased efficiency of the HVAC system when switched to a hybrid geothermal system.

Savings:
- -(28,032) kWh
- 6,801 CCF Natural Gas

ECM-15: Agriculture Geothermal

Existing Conditions
The Agriculture Building is primarily served by a WSHP system that was installed in 2013. The WSHP water loop utilizes a fluid cooler and electric boilers to temper the water in order to maintain optimum efficiency within the units. The building does have natural gas service, however the boilers in the building are still electric. It is recommended to replace the 1973 electric boilers with natural gas fired boilers.

Proposed Solution
As with the 18th & Herr Complex, McClure Company studied a solution to provide geothermal heating/cooling to the site. While a geothermal system is feasible, the upfront cost to install a well field will overcome the payback criteria needed as part of the base scope of work which is why it has been provided as an alternate item in our Optional program.

The proposed scope would be to install a geothermal well field on site to serve the Agriculture Building. Due to the site already having an existing fluid cooler and a natural gas boiler as part of ECM-16, the well field can be reduced in size to decrease install cost while also providing energy saving benefits to the system. The system would be considered a hybrid system as it has the ability to utilize both a well field and a fluid cooler/boiler for cooling and heating.

This ECM is considered a scope add to ECM-16 and does not require ECM-16 for implementation.

Assumptions
McClure Company has assumed the existing site allows for a location to install a well field of necessary size to service the system in both area and thermal conductivity. Additionally, it has been assumed that the WSHPs are of sufficient size and configuration to properly utilize the geothermal well field and that all existing piping is in good operable condition with adequate insulation.

Annual Savings / Benefits
Energy and conservation savings associated with this measure result from the increased efficiency of the HVAC system when switch to a hybrid geothermal system.

Savings:
- 86,935 kWh of Electric

ECM-16: Finance Steam Loop Removal/Disconnection

Existing Conditions

Similar to Rachel Carson, the Finance building utilizes utility provided steam as a heating fuel source for all of the facility's load. The facility has undergone numerous renovation projects in the past in which the central plant systems have changed, including the removal of a central steam boiler plant to connect to the utility steam. Given the high utility cost for steam, it is recommended to provide some form of onsite heating generation to eliminate the need for purchased steam.

Proposed Solution

McClure Company is proposing to disconnect the utility steam service and install a new gas fired steam central plant in the former boiler room. As the new system would be steam, no additional work is required with the terminal equipment. The new steam boiler plant would utilize much of the existing infrastructure from the plant that existed in the past, including the combustion venting path.

Assumptions

McClure Company has assumed the existing boiler room and routing of utilities is sufficient for re-installation of a new steam boiler plant. The existing utility agreement for steam is unknown, and any penalties or fees associated with disconnection of service have not been included. No work is required for terminal equipment as the system is to remain steam.

Annual Savings / Benefits

This measure will switch the utility steam heating source to an onsite system producing steam via natural gas boilers.

Savings:
- -(165,156) CCF Natural Gas
- 13,425 Mlbs Steam

ECM-18: Records Center VFD Pumping

Existing Conditions

The Records Building heating system uses constant volume hot water pumps to move the water throughout the building.

Proposed Solution

McClure Company is proposing to add variable frequency drives (VFD) to the existing hot water pumps to obtain added balancing control and energy savings.

Assumptions

McClure Company has assumed the existing pump motors are capable to install the VFDs, along with the existing control system being sufficient for variable speed control.

Annual Savings / Benefits

Energy and conservation savings associated with this measure result from variable speed control of the motors.

Savings:
- 2,870 kWh

ECM-27: Finance Window A/C Control System

Existing Conditions

The Finance Building is largely cooled by packaged window air conditioning units of various vintages. The units are self-contained and limited in controllability to user selected operation with no scheduling or setpoint control. Approximately 303 units are currently in operation at the facility.

Proposed Solution

McClure Company is proposing to install controllable WIFI outlets for each of the units that will allow for a system wide integration of the packaged window air conditioning units. The new outlets will be installed with tamper proof screws to prevent removal and will be commissioned to a schedule approved by DGS. While unable to control the setpoint, the outlet will allow for increased control of the schedule. The outlets will be able to determine if a unit is operating when the unoccupied period is scheduled to begin and will allow the compressor to finish its cycle to prevent damage to the unit.

Additionally, given the metering capability of the outlets, when connected to the central control platform through the wireless network, not only will energy usage be available to the staff, but units that operate 24/7 (likely user selected minimum setpoint) can be corrected to proper setpoints.

Assumptions

Installation and operation of the controllable outlets require a WIFI network. It has been assumed for this submission an adequate network exists within the facility to communicate between the devices and the central control platform. The central control platform will be integrated into the proposed BMS from ECM 4. McClure has assumed the existing electrical infrastructure is adequate to serve the existing packaged window air conditioning units and that no code deficiencies exist. If any are found during the IGA, they will be presented to the owner.

Annual Savings / Benefits

This measure will reduce run time of equipment resulting in savings.

Savings:

- 791,156 kWh

D.1-c Preliminary Assessment of Energy Conservation Measures (ECMs)

McClure Company has evaluated and provided a preliminary assessment for each energy conservation measure (ECM) opportunity, which includes estimated implementation costs, energy cost savings, and detailed savings calculations that support implementation of each ECM under this GESA program. Detailed calculations for the energy cost savings can be found under **Attachment 2**. Our preliminary assessment of the identified Core ECM opportunities is based upon the information and data provided under this RFQ and the two (2) allotted site visits per DGS site, not exceeding 3-hour durations per visit, that our team conducted during the original RFQ phase.

Table 3A and 3B provided below summarize total implementation costs and annual savings generated by all Energy Conservation Measures (*Core ECMs + McClure's Additional ECMs*) proposed by McClure Company.

> **Table 3A-** *Proposed Energy Conservation Measures – Base GESA Program: Total Installation Costs and Annual Savings*. Note, McClure's Base GESA project presented under Table 3A below has no financial shortfalls and is a fully self-funded GESA program utilizing guaranteed energy savings, O&M "Material" type savings and Act 129 energy rebate dollars.

ECM ID	ECM Description	Total Installation Cost ($)	Electric (kWh/Yr)	Electric ($/Yr)	Natural Gas (CCF/Yr)	Natural Gas ($/Yr)	Steam (Mlbs/Yr)	Steam ($/Yr)	Water (kGal/Yr)	Water ($/Yr)	Rebates / Incentives ($)	Total Cost Savings ($)*
												Table 3A: Costs & Savings Summary PA DGS - Capitol Complex GESA Project Base Self-Funded GESA – Core & Additional ECMs
1	LED Lighting Upgrades	$ 1,623,220	2,031,238	$ 171,742							$ 106,900	$ 171,742
3	Weatherization	$ 120,933	93,416	$ 7,093	7,115	$ 6,901	432	$ 10,432				$ 24,426
4	BMS Control Optimization	$ 96,556	538,363	$ 43,846	23,500	$ 21,061	1,265	$ 32,093				$ 97,000
5	Rachel Carson Temperature Master Diffuser Upgrades	$ 697,899	139,513	$ 12,627								$ 12,627
6	Rachel Carson Pneumatic HVAC System Upgrades	$ 619,178	3,776	$ 342	7,185	$ 5,706						$ 6,048
7	Rachel Carson Steam Loop Removal	$ 500,326			-18,309	$ (14,541)	1,644	$ 39,665				$ 25,124
8	Rachel Carson Domestic Water Pump Replacements	$ 72,923										$ -
9	Finance VFDs for HVAC Motors	$ 100,344	39,581	$ 2,916							$ 2,083	$ 2,916
10	Irvis Water Waster to DX/Water Coil	$ 34,124	4,253	$ 313					146	$ 5,366		$ 5,679
11	Records Center Summer Condensing Boiler Installation	$ 109,451			2,541	$ 2,563						$ 2,563
12	18th and Herr Decentralized Heating System Installation	$ 594,057	16,767	$ 1,510	8,910	$ 8,835						$ 10,345
14	Agriculture Boiler Replacement	$ 168,955	117,516	$ 10,216	-5,076	$ (5,469)						$ 4,747
17	Irvis FCU Controls	$ 83,638	63,234	$ 4,659							$ 3,513	$ 4,659
19	22nd & Forster Convert Electric AHU to Hot Water	$ 77,038	124,141	$ 10,396	-5,362	$ (5,359)						$ 5,037
20	22nd & Forster VFDs for Fans	$ 44,122	91,299	$ 7,645							$ 4,805	$ 7,645
21	Plumbing Improvements	$ 133,917	1,294	$ 109	448	$ 451	29	$ 708	986	$ 25,421		$ 26,689
22	Steam Trap Replacements	$ 329,180					1,665	$ 42,217				$ 42,217
23	Electrical Transformer Upgrades	$ 594,792	459,810	$ 37,464							$ 24,201	$ 37,464
24	Boiler Controls	$ 83,519			14,465	$ 13,502						$ 13,502
25	Rachel Carson Insulation Covers	$ 41,085					299	$ 7,211				$ 7,211
26	Rachel Carson Chiller Optimization	$ 112,292	129,229	$ 11,696							$ 7,179	$ 11,696
	Totals:	$ 6,237,549	3,853,429	$322,573	35,417	$ 33,650	5334	$132,326	1,132	$30,787	$ 148,681	$519,336
	DGS Energy Consultant Fee ($):	$0									Escalated:	1%
	Bond Cost ($):	$45,675									Year 1 Savings	$524,530
	Project Contingency ($):	$124,751										
	Total Project Cost ($)	$ 6,407,975										

➢ **Table 3B-** *Proposed Energy Conservation Measures – Base Alternate GESA Program: Total Installation Costs and Annual Savings*. Note, McClure's Base Alternate GESA project presented under Table 3B below utilizes a responsible level of annually applied energy savings, O&M savings, and Act 129 energy rebate dollars. In addition, it also includes $1,200,000 in total Energy Related Costs Savings, which are being utilized to further address the defined Core ECM scope, identified deferred maintenance items and other capital improvement needs.

Table 3B: Costs & Savings Summary — PA DGS - Capitol Complex GESA Project — Base Alternate GESA w/ Energy Related Cost Savings – Core & Additional ECMs												
ECM ID	ECM Description	Total Installation Cost ($)	Electric (kWh/Yr)	Electric ($/Yr)	Natural Gas (CCF/Yr)	Natural Gas ($/Yr)	Steam (Mlbs/Yr)	Steam ($/Yr)	Water (kGal/Yr)	Water ($/Yr)	Rebates / Incentives ($)	Total Cost Savings ($)*
1	LED Lighting Upgrades	$ 1,623,220	2,031,238	$ 171,742							$ 106,900	$ 171,742
2	Lighting Controls	$ 1,932,189	244,712	$20,572							$ 12,261	$ 20,572
3	Weatherization	$ 120,933	93,416	$ 7,093	7,115	$ 6,901	432	$ 10,432				$ 24,426
4	BMS Control Optimization	$ 96,556	538,363	$ 43,846	23,500	$ 21,061	1,265	$ 32,093				$ 97,000
5	Rachel Carson Temperature Master Diffuser Upgrades	$ 697,899	139,513	$ 12,627								$ 12,627
6	Rachel Carson Pneumatic HVAC System Upgrades	$ 619,178	3,776	$ 342	7,185	$ 5,706						$ 6,048
7A	Rachel Carson Steam Loop Removal - CHP / HW Conversion	$ 769,385	133,152	$ 12,051	-21,377	$ (16,977)	1,644	$ 39,665			$ 4,204	$ 34,739
8	Rachel Carson Domestic Water Pump Replacements	$ 72,923										$ -
9	Finance VFDs for HVAC Motors	$ 100,344	39,581	$ 2,916							$ 2,083	$ 2,916
10	Irvis Water Waster to DX/Water Coil	$ 34,124	4,253	$ 313					146	$ 5,366		$ 5,679
11	Records Center Summer Condensing Boiler Installation	$ 109,451			2,541	$ 2,563						$ 2,563
12	18th and Herr Decentralized Heating System Installation	$ 594,057	16,767	$ 1,510	8,910	$ 8,835						$ 10,345
12A	18th and Herr Water Source Heat Pump Replacements	$ 735,329	41,577	$ 3,743								$ 3,743
13	18th and Herr Geothermal Installation (*Tent Building*)	$ 558,185	-28,032	$ (2,524)	6,801	$ 6,744						$ 4,220
14	Agriculture Boiler Replacement	$ 168,955	117,516	$ 10,216	-5,076	$ (5,469)						$ 4,747
15	Agriculture Geothermal	$ 1,887,195	86,935	$ 7,557								$ 7,557
16	Finance Steam Loop Removal/Disconnection	$ 742,500			-165,156	$ (165,156)	13,425	$ 340,478				$ 175,322
17	Irvis FCU Controls	$ 83,638	63,234	$ 4,659							$ 3,513	$ 4,659
18	Records Center VFD Pumping	$ 23,027	2,870	$ 255							$ 151	$ 255
19	22nd & Forster Convert Electric AHU to Hot Water	$ 77,038	124,141	$ 10,396	-5,362	$ (5,359)						$ 5,037
20	22nd & Forster VFDs for Fans	$ 44,122	91,299	$ 7,645							$ 4,805	$ 7,645
21	Plumbing Improvements	$ 133,917	1,294	$ 109	448	$ 451	29	$ 708	986	$ 25,421		$ 26,689
22	Steam Trap Replacements	$ 329,180					1665	$ 42,217				$ 42,217
23	Electrical Transformer Upgrades	$ 594,792	459,810	$ 37,464							$ 24,201	$ 37,464
24	Boiler Controls	$ 83,519			14,465	$ 13,502						$ 13,502
25	Rachel Carson Insulation Covers	$ 41,085					299	$ 7,211				$ 7,211
26	Rachel Carson Chiller Optimization	$ 112,292	129,229	$ 11,696							$ 7,179	$ 11,696
27	Finance Window A/C Control System	$ 59,606	791,156	$ 58,282							$ 41,641	$ 58,282
	Totals:	$ 12,444,639	5,125,799	$422,509	(126,006)	$(127,198)	18,759	$472,804	1,132	$30,787	$ 206,938	$798,903

DGS Energy Consultant Fee ($):	$0	Escalated:	1%
Bond Cost ($):	$80,446	Year 1 Savings	$806,892
Project Contingency ($):	$248,893		
Total Project Cost ($)	$ 12,773,978		

McClure Company commits that the total energy savings projected in the final scope of work will be at least 95% of the savings projected in this quote proposal, the actual ECM costs shall be within 10% of the costs listed within the CEA, and that this project will be self-funded over the financial term of the project (maximum term of 18 years).

D.1-d The Degree to Which the Proposal Demonstrates the Technical Feasibility, Suitability, Reasonableness, Comprehensiveness and Acceptability of the Proposed ECMs

McClure's evaluation of the proposed energy conservation measures (ECMs) includes the technical feasibility, suitability, reasonableness, comprehensiveness and acceptability as demonstrated below. All material, equipment and installation labor needed to deliver "turnkey" solutions are provided by McClure, including our internal quality evaluation of said equipment to generate the proposed savings.

The *Technical Feasibility* of the proposed ECMs was taken from McClure's vast energy project experience on past projects implemented across the Commonwealth. Many of the ECMs proposed were designed specifically for the required building

application. The lighting scope was also customized for office and public-space facilities, interior and exterior applications, to ensure light levels met code requirements. While the systems proposed were created with DGS specifically in mind, these system types have been instituted across other McClure facility projects implemented throughout the Commonwealth. With our direct knowledge and experience of design, implementation, and post construction monitoring and servicing of these systems, McClure's Design/Build expertise and comfort in servicing these systems ensures a successful final GESA project that will sustainably generate savings for DGS over the long-term.

The *Suitability* of the ECMs proposed will be reviewed with DGS during the Investment Grade Audit phase of the project. From initial kick-off meeting, to interim and bi-weekly meetings, and the final close-out meeting, McClure will maintain open communication with DGS staff and stakeholders to ensure the proposed ECMs are suitable and align with both DGS's operations, goals, needs, and future facility requirements.

The *Reasonableness* of the ECMs proposed will be identified, quantified and communicated to the project team through a variety of metrics. These metrics will ensure optimization of an ECM at each level, from each unit component to the full system application. This protocol is essential to ensuring that the ECMs proposed not only meet the goals of DGS and the Commonwealth over the long-term but are also reasonable and make implementation sense from multiple metric aspects.

The *Comprehensiveness* of the ECMs proposed starts with the Investment Grade Audit (IGA). McClure understands that the scope of each ECM shall not be applied without careful monitoring; that significant due diligence analysis and understanding of the client's operation needs to be taken into consideration for all future ECMs. A blanket solution is not always viable or may not make financial or physical sense. McClure's approach to ECM identification and scope determination is comprehensive, time intensive, and extensive. Not only is every ECM system reviewed, but each system component is carefully analyzed, measured, metered and/or evaluated for reasonableness, suitability and technical feasibility, including interaction with other measures. This upfront peer review and quality control process ensures that a fully customized scope is produced through our IGA, in addition to multiple ECM options being presented to DGS and the Commonwealth for consideration.

The *Acceptability* of the ECMs proposed is an important step for a successful project. A kick-off meeting, interim meeting(s) and final meeting will ensure the ECMs proposed are suitable for DGS and Commonwealth staff's goals, needs, and future facility requirements.

D.1-e Training for DGS Personnel

McClure will provide extensive training to the DGS staff on all newly installed systems and technology. Below is a summary of the training scope that will be provided to DGS personnel. If preferred, this training may also be videotaped for future DGS use. Each training seminar will review the basic operational and maintenance (O&M) practices, introducing new technology and procedures to DGS staff. The training seminars, along with the documentation, will be coordinated with DGS staff and will be fully customized to meet the goals and needs of DGS.

Training scope selection is paramount for a successful energy savings project. To achieve long-term success of ECM system operability and savings potential, the in-house maintenance personnel must have an understanding of the ECM design and be capable of operating the equipment, especially in emergency situations. The initial training we provide to DGS staff includes a comprehensive review of each ECM. This review will include an explanation of the energy savings expected with each ECM, a description of the construction that was included to achieve the savings, and O&M procedures of the new equipment. McClure's Project Development Engineer will provide this training due to their direct knowledge and understanding of the overall scope. Training is the most important component for an energy project to ensure long-term success. During project commissioning and closeout, training will be customized for each ECM system.

DGS Personnel being provided the training shall be a necessary component for project closeout and throughout the life of the contract. McClure Company will provide a qualified instructor on all new energy conservation measure (ECM) systems. We have the ability to train personnel both on and off-site, including the use of our local Harrisburg headquarters, based upon preference. Onsite training allows all training session to be attended by all applicable DGS personnel. To ensure increased training outreach, there is no limitation on the number of personnel allowed to attend any training class. Onsite training is proposed for all ECM's.

A videotape of the training may also be provided for future training use. In addition, McClure Company can also provide an on-going annual training program which can be used to provide training to new employees or provide assistance to the

maintenance staff to resolve any on-going issues. McClure Company will provide sixty (60) annual hours of consultative services. The intention of these annual hours is to demonstrate expected system operation, system calibration, troubleshooting problems for the purpose of training in house personnel. These hours could also be used to provide training to new DGS employees on systems where training had previously occurred at project close-out. The amount and use of these annual training hours will be determined during the Investment Grade Audit phase.

D.1-f Methodology & Explanation of Proposed ECMs

McClure's methodology towards developing our proposed Energy Conservation Measures (ECMs) is based upon the needs and priorities of our clients, such as those specified by the RFQ's Core ECMs (Appendix S) and other critical needs our team identified through site inspection of DGS facilities. In parallel to tailoring this GESA program to DGS's needs and expectations, we separately evaluate all ECM opportunities for energy and cost savings potential while identifying efficiency strategies that compliment and/or optimize DGS operations for the long-term, and further reduce carbon and greenhouse gas emissions. We utilize industry proven best practices while applying "lessons learned" experience, earned from our implementation of over 200 PA GESA programs, to help guide our equipment / technology selections, streamline schedules, and ensure quality installations. McClure will maintain open communication and prepare various ECM scope and program options for DGS's consideration throughout the IGA process, thus ensuring the program is customized to its unique needs and requirements.

From complex mechanical, HVAC and direct digital control (DDC) systems to LED lighting, building envelope and other customized measures, our staff will provide detailed explanation and rationale for all ECMs. Manufacturer "cut sheets" for all proposed equipment, material and technology; detailed energy savings calculations along with complete explanation of IPMVP based M&V option being utilized for each ECM; and comprehensive equipment listings with O&M manuals, including lighting line-by-line installation data and as-built drawings, will be furnished to DGS to ensure the entire scope is thoroughly explained and documented.   Based within our local Harrisburg headquarters, McClure professionals are readily available to provide detailed explanation of any/all ECMs implemented under this GESA program; capable of clarifying any scope-of-work or provide additional training or insight into the operation of each system and deployed technologies.

D.1-g Additional Innovative Energy Conservation Measures Not Already Included in the Project

McClure Company explored limited additional ECMs that did not make the Optional program listed above. These scopes were determined to have capital cost that exceeded the added energy savings benefit through preliminary evaluation, however, can be considered during the IGA as alternates to scope items proposed in the Base and Optional Scopes.

Rachel Carson Building

McClure Company evaluated the addition of a high efficiency boiler on the 4th floor to provide added redundancy with removing the steam utility service. As the preliminary evaluation showed the existing boiler plant capable of heating the facility, this scope was removed in favor of the micro CHP alternate detailed in ECM-7A. This option should be included for further investigation during the IGA.

During the site surveys, there were select locations within the facility that at one time housed IT equipment and are served with additional, specialized cooling units. Without knowing the intentions of these spaces in the future, McClure Company did not investigate the removal or modification to the heating/cooling systems for these spaces, but recommends studying during the IGA.

Finance Building

In addition to the scope detailed in ECM-9, and 10 there are other scopes that may be considered for not only control of the packaged window air conditioners but removal and replacement of the units with alternate systems, such as VRF (variable refrigerant flow) equipment. This may allow for increased control from a high efficiency system that can also provide supplemental heating to lower the buildings dependence on utility steam or reduce the boiler sizing for ECM- 16.

Irvis Building

As with the Finance Building, there are other options for control of the FCU's within this facility, primarily the implementation of electronic controllers that would increase control beyond the fan to include the valves and setpoints. This system was estimated with a high capital cost given the quantity of units but is recommended for further investigation during the IGA.

Agriculture Vet Lab

The existing HVAC system provides 100% outdoor air to the Agriculture Vet Lab building with no air recirculation. Outdoor air is preconditioned with a heat recovery runaround loop and then supplied to the penthouse which acts as a large outdoor air plenum for the (7) AHUs. The AHUs supply the labs, support space, and offices throughout the building. Given the high outdoor air and exhaust air requirements for this facility, there are energy savings opportunities that are recommended for further investigation during the IGA. McClure will evaluate potential energy saving upgrades such as lab exhaust fan control, building automation upgrades to improve temperature, pressure, and humidity control, and the reconfiguration of the existing 100% OA systems to utilize Enverid's return air cleaning/scrubbing technology to allow for air recirculation in lieu of 100% exhaust. These energy saving technologies are best studied during the IGA process as they require in depth surveys, testing, and collaboration with the building operators to maximize savings.

Lighting Control Systems

In addition to the low voltage occupancy sensor solution proposed above in ECM-2, McClure Company also evaluated a full-scale control system with addressable fixtures and the necessary changes to the lighting retrofit scope (ECM-1). Preliminary investigation indicated this system was limited in applications beyond that proposed in ECM-2 and at much higher costs, especially given the need for changes to ECM-1 to accommodate the system.

Costs
D.1-h Annual Financial Projections

Utilizing the RFQ provided Cash Flow Templates, please find McClure Company's annual financial projections for both the Base and Base Alternate GESA Program options modeled to 18-year contract terms presented on the following pages. These costs and savings projections provide various project options available to DGS for all Core ECMs; presented as:

> *Table 4A: Annual Financial Cash Flow – Base Self-Funded GESA – Core & Additional ECMs*
> *Table 4B: Costs & Savings Summary – Base Self-Funded GESA – Core & Additional ECMs*
> *Table 4C: Annual Financial Cash Flow – Base Alternate GESA w/ Energy Related Cost Savings – Core & Additional ECMs*
> *Table 4D: Costs & Savings Summary – Base Alternate GESA w/ Energy Related Cost Savings – Core & Additional ECMs*

Our cash-flow and annual financial projections are prepared in accordance to the format and requirements defined by the RFQ. All energy savings presented on these tables are guaranteed directly by McClure Company. McClure's Base Alternate GESA program proposal fully encompasses the RFQ defined Core ECMs, thus an "ECMs Evaluated but not Included" table is not applicable and is not included. Estimated cost and cost savings information for all "Core ECMs" are provided under this Section.

Detailed energy and cost calculations for each ECM can be found in **Attachment 2**. For purposes of developing this proposal and the many assumed variables at this phase of the project, we have de-rated the calculated savings for an added level of conservatism. When the Investment Grade Audit (IGA) is conducted, many variables will be measured and verified and the savings will be adjusted accordingly.

Table 4A: Annual Financial Cash Flow – Base Self-Funded GESA – Core & Additional ECMs

Table 4A: Annual Financial Cash Flow
Base Self-Funded GESA – Core & Additional ECMs
PA DGS - Capitol Complex GESA Project
3% Rate / 18 Year Term

Total Project Cost (with Contingency):	$ 6,407,975	Interest Rate:	3%
Rebates /Incentives:	$ 148,681	Annual Utility Escalation Rate:	1%
Net Project Cost to be Financed:	$ 6,259,294	Construction Period (Months):	12
First Year Energy Savings:	$ 524,530	Payment Frequency:	Annual

Year	A Annual Energy Costs without Improvements	B Annual Energy Costs with Improvements	C Annual Energy Cost Savings (A-B)	D O&M (Includes ACT 129)	E Total Savings (C + D)	F Payments for Financing Equipment	G Energy Related Cost Savings	H Payments for Monitoring & Maintenance Services	I Net Annual Benefit	J Cumulative Cash Flow
Const.	$2,916,263	$2,656,595	$259,668		$259,668		$0		$259,668	$259,668
1	$2,945,426	$2,420,896	$524,530	$183,756	$708,286	$463,327	$0	$25,000	$219,959	$479,627
2	$2,974,880	$2,445,105	$529,775	$35,426	$565,201	$463,327	$0	$25,750	$76,124	$555,751
3	$3,004,629	$2,469,556	$535,073	$35,780	$570,853	$463,327	$0	$26,523	$81,003	$636,754
4	$3,034,675	$2,494,251	$540,424	$36,138	$576,562	$463,327	$0		$113,234	$749,988
5	$3,065,022	$2,519,194	$545,828	$36,499	$582,327	$463,327	$0		$119,000	$868,988
6	$3,095,672	$2,544,386	$551,286	$36,864	$588,150	$463,327	$0		$124,823	$993,811
7	$3,126,629	$2,569,830	$556,799	$37,233	$594,032	$463,327	$0		$130,705	$1,124,516
8	$3,157,895	$2,595,528	$562,367	$37,605	$599,972	$463,327	$0		$136,645	$1,261,161
9	$3,189,474	$2,621,483	$567,991	$37,981	$605,972	$463,327	$0		$142,645	$1,403,806
10	$3,221,369	$2,647,698	$573,671	$38,361	$612,032	$463,327	$0		$148,704	$1,552,510
11	$3,253,582	$2,674,175	$579,407	$0	$579,407	$463,327	$0		$116,080	$1,668,590
12	$3,286,118	$2,700,917	$585,201	$0	$585,201	$463,327	$0		$121,874	$1,790,464
13	$3,318,979	$2,727,926	$591,053	$0	$591,053	$463,327	$0		$127,726	$1,918,190
14	$3,352,169	$2,755,205	$596,964	$0	$596,964	$463,327	$0		$133,637	$2,051,827
15	$3,385,691	$2,782,757	$602,934	$0	$602,934	$463,327	$0		$139,606	$2,191,434
16	$3,419,548	$2,810,585	$608,963	$0	$608,963	$463,327	$0		$145,636	$2,337,069
17	$3,453,743	$2,838,691	$615,053	$0	$615,053	$463,327	$0		$151,725	$2,488,795
18	$3,488,281	$2,867,077	$621,203	$0	$621,203	$463,327	$0		$157,876	$2,646,670
Totals:	$60,690,043	$50,141,852	$10,548,191	$515,643	$11,063,834	$8,339,891	$0	$77,273	$2,646,670	

NPV of Cashflow (Column I): $2,010,268.55

Table 4B: Costs & Savings Summary – Base Self-Funded GESA – Core & Additional ECMs

Table 4B: Costs & Savings Summary
Base Self-Funded GESA – Core & Additional ECMs
PA DGS - Capitol Complex GESA Project
3% Rate / 18 Year Term
ECM Chart

Project Column Description
A: Construction cost to supply, install and start-up ECM
B: Preliminary Calculated Utility Rebate
C: Preliminary Calculated Energy Savings
D: Operation and Maintenance (O&M) Savings (provided in RFQ)
E: C + D
F: (B - C) / E
G: Calculated Utility Savings (energy constant by ESCO)
H: Additional Funds Needed Annually for 18 Year Simple Payback

Self Funded Project (18 Year Payback)

ECM #	ECM Description	A Construction Cost	B Utility Rebate	C Annual Energy Savings	D O&M Savings	E Total Energy and O&M Savings	F Simple Payback	G Annual Utility Savings Natural Gas (MCF)	Electric (kWh)	Water / Sewer (Kgal)	Steam (Mlbs/Yr)	Oil (Gal)	H Annual SPB Shortfall
1	LED Lighting Upgrades	$1,623,220	$106,900	$171,742	$35,075	$206,817	7.33		2,031,238				
3	Weatherization	$120,933	$0	$24,426		$24,426	4.95	712	93,416		432		
4	BMS Control Optimization	$96,556	$0	$97,000		$97,000	1.00	2,350	538,363		1,265		
5	Rachel Carson Temperature Master Diffuser Upgrades	$697,899	$0	$12,627		$12,627	55.27		139,513				
6	Rachel Carson Pneumatic HVAC System Upgrades	$619,178	$0	$6,048		$6,048	102.38	719	3,776				
7	Rachel Carson Steam Loop Removal	$500,326	$0	$25,124		$25,124	19.91	(1,831)			1,644		
8	Rachel Carson Domestic Water Pump Replacements	$72,923	$0	$0		$0							
9	Finance VFDs for HVAC Motors	$100,344	$2,083	$2,916		$2,916	33.70		39,581				
10	Irvis Water Waster to DX/Water Coil	$34,124	$0	$5,679		$5,679	6.01		4,253	146			
11	Records Center Summer Condensing Boiler Installation	$109,451	$0	$2,563		$2,563	42.70	254					
12	18th and Herr Decentralized Heating System Installation	$594,057	$0	$10,345		$10,345	57.43	891	16,767				
14	Agriculture Boiler Replacement	$168,955	$0	$4,747		$4,747	35.59	(508)	117,516				
17	Irvis FCU Controls	$83,638	$3,513	$4,659		$4,659	17.20		63,234				
19	22nd & Forster Convert Electric AHU to Hot Water	$77,038	$0	$5,037		$5,037	15.30	(536)	124,141				
20	22nd & Forster VFDs for Fans	$44,122	$4,805	$7,645		$7,645	5.14		91,299				
21	Plumbing Improvements	$133,917	$0	$26,689		$26,689	5.02	45	1,294	986	29		
22	Steam Trap Replacements	$329,180	$0	$42,217		$42,217	7.80				1,665		
23	Electrical Transformer Upgrades	$594,792	$24,201	$37,464		$37,464	15.23		459,810				
24	Boiler Controls	$83,519	$0	$13,502		$13,502	6.19	1,447					
25	Rachel Carson Insulation Covers	$41,085	$0	$7,211		$7,211	5.70				299		
26	Rachel Carson Chiller Optimization	$112,292	$7,179	$11,696		$11,696	8.99		129,229				
	Bond Cost	$45,675											
	Project Contingency	$124,751											
	Energy Consultant Fee (0%)	$0											
	Totals:	$6,407,975	$148,681	$519,336	$35,075	$554,411	16.50	3,542	3,853,429	1132	5334	0	0

Utility Rebates (Total)	$148,681
Energy Related Cost Savings (Total)	$0
Total Financed Amount	$6,259,294

Note: "O&M Savings" (Column "D" above) included within McClure's Base Self-Funded GESA program relate to material savings associated with making lighting system improvements, in accordance to Bulletin #1 (Re-Bid)

Table 4C: Annual Financial Cash Flow – Base Alternate GESA w/ Energy Related Cost Savings – Core & Additional ECMs

Table 4C: Annual Financial Cash Flow									
Base Alternate GESA w/ Energy Related Cost Savings – Core & Additional ECMs									
PA DGS - Capitol Complex GESA Project									
3% Rate / 18 Year Term									

Total Project Cost:	$ 12,773,978			Interest Rate:	3%
Rebates /Incentives:	$ 206,938			Annual Utility Escalation Rate:	1%
Net Project Cost to be Financed:	$ 12,567,040			Construction Period (Months):	12
First Year Energy Savings:	$ 806,892			Payment Frequency:	Annual

Year	A Annual Energy Costs without Improvements	B Annual Energy Costs with Improvements	C Annual Energy Cost Savings (A-B)	D O&M (Includes ACT 129)	E Total Savings (C + D)	F Payments for Financing Equipment	G Energy Related Cost Savings	H Payments for Monitoring & Maintenance Services	I Net Annual Benefit	J Cumulative Cash Flow
Const.	$2,916,263	$2,516,811	$399,452		$399,452				$399,452	$399,452
1	$2,945,426	$2,138,533	$806,892	$277,888	$1,084,781	$923,620	$66,667	$25,000	$202,828	$602,279
2	$2,974,880	$2,159,919	$814,961	$71,660	$886,622	$923,620	$66,667	$25,750	$3,918	$606,198
3	$3,004,629	$2,181,518	$823,111	$72,377	$895,488	$923,620	$66,667	$26,523	$12,012	$618,210
4	$3,034,675	$2,203,333	$831,342	$73,101	$904,443	$923,620	$66,667		$47,489	$665,699
5	$3,065,022	$2,225,366	$839,656	$73,832	$913,487	$923,620	$66,667		$56,534	$722,233
6	$3,095,672	$2,247,620	$848,052	$74,570	$922,622	$923,620	$66,667		$65,669	$787,902
7	$3,126,629	$2,270,096	$856,533	$75,316	$931,848	$923,620	$66,667		$74,895	$862,797
8	$3,157,895	$2,292,797	$865,098	$76,069	$941,167	$923,620	$66,667		$84,213	$947,010
9	$3,189,474	$2,315,725	$873,749	$76,829	$950,578	$923,620	$66,667		$93,625	$1,040,635
10	$3,221,369	$2,338,882	$882,486	$77,598	$960,084	$923,620	$66,667		$103,131	$1,143,766
11	$3,253,582	$2,362,271	$891,311	$39,629	$930,940	$923,620	$66,667		$73,987	$1,217,753
12	$3,286,118	$2,385,894	$900,224	$40,025	$940,250	$923,620	$66,667		$83,297	$1,301,050
13	$3,318,979	$2,409,753	$909,227	$40,426	$949,652	$923,620	$66,667		$92,699	$1,393,749
14	$3,352,169	$2,433,850	$918,319	$40,830	$959,149	$923,620	$66,667		$102,196	$1,495,944
15	$3,385,691	$2,458,189	$927,502	$41,238	$968,740	$923,620	$66,667		$111,787	$1,607,731
16	$3,419,548	$2,482,771	$936,777	$41,651	$978,428	$923,620	$66,667		$121,474	$1,729,206
17	$3,453,743	$2,507,598	$946,145	$42,067	$988,212	$923,620	$66,667		$131,259	$1,860,465
18	$3,488,281	$2,532,674	$955,606	$42,488	$998,094	$923,620	$66,667		$141,141	$2,001,605
Totals:	$60,690,043	$44,463,600	$16,226,443	$1,277,592	$17,504,035	$16,625,157	$1,200,000	$77,273	$2,001,605	

NPV of Cashflow (Column I): $1,539,042.64

mcclure COMPANY

Table 4D: Costs & Savings Summary – Base Alternate GESA w/ Energy Related Cost Savings – Core & Additional ECMs

Table 4D: Costs & Savings Summary
Base Alternate GESA w/ Energy Related Cost Savings – Core & Additional ECMs
PA DGS - Capitol Complex GESA Project
3% Rate / 18 Year Term
ECM Chart

Project Column Description
A: Construction cost to supply, install and start-up ECM
B: Preliminary Calculated Utility Rebate
C: Preliminary Calculated Energy Savings
D: Operation and Maintenance (O&M) Savings (provided in RFQ)
E: C + D
F: (B - C) / E
G: Calculated Utility Savings (energy constant by ESCO)
H: Additional Funds Needed Annually for 18 Year Simple Payback

Proposed Project With Energy Related Cost Savings (18 Year Payback)

ECM #	ECM Description	A Construction Cost	B Utility Rebate	C Annual Energy Savings	D O&M Savings	E Total Energy and O&M Savings	F Simple Payback	G Annual Utility Savings Natural Gas (MCF)	Electric (kWh)	Water / Sewer (Kgal)	Steam (Mlbs/Yr)	Oil (Gal)	H Annual SPB Shortfall
1	LED Lighting Upgrades	$1,623,220	$106,900	$171,742	$35,075	$206,817	7.33		2,031,238				
2	Lighting Controls	$1,932,189	$12,261	$20,572		$20,572	93.33		244,712				$16,667
3	Weatherization	$120,933	$0	$24,426		$24,426	4.95	711.5	93,416		432		$0
4	BMS Control Optimization	$96,556	$0	$97,000		$97,000	1.00	2,350	538,363		1,265		$0
5	Rachel Carson Temperature Master Diffuser Upgrades	$697,899	$0	$12,627	$8,705	$21,332	32.72		139,513				$0
6	Rachel Carson Pneumatic HVAC System Upgrades	$619,178	$0	$6,048		$6,048	102.38	719	3,776				$0
7A	Rachel Carson Steam Loop Removal - CHP / HW Conversion	$769,385	$4,204	$34,739	$5,301	$40,040	19.11	(2,138)	133,152		1,644		$0
8	Rachel Carson Domestic Water Pump Replacements	$72,923	$0	$0	$746	$746	97.78						$0
9	Finance VFDs for HVAC Motors	$100,344	$2,083	$2,916		$2,916	33.70		39,581				$0
10	Irvis Water Waster to DX/Water Coil	$34,124	$0	$5,679		$5,679	6.01		4,253	146			$0
11	Records Center Summer Condensing Boiler Installation	$109,451	$0	$2,563		$2,563	42.70	254					$0
12	18th and Herr Decentralized Heating System Installation	$594,057	$0	$10,345	$553	$10,898	54.51	891	16,767				$0
12A	18th and Herr Water Source Heat Pump Replacements	$735,329	$0	$3,743		$3,743	196.45		41,577				$16,667
13	18th and Herr Geothermal Installation (Tent Building)	$558,185	$0	$4,220		$4,220	132.27	680	-28,032				$16,667
14	Agriculture Boiler Replacement	$168,955	$0	$4,747		$4,747	35.59	(508)	117,516				$0
15	Agriculture Geothermal	$1,887,195	$0	$7,557		$7,557	249.73		86,935				$16,667
16	Finance Steam Loop Removal/Disconnection	$742,500	$0	$175,322	$18,444	$193,766	3.83	(16,516)			13,425		$0
17	Irvis FCU Controls	$83,638	$3,513	$4,659		$4,659	17.20		63,234				$0
18	Records Center VFD Pumping	$23,027	$151	$255		$255	89.71		2,870				$0
19	22nd & Forster Convert Electric AHU to Hot Water	$77,038	$0	$5,037		$5,037	15.29	(536)	124,141				$0
20	22nd & Forster VFDs for Fans	$44,122	$4,805	$7,645		$7,645	5.14		91,299				$0
21	Plumbing Improvements	$133,917	$0	$26,689		$26,689	5.02	45	1,294	986	29		$0
22	Steam Trap Replacements	$329,180	$0	$42,217		$42,217	7.80				1,665		$0
23	Electrical Transformer Upgrades	$594,792	$24,201	$37,464	$2,127	$39,591	14.41		459,810				$0
24	Boiler Controls	$83,519	$0	$13,502		$13,502	6.19	1,447					$0
25	Rachel Carson Insulation Covers	$41,085	$0	$7,211		$7,211	5.70				299		$0
26	Rachel Carson Chiller Optimization	$112,292	$7,179	$11,696		$11,696	8.99		129,229				$0
27	Finance Window A/C Control System	$59,606	$41,641	$58,282		$58,282	0.31		791,156				$0
	Bond Cost	$80,446											
	Project Contingency	$248,893											
	Energy Consultant Fee (0%)	$0											
	Totals:	$12,773,978	$206,938	$798,903	$70,951	$869,854	14.45	-12,601	5,125,799	1,132	18,759	0	$66,667

Utility Rebates (Total)	$206,938
Energy Related Cost Savings (Total)	$1,200,000
Total Financed Amount	$12,567,040

D.1-i Energy Analysis Demonstrates Sound Engineering Principles and the Reasonableness of the Proposed Savings

McClure Company has provided detailed energy analysis and calculations under industry accepted "best practices" and standards, demonstrating sound engineering principles that yield reasonable savings expectations for a project of this scope and magnitude. Our detailed energy analysis can be found in **Attachment 2 – Energy Calculations**, located at the end of this Volume.

Sound engineering principles and industry "best practices" were utilized to analyze all provided data and perform associated energy saving calculations relating to the DGS Capitol Complex GESA project. As an internal quality control and check on the reasonableness of our proposed savings, McClure compared cost reductions of this proposal to other past GESA projects having a similar scope. In summary, our proposed cost savings (Self-Funded Base Scope of Work) for the Capitol Complex facilities reduces the baseline annual utility expenses by $519,337, or 17.81%. Our Base Alternate program saves $798,903/year (or 27.39%) off DGS's total annual operational spend of these facilities. This project falls within historical expected savings ranges for the scope of work proposed, demonstrating McClure's sound engineering principles and reasonableness of proposed savings.

Monitoring and Maintenance

D.1-j Ongoing Monitoring and Maintenance Services

Provided below is a thorough summary of the ongoing project monitoring and maintenance services that McClure will provide, including a description of the methods, schedule, scope and personnel who will be providing these services to DGS. Per the RFQ, there is no service contract included at this time.

Methods for providing ongoing project monitoring and maintenance services through McClure Company are extensive. McClure will monitor the energy use of each facility throughout the construction year. This benchmarking provides an early indicator of whether the Year 1 savings will be fully realized, or if adjustments to ECM scope are needed

For ongoing maintenance services, McClure has an in-house 24-hour mechanical emergency service department ready to respond to DGS needs over the entire contract term. Our local service team consists of over ninety (90) full time field service and maintenance technicians.

Scope for ongoing project monitoring is included for all proposed energy conservation measures (ECMs) and associated equipment, including lighting, lighting controls, building management system and components, and all building envelope installations. Utilizing industry approved "best practices" and standards, McClure will measure and verify the associated savings for each ECM. The goal is to successfully measure and cost-effectively verify the energy savings calculated, in accordance with the selected International Performance Measurement and Verification Protocol (IPMVP) Option, one year after the systems being installed.

Personnel for the ongoing project monitoring are critical in quantifying and calculating the total energy savings associated with the project. Richard Skinner, P.E., McClure's Measurement and Verification (M&V) manager, will be the supervisor responsible for all ongoing project monitoring. Shayne Homan, Vice President - Energy Services, will oversee Richard's work and manages the entire process.

D.1-k Measurement and Verification

McClure Company's proposed Measurement and Verification (M&V) plan for the DGS GESA project, which adheres to all IPMVP standards, is further described below. Our plan demonstrates scalability for measurement and verification of the proposed energy baseline, adjustment factors and energy cost savings. To ensure DGS receives the greatest value from its M&V plan, McClure considered the reasonableness and cost/benefits of all IPMVP options for each respective ECM and based our plan recommendations upon the overall suitability to the applicable ECM and cost effectiveness to DGS over the contract term.

McClure's M&V Plan Adheres to all IPMVP Standards. Information presented below includes procedures and guidelines utilized to quantify savings resulting from the installation of ECMs under PA GESA projects, and are designed to comply with the International Performance Measurement & Verification Protocol (IPMVP) being utilized for this DGS GESA program:

- **Option A – Partially Measured Retrofit Isolation**
- **Option B – Retrofit Isolation**
- **Option C – Utility Bill Comparison** (where applicable)
- **Option D – Computer Simulation**

	Table 5: Proposed IPMVP Strategy Per ECM PA DGS - Capitol Complex GESA Project		
ECM Number	**ECM Title**	**Proposed M&V Methodology**	**Justification / Reasoning for Selected M&V Methodology**
ECM-1	LED Lighting Upgrades	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-2	Lighting Controls	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-3	Weatherization	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-4	BMS Control Optimization	IPMVP Option B	Not all components of the buildings are being touched or replaced. Spot measurements and/or long term metering may most accurately determine savings for the specific ECM. Final investigation is needed during the IGA to determine the final M&V option.
ECM-5	Rachel Carson Temperature Master Diffuser Upgrades	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-6	Rachel Carson Pneumatic HVAC System Upgrades	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-7	Rachel Carson Steam Loop Removal	IPMVP Option C	Steam is a standalone utility but only serves a small portion of the load. The gas use may be impacted by other systems, however, in conjunction with ECM -4, the use of utility bills may be used to verify savings. Further investigation is needed during the IGA to determine the final M&V option.
ECM-7A	Rachel Carson Steam Loop Removal - CHP / HW Conversion	IPMVP Option A/C	Similar to ECM-7, however, Option A may be used to isolate the electrical production of the CHP as it is only a portion of the overall facility electrical system. Further investigation is needed during the IGA to determine the final M&V option.
ECM-8	Rachel Carson Domestic Water Pump Replacements	N/A	No savings associated with this measure
ECM-9	Finance VFDs for HVAC Motors	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-10	Irvis Water Waster to DX/Water Coil	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-11	Records Center Summer Condensing Boiler Installation	IPMVP Option C	The scope of work impacts the primary natural gas energy use component of the facility and can be isolated for savings through utility bill analysis that may require additional adjustments. Further investigation is needed during the IGA concerning any adjustments or to determine the M&V option.
ECM-12	18th and Herr Decentralized Heating System Installation	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-12A	18th and Herr Water Source Heat Pump Replacements	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-13	18th and Herr Geothermal Installation (Tent Building)	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.

ECM Number	ECM Title	Proposed M&V Methodology	Justification / Reasoning for Selected M&V Methodology
ECM-14	Agriculture Boiler Replacement	IPMVP Option A/C	The fuel switch allows for use of Option C for the new gas fired boilers, however, isolating the electrical energy use from the existing boilers will require isolated measurements. Further investigation is needed during the GIA to determine the final M&V option.
ECM-15	Agriculture Geothermal	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-16	Finance Steam Loop Removal/Disconnection	IPMVP Option C	Steam is a stand alone utility and natural gas would be a new utility to the site. This would allow the use of utility bills to verify savings. Further investigation is needed during the IGA to determine the final M&V option.
ECM-17	Irvis FCU Controls	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-18	Records Center VFD Pumping	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-19	22nd & Forster Convert Electric AHU to Hot Water	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-20	22nd & Forster VFDs for Fans	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-21	Plumbing Improvements	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-22	Steam Trap Replacements	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-23	Electrical Transformer Upgrades	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-24	Boiler Controls	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-25	Rachel Carson Insulation Covers	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-26	Rachel Carson Chiller Optimization	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.
ECM-27	Finance Window A/C Control System	IPMVP Option A	Not all components of the buildings are being touched or replaced. Spot measurements and stipulated variables most accurately determine savings for the specific ECM.

During the post-installation M&V verification process, McClure Company and DGS will mutually agree that the proper equipment components or systems were installed as contracted, are operating correctly and as specified, and have the potential to generate the projected savings. Verification methods may include surveys, inspections and/or continuous metering of equipment and systems. A critical step in the process will commence during system/equipment commissioning of each installed ECM, which McClure will coordinate with DGS staff and representatives installing subcontract partners. McClure Company and DGS will determine energy savings in accordance with an agreed-upon M&V method using verification techniques defined within this M&V plan.

The Scalability for the Measurement and Verification Plan of the Proposed Energy Baseline, Adjustment Factors and Energy Cost Savings will be quantified and mutually agreed to between DGS and McClure Company. McClure's M&V plan is scalable, from one ECM's measurement and verification criteria to the entire program and portfolio of ECMs. Scaling allows McClure's team to separately measure each ECM and calculate the aggregate of savings attributed to the program. Below is a summary of the scalability components of the plan:

- *Proposed Energy Baseline*: During the performance period, it may be necessary to adjust the baseline for changes in the facilities use. Some common adjustments are made for items such as:

  - Changes in building occupancy
  - Additions to the building footprint
  - Weather
  - Operational (schedule and /or temperature set point, equipment operation, etc.) changes
  - Equipment maintenance changes

- *Energy Cost Savings:* To calculate the energy cost savings, McClure will conduct building surveys, monitor the facilities for occupation and usage, and verify energy savings. There are four industry-accepted options to verifying energy savings that were created as part of the International Performance Measurement and Verification Protocol (IPMVP); Option A, B, C & D. These industry standards will be utilized to determine and justify guaranteed energy cost savings associated with the DGS GESA program.

Attachment 1 – Energy Baseline

McClure Company has provided an energy baseline for DGS based upon the provided utility usage data sheets. The baseline selected is described above in section D.1-a.5. Located in this attachment are the energy baseline rates utilized to calculate the energy savings for each energy conservation measure. The data provided by DGS during the RFQ phase did not include complete utility information for each site. Assumption where made and can be seen in the energy calculations.

Base Utility Rates						
Site	Electric $kWh	Oil $/Gal	Natural Gas $/CCF	Steam $/MLbs	Propane $/Gal	Water/Sewer $/kGal
Rachel Carson	$0.09051		$0.79418	$24.12301		$20.20886
Finance Building	$0.07367		*$1.00000*	$25.36157		*$16.45000*
Irvis Building (aka - South Office)	$0.07368			*$25.36157*		$36.64967
State Records Center	$0.08878		$1.00873			*$16.45000*
18th & Herr Complex (Including Shops)	$0.09003		$0.99160			*$43.29299*
Agriculturtal Building	$0.08693		$1.07746			$26.74937
Agricultural Vet Laboratory	$0.07948		$0.82279			$48.93498
22nd & Forester St, Office	$0.08374		$0.99945			$32.04185

Estimated values based on historical rates or similar buildings

Energy Consumption:

Site	Base Utility Usage and Costs												
	Electric		Oil		Natural Gas		Propane		Steam		Water / Sewer		
	Usage kWh	Cost	Usage Gal	Cost	Usage CCF	Cost	Usage Gal	Cost	Usage MLbs.	Cost	Usage kGal	Cost	
Rachel Carson	4,284,000	$387,738			102,940	$81,753			2,390	$57,654	3,950	$79,825	
Finance Building	3,527,981	$259,896							15,925	$403,883	2,981	$99,718	
Irvis Building (aka - South Office)	3,098,845	$228,311							*TBD - Included within 1 Master Account (See Bulletin #4 Response). $194,774 (Est)*		1,196	$43,833	
State Records Center	479,100	$42,534			25,077	$25,296					576	$60,826	
18th & Herr Complex (Including Shops)	879,600	$79,194			48,940	$48,529					157	$27,318	
Agriculturtal Building	2,671,000	$232,197			1,859	$2,003					1,185	$31,698	
Agricultural Vet Laboratory	2,365,800	$188,037			158,329	$130,271					646	$31,612	
22nd & Forester St, Office	1,105,800	$92,601			57,700	$57,668					908	$29,094	
Total Annual Cost		$2,916,263											

Bulletin #4 Note: Steam data for NRG Account 001002 (Central Plant) was not provided for analysis at this phase of the project, however, will be collected and analyzed during the Investment Grade Audit (IGA) process. Cost was assumed to be $194,774 based on similar buildings.

