PERFORMANCE BASED ENERGY SAVINGS AGREEMENT

BETWEEN

MCCLURE COMPANY

AND

SOUTHERN COLUMBIA AREA SCHOOL DISTRICT

DATED: MAY 19TH, 2014

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PERFORMANCE BASED ENERGY SAVINGS AGREEMENT

THIS PERFORMANCE BASED ENERGY SAVINGS AGREEMENT (the "Agreement") dated this 19th day of May 2014, by and between MCCLURE COMPANY ("McClure"), a Pennsylvania corporation having an address of 4101 North Sixth Street, Harrisburg, Pennsylvania 17110; and the SOUTHERN COLUMBIA AREA SCHOOL DISTRICT ("Client"), having an address of 800 Southern Drive, Catawissa, Pennsylvania 17820.

BACKGROUND

A. The Client desires to install various energy conservation measures for the purpose of achieving reductions in energy consumption or demand.

B. McClure, among other things, is in the business of providing energy conservation services to third parties, including without limitation, providing the design, implementation, and monitoring of energy conservation projects.

C. McClure has analyzed energy use at the Client's Facilities (described in Schedule A) and made recommendations as set forth herein concerning energy conservation measures which, if installed and implemented, will yield Guaranteed Energy Savings (detailed in Schedule D) to the Client.

D. The Client's Board of Education approved and executed a Notice to Proceed (NTP) relating to this Agreement on April 22nd, 2014. The NTP was necessary to expedite the project substantial completion prior to the beginning of the 2014 - 2015 school year. The NTP authorized McClure Company to proceed with final engineering and procure major equipment carrying manufacturing lead times of 8 weeks or greater. In addition, the Notice to Proceed Authorized McClure Company to issue subcontracts to contractors with substantial scopes of work or time sensitive procurement requirements.

NOW THEREFORE, in consideration of the promises contained herein, and intending to be legally bound hereby, the parties hereto agree as follows:

AGREEMENT

I. BACKGROUND:

The Background paragraphs are incorporated in this Agreement as if fully set forth in this Agreement.

II. DEFINITIONS:

The following terms when used in this Agreement, shall have the following meanings:

A. **"Agreement"** means this Agreement, and all Schedules and Addendum attached hereto and made a part hereof, including without limitation:

Schedule "A" – Client Facilities
Schedule "B" – Energy Use Base
Schedule "C" – Base Energy Rates
Schedule "D" – Guaranteed Energy Savings
Schedule "E" – Energy Conservation Measures
Schedule “F” – Total Project Fee
Schedule “G” – Insurance
Schedule “H” – Additional Terms and Conditions
Schedule “I” – Standards of Occupancy and Comfort
Schedule “J” – Materials and Maintenance Savings
Schedule “K” – Stipulated Lighting Hours of Operation
Schedule “L” – Measurement and Verification Plan
Schedule “M(a)” – Certificate of Substantial Completion
Schedule “M(b)” – Certificate of Final Completion
Attachment “A” – Scope of Work for Energy Conservation Measures
Attachment “B” – Lighting Audit
Attachment “C” – Commissioning Plan

and all amendments, change orders, modifications and supplements thereof or thereto.

B. **"Base Energy Rates"** means those energy rates described on Schedule C and increased each year on a cumulative basis as shown in the table below. This is used by McClure, as set forth in Section V, to calculate the EC Savings for the various EC Measures.

Percent Increase Table

Year	Electric	Gas	Oil	Propane	Water
1	3%	3%	4%	3%	3%
2	3%	3%	4%	3%	3%
3	3%	3%	4%	3%	3%
4	3%	3%	4%	3%	3%
5	3%	3%	4%	3%	3%
6	3%	3%	4%	3%	3%
7	3%	3%	4%	3%	3%
8	3%	3%	4%	3%	3%
9	3%	3%	4%	3%	3%
10	3%	3%	4%	3%	3%
11	3%	3%	4%	3%	3%
12	3%	3%	4%	3%	3%
13	3%	3%	4%	3%	3%
14	3%	3%	4%	3%	3%
15	3%	3%	4%	3%	3%
16	3%	3%	4%	3%	3%
17	3%	3%	4%	3%	3%
18	3%	3%	4%	3%	3%
19	3%	3%	4%	3%	3%
20	3%	3%	4%	3%	3%

C. **"Commencement Date"** means the first day of the month following Substantial Completion of all EC Measures.

D. **"Contract Year"** means each one-year period following the Commencement Date.

E. **"EC Measures"** means the energy conservation measures described in the attached Schedule E.

F. **"EC Savings"** means the energy conservation savings achieved through reduction in energy consumption, demand, energy rates, maintenance or materials by implementation of the EC Measures identified by McClure, which will be calculated as set forth in Section V of this Agreement.

G. **"Energy Savings Period"** means the period commencing on the Commencement Date and terminating on the fifteenth year anniversary of the Commencement Date.

H. **"Energy Use Base"** means the energy usage and demand, if applicable, of the Client's Facilities, as described on Schedule B of this Agreement, which may be adjusted from time to time due to changes in any of the factors that may affect energy use of any of the Facilities, in accordance with the provisions of Section VII of this Agreement.

I. **"Equipment"** means all items of equipment provided to Client by McClure pursuant to this Agreement.

J. **"Facilities"** means the Client's facilities as detailed in Schedule "A".

K. **"Guaranteed Energy Savings,"** means the amount of dollar savings, as shown on Schedule D, that McClure guarantees that the Client will realize in EC Savings from the EC Measures during the Energy Savings Period.

L. **"Program"** means the performance based guaranteed energy savings program, which covers the full complement of EC Measures to be designed, implemented and monitored by McClure pursuant to this Agreement, including the McClure Guaranteed Energy Savings.

M. **"Substantial Completion"** means when all the items of new Equipment included in the EC Measures for the Program are operational and McClure notifies the Client thereof in writing and the Client confirms the same in writing to McClure, which confirmation shall not be unreasonably withheld. The Substantial Completion date shall be the earlier of:

(a) The date of which Client executes a Certificate of Substantial Completion attached hereto as Schedule "M(a)"

Or

(b) Twelve (12) months after McClure's receipt of Customer's Notice to Proceed subject to adjustments set forth in Section XXIX of this Agreement.

N. "**Investment Grade Audit (IGA)**" means the detailed comprehensive analysis of the Clients facilities, equipment and operating procedures for the purposes of evaluating various EC Measures for their energy savings potential, maintenance savings potential, appropriateness for the facility, and installation costs.

III. EC MEASURES:

A. The Client authorizes McClure to design, implement and monitor the Program, and McClure agrees to design, implement and monitor the Program, under and subject to the terms and conditions provided in this Agreement. McClure, itself or through its subcontractors, shall supply all labor, materials, equipment, management, and supervision necessary to design, install and commission all EC Measures. McClure's responsibilities to perform the EC Measures described on Schedule E for each of Client's Facilities (on a Facility-by-Facility basis and not necessarily on a simultaneous basis) shall include:

1. providing all necessary designs, plans and specifications;

2. selecting subcontractors; provided however, Client shall have the right to reject any subcontractor in Client's sole discretion that has not been previously approved in relation to the Notice to Proceed.

3. awarding subcontracts;

4. obtaining and evaluating submitted drawings on all equipment to be provided;

5. progress inspections during installation;

6. training the Client's personnel on proper operation of the newly installed equipment;

7. final inspection; and

8. commissioning or start-up of each item of Equipment.

B. The Client shall provide McClure and its subcontractors with access to all of the Facilities, as well as to available information requested by McClure about the Facilities and shall cooperate fully with McClure at all stages of the implementation of the EC Measures. The Client represents that it is the owner or lessee of the Facilities, that it will be the owner or lessee at all times during which any work under this Agreement is performed and during the Energy Savings Period, and that it will obtain and provide evidence of the consent of any mortgagee, owner, or other party who may have the right to disapprove any work to be done on the Facilities.

C. McClure will be required to work with current building management and maintenance personnel, to coordinate construction and provide appropriate training in the operation of all retrofits. No equipment shall be installed that will require the hiring of additional personnel by the Client unless contract negotiations produce an explicit exemption from this rule for a specific issue.

D. Client shall retain the option to; approve proposed equipment, materials, products and installation plans that may be proposed in the project that has otherwise not been previously pre-approved in relation to the Notice to Proceed as described in Section I, Background, of this Agreement or as described in Attachment A, “Scope of Work” and Attachment C, “Major Equipment Data” of this Agreement.

E. Client shall retain the right to: (i) approve equipment specifications and installation plans for any proposed changes prior to the implementation of any modifications; and (ii) make routine inspections and be present during any equipment and systems commissioning procedures conducted; If Client approval is requested, Client shall grant or deny the request within three (3) weeks of receipt of proposed requested change.

F. Client reserves the right of final approval over the scope of work and all end use conditions not previously approved and agreed upon in relation to the Notice to Proceed as described in Section I, Background, of this Agreement or as described in Attachment A, “Scope of Work” and Attachment C, “Major Equipment Data” of this Agreement.

G. All drawings, reports and materials prepared by McClure in performance of the contract shall become the property of Client and shall be delivered to them as needed or within thirty (30) days after construction is completed and accepted by the Client that the project is fully installed and operating.

IV. MAINTENANCE:

A. The Client shall maintain all Equipment installed under this Agreement in a manner consistent with the manufacturer's recommended maintenance schedules and procedures.

B. The Client acknowledges and consents to McClure's right to monitor EC Savings and energy management performance by conducting onsite measurements, including but not limited to, reading meters and installing and observing onsite monitoring equipment ("Monitoring Services"). The Client agrees to cooperate fully with any such measures instituted by McClure pursuant to this Subsection. McClure shall not institute any measures which reasonably interfere with the business of the Client conducted at the Facilities.

V. EC SAVINGS:

A. EC Measures that are designated for the **Option A** method of Measurement and Verification (as set forth in Schedule L) will be measured with spot or short- term metering. Key performance factors such as lighting hours will be stipulated as part of the contract. McClure will submit a report of the results to the client upon completion of the monitoring period. If the EC Measures fail to meet the projected EC Savings, McClure will repair or modify the EC Measures until the required operation is achieved. If the EC Savings cannot be met after modification, McClure will calculate the annual energy use of the EC Measures at the installed efficiency and pay the client the difference between the base year and cost and the calculated cost.

B. EC Measures categorized as **Option B** for Measurement and Verification (as set forth in Schedule L) will be tested for energy efficient operation at the time of system start up. If the EC Measures do not operate in accordance with parameters defined in the design documents and the energy calculations, McClure will modify or repair the EC Measures until specified conditions are met. If the EC Measures cannot meet the specified operation criteria, McClure will calculate the annual energy use of the EC Measures at the installed efficiency and pay the client the difference between the base year cost and the calculated cost.

C. EC Measures categorized as **Option C** for Measurement and Verification (as set forth in Schedule L) will be measured with the "whole house" method. The current energy bills are compared to historical energy bills. The historical energy bills are referred to as the baseline.

D. EC Measures categorized as **Option D** for Measurement and Verification (as set forth in Schedule L) will be measured with computer simulation of building energy use.

If the projected energy savings are verified through either Options A, B, or D the client will (i) accept the EC Measures as complete, (ii) agree that long term and ongoing savings as defined in the contract schedules will be realized and (iii) waive any further measurement and verification of the EC Measures to include metering, site inspections and reporting.

E. Calculation of EC Savings shall be derived from the cumulative monthly savings achieved from the sum of the Energy Use Savings, Fuel Switch Savings, Energy Rate Reduction Savings,

Maintenance and Materials Savings, and Other Identified Savings, all as defined below, as adjusted pursuant to changes in the factors affecting energy use, as provided in Section VII of this Agreement.

(i) **"Energy Use Savings"** are those savings achieved through reduction in energy and demand use. McClure will calculate Energy Use Savings achieved at each of the Facilities by subtracting the energy consumption for the then current monthly period from the Energy Use Base for the corresponding month as set forth in Schedule B hereof, and multiplying the number of units saved (i.e., therms of natural gas, kilowatts, kilowatt hours, pounds of steam, and gallons of oil) by the Base Energy Rates applicable to such monthly period. The dollar amount arrived at by such calculation shall be the Energy Use Savings for such monthly period.

(ii) **"Fuel Switch Savings"** are those savings achieved by switching to a more economical source of energy. McClure will calculate Fuel Switch Savings by subtracting the cost of the alternate energy utilized during each monthly period from the Energy Use Savings for such corresponding period. The cost of the alternate energy utilized is determined by multiplying the number of units of alternate energy utilized by the average unit cost applicable to such monthly period. In no case, however, shall the unit costs used in this calculation be greater than the Base Energy Rate for such alternate energy used.

(iii) **"Energy Rate Reduction Savings"** are those savings achieved through a reduction in fuel and/or electricity rates by one of the following means:

(a) Improve rate from local electric utility company, natural gas company, or fuel company,

(b) Direct purchase of natural gas or electricity, or

(c) Bulk purchase of fuel.

(d) Installation of equipment to provide a secondary fuel source so that the primary fuel can be supplied on an interruptible basis

(iv) **"Materials and Maintenance Savings"** are those savings achieved through reduction in regularly needed materials and maintenance due to the implementation of the EC Measures identified by McClure, which are stipulated as set forth in Schedule J.

(v) **"Other Identified Savings"** are those savings identified by McClure that may result from performance under this Agreement, and which do not meet the definition of the other types of savings referenced in this Section V. If such savings are agreed to by the Client, for the purposes of meeting the Guaranteed Energy Savings, these savings will be detailed in a schedule appended to this Agreement. Such savings will then be considered as a component of the EC Savings for the purposes of this Agreement.

If the Client fails to notify McClure of changes in factors affecting energy use, as required under Section VII hereof, EC Savings shall be calculated using good faith estimates.

VI. ENERGY SAVINGS GUARANTY:

A. Subject to changes in factors affecting energy use, as discussed in Section VII of this Agreement, McClure guarantees that the Client will realize total EC Savings from the EC Measures during each Contract Year of not less than the Guaranteed Energy Savings set forth on Schedule D of this Agreement. Savings in any year are guaranteed to the extent necessary to make payment under the contract year. Savings will meet or exceed the cost of the energy conservation measures to be evaluated, recommended, designed, implemented or installed under this Agreement.

B. If the projected energy savings are verified through either Options A, B, or D the client will (i) accept the EC Measures as complete, (ii) agree that long term and ongoing savings as defined in the contract schedules will be realized and (iii) waive any further measurement and verification of the EC Measures to include metering, site inspections and reporting.

C. If the Client's EC savings are less than the Guaranteed Energy Savings for the first year, McClure will repair or modify the EC Measures until the required savings are achieved. If the EC Savings cannot be met after modification, McClure will calculate the Guaranteed Energy Savings shortfall and will pay the Client the shortfall for year one. McClure will pay the year one shortfall through the length of the contract including escalation of energy costs.

D. Should a disagreement arise as to the calculation of annual total EC Savings, an independent public accounting firm may be engaged by either party to conduct a review and give an opinion on whether the calculation of annual dollar savings or deficiencies as prepared by McClure is fairly stated in accordance with this Agreement. The independent public accounting firm shall be mutually agreed upon by the parties (if the parties cannot agree upon an accounting firm, then each shall designate a firm, and the two designated firms shall identify a mutually agreeable third firm). The independent public accounting firm shall include in its report any exceptions determined by its review. Exercise of the right to request a review shall in no way effect the Client's obligation to make current payments pursuant to this Agreement unless otherwise described herein. Any payments between the parties necessary to resolve any irregularities identified in the review will be made within 60 days after submission of the review to the parties. If the review is called by McClure, McClure shall pay the cost of the review. If the review is called for by the Client, the following structure will be applied to paying for the review:

If the review determines that McClure's preparation of the annual total EC Savings was more than 10% in error, McClure shall pay the entire cost of the review; however, if McClure's determination of the annual total EC Savings are in error of 10% or less than the amounts as determined by the independent public accounting firm, the Client shall pay for the entire cost of the review. In any case, the annual Energy Savings Report shall be amended to reflect the findings of the review and the calculations of savings relating to the guarantee will be modified if necessary.

VII. CHANGES IN FACTORS AFFECTING ENERGY USE:

A. Certain factors that may affect energy use of the Facilities are taken into account when establishing the Energy Use Base. These factors include, without limitation, hours and levels of occupancy; adjustments in labor force; building use and operational procedures; temperature, humidification and ventilation levels; installed lighting and scheduled use; building construction and size; general level of repair and efficiency of heating and air conditioning equipment and other energy-using equipment; the amount of heating and air conditioning and other energy-using equipment. McClure has established the initial Energy Use Base after consideration of these factors and certain other anomalous use of the Facilities. The standards of occupancy and comfort set forth in Schedule J to this Agreement, includes the assumptions that McClure has utilized in consideration of these factors in establishing the Energy Use Base. Client acknowledges and understands that due to changes in the factors affecting energy use, the Energy Use Base may be adjusted by McClure from time to time to more accurately reflect the affect that a change in any of the factors has to the energy use of a Facility. In addition, utility data collected during the period before construction of any EC Measures may indicate a change of the energy use pattern at a Facility and require an adjustment to the Energy Use Base. McClure shall notify the Client, in writing, of all such adjustments.

B. The Client shall notify McClure within thirty (30) business days of any change in any factor that affects energy use at any of the Facilities. McClure will determine the effect that any such change will have on EC Savings and present to the Client a written analysis of the effects of the changes. Changes that are long term or permanent will be reflected in an adjustment to the Energy Use Base. Temporary changes that affect energy use will be calculated and used as an adjustment to the corresponding month's EC Savings.

C. If a change in any of the factors used in establishing the Energy Use Base occurs and results in a reduced Energy Use Base, then the Guaranteed Energy Savings will be decreased as necessary to reflect such adjustment. If, however, the change results in an increase to the Energy Use Base, then there will be no corresponding adjustment to the Guaranteed Energy Savings.

D. Client and McClure may from time to time desire to make a major construction or other change to the Facilities (outside of the EC Measures set forth in this Agreement) to one or more of the Facilities for the express purpose of increasing EC Savings. Any such change will be made only with the prior consent of both parties, which will not be unreasonably withheld. The Energy Use Base will not be adjusted to reflect any changes agreed to under this subparagraph. If McClure elects to pay for the cost of any such changes, then the same may be implemented by McClure without the Client's consent so long as such changes do not unreasonably interfere with the conduct of Client's business.

E. If Client performs any large-scale changes to any of its Facilities, including but not limited to building additions, new buildings, and new or changed HVAC equipment, which is outside of the EC Measures contemplated in this Agreement, McClure has the right to charge the Client for a new engineering study or such other work reasonably required by McClure to assess the effect of such changes on savings. Such hours will be billed at current McClure engineering rates. Before initiating such work, McClure will notify the client in writing of the intent and cost associated with the work. The Client will, within 30 days in writing, notify McClure with permission to proceed, or alternatively at no charge, will stipulate that the projected EC Savings for the affected Facility have been achieved.

VIII. WARRANTIES; REMEDIES; LIMITATIONS OF LIABILITY:

A. McClure will perform the Work in a professional and workmanlike manner. McClure will promptly re-perform any non-conforming Work for no charge as long as Client provides written notice to McClure within one (1) year following Substantial Completion or such other period identified in Attachment A. If McClure installs or furnishes goods or equipment under this Agreement, and such goods or equipment is covered by an end-user warranty from their manufacturer, McClure will transfer the benefits of such warranty to Client. The foregoing remedy with respect to the Work, together with any remedy provided by goods or equipment manufacturers, shall be Client's sole and exclusive remedies for warranty claims. Client agrees that the one (1) year period following Substantial Completion, or such other period identified in Attachment A, shall be a reasonable time for purposes of submitting valid warranty claims with respect to the Work. These exclusive remedies shall not have failed of their essential purpose so long as McClure transfers the benefits of any goods or equipment end-user warranty to Client and remains willing to re-perform any non-conforming Work for no charge within the one (1) year period described above or such other period identified in Attachment A. NO OTHER EXPRESS OR IMPLIED WARRANTIES, INCLUDING IMPLIED WARRANTIES OF MERCHANABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE PROVIDED BY MCCLURE. This warranty does not extend to any Work that has been abused, altered, misused, repaired by Client or third parties without the supervision or prior written approval of McClure, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage.

The one (1) year period set forth herein shall not be extended by corrective work performed by McClure pursuant to this section. Notwithstanding any language herein to the contrary, if any defect in the Equipment is due to: (i) an error, omission, negligence or willful misconduct of the Client, Client employee or other agent or invitee of the Client, or (ii) any act which would customarily be covered by standard forms of property or casualty insurance then, in each case, the Client shall pay McClure for the reasonable and customary time and materials cost of the repair, and such charges shall be in addition to all other payments due McClure under this Agreement.

B. In no event, whether under theory of contract, warranty, tort (including negligence), strict liability, or otherwise will McClure or any subcontractor be liable for any indirect, special, incidental or consequential damages, including without limitation, loss of use of any equipment or property, cost of substitute equipment or service, lost profits or down-time costs, even if Client has been advised as to the possibility of such damages. With respect to Guaranteed Energy Savings, the total liability of McClure for each Contract Year shall not exceed the Guaranteed Energy Savings for such Contract Year, as set forth on Schedule D of this Agreement. With respect to all other claims in any manner relating to, or in connection with, this Agreement or the work being performed hereunder, the total liability of McClure shall not exceed the Total Project Fee set forth in Schedule F.

C. McClure Company is not providing advice with respect to municipal financial products or the issuance of municipal securities, including advice with respect to their structure, timing, terms and other similar matters. The Energy Savings Guarantee set forth in section VI of this Agreement, the Investment Grade Audit and the calculations on which the Guarantee and the Investment Grade Audit are based are the result of advice provided by engineers working for McClure Company.

IX. REPRESENTATIONS AND WARRANTIES OF CLIENT:

A. The Client hereby warrants and represents to McClure that: (i) the Client has provided McClure with all records heretofore requested by McClure and the information set forth therein is, and all information in other records to be subsequently provided by the Client pursuant to this Agreement will be, true and accurate in all material respects; and (ii) the Client has not entered into any contracts or agreements with other persons or entities regarding the provision of energy management services or with regard to servicing any of the Equipment located on the Facilities.

B. The Client represents and warrants that it has the legal power and authority to enter into this Agreement and to consummate the transactions contemplated hereby, in accordance with the terms and conditions of this Agreement. The Client has received all necessary authorizations, approvals or other action by all governmental authorities or regulatory bodies required for the due execution, delivery and performance by the Client under this Agreement. This Agreement is legally valid and binding on the Client. The Client has obtained all necessary financing commitments to finance the construction of the EC Measures and this Project.

X. AFFIRMATIVE COVENANTS OF CLIENT:

A. The parties hereto acknowledge and agree that McClure has entered into this Agreement in material reliance upon the prospect of earning compensation based on projected EC Savings exceeding Guaranteed Energy Savings from the Facilities, as set forth herein. The parties further acknowledge and agree that said EC Savings will not likely be obtained unless certain procedures and methods of operation designed for energy conservation shall be implemented and followed by the Client on a regular basis. The Client agrees that it shall adhere to, follow and implement the procedures and methods of operation and maintenance set forth in this Agreement and the Schedules hereto.

B. The Client agrees that McClure shall have the right, with prior notice, to inspect the Facilities to determine if the Client is in compliance with its obligations as set forth above. In the event that any inspection discloses that the Client has failed on the date of the inspection to be in compliance with any items set forth above, then the Guaranteed Energy Savings shall be assumed to have been achieved for and with respect to the portion of the Contract Year during which such failure shall have existed.

C. The Client will provide McClure with copies of any successor or additional contracts for the management or servicing of pre-existing equipment or the Equipment, which may be executed form time to time hereinafter within ten (10) days after execution thereof.

XI. AFFIRMATIVE COVENANTS OF MCCLURE

McClure must secure all licenses and permits and comply with all federal and state laws with respect to this project. All work completed under this contract must be in compliance with all building and codes appropriate accreditation, certification and licensing standards.

This Agreement is a Prevailing Wage Rate Agreement and subject to the provisions, duties, obligations, remedies and penalties of the Pennsylvania Prevailing Wage Act, Act 15, 1961, P.L. 981, as amended, 43 P.S. Section 165-1 et seq.

XII. [Intentionally Omitted]

XIII. [Intentionally Omitted]

XIV. WORKING HOURS AND SCHEDULE:

It is agreed that all installation work during the normally occupied school period ("non-summer break") shall be conducted without disruption to the classroom and teaching environments or conducted during "off hours" at no additional expense to the Client. Work performed during occupied periods must be returned to a condition for full use by the Client. Furthermore, it is agreed that installation work inherently disruptive to the classroom and teaching environments will be conducted during the unoccupied ("summer break") school period during normal working hours. Normal working hours shall be generally defined as 6AM to 5PM, Monday through Friday and / or in compliance with local ordinances.

XV. [Intentionally Omitted]

XVI. TERMINATION OF AGREEMENT:

A. McClure may terminate this Agreement without further responsibility or liability upon the occurrence of any of the following events:

1. All or any part of Client's ownership or lessee's interest in the Facilities is transferred voluntarily or involuntarily by any means including but not limited to the transfer of any ownership interest in the Client;

2. If Client defaults on any payment or any other obligation to McClure under this Agreement and fails to cure the same within (30) days after written notice from McClure.

B. Client may terminate this Agreement at any time after the Client has signed off on the Measurement and Verification results and the Client has met all financial obligations as detailed in Section XVII below.

C. Either party may terminate this Agreement pursuant to Section XIX below.

D. In the event of termination, McClure and Client shall continue to be responsible for their respective payment obligations accrued under this Agreement prior to the effective date of termination.

XVII. FEES AND TERMS OF PAYMENT:

A. McClure will, on or about the first day of each month during the construction period, calculate the value of the work performed on account of the Total Project Fee, calculated by reference to the values set forth on Schedule F, during the preceding month and submit same to the Client for payment. A fee of twenty percent (20%) of the Total Project Fee will be invoiced to the Client upon both parties' acceptance of the Agreement. All invoices of McClure shall be due and payable by Client within (30) days of the invoice date. The Client shall have (20) days from the date of receipt of said invoice to notify McClure of any irregularity in the billing. Interest at a rate of 0.5% per month will accrue on all unpaid balances more than (30) calendar days after the invoice date. Title to the EC Measures shall not pass until full payment by Client of the Total Project Fee. Without limitation to the obligation of Client to pay to McClure the Total Project Fee, when due as provided herein, if Client receives any third party financing, Client shall make payment to McClure directly or authorize such third party to make payment to McClure directly.

B. McClure and Client acknowledge that this Agreement is subject to the provisions of 62 Pa. C.S.A. §3755. Therefore, notwithstanding any provision of this Agreement to the contrary, in the event that insufficient funds are available in Client's budget for the next budget year to make payments Client is required to make McClure under this Agreement, Client shall have the option to non-appropriate the funds to make such required payment for the next budgets year. If Client chooses this option, all obligations of Client under this Agreement regarding payments from Client to McClure shall be terminated at the end of the current budget year without penalty or liability to McClure of any kind, and Client shall deliver possession of all facilities provided to Client by McClure hereunder to McClure.

XVIII. INDEPENDENT CONTRACTOR:

McClure is an independent contractor and is not an employee, partner, legal representative, joint venture or agent of Client. McClure does not in any way assume any of the contractual or other obligations of Client to other parties under any agreements referred to herein or otherwise. The Client is not an employee, partner, legal representative, joint venture or agent of McClure. The Client does not in any way assume any of the contractual or other obligations of McClure to other parties under any agreements referred to herein or otherwise.

XIX. CASUALTY OR CONDEMNATION OF FACILITIES:

Any fire, flood or other casualty or condemnation affecting any portion of the Facilities may be a material change. If so, the notice thereof shall be given to McClure by Client and the required Energy Use Base modifications will be made. If any fire, flood or other casualty or condemnation renders a majority of the Facilities incapable of being occupied and the affected portion is not reconstructed or restored within 120 days from the date of such casualty or condemnation, either party may terminate this Agreement by delivery of written notice to the other, in which case McClure shall receive the payments described in Section XVII. If any fire, flood or other casualty or condemnation renders any particular Facility incapable of being occupied and such Facility is not

reconstructed or restored within 120 days from the date of such casualty or condemnation, McClure may remove such Facility for the purpose of calculating the Energy Savings Guaranty, in which case McClure shall receive the payments described in Section XVII with respect to such Facility, and this Agreement shall continue in full force and effect. Notwithstanding anything to the contrary in this Agreement, in no event shall McClure be obligated to make any payment to Client under the Guaranteed Energy Savings with respect to any Facility for any period of time in which such Facility incurs any casualty, including without limitation, from fire, flood, collapse or otherwise.