Attachment 2 – Energy Calculations

McClure Company has provided a preliminary assessment for each energy conservation measure (ECM) opportunity, including a detailed estimate of implementation costs and energy cost savings. A sample of the complete detailed calculations for the energy cost savings can be found within this Attachment. The preliminary assessment of the energy efficiency opportunities available to DGS are based upon the information provided in the RFQ, originally issued bulletins (1-4) and Re-Bid bulletins (1&2), and escorted tours of DGS sites during the original RFQ procurement phase.

ECM 4: BMS Control Optimization
Weather: Harrisburg, PA

Optimization		Existing	Proposed	Saved	Units
	Heating	7,461	6,448	1,013	MLB
	Cooling	0	0	0	kWh
	Fan	329,687	262,518	67,169	kWh

Existing System

Value	Label
0	Boilers
90%	Efficency
1	CLG kW/Ton
429,521	SF
	HP Pump
42,952	HTG OA CFM
42,952	CLG OA CFM
155	HP Fan

Value	Label
70	HTG Setpoint
72	CLG Setpoint
65	HTG Setback
75	CLG Setback
50	HTG Balance Point (F)
21.98	CLG Balance Point (h)
859	Building Occupants
150	Btu/HR
128850	Total Btu

Proposed System

Value	Label
0	Boilers
90%	Efficency
1	CLG kW/Ton
68	Proposed HTG Occ. Setpoint
76	Proposed CLG Occ. Setpoint
60	Proposed HTG UnOcc. Setpoint
80	Proposed CLG UnOcc. Setpoint
50	HTG Balance Point (F)
21.98	CLG Balance Point (h)

Building Envelope HTG Load

	Value	Units		R Value
Roof Area	57,552	SF		
Total Wall Area	89,100	SF		
Glass Area	13,365	SF		
Masonry Wall Area	75,735	SF		
Roof Overall U-Value	0.1000	BTU / Hr-Sq Ft-Deg F		10
Wall Overall U-Value	0.0615	BTU / Hr-Sq Ft-Deg F		16.27243969
Glass Overall U-Value	0.9500	BTU / Hr-Sq Ft-Deg F		1.052631579
Roof Heat Loss	5,755	BTU / Hr-Deg F		
Wall Heat Loss	4,654	BTU / Hr-Deg F		
Glass Heat Loss	12,697	BTU / Hr-Deg F		
Total Envelope Heat Load	23,106	BTU / Hr-Deg F		
	Design OA	Actual OA		
OA Heat Load	13,981	13,981	BTU / Hr-Deg F	
Total Occupied Heat Load	37,087	37,087	BTU / Hr-Deg F	
OA % of design 100%	12,886	12,886	CFM OA	

Existing

Day of Week #	Day	Occup:	Hour Ending	Occup:	Month #:	Month:	Occup:
1	Sunday	N	1	N	1	January	Y
2	Monday	Y	2	N	2	February	Y
3	Tuesday	Y	3	N	3	March	Y
4	Wednesday	Y	4	N	4	April	Y
5	Thursday	Y	5	N	5	May	Y
6	Friday	Y	6	Y	6	June	Y
7	Saturday	N	7	Y	7	July	Y
			8	Y	8	August	Y
			9	Y	9	September	Y
			10	Y	10	October	Y
			11	Y	11	November	Y
			12	Y	12	December	Y
			13	Y			
			14	Y			
			15	Y			
			16	Y			
			17	Y			
			18	Y			
			19	Y			
			20	Y			
			21	Y			
			22	Y			
			23	Y			
			24	Y			

Proposed

Day of Week #	Day	Occup:	Hour Ending	Occup:	Month #:	Month:	Occup:
1	Sunday	N	1	N	1	January	Y
2	Monday	Y	2	N	2	February	Y
3	Tuesday	Y	3	N	3	March	Y
4	Wednesday	Y	4	N	4	April	Y
5	Thursday	Y	5	N	5	May	Y
6	Friday	Y	6	Y	6	June	Y
7	Saturday	N	7	Y	7	July	Y
			8	Y	8	August	Y
			9	Y	9	September	Y
			10	Y	10	October	Y
			11	Y	11	November	Y
			12	Y	12	December	Y
			13	Y			
			14	Y			
			15	Y			
			16	Y			
			17	Y			
			18	Y			
			19	Y			
			20	Y			
			21	N			
			22	N			
			23	N			
			24	N			

Max 99 — Min 5 — DB — 3935 HTG

Existing System totals: 4997 | 3,344 | 3,936 | 2,994 | 3,524 | 0 | 0 | 329,687
Proposed Optimization totals: 3945 | 2,992 | 3,456 | 0 | 262,518

(Empty columns in both systems: CLG OA BTU, CLG OA kWh, CLG People BTU, CLG People kWh, Pump VFD %, Pump KWh)

Month	Day	Day of Week	Hour	DB	h	3935 HTG	Ex Occ	Ex Plant	Ex HTG OA BTU	Ex HTG OA MLB	Ex HTG BLDG BTU	Ex HTG BLDG MLB	Ex Fan kWh	Pr Sys	Pr Plant	Pr HTG OA BTU	Pr HTG OA MLB	Pr HTG BLDG BTU	Pr HTG BLDG MLB	Pr Fan kWh
1	1	5	1	37	13.17	1	N	On	0	0.00	646,972	0.76	0	N	On	0	0.00	531,441	0.63	0
1	1	5	2	36.3	12.92	1	N	On	0	0.00	663,146	0.78	0	N	On	0	0.00	663,146	0.78	0
1	1	5	3	35.8	12.8	1	N	On	0	0.00	674,699	0.79	0	N	On	0	0.00	674,699	0.79	0
1	1	5	4	35.1	12.55	1	N	On	0	0.00	690,874	0.81	0	N	On	0	0.00	690,874	0.81	0
1	1	5	5	34.7	12.18	1	N	On	0	0.00	700,116	0.82	0	N	On	0	0.00	700,116	0.82	0
1	1	5	6	34.3	11.76	1	Y	On	1,663,728	1.96	824,889	0.97	69.378	Y	On	1,663,728	1.96	824,889	0.97	69.378
1	1	5	7	34	11.4	1	Y	On	1,677,709	1.97	831,821	0.98	69.378	Y	On	1,677,709	1.97	831,821	0.98	69.378
1	1	5	8	34	11.36	1	Y	On	1,677,709	1.97	831,821	0.98	69.378	Y	On	1,677,709	1.97	831,821	0.98	69.378
1	1	5	9	34	11.31	1	Y	On	1,677,709	1.97	831,821	0.98	69.378	Y	On	1,677,709	1.97	831,821	0.98	69.378
1	1	5	10	34	11.27	1	Y	On	1,677,709	1.97	831,821	0.98	69.378	Y	On	1,677,709	1.97	831,821	0.98	69.378
1	1	5	11	35.1	11.57	1	Y	On	1,626,446	1.91	806,404	0.95	69.378	Y	On	1,626,446	1.91	806,404	0.95	69.378
1	1	5	12	36	11.86	1	Y	On	1,584,503	1.86	785,609	0.92	69.378	Y	On	1,584,503	1.86	785,609	0.92	69.378
1	1	5	13	37	12.16	1	Y	On	1,537,900	1.81	762,503	0.90	69.378	Y	On	1,537,900	1.81	762,503	0.90	69.378
1	1	5	14	36.7	11.93	1	Y	On	1,551,881	1.83	769,434	0.91	69.378	Y	On	1,551,881	1.83	769,434	0.91	69.378
1	1	5	15	36.3	11.7	1	Y	On	1,570,522	1.85	778,677	0.92	69.378	Y	On	1,570,522	1.85	778,677	0.92	69.378
1	1	5	16	36	11.47	1	Y	On	1,584,503	1.86	785,609	0.92	69.378	Y	On	1,584,503	1.86	785,609	0.92	69.378
1	1	5	17	34.7	11.16	1	Y	On	1,645,087	1.94	815,647	0.96	69.378	Y	On	1,645,087	1.94	815,647	0.96	69.378
1	1	5	18	33.3	10.83	1	Y	On	1,710,331	2.01	847,995	1.00	69.378	Y	On	1,710,331	2.01	847,995	1.00	69.378
1	1	5	19	32	10.51	1	Y	On	1,770,915	2.08	878,033	1.03	69.378	Y	On	1,770,915	2.08	878,033	1.03	69.378
1	1	5	20	32	10.43	1	Y	On	1,770,915	2.08	878,033	1.03	69.378	Y	On	1,770,915	2.08	878,033	1.03	69.378
1	1	5	21	32	10.39	1	Y	On	1,770,915	2.08	878,033	1.03	69.378	N	On	0	0.00	762,503	0.90	0
1	1	5	22	32	10.3	1	Y	On	1,770,915	2.08	878,033	1.03	69.378	N	On	0	0.00	762,503	0.90	0
1	1	5	23	30.9	9.84	1	Y	On	1,822,178	2.14	903,450	1.06	69.378	N	On	0	0.00	787,919	0.93	0
1	1	5	24	30	9.45	1	Y	On	1,864,121	2.19	924,246	1.09	69.378	N	On	0	0.00	808,715	0.95	0
1	2	6	1	28.9	9.01	1	N	On	0	0.00	834,132	0.98	0	N	On	0	0.00	834,132	0.98	0
1	2	6	2	27.7	8.62	1	N	On	0	0.00	861,859	1.01	0	N	On	0	0.00	861,859	1.01	0
1	2	6	3	26.2	8.14	1	N	On	0	0.00	896,518	1.06	0	N	On	0	0.00	896,518	1.06	0
1	2	6	4	25	7.76	1	N	On	0	0.00	924,246	1.09	0	N	On	0	0.00	924,246	1.09	0
1	2	6	5	23.4	7.41	1	N	On	0	0.00	961,215	1.13	0	N	On	0	0.00	961,215	1.13	0
1	2	6	6	21.6	6.95	1	Y	On	2,255,587	2.65	1,118,337	1.32	69.378	Y	On	2,255,587	2.65	1,118,337	1.32	69.378
1	2	6	7	19.9	6.57	1	Y	On	2,334,812	2.75	1,157,618	1.36	69.378	Y	On	2,334,812	2.75	1,157,618	1.36	69.378
1	2	6	8	21	6.85	1	Y	On	2,283,548	2.69	1,132,201	1.33	69.378	Y	On	2,283,548	2.69	1,132,201	1.33	69.378
1	2	6	9	21.9	7.07	1	Y	On	2,241,606	2.64	1,111,405	1.31	69.378	Y	On	2,241,606	2.64	1,111,405	1.31	69.378
1	2	6	10	23	7.34	1	Y	On	2,190,342	2.58	1,085,989	1.28	69.378	Y	On	2,190,342	2.58	1,085,989	1.28	69.378
1	2	6	11	25	7.88	1	Y	On	2,097,136	2.47	1,039,776	1.22	69.378	Y	On	2,097,136	2.47	1,039,776	1.22	69.378
1	2	6	12	27	8.41	1	Y	On	2,003,930	2.36	993,564	1.17	69.378	Y	On	2,003,930	2.36	993,564	1.17	69.378
1	2	6	13	28.9	8.94	1	Y	On	1,915,384	2.25	949,662	1.12	69.378	Y	On	1,915,384	2.25	949,662	1.12	69.378
1	2	6	14	29.3	9.06	1	Y	On	1,896,743	2.23	940,420	1.11	69.378	Y	On	1,896,743	2.23	940,420	1.11	69.378
1	2	6	15	29.7	9.18	1	Y	On	1,878,102	2.21	931,177	1.10	69.378	Y	On	1,878,102	2.21	931,177	1.10	69.378
1	2	6	16	30	9.3	1	Y	On	1,864,121	2.19	924,246	1.09	69.378	Y	On	1,864,121	2.19	924,246	1.09	69.378
1	2	6	17	30	9.37	1	Y	On	1,864,121	2.19	924,246	1.09	69.378	Y	On	1,864,121	2.19	924,246	1.09	69.378
1	2	6	18	30	9.41	1	Y	On	1,864,121	2.19	924,246	1.09	69.378	Y	On	1,864,121	2.19	924,246	1.09	69.378
1	2	6	19	30	9.48	1	Y	On	1,864,121	2.19	924,246	1.09	69.378	Y	On	1,864,121	2.19	924,246	1.09	69.378
1	2	6	20	30	9.56	1	Y	On	1,864,121	2.19	924,246	1.09	69.378	Y	On	1,864,121	2.19	924,246	1.09	69.378
1	2	6	21	30	9.6	1	Y	On	1,864,121	2.19	924,246	1.09	69.378	N	On	0	0.00	808,715	0.95	0
1	2	6	22	30	9.67	1	Y	On	1,864,121	2.19	924,246	1.09	69.378	N	On	0	0.00	808,715	0.95	0
1	2	6	23	30	9.75	1	Y	On	1,864,121	2.19	924,246	1.09	69.378	N	On	0	0.00	808,715	0.95	0
1	2	6	24	30	9.82	1	Y	On	1,864,121	2.19	924,246	1.09	69.378	N	On	0	0.00	808,715	0.95	0
1	3	7	1	30	9.9	1	N	On	0	0.00	808,715	0.95	0	N	On	0	0.00	808,715	0.95	0
1	3	7	2	30.4	10.07	1	N	On	0	0.00	799,472	0.94	0	N	On	0	0.00	799,472	0.94	0
1	3	7	3	30.6	10.17	1	N	On	0	0.00	794,851	0.94	0	N	On	0	0.00	794,851	0.94	0
1	3	7	4	30.9	10.35	1	N	On	0	0.00	787,919	0.93	0	N	On	0	0.00	787,919	0.93	0
1	3	7	5	31.6	10.74	1	N	On	0	0.00	771,745	0.91	0	N	On	0	0.00	771,745	0.91	0
1	3	7	6	32.4	11.18	1	N	On	0	0.00	753,260	0.89	0	N	On	0	0.00	753,260	0.89	0
1	3	7	7	33.1	11.59	1	N	On	0	0.00	737,086	0.87	0	N	On	0	0.00	737,086	0.87	0
1	3	7	8	33.4	11.81	1	N	On	0	0.00	730,154	0.86	0	N	On	0	0.00	730,154	0.86	0
1	3	7	9	33.6	12.02	1	N	On	0	0.00	725,533	0.85	0	N	On	0	0.00	725,533	0.85	0
1	3	7	10	34	12.25	1	N	On	0	0.00	716,290	0.84	0	N	On	0	0.00	716,290	0.84	0
1	3	7	11	34.3	12.4	1	N	On	0	0.00	709,358	0.83	0	N	On	0	0.00	709,358	0.83	0
1	3	7	12	34.7	12.55	1	N	On	0	0.00	700,116	0.82	0	N	On	0	0.00	700,116	0.82	0
1	3	7	13	35.1	12.69	1	N	On	0	0.00	690,874	0.81	0	N	On	0	0.00	690,874	0.81	0
1	3	7	14	35.1	12.74	1	N	On	0	0.00	690,874	0.81	0	N	On	0	0.00	690,874	0.81	0
1	3	7	15	35.1	12.83	1	N	On	0	0.00	690,874	0.81	0	N	On	0	0.00	690,874	0.81	0
1	3	7	16	35.1	12.88	1	N	On	0	0.00	690,874	0.81	0	N	On	0	0.00	690,874	0.81	0
1	3	7	17	35.8	12.8	1	N	On	0	0.00	674,699	0.79	0	N	On	0	0.00	674,699	0.79	0
1	3	7	18	36.3	12.68	1	N	On	0	0.00	663,146	0.78	0	N	On	0	0.00	663,146	0.78	0
1	3	7	19	37	12.56	1	N	On	0	0.00	646,972	0.76	0	N	On	0	0.00	646,972	0.76	0
1	3	7	20	36.3	12.09	1	N	On	0	0.00	663,146	0.78	0	N	On	0	0.00	663,146	0.78	0
1	3	7	21	35.8	11.74	1	N	On	0	0.00	674,699	0.79	0	N	On	0	0.00	674,699	0.79	0
1	3	7	22	35.1	11.29	1	N	On	0	0.00	690,874	0.81	0	N	On	0	0.00	690,874	0.81	0
1	3	7	23	33.6	10.65	1	N	On	0	0.00	725,533	0.85	0	N	On	0	0.00	725,533	0.85	0
1	3	7	24	32.4	10.14	1	N	On	0	0.00	753,260	0.89	0	N	On	0	0.00	753,260	0.89	0
1	4	1	1	30.9	9.52	1	N	On	0	0.00	787,919	0.93	0	N	On	0	0.00	787,919	0.93	0
1	4	1	2	29.7	9.1	1	N	On	0	0.00	815,647	0.96	0	N	On	0	0.00	815,647	0.96	0
1	4	1	3	27	8.66	1	N	On	0	0.00	850,306	1.00	0	N	On	0	0.00	850,306	1.00	0
1	4	1	4	27	8.25	1	N	On	0	0.00	878,033	1.03	0	N	On	0	0.00	878,033	1.03	0
1	4	1	5	26.1	7.9	1	N	On	0	0.00	898,829	1.06	0	N	On	0	0.00	898,829	1.06	0
1	4	1	6	25	7.53	1	N	On	0	0.00	924,246	1.09	0	N	On	0	0.00	924,246	1.09	0
1	4	1	7	24.1	7.19	1	N	On	0	0.00	945,041	1.11	0	N	On	0	0.00	945,041	1.11	0
1	4	1	8	23.4	7.02	1	N	On	0	0.00	961,215	1.13	0	N	On	0	0.00	961,215	1.13	0
1	4	1	9	22.6	6.83	1	N	On	0	0.00	979,700	1.15	0	N	On	0	0.00	979,700	1.15	0
1	4	1	10	21.9	6.66	1	N	On	0	0.00	995,875	1.17	0	N	On	0	0.00	995,875	1.17	0

ECM 5: Rachel Carson Temperature Master Diffuser Upgrades
Weather: Harrisburg, PA

Assumptions

25%	of Diffusers already repaired/replaced
2700	Total Number of Diffusers
2025	QTY to be repaired/replaced
*all units served from central air station AHUs	

	Savings	Existing	Proposed	Saved	Units
	Fan Energy	1,416,651	1,261,637	155,014	kWh

Unit	SA CFM	Min OA %	OA CFM	SAF QTY	SAF CFM EA	SAF HP EA	RAF QTY	RAF CFM EA	RAF HP EA	Tot SAF HP	Tot RAF HP
1	180000	10%	18000	2	90000	125	2	90000	50	250	100
2	180000	10%	18000	2	90000	125	2	90000	50	250	100

				OAT	% Load	m			b	
60%	Min VFD Existing									
50%	Min VFD Proposed		20	100%	-0.03333	x	+	1.6667	
60%	VFD HTG (proposed only)		50	0%					
50	F HTG Balance		OAT	% Load	m			b	
65	F CLG Balance		89	100%	0.041667	x	+	-2.7083	
20	F Min Design Day		65	0%					
89	F Max Design Day								

Existing

Day of Week	Day:	Occup:	Hour Ending	Occup:	Month #:	Month:	Occup:
1	Sunday	N	1	N	1	January	Y
2	Monday	Y	2	N	2	February	Y
3	Tuesday	Y	3	N	3	March	Y
4	Wednesday	Y	4	N	4	April	Y
5	Thursday	Y	5	N	5	May	Y
6	Friday	Y	6	Y	6	June	Y
7	Saturday	N	7	Y	7	July	Y
			8	Y	8	August	Y
			9	Y	9	September	Y
			10	Y	10	October	Y
			11	Y	11	November	Y
			12	Y	12	December	Y
			13	Y			
			14	Y			
			15	Y			
			16	Y			
			17	Y			
			18	Y			
			19	Y			
			20	Y			
			21	Y			
			22	N			
			23	N			
			24	N			

Proposed

Day of Week	Day:	Occup:	Hour Ending	Occup:	Month #:	Month:	Occup:
1	Sunday	N	1	N	1	January	N
2	Monday	Y	2	N	2	February	Y
3	Tuesday	Y	3	N	3	March	Y
4	Wednesday	Y	4	N	4	April	Y
5	Thursday	Y	5	N	5	May	Y
6	Friday	Y	6	Y	6	June	Y
7	Saturday	N	7	Y	7	July	Y
			8	Y	8	August	Y
			9	Y	9	September	Y
			10	Y	10	October	Y
			11	Y	11	November	Y
			12	Y	12	December	Y
			13	Y			
			14	Y			
			15	Y			
			16	Y			
			17	Y			
			18	Y			
			19	Y			
			20	N			
			21	N			
			22	N			
			23	N			
			24	N			

		99		44.88							kWh		kWh
		5			3935	2718	1523	4208	3682		1,416,651		1,261,637

Month	Day	Hour	DB	WB	DOW	h	HTG Hour	CLG Hour	CLG Hour Occupied	Existing Occupied	Proposed Occupied	Existing VFD Load	Existing Fan Energy	Proposed VFD Load	Proposed Fan Energy
1	1	1	37	35.3	5	13.17	1	0	0	N	N	0%	0	0%	0
1	1	2	36.3	34.7	5	12.92	1	0	0	N	N	0%	0	0%	0
1	1	3	35.8	34.4	5	12.8	1	0	0	N	N	0%	0	0%	0
1	1	4	35.1	33.8	5	12.55	1	0	0	N	N	0%	0	0%	0
1	1	5	34.7	32.9	5	12.18	1	0	0	N	N	0%	0	0%	0
1	1	6	34.3	31.9	5	11.76	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	7	34	31.1	5	11.4	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	8	34	31	5	11.36	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	9	34	30.9	5	11.31	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	10	34	30.8	5	11.27	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	11	35.1	31.5	5	11.57	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	12	36	32.2	5	11.86	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	13	37	32.9	5	12.16	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	14	36.7	32.3	5	11.93	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	15	36.3	31.8	5	11.7	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	16	36	31.3	5	11.47	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	17	34.7	30.5	5	11.16	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	18	33.3	29.7	5	10.83	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	19	32	28.9	5	10.51	1	0	0	Y	Y	60%	313.32	60%	313.32
1	1	20	32	28.7	5	10.43	1	0	0	Y	N	60%	313.32	60%	313.32
1	1	21	32	28.6	5	10.39	1	0	0	Y	N	60%	313.32	60%	313.32
1	1	22	32	28.4	5	10.3	1	0	0	N	N	0%	0	0%	0
1	1	23	30.9	27.3	5	9.84	1	0	0	N	N	0%	0	0%	0
1	1	24	30	26.3	5	9.45	1	0	0	N	N	0%	0	0%	0
1	2	1	28.9	25.1	6	9.01	1	0	0	N	N	0%	0	0%	0
1	2	2	27.7	24.1	6	8.62	1	0	0	N	N	0%	0	0%	0
1	2	3	26.2	22.8	6	8.14	1	0	0	N	N	0%	0	0%	0
1	2	4	25	21.8	6	7.76	1	0	0	N	N	0%	0	0%	0
1	2	5	23.4	20.8	6	7.41	1	0	0	N	N	0%	0	0%	0
1	2	6	21.6	19.5	6	6.95	1	0	0	Y	Y	95%	494.3493	60%	313.32
1	2	7	19.9	18.4	6	6.57	1	0	0	Y	Y	100%	522.2	60%	313.32
1	2	8	21	19.2	6	6.85	1	0	0	Y	Y	97%	504.7933	60%	313.32
1	2	9	21.9	19.8	6	7.07	1	0	0	Y	Y	94%	489.1273	60%	313.32
1	2	10	23	20.6	6	7.34	1	0	0	Y	Y	90%	469.98	60%	313.32
1	2	11	25	22.1	6	7.88	1	0	0	Y	Y	83%	435.1667	60%	313.32
1	2	12	27	23.5	6	8.41	1	0	0	Y	Y	77%	400.3533	60%	313.32
1	2	13	28.9	24.9	6	8.94	1	0	0	Y	Y	70%	367.2807	60%	313.32
1	2	14	29.3	25.2	6	9.06	1	0	0	Y	Y	69%	360.318	60%	313.32
1	2	15	29.7	25.6	6	9.18	1	0	0	Y	Y	68%	353.3553	60%	313.32
1	2	16	30	25.9	6	9.3	1	0	0	Y	Y	67%	348.1333	60%	313.32
1	2	17	30	26.1	6	9.37	1	0	0	Y	Y	67%	348.1333	60%	313.32
1	2	18	30	26.2	6	9.41	1	0	0	Y	Y	67%	348.1333	60%	313.32
1	2	19	30	26.4	6	9.48	1	0	0	Y	Y	67%	348.1333	60%	313.32
1	2	20	30	26.6	6	9.56	1	0	0	Y	N	67%	348.1333	60%	313.32
1	2	21	30	26.7	6	9.6	1	0	0	Y	N	67%	348.1333	60%	313.32
1	2	22	30	26.8	6	9.67	1	0	0	N	N	0%	0	0%	0
1	2	23	30	27	6	9.75	1	0	0	N	N	0%	0	0%	0
1	2	24	30	27.2	6	9.82	1	0	0	N	N	0%	0	0%	0
1	3	1	30	27.4	7	9.9	1	0	0	N	N	0%	0	0%	0

ECM 6: Rachel Carson Pneumatic HVAC System Upgrades

Weather: Harrisburg, PA

Summary Table

		Savings	Existing	Proposed	Saved	Units
Optimization	Heating		129,293	123,731	5,562	CCF
	Cooling		260,209	231,137	29,072	kWh
	Fan		1,261,637	1,109,262	152,376	kWh
Control Upgrades	Heating		123,731	115,748	7,983	CCF
	Cooling		231,137	226,940	4,196	kWh
	Fan		1,109,262	1,109,262		kWh

Existing System

3	Boilers
88%	Efficiency
1	CLG kW/Ton
420,125	SF
42,000	HP Pump
42,000	HTG OA CFM
700	HP Fan

70	HTG Setpoint
72	CLG Setpoint
62	HTG Setback
75	CLG Setback
50	HTG Balance Point (F)
21.98	CLG Balance Point (h)

1519	Building Occupants
150	Btu/HR
227850	Total Btu

Proposed System

3	Boilers
88%	Eff.
88%	Efficiency
1	CLG kW/Ton

for optimization savings is only schedule, for pneumatic replacement is only temp settings

68	Proposed HTG Occ. Setpoint
76	Proposed CLG Occ. Setpoint
60	Proposed HTG UnOcc. Setpoint
80	Proposed CLG UnOcc. Setpoint
50	HTG Balance Point (F)
21.98	CLG Balance Point (h)

Building Envelope HTG Load

			R Value
Roof Area	35,661	SF	
Total Wall Area	218,940	SF	
Glass Area	65,682	SF	
Masonry Wall Area	153,258	SF	
Roof Overall U-Value	0.0667	BTU / Hr-Sq Ft-Deg F	15
Wall Overall U-Value	0.0615	BTU / Hr-Sq Ft-Deg F	16.27243969
Glass Overall U-Value	0.9500	BTU / Hr-Sq Ft-Deg F	1.052631579
Roof Heat Loss	2,377	BTU / Hr-Deg F	
Wall Heat Loss	9,418	BTU / Hr-Deg F	
Glass Heat Loss	62,398	BTU / Hr-Deg F	
Total Envelope Heat Load	74,194	BTU / Hr-Deg F	
	Design OA	Actual OA	
OA Heat Load	0	0	BTU / Hr-Deg F
Total Occupied Heat Load	74,194	74,194	BTU / Hr-Deg F
OA % of design	35%	0	0	CFM OA

Existing Schedule

Day of Week #	Day:	Occup	Hour Ending	Occup	Month #:	Month:	Occup
1	Sunday	N	1	N	1	January	Y
2	Monday	Y	2	N	2	February	Y
3	Tuesday	Y	3	N	3	March	Y
4	Wednesday	Y	4	N	4	April	Y
5	Thursday	Y	5	N	5	May	Y
6	Friday	Y	6	Y	6	June	Y
7	Saturday	N	7	Y	7	July	Y
			8	Y	8	August	Y
			9	Y	9	September	Y
			10	Y	10	October	Y
			11	Y	11	November	Y
			12	Y	12	December	Y
			13	Y			
			14	Y			
			15	Y			
			16	Y			
			17	Y			
			18	Y			
			19	Y			
			20	Y			
			21	Y			
			22	N			
			23	N			
			24	N			

Proposed Schedule

Day of Week #	Day:	Occup	Hour Ending	Occup	Month #:	Month:	Occup
1	Sunday	N	1	N	1	January	Y
2	Monday	Y	2	N	2	February	Y
3	Tuesday	Y	3	N	3	March	Y
4	Wednesday	Y	4	N	4	April	Y
5	Thursday	Y	5	N	5	May	Y
6	Friday	Y	6	Y	6	June	Y
7	Saturday	N	7	Y	7	July	Y
			8	Y	8	August	Y
			9	Y	9	September	Y
			10	Y	10	October	Y
			11	Y	11	November	Y
			12	Y	12	December	Y
			13	Y			
			14	Y			
			15	Y			
			16	Y			
			17	Y			
			18	Y			
			19	Y			
			20	N			
			21	N			
			22	N			
			23	N			
			24	N			

[Large hourly simulation data table follows, with three sections — Existing System, Proposed Optimization, and Proposed Replacement — each containing hourly rows of Month, Day, Day of Week, Hour, DB, h, HTG, Existing Occupied, HTG Plant Operation, HTG OA BTU, HTG OA CCF, HTG BLDG BTU, HTG BLDG CCF, CLG OA BTU, CLG OA kWh, CLG People BTU, CLG People kWh, Fan kWh, Pump VFD %, and Pump kWh values.]

ECM 7: Rachel Carson Steam Loop Removal

Assumptions		Steam Usage Mlbs		BE Savings	MBH	CCF		Savings	Existing	Proposed	Saved	Units
944000	BTU/Mlb Steam	Jan-18	208.5	47	152,278	1,521		HTG	2390.4	0	**2390.4**	MLB
2	PSIG	Feb-18	136	31	99,328	992		HTG	0	17,437	**-17,437**	CCF
		Mar-18	126.7	29	92,536	924						
88%	Average Boiler Efficiency	Apr-18	132.1	30	96,480	964						
90%	Estimated HX Efficiency	May-18	146.8	33	107,216	1,071						
		Jun-18	255.2	58	186,386	1,862						
		Jul-18	266.8	60	194,858	1,946						
		Aug-18	288.6	65	210,780	2,105						
		Sep-18	281	64	205,229	2,050						
		Oct-18	260.6	59	190,330	1,901						
		Nov-18	140.6	32	102,688	1,026						
		Dec-18	147.5	33	107,727	1,076						
			2390.4	541		17,437						

Converter Schedule

No	PSIG	BTU/MLB	GPM	EWT	LWT	Delta		BTUh	MLB/hr
1	2	944,000	450	156	180	24		5,400,000	5.72
2	2	944,000	450	156	180	24		5,400,000	5.72

ECM 9: Finance VFDs for HVAC Motors
Assumptions

Unit	HP
1	7.5
2	20
3	20
4	7.5
5	10
6	30
7	30
8	15
A	7.5
B	7.5
Total	155

Savings	Existing	Proposed	Saved	Units
Fan Energy	371,350	329,687	41,664	kWh

	OAT	% Load	m		b
60% Min VFD Existing					
50% Min VFD Proposed	20	100%	-0.03333 x	+	1.6667
60% VFD HTG (proposed only)	50	0%			
50 F HTG Balance	OAT	% Load	m		b
65 F CLG Balance	89	100%	0.041667 x	+	-2.7083
20 F Min Design Day	65	0%			
89 F Max Design Day					

Existing

Day of Week	Day:	Occup:
1	Sunday	N
2	Monday	Y
3	Tuesday	Y
4	Wednesday	Y
5	Thursday	Y
6	Friday	Y
7	Saturday	N

Hour Ending	Occup:
1	N
2	N
3	N
4	N
5	N
6	Y
7	Y
8	Y
9	Y
10	Y
11	Y
12	Y
13	Y
14	Y
15	Y
16	Y
17	Y
18	Y
19	Y
20	Y
21	Y
22	Y
23	Y
24	Y

Month #:	Month:	Occup:
1	January	Y
2	February	Y
3	March	Y
4	April	Y
5	May	Y
6	June	Y
7	July	Y
8	August	Y
9	September	Y
10	October	Y
11	November	Y
12	December	Y

Proposed

Day of Week	Day:	Occup:
1	Sunday	N
2	Monday	Y
3	Tuesday	Y
4	Wednesday	Y
5	Thursday	Y
6	Friday	Y
7	Saturday	N

Hour Ending	Occup:
1	N
2	N
3	N
4	N
5	N
6	Y
7	Y
8	Y
9	Y
10	Y
11	Y
12	Y
13	Y
14	Y
15	Y
16	Y
17	Y
18	Y
19	Y
20	Y
21	N
22	N
23	N
24	N

Month #:	Month:	Occup:
1	January	Y
2	February	Y
3	March	Y
4	April	Y
5	May	Y
6	June	Y
7	July	Y
8	August	Y
9	September	Y
10	October	Y
11	November	Y
12	December	Y

Month	Day	Hour	DB	WB	DOW	h	HTG Hour	CLG Hour	CLG Hour Occupied	Existing Occupied	Proposed Occupied	Existing VFD Load	Existing Fan Energy	Proposed VFD Load	Proposed Fan Energy
			99			44.88							kWh 371,350		kWh 329,687
			5				3935	2718	1733	4997	3945				
1	1	1	37	35.3	5	13.17	1	0	0	N	N	0%	0	0%	0
1	1	2	36.3	34.7	5	12.92	1	0	0	N	N	0%	0	0%	0
1	1	3	35.8	34.4	5	12.8	1	0	0	N	N	0%	0	0%	0
1	1	4	35.1	33.8	5	12.55	1	0	0	N	N	0%	0	0%	0
1	1	5	34.7	32.9	5	12.18	1	0	0	N	N	0%	0	0%	0
1	1	6	34.3	31.9	5	11.76	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	7	34	31.1	5	11.4	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	8	34	31	5	11.36	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	9	34	30.9	5	11.31	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	10	34	30.8	5	11.27	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	11	35.1	31.5	5	11.57	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	12	36	32.2	5	11.86	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	13	37	32.9	5	12.16	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	14	36.7	32.3	5	11.93	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	15	36.3	31.8	5	11.7	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	16	36	31.3	5	11.47	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	17	34.7	30.5	5	11.16	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	18	33.3	29.7	5	10.83	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	19	32	28.9	5	10.51	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	20	32	28.7	5	10.43	1	0	0	Y	Y	60%	69.378	60%	69.378
1	1	21	32	28.6	5	10.39	1	0	0	Y	N	60%	69.378	60%	69.378
1	1	22	32	28.4	5	10.3	1	0	0	Y	N	60%	69.378	60%	69.378
1	1	23	30.9	27.3	5	9.84	1	0	0	Y	N	64%	73.61777	60%	69.378
1	1	24	30	26.3	5	9.45	1	0	0	Y	N	67%	77.08667	60%	69.378
1	2	1	28.9	25.1	6	9.01	1	0	0	N	N	0%	0	0%	0
1	2	2	27.7	24.1	6	8.62	1	0	0	N	N	0%	0	0%	0
1	2	3	26.2	22.8	6	8.14	1	0	0	N	N	0%	0	0%	0
1	2	4	25	21.8	6	7.76	1	0	0	N	N	0%	0	0%	0
1	2	5	23.4	20.8	6	7.41	1	0	0	N	N	0%	0	0%	0
1	2	6	21.6	19.5	6	6.95	1	0	0	Y	Y	95%	109.4631	60%	69.378
1	2	7	19.9	18.4	6	6.57	1	0	0	Y	Y	100%	115.63	60%	69.378
1	2	8	21	19.2	6	6.85	1	0	0	Y	Y	97%	111.7757	60%	69.378
1	2	9	21.9	19.8	6	7.07	1	0	0	Y	Y	94%	108.3068	60%	69.378
1	2	10	23	20.6	6	7.34	1	0	0	Y	Y	90%	104.067	60%	69.378
1	2	11	25	22.1	6	7.88	1	0	0	Y	Y	83%	96.35833	60%	69.378
1	2	12	27	23.5	6	8.41	1	0	0	Y	Y	77%	88.64967	60%	69.378
1	2	13	28.9	24.9	6	8.94	1	0	0	Y	Y	70%	81.32643	60%	69.378
1	2	14	29.3	25.2	6	9.06	1	0	0	Y	Y	69%	79.7847	60%	69.378
1	2	15	29.7	25.6	6	9.18	1	0	0	Y	Y	68%	78.24297	60%	69.378
1	2	16	30	25.9	6	9.3	1	0	0	Y	Y	67%	77.08667	60%	69.378
1	2	17	30	26.1	6	9.37	1	0	0	Y	Y	67%	77.08667	60%	69.378
1	2	18	30	26.2	6	9.41	1	0	0	Y	Y	67%	77.08667	60%	69.378
1	2	19	30	26.4	6	9.48	1	0	0	Y	Y	67%	77.08667	60%	69.378
1	2	20	30	26.6	6	9.56	1	0	0	Y	Y	67%	77.08667	60%	69.378
1	2	21	30	26.7	6	9.6	1	0	0	Y	N	67%	77.08667	60%	69.378
1	2	22	30	26.8	6	9.67	1	0	0	Y	N	67%	77.08667	60%	69.378
1	2	23	30	27	6	9.75	1	0	0	Y	N	67%	77.08667	60%	69.378
1	2	24	30	27.2	6	9.82	1	0	0	Y	N	67%	77.08667	60%	69.378
1	3	1	30	27.4	7	9.9	1	0	0	N	N	0%	0	0%	0
1	3	2	30.4	27.8	7	10.07	1	0	0	N	N	0%	0	0%	0
1	3	3	30.6	28.1	7	10.17	1	0	0	N	N	0%	0	0%	0

ECM 10: Irvis Water Waster to DX/Water Coil

Assumptions

5	T Unit
72000	BTU Heat Rejection

Compressor

1	QTY
230	V
3	PH
16	Amps
6,374	W
15	F Delta

20	F Min Design Day
89	F Max Design Day

OAT	% Load	m			b
20	100%	-0.03333 x	+		1.6667
50	0%				

OAT	% Load	m			b
89	100%	0.041667 x	+		-2.7083
65	0%				

70	HTG Setpoint
72	CLG Setpoint
65	HTG Setback
75	CLG Setback
50	HTG Balance Point (F)
21.98	CLG Balance Point (h)

140	Building Occupants
150	Btu/HR
21000	Total Btu

Savings

	Existing	Proposed	Saved	
Water	183	0	183	kGal
Compresso	4,725	0	4,725	kWh

Existing

Day of Week	Day:	Occup:	Hour Ending	Occup:	Month #:	Month:	Occup:
1	Sunday	N	1	N	1	January	Y
2	Monday	Y	2	N	2	February	Y
3	Tuesday	Y	3	N	3	March	Y
4	Wednesday	Y	4	N	4	April	Y
5	Thursday	Y	5	N	5	May	Y
6	Friday	Y	6	Y	6	June	Y
7	Saturday	N	7	Y	7	July	Y
			8	Y	8	August	Y
			9	Y	9	September	Y
			10	Y	10	October	Y
			11	Y	11	November	Y
			12	Y	12	December	Y
			13	Y			
			14	Y			
			15	Y			
			16	Y			
			17	Y			
			18	Y			
			19	Y			
			20	Y			
			21	Y			
			22	Y			
			23	Y			
			24	Y			

			99			44.88													
			5					3935	2718	1733	4997			4.11	427,010			182,665	4,725

Month	Day	Hour	DB	WB	DOW	h	HTG Hour	CLG Hour	CLG Hour Occupied	Existing Occupied	Comp Load	Average Heat Rejection BTU	GPM	GPH	Hourly Run Time	GPH	Comp Energy kWh
1	1	1	37	35.3	5	13.17	1	0	0	N	0%	0		0	0%	0	0
1	1	2	36.3	34.7	5	12.92	1	0	0	N	0%	0		0	0%	0	0
1	1	3	35.8	34.4	5	12.8	1	0	0	N	0%	0		0	0%	0	0
1	1	4	35.1	33.8	5	12.55	1	0	0	N	0%	0		0	0%	0	0
1	1	5	34.7	32.9	5	12.18	1	0	0	N	0%	0		0	0%	0	0
1	1	6	34.3	31.9	5	11.76	1	0	0	Y	0%	0		0	0%	0	0
1	1	7	34	31.1	5	11.4	1	0	0	Y	0%	0		0	0%	0	0
1	1	8	34	31	5	11.36	1	0	0	Y	0%	0		0	0%	0	0
1	1	9	34	30.9	5	11.31	1	0	0	Y	0%	0		0	0%	0	0
1	1	10	34	30.8	5	11.27	1	0	0	Y	0%	0		0	0%	0	0
1	1	11	35.1	31.5	5	11.57	1	0	0	Y	0%	0		0	0%	0	0
1	1	12	36	32.2	5	11.86	1	0	0	Y	0%	0		0	0%	0	0
1	1	13	37	32.9	5	12.16	1	0	0	Y	0%	0		0	0%	0	0
1	1	14	36.7	32.3	5	11.93	1	0	0	Y	0%	0		0	0%	0	0
1	1	15	36.3	31.8	5	11.7	1	0	0	Y	0%	0		0	0%	0	0
1	1	16	36	31.3	5	11.47	1	0	0	Y	0%	0		0	0%	0	0
1	1	17	34.7	30.5	5	11.16	1	0	0	Y	0%	0		0	0%	0	0
1	1	18	33.3	29.7	5	10.83	1	0	0	Y	0%	0		0	0%	0	0
1	1	19	32	28.9	5	10.51	1	0	0	Y	0%	0		0	0%	0	0
1	1	20	32	28.7	5	10.43	1	0	0	Y	0%	0		0	0%	0	0
1	1	21	32	28.6	5	10.39	1	0	0	Y	0%	0		0	0%	0	0
1	1	22	32	28.4	5	10.3	1	0	0	Y	0%	0		0	0%	0	0
1	1	23	30.9	27.3	5	9.84	1	0	0	Y	0%	0		0	0%	0	0
1	1	24	30	26.3	5	9.45	1	0	0	Y	0%	0		0	0%	0	0
1	2	1	28.9	25.1	6	9.01	1	0	0	N	0%	0		0	0%	0	0
1	2	2	27.7	24.1	6	8.62	1	0	0	N	0%	0		0	0%	0	0
1	2	3	26.2	22.8	6	8.14	1	0	0	N	0%	0		0	0%	0	0
1	2	4	25	21.8	6	7.76	1	0	0	N	0%	0		0	0%	0	0
1	2	5	23.4	20.8	6	7.41	1	0	0	N	0%	0		0	0%	0	0
1	2	6	21.6	19.5	6	6.95	1	0	0	Y	0%	0		0	0%	0	0
1	2	7	19.9	18.4	6	6.57	1	0	0	Y	0%	0		0	0%	0	0
1	2	8	21	19.2	6	6.85	1	0	0	Y	0%	0		0	0%	0	0
1	2	9	21.9	19.8	6	7.07	1	0	0	Y	0%	0		0	0%	0	0
1	2	10	23	20.6	6	7.34	1	0	0	Y	0%	0		0	0%	0	0
1	2	11	25	22.1	6	7.88	1	0	0	Y	0%	0		0	0%	0	0
1	2	12	27	23.5	6	8.41	1	0	0	Y	0%	0		0	0%	0	0
1	2	13	28.9	24.9	6	8.94	1	0	0	Y	0%	0		0	0%	0	0
1	2	14	29.3	25.2	6	9.06	1	0	0	Y	0%	0		0	0%	0	0
1	2	15	29.7	25.6	6	9.18	1	0	0	Y	0%	0		0	0%	0	0
1	2	16	30	25.9	6	9.3	1	0	0	Y	0%	0		0	0%	0	0
1	2	17	30	26.1	6	9.37	1	0	0	Y	0%	0		0	0%	0	0
1	2	18	30	26.2	6	9.41	1	0	0	Y	0%	0		0	0%	0	0
1	2	19	30	26.4	6	9.48	1	0	0	Y	0%	0		0	0%	0	0
1	2	20	30	26.6	6	9.56	1	0	0	Y	0%	0		0	0%	0	0
1	2	21	30	26.7	6	9.6	1	0	0	Y	0%	0		0	0%	0	0
1	2	22	30	26.8	6	9.67	1	0	0	Y	0%	0		0	0%	0	0

ECM 11: Records Center Summer Condensing Boiler Installation

Weather: Harrisburg, PA

Existing System

1	Boilers	
79%	Efficiency	

25000	CFM	
75	Supply Temp Post Coil	
55	Supply Temp Pre Coil	
3	HP of HW Pump	
3	HP of CW Pump	

Proposed System

1	Boilers	
90%	Eff.	

25000	CFM	
75	Supply Temp Post Coil	
55	Supply Temp Pre Coil	
3	HP of HW Pump	

72	HTG Setpoint
75	CLG Setpoint
55	HTG Balance Point
26	CLG Balance Point

7	Building Occupants
150	Btu/HR
1050	Total Btu

72	Proposed HTG Occ. Setpoint
75	Proposed CLG Occ. Setpoint
72	Proposed HTG UnOcc. Setpoint
75	Proposed CLG UnOcc. Setpoint

Summer Boiler

	Existing		Proposed		Saved		
	Summer CCF	Winter CCF	Summer CCF	Winter CCF	Summer CCF	Winter CCF	Total CCF
	7,027	17,640	6,204	15,576	822	2,065	2,887

Pump VFD's

Existing kWh	Proposed kWh	Saved kWh
10,147	7,126	3,021

Building Envelope HTG Load

			R Value
Roof Area	81,565	SF	
Total Wall Area	19,488	SF	
Glass Area	1,949	SF	
Masonry Wall Area	17,539		
Roof Overall U-Value	0.0755	BTU / Hr-Sq Ft-Deg F	13.2477528
Wall Overall U-Value	0.0615	BTU / Hr-Sq Ft-Deg F	16.2724397
Glass Overall U-Value	0.9500	BTU / Hr-Sq Ft-Deg F	1.05263158
Roof Heat Loss	6,157	BTU / Hr-Deg F	
Wall Heat Loss	1,078	BTU / Hr-Deg F	
Glass Heat Loss	1,851	BTU / Hr-Deg F	
Total Envelope Heat Load	9,086	BTU / Hr-Deg F	

	Design OA	Actual OA	
OA Heat Load	0	0	BTU / Hr-Deg F
Total Occupied Heat Load	9,086	9,086	BTU / Hr-Deg F
OA % of design	35%	0	CFM OA

Existing

Day of Week #:	Day:	Occup:	Hour Ending	Occup:	Month #:	Month:	Occup:
1	Sunday	N	1	N	1	January	Y
2	Monday	Y	2	N	2	February	Y
3	Tuesday	Y	3	N	3	March	Y
4	Wednesday	Y	4	N	4	April	Y
5	Thursday	Y	5	N	5	May	Y
6	Friday	Y	6	N	6	June	Y
7	Saturday	N	7	Y	7	July	Y
			8	Y	8	August	Y
			9	Y	9	September	Y
			10	Y	10	October	Y
			11	Y	11	November	Y
			12	Y	12	December	Y
			13	Y			
			14	Y			
			15	Y			
			16	Y			
			17	N			
			18	N			
			19	N			
			20	N			
			21	N			
			22	N			
			23	N			
			24	N			

Proposed

Day of Week #:	Day:	Occup:	Hour Ending	Occup:	Month #:	Month:	Occup
1	Sunday	N	1	N	1	January	Y
2	Monday	Y	2	N	2	February	Y
3	Tuesday	Y	3	N	3	March	Y
4	Wednesday	Y	4	N	4	April	Y
5	Thursday	Y	5	N	5	May	Y
6	Friday	Y	6	N	6	June	Y
7	Saturday	N	7	Y	7	July	Y
			8	Y	8	August	Y
			9	Y	9	September	Y
			10	Y	10	October	Y
			11	Y	11	November	Y
			12	Y	12	December	Y
			13	Y			
			14	Y			
			15	Y			
			16	Y			
			17	N			
			18	N			
			19	N			
			20	N			
			21	N			
			22	N			
			23	N			
			24	N			