XX. NOTICES:

Any notice required or permitted to be given under this Agreement shall be sufficient if in writing, and if sent by registered or certified mail, postage prepaid, return receipt requested, or by facsimile, to either party at the following addresses:

If to Client:
SOUTHERN COLUMBIA AREA SCHOOL DISTRICT
800 Southern Drive
Catawissa, Pennsylvania 17802
Fax No.: (570)-356-2892

Attention: District Superintendent

If to McClure:
MCCLURE COMPANY
4101 North Sixth Street
Harrisburg, Pennsylvania 17110
Fax No.: (717) 236-5239

Attention: President

Notice shall be deemed given two days after sent by mail, or on the date of receipt of confirmation of fax, and such receipt is confirmed orally by the recipient.

XXI. GOVERNING LAW:

This Agreement shall be governed and construed under the laws of the Commonwealth of Pennsylvania, notwithstanding its law of conflicts of law. This agreement is for a public work project and the McClure Company is subject to, and must comply with the requirements of the Pennsylvania Public Works Employment Verification Act, Act 127-1012 (the “Act”).

XXII. INDEMNIFICATION:

A. To the extent of McClure's negligence or intentional misconduct, McClure shall indemnify, defend, and hold harmless the Client and Client's representatives and employees from and against all claims, damages, losses, and expenses arising out of the performance of the work, provided any such claim, damage, loss or expense is caused by any negligent or intentional misconduct of

McClure, McClure's representative or employees. McClure shall require all contractors and subcontractors to deliver to McClure and Client a certificate of insurance coverage with types and amounts of insurance as set forth in Schedule G. All such insurance coverage for contractors and subcontractors shall list McClure and Client as additional insureds.

B. To the extent of Client's negligence or intentional misconduct, Client shall indemnify, defend and hold harmless McClure and McClure's representatives and employees from and against all claims, damages, losses and expenses arising out of the performance of the work, provided any such claim, damage, loss or expense is caused by any negligent or intentional misconduct of Client, Client's representative or employees.

XXIII. DOCUMENTS:

All drawings and specifications prepared by McClure shall remain the property of McClure until such time as the Total Project Fee has been paid in full, at which time, said documents shall become the property of Client. Client shall not make any changes to said documents without the prior written consent of McClure. Client grants McClure a perpetual, non-exclusive and royalty-free license to use all such drawings, designs and specifications.

XXIV. SEVERABILITY:

This Agreement shall be severable and to the extent that any part of the Agreement is unenforceable for any reason whatsoever, the remaining parts of this Agreement shall remain in full force and effect.

XXV. ASSIGNMENT; SUCCESSORS AND ASSIGNS:

This Agreement is not assignable by either McClure or Client without the prior written consent of the other party.

XXVI. INSURANCE; RISK OF LOSS:

In the performance of the services under this Agreement, McClure shall use reasonable care to prevent the loss or damage of any of Client’s equipment or property. However, notwithstanding that Client’s equipment may be in the care, custody or control of McClure in connection with the performance of services under this Agreement, risk of loss or damage to the equipment and property shall remain with the Client at all times. Nothing in this Agreement places any responsibility or liability on McClure or its subcontractors for conditions pre-existing at Client’s Facilities or on the equipment being worked upon. Client shall defend, indemnify and hold harmless MCCLURE and its subcontractors against any claims or liabilities based on such pre-existing conditions. McClure and Client at all times during the term of this Agreement shall carry the types of insurance coverage as set forth in the attached Schedule G.

XXVII. MEDIATION OR ARBITRATION:

Any dispute, controversy or claim arising out of or relating to this Agreement or any breach or alleged breach hereof, shall, upon the request of any party involved (and without regard to whether or not any provision of this Agreement expressly provides for arbitration), be submitted to mediation or litigation in the Court of Common Pleas of Columbia County. The expenses of the mediation or litigation shall be borne by the individually by the parties to the mediation or litigation, provided that each party shall pay for and bear the cost of its own experts, evidence and counsel.

XXVIII. PRIOR AGREEMENTS:

This Agreement supersedes the terms and conditions of any prior agreements, understandings or representations, oral or written, between the parties, and contains the entire agreement of the parties with respect to the subject matter herein.

XXIX. EXCLUDED MATERIAL AND ACTIVITIES:

A. The Client recognizes that in connection with the installation and/or service or maintenance of Equipment at the Client's Facilities, McClure may encounter, but is not responsible for, any work relating to (i) asbestos, materials containing asbestos, or the existence, use, detection, removal, containment or treatment thereof, or (ii) pollutants, hazardous wastes, hazardous materials, contaminants, or the storage, handling, use, transportation, treatment or the disposal, discharge, leakage, detection, removal, or containment thereof. The materials and activities listed in the foregoing sentence are hereinafter referred to as "Excluded Materials and Activities". The Client agrees that if McClure's performance of any work under this Agreement involves Excluded Materials and Activities, Client shall bear the sole risk and responsibility therefore. In the event McClure discovers Excluded Materials, McClure shall immediately cease work, remove all McClure personnel or subcontractors from the site, and notify the Client. The Client shall be responsible to handle such Excluded Materials at the Client's expense. McClure does not take title to any Excluded Materials, and does not assume any responsibility for the transportation, handling or disposal of Excluded Materials. If Excluded Materials are discovered at a Facility, McClure shall undertake no further work at such Facility except as authorized by the Client in writing.

B. Notwithstanding anything to the contrary in this Agreement, the Client hereby releases and agrees to indemnify, defend, and hold harmless McClure, its assigns, consultants, contractors, subcontractors, and their respective shareholders, officers, directors, agents and employees (and each of them) from and against all costs, claims, fines, fees, damages or liability (including without limitation, all attorneys' fees and costs, costs of settlement or suit) arising out of, or in any manner connected with any work related to Excluded Materials and Activities performed by or for the Client, or with respect to the ownership, handling or transportation of Excluded Materials, whether such claim or action arises in contract, warranty, tort (including negligence), strict liability, environmental liability, or otherwise, and from any cause whatsoever. Any such proceeding or suit shall not be settled without the prior written consent of McClure, which consent shall not be unreasonably withheld.

XXX. BONDING

Performance and payment bonds will be provided which will guarantee the installation and/or improvements only. McClure Company will be responsible for the energy savings and the guaranteed energy savings, which are not covered by the bond. NOW THEREFORE, the parties hereto, have caused their duly authorized representatives to execute and deliver this Agreement as of the date first above written.

McClure Company

Signature: _____

Print Name: _____

Title: _____

Southern Columbia Area School District

Signature: _____

Print Name: _____

Title: _____

SCHEDULE A – CLIENT FACILITIES

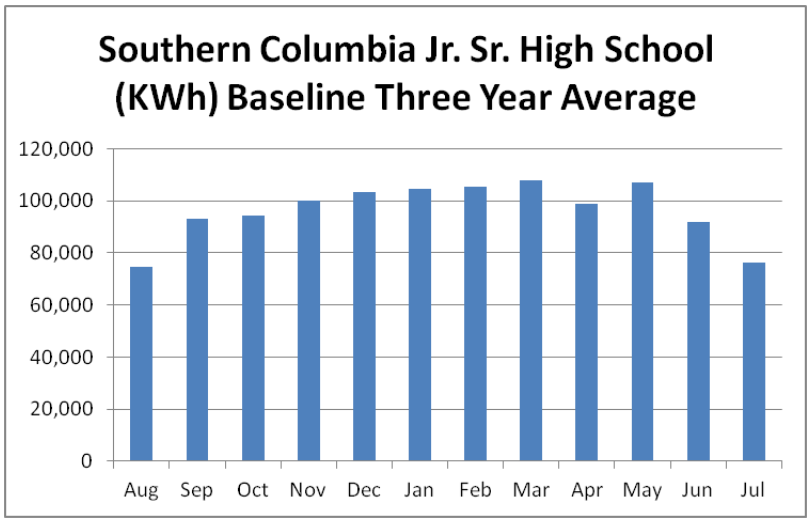
Building Name	Area (Sq Ft)	Building Type
Southern Columbia High School/Middle School	174,215	School
G.C. Hartman Elementary School	110,545	School
Southern Columbia Bus Garage	7,500	Garage

SCHEDULE B – ENERGY USE BASE

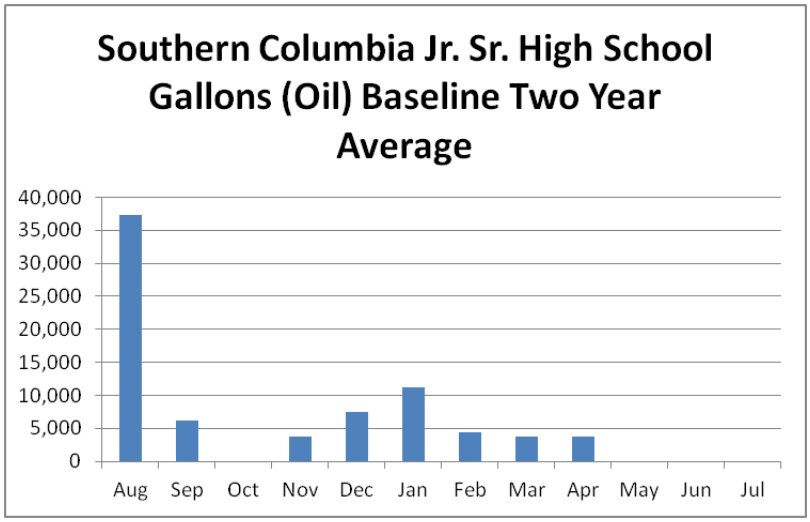
The energy baseline for the facilities is as follows:

- High School / Middle School
  - Electric – August 2010 – July 2013
  - Oil – August 2012 – April 2014
- G.C. Hartman Elementary School
  - Electric – August 2010 – July 2013
  - Oil – August 2012 – April 2014
- Bus Garage
  - Electric – August 2010 – July 2013

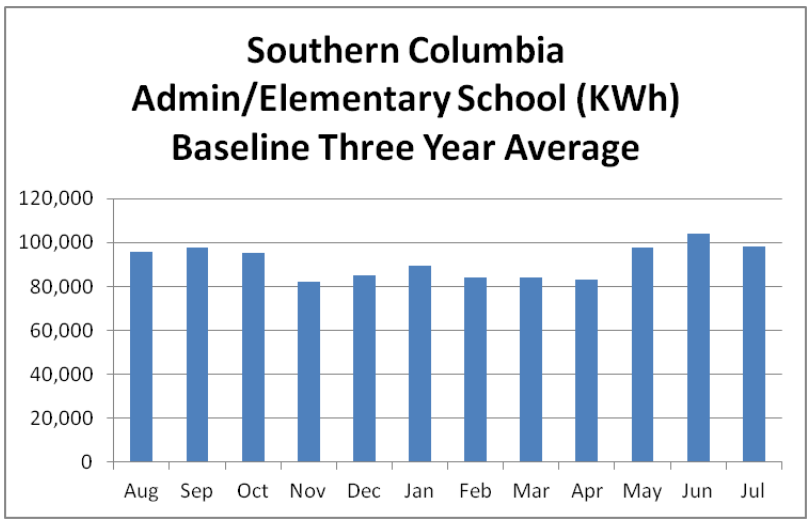
Southern Columbia Jr. Sr. High School (KWh) Baseline Three Year Average	
Month	(KWh)
Aug	74,700
Sep	93,100
Oct	94,500
Nov	100,000
Dec	103,500
Jan	104,400
Feb	105,600
Mar	107,800
Apr	98,700
May	106,900
Jun	91,900
Jul	76,400



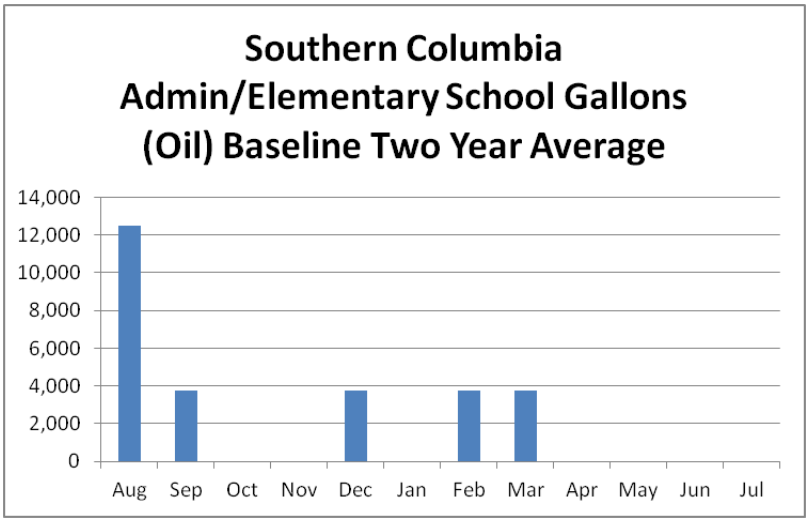
Southern Columbia Jr. Sr. High School Gallons (Oil) Baseline Two Year Average	
Month	Gallons (Oil)
Aug	37,397
Sep	6,150
Oct	0
Nov	3,750
Dec	7,500
Jan	11,250
Feb	4,350
Mar	3,750
Apr	3,750
May	0
Jun	0
Jul	0



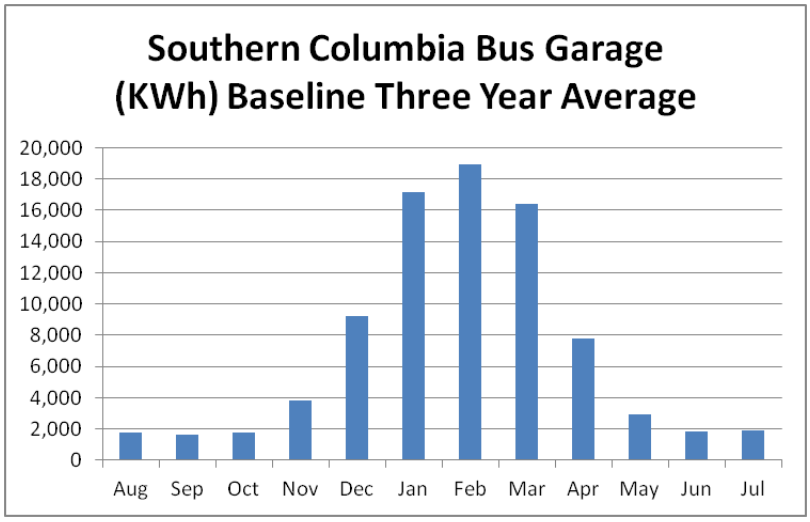
Southern Columbia Admin/Elementary School (KWh) Baseline Three Year Average	
Month	(KWh)
Aug	96,000
Sep	97,500
Oct	95,250
Nov	82,250
Dec	85,250
Jan	89,500
Feb	84,000
Mar	84,000
Apr	83,000
May	97,500
Jun	104,250
Jul	98,000



Southern Columbia Admin/Elementary School Gallons (Oil) Baseline Two Year	
Month	Gallons (Oil)
Aug	12,500
Sep	3,750
Oct	0
Nov	0
Dec	3,750
Jan	0
Feb	3,750
Mar	3,750
Apr	0
May	0
Jun	0
Jul	0



Southern Columbia Bus Garage (KWh) Baseline Three Year Average	
Month	(KWh)
Aug	1,769
Sep	1,603
Oct	1,779
Nov	3,843
Dec	9,239
Jan	17,131
Feb	18,965
Mar	16,431
Apr	7,789
May	2,928
Jun	1,859
Jul	1,944



SCHEDULE C – BASE ENERGY RATES

ECM Savings from all measures at the Southern Columbia Area School District will be calculated by using the Base Energy Rates listed below. These rates are based on the annual usage and cost from the district provided utility bills for the base line periods listed in Schedule B above.

The Base Energy Rates listed below will be increased each year on a cumulative basis at the escalation rates set forth in Section II, Paragraph B.

Electric Rates

1. Southern Columbia High School/Middle School: $0.10116 / KWH
2. G.C. Hartman Elementary School: $0.10116 / KWH
3. Southern Columbia Bus Garage: $0.10116 / KWH

Oil Rates

1. Southern Columbia High School/Middle School: $3.30000 / Gallon
2. G.C. Hartman Elementary School: $3.30000 / Gallon

Propane Rates

1. Southern Columbia High School/Middle School: $1.85000 / Gallon
2. G.C. Hartman Elementary School: $1.85000 / Gallon

The fuel rates listed above serve as the baseline rate starting June 2015. Escalation will take effect for Contract Year 1 and all subsequent years.

While some construction activities may begin during the current school year, a large portion of the project will be implemented and commissioned based on construction beginning in June 2014

12 Month Construction Period -	June 2014 through May 2015
Contract Year 1 -	June 2015 through May 2016

SCHEDULE D – GUARANTEED ENERGY SAVINGS PER CONTRACT YEAR

The Guaranteed Energy Savings per Contract Year is shown in column (2) in the table below. Year One (1) savings are measured and verified. Years Two through Twenty (2 – 20) are projected based on the Year One (1) measurement. Operational Savings in Column 3 include both Operational Savings and Warranty Savings in Years One (1) through Five (5). See Detailed Operational and Maintenance Worksheet on the next page.

As of the date of this agreement, the District is analyzing funding options in collaboration with their Financial Advisor. The options vary by term and structure and will be custom tailored to best fit the District's current debt portfolio. For this reason, "lease payments", Column 6 of Schedule D has been intentionally omitted.

Southern Columbia Area School District
Catawissa, PA
Retrofit
Project Proforma Cash Flow
20 Year Lease Term

Total Project Cost	4,651,350
Less: Customer Equity	-
Total Amount Financed	4,651,350
First Year Energy Savings	128,838
First year Operational Savings	36,721
Total First Year Savings	165,559

One Time Escalation

Electric	0.0%

Annual Escalation Rates

Electric	3.00%
Oil	4.00%
Propane	3.00%
Gas	3.00%
Coal	3.00%
Water	3.00%
Maintenance	3.00%

1	2	3	4	5	6	7	8	9
Year	**Energy Savings**	**Operational Savings**	**Total Savings**	**Avoided Capital Outlays**	**Lease Payments**	**Performance Assurance**	**Net Savings**	**Accumulated Savings**
const.	64,113		64,113				64,113	64,113
1	128,838	36,721	165,559	81,000		-	246,559	310,672
2	136,287	35,819	172,106	81,000		-	253,106	563,778
3	144,102	5,338	149,440	81,000		-	230,440	794,218
4	152,301	2,993	155,294	81,000		-	236,294	1,030,513
5	160,902	3,068	163,970	81,000		-	244,970	1,275,482
6	169,921	-	169,921	81,000		-	250,921	1,526,403
7	179,378	-	179,378	81,000		-	260,378	1,786,781
8	189,294	-	189,294	81,000		-	270,294	2,057,075
9	199,689	-	199,689	81,000		-	280,689	2,337,764
10	210,584	-	210,584	81,000		-	291,584	2,629,348
11	222,002	-	222,002	81,000		-	303,002	2,932,349
12	233,966	-	233,966	81,000		-	314,966	3,247,315
13	246,502	-	246,502	81,000		-	327,502	3,574,817
14	259,634	-	259,634	81,000		-	340,634	3,915,451
15	273,390	-	273,390	81,000		-	354,390	4,269,841
16	287,797	-	287,797	81,000		-	368,797	4,638,639
17	302,885	-	302,885	81,000		-	383,885	5,022,524
18	318,683	-	318,683	81,000		-	399,683	5,422,207
19	335,224	-	335,224	81,000		-	416,224	5,838,432
20	352,541	-	352,541	81,000		-	433,541	6,271,972
	4,568,033	83,939	4,651,972	1,620,000	-	-	6,271,972	

Detailed Operational and Maintenance Worksheet

Year	Mechanical Lighting Building Detail Operational Savings	Lighting Warranty Savings	Additional Operational Savings	Total Operational Savings
const.				
1	-	6109	$30,612	36,721
2	-	5207	$30,612	35,819
3	-	5338	$0	5,338
4	-	2993	$0	2,993
5	-	3068	$0	3,068
6	-		$0	-
7	-		$0	-
8	-		$0	-
9	-		$0	-
10	-		$0	-
11	-		$0	-
12	-		$0	-
13	-		$0	-
14	-		$0	-
15	-		$0	-
16	-		$0	-
17	-		$0	-
18	-		$0	-
19	-		$0	-
20	-		$0	-
	-	22,715	61,224	83,939

SCHEDULE E – ENERGY CONSERVATION MEASURES

The following section lists the Energy Conservation Measures (ECM's) for the Energy Services Program at “Client”. Details may be found in Attachment “A”, Scope of Work for Energy Conservation Measures and Attachment “B”, Lighting Audit and Attachment “C”, Commissioning.

ECM NUMBER	ECM TITLE
1	District Wide Lighting Upgrades
2	District Wide Building Envelope Upgrades
3	District Wide Plug Load Management
4	High School HVAC Upgrades
5	Middle School HVAC Upgrades
6	Elementary School HVAC Upgrades
7	High School Roofing Upgrades
8	Elementary School Roofing Upgrades

SCHEDULE F – TOTAL PROJECT FEE

The Total Project Fee is as follows: $4,651,350.00 (Four Million Six Hundred Fifty-One Thousand Three Hundred Fifty Dollars)

SCHEDULE G – INSURANCE

McClure, at all times during this Agreement, shall carry as a minimum the following amounts of insurance. Greater amounts will be carried where required by law:

(1) Workers' Compensation, etc.:	
(a) State	Statutory
(b) Applicable Federal (e.g. Longshoreman's)	Statutory
(c) Employer Liability	$100,000 each incident $500,000 disease-policy limit $1,000 disease-each employee
(2) Comprehensive General Liability:	
(a) Bodily Injury: $1,000,000 $1,000,000	 Each Occurrence Annual Aggregate, Products, and Completed Operations
(b) Property Damage $1,000,000 $1,000,000	 Each Occurrence Annual Aggregate
(c) Property Damage Liability Insurance will provide Explosion, Collapse, and Underwater coverage where applicable	
(d) Personal injury, with employment exclusion deleted $1,000,000	 Annual Aggregate
(3) Comprehensive Automobile Liability:	
(a) Bodily Injury: $1,000,000 $1,000,000	 Each Person Each Accident
(b) Property Damage: $1,000,000	 Each Occurrence

SCHEDULE H – ADDITIONAL TERMS AND CONDITIONS

McClure shall comply with all governmental requirements applicable to the work, under this Agreement, including without limitation to the following:

(a) Competent Workmen - According to Section 752 of the Public School Code of 1949, no person shall be employed to do work under such contract except competent and first class workmen and mechanics. No workmen shall be regarded as competent first class, within the meaning of this Act, except those who are duly skilled in their respective branches of labor, and who shall be paid not less than such rates of wages and for such hours of work as shall be established and current rates of wages paid for such hours by employers of organized labor in doing similar work in the district where work is being done.

(b) Discrimination Prohibited - According to Section 755, Public School Code of Pennsylvania, 1949 as amended, the contractor agrees:

(i) That in hiring of employees for the performance of work under this contract, or any sub-contract hereunder, no contractor, sub-contractor, nor any person acting on behalf of such contractor or sub-contractor, shall, by reason of race, creed or color, discriminate against any citizen of the Commonwealth of Pennsylvania who is qualified and available to perform the work to which the employment relates;
(ii) That no contractor, sub-contractor, nor any person acting on his behalf, shall in any manner discriminate against or intimidate any employee hired for the performance of the work under this contract on account of race, creed or color;
(iii) That there may be deducted from the amount payable to the contractor under this contract, a penalty of five dollars ($5) for each calendar day during which such person was discriminated against or intimidated, in violation of the contract; and,
(iv) That this contract may be canceled or terminated by the school district, and all money due or to become due hereunder may be forfeited, for a second or any subsequent violation of the terms or conditions of this portion of the contract.

(c) Human Relations Act - The provisions of the Pennsylvania Human Relations Act, Act 222 of October 27, 1955 (P.L. 744) (43 P.S. Section 951, Et. Seq.) of the Commonwealth of Pennsylvania prohibit discrimination because of race, color, religious, creed, ancestry, age, sex, national origin, handicap or disability, by employers, employment agencies, labor organizations, contractors and others. The contractor shall agree to comply with the provisions of this Act as amended that is made part of this specification. Your attention is directed to the language of the Commonwealth's non-discrimination clause in 16 PA. Code 349.101.

(d) Provision for the Use of Steel and Steel Products made in the U.S.A. - In accordance with Act 3 of the 1978 General Assembly of the Commonwealth of Pennsylvania, if any steel or steel products are to be used or supplied in the performance of the contract, only those produced in the United States as defined therein shall be used or supplied in the performance of the contract or any subcontracts there under. In accordance with Act 161 of 1982, cast iron products; shall also be included and produced in the United States. Act 141 of 1984 further defines "steel products" to include machinery and equipment. The act also provides clarifications and penalties.

(e) Environmental Statutes and Regulations - Contractor shall comply with all applicable provisions of federal and state laws dealing with the prevention of environmental pollution and the preservation of natural resources, including but not limited to Act 247 of October 25, 1972; the Federal Air Quality Act of 1967; the Clean Air Act; the Clean Water Restoration Act; the Water Pollution Control Act Amendments of 1956; the Water Quality Act of 1965; the Water Quality Improvement Act of 1970; the Water Pollution Control Act Amendments of 1972; the Water Facilities Act (see Consolidated Farmer's Home administration Act of 1961); the Watershed Protection and Flood Prevention Act; the Pennsylvania Air Pollution Control Act; the Clean Streams Law; the Solid Waste Management Act; the Municipal Waste Planning, Recycling and Waste Reduction Act; the Pennsylvania Sewage Facilities Act; AHERA; and all rules and regulations there under, including but not limited to those formulated by the United States Environmental Protection Agency and the Pennsylvania Department of Environmental Resources. Nothing contained in the Contract shall be construed as relieving Contractor in any way of Contractor's responsibility for strict compliance with all government requirements pertaining to environmental protection.

(f) Safety and Health Regulations - The Contract is to be governed at all times by applicable provisions of federal law, including but not limited to the following: William-Steiger Occupational Safety and Health Act of 1970, Public Law 91-596. Part 1910 - Occupational Safety and Health Standards, Chapter XIII of title 29, code of federal Regulations. Nothing contained in the Contract shall be construed as relieving Contractor in any way of Contractor's responsibility for strict compliance with all governmental requirements pertaining to health and safety.

(g) Bonds Required – McClure shall furnish and deliver to the Client at or before the execution of this Agreement by McClure:

(i) Performance Bond – A performance bond for the installation portion of the Agreement at one hundred percent (100%) of the contract amount, conditioned upon the faithful performance of the contract in accordance with the plans, specifications and conditions of the contract, within the time specified therein. Such bond shall be solely for the protection of the Client. The surety company which issues said bond must be legally authorized to do business in the Commonwealth of Pennsylvania and must have a rating of B+, A or A+ as determined by the A.M. Best company or an equivalent rating agency deemed satisfactory to Client.

(ii) Labor and Material Payment Bond – A labor and material payment bond at one hundred percent (100%) of the contract amount, solely for the protection of claimants supplying labor and/or materials to McClure to whom the contract was awarded, or to any of his subcontractors in the prosecution of the work provided for in such contract, and shall be conditioned for the prompt payment of all such material furnished or labor supplied or performed in the prosecution of the work. "Labor and/or materials" shall include public utility services and reasonable rentals of equipment, but only for periods when the equipment rented is actually used at the site. The surety company which issues said bond must be legally authorized to do business in the Commonwealth of Pennsylvania and must have a rating of B+, A or A+ as determined by the A.M. Best Company or an equivalent rating agency deemed satisfactory to Client.

(iii) Additional Security – Should any surety company providing any bond required in this Contract be deemed unsatisfactory to the Client, notice will be given to McClure to that effect, and McClure shall immediately substitute a new surety company or companies satisfactory to Client, without any additional cost or expense to Client.

(iv) Failure to Furnish Bonds – Failure to furnish and deliver any bond as required by this Contract, shall entitle the Client to declare McClure's Bid or Proposal to be non-responsive, and not the lowest responsible bid or proposal, and shall constitute a basis to award the contract to another bidder or proposer.

(h) Act 34, Act 151 and Act 114 Compliance - As stated in the original request for proposal, McClure will comply with all requirements of PA Act 34 Pursuant to Section 111 of the Public School code of 1949, Act of March 10, 1959, P.L. 30, No. 14, as amended, H.B. 1139, Session of 1985, 24 P.S. 111.

McClure Company will comply with all requirements of Act 151 of 2006, as amended, and obtain Department of Public Welfare Child Abuse History clearances for all on site personnel.

McClure Company will comply with all requirements of Act 114 of 2006, as amended, and obtain Federal Criminal History Reports not more than 1 year old in addition to other requirements listed within the Act.

SCHEDULE I – STANDARDS OF OCCUPANCY AND COMFORT

Listed below are the post project targeted baseline thermal comfort conditions and minimum lighting levels. See Table I.1 below for each building's baseline temperature set points and current operating status.

It is understood that existing and installed equipment may not allow for exact times and temperatures to be met, but every effort will be made to meet the below standards as closely as the equipment allows.