Existing System

Month	Day	Day of Week	Min Hour	5 DB	h	4534 HTG	Existing Occupied	HTG Plant Operation	Summer HTG BTU	Summer HTG CCF	HTG BLDG BTU	CCF	CLG OA BTU	CLG OA kWh	CLG BLDG / People BTU	CLG BLDG/Pep kWh	Fan kWh	Pump VFD %	Pump KWh
									7,027	17,640	0		0		10,147		10,147		
1	1	5	1	37	13.17	1	N	On	0	0.00	318,014	3.91	0	0	0	0	2.238	100%	2.24
1	1	5	2	36.3	12.92	1	N	On	0	0.00	324,374	3.99	0	0	0	0	2.238	100%	2.24
1	1	5	3	35.8	12.8	1	N	On	0	0.00	328,917	4.04	0	0	0	0	2.238	100%	2.24
1	1	5	4	35.1	12.55	1	N	On	0	0.00	335,277	4.12	0	0	0	0	2.238	100%	2.24
1	1	5	5	34.7	12.18	1	N	On	0	0.00	338,912	4.16	0	0	0	0	2.238	100%	2.24
1	1	5	6	34.3	11.76	1	N	On	0	0.00	342,546	4.21	0	0	0	0	2.238	100%	2.24
1	1	5	7	34	11.4	1	Y	On	0	0.00	345,272	4.24	0	0	0	0	2.238	100%	2.24
1	1	5	8	34	11.36	1	Y	On	0	0.00	345,272	4.24	0	0	0	0	2.238	100%	2.24
1	1	5	9	34	11.31	1	Y	On	0	0.00	345,272	4.24	0	0	0	0	2.238	100%	2.24
1	1	5	10	34	11.27	1	Y	On	0	0.00	345,272	4.24	0	0	0	0	2.238	100%	2.24
1	1	5	11	35.1	11.57	1	Y	On	0	0.00	335,277	4.12	0	0	0	0	2.238	100%	2.24
1	1	5	12	36	11.86	1	Y	On	0	0.00	327,100	4.02	0	0	0	0	2.238	100%	2.24
1	1	5	13	37	12.16	1	Y	On	0	0.00	318,014	3.91	0	0	0	0	2.238	100%	2.24
1	1	5	14	36.7	11.93	1	Y	On	0	0.00	320,739	3.94	0	0	0	0	2.238	100%	2.24
1	1	5	15	36.3	11.7	1	Y	On	0	0.00	324,374	3.99	0	0	0	0	2.238	100%	2.24
1	1	5	16	36	11.47	1	N	On	0	0.00	327,100	4.02	0	0	0	0	2.238	100%	2.24
1	1	5	17	34.7	11.16	1	N	On	0	0.00	338,912	4.16	0	0	0	0	2.238	100%	2.24
1	1	5	18	33.3	10.83	1	N	On	0	0.00	351,632	4.32	0	0	0	0	2.238	100%	2.24
1	1	5	19	32	10.51	1	N	On	0	0.00	363,444	4.47	0	0	0	0	2.238	100%	2.24
1	1	5	20	32	10.43	1	N	On	0	0.00	363,444	4.47	0	0	0	0	2.238	100%	2.24
1	1	5	21	32	10.39	1	N	On	0	0.00	363,444	4.47	0	0	0	0	2.238	100%	2.24
1	1	5	22	32	10.3	1	N	On	0	0.00	363,444	4.47	0	0	0	0	2.238	100%	2.24
1	1	5	23	30.9	9.84	1	N	On	0	0.00	373,439	4.59	0	0	0	0	2.238	100%	2.24
1	1	5	24	30	9.45	1	N	On	0	0.00	381,616	4.69	0	0	0	0	2.238	100%	2.24
1	2	6	1	28.9	9.01	1	N	On	0	0.00	391,611	4.81	0	0	0	0	2.238	100%	2.24
1	2	6	2	27.7	8.62	1	N	On	0	0.00	402,514	4.95	0	0	0	0	2.238	100%	2.24
1	2	6	3	26.2	8.14	1	N	On	0	0.00	416,143	5.11	0	0	0	0	2.238	100%	2.24
1	2	6	4	25	7.76	1	N	On	0	0.00	427,047	5.25	0	0	0	0	2.238	100%	2.24
1	2	6	5	23.4	7.41	1	N	On	0	0.00	441,584	5.43	0	0	0	0	2.238	100%	2.24
1	2	6	6	21.6	6.95	1	N	On	0	0.00	457,939	5.63	0	0	0	0	2.238	100%	2.24
1	2	6	7	19.9	6.57	1	Y	On	0	0.00	473,386	5.82	0	0	0	0	2.238	100%	2.24
1	2	6	8	21	6.85	1	Y	On	0	0.00	463,391	5.69	0	0	0	0	2.238	100%	2.24
1	2	6	9	21.9	7.07	1	Y	On	0	0.00	455,214	5.59	0	0	0	0	2.238	100%	2.24
1	2	6	10	23	7.34	1	Y	On	0	0.00	445,219	5.47	0	0	0	0	2.238	100%	2.24
1	2	6	11	25	7.88	1	Y	On	0	0.00	427,047	5.25	0	0	0	0	2.238	100%	2.24
1	2	6	12	27	8.41	1	Y	On	0	0.00	408,875	5.02	0	0	0	0	2.238	100%	2.24
1	2	6	13	28.9	8.94	1	Y	On	0	0.00	391,611	4.81	0	0	0	0	2.238	100%	2.24
1	2	6	14	29.3	9.06	1	Y	On	0	0.00	387,976	4.77	0	0	0	0	2.238	100%	2.24
1	2	6	15	29.7	9.18	1	Y	On	0	0.00	384,342	4.72	0	0	0	0	2.238	100%	2.24
1	2	6	16	30	9.3	1	Y	On	0	0.00	381,616	4.69	0	0	0	0	2.238	100%	2.24
1	2	6	17	30	9.37	1	N	On	0	0.00	381,616	4.69	0	0	0	0	2.238	100%	2.24
1	2	6	18	30	9.41	1	N	On	0	0.00	381,616	4.69	0	0	0	0	2.238	100%	2.24
1	2	6	19	30	9.48	1	N	On	0	0.00	381,616	4.69	0	0	0	0	2.238	100%	2.24
1	2	6	20	30	9.56	1	N	On	0	0.00	381,616	4.69	0	0	0	0	2.238	100%	2.24
1	2	6	21	30	9.6	1	N	On	0	0.00	381,616	4.69	0	0	0	0	2.238	100%	2.24
1	2	6	22	30	9.67	1	N	On	0	0.00	381,616	4.69	0	0	0	0	2.238	100%	2.24
1	2	6	23	30	9.75	1	N	On	0	0.00	381,616	4.69	0	0	0	0	2.238	100%	2.24
1	2	6	24	30	9.82	1	N	On	0	0.00	381,616	4.69	0	0	0	0	2.238	100%	2.24
1	3	7	1	30	9.9	1	N	On	0	0.00	381,616	4.69	0	0	0	0	2.238	100%	2.24
1	3	7	2	30.4	10.07	1	N	On	0	0.00	377,982	4.65	0	0	0	0	2.238	100%	2.24
1	3	7	3	30.6	10.17	1	N	On	0	0.00	376,165	4.62	0	0	0	0	2.238	100%	2.24
1	3	7	4	30.9	10.35	1	N	On	0	0.00	373,439	4.59	0	0	0	0	2.238	100%	2.24
1	3	7	5	31.6	10.74	1	N	On	0	0.00	367,078	4.51	0	0	0	0	2.238	100%	2.24
1	3	7	6	32.4	11.18	1	N	On	0	0.00	359,810	4.42	0	0	0	0	2.238	100%	2.24
1	3	7	7	33.1	11.59	1	N	On	0	0.00	353,449	4.34	0	0	0	0	2.238	100%	2.24
1	3	7	8	33.4	11.81	1	N	On	0	0.00	350,723	4.31	0	0	0	0	2.238	100%	2.24
1	3	7	9	33.6	12.02	1	N	On	0	0.00	348,906	4.29	0	0	0	0	2.238	100%	2.24
1	3	7	10	34	12.25	1	N	On	0	0.00	345,272	4.24	0	0	0	0	2.238	100%	2.24
1	3	7	11	34.3	12.4	1	N	On	0	0.00	342,546	4.21	0	0	0	0	2.238	100%	2.24
1	3	7	12	34.7	12.55	1	N	On	0	0.00	338,912	4.16	0	0	0	0	2.238	100%	2.24
1	3	7	13	35.1	12.69	1	N	On	0	0.00	335,277	4.12	0	0	0	0	2.238	100%	2.24
1	3	7	14	35.1	12.74	1	N	On	0	0.00	335,277	4.12	0	0	0	0	2.238	100%	2.24
1	3	7	15	35.1	12.83	1	N	On	0	0.00	335,277	4.12	0	0	0	0	2.238	100%	2.24
1	3	7	16	35.1	12.88	1	N	On	0	0.00	335,277	4.12	0	0	0	0	2.238	100%	2.24
1	3	7	17	35.8	12.8	1	N	On	0	0.00	328,917	4.04	0	0	0	0	2.238	100%	2.24
1	3	7	18	36.3	12.68	1	N	On	0	0.00	324,374	3.99	0	0	0	0	2.238	100%	2.24
1	3	7	19	37	12.56	1	N	On	0	0.00	318,014	3.91	0	0	0	0	2.238	100%	2.24
1	3	7	20	36.3	11.74	1	N	On	0	0.00	324,374	3.99	0	0	0	0	2.238	100%	2.24
1	3	7	21	35.8	11.74	1	N	On	0	0.00	328,917	4.04	0	0	0	0	2.238	100%	2.24
1	3	7	22	35.1	11.29	1	N	On	0	0.00	335,277	4.12	0	0	0	0	2.238	100%	2.24
1	3	7	23	33.6	10.65	1	N	On	0	0.00	348,906	4.29	0	0	0	0	2.238	100%	2.24
1	3	7	24	32.4	10.14	1	N	On	0	0.00	359,810	4.42	0	0	0	0	2.238	100%	2.24
1	4	1	1	30.9	9.52	1	N	On	0	0.00	373,439	4.59	0	0	0	0	2.238	100%	2.24
1	4	1	2	29.7	9.1	1	N	On	0	0.00	384,342	4.72	0	0	0	0	2.238	100%	2.24
1	4	1	3	28.2	8.66	1	N	On	0	0.00	397,971	4.89	0	0	0	0	2.238	100%	2.24
1	4	1	4	27	8.25	1	N	On	0	0.00	408,875	5.02	0	0	0	0	2.238	100%	2.24
1	4	1	5	26.1	7.9	1	N	On	0	0.00	417,052	5.13	0	0	0	0	2.238	100%	2.24
1	4	1	6	25	7.53	1	N	On	0	0.00	427,047	5.25	0	0	0	0	2.238	100%	2.24
1	4	1	7	24.1	7.19	1	N	On	0	0.00	435,224	5.35	0	0	0	0	2.238	100%	2.24
1	4	1	8	23.4	7.02	1	N	On	0	0.00	441,584	5.43	0	0	0	0	2.238	100%	2.24
1	4	1	9	22.6	6.83	1	N	On	0	0.00	448,853	5.52	0	0	0	0	2.238	100%	2.24
1	4	1	10	21.9	6.66	1	N	On	0	0.00	455,214	5.59	0	0	0	0	2.238	100%	2.24
1	4	1	11	23.5	7.11	1	N	On	0	0.00	440,676	5.42	0	0	0	0	2.238	100%	2.24
1	4	1	12	25.3	7.61	1	N	On	0	0.00	424,321	5.21	0	0	0	0	2.238	100%	2.24
1	4	1	13	27	8.06	1	N	On	0	0.00	408,875	5.02	0	0	0	0	2.238	100%	2.24

Proposed System

Proposed System	HTG Plant Operation	Summer HTG BTU	Summer HTG CCF	HTG BLDG BTU	HTG BLDG CCF	CLG OA BTU	CLG OA kWh	CLG BLDG / People BTU	CLG BLDG/Pep kWh	Fan kWh	Pump VFD %	Pump KWh
		6,204	15,576	0		0		10147		7,126		
N	On	0	0.00	318,014	3	0	0	0	0	2.238	71%	1.59
N	On	0	0.00	324,374	4	0	0	0	0	2.238	72%	1.62
N	On	0	0.00	328,917	4	0	0	0	0	2.238	73%	1.64
N	On	0	0.00	335,277	4	0	0	0	0	2.238	74%	1.66
N	On	0	0.00	338,912	4	0	0	0	0	2.238	75%	1.68
N	On	0	0.00	342,546	4	0	0	0	0	2.238	76%	1.69
Y	On	0	0.00	345,272	4	0	0	0	0	2.238	76%	1.70
Y	On	0	0.00	345,272	4	0	0	0	0	2.238	76%	1.70
Y	On	0	0.00	345,272	4	0	0	0	0	2.238	76%	1.70
Y	On	0	0.00	345,272	4	0	0	0	0	2.238	76%	1.70
Y	On	0	0.00	335,277	4	0	0	0	0	2.238	74%	1.66
Y	On	0	0.00	327,100	4	0	0	0	0	2.238	73%	1.63
Y	On	0	0.00	318,014	3	0	0	0	0	2.238	71%	1.59
Y	On	0	0.00	320,739	3	0	0	0	0	2.238	72%	1.60
Y	On	0	0.00	324,374	4	0	0	0	0	2.238	72%	1.62
Y	On	0	0.00	327,100	4	0	0	0	0	2.238	73%	1.63
N	On	0	0.00	338,912	4	0	0	0	0	2.238	75%	1.68
N	On	0	0.00	351,632	4	0	0	0	0	2.238	77%	1.73
N	On	0	0.00	363,444	4	0	0	0	0	2.238	80%	1.78
N	On	0	0.00	363,444	4	0	0	0	0	2.238	80%	1.78
N	On	0	0.00	363,444	4	0	0	0	0	2.238	80%	1.78
N	On	0	0.00	363,444	4	0	0	0	0	2.238	80%	1.78
N	On	0	0.00	373,439	4	0	0	0	0	2.238	81%	1.82
N	On	0	0.00	381,616	4	0	0	0	0	2.238	83%	1.86
N	On	0	0.00	391,611	4	0	0	0	0	2.238	85%	1.90
N	On	0	0.00	402,514	4	0	0	0	0	2.238	87%	1.95
N	On	0	0.00	416,143	5	0	0	0	0	2.238	89%	2.00
N	On	0	0.00	427,047	5	0	0	0	0	2.238	92%	2.05
N	On	0	0.00	441,584	5	0	0	0	0	2.238	94%	2.11
N	On	0	0.00	457,939	5	0	0	0	0	2.238	97%	2.18
Y	On	0	0.00	473,386	5	0	0	0	0	2.238	100%	2.24
Y	On	0	0.00	463,391	5	0	0	0	0	2.238	98%	2.20
Y	On	0	0.00	455,214	5	0	0	0	0	2.238	97%	2.17
Y	On	0	0.00	445,219	5	0	0	0	0	2.238	95%	2.13
Y	On	0	0.00	427,047	5	0	0	0	0	2.238	92%	2.05
Y	On	0	0.00	408,875	5	0	0	0	0	2.238	88%	1.97
Y	On	0	0.00	391,611	4	0	0	0	0	2.238	85%	1.90
Y	On	0	0.00	387,976	4	0	0	0	0	2.238	84%	1.88
Y	On	0	0.00	384,342	4	0	0	0	0	2.238	84%	1.87
Y	On	0	0.00	381,616	4	0	0	0	0	2.238	83%	1.86
N	On	0	0.00	381,616	4	0	0	0	0	2.238	83%	1.86
N	On	0	0.00	381,616	4	0	0	0	0	2.238	83%	1.86
N	On	0	0.00	381,616	4	0	0	0	0	2.238	83%	1.86
N	On	0	0.00	381,616	4	0	0	0	0	2.238	83%	1.86
N	On	0	0.00	381,616	4	0	0	0	0	2.238	83%	1.86
N	On	0	0.00	381,616	4	0	0	0	0	2.238	83%	1.86
N	On	0	0.00	381,616	4	0	0	0	0	2.238	83%	1.86
N	On	0	0.00	381,616	4	0	0	0	0	2.238	83%	1.86
N	On	0	0.00	381,616	4	0	0	0	0	2.238	83%	1.86
N	On	0	0.00	377,982	4	0	0	0	0	2.238	82%	1.84
N	On	0	0.00	376,165	4	0	0	0	0	2.238	82%	1.83
N	On	0	0.00	373,439	4	0	0	0	0	2.238	81%	1.82
N	On	0	0.00	367,078	4	0	0	0	0	2.238	80%	1.80
N	On	0	0.00	359,810	4	0	0	0	0	2.238	79%	1.77
N	On	0	0.00	353,449	4	0	0	0	0	2.238	78%	1.74
N	On	0	0.00	350,723	4	0	0	0	0	2.238	77%	1.73
N	On	0	0.00	348,906	4	0	0	0	0	2.238	76%	1.70
N	On	0	0.00	345,272	4	0	0	0	0	2.238	76%	1.70
N	On	0	0.00	342,546	4	0	0	0	0	2.238	76%	1.69
N	On	0	0.00	338,912	4	0	0	0	0	2.238	75%	1.68
N	On	0	0.00	335,277	4	0	0	0	0	2.238	74%	1.66
N	On	0	0.00	335,277	4	0	0	0	0	2.238	74%	1.66
N	On	0	0.00	335,277	4	0	0	0	0	2.238	74%	1.66
N	On	0	0.00	335,277	4	0	0	0	0	2.238	74%	1.66
N	On	0	0.00	328,917	4	0	0	0	0	2.238	73%	1.64
N	On	0	0.00	324,374	3	0	0	0	0	2.238	72%	1.62
N	On	0	0.00	318,014	3	0	0	0	0	2.238	71%	1.59
N	On	0	0.00	324,374	4	0	0	0	0	2.238	72%	1.62
N	On	0	0.00	328,917	4	0	0	0	0	2.238	73%	1.64
N	On	0	0.00	335,277	4	0	0	0	0	2.238	74%	1.66
N	On	0	0.00	348,906	4	0	0	0	0	2.238	77%	1.72
N	On	0	0.00	359,810	4	0	0	0	0	2.238	79%	1.77
N	On	0	0.00	373,439	4	0	0	0	0	2.238	81%	1.82
N	On	0	0.00	384,342	4	0	0	0	0	2.238	84%	1.87
N	On	0	0.00	397,971	4	0	0	0	0	2.238	86%	1.93
N	On	0	0.00	408,875	5	0	0	0	0	2.238	88%	1.97
N	On	0	0.00	417,052	5	0	0	0	0	2.238	90%	2.01
N	On	0	0.00	427,047	5	0	0	0	0	2.238	92%	2.05
N	On	0	0.00	435,224	5	0	0	0	0	2.238	93%	2.08
N	On	0	0.00	441,584	5	0	0	0	0	2.238	94%	2.11
N	On	0	0.00	448,853	5	0	0	0	0	2.238	96%	2.14
N	On	0	0.00	455,214	5	0	0	0	0	2.238	97%	2.17
N	On	0	0.00	440,676	5	0	0	0	0	2.238	94%	2.11
N	On	0	0.00	424,321	5	0	0	0	0	2.238	91%	2.04
N	On	0	0.00	408,875	4	0	0	0	0	2.238	88%	1.97

ECM 12: 18th & Herr Complex Tent Building Decentralization

Weather: Harrisburg, PA

Existing System

72	HTG Setpoint	
2	Boilers	
67%	NET HTG Efficiency	55	HTG Balance Point
1.6	CLG kW/Ton	26	CLG Balance Point

2850	OA CFM
25.8	Fan HP
2.75	COP
10	HP of HP Loop Pump
7.5	HP of HW Pump
1	HP of CT Pump Tent

Proposed System

2	Boilers
90%	Eff.
2.75	COP
	PTAC Eff.
1.6	CLG kW/Ton

72	Proposed HTG Occ. Setpoint
75	Proposed CLG Occ. Setpoint
72	Proposed HTG UnOcc. Setpoint
75	Proposed CLG UnOcc. Setpoint

2850	CFM
10	HP of HP Loop Pump
7.5	HP of HW Pump
1	HP of CT Pump Tent
25.8	Fan HP
Y	Pump VFD?

168.87	Building Occupants
150	Btu/HR
25330	Total Btu

Decentralization of Tent Building

Existing		Proposed		Saved	
CCF	kWh	CCF	kWh	CCF	kWh
12,460	193,593	9,283	182,515	3,178	11,077

Building Envelope HTG Load

			R Value
Roof Area	9,829	SF	
Total Wall Area	24,435	SF	
Glass Area	2,444	SF	
Masonry Wall Area	21,992	SF	
Roof Overall U-Value	0.0755	BTU / Hr-Sq Ft-Deg F	13.2477528
Wall Overall U-Value	0.0615	BTU / Hr-Sq Ft-Deg F	16.2724397
Glass Overall U-Value	0.9500	BTU / Hr-Sq Ft-Deg F	1.05263158
Roof Heat Loss	742	BTU / Hr-Deg F	
Wall Heat Loss	1,351	BTU / Hr-Deg F	
Glass Heat Loss	2,321	BTU / Hr-Deg F	
Total Envelope Heat Load	4,415	BTU / Hr-Deg F	

	Design OA	Actual OA	
OA Heat Load	0	0	BTU / Hr-Deg F
Total Occupied Heat Load	4,415	4,415	BTU / Hr-Deg F
OA % of design	35%	0	0	CFM OA

Existing

Day of Week #:	Day:	Occup:	Hour Ending	Occup:	Month #:	Month:	Occup:
1	Sunday	Y	1	Y	1	January	Y
2	Monday	Y	2	Y	2	February	Y
3	Tuesday	Y	3	Y	3	March	Y
4	Wednesday	Y	4	Y	4	April	Y
5	Thursday	Y	5	Y	5	May	Y
6	Friday	Y	6	Y	6	June	Y
7	Saturday	Y	7	Y	7	July	Y
			8	Y	8	August	Y
			9	Y	9	September	Y
			10	Y	10	October	Y
			11	Y	11	November	Y
			12	Y	12	December	Y
			13	Y			
			14	Y			
			15	Y			
			16	Y			
			17	Y			
			18	Y			
			19	Y			
			20	Y			
			21	Y			
			22	Y			
			23	Y			
			24	Y			

Proposed

Day of Week #:	Day:	Occup:	Hour Ending	Occup:	Month #:	Month:	Occup
1	Sunday	Y	1	Y	1	January	Y
2	Monday	Y	2	Y	2	February	Y
3	Tuesday	Y	3	Y	3	March	Y
4	Wednesday	Y	4	Y	4	April	Y
5	Thursday	Y	5	Y	5	May	Y
6	Friday	Y	6	Y	6	June	Y
7	Saturday	Y	7	Y	7	July	Y
			8	Y	8	August	Y
			9	Y	9	September	Y
			10	Y	10	October	Y
			11	Y	11	November	Y
			12	Y	12	December	Y
			13	Y			
			14	Y			
			15	Y			
			16	Y			
			17	Y			
			18	Y			
			19	Y			
			20	Y			
			21	Y			
			22	Y			
			23	Y			
			24	Y			

Existing System / Proposed System (hourly data)

Month	Day	Day of Week	Hour	5 DB	h	4534 HTG	Existing Occupied	HTG Plant Operation	OA HTG BTU	OA HTG CCF	HTG BLDG BTU	HTG BLDG CCF	HTG BLDG kWh	CLG OA BTU	CLG OA kWh	CLG BLDG / People BTU	CLG BLDG/Pep kWh	Fan kWh	Pump VFD %	Pump KWh	Proposed System	HTG Plant Operation	OA HTG BTU	OA HTG CCF	HTG BLDG BTU	HTG BLDG CCF	HTG BLDG kWh	CLG OA BTU	CLG OA kWh	CLG BLDG / People BTU	CLG BLDG/Pep kWh	Fan kWh	Pump VFD %	Pump KWh
									7,115		5,345	35,222		26,552		7,348	87,265			37,206			5,301		3,982	35,222		26,552		7,348	87,265			26,129
1	1	5	1	37	13.17	1	Y	On	108,229	1.58	154,515	0.00	16.47	0	0	0	0	19.2468	100%	8.21	Y	On	108,229	1.17	154,515	0.00	16.47	0	0	0	0	19.2468	71%	5.83
72	1	5	2	36.3	12.92	1	Y	On	110,393	1.61	157,605	0.00	16.80	0	0	0	0	19.2468	100%	8.21	Y	On	110,393	1.20	157,605	0.00	16.80	0	0	0	0	19.2468	73%	5.93
1	1	5	3	35.8	12.8	1	Y	On	111,939	1.63	159,813	0.00	17.03	0	0	0	0	19.2468	100%	8.21	Y	On	111,939	1.21	159,813	0.00	17.03	0	0	0	0	19.2468	73%	6.00
1	1	5	4	35.1	12.55	1	Y	On	114,104	1.66	162,903	0.00	17.36	0	0	0	0	19.2468	100%	8.21	Y	On	114,104	1.24	162,903	0.00	17.36	0	0	0	0	19.2468	74%	6.09
1	1	5	5	34.7	12.18	1	Y	On	115,341	1.68	164,669	2.40	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	115,341	1.25	164,669	1.79	0.00	0	0	0	0	19.2468	75%	6.15
1	1	5	6	34.3	11.76	1	Y	On	116,578	1.70	166,435	2.42	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	116,578	1.26	166,435	1.81	0.00	0	0	0	0	19.2468	76%	6.21
1	1	5	7	34	11.4	1	Y	On	117,506	1.71	167,759	2.44	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	117,506	1.28	167,759	1.82	0.00	0	0	0	0	19.2468	76%	6.25
1	1	5	8	34	11.36	1	Y	On	117,506	1.71	167,759	2.44	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	117,506	1.28	167,759	1.82	0.00	0	0	0	0	19.2468	76%	6.25
1	1	5	9	34	11.31	1	Y	On	117,506	1.71	167,759	2.44	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	117,506	1.28	167,759	1.82	0.00	0	0	0	0	19.2468	76%	6.25
1	1	5	10	34	11.27	1	Y	On	117,506	1.71	167,759	2.44	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	117,506	1.28	167,759	1.82	0.00	0	0	0	0	19.2468	76%	6.25
1	1	5	11	35.1	11.57	1	Y	On	114,104	1.66	162,903	0.00	17.36	0	0	0	0	19.2468	100%	8.21	Y	On	114,104	1.24	162,903	0.00	17.36	0	0	0	0	19.2468	74%	6.09
1	1	5	12	36	11.86	1	Y	On	111,321	1.62	158,930	0.00	16.94	0	0	0	0	19.2468	100%	8.21	Y	On	111,321	1.21	158,930	0.00	16.94	0	0	0	0	19.2468	73%	5.97
73	1	5	13	37	12.16	1	Y	On	108,229	1.58	154,515	0.00	16.94	0	0	0	0	19.2468	100%	8.21	Y	On	108,229	1.17	154,515	0.00	16.47	0	0	0	0	19.2468	71%	5.83
1	1	5	14	36.7	11.93	1	Y	On	109,156	1.59	155,840	0.00	16.61	0	0	0	0	19.2468	100%	8.21	Y	On	109,156	1.18	155,840	0.00	16.61	0	0	0	0	19.2468	72%	5.87
1	1	5	15	36.3	11.7	1	Y	On	110,393	1.61	157,605	0.00	16.80	0	0	0	0	19.2468	100%	8.21	Y	On	110,393	1.20	157,605	0.00	16.80	0	0	0	0	19.2468	72%	5.93
1	1	5	16	36	11.47	1	Y	On	111,321	1.62	158,930	0.00	16.94	0	0	0	0	19.2468	100%	8.21	Y	On	111,321	1.21	158,930	0.00	16.94	0	0	0	0	19.2468	73%	5.97
1	1	5	17	34.7	11.16	1	Y	On	115,341	1.68	164,669	2.40	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	115,341	1.25	164,669	1.79	0.00	0	0	0	0	19.2468	75%	6.15
75	1	5	18	33.3	10.83	1	Y	On	119,670	1.74	170,850	2.49	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	119,670	1.30	170,850	1.85	0.00	0	0	0	0	19.2468	77%	6.33
1	1	5	19	32	10.51	1	Y	On	123,690	1.80	176,589	2.57	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	123,690	1.34	176,589	1.92	0.00	0	0	0	0	19.2468	80%	6.53
1	1	5	20	32	10.43	1	Y	On	123,690	1.80	176,589	2.57	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	123,690	1.34	176,589	1.92	0.00	0	0	0	0	19.2468	80%	6.53
1	1	5	21	32	10.39	1	Y	On	123,690	1.80	176,589	2.57	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	123,690	1.34	176,589	1.92	0.00	0	0	0	0	19.2468	80%	6.53
1	1	5	22	32	10.3	1	Y	On	123,690	1.80	176,589	2.57	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	123,690	1.34	176,589	1.92	0.00	0	0	0	0	19.2468	80%	6.53
1	1	5	23	30.9	9.84	1	Y	On	127,091	1.85	181,445	2.64	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	127,091	1.38	181,445	1.97	0.00	0	0	0	0	19.2468	81%	6.68
1	1	5	24	30	9.45	1	Y	On	129,875	1.89	185,418	2.70	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	129,875	1.41	185,418	2.01	0.00	0	0	0	0	19.2468	83%	6.81
1	2	6	1	28.9	9.01	1	Y	On	133,276	1.94	190,274	2.77	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	133,276	1.45	190,274	2.06	0.00	0	0	0	0	19.2468	85%	6.96
87	2	6	2	27.7	8.62	1	Y	On	136,987	2.00	195,572	2.85	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	136,987	1.49	195,572	2.12	0.00	0	0	0	0	19.2468	87%	7.13
1	2	6	3	26.2	8.14	1	Y	On	141,625	2.06	202,194	2.94	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	141,625	1.54	202,194	2.19	0.00	0	0	0	0	19.2468	89%	7.34
1	2	6	4	25	7.76	1	Y	On	145,336	2.12	207,492	3.02	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	145,336	1.58	207,492	2.25	0.00	0	0	0	0	19.2468	92%	7.51
1	2	6	5	23.4	7.41	1	Y	On	150,283	2.19	214,555	3.13	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	150,283	1.63	214,555	2.33	0.00	0	0	0	0	19.2468	94%	7.74
1	2	6	6	21.6	6.95	1	Y	On	155,849	2.27	222,502	3.24	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	155,849	1.69	222,502	2.41	0.00	0	0	0	0	19.2468	97%	7.99
1	2	6	7	19.9	6.57	1	Y	On	161,106	2.35	230,007	3.35	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	161,106	1.75	230,007	2.50	0.00	0	0	0	0	19.2468	100%	8.21
98	2	6	8	21	6.85	1	Y	On	157,705	2.30	225,151	3.28	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	157,705	1.71	225,151	2.44	0.00	0	0	0	0	19.2468	98%	8.07
1	2	6	9	21.9	7.07	1	Y	On	154,922	2.26	221,177	3.22	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	154,922	1.68	221,177	2.40	0.00	0	0	0	0	19.2468	97%	7.95
1	2	6	10	23	7.34	1	Y	On	151,520	2.21	216,321	3.15	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	151,520	1.64	216,321	2.35	0.00	0	0	0	0	19.2468	95%	7.79
1	2	6	11	25	7.88	1	Y	On	145,336	2.12	207,492	3.02	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	145,336	1.58	207,492	2.25	0.00	0	0	0	0	19.2468	92%	7.51
1	2	6	12	27	8.41	1	Y	On	139,151	2.03	198,662	2.89	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	139,151	1.51	198,662	2.16	0.00	0	0	0	0	19.2468	88%	7.23
85	2	6	13	28.9	8.94	1	Y	On	133,276	1.94	190,274	2.77	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	133,276	1.45	190,274	2.06	0.00	0	0	0	0	19.2468	85%	6.96
1	2	6	14	29.3	9.06	1	Y	On	132,039	1.92	188,509	2.75	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	132,039	1.43	188,509	2.05	0.00	0	0	0	0	19.2468	84%	6.91
1	2	6	15	29.7	9.18	1	Y	On	130,802	1.91	186,743	2.72	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	130,802	1.42	186,743	2.03	0.00	0	0	0	0	19.2468	84%	6.85
1	2	6	16	30	9.3	1	Y	On	129,875	1.89	185,418	2.70	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	129,875	1.41	185,418	2.01	0.00	0	0	0	0	19.2468	83%	6.81
1	2	6	17	30	9.37	1	Y	On	129,875	1.89	185,418	2.70	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	129,875	1.41	185,418	2.01	0.00	0	0	0	0	19.2468	83%	6.81
1	2	6	18	30	9.41	1	Y	On	129,875	1.89	185,418	2.70	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	129,875	1.41	185,418	2.01	0.00	0	0	0	0	19.2468	83%	6.81
1	2	6	19	30	9.48	1	Y	On	129,875	1.89	185,418	2.70	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	129,875	1.41	185,418	2.01	0.00	0	0	0	0	19.2468	83%	6.81
1	2	6	20	30	9.56	1	Y	On	129,875	1.89	185,418	2.70	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	129,875	1.41	185,418	2.01	0.00	0	0	0	0	19.2468	83%	6.81
1	2	6	21	30	9.6	1	Y	On	129,875	1.89	185,418	2.70	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	129,875	1.41	185,418	2.01	0.00	0	0	0	0	19.2468	83%	6.81
1	2	6	22	30	9.67	1	Y	On	129,875	1.89	185,418	2.70	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	129,875	1.41	185,418	2.01	0.00	0	0	0	0	19.2468	83%	6.81
1	2	6	23	30	9.75	1	Y	On	129,875	1.89	185,418	2.70	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	129,875	1.41	185,418	2.01	0.00	0	0	0	0	19.2468	83%	6.81
1	2	6	24	30	9.82	1	Y	On	129,875	1.89	185,418	2.70	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	129,875	1.41	185,418	2.01	0.00	0	0	0	0	19.2468	83%	6.81
1	3	7	1	30	9.9	1	Y	On	129,875	1.89	185,418	2.70	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	129,875	1.41	185,418	2.01	0.00	0	0	0	0	19.2468	83%	6.81
1	3	7	2	30.4	10.07	1	Y	On	128,638	1.87	183,652	2.67	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	128,638	1.40	183,652	1.99	0.00	0	0	0	0	19.2468	82%	6.75
1	3	7	3	30.6	10.17	1	Y	On	128,019	1.86	182,769	2.66	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	128,019	1.39	182,769	1.98	0.00	0	0	0	0	19.2468	82%	6.73
1	3	7	4	30.9	10.35	1	Y	On	127,091	1.85	181,445	2.64	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	127,091	1.38	181,445	1.97	0.00	0	0	0	0	19.2468	81%	6.68
1	3	7	5	31.6	10.74	1	Y	On	124,927	1.82	178,355	2.60	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	124,927	1.36	178,355	1.94	0.00	0	0	0	0	19.2468	80%	6.59
1	3	7	6	32.4	11.18	1	Y	On	122,453	1.78	174,823	2.55	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	122,453	1.33	174,823	1.90	0.00	0	0	0	0	19.2468	79%	6.47
1	3	7	7	33.1	11.59	1	Y	On	120,289	1.75	171,733	2.50	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	120,289	1.31	171,733	1.86	0.00	0	0	0	0	19.2468	78%	6.38
1	3	7	8	33.4	11.81	1	Y	On	119,361	1.74	170,408	2.48	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	119,361	1.30	170,408	1.85	0.00	0	0	0	0	19.2468	77%	6.33
1	3	7	9	33.6	12.02	1	Y	On	118,742	1.73	169,525	2.47	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	118,742	1.29	169,525	1.84	0.00	0	0	0	0	19.2468	77%	6.30
1	3	7	10	34	12.25	1	Y	On	117,506	1.71	167,759	2.44	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	117,506	1.28	167,759	1.82	0.00	0	0	0	0	19.2468	76%	6.25
1	3	7	11	34.3	12.4	1	Y	On	116,578	1.70	166,435	2.42	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	116,578	1.26	166,435	1.81	0.00	0	0	0	0	19.2468	76%	6.21
1	3	7	12	34.7	12.55	1	Y	On	115,341	1.68	164,669	2.40	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	115,341	1.25	164,669	1.79	0.00	0	0	0	0	19.2468	75%	6.15
1	3	7	13	35.1	12.69	1	Y	On	114,104	1.66	162,903	0.00	17.36	0	0	0	0	19.2468	100%	8.21	Y	On	114,104	1.24	162,903	0.00	17.36	0	0	0	0	19.2468	74%	6.09
1	3	7	14	35.1	12.74	1	Y	On	114,104	1.66	162,903	0.00	17.36	0	0	0	0	19.2468	100%	8.21	Y	On	114,104	1.24	162,903	0.00	17.36	0	0	0	0	19.2468	74%	6.09
1	3	7	15	35.1	12.83	1	Y	On	114,104	1.66	162,903	0.00	17.36	0	0	0	0	19.2468	100%	8.21	Y	On	114,104	1.24	162,903	0.00	17.36	0	0	0	0	19.2468	74%	6.09
1	3	7	16	35.1	12.88	1	Y	On	114,104	1.66	162,903	0.00	17.36	0	0	0	0	19.2468	100%	8.21	Y	On	114,104	1.24	162,903	0.00	17.36	0	0	0	0	19.2468	74%	6.09
1	3	7	17	35.8	12.8	1	Y	On	111,939	1.63	159,813	0.00	17.03	0	0	0	0	19.2468	100%	8.21	Y	On	111,939	1.21	159,813	0.00	17.03	0	0	0	0	19.2468	73%	6.00
1	3	7	18	36.3	12.68	1	Y	On	110,393	1.61	157,605	0.00	16.80	0	0	0	0	19.2468	100%	8.21	Y	On	110,393	1.20	157,605	0.00	16.80	0	0	0	0	19.2468	72%	5.93
1	3	7	19	37	12.56	1	Y	On	108,229	1.58	154,515	0.00	16.47	0	0	0	0	19.2468	100%	8.21	Y	On	108,229	1.17	154,515	0.00	16.47	0	0	0	0	19.2468	71%	5.83
1	3	7	20	36.3	12.09	1	Y	On	110,393	1.61	157,605	0.00	16.80	0	0	0	0	19.2468	100%	8.21	Y	On	110,393	1.20	157,605	0.00	16.80	0	0	0	0	19.2468	72%	5.93
1	3	7	21	35.8	11.74	1	Y	On	111,939	1.63	159,813	0.00	17.03	0	0	0	0	19.2468	100%	8.21	Y	On	111,939	1.21	159,813	0.00	17.03	0	0	0	0	19.2468	73%	6.00
1	3	7	22	35.1	11.29	1	Y	On	114,104	1.66	162,903	0.00	17.36	0	0	0	0	19.2468	100%	8.21	Y	On	114,104	1.24	162,903	0.00	17.36	0	0	0	0	19.2468	73%	6.00
1	3	7	23	33.6	10.65	1	Y	On	118,742	1.73	169,525	2.47	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	118,742	1.29	169,525	1.84	0.00	0	0	0	0	19.2468	77%	6.30
1	3	7	24	32.4	10.14	1	Y	On	122,453	1.78	174,823	2.55	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	122,453	1.33	174,823	1.90	0.00	0	0	0	0	19.2468	79%	6.47
1	4	1	1	30.9	9.52	1	Y	On	127,091	1.85	181,445	2.64	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	127,091	1.38	181,445	1.97	0.00	0	0	0	0	19.2468	81%	6.68
1	4	1	2	29.7	9.1	1	Y	On	130,802	1.91	186,743	2.72	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	130,802	1.42	186,743	2.03	0.00	0	0	0	0	19.2468	84%	6.85
1	4	1	3	28.2	8.66	1	Y	On	135,441	1.97	193,365	2.82	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	135,441	1.47	193,365	2.10	0.00	0	0	0	0	19.2468	86%	7.06
1	4	1	4	27	8.25	1	Y	On	139,151	2.03	198,662	2.89	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	139,151	1.51	198,662	2.16	0.00	0	0	0	0	19.2468	88%	7.23
1	4	1	5	26	7.9	1	Y	On	141,934	2.07	202,636	2.95	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	141,934	1.54	202,636	2.20	0.00	0	0	0	0	19.2468	90%	7.35
1	4	1	6	25	7.53	1	Y	On	145,336	2.12	207,492	3.02	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	145,336	1.58	207,492	2.25	0.00	0	0	0	0	19.2468	92%	7.51
1	4	1	7	24.1	7.19	1	Y	On	148,119	2.16	211,465	3.08	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	148,119	1.61	211,465	2.29	0.00	0	0	0	0	19.2468	94%	7.64
1	4	1	8	23.4	7.02	1	Y	On	150,283	2.19	214,555	3.13	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	150,283	1.63	214,555	2.33	0.00	0	0	0	0	19.2468	94%	7.74
1	4	1	9	22.6	6.83	1	Y	On	152,757	2.22	218,087	3.18	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	152,757	1.66	218,087	2.37	0.00	0	0	0	0	19.2468	96%	7.85
1	4	1	10	22.1	6.66	1	Y	On	154,304	2.25	220,295	3.21	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	154,304	1.67	220,295	2.38	0.00	0	0	0	0	19.2468	96%	7.92
1	4	1	11	23.5	7.11	1	Y	On	149,974	2.18	214,114	3.12	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	149,974	1.63	214,114	2.32	0.00	0	0	0	0	19.2468	97%	7.72
1	4	1	12	25.3	7.61	1	Y	On	144,408	2.10	206,167	3.00	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	144,408	1.57	206,167	2.24	0.00	0	0	0	0	19.2468	91%	7.47
1	4	1	13	27	8.06	1	Y	On	139,151	2.03	198,662	2.89	0.00	0	0	0	0	19.2468	100%	8.21	Y	On	139,151	1.51	198,662	2.16	0.00	0	0	0	0	19.2468	88%	7.23

ECM 12: 18th & Herr Complex Arsenal Bldg & Garages Decentralization Weather:

Harrisburg, PA

Existing System

2	Boilers
67%	NET I&R Efficiency
1.1	CLG kW/Ton

| 3850 | OA CFM |
| 25.8 | Fan HP |

| 150 | Btu/HR |

0	HP of HP Loop Pump
7.5	HP of HW Pump
7.5	HP of CW Pump

Proposed System

2	Boilers
90%	Eff.

| 1.1 | CLG kW/Ton |

3850	CFM
0	HP of HP Loop Pump
7.5	HP of HW Pump
7.5	HP of CW Pump
25.8	Fan HP
Y	Pump VFD?

72	HTG Setpoint
75	CLG Setpoint
55	HTG Balance Point
26	CLG Balance Point

| 168.87 | Building Occupants |

| 25330 | Total Btu |

72	Proposed HTG Occ. Setpoint
75	Proposed CLG Occ. Setpoint
72	Proposed HTG UnOcc. Setpoint
75	Proposed CLG UnOcc. Setpoint

Decentralization Arsenal & Garage Buildings

	Existing		Proposed		Saved	
	CCF	kWh	CCF	kWh	CCF	kWh
	26,360	144,033	19,638	136,481	6,723	7,553

Building Envelope HTG Load

			R Value
Roof Area	23,944	SF	
Total Wall Area	36,400	SF	
Glass Area	3,640	SF	
Masonry Wall Area	32,760	SF	
Roof Overall U-Value	0.0755	BTU / Hr-Sq Ft-Deg F	13.2477528
Wall Overall U-Value	0.0615	BTU / Hr-Sq Ft-Deg F	16.2724397
Glass Overall U-Value	0.9500	BTU / Hr-Sq Ft-Deg F	1.05263158
Roof Heat Loss	1,807	BTU / Hr-Deg F	
Wall Heat Loss	2,013	BTU / Hr-Deg F	
Glass Heat Loss	3,458	BTU / Hr-Deg F	
Total Envelope Heat Load	7,279	BTU / Hr-Deg F	

	Design OA	Actual OA	
OA Heat Load	0	0	BTU / Hr-Deg F
Total Occupied Heat Load	7,279	7,279	BTU / Hr-Deg F
OA % of design	35%	0	0 CFM OA

Existing (calendar blocks)

Day of Week #:	Day:	Occup:		Hour Ending	Occup:		Month #:	Month:	Occup:
1	Sunday	Y		1	Y		1	January	Y
2	Monday	Y		2	Y		2	February	Y
3	Tuesday	Y		3	Y		3	March	Y
4	Wednesday	Y		4	Y		4	April	Y
5	Thursday	Y		5	Y		5	May	Y
6	Friday	Y		6	Y		6	June	Y
7	Saturday	Y		7	Y		7	July	Y
				8	Y		8	August	Y
				9	Y		9	September	Y
				10	Y		10	October	Y
				11	Y		11	November	Y
				12	Y		12	December	Y
				13	Y				
				14	Y				
				15	Y				
				16	Y				
				17	Y				
				18	Y				
				19	Y				
				20	Y				
				21	Y				
				22	Y				
				23	Y				
				24	Y				

Proposed (calendar blocks)

Day of Week #:	Day:	Occup:		Hour Ending	Occup:		Month #:	Month:	Occup
1	Sunday	Y		1	Y		1	January	Y
2	Monday	Y		2	Y		2	February	Y
3	Tuesday	Y		3	Y		3	March	Y
4	Wednesday	Y		4	Y		4	April	Y
5	Thursday	Y		5	Y		5	May	Y
6	Friday	Y		6	Y		6	June	Y
7	Saturday	Y		7	Y		7	July	Y
				8	Y		8	August	Y
				9	Y		9	September	Y
				10	Y		10	October	Y
				11	Y		11	November	Y
				12	Y		12	December	Y
				13	Y				
				14	Y				
				15	Y				
				16	Y				
				17	Y				
				18	Y				
				19	Y				
				20	Y				
				21	Y				
				22	Y				
				23	Y				
				24	Y				

Existing System / Proposed System data table

Column group totals (Existing): 9,612 | 16,748 | 0 | 24,660 | 6,741 | 87,265 | 25,368
Column group totals (Proposed): 7,161 | 12,477 | 0 | 24,660 | 6,741 | 87,265 | 17,815

Month	Day	Day of Week	Min Hour	5 DB	h	4534 HTG	Existing Occupied	HTG Plant Operation	OA HTG BTU	OA HTG CCF	HTG BLDG BTU	HTG BLDG CCF	HTG BLDG kWh	CLG OA BTU	CLG OA kWh	CLG BLDG / People BTU	CLG BLDG/Pep kWh	Fan kWh	Pump VFD %	Pump KWh	Proposed System	HTG Plant Operation	OA HTG BTU	OA HTG CCF	HTG BLDG BTU	HTG BLDG CCF	HTG BLDG kWh	CLG OA BTU	CLG OA kWh	CLG BLDG / People BTU	CLG BLDG/Pep kWh	Fan kWh	Pump VFD %	Pump KWh
1	1	5	1	37	13.17	1	Y	On	146,204	2.13	254,752	3.71	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	146,204	1.59	254,752	2.76	0.00	0	0	0	0	19.2468	71%	3.97
72	1	5	2	36.3	12.92	1	Y	On	149,128	2.17	259,847	3.78	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	149,128	1.62	259,847	2.82	0.00	0	0	0	0	19.2468	72%	4.04
1	1	5	3	35.8	12.8	1	Y	On	151,216	2.20	263,486	3.84	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	151,216	1.64	263,486	2.86	0.00	0	0	0	0	19.2468	73%	4.09
1	1	5	4	35.1	12.55	1	Y	On	154,141	2.25	268,581	3.91	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	154,141	1.67	268,581	2.91	0.00	0	0	0	0	19.2468	74%	4.16
1	1	5	5	34.7	12.18	1	Y	On	155,811	2.27	271,493	3.95	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	155,811	1.69	271,493	2.95	0.00	0	0	0	0	19.2468	75%	4.19
1	1	5	6	34.3	11.76	1	Y	On	157,482	2.29	274,404	4.00	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	157,482	1.71	274,404	2.98	0.00	0	0	0	0	19.2468	76%	4.23
76	1	5	7	34	11.4	1	Y	On	158,736	2.31	276,588	4.03	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	158,736	1.72	276,588	3.00	0.00	0	0	0	0	19.2468	76%	4.26
1	1	5	8	34	11.36	1	Y	On	158,736	2.31	276,588	4.03	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	158,736	1.72	276,588	3.00	0.00	0	0	0	0	19.2468	76%	4.26
1	1	5	9	34	11.31	1	Y	On	158,736	2.31	276,588	4.03	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	158,736	1.72	276,588	3.00	0.00	0	0	0	0	19.2468	76%	4.26
1	1	5	10	34	11.27	1	Y	On	158,736	2.31	276,588	4.03	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	158,736	1.72	276,588	3.00	0.00	0	0	0	0	19.2468	76%	4.26
1	1	5	11	35.1	11.57	1	Y	On	154,141	2.25	268,581	3.91	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	154,141	1.67	268,581	2.91	0.00	0	0	0	0	19.2468	74%	4.16
1	1	5	12	36	11.86	1	Y	On	150,381	2.19	262,030	3.82	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	150,381	1.63	262,030	2.84	0.00	0	0	0	0	19.2468	73%	4.07
73	1	5	13	37	12.16	1	Y	On	146,204	2.13	254,752	3.71	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	146,204	1.59	254,752	2.76	0.00	0	0	0	0	19.2468	71%	3.97
1	1	5	14	36.7	11.93	1	Y	On	147,457	2.15	256,935	3.74	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	147,457	1.60	256,935	2.79	0.00	0	0	0	0	19.2468	72%	4.00
1	1	5	15	36.3	11.7	1	Y	On	149,128	2.17	259,847	3.78	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	149,128	1.62	259,847	2.82	0.00	0	0	0	0	19.2468	72%	4.04
1	1	5	16	36	11.47	1	Y	On	150,381	2.19	262,030	3.82	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	150,381	1.63	262,030	2.84	0.00	0	0	0	0	19.2468	73%	4.07
1	1	5	17	34.7	11.16	1	Y	On	155,811	2.27	271,493	3.95	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	155,811	1.69	271,493	2.95	0.00	0	0	0	0	19.2468	75%	4.19
75	1	5	18	33.3	10.83	1	Y	On	161,660	2.35	281,683	4.10	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	161,660	1.75	281,683	3.06	0.00	0	0	0	0	19.2468	77%	4.33
1	1	5	19	32	10.51	1	Y	On	167,090	2.43	291,145	4.24	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	167,090	1.81	291,145	3.16	0.00	0	0	0	0	19.2468	80%	4.45
1	1	5	20	32	10.43	1	Y	On	167,090	2.43	291,145	4.24	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	167,090	1.81	291,145	3.16	0.00	0	0	0	0	19.2468	80%	4.45
1	1	5	21	32	10.39	1	Y	On	167,090	2.43	291,145	4.24	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	167,090	1.81	291,145	3.16	0.00	0	0	0	0	19.2468	80%	4.45
1	1	5	22	32	10.3	1	Y	On	167,090	2.43	291,145	4.24	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	167,090	1.81	291,145	3.16	0.00	0	0	0	0	19.2468	80%	4.45
1	1	5	23	30.9	9.84	1	Y	On	171,685	2.50	299,151	4.36	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	171,685	1.86	299,151	3.25	0.00	0	0	0	0	19.2468	81%	4.56
1	1	5	24	30	9.45	1	Y	On	175,445	2.56	305,702	4.45	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	175,445	1.90	305,702	3.32	0.00	0	0	0	0	19.2468	83%	4.64
1	2	6	1	28.9	9.01	1	Y	On	180,039	2.62	313,709	4.57	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	180,039	1.95	313,709	3.40	0.00	0	0	0	0	19.2468	85%	4.75
87	2	6	2	27.7	8.62	1	Y	On	185,052	2.70	322,443	4.70	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	185,052	2.01	322,443	3.50	0.00	0	0	0	0	19.2468	87%	4.86
1	2	6	3	26.2	8.14	1	Y	On	191,318	2.79	333,361	4.86	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	191,318	2.08	333,361	3.62	0.00	0	0	0	0	19.2468	89%	5.01
1	2	6	4	25	7.76	1	Y	On	196,331	2.86	342,095	4.98	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	196,331	2.13	342,095	3.71	0.00	0	0	0	0	19.2468	92%	5.12
1	2	6	5	23.4	7.41	1	Y	On	203,014	2.96	353,741	5.15	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	203,014	2.20	353,741	3.84	0.00	0	0	0	0	19.2468	94%	5.27
1	2	6	6	21.6	6.95	1	Y	On	210,533	3.07	366,842	5.34	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	210,533	2.28	366,842	3.98	0.00	0	0	0	0	19.2468	97%	5.45
1	2	6	7	19.9	6.57	1	Y	On	217,635	3.17	379,216	5.52	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	217,635	2.36	379,216	4.11	0.00	0	0	0	0	19.2468	100%	5.60
98	2	6	8	21	6.85	1	Y	On	213,040	3.10	371,210	5.41	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	213,040	2.31	371,210	4.03	0.00	0	0	0	0	19.2468	98%	5.50
1	2	6	9	21.9	7.07	1	Y	On	209,280	3.05	364,659	5.31	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	209,280	2.27	364,659	3.96	0.00	0	0	0	0	19.2468	97%	5.42
1	2	6	10	23	7.34	1	Y	On	204,685	2.98	356,652	5.19	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	204,685	2.22	356,652	3.87	0.00	0	0	0	0	19.2468	95%	5.31
1	2	6	11	25	7.88	1	Y	On	196,331	2.86	342,095	4.98	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	196,331	2.13	342,095	3.71	0.00	0	0	0	0	19.2468	92%	5.12
1	2	6	12	28.9	8.41	1	Y	On	187,976	2.74	327,538	4.77	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	187,976	2.04	327,538	3.55	0.00	0	0	0	0	19.2468	88%	4.93
85	2	6	13	28.9	8.94	1	Y	On	180,039	2.62	313,709	4.57	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	180,039	1.95	313,709	3.40	0.00	0	0	0	0	19.2468	85%	4.75
1	2	6	14	29.3	9.06	1	Y	On	178,369	2.60	310,797	4.53	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	178,369	1.94	310,797	3.37	0.00	0	0	0	0	19.2468	84%	4.71
1	2	6	15	29.7	9.18	1	Y	On	176,698	2.57	307,886	4.48	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	176,698	1.92	307,886	3.34	0.00	0	0	0	0	19.2468	84%	4.67
1	2	6	16	30	9.3	1	Y	On	175,445	2.56	305,702	4.45	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	175,445	1.90	305,702	3.32	0.00	0	0	0	0	19.2468	83%	4.64
1	2	6	17	30	9.37	1	Y	On	175,445	2.56	305,702	4.45	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	175,445	1.90	305,702	3.32	0.00	0	0	0	0	19.2468	83%	4.64
83	2	6	18	30	9.41	1	Y	On	175,445	2.56	305,702	4.45	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	175,445	1.90	305,702	3.32	0.00	0	0	0	0	19.2468	83%	4.64
1	2	6	19	30	9.48	1	Y	On	175,445	2.56	305,702	4.45	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	175,445	1.90	305,702	3.32	0.00	0	0	0	0	19.2468	83%	4.64
1	2	6	20	30	9.56	1	Y	On	175,445	2.56	305,702	4.45	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	175,445	1.90	305,702	3.32	0.00	0	0	0	0	19.2468	83%	4.64
1	2	6	21	30	9.6	1	Y	On	175,445	2.56	305,702	4.45	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	175,445	1.90	305,702	3.32	0.00	0	0	0	0	19.2468	83%	4.64
1	2	6	22	30	9.67	1	Y	On	175,445	2.56	305,702	4.45	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	175,445	1.90	305,702	3.32	0.00	0	0	0	0	19.2468	83%	4.64
83	2	6	23	30	9.75	1	Y	On	175,445	2.56	305,702	4.45	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	175,445	1.90	305,702	3.32	0.00	0	0	0	0	19.2468	83%	4.64
1	2	6	24	30	9.82	1	Y	On	175,445	2.56	305,702	4.45	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	175,445	1.90	305,702	3.32	0.00	0	0	0	0	19.2468	83%	4.64
1	3	7	1	30	9.9	1	Y	On	175,445	2.56	305,702	4.45	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	175,445	1.90	305,702	3.32	0.00	0	0	0	0	19.2468	83%	4.64
1	3	7	2	30.4	10.07	1	Y	On	173,774	2.53	302,791	4.41	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	173,774	1.89	302,791	3.29	0.00	0	0	0	0	19.2468	82%	4.61
1	3	7	3	30.6	10.17	1	Y	On	172,938	2.52	301,335	4.39	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	172,938	1.88	301,335	3.27	0.00	0	0	0	0	19.2468	82%	4.59
81	3	7	4	30.9	10.35	1	Y	On	171,685	2.50	299,151	4.36	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	171,685	1.86	299,151	3.25	0.00	0	0	0	0	19.2468	81%	4.56
1	3	7	5	31.6	10.74	1	Y	On	168,761	2.46	294,056	4.28	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	168,761	1.83	294,056	3.19	0.00	0	0	0	0	19.2468	80%	4.49
1	3	7	6	32.4	11.18	1	Y	On	165,419	2.41	288,233	4.20	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	165,419	1.79	288,233	3.13	0.00	0	0	0	0	19.2468	79%	4.41
1	3	7	7	33.1	11.59	1	Y	On	162,495	2.37	283,138	4.12	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	162,495	1.76	283,138	3.07	0.00	0	0	0	0	19.2468	78%	4.35
1	3	7	8	33.4	11.81	1	Y	On	161,242	2.35	280,955	4.09	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	161,242	1.75	280,955	3.05	0.00	0	0	0	0	19.2468	77%	4.32
1	3	7	9	33.6	12.02	1	Y	On	160,406	2.34	279,499	4.07	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	160,406	1.74	279,499	3.03	0.00	0	0	0	0	19.2468	77%	4.30
1	3	7	10	34	12.25	1	Y	On	158,736	2.31	276,588	4.03	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	158,736	1.72	276,588	3.00	0.00	0	0	0	0	19.2468	76%	4.26
1	3	7	11	34.3	12.4	1	Y	On	157,482	2.29	274,404	4.00	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	157,482	1.71	274,404	2.98	0.00	0	0	0	0	19.2468	76%	4.23
1	3	7	12	34.7	12.55	1	Y	On	155,811	2.27	271,493	3.95	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	155,811	1.69	271,493	2.95	0.00	0	0	0	0	19.2468	75%	4.19
1	3	7	13	35.1	12.69	1	Y	On	154,141	2.25	268,581	3.91	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	154,141	1.67	268,581	2.91	0.00	0	0	0	0	19.2468	74%	4.16
1	3	7	14	35.1	12.74	1	Y	On	154,141	2.25	268,581	3.91	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	154,141	1.67	268,581	2.91	0.00	0	0	0	0	19.2468	74%	4.16
1	3	7	15	35.1	12.83	1	Y	On	154,141	2.25	268,581	3.91	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	154,141	1.67	268,581	2.91	0.00	0	0	0	0	19.2468	74%	4.16
1	3	7	16	35.1	12.88	1	Y	On	154,141	2.25	268,581	3.91	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	154,141	1.67	268,581	2.91	0.00	0	0	0	0	19.2468	74%	4.16
1	3	7	17	35.8	12.8	1	Y	On	151,216	2.20	263,486	3.84	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	151,216	1.64	263,486	2.86	0.00	0	0	0	0	19.2468	73%	4.09
1	3	7	18	36.3	12.68	1	Y	On	149,128	2.17	259,847	3.78	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	149,128	1.62	259,847	2.82	0.00	0	0	0	0	19.2468	72%	4.04
1	3	7	19	37	12.56	1	Y	On	146,204	2.13	254,752	3.71	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	146,204	1.59	254,752	2.76	0.00	0	0	0	0	19.2468	71%	3.97
1	3	7	20	36.3	12.09	1	Y	On	149,128	2.17	259,847	3.78	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	149,128	1.62	259,847	2.82	0.00	0	0	0	0	19.2468	72%	4.04
1	3	7	21	35.8	11.74	1	Y	On	151,216	2.20	263,486	3.84	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	151,216	1.64	263,486	2.86	0.00	0	0	0	0	19.2468	73%	4.09
1	3	7	22	35.1	11.29	1	Y	On	154,141	2.25	268,581	3.91	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	154,141	1.67	268,581	2.91	0.00	0	0	0	0	19.2468	74%	4.16
1	3	7	23	33.6	10.65	1	Y	On	160,406	2.34	279,499	4.07	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	160,406	1.74	279,499	3.03	0.00	0	0	0	0	19.2468	77%	4.30
1	3	7	24	32.4	10.14	1	Y	On	165,419	2.41	288,233	4.20	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	165,419	1.79	288,233	3.13	0.00	0	0	0	0	19.2468	79%	4.41
1	4	1	1	30.9	9.52	1	Y	On	171,685	2.50	299,151	4.36	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	171,685	1.86	299,151	3.25	0.00	0	0	0	0	19.2468	81%	4.56
1	4	1	2	29.7	9.1	1	Y	On	176,698	2.57	307,886	4.48	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	176,698	1.92	307,886	3.34	0.00	0	0	0	0	19.2468	84%	4.67
1	4	1	3	28.2	8.66	1	Y	On	182,964	2.66	318,804	4.64	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	182,964	1.99	318,804	3.46	0.00	0	0	0	0	19.2468	86%	4.82
1	4	1	4	27	8.25	1	Y	On	187,976	2.74	327,538	4.77	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	187,976	2.04	327,538	3.55	0.00	0	0	0	0	19.2468	88%	4.93
1	4	1	5	26.1	7.9	1	Y	On	191,736	2.79	334,089	4.87	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	191,736	2.08	334,089	3.63	0.00	0	0	0	0	19.2468	90%	5.02
1	4	1	6	25	7.53	1	Y	On	196,331	2.86	342,095	4.98	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	196,331	2.13	342,095	3.71	0.00	0	0	0	0	19.2468	92%	5.12
1	4	1	7	24.1	7.19	1	Y	On	200,090	2.17	348,646	5.08	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	200,090	2.17	348,646	3.78	0.00	0	0	0	0	19.2468	94%	5.21
1	4	1	8	23.4	7.02	1	Y	On	203,014	2.96	353,741	5.15	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	203,014	2.20	353,741	3.84	0.00	0	0	0	0	19.2468	94%	5.27
1	4	1	9	22.6	6.83	1	Y	On	206,356	2.24	359,564	5.24	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	206,356	2.24	359,564	3.90	0.00	0	0	0	0	19.2468	96%	5.35
1	4	1	10	21.9	6.66	1	Y	On	209,280	3.05	364,659	5.31	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	209,280	2.27	364,659	3.96	0.00	0	0	0	0	19.2468	97%	5.42
1	4	1	11	23.5	7.11	1	Y	On	202,597	2.95	353,013	5.14	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	202,597	2.20	353,013	3.83	0.00	0	0	0	0	19.2468	94%	5.27
1	4	1	12	25.3	7.61	1	Y	On	195,078	2.84	339,912	4.95	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	195,078	2.12	339,912	3.69	0.00	0	0	0	0	19.2468	91%	5.09
1	4	1	13	27	8.06	1	Y	On	187,976	2.74	327,538	4.77	0.00	0	0	0	0	19.2468	100%	5.60	Y	On	187,976	2.04	327,538	3.55	0.00	0	0	0	0	19.2468	88%	4.93

ECM 14: Ag Building Electric Boiler Replacement Weather:

Harrisburg, PA

Existing System

2	Boilers	
100%	Efficiency	
0.98361	CLG kW/Ton	

72	HTG Setpoint
75	CLG Setpoint
55	HTG Balance Point
26	CLG Balance Point

6820	OA CFM
22	Fan HP
2.50	COP
15	HP of HP Loop Pump

168.87	Building Occupants
150	Btu/HR
25330	Total Btu

Proposed System

2	Boilers
90%	Eff.
2.50	COP

| 0.98361 | CLG kW/Ton |

| 6820 | CFM |
| 15 | HP of HP Loop Pump |

72	Proposed HTG Occ. Setpoint
75	Proposed CLG Occ. Setpoint
72	Proposed HTG UnOcc. Setpoint
75	Proposed CLG UnOcc. Setpoint

| 22 | Fan HP |
| N | Pump VFD? |

Ag Building Electric Boiler Replacement

Existing		Proposed		Saved	
CCF	kWh	CCF	kWh	CCF	kWh
0	130,573	4,834	0	-4,834	130,573

Building Envelope HTG Load

			R Value
Roof Area	42,540	SF	
Total Wall Area	42,600	SF	
Glass Area	8,520	SF	
Masonry Wall Area	34,080	SF	
Roof Overall U-Value	0.0755	BTU / Hr-Sq Ft-Deg F	13.2477528
Wall Overall U-Value	0.0615	BTU / Hr-Sq Ft-Deg F	16.2724397
Glass Overall U-Value	0.9500	BTU / Hr-Sq Ft-Deg F	1.05263158
Roof Heat Loss	3,211	BTU / Hr-Deg F	
Wall Heat Loss	2,094	BTU / Hr-Deg F	
Glass Heat Loss	8,094	BTU / Hr-Deg F	
Total Envelope Heat Load	13,399	BTU / Hr-Deg F	

	Design OA	Actual OA	
OA Heat Load	0	0	BTU / Hr-Deg F
Total Occupied Heat Load	13,399	13,399	BTU / Hr-Deg F
OA % of design	35%	0	0 CFM OA

Existing System / Proposed System (hourly data)

Month	Day	Day of Week	Hour	Min 5 DB	h	4534 HTG	Existing Occupied	HTG Plant Operation	OA HTG BTU	OA HTG CCF	HTG BLDG BTU	HTG BLDG kWh	HTG BLDG kWh	CLG OA BTU	CLG OA kWh	CLG BLDG / People BTU	CLG BLDG/Pep kWh	Fan kWh	Pump VFD %	Pump KWh	Proposed System	HTG Plant Operation	OA HTG BTU	OA HTG CCF	HTG BLDG BTU	HTG BLDG CCF	HTG BLDG kWh	CLG OA BTU	CLG OA kWh	CLG BLDG / People BTU	CLG BLDG/Pep kWh	Fan kWh	Pump VFD %	Pump KWh
									5,162	130,573	248,168		17,633		9,256	74,412			50,735			5,162	4,834	117,595		17,633		9,256	74,412			50,735
1	1	5	1	37	13.17	1	N	On	0	0.00	468,981	0.00	54.98	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	468,981	0.00	54.98	0	0	0	0	16.412	100%	11.19
1	1	5	2	36.3	12.92	1	N	On	0	0.00	478,360	0.00	56.08	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	478,360	0.00	56.08	0	0	0	0	16.412	100%	11.19
1	1	5	3	35.8	12.8	1	N	On	0	0.00	485,060	0.00	56.87	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	485,060	0.00	56.87	0	0	0	0	16.412	100%	11.19
1	1	5	4	35.1	12.55	1	N	On	0	0.00	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19
1	1	5	5	34.7	12.18	1	N	On	0	0.00	499,799	58.59	58.59	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	499,799	2.17	0.00	0	0	0	0	16.412	100%	11.19
1	1	5	6	34.3	11.76	1	Y	On	278,969	3.58	505,159	59.22	59.22	0	0	0	0	16.412	100%	11.19	Y	On	278,969	3.58	505,159	2.19	0.00	0	0	0	0	16.412	100%	11.19
1	1	5	7	34	11.4	1	Y	On	281,189	3.61	509,179	59.69	59.69	0	0	0	0	16.412	100%	11.19	Y	On	281,189	3.61	509,179	2.21	0.00	0	0	0	0	16.412	100%	11.19
1	1	5	8	34	11.36	1	Y	On	281,189	3.61	509,179	59.69	59.69	0	0	0	0	16.412	100%	11.19	Y	On	281,189	3.61	509,179	2.21	0.00	0	0	0	0	16.412	100%	11.19
1	1	5	9	34	11.31	1	Y	On	281,189	3.61	509,179	59.69	59.69	0	0	0	0	16.412	100%	11.19	Y	On	281,189	3.61	509,179	2.21	0.00	0	0	0	0	16.412	100%	11.19
1	1	5	10	34	11.27	1	Y	On	281,189	3.61	509,179	59.69	59.69	0	0	0	0	16.412	100%	11.19	Y	On	281,189	3.61	509,179	2.21	0.00	0	0	0	0	16.412	100%	11.19
1	1	5	11	35.1	11.57	1	Y	On	273,049	3.51	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19	Y	On	273,049	3.51	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19
1	1	5	12	36	11.86	1	Y	On	266,389	3.42	482,380	0.00	56.55	0	0	0	0	16.412	100%	11.19	Y	On	266,389	3.42	482,380	0.00	56.55	0	0	0	0	16.412	100%	11.19
1	1	5	13	37	12.16	1	Y	On	258,990	3.33	468,981	0.00	54.98	0	0	0	0	16.412	100%	11.19	Y	On	258,990	3.33	468,981	0.00	54.98	0	0	0	0	16.412	100%	11.19
1	1	5	14	36.7	11.93	1	Y	On	261,209	3.36	473,001	0.00	55.45	0	0	0	0	16.412	100%	11.19	Y	On	261,209	3.36	473,001	0.00	55.45	0	0	0	0	16.412	100%	11.19
1	1	5	15	36.3	11.7	1	Y	On	264,169	3.39	478,360	0.00	56.08	0	0	0	0	16.412	100%	11.19	Y	On	264,169	3.39	478,360	0.00	56.08	0	0	0	0	16.412	100%	11.19
1	1	5	16	36	11.47	1	Y	On	266,389	3.42	482,380	0.00	56.55	0	0	0	0	16.412	100%	11.19	Y	On	266,389	3.42	482,380	0.00	56.55	0	0	0	0	16.412	100%	11.19
1	1	5	17	34.7	11.16	1	Y	On	276,009	3.55	499,799	58.59	58.59	0	0	0	0	16.412	100%	11.19	Y	On	276,009	3.55	499,799	2.17	0.00	0	0	0	0	16.412	100%	11.19
1	1	5	18	33.3	10.83	1	Y	On	286,368	3.68	518,559	60.79	60.79	0	0	0	0	16.412	100%	11.19	Y	On	286,368	3.68	518,559	2.25	0.00	0	0	0	0	16.412	100%	11.19
1	1	5	19	32	10.51	1	N	On	0	0.00	535,978	62.83	62.83	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	535,978	2.33	0.00	0	0	0	0	16.412	100%	11.19
1	1	5	20	32	10.43	1	N	On	0	0.00	535,978	62.83	62.83	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	535,978	2.33	0.00	0	0	0	0	16.412	100%	11.19
1	1	5	21	32	10.39	1	N	On	0	0.00	535,978	62.83	62.83	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	535,978	2.33	0.00	0	0	0	0	16.412	100%	11.19
1	1	5	22	32	10.3	1	N	On	0	0.00	535,978	62.83	62.83	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	535,978	2.33	0.00	0	0	0	0	16.412	100%	11.19
1	1	5	23	30.9	9.84	1	N	On	0	0.00	550,717	64.56	64.56	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	550,717	2.39	0.00	0	0	0	0	16.412	100%	11.19
1	1	5	24	30	9.45	1	N	On	0	0.00	562,777	65.98	65.98	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	562,777	2.44	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	1	28.9	9.01	1	N	On	0	0.00	577,516	67.70	67.70	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	577,516	2.51	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	2	27.7	8.62	1	N	On	0	0.00	593,596	69.59	69.59	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	593,596	2.58	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	3	26.2	8.14	1	N	On	0	0.00	613,695	71.95	71.95	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	613,695	2.66	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	4	25	7.76	1	N	On	0	0.00	629,774	73.83	73.83	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	629,774	2.73	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	5	23.4	7.41	1	N	On	0	0.00	651,213	76.34	76.34	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	651,213	2.83	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	6	21.6	6.95	1	Y	On	372,945	4.79	675,332	79.17	79.17	0	0	0	0	16.412	100%	11.19	Y	On	372,945	4.79	675,332	2.93	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	7	19.9	6.57	1	Y	On	385,524	4.95	698,111	81.84	81.84	0	0	0	0	16.412	100%	11.19	Y	On	385,524	4.95	698,111	3.03	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	8	21	6.85	1	Y	On	377,385	4.85	683,372	80.11	80.11	0	0	0	0	16.412	100%	11.19	Y	On	377,385	4.85	683,372	2.97	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	9	21.9	7.07	1	Y	On	370,725	4.76	671,312	78.70	78.70	0	0	0	0	16.412	100%	11.19	Y	On	370,725	4.76	671,312	2.91	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	10	23	7.34	1	Y	On	362,585	4.66	656,573	76.97	76.97	0	0	0	0	16.412	100%	11.19	Y	On	362,585	4.66	656,573	2.85	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	11	25	7.88	1	Y	On	347,786	4.47	629,774	73.83	73.83	0	0	0	0	16.412	100%	11.19	Y	On	347,786	4.47	629,774	2.73	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	12	27	8.41	1	Y	On	332,987	4.28	602,975	70.69	70.69	0	0	0	0	16.412	100%	11.19	Y	On	332,987	4.28	602,975	2.62	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	13	28.9	8.94	1	Y	On	318,927	4.10	577,516	67.70	67.70	0	0	0	0	16.412	100%	11.19	Y	On	318,927	4.10	577,516	2.51	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	14	29.3	9.06	1	Y	On	315,967	4.06	572,156	67.08	67.08	0	0	0	0	16.412	100%	11.19	Y	On	315,967	4.06	572,156	2.48	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	15	29.7	9.18	1	Y	On	313,000	4.02	566,797	66.45	66.45	0	0	0	0	16.412	100%	11.19	Y	On	313,000	4.02	566,797	2.46	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	16	30	9.3	1	Y	On	310,787	3.99	562,777	65.98	65.98	0	0	0	0	16.412	100%	11.19	Y	On	310,787	3.99	562,777	2.44	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	17	30	9.37	1	Y	On	310,787	3.99	562,777	65.98	65.98	0	0	0	0	16.412	100%	11.19	Y	On	310,787	3.99	562,777	2.44	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	18	30	9.41	1	Y	On	310,787	3.99	562,777	65.98	65.98	0	0	0	0	16.412	100%	11.19	Y	On	310,787	3.99	562,777	2.44	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	19	30	9.48	1	N	On	0	0.00	562,777	65.98	65.98	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	562,777	2.44	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	20	30	9.56	1	N	On	0	0.00	562,777	65.98	65.98	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	562,777	2.44	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	21	30	9.6	1	N	On	0	0.00	562,777	65.98	65.98	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	562,777	2.44	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	22	30	9.67	1	N	On	0	0.00	562,777	65.98	65.98	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	562,777	2.44	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	23	30	9.75	1	N	On	0	0.00	562,777	65.98	65.98	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	562,777	2.44	0.00	0	0	0	0	16.412	100%	11.19
1	2	6	24	30	9.82	1	N	On	0	0.00	562,777	65.98	65.98	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	562,777	2.44	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	1	30	9.9	1	N	On	0	0.00	562,777	65.98	65.98	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	562,777	2.44	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	2	30.4	10.07	1	N	On	0	0.00	557,417	65.35	65.35	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	557,417	2.42	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	3	30.6	10.17	1	N	On	0	0.00	554,737	65.03	65.03	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	554,737	2.41	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	4	30.9	10.35	1	N	On	0	0.00	550,717	64.56	64.56	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	550,717	2.39	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	5	31.6	10.74	1	N	On	0	0.00	541,338	63.46	63.46	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	541,338	2.35	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	6	32.4	11.18	1	N	On	0	0.00	530,618	62.21	62.21	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	530,618	2.30	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	7	33.1	11.59	1	N	On	0	0.00	521,239	61.11	61.11	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	521,239	2.26	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	8	33.4	11.81	1	N	On	0	0.00	517,219	60.64	60.64	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	517,219	2.24	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	9	33.6	12.02	1	N	On	0	0.00	514,539	60.32	60.32	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	514,539	2.23	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	10	34	12.25	1	N	On	0	0.00	509,179	59.69	59.69	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	509,179	2.21	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	11	34.3	12.4	1	N	On	0	0.00	505,159	59.22	59.22	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	505,159	2.19	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	12	34.7	12.55	1	N	On	0	0.00	499,799	58.59	58.59	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	499,799	2.17	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	13	35.1	12.69	1	N	On	0	0.00	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19
1	3	7	14	35.1	12.74	1	N	On	0	0.00	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19
1	3	7	15	35.1	12.83	1	N	On	0	0.00	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19
1	3	7	16	35.1	12.88	1	N	On	0	0.00	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19
1	3	7	17	35.8	12.8	1	N	On	0	0.00	485,060	0.00	56.87	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	485,060	0.00	56.87	0	0	0	0	16.412	100%	11.19
1	3	7	18	36.3	12.68	1	N	On	0	0.00	478,360	0.00	56.08	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	478,360	0.00	56.08	0	0	0	0	16.412	100%	11.19
1	3	7	19	37	12.56	1	N	On	0	0.00	468,981	0.00	54.98	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	468,981	0.00	54.98	0	0	0	0	16.412	100%	11.19
1	3	7	20	36.3	11.74	1	N	On	0	0.00	478,360	0.00	56.08	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	478,360	0.00	56.08	0	0	0	0	16.412	100%	11.19
1	3	7	21	35.8	11.79	1	N	On	0	0.00	485,060	0.00	56.87	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	485,060	0.00	56.87	0	0	0	0	16.412	100%	11.19
1	3	7	22	35.1	11.29	1	N	On	0	0.00	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	494,440	0.00	57.96	0	0	0	0	16.412	100%	11.19
1	3	7	23	33.6	10.65	1	N	On	0	0.00	514,539	60.32	60.32	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	514,539	2.23	0.00	0	0	0	0	16.412	100%	11.19
1	3	7	24	32.4	10.14	1	N	On	0	0.00	530,618	62.21	62.21	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	530,618	2.30	0.00	0	0	0	0	16.412	100%	11.19
1	4	1	1	30.9	9.52	1	N	On	0	0.00	550,717	64.56	64.56	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	550,717	2.39	0.00	0	0	0	0	16.412	100%	11.19
1	4	1	2	29.7	9.1	1	N	On	0	0.00	566,797	66.45	66.45	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	566,797	2.46	0.00	0	0	0	0	16.412	100%	11.19
1	4	1	3	28.2	8.66	1	N	On	0	0.00	586,896	68.80	68.80	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	586,896	2.55	0.00	0	0	0	0	16.412	100%	11.19
1	4	1	4	27	8.25	1	N	On	0	0.00	602,975	70.69	70.69	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	602,975	2.62	0.00	0	0	0	0	16.412	100%	11.19
1	4	1	5	26.1	7.9	1	N	On	0	0.00	615,035	72.10	72.10	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	615,035	2.67	0.00	0	0	0	0	16.412	100%	11.19
1	4	1	6	25	7.53	1	N	On	0	0.00	629,774	73.83	73.83	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	629,774	2.73	0.00	0	0	0	0	16.412	100%	11.19
1	4	1	7	24.1	7.19	1	N	On	0	0.00	641,834	75.24	75.24	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	641,834	2.79	0.00	0	0	0	0	16.412	100%	11.19
1	4	1	8	23.4	7.02	1	N	On	0	0.00	651,213	76.34	76.34	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	651,213	2.83	0.00	0	0	0	0	16.412	100%	11.19
1	4	1	9	22.6	6.83	1	N	On	0	0.00	661,933	77.60	77.60	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	661,933	2.87	0.00	0	0	0	0	16.412	100%	11.19
1	4	1	10	21.9	6.66	1	N	On	0	0.00	671,312	78.70	78.70	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	671,312	2.91	0.00	0	0	0	0	16.412	100%	11.19
1	4	1	11	23.5	7.11	1	N	On	0	0.00	649,873	76.19	76.19	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	649,873	2.82	0.00	0	0	0	0	16.412	100%	11.19
1	4	1	12	25.3	7.61	1	N	On	0	0.00	625,754	73.36	73.36	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	625,754	2.72	0.00	0	0	0	0	16.412	100%	11.19
1	4	1	13	27	8.06	1	N	On	0	0.00	602,975	70.69	70.69	0	0	0	0	16.412	100%	11.19	N	On	0	0.00	602,975	2.62	0.00	0	0	0	0	16.412	100%	11.19

ECM 17: Irvis FCU Controls

Assumptions

		Totals	
321	QTY		
7500	BTU/HR CLG AVG	2,407,500	
19000	BTU/HR HTG AVG	6,099,000	
410	CFM (No OA)	131,610	
184	W	59,064	

Savings	Existing	Proposed	Saved	Units
Fan	295,143	233,007	62,135	kWh
HTG	6,396	4,851	1,545	MLB
CLG	109,666	101,541	8,125	kWh

		OAT	% Load	m		b
50	F HTG Balance					
65	F CLG Balance	20	100%	-0.033333 x	+	1.6667
20	F Min Design Day	50	0%			
89	F Max Design Day					

	OAT	% Load	m		b
	89	100%	0.041667 x	+	-2.7083
	65	0%			

70	HTG Setpoint
72	CLG Setpoint
65	HTG Setback
75	CLG Setback
50	HTG Balance Point (F)
21.98	CLG Balance Point (h)
0.85	kW/Ton CLG

				Max	99							Existing					Proposed			
				Min	5							295,143	6,038.254	1,548.223	109,665.805		233,007	4,579.475	1,433.516	101,540.701
Month	Day	Day of Week	Hour	DB	h	HTG	CLG	CLG Occ	Existing Occ	Proposed Occ		Fan kWh	HTG BTU	CLG BTU	CLG kWh		Fan kWh	HTG BTU	CLG BTU	CLG kWh
1	1	5	1	37	13.17	1	0	0	N	N		0	0	0	0		0	0	0	0
1	1	5	2	36.3	12.92	1	0	0	N	N		0	0	0	0		0	0	0	0
1	1	5	3	35.8	12.8	1	0	0	N	N		0	0	0	0		0	0	0	0
1	1	5	4	35.1	12.55	1	0	0	N	N		0	0	0	0		0	0	0	0
1	1	5	5	34.7	12.18	1	0	0	N	N		0	0	0	0		0	0	0	0
1	1	5	6	34.3	11.76	1	0	0	Y	Y		59.064	3191810	0	0		59.064	3191810	0	0
1	1	5	7	34	11.4	1	0	0	Y	Y		59.064	3252800	0	0		59.064	3252800	0	0
1	1	5	8	34	11.36	1	0	0	Y	Y		59.064	3252800	0	0		59.064	3252800	0	0
1	1	5	9	34	11.31	1	0	0	Y	Y		59.064	3252800	0	0		59.064	3252800	0	0
1	1	5	10	34	11.27	1	0	0	Y	Y		59.064	3252800	0	0		59.064	3252800	0	0
1	1	5	11	35.1	11.57	1	0	0	Y	Y		59.064	3029170	0	0		59.064	3029170	0	0
1	1	5	12	36	11.86	1	0	0	Y	Y		59.064	2846200	0	0		59.064	2846200	0	0
1	1	5	13	37	12.16	1	0	0	Y	Y		59.064	2642900	0	0		59.064	2642900	0	0
1	1	5	14	36.7	11.93	1	0	0	Y	Y		59.064	2703890	0	0		59.064	2703890	0	0
1	1	5	15	36.3	11.7	1	0	0	Y	Y		59.064	2785210	0	0		59.064	2785210	0	0
1	1	5	16	36	11.47	1	0	0	Y	Y		59.064	2846200	0	0		59.064	2846200	0	0
1	1	5	17	34.7	11.16	1	0	0	Y	Y		59.064	3110490	0	0		59.064	3110490	0	0

ECM 19: 22nd & Forster Convert Electric AHU to Hot Water

Weather: Harrisburg, PA

Existing System

	72	HTG Setpoint
2	Boilers	75	CLG Setpoint
90%	Efficiency	55	HTG Balance Point
1	CLG kW/Ton	26	CLG Balance Point
2000	OA CFM	168.87	Building Occupants
10	Fan HP	150	Btu/HR
1.00	COP	25330	Total Btu

Proposed System

2	Boilers	72	Proposed HTG Occ. Setpoint
90%	Eff.	75	Proposed CLG Occ. Setpoint
1.00	COP	72	Proposed HTG UnOcc. Setpoint
1	CLG kW/Ton	75	Proposed CLG UnOcc. Setpoint
2000	CFM		
10	Fan HP		
N	Pump VFD?		

22nd& Forster Electric AHU to Hot Water

Existing		Proposed		Saved	
CCF	kWh	CCF	kWh	CCF	kWh
0	137,934	5,107	0	-5,107	137,934

Building Envelope HTG Load

			R Value
Roof Area	7,090	SF	
Total Wall Area	7,100	SF	
Glass Area	1,420	SF	
Masonry Wall Area	5,680		
Roof Overall U-Value	0.0755	BTU / Hr-Sq Ft-Deg F	13.2477528
Wall Overall U-Value	0.0615	BTU / Hr-Sq Ft-Deg F	16.2724397
Glass Overall U-Value	0.9500	BTU / Hr-Sq Ft-Deg F	1.05263158
Roof Heat Loss	535	BTU / Hr-Deg F	
Wall Heat Loss	349	BTU / Hr-Deg F	
Glass Heat Loss	1,349	BTU / Hr-Deg F	
Total Envelope Heat Load	2,233	BTU / Hr-Deg F	

	Design OA	Actual OA	
OA Heat Load	0	0	BTU / Hr-Deg F
Total Occupied Heat Load	2,233	2,233	BTU / Hr-Deg F
OA % of design	35%	0	0	CFM OA

Existing

Day of Week #:	Day:	Occup:	Hour Ending	Occup:	Month #:	Month:	Occup:
1	Sunday	N	1	N	1	January	Y
2	Monday	Y	2	N	2	February	Y
3	Tuesday	Y	3	N	3	March	Y
4	Wednesday	Y	4	N	4	April	Y
5	Thursday	Y	5	N	5	May	Y
6	Friday	Y	6	N	6	June	Y
7	Saturday	N	7	Y	7	July	Y
			8	Y	8	August	Y
			9	Y	9	September	Y
			10	Y	10	October	Y
			11	Y	11	November	Y
			12	Y	12	December	Y
			13	Y			
			14	Y			
			15	Y			
			16	Y			
			17	Y			
			18	Y			
			19	Y			
			20	N			
			21	N			
			22	N			
			23	N			
			24	N			

Proposed

Day of Week #:	Day:	Occup:	Hour Ending	Occup:	Month #:	Month:	Occup
1	Sunday	N	1	N	1	January	Y
2	Monday	Y	2	N	2	February	Y
3	Tuesday	Y	3	N	3	March	Y
4	Wednesday	Y	4	N	4	April	Y
5	Thursday	Y	5	N	5	May	Y
6	Friday	Y	6	N	6	June	Y
7	Saturday	N	7	Y	7	July	Y
			8	Y	8	August	Y
			9	Y	9	September	Y
			10	Y	10	October	Y
			11	Y	11	November	Y
			12	Y	12	December	Y
			13	Y			
			14	Y			
			15	Y			
			16	Y			
			17	Y			
			18	Y			
			19	Y			
			20	N			
			21	N			
			22	N			
			23	N			
			24	N			

Existing System / Proposed System

				Min	5		4534							34,531	0	103,403						1,278	3,828	0
Month	Day	Day of Week	Hour	DB	h		HTG	Existing Occupied	HTG Plant Operation	OA HTG BTU	OA HTG kWh	HTG BLDG BTU	HTG BLDG CCF	HTG BLDG kWh	Proposed System	HTG Plant Operation	OA HTG BTU	OA HTG CCF	HTG BLDG BTU	HTG BLDG CCF	HTG BLDG kWh
1	1	5	1	37	13.17	1	N	On	0	0.00	78,163	0.00	22.91	N	On	0	0.00	78,163	0.85	0.00
1	1	5	2	36.3	12.92	1	N	On	0	0.00	79,727	0.00	23.37	N	On	0	0.00	79,727	0.87	0.00
1	1	5	3	35.8	12.8	1	N	On	0	0.00	80,843	0.00	23.69	N	On	0	0.00	80,843	0.88	0.00
1	1	5	4	35.1	12.55	1	N	On	0	0.00	82,407	0.00	24.15	N	On	0	0.00	82,407	0.89	0.00
1	1	5	5	34.7	12.18	1	N	On	0	0.00	83,300	0.00	24.41	N	On	0	0.00	83,300	0.90	0.00
1	1	5	6	34.3	11.76	1	Y	On	81,809	23.98	84,193	0.00	24.68	Y	On	81,809	0.89	84,193	0.91	0.00
1	1	5	7	34	11.4	1	Y	On	82,460	24.17	84,863	0.00	24.87	Y	On	82,460	0.89	84,863	0.92	0.00
1	1	5	8	34	11.36	1	Y	On	82,460	24.17	84,863	0.00	24.87	Y	On	82,460	0.89	84,863	0.92	0.00
1	1	5	9	34	11.31	1	Y	On	82,460	24.17	84,863	0.00	24.87	Y	On	82,460	0.89	84,863	0.92	0.00
1	1	5	10	34	11.27	1	Y	On	82,460	24.17	84,863	0.00	24.87	Y	On	82,460	0.89	84,863	0.92	0.00
1	1	5	11	35.1	11.57	1	Y	On	80,073	23.47	82,407	0.00	24.15	Y	On	80,073	0.87	82,407	0.89	0.00
1	1	5	12	36	11.86	1	Y	On	78,120	22.90	80,397	0.00	23.56	Y	On	78,120	0.85	80,397	0.87	0.00
1	1	5	13	37	12.16	1	Y	On	75,950	22.26	78,163	0.00	22.91	Y	On	75,950	0.82	78,163	0.85	0.00
1	1	5	14	36.7	11.93	1	Y	On	76,601	22.45	78,833	0.00	23.10	Y	On	76,601	0.83	78,833	0.86	0.00
1	1	5	15	36.3	11.7	1	Y	On	77,469	22.70	79,727	0.00	23.37	Y	On	77,469	0.84	79,727	0.87	0.00
1	1	5	16	36	11.47	1	Y	On	78,120	22.90	80,397	0.00	23.56	Y	On	78,120	0.85	80,397	0.87	0.00
1	1	5	17	34.7	11.16	1	Y	On	80,941	23.72	83,300	0.00	24.41	Y	On	80,941	0.88	83,300	0.90	0.00
1	1	5	18	33.3	10.83	1	Y	On	83,979	24.61	86,426	0.00	25.33	Y	On	83,979	0.91	86,426	0.94	0.00
1	1	5	19	32	10.51	1	N	On	0	0.00	89,330	0.00	26.18	N	On	0	0.00	89,330	0.97	0.00
1	1	5	20	32	10.43	1	N	On	0	0.00	89,330	0.00	26.18	N	On	0	0.00	89,330	0.97	0.00
1	1	5	21	32	10.39	1	N	On	0	0.00	89,330	0.00	26.18	N	On	0	0.00	89,330	0.97	0.00
1	1	5	22	32	10.3	1	N	On	0	0.00	89,330	0.00	26.18	N	On	0	0.00	89,330	0.97	0.00
1	1	5	23	30.9	9.84	1	N	On	0	0.00	91,786	0.00	26.90	N	On	0	0.00	91,786	1.00	0.00
1	1	5	24	30	9.45	1	N	On	0	0.00	93,796	0.00	27.49	N	On	0	0.00	93,796	1.02	0.00
1	2	6	1	28.9	9.01	1	N	On	0	0.00	96,253	0.00	28.21	N	On	0	0.00	96,253	1.04	0.00
1	2	6	2	27.7	8.62	1	N	On	0	0.00	98,933	0.00	29.00	N	On	0	0.00	98,933	1.07	0.00
1	2	6	3	26.2	8.14	1	N	On	0	0.00	102,282	0.00	29.98	N	On	0	0.00	102,282	1.11	0.00
1	2	6	4	25	7.76	1	N	On	0	0.00	104,962	0.00	30.76	N	On	0	0.00	104,962	1.14	0.00
1	2	6	5	23.4	7.41	1	N	On	0	0.00	108,536	0.00	31.81	N	On	0	0.00	108,536	1.18	0.00
1	2	6	6	21.6	6.95	1	Y	On	109,368	32.05	112,555	0.00	32.99	Y	On	109,368	1.19	112,555	1.22	0.00
1	2	6	7	19.9	6.57	1	Y	On	113,057	33.14	116,352	0.00	34.10	Y	On	113,057	1.23	116,352	1.26	0.00
1	2	6	8	21	6.85	1	Y	On	110,670	32.44	113,895	0.00	33.38	Y	On	110,670	1.20	113,895	1.24	0.00
1	2	6	9	21.9	7.07	1	Y	On	108,717	31.86	111,885	0.00	32.79	Y	On	108,717	1.18	111,885	1.21	0.00
1	2	6	10	23	7.34	1	Y	On	106,330	31.16	109,429	0.00	32.07	Y	On	106,330	1.15	109,429	1.19	0.00
1	2	6	11	25	7.88	1	Y	On	101,990	29.89	104,962	0.00	30.76	Y	On	101,990	1.11	104,962	1.14	0.00
1	2	6	12	27	8.41	1	Y	On	97,650	28.62	100,496	0.00	29.45	Y	On	97,650	1.06	100,496	1.09	0.00
1	2	6	13	28.9	8.94	1	Y	On	93,527	27.41	96,253	0.00	28.21	Y	On	93,527	1.01	96,253	1.04	0.00
1	2	6	14	29.3	9.06	1	Y	On	92,659	27.16	95,359	0.00	27.95	Y	On	92,659	1.01	95,359	1.03	0.00
1	2	6	15	29.7	9.18	1	Y	On	91,791	26.90	94,466	0.00	27.69	Y	On	91,791	1.00	94,466	1.03	0.00
1	2	6	16	30	9.3	1	Y	On	91,140	26.71	93,796	0.00	27.49	Y	On	91,140	0.99	93,796	1.02	0.00
1	2	6	17	30	9.37	1	Y	On	91,140	26.71	93,796	0.00	27.49	Y	On	91,140	0.99	93,796	1.02	0.00
1	2	6	18	30	9.41	1	Y	On	91,140	26.71	93,796	0.00	27.49	Y	On	91,140	0.99	93,796	1.02	0.00
1	2	6	19	30	9.48	1	N	On	0	0.00	93,796	0.00	27.49	N	On	0	0.00	93,796	1.02	0.00
1	2	6	20	30	9.56	1	N	On	0	0.00	93,796	0.00	27.49	N	On	0	0.00	93,796	1.02	0.00
1	2	6	21	30	9.6	1	N	On	0	0.00	93,796	0.00	27.49	N	On	0	0.00	93,796	1.02	0.00
1	2	6	22	30	9.67	1	N	On	0	0.00	93,796	0.00	27.49	N	On	0	0.00	93,796	1.02	0.00
1	2	6	23	30	9.75	1	N	On	0	0.00	93,796	0.00	27.49	N	On	0	0.00	93,796	1.02	0.00
1	2	6	24	30	9.82	1	N	On	0	0.00	93,796	0.00	27.49	N	On	0	0.00	93,796	1.02	0.00
1	3	7	1	30	9.9	1	N	On	0	0.00	93,796	0.00	27.49	N	On	0	0.00	93,796	1.02	0.00
1	3	7	2	30.4	10.07	1	N	On	0	0.00	92,903	0.00	27.23	N	On	0	0.00	92,903	1.01	0.00
1	3	7	3	30.6	10.17	1	N	On	0	0.00	92,456	0.00	27.10	N	On	0	0.00	92,456	1.00	0.00
1	3	7	4	30.9	10.35	1	N	On	0	0.00	91,786	0.00	26.90	N	On	0	0.00	91,786	1.00	0.00
1	3	7	5	31.6	10.74	1	N	On	0	0.00	90,223	0.00	26.44	N	On	0	0.00	90,223	0.98	0.00
1	3	7	6	32.4	11.18	1	N	On	0	0.00	88,436	0.00	25.92	N	On	0	0.00	88,436	0.96	0.00
1	3	7	7	33.1	11.59	1	N	On	0	0.00	86,873	0.00	25.46	N	On	0	0.00	86,873	0.94	0.00
1	3	7	8	33.4	11.81	1	N	On	0	0.00	86,203	0.00	25.26	N	On	0	0.00	86,203	0.94	0.00
1	3	7	9	33.6	12.02	1	N	On	0	0.00	85,756	0.00	25.13	N	On	0	0.00	85,756	0.93	0.00
1	3	7	10	34	12.25	1	N	On	0	0.00	84,863	0.00	24.87	N	On	0	0.00	84,863	0.92	0.00
1	3	7	11	34.3	12.4	1	N	On	0	0.00	84,193	0.00	24.68	N	On	0	0.00	84,193	0.91	0.00
1	3	7	12	34.7	12.55	1	N	On	0	0.00	83,300	0.00	24.41	N	On	0	0.00	83,300	0.90	0.00
1	3	7	13	35.1	12.69	1	N	On	0	0.00	82,407	0.00	24.15	N	On	0	0.00	82,407	0.89	0.00
1	3	7	14	35.1	12.74	1	N	On	0	0.00	82,407	0.00	24.15	N	On	0	0.00	82,407	0.89	0.00
1	3	7	15	35.1	12.83	1	N	On	0	0.00	82,407	0.00	24.15	N	On	0	0.00	82,407	0.89	0.00
1	3	7	16	35.1	12.88	1	N	On	0	0.00	82,407	0.00	24.15	N	On	0	0.00	82,407	0.89	0.00
1	3	7	17	35.8	12.8	1	N	On	0	0.00	80,843	0.00	23.69	N	On	0	0.00	80,843	0.88	0.00
1	3	7	18	36.3	12.68	1	N	On	0	0.00	79,727	0.00	23.37	N	On	0	0.00	79,727	0.87	0.00
1	3	7	19	37	12.56	1	N	On	0	0.00	78,163	0.00	22.91	N	On	0	0.00	78,163	0.85	0.00
1	3	7	20	36.3	12.09	1	N	On	0	0.00	79,727	0.00	23.37	N	On	0	0.00	79,727	0.87	0.00
1	3	7	21	35.8	11.74	1	N	On	0	0.00	80,843	0.00	23.69	N	On	0	0.00	80,843	0.88	0.00
1	3	7	22	35.1	11.29	1	N	On	0	0.00	82,407	0.00	24.15	N	On	0	0.00	82,407	0.89	0.00
1	3	7	23	33.6	10.92	1	N	On	0	0.00	85,756	0.00	25.13	N	On	0	0.00	85,756	0.93	0.00
1	3	7	24	32.4	10.14	1	N	On	0	0.00	88,436	0.00	25.92	N	On	0	0.00	88,436	0.96	0.00
1	4	1	1	30.9	9.52	1	N	On	0	0.00	91,786	0.00	26.90	N	On	0	0.00	91,786	1.00	0.00
1	4	1	2	29.7	9.1	1	N	On	0	0.00	94,466	0.00	27.69	N	On	0	0.00	94,466	1.03	0.00
1	4	1	3	28.2	8.66	1	N	On	0	0.00	97,816	0.00	28.67	N	On	0	0.00	97,816	1.06	0.00
1	4	1	4	27	8.25	1	N	On	0	0.00	100,496	0.00	29.45	N	On	0	0.00	100,496	1.09	0.00
1	4	1	5	26	7.9	1	N	On	0	0.00	102,506	0.00	30.04	N	On	0	0.00	102,506	1.11	0.00
1	4	1	6	25	7.53	1	N	On	0	0.00	104,962	0.00	30.76	N	On	0	0.00	104,962	1.14	0.00
1	4	1	7	24.1	7.19	1	N	On	0	0.00	106,972	0.00	31.35	N	On	0	0.00	106,972	1.16	0.00
1	4	1	8	23.4	7.02	1	N	On	0	0.00	108,536	0.00	31.81	N	On	0	0.00	108,536	1.18	0.00
1	4	1	9	22.6	6.83	1	N	On	0	0.00	110,322	0.00	32.33	N	On	0	0.00	110,322	1.20	0.00
1	4	1	10	21.9	6.66	1	N	On	0	0.00	111,885	0.00	32.79	N	On	0	0.00	111,885	1.21	0.00
1	4	1	11	23.5	7.11	1	N	On	0	0.00	108,312	0.00	31.74	N	On	0	0.00	108,312	1.18	0.00
1	4	1	12	25.3	7.61	1	N	On	0	0.00	104,292	0.00	30.57	N	On	0	0.00	104,292	1.13	0.00
1	4	1	13	27	8.06	1	N	On	0	0.00	100,496	0.00	29.45	N	On	0	0.00	100,496	1.09	0.00

ECM 20: 22nd & Forster VFDs for Fans

50.5	HP of Fans
2,840	CLG Hours
4,534	HTG Hours
50%	HTG VFD %
90%	CLG VFD %

170,809	HTG Use Existing
85,405	HTG Use Proposed
106,991	CLG Use Existing
96,292	CLG Use Proposed

96,104	kWh Savings

ECM 21: Plumbing Improvements

H2O Applied Technologies LLC

Project:	Capitol Complex
CM:	Domestic Fixtures
Eng:	JSC
Date:	11/22/2019

pick list do not move
residential
other

	Baseline Allocation		Post Allocation		Savings	
	kgal	MMBtu*	kgal	MMBtu*	kgal	MMBtu*
Toilets	4,436		3,550		886	
Urinals	164		164		0	
Sinks	527	188	317	113	210	75
Showers	0	0	0	0	0	0
Total	5,127	188	4,031	113	1,096	75
					21%	40%

* Point of use, not including boiler efficiency

Building Name:	18th and herr	18th and herr	18th and herr	22nd & Forster	22nd & Forster	Agriculture	Agriculture	Agriculture Vet Lab	Agriculture Vet Lab	Aresenal (18th & Herr Complex)	Aresenal (18th & Herr Complex)	Aresenal (18th & Herr Complex)	Aresenal (18th & Herr Complex)	Finance	Irvis (South Office)	Irvis (South Office)	Rachel Carson	Rachel Carson	Records Center	Records Center	Records Center					
Population Name:	Public	Staff	Staff Hand Sinks	Staff	Staff Hand Sinks	Staff	Staff Hand Sinks	Staff	Staff Hand Sinks	Public	Public Hand Sinks	Staff	Staff Hand Sinks	Staff	Public	Staff	Public	Staff	Public	Staff	Staff Hand Sinks	0	0	0	0	0
Total Population	15	59	59	65	65	222	222	107	107	25	25	48	48	859	25	140	50	1,519	5	47	47	0	0	0	0	0
% Male	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	50%	0%	0%	0%	0%	0%
Avg Hours/Week/Person (for FTE only)**	0	40	0	40	0	40	0	40	0	0	0	40	0	40	0	40	0	40	0	40	0	0	0	0	0	0
Weeks per Year	50	48	48	48	48	48	48	48	48	50	50	48	48	48	50	48	50	48	50	48	48	0	0	0	0	0
Avg % Occupancy During Weeks/Year	100%	95%	95%	95%	95%	95%	95%	95%	95%	100%	100%	95%	95%	95%	100%	95%	100%	95%	100%	95%	95%	0%	0%	0%	0%	0%
FTE* (see definition below)	0	54	0	59	0	202	0	98	0	0	0	44	0	783	0	128	0	1,385	0	43	0	0	0	0	0	0
% of Population Showering	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Number of Showers/Week/Person	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
% male access to urinals	37%	0%	0%	29%	0%	30%	0%	20%	0%	29%	0%	33%	0%	22%	23%	33%	20%	20%	33%	27%	0%	0%	0%	0%	0%	0%
# of Days/Year That Cleaning Occurs	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	250	0	250	250	0	0	0	0	0
% of Occupancy Using Bathrooms	25%	0%	50%	0%	50%	0%	50%	0%	50%	25%	25%	0%	50%	0%	25%	0%	25%	0%	25%	0%	50%	0%	0%	0%	0%	0%
Number of Uses/Person/Day (toilet,urinal,sink)	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	1.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	1.0	0.0	0.0	0.0	0.0	0
Number of Days/Year	250	0	240	0	240	0	240	0	240	250	250	0	240	0	250	0	250	0	250	0	240	0	0	0	0	0

** FTE Based on the Following Occupancy

8	Hours/Day
5	Days/Week
50	Weeks/Year

Use amber cells whenever calculations are based on bathroom uses/day/person as opposed to people occupancy-hours

FTE-Based Usage Profiles				
	Toilet	Urinal	Sink	Shower
Sec/Use			15	
Min/Use				5
Cold Water Temp			60	60
Warm Water Temp			105	110
Female FTE Uses/Day	3.0		3.0	
Male FTE Uses/Day	1.0	2.0	3.0	
Sink blended warm water consumption as % of total sink water consumption			95%	
Shower blended warm water use as % of total shower use			100%	

Select Residential or other Non-FTE-Based Usage Profiles: other				
	Toilet	Urinal	Sink	Shower
Sec/Use			15	
Min/Use				5
Cold Water Temp			60	60
Warm Water Temp			105	110
Female Uses % of UPD	100%		100%	
Male Uses % of UPD	33%	67%	100%	
Sink blended warm water use as % of total sink water use			95%	
Shower blended warm water use as a % of total shower use			100%	

Cleaning Profiles				
	Toilet	Urinal	Sink	Shower
Washes/Day			1	1
Sec/Wash			30	60
Flushes/Day	1	1		

Cleaning Profiles				
	Toilet	Urinal	Sink	Shower
Washes/Day			1	1
Sec/Wash			30	60
Flushes/Day	1	1		