Buildings listed with "as is" are to remain as currently operating at the established set points, ventilation rates, and schedule set forth by the district. The baseline for those not listed "as is" will be as described, and while there are space outliers, such as gyms and public meeting spaces, the schedule will be set up as listed with the prescribed set points. Modifications can be made, but could impact the level of savings and may require an adjustment in the M&V methodology. These schedules and set points have been developed with the staff at Southern Columbia Area School District and through historical project data for similar schools.

Post project lighting levels will meet or exceed the required levels as set forth by the Illuminating Engineering Society of North America (IESNA). IESNA is the recognized standard for determining minimum lighting levels. The energy index and installation practices of the installed lighting will be in full compliance with the PA statewide 2009 Uniform Construction Code (UCC). The UCC recognizes NFPA 70: National Electrical Code as the standard for electrical related work. As for the installed lighting the UCC references the International Energy Conservation Code 2009 (IECC 2009) for lighting power requirements. While lighting power has little effect on the standards of comfort provided by adequate light levels, referenced from IESNA, the new lighting fixtures and lamps will be below the maximum power allowance found in IECC 2009 Section 505.5.2 Table 505.5.2 for each building and its function, as expected when using lower wattage lamps and fixtures to provide similar lighting levels as their existing counterparts.

IESNA RECOMMENDED LIGHTING LEVELS:

Average Reading and Writing:	50 FC
Office:	25 FC
Corridors:	10 FC
Storage:	30 FC
Entrances:	5 FC
Parking Lots:	0.8 – 3.6 FC

TABLE I.1 – Baseline Thermal Comfort Conditions

Building Name	Typical Occupied Schedule	HVAC Occupied Heating/Cooling Temperature	Ventilation Rate	HVAC Unoccupied Heating/Cooling Temperature
High School / Middle School	7:00 AM –4:00 PM Nights and Weekends per normal scheduled sporting events and activities.	70/75	In accordance With ASHRAE Std. 62.1-2004	60/85
G.C. Hartman Elementary	7:00 AM- 4:00 PM	70/75	In accordance With ASHRAE Std. 62.1-2004	60/85

SCHEDULE J – OPERATIONS AND MAINTENANCE SAVINGS

General

The operations and maintenance savings have been calculated from data provided by the Southern Columbia Area School District Business Office, Buildings and Grounds, industry standards and averages, actual material costs, actual repair costs, and outside purchased repairs and service costs. The District agrees the recurring or non-recurring savings listed below are tangible and quantifiable savings as a result of the scope of work described within this contract.

The total Year 1 stipulated Operations and Maintenance Savings is $36,721. The total 20 year cumulative savings, as shown in Schedule D is $83,939.

1. Lighting Retrofit; Cumulative 5 Year Savings = $22,988

This savings represents the lamps and ballasts that the District will not have to replace as a result of the retrofit. O&M savings are calculated using the manufacturer's expected rated product life and hours of operation. The Operation and Maintenance Savings reflects the estimated material savings that will be realized by implementing this project. Failure rates and time estimates were based on average hours of operation and industry standards. The manufacturer of the lamps and ballasts will provide a three (3) year warranty on the lamps and a five (5) year warranty on the ballasts. The 5 years savings is as follows:

Year 1 = $6,109
Year 2 = $5,207
Year 3 = $5,338
Year 4 = $2,993
Year 5 = $3,068

2. Act 129 Utility Rebates; Cumulative Savings = $61,224

The District's Electrical Distribution Company is PPL. In 2009, the Public Utility Commission mandated each of the Commonwealth's (7) EDC's implement a rebate program that incentivizes customers to proactively install energy efficient equipment. Based on PPL's published prescriptive rebates, we have estimated the total rebate amount to be $61,224. McClure Company will apply for the rebates on behalf of the District. All rebate monies go directly to the District. We do not have direct control of when the rebate monies are disbursed, therefore, to remain conservative; we have shown them being received over a 2 year period as follows:

Year 1 = $30,612
Year 2 = $30,612

Avoided Capital Costs

General

Act 39 enables government entities in Pennsylvania to utilize capital costs to offset the cost of guaranteed energy savings projects. The Act states that allowable capital costs include capital costs that the District reasonably believes will be incurred during the term of the guaranteed energy savings contract and are documented by industry engineering standards.

The avoided capital outlays that are listed below are stipulated savings. The District agrees these costs would have been incurred within the term of this contract amendment in order to, at a minimum, maintain its current level of operation.

Furthermore, the District agrees the equipment and / or systems included within the Avoided Capital Costs section are considered irreparable, obsolete, or in need of immediate repair. Based on the condition of the equipment and onsite inspections and metering, it does not make long term economical sense for the District to keep the equipment in operation.

The costs below represent replacing existing equipment or systems in kind and utilizing an outside service for proper and timely installation. The estimates follow suit with the basis of design for equipment or systems the District has previously installed. Current prevailing wage rates were figured for all labor costs.

1. High School Unit Ventilator Replacement

Select existing unit ventilators serving the High School are largely original to the building and over 50 years old. The terminal steam units and steam infrastructure are in operable, but poor condition. Given the equipment's age, it has served well beyond its useful life, and considering the central plant upgrades to replace the boilers, replacement is required. The existing system was surveyed and determined to be in need of select upgrades in order to sustain satisfactory levels of performance, however, this would not address the overarching issues surrounding the age of the system. Any repair to the system would merely be to keep it operational until a holistic replacement could occur.

The total cost for the necessary repairs and upgrades to the system to sustain satisfactory operation has been estimated at $350,000.

2. High School ATC Replacement

The existing pneumatic controls in the High School are outdated and becoming obsolete as well as beginning to fail. It has been seen that some units do not even receive air for control actuation due to a failing pneumatic infrastructure. To maintain the infrastructure as well as comfort and address the issues seen, a repair or upgrade to a fully direct digital control system would need to be completed.

The total cost necessary for repairs and upgrades to the system to sustain satisfactory operation has been estimated at $400,000.

3. G.C. Hartman Elementary Roof Replacement

The existing roof on the elementary school is over 20 years old and is beyond its life expectancy. There are multiple leaks in the roof which are in immediate need of repairs and have to be addressed by the district. Wet insulation leads to poor R-Value and does not retain heat in the winter very well.

Upgrades will need to be complete in order to stop the leaks and bring the R-Value back up to its designed value.

The total cost for the replacement of the roof to bring it back to satisfactory operation has been estimated at $700,000.

4. High School Roof Upgrades

The existing roof at the high school is a mix of EPDM and hot tar buildup. There are locations where leaking can be seen inside the school. The leaks are in immediate need of repair to save from the constant expenditure of fixing or replacing ceiling tiles.

The total cost for the necessary repairs and upgrades to the roof system to sustain satisfactory operation has been estimated at $170,000.

SCHEDULE K – STIPULATED LIGHTING HOURS OF OPERATION

The lighting hours of operation are as follows and can be found in the lighting line by line located in Attachment B.

		Southern Columbia High School	Hartman Elementary Center	Bus Garage	Southern Columbia High School Exterior	Hartman Elementary Center Exterior	Bus Garage Exterior
AUD	AUD	1,000	1,000	1,000			
CAF	CAF	1,800	1,800	1,800			
COR	CORRIDOR	2,600	2,600	2,600			
CR	CLASSROOM	2,200	1,800	1,800			
CS	COMMON SPACE	3,000	2,600	2,600			
E	EXIT SIGN	8,760	8,760	8,760			
EXT	EXTERIOR LIGHTING	4,000	4,000	4,000	4,000	4,000	4,000
GYM	GYM	2,600	2,600	2,600			
JC	JANITOR CLOSET	1,000	1,000	1,000			
KIT	KITCHEN	1,800	1,800	1,800			
LIB	LIBRARY	2,600	2,600	2,600			
LR	LOCKER ROOM	2,400	2,400	2,400			
MRH	MECH ROOM HIGH	2,400	2,400	2,400			
MRL	MECH ROOM LOW	1,000	1,000	1,000			
OH	OFFICE HIGH	3,000	3,000	3,000			
OL	OFFICE LOW	2,400	2,400	2,400			
SH	STORAGE HIGH	1,000	1,000	1,000			
ST	STAIRS	2,600	2,600	2,600			
TR	TOILET ROOMS	2,600	2,600	2,600			
24/7	24 HOURS 7 DAYS A WEEK	8,760	8,760	8,760			
GAR	GARAGE	3,200	3,200	3,200			
CR-S	CLASSROOM - SENSORED	1,540	1,260	1,260	N/A	N/A	N/A
JC-S	JANITOR CLOSET - SENSORED	700	700	700	N/A	N/A	N/A
LR-S	LOCKER ROOM - SENSORED	1,680	1,680	1,680	N/A	N/A	N/A
OH-S	OFFICE HIGH - SENSORED	2,100	2,100	2,100	N/A	N/A	N/A
OL-S	OFFICE LOW - SENSORED	1,680	1,680	1,680	N/A	N/A	N/A
SH-S	STORAGE HIGH - SENSORED	700	700	700	N/A	N/A	N/A
TR-S	TOILET ROOM - SENSORED	1,820	1,820	1,820	N/A	N/A	N/A
CS-S	COMMON SPACE - SENSORED	3,000	2,600	2,600	N/A	N/A	N/A

SCHEDULE L – MEASUREMENT AND VERIFICATION PLAN

SOUTHERN COLUMBIA AREA SCHOOL DISTRICT

ECM NUMBER	ECM TITLE
1	District Wide Lighting Upgrades
2	District Wide Building Envelope Upgrades
3	District Wide Plug Load Management
4	High School HVAC Upgrades
5	Middle School HVAC Upgrades
6	Elementary School HVAC Upgrades
7	High School Roofing Upgrades
8	Elementary School Roofing Upgrades

M&V Plan: M&V General Overview

Introduction

This section provides procedures and guidelines for quantifying savings resulting from the installation of ECMs under energy performance contracts and is intended to comply with the International Performance Measurement & Verification Protocol (IPMVP). The IPMVP was developed to provide a commonly accepted methodology for measuring energy savings associated with performance contracts. There are two components of M&V for Energy Saving Performance Contracting (ESPC) projects:

- **Verifying ECM potential to perform and generate savings -** by confirming that: i) baseline conditions are accurately defined, and ii) the appropriate equipment components or systems are properly installed, performing per specification and have the potential to generate predicted savings.
- **Verifying ECM performance (savings)** - by determining the actual energy savings achieved by the installed ECM.

The general approach to determining energy savings involves comparing the energy use associated with a facility, or certain systems within a facility, before installation of the ECM (baseline) and after installation of the ECM (post-installation). Therefore, in general:

Equation 1

Energy savings = (baseline energy use) - (post-installation energy use)

As ESPC projects are based on pay for performance, each ECM or site will have a site-specific verification process to determine its savings. For each site or project, the baseline and post-installation energy use will be defined using metering, billing analysis and/or engineering calculations (possibly including computer simulation). In addition, values for certain factors that affect energy use and savings, and that are beyond the control of McClure (i.e., building occupancy), may be stipulated by the client sponsoring the project.

With the completion of the project, McClure will submit a report that defines projected energy savings based on the before and after measurements. This report must be accepted and approved by the client.

Verifying ECM Potential to Perform

Maintaining Service Quality

The Demand Side Management (DSM) measures installed under ESPC programs should maintain or improve the quality of service provided to the client by the affected equipment or systems. For example, lighting projects that reduce lighting levels must maintain some minimum standards, i.e., the minimum standard for the facility's primary use.

Baseline Verification

Baseline conditions may be defined by either the client or McClure. If the baseline is client-defined, then McClure will have the opportunity to verify it. If the baseline is defined by McClure, the client will verify it. Baseline physical conditions such as equipment counts, nameplate data, and energy consumption rate plus control strategies will typically be determined through surveys, inspections and/or spot or short-term metering activities. Variables which affect baseline energy calculations such as weather and building occupancy are identified.

Post-Installation Verification

In a post-installation M&V verification, McClure and client agree that the proper equipment components or systems were installed, are operating correctly and have the potential to generate the predicted savings. Verification methods may include surveys, inspections and/or continuous metering. McClure is expected to complete the system/equipment commissioning.

Verifying ECM Performance

After the ECM is installed, McClure and client will determine energy savings in accordance with an agreed-upon M&V method using verification techniques defined in this M&V plan.

Verification Techniques

Baseline energy use, post-installation energy use and energy (and cost) savings will be determined using the following M&V techniques:

- Engineering Calculations
- Metering And Monitoring

- Utility Meter Billing Analysis
- Computer Simulations, e.g. Trane Tracer Building Simulation
- Agreed-Upon Stipulations By The Client and McClure

Estimating Energy Savings

There are numerous factors that can affect energy savings during the term of a contract such as weather, operating hours, process loads and heat exchanger fouling. In general, one ESPC contract objective may be to adjust baseline energy use up or down for factors beyond the control of McClure (e.g., changes in building occupancy or weather), and adjust post-installation energy use for controllable factors (e.g., maintenance of equipment efficiency).

In order to calculate energy savings, the client may in some cases stipulate the value of factors that are difficult to determine or that may vary during the contract term. In other situations, continuous or regular interval measurements throughout the term of the contract may be compared to baseline energy measurements to determine savings.

There are four industry-accepted options to verifying energy savings. **Option A** emphasizes verification of performance factors and involves determining long-term savings through use of stipulations for operational factors. **Option B and C** involves use of long term metering data; **Option B** involves end use data analysis and **Option C** involves whole building data analysis. **Option D** involves calibrated building simulation.

Option A focuses on physical assessment of equipment changes to insure the installation is to specification. Key performance factors (lighting wattage or chiller efficiency) are determined with spot or short-term measurements and operational factors (lighting hours of operation or cooling ton-hours) are stipulated based on analysis of historical data or spot/short term measurements. The savings are determined using spot or short-term measurements. An example of the measurements will be measuring the wattage use of fixed number of samples of lighting fixtures both before and after the lighting retro-fit.

Option B savings are determined after the project completion by short term or continuous measurements taken up to one year following the completion of the installation. The baseline for option B is determined through energy measurements during the IGA phase. The actual baseline is projected to an annual cost through use of standard engineering calculations. The savings are determined by comparison of the baseline to the measured results.

Option C is also referred to as the “whole house” method to determine savings**.** The current year utility bills are compared to historical bills. The historical bills are adjusted to account for factors such as weather. The savings are determined by analysis of utility meter (or sub-meter) data using techniques from simple comparison to regression analysis.

Option D savings are determined through simulation of facility components and/or the whole facility. The savings are determined by energy simulation/modeling calibrated with monthly utility billing data and or end-use metering.

M&V Methodology

The following table outlines the methodology proposed for each ECM:

ID	TITLE	M&V METHODOLOGY
1	**District Wide Lighting Upgrades**	IPMVP Option A
2	**District Wide Building Envelope Upgrades**	IPMVP Option A
3	**District Wide Plug Load Management**	IPMVP Option B
4	**High School HVAC Upgrades**	IPMVP Option C
5	**Middle School HVAC Upgrades**	IPMVP Option C
6	**Elementary School HVAC Upgrades**	IPMVP Option C
7	**High School Roofing Upgrades**	IPMVP Option C
8	**Elementary School Roofing Upgrades**	IPMVP Option C

M&V Plan-Lighting

Lighting Spot Metering with Stipulated Operating Hours

Based on IPMVP Option: A

Applies to ECM: 1

ECM Definition

The measures covered by this verification plan are lighting retrofits of existing fixtures, lamps, and/or ballasts with an identical number of more energy efficient fixtures, lamps, and/or ballasts. These lighting efficiency projects cause a reduction in demand.

Verification Method

Surveys will be made of all baseline (existing) and post-installation (new) lighting fixtures. Corrections may be required for non-operating fixtures. The operating hours are stipulated in the contract and were determined by pre-installation metering or as provided by the district. If through metering, the metering results along with the associated measured operating hours will be reviewed with the school district prior to contract signing. Fixture wattage will be determined from a combination of documentation on each fixture/ballast/lamp and spot measurements of representative fixtures or lighting circuits. The results of the verification will be presented with the M&V report.

Baseline Demand

The baseline conditions identified in the pre-installation survey will be defined by McClure Company in the IGA and verified by the Client. In the pre-installation survey, the equipment to be changed and the replacement equipment to be installed will be inventoried. The surveys will include, in a set format, fixture, lamp, and ballast types; usage area designations, counts of fixtures; and location of occupancy sensors.

Fixture Wattage Metering

McClure Company will take true RMS wattage measurements from a representative sample of the baseline and post-installation fixtures agreed upon by McClure Company and the Client. Readings will be averaged to determine per fixture wattage values. For post-installation fixtures, readings will be taken after the new fixtures have been operating for at least 100 hours. Meters used for this task will be calibrated and have an accuracy of +/- 2% of reading or better.

Adjustments to Baseline Demand

Prior to installation of new lighting fixtures, adjustments to the baseline demand may be required for non-operating fixtures. In addition, after ECM installation, adjustments to baseline demand may be required because of remodeling or changes in occupancy.

With respect to non-operating fixtures, McClure Company will also identify any non-operating fixtures only as part of the pre and post installation electrical measurements. The report documenting the pre and post electrical readings will also document rooms that were included in the electrical measurements that had lamp or fixture failures. The number of lamps failed for each electrical reading will be documented. Non-operating fixtures are those that are typically operating but that have broken lamps, ballasts, and/or switches that are intended for repair.

For non-operating fixtures, the baseline electrical use is adjusted to account for failed lamps or fixtures for the pre-installation electrical readings. The adjustment is repeated for each failed lamp or fixture. A separate spreadsheet is included with the lighting measurement and verification report to document each instance of adjustment and the amount of the adjustment.

Determining Energy Savings

The annual baseline energy usage is the sum of the baseline kWh for all of the usage areas. The post-retrofit energy usage is calculated similarly. The pre and post electrical readings will sample a total of at least 10 % of the total fixtures to be replaced or have an existing fixture get new lamps and ballasts. The electrical savings are measured as described below, the percentage savings achieved compared to the expected savings is the percentage of the total lighting savings McClure will report as saved. The energy savings are calculated as the difference between baseline and post-installation energy usage. The stipulated operating hours will be used for both the baseline and post-installation energy calculations.

$$kWh\ Savings_t = \sum_u [(kW/fixture_{baseline} \times Quantity_{baseline}) - (kW/Fixture_{post} \times Quantity_{post}) \times Hours\ of\ Operation]_{t,u}$$

Where:

$kWh\ Savings_t$ =	kilowatt-hour savings realized during the post-installation time period *t*
$kW/fixture_{baseline}$ =	lighting baseline demand per fixture for usage group *u*
$kW/fixture_{post}$ =	lighting demand per fixture during post-installation period for usage group *u*
$Quantity_{baseline}$ =	quantity of affected fixtures before the lighting retrofit adjusted for inoperative lighting fixtures for usage group *u*
$Quantity_{post}$ =	quantity of affected fixtures after the lighting retrofit for usage group *u* and time period *t*
Hours of Operation =	total number of post-installation operating hours (assumes number is the same before and after the lighting retrofit) for usage

Sample Equipment Survey Data Sheet

Project: **Southern Columbia Area School District**

Dates: Pre-retrofit: June-14 Post-retrofit: Oct-14

Random Sample #	Bldg	IGA Line-by-Line # Bldg Location		Light Levels (fc's)	Measured Volts(RMS) (V)	Current Draw (amps)	Calculated Watts (W)
1	High School	4	Pre-retrofit	70	278.9	0.589	164.27
		Room A7	Post-retrofit	80	280.3	0.350	98.11
2	High School	6	Pre-retrofit	8 (avg)	281.1	0.295	82.92
		Basement Halls	Post-retrofit	15 (avg)	280.9	0.184	51.69
3	High School	7	Pre-retrofit	87	279.9	0.482	134.91
		Room A5	Post-retrofit	110	281.2	0.269	75.64
74	High School	750	Pre-retrofit	21	121.1	0.359	43.47
		Lobby Cove Lights	Post-retrofit	25	121.2	0.185	22.42
75	Elementary School	762	Pre-retrofit	24	119.9	0.609	73.02
		Hallway	Post-retrofit	29	119.9	0.435	52.16
76	Elementary School	806	Pre-retrofit	30	121.1	0.715	86.59
		Entrance Foyer	Post-retrofit	33	121.1	0.429	51.95
78	Elementary School	836	Pre-retrofit	55	120.7	4.769	575.62
		Room 131	Post-retrofit	65	120.6	3.146	379.41
Totals			Pre-retrofit				23,338.80
			Post-retrofit				11,560.99

Sample Equipment Survey Data Sheet (cont.)

IGA Watts (W)	Stipulated Hours	Calculated Energy (KWh)	IGA Energy (KWh)	AS BUILT Fixture Types	NOTES
164	6,216	1,021	1,019	(1) 44SE	ONLY (1) FIXTURE SAMPLED
98	6,216	610	609	(1) LB44LP	
82	6,216	515	510	(1) 24SE	ONLY (1) FIXTURE SAMPLED
51	6,216	321	317	(1) LB24LP	
164	6,216	839	1,019	(1) 44SE	ONLY (1) FIXTURE SAMPLED
98	6,216	470	609	(1) LB44LP	
106	6,216	662	659	(1) 42SS	ONLY (1) FIXTURE SAMPLED
33	6,216	210	205	(1) LB22REF	
50	6,216	270	311	(1) 14EE	ONLY (1) FIXTURE SAMPLED
25	6,216	139	155	(1) LB14	
86	8,760	640	753	(1) 24EE	ONLY (1) FIXTURE SAMPLED
51	8,760	457	447	(1) LB24LP	
86	8,760	758	753	(2) 14EE	
51	8,760	455	447	(1) LB24LPTW	
86	6,216	449	535	(1) 24UEE	
51	6,216	211	317	(1) LB22REF	
576	6,216	3,578	3,580	(5) 34EE	ONLY (5) FIXTURES SAMPLED
380	6,216	2,358	2,362	(5) LB34LP	
22,711		136,558	133,109		
11,335		70,605	69,119		

Actual Power Savings for Sampled Group:		11.78KW
IGA Power Savings Projections for Sampled Group:		11.38KW
Actual Energy Savings for Sampled Group:		65,953KWh
IGA Energy Savings Projections for Sampled Group:		63,990KWh
Actual KWh Sampled/IGA KWh Sampled:		103.1%
IGA Savings Projections for Total Program:		282.10KW
Percentage of Total Retrofits Sampled:		4.0%
IGA Total Energy Savings Guaranteed:		1,779,537
Actual Total Energy Savings Based on Results of Sampled Group:		1,834,127
Contract Rate:	$	0.05527per KWh
Energy Cost Savings Guaranteed Based on IGA:	$	98,355
Actual Energy Cost Saved:	**$**	**101,372**

Approved, McClure Company

Approved, Client

M&V Plan
<u>Spot Metering with Stipulated Values– Building Envelope Upgrades</u>
Based on IPMVP Option: A
Applies to ECM: 2

ECM Definition

The measures covered by this verification plan are the energy savings related to the reduced electrical and fuel use associated with sealing and insulting the building envelope. The savings are determined by measuring the area of leaks that are sealed. The savings associated with this M&V plan apply to the building envelope upgrades at the High School and Elementary School.

Verification Method Overview

Option A involves the use calculations based in how much insulation is added or cracks to the outside that are sealed. As part of the verification process and the measurement and verification report, pictures of conditions prior to the building envelope improvements (baseline) and pictures of the same location after the building envelope improvements will be included. The stipulated variables are marked in italics below. The following variables are measured:

- Area where leaks repaired
- Building thermal conductance (U = 1/R) based on building construction
- Heating Degree Days
- Cooling Degree days
  Government web site to determine HDD and CDD
  www.cpc.ncep.noaa.gov/products/analysis_monitoring/cdus/degree_days/

Baseline Demand

The baseline is existing conditions and is not measured or calculated. The savings are calculated based on improvements to the building envelope.

Determining Energy Savings

Infiltration Rate

Q = k * dp^n * A
Q = average air flow infiltration in cubic feet per minute
A = Total infiltration crack area in square feet
k= flow coefficient = 80 cfm/pascalft^2
dp^n = differential pressure across the crack opening due to wind
n = 0.65 from ASHRAE fundamentals
dp^n = depend on average regional wind conditions

Air Leakage Cooling Loss Calculation

Cooling loss per year (BTU/year) = 60 * Q * rho * cp * CDD *24
Rho = density = 0.075
Cp = specific heat = 0.24
CDD = Cooling degree days (determined locally from weather conditions)

Conductive Cooling Loss

Cooling Energy Lost per year (BTU/year) = U * A * CDD * 24
U = 1/R = BTU/hr F ft^2
A = Area ft^2
CDD = Cooling degree days (determined locally from weather conditions)

Air Leakage Heat Loss

Heat Lost per year (BTU/year) = 60 * Q * rho * Cp * HDD *24

Where:

60 min/hr
Q = Infiltration rate
Rho = density 0.075 lb/ft^3
Cp = 0.24 BTU/lb F
HDD = Heating Degree Days

Resulting Equation:

Heat Lost per year (BTU/year) = 25.92 * Q * HDD

M&V Plan
<u>Short Term Metering– Plug Load Management</u>
Based on IPMVP Option: B
Applies to ECM: 3

ECM Definition

The measures covered by this verification plan are energy savings associated with reducing electrical use or limiting operation of plug in electrical devices. Devices that utilize a standard 120 volt electric supply can be turned off during periods of un-occupancy to reduce electrical consumption. A wide variety of plug in devices can be controlled and include items such as vending machines, printers, copiers, smart boards, water fountains, projectors, coffee makers, charging stations, and monitors.

Verification Method Overview

Surveys will be made of baseline (existing) equipment. Corrections may be required for non-operating equipment. Equipment energy use will be determined from short-term measurements of a representative sample of equipment. The equipment to be controlled will also be monitored after installation to determine the reduction in electrical use.

Baseline Demand

The steps to developing a baseline include:

1. Developing an onsite plug load device inventory.
2. Determine the baseline and proposed existing kWh consumption from testing data and manufacturer's data.
3. Establish hours of operation through observation and test data.
4. Develop a spreadsheet model of the plug in devices with the collected data.
5. Measure the baseline kWh consumption.

Determining Energy Savings

1. Develop the post-installation M&V data based upon an on-site audit.
2. Determine the post installation hours of operation based on actual testing data.
3. Use the reduced hours of operation and electrical demand of the plug in devices.
4. Measure the post installation kWh consumption.

Equations for Calculation of Energy and Demand Savings

$$KWH_{baseline} = KW\ baseline^{*}\ hours\ of\ operation\ (hr)$$

$$KWH_{post} = KW\ post^{*}\ hours\ of\ operation\ (hr)$$

$$KWH_{savings} = KWH_{baseline} - KWH_{post}$$

M&V Plan
<u>Bill Comparison</u>
Based on IPMVP Option: C
Applies to ECMs: 4, 5, & 7

ECM Definition

The measures covered by this verification plan are the energy savings related to the HVAC and roofing ECMs at the Middle/High School. Energy savings will result from improvements to the HVAC system and roof.

The existing HVAC system is an inefficient system and is mostly comprised of classroom unit vents served by a pair of oil-fired steam boilers and controlled by a pneumatic control system. The new HVAC system will include heat pumps with energy recovery wheels for the classrooms and propane fired boilers. New DDC controls will be installed along with VFDs on the pumps. The roofing upgrades at the HS include a combination of new roof, repaired sections of roof, and roof restoration.

Additional clarification of the scope of work can be found in the technical solutions segment of the IGA.

Verification Method

Option C involves a utility bill comparison to determine energy savings. The baseline (historical) energy bills are compared to the current energy bills. The bill comparison occurs monthly for a one year period.

Baseline Demand

The baseline energy use for the Middle/High School will be the utility bills from August 2012 to July 2013.

Adjustments to Baseline Demand

The baseline demand will be adjusted to account for changes in weather. The baseline may be adjusted upward or downward depending on the year one weather compared to the baseline weather. The adjustment will be made on a monthly basis using published Heating Degree Day (HDD) and Cooling Degree Day (CDD) data.

Additional adjustments may be required if the building changes operational parameters. An example of changing operational parameters that would require an adjustment would be a change from a traditional school year to a 12 month school year. Operational changes such as changing the run time in a gymnasium to accommodate a longer occupied schedule due to a sports practice will not result in a baseline adjustment.

Outside air (OA) measurements were taken at 13 locations identified in the table below. From this table it is shown that, on average, only 23.35% of the code required ventilation air is being brought into the building.

Room	Measured OA CFM	Design OA CFM	Deficiency	% of design
128	348	390	42	89.23%
127	0	390	390	0.00%
126	0	390	390	0.00%
125	0	390	390	0.00%
124	0	390	390	0.00%
108	0	300	300	0.00%
106	70	300	230	23.33%
104	96	300	204	32.00%
102	351	300	-51	117.00%
101	126	300	174	42.00%
115	0	300	300	0.00%
117	0	300	300	0.00%
118	0	300	300	0.00%
Total:	991	4,350	Average:	23.35%

The table below shows the design OA and the calculated OA for each room. The calculated (or existing) OA is based on the 23.35% that was measured in the 13 rooms. The total design OA is 30,315 cfm. The existing cfm is 11,960 cfm. The difference between these two figures, 18,355 cfm, is the adjusted amount of OA that will have to be introduced into the building to meet the ventilation requirements.