Bathroom Group Table — DOMESTIC WATER FIXTURE UTILIZATION MODEL

Building or Facility:	18th and herr	18th and herr	18th and herr	22nd & Forster	22nd & Forster	Agriculture	Agriculture	Agriculture Vet Lab	Agriculture Vet Lab	Aresenal (18th & Herr Complex)	Aresenal (18th & Herr Complex)	Aresenal (18th & Herr Complex)	Aresenal (18th & Herr Complex)	Finance	Irvis (South Office)	Irvis (South Office)	Rachel Carson	Rachel Carson	Records Center	Records Center	Records Center					
Populations:	Public	Staff	Staff Hand Sinks	Staff	Staff Hand Sinks	Staff	Staff Hand Sinks	Staff	Staff Hand Sinks	Public	Public Hand Sinks	Staff	Staff Hand Sinks	Staff	Public	Staff	Public	Staff	Public	Staff	Staff Hand Sinks					

Fixture Utilization (gallons)

Number of FTEs	0	54	0	59	0	202	0	98	0	0	0	44	0	783	0	128	0	1,385	0	43	0	0	0	0	0	0
Number male FTEs	0	27	0	30	0	101	0	49	0	0	0	22	0	392	0	64	0	693	0	21	0	0	0	0	0	0
Toilet Usage FTE Flushes/FTE Day	0	161	0	161	0	546	0	273	0	0	0	117	0	2,175	0	340	0	3,874	0	117	0	0	0	0	0	0
Toilet Average Cleaning Flushes/Cleaning Day	12	3	0	30	0	37	0	16	0	5	0	12	0	97	47	2	125	2	8	0	0	0	0	0	0	0
Toilet Usage Assigned Person Flushes/Day	3	0	28	0	31	0	105	0	51	6	6	0	23	0	6	0	12	0	1	0	22	0	0	0	0	0
Urinal Usage FTE Flushes/FTE Day	0	17	0	17	0	61	0	20	0	0	0	15	0	175	0	43	0	282	0	12	0	0	0	0	0	0
Urinal Average Cleaning Flushes/Cleaning Day	7	0	0	12	0	16	0	4	0	2	0	6	0	28	14	1	32	32	1	3	0	0	0	0	0	0
Urinal Usage Assigned Person Flushes/Day	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Sink Usage FTE Min/FTE Day	0	40	0	44	0	152	0	73	0	0	0	33	0	588	0	96	0	1,039	0	32	0	0	0	0	0	0
Sink Average Cleaning Min/Cleaning Day	7	2	1	16	2	18	1	9	7	2	2	6	1	50	30	1	62	62	1	5	1	0	0	0	0	0
Sink Usage Assigned Person Min/Day	1	0	7	0	8	0	26	0	13	2	2	0	6	0	2	0	3	0	1	0	0	0	0	0	0	0
Number of Persons	15	59	59	65	65	222	222	107	107	25	25	48	48	859	25	140	50	1,519	5	47	47	0	0	0	0	0
% Occupancy	100%	95%	95%	95%	95%	95%	95%	95%	95%	100%	100%	95%	95%	95%	100%	95%	100%	95%	100%	95%	95%	0%	0%	0%	0%	0%
% of Population Showering	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Number of Showers/Week/Person	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minutes/shower	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	0.0	0.0	0.0	0.0	0.0
Shower Usage Min/week	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Shower Average Cleaning Min/Cleaning Day	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Baseline Annual kgal Water Consumption

Toilets	4,436	6	66	0	82	0	510	0	202	0	3	0	68	0	909	36	137	80	2,256	2	80	0	0	0	0	0
Urinals	164	2	0	0	11	0	19	0	6	0	0	0	25	0	25	4	11	8	71	0	2	0	0	0	0	0
Sinks	527	4	15	4	18	5	85	14	32	9	1	1	5	2	80	8	48	10	168	1	12	3	0	0	0	0
Showers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Baseline kgal	5,127	12	80	4	110	5	615	14	240	9	5	1	79	2	1,014	47	196	98	2,495	3	93	3	0	0	0	0

Baseline annual MMBtu Consumption

Sinks	188	1	5	1	6	2	30	5	11	3	0	1	2	1	28	3	17	4	60	0	4	1	0	0	0	0
Showers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	188	1	5	1	6	2	30	5	11	3	0	1	2	1	28	3	17	4	60	0	4	1	0	0	0	0

Post-Retrofit Annual gal Water Consumption

Toilets	3,550	6	66	0	78	0	195	0	152	0	3	0	57	0	909	26	137	64	1,811	1	45	0	0	0	0	0
Urinals	164	2	0	0	11	0	19	0	6	0	0	0	25	0	25	4	11	8	71	0	2	0	0	0	0	0
Sinks	317	1	5	3	7	3	21	10	10	7	0	1	5	2	80	4	12	8	130	0	5	2	0	0	0	0
Showers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Post-Retrofit kgal	4,031	9	71	3	96	3	236	10	168	7	4	1	67	2	1,014	34	160	80	2,011	1	51	2	0	0	0	0

Post-Retrofit annual MMBtu Consumption

Sinks	113	0	2	1	3	1	8	3	4	2	0	0	2	1	28	1	4	3	46	0	2	1	0	0	0	0
Showers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	113	0	2	1	3	1	8	3	4	2	0	0	2	1	28	1	4	3	46	0	2	1	0	0	0	0

Annual kgal Water Savings

Toilets	886	0	0	0	3	0	315	0	50	0	0	0	12	0	0	9	0	16	445	1	35	0	0	0	0	0
Urinals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sinks	210	3	9	1	10	2	64	5	22	3	1	0	0	4	36	2	38	0	7	1	0	0	0	0	0	0
Showers	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Annual kgal Savings	1,096	3	9	1	14	2	379	5	72	3	1	0	12	0	14	36	18	483	1	42	1	0	0	0	0	0

ECM 22: Steam Trap Replacements

Rev:10/9/13

CM SAVINGS SUMMARY

Utility	Baseline	Post-Retrofit	$ Savings
MMbtu Natural Gas all building	2050	0	$50,740

Design Data & Assumptions

Modified Napier Formula

$q = 24.24 * D^2 * (P+14.7) *$ Orifice Factor * App Factor * Loss Factor

q = Heat Loss (lb/hr)
D = Orifice Diameter (inches)
P = Gauge Pressure (psig)
Orifice Factor = 0.66   Orifice diameter reduction due to presence of condensate.
Application Factor = (See note) 1.0 for Drip Legs, 0.92 for Coils or other Valved Applications.
Loss Factor = (See table below)

Condition	Code	Loss Factor	
Abandoned	A	0	
Vacuum breaker/Vent	VB	0	
Not Tested	NT	0.08	Include NT in savings? yes
Plugged (Failed Closed)	P	0	
Blowing (Failed Open)	B	1	
Leaking	L	0.3	
Working Properly	OK	0	

yes
no

TRAP SURVEY:

Condition	Code	TOTAL TRAP SUMMARY Quantity	Percent	TESTED TRAP SUMMARY Quantity	Percent
Abandoned in place	AIP	0	0%		
Vacuum Breaker or misc trap use	VB	0	0%		
Not Tested	NT	719	100%		
Plugged (Failed Closed)	P	0	0%	0	5%
Blowing (Failed Open)	B	0	0%	0	5%
Leaking	L	0	0%	0	10%
Working Properly	OK	0	0%	0	80%
Totals:		719	100%	0	100%
		percent tested:	0%		

Totals: 719

| | | | | | | | 1,384 | 1,403 | 2,050 | - | 2,050 | | 50,740 |

Line Item	Qty.	Tag #	Building	Floor	Room Description	Location	Application	Line Pressure (psig)	Test Result	Manufacturer	Model	Type	Pipe Size	Orifice Size	Controls	Hours Active	Loss Factor	Boile eff.	Baseline Losses (lb/hr)	(Mbtu/hr)	(MMbtu/yr)	Post Retrofit Losses (MMBtu/yr)	Annual Savings (MMBtu/yr)	Nat Gas Rate ($/mmbtu)	Annual Cost Reduction ($/yr)	Comments
1	1	na	18th and herr	B	Boiler room	By boiler	Drip Leg	5	NT	TBD	TBD	F&T	3/4	0.218	No Control	4410	0.08	82%	1	1.46	6	-	6	$ 9.92	$ 63.90	
2	1	na	18th and herr	B	Boiler room	Hw hx	Heat Exchanger	5	NT	TBD	TBD	F&T	1 1/4	0.312	Thermostat	1520	0.08	82%	2	2.75	4	-	4	$ 9.92	$ 41.51	
3	1	na	18th and herr	B	Boiler room	Basement ahu	Heating Coil	5	NT	TBD	TBD	F&T	3/4	0.218	Thermostat	1520	0.08	82%	1	1.34	2	-	2	$ 9.92	$ 20.26	
4	1	na	18th and herr	B	Boiler room	Hall to boiler house	Radiation Heat	5	NT	TBD	TBD	TS	1/2	0.250	Thermostat	1520	0.08	82%	1	1.77	3	-	3	$ 9.92	$ 26.65	
5	1	na	18th and herr	B	Boiler room	Hall to boiler house	Drip Leg	5	NT	TBD	TBD	TD	3/4	0.125	No Control	4410	0.08	82%	0	0.48	2	-	3	$ 9.92	$ 21.01	
6	1	na	18th and herr	B	Boiler room	Hall to boiler house	Drip Leg	5	NT	TBD	TBD	TS	1/2	0.250	No Control	4410	0.08	82%	1	1.92	8	-	8	$ 9.92	$ 84.04	
7	1	na	18th and herr	B	Boiler room	West end stair	Drip Leg	5	NT	TBD	TBD	F&T	3/4	0.218	No Control	4410	0.08	82%	1	1.46	6	-	6	$ 9.92	$ 63.90	
8	3	na	18th and herr	B	Boiler room	West stair	Radiation Heat	5	NT	TBD	TBD	TS	1/2	0.250	Thermostat	1520	0.08	82%	4	5.30	8	-	6	$ 9.92	$ 79.95	
9	3	na	18th and herr	B	Boiler room	East stair well	Radiation Heat	5	NT	TBD	TBD	TS	1/2	0.250	Thermostat	1520	0.08	82%	4	5.30	8	-	8	$ 9.92	$ 79.95	
10	2	na	Agriculture Vet Lab	1	Boiler room	Header	Drip Leg	60	NT	TBD	TBD	IB	1	0.281	No Control	4410	0.08	82%								Understood that DGS does not maintain; out of scope.
11	1	na	Agriculture Vet Lab	1	Boiler room	Prv	Drip Leg	60	NT	TBD	TBD	IB	1/2	0.156	No Control	4410	0.08	82%								Understood that DGS does not maintain; out of scope.
12	1	na	Agriculture Vet Lab	1	Boiler room	Prv	Drip Leg	15	NT	TBD	TBD	IB	1	0.500	No Control	4410	0.08	82%								Understood that DGS does not maintain; out of scope.
13	1	na	Agriculture Vet Lab	1	Boiler room	Prv	Drip Leg	7	NT	TBD	TBD	IB	1	0.500	No Control	4410	0.08	82%								Understood that DGS does not maintain; out of scope.
14	1	na	Agriculture Vet Lab	1	Boiler room	Ahu	Heating Coil	7	NT	TBD	TBD	F&T	1 1/4	0.312	Thermostat	1520	0.08	82%								Understood that DGS does not maintain; out of scope.
15	2	na	Agriculture Vet Lab	1	Boiler room	Dom hw	Domestic HX	7	NT	TBD	TBD	F&T	1 1/2	0.500	Thermostat	1520	0.08	82%								Understood that DGS does not maintain; out of scope.
16	4	na	Agriculture Vet Lab	1	Boiler room	Hw hx	Heat Exchanger	7	NT	TBD	TBD	F&T	2	0.625	Thermostat	1520	0.08	82%								Understood that DGS does not maintain; out of scope.
17	1	na	Agriculture Vet Lab	1	Boiler room	Chem line	Heating Coil	7	NT	TBD	TBD	F&T	1 1/4	0.312	Thermostat	1520	0.08	82%								Understood that DGS does not maintain; out of scope.
18	1	na	Aresenal (18th & Herr Complex)	1	East end	$0.00	Radiation Heat	5	NT	TBD	TBD	TS	1/2	0.250	Thermostat	1520	0.08	82%	1	1.77	3	-	3	$ 9.92	$ 26.65	
19	2	na	Aresenal (18th & Herr Complex)	1	West end exit	Rads	Radiation Heat	0	NT	TBD	TBD	TS	1/2	0.250	Thermostat	1520	0.08	82%	2	2.64	4	-	4	$ 9.92	$ 39.77	
20	1	na	Aresenal (18th & Herr Complex)	1	West end mens	Rad	Radiation Heat	5	NT	TBD	TBD	TS	1/2	0.250	Thermostat	1520	0.08	82%	1	1.77	3	-	3	$ 9.92	$ 26.65	
21	1	na	Finance	5	Mens bv 518	Rad	Radiation Heat	7	NT	TBD	TBD	TS	1/2	0.250	Thermostat	1520	0.08	99%	2	1.61	2	-	2	$ 25.36	$ 62.19	
22	600	na	Finance	All	All	Rad	Radiation Heat	7	NT	TBD	TBD	TS	1/2	0.250	Thermostat	1520	0.08	99%	958	967.85	1,471	-	1,471	$ 25.36	$ 37,314.11	
23	1	na	Finance	All	Mens	$0.00	Radiation Heat	7	NT	TBD	TBD	TS	1/2	0.250	Thermostat	1520	0.08	99%	2	1.61	2	-	2	$ 25.36	$ 62.19	
24	2	na	Finance	B	AC room C	On wall out side door	Drip Leg	7	NT	TBD	TBD	F&T	3/4	0.218	No Control	4410	0.08	99%	3	2.67	12	-	12	$ 25.36	$ 298.23	
25	1	na	Finance	B	AC room C	On wall in rm	Drip Leg	7	NT	TBD	TBD	F&T	3/4	0.218	No Control	4410	0.08	99%	1	1.33	6	-	6	$ 25.36	$ 149.12	
26	1	na	Finance	B	Fan room A	Feed to coil	Drip Leg	7	NT	TBD	TBD	F&T	1 1/4	0.312	No Control	4410	0.08	99%	3	2.73	12	-	12	$ 25.36	$ 305.44	
27	1	na	Finance	B	Fan room A	Coil	Heating Coil	7	NT	TBD	TBD	F&T	3/4	0.218	No Control	4410	0.08	99%	1	1.46	2	-	2	$ 25.36	$ 47.29	
28	1	na	Finance	B	Fan room B	Main	Drip Leg	7	NT	TBD	TBD	F&T	1 1/4	0.312	No Control	4410	0.08	99%	3	2.73	12	-	12	$ 25.36	$ 305.44	
29	5	na	Finance	B	High voltage rm	Main Lines from feed	Drip Leg	7	NT	TBD	TBD	F&T	3/4	0.218	No Control	4410	0.08	99%	7	6.67	29	-	29	$ 25.36	$ 745.58	
30	2	na	Finance	B	Mech by B07	As enters rm	Drip Leg	7	NT	TBD	TBD	F&T	1	0.218	No Control	4410	0.08	99%	3	2.67	12	-	12	$ 25.36	$ 298.23	
31	1	na	Finance	B	Mech by B07	Flash	Drip Leg	7	NT	TBD	TBD	F&T	1 1/4	0.312	No Control	4410	0.08	99%	3	2.73	12	-	12	$ 25.36	$ 305.44	
32	2	na	Finance	B	Mech by B07	On wall/ main	Drip Leg	7	NT	TBD	TBD	F&T	3/4	0.218	No Control	4410	0.08	99%	3	2.67	12	-	12	$ 25.36	$ 298.23	
33	2	na	Finance	B	Mech by B07	Elevation change in r	Drip Leg	7	NT	TBD	TBD	F&T	1	0.218	No Control	4410	0.08	99%	3	2.67	12	-	12	$ 25.36	$ 298.23	
34	3	na	Finance	B	Mech by B07	Hw hx	Heat Exchanger	7	NT	TBD	TBD	F&T	1 1/2	0.500	Thermostat	1520	0.08	99%	14	14.03	62	-	62	$ 25.36	$ 1,568.86	
35	3	na	Finance	G	G24b	Rads	Radiation Heat	7	NT	TBD	TBD	TS	1/2	0.250	Thermostat	1520	0.08	99%	5	4.84	7	-	7	$ 25.36	$ 186.57	
36	1	na	Irvis (South Office)	B	Main mech rm	Heating hw hx	Heat Exchanger	7	NT	TBD	TBD	F&T	2 1/2	0.625	Thermostat	1520	0.08	99%	10	10.08	15	-	15	$ 24.74	$ 379.16	
37	2	na	Irvis (South Office)	B	Main mech rm	Drip at tanks	Drip Leg	7	NT	TBD	TBD	F&T	1 1/4	0.625	No Control	4410	0.08	99%	5	5.46	24	-	24	$ 24.74	$ 595.91	
38	2	na	Irvis (South Office)	B	Main mech rm	Hw hx	Heat Exchanger	7	NT	TBD	TBD	F&T	2	0.625	Thermostat	1520	0.08	99%	20	20.16	31	-	31	$ 24.74	$ 758.33	
39	1	na	Irvis (South Office)	B	Main mech rm	Drip of main line	Drip Leg	7	NT	TBD	TBD	F&T	1	0.218	Thermostat	4410	0.08	99%	1	1.33	6	-	6	$ 24.74	$ 145.46	
40	1	na	Irvis (South Office)	B	Main mech rm	Drip at main line	Heat Exchanger	7	NT	TBD	TBD	F&T	1 1/4	0.312	Thermostat	1520	0.08	99%	2	2.51	4	-	4	$ 24.74	$ 94.49	
41	4	na	Rachel Carson	4	Mech room	LP steam at HX	Drip Leg	7	NT	TBD	TBD	F&T	3/4	0.218	No Control	4410	0.08	99%	5	5.33	24	-	24	$ 24.12	$ 567.23	
42	4	na	Rachel Carson	4	Mech room	Hw hx	Heat Exchanger	7	NT	TBD	TBD	IB	2	0.750	Thermostat	1520	0.08	99%	57	58.07	88	-	88	$ 24.12	$ 2,129.12	
43	1	na	Rachel Carson	4	Mech room	Fan coil	Heating Coil	7	NT	TBD	TBD	F&T	3/4	0.218	No Control	4410	0.08	99%	1	1.23	2	-	2	$ 24.12	$ 44.97	
44	4	na	Rachel Carson	4	Mech room	Dom hw hx	Domestic HX	7	NT	TBD	TBD	F&T	1 1/4	0.312	Thermostat	1520	0.08	99%	10	10.05	15	-	15	$ 24.12	$ 368.46	
45	4	na	Rachel Carson	4	Mech room	Hw hx	Drip Leg	7	NT	TBD	TBD	F&T	3/4	0.218	No Control	4410	0.08	99%	5	5.33	24	-	24	$ 24.12	$ 567.23	
46	4	na	Rachel Carson	4	Mech room	Main line ceiling	Drip Leg	7	NT	TBD	TBD	F&T	3/4	0.218	No Control	4410	0.08	99%	5	5.33	24	-	24	$ 24.12	$ 567.23	
47	18	na	Rachel Carson	4	Mech room	Ahu right side of room	Heating Coil	7	NT	TBD	TBD	IB	1	0.500	Thermostat	304	0.08	99%	115	116.14	35	-	35	$ 24.12	$ 851.65	
48	18	na	Rachel Carson	4	Mech room	Ahu left side of room	Heating Coil	7	NT	TBD	TBD	IB	1	0.500	Thermostat	304	0.08	99%	115	116.14	35	-	35	$ 24.12	$ 851.65	

OPAL

POWERSMITHS

The Preliminary ESP Calculator™
Energy Savings Payback Calculator

OPAL

Building Type (Select From Pick-List)

Building Name:	Rachel Carson	Commercial
		Equipment Operating Days/year:	255

	Operating Hours/Day:	12

Utility Rate	
kWh rate ($):	$0.091
Demand rate ($/kW):	$0.00
Potential Rebate Rate ($/kWh)	$0.00

% Load During Normal Operating Hours is 15
% Load Outside Normal Operating Hours is 10

A/C Performance (kW/ton):	0.5

Building Summary:	
Total Proposed Transformer Quantity	22
Calculated Potential Rebates and Incentives	$0

Losses	kW Losses (Peak)	Annual kWh Losses
Baseline Transformers:	21.46	184,092
Powersmiths Transformers:	3.66	28,455
Savings with Powersmiths:	**17.80**	**155,637**

Building Transformer Details:			
Transformer kVA	Existing Transformer Quantity	Proposed Replacement Quantity	Comments
30	8	8	
45	5	5	
75	5	5	
112.5	3	3	
225	1	1	

ECM 24: Boiler Controls

Assumptions

					Savings	Existing	Proposed	Saved	Units	
388,544	SF					2758	1827	931	firings	33.76%
57,700	CCF	3.86	BTU/SF/YR Avg Running	20	F Min Design Day	57,700	50,055	7,645	CCF	
50	F HTG Bala	8	BTU/SF/YR Adjusted Running			119,447	111,802	7,645	CCF	
		119,447	CCF Adjusted	OAT	% Load	m		b		
				20	100%	-0.03333 x	+	1.6667		

Boilers

2	PK Mach			50	0%			
2000	MBH Input Gas	4000		OAT	Delta	m		b
1920	MBH Output	3840		20	30	-1 x	+	50.0000
96.00%	Efficiency	81.60%	Adjusted Efficiency	50	0			
4.941525	BTU/SF	9.883051	BTU/SF					

Design

180	F LWT			
160	F EWT	30	F Delta	

Pumps

2	QTY
245	GPM
75	FHD
7.5	HP

										33.76%			
			99							2758	1827	7,645	CCF
			5				3935			10	15	782,840	MBH

Month	Day	Hour	DB	WB	DOW	h	HTG Hour		Boiler Load	Delta	Delta >10	Delta >15		MBH Saved
1	1	1	37	35.3	5	13.17	1		43.33%	13	1	0	1	866.6667
1	1	2	36.3	34.7	5	12.92	1		45.67%	13.7	1	0	1	913.3333
1	1	3	35.8	34.4	5	12.8	1		47.33%	14.2	1	0	1	946.6667
1	1	4	35.1	33.8	5	12.55	1		49.67%	14.9	1	0	1	993.3333
1	1	5	34.7	32.9	5	12.18	1		51.00%	15.3	1	1	0	0
1	1	6	34.3	31.9	5	11.76	1		52.33%	15.7	1	1	0	0
1	1	7	34	31.1	5	11.4	1		53.33%	16	1	1	0	0
1	1	8	34	31	5	11.36	1		53.33%	16	1	1	0	0
1	1	9	34	30.9	5	11.31	1		53.33%	16	1	1	0	0
1	1	10	34	30.8	5	11.27	1		53.33%	16	1	1	0	0
1	1	11	35.1	31.5	5	11.57	1		49.67%	14.9	1	0	1	993.3333
1	1	12	36	32.2	5	11.86	1		46.67%	14	1	0	1	933.3333
1	1	13	37	32.9	5	12.16	1		43.33%	13	1	0	1	866.6667
1	1	14	36.7	32.3	5	11.93	1		44.33%	13.3	1	0	1	886.6667
1	1	15	36.3	31.8	5	11.7	1		45.67%	13.7	1	0	1	913.3333

ECM 25: Rachel Carson Insulation Covers

CM SAVINGS SUMMARY

Utility	Baseline	Post-Retrofit	Savings	$ Savings
MMbtu natural gas	404	34	369	$ 8,374
gal oil*				
mlb steam				
Ton/hrs chilled water				

Design Data & Assumptions

Parameter	Value	units
L (Insulation Thickness):	1.5	inches
k (insulation conductivity)	0.26	Btuh/(sqft*deg F/inch)
Ta (Ambient Temp)	80	deg F
Rs (insulated surface resistance)	0.5	(sqft*deg F/Btuh)
Wind Speed:	0	MPH

Baseline Rs= f(delta T) regression analysis:

a	1.125E-06
b	-0.0012435
c	0.59025
q =Delta T/Baseline Rs	Delta T = bare surface temperature minus ambient temp

Insulated valve heat loss for "L" inches insulation (Btuh):

Q = Delta T* valve area * A_ratio / (ET/k + Rs)

$A\_ratio = 0.264*L+1$

$ET = {}^{*}0.0771*L^2+1.0774*L-0.036$

$A\_ratio/ (ET/k+Rs) = 0.193$

Insulation surface temperature

$Ti = Ta + Delta\ T * Rs/(ET/k+Rs)$

$Rs/(ET/k+Rs) = 0.069$

| Totals: | 34 | | | | | | | | | | 53,893 | 404 | 547.3 | 4,599 | 34.5 | 369 | | $ 8,374 | |

											Baseline Heat Loss			Post-retrofit heat loss		Annual Savings	Nat Gas Rate	Annual Cost Reduction	
Line Item	Qty.	Tag #	Building	Floor	Room Description	Size	Description	Bare Surface Temp	Area (sq ft)	Hours	Boiler eff.	per valve (Btu/Hr/sq ft)	Total (Btu/Hr)	Annual (MMBtu)	per valve (BTU/Hr/sq ft)	Total (Btu/Hr)	Annual (MMBtu)	(MMBtu)	($/mmbtu)	($/yr)	Comments
5	3	0	Rachel Carson	4	Mech room	6	Valve Bonnet	215	3.90	8760	99%	307.9	3,602	31.6	26.28	307.44	2.7	28.9	$ 24.12	$ 696.18	
6	1	0	Rachel Carson	4	Mech room	6	Gate/Globe Valve	215	7.03	8760	99%	307.9	2,165	19.0	26.28	184.73	1.6	17.3	$ 24.12	$ 418.30	
7	1	0	Rachel Carson	4	Mech room	6	Y-Strainer	215	7.03	8760	99%	307.9	2,165	19.0	26.28	184.73	1.6	17.3	$ 24.12	$ 418.30	
8	1	0	Rachel Carson	4	Mech room	3	Control Valve	215	2.36	8760	99%	307.9	727	6.4	26.28	62.01	0.5	5.8	$ 24.12	$ 140.43	
9	1	0	Rachel Carson	4	Mech room	4	Valve Bonnet	215	2.80	8760	99%	307.9	862	7.6	26.28	73.58	0.6	6.9	$ 24.12	$ 166.61	
10	3	0	Rachel Carson	4	Mech room	4	Gate/Globe Valve	215	4.68	8760	99%	307.9	4,323	37.9	26.28	368.93	3.2	34.6	$ 24.12	$ 835.41	
11	2	0	Rachel Carson	4	Mech room	2	Control Valve	215	1.55	8760	99%	307.9	954	8.4	26.28	81.46	0.7	7.6	$ 24.12	$ 184.46	
12	2	0	Rachel Carson	4	Mech room	8	Gate/Globe Valve	215	10.30	4410	99%	307.9	6,343	28.0	26.28	541.30	2.4	25.6	$ 24.12	$ 617.07	
13	1	0	Rachel Carson	4	Mech room	4	Y-Strainer	215	4.68	8760	99%	307.9	1,441	12.6	26.28	122.98	1.1	11.5	$ 24.12	$ 278.47	
14	1	0	Rachel Carson	4	Mech room	6	Strainer Bonnet	215	3.90	8760	99%	307.9	1,201	10.5	26.28	102.48	0.9	9.6	$ 24.12	$ 232.06	
15	2	0	Rachel Carson	4	Mech room	2	Y-Strainer	215	2.21	8760	99%	307.9	1,361	11.9	26.28	116.14	1.0	10.9	$ 24.12	$ 263.00	
16	2	0	Rachel Carson	4	Mech room	2	Pressure Reducing Valve	215	5.20	8760	99%	307.9	3,202	28.1	26.28	273.28	2.4	25.7	$ 24.12	$ 618.82	
17	1	0	Rachel Carson	4	Mech room	8	Gate/Globe Valve	215	10.30	8760	99%	307.9	3,171	27.8	26.28	270.65	2.4	25.4	$ 24.12	$ 612.87	
18	2	0	Rachel Carson	4	Mech room	8	Strainer Bonnet	215	5.40	8760	99%	307.9	3,325	29.1	26.28	283.79	2.5	26.6	$ 24.12	$ 642.63	
19	2	0	Rachel Carson	4	Mech room	6	Control Valve	215	4.96	8760	99%	307.9	3,054	26.8	26.28	260.67	2.3	24.5	$ 24.12	$ 590.26	
20	4	0	Rachel Carson	4	Mech room	8	Valve Bonnet	215	5.40	8760	99%	307.9	6,651	58.3	26.28	567.58	5.0	53.3	$ 24.12	$ 1,285.25	

Note:
The Agriculture Lab building was not included in the scope as it is understood to be serviced the by the DOA not the DGS.

ECM 26: Rachel Carson Chiller Optimization

Annual Load (ton-hrs)	Optimum LOOP Eff. Savings (kW/ton)	Energy Usage Savings (kWh/yr)	CT Water Usage Savings (gal/yr)	Energy Costs Savings ($/yr)
627,646	0.229	143,588	38,920	$11,721

* Energy costs calculated at $0.08/kWh blended and $6 per kgal for water, chemicals and sewer

Attachment 3 – Supplemental ECM Information and Documentation

ECM-1: Site-Wide LED Lighting Upgrades

Line #	BLD	BLD Code	ECM Code	QTY	Length (Ft)	Crack Width (in)	EXISTING CONDITIONS Description	Total Area	Total Square Inches	CFM	Qty	Linear Ft (ea)	PROPOSED UPGRADE Description	Notes	Heating Therms Saved	kWh Saved
1	Rachel Carson BLDG	1	EDW	12	17	1/8	WORN OUT ENTRY DOOR WEATHERSTRIPPING	2.12	306.00	515.28	12	17	REPAIR/REPLACE WEATHERSTRIP ON ENTRY DOORS	2 Rotating doors	850.49	411.84
2	Rachel Carson BLDG	1	EDS	12	3	1/8	WORN OUT ENTRY DOOR SWEEP	0.37	54.00	90.93	12	3	INSTALL SWEEPS ON ENTRY DOORS	2 Rotating doors	150.09	72.68
3	Rachel Carson BLDG	1	EDDW	2	20	1/8	WORN OUT DOUBLE DOOR WEATHERSTRIPPING	0.42	60.00	101.04	2	20	REPAIR/REPLACE WEATHERSTRIP ON DOUBLE DOORS		166.76	80.75
4	Rachel Carson BLDG	1	EDDS	2	6	1/8	WORN OUT DOUBLE DOOR SWEEP	0.12	18.00	30.31	2	6	INSTALL SWEEPS ON DOUBLE DOORS		50.03	24.23
5	Rachel Carson BLDG	1	AS	2	7	1/4	WORN/MISSING ASTRAGAL	0.29	42.00	70.73	2	7	INSTALL NEW ASTRAGAL		116.73	56.53
6	Rachel Carson BLDG	1	GDW	2	36	1/4	WORN OUT GARAGE DOOR WEATHER STRIPPING ONLY	1.50	216.00	363.73	2	36	REPLACE GARAGE DOOR WEATHER STRIPPING ONLY		600.35	290.71
7	Rachel Carson BLDG	1	IDW	38	17	1/8	WORN OUT INTERIOR DOOR WEATHERSTRIP	6.73	969.00	1631.73	38	17	WEATHERSTRIP INTERIOR DOORS WHICH COMPARTMENTALIZE FLOORS, MECHANICAL ROOM AND ACCESS TO UNCONDITIONED AREAS		2693.23	1304.16
8	Rachel Carson BLDG	1	IDS	38	3	1/8	WORN OUT INTERIOR DOOR SWEEPS	1.19	171.00	287.95	38	3	INSTALL SWEEPS ON INTERIOR DOORS WHICH COMPARTMENTALIZE FLOORS, MECHANICAL ROOM AND ACCESS TO UNCONDITIONED AREAS		475.28	230.15
9	Finance BLDG	2	EDW	15	17	1/8	WORN OUT ENTRY DOOR WEATHERSTRIPPING	2.66	382.50	539.00	15	17	REPAIR/REPLACE WEATHERSTRIP ON ENTRY DOORS	3 Rotating doors	0.00	9077.35
10	Finance BLDG	2	EDS	15	3	1/8	WORN OUT ENTRY DOOR SWEEP	0.47	67.50	95.12	15	3	INSTALL SWEEPS ON ENTRY DOORS	3 Rotating doors	0.00	1601.88
11	Finance BLDG	2	EDDW	9	20	1/8	WORN OUT DOUBLE DOOR WEATHERSTRIPPING	1.87	270.00	380.47	9	20	REPAIR/REPLACE WEATHERSTRIP ON DOUBLE DOORS		0.00	2295.08
12	Finance BLDG	2	EDDS	9	6	1/8	WORN OUT DOUBLE DOOR SWEEP	0.56	81.00	114.14	9	6	INSTALL SWEEPS ON DOUBLE DOORS		0.00	688.52
13	Finance BLDG	2	AS	9	7	1/4	WORN/MISSING ASTRAGAL	1.31	189.00	266.33	9	7	INSTALL NEW ASTRAGAL		0.00	1606.55
15	Finance BLDG	2	IDW	14	17	1/8	WORN OUT INTERIOR DOOR WEATHERSTRIP	2.48	357.00	503.07	14	17	WEATHERSTRIP INTERIOR DOORS WHICH COMPARTMENTALIZE FLOORS, MECHANICAL ROOM AND ACCESS TO UNCONDITIONED AREAS		0.00	10980.28
16	Finance BLDG	2	IDS	14	3	1/8	WORN OUT INTERIOR DOOR SWEEPS	0.44	63.00	88.78	14	3	INSTALL SWEEPS ON INTERIOR DOORS WHICH COMPARTMENTALIZE FLOORS, MECHANICAL ROOM AND ACCESS TO UNCONDITIONED AREAS		0.00	5828.41
17	Irvis (South Office) BLDG	3	EDW	3	17	1/8	WORN OUT ENTRY DOOR WEATHERSTRIPPING	0.53	76.50	99.82	3	17	REPAIR/REPLACE WEATHERSTRIP ON ENTRY DOORS		0.00	1030.84
18	Irvis (South Office) BLDG	3	EDS	3	3	1/8	WORN OUT ENTRY DOOR SWEEP	0.09	13.50	17.61	3	3	INSTALL SWEEPS ON ENTRY DOORS		0.00	28559.23
19	Irvis (South Office) BLDG	3	EDDW	8	20	1/8	WORN OUT DOUBLE DOOR WEATHERSTRIPPING	1.67	240.00	313.15	8	20	REPAIR/REPLACE WEATHERSTRIP ON DOUBLE DOORS		0.00	9528.12
20	Irvis (South Office) BLDG	3	EDDS	8	6	1/8	WORN OUT DOUBLE DOOR SWEEP	0.50	72.00	93.94	8	6	INSTALL SWEEPS ON DOUBLE DOORS		0.00	17277.06
21	Irvis (South Office) BLDG	3	AS	8	7	1/4	WORN/MISSING ASTRAGAL	1.17	168.00	219.20	8	7	INSTALL NEW ASTRAGAL		0.00	3054.42
22	Records Center	4	EDW	14	17	1/8	WORN OUT ENTRY DOOR WEATHERSTRIPPING	2.48	357.00	187.40	14	17	REPAIR/REPLACE WEATHERSTRIP ON ENTRY DOORS		309.31	149.78
23	Records Center	4	EDS	14	3	1/8	WORN OUT ENTRY DOOR SWEEP	0.44	63.00	33.07	14	3	INSTALL SWEEPS ON ENTRY DOORS		54.58	26.43

Line #	BLD	BLD Code	ECM Code	QTY	Length (Ft)	Crack Width (in)	Description	Total Area	Total Square Inches	CFM	Qty	Linear Ft (ea)	Description	Notes	Heating Therms Saved	kWh Saved
							EXISTING CONDITIONS						**PROPOSED UPGRADE**			
24	Records Center	4	EDDW	3	20	1/8	WORN OUT DOUBLE DOOR WEATHERSTRIPPING	0.62	90.00	47.24	3	20	REPAIR/REPLACE WEATHERSTRIP ON DOUBLE DOORS		77.98	37.76
25	Records Center	4	EDDS	3	6	1/8	WORN OUT DOUBLE DOOR SWEEP	0.19	27.00	14.17	3	6	INSTALL SWEEPS ON DOUBLE DOORS		23.39	11.33
26	Records Center	4	AS	3	7	1/4	WORN/MISSING ASTRAGAL	0.44	63.00	33.07	3	7	INSTALL NEW ASTRAGAL		54.58	26.43
27	Records Center	4	GDW	4	36	1/4	WORN OUT GARAGE DOOR WEATHER STRIPPING ONLY	3.00	432.00	226.77	4	36	REPLACE GARAGE DOOR WEATHER STRIPPING ONLY		374.29	181.24
28	Records Center	4	IDW	9	17	1/8	WORN OUT INTERIOR DOOR WEATHERSTRIP	1.59	229.50	120.47	9	17	WEATHERSTRIP INTERIOR DOORS WHICH COMPARTMENTALIZE FLOORS, MECHANICAL ROOM AND ACCESS TO UNCONDITIONED AREAS		198.84	96.29
29	Records Center	4	IDS	9	3	1/8	WORN OUT INTERIOR DOOR SWEEPS	0.28	40.50	21.26	9	3	INSTALL SWEEPS ON INTERIOR DOORS WHICH COMPARTMENTALIZE FLOORS, MECHANICAL ROOM AND ACCESS TO UNCONDITIONED AREAS		35.09	16.99
30	Records Center	4	PS	1,500	1	1/16	UNSEALED PENETRATIONS	7.81	1125.00	590.54	1,500	1	SEAL PENETRATIONS AT VARIOUS LOCATIONS		974.70	471.99
31	Records Center	4	CLK	1,000	1	1/32	EXISTING GAP AT EXTERIOR ROOF WALL	2.60	375.00	196.85	1,000	1	SEAL EXISTING GAP USING EXTERIOR CAULK		324.90	157.33
32	18th & Herr Complex	5	EDW	19	17	1/8	WORN OUT ENTRY DOOR WEATHERSTRIPPING	3.36	484.50	357.20	19	17	REPAIR/REPLACE WEATHERSTRIP ON ENTRY DOORS		589.57	285.49
33	18th & Herr Complex	5	EDS	19	3	1/8	WORN OUT ENTRY DOOR SWEEP	0.59	85.50	63.04	19	3	INSTALL SWEEPS ON ENTRY DOORS		104.04	50.38
34	18th & Herr Complex	5	EDDW	3	20	1/8	WORN OUT DOUBLE DOOR WEATHERSTRIPPING	0.62	90.00	66.35	3	20	REPAIR/REPLACE WEATHERSTRIP ON DOUBLE DOORS		109.52	53.03
35	18th & Herr Complex	5	EDDS	3	6	1/8	WORN OUT DOUBLE DOOR SWEEP	0.19	27.00	19.91	3	6	INSTALL SWEEPS ON DOUBLE DOORS		32.86	15.91
36	18th & Herr Complex	5	AS	3	7	1/4	WORN/MISSING ASTRAGAL	0.44	63.00	46.45	3	7	INSTALL NEW ASTRAGAL		76.66	37.12
37	18th & Herr Complex	5	ND	3	20	1/8	EXTERIOR ENTRY DOOR REPLACEMENT NEEDED	0.62	90.00	66.35	3	20	INSTALL NEW EXTERIOR ENTRY DOOR	1 is a Double Door	109.52	53.03
38	18th & Herr Complex	5	GDW	7	36	1/4	WORN OUT GARAGE DOOR WEATHER STRIPPING ONLY	5.25	756.00	557.37	7	36	REPLACE GARAGE DOOR WEATHER STRIPPING ONLY		919.95	445.47
39	22nd & Foster BLDG	6	EDW	11	17	1/8	WORN OUT ENTRY DOOR WEATHERSTRIPPING	1.95	280.50	252.97	11	17	REPAIR/REPLACE WEATHERSTRIP ON ENTRY DOORS		417.54	202.19
40	22nd & Foster BLDG	6	EDS	11	3	1/8	WORN OUT ENTRY DOOR SWEEP	0.34	49.50	44.64	11	3	INSTALL SWEEPS ON ENTRY DOORS		73.68	35.68
41	22nd & Foster BLDG	6	EDDW	5	20	1/8	WORN OUT DOUBLE DOOR WEATHERSTRIPPING	1.04	150.00	135.28	5	20	REPAIR/REPLACE WEATHERSTRIP ON DOUBLE DOORS		223.28	108.12
42	22nd & Foster BLDG	6	EDDS	5	6	1/8	WORN OUT DOUBLE DOOR SWEEP	0.31	45.00	40.58	5	6	INSTALL SWEEPS ON DOUBLE DOORS		66.98	32.44
43	22nd & Foster BLDG	6	AS	5	7	1/4	WORN/MISSING ASTRAGAL	0.73	105.00	94.70	5	7	INSTALL NEW ASTRAGAL		156.30	75.69
44	22nd & Foster BLDG	6	GDW	10	36	1/4	WORN OUT GARAGE DOOR WEATHER STRIPPING ONLY	7.50	1080.00	974.01	10	36	REPLACE GARAGE DOOR WEATHER STRIPPING ONLY		1607.64	778.48
45	22nd & Foster BLDG	6	ACS	13	8	1/10	MISSING OR WORN AIR CONDITIONER SEALING	0.87	124.80	112.55	13	8	SEAL GAPS AROUND WINDOW AIR CONDITIONER		185.77	89.96

Line #	BLD	BLD Code	ECM Code	QTY	Length (Ft)	Crack Width (in)	EXISTING CONDITIONS Description	Total Area	Total Square Inches	CFM	Qty	Linear Ft (ea)	PROPOSED UPGRADE Description	Notes	Heating Therms Saved	kWh Saved
46	Agriculture BLDG	7	EDW	4	17	1/16	WORN OUT ENTRY DOOR WEATHERSTRIPPING	0.35	51.00	45.99	4	17	REPAIR/REPLACE WEATHERSTRIP ON ENTRY DOORS		0.00	724.17
47	Agriculture BLDG	7	EDS	4	3	1/8	WORN OUT ENTRY DOOR SWEEP	0.12	18.00	16.23	4	3	INSTALL SWEEPS ON ENTRY DOORS		0.00	255.59
48	Agriculture BLDG	7	EDDW	7	20	1/16	WORN OUT DOUBLE DOOR WEATHERSTRIPPING	0.73	105.00	94.70	7	20	REPAIR/REPLACE WEATHERSTRIP ON DOUBLE DOORS		0.00	1490.93
49	Agriculture BLDG	7	EDDS	7	6	1/8	WORN OUT DOUBLE DOOR SWEEP	0.44	63.00	56.82	7	6	INSTALL SWEEPS ON DOUBLE DOORS		0.00	894.56
50	Agriculture BLDG	7	AS	7	7	1/16	WORN/MISSING ASTRAGAL	0.26	36.75	33.14	7	7	INSTALL NEW ASTRAGAL		0.00	521.83
51	Agriculture BLDG	7	GDW	1	28	1/8	WORN OUT GARAGE DOOR WEATHER STRIPPING ONLY	0.29	42.00	37.88	1	28	REPLACE GARAGE DOOR WEATHER STRIPPING ONLY		0.00	596.37
52	Agriculture BLDG	7	IRW	1,365	1	1/32	EXISTING ROOF WALL GAPS - INTERIOR	3.55	511.87	461.64	1,365	1	SEAL INTERIOR ROOF/WALL INTERSECTION		0.00	7268.29
53	Agriculture Vet Lab BLDG	8	EDW	4	17	1/8	WORN OUT ENTRY DOOR WEATHERSTRIPPING	0.71	102.00	91.99	4	17	REPAIR/REPLACE WEATHERSTRIP ON ENTRY DOORS		151.83	73.52
54	Agriculture Vet Lab BLDG	8	EDS	4	3	1/8	WORN OUT ENTRY DOOR SWEEP	0.12	18.00	16.23	4	3	INSTALL SWEEPS ON ENTRY DOORS		26.79	12.97
55	Agriculture Vet Lab BLDG	8	EDDW	5	20	1/8	WORN OUT DOUBLE DOOR WEATHERSTRIPPING	1.04	150.00	135.28	5	20	REPAIR/REPLACE WEATHERSTRIP ON DOUBLE DOORS		223.28	108.12
56	Agriculture Vet Lab BLDG	8	EDDS	5	6	1/8	WORN OUT DOUBLE DOOR SWEEP	0.31	45.00	40.58	5	6	INSTALL SWEEPS ON DOUBLE DOORS		66.98	32.44
57	Agriculture Vet Lab BLDG	8	AS	5	7	1/4	WORN/MISSING ASTRAGAL	0.73	105.00	94.70	5	7	INSTALL NEW ASTRAGAL		156.30	75.69
58	Agriculture Vet Lab BLDG	8	GDW	1	36	1/4	WORN OUT GARAGE DOOR WEATHER STRIPPING ONLY	0.75	108.00	97.40	1	36	REPLACE GARAGE DOOR WEATHER STRIPPING ONLY		160.76	77.85
59	Agriculture Vet Lab BLDG	8	CLK	1,225	1	1/32	EXISTING GAP AT EXTERIOR ROOF WALL	3.19	459.37	414.29	1,225	1	SEAL EXISTING GAP USING EXTERIOR CAULK	exterior RW	683.80	331.12
		X		5,543							0	5,543		0	13,674	109,901

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
1	DGS Capital Complex - Rachel Carson Building	AUDITORIUM		Q250DL6-DIM	100	250 Watt Quartz 6" Downlight Fixture; Dimming	250	25.000	A	2088	52,200		100	ZZ DD	No Retrofit	250	25.000	0.000	$ -	2,088	52,200	0	$0.00	$0.00
2	DGS Capital Complex - Rachel Carson Building	ATRIUM		MH360CYL16"	20	360 Watt Metal Halide Cylinder Fixture; 16"	455	9.100	A	2088	19,001		20	N HLED72CYL-WH	New 72 Watt LED Cylinder Fixture; White	72	1.440	91.920	$ -	2,088	3,007	15,994	$959.64	$959.64
3	DGS Capital Complex - Rachel Carson Building	ATRIUM		MH350CYL16"-WH-PEND	16	350 Watt Metal Halide Cylinder Fixture; 16"; White; Pendant Mount	455	7.280	A	2088	15,201		16	N HLED72CYL-WH	New 72 Watt LED Cylinder Fixture; White	72	1.152	73.536	$ -	2,088	2,405	12,795	$767.72	$767.72
4	DGS Capital Complex - Rachel Carson Building	EXTERIOR		LEDWP30	3	30 Watt LED Wall Pack Fixture	30	0.090	EX	4380	394		3	ZZ DD	No Retrofit	30	0.090	0.000	$ -	4,380	394	0	$0.00	$0.00
5	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDMR16-8	65	8 Watt LED MR16 Fixture	8	0.520	CF	2088	1,086		65	ZZ DD	No Retrofit	8	0.520	0.000	$ -	2,088	1,086	0	$0.00	$0.00
6	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDMR16-8	34	8 Watt LED MR16 Fixture	8	0.272	CF	2088	568		34	ZZ DD	No Retrofit	8	0.272	0.000	$ -	2,088	568	0	$0.00	$0.00
7	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDMR16-8	193	8 Watt LED MR16 Fixture	8	1.544	CF	2088	3,224		193	ZZ DD	No Retrofit	8	1.544	0.000	$ -	2,088	3,224	0	$0.00	$0.00
8	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDMR16-8	34	8 Watt LED MR16 Fixture	8	0.272	CF	2088	568		34	ZZ DD	No Retrofit	8	0.272	0.000	$ -	2,088	568	0	$0.00	$0.00
9	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDMR16-8	34	8 Watt LED MR16 Fixture	8	0.272	CF	2088	568		34	ZZ DD	No Retrofit	8	0.272	0.000	$ -	2,088	568	0	$0.00	$0.00
10	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDMR16-8	34	8 Watt LED MR16 Fixture	8	0.272	CF	2088	568		34	ZZ DD	No Retrofit	8	0.272	0.000	$ -	2,088	568	0	$0.00	$0.00
11	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDMR16-8	34	8 Watt LED MR16 Fixture	8	0.272	CF	2088	568		34	ZZ DD	No Retrofit	8	0.272	0.000	$ -	2,088	568	0	$0.00	$0.00
12	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDMR16-8	34	8 Watt LED MR16 Fixture	8	0.272	CF	2088	568		34	ZZ DD	No Retrofit	8	0.272	0.000	$ -	2,088	568	0	$0.00	$0.00
13	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDBR30DL6-DIM	83	LED BR30 6" Downlight Fixture; Dimming	9	0.747	CF	2088	1,560		83	ZZ DD	No Retrofit	9	0.747	0.000	$ -	2,088	1,560	0	$0.00	$0.00
14	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDBR30DL6-DIM	53	LED BR30 6" Downlight Fixture; Dimming	9	0.477	CF	2088	996		53	ZZ DD	No Retrofit	9	0.477	0.000	$ -	2,088	996	0	$0.00	$0.00
15	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDBR30DL6-DIM	14	LED BR30 6" Downlight Fixture; Dimming	9	0.126	CF	2088	263		14	ZZ DD	No Retrofit	9	0.126	0.000	$ -	2,088	263	0	$0.00	$0.00
16	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDBR30DL6-DIM	14	LED BR30 6" Downlight Fixture; Dimming	9	0.126	CF	2088	263		14	ZZ DD	No Retrofit	9	0.126	0.000	$ -	2,088	263	0	$0.00	$0.00
17	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDBR30DL6-DIM	14	LED BR30 6" Downlight Fixture; Dimming	9	0.126	CF	2088	263		14	ZZ DD	No Retrofit	9	0.126	0.000	$ -	2,088	263	0	$0.00	$0.00
18	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDBR30DL6-DIM	14	LED BR30 6" Downlight Fixture; Dimming	9	0.126	CF	2088	263		14	ZZ DD	No Retrofit	9	0.126	0.000	$ -	2,088	263	0	$0.00	$0.00
19	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDBR30DL6-DIM	14	LED BR30 6" Downlight Fixture; Dimming	9	0.126	CF	2088	263		14	ZZ DD	No Retrofit	9	0.126	0.000	$ -	2,088	263	0	$0.00	$0.00
20	DGS Capital Complex - Rachel Carson Building	CONFERENCE		LEDBR30DL6-DIM	14	LED BR30 6" Downlight Fixture; Dimming	9	0.126	CF	2088	263		14	ZZ DD	No Retrofit	9	0.126	0.000	$ -	2,088	263	0	$0.00	$0.00
21	DGS Capital Complex - Rachel Carson Building	M		LEDA19RLM	42	LED A19 RLM Fixture	9	0.378	M	3863	1,460		42	ZZ DD	No Retrofit	9	0.378	0.000	$ -	3,863	1,460	0	$0.00	$0.00
22	DGS Capital Complex - Rachel Carson Building	HALLWAYS		LEDA19-SC-UP	14	LED A19 Security Up Light Fixture	9	0.126	H	3863	487		14	ZZ DD	No Retrofit	9	0.126	0.000	$ -	3,863	487	0	$0.00	$0.00
23	DGS Capital Complex - Rachel Carson Building	HALLWAYS		LEDDL6	588	LED 6" Downlight Fixture	25	14.700	H	3863	56,786		588	ZZ DD	No Retrofit	25	14.700	0.000	$ -	3,863	56,786	0	$0.00	$0.00
24	DGS Capital Complex - Rachel Carson Building	HALLWAYS		LEDDL6	25	LED 6" Downlight Fixture	25	0.625	H	3863	2,414		25	ZZ DD	No Retrofit	25	0.625	0.000	$ -	3,863	2,414	0	$0.00	$0.00
25	DGS Capital Complex - Rachel Carson Building	HALLWAYS		LEDDL6	25	LED 6" Downlight Fixture	25	0.625	H	3863	2,414		25	ZZ DD	No Retrofit	25	0.625	0.000	$ -	3,863	2,414	0	$0.00	$0.00
26	DGS Capital Complex - Rachel Carson Building	HALLWAYS		LEDDL6	25	LED 6" Downlight Fixture	25	0.625	H	3863	2,414		25	ZZ DD	No Retrofit	25	0.625	0.000	$ -	3,863	2,414	0	$0.00	$0.00
27	DGS Capital Complex - Rachel Carson Building	HALLWAYS		LEDDL6	25	LED 6" Downlight Fixture	25	0.625	H	3863	2,414		25	ZZ DD	No Retrofit	25	0.625	0.000	$ -	3,863	2,414	0	$0.00	$0.00
28	DGS Capital Complex - Rachel Carson Building	HALLWAYS		LEDDL6	25	LED 6" Downlight Fixture	25	0.625	H	3863	2,414		25	ZZ DD	No Retrofit	25	0.625	0.000	$ -	3,863	2,414	0	$0.00	$0.00
29	DGS Capital Complex - Rachel Carson Building	HALLWAYS		LEDDL6	25	LED 6" Downlight Fixture	25	0.625	H	3863	2,414		25	ZZ DD	No Retrofit	25	0.625	0.000	$ -	3,863	2,414	0	$0.00	$0.00
30	DGS Capital Complex - Rachel Carson Building	HALLWAYS		LEDDL6	25	LED 6" Downlight Fixture	25	0.625	H	3863	2,414		25	ZZ DD	No Retrofit	25	0.625	0.000	$ -	3,863	2,414	0	$0.00	$0.00