Additional analysis was performed using weather bin data from Williamsport, PA, and an occupied schedule of Monday to Friday, 7am to 5pm, to determine the impact of this additional OA on fuel consumption. It was found that an additional 8,455 gallons of oil will be used to heat this adjusted amount of OA.

Room	Design OA CFM	ADJ	% of design	Caclulated OA CFM
Library	525	Yes	23.35%	123
107	150	Yes	23.35%	35
105	60	Yes	23.35%	14
Control Room	150	Yes	23.35%	35
103	300	Yes	23.35%	70
Guidance	100	Yes	23.35%	23
Small Group A	300	Yes	23.35%	70
Small Group B	300	Yes	23.35%	70
116	300	Yes	23.35%	70
Art	600	Yes	23.35%	140
111	300	Yes	23.35%	70

Room	Design OA CFM	ADJ	% of design	Caclulated OA CFM
110	390	Yes	23.35%	91
109	390	Yes	23.35%	91
Auditorium	2,900	No	0.00%	2,900
Wrestling	0	No	0.00%	0
Girls Locker	1,500	Yes	23.35%	350
Boys Locker	1,900	Yes	23.35%	444
Training	75	Yes	23.35%	18
Weight Room	0	No	0.00%	0
Wood Shop	0	No	0.00%	0
Shop	225	Yes	23.35%	53
Shop	390	Yes	23.35%	91
Shop	3,500	No	0.00%	3,500
Gym	4,500	Yes	23.35%	1,051
201	390	Yes	23.35%	91
202	390	Yes	23.35%	91
204	300	Yes	23.35%	70
205	390	Yes	23.35%	91
206	300	Yes	23.35%	70
207	300	Yes	23.35%	70
208	300	Yes	23.35%	70
209	300	Yes	23.35%	70
210	300	Yes	23.35%	70
211	300	Yes	23.35%	70
212	300	Yes	23.35%	70
213	300	Yes	23.35%	70
214	300	Yes	23.35%	70
Staff	300	Yes	23.35%	70
214	300	Yes	23.35%	70
215	390	Yes	23.35%	91
216	390	Yes	23.35%	91
217	390	Yes	23.35%	91
218	390	Yes	23.35%	91
219	390	Yes	23.35%	91
220	390	Yes	23.35%	91
Total	25,965	Average	42%	10,969
Table Above:	4,350			991
Grand Total:	30,315			11,960
Difference Between Design and Existing:				18,355

Verifying Savings

The savings are determined by comparing the post installation utility usage to the baseline energy use on a monthly basis. Along with a comparison of baseline energy use to post installation energy use, the post installation energy use will be compared to the expected savings on a monthly basis.

The tables below represents the sample format that will be used to determine energy savings. The data includes actual energy use for the Middle/High School along with a projected reduction in energy use.

So. Columbia High School kWh

	1	2	3	4	6	7	8	9	10
Month	Contract Baseline	Weather ADJ	OA ADJ*	ADJ Baseline	Year 1 Usage	Non-Lighting Projected Savings	Lighting Savings (kWh)	Measured Savings (kWh)	Measured Savings ($)
January	104,400	0.81		94,388	77,000	0	15,000	2,388	$249
February	105,600	1.06		108,635	92,000	0	15,000	1,635	$170
March	107,800	1.16		116,647	97,000	0	15,000	4,647	$484
April	98,700	1.50		123,375	96,000	0	15,000	12,375	$1,289
May	106,900	0.97		105,512	90,000	0	15,000	512	$53
June	91,900	0.93		88,496	75,000	0	15,000	-1,504	-$157
July	76,400	0.99		76,116	64,000	0	15,000	-2,884	-$301
August	74,700	1.00		74,700	63,000	0	15,000	-3,300	-$344
September	93,100	1.00		93,100	79,000	0	15,000	-900	-$94
October	94,500	0.95		92,211	81,000	0	15,000	-3,789	-$395
November	100,000	0.97		98,656	82,000	0	15,000	1,656	$173
December	103,500	0.76		91,154	83,000	0	15,000	-6,846	-$713
TOTAL	1,157,500			1,162,990	979,000	0	180,000	3,990	$416
			*if required			Total Savings (Lighting+Measured)		183,990	

		Contract Cost per kWh	$0.101
Year 1 Savings starts with June 2015 and ends with May 2016		Previous Year Cost per kWh per Contract	$0.101
Percentage ADJ Baseline effected by CDD	50%	Annual Increase in Energy Costs per Contract	3.00%
Percentage ADJ Baseline effected by HDD	50%	Increase in Energy Costs per Contract	$0.0030
		M&V Year 1 Energy Cost per Contract	$0.1042

ADJ Baseline = (Contract Baseline * Weather ADJ * HDD ADJ) + ((1 - HDD ADJ) * Contract Baseline) + OA ADJ

Measured Savings (KWH) = (ADJ Baseline - Lighting Savings) - Year 1 Usage

Measured Savings ($) = Measured Savings (KWH) * M&V Year 1 Energy Cost per Contract

Projected Savings = Savings estimated based upon pre engineering calculations and distributed based upon the heating and cooling seasons

Non-Lighting Projected Savings = Pre engineering calculated savings for all electric use other than lighting

So. Columbia High School Gallons (Prop)

	1	2	3	4	6	7	8	9	10
Month	Contract Baseline	Weather ADJ	OA ADJ*	ADJ Baseline	Year 1 Usage	Projected Savings	Annual Distributed Savings	Measured Savings (Gallons	Measured Savings ($)
January	0	0.81		0	23,000	-24,224	0	-23,000	-$40,273
February	0	1.06		0	21,000	-22,907	0	-21,000	-$36,771
March	0	1.16		0	18,000	-19,677	0	-18,000	-$31,518
April	0	1.50		0	7,000	-8,870	0	-7,000	-$12,257
May	0	0.97		-	0	0	0	-	-
June	0	0.93		-	0	0	0	-	-
July	0	0.99		-	0	0	0	-	-
August	0	1.00		-	0	0	0	-	-
September	0	1.00		-	0	0	0	-	-
October	0	0.95		0	6,000	-7,180	0	-6,000	-$10,506
November	0	0.97		0	16,000	-17,565	0	-16,000	-$28,016
December	0	0.76		0	19,000	-19,578	0	-19,000	-$33,269
TOTAL	0			0	110,000	-120,000	0	-110,000	-$192,610
			*if required			Total Savings (Propane, Gallons (Prop))		-110,000	

		Contract Cost per Gallons (Prop)	$1.7000
Year 1 Savings starts with June 2015 and ends with May 2016		Previous Year Cost per Gallons (Prop) per Contract	$1.7000
Percentage ADJ Baseline effected by CDD	0%	Annual Increase in Energy Costs per Contract	3.00%
Percentage ADJ Baseline effected by HDD	75%	Increase in Energy Costs per Contract	$0.0510
		M&V Year 1 Energy Cost per Contract	$1.7510

ADJ Baseline = (Contract Baseline * Weather ADJ * HDD ADJ) + ((1 - HDD ADJ) * Contract Baseline) + OA ADJ

Measured Savings (Gallons (Prop)) = (ADJ Baseline - Annual Distributed Savings) - Year 1 Usage

Measured Savings ($) = Measured Savings (Gallons (Prop)) * M&V Year 1 Energy Cost per Contract

Projected Savings = Savings estimated based upon pre engineering calculations and distributed based upon the heating and cooling seasons

Annual Distriubted Savings = Pre engineering calculated savings not dependent upon heating or cooling

So. Columbia High School Gallons (Oil)

	1	2	3	4	5	6	7	8	9	10
Month	Contract Baseline	Weather ADJ	OA ADJ*	ADJ Baseline	Projected Use	Year 1	Projected Savings	Annual Distributed Savings	Measured Savings (Gallons (Oil))	Measured Savings ($)
January	11,250	0.81	1,630	10,722		0	14,564	0	10,722	$36,799
February	4,350	1.06	1,542	6,142		0	13,773	0	6,142	$21,078
March	3,750	1.16	1,324	5,690		0	11,831	0	5,690	$19,527
April	3,750	1.50	597	6,222		0	5,333	0	6,222	$21,353
May	0	0.97	274	274		0	0	0	274	$941
June	0	0.93	2	2		0	0	0	2	$6
July	0	0.99	0	0		0	0	0	0	$0
August	37,397	1.00	0	37,397		0	0	0	37,397	$128,347
September	6,150	1.00	104	6,254		0	0	0	6,254	$21,463
October	0	0.95	483	483		0	4,317	0	483	$1,658
November	3,750	0.97	1,182	4,831		0	10,561	0	4,831	$16,581
December	7,500	0.76	1,317	7,028		0	11,771	0	7,028	$24,121
TOTAL	77,897		8,455	85,045	0	0	72,149	0	85,045	$291,874
			*if required				Total Savings (Lighting+Measured)		85,045	

		Contract Cost per Gallons (Oil)	$3.3000
Year 1 Savings starts with June 2015 and ends with May 2016		Previous Year Cost per Gallons (Oil) per Contract	$3.3000
Percentage ADJ Baseline effected by CDD	0%	Annual Increase in Energy Costs per Contract	4.00%
Percentage ADJ Baseline effected by HDD	100%	Increase in Energy Costs per Contract	$0.1320
		M&V Year 1 Energy Cost per Contract	$3.4320

M&V Plan
Bill Comparison
Based on IPMVP Option: C
Applies to ECMs: 6 & 8

ECM Definition

The measures covered by this verification plan are the energy savings related to the HVAC and roofing upgrades at the Elementary School. Energy savings will result from improvements to the HVAC system and roof.

The existing HVAC system at the ES uses a pair of oil-fired boilers to produce hot water for the building's heating system along with an oil-fired domestic hot water system. Upgrades to the HVAC system include the installation of propane tanks, new dual fuel burners for the boilers, and a new propane-fired domestic water heater. The roof ECM includes installation of a new roof with improved insulation.

Additional clarification of the scope of work can be found in the technical solutions segment of the IGA.

Verification Method

Option C involves a utility bill comparison to determine energy savings. The baseline (historical) energy bills are compared to the current energy bills. The bill comparison occurs monthly for a one year period.

Baseline Demand

The baseline energy use for this building will be the utility bills from August 2012 to July 2013.

Adjustments to Baseline Demand

The baseline demand will be adjusted to account for changes in weather. The baseline may be adjusted upward or downward depending on the year one weather compared to the baseline weather. The adjustment will be made on a monthly basis using published Heating Degree Day (HDD) and Cooling Degree Day (CDD) data.

Additional adjustments may be required if the building changes operational parameters. An example of changing operational parameters that would require an adjustment would be a change from a traditional school year to a 12 month school year. Operational changes such as changing the run time in a gymnasium to accommodate a longer occupied schedule due to a sports practice will not result in a baseline adjustment.

Verifying Savings

The savings are determined by comparing the post installation utility usage to the baseline energy use on a monthly basis. Along with a comparison of baseline energy use to post installation energy use, the post installation energy use will be compared to the expected savings on a monthly basis.

The tables below represents the sample format that will be used to determine energy savings. The data includes actual energy use for the ES along with a projected reduction in energy use.

GC Hartman ES kWh

	1	2	3	4	6	7	8	9	10
Month	Contract Baseline	Weather ADJ	OA ADJ*	ADJ Baseline	Year 1 Usage	Non-Lighting Projected Savings	Lighting Savings (kWh)	Measured Savings (kWh)	Measured Savings ($)
January	89,500	0.81		80,917	68,000	0	10,000	2,917	$303
February	84,000	1.06		86,414	62,000	0	10,000	14,414	$1,500
March	84,000	1.16		90,894	60,000	0	10,000	20,894	$2,174
April	83,000	1.50		103,750	77,000	0	10,000	16,750	$1,743
May	97,500	0.97		96,234	71,000	0	10,000	15,234	$1,585
June	104,250	0.93		100,389	83,000	0	10,000	7,389	$769
July	98,000	0.99		97,635	87,000	0	10,000	635	$66
August	96,000	1.00		96,000	99,000	0	10,000	-13,000	-$1,352
September	97,500	0.90		92,712	92,000	0	10,000	-9,288	-$966
October	95,250	0.95		92,943	77,000	0	10,000	5,943	$618
November	82,250	0.97		81,145	63,000	0	10,000	8,145	$847
December	85,250	0.76		75,081	50,000	0	10,000	15,081	$1,569
TOTAL	1,096,500			1,094,114	889,000	0	120,000	85,114	$8,854
			*if required			Total Savings (Lighting+Measured)		205,114	

		Contract Cost per kWh	$0.101
Year 1 Savings starts with June 2015 and ends with May 2016		Previous Year Cost per kWh per Contract	$0.101
Percentage ADJ Baseline effected by CDD	50%	Annual Increase in Energy Costs per Contract	3.00%
Percentage ADJ Baseline effected by HDD	50%	Increase in Energy Costs per Contract	$0.0030
		M&V Year 1 Energy Cost per Contract	$0.1040

ADJ Baseline = (Contract Baseline * Weather ADJ * HDD ADJ) + ((1 - HDD ADJ) * Contract Baseline) + OA ADJ

Measured Savings (KWH) = (ADJ Baseline - Lighting Savings) - Year 1 Usage

Measured Savings ($) = Measured Savings (KWH) * M&V Year 1 Energy Cost per Contract

Projected Savings = Savings estimated based upon pre engineering calculations and distributed based upon the heating and cooling seasons

Non-Lighting Projected Savings = Pre engineering calculated savings for all electric use other than lighting

GC Hartman ES Gallons (Oil)

	1	2	3	4	5	6	7	8	9	10
Month	Contract Baseline	Weather ADJ	OA ADJ*	ADJ Baseline	Projected Use	Year 1	Projected Savings	Annual Distributed Savings	Measured Savings (Gallons (Oil))	Measured Savings ($)
January	0	0.81		0		0	5,047	0	0	$0
February	3,750	1.06		3,966		0	4,772	0	3,965	$13,609
March	3,750	1.16		4,366		0	4,099	0	4,365	$14,982
April	0	1.50		0		0	1,848	0	0	$0
May	0	0.97		0		0	0	0	0	$0
June	0	0.93		0		0	0	0	0	$0
July	0	0.99		0		0	0	0	0	$0
August	12,500	1.00		12,500		0	0	0	12,500	$42,900
September	3,750	0.90		3,382		0	0	0	3,382	$11,606
October	0	0.95		0		0	1,496	0	0	$0
November	0	0.97		0		0	3,659	0	0	$0
December	3,750	0.76		2,855		0	4,079	0	2,855	$9,799
TOTAL	27,500			27,068	0	1	25,000	0	27,067	$92,894
			*if required				Total Savings (Lighting+Measured)		27,067	

		Contract Cost per Gallons (Oil)	$3.3000
Year 1 Savings starts with June 2015 and ends with May 2016		Previous Year Cost per Gallons (Oil) per Contract	$3.3000
Percentage ADJ Baseline effected by CDD	25%	Annual Increase in Energy Costs per Contract	4.00%
Percentage ADJ Baseline effected by HDD	100%	Increase in Energy Costs per Contract	$0.1320
		M&V Year 1 Energy Cost per Contract	$3.4320

GC Hartman ES Gallons (Prop)

	1	2	3	4	6	7	8	9	10
Month	Contract Baseline	Weather ADJ	OA ADJ*	ADJ Baseline	Year 1 Usage	Projected Savings	Annual Distributed Savings	Measured Savings (Gallons	Measured Savings ($)
January	0	0.81		0	7,900	-8,075	0	-7,900	-$13,833
February	0	1.06		0	7,500	-7,636	0	-7,500	-$13,133
March	0	1.16		0	6,600	-6,559	0	-6,600	-$11,557
April	0	1.50		0	2,200	-2,957	0	-2,200	-$3,852
May	0	0.97		-	0	0	0	-	-
June	0	0.93		-	0	0	0	-	-
July	0	0.99		-	0	0	0	-	-
August	0	1.00		-	0	0	0	-	-
September	0	0.90		-	0	0	0	-	-
October	0	0.95		0	2,100	-2,393	0	-2,100	-$3,677
November	0	0.97		0	5,500	-5,855	0	-5,500	-$9,631
December	0	0.76		0	6,100	-6,526	0	-6,100	-$10,681
TOTAL	0			0	37,900	-40,000	0	-37,900	-$66,363
			*if required			Total Savings (Propane, Gallons (Prop))		-37,900	

		Contract Cost per Gallons (Prop)	$1.7000
Year 1 Savings starts with June 2015 and ends with May 2016		Previous Year Cost per Gallons (Prop) per Contract	$1.7000
Percentage ADJ Baseline effected by CDD	0%	Annual Increase in Energy Costs per Contract	3.00%
Percentage ADJ Baseline effected by HDD	75%	Increase in Energy Costs per Contract	$0.0510
		M&V Year 1 Energy Cost per Contract	$1.7510

ADJ Baseline = (Contract Baseline * Weather ADJ * HDD ADJ) + ((1 - HDD ADJ) * Contract Baseline) + OA ADJ

Measured Savings (Gallons (Prop)) = (ADJ Baseline - Annual Distributed Savings) - Year 1 Usage

Measured Savings ($) = Measured Savings (Gallons (Prop)) * M&V Year 1 Energy Cost per Contract

Projected Savings = Savings estimated based upon pre engineering calculations and distributed based upon the heating and cooling seasons

Annual Distriubted Savings = Pre engineering calculated savings not dependent upon heating or cooling

SCHEDULE M(a) - CERTIFICATE OF SUBSTANTIAL COMPLETION

PARTIES: MCCLURE COMPANY ("McClure")
4101 North Sixth Street
Harrisburg, PA 17110

And

SOUTHERN COLUMBIA AREA SCHOOL DISTRICT ("Client" or "District")
800 Southern Drive
Catawissa, PA 17820

DATE: _____, 20_____

PROJECT: Performance Based Energy Savings Agreement between McClure Company and the Southern Columbia Area School District dated April 28, 2014.

By executing this Certificate of Substantial Completion, Client acknowledges the following:

1. The work set forth in the Performance Based Energy Savings Agreement is substantially complete.
2. Client has "Beneficial Use" of the facilities and systems are operational such that Client could occupy and utilize the facility for its intended use in accordance with the defined construction schedule in prescribed within this Agreement.
3. Client has received pertinent system and equipment operations and maintenance manuals, manufacturer's warranty information and initial training required under the Performance Based Energy Savings Agreement. Client acknowledges supplemental maintenance manuals, warranty information and training may need to be provided after the Substantial Completion date.
4. The warranty as defined in the Performance Based Energy Savings Agreement is in full effect as of the date of this Certificate of Substantial Completion.
5. The following punch list items must be completed by McClure Company (check as applicable):

   ☐ Punch list attached

   ☐ Punch list complete

6. Upon completion of the punch list items, or if such punch list items are complete, McClure and Client shall sign the Certificate of Final Completion attached hereto.

SCHDULE M(b) - CERTIFICATE OF FINAL COMPLETION

PARTIES: MCCLURE COMPANY ("McClure")
4101 North Sixth Street
Harrisburg, PA 17110

And

SOUTHERN COLUMBIA AREA SCHOOL DISTRICT ("Client" or "District")
800 Southern Drive
Catawissa, PA 17820

DATED: _____, 20____

PROJECT: Performance Based Energy Savings Agreement between McClure Company and the Southern Columbia Area School District dated April 28, 2014.

By executing this Certificate of Final Completion, Client acknowledges the following:

1. The work set forth in the Performance Based Energy Savings Agreement has been reviewed and determined by Client to be fully complete.
2. Client accepts the work as complete and hereby releases McClure's obligations under and performance and payment bonds posted for the project as of the date set forth above.
3. Client agrees to release to release final payment within thirty (30) calendar days as of the execution date set forth above. Interest at a rate of 0.5% per month will accrue on all unpaid balances more than (30) calendar days after the date set forth above.

CLIENT:	MCCLURE COMPANY:
Signature:_____	Signature:_____
Printed Name:_____	Printed Name:_____
Title:_____	Title:_____

Attachment A – Scope of Work

ECM 1 – District Wide Lighting Upgrades

Areas Implemented

- ✓ Southern Columbia High School/Middle School
- ✓ G.C. Hartman Elementary School
- ✓ Southern Columbia Bus Garage

Existing Conditions

The 3 building(s) included in the audit for the survey performed in February of 2014 at the Southern Columbia Area School District revealed a total of 3,736 fixtures that contained a variety of lighting technologies ranging from the inefficient incandescent to the more energy efficient T8 and compact fluorescent. The following is a list of the existing lighting systems along with the proposed replacement technology for Southern Columbia Area SD:

	Exist Qty	Retro Qty
Existing T8 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8	2161	2161
Existing T8 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8 Reduce Lamp Qty	553	553
Existing Excluded due to lack of cost effective replacement or more efficient option - No Retrofit Proposed	363	363
Existing T12 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8	241	241
Existing Incandescent - Proposed Relamp Compact Fluorescent	167	167
Existing High Intensity Discharge - Proposed New LED Fixture	92	92
Existing Incandescent - Proposed Relamp LED Dimmable	38	38
Existing High Intensity Discharge - Proposed Retrofit LED	32	32
Existing T12 Fluorescent U Tube - Proposed Relamp Reballast Linear Fluorescent T8 With Reflector kit	22	22
Existing Compact Fluorescent - Proposed New Linear Fluorescent Fixture T8 High-Bay With Sensor	19	19
Existing Incandescent - Proposed New Compact Fluorescent Fixture	15	15
Existing T12 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8 Reduce Lamp Qty	12	12
Existing T8 Fluorescent U Tube - Proposed Relamp Reballast Linear Fluorescent T8 With Reflector kit	12	12
Existing T8 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8 Tandem Wire	8	2
Existing Incandescent - Proposed New LED Fixture	1	1
Grand Total	3736	3730

Out of the 3,736 fixtures recorded in our survey, a total of 363 fixtures were excluded primarily due to their present energy efficiency or lack of a more cost effective energy efficient replacement source that would provide any significant gain in performance. The excluded fixtures may consist of, but not limited to, compact fluorescent, existing two and three-foot linear T8 fixtures, select high intensity discharge fixtures and LED Exit Signs.

Most fixtures overall are in good serviceable condition and are well maintained with minimal lamp or ballast outages. Based on existing fixture condition most fixtures will be addressed with an energy saving retrofit consisting of a reduced wattage lamp and energy efficient ballast. In designated areas a total of 127 new fixtures have been proposed to replace any fixtures in poor condition or to improve on the energy savings performance.

Included in Attachment B is a detailed line by line accounting for every fixture in the above surveyed facilities. The line by line shows the existing fixture and its proposed replacement, along with any sensor requirements.

Proposed Solution

LED (Light-emitting diode)

Our design strategy for LED's is to maximize energy savings, maintenance savings and system reliability. Where the appropriate application exists we will propose LED upgrades from reputable manufacturers taking into consideration the financial payback and maintenance benefits of the prescribed solution. To maximize utility rebates, where available, we would use Energy Star labeled LED lamps, or Design Lights Consortium tested and verified LED fixtures. The proposed design is meant to provide appropriate light levels while taking advantage of the long-life, highly efficient nature of LED's.

Fluorescent

Our design strategy is to standardize on the same type of fluorescent lamp type throughout the buildings included in this project. We have selected a non-proprietary proven lamp and ballast combination that will provide the greatest performance and energy savings of any of the lighting systems considered. The premium grade electronic ballasts we propose are of a high-efficiency design, which is a step above the standard grade electronic ballasts more commonly found in low bid construction projects. These ballasts provide a greater level of efficiency over the standard ballast and also incorporate an intelligent voltage capability allowing the ballast to be used on both 120v and 277v applications. The proposed T8 lamps are a premium high lumen, extended life type that again yields better results than the standard grade.

For this project we have selected a 25-watt energy saving lamp. The proposed lamp and ballast system will provide the greatest energy savings of the various lamp/ballast options explored, and will additionally allow us to improve efficiency on the large quantity of existing T8 linear fluorescent fixtures with instant start ballast by relamping them with the latest in T8 technology. This T8 retrofit strategy will allow us to maintain recommended light levels while still providing a reduction in energy usage in all T8 fixtures and still standardize lamp types. Fluorescent fixtures with broken lamp tombstones will have the tombstones replaced at no additional cost. All fixtures retrofitted will be dry wiped to remove dust and particulate matter to improve fixture lumen efficiency.

High Intensity Discharge

Our design strategy for HID (high intensity discharge), including metal halide or high-pressure sodium, varies due to the variety of applications. In the case of this project, the exterior HID (high-pressure sodium and metal halide) building mounted fixtures and pole site lighting for both buildings are proposed to be replaced with LED Fixtures from recognized manufacturers that have met the required standards for light quality, efficiency and longevity. Consideration is also given to the financial payback and maintenance benefits of the prescribed solution. The new proposed fixture replacement has been designed to furnish light levels that are in compliance with IES and

support the existing site condition requirements. Existing HID site lighting has also been proposed to be replaced with new LED fixtures utilizing an integral photocell.

Incandescent

Our design strategy for the use of incandescent lamps is to eliminate wherever possible. In applications where it is used as a primary source of illumination and sufficient operating hours are present, we will try to replace the existing incandescent fixtures with new fixtures utilizing linear fluorescent or plug-in compact fluorescent lamp fixtures. In areas where incandescent fixtures are the primary light source but have limited operating hours we will replace the incandescent lamps with a self-ballasted screw-in compact fluorescent lamp. Screw-in compact fluorescent lamps not only offer a tremendous energy savings potential when compared with their incandescent counterparts, but also have a significantly longer operating life. We will carefully analyze where the installation of these devices make sense and try to limit their use to areas which fit the above mentioned profile. There are guidelines to using this strategy when aesthetics might be compromised or payback criteria prohibits the installation of a new fixture, a screw-in compact fluorescent lamp can then be used as an alternative. Areas where incandescent fixtures are connected to dimmers are assessed on a case-by-case basis.

Occupancy Sensors

Both the High School and Hartman Elementary have existing occupancy sensors in place which are located in some but not all classrooms, toilet rooms, custodial areas, offices, storage spaces and common areas. McClure Company has proposed installing an additional quantity of 128 occupancy sensors in classrooms spaces only. This will provide uniform control in classroom spaces and generate additional energy savings. In the Hartman Elementary gymnasium integral occupancy sensors have been proposed with the new fixture installation. A quantity of 8 designated vending machines with non perishable snacks and beverages have also been addressed with occupancy based controls to reduce electrical consumption during low occupancy periods.

Utility Rebates

Certain lighting retrofit projects may qualify for Grants, Rebates, and/or Tax Incentives. These incentives, which are provided by Federal and State Governments, and by local utility companies, can vary greatly from one region of the country to another. Since the program timeline incentives may change from time to time, and since they may be limited to specific types of technology or products, we track and monitor these variables and work to design our projects to take full advantage of the offerings.

Following are the Grants, Rebates, and Tax Incentives that have been applied to this project:

Utility Rebate with: PPL $ 61,224

Scope of Work

The following building lighting assessment descriptions will show an accurate breakdown of the lighting technology presently being utilized and the proposed energy efficient retrofit strategy recommended.

Retrofit Description by Building

BUILDING NAME	EXISTING & RETROFIT STANDARD LEGEND DESCRIPTIONS	EXISTING QTY	RETROFIT QTY
Southern Columbia High School	Existing Excluded due to lack of cost effective replacement or more efficient option - No Retrofit Proposed	271	271
	Existing Incandescent - Proposed New Compact Fluorescent Fixture	2	2
	Existing Incandescent - Proposed New LED Fixture	1	1
	Existing Incandescent - Proposed Relamp Compact Fluorescent	98	98

	Existing Incandescent - Proposed Relamp LED Dimmable	23	23
	Existing T12 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8	137	137
	Existing T8 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8	1,621	1,621
	Existing T8 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8 Reduce Lamp Qty	53	53
	Existing T8 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8 Tandem Wire	8	2
	Existing T8 Fluorescent U Tube - Proposed Relamp Reballast Linear Fluorescent T8 With Reflector kit	4	4
Hartman Elementary Center	Existing Compact Fluorescent - Proposed New Linear Fluorescent Fixture T8 High-Bay With Sensor	19	19
	Existing Excluded due to lack of cost effective replacement or more efficient option - No Retrofit Proposed	78	78
	Existing Incandescent - Proposed New Compact Fluorescent Fixture	13	13
	Existing Incandescent - Proposed Relamp Compact Fluorescent	65	65
	Existing Incandescent - Proposed Relamp LED Dimmable	15	15
	Existing T12 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8	96	96
	Existing T12 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8 Reduce Lamp Qty	10	10
	Existing T12 Fluorescent U Tube - Proposed Relamp Reballast Linear Fluorescent T8 With Reflector kit	22	22
	Existing T8 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8	506	506
	Existing T8 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8 Reduce Lamp Qty	494	494
	Existing T8 Fluorescent U Tube - Proposed Relamp Reballast Linear Fluorescent T8 With Reflector kit	8	8
Bus Garage	Existing T12 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8	8	8
	Existing T12 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8 Reduce Lamp Qty	2	2
	Existing T8 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8	34	34
	Existing T8 Fluorescent - Proposed Relamp Reballast Linear Fluorescent T8 Reduce Lamp Qty	6	6
Southern Columbia High School Exterior	Existing Excluded due to lack of cost effective replacement or more efficient option - No Retrofit Proposed	14	14
	Existing High Intensity Discharge - Proposed New LED Fixture	57	57
	Existing High Intensity Discharge - Proposed Retrofit LED	26	26
	Existing Incandescent - Proposed Relamp Compact Fluorescent	1	1
Hartman Elementary Center Exterior	Existing High Intensity Discharge - Proposed New LED Fixture	35	35

	Existing High Intensity Discharge - Proposed Retrofit LED	2	2
Bus Garage Exterior	Existing High Intensity Discharge - Proposed Retrofit LED	4	4
	Existing Incandescent - Proposed Relamp Compact Fluorescent	3	3
Grand Total		3,736	3,730

*Please note, tandem wire and design strategies may result in a reduced retrofit fixture quantity.