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
31	DGS Capital Complex - Rachel Carson Building	EXTERIOR		HPS70DL6	55	70 Watt High Pressure Sodium 6" Downlight Fixture	90	4.950	EX	4380	21,681		55	N GLED18DL6	Retrofit with (1) 18 Watt 6" LED Downlight	18	0.990	47.520	$ -	4,380	4,336	17,345	$1,040.69	$1,040.69
32	DGS Capital Complex - Rachel Carson Building	EXTERIOR		HPS150WP-PC	5	150 Watt High Pressure Sodium Wall Pack Fixture; Photocell	188	0.940	EX	4380	4,117		5	N RLED37WP-PC	New 37 Watt LED Wall Pack Fixture; Photocell	37	0.185	9.060	$ -	4,380	810	3,307	$198.41	$198.41
33	DGS Capital Complex - Rachel Carson Building	EXTERIOR		CF23JJ	6	23 Watt CFL Jelly Jar Fixture	23	0.138	EX	4380	604		6	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.030	1.296	$ -	4,380	131	473	$28.38	$28.38
34	DGS Capital Complex - Rachel Carson Building	EXTERIOR		CF13DL6	16	13 Watt CFL 6" Downlight Fixture	13	0.208	EX	4380	911		16	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.080	1.536	$ -	4,380	350	561	$33.64	$33.64
35	DGS Capital Complex - Rachel Carson Building	HALLWAYS		4UP25-3'	6	T8 1x3 4-Lamp Up Light Fixture	116	0.696	H	3863	2,689		6	R 4L-12LED3'	Retrofit with (4) 12 Watt LED T8 3' Lamps; Direct Wire to Socket	48	0.288	4.896	$ -	3,863	1,113	1,576	$94.57	$94.57
36	DGS Capital Complex - Rachel Carson Building	OFFICES		3L25PB-BI-AR	2,754	T8 2x4 3-Lamp Parabolic Troffer Fixture; Bi-Level; Air Return	87	239.598	O	2340	560,659		2,754	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	74.358	1,982.880	$ -	2,340	173,998	386,662	$23,199.70	$23,199.70
37	DGS Capital Complex - Rachel Carson Building	OFFICES		3L25PB-BI-AR	332	T8 2x4 3-Lamp Parabolic Troffer Fixture; Bi-Level; Air Return	87	28.884	O	2340	67,589		332	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	8.964	239.040	$ -	2,340	20,976	46,613	$2,796.77	$2,796.77
38	DGS Capital Complex - Rachel Carson Building	OFFICES		3L25PB-BI-AR	332	T8 2x4 3-Lamp Parabolic Troffer Fixture; Bi-Level; Air Return	87	28.884	O	2340	67,589		332	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	8.964	239.040	$ -	2,340	20,976	46,613	$2,796.77	$2,796.77
39	DGS Capital Complex - Rachel Carson Building	OFFICES		3L25PB-BI-AR	332	T8 2x4 3-Lamp Parabolic Troffer Fixture; Bi-Level; Air Return	87	28.884	O	2340	67,589		332	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	8.964	239.040	$ -	2,340	20,976	46,613	$2,796.77	$2,796.77
40	DGS Capital Complex - Rachel Carson Building	OFFICES		3L25PB-BI-AR	332	T8 2x4 3-Lamp Parabolic Troffer Fixture; Bi-Level; Air Return	87	28.884	O	2340	67,589		332	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	8.964	239.040	$ -	2,340	20,976	46,613	$2,796.77	$2,796.77
41	DGS Capital Complex - Rachel Carson Building	OFFICES		3L25PB-BI-AR	332	T8 2x4 3-Lamp Parabolic Troffer Fixture; Bi-Level; Air Return	87	28.884	O	2340	67,589		332	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	8.964	239.040	$ -	2,340	20,976	46,613	$2,796.77	$2,796.77
42	DGS Capital Complex - Rachel Carson Building	OFFICES		3L25PB-BI-AR	332	T8 2x4 3-Lamp Parabolic Troffer Fixture; Bi-Level; Air Return	87	28.884	O	2340	67,589		332	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	8.964	239.040	$ -	2,340	20,976	46,613	$2,796.77	$2,796.77
43	DGS Capital Complex - Rachel Carson Building	OFFICES		3L25PB-BI-AR	332	T8 2x4 3-Lamp Parabolic Troffer Fixture; Bi-Level; Air Return	87	28.884	O	2340	67,589		332	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	8.964	239.040	$ -	2,340	20,976	46,613	$2,796.77	$2,796.77
44	DGS Capital Complex - Rachel Carson Building	MECHANICAL/STORAGE		2EC25	192	T8 2x4 2-Lamp Egg Crate Fixture	62	11.904	M	3863	45,985		192	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	3.456	101.376	$ -	3,863	13,351	32,635	$1,958.08	$1,958.08
45	DGS Capital Complex - Rachel Carson Building	MECHANICAL/STORAGE		2EC25	10	T8 2x4 2-Lamp Egg Crate Fixture	62	0.620	M	3863	2,395		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	5.280	$ -	3,863	695	1,700	$101.98	$101.98
46	DGS Capital Complex - Rachel Carson Building	MECHANICAL/STORAGE		2EC25	5	T8 2x4 2-Lamp Egg Crate Fixture	62	0.310	M	3863	1,198		5	N 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.090	2.640	$ -	3,863	348	850	$50.99	$50.99
47	DGS Capital Complex - Rachel Carson Building	MECHANICAL/STORAGE		2EC25	5	T8 2x4 2-Lamp Egg Crate Fixture	62	0.310	M	3863	1,198		5	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.090	2.640	$ -	3,863	348	850	$50.99	$50.99
48	DGS Capital Complex - Rachel Carson Building	MECHANICAL/STORAGE		2EC25	5	T8 2x4 2-Lamp Egg Crate Fixture	62	0.310	M	3863	1,198		5	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.090	2.640	$ -	3,863	348	850	$50.99	$50.99
49	DGS Capital Complex - Rachel Carson Building	MECHANICAL/STORAGE		2EC25	5	T8 2x4 2-Lamp Egg Crate Fixture	62	0.310	M	3863	1,198		5	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.090	2.640	$ -	3,863	348	850	$50.99	$50.99
50	DGS Capital Complex - Rachel Carson Building	MECHANICAL/STORAGE		2EC25	5	T8 2x4 2-Lamp Egg Crate Fixture	62	0.310	M	3863	1,198		5	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.090	2.640	$ -	3,863	348	850	$50.99	$50.99
51	DGS Capital Complex - Rachel Carson Building	MECHANICAL/STORAGE		2EC25	5	T8 2x4 2-Lamp Egg Crate Fixture	62	0.310	M	3863	1,198		5	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.090	2.640	$ -	3,863	348	850	$50.99	$50.99
52	DGS Capital Complex - Rachel Carson Building	STAIRS		2WD25	50	T8 2x4 2-Lamp Wide Wrap Fixture	62	3.100	H	3863	11,975		50	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.900	26.400	$ -	3,863	3,477	8,499	$509.92	$509.92
53	DGS Capital Complex - Rachel Carson Building	STAIRS		2WD25	6	T8 2x4 2-Lamp Wide Wrap Fixture	62	0.372	H	3863	1,437		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	3.168	$ -	3,863	417	1,020	$61.19	$61.19
54	DGS Capital Complex - Rachel Carson Building	STAIRS		2WD25	6	T8 2x4 2-Lamp Wide Wrap Fixture	62	0.372	H	3863	1,437		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	3.168	$ -	3,863	417	1,020	$61.19	$61.19
55	DGS Capital Complex - Rachel Carson Building	STAIRS		2WD25	4	T8 2x4 2-Lamp Wide Wrap Fixture	62	0.248	H	3863	958		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	2.112	$ -	3,863	278	680	$40.79	$40.79
56	DGS Capital Complex - Rachel Carson Building	STAIRS		2WD25	4	T8 2x4 2-Lamp Wide Wrap Fixture	62	0.248	H	3863	958		4	R 2L-9LED	Retrofit with (2) 18 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	2.112	$ -	3,863	278	680	$40.79	$40.79
57	DGS Capital Complex - Rachel Carson Building	STAIRS		2WD25	4	T8 2x4 2-Lamp Wide Wrap Fixture	62	0.248	H	3863	958		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	2.112	$ -	3,863	278	680	$40.79	$40.79
58	DGS Capital Complex - Rachel Carson Building	STAIRS		2WD25	4	T8 2x4 2-Lamp Wide Wrap Fixture	62	0.248	H	3863	958		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	2.112	$ -	3,863	278	680	$40.79	$40.79
59	DGS Capital Complex - Rachel Carson Building	STAIRS		2WD25	4	T8 2x4 2-Lamp Wide Wrap Fixture	62	0.248	H	3863	958		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	2.112	$ -	3,863	278	680	$40.79	$40.79
60	DGS Capital Complex - Rachel Carson Building	MECHANICAL		2VT25	44	T8 2x3 2-Lamp Vaportight Fixture	49	2.156	M	3863	8,329		44	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.792	16.368	$ -	3,863	3,059	5,269	$316.15	$316.15

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
61	DGS Capital Complex - Rachel Carson Building	HALLS/RESTROOMS		2S25	136	T8 2x3 2-Lamp Strip Fixture	49	6.664	H	3863	25,743		136	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	2.448	50.592	$ -	3,863	9,457	16,286	$977.18	$977.18
62	DGS Capital Complex - Rachel Carson Building	HALLS/RESTROOMS		2S25	10	T8 2x3 2-Lamp Strip Fixture	49	0.490	H	3863	1,893		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.720	$ -	3,863	695	1,198	$71.85	$71.85
63	DGS Capital Complex - Rachel Carson Building	HALLS/RESTROOMS		2S25	10	T8 2x3 2-Lamp Strip Fixture	49	0.490	H	3863	1,893		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.720	$ -	3,863	695	1,198	$71.85	$71.85
64	DGS Capital Complex - Rachel Carson Building	HALLS/RESTROOMS		2S25	10	T8 2x3 2-Lamp Strip Fixture	49	0.490	H	3863	1,893		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.720	$ -	3,863	695	1,198	$71.85	$71.85
65	DGS Capital Complex - Rachel Carson Building	HALLS/RESTROOMS		2S25	10	T8 2x3 2-Lamp Strip Fixture	49	0.490	H	3863	1,893		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.720	$ -	3,863	695	1,198	$71.85	$71.85
66	DGS Capital Complex - Rachel Carson Building	HALLS/RESTROOMS		2S25	10	T8 2x3 2-Lamp Strip Fixture	49	0.490	H	3863	1,893		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.720	$ -	3,863	695	1,198	$71.85	$71.85
67	DGS Capital Complex - Rachel Carson Building	HALLS/RESTROOMS		2S25	10	T8 2x3 2-Lamp Strip Fixture	49	0.490	H	3863	1,893		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.720	$ -	3,863	695	1,198	$71.85	$71.85
68	DGS Capital Complex - Rachel Carson Building	HALLS/RESTROOMS		2S25	10	T8 2x3 2-Lamp Strip Fixture	49	0.490	H	3863	1,893		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.720	$ -	3,863	695	1,198	$71.85	$71.85
69	DGS Capital Complex - Rachel Carson Building	RESTROOMS		2PL13DL8H	16	13 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	26	0.416	RR	3863	1,607		16	N GLED14DL8	Retrofit with (1) 14 Watt 8" LED Downlight	14	0.224	2.304	$ -	3,863	865	742	$44.50	$44.50
70	DGS Capital Complex - Rachel Carson Building	RESTROOMS		2PL13DL8H	2	13 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	26	0.052	RR	3863	201		2	N GLED14DL8	Retrofit with (1) 14 Watt 8" LED Downlight	14	0.028	0.288	$ -	3,863	108	93	$5.56	$5.56
71	DGS Capital Complex - Rachel Carson Building	RESTROOMS		2PL13DL8H	2	13 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	26	0.052	RR	3863	201		2	N GLED14DL8	Retrofit with (1) 14 Watt 8" LED Downlight	14	0.028	0.288	$ -	3,863	108	93	$5.56	$5.56
72	DGS Capital Complex - Rachel Carson Building	RESTROOMS		2PL13DL8H	2	13 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	26	0.052	RR	3863	201		2	N GLED14DL8	Retrofit with (1) 14 Watt 8" LED Downlight	14	0.028	0.288	$ -	3,863	108	93	$5.56	$5.56
73	DGS Capital Complex - Rachel Carson Building	RESTROOMS		2PL13DL8H	2	13 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	26	0.052	RR	3863	201		2	N GLED14DL8	Retrofit with (1) 14 Watt 8" LED Downlight	14	0.028	0.288	$ -	3,863	108	93	$5.56	$5.56
74	DGS Capital Complex - Rachel Carson Building	RESTROOMS		2PL13DL8H	2	13 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	26	0.052	RR	3863	201		2	N GLED14DL8	Retrofit with (1) 14 Watt 8" LED Downlight	14	0.028	0.288	$ -	3,863	108	93	$5.56	$5.56
75	DGS Capital Complex - Rachel Carson Building	RESTROOMS		2PL13DL8H	2	13 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	26	0.052	RR	3863	201		2	N GLED14DL8	Retrofit with (1) 14 Watt 8" LED Downlight	14	0.028	0.288	$ -	3,863	108	93	$5.56	$5.56
76	DGS Capital Complex - Rachel Carson Building	RESTROOMS		2PL13DL8H	2	13 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	26	0.052	RR	3863	201		2	N GLED14DL8	Retrofit with (1) 14 Watt 8" LED Downlight	14	0.028	0.288	$ -	3,863	108	93	$5.56	$5.56
77	DGS Capital Complex - Rachel Carson Building	HALLWAYS		2L25-1X4	13	T8 1x4 2-Lamp Troffer Fixture	62	0.806	H	3863	3,114		13	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.234	6.864	$ -	3,863	904	2,210	$132.58	$132.58
78	DGS Capital Complex - Rachel Carson Building	HALLWAYS		2L25	31	T8 2x3 2-Lamp Troffer Fixture	49	1.519	H	3863	5,868		31	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.558	11.532	$ -	3,863	2,156	3,712	$222.74	$222.74
79	DGS Capital Complex - Rachel Carson Building	HALLWAYS		2L25	3	T8 2x3 2-Lamp Troffer Fixture	49	0.147	H	3863	568		3	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.054	1.116	$ -	3,863	209	359	$21.56	$21.56
80	DGS Capital Complex - Rachel Carson Building	MECHANICAL		2I25	46	T8 2x3 2-Lamp Industrial Strip Fixture	49	2.254	M	3863	8,707		46	R 2L-12LED3'	Retrofit with (2) 12 Watt LED T8 3' Lamps; Direct Wire to Socket	24	1.104	13.800	$ -	3,863	4,265	4,442	$266.55	$266.55
81	DGS Capital Complex - Rachel Carson Building	HALLWAYS		2LEDA19SC	11	LED A19 2-Lamp Sconce Fixture	18	0.198	H	3863	765		11	ZZ DD	No Retrofit	18	0.198	0.000	$ -	3,863	765	0	$0.00	$0.00
82	DGS Capital Complex - State Records Center	LOBBY/HALL		2L28-1X4	4	T8 1x4 2-Lamp Troffer Fixture	48	0.192	H	3863	742		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	3,863	278	464	$27.81	$27.81
83	DGS Capital Complex - State Records Center	LOBBY/HALL		4L28-18"X4-AR	3	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.291	H	3863	1,124		3	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.054	2.844	$ -	3,863	209	916	$54.93	$54.93
84	DGS Capital Complex - State Records Center	OFFICE 127		4L28-18"X4-AR	3	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.291	O	2340	681		3	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.054	2.844	$ -	1,638	88	592	$35.55	$35.55
85	DGS Capital Complex - State Records Center	OFFICE 125		4L28-18"X4-AR	3	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.291	O	2340	681		3	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.054	2.844	$ -	2,340	126	555	$33.27	$33.27
86	DGS Capital Complex - State Records Center	OFFICE 124		4L28-18"X4-AR	9	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.873	O	2340	2,043		9	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.162	8.532	$ -	1,638	265	1,777	$106.65	$106.65
87	DGS Capital Complex - State Records Center	OFFICE 122		4L28-18"X4-AR	6	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.582	O	2340	1,362		6	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.108	5.688	$ -	1,638	177	1,185	$71.10	$71.10
88	DGS Capital Complex - State Records Center	OFFICE 123/124		4L28-18"X4-AR	10	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.970	O	2340	2,270		10	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.180	9.480	$ -	1,638	295	1,975	$118.50	$118.50
89	DGS Capital Complex - State Records Center	OFFICE 126		4L28-18"X4-AR	8	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.776	O	2340	1,816		8	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.144	7.584	$ -	1,638	236	1,580	$94.80	$94.80
90	DGS Capital Complex - State Records Center	RESTROOM 131-130		1V25	1	T8 2x3 1-Lamp Vanity Fixture	22	0.022	RR	3863	85		1	R 1L-12LED3'	Retrofit with (1) 12 Watt LED T8 3' Lamp; Direct Wire to Socket	12	0.012	0.120	$ -	2,704	32	53	$3.15	$3.15

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
91	DGS Capital Complex - State Records Center	RESTROOM 131-130		1V28	1	T8 1x4 1-Lamp Vanity Fixture	25	0.025	RR	3863	97		1	R 1L-9LED	Retrofit with (1) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	9	0.009	0.192	$ -	2,704	24	72	$4.33	$4.33
92	DGS Capital Complex - State Records Center	OFFICE 132		4L28-18"X4-AR	3	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.291	O	2340	681		3	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.054	2.844	$ -	1,638	88	592	$35.55	$35.55
93	DGS Capital Complex - State Records Center	OFFICE 133		4L28-18"X4-AR	3	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.291	O	2340	681		3	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.054	2.844	$ -	2,340	126	555	$33.27	$33.27
94	DGS Capital Complex - State Records Center	OFFICE 134		4L28-18"X4-AR	4	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.388	O	2340	908		4	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.072	3.792	$ -	1,638	118	790	$47.40	$47.40
95	DGS Capital Complex - State Records Center	OFFICE 136		4L28-18"X4-AR	21	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	2.037	O	2340	4,767		21	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.378	19.908	$ -	1,638	619	4,147	$248.84	$248.84
96	DGS Capital Complex - State Records Center	OFFICE 138		4L28-18"X4-AR	3	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.291	O	2340	681		3	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.054	2.844	$ -	1,638	88	592	$35.55	$35.55
97	DGS Capital Complex - State Records Center	OFFICE 137		4L28-18"X4-AR	3	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.291	O	2340	681		3	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.054	2.844	$ -	1,638	88	592	$35.55	$35.55
98	DGS Capital Complex - State Records Center	JANITOR		60SQDL-12X12	1	60 Watt Incandescent Square Downlight Fixture; 12x12	60	0.060	JC	728	44		1	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.010	0.606	$ -	728	7	37	$2.21	$2.21
99	DGS Capital Complex - State Records Center	OFFICE 115		4L28-18"X4-AR	19	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	1.843	O	2340	4,313		19	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.342	18.012	$ -	1,638	560	3,752	$225.15	$225.15
100	DGS Capital Complex - State Records Center	MENS RESTROOM		2V28	1	T8 2x4 2-Lamp Vanity Fixture	48	0.048	RR	3863	185		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	2,704	49	137	$8.21	$8.21
101	DGS Capital Complex - State Records Center	JANITOR		2B28	1	T8 2x4 2-Lamp Box Fixture	48	0.048	JC	728	35		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	728	13	22	$1.31	$1.31
102	DGS Capital Complex - State Records Center	WOMENS RESTROOM		1V30	1	T12 2x3 1-Lamp Vanity Fixture	47	0.047	RR	3863	182		1	R 1L-12LED3'	Retrofit with (1) 12 Watt LED T8 3' Lamp; Direct Wire to Socket	12	0.012	0.420	$ -	2,704	32	149	$8.95	$8.95
103	DGS Capital Complex - State Records Center	STORAGE		4B28-1X8	3	T8 1x8 4-Lamp Box Fixture	48	0.144	S	728	105		3	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.108	0.432	$ -	728	79	26	$1.57	$1.57
104	DGS Capital Complex - State Records Center	LOADING DOCK		2I28-1X8	9	T8 2x4 2-lamp Industrial Fixture	97	0.873	EX	4380	3,824		9	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.162	8.532	$ -	4,380	710	3,114	$186.85	$186.85
105	DGS Capital Complex - State Records Center	OFFICE 107		4L28-18"X4-AR	8	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.776	O	2340	1,816		8	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.144	7.584	$ -	1,638	236	1,580	$94.80	$94.80
106	DGS Capital Complex - State Records Center	OFFICE 108		4L28-18"X4-AR	3	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.291	O	2340	681		3	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.054	2.844	$ -	1,638	88	592	$35.55	$35.55
107	DGS Capital Complex - State Records Center	RESTROOM		1V28	1	T8 1x4 1-Lamp Vanity Fixture	25	0.025	RR	3863	97		1	R 1L-9LED	Retrofit with (1) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	9	0.009	0.192	$ -	2,704	24	72	$4.33	$4.33
108	DGS Capital Complex - State Records Center	RESTROOM		2W28	1	T8 2x4 2-Lamp Wrap Fixture	48	0.048	RR	3863	185		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	3,863	70	116	$6.95	$6.95
109	DGS Capital Complex - State Records Center	OFFICE		4L28-18"X4-AR	4	T8 18"x4' 4-Lamp Troffer Fixture; Air Return	97	0.388	O	2340	908		4	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.072	3.792	$ -	1,638	118	790	$47.40	$47.40
110	DGS Capital Complex - State Records Center	OFFICE		2L28-18"X4-AR	6	T8 18"x4' 2-Lamp Troffer Fixture; Air Return	48	0.288	O	2340	674		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	1,638	177	497	$29.82	$29.82
111	DGS Capital Complex - State Records Center	OFFICE		2L28-18"X4-AR	6	T8 18"x4' 2-Lamp Troffer Fixture; Air Return	48	0.288	O	2340	674		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	1,638	177	497	$29.82	$29.82
112	DGS Capital Complex - State Records Center	OFFICE		2L28-18"X4-AR	8	T8 18"x4' 2-Lamp Troffer Fixture; Air Return	48	0.384	O	2340	899		8	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.144	2.880	$ -	1,638	236	663	$39.76	$39.76
113	DGS Capital Complex - State Records Center	OFFICE		2L28-18"X4-AR	2	T8 18"x4' 2-Lamp Troffer Fixture; Air Return	48	0.096	O	2340	225		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	1,638	59	166	$9.94	$9.94
114	DGS Capital Complex - State Records Center	OFFICE 105		2L28-18"X4-AR	1	T8 18"x4' 2-Lamp Troffer Fixture; Air Return	48	0.048	O	2340	112		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	1,638	29	83	$4.97	$4.97
115	DGS Capital Complex - State Records Center	OFFICE 105		2LU32	12	T8 2x2 2-Lamp U-Lamp Troffer Fixture with 6" Lamps	62	0.744	O	2340	1,741		12	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.168	6.912	$ -	1,638	275	1,466	$87.95	$87.95
116	DGS Capital Complex - State Records Center	OFFICE 105		2L28-1X4	1	T8 1x4 2-Lamp Troffer Fixture	48	0.048	O	2340	112		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	1,638	29	83	$4.97	$4.97
117	DGS Capital Complex - State Records Center	WAREHOUSE 101		2I28-1X8	182	T8 2x4 2-lamp Industrial Fixture	97	17.654	W	1827	32,254		182	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	3.276	172.536	$ -	1,827	5,985	26,269	$1,576.12	$1,576.12
118	DGS Capital Complex - State Records Center	WAREHOUSE 101		2I28-1X8	167	T8 2x4 2-lamp Industrial Fixture	97	16.199	W	1827	29,596		167	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	3.006	158.316	$ -	1,827	5,492	24,104	$1,446.22	$1,446.22
119	DGS Capital Complex - State Records Center	WAREHOUSE 101		1I28-1X4	2	T8 1x4 1-Lamp Industrial Fixture	25	0.050	W	1827	91		2	R 1L-9LED	Retrofit with (1) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	9	0.018	0.384	$ -	1,827	33	58	$3.51	$3.51
120	DGS Capital Complex - State Records Center	WAREHOUSE 101		2V28	10	T8 2x4 2-Lamp Vanity Fixture	48	0.480	W	1827	877		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.600	$ -	1,827	329	548	$32.89	$32.89

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
121	DGS Capital Complex - State Records Center	SMALL HALL		2B28	1	T8 2x4 2-Lamp Box Fixture	48	0.048	H	3863	185		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	3,863	70	116	$6.95	$6.95
122	DGS Capital Complex - State Records Center	CONFERENCE		3L28-DIM	8	T8 2x4 3-Lamp Troffer Fixture; Dimming	72	0.576	CF	2088	1,203		8	R 3L-14LEDT8-DIM	Retrofit with (3) 14 Watt LED T8 4' Lamps and (1) 2-Lamp LED Driver; Dimming	42	0.336	2.880	$ -	1,462	491	712	$42.70	$42.70
123	DGS Capital Complex - State Records Center	HALL		2L28	4	T8 2x4 2-Lamp Troffer Fixture	48	0.192	H	3863	742		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	2,704	195	547	$32.82	$32.82
124	DGS Capital Complex - State Records Center	HALL		2L28-1X4	8	T8 1x4 2-Lamp Troffer Fixture	48	0.384	H	3863	1,483		8	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.144	2.880	$ -	2,704	389	1,094	$65.64	$65.64
125	DGS Capital Complex - State Records Center	OFFICE 107		2L28	2	T8 2x4 2-Lamp Troffer Fixture	48	0.096	O	2340	225		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	1,638	59	166	$9.94	$9.94
126	DGS Capital Complex - State Records Center	OFFICE 109		2L28-1X4	2	T8 1x4 2-Lamp Troffer Fixture	48	0.096	O	2340	225		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	1,638	59	166	$9.94	$9.94
127	DGS Capital Complex - State Records Center	WOMENS RESTROOM		2L28-1X4	1	T8 1x4 2-Lamp Troffer Fixture	48	0.048	RR	3863	185		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	2,704	49	137	$8.21	$8.21
128	DGS Capital Complex - State Records Center	MENS RESTROOM		2L28-1X4	1	T8 1x4 2-Lamp Troffer Fixture	48	0.048	RR	3863	185		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	2,704	49	137	$8.21	$8.21
129	DGS Capital Complex - State Records Center	OFFICE		2L28-1X4	2	T8 1x4 2-Lamp Troffer Fixture	48	0.096	O	2340	225		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	2,340	84	140	$8.42	$8.42
130	DGS Capital Complex - State Records Center	DOCK 114		2I59-TUR-1X8	12	T8 1x8 2-Lamp Industrial Fixture; Turret	104	1.248	EX	4380	5,466		12	N 2I-9LED-8'	New 1x8 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.216	12.384	$ -	4,380	946	4,520	$271.21	$271.21
131	DGS Capital Complex - State Records Center	DOCK 114		1S28	1	T8 1x4 1-Lamp Strip Fixture	25	0.025	EX	4380	110		1	R 1L-9LED	Retrofit with (1) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	9	0.009	0.192	$ -	4,380	39	70	$4.20	$4.20
132	DGS Capital Complex - State Records Center	SMALL HALL		3B28	1	T8 2x4 3-Lamp Box Fixture	72	0.072	H	3863	278		1	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	0.027	0.540	$ -	3,863	104	174	$10.43	$10.43
133	DGS Capital Complex - State Records Center	WAREHOUSE 117		2I59-TUR-1X8-OCC	196	T8 1x8 2-Lamp Industrial Fixture; Turret; Occ Sensor	104	20.384	W	1827	37,242		196	N 4I-9LED-8'	New 1x8 2-Lamp Industrial Fixture with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	7.056	159.936	$ -	1,279	9,024	28,218	$1,693.06	$1,693.06
134	DGS Capital Complex - State Records Center	WAREHOUSE 117		1S28	3	T8 1x4 1-Lamp Strip Fixture	25	0.075	W	1827	137		3	R 1L-9LED	Retrofit with (1) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	9	0.027	0.576	$ -	1,827	49	88	$5.26	$5.26
135	DGS Capital Complex - State Records Center	BOILER		2I60-TUR-1X8	5	T12 1x8 2-Lamp Industrial Fixture; Turret	113	0.565	M	3863	2,183		5	N 2I-9LED-8'	New 1x8 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.090	5.700	$ -	3,863	348	1,835	$110.10	$110.10
136	DGS Capital Complex - State Records Center	COAL ROOM 105		60JJ	1	60 Watt Incandescent A-Lamp Jelly Jar Fixture	60	0.060	M	3863	232		1	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.010	0.606	$ -	3,863	37	195	$11.70	$11.70
137	DGS Capital Complex - State Records Center	MECHANICAL 105		2I60TUR-1X8	3	T12 1x8 2-Lamp Industrial Fixture	113	0.339	M	3863	1,310		3	N 2I-9LED-8'	New 1x8 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.054	3.420	$ -	3,863	209	1,101	$66.06	$66.06
138	DGS Capital Complex - State Records Center	EXTERIOR		LEDCPY40	2	40 Watt LED Canopy Fixture	40	0.080	EX	4380	350		2	ZZ DD	No Retrofit	40	0.080	0.000	$ -	4,380	350	0	$0.00	$0.00
139	DGS Capital Complex - State Records Center	EXTERIOR		LEDWP27	24	27 Watt LED Wall Pack Fixture	27	0.648	EX	4380	2,838		24	ZZ DD	No Retrofit	27	0.648	0.000	$ -	4,380	2,838	0	$0.00	$0.00
140	DGS Capital Complex - State Records Center	EXTERIOR		LEDCOBSB-BZ	4	LED Cob Shoebox Fixture; Bronze	100	0.400	EX	4380	1,752		4	ZZ DD	No Retrofit	100	0.400	0.000	$ -	4,380	1,752	0	$0.00	$0.00
141	DGS Capital Complex - State Records Center	EXTERIOR		2LEDCOBSB-BZ	1	LED Cob 2-Lamp Shoebox Fixture; Bronze	200	0.200	EX	4380	876		1	ZZ DD	No Retrofit	200	0.200	0.000	$ -	4,380	876	0	$0.00	$0.00
142	DGS Capital Complex - 18th & Herr	VESTIBULE		2PL26DL8H	6	26 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	52	0.312	H	3863	1,205		6	N GLED18DL8	Retrofit with (1) 18 Watt 8" LED Downlight	18	0.108	2.448	$ -	3,863	417	788	$63.04	$63.04
143	DGS Capital Complex - 18th & Herr	VESTIBULE		2PL13SC-DECO	3	13 Watt Plug-In CFL 2-Lamp Sconce Fixture; Decorative	26	0.078	H	3863	301		3	R 2L-5.5LED-PLH	Retrofit with (2) 5.5 Watt LED Plug-In Lamps; Horizontal	11	0.033	0.540	$ -	3,863	127	174	$13.91	$13.91
144	DGS Capital Complex - 18th & Herr	LOBBY		2PL26DL8H	11	26 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	52	0.572	H	3863	2,210		11	N GLED18DL8	Retrofit with (1) 18 Watt 8" LED Downlight	18	0.198	4.488	$ -	3,863	765	1,445	$115.58	$115.58
145	DGS Capital Complex - 18th & Herr	HALL		2L17-AR	8	T8 2x2 2-Lamp Troffer Fixture	45	0.360	H	3863	1,391		8	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.112	2.976	$ -	3,863	433	958	$76.64	$76.64
146	DGS Capital Complex - 18th & Herr	RESTROOM		2L28-1X4-AR	8	T8 1x4 2-Lamp Troffer Fixture; Air Return	48	0.384	RR	3863	1,483		8	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.144	2.880	$ -	2,704	389	1,094	$87.52	$87.52
147	DGS Capital Complex - 18th & Herr	RESTROOM		2V25	2	T8 2x3 2-Lamp Vanity Fixture	49	0.098	RR	3863	379		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.744	$ -	3,863	139	240	$19.16	$19.16
148	DGS Capital Complex - 18th & Herr	RESTROOM		2V28	1	T8 2x4 2-Lamp Vanity Fixture	48	0.048	RR	3863	185		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	3,863	70	116	$9.27	$9.27
149	DGS Capital Complex - 18th & Herr	JANITORY		60JJ	1	60 Watt Incandescent A-Lamp Jelly Jar Fixture	60	0.060	JC	728	44		1	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.010	0.606	$ -	728	7	37	$2.94	$2.94
150	DGS Capital Complex - 18th & Herr	OFFICE-STORAGE		2L28	4	T8 2x4 2-Lamp Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	2,340	168	281	$22.46	$22.46

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
151	DGS Capital Complex - 18th & Herr	OFFICE-STORAGE		2L28-1X4	5	T8 1x4 2-Lamp Troffer Fixture	48	0.240	O	2340	562		5	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.090	1.800	$ -	2,340	211	351	$28.08	$28.08
152	DGS Capital Complex - 18th & Herr	OFFICE-STORAGE		2L28	14	T8 2x4 2-Lamp Troffer Fixture	48	0.672	O	2340	1,572		14	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.252	5.040	$ -	1,638	413	1,160	$92.78	$92.78
153	DGS Capital Complex - 18th & Herr	OFFICE-STORAGE		2L28	4	T8 2x4 2-Lamp Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	2,340	168	281	$22.46	$22.46
154	DGS Capital Complex - 18th & Herr	OFFICE-STORAGE		2L28-YELLOW	4	T8 2x4 2-Lamp Troffer Fixture; Yellow	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	2,340	168	281	$22.46	$22.46
155	DGS Capital Complex - 18th & Herr	OFFICE-STORAGE		2L28	4	T8 2x4 2-Lamp Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	2,340	168	281	$22.46	$22.46
156	DGS Capital Complex - 18th & Herr	OFFICE		2L28-AR	9	T8 2x4 2-Lamp Troffer Fixture; Air Return	48	0.432	O	2340	1,011		9	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.162	3.240	$ -	1,638	265	746	$59.64	$59.64
157	DGS Capital Complex - 18th & Herr	STOCK		2L28	18	T8 2x4 2-Lamp Troffer Fixture	48	0.864	O	2340	2,022		18	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.324	6.480	$ -	1,638	531	1,491	$119.28	$119.28
158	DGS Capital Complex - 18th & Herr	STOCK		2L28-1X4-AR	2	T8 1x4 2-Lamp Troffer Fixture; Air Return	48	0.096	O	2340	225		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	2,340	84	140	$11.23	$11.23
159	DGS Capital Complex - 18th & Herr	OFFICE		2L28-AR	7	T8 2x4 2-Lamp Troffer Fixture; Air Return	48	0.336	O	2340	786		7	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.126	2.520	$ -	1,638	206	580	$46.39	$46.39
160	DGS Capital Complex - 18th & Herr	OFFICE		2L28	6	T8 2x4 2-Lamp Troffer Fixture	48	0.288	O	2340	674		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	1,638	177	497	$39.76	$39.76
161	DGS Capital Complex - 18th & Herr	OFFICE 104		2L28	4	T8 2x4 2-Lamp Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
162	DGS Capital Complex - 18th & Herr	OFFICE		2L28	3	T8 2x4 2-Lamp Troffer Fixture	48	0.144	O	2340	337		3	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.054	1.080	$ -	2,340	126	211	$16.85	$16.85
163	DGS Capital Complex - 18th & Herr	STAIR		2L17-AR	2	T8 2x2 2-Lamp Troffer Fixture	45	0.090	H	3863	348		2	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.028	0.744	$ -	3,863	108	240	$19.16	$19.16
164	DGS Capital Complex - 18th & Herr	TRAINING		2L17-AR	28	T8 2x2 2-Lamp Troffer Fixture	45	1.260	CHS	2284	2,878		28	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.392	10.416	$ -	1,599	627	2,251	$180.09	$180.09
165	DGS Capital Complex - 18th & Herr	STAIR		2BU32	6	T8 2x2 2-Lamp U-Lamp Box Fixture	62	0.372	H	3863	1,437		6	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.084	3.456	$ -	3,863	324	1,113	$89.00	$89.00
166	DGS Capital Complex - 18th & Herr	STAIR		60JJ	1	60 Watt Incandescent A-Lamp Jelly Jar Fixture	60	0.060	H	3863	232		1	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.010	0.606	$ -	3,863	37	195	$15.61	$15.61
167	DGS Capital Complex - 18th & Herr	CONFERENCE		2CF28	3	28 Watt CFL 2-Lamp Fixture	56	0.168	CF	2088	351		3	LED 2-9A	Re-Lamp with (2) 9 Watt LED A19	19	0.057	1.332	$ -	1,462	83	267	$21.40	$21.40
168	DGS Capital Complex - 18th & Herr	STORAGE		2L28-PB	2	T8 2x4 2-Lamp Parabolic Troffer Fixutre	48	0.096	S	728	70		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	728	26	44	$3.49	$3.49
169	DGS Capital Complex - 18th & Herr	OPEN OFFICE		2CF28	34	28 Watt CFL 2-Lamp Fixture	56	1.904	O	2340	4,455		34	LED 2-9A	Re-Lamp with (2) 9 Watt LED A19	19	0.646	15.096	$ -	2,340	1,512	2,944	$235.50	$235.50
170	DGS Capital Complex - 18th & Herr	OPEN OFFICE		2LU32-PB	2	T8 2x2 2-Lamp U-Lamp Parabolic Troffer Fixture	62	0.124	O	2340	290		2	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.028	1.152	$ -	2,340	66	225	$17.97	$17.97
171	DGS Capital Complex - 18th & Herr	OPEN OFFICE		2L17-AR	4	T8 2x2 2-Lamp Troffer Fixture	45	0.180	O	2340	421		4	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.056	1.488	$ -	2,340	131	290	$23.21	$23.21
172	DGS Capital Complex - 18th & Herr	BREAK ROOM		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixutre	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
173	DGS Capital Complex - 18th & Herr	OFFICE		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixutre	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	2,340	168	281	$22.46	$22.46
174	DGS Capital Complex - 18th & Herr	OFFICE		2L28-PB	3	T8 2x4 2-Lamp Parabolic Troffer Fixutre	48	0.144	O	2340	337		3	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.054	1.080	$ -	2,340	126	211	$16.85	$16.85
175	DGS Capital Complex - 18th & Herr	OFFICE		2L28-PB	2	T8 2x4 2-Lamp Parabolic Troffer Fixutre	48	0.096	O	2340	225		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	1,638	59	166	$13.25	$13.25
176	DGS Capital Complex - 18th & Herr	OFFICE		2CF28	9	28 Watt CFL 2-Lamp Fixture	56	0.504	O	2340	1,179		9	LED 2-9A	Re-Lamp with (2) 9 Watt LED A19	19	0.171	3.996	$ -	1,638	280	899	$71.94	$71.94
177	DGS Capital Complex - 18th & Herr	OFFICE		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixutre	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
178	DGS Capital Complex - 18th & Herr	OFFICE		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixutre	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
179	DGS Capital Complex - 18th & Herr	OFFICE		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixutre	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
180	DGS Capital Complex - 18th & Herr	OFFICE		2LU32-PB	2	T8 2x2 2-Lamp U-Lamp Parabolic Troffer Fixture	62	0.124	O	2340	290		2	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.028	1.152	$ -	2,340	66	225	$17.97	$17.97

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
181	DGS Capital Complex - 18th & Herr	WOMENS RESTROOM		2L28-1X4	3	T8 1x4 2-Lamp Troffer Fixture	48	0.144	RR	3863	556		3	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.054	1.080	$ -	2,704	146	410	$32.82	$32.82
182	DGS Capital Complex - 18th & Herr	WOMENS RESTROOM		2V28	1	T8 2x4 2-Lamp Vanity Fixture	48	0.048	RR	3863	185		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	3,863	70	116	$9.27	$9.27
183	DGS Capital Complex - 18th & Herr	MENS RESTROOM		2L28-1X4	3	T8 1x4 2-Lamp Troffer Fixture	48	0.144	RR	3863	556		3	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.054	1.080	$ -	2,704	146	410	$32.82	$32.82
184	DGS Capital Complex - 18th & Herr	MENS RESTROOM		2V28	1	T8 2x4 2-Lamp Vanity Fixture	48	0.048	RR	3863	185		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	3,863	70	116	$9.27	$9.27
185	DGS Capital Complex - 18th & Herr	OFFICE		2L28-PB	8	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.384	O	2340	899		8	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.144	2.880	$ -	1,638	236	663	$53.02	$53.02
186	DGS Capital Complex - 18th & Herr	JANITOR		CF13JJ	1	13 Watt CFL Jelly Jar Fixture	13	0.013	JC	728	9		1	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.005	0.096	$ -	728	4	6	$0.47	$0.47
187	DGS Capital Complex - 18th & Herr	HALLWAYS		2L17-PB	16	T8 2x2 2-Lamp Parabolic Troffer Fixture	45	0.720	H	3863	2,781		16	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.224	5.952	$ -	3,863	865	1,916	$153.28	$153.28
188	DGS Capital Complex - 18th & Herr	OFFICE		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
189	DGS Capital Complex - 18th & Herr	OFFICE		2L28-PB	2	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.096	O	2340	225		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	1,638	59	166	$13.25	$13.25
190	DGS Capital Complex - 18th & Herr	OFFICE		2L28-PB	14	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.672	O	2340	1,572		14	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.252	5.040	$ -	1,638	413	1,160	$92.78	$92.78
191	DGS Capital Complex - 18th & Herr	OFFICE		2L28	6	T8 2x4 2-Lamp Troffer Fixture	48	0.288	O	2340	674		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	1,638	177	497	$39.76	$39.76
192	DGS Capital Complex - 18th & Herr	OFFICE		2L28-PC	16	T8 2x4 2-Lamp Troffer Fixture; Photocell	48	0.768	O	2340	1,797		16	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.288	5.760	$ -	2,340	674	1,123	$89.86	$89.86
193	DGS Capital Complex - 18th & Herr	OFFICE		2L28-PC	16	T8 2x4 2-Lamp Troffer Fixture; Photocell	48	0.768	O	2340	1,797		16	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.288	5.760	$ -	2,340	674	1,123	$89.86	$89.86
194	DGS Capital Complex - 18th & Herr	OFFICE		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
195	DGS Capital Complex - 18th & Herr	STAIR		2BU32	4	T8 2x2 2-Lamp U-Lamp Box Fixture	62	0.248	H	3863	958		4	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.056	2.304	$ -	3,863	216	742	$59.34	$59.34
196	DGS Capital Complex - 18th & Herr	CONFERENCE		3L17-AR	24	T8 2x2 3-Lamp Troffer Fixture; Air Return	64	1.536	CF	2088	3,207		24	R 3L-7LED2'	Retrofit with (3) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	21	0.504	12.384	$ -	1,462	737	2,471	$197.64	$197.64
197	DGS Capital Complex - 18th & Herr	BREAK ROOM		2L28-PB	6	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.288	O	2340	674		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	1,638	177	497	$39.76	$39.76
198	DGS Capital Complex - 18th & Herr	OFFICE 305		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
199	DGS Capital Complex - 18th & Herr	OFFICE 302		2L28-PB	6	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.288	O	2340	674		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	1,638	177	497	$39.76	$39.76
200	DGS Capital Complex - 18th & Herr	OFFICE 306		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
201	DGS Capital Complex - 18th & Herr	OFFICE 301		2L28-PB	9	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.432	O	2340	1,011		9	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.162	3.240	$ -	1,638	265	746	$59.64	$59.64
202	DGS Capital Complex - 18th & Herr	OFFICE 307		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
203	DGS Capital Complex - 18th & Herr	CONFERENCE 308		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	CF	2088	401		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,462	105	296	$23.65	$23.65
204	DGS Capital Complex - 18th & Herr	OFFICE 309		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
205	DGS Capital Complex - 18th & Herr	OFFICE 310		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
206	DGS Capital Complex - 18th & Herr	OFFICE 311		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
207	DGS Capital Complex - 18th & Herr	OFFICE 323		2LU32-AR	15	T8 2x2 2-Lamp U-Lamp Troffer Fixture; Air Return	62	0.930	O	2340	2,176		15	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.210	8.640	$ -	1,638	344	1,832	$146.58	$146.58
208	DGS Capital Complex - 18th & Herr	OFFICE 312		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
209	DGS Capital Complex - 18th & Herr	OFFICE 313		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
210	DGS Capital Complex - 18th & Herr	OFFICE 322		2L28-PB	6	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.288	O	2340	674		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	1,638	177	497	$39.76	$39.76

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
211	DGS Capital Complex - 18th & Herr	OFFICE 314		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
212	DGS Capital Complex - 18th & Herr	OFFICE 315		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
213	DGS Capital Complex - 18th & Herr	OFFICE 321		2L28-PB	6	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.288	O	2340	674		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	1,638	177	497	$39.76	$39.76
214	DGS Capital Complex - 18th & Herr	OFFICE 320		2L28-PB	6	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.288	O	2340	674		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	1,638	177	497	$39.76	$39.76
215	DGS Capital Complex - 18th & Herr	OFFICE 316		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
216	DGS Capital Complex - 18th & Herr	OFFICE 317		2L28-PB	2	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.096	O	2340	225		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	1,638	59	166	$13.25	$13.25
217	DGS Capital Complex - 18th & Herr	OFFICE 319		2L28-PB	2	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.096	O	2340	225		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	1,638	59	166	$13.25	$13.25
218	DGS Capital Complex - 18th & Herr	OFFICE 318		2L28-PB	4	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,638	118	331	$26.51	$26.51
219	DGS Capital Complex - 18th & Herr	HALLWAYS		2L17-AR	15	T8 2x2 2-Lamp Troffer Fixture	45	0.675	H	3863	2,608		15	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.210	5.580	$ -	3,863	811	1,796	$143.70	$143.70
220	DGS Capital Complex - 18th & Herr	RESTROOM		2L28-1X4-AR	3	T8 1x4 2-Lamp Troffer Fixture; Air Return	48	0.144	RR	3863	556		3	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.054	1.080	$ -	2,704	146	410	$32.82	$32.82
221	DGS Capital Complex - 18th & Herr	RESTROOM		2V25	2	T8 2x3 2-Lamp Vanity Fixture	49	0.098	RR	3863	379		2	R 2L-12LED3'	Retrofit with (2) 12 Watt LED T8 3' Lamps; Direct Wire to Socket	24	0.048	0.600	$ -	3,863	185	193	$15.45	$15.45
222	DGS Capital Complex - 18th & Herr	JANITOR		CF13JJ	1	13 Watt CFL Jelly Jar Fixture	13	0.013	JC	728	9		1	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.005	0.096	$ -	728	4	6	$0.47	$0.47
223	DGS Capital Complex - 18th & Herr	RECORD		2L28-1X4	2	T8 1x4 2-Lamp Troffer Fixture	48	0.096	S	728	70		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	728	26	44	$3.49	$3.49
224	DGS Capital Complex - 18th & Herr	RECORD		2I28	12	T8 2x4 2-Lamp Industrial Fixture	48	0.576	S	728	419		12	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.216	4.320	$ -	728	157	262	$20.97	$20.97
225	DGS Capital Complex - 18th & Herr	FILES		2L28-PB	10	T8 2x4 2-Lamp Parabolic Troffer Fixture	48	0.480	S	728	349		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.600	$ -	728	131	218	$17.47	$17.47
226	DGS Capital Complex - 18th & Herr	HALL		2I28	1	T8 2x4 2-Lamp Industrial Fixture	48	0.048	H	3863	185		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	3,863	70	116	$9.27	$9.27
227	DGS Capital Complex - 18th & Herr	HALL		2W28	2	T8 2x4 2-Lamp Wrap Fixture	48	0.096	H	3863	371		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	3,863	139	232	$18.54	$18.54
228	DGS Capital Complex - 18th & Herr	HALL		2I28-TUR	11	T8 2x4 2-Lamp Industrial Fixture; Turret	48	0.528	H	3863	2,040		11	N 2I-9LED	New 1x4 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.198	3.960	$ -	3,863	765	1,275	$101.98	$101.98
229	DGS Capital Complex - 18th & Herr	STORAGE		2L28	6	T8 2x4 2-Lamp Troffer Fixture	48	0.288	S	728	210		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	728	79	131	$10.48	$10.48
230	DGS Capital Complex - 18th & Herr	RESTROOM		CF23RLM	1	23 Watt CFL RLM Fixture	23	0.023	RR	3863	89		1	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.005	0.216	$ -	3,863	19	70	$5.56	$5.56
231	DGS Capital Complex - 18th & Herr	MECHANICAL		2I28	1	T8 2x4 2-Lamp Industrial Fixture	48	0.048	M	3863	185		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	3,863	70	116	$9.27	$9.27
232	DGS Capital Complex - 18th & Herr	STORAGE		2EC28	4	T8 2x4 2-Lamp Egg Crate Fixture	48	0.192	S	728	140		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	728	52	87	$6.99	$6.99
233	DGS Capital Complex - 18th & Herr	STORAGE		4B28-1X8	4	T8 1x8 4-Lamp Box Fixture	48	0.192	S	728	140		4	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.144	0.576	$ -	728	105	35	$2.80	$2.80
234	DGS Capital Complex - 18th & Herr	STORAGE		2I28-TUR	16	T8 2x4 2-Lamp Industrial Fixture; Turret	48	0.768	S	728	559		16	N 2I-9LED	New 1x4 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.288	5.760	$ -	728	210	349	$27.96	$27.96
235	DGS Capital Complex - 18th & Herr	MECHANICAL		2EC28	3	T8 2x4 2-Lamp Egg Crate Fixture	48	0.144	M	3863	556		3	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.054	1.080	$ -	3,863	209	348	$27.81	$27.81
236	DGS Capital Complex - 18th & Herr	HALL		2PL32CYL-WH	8	32 Watt Plug-In CFL 2-Lamp Cylinder Fixture; White	64	0.512	H	3863	1,978		8	R 2L-8.5LED-PLV	Retrofit with (2) 8.5 Watt LED Plug-In Lamps; Vertical	17	0.136	4.512	$ -	3,863	525	1,452	$116.20	$116.20
237	DGS Capital Complex - 18th & Herr	HALL		2LU32-AR	12	T8 2x2 2-Lamp U-Lamp Troffer Fixture; Air Return	62	0.744	H	3863	2,874		12	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.168	6.912	$ -	3,863	649	2,225	$178.01	$178.01
238	DGS Capital Complex - 18th & Herr	STAIR		3B17-DA	9	T8 2x2 3-Lamp Box Fixture; Difficult Access	64	0.576	H	3863	2,225		9	R 3L-7LED2'-DA	Retrofit with (3) 7 Watt LED T8 2' Lamps; Direct Wire to Socket; Difficult Access	21	0.189	4.644	$ -	3,863	730	1,495	$119.60	$119.60
239	DGS Capital Complex - 18th & Herr	RESTROOM		2LU32-AR	8	T8 2x2 2-Lamp U-Lamp Troffer Fixture; Air Return	62	0.496	RR	3863	1,916		8	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.112	4.608	$ -	3,863	433	1,483	$118.67	$118.67
240	DGS Capital Complex - 18th & Herr	RESTROOM		2PL13DL8	4	13 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture	26	0.104	RR	3863	402		4	N GLED14DL8	Retrofit with (1) 14 Watt 8" LED Downlight	14	0.056	0.576	$ -	3,863	216	185	$14.83	$14.83

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
241	DGS Capital Complex - 18th & Herr	ARSENAL BUILDING		2B28	43	T8 2x4 2-Lamp Box Fixture	48	2.064	O	2340	4,830		43	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.774	15.480	$ -	2,340	1,811	3,019	$241.49	$241.49
242	DGS Capital Complex - 18th & Herr	ARSENAL BUILDING		2I28	3	T8 2x4 2-Lamp Industrial Fixture	48	0.144	O	2340	337		3	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.054	1.080	$ -	2,340	126	211	$16.85	$16.85
243	DGS Capital Complex - 18th & Herr	ARSENAL BUILDING		2L28(L)	6	T8 2x4 2-Lamp Troffer Fixture; Missing Lens	48	0.288	O	2340	674		6	N 2L-9LED	New 2x4 2-Lamp Lay-In Troffer Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.108	2.160	$ -	2,340	253	421	$33.70	$33.70
244	DGS Capital Complex - 18th & Herr	ARSENAL BUILDING		2B28-1X4	7	T8 1x4 2-Lamp Box Fixture	48	0.336	O	2340	786		7	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.126	2.520	$ -	2,340	295	491	$39.31	$39.31
245	DGS Capital Complex - 18th & Herr	ARSENAL BUILDING		2W28	1	T8 2x4 2-Lamp Wrap Fixture	48	0.048	O	2340	112		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	2,340	42	70	$5.62	$5.62
246	DGS Capital Complex - 18th & Herr	ARSENAL BUILDING		CF13K	1	13 Watt CFL Keyless Fixture	13	0.013	O	2340	30		1	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.005	0.096	$ -	2,340	12	19	$1.50	$1.50
247	DGS Capital Complex - 18th & Herr	ARSENAL BUILDING		2S28	1	T8 2x4 2-Lamp Strip Fixture	48	0.048	O	2340	112		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	2,340	42	70	$5.62	$5.62
248	DGS Capital Complex - 18th & Herr	STORAGE		2B28	1	T8 2x4 2-Lamp Box Fixture	48	0.048	S	728	35		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	728	13	22	$1.75	$1.75
249	DGS Capital Complex - 18th & Herr	STORAGE		CF23K	1	23 Watt CFL Keyless Fixture	23	0.023	S	728	17		1	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.005	0.216	$ -	728	4	13	$1.05	$1.05
250	DGS Capital Complex - 18th & Herr	MASON SHOP		2B28	4	T8 2x4 2-Lamp Box Fixture	48	0.192	W	1827	351		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	1,827	132	219	$17.54	$17.54
251	DGS Capital Complex - 18th & Herr	MASON SHOP		60K	1	60 Watt Incandescent Keyless Fixture	60	0.060	W	1827	110		1	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.010	0.606	$ -	1,827	17	92	$7.38	$7.38
252	DGS Capital Complex - 18th & Herr	MASON SHOP		150K	1	150 Watt Incandescent Keyless Fixture	150	0.150	W	1827	274		1	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.010	1.686	$ -	1,827	17	257	$20.54	$20.54
253	DGS Capital Complex - 18th & Herr	SHOP		2L28	10	T8 2x4 2-Lamp Troffer Fixture	48	0.480	W	1827	877		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.600	$ -	1,827	329	548	$43.85	$43.85
254	DGS Capital Complex - 18th & Herr	STORAGE		2L28(L)	8	T8 2x4 2-Lamp Troffer Fixture; Missing Lens	48	0.384	S	728	280		8	N 2L-9LED	New 2x4 2-Lamp Lay-In Troffer Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.144	2.880	$ -	728	105	175	$13.98	$13.98
255	DGS Capital Complex - 18th & Herr	WOOD SHOP		2B28	10	T8 2x4 2-Lamp Box Fixture	48	0.480	W	1827	877		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.600	$ -	1,827	329	548	$43.85	$43.85
256	DGS Capital Complex - 18th & Herr	MECHANICAL		2I34-TUR	4	T12 2x4 2-Lamp Industrial Fixture; Turret	72	0.288	M	3863	1,113		4	N 2I-9LED	New 1x4 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.072	2.592	$ -	3,863	278	834	$66.75	$66.75
257	DGS Capital Complex - 18th & Herr	STORAGE		2L28	20	T8 2x4 2-Lamp Troffer Fixture	48	0.960	S	728	699		20	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.360	7.200	$ -	728	262	437	$34.94	$34.94
258	DGS Capital Complex - 18th & Herr	STORAGE		150JJ	5	150 Watt Incandescent Jelly Jar Fixture	150	0.750	S	728	546		5	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.048	8.430	$ -	728	35	511	$40.91	$40.91
259	DGS Capital Complex - 18th & Herr	EXTERIOR		HPS70SECWP-PC	1	70 Watt High Pressure Sodium Security Wall Pack Fixture; Photocell	90	0.090	EX	4380	394		1	N RLED25TWP-PC	New 25 Watt LED Tall Wall Pack; Photocell	25	0.025	0.780	$ -	4,380	110	285	$22.78	$22.78
260	DGS Capital Complex - 18th & Herr	EXTERIOR		60JJ-PC	1	60 Watt Incandescent Jelly Jar Fixture; Photocell	60	0.060	EX	4380	263		1	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.010	0.606	$ -	4,380	42	221	$17.70	$17.70
261	DGS Capital Complex - 18th & Herr	CARPENTERS SHOP		1V28	3	T8 1x4 1-Lamp Vanity Fixture	25	0.075	W	1827	137		3	R 1L-9LED	Retrofit with (1) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	9	0.027	0.576	$ -	1,827	49	88	$7.02	$7.02
262	DGS Capital Complex - 18th & Herr	CARPENTERS SHOP		2I28-TUR	1	T8 2x4 2-Lamp Industrial Fixture; Turret	48	0.048	W	1827	88		1	N 2I-9LED	New 1x4 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.018	0.360	$ -	1,827	33	55	$4.38	$4.38
263	DGS Capital Complex - 18th & Herr	CARPENTERS SHOP		4I28-1X8	28	T8 1x8 4-Lamp Industrial Fixture	97	2.716	W	1827	4,962		28	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	1.008	20.496	$ -	1,827	1,842	3,121	$249.64	$249.64
264	DGS Capital Complex - 18th & Herr	CARPENTERS SHOP		4VT28-1X8	1	T8 1x8 4-Lamp Vaportight Fixture	97	0.097	W	1827	177		1	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.036	0.732	$ -	1,827	66	111	$8.92	$8.92
265	DGS Capital Complex - 18th & Herr	RESTROOM		4L28	1	T8 2x4 4-Lamp Troffer Fixture	97	0.097	RR	3863	375		1	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.018	0.948	$ -	2,704	49	326	$26.08	$26.08
266	DGS Capital Complex - 18th & Herr	RESTROOM		4L28(L)-CHAIN	1	T8 2x4 4-Lamp Troffer Fixture; Missing Lens; Chain Mount	97	0.097	RR	3863	375		1	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.018	0.948	$ -	3,863	70	305	$24.41	$24.41
267	DGS Capital Complex - 18th & Herr	VESTIBULE		2S28	1	T8 2x4 2-Lamp Strip Fixture	48	0.048	H	3863	185		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	3,863	70	116	$9.27	$9.27
268	DGS Capital Complex - 18th & Herr	BREAK ROOM		2W28(W)	8	T8 2x4 2-Lamp Wrap Fixture; Missing Lens	48	0.384	O	2340	899		8	N 2W-9LED	New 1x4 2-Lamp Wrap Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.144	2.880	$ -	2,340	337	562	$44.93	$44.93
269	DGS Capital Complex - 18th & Herr	BREAK ROOM		2W28(W)	4	T8 2x4 2-Lamp Wrap Fixture; Missing Lens	48	0.192	O	2340	449		4	N 2W-9LED	New 1x4 2-Lamp Wrap Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.072	1.440	$ -	2,340	168	281	$22.46	$22.46
270	DGS Capital Complex - 18th & Herr	MEZZ		4W28(W)	8	T8 2x4 4-Lamp Wrap Fixture; Missing Lens	97	0.776	H	3863	2,998		8	N 4W-9LED	New 1x4 4-Lamp Wrap Fixture with (4) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	36	0.288	5.856	$ -	3,863	1,113	1,885	$150.81	$150.81

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
271	DGS Capital Complex - 18th & Herr	MECHANICS SHOP		4I28-1X8	8	T8 1x8 4-Lamp Industrial Fixture	97	0.776	W	1827	1,418		8	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.288	5.856	$ -	1,827	526	892	$71.33	$71.33
272	DGS Capital Complex - 18th & Herr	MECHANICS SHOP		2I28-TUR	12	T8 2x4 2-Lamp Industrial Fixture; Turret	48	0.576	W	1827	1,052		12	N 2I-9LED	New 1x4 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.216	4.320	$ -	1,827	395	658	$52.62	$52.62
273	DGS Capital Complex - 18th & Herr	STORAGE		2W28(W)	14	T8 2x4 2-Lamp Wrap Fixture; Missing Lens	48	0.672	S	728	489		14	N 2W-9LED	New 1x4 2-Lamp Wrap Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.252	5.040	$ -	728	183	306	$24.46	$24.46
274	DGS Capital Complex - 18th & Herr	SINK		2W28	1	T8 2x4 2-Lamp Wrap Fixture	48	0.048	W	1827	88		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	1,827	33	55	$4.38	$4.38
275	DGS Capital Complex - 18th & Herr	RESTROOM		CF13FAN	1	13 Watt CFL Fan Fixture	13	0.013	RR	3863	50		1	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.005	0.096	$ -	3,863	19	31	$2.47	$2.47
276	DGS Capital Complex - 18th & Herr	EXTERIOR		HPS400CH-PC	3	400 Watt High Pressure Sodium Cobrahead Fixture; Photocell	464	1.392	EX	4380	6,097		3	N RLED240CH-PC	New 240 Watt LED Cobrahead Fixture; Photocell	240	0.720	8.064	$ -	4,380	3,154	2,943	$235.47	$235.47
277	DGS Capital Complex - 18th & Herr	EXTERIOR		HPS70SECWP-PC	1	70 Watt High Pressure Sodium Security Wall Pack Fixture; Photocell	90	0.090	EX	4380	394		1	N RLED25TWP-PC	New 25 Watt LED Tall Wall Pack; Photocell	25	0.025	0.780	$ -	4,380	110	285	$22.78	$22.78
278	DGS Capital Complex - 18th & Herr	LAWN MOWER STORAGE		2I28-1X8	1	T8 2x4 2-lamp Industrial Fixture	97	0.097	S	728	71		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.948	$ -	728	13	58	$4.60	$4.60
279	DGS Capital Complex - 18th & Herr	EXTERIOR		HPS400CH-PC		400 Watt High Pressure Sodium Cobrahead Fixture; Photocell	464	0.000	EX	4380	0		0	N RLED240CH-PC	New 240 Watt LED Cobrahead Fixture; Photocell	240	0.000	0.000	$ -	4,380	0	0	$0.00	$0.00
280	DGS Capital Complex - 18th & Herr	SPRAY BOOTH		4I28-1X8	4	T8 1x8 4-Lamp Industrial Fixture	97	0.388	W	1827	709		4	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.144	2.928	$ -	1,827	263	446	$35.66	$35.66
281	DGS Capital Complex - 18th & Herr	SPRAY BOOTH		2I28	2	T8 2x4 2-Lamp Industrial Fixture	48	0.096	W	1827	175		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	1,827	66	110	$8.77	$8.77
282	DGS Capital Complex - 18th & Herr	SPRAY BOOTH		2EXP34	3	T12 2x4 2-Lamp Explosion Proof Fixture	72	0.216	W	1827	395		3	ZZ DD	No Retrofit	72	0.216	0.000	$ -	1,827	395	0	$0.00	$0.00
283	DGS Capital Complex - 18th & Herr	SPRAY BOOTH		3SPRAY28	3	T8 2x4 3-Lamp Spray Fixture	72	0.216	W	1827	395		3	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	0.081	1.620	$ -	1,827	148	247	$19.73	$19.73
284	DGS Capital Complex - 18th & Herr	SHOP		4I28-1X8	6	T8 1x8 4-Lamp Industrial Fixture	97	0.582	W	1827	1,063		6	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.216	4.392	$ -	1,827	395	669	$53.49	$53.49
285	DGS Capital Complex - 18th & Herr	SHOP		2I28-1X8	3	T8 2x4 2-lamp Industrial Fixture	97	0.291	W	1827	532		3	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.054	2.844	$ -	1,827	99	433	$34.64	$34.64
286	DGS Capital Complex - 18th & Herr	OFFICE		4I28-1X8	4	T8 1x8 4-Lamp Industrial Fixture	97	0.388	O	2340	908		4	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.144	2.928	$ -	2,340	337	571	$45.68	$45.68
287	DGS Capital Complex - 18th & Herr	MEZZ		4I28-1X8	3	T8 1x8 4-Lamp Industrial Fixture	97	0.291	H	3863	1,124		3	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.108	2.196	$ -	3,863	417	707	$56.55	$56.55
288	DGS Capital Complex - 18th & Herr	OFFICE		2L28	7	T8 2x4 2-Lamp Troffer Fixture	48	0.336	O	2340	786		7	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.126	2.520	$ -	2,340	295	491	$39.31	$39.31
289	DGS Capital Complex - 18th & Herr	RESTROOM		2L28	1	T8 2x4 2-Lamp Troffer Fixture	48	0.048	RR	3863	185		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	2,704	49	137	$10.94	$10.94
290	DGS Capital Complex - 18th & Herr	SHOP		2L28	16	T8 2x4 2-Lamp Troffer Fixture	48	0.768	W	1827	1,403		16	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.288	5.760	$ -	1,827	526	877	$70.16	$70.16
291	DGS Capital Complex - 18th & Herr	EXTERIOR		HPS70WP-PC	2	70 Watt High Pressure Sodium Wall Pack Fixture; Photocell	90	0.180	EX	4380	788		2	N RLED24WP-PC	New 24 Watt LED Wall Pack Fixture; Photocell	25	0.050	1.560	$ -	4,380	219	569	$45.55	$45.55
292	DGS Capital Complex - 18th & Herr	EXTERIOR		HPS70FL-PC	1	70 Watt High Pressure Sodium Flood Fixture; Photocell	90	0.090	EX	4380	394		1	N RLED18FL-PC	New 18 Watt LED Flood Fixture; Photocell	23	0.023	0.804	$ -	4,380	101	293	$23.48	$23.48
293	DGS Capital Complex - 18th & Herr	BASEMENT STORAGE		CF18K	4	18 Watt CFL Keyless Fixture	18	0.072	S	728	52		4	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.020	0.624	$ -	728	15	38	$3.03	$3.03
294	DGS Capital Complex - 18th & Herr	BASEMENT STORAGE		60K	3	60 Watt Incandescent Keyless Fixture	60	0.180	S	728	131		3	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.029	1.818	$ -	728	21	110	$8.82	$8.82
295	DGS Capital Complex - 18th & Herr	BASEMENT STORAGE		2W28	1	T8 2x4 2-Lamp Wrap Fixture	48	0.048	S	728	35		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	728	13	22	$1.75	$1.75
296	DGS Capital Complex - 18th & Herr	BOILER ROOM		4B28-1X8	8	T8 1x8 4-Lamp Box Fixture	48	0.384	M	3863	1,483		8	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.288	1.152	$ -	3,863	1,113	371	$29.67	$29.67
297	DGS Capital Complex - 18th & Herr	EXTERIOR		CF23JJ	3	23 Watt CFL Jelly Jar Fixture	23	0.069	EX	4380	302		3	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.015	0.648	$ -	4,380	66	237	$18.92	$18.92
298	DGS Capital Complex - 18th & Herr	EXTERIOR		CF32CPY	2	32 Watt CFL Canopy Fixture	32	0.064	EX	4380	280		2	N RLED10CPY	New 10 Watt LED Canopy Fixture	12	0.024	0.480	$ -	4,380	105	175	$14.02	$14.02
299	DGS Capital Complex - 18th & Herr	EXTERIOR		CF32SECWP	1	32 Watt CFL Security Wall Pack Fixture	32	0.032	EX	4380	140		1	N RLED12WP	New 12 Watt LED Wall Pack Fixture	13	0.013	0.228	$ -	4,380	57	83	$6.66	$6.66
300	DGS Capital Complex - 18th & Herr	EXTERIOR		HPS150SB-PC	2	150 Watt High Pressure Sodium Shoebox Fixture; Photocell	188	0.376	EX	4380	1,647		2	N RLED50SB-PC	New 50 Watt LED Shoebox Fixture; Photocell	51	0.102	3.288	$ -	4,380	447	1,200	$96.01	$96.01

				EXISTING FIXTURES								x	PROPOSED FIXTURE UPGRADE											
ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh		Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
301	DGS Capital Complex - 18th & Herr	EXTERIOR		PL32RNDWP	3	32 Watt Plug-In CFL Round Wall Pack Fixture	32	0.096	EX	4380	420		3	R 1L-8.5LED-PLV	Retrofit with (1) 8.5 Watt LED Plug-In Lamps; Vertical	8.5	0.026	0.846	$ -	4,380	112	309	$24.70	$24.70
302	DGS Capital Complex - 18th & Herr	EXTERIOR		65P38DL6	1	65 Watt Incandescent PAR38 6" Downlight Fixture	65	0.065	EX	4380	285		1	LED 14P38	Re-Lamp with (1) 14 Watt LED PAR38	14	0.014	0.612	$ -	4,380	61	223	$17.87	$17.87
303	DGS Capital Complex - 18th & Herr	EXTERIOR		HPS70WP-PC	4	70 Watt High Pressure Sodium Wall Pack Fixture; Photocell	90	0.360	EX	4380	1,577		4	N RLED24WP-PC	New 24 Watt LED Wall Pack Fixture; Photocell	25	0.100	3.120	$ -	4,380	438	1,139	$91.10	$91.10
304	DGS Capital Complex - 18th & Herr	STORAGE		4L28-PB-AR	8	T8 2x4 4-Lamp Parabolic Troffer Fixture; Air Return	97	0.776	S	728	565		8	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.144	7.584	$ -	728	105	460	$36.81	$36.81
305	DGS Capital Complex - 18th & Herr	EXTERIOR		MH175TEARDEC	10	175 Watt Metal Halide Tear Fixture; Decorative	213	2.130	EX	4380	9,329		10	LED 63COB	Re-Lamp with (1) 63 Watt LED Omni-Cob Lamp; Hardwire Ballast	63	0.630	18.000	$ -	4,380	2,759	6,570	$525.60	$525.60
306	DGS Capital Complex - 18th & Herr	EXTERIOR		HPS400CH-PC	2	400 Watt High Pressure Sodium Cobrahead Fixture; Photocell	464	0.928	EX	4380	4,065		2	N RLED125CH	New 125 Watt LED Cobra Head Fixture	134	0.268	7.920	$ -	4,380	1,174	2,891	$231.26	$231.26
307	DGS Capital Complex - 18th & Herr	EXTERIOR		MH70CPY	2	70 Watt Metal Halide Canopy Fixture	94	0.188	EX	4380	823		2	N RLED20CPY	New 20 Watt LED Canopy Fixture	21	0.042	1.752	$ -	4,380	184	639	$51.16	$51.16
308	DGS Capital Complex - 18th & Herr	SHED		2I34-TUR	3	T12 2x4 2-Lamp Industrial Fixture; Turret	72	0.216	EX	4380	946		3	N 2I-9LED	New 1x4 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.054	1.944	$ -	3,066	166	781	$62.44	$62.44
309	DGS Capital Complex - 18th & Herr	EXTERIOR		MV150DTD-PC	1	150 Watt Mercury Vapor Dusk to Dawn Fixture; Photocell	205	0.205	EX	4380	898		1	N RLED26BY-PC	New 26 Watt LED Dusk to Dawn Barnyard Fixture; Photocell	28	0.028	2.124	$ -	4,380	123	775	$62.02	$82.02
310	DGS Capital Complex - 18th & Herr	PARKING LOT		HPS400CH-PC	4	400 Watt High Pressure Sodium Cobrahead Fixture; Photocell	464	1.856	EX	4380	8,129		4	N RLED125CH	New 125 Watt LED Cobra Head Fixture	134	0.536	15.840	$ -	4,380	2,348	5,782	$462.53	$462.53
311	DGS Capital Complex - 18th & Herr	EXTERIOR		LEDCOBWP-PC	2	LED Cob Wall Pack Fixture; Photocell	40	0.080	EX	4380	350		2	ZZ DD	No Retrofit	40	0.080	0.000	$ -	4,380	350	0	$0.00	$0.00
312	DGS Capital Complex - 18th & Herr	STORAGE		4I28-1X8	5	T8 1x8 4-Lamp Industrial Fixture	97	0.485	S	728	353		5	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.180	3.660	$ -	728	131	222	$17.76	$17.76
313	DGS Capital Complex - 18th & Herr	EXTERIOR		HPS100CPY-PC	3	100 Watt High Pressure Sodium Canopy Fixture; Photocell	125	0.375	EX	4380	1,643		3	N RLED40CPY-PC	New 40 Watt LED Canopy Fixture; Photocell	38	0.114	3.132	$ -	4,380	499	1,143	$91.45	$91.45
314	DGS Capital Complex - 18th & Herr	EXTERIOR		MV150DTD-PC	1	150 Watt Mercury Vapor Dusk to Dawn Fixture; Photocell	205	0.205	EX	4380	898		1	N RLED26BY-PC	New 26 Watt LED Dusk to Dawn Barnyard Fixture; Photocell	28	0.028	2.124	$ -	4,380	123	775	$62.02	$62.02
315	DGS Capital Complex - Finance Building	OPEN OFFICE		2L28	243	T8 2x4 2-Lamp Troffer Fixture	48	11.664	O	2340	27,294		243	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	4.374	87.480	$ -	2,340	10,235	17,059	$1,023.52	$1,023.52
316	DGS Capital Complex - Finance Building	OPEN OFFICE		4W28(W)	31	T8 2x4 4-Lamp Wrap Fixture; Missing Lens	97	3.007	O	2340	7,036		31	N 4W-9LED	New 1x4 4-Lamp Wrap Fixture with (4) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	36	1.116	22.692	$ -	2,340	2,611	4,425	$265.50	$265.50
317	DGS Capital Complex - Finance Building	OPEN OFFICE		2W28	12	T8 2x4 2-Lamp Wrap Fixture	48	0.576	O	2340	1,348		12	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.216	4.320	$ -	2,340	505	842	$50.54	$50.54
318	DGS Capital Complex - Finance Building	OPEN OFFICE		4W28-PEND	19	T8 2x4 4-Lamp Wrap Fixture; Pendant Mount	97	1.843	O	2340	4,313		19	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.684	13.908	$ -	2,340	1,601	2,712	$162.72	$162.72
319	DGS Capital Complex - Finance Building	PRIVATE OFFICE		2L28	124	T8 2x4 2-Lamp Troffer Fixture	48	5.952	O	2340	13,928		124	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	2.232	44.640	$ -	2,340	5,223	8,705	$522.29	$522.29
320	DGS Capital Complex - Finance Building	CONFERENCE/MEETNG		2L28	9	T8 2x4 2-Lamp Troffer Fixture	48	0.432	CF	2088	902		9	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.162	3.240	$ -	2,088	338	564	$33.83	$33.83
321	DGS Capital Complex - Finance Building	RESTROOM		1S54-T5	52	T5HO 1x4 1-Lamp Strip Fixture	62	3.224	RR	3863	12,454		52	R 1L-25LEDT5HO-4'	Retrofit with (1) 25 Watt LED T5HO 4' Lamp; Direct Wire to Socket	25	1.300	23.088	$ -	3,863	5,022	7,432	$445.94	$445.94
322	DGS Capital Complex - Finance Building	RESTROOM		2PL26DL8H	12	26 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	52	0.624	RR	3863	2,411		12	N GLED18DL8	Retrofit with (1) 18 Watt 8" LED Downlight	18	0.216	4.896	$ -	3,863	834	1,576	$94.57	$94.57
323	DGS Capital Complex - Finance Building	HALLS		2B28	39	T8 2x4 2-Lamp Box Fixture	48	1.872	H	3863	7,232		39	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.702	14.040	$ -	3,863	2,712	4,520	$271.18	$271.18
324	DGS Capital Complex - Finance Building	HALLS		2W28	8	T8 2x4 2-Lamp Wrap Fixture	48	0.384	H	3863	1,483		8	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.144	2.880	$ -	3,863	556	927	$55.63	$55.63
325	DGS Capital Complex - Finance Building	OPEN OFFICE		2L28	243	T8 2x4 2-Lamp Troffer Fixture	48	11.664	O	2340	27,294		243	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	4.374	87.480	$ -	2,340	10,235	17,059	$1,023.52	$1,023.52
326	DGS Capital Complex - Finance Building	OPEN OFFICE		4W28(W)	31	T8 2x4 4-Lamp Wrap Fixture; Missing Lens	97	3.007	O	2340	7,036		31	N 4W-9LED	New 1x4 4-Lamp Wrap Fixture with (4) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	36	1.116	22.692	$ -	2,340	2,611	4,425	$265.50	$265.50
327	DGS Capital Complex - Finance Building	OPEN OFFICE		2W28	12	T8 2x4 2-Lamp Wrap Fixture	48	0.576	O	2340	1,348		12	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.216	4.320	$ -	2,340	505	842	$50.54	$50.54
328	DGS Capital Complex - Finance Building	OPEN OFFICE		4W28-PEND	19	T8 2x4 4-Lamp Wrap Fixture; Pendant Mount	97	1.843	O	2340	4,313		19	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.684	13.908	$ -	2,340	1,601	2,712	$162.72	$162.72
329	DGS Capital Complex - Finance Building	PRIVATE OFFICE		2L28	124	T8 2x4 2-Lamp Troffer Fixture	48	5.952	O	2340	13,928		124	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	2.232	44.640	$ -	2,340	5,223	8,705	$522.29	$522.29
330	DGS Capital Complex - Finance Building	CONFERENCE/MEETNG		2L28	9	T8 2x4 2-Lamp Troffer Fixture	48	0.432	CF	2088	902		9	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.162	3.240	$ -	2,088	338	564	$33.83	$33.83

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
331	DGS Capital Complex - Finance Building	RESTROOM		1S54-T5	52	T5HO 1x4 1-Lamp Strip Fixture	62	3.224	RR	3863	12,454		52	R 1L-25LEDT5HO-4'	Retrofit with (1) 25 Watt LED T5HO 4' Lamp; Direct Wire to Socket	25	1.300	23.088	$ -	3,863	5,022	7,432	$445.94	$445.94
332	DGS Capital Complex - Finance Building	RESTROOM		2PL26DL8H	12	26 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	52	0.624	RR	3863	2,411		12	N GLED18DL8	Retrofit with (1) 18 Watt 8" LED Downlight	18	0.216	4.896	$ -	3,863	834	1,576	$94.57	$94.57
333	DGS Capital Complex - Finance Building	HALLS		2B28	39	T8 2x4 2-Lamp Box Fixture	48	1.872	H	3863	7,232		39	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.702	14.040	$ -	3,863	2,712	4,520	$271.18	$271.18
334	DGS Capital Complex - Finance Building	HALLS		2W28	8	T8 2x4 2-Lamp Wrap Fixture	48	0.384	H	3863	1,483		8	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.144	2.880	$ -	3,863	556	927	$55.63	$55.63
335	DGS Capital Complex - Finance Building	RESTROOM		1S54-T5	52	T5HO 1x4 1-Lamp Strip Fixture	62	3.224	RR	3863	12,454		52	R 1L-25LEDT5HO-4'	Retrofit with (1) 25 Watt LED T5HO 4' Lamp; Direct Wire to Socket	25	1.300	23.088	$ -	3,863	5,022	7,432	$445.94	$445.94
336	DGS Capital Complex - Finance Building	RESTROOM		2PL26DL8H	12	26 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	52	0.624	RR	3863	2,411		12	N GLED18DL8	Retrofit with (1) 18 Watt 8" LED Downlight	18	0.216	4.896	$ -	3,863	834	1,576	$94.57	$94.57
337	DGS Capital Complex - Finance Building	OFFICE		2W17	1	T8 2x2 2-Lamp Wrap Fixture	36	0.036	O	2340	84		1	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.014	0.264	$ -	2,340	33	51	$3.09	$3.09
338	DGS Capital Complex - Finance Building	OFFICE		CF13DEC-CM	9	13 Watt CFL Decorative Fixture; Ceiling Mount	13	0.117	O	2340	274		9	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.045	0.864	$ -	2,340	105	168	$10.11	$10.11
339	DGS Capital Complex - Finance Building	OFFICE		DEC3-40A15	3	40 Watt Incandescent A15 3-Lamp Decorative Fixture	120	0.360	O	2340	842		3	LED 3-16A	Re-Lamp with (3) 16 Watt LED A21	46.5	0.140	2.646	$ -	2,340	326	516	$30.96	$30.96
340	DGS Capital Complex - Finance Building	OFFICE		DEC3-40A15-CHAND	4	40 Watt Incandescent A15 3-Lamp Decorative Chandelier Fixture	120	0.480	O	2340	1,123		4	LED 3-16A	Re-Lamp with (3) 16 Watt LED A21	46.5	0.186	3.528	$ -	2,340	435	688	$41.28	$41.28
341	DGS Capital Complex - Finance Building	RESTROOM		DEC60DL	1	60 Watt Incandescent Decorative Downlight Fixture	60	0.060	RR	3863	232		1	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.010	0.606	$ -	3,863	37	195	$11.70	$11.70
342	DGS Capital Complex - Finance Building	OFFICE		3CF13DECCHAND	4	13 Watt CFL 3-Lamp Decorative Chandelier Fixture	39	0.156	O	2340	365		4	LED 3-5A	Re-Lamp with (3) 5 Watt LED A19	15	0.060	1.152	$ -	2,340	140	225	$13.48	$13.48
343	DGS Capital Complex - Finance Building	OFFICE		40A15COVE	248	40 Watt Incandescent A15 Cove Fixture	40	9.920	O	2340	23,213		248	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	2.356	90.768	$ -	2,340	5,513	17,700	$1,061.99	$1,061.99
344	DGS Capital Complex - Finance Building	CONFERENCE		4DID28-PEND-1X8	3	T8 1x8 4-Lamp Direct Indirect Fixture; Pendant Mount	97	0.291	CF	2088	608		3	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.108	2.196	$ -	2,088	226	382	$22.93	$22.93
345	DGS Capital Complex - Finance Building	OPEN OFFICE		3CF13DECCHAND	3	13 Watt CFL 3-Lamp Decorative Chandelier Fixture	39	0.117	O	2340	274		3	LED 3-5A	Re-Lamp with (3) 5 Watt LED A19	15	0.045	0.864	$ -	2,340	105	168	$10.11	$10.11
346	DGS Capital Complex - Finance Building	OPEN OFFICE		2L28	176	T8 2x4 2-Lamp Troffer Fixture	48	8.448	O	2340	19,768		176	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	3.168	63.360	$ -	2,340	7,413	12,355	$741.31	$741.31
347	DGS Capital Complex - Finance Building	OPEN OFFICE		2L28PB-1X4	60	T8 1x4 2-Lamp Parabolic Troffer Fixture	48	2.880	O	2340	6,739		60	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	1.080	21.600	$ -	2,340	2,527	4,212	$252.72	$252.72
348	DGS Capital Complex - Finance Building	OPEN OFFICE		4W28	2	T8 2x4 4-Lamp Wrap Fixture	97	0.194	O	2340	454		2	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.072	1.464	$ -	2,340	168	285	$17.13	$17.13
349	DGS Capital Complex - Finance Building	OPEN OFFICE		2PL26DL8H	24	26 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	52	1.248	O	2340	2,920		24	N GLED18DL8	Retrofit with (1) 18 Watt 8" LED Downlight	18	0.432	9.792	$ -	2,340	1,011	1,909	$114.57	$114.57
350	DGS Capital Complex - Finance Building	OPEN OFFICE		4PL32DECCHAND	12	32 Watt Plug-In CFL 4-Lamp Decorative Chandelier Fixture	128	1.536	O	2340	3,594		12	R 4L-8.5LED-PLV	Retrofit with (4) 8.5 Watt LED Plug-In Lamps; Vertical	17	0.204	15.984	$ -	2,340	477	3,117	$187.01	$187.01
351	DGS Capital Complex - Finance Building	OPEN OFFICE		75P38DL8-NW	8	75 Watt Incandescent PAR38 8" Downlight Fixture; Not Working	75	0.600	O	2340	1,404		8	ZZ DD	No Retrofit	75	0.600	0.000	$ -	2,340	1,404	0	$0.00	$0.00
352	DGS Capital Complex - Finance Building	OPEN OFFICE		1S34	6	T12 1x4 1-Lamp Strip Fixture	43	0.258	O	2340	604		6	R 1L-9LED	Retrofit with (1) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	9	0.054	2.448	$ -	2,340	126	477	$28.64	$28.64
353	DGS Capital Complex - Finance Building	OPEN OFFICE		60DL6-DIM	3	60 Watt Incandescent 6" Downlight Fixture; Dimming	60	0.180	O	2340	421		3	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.029	1.818	$ -	2,340	67	355	$21.27	$21.27
354	DGS Capital Complex - Finance Building	OPEN OFFICE		60DL6-DIM-EYE	3	60 Watt Incandescent 6" Downlight Fixture; Dimming; Eye	60	0.180	O	2340	421		3	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.029	1.818	$ -	2,340	67	355	$21.27	$21.27
355	DGS Capital Complex - Finance Building	OPEN OFFICE		2PL13DL8	2	13 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture	26	0.052	O	2340	122		2	N GLED14DL8	Retrofit with (1) 14 Watt 8" LED Downlight	14	0.028	0.288	$ -	2,340	66	56	$3.37	$3.37
356	DGS Capital Complex - Finance Building	OPEN OFFICE		2L17-AR	4	T8 2x2 2-Lamp Troffer Fixture	45	0.180	O	2340	421		4	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.056	1.488	$ -	2,340	131	290	$17.41	$17.41
357	DGS Capital Complex - Finance Building	OPEN OFFICE		8B28-DA	21	T8 2x4 8-Lamp Box Fixture; Difficult Access	200	4.200	O	2340	9,828		21	R 8L-9LED-DA	Retrofit with (8) 9 Watt LED T8 4' Lamps; Direct Wire to Socket; Difficult Access	72	1.512	32.256	$ -	2,340	3,538	6,290	$377.40	$377.40
358	DGS Capital Complex - Finance Building	CLOSET		2W28	1	T8 2x4 2-Lamp Wrap Fixture	48	0.048	S	728	35		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	728	13	22	$1.31	$1.31
359	DGS Capital Complex - Finance Building	HALL		8B28-DA	24	T8 2x4 8-Lamp Box Fixture; Difficult Access	200	4.800	H	3863	18,542		24	R 8L-9LED-DA	Retrofit with (8) 9 Watt LED T8 4' Lamps; Direct Wire to Socket; Difficult Access	72	1.728	36.864	$ -	3,863	6,675	11,867	$712.03	$712.03
360	DGS Capital Complex - Finance Building	HALL		2B28	2	T8 2x4 2-Lamp Box Fixture	48	0.096	H	3863	371		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	3,863	139	232	$13.91	$13.91

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
361	DGS Capital Complex - Finance Building	HALL		CF13DECSC-BRASS	2	13 Watt CFL Decorative Sconce Fixture; Brass	13	0.026	H	3863	100		2	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.010	0.192	$ -	3,863	39	62	$3.71	$3.71
362	DGS Capital Complex - Finance Building	CONFERENCE		65BR40DL6-DIM	6	65 Watt Incandescent BR40 6" Downlight Fixture; Dimming	60	0.360	CF	2088	752		6	LED 11BR40	Re-Lamp with (1) 11 Watt LED BR40	11.5	0.069	3.492	$ -	2,088	144	608	$36.46	$36.46
363	DGS Capital Complex - Finance Building	CONFERENCE		2L28	5	T8 2x4 2-Lamp Troffer Fixture	48	0.240	CF	2088	501		5	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.090	1.800	$ -	2,088	188	313	$18.79	$18.79
364	DGS Capital Complex - Finance Building	CONFERENCE		CF13DECSC-BRASS	2	13 Watt CFL Decorative Sconce Fixture; Brass	13	0.026	CF	2088	54		2	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.010	0.192	$ -	2,088	21	33	$2.00	$2.00
365	DGS Capital Complex - Finance Building	CONFERENCE		CF23BR40DECDL	7	23 Watt CFL BR40 Deorative Downlight Fixture	23	0.161	CF	2088	336		7	LED 11BR40	Re-Lamp with (1) 11 Watt LED BR40	11.5	0.081	0.966	$ -	2,088	168	168	$10.09	$10.09
366	DGS Capital Complex - Finance Building	OPEN OFFICE		CF13DECCHAND	11	13 Watt CFL Decorative Chandelier Fixture	13	0.143	O	2340	335		11	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.055	1.056	$ -	2,340	129	206	$12.36	$12.36
367	DGS Capital Complex - Finance Building	OPEN OFFICE		2W28	3	T8 2x4 2-Lamp Wrap Fixture	48	0.144	O	2340	337		3	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.054	1.080	$ -	2,340	126	211	$12.64	$12.64
368	DGS Capital Complex - Finance Building	OPEN OFFICE		2L24-T5	16	T5 2x4 2-Lamp Troffer Fixture	54	0.864	O	2340	2,022		16	R 2L-13LEDT5-4'	Retrofit with (2) 13 Watt LED T5HE 4' Lamps; Direct Wire to Socket	26	0.416	5.376	$ -	2,340	973	1,048	$62.90	$62.90
369	DGS Capital Complex - Finance Building	OPEN OFFICE		2S28	16	T8 2x4 2-Lamp Strip Fixture	48	0.768	O	2340	1,797		16	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.288	5.760	$ -	2,340	674	1,123	$67.39	$67.39
370	DGS Capital Complex - Finance Building	OPEN OFFICE		2L28	12	T8 2x4 2-Lamp Troffer Fixture	48	0.576	O	2340	1,348		12	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.216	4.320	$ -	2,340	505	842	$50.54	$50.54
371	DGS Capital Complex - Finance Building	OPEN OFFICE		2W28-PEND	12	T8 2x4 2-Lamp Wrap Fixture; Pendant Mount	48	0.576	O	2340	1,348		12	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.216	4.320	$ -	2,340	505	842	$50.54	$50.54
372	DGS Capital Complex - Finance Building	OPEN OFFICE		4WW28-PEND	40	T8 2x4 4-Lamp Wide Wrap Fixture; Pendant Mount	97	3.880	O	2340	9,079		40	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	1.440	29.280	$ -	2,340	3,370	5,710	$342.58	$342.58
373	DGS Capital Complex - Finance Building	OPEN OFFICE		CF23SQDL-DEC	2	23 Watt CFL Square Downlight Fixture; Decorative	23	0.046	O	2340	108		2	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.019	0.324	$ -	2,340	44	63	$3.79	$3.79
374	DGS Capital Complex - Finance Building	ELECTRICAL		2I28-TUR	2	T8 2x4 2-Lamp Industrial Fixture; Turret	48	0.096	M	3863	371		2	N 2I-9LED	New 1x4 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.036	0.720	$ -	3,863	139	232	$13.91	$13.91
375	DGS Capital Complex - Finance Building	LOBBY		3S25-DEC	6	T8 1x3 3-Lamp Strip Fixture; Decorative	63	0.378	H	3863	1,460		6	R 3L-12LED3'	Retrofit with (3) 12 Watt LED T8 3' Lamps; Direct Wire to Socket	36	0.216	1.944	$ -	3,863	834	626	$37.55	$37.55
376	DGS Capital Complex - Finance Building	LOBBY		LEDCOBDEC-2X2	12	LED 2x2 Cob Decorative Fixture	40	0.480	H	3863	1,854		12	ZZ DD	No Retrofit	40	0.480	0.000	$ -	3,863	1,854	0	$0.00	$0.00
377	DGS Capital Complex - Finance Building	LOBBY		5CF13DECSC-BRASS	14	13 Watt CFL 5-Lamp Decorative Sconce Fixture; Brass	65	0.910	H	3863	3,515		14	LED 5-5A	Re-Lamp with (5) 5 Watt LED A19	25	0.350	6.720	$ -	3,863	1,352	2,163	$129.80	$129.80
378	DGS Capital Complex - Finance Building	LOBBY		LEDCOBDEC-POLE	2	LED Cob Decorative Pole Fixture	40	0.080	H	3863	309		2	ZZ DD	No Retrofit	40	0.080	0.000	$ -	3,863	309	0	$0.00	$0.00
379	DGS Capital Complex - Finance Building	OFFICE		2W28	18	T8 2x4 2-Lamp Wrap Fixture	48	0.864	O	2340	2,022		18	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.324	6.480	$ -	2,340	758	1,264	$75.82	$75.82
380	DGS Capital Complex - Finance Building	STORAGE/VACANT		2W28	47	T8 2x4 2-Lamp Wrap Fixture	48	2.256	S	728	1,642		47	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.846	16.920	$ -	728	616	1,026	$61.59	$61.59
381	DGS Capital Complex - Finance Building	OFFICE		2W28	13	T8 2x4 2-Lamp Wrap Fixture	48	0.624	O	2340	1,460		13	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.234	4.680	$ -	2,340	548	913	$54.76	$54.76
382	DGS Capital Complex - Finance Building	WAREHOUSE		2S28	48	T8 2x4 2-Lamp Strip Fixture	48	2.304	W	1827	4,209		48	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.864	17.280	$ -	1,827	1,579	2,631	$157.85	$157.85
383	DGS Capital Complex - Finance Building	WAREHOUSE		CF23K	8	23 Watt CFL Keyless Fixture	23	0.184	W	1827	336		8	LED 5A	Re-Lamp with (1) 5 Watt LED A19	5	0.040	1.728	$ -	1,827	73	263	$15.79	$15.79
384	DGS Capital Complex - Finance Building	WAREHOUSE		2W28	24	T8 2x4 2-Lamp Wrap Fixture	48	1.152	W	1827	2,105		24	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.432	8.640	$ -	1,827	789	1,315	$78.93	$78.93
385	DGS Capital Complex - Finance Building	MECHANICAL		2W28	11	T8 2x4 2-Lamp Wrap Fixture	48	0.528	M	3863	2,040		11	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.198	3.960	$ -	3,863	765	1,275	$76.49	$76.49
386	DGS Capital Complex - Finance Building	MECHANICAL		2L28-CM	6	T8 2x4 2-Lamp Troffer Fixture; Ceiling Mount	48	0.288	M	3863	1,113		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	3,863	417	695	$41.72	$41.72
387	DGS Capital Complex - Finance Building	MECHANICAL		2VT28-1X8	4	T8 1x8 2-Lamp Vaportight Fixture	48	0.192	M	3863	742		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	3,863	278	464	$27.81	$27.81
388	DGS Capital Complex - Finance Building	MECHANICAL		1VT28	3	T8 1x4 1-Lamp Vaportight Fixture	25	0.075	M	3863	290		3	R 1L-9LED	Retrofit with (1) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	9	0.027	0.576	$ -	3,863	104	185	$11.13	$11.13
389	DGS Capital Complex - Finance Building	GARAGE		MH175LB	4	175 Watt Metal Halide Low Bay Fixture	213	0.852	EX	4380	3,732		4	N RLED95HB	New 95 Watt LED High Bay Fixture	93	0.372	5.760	$ -	4,380	1,629	2,102	$126.14	$126.14
390	DGS Capital Complex - Finance Building	HALL		4W28	5	T8 2x4 4-Lamp Wrap Fixture	97	0.485	H	3863	1,874		5	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.180	3.660	$ -	3,863	695	1,178	$70.69	$70.69

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
391	DGS Capital Complex - Finance Building	HALL		2B28	6	T8 2x4 2-Lamp Box Fixture	48	0.288	H	3863	1,113		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	3,863	417	695	$41.72	$41.72
392	DGS Capital Complex - Finance Building	HALL		2L28	10	T8 2x4 2-Lamp Troffer Fixture	48	0.480	H	3863	1,854		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.600	$ -	3,863	695	1,159	$69.53	$69.53
393	DGS Capital Complex - Finance Building	HALL		4L28	12	T8 2x4 4-Lamp Troffer Fixture	97	1.164	H	3863	4,497		12	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.216	11.376	$ -	3,863	834	3,662	$219.73	$219.73
394	DGS Capital Complex - Finance Building	HALL		4B28-1X8	11	T8 1x8 4-Lamp Box Fixture	48	0.528	H	3863	2,040		11	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.396	1.584	$ -	3,863	1,530	510	$30.59	$30.59
395	DGS Capital Complex - Finance Building	HALL		2PL26DL8H	7	26 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	52	0.364	H	3863	1,406		7	N GLED18DL8	Retrofit with (1) 18 Watt 8" LED Downlight	18	0.126	2.856	$ -	3,863	487	919	$55.16	$55.16
396	DGS Capital Complex - Finance Building	HALL		2W28	1	T8 2x4 2-Lamp Wrap Fixture	48	0.048	H	3863	185		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.360	$ -	3,863	70	116	$6.95	$6.95
397	DGS Capital Complex - Finance Building	HALL		2I28-TUR	5	T8 2x4 2-Lamp Industrial Fixture; Turret	48	0.240	H	3863	927		5	N 2I-9LED	New 1x4 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.090	1.800	$ -	3,863	348	579	$34.77	$34.77
398	DGS Capital Complex - Finance Building	HALL		2WLED	3	2-Lamp LED Wrap Fixture	14	0.042	H	3863	162		3	ZZ DD	No Retrofit	14	0.042	0.000	$ -	3,863	162	0	$0.00	$0.00
399	DGS Capital Complex - Finance Building	RESTROOM		1S54-T5	26	T5HO 1x4 1-Lamp Strip Fixture	62	1.612	RR	3863	6,227		26	R 1L-25LEDT5HO-4'	Retrofit with (1) 25 Watt LED T5HO 4' Lamp; Direct Wire to Socket	25	0.650	11.544	$ -	3,863	2,511	3,716	$222.97	$222.97
400	DGS Capital Complex - Finance Building	RESTROOM		2PL26DL8H	6	26 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	52	0.312	RR	3863	1,205		6	N GLED18DL8	Retrofit with (1) 18 Watt 8" LED Downlight	18	0.108	2.448	$ -	3,863	417	788	$47.28	$47.28
401	DGS Capital Complex - Finance Building	OFFICE		2L28	72	T8 2x4 2-Lamp Troffer Fixture	48	3.456	O	2340	8,087		72	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	1.296	25.920	$ -	2,340	3,033	5,054	$303.26	$303.26
402	DGS Capital Complex - Finance Building	STORAGE		4i28-1X8	10	T8 1x8 4-Lamp Industrial Fixture	97	0.970	S	728	706		10	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.360	7.320	$ -	728	262	444	$26.64	$26.64
403	DGS Capital Complex - Finance Building	STORAGE		2I28	5	T8 2x4 2-Lamp Industrial Fixture	48	0.240	S	728	175		5	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.090	1.800	$ -	728	66	109	$6.55	$6.55
404	DGS Capital Complex - Finance Building	PENTHOUSE		2I28-TUR	46	T8 2x4 2-Lamp Industrial Fixture; Turret	48	2.208	O	2340	5,167		46	N 2I-9LED	New 1x4 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.828	16.560	$ -	2,340	1,938	3,229	$193.75	$193.75
405	DGS Capital Complex - Finance Building	HALL		2B28	31	T8 2x4 2-Lamp Box Fixture	48	1.488	H	3863	5,748		31	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.558	11.160	$ -	3,863	2,156	3,593	$215.56	$215.56
406	DGS Capital Complex - Finance Building	LOUNGE		2L28	20	T8 2x4 2-Lamp Troffer Fixture	48	0.960	Z	8760	8,410		20	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.360	7.200	$ -	6,132	2,208	6,202	$372.12	$372.12
407	DGS Capital Complex - Finance Building	RESTROOM		1S54-T5	26	T5HO 1x4 1-Lamp Strip Fixture	62	1.612	RR	3863	6,227		26	R 1L-25LEDT5HO-4'	Retrofit with (1) 25 Watt LED T5HO 4' Lamp; Direct Wire to Socket	25	0.650	11.544	$ -	3,863	2,511	3,716	$222.97	$222.97
408	DGS Capital Complex - Finance Building	RESTROOM		2PL26DL8H	2	26 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	52	0.104	RR	3863	402		2	N GLED18DL8	Retrofit with (1) 18 Watt 8" LED Downlight	18	0.036	0.816	$ -	3,863	139	263	$15.76	$15.76
409	DGS Capital Complex - Finance Building	OFFICE		2L28	184	T8 2x4 2-Lamp Troffer Fixture	48	8.832	O	2340	20,667		184	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	3.312	66.240	$ -	2,340	7,750	12,917	$775.01	$775.01
410	DGS Capital Complex - Finance Building	OFFICE		2B28	2	T8 2x4 2-Lamp Box Fixture	48	0.096	O	2340	225		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	2,340	84	140	$8.42	$8.42
411	DGS Capital Complex - Finance Building	OFFICE		2TUB28-PEND	42	T8 2x4 2-Lamp Tube Fixture; Pendant Mount	48	2.016	O	2340	4,717		42	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.756	15.120	$ -	2,340	1,769	2,948	$176.90	$176.90
412	DGS Capital Complex - Finance Building	OFFICE		4TUB28-1X8-PEND	15	T8 1x8 4-Lamp Tube Fixture; Pendant Mount	97	1.455	O	2340	3,405		15	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.540	10.980	$ -	2,340	1,264	2,141	$128.47	$128.47
413	DGS Capital Complex - Finance Building	OFFICE		6TUB28-1X8-PEND	25	T8 1x8 6-Lamp Tube Fixture; Pendant Mount	150	3.750	O	2340	8,775		25	R 6L-9LED	Retrofit with (6) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	54	1.350	28.800	$ -	2,340	3,159	5,616	$336.96	$336.96
414	DGS Capital Complex - Finance Building	OFFICE		CF13BR30DL6	6	13 Watt CFL BR30 6" Downlight Fixture	13	0.078	O	2340	183		6	LED 8BR30	Re-Lamp with (1) 8 Watt LED BR30	8	0.048	0.360	$ -	2,340	112	70	$4.21	$4.21
415	DGS Capital Complex - Finance Building	OFFICE		4TUBUP28	1	T8 2x4 4-Lamp Tube Up-Light Fixture	97	0.097	O	2340	227		1	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.036	0.732	$ -	2,340	84	143	$8.56	$8.56
416	DGS Capital Complex - Finance Building	OFFICE		2W28	2	T8 2x4 2-Lamp Wrap Fixture	48	0.096	O	2340	225		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	2,340	84	140	$8.42	$8.42
417	DGS Capital Complex - Finance Building	OFFICE		10-40CANDLE-65BR30CHAND	1	40 Watt Incandescent 10-Lamp Candelabra + 65 Watt Incandescent BR30 Chandelier Fixture	400	0.400	O	2340	936		1	R 10LED-5C + 1LED-8BR30	Re-Lamp with (10) 5 Watt LED Candelabra Lamps and (1) 8 Watt BR30 Lamp	58	0.058	4.104	$ -	2,340	136	800	$48.02	$48.02
418	DGS Capital Complex - Finance Building	OFFICE		4W28	1	T8 2x4 4-Lamp Wrap Fixture	97	0.097	O	2340	227		1	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.036	0.732	$ -	2,340	84	143	$8.56	$8.56
419	DGS Capital Complex - Finance Building	OFFICE		3L14-T5	25	T5 2x2 3-Lamp Troffer Fixture	42	1.050	O	2340	2,457		25	R 3L-9LEDT5-2'	Retrofit with (3) 9 Watt LED T5HE 2' Lamps; Direct Wire to Socket	27	0.675	4.500	$ -	2,340	1,580	878	$52.65	$52.65
420	DGS Capital Complex - Finance Building	OFFICE		4B28-SHALLOW	39	T8 2x4 4-Lamp Box Fixture; Shallow	97	3.783	O	2340	8,852		39	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	1.404	28.548	$ -	2,340	3,285	5,567	$334.01	$334.01