Lighting Controls by Building

The proposed numbers of sensor controls by building that are not an integral part of the lighting fixtures are as follows:

Building Name	Sensor Qty.
Soutern Columbia High School	77
Bus Garage	0
Hartman Elementary Center Exterior	0
Grand Total	136

Building Name	Sensor Qty.
Hartman Elementary Center	59
Soutern Columbia High School Exterior	0
Bus Garage Exterior	0

Spare Lamp, Ballast and Sensors Materials

As part of the lighting scope Proposal, McClure Company will furnish, at no additional cost to Southern Columbia Area SD, 2% of the total number of installed lamps for shelf stock. Ballast shelf stock will also be furnished for a total of 1% of the total installed number of ballasts on the project. When sensors are part of our design and included in the installation we will also provide shelf stock for a 1% of the total installed number of sensors on the project. Future replacement lamps and ballasts can be purchased at most electrical distributors.

Operating Hours

Operating hours are as follows:

		Southern Columbia High School	Hartman Elementary Center	Bus Garage	Southern Columbia High School Exterior	Hartman Elementary Center Exterior	Bus Garage Exterior
AUD	AUD	1,000	1,000	1,000			
CAF	CAF	1,800	1,800	1,800			
COR	CORRIDOR	2,600	2,600	2,600			
CR	CLASSROOM	2,200	1,800	1,800			
CS	COMMON SPACE	3,000	2,600	2,600			
E	EXIT SIGN	8,760	8,760	8,760			
EXT	EXTERIOR LIGHTING	4,000	4,000	4,000	4,000	4,000	4,000
GYM	GYM	2,600	2,600	2,600			
JC	JANITOR CLOSET	1,000	1,000	1,000			
KIT	KITCHEN	1,800	1,800	1,800			
LIB	LIBRARY	2,600	2,600	2,600			
LR	LOCKER ROOM	2,400	2,400	2,400			
MRH	MECH ROOM HIGH	2,400	2,400	2,400			
MRL	MECH ROOM LOW	1,000	1,000	1,000			
OH	OFFICE HIGH	3,000	3,000	3,000			
OL	OFFICE LOW	2,400	2,400	2,400			
SH	STORAGE HIGH	1,000	1,000	1,000			
ST	STAIRS	2,600	2,600	2,600			
TR	TOILET ROOMS	2,600	2,600	2,600			
24/7	24 HOURS 7 DAYS A WEEK	8,760	8,760	8,760			
GAR	GARAGE	3,200	3,200	3,200			
CR-S	CLASSROOM - SENSORED	1,540	1,260	1,260	N/A	N/A	N/A
JC-S	JANITOR CLOSET - SENSORED	700	700	700	N/A	N/A	N/A
LR-S	LOCKER ROOM - SENSORED	1,680	1,680	1,680	N/A	N/A	N/A
OH-S	OFFICE HIGH - SENSORED	2,100	2,100	2,100	N/A	N/A	N/A
OL-S	OFFICE LOW - SENSORED	1,680	1,680	1,680	N/A	N/A	N/A
SH-S	STORAGE HIGH - SENSORED	700	700	700	N/A	N/A	N/A
TR-S	TOILET ROOM - SENSORED	1,820	1,820	1,820	N/A	N/A	N/A
CS-S	COMMON SPACE - SENSORED	3,000	2,600	2,600	N/A	N/A	N/A

Energy Savings and Modeling

Energy savings associated with this ECM are based on wattage reductions from the manufacturer's specified wattages found on lamp and ballast cut sheets, operational hours, and a blended utility rate.

The savings will be verified through the M&V strategy listed below.

Sample Operation and Maintenance Savings Calculations

Maintenance savings for all lighting projects are based on material savings only as a result of the lamp and ballast warranty. This project has surveyed a total of 3,736 fixtures.

- Year 1 - $6,109
- Year 2 - $5,207
- Year 3 - $5,338
- Year 4 - $2,993
- Year 5 - $3,068

Measurement and Verification Methodology

The M&V methodology for ECM 1 District Wide Lighting Upgrades will be Option A as defined by the International Performance Measurement and Verification Protocol (IPMVP). Option A includes some pre and post installation measurements and stipulated variables.

The lighting hours of operation throughout the campus will be stipulated and used to determine the KWH savings. The demand savings (KW) are determined by sampling a predetermined number of fixtures and measure the electric demand (Volts * Amps). The reduction in electric demand is then multiplied by the stipulated hours to determine the reduced electrical consumption.

The measured electrical savings will be projected through the life of the contract. As part of the contract negotiations additional post installation measurements may be required.

The following are calculations for determining energy and demand savings:

$$kWh\ Savings_t = \sum_u \left[(kW/fixture_{baseline} \times Quantity_{baseline} - kW/Fixture_{post} \times Quantity_{post}) \times Hours\ of\ Operation \right]_{t,u}$$

Hours of Operation

The stipulated operating hours will be used for both the baseline and post-installation energy calculations. The initial survey will include random measurements to determine the hours of operation. Theses hours will be discussed and reviewed with the customer and then used for energy savings calculations.

Where:

$kWh\ Savings_t$ =	kilowatt-hour savings realized during the post-installation time period *t*
$kW/fixture_{baseline}$ =	lighting baseline demand per fixture for usage group *u*
$kW/fixture_{post}$ =	lighting demand per fixture during post-installation period for usage group *u*
$Quantity_{baseline}$ =	quantity of affected fixtures before the lighting retrofit adjusted for inoperative lighting fixtures for usage group *u*
$Quantity_{post}$ =	quantity of affected fixtures after the lighting retrofit for usage group *u* and time period *t*
Hours of Operation =	total number of post-installation operating hours (assumes number is the same before and after the lighting retrofit) for usage group *u*

Commissioning Process

Level 1 is the proper level of commissioning for the lighting retrofit. Level 1 commissioning involves visual inspection of the installation.

Equipment Training

Four (4) hours of training total among all buildings has been proposed for the lighting retrofit. The training will include but not limited to: component (lamp and ballast) selection procedures, how to determine component locations, and warranty procedures.

Warranty Information

The follow is the warranty periods for each type of lamp, ballast, and fixture. Lamps and ballasts that fail in the warranty period can be exchanged at a local authorized stocking distributor

Linear Fluorescent Lamps	3 years
Linear Fluorescent Ballasts	5 Years
Screw in Compact Fluorescent Lamps	15 months
Retrofitted HID Lamps	6 – 24 Months based on lamp
Retrofitted HID Ballasts	24 Months
Light Fixtures	Varies by Manufacturer (Typically 1 year)
Sensors	Varies by Manufacturer (Typically 5 years)
LED	Varies by Manufacturer

ECM 2 – District Wide Building Envelope Upgrades

Areas Implemented

- ✓ Southern Columbia Area High School & Middle School
- ✓ G.C. Hartman Elementary School / Administration Building

Existing Conditions

McClure Company is proposing to reduce the amount of infiltration air and increase critical insulation areas at the High School/Middle School and G.C. Hartman Elementary School/Administration Building. 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. Even the smallest cracks or penetrations can have a significant impact on the annual heating and cooling energy consumption.

Proposed Solution

These facilities were fully surveyed to leverage the savings opportunities available in limiting infiltration. Common savings areas include air sealing roof wall interfaces and roof edges. The table below breaks out the opportunities available with specific descriptions in subsequent paragraphs.

	Opportunity			
Building	Doors	Roof/Wall Transition	Soffits	Exhaust Fans
High School/Middle School	X	X		X
G.C. Hartman Elementary / Admin. Building	X	X	X	X

Scope of Work

The following is the proposed scope of work:

- High School / Middle School
  - Weatherstrip 24 doors
  - Clean and seal 39 exhaust fans
  - Seal 2,196 linear feet (LF) of roof to wall transition
- G.C. Hartman Elementary
  - Weatherstrip 23 doors
  - Seal 1,918 square feet (SF) of soffit
  - Clean and seal 20 exhaust fans
  - Seal 994 LF of roof to wall transition

Operating Hours

Operating hours for this facility are Monday to Friday, 7:00AM to 4:00PM for the High School/Middle School and 7:00AM to 4:00PM for G.C. Hartman Elementary School.

Energy Savings and Modeling

Energy savings associated with this ECM are based on a custom hourly spreadsheet analysis utilizing ASHRAE standard engineering calculations. McClure Company utilizes custom 8760 hour spreadsheet analysis in order to more effectively calibrate to existing conditions and determine individual ECM savings in more detail. When using these spreadsheets, all of our results are then cross checked with TRACE 700, DOE eQuest or industry

standard engineering checks. Any major difference between the two results is then further analyzed to make a determination for the difference.

The savings are a result of reducing the infiltration of raw outside air into the building and sealing attic / occupied space thermal boundaries. The savings will be verified with the M&V methodology described below.

Sample Operation and Maintenance Savings Calculations

Based on the preliminary study, there are no operation and maintenance savings included at this time.

Measurement and Verification Methodology

The M&V methodology for ECM 2 District Wide Building Envelope Upgrades will be Option A as defined by the International Performance Measurement and Verification Protocol (IPMVP). Option A includes some pre and post installation measurements and stipulated variables.

Infiltration Rate

Q = k * dp^n * A
Q = average air flow infiltration in cubic feet per minute
A = Total infiltration crack area in square feet
k= flow coefficient = 80 cfm/pascalft^2
dp^n = differential pressure across the crack opening due to wind
n = 0.65 from ASHRAE fundamentals
dp^n = depend on average regional wind conditions

Air Leakage Cooling Loss Calculation

Cooling loss per year (BTU/year) = 60 * Q * rho * cp * CDD *24
Rho = density = 0.075
Cp = specific heat = 0.24
CDD = Cooling degree days (determined locally from weather conditions)
Conductive Cooling Loss
Cooling Energy Lost per year (BTU/year) = U * A * CDD * 24
U = 1/R = BTU/hr F ft^2
A = Area ft^2
CDD = Cooling degree days (determined locally from weather conditions)

Air Leakage Heat Loss

Heat Lost per year (BTU/year) = 60 * Q * rho * Cp * HDD *24
Where:
60 min/hr
Q = Infiltration rate
Rho = density 0.075 lb/ft^3
Cp = 0.24 BTU/lb F
HDD = Heating Degree Days

Resulting Equation:
Heat Lost per year (BTU/year) = 25.92 * Q * HDD

Commissioning Process

Level 1 is the proper level of commissioning for the building envelope installation. Level 1 commissioning involves visual inspection of the installation.

Equipment Training

No training has been proposed for this ECM.

Warranty Information

There is a warranty for a period of 1 year on installation and workmanship.

ECM 3 – District Wide Plug Load Management

Areas Implemented

- ✓ Southern Columbia Area High School & Middle School
- ✓ G.C. Hartman Elementary School / Administration Building

Scope of Work

As part of the preliminary survey, McClure Company evaluated the opportunity for installation of plug load management devices allowing for increased control over computer workstations during non-use periods. Through a combination of "smart" outlets, control management equipment, and software integration, this system will allow for work stations, and other devices using the outlet, to be powered down based on un-occupancy, idle use, or a master operation schedule. Monitoring and controlling energy consumption is an important step in improving a facilities overall efficiency. Currently there is no plug load management system implemented in the school district.

While the product use has many opportunities, the preliminary focus is to control computer workstations and ancillary equipment. Workstations offer a great advantage for this ECM as there is opportunity for savings from not only the workstation itself, but also the monitor and possibly other ancillary devices such as printers, copiers, and scanners. Other opportunities evaluated as part of this study include water fountains/coolers, laptop storage/charging carts, commercial copiers, and other devices that may be powered down overnight.

The proposed system is comprised of three parts. The controlled devices are plugged into a smart outlet or power strip that has been retrofit to an existing outlet. The outlet communicates wirelessly with a control box that is tied to the existing building intranet system allowing for communication with the server installed software. Also connected to the control box, in specific applications, are occupancy sensors that allow for not only idle or schedule control of the devices, but also the ability to power down during extended periods of un-occupancy.

The control software is stand alone, but has the ability to be integrated into many standard digital control systems if desired. The management system allows for user defined schedules to be implemented that will not only power down the workstations, but once the systems have been confirmed to be off, also cuts power to the devices, effectively eliminating any phantom loads. Outside of the standard user defined schedules the control logic also allows for units to be powered down after a user defined period of inactivity, such as mouse movement or keystrokes, or after a user set period of no occupancy (using occupancy sensors).

Operating Hours

Operating hours for this facility are Monday to Friday, 7:00PM to 4:00AM for the High School/Middle School and 7:00PM to 4:00AM for G.C. Hartman Elementary School.

Energy Savings

Energy savings associated with this ECM are based on a custom hourly spreadsheet analysis utilizing ASHRAE standard engineering calculations. McClure Company utilizes custom 8760 hour spreadsheet analysis in order to more effectively calibrate to existing conditions and determine individual ECM savings in more detail. When using these spreadsheets, all of our results are then cross checked with TRACE 700, DOE eQuest or industry standard engineering checks. Any major difference between the two results is then further analyzed to make a determination for the difference.

Energy savings for this ECM are a result of increased control of the power usage for the equipment during idle or unoccupied time periods. The savings will be verified through the M&V strategy listed below.

Measurement and Verification Methodology

The M&V methodology for this ECM will be Option B as defined by the International Performance Measurement and Verification Protocol (IPMVP). Option B includes pre and post installation measurements and stipulated variables.

The hours of operation throughout the campus will be determined upon post metering and used to determine the KWH savings. The demand savings (KW) are determined by sampling a predetermined number of devices and measure the electric demand (Volts * Amps). The reduction in electric demand is then multiplied by the hours to determine the reduced electrical consumption.

The following are calculations for determining energy and demand savings:

$$KWH_{baseline} = KW\ baseline^{*}\ hours\ of\ operation\ (hr)$$

$$KWH_{post} = KW\ post^{*}\ hours\ of\ operation\ (hr)$$

$$KWH_{savings} = KWH_{baseline} - KWH_{post}$$

Commissioning Process

Level 2 is the proper level of commissioning for the plug load management system. The level ensures that the contractor meets basic contractual requirements to produce a fully functioning installation in accordance with the contract documents. The contractor shall ensure that system operations are checked and that specified performance is achieved in all respects. The contractor shall provide documentation showing that system operation is in accordance with requirements. The contractor will also ensure that the owner is able to operate the equipment and systems.

Equipment Training

Four (4) hours of training is proposed for this ECM. Training will cover, but is not limited to: software control, device operation, device maintenance, and control logic.

ECM 4 – High School HVAC Upgrades

Areas Implemented

- ✓ Southern Columbia Area High School & Middle School

Existing Conditions

The Southern Columbia Area High School was originally constructed in 1961. It had major additions added in 1999 and 2010, bringing the total building size to approximately 175,000 square feet. The original HVAC heating system of the building was steam served by two oil fired steam boilers. Steam was then distributed throughout the building utilizing the under floor crawl space. The steam served terminal heating units throughout the building. Largely, the steam system utilized pneumatic controls to adjust the temperature set points of the system, which is inefficient and maintenance intensive.

In 1999, a second HVAC heating system was added to serve a newly added middle school section; a hot water system. The hot water was created by installing a steam to hot water heat exchanger in the boiler room. Hot water was created from the steam and was pumped to the ancillary heating equipment located in the new section. For the most part, the hot water system uses a DMS pneumatic overlay to adjust the temperature set points of the system.

In 2010, a third heating system was added to serve a second middle school addition; a hot water / glycol water system. This system, similar to the hot water system, also utilizes a steam to hot water/glycol heat exchanger in the boiler room. The hot water/glycol mix was heated by a steam to hot water/glycol heat exchanger in the boiler room. The hot water/glycol mix was heated by the steam and was circulated to the building heating units through a set of inline pumps. The hot water glycol system utilizes direct digital controls (DDC) to adjust the temperature set points of this system.

The existing steam heating system is far beyond its useful life in addition to being very inefficient and therefore is in need of complete replacement. Approximately (26) high school classrooms are served by the original steam system. Heat and ventilation air is delivered to the classrooms by floor mounted unit ventilators with steam coils. The classroom units have reached their life expectancy and do not provide any sort of cooling to these spaces. The steam system also serves a variety of large group spaces, including the weight room, wood shop, metal shop, auxiliary gym, lobby, wrestling room, faculty rooms, corridors, gang toilets, storage rooms, computer rooms, auditorium and guidance office suite. These steam terminal units serving these spaces are at the end of their life and are in need of replacement.

The domestic hot water system is served by the steam boilers and hot water storage tank during heating season and a "summer" oil fired domestic water heater and smaller storage tank during the remainder of the year. The hot water storage tank, originally installed in 1960s, is in need of replacement.

Proposed Solution

Our proposed solution includes removing the most critical, lowest functioning HVAC systems and replacing them with new HVAC equipment. Our solution is also to provide cooling to the critical classrooms. The pneumatic controls system will be removed and replaced with a new DDC building automation system.

McClure Company is proposing to install a secondary fuel source, propane, for the district. Four new, 1,000 gallon above ground propane tanks will be installed in close proximity to the boiler room. The propane tank will be installed on a concrete pad and a fence with privacy slats will surround the tank. Concrete bollards will be installed around the fence for safety reasons.

Both steam boilers will be removed and replaced with two high efficiency dual fuel boilers. The boilers will be tied into a new hot water header. The existing hot water system will be tied into the header. The glycol system will be converted to hot water and tied in the hot water header as well.

Two base mounted pumps will be installed with variable frequency drives. This will allow the pumps to be more energy efficient since they will be able to vary the flow to the system based on the heating needs.

The existing steam equipment throughout the building will be replaced with hot water equipment.

Twenty-Six high school classrooms and twelve middle school classrooms will be served by vertical packaged heat pumps. The basis of our proposal is an Airedale Classmate® high efficient vertical heat pump with a hot water auxiliary coil. The unit is capable of heating and cooling each classroom. Each unit will contain an internal heat recovery wheel, which will reduce energy use associated with introducing required outside ventilation air.

The heat pump will be placed in a corner of each classroom. A new HVAC louver will be installed for each unit through the exterior wall for outside and relief air on the heat pump. We intend to install exposed painted spiral supply air duct in each classroom. New hot water mains will be routed above the ceiling and serve each heat pump's auxiliary hot water coil from above. The photo to the left shows a similar Airedale Classmate® installation.

High School spaces currently served by steam equipment, including the weight room, wood shop, metal shop, auxiliary gym, auxiliary gym lobby, wrestling room, faculty rooms, corridors, gang toilets, and storage rooms, will be replaced in kind with hot water equipment. The computer room, auditorium and guidance office suite, currently served by steam units with split system DX cooling, will be replaced in kind by hot water units with split system DX cooling.

The domestic water system will be repurposed for a dual fuel application. The oil fired "summer" domestic water heater and smaller storage tank will be tied into a (6) high efficient propane tankless water heating system. This will give the district the flexibility to utilize either fuel type to meet the domestic heating water needs.

As part of the HVAC upgrades, McClure Company is proposing to replace the existing pneumatic control system with a new open protocol, direct digital control (DDC) automation system capable of integrating into the existing digital control systems already in place in the facility.

Below is a basic list of systems and anticipated points for which the new DDC automation system will provide control:

- Heating Hot Water System
  - (2) Dual Fuel Hot Water Boilers and Accessories
  - (2) Base Mounted End Suction Pumps with Variable Frequency Drives
  - (6) Propane Fired Tankless Water Heaters
  - Fuel Oil and Propane Monitoring

- Terminal Equipment
  - (38) DX / Hot Water Vertical Self Contained Heat Pumps
  - (10) Hot Water Cabinet Unit Heaters
  - (7) Hot Water Unit Heaters
  - (5) Hot Water Heating Only Horizontal Unit Ventilators

- (2) DX / Hot Water Horizontal Unit Ventilators & Condensing Unit
- (6) Hot Water Heating Only Indoor Air Handling Units
- (1) DX / Hot Water Indoor Air Handling Unit & Condensing Unit
- (7) Exhaust Fans
- (1) Power Roof Ventilator
-

Classroom Self Contained Heat Pumps

Point Description	Point Type AI	AO	DI	DO
Supply Fan Start/Stop				x
Supply Fan Status			x	
Supply Fan high speed command				x
Reversing Valve command				x
Compressor command				x
Compressor second stage				x
Heat wheel command				x
Heat wheel status			x	
Exhaust Fan command				x
Exhaust fan speed control		x		
Outside air damper position		x		
Auxiliary Heat - hot water valve		x		
Outdoor Air Temp (shared value)	x			
Space temperature	x			
Supply Air Temp	x			
Low temperature alarm			x	
Condensate high level alarm			x	

Unit Vent

Point Description	Point Type AI	AO	DI	DO
Supply Fan Start/Stop				x
Supply Fan Status			x	
Modulating Supply Fan Speed		x		
Mechanical Cooling (typical of two)				x
Hot Water Valve		x		
Outside air damper		x		
Outdoor Air Temp (shared value)	x			
Space temperature	x			
Supply Air Temp	x			
CO2 wall sensor	x			
Low temperature alarm			x	

Indoor Air Handler

Point Description	Point Type AI	AO	DI	DO
Supply Fan Start/Stop				x
Supply Fan Status			x	
Supply Fan VFD Control		x		
Outdoor Air Temp (shared value)	x			
Space temperature	x			
Supply Air Temp	x			
Mixed Air Temp	x			
CO2 sensor - wall or return	x			
Hot water valve - non floating		x		
Mechanical Cooling (typical of 1)				x
Economizer damper control		x		
Low temperature alarm			x	
Fire alarm shut down (smoke detector)			x	

Exhaust Fan / Power Ventilator

Point Description	Point Type AI	AO	DI	DO
Supply Fan Start/Stop				x
Supply Fan Status			x	
Damper command (typical of 1)				x
Damper Position (typical of 1)			x	

Mechanical Room				
	Point Type			
Point Description	AI	AO	DI	DO
System Pump 1 Start/Stop				x
System Pump 1 Status			x	
System Pump 1 VFD Control		x		
System Pump 2 Start/Stop				x
System Pump 2 Status			x	
System Pump 2 VFD Control		x		
Boiler 1 Enable				x
Boiler 1 Status			x	
Boiler 1 Output Control		x		
Boiler 1 Alarm			x	
Boiler 1 Isolation Valve		x		
Boiler 1 Leaving Temperature	x			
Boiler 2 Enable				x
Boiler 2 Status			x	
Boiler 2 Output Control		x		
Boiler 2 Alarm			x	
Boiler 1 Isolation Valve		x		
Boiler 2 Leaving Temperature	x			
Outside Air Temperature	x			
Outside Air Humidity	x			
System Supply Water Temperature	x			
System Return Water Temperature	x			
Mechanical Room Space Temperature	x			
Hot water System Differential Pressure	x			
Emergency Stop Position			x	
Carbon Monoxide Sensor	x			
Combustion Damper Open/Closed				x
Combustion Damper Position			x	
Propane tank Level	x			
Oil Tank Level	x			

Cabinet unit heaters and unit heaters are stand alone control and will not be part of the upgraded and expanded automation system. The pneumatic thermostats will be replaced electric thermostats and the pneumatic control valves will be replaced with two position electric valves.

Below is a basic list of systems and anticipated points for which the new DDC automation system will replace the existing DMS pneumatic actuation control:

- (5) DX/Hot Water Fan Coils
- (3) Hot Water Heating Only Fan Coils
- (2) DX / Hot Water Unit Ventilators & Condensing Unit
- (2) Hot Water Heating Only Unit Ventilators
- (2) DX / Hot Water Indoor Air Handling Unit & Condensing Unit
- (1) Hot Water Heating Only Indoor Air Handling Units
- (4) DX / Hot Water Rooftop Units
- (1) Kitchen Hood

The hardware points associated with converting the DMS control to current control levels will not change. The change will occur at the end device level replacing pneumatic actuators with new electronic actuators. This allows for the elimination of the pneumatic compressor and updates both the valve and damper control at each device list above to single point control by the controller and eliminates another aging control device that converts the pneumatic signal to electronic.

The following is the proposed scope of work:

- Demolition of existing steam heating HVAC equipment and piping as necessary to install new equipment. Existing steam and condensate piping located in pipe tunnels and inaccessible spaces shall be abandoned in place. Existing steam convectors installed in corridors shall be abandoned in place.
- Demolition of the existing steam boilers and all associated boiler room equipment including condensate return system and breeching as necessary to install new equipment.
- Installation of a new propane storage tanks. Propane tank assembly shall consist of (4) 1000 gallon above grade tanks, manifolded, with a vaporizer, installed in a new fenced enclosure. The tanks and vaporizer will be located on concrete pads, the remainder of the enclosure will be stone. The surrounding fence will be an 8' high chain link with vision screen slats. The new propane supply line will run underground from the enclosure to the building and enter the building above grade. The enclosure will be located in the grass area at the west end of the classroom wing, 25' from the building.
- Furnish & Install the following equipment:
    - (2) 4000 MBH dual fuel propane/oil fired boilers.
    - (2) Base mounted, end suction pumps with VFD's
    - (2) Expansion tanks, ASME bladder type
    - (1) Tangential air separators with strainers
    - (6) Propane Fired Tankless Water Heaters
    - (26) DX / Hot Water Vertical Self Contained Heat Pumps
    - (10) Hot Water Cabinet Unit Heaters
    - (7) Hot Water Unit Heaters
    - (5) Hot Water Heating Only Horizontal Unit Ventilators
    - (2) DX / Hot Water Horizontal Unit Ventilators & Condensing Unit
    - (6) Hot Water Heating Only Indoor Air Handling Units
    - (1) DX / Hot Water Indoor Air Handling Unit & Condensing Unit
- New sheet metal ductwork to connect new equipment, existing distribution systems or to support new designs as needed:
    - Duct shall be galvanized sheet metal, seal class A
    - Supply and return ductwork shall be lined.
    - Spiral ductwork in classrooms will not be insulated.
- New hydronic piping to all new equipment:
    - Schedule 40 steel with Vic couplings 2-1/2" and up, type L copper with Pro-press fittings 2" and down.
    - Air conditioning condensate drain piping – type L copper.
    - Propane piping - schedule 40 screwed <=2" and welded >= 2-1/2", gas piping is painted.
    - Cold water make-up piping to hydronic systems - type L copper.
    - All piping shall be insulated with fiberglass insulation with all service jacket in thicknesses as defined by the current Energy Code.
- Coring and sleeves are included in existing building
- Testing and balancing of air and water systems
- Fire stopping of our new penetrations
- Installation of new DDC automation system and decommissioning of pneumatic control system, pneumatic control lines to be abandoned in place.

- Casework: Provide and install casework where existing unit ventilators were removed. The existing outdoor air intake louvers will remain and be blanked off with an insulated panel and new casework installed in the space.
- General Construction: All general construction work required for the installation of the new systems will be provided including:
    - Concrete pads for boiler room equipment.
    - Exterior wall cutting and patching for flues, vents and piping.
    - Interior wall and floor cutting and patching including miscellaneous structural steel for the installation of ductwork and piping.
    - Chases to enclose new duct and piping risers as needed. Duct and piping in mechanical and storage spaces will be run exposed.

Operating Hours

Operating hours for this facility are Monday to Friday, 7:00AM to 4:00PM. Consideration has been given to after school events in gymnasiums, select offices, and cafeterias requiring addition hours of use.

Energy Savings and Modeling

Energy savings for this ECM are based on a custom, 8,760 hour spreadsheet analysis based on facility data, operations parameters, and boiler combustion efficiency. The existing or base case is determined by using these parameters and weather bin data to develop a calibrated representation for the operation of the existing HVAC system scope described above. These results are then adjusted to the proposed operating conditions, in this case the new efficiency of the boilers, anticipated operation of the new terminal equipment (demand control ventilation and other advanced control strategies), along with the proposed operating hours, to develop a proposed case. The difference between the two analyses is the energy savings of the ECM. This analysis is then further checked using ASHRAE standard engineering checks or DOE approved energy modeling software such as eQuest or Trane Trace. Any differences in results are then cross checked to determine the cause of the variance.

McClure Company has selected the above scope as its proposed system given the benefits of Airedale systems and the existing building layout. The use of energy recovery tactics, demand control ventilation, and other advanced control strategies that will be available with the new DDC system is not only a considerable upgrade to the areas including in the scope of work above, but also provides a means to energy savings while maintaining occupant comfort.

Energy savings for this ECM are a result of increased efficiencies in the boilers and terminal heating system, increased control, advanced control strategies such as demand control ventilation. The savings will be verified through the M&V strategy listed below.

Sample Operation and Maintenance Savings Calculations

Based on the preliminary study, there are no operation and maintenance savings included at this time.

Measurement and Verification Methodology

The M&V methodology for this ECM will be Option C as defined by the International Performance Measurement and Verification Protocol (IPMVP). All ECM's that impact energy use at the High School/Middle School (ECMs 4, 5, & 7) will be grouped together for savings determination through comparisons of the baseline utility bills to post construction utility bills.

Verification for the ECM's will be accomplished through direct comparison of the pre and post construction utility bills, with an adjustment for monthly weather variations and any necessary outdoor air adjustments for code compliance. The weather comparison is done monthly, as a ratio to the current months Heating Degree Days (HDD) to baseline month's HDD. There is also a percentage of total utility use that is affected by HDD which is also considered. The baseline energy use has been provided for each building, along with a more

detailed M&V description in Schedule L. Outdoor air (OA) adjustments will be required as the existing, measured OA is less than the minimum required by code for the facility. These adjustments utilize standard bin data analysis and industry standard engineering calculations to determine the adjustments.

Commissioning Process

Since parts of the HVAC system will be replaced in its entirety and it will interface with a new controls, the commissioning process must be of the highest level and level 3 commissioning is proposed. Level 3 commissioning is the most detailed and exhaustive application of the commissioning process. Level 3 commissioning is meant to ensure system operation, including all control sequences, is adequately checked and that functional performance is achieved in all respects.

Before any functional testing will occur, the contractor will perform all pre-start up checks and tests.

Level 3 commissioning involves a visual inspection of the installation, system start up check and documentation of start-up procedures, functional testing to ensure integrated operating systems function as designed, customer attendance and sign off that all functional tests have been completed and the system operation meets expectations.

Equipment Training

Forty (40) hours of training is proposed for both this ECM and ECM's 5 & 6 (Middle School HVAC Upgrades & Elementary School HVAC Upgrades). Eight (8) hours will be dedicated to equipment. Training will cover, but is not limited to: safety, general maintenance, and system operation. The remaining (32) hours will be dedicated to control training and will be divided into two sessions. The first will be (24) hours provided at close out, with the remaining (8) hours to be held approximately six month later as a refresher/seasonal change training. Training will cover, but is not limited to: control sequence review, scheduling, set point override, and system architecture.

Warranty Information

There is a warranty for a period of 1 year on installation and workmanship. Compressors carry a 5 year manufacturer's warranty.

ECM 5 – Middle School HVAC Upgrades

Areas Implemented

- ✓ Southern Columbia Area Middle School

Existing Conditions

Southern Columbia Area Middle School was built in 1999. The building was designed to be heated by a hot water HVAC system utilizing a hot water piping distribution system.

Approximately (12) middle school classrooms are served by the hot water system. Heat and ventilation air is delivered to the classrooms by floor mounted unit ventilators with hot water coils. The classroom units do not provide any sort of cooling to these spaces.

Proposed Solution

Our proposed solution is to provide cooling to the (12) heating only classrooms at the Middle School.

Twelve standard classrooms will be served by vertical packaged heat pumps. The basis of our proposal is an Airedale Classmate® high efficient vertical heat pump with a hot water auxiliary coil. The unit is capable of heating and cooling each classroom. Each unit will contain an internal heat recovery wheel, which will reduce energy use associated with introducing required outside ventilation air. The photo above shows a similar Airedale Classmate® installation.

The heat pump will be placed in a corner of each classroom. A new HVAC louver will be installed for each unit through the exterior wall for outside and relief air on the heat pump. We intend to install exposed painted spiral supply air duct in each classroom.

The following is the proposed scope of work:

- Demolition of existing hot water heating HVAC equipment and piping as necessary to install new equipment.
- Furnish & Install (12) DX / Hot Water Vertical Self Contained Heat Pumps
- New sheet metal ductwork to connect new equipment, existing distribution systems or to support new designs as needed:
    - Duct shall be galvanized sheet metal, seal class A
    - Supply and return ductwork shall be lined.
    - Spiral ductwork in classrooms will not be insulated.
- Extension of hydronic piping to all new equipment:
    - Schedule 40 steel with Vic couplings 2-1/2" and up, type L copper with Pro-press fittings 2" and down.
    - Air conditioning condensate drain piping – type L copper.
    - All piping shall be insulated with fiberglass insulation with all service jacket in thicknesses as defined by the current Energy Code.
- Testing and balancing of air and water systems

- Casework: Provide and install casework where existing unit ventilators were removed. The existing outdoor air intake louvers will remain and be blanked off with an insulated panel and new casework installed in the space.
- General Construction: All general construction work required for the installation of the new systems will be provided including:
    - Exterior wall cutting and patching for flues, vents and piping.
    - Interior wall and floor cutting and patching including miscellaneous structural steel for the installation of ductwork and piping.
- Install new Direct Digital Controls (DDC) replace the existing DMS control system with a new open protocol, direct digital control (DDC) automation system capable of integrating into the existing digital control systems already in place in the facility. See points list for heat pumps below.

Classroom Self Contained Heat Pumps

	Point Type			
Point Description	**AI**	**AO**	**DI**	**DO**
Supply Fan Start/Stop				x
Supply Fan Status			x	
Supply Fan high speed command				x
Reversing Valve command				x
Compressor command				x
Compressor second stage				x
Heat wheel command				x
Heat wheel status			x	
Exhaust Fan command				x
Exhaust fan speed control		x		
Outside air damper position		x		
Auxiliary Heat - hot water valve		x		
Outdoor Air Temp (shared value)	x			
Space temperature	x			
Supply Air Temp	x			
Low temperature alarm			x	
Condensate high level alarm			x	

Operating Hours

Operating hours for this facility are Monday to Friday, 7:00AM to 4:00PM. Consideration has been given to after school events in gymnasiums, select offices, and cafeterias requiring addition hours of use.

Energy Savings and Modeling

Energy savings for this ECM are based on a custom, 8,760 hour spreadsheet analysis based on facility data, operations parameters, and boiler combustion efficiency. The existing or base case is determined by using these parameters and weather bin data to develop a calibrated representation for the operation of the existing HVAC system scope described above. These results are then adjusted to the proposed operating conditions, in this case the new efficiency of the boilers, anticipated operation of the new terminal equipment (demand control ventilation and other advanced control strategies), along with the proposed operating hours, to develop a proposed case. The difference between the two analyses is the energy savings of the ECM. This analysis is then further checked using ASHRAE standard engineering checks or DOE approved energy modeling software such as eQuest or Trane Trace. Any differences in results are then cross checked to determine the cause of the variance.

McClure Company has selected the above scope as its proposed system given the benefits of Airedale systems and the existing building layout. The use of energy recovery tactics, demand control ventilation, and other

advanced control strategies that will be available with the new DDC system is not only a considerable upgrade to the areas including in the scope of work above, but also provides a means to energy savings while maintaining occupant comfort.

Energy savings for this ECM are a result of increased efficiencies in the boilers and terminal heating system, increased control, advanced control strategies such as demand control ventilation. The savings will be verified through the M&V strategy listed below.

Sample Operation and Maintenance Savings Calculations

Based on the preliminary study, there are no operation and maintenance savings included at this time.

Measurement and Verification Methodology

The M&V methodology for this ECM will be Option C as defined by the International Performance Measurement and Verification Protocol (IPMVP). All ECM's that impact energy use at the High School/Middle School (ECMs 4, 5, & 7) will be grouped together for savings determination through comparisons of the baseline utility bills to post construction utility bills.

Verification for the ECM's will be accomplished through direct comparison of the pre and post construction utility bills, with an adjustment for monthly weather variations and any necessary outdoor air adjustments for code compliance. The weather comparison is done monthly, as a ratio to the current months Heating Degree Days (HDD) to baseline month's HDD. There is also a percentage of total utility use that is affected by HDD which is also considered. The baseline energy use has been provided for each building, along with a more detailed M&V description in Schedule L. Outdoor air (OA) adjustments will be required as the existing, measured OA is less than the minimum required by code for the facility. These adjustments utilize standard bin data analysis and industry standard engineering calculations to determine the adjustments.

Commissioning Process

Since parts of the HVAC system will be replaced in its entirety and it will interface with new controls, the commissioning process must be of the highest level and level 3 commissioning is proposed. Level 3 commissioning is the most detailed and exhaustive application of the commissioning process. Level 3 commissioning is meant to ensure system operation, including all control sequences, is adequately checked and that functional performance is achieved in all respects.

Before any functional testing will occur, the contractor will perform all pre-start up checks and tests.

Level 3 commissioning involves a visual inspection of the installation, system start up check and documentation of start-up procedures, functional testing to ensure integrated operating systems function as designed, customer attendance and sign off that all functional tests have been completed and the system operation meets expectations.

Equipment Training

Forty (40) hours of training is proposed for both this ECM and ECM's 5 & 6 (Middle School HVAC Upgrades & Elementary School HVAC Upgrades). Eight (8) hours will be dedicated to equipment. Training will cover, but is not limited to: safety, general maintenance, and system operation. The remaining (32) hours will be dedicated to control training and will be divided into two sessions. The first will be (24) hours provided at close out, with the remaining (8) hours to be held approximately six month later as a refresher/seasonal change training. Training will cover, but is not limited to: control sequence review, scheduling, set point override, and system architecture.

Warranty Information

There is a warranty for a period of 1 year on installation and workmanship. Compressors carry a 5 year manufacturer's warranty.

ECM 6 – Elementary School HVAC Upgrades

Areas Implemented

- ✓ G.C. Hartman Elementary School / Administration Building

Existing Conditions

The Elementary building was designed to be heated by a hot water HVAC system utilizing overhead hot water piping distribution system served by two oil-fired York Shipley boilers located in the mechanical room. An oil fired domestic water heater boiler and storage tank was installed for the Elementary domestic water heating.

The domestic water is served by the steam boilers and hot water storage tank during heating season and a "summer" oil fired domestic water heater during the remainder of the year. The hot water storage tank, originally installed in 1970s, is in need of replacement.

Proposed Solution

McClure Company is proposing to install a secondary fuel source, propane, for the district. Four new, 1,000 gallon above ground propane tanks will be installed in close proximity to the boiler room. The propane tanks will be installed on a concrete pad and a fence with privacy slats will surround the tank. Concrete bollards will be installed around the fence for safety reasons.

Both boiler oil fired burners will be replaced with dual fuel burners, capable of burning fuel oil or propane.

The domestic water system will be repurposed for a dual fuel application. The oil fired "summer" domestic water will be tied into a (6) high efficient propane tankless water heating system and an additional 200 gallon storage tank. This will give the district the flexibility to utilize either fuel type to meet the domestic heating water needs.

The following is the proposed scope of work:

- Install (2) dual fuel oil and propane fired burner for (2) York Shipley boilers.
- Install (3) Propane Fired Tankless Water Heaters
- Install (1) 200 gallon domestic hot water storage tank
- Install (4) 1,000 Gallon Propane Tank on a concrete pad with protective fence and bollards.
- Provide Fuel Oil and Propane Monitoring

The following is the proposed scope of work:

- Installation of a new propane storage tanks. Propane tank assembly shall consist of (4) 1000 gallon above grade tanks, manifolded, with a vaporizer, installed in a new fenced enclosure. The tanks and vaporizer will be located on concrete pads, the remainder of the enclosure will be stone. The surrounding fence will be an 8' high chain link with vision screen slats. The new propane supply line will run underground from the enclosure to the building and enter the building above grade. The enclosure will be located in the grass area at the west end of the classroom wing, 25' from the building.
- Installation of new dual fuel Webster burners with high efficient Temp-A-Trim Air Density control system.
- Installation of new tankless propane water heaters and storage tank. The new domestic water heating system will be tied into the existing oil fired water heating system.

Operating Hours

Operating hours for this facility are Monday to Friday, 7:00AM to 4:00PM. Consideration has been given to after school events in gymnasiums, select offices, and cafeterias requiring addition hours of use.

Energy Savings and Modeling

Energy savings for this ECM are based on a custom, 8,760 hour spreadsheet analysis based on facility data, operations parameters, and boiler combustion efficiency. The existing or base case is determined by using these parameters and weather bin data to develop a calibrated representation for the operation of the existing HVAC system scope described above. These results are then adjusted to the proposed operating conditions, in this case the new efficiency of the boilers, anticipated operation of the new terminal equipment (demand control ventilation and other advanced control strategies), along with the proposed operating hours, to develop a proposed case. The difference between the two analyses is the energy savings of the ECM. This analysis is then further checked using ASHRAE standard engineering checks or DOE approved energy modeling software such as eQuest or Trane Trace. Any differences in results are then cross checked to determine the cause of the variance.

Energy savings for this ECM are a result of increased efficiencies in the boilers, increased control, and advanced control strategies. The savings will be verified through the M&V strategy listed below.

Sample Operation and Maintenance Savings Calculations

Based on the preliminary study, there are no operation and maintenance savings included at this time.

Measurement and Verification Methodology

The M&V methodology for this ECM will be Option C as defined by the International Performance Measurement and Verification Protocol (IPMVP). All ECM's that impact energy use at the Elementary School (ECMs 6 & 8) will be grouped together for savings determination through comparisons of the baseline utility bills to post construction utility bills.

Verification for the ECM's will be accomplished through direct comparison of the pre and post construction utility bills, with an adjustment for monthly weather variations and any necessary outdoor air adjustments for code compliance. The weather comparison is done monthly, as a ratio to the current months Heating Degree Days (HDD) to baseline month's HDD. There is also a percentage of total utility use that is affected by HDD which is also considered. The baseline energy use has been provided for each building, along with a more detailed M&V description in Schedule L. Outdoor air (OA) adjustments will be required as the existing, measured OA is less than the minimum required by code for the facility. These adjustments utilize standard bin data analysis and industry standard engineering calculations to determine the adjustments.

Commissioning Process

Since parts of the HVAC system will be replaced in its entirety and it will interface with new controls, the commissioning process must be of the highest level and level 3 commissioning is proposed. Level 3 commissioning is the most detailed and exhaustive application of the commissioning process. Level 3 commissioning is meant to ensure system operation, including all control sequences, is adequately checked and that functional performance is achieved in all respects.

Before any functional testing will occur, the contractor will perform all pre-start up checks and tests.

Level 3 commissioning involves a visual inspection of the installation, system start up check and documentation of start-up procedures, functional testing to ensure integrated operating systems function as designed, customer attendance and sign off that all functional tests have been completed and the system operation meets expectations.

Equipment Training

Forty (40) hours of training is proposed for this ECM. Eight (8) hours will be dedicated to equipment. Training will cover, but is not limited to: safety, general maintenance, and system operation. The remaining (32) hours

will be dedicated to control training and will be divided into two sessions. The first will be (24) hours provided at close out, with the remaining (8) hours to be held approximately six month later as a refresher/seasonal change training. Training will cover, but is not limited to: control sequence review, scheduling, set point override, and system architecture.

Warranty Information

There is a warranty for a period of 1 year on installation and workmanship.

ECM 7 – High School Roofing Upgrades

Areas Implemented

- ✓ Southern Columbia Area High School & Middle School

Existing Conditions

The high school roof is a combination of hot tar buildup and EPDM roof. Select areas of the roof are leaking and starting to cause damage inside the school. Other deficiencies found include:

- Debris under EPDM membrane
- Failed lap sealant
- Open lap seams
- Areas of soft/wet insulation
- Protruding fastener heads
- Loose wall flashings / term bar
- Loose repair patches
- Holes / Slices in the Membrane

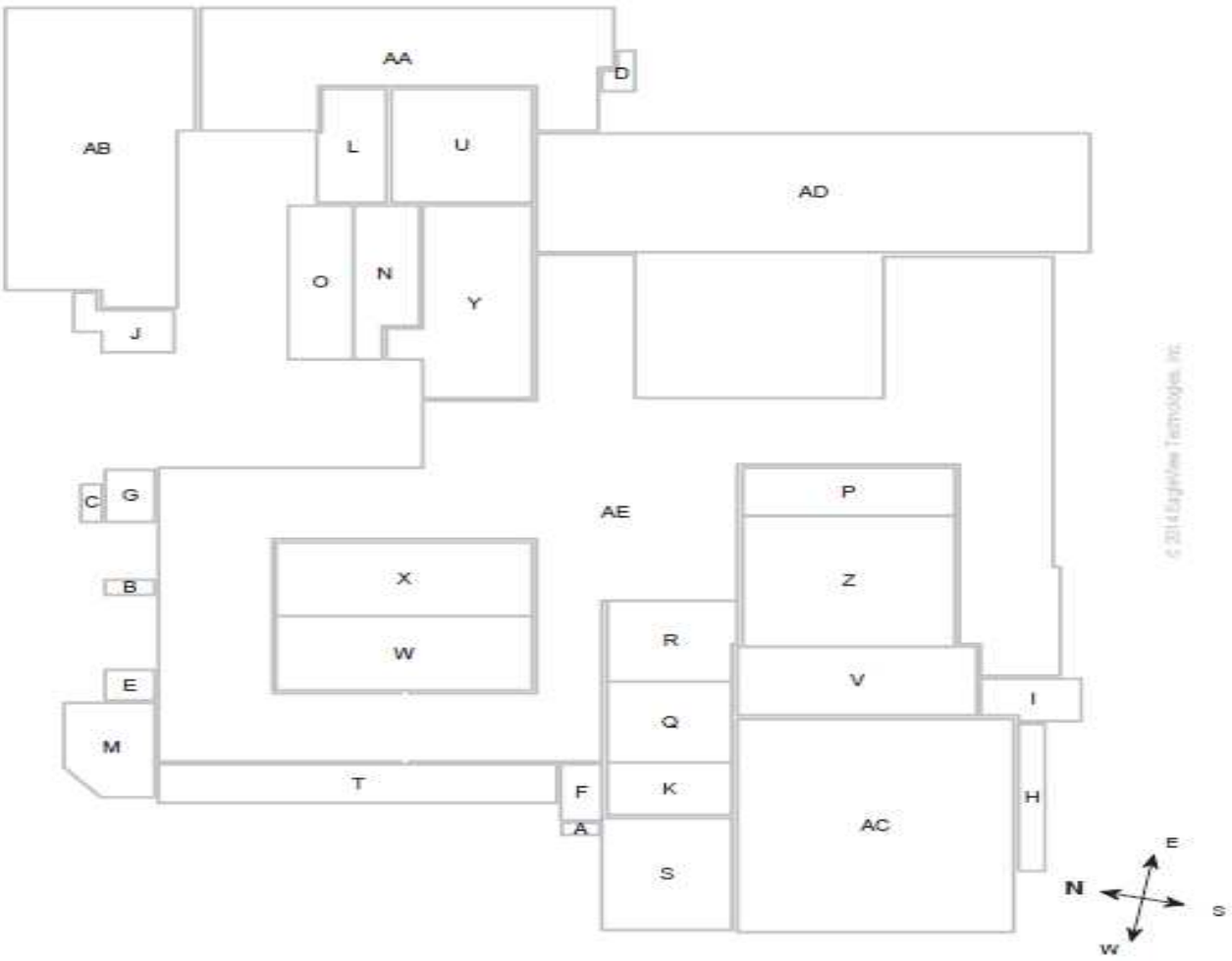
The roof would greatly benefit from a roof repair.

Proposed Solution

McClure Company is proposing to both repair and replace sections of the roof. Leaking areas in the hot tar buildup that are getting repaired will be patched and all loose counter flashing, edging, t-bar and piping will be reflashed and sealed. Areas in the EPDM roof that need replaced will be removed down to the steel deck and new R-20 ISO insulation and 090 white EPDM will be installed on top. Other areas that are still in good shape will be washed and one coat of primer and top coating will be applied to give the roof at 10 year material warranty in those areas.

Scope of Work

- Areas “AE”, “P”, “V”, “M” & “T”, “K”, & “Z”: Patch roof where needed and secure all loose counter flashing, edging, t-bar and pipe flashings.
- Areas “R” & “Q”: Remove old EPDM roof and insulation down to steel deck. Install 3.25” R-20 ISO and 090 white EPDM roof with a 30 year warranty. Install wood blocking and new 050 aluminum replacement roof drains.
- Areas “AD”: Pressure wash surface and apply one coat of primer and one coat of top coating, flash all seams, pipes, drains, curbs, and expansion joints as required for a 10 year material warranty.
- Area “U”: Remove old EPDM roof and insulation down to steel deck. Install 3.25” R-20 ISO and 090 white EPDM roof with a 30 year roof warranty. Install wood blocking and new 050 aluminum roof edging and new aluminum replacement roof drains.



Operating Hours

Operating hours for this ECM are based on 8760 hours per year.

Energy Savings

Energy savings associated with this ECM are based on a custom, 8760 hour, spreadsheet analysis using industry standard engineering calculations and bin data analysis. The analysis uses existing operational and equipment data to create a baseline of existing operation for the equipment based on bin weather data. The proposed system parameters are then applied to the baseline, primarily changes in insulation. The resulting difference in energy use is the net savings for this ECM.

Energy savings for this ECM are a result of increased insulation in the roof structure. The savings will be verified with the M&V methodology described below.

Sample Operation and Maintenance Savings Calculations

Based on the preliminary study, there are no operation and maintenance savings included at this time.

Measurement and Verification Methodology

The M&V methodology for this ECM will be Option C as defined by the International Performance Measurement and Verification Protocol (IPMVP). All ECM's that impact energy use at the High School/Middle School (ECMs

4, 5, & 7) will be grouped together for savings determination through comparisons of the baseline utility bills to post construction utility bills.

Verification for the ECM's will be accomplished through direct comparison of the pre and post construction utility bills, with an adjustment for monthly weather variations and any necessary outdoor air adjustments for code compliance. The weather comparison is done monthly, as a ratio to the current months Heating Degree Days (HDD) to baseline month's HDD. There is also a percentage of total utility use that is affected by HDD which is also considered. The baseline energy use has been provided for each building, along with a more detailed M&V description in Schedule L. Outdoor air (OA) adjustments will be required as the existing, measured OA is less than the minimum required by code for the facility. These adjustments utilize standard bin data analysis and industry standard engineering calculations to determine the adjustments.

Commissioning Process

Level 1 is the proper level of commissioning for the roof replacement. Level 1 commissioning basically involves visual inspection of the installation.

Equipment Training

No training has been proposed for this ECM.

Warranty Information

The EPDM roof replacement will come with a 30 year warranty and the EPDM recoat system will come with a 10 year warranty on material.

ECM 8 – Elementary School Roofing Upgrades

Areas Implemented

- ✓ G.C. Hartman Elementary School / Administration Building

Existing Conditions

Similar to the High School/Middle School, the Elementary School is also in immediate need of a roof replacement. Water has been able to penetrate the roof and get into the insulation beneath it. This causes a loss in R-Value from the insulation and weakens the integrity of the roof. Leaks have also been noticed in the school which causes more repairs to be made beyond the roof itself. Other deficiencies found include:

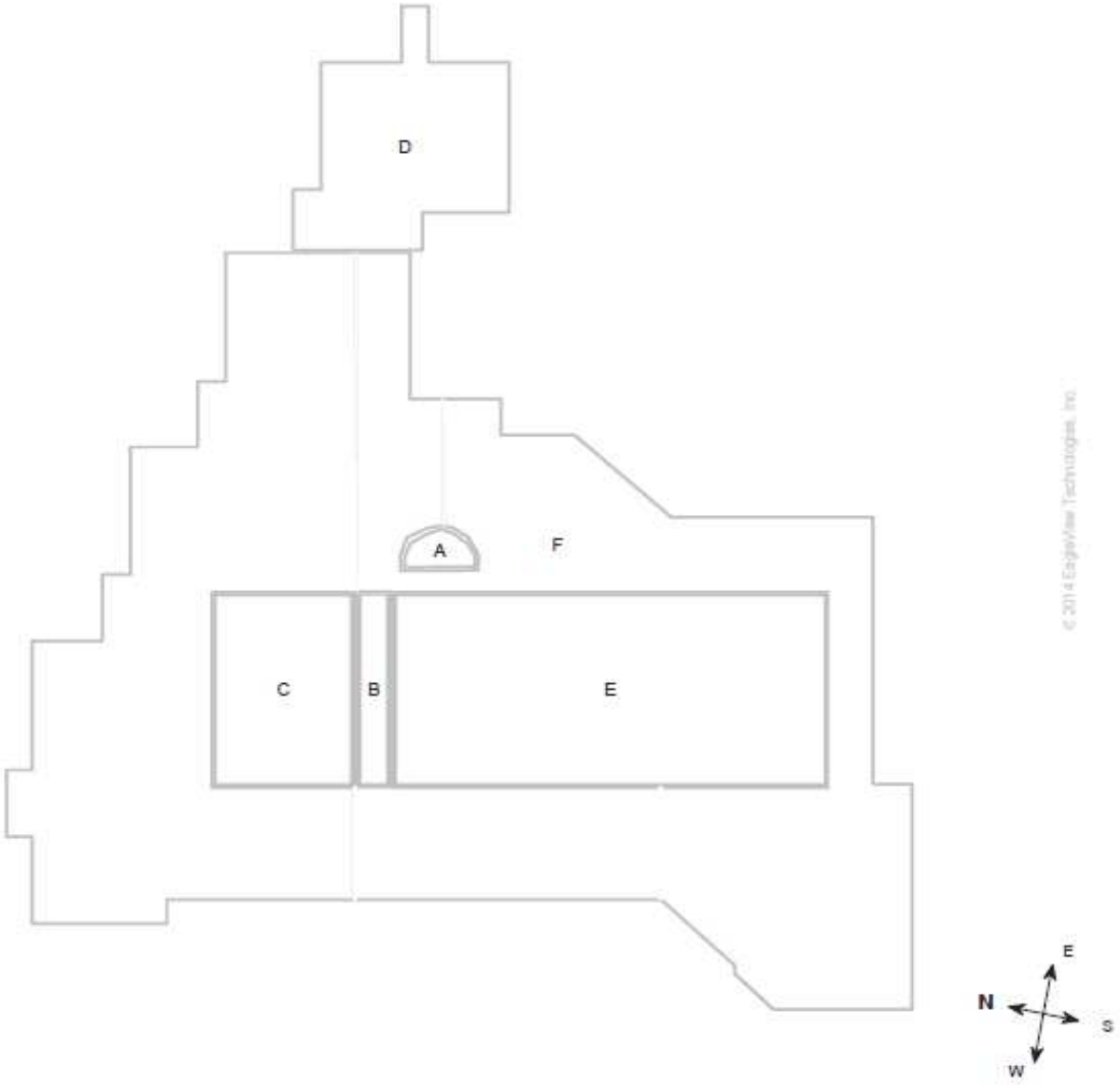
- Debris under EPDM membrane
- Failed lap sealant
- Open lap seams
- Areas of soft/wet insulation
- Protruding fastener heads
- Loose wall flashings / term bar
- Holes in the Membrane

Proposed Solution

McClure Company is proposing to remove the old EPDM roof and insulation down to the gypsum deck on the original building and down to the steel deck on the new addition. A 6 mil poly vapor over gypsum deck will be installed. 3.25" of R-20 ISO insulation and 090 white EPDM with a 30 year total system roof warranty will also be installed. In addition to the insulation and EPDM roof, new 050 aluminum coping and edging, and aluminum replacement roof drains will be installed.

Scope of Work

- Complete removal of existing roofing.
- Install rigid insulation and .090 white EPDM
- 30 year warranty.
- Install wood blocking and new .050 aluminum edging and roof drains.



Operating Hours
Operating hours for this ECM are based on 8760 hours per year.

Energy Savings
Energy savings associated with this ECM are based on a custom, 8760 hour, spreadsheet analysis using industry standard engineering calculations and bin data analysis. The analysis uses existing operational and equipment data to create a baseline of existing operation for the equipment based on bin weather data. The proposed system parameters are then applied to the baseline, primarily changes in insulation. The resulting difference in energy use is the net savings for this ECM.

Energy savings for this ECM are a result of increased insulation in the roof structure. The savings will be verified with the M&V methodology described below.

Sample Operation and Maintenance Savings Calculations
Based on the preliminary study, there are no operation and maintenance savings included at this time.

Measurement and Verification Methodology
The M&V methodology for this ECM will be Option C as defined by the International Performance Measurement and Verification Protocol (IPMVP). All ECM's that impact energy use at the Elementary School (ECMs 6 & 8) will be grouped together for savings determination through comparisons of the baseline utility bills to post construction utility bills.

Verification for the ECM's will be accomplished through direct comparison of the pre and post construction utility bills, with an adjustment for monthly weather variations and any necessary outdoor air adjustments for code compliance. The weather comparison is done monthly, as a ratio to the current months Heating Degree Days (HDD) to baseline month's HDD. There is also a percentage of total utility use that is affected by HDD which is also considered. The baseline energy use has been provided for each building, along with a more detailed M&V description in Schedule L. Outdoor air (OA) adjustments will be required as the existing, measured OA is less than the minimum required by code for the facility. These adjustments utilize standard bin data analysis and industry standard engineering calculations to determine the adjustments.

Commissioning Process
Level 1 is the proper level of commissioning for the roof replacement. Level 1 commissioning basically involves visual inspection of the installation.

Equipment Training
No training has been proposed for this ECM.

Warranty Information
The EPDM roofing system will come with a 30 year warranty.

Attahcment B - Lighting Audit

Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
1	Soutern Columbia High School	1		VESTIBULE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
2	Soutern Columbia High School	1		MAIN OFFICE		3,000	4	14T8	30 W	0.12 kW	360 kWh	1	LB44TW	85 W	0.09 kW	255 kWh	0 kWh	255 kWh			0.04 kW	105 kWh	0 kWh	105 kWh
3	Soutern Columbia High School	1		MAIN OFFICE		3,000	4	24T8	59 W	0.24 kW	708 kWh	4	LB24LP	39 W	0.16 kW	468 kWh	0 kWh	468 kWh			0.08 kW	240 kWh	0 kWh	240 kWh
4	Soutern Columbia High School	1		MAIN OFFICE		3,000	4	PL26X2	54 W	0.22 kW	648 kWh	4	EXTR	54 W	0.22 kW	648 kWh	0 kWh	648 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
5	Soutern Columbia High School	1		CORRIDOR		2,600	7	24T5	65 W	0.46 kW	1,183 kWh	7	EXTR	65 W	0.46 kW	1,183 kWh	0 kWh	1,183 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
6	Soutern Columbia High School	1		PRINCIPAL OFFICE	84	2,100	2	24T8	59 W	0.12 kW	248 kWh	2	LB24LP	39 W	0.08 kW	164 kWh	0 kWh	164 kWh			0.04 kW	84 kWh	0 kWh	84 kWh
7	Soutern Columbia High School	1		AD OFFICE		2,100	2	24T8	59 W	0.12 kW	248 kWh	2	LB24LP	39 W	0.08 kW	164 kWh	0 kWh	164 kWh			0.04 kW	84 kWh	0 kWh	84 kWh
8	Soutern Columbia High School	1		CONFERENCE	61	1,680	4	24T8	59 W	0.24 kW	396 kWh	4	LB24LP	39 W	0.16 kW	262 kWh	0 kWh	262 kWh			0.08 kW	134 kWh	0 kWh	134 kWh
9	Soutern Columbia High School	1		OFFICE		3,000	2	34T8	87 W	0.17 kW	522 kWh	2	LB34LP	57 W	0.11 kW	342 kWh	0 kWh	342 kWh			0.06 kW	180 kWh	0 kWh	180 kWh
10	Soutern Columbia High School	1		VAULT STORAGE		1,000	2	24T8	59 W	0.12 kW	118 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.04 kW	40 kWh	0 kWh	40 kWh
11	Soutern Columbia High School	1		PA ROOM		1,000	2	24T8	59 W	0.12 kW	118 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.04 kW	40 kWh	0 kWh	40 kWh
12	Soutern Columbia High School	1		OFFICE 2		3,000	2	34T8	87 W	0.17 kW	522 kWh	2	LB34LP	57 W	0.11 kW	342 kWh	0 kWh	342 kWh			0.06 kW	180 kWh	0 kWh	180 kWh
13	Soutern Columbia High School	1		COPY ROOM		3,000	4	24T8	59 W	0.24 kW	708 kWh	4	LB24LP	39 W	0.16 kW	468 kWh	0 kWh	468 kWh			0.08 kW	240 kWh	0 kWh	240 kWh
14	Soutern Columbia High School	1		MENS TOILET		2,600	1	22SS	53 W	0.05 kW	138 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.03 kW	70 kWh	0 kWh	70 kWh
15	Soutern Columbia High School	1		WOMENS TOILET		2,600	1	22SS	53 W	0.05 kW	138 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.03 kW	70 kWh	0 kWh	70 kWh
16	Soutern Columbia High School	1		OFFICE 3		3,000	2	34T8	87 W	0.17 kW	522 kWh	2	LB34LP	57 W	0.11 kW	342 kWh	0 kWh	342 kWh			0.06 kW	180 kWh	0 kWh	180 kWh
17	Soutern Columbia High School	1		OFFICE 4		3,000	2	34T8	87 W	0.17 kW	522 kWh	2	LB34LP	57 W	0.11 kW	342 kWh	0 kWh	342 kWh			0.06 kW	180 kWh	0 kWh	180 kWh
18	Soutern Columbia High School	1		HEALTH SUITE OFFICE	64/29	3,000	4	34T8	87 W	0.35 kW	1,044 kWh	4	LB34LP	57 W	0.23 kW	684 kWh	0 kWh	684 kWh			0.12 kW	360 kWh	0 kWh	360 kWh
19	Soutern Columbia High School	1		EXAM ROOM		3,000	2	34T8	87 W	0.17 kW	522 kWh	2	LB34LP	57 W	0.11 kW	342 kWh	0 kWh	342 kWh			0.06 kW	180 kWh	0 kWh	180 kWh
20	Soutern Columbia High School	1		AUDIO TESTING		3,000	1	24T8	59 W	0.06 kW	177 kWh	1	LB24LP	39 W	0.04 kW	117 kWh	0 kWh	117 kWh			0.02 kW	60 kWh	0 kWh	60 kWh
21	Soutern Columbia High School	1		COT ROOM		2,400	3	65	65 W	0.20 kW	468 kWh	3	LED15-DIMR30	15 W	0.05 kW	108 kWh	0 kWh	108 kWh			0.15 kW	360 kWh	0 kWh	360 kWh
22	Soutern Columbia High School	1		TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
23	Soutern Columbia High School	1		STORAGE		1,000	2	34T8	87 W	0.17 kW	174 kWh	2	LB34LP	57 W	0.11 kW	114 kWh	0 kWh	114 kWh			0.06 kW	60 kWh	0 kWh	60 kWh
24	Soutern Columbia High School	1		VESTIBULE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
25	Soutern Columbia High School	1		VESTIBULE		3,000	4	22T8	32 W	0.13 kW	384 kWh	4	LB22	26 W	0.10 kW	312 kWh	0 kWh	312 kWh			0.02 kW	72 kWh	0 kWh	72 kWh
26	Soutern Columbia High School	1		CORRIDOR @ 101		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
27	Soutern Columbia High School	1		CORRIDOR @ 101		2,600	4	22T8	32 W	0.13 kW	333 kWh	4	LB22	26 W	0.10 kW	270 kWh	0 kWh	270 kWh			0.02 kW	62 kWh	0 kWh	62 kWh
28	Soutern Columbia High School	1		CORRIDOR @ 101		2,600	1	PL26X2	54 W	0.05 kW	140 kWh	1	EXTR	54 W	0.05 kW	140 kWh	0 kWh	140 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
29	Soutern Columbia High School	1		CORRIDOR @ 101		2,600	11	24T8	59 W	0.65 kW	1,687 kWh	11	LB24LP	39 W	0.43 kW	1,115 kWh	0 kWh	1,115 kWh			0.22 kW	572 kWh	0 kWh	572 kWh
30	Soutern Columbia High School	1	101	CLASSROOM	57/35	1,540	15	34T8	87 W	1.31 kW	2,010 kWh	15	LB34LP	57 W	0.86 kW	1,317 kWh	0 kWh	1,317 kWh			0.45 kW	693 kWh	0 kWh	693 kWh
31	Soutern Columbia High School	1	101	STORAGE		1,000	2	24EE	72 W	0.14 kW	144 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.07 kW	66 kWh	0 kWh	66 kWh
32	Soutern Columbia High School	1	102	CLASSROOM		1,540	15	34T8	87 W	1.31 kW	2,010 kWh	15	LB34LP	57 W	0.86 kW	1,317 kWh	0 kWh	1,317 kWh			0.45 kW	693 kWh	0 kWh	693 kWh
33	Soutern Columbia High School	1	102	STORAGE		1,000	2	24EE	72 W	0.14 kW	144 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.07 kW	66 kWh	0 kWh	66 kWh
34	Soutern Columbia High School	1	103	CLASSROOM		1,540	15	34T8	87 W	1.31 kW	2,010 kWh	15	LB34LP	57 W	0.86 kW	1,317 kWh	0 kWh	1,317 kWh			0.45 kW	693 kWh	0 kWh	693 kWh
35	Soutern Columbia High School	1	104	CLASSROOM		1,540	15	34T8	87 W	1.31 kW	2,010 kWh	15	LB34LP	57 W	0.86 kW	1,317 kWh	0 kWh	1,317 kWh			0.45 kW	693 kWh	0 kWh	693 kWh
36	Soutern Columbia High School	1		WOMENS TOILET		1,820	3	24T8	59 W	0.18 kW	322 kWh	3	LB24LP	39 W	0.12 kW	213 kWh	0 kWh	213 kWh			0.06 kW	109 kWh	0 kWh	109 kWh

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Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
37	Soutern Columbia High School	1		JANITOR CLOSET		1,000	1	CF13X2	26 W	0.03 kW	26 kWh	1	EXTR	26 W	0.03 kW	26 kWh	0 kWh	26 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
38	Soutern Columbia High School	1		STORAGE		1,000	1	24T8	59 W	0.06 kW	59 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.02 kW	20 kWh	0 kWh	20 kWh
39	Soutern Columbia High School	1		MENS TOILET		1,820	3	24T8	59 W	0.18 kW	322 kWh	3	LB24LP	39 W	0.12 kW	213 kWh	0 kWh	213 kWh			0.06 kW	109 kWh	0 kWh	109 kWh
40	Soutern Columbia High School	1	105	TV STUDIO		2,400	1	24T8	59 W	0.06 kW	142 kWh	1	LB24LP	39 W	0.04 kW	94 kWh	0 kWh	94 kWh			0.02 kW	48 kWh	0 kWh	48 kWh
41	Soutern Columbia High School	1	105	DATA RM		2,400	1	24T8	59 W	0.06 kW	142 kWh	1	LB24LP	39 W	0.04 kW	94 kWh	0 kWh	94 kWh			0.02 kW	48 kWh	0 kWh	48 kWh
42	Soutern Columbia High School	1	105	DATA RM		2,400	1	34T8	87 W	0.09 kW	209 kWh	1	LB34LP	57 W	0.06 kW	137 kWh	0 kWh	137 kWh			0.03 kW	72 kWh	0 kWh	72 kWh
43	Soutern Columbia High School	1	105	CONTROL RM		3,000	2	34T8	87 W	0.17 kW	522 kWh	2	LB34LP	57 W	0.11 kW	342 kWh	0 kWh	342 kWh			0.06 kW	180 kWh	0 kWh	180 kWh
44	Soutern Columbia High School	1	105	STUDIO		2,400	6	24T8	59 W	0.35 kW	850 kWh	6	LB24LP	39 W	0.23 kW	562 kWh	0 kWh	562 kWh			0.12 kW	288 kWh	0 kWh	288 kWh
45	Soutern Columbia High School	1	106	CLASSROOM		2,200	15	34T8	87 W	1.31 kW	2,871 kWh	15	LB34LP	57 W	0.86 kW	1,881 kWh	-564 kWh	1,317 kWh	30%	X	0.45 kW	990 kWh	564 kWh	1,554 kWh
46	Soutern Columbia High School	1	107	CLASSROOM		2,200	6	34T8	87 W	0.52 kW	1,148 kWh	6	LB34LP	57 W	0.34 kW	752 kWh	-226 kWh	527 kWh	30%	X	0.18 kW	396 kWh	226 kWh	622 kWh
47	Soutern Columbia High School	1	108	CLASSROOM	62/32	2,200	15	34T8	87 W	1.31 kW	2,871 kWh	15	LB34LP	57 W	0.86 kW	1,881 kWh	-564 kWh	1,317 kWh	30%	X	0.45 kW	990 kWh	564 kWh	1,554 kWh
48	Soutern Columbia High School	1		STORAGE		1,000	2	34T8	87 W	0.17 kW	174 kWh	2	LB34LP	57 W	0.11 kW	114 kWh	0 kWh	114 kWh			0.06 kW	60 kWh	0 kWh	60 kWh
49	Soutern Columbia High School	1		CORRIDOR		2,600	5	34T8	87 W	0.44 kW	1,131 kWh	5	LB34LP	57 W	0.29 kW	741 kWh	0 kWh	741 kWh			0.15 kW	390 kWh	0 kWh	390 kWh
50	Soutern Columbia High School	1		CORRIDOR		2,600	1	PL26	28 W	0.03 kW	73 kWh	1	EXTR	28 W	0.03 kW	73 kWh	0 kWh	73 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
51	Soutern Columbia High School	1		VESTIBULE		3,000	3	34T8	87 W	0.26 kW	783 kWh	3	LB34LP	57 W	0.17 kW	513 kWh	0 kWh	513 kWh			0.09 kW	270 kWh	0 kWh	270 kWh
52	Soutern Columbia High School	1		VESTIBULE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
53	Soutern Columbia High School	1		VESTIBULE		3,000	2	PL26	28 W	0.06 kW	168 kWh	2	EXTR	28 W	0.06 kW	168 kWh	0 kWh	168 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
54	Soutern Columbia High School	1		CORRIDOR @ 124		2,600	14	34T8	87 W	1.22 kW	3,167 kWh	14	LB34LP	57 W	0.80 kW	2,075 kWh	0 kWh	2,075 kWh			0.42 kW	1,092 kWh	0 kWh	1,092 kWh
55	Soutern Columbia High School	1		CORRIDOR @ 124		2,600	6	PL26	28 W	0.17 kW	437 kWh	6	EXTR	28 W	0.17 kW	437 kWh	0 kWh	437 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
56	Soutern Columbia High School	1	124	CLASSROOM	51/14	2,200	11	34T8	87 W	0.96 kW	2,105 kWh	11	LB34LP	57 W	0.63 kW	1,379 kWh	-414 kWh	966 kWh	30%	X	0.33 kW	726 kWh	414 kWh	1,140 kWh
57	Soutern Columbia High School	1	124	OFFICE		3,000	1	24T8	59 W	0.06 kW	177 kWh	1	LB24LP	39 W	0.04 kW	117 kWh	0 kWh	117 kWh			0.02 kW	60 kWh	0 kWh	60 kWh
58	Soutern Columbia High School	1		WOMENS TOILET		2,600	3	34T8	87 W	0.26 kW	679 kWh	3	LB34LP	57 W	0.17 kW	445 kWh	0 kWh	445 kWh			0.09 kW	234 kWh	0 kWh	234 kWh
59	Soutern Columbia High School	1		WOMENS TOILET		2,600	1	PL26	28 W	0.03 kW	73 kWh	1	EXTR	28 W	0.03 kW	73 kWh	0 kWh	73 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
60	Soutern Columbia High School	1		BOYS TOILET		2,600	2	34T8	87 W	0.17 kW	452 kWh	2	LB34LP	57 W	0.11 kW	296 kWh	0 kWh	296 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
61	Soutern Columbia High School	1		BOYS TOILET		2,600	2	PL26	28 W	0.06 kW	146 kWh	2	EXTR	28 W	0.06 kW	146 kWh	0 kWh	146 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
62	Soutern Columbia High School	1		JANITOR CLOSET		1,000	1	24T8	59 W	0.06 kW	59 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.02 kW	20 kWh	0 kWh	20 kWh
63	Soutern Columbia High School	1	125	CLASSROOM		1,540	12	34T8	87 W	1.04 kW	1,608 kWh	12	LB34LP	57 W	0.68 kW	1,053 kWh	0 kWh	1,053 kWh			0.36 kW	554 kWh	0 kWh	554 kWh
64	Soutern Columbia High School	1	126	CLASSROOM		1,540	12	34T8	87 W	1.04 kW	1,608 kWh	12	LB34LP	57 W	0.68 kW	1,053 kWh	0 kWh	1,053 kWh			0.36 kW	554 kWh	0 kWh	554 kWh
65	Soutern Columbia High School	1	127	CLASSROOM		1,540	12	34T8	87 W	1.04 kW	1,608 kWh	12	LB34LP	57 W	0.68 kW	1,053 kWh	0 kWh	1,053 kWh			0.36 kW	554 kWh	0 kWh	554 kWh
66	Soutern Columbia High School	1	128	CLASSROOM	55/20	1,540	12	34T8	87 W	1.04 kW	1,608 kWh	12	LB34LP	57 W	0.68 kW	1,053 kWh	0 kWh	1,053 kWh			0.36 kW	554 kWh	0 kWh	554 kWh
67	Soutern Columbia High School	1	129	CLASSROOM		1,540	11	34T8	87 W	0.96 kW	1,474 kWh	11	LB34LP	57 W	0.63 kW	966 kWh	0 kWh	966 kWh			0.33 kW	508 kWh	0 kWh	508 kWh
68	Soutern Columbia High School	1		CORRIDOR		2,600	13	24T8	59 W	0.77 kW	1,994 kWh	13	LB24LP	39 W	0.51 kW	1,318 kWh	0 kWh	1,318 kWh			0.26 kW	676 kWh	0 kWh	676 kWh
69	Soutern Columbia High School	1		CORRIDOR		2,600	2	44T8	114 W	0.23 kW	593 kWh	2	LB24HPDL	60 W	0.12 kW	312 kWh	0 kWh	312 kWh			0.11 kW	281 kWh	0 kWh	281 kWh
70	Soutern Columbia High School	1		CORRIDOR		2,600	9	PL18X2	35 W	0.32 kW	819 kWh	9	EXTR	35 W	0.32 kW	819 kWh	0 kWh	819 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
71	Soutern Columbia High School	1		CORRIDOR		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
72	Soutern Columbia High School	1		CORRIDOR		2,600	3	20	20 W	0.06 kW	156 kWh	3	EXTR	20 W	0.06 kW	156 kWh	0 kWh	156 kWh			0.00 kW	0 kWh	0 kWh	0 kWh

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Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
73	Soutern Columbia High School	1		VESTIBULE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
74	Soutern Columbia High School	1	130	CLASSROOM		2,200	11	34T8	87 W	0.96 kW	2,105 kWh	11	LB34LP	57 W	0.63 kW	1,379 kWh	-414 kWh	966 kWh	30%	X	0.33 kW	726 kWh	414 kWh	1,140 kWh
75	Soutern Columbia High School	1	130	CLASSROOM		2,200	1	32T8	46 W	0.05 kW	101 kWh	1	LB32LP	32 W	0.03 kW	70 kWh	-21 kWh	49 kWh	30%		0.01 kW	31 kWh	21 kWh	52 kWh
76	Soutern Columbia High School	1	131	ART ROOM		2,200	8	24T8	59 W	0.47 kW	1,038 kWh	8	LB24LP	39 W	0.31 kW	686 kWh	-206 kWh	480 kWh	30%	X	0.16 kW	352 kWh	206 kWh	558 kWh
77	Soutern Columbia High School	1	131	ART ROOM		2,200	6	24T8	59 W	0.35 kW	779 kWh	6	LB24LP	39 W	0.23 kW	515 kWh	-154 kWh	360 kWh	30%	X	0.12 kW	264 kWh	154 kWh	418 kWh
78	Soutern Columbia High School	1	131	ART ROOM		2,200	14	30	30 W	0.42 kW	924 kWh	14	LED6-MR16	6 W	0.08 kW	185 kWh	-55 kWh	129 kWh	30%		0.34 kW	739 kWh	55 kWh	795 kWh
79	Soutern Columbia High School	1	131	STORAGE		700	2	24T8	59 W	0.12 kW	83 kWh	2	LB24LP	39 W	0.08 kW	55 kWh	0 kWh	55 kWh			0.04 kW	28 kWh	0 kWh	28 kWh
80	Soutern Columbia High School	1		BOYS TOILET		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
81	Soutern Columbia High School	1		STAFF TOILET		1,820	1	24T8	59 W	0.06 kW	107 kWh	1	LB24LP	39 W	0.04 kW	71 kWh	0 kWh	71 kWh			0.02 kW	36 kWh	0 kWh	36 kWh
82	Soutern Columbia High School	1		JANITOR CLOSET		700	1	24T8	59 W	0.06 kW	41 kWh	1	LB24LP	39 W	0.04 kW	27 kWh	0 kWh	27 kWh			0.02 kW	14 kWh	0 kWh	14 kWh
83	Soutern Columbia High School	1		GIRLS TOILET		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
84	Soutern Columbia High School	1	132	CLASSROOM		2,200	17	34T8	87 W	1.48 kW	3,254 kWh	17	LB34LP	57 W	0.97 kW	2,132 kWh	-640 kWh	1,492 kWh	30%	X	0.51 kW	1,122 kWh	640 kWh	1,762 kWh
85	Soutern Columbia High School	1	132	CLASSROOM		2,200	1	32T8	46 W	0.05 kW	101 kWh	1	LB32LP	32 W	0.03 kW	70 kWh	-21 kWh	49 kWh	30%		0.01 kW	31 kWh	21 kWh	52 kWh
86	Soutern Columbia High School	1	132	STORAGE		700	1	24T8	59 W	0.06 kW	41 kWh	1	LB24LP	39 W	0.04 kW	27 kWh	0 kWh	27 kWh			0.02 kW	14 kWh	0 kWh	14 kWh
87	Soutern Columbia High School	1	133	CLASSROOM		2,200	11	34T8	87 W	0.96 kW	2,105 kWh	11	LB34LP	57 W	0.63 kW	1,379 kWh	-414 kWh	966 kWh	30%	X	0.33 kW	726 kWh	414 kWh	1,140 kWh
88	Soutern Columbia High School	1	133	CLASSROOM		2,200	1	32T8	46 W	0.05 kW	101 kWh	1	LB32LP	32 W	0.03 kW	70 kWh	-21 kWh	49 kWh	30%		0.01 kW	31 kWh	21 kWh	52 kWh
89	Soutern Columbia High School	1	134	CLASSROOM		2,200	11	34T8	87 W	0.96 kW	2,105 kWh	11	LB34LP	57 W	0.63 kW	1,379 kWh	-414 kWh	966 kWh	30%	X	0.33 kW	726 kWh	414 kWh	1,140 kWh
90	Soutern Columbia High School	1	134	CLASSROOM		2,200	1	32T8	46 W	0.05 kW	101 kWh	1	LB32LP	32 W	0.03 kW	70 kWh	-21 kWh	49 kWh	30%		0.01 kW	31 kWh	21 kWh	52 kWh
91	Soutern Columbia High School	1	134	STORAGE		700	1	24T8	59 W	0.06 kW	41 kWh	1	LB24LP	39 W	0.04 kW	27 kWh	0 kWh	27 kWh			0.02 kW	14 kWh	0 kWh	14 kWh
92	Soutern Columbia High School	1	134	TOILET		1,820	1	24T8	59 W	0.06 kW	107 kWh	1	LB24LP	39 W	0.04 kW	71 kWh	0 kWh	71 kWh			0.02 kW	36 kWh	0 kWh	36 kWh
93	Soutern Columbia High School	1	135	CLASSROOM		2,200	11	34T8	87 W	0.96 kW	2,105 kWh	11	LB34LP	57 W	0.63 kW	1,379 kWh	-414 kWh	966 kWh	30%	X	0.33 kW	726 kWh	414 kWh	1,140 kWh
94	Soutern Columbia High School	1	135	CLASSROOM		2,200	1	32T8	46 W	0.05 kW	101 kWh	1	LB32LP	32 W	0.03 kW	70 kWh	-21 kWh	49 kWh	30%		0.01 kW	31 kWh	21 kWh	52 kWh
95	Soutern Columbia High School	1	136	CLASSROOM		2,200	11	34T8	87 W	0.96 kW	2,105 kWh	11	LB34LP	57 W	0.63 kW	1,379 kWh	-414 kWh	966 kWh	30%	X	0.33 kW	726 kWh	414 kWh	1,140 kWh
96	Soutern Columbia High School	1	136	CLASSROOM		2,200	1	32T8	46 W	0.05 kW	101 kWh	1	LB32LP	32 W	0.03 kW	70 kWh	-21 kWh	49 kWh	30%		0.01 kW	31 kWh	21 kWh	52 kWh
97	Soutern Columbia High School	1		MAIL ROOM		2,100	1	24T8	59 W	0.06 kW	124 kWh	1	LB24LP	39 W	0.04 kW	82 kWh	0 kWh	82 kWh			0.02 kW	42 kWh	0 kWh	42 kWh
98	Soutern Columbia High School	1		TOILET		1,820	1	24T8	59 W	0.06 kW	107 kWh	1	LB24LP	39 W	0.04 kW	71 kWh	0 kWh	71 kWh			0.02 kW	36 kWh	0 kWh	36 kWh
99	Soutern Columbia High School	1		ADMIN OPEN OFFICE		3,000	4	14T8	30 W	0.12 kW	360 kWh	1	LB44TW	85 W	0.09 kW	255 kWh	0 kWh	255 kWh			0.04 kW	105 kWh	0 kWh	105 kWh
100	Soutern Columbia High School	1		ADMIN OPEN OFFICE		3,000	3	PL26X2	54 W	0.16 kW	486 kWh	3	EXTR	54 W	0.16 kW	486 kWh	0 kWh	486 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
101	Soutern Columbia High School	1		GUIDANCE OFFICE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
102	Soutern Columbia High School	1		CONFERENCE		2,100	2	24T8	59 W	0.12 kW	248 kWh	2	LB24LP	39 W	0.08 kW	164 kWh	0 kWh	164 kWh			0.04 kW	84 kWh	0 kWh	84 kWh
103	Soutern Columbia High School	1		PRINCIPAL OFFICE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
104	Soutern Columbia High School	1		CORRIDOR @ MEDIA CENTER		2,600	11	24T8	59 W	0.65 kW	1,687 kWh	11	LB24LP	39 W	0.43 kW	1,115 kWh	0 kWh	1,115 kWh			0.22 kW	572 kWh	0 kWh	572 kWh
105	Soutern Columbia High School	1		LIBRARY	43	2,600	36	34T8	87 W	3.13 kW	8,143 kWh	36	LB34LP	57 W	2.05 kW	5,335 kWh	0 kWh	5,335 kWh			1.08 kW	2,808 kWh	0 kWh	2,808 kWh
106	Soutern Columbia High School	1		LIBRARY	13	2,600	18	34T8	87 W	1.57 kW	4,072 kWh	18	LB34LP	57 W	1.03 kW	2,668 kWh	0 kWh	2,668 kWh			0.54 kW	1,404 kWh	0 kWh	1,404 kWh
107	Soutern Columbia High School	1		OFFICE		3,000	2	34T8	87 W	0.17 kW	522 kWh	2	LB34LP	57 W	0.11 kW	342 kWh	0 kWh	342 kWh			0.06 kW	180 kWh	0 kWh	180 kWh
108	Soutern Columbia High School	1		MEDIA CENTER		2,200	3	34T8	87 W	0.26 kW	574 kWh	3	LB34LP	57 W	0.17 kW	376 kWh	-113 kWh	263 kWh	30%	X	0.09 kW	198 kWh	113 kWh	311 kWh

Attahcment B - Lighting Audit

Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
109	Soutern Columbia High School	1		OFFICE		3,000	2	34T8	87 W	0.17 kW	522 kWh	2	LB34LP	57 W	0.11 kW	342 kWh	0 kWh	342 kWh			0.06 kW	180 kWh	0 kWh	180 kWh
110	Soutern Columbia High School	1		STORAGE		1,000	3	34T8	87 W	0.26 kW	261 kWh	3	LB34LP	57 W	0.17 kW	171 kWh	0 kWh	171 kWh			0.09 kW	90 kWh	0 kWh	90 kWh
111	Soutern Columbia High School	1		OFFICE		3,000	2	34T8	87 W	0.17 kW	522 kWh	2	LB34LP	57 W	0.11 kW	342 kWh	0 kWh	342 kWh			0.06 kW	180 kWh	0 kWh	180 kWh
112	Soutern Columbia High School	1		INCINERATOR		1,000	2	24T8	59 W	0.12 kW	118 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.04 kW	40 kWh	0 kWh	40 kWh
113	Soutern Columbia High School	1		DATA		1,000	1	24T8	59 W	0.06 kW	59 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.02 kW	20 kWh	0 kWh	20 kWh
114	Soutern Columbia High School	1		ISS		2,200	2	24T8	59 W	0.12 kW	260 kWh	2	LB24LP	39 W	0.08 kW	172 kWh	-51 kWh	120 kWh	30%	X	0.04 kW	88 kWh	51 kWh	139 kWh
115	Soutern Columbia High School	1		ISS		2,200	4	24UT8	59 W	0.24 kW	519 kWh	4	LB22HPREF	37 W	0.15 kW	326 kWh	-98 kWh	228 kWh	30%	X	0.09 kW	194 kWh	98 kWh	291 kWh
116	Soutern Columbia High School	1		OLD CAFÉ	42	1,800	24	44T8	114 W	2.74 kW	4,925 kWh	24	LB24HPDL	60 W	1.44 kW	2,592 kWh	0 kWh	2,592 kWh			1.30 kW	2,333 kWh	0 kWh	2,333 kWh
117	Soutern Columbia High School	1		OLD CAFÉ		1,800	5	PL13	16 W	0.08 kW	144 kWh	5	EXTR	16 W	0.08 kW	144 kWh	0 kWh	144 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
118	Soutern Columbia High School	1		OLD CAFÉ		1,800	6	24T8	59 W	0.35 kW	637 kWh	6	LB24LP	39 W	0.23 kW	421 kWh	0 kWh	421 kWh			0.12 kW	216 kWh	0 kWh	216 kWh
119	Soutern Columbia High School	1		NEW CAFÉ	55	1,800	18	34T8	87 W	1.57 kW	2,819 kWh	18	LB34LP	57 W	1.03 kW	1,847 kWh	0 kWh	1,847 kWh			0.54 kW	972 kWh	0 kWh	972 kWh
120	Soutern Columbia High School	1				8,760	1	DRINK	400 W	0.40 kW	3,504 kWh	1	EXTR	400 W	0.40 kW	3,504 kWh	-1,647 kWh	1,857 kWh	47%	X	0.00 kW	0 kWh	1,647 kWh	1,647 kWh
121	Soutern Columbia High School	1	109	CLASSROOM		2,200	9	32T8	46 W	0.41 kW	911 kWh	9	LB32LP	32 W	0.29 kW	634 kWh	-190 kWh	444 kWh	30%	X	0.13 kW	277 kWh	190 kWh	467 kWh
122	Soutern Columbia High School	1	110	CLASSROOM		2,200	9	34T8	87 W	0.78 kW	1,723 kWh	9	LB34LP	57 W	0.51 kW	1,129 kWh	-339 kWh	790 kWh	30%	X	0.27 kW	594 kWh	339 kWh	933 kWh
123	Soutern Columbia High School	1		STORAGE		1,000	3	34T8	87 W	0.26 kW	261 kWh	3	LB34LP	57 W	0.17 kW	171 kWh	0 kWh	171 kWh			0.09 kW	90 kWh	0 kWh	90 kWh
124	Soutern Columbia High School	1		KITCHEN		1,800	15	24EE	72 W	1.08 kW	1,944 kWh	15	LB24LP	39 W	0.59 kW	1,053 kWh	0 kWh	1,053 kWh			0.50 kW	891 kWh	0 kWh	891 kWh
125	Soutern Columbia High School	1		LOCKER RM		2,400	1	24EE	72 W	0.07 kW	173 kWh	1	LB24LP	39 W	0.04 kW	94 kWh	0 kWh	94 kWh			0.03 kW	79 kWh	0 kWh	79 kWh
126	Soutern Columbia High School	1		OFFICE		3,000	1	24EE	72 W	0.07 kW	216 kWh	1	LB24LP	39 W	0.04 kW	117 kWh	0 kWh	117 kWh			0.03 kW	99 kWh	0 kWh	99 kWh
127	Soutern Columbia High School	1		CAFÉ		1,000	2	24EE	72 W	0.14 kW	144 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.07 kW	66 kWh	0 kWh	66 kWh
128	Soutern Columbia High School	1		DISHWASH		1,800	2	24EE	72 W	0.14 kW	259 kWh	2	LB24LP	39 W	0.08 kW	140 kWh	0 kWh	140 kWh			0.07 kW	119 kWh	0 kWh	119 kWh
129	Soutern Columbia High School	1		KITCHEN		1,800	13	34T8	87 W	1.13 kW	2,036 kWh	13	LB34LP	57 W	0.74 kW	1,334 kWh	0 kWh	1,334 kWh			0.39 kW	702 kWh	0 kWh	702 kWh
130	Soutern Columbia High School	1		STORAGE		1,000	2	34T8	87 W	0.17 kW	174 kWh	2	LB34LP	57 W	0.11 kW	114 kWh	0 kWh	114 kWh			0.06 kW	60 kWh	0 kWh	60 kWh
131	Soutern Columbia High School	1		VESTIBULE		3,000	2	PL13	16 W	0.03 kW	96 kWh	2	EXTR	16 W	0.03 kW	96 kWh	0 kWh	96 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
132	Soutern Columbia High School	1		TOILET		2,600	2	22SS	53 W	0.11 kW	276 kWh	2	LB22	26 W	0.05 kW	135 kWh	0 kWh	135 kWh			0.05 kW	140 kWh	0 kWh	140 kWh
133	Soutern Columbia High School	1		LOUNGE		2,400	6	24T8	59 W	0.35 kW	850 kWh	6	LB24LP	39 W	0.23 kW	562 kWh	0 kWh	562 kWh			0.12 kW	288 kWh	0 kWh	288 kWh
134	Soutern Columbia High School	1		LOUNGE		8,760	1	DRINK	400 W	0.40 kW	3,504 kWh	1	EXTR	400 W	0.40 kW	3,504 kWh	-1,647 kWh	1,857 kWh	47%	X	0.00 kW	0 kWh	1,647 kWh	1,647 kWh
135	Soutern Columbia High School	1		STORAGE		1,000	4	24EE	72 W	0.29 kW	288 kWh	4	LB24LP	39 W	0.16 kW	156 kWh	0 kWh	156 kWh			0.13 kW	132 kWh	0 kWh	132 kWh
136	Soutern Columbia High School	1		STORAGE		1,000	1	24EE	72 W	0.07 kW	72 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.03 kW	33 kWh	0 kWh	33 kWh
137	Soutern Columbia High School	1		CORRIDOR		2,600	4	24T8	59 W	0.24 kW	614 kWh	4	LB24LP	39 W	0.16 kW	406 kWh	0 kWh	406 kWh			0.08 kW	208 kWh	0 kWh	208 kWh
138	Soutern Columbia High School	1		LOBBY		3,000	27	24T8	59 W	1.59 kW	4,779 kWh	27	LB24LP	39 W	1.05 kW	3,159 kWh	0 kWh	3,159 kWh			0.54 kW	1,620 kWh	0 kWh	1,620 kWh
139	Soutern Columbia High School	1		LOBBY		3,000	7	150	150 W	1.05 kW	3,150 kWh	7	CF40	40 W	0.28 kW	840 kWh	0 kWh	840 kWh			0.77 kW	2,310 kWh	0 kWh	2,310 kWh
140	Soutern Columbia High School	1		LOBBY		3,000	40	LED	30 W	1.20 kW	3,600 kWh	40	EXTR	30 W	1.20 kW	3,600 kWh	0 kWh	3,600 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
141	Soutern Columbia High School	1		LOBBY		3,000	5	PL13	16 W	0.08 kW	240 kWh	5	EXTR	16 W	0.08 kW	240 kWh	0 kWh	240 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
142	Soutern Columbia High School	1		LOBBY		8,760	2	DRINK	400 W	0.80 kW	7,008 kWh	2	EXTR	400 W	0.80 kW	7,008 kWh	-3,294 kWh	3,714 kWh	47%	X	0.00 kW	0 kWh	3,294 kWh	3,294 kWh
143	Soutern Columbia High School	1		SHOWCASE		3,000	3	14EE	43 W	0.13 kW	387 kWh	3	LB14	25 W	0.08 kW	225 kWh	0 kWh	225 kWh			0.05 kW	162 kWh	0 kWh	162 kWh
144	Soutern Columbia High School	1		VESTIBULE		3,000	8	24T8	59 W	0.47 kW	1,416 kWh	8	LB24LP	39 W	0.31 kW	936 kWh	0 kWh	936 kWh			0.16 kW	480 kWh	0 kWh	480 kWh

Attahcment B - Lighting Audit

Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
145	Soutern Columbia High School	1		CORRIDOR @ GYM		2,600	4	24T8	59 W	0.24 kW	614 kWh	4	LB24LP	39 W	0.16 kW	406 kWh	0 kWh	406 kWh			0.08 kW	208 kWh	0 kWh	208 kWh
146	Soutern Columbia High School	1		STORAGE		1,000	5	24T8	59 W	0.30 kW	295 kWh	5	LB24LP	39 W	0.20 kW	195 kWh	0 kWh	195 kWh			0.10 kW	100 kWh	0 kWh	100 kWh
147	Soutern Columbia High School	1		WRESTLING RM	49	2,600	16	64T8	174 W	2.78 kW	7,238 kWh	16	EXTR	174 W	2.78 kW	7,238 kWh	0 kWh	7,238 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
148	Soutern Columbia High School	1		WRESTLING RM		2,600	3	CF13	13 W	0.04 kW	101 kWh	3	EXTR	13 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
149	Soutern Columbia High School	1		STORAGE		1,000	2	24T8	59 W	0.12 kW	118 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.04 kW	40 kWh	0 kWh	40 kWh
150	Soutern Columbia High School	1		WRESTLING RM		2,600	6	150	150 W	0.90 kW	2,340 kWh	6	CF60	60 W	0.36 kW	936 kWh	0 kWh	936 kWh			0.54 kW	1,404 kWh	0 kWh	1,404 kWh
151	Soutern Columbia High School	1		STORAGE		1,000	1	24T8	59 W	0.06 kW	59 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.02 kW	20 kWh	0 kWh	20 kWh
152	Soutern Columbia High School	1		REFEREES		2,400	2	34T8	87 W	0.17 kW	418 kWh	2	LB34LP	57 W	0.11 kW	274 kWh	0 kWh	274 kWh			0.06 kW	144 kWh	0 kWh	144 kWh
153	Soutern Columbia High School	1		REFEREES		2,400	1	23T8	45 W	0.05 kW	108 kWh	1	LB23	36 W	0.04 kW	86 kWh	0 kWh	86 kWh			0.01 kW	22 kWh	0 kWh	22 kWh
154	Soutern Columbia High School	1		GIRLS LOCKER RM		2,400	27	24T8	59 W	1.59 kW	3,823 kWh	27	LB24LP	39 W	1.05 kW	2,527 kWh	0 kWh	2,527 kWh			0.54 kW	1,296 kWh	0 kWh	1,296 kWh
155	Soutern Columbia High School	1		GIRLS LOCKER RM		2,400	3	24T8	59 W	0.18 kW	425 kWh	3	LB24LP	39 W	0.12 kW	281 kWh	0 kWh	281 kWh			0.06 kW	144 kWh	0 kWh	144 kWh
156	Soutern Columbia High School	1		PE OFFICE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
157	Soutern Columbia High School	1		STORAGE		1,000	1	24T8	59 W	0.06 kW	59 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.02 kW	20 kWh	0 kWh	20 kWh
158	Soutern Columbia High School	1		TOILET		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
159	Soutern Columbia High School	1		SHOWER		2,400	3	24T8	59 W	0.18 kW	425 kWh	3	LB24LP	39 W	0.12 kW	281 kWh	0 kWh	281 kWh			0.06 kW	144 kWh	0 kWh	144 kWh
160	Soutern Columbia High School	1		COACHES LOCKER		2,400	3	24T8	59 W	0.18 kW	425 kWh	3	LB24LP	39 W	0.12 kW	281 kWh	0 kWh	281 kWh			0.06 kW	144 kWh	0 kWh	144 kWh
161	Soutern Columbia High School	1		GYM		2,600	23	64T8	174 W	4.00 kW	10,405 kWh	23	EXTR	174 W	4.00 kW	10,405 kWh	0 kWh	10,405 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
162	Soutern Columbia High School	1		GYM		2,600	8	150	150 W	1.20 kW	3,120 kWh	8	CF40	40 W	0.32 kW	832 kWh	0 kWh	832 kWh			0.88 kW	2,288 kWh	0 kWh	2,288 kWh
163	Soutern Columbia High School	1		CONCESSION		2,400	3	24T8	59 W	0.18 kW	425 kWh	3	LB24LP	39 W	0.12 kW	281 kWh	0 kWh	281 kWh			0.06 kW	144 kWh	0 kWh	144 kWh
164	Soutern Columbia High School	1		CORRIDOR		2,600	8	24T8	59 W	0.47 kW	1,227 kWh	8	LB24LP	39 W	0.31 kW	811 kWh	0 kWh	811 kWh			0.16 kW	416 kWh	0 kWh	416 kWh
165	Soutern Columbia High School	1		STORAGE		1,000	8	24EE	72 W	0.58 kW	576 kWh	8	LB24LP	39 W	0.31 kW	312 kWh	0 kWh	312 kWh			0.26 kW	264 kWh	0 kWh	264 kWh
166	Soutern Columbia High School	1		BOILER RM		2,400	10	24EE	72 W	0.72 kW	1,728 kWh	10	LB24LP	39 W	0.39 kW	936 kWh	0 kWh	936 kWh			0.33 kW	792 kWh	0 kWh	792 kWh
167	Soutern Columbia High School	1		STORAGE		1,000	2	24EE	72 W	0.14 kW	144 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.07 kW	66 kWh	0 kWh	66 kWh
168	Soutern Columbia High School	1		COMP AREA		2,400	2	24EE	72 W	0.14 kW	346 kWh	2	LB24LP	39 W	0.08 kW	187 kWh	0 kWh	187 kWh			0.07 kW	158 kWh	0 kWh	158 kWh
169	Soutern Columbia High School	1		STORAGE		1,000	2	24EE	72 W	0.14 kW	144 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.07 kW	66 kWh	0 kWh	66 kWh
170	Soutern Columbia High School	1		PIPE CHASE		1,000	4	CF13	13 W	0.05 kW	52 kWh	4	EXTR	13 W	0.05 kW	52 kWh	0 kWh	52 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
171	Soutern Columbia High School	1		PUMP ROOM		2,400	8	24EE	72 W	0.58 kW	1,382 kWh	8	LB24LP	39 W	0.31 kW	749 kWh	0 kWh	749 kWh			0.26 kW	634 kWh	0 kWh	634 kWh
172	Soutern Columbia High School	1		BOILER RM		2,400	2	150	150 W	0.30 kW	720 kWh	2	CF40	40 W	0.08 kW	192 kWh	0 kWh	192 kWh			0.22 kW	528 kWh	0 kWh	528 kWh
173	Soutern Columbia High School	1		WELD SHOP		2,200	10	24T8	59 W	0.59 kW	1,298 kWh	10	LB24LP	39 W	0.39 kW	858 kWh	0 kWh	858 kWh			0.20 kW	440 kWh	0 kWh	440 kWh
174	Soutern Columbia High School	1		WELD SHOP		2,200	5	24T8	59 W	0.30 kW	649 kWh	5	LB24LP	39 W	0.20 kW	429 kWh	0 kWh	429 kWh			0.10 kW	220 kWh	0 kWh	220 kWh
175	Soutern Columbia High School	1		WELD SHOP		2,200	4	24T8	59 W	0.24 kW	519 kWh	4	LB24LP	39 W	0.16 kW	343 kWh	0 kWh	343 kWh			0.08 kW	176 kWh	0 kWh	176 kWh
176	Soutern Columbia High School	1		WELD SHOP		2,200	1	24T8	59 W	0.06 kW	130 kWh	1	LB24LP	39 W	0.04 kW	86 kWh	0 kWh	86 kWh			0.02 kW	44 kWh	0 kWh	44 kWh
177	Soutern Columbia High School	1		WELD SHOP		2,200	7	24EE	72 W	0.50 kW	1,109 kWh	7	LB24LP	39 W	0.27 kW	601 kWh	0 kWh	601 kWh			0.23 kW	508 kWh	0 kWh	508 kWh
178	Soutern Columbia High School	1		WELD SHOP		2,200	20	100	100 W	2.00 kW	4,400 kWh	20	CF23	23 W	0.46 kW	1,012 kWh	0 kWh	1,012 kWh			1.54 kW	3,388 kWh	0 kWh	3,388 kWh
179	Soutern Columbia High School	1		STORAGE		1,000	3	24T8	59 W	0.18 kW	177 kWh	3	LB24LP	39 W	0.12 kW	117 kWh	0 kWh	117 kWh			0.06 kW	60 kWh	0 kWh	60 kWh
180	Soutern Columbia High School	1		PAINT RM		1,000	2	24T8	59 W	0.12 kW	118 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.04 kW	40 kWh	0 kWh	40 kWh

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Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
181	Soutern Columbia High School	1	120	CLASSROOM	41/28	2,200	15	32T8	46 W	0.69 kW	1,518 kWh	15	LB32LP	32 W	0.48 kW	1,056 kWh	-317 kWh	739 kWh	30%	X	0.21 kW	462 kWh	317 kWh	779 kWh
182	Soutern Columbia High School	1	121	CLASSROOM		2,200	11	32T8	46 W	0.51 kW	1,113 kWh	11	LB32LP	32 W	0.35 kW	774 kWh	-232 kWh	542 kWh	30%	X	0.15 kW	339 kWh	232 kWh	571 kWh
183	Soutern Columbia High School	1		WOOD SHOP	72	2,200	22	24T8	59 W	1.30 kW	2,856 kWh	22	LB24LP	39 W	0.86 kW	1,888 kWh	-566 kWh	1,321 kWh	30%	X	0.44 kW	968 kWh	566 kWh	1,534 kWh
184	Soutern Columbia High School	1		WOOD SHOP		2,200	18	24T8	59 W	1.06 kW	2,336 kWh	18	LB24LP	39 W	0.70 kW	1,544 kWh	-463 kWh	1,081 kWh	30%	X	0.36 kW	792 kWh	463 kWh	1,255 kWh
185	Soutern Columbia High School	1		AREA 2 STORAGE		1,000	2	24EE	72 W	0.14 kW	144 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.07 kW	66 kWh	0 kWh	66 kWh
186	Soutern Columbia High School	1		AREA 3 STORAGE		1,000	6	24EE	72 W	0.43 kW	432 kWh	6	LB24LP	39 W	0.23 kW	234 kWh	0 kWh	234 kWh			0.20 kW	198 kWh	0 kWh	198 kWh
187	Soutern Columbia High School	1		UPPER STORAGE		1,000	1	100	100 W	0.10 kW	100 kWh	1	CF23	23 W	0.02 kW	23 kWh	0 kWh	23 kWh			0.08 kW	77 kWh	0 kWh	77 kWh
188	Soutern Columbia High School	1		AREA 4		1,000	2	150	150 W	0.30 kW	300 kWh	2	CF40	40 W	0.08 kW	80 kWh	0 kWh	80 kWh			0.22 kW	220 kWh	0 kWh	220 kWh
189	Soutern Columbia High School	1		TOILET		2,600	1	24EE	72 W	0.07 kW	187 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.03 kW	86 kWh	0 kWh	86 kWh
190	Soutern Columbia High School	1		TOILET		2,600	1	22SS	53 W	0.05 kW	138 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.03 kW	70 kWh	0 kWh	70 kWh
191	Soutern Columbia High School	1		JANITOR CLOSET		1,000	1	24EE	72 W	0.07 kW	72 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.03 kW	33 kWh	0 kWh	33 kWh
192	Soutern Columbia High School	1		WEIGHT RM		2,600	20	24EE	72 W	1.44 kW	3,744 kWh	20	LB24LP	39 W	0.78 kW	2,028 kWh	0 kWh	2,028 kWh			0.66 kW	1,716 kWh	0 kWh	1,716 kWh
193	Soutern Columbia High School	1		WEIGHT RM		2,600	17	44T8	114 W	1.94 kW	5,039 kWh	17	LB24HPDL	60 W	1.02 kW	2,652 kWh	0 kWh	2,652 kWh			0.92 kW	2,387 kWh	0 kWh	2,387 kWh
194	Soutern Columbia High School	1		TRAINER		3,000	9	34T8	87 W	0.78 kW	2,349 kWh	9	LB34LP	57 W	0.51 kW	1,539 kWh	0 kWh	1,539 kWh			0.27 kW	810 kWh	0 kWh	810 kWh
195	Soutern Columbia High School	1		BOYS LOCKER ROOM		2,400	24	24T8	59 W	1.42 kW	3,398 kWh	24	LB24LP	39 W	0.94 kW	2,246 kWh	0 kWh	2,246 kWh			0.48 kW	1,152 kWh	0 kWh	1,152 kWh
196	Soutern Columbia High School	1		BOYS LOCKER ROOM		2,400	12	24T8	59 W	0.71 kW	1,699 kWh	12	LB24LP	39 W	0.47 kW	1,123 kWh	0 kWh	1,123 kWh			0.24 kW	576 kWh	0 kWh	576 kWh
197	Soutern Columbia High School	1		COACHES LOCKER		2,400	3	24T8	59 W	0.18 kW	425 kWh	3	LB24LP	39 W	0.12 kW	281 kWh	0 kWh	281 kWh			0.06 kW	144 kWh	0 kWh	144 kWh
198	Soutern Columbia High School	1		TOILET		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
199	Soutern Columbia High School	1		SHOWER		2,400	3	24T8	59 W	0.18 kW	425 kWh	3	LB24LP	39 W	0.12 kW	281 kWh	0 kWh	281 kWh			0.06 kW	144 kWh	0 kWh	144 kWh
200	Soutern Columbia High School	1		PE OFFICE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
201	Soutern Columbia High School	1	114	MUSIC	100	2,200	24	34T8	87 W	2.09 kW	4,594 kWh	24	LB34LP	57 W	1.37 kW	3,010 kWh	-903 kWh	2,107 kWh	30%	X	0.72 kW	1,584 kWh	903 kWh	2,487 kWh
202	Soutern Columbia High School	1		OFFICE	38	3,000	4	24EE	72 W	0.29 kW	864 kWh	4	LB24LP	39 W	0.16 kW	468 kWh	0 kWh	468 kWh			0.13 kW	396 kWh	0 kWh	396 kWh
203	Soutern Columbia High School	1		STORAGE		1,000	6	24EE	72 W	0.43 kW	432 kWh	6	LB24LP	39 W	0.23 kW	234 kWh	0 kWh	234 kWh			0.20 kW	198 kWh	0 kWh	198 kWh
204	Soutern Columbia High School	1		CORRIDOR @ JANITOR CLOSET		2,600	12	24T8	59 W	0.71 kW	1,841 kWh	12	LB24LP	39 W	0.47 kW	1,217 kWh	0 kWh	1,217 kWh			0.24 kW	624 kWh	0 kWh	624 kWh
205	Soutern Columbia High School	1		JANITOR CLOSET		1,000	1	24EE	72 W	0.07 kW	72 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.03 kW	33 kWh	0 kWh	33 kWh
206	Soutern Columbia High School	1		WOMENS TOILET		1,820	2	24T8	59 W	0.12 kW	215 kWh	2	LB24LP	39 W	0.08 kW	142 kWh	0 kWh	142 kWh			0.04 kW	73 kWh	0 kWh	73 kWh
207	Soutern Columbia High School	1		MENS TOILET		1,820	2	24T8	59 W	0.12 kW	215 kWh	2	LB24LP	39 W	0.08 kW	142 kWh	0 kWh	142 kWh			0.04 kW	73 kWh	0 kWh	73 kWh
208	Soutern Columbia High School	1	111	CLASSROOM		2,200	14	34T8	87 W	1.22 kW	2,680 kWh	14	LB34LP	57 W	0.80 kW	1,756 kWh	-527 kWh	1,229 kWh	30%	X	0.42 kW	924 kWh	527 kWh	1,451 kWh
209	Soutern Columbia High School	1	111	OFFICE		3,000	1	34T8	87 W	0.09 kW	261 kWh	1	LB34LP	57 W	0.06 kW	171 kWh	0 kWh	171 kWh			0.03 kW	90 kWh	0 kWh	90 kWh
210	Soutern Columbia High School	1		ART	39	2,200	18	34T8	87 W	1.57 kW	3,445 kWh	18	LB34LP	57 W	1.03 kW	2,257 kWh	-677 kWh	1,580 kWh	30%	X	0.54 kW	1,188 kWh	677 kWh	1,865 kWh
211	Soutern Columbia High School	1		STORAGE		1,000	2	24EE	72 W	0.14 kW	144 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.07 kW	66 kWh	0 kWh	66 kWh
212	Soutern Columbia High School	1		STORAGE		1,000	2	24EE	72 W	0.14 kW	144 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.07 kW	66 kWh	0 kWh	66 kWh
213	Soutern Columbia High School	1		STORAGE		1,000	6	24T8	59 W	0.35 kW	354 kWh	6	LB24LP	39 W	0.23 kW	234 kWh	0 kWh	234 kWh			0.12 kW	120 kWh	0 kWh	120 kWh
214	Soutern Columbia High School	1		CORRIDOR		2,600	7	24T8	59 W	0.41 kW	1,074 kWh	7	LB24LP	39 W	0.27 kW	710 kWh	0 kWh	710 kWh			0.14 kW	364 kWh	0 kWh	364 kWh
215	Soutern Columbia High School	1		CORRIDOR @ 113		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
216	Soutern Columbia High School	1	113	CLASSROOM		2,200	14	34T8	87 W	1.22 kW	2,680 kWh	14	LB34LP	57 W	0.80 kW	1,756 kWh	-527 kWh	1,229 kWh	30%	X	0.42 kW	924 kWh	527 kWh	1,451 kWh

Attahcment B - Lighting Audit

Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
217	Soutern Columbia High School	1	113	CLASSROOM		2,200	2	32T8	46 W	0.09 kW	202 kWh	2	LB32LP	32 W	0.06 kW	141 kWh	-42 kWh	99 kWh	30%		0.03 kW	62 kWh	42 kWh	104 kWh
218	Soutern Columbia High School	1	1	OFFICE		3,000	4	22T8	32 W	0.13 kW	384 kWh	4	LB22	26 W	0.10 kW	312 kWh	0 kWh	312 kWh			0.02 kW	72 kWh	0 kWh	72 kWh
219	Soutern Columbia High School	1	2	OFFICE		3,000	1	34T8	87 W	0.09 kW	261 kWh	1	LB34LP	57 W	0.06 kW	171 kWh	0 kWh	171 kWh			0.03 kW	90 kWh	0 kWh	90 kWh
220	Soutern Columbia High School	1	3	STORAGE		1,000	1	34T8	87 W	0.09 kW	87 kWh	1	LB34LP	57 W	0.06 kW	57 kWh	0 kWh	57 kWh			0.03 kW	30 kWh	0 kWh	30 kWh
221	Soutern Columbia High School	1	4	STORAGE		1,000	2	34T8	87 W	0.17 kW	174 kWh	2	LB34LP	57 W	0.11 kW	114 kWh	0 kWh	114 kWh			0.06 kW	60 kWh	0 kWh	60 kWh
222	Soutern Columbia High School	1		STORAGE		1,000	8	24T8	59 W	0.47 kW	472 kWh	8	LB24LP	39 W	0.31 kW	312 kWh	0 kWh	312 kWh			0.16 kW	160 kWh	0 kWh	160 kWh
223	Soutern Columbia High School	1		CORRIDOR		2,600	20	24T8	59 W	1.18 kW	3,068 kWh	20	LB24LP	39 W	0.78 kW	2,028 kWh	0 kWh	2,028 kWh			0.40 kW	1,040 kWh	0 kWh	1,040 kWh
224	Soutern Columbia High School	1		SUPPLY RM		1,000	3	24T8	59 W	0.18 kW	177 kWh	3	LB24LP	39 W	0.12 kW	117 kWh	0 kWh	117 kWh			0.06 kW	60 kWh	0 kWh	60 kWh
225	Soutern Columbia High School	1		WOMENS TOILET		2,600	1	24EE	72 W	0.07 kW	187 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.03 kW	86 kWh	0 kWh	86 kWh
226	Soutern Columbia High School	1		WOMENS TOILET		2,600	1	22SS	53 W	0.05 kW	138 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.03 kW	70 kWh	0 kWh	70 kWh
227	Soutern Columbia High School	1		MENS TOILET		2,600	1	24EE	72 W	0.07 kW	187 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.03 kW	86 kWh	0 kWh	86 kWh
228	Soutern Columbia High School	1		MENS TOILET		2,600	1	22SS	53 W	0.05 kW	138 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.03 kW	70 kWh	0 kWh	70 kWh
229	Soutern Columbia High School	1		CAREER CENTER	62	3,000	4	44T8	114 W	0.46 kW	1,368 kWh	4	LB24HPDL	60 W	0.24 kW	720 kWh	0 kWh	720 kWh			0.22 kW	648 kWh	0 kWh	648 kWh
230	Soutern Columbia High School	1		CAREER CENTER		3,000	1	44T8	114 W	0.11 kW	342 kWh	1	LB24HPDL	60 W	0.06 kW	180 kWh	0 kWh	180 kWh			0.05 kW	162 kWh	0 kWh	162 kWh
231	Soutern Columbia High School	1		GUIDANCE OFFICE		3,000	2	44T8	114 W	0.23 kW	684 kWh	2	LB24HPDL	60 W	0.12 kW	360 kWh	0 kWh	360 kWh			0.11 kW	324 kWh	0 kWh	324 kWh
232	Soutern