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
421	DGS Capital Complex - Finance Building	OFFICE		2B28-1X4	6	T8 1x4 2-Lamp Box Fixture	48	0.288	O	2340	674		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	2,340	253	421	$25.27	$25.27
422	DGS Capital Complex - Finance Building	OFFICE		2L28	418	T8 2x4 2-Lamp Troffer Fixture	48	20.064	O	2340	46,950		418	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	7.524	150.480	$ -	2,340	17,606	29,344	$1,760.62	$1,760.62
423	DGS Capital Complex - Finance Building	OFFICE		CF23SQDL-DEC	3	23 Watt CFL Square Downlight Fixture; Decorative	23	0.069	O	2340	161		3	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.029	0.486	$ -	2,340	67	95	$5.69	$5.69
424	DGS Capital Complex - Finance Building	OFFICE		2W28	2	T8 2x4 2-Lamp Wrap Fixture	48	0.096	O	2340	225		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	2,340	84	140	$8.42	$8.42
425	DGS Capital Complex - Finance Building	OFFICE		8B28-4X4	3	T8 4x4 8-Lamp Box Fixture	200	0.600	O	2340	1,404		3	R 8L-9LED	Retrofit with (8) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	72	0.216	4.608	$ -	2,340	505	899	$53.91	$53.91
426	DGS Capital Complex - Finance Building	OFFICE		2L17-AR	9	T8 2x2 2-Lamp Troffer Fixture	45	0.405	O	2340	948		9	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.126	3.348	$ -	2,340	295	653	$39.17	$39.17
427	DGS Capital Complex - Finance Building	CONFERENCE		2L28	21	T8 2x4 2-Lamp Troffer Fixture	48	1.008	CF	2088	2,105		21	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.378	7.560	$ -	2,088	789	1,315	$78.93	$78.93
428	DGS Capital Complex - Finance Building	CONFERENCE		4L34	6	T12 2x4 4-Lamp Troffer Fixture	144	0.864	CF	2088	1,804		6	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.108	9.072	$ -	2,088	226	1,579	$94.71	$94.71
429	DGS Capital Complex - Finance Building	ELECTRICAL		2I28-TUR	2	T8 2x4 2-Lamp Industrial Fixture; Turret	48	0.096	M	3863	371		2	N 2I-9LED	New 1x4 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.036	0.720	$ -	3,863	139	232	$13.91	$13.91
430	DGS Capital Complex - Finance Building	RESTROOM		1S54-T5	26	T5HO 1x4 1-Lamp Strip Fixture	62	1.612	RR	3863	6,227		26	R 1L-25LEDT5HO-4'	Retrofit with (1) 25 Watt LED T5HO 4' Lamp; Direct Wire to Socket	25	0.650	11.544	$ -	3,863	2,511	3,716	$222.97	$222.97
431	DGS Capital Complex - Finance Building	RESTROOM		2PL26DL8H	2	26 Watt Plug-In CFL 2-Lamp 8" Downlight Fixture; Horizontal	52	0.104	RR	3863	402		2	N GLED18DL8	Retrofit with (1) 18 Watt 8" LED Downlight	18	0.036	0.816	$ -	3,863	139	263	$15.76	$15.76
432	DGS Capital Complex - Finance Building	JANITOR		PL26JJ	6	26 Watt Plug-In CFL Jelly Jar Fixture	26	0.156	JC	728	114		6	R 1L-8.5LED-PLV	Retrofit with (1) 8.5 Watt LED Plug-In Lamps; Vertical	8.5	0.051	1.260	$ -	728	37	76	$4.59	$4.59
433	DGS Capital Complex - Finance Building	JANITOR		2CF13DL(DL)	26	13 Watt CFL 2-Lamp Downlight Fixture; Missing Lens	26	0.676	JC	728	492		26	N GLED14DL8	Retrofit with (1) 14 Watt 8" LED Downlight	14	0.364	3.744	$ -	728	265	227	$13.63	$13.63
434	DGS Capital Complex - Finance Building	HALL		2W28	6	T8 2x4 2-Lamp Wrap Fixture	48	0.288	H	3863	1,113		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	3,863	417	695	$41.72	$41.72
435	DGS Capital Complex - Finance Building	HALL		4W28	31	T8 2x4 4-Lamp Wrap Fixture	97	3.007	H	3863	11,616		31	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	1.116	22.692	$ -	3,863	4,311	7,305	$438.30	$438.30
436	DGS Capital Complex - Finance Building	OFFICE		2W28	124	T8 2x4 2-Lamp Wrap Fixture	48	5.952	O	2340	13,928		124	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	2.232	44.640	$ -	2,340	5,223	8,705	$522.29	$522.29
437	DGS Capital Complex - Finance Building	OFFICE		2WLED	38	2-Lamp LED Wrap Fixture	14	0.532	O	2340	1,245		38	ZZ DD	No Retrofit	14	0.532	0.000	$ -	2,340	1,245	0	$0.00	$0.00
438	DGS Capital Complex - Finance Building	OFFICE		8B28-4X4	1	T8 4x4 8-Lamp Box Fixture	200	0.200	O	2340	468		1	R 8L-9LED	Retrofit with (8) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	72	0.072	1.536	$ -	2,340	168	300	$17.97	$17.97
439	DGS Capital Complex - Finance Building	OFFICE		8B34-4X4	1	T12 4x4 8-Lamp Box Fixture	344	0.344	O	2340	805		1	R 8L-9LED	Retrofit with (8) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	72	0.072	3.264	$ -	2,340	168	636	$38.19	$38.19
440	DGS Capital Complex - Finance Building	OFFICE		2L28	4	T8 2x4 2-Lamp Troffer Fixture	48	0.192	O	2340	449		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	2,340	168	281	$16.85	$16.85
441	DGS Capital Complex - Finance Building	MEZZ TIER		CF23DR	52	23 Watt CFL Drum Fixture	23	1.196	H	3863	4,620		52	ZZ DD	No Retrofit	23	1.196	0.000	$ -	3,863	4,620	0	$0.00	$0.00
442	DGS Capital Complex - Finance Building	MEZZ TIER		2W28	2	T8 2x4 2-Lamp Wrap Fixture	48	0.096	H	3863	371		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	0.720	$ -	3,863	139	232	$13.91	$13.91
443	DGS Capital Complex - Finance Building	MEZZ TIER		4W28	28	T8 2x4 4-Lamp Wrap Fixture	97	2.716	H	3863	10,492		28	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	1.008	20.496	$ -	3,863	3,894	6,598	$395.88	$395.88
444	DGS Capital Complex - Finance Building	EXTERIOR		LEDWP	7	LED Wall Pack Fixture	40	0.280	EX	4380	1,226		7	ZZ DD	No Retrofit	40	0.280	0.000	$ -	4,380	1,226	0	$0.00	$0.00
445	DGS Capital Complex - Finance Building	EXTERIOR		LEDCPY	3	LED Canopy Fixture	40	0.120	EX	4380	526		3	ZZ DD	No Retrofit	40	0.120	0.000	$ -	4,380	526	0	$0.00	$0.00
446	DGS Capital Complex - Finance Building	EXTERIOR		LEDCOBSPIDER-DEC	4	LED Cob Spider Mount Fixture; Decorative	40	0.160	EX	4380	701		4	ZZ DD	No Retrofit	40	0.160	0.000	$ -	4,380	701	0	$0.00	$0.00
447	DGS Capital Complex - Agriculture	AGRICULTURE		4L32	65	T8 2x4 4-Lamp Troffer Fixture	106	6.890	AGRI	2080	14,331		65	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	1.170	68.640	$ -	2,080	2,434	11,898	$713.86	$713.86
448	DGS Capital Complex - Agriculture	AGRICULTURE		2W32-1X4	5	T8 1x4 2-Lamp Wrap Fixture	62	0.310	AGRI	2080	645		5	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.090	2.640	$ -	2,080	187	458	$27.46	$27.46
449	DGS Capital Complex - Agriculture	AGRICULTURE		2PL13DL	8	13 Watt Plug-In CFL 2-Lamp Downlight Fixture	26	0.208	AGRI	2080	433		8	R 2L-5.5LED-PLH	Retrofit with (2) 5.5 Watt LED Plug-In Lamps; Horizontal	11	0.088	1.440	$ -	2,080	183	250	$14.98	$14.98
450	DGS Capital Complex - Agriculture	AGRICULTURE		3L32-1X4	1,219	T8 1x4 3-Lamp Wrap Fixture	84	102.396	AGRI	2080	212,984		1,219	R 3L-9LED	Retrofit with (9) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	32.913	833.796	$ -	2,080	68,459	144,525	$8,671.48	$8,671.48

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
451	DGS Capital Complex - Agriculture	AGRICULTURE		4WW32	2	T8 2x4 4-Lamp Wide Wrap Fixture	106	0.212	AGRI	2080	441		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	2.112	$ -	2,080	75	366	$21.96	$21.96
452	DGS Capital Complex - Agriculture	AGRICULTURE		2I32	117	T8 1x4 2-Lamp Industrial Strip Fixture	62	7.254	AGRI	2080	15,088		117	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	2.106	61.776	$ -	2,080	4,380	10,708	$642.47	$642.47
453	DGS Capital Complex - Agriculture	AGRICULTURE		2W32	34	T8 1x4 2-Lamp Wrap Fixture	62	2.108	AGRI	2080	4,385		34	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.612	17.952	$ -	2,080	1,273	3,112	$186.70	$186.70
454	DGS Capital Complex - Agriculture	AGRICULTURE		4I34	23	T12 1x4 4-Lamp Industrial Strip Fixture	144	3.312	AGRI	2080	6,889		23	R 4L-9LED	Retrofit with (4) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	36	0.828	29.808	$ -	2,080	1,722	5,167	$310.00	$310.00
455	DGS Capital Complex - Agriculture	AGRICULTURE		2V34	5	T12 1x4 2-Lamp Vanity Fixture	72	0.360	AGRI	2080	749		5	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.090	3.240	$ -	2,080	187	562	$33.70	$33.70
456	DGS Capital Complex - Agriculture	AGRICULTURE		2-60SQDL	2	60 Watt Incandescent A-Lamp 2-Lamp Square Downlight Fixture	120	0.240	AGRI	2080	499		2	LED 2-9A	Re-Lamp with (2) 9 Watt LED A19	19	0.038	2.424	$ -	2,080	79	420	$25.21	$25.21
457	DGS Capital Complex - Agriculture	AGRICULTURE		CF23	27	23 Watt CFL Fixture	23	0.621	AGRI	2080	1,292		27	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.257	4.374	$ -	2,080	534	758	$45.49	$45.49
458	DGS Capital Complex - Agriculture	AGRICULTURE		2S32	2	T8 1x4 2-Lamp Strip Fixture	62	0.124	AGRI	2080	258		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	1.056	$ -	2,080	75	183	$10.98	$10.98
459	DGS Capital Complex - Agriculture	AGRICULTURE		60A	56	60 Watt Incandescent A-Lamp Fixture	60	3.360	AGRI	2080	6,989		56	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.532	33.936	$ -	2,080	1,107	5,882	$352.93	$352.93
460	DGS Capital Complex - Agriculture	AGRICULTURE		2B32	15	T8 2x4 2-Lamp Surface Mount Fixture	62	0.930	AGRI	2080	1,934		15	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.270	7.920	$ -	2,080	562	1,373	$82.37	$82.37
461	DGS Capital Complex - Agriculture	AGRICULTURE		2L32	76	T8 2x4 2-Lamp Troffer Fixture	62	4.712	AGRI	2080	9,801		76	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	1.368	40.128	$ -	2,080	2,845	6,956	$417.33	$417.33
462	DGS Capital Complex - Agriculture	AGRICULTURE		3L32	81	T8 2x4 3-Lamp Troffer Fixture	84	6.804	AGRI	2080	14,152		81	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	2.187	55.404	$ -	2,080	4,549	9,603	$576.20	$576.20
463	DGS Capital Complex - Agriculture	AGRICULTURE		4WW32	12	T8 2x4 4-Lamp Wide Wrap Fixture	106	1.272	AGRI	2080	2,646		12	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.216	12.672	$ -	2,080	449	2,196	$131.79	$131.79
464	DGS Capital Complex - Agriculture	AGRICULTURE		65R30	3	65 Watt Incandescent R30 Fixture	65	0.195	AGRI	2080	406		3	LED 14P30	Re-Lamp with (1) 14 Watt LED PAR30	14	0.042	1.836	$ -	2,080	87	318	$19.09	$19.09
465	DGS Capital Complex - Agriculture	AGRICULTURE		2L17	1	T8 2x2 2-Lamp Troffer Fixture	36	0.036	AGRI	2080	75		1	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.014	0.264	$ -	2,080	29	46	$2.75	$2.75
466	DGS Capital Complex - Agriculture	AGRICULTURE		2S32	1	T8 1x4 2-Lamp Strip Fixture	62	0.062	AGRI	2080	129		1	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.018	0.528	$ -	2,080	37	92	$5.49	$5.49
467	DGS Capital Complex - Agriculture	AGRICULTURE		3L32	30	T8 2x4 3-Lamp Troffer Fixture	84	2.520	AGRI	2080	5,242		30	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	0.810	20.520	$ -	2,080	1,685	3,557	$213.41	$213.41
468	DGS Capital Complex - Agriculture	AGRICULTURE		3L32-PB	215	T8 2x4 3-Lamp Parabolic Troffer Fixture	84	18.060	AGRI	2080	37,565		215	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	5.805	147.060	$ -	2,080	12,074	25,490	$1,529.42	$1,529.42
469	DGS Capital Complex - Agriculture	AGRICULTURE		2S34	9	T12 1x4 2-Lamp Strip Fixture	72	0.648	AGRI	2080	1,348		9	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.162	5.832	$ -	2,080	337	1,011	$60.65	$60.65
470	DGS Capital Complex - Agriculture	AGRICULTURE		2LU32	4	T8 2x2 2-Lamp U-Lamp Troffer Fixture with 6" Lamps	62	0.248	AGRI	2080	516		4	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.056	2.304	$ -	2,080	116	399	$23.96	$23.96
471	DGS Capital Complex - Agriculture	AGRICULTURE		3L17-1X2	11	T8 1x2 3-Lamp Troffer Fixture	58	0.638	AGRI	2080	1,327		11	R 3L-7LED2'	Retrofit with (3) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	21	0.231	4.884	$ -	2,080	480	847	$50.79	$50.79
472	DGS Capital Complex - Agriculture	AGRICULTURE		2WW32	4	T8 2x4 2-Lamp Wide Wrap Fixture	62	0.248	AGRI	2080	516		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	2.112	$ -	2,080	150	366	$21.96	$21.96
473	DGS Capital Complex - Agriculture	AGRICULTURE		HPS100WP	2	100 Watt High Pressure Sodium Wall Pack Fixture	125	0.250	AGRI	2080	520		2	N RLED30WP	New 30 Watt LED Wall Pack Fixture	31	0.062	2.256	$ -	2,080	129	391	$23.46	$23.46
474	DGS Capital Complex - Agriculture	AGRICULTURE		PAR30DL	4	75 Watt Incandescent PAR30 Downlight Fixture	75	0.300	AGRI	2080	624		4	LED 14P30	Re-Lamp with (1) 14 Watt LED PAR30	14	0.056	2.928	$ -	2,080	116	508	$30.45	$30.45
475	DGS Capital Complex - Agriculture	AGRICULTURE		HPS50CPY	16	50 Watt High Pressure Sodium Canopy Fixture	70	1.120	AGRI	2080	2,330		16	N RLED10CPY	New 10 Watt LED Canopy Fixture	12	0.192	11.136	$ -	2,080	399	1,930	$115.81	$115.81
476	DGS Capital Complex - Veterinary Lab	VETERINARY LAB		3B32	341	T8 2x4 3-Lamp Surface Mount Fixture	84	28.644	AGRI	2080	59,580		341	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	9.207	233.244	$ -	2,080	19,151	40,429	$2,425.74	$2,425.74
477	DGS Capital Complex - Veterinary Lab	VETERINARY LAB		2LU32	15	T8 2x2 2-Lamp U-Lamp Troffer Fixture with 6" Lamps	62	0.930	AGRI	2080	1,934		15	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.210	8.640	$ -	2,080	437	1,498	$89.86	$89.86
478	DGS Capital Complex - Veterinary Lab	VETERINARY LAB		2PL13DL	112	13 Watt Plug-In CFL 2-Lamp Downlight Fixture	26	2.912	AGRI	2080	6,057		112	R 2L-5.5LED-PLH	Retrofit with (2) 5.5 Watt LED Plug-In Lamps; Horizontal	11	1.232	20.160	$ -	2,080	2,563	3,494	$209.66	$209.66
479	DGS Capital Complex - Veterinary Lab	VETERINARY LAB		2L32-1X4	420	T8 1x4 2-Lamp Troffer Fixture	62	26.040	AGRI	2080	54,163		420	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	7.560	221.760	$ -	2,080	15,725	38,438	$2,306.30	$2,306.30
480	DGS Capital Complex - Veterinary Lab	VETERINARY LAB		MH250HB	13	250 Watt Metal Halide Highbay Fixture	295	3.835	AGRI	2080	7,977		13	N RLED95HB	New 95 Watt LED High Bay Fixture	93	1.209	31.512	$ -	2,080	2,515	5,462	$327.72	$327.72

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
481	DGS Capital Complex - Veterinary Lab	VETERINARY LAB		CF23DL	34	23 Watt CFL Downlight Fixture	23	0.782	AGRI	2080	1,627		34	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.323	5.508	$ -	2,080	672	955	$57.28	$57.28
482	DGS Capital Complex - Veterinary Lab	VETERINARY LAB		2V32	2	T8 2x4 2-Lamp Vanity Fixture	62	0.124	AGRI	2080	258		2	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.036	1.056	$ -	2,080	75	183	$10.98	$10.98
483	DGS Capital Complex - Veterinary Lab	VETERINARY LAB		3UD28	9	T8 2x4 3-Lamp Up Down Fixture	72	0.648	AGRI	2080	1,348		9	R 3L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	0.243	4.860	$ -	2,080	505	842	$50.54	$50.54
484	DGS Capital Complex - Veterinary Lab	VETERINARY LAB		MH100WP	15	100 Watt Metal Halide Wall Pack Fixture	125	1.875	AGRI	2080	3,900		15	N RLED30WP	New 30 Watt LED Wall Pack Fixture	31	0.465	16.920	$ -	2,080	967	2,933	$175.97	$175.97
485	DGS Capital Complex - 2221 Forster Street	OFFICES		2I28	6	T8 2x4 2-Lamp Industrial Fixture	48	0.288	O	2340	674		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	2,340	253	421	$25.27	$25.27
486	DGS Capital Complex - 2221 Forster Street	OFFICES		2L28	772	T8 2x4 2-Lamp Troffer Fixture	48	37.056	O	2340	86,711		772	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	13.896	277.920	$ -	2,340	32,517	54,194	$3,251.66	$3,251.66
487	DGS Capital Complex - 2221 Forster Street	OFFICES		2W28	10	T8 2x4 2-Lamp Wrap Fixture	48	0.480	O	2340	1,123		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.600	$ -	2,340	421	702	$42.12	$42.12
488	DGS Capital Complex - 2221 Forster Street	STORAGE		2W28	265	T8 2x4 2-Lamp Wrap Fixture	48	12.720	S	728	9,260		265	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	4.770	95.400	$ -	728	3,473	5,788	$347.26	$347.26
489	DGS Capital Complex - 2221 Forster Street	LAB		4L28	50	T8 2x4 4-Lamp Troffer Fixture	97	4.850	O	2340	11,349		50	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.900	47.400	$ -	2,340	2,106	9,243	$554.58	$554.58
490	DGS Capital Complex - 2221 Forster Street	LAB		2L28	10	T8 2x4 2-Lamp Troffer Fixture	48	0.480	O	2340	1,123		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.600	$ -	2,340	421	702	$42.12	$42.12
491	DGS Capital Complex - 2221 Forster Street	HALL		2L28	80	T8 2x4 2-Lamp Troffer Fixture	48	3.840	H	3863	14,834		80	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	1.440	28.800	$ -	3,863	5,563	9,271	$556.27	$556.27
492	DGS Capital Complex - 2221 Forster Street	HALL		2VT28	10	T8 2x4 2-Lamp Vaportight Fixture	48	0.480	H	3863	1,854		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.600	$ -	3,863	695	1,159	$69.53	$69.53
493	DGS Capital Complex - 2221 Forster Street	STORAGE		2L28	50	T8 2x4 2-Lamp Troffer Fixture	48	2.400	S	728	1,747		50	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.900	18.000	$ -	728	655	1,092	$65.52	$65.52
494	DGS Capital Complex - 2221 Forster Street	STORAGE		4L28	10	T8 2x4 4-Lamp Troffer Fixture	97	0.970	S	728	706		10	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.180	9.480	$ -	728	131	575	$34.51	$34.51
495	DGS Capital Complex - 2221 Forster Street	STORAGE		2W28	10	T8 2x4 2-Lamp Wrap Fixture	48	0.480	S	728	349		10	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.180	3.600	$ -	728	131	218	$13.10	$13.10
496	DGS Capital Complex - 2221 Forster Street	MECHANICAL		2I28-TUR	16	T8 2x4 2-Lamp Industrial Fixture; Turret	48	0.768	M	3863	2,967		16	N 2I-9LED	New 1x4 2-Lamp Industrial Fixture with (2) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	18	0.288	5.760	$ -	3,863	1,113	1,854	$111.25	$111.25
497	DGS Capital Complex - 2221 Forster Street	MECHANICAL		2W28	18	T8 2x4 2-Lamp Wrap Fixture	48	0.864	M	3863	3,338		18	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.324	6.480	$ -	3,863	1,252	2,086	$125.16	$125.16
498	DGS Capital Complex - 2221 Forster Street	MECHANICAL		100RLM	4	100 Watt Incandescent A-Lamp RLM Fixture	100	0.400	M	3863	1,545		4	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.038	4.344	$ -	3,863	147	1,398	$83.90	$83.90
499	DGS Capital Complex - 2221 Forster Street	MEETINGS ROOM		2L28	16	T8 2x4 2-Lamp Troffer Fixture	48	0.768	CF	2088	1,604		16	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.288	5.760	$ -	2,088	601	1,002	$60.13	$60.13
500	DGS Capital Complex - 2221 Forster Street	BOILER		2I28	20	T8 2x4 2-Lamp Industrial Fixture	48	0.960	M	3863	3,708		20	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.360	7.200	$ -	3,863	1,391	2,318	$139.07	$139.07
501	DGS Capital Complex - 2221 Forster Street	WORK OUT ROOM		2L28	20	T8 2x4 2-Lamp Troffer Fixture	48	0.960	FC	2704	2,596		20	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.360	7.200	$ -	2,704	973	1,622	$97.34	$97.34
502	DGS Capital Complex - 2221 Forster Street	RESTROOM		32CIRCDR	16	32 Watt Incandescent Circuline Drum Fixture	32	0.512	RR	3863	1,978		16	N LED14DR	New 12" Round 14 Watt LED Drum Fixture	14	0.224	3.456	$ -	3,863	865	1,113	$66.75	$66.75
503	DGS Capital Complex - 2221 Forster Street	RESTROOM		2EC28	6	T8 2x4 2-Lamp Egg Crate Fixture	48	0.288	RR	3863	1,113		6	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.108	2.160	$ -	3,863	417	695	$41.72	$41.72
504	DGS Capital Complex - 2221 Forster Street	RESTROOM		2W28	8	T8 2x4 2-Lamp Wrap Fixture	48	0.384	RR	3863	1,483		8	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.144	2.880	$ -	3,863	556	927	$55.63	$55.63
505	DGS Capital Complex - 2221 Forster Street	NE CORNER OFFICE		2LU28	40	T8 2x2 2-Lamp U-Lamp Troffer Fixture	48	1.920	O	2340	4,493		40	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.560	16.320	$ -	2,340	1,310	3,182	$190.94	$190.94
506	DGS Capital Complex - 2221 Forster Street	NE CORNER OFFICE		2L32	12	T8 2x4 2-Lamp Troffer Fixture	62	0.744	O	2340	1,741		12	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.216	6.336	$ -	2,340	505	1,236	$74.13	$74.13
507	DGS Capital Complex - 2221 Forster Street	NE CORNER OFFICE		4L28	20	T8 2x4 4-Lamp Troffer Fixture	97	1.940	O	2340	4,540		20	RF 2LR-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps and (1) 2x4 2-Lamp White Reflector Kit; Direct Wire to Socket	18	0.360	18.960	$ -	2,340	842	3,697	$221.83	$221.83
508	DGS Capital Complex - 2221 Forster Street	FED SUPPLY WAREHOUSE		2I28	110	T8 2x4 2-Lamp Industrial Fixture	48	5.280	W	1827	9,647		110	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	1.980	39.600	$ -	1,827	3,617	6,029	$361.75	$361.75
509	DGS Capital Complex - 2221 Forster Street	FED SUPPLY WAREHOUSE		2PL13DL	8	13 Watt Plug-In CFL 2-Lamp Downlight Fixture	26	0.208	W	1827	380		8	R 2L-5.5LED-PLH	Retrofit with (2) 5.5 Watt LED Plug-In Lamps; Horizontal	11	0.088	1.440	$ -	1,827	161	219	$13.15	$13.15
510	DGS Capital Complex - 2221 Forster Street	FED SUPPLY WAREHOUSE		2W28	5	T8 2x4 2-Lamp Wrap Fixture	48	0.240	W	1827	438		5	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.090	1.800	$ -	1,827	164	274	$16.44	$16.44

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
511	DGS Capital Complex - 2221 Forster Street	LARGE WAREHOUSE		2I28	20	T8 2x4 2-Lamp Industrial Fixture	48	0.960	W	1827	1,754		20	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.360	7.200	$ -	1,827	658	1,096	$65.77	$65.77
512	DGS Capital Complex - 2221 Forster Street	LARGE WAREHOUSE		2VT28-1X8	135	T8 1x8 2-Lamp Vaportight Fixture	48	6.480	W	1827	11,839		135	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	2.430	48.600	$ -	1,827	4,440	7,399	$443.96	$443.96
513	DGS Capital Complex - 2221 Forster Street	LARGE WAREHOUSE		3PL18DL6	12	18 Watt Plug-In CFL 3-Lamp 6" Downlight Fixture	54	0.648	W	1827	1,184		12	R 3L-5.5LED-PLH	Retrofit with (3) 5.5 Watt LED Plug-In Lamps; Horizontal	16.5	0.198	5.400	$ -	1,827	362	822	$49.33	$49.33
514	DGS Capital Complex - 2221 Forster Street	WASH BAY		3I28-TUR	8	T8 2x4 3-Lamp Industrial Fixture; Turret	72	0.576	W	1827	1,052		8	N 3I-9LED	New 1x4 3-Lamp Industrial Fixture with (3) 9 Watt LED T8 4' Lamp; Direct Wire to Socket	27	0.216	4.320	$ -	1,827	395	658	$39.46	$39.46
515	DGS Capital Complex - 2221 Forster Street	WASH BAY		32CIRCDR	2	32 Watt Incandescent Circuline Drum Fixture	32	0.064	W	1827	117		2	N LED14DR	New 12" Round 14 Watt LED Drum Fixture	14	0.028	0.432	$ -	1,827	51	66	$3.95	$3.95
516	DGS Capital Complex - 2221 Forster Street	EXTERIOR		MH70WP	2	70 Watt Metal Halide Wall Pack Fixture	94	0.188	EX	4380	823		2	N RLED24WP	New 24 Watt LED Wall Pack Fixture	25	0.050	1.656	$ -	4,380	219	604	$36.27	$36.27
517	DGS Capital Complex - 2221 Forster Street	EXTERIOR		2-100CPY	1	100 Watt Incandescent A-Lamp 2-Lamp Canopy Fixture	200	0.200	EX	4380	876		1	LED 2-9A	Re-Lamp with (2) 9 Watt LED A19	19	0.019	2.172	$ -	4,380	83	793	$47.57	$47.57
518	DGS Capital Complex - 2221 Forster Street	EXTERIOR		HPS50WP	12	50 Watt High Pressure Sodium Wall Pack Fixture	70	0.840	EX	4380	3,679		12	N RLED24WP	New 24 Watt LED Wall Pack Fixture	25	0.300	6.480	$ -	4,380	1,314	2,365	$141.91	$141.91
519	DGS Capital Complex - 2221 Forster Street	EXTERIOR		MH250CPY	8	250 Watt Metal Halide Canopy Fixture	295	2.360	EX	4380	10,337		8	N RLED75CPY	New 75 Watt LED Canopy Fixture	76	0.608	21.024	$ -	4,380	2,663	7,674	$460.43	$460.43
520	DGS Capital Complex - 2221 Forster Street	EXTERIOR		HPS150DTD	11	150 Watt High Pressure Sodium Dusk to Dawn Fixture	188	2.068	EX	4380	9,058		11	N RLED26BY	New 26 Watt LED Dusk to Dawn Barnyard Fixture	28	0.308	21.120	$ -	4,380	1,349	7,709	$462.53	$462.53
521	DGS Capital Complex - 2221 Forster Street	EXTERIOR		HPS400SB	4	400 Watt High Pressure Sodium Shoebox Fixture	464	1.856	EX	4380	8,129		4	N RLED150SB	New 150 Watt LED Shoebox Fixture	155	0.620	14.832	$ -	4,380	2,716	5,414	$324.82	$324.82
522	DGS Capital Complex - 2221 Forster Street	EXTERIOR		MH175SB	4	175 Watt Metal Halide Shoebox Fixture	213	0.852	EX	4380	3,732		4	N RLED50SB	New 50 Watt LED Shoebox Fixture	51	0.204	7.776	$ -	4,380	894	2,838	$170.29	$170.29
523	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2L28	188	T8 2x4 2-Lamp Troffer Fixture	48	9.024	O	2340	21,116		188	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	3.384	67.680	$ -	2,340	7,919	13,198	$923.83	$923.83
524	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		LEDFP	47	LED Flat Panel Fixture	0	0.000	O	2340	0		47	ZZ DD	No Retrofit	0	0.000	0.000	$ -	2,340	0	0	$0.00	$0.00
525	DGS Capital Complex - Leroy Irvis Office Building	HALL		2L28	34	T8 2x4 2-Lamp Troffer Fixture	48	1.632	H	3863	6,304		34	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.612	12.240	$ -	3,863	2,364	3,940	$275.82	$275.82
526	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L28	16	T8 2x4 2-Lamp Troffer Fixture	48	0.768	RR	3863	2,967		16	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.288	5.760	$ -	3,863	1,113	1,854	$129.80	$129.80
527	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L25-3'	2	T8 1x3 2-Lamp Troffer Fixture	43	0.086	RR	3863	332		2	R 2L-12LED3'	Retrofit with (2) 12 Watt LED T8 3' Lamps; Direct Wire to Socket	24	0.048	0.456	$ -	3,863	185	147	$10.28	$10.28
528	DGS Capital Complex - Leroy Irvis Office Building	STAIR		2L28	4	T8 2x4 2-Lamp Troffer Fixture	48	0.192	H	3863	742		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	3,863	278	464	$32.45	$32.45
529	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2L28	146	T8 2x4 2-Lamp Troffer Fixture	48	7.008	O	2340	16,399		146	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	2.628	52.560	$ -	2,340	6,150	10,249	$717.44	$717.44
530	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2L25-3'	2	T8 1x3 2-Lamp Troffer Fixture	43	0.086	O	2340	201		2	R 2L-12LED3'	Retrofit with (2) 12 Watt LED T8 3' Lamps; Direct Wire to Socket	24	0.048	0.456	$ -	2,340	112	89	$6.22	$6.22
531	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2LU28	2	T8 2x2 2-Lamp U-Lamp Troffer Fixture	48	0.096	O	2340	225		2	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.028	0.816	$ -	2,340	66	159	$11.14	$11.14
532	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		LEDFP	4	LED Flat Panel Fixture	0	0.000	O	2340	0		4	ZZ DD	No Retrofit	0	0.000	0.000	$ -	2,340	0	0	$0.00	$0.00
533	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2L28-TBR	58	T8 2x4 2-Lamp Troffer Fixture; To be Removed	48	2.784	O	2340	6,515		58	ZZ DD	No Retrofit	48	2.784	0.000	$ -	2,340	6,515	0	$0.00	$0.00
534	DGS Capital Complex - Leroy Irvis Office Building	HALL		2L28	36	T8 2x4 2-Lamp Troffer Fixture	48	1.728	H	3863	6,675		36	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.648	12.960	$ -	3,863	2,503	4,172	$292.04	$292.04
535	DGS Capital Complex - Leroy Irvis Office Building	HALL		50MR16	20	50 Watt Incandescent MR16 Fixture	50	1.000	H	3863	3,863		20	LED 7MR16	Re-Lamp with (1) 7 Watt LED MR16	6.5	0.130	10.440	$ -	3,863	502	3,361	$235.26	$235.26
536	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L28	16	T8 2x4 2-Lamp Troffer Fixture	48	0.768	RR	3863	2,967		16	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.288	5.760	$ -	3,863	1,113	1,854	$129.80	$129.80
537	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2V25-3'	2	T8 1x3 2-Lamp Vanity Fixture	43	0.086	RR	3863	332		2	R 2L-12LED3'	Retrofit with (2) 12 Watt LED T8 3' Lamps; Direct Wire to Socket	24	0.048	0.456	$ -	3,863	185	147	$10.28	$10.28
538	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2V17	4	T8 1x2 2-Lamp Vanity Fixture	36	0.144	RR	3863	556		4	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.056	1.056	$ -	3,863	216	340	$23.80	$23.80
539	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L17	4	T8 2x2 2-Lamp Troffer Fixture	36	0.144	RR	3863	556		4	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.056	1.056	$ -	3,863	216	340	$23.80	$23.80
540	DGS Capital Complex - Leroy Irvis Office Building	STAIRS		2L28	4	T8 2x4 2-Lamp Troffer Fixture	48	0.192	H	3863	742		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	3,863	278	464	$32.45	$32.45

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
541	DGS Capital Complex - Leroy Irvis Office Building	COURT ROOM		65BR30DL	105	65 Watt Incandescent BR30 Downlight Fixture	65	6.825	A	2088	14,251		105	LED 14P30	Re-Lamp with (1) 14 Watt LED PAR30	14	1.470	64.260	$ -	2,088	3,069	11,181	$782.69	$782.69
542	DGS Capital Complex - Leroy Irvis Office Building	COURT ROOM		50MR16DL	12	50 Watt Incandescent MR16 Downlight Fixture	50	0.600	A	2088	1,253		12	LED 7MR16	Re-Lamp with (1) 7 Watt LED MR16	6.5	0.078	6.264	$ -	2,088	163	1,090	$76.30	$76.30
543	DGS Capital Complex - Leroy Irvis Office Building	CUT OFF BY WALLS		2L28	14	T8 2x4 2-Lamp Troffer Fixture	48	0.672	Z-TT	500	336		14	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.252	5.040	$ -	500	126	210	$14.70	$14.70
544	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2L28	190	T8 2x4 2-Lamp Troffer Fixture	48	9.120	O	2340	21,341		190	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	3.420	68.400	$ -	2,340	8,003	13,338	$933.66	$933.66
545	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		50MR16	10	50 Watt Incandescent MR16 Fixture	50	0.500	O	2340	1,170		10	LED 7MR16	Re-Lamp with (1) 7 Watt LED MR16	6.5	0.065	5.220	$ -	2,340	152	1,018	$71.25	$71.25
546	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		75P38DL	38	75 Watt Incandescent PAR38 Downlight Fixture	75	2.850	O	2340	6,669		38	LED 17P38	Re-Lamp with (1) 17 Watt LED PAR38	17	0.646	26.448	$ -	2,340	1,512	5,157	$361.02	$361.02
547	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2LU32	18	T8 2x2 2-Lamp U-Lamp Troffer Fixture with 6" Lamps	62	1.116	O	2340	2,611		18	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.252	10.368	$ -	2,340	590	2,022	$141.52	$141.52
548	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2L17	2	T8 2x2 2-Lamp Troffer Fixture	36	0.072	O	2340	168		2	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.028	0.528	$ -	2,340	66	103	$7.21	$7.21
549	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2L28-NR	45	T8 2x4 2-Lamp Troffer Fixture; No Retro	48	2.160	O	2340	5,054		45	ZZ DD	No Retrofit	48	2.160	0.000	$ -	2,340	5,054	0	$0.00	$0.00
550	DGS Capital Complex - Leroy Irvis Office Building	STAIR		2L28	4	T8 2x4 2-Lamp Troffer Fixture	48	0.192	H	3863	742		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	3,863	278	464	$32.45	$32.45
551	DGS Capital Complex - Leroy Irvis Office Building	HALL		2L28	36	T8 2x4 2-Lamp Troffer Fixture	48	1.728	H	3863	6,675		36	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.648	12.960	$ -	3,863	2,503	4,172	$292.04	$292.04
552	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L28	16	T8 2x4 2-Lamp Troffer Fixture	48	0.768	RR	3863	2,967		16	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.288	5.760	$ -	3,863	1,113	1,854	$129.80	$129.80
553	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L25-3'	2	T8 1x3 2-Lamp Troffer Fixture	43	0.086	RR	3863	332		2	R 2L-12LED3'	Retrofit with (2) 12 Watt LED T8 3' Lamps; Direct Wire to Socket	24	0.048	0.456	$ -	3,863	185	147	$10.28	$10.28
554	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2V17	4	T8 1x2 2-Lamp Vanity Fixture	36	0.144	RR	3863	556		4	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.056	1.056	$ -	3,863	216	340	$23.80	$23.80
555	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L17-1X2	4	T8 1x2 2-Lamp Troffer Fixture	36	0.144	RR	3863	556		4	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.056	1.056	$ -	3,863	216	340	$23.80	$23.80
556	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2L28	190	T8 2x4 2-Lamp Troffer Fixture	48	9.120	O	2340	21,341		190	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	3.420	68.400	$ -	2,340	8,003	13,338	$933.66	$933.66
557	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		50MR16	10	50 Watt Incandescent MR16 Fixture	50	0.500	O	2340	1,170		10	LED 7MR16	Re-Lamp with (1) 7 Watt LED MR16	6.5	0.065	5.220	$ -	2,340	152	1,018	$71.25	$71.25
558	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		75P38DL	38	75 Watt Incandescent PAR38 Downlight Fixture	75	2.850	O	2340	6,669		38	LED 17P38	Re-Lamp with (1) 17 Watt LED PAR38	17	0.646	26.448	$ -	2,340	1,512	5,157	$361.02	$361.02
559	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2LU28	18	T8 2x2 2-Lamp U-Lamp Troffer Fixture	48	0.864	O	2340	2,022		18	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.252	7.344	$ -	2,340	590	1,432	$100.25	$100.25
560	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2L17	2	T8 2x2 2-Lamp Troffer Fixture	36	0.072	O	2340	168		2	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.028	0.528	$ -	2,340	66	103	$7.21	$7.21
561	DGS Capital Complex - Leroy Irvis Office Building	STAIRS		2L28	4	T8 2x4 2-Lamp Troffer Fixture	48	0.192	H	3863	742		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	3,863	278	464	$32.45	$32.45
562	DGS Capital Complex - Leroy Irvis Office Building	HALL		2L28	36	T8 2x4 2-Lamp Troffer Fixture	48	1.728	H	3863	6,675		36	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.648	12.960	$ -	3,863	2,503	4,172	$292.04	$292.04
563	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L28	16	T8 2x4 2-Lamp Troffer Fixture	48	0.768	RR	3863	2,967		16	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.288	5.760	$ -	3,863	1,113	1,854	$129.80	$129.80
564	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L25-3'	2	T8 1x3 2-Lamp Troffer Fixture	43	0.086	RR	3863	332		2	R 2L-12LED3'	Retrofit with (2) 12 Watt LED T8 3' Lamps; Direct Wire to Socket	24	0.048	0.456	$ -	3,863	185	147	$10.28	$10.28
565	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2V17	4	T8 1x2 2-Lamp Vanity Fixture	36	0.144	RR	3863	556		4	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.056	1.056	$ -	3,863	216	340	$23.80	$23.80
566	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L17-1X2	4	T8 1x2 2-Lamp Troffer Fixture	36	0.144	RR	3863	556		4	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.056	1.056	$ -	3,863	216	340	$23.80	$23.80
567	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2L28	190	T8 2x4 2-Lamp Troffer Fixture	48	9.120	O	2340	21,341		190	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	3.420	68.400	$ -	2,340	8,003	13,338	$933.66	$933.66
568	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		50MR16	10	50 Watt Incandescent MR16 Fixture	50	0.500	O	2340	1,170		10	LED 7MR16	Re-Lamp with (1) 7 Watt LED MR16	6.5	0.065	5.220	$ -	2,340	152	1,018	$71.25	$71.25
569	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		75P38DL	38	75 Watt Incandescent PAR38 Downlight Fixture	75	2.850	O	2340	6,669		38	LED 17P38	Re-Lamp with (1) 17 Watt LED PAR38	17	0.646	26.448	$ -	2,340	1,512	5,157	$361.02	$361.02
570	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2LU28	18	T8 2x2 2-Lamp U-Lamp Troffer Fixture	48	0.864	O	2340	2,022		18	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.252	7.344	$ -	2,340	590	1,432	$100.25	$100.25

ID #	Facility Name	Room Description	Room #	ECM Code	Qty	Description	Watts	kW	Burn Hour Code	Pre Burn Hours	kWh	x	Qty	New Code	Description	Watts	kW	Annual KW Saved	KW Cost Savings	Post Burn Hours	kWh	kWh Saved	Kwh Cost Savings	Total Energy Cost Savings
571	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2L17	2	T8 2x2 2-Lamp Troffer Fixture	36	0.072	O	2340	168		2	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.028	0.528	$ -	2,340	66	103	$7.21	$7.21
572	DGS Capital Complex - Leroy Irvis Office Building	STAIRS		2L28	4	T8 2x4 2-Lamp Troffer Fixture	48	0.192	H	3863	742		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	3,863	278	464	$32.45	$32.45
573	DGS Capital Complex - Leroy Irvis Office Building	HALL		2L28	36	T8 2x4 2-Lamp Troffer Fixture	48	1.728	H	3863	6,675		36	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.648	12.960	$ -	3,863	2,503	4,172	$292.04	$292.04
574	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L28	16	T8 2x4 2-Lamp Troffer Fixture	48	0.768	RR	3863	2,967		16	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.288	5.760	$ -	3,863	1,113	1,854	$129.80	$129.80
575	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L25-3'	2	T8 1x3 2-Lamp Troffer Fixture	43	0.086	RR	3863	332		2	R 2L-12LED3'	Retrofit with (2) 12 Watt LED T8 3' Lamps; Direct Wire to Socket	24	0.048	0.456	$ -	3,863	185	147	$10.28	$10.28
576	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2L28	190	T8 2x4 2-Lamp Troffer Fixture	48	9.120	O	2340	21,341		190	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	3.420	68.400	$ -	2,340	8,003	13,338	$933.66	$933.66
577	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		50MR16	10	50 Watt Incandescent MR16 Fixture	50	0.500	O	2340	1,170		10	LED 7MR16	Re-Lamp with (1) 7 Watt LED MR16	6.5	0.065	5.220	$ -	2,340	152	1,018	$71.25	$71.25
578	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		75P38DL	38	75 Watt Incandescent PAR38 Downlight Fixture	75	2.850	O	2340	6,669		38	LED 17P38	Re-Lamp with (1) 17 Watt LED PAR38	17	0.646	26.448	$ -	2,340	1,512	5,157	$361.02	$361.02
579	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2LU32	18	T8 2x2 2-Lamp U-Lamp Troffer Fixture with 6" Lamps	62	1.116	O	2340	2,611		18	RF 2LR-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps and (1) 2x2 2-Lamp White Reflector Kit; Direct Wire to Socket	14	0.252	10.368	$ -	2,340	590	2,022	$141.52	$141.52
580	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		2L17	2	T8 2x2 2-Lamp Troffer Fixture	36	0.072	O	2340	168		2	R 2L-7LED2'	Retrofit with (2) 7 Watt LED T8 2' Lamps; Direct Wire to Socket	14	0.028	0.528	$ -	2,340	66	103	$7.21	$7.21
581	DGS Capital Complex - Leroy Irvis Office Building	STAIRS		2L28	4	T8 2x4 2-Lamp Troffer Fixture	48	0.192	H	3863	742		4	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.072	1.440	$ -	3,863	278	464	$32.45	$32.45
582	DGS Capital Complex - Leroy Irvis Office Building	HALL		2L28	36	T8 2x4 2-Lamp Troffer Fixture	48	1.728	H	3863	6,675		36	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.648	12.960	$ -	3,863	2,503	4,172	$292.04	$292.04
583	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L28	16	T8 2x4 2-Lamp Troffer Fixture	48	0.768	RR	3863	2,967		16	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.288	5.760	$ -	3,863	1,113	1,854	$129.80	$129.80
584	DGS Capital Complex - Leroy Irvis Office Building	RESTROOM		2L25-3'	2	T8 1x3 2-Lamp Troffer Fixture	43	0.086	RR	3863	332		2	R 2L-12LED3'	Retrofit with (2) 12 Watt LED T8 3' Lamps; Direct Wire to Socket	24	0.048	0.456	$ -	3,863	185	147	$10.28	$10.28
585	DGS Capital Complex - Leroy Irvis Office Building	LOBBY		3-26CFLCHAND-DECO	3	26 Watt CFL 3-Lamp Decorative Chandelier Fixture	78	0.234	H	3863	904		3	LED 3-9A	Re-Lamp with (3) 9 Watt LED A19	28.5	0.086	1.782	$ -	3,863	330	574	$40.16	$40.16
586	DGS Capital Complex - Leroy Irvis Office Building	LOBBY		6-26CFLCHAND-DECO	3	26 Watt CFL 6-Lamp Decorative Chandelier Fixture	156	0.468	H	3863	1,808		3	LED 6-9A	Re-Lamp with (6) 9 Watt LED A19	54	0.162	3.672	$ -	3,863	626	1,182	$82.75	$82.75
587	DGS Capital Complex - Leroy Irvis Office Building	OFFICES		3L28	398	T8 2x4 3-Lamp Troffer Fixture	72	28.656	O	2340	67,055		398	R 3L-9LED	Retrofit with (3) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	27	10.746	214.920	$ -	2,340	25,146	41,909	$2,933.66	$2,933.66
588	DGS Capital Complex - Leroy Irvis Office Building	STORAGE		2S28	30	T8 2x4 2-Lamp Strip Fixture	48	1.440	S	728	1,048		30	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	0.540	10.800	$ -	728	393	655	$45.86	$45.86
589	DGS Capital Complex - Leroy Irvis Office Building	OPEN AREA		2PL42DL10	28	42 Watt Plug-In CFL 2-Lamp 10" Downlight Fixture	84	2.352	O	2340	5,504		28	R 2L-15.5LED-PLH	Retrofit with (2) 15.5 Watt LED Plug-In Lamps; Horizontal	31	0.868	17.808	$ -	2,340	2,031	3,473	$243.08	$243.08
590	DGS Capital Complex - Leroy Irvis Office Building	OPEN AREA		2S25-3'	4	T8 1x3 2-Lamp Strip Fixture	43	0.172	O	2340	402		4	R 2L-12LED3'	Retrofit with (2) 12 Watt LED T8 3' Lamps; Direct Wire to Socket	24	0.096	0.912	$ -	2,340	225	178	$12.45	$12.45
591	DGS Capital Complex - Leroy Irvis Office Building	HALL		2L28	64	T8 2x4 2-Lamp Troffer Fixture	48	3.072	H	3863	11,867		64	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	1.152	23.040	$ -	3,863	4,450	7,417	$519.19	$519.19
592	DGS Capital Complex - Leroy Irvis Office Building	STORAGE		2L28	310	T8 2x4 2-Lamp Troffer Fixture	48	14.880	S	728	10,833		310	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	5.580	111.600	$ -	728	4,062	6,770	$473.93	$473.93
593	DGS Capital Complex - Leroy Irvis Office Building	HALLS		2L28	66	T8 2x4 2-Lamp Troffer Fixture	48	3.168	H	3863	12,238		66	R 2L-9LED	Retrofit with (2) 9 Watt LED T8 4' Lamps; Direct Wire to Socket	18	1.188	23.760	$ -	3,863	4,589	7,649	$535.41	$535.41
594	DGS Capital Complex - Leroy Irvis Office Building	MECHANICAL		26RLM	18	26 Watt Incandescent RLM Fixture	26	0.468	M	3863	1,808		18	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.171	3.564	$ -	3,863	661	1,147	$80.31	$80.31
595	DGS Capital Complex - Leroy Irvis Office Building	EXTERIOR		100SC-DECO-DA	8	100 Watt Incandescent Decorative Sconce Fixture; Difficult Access	100	0.800	EX	4380	3,504		8	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.076	8.688	$ -	4,380	333	3,171	$221.98	$221.98
596	DGS Capital Complex - Leroy Irvis Office Building	EXTERIOR		100SC-DECO-DA	6	100 Watt Incandescent Decorative Sconce Fixture; Difficult Access	100	0.600	EX	4380	2,628		6	LED 9A	Re-Lamp with (1) 9 Watt LED A19	9.5	0.057	6.516	$ -	4,380	250	2,378	$166.48	$166.48
TOTALS					20,708			1,371			3,307,914		20,708				481	10,679	0		1,169,768	2,138,146	$ 132,838	$ 132,838.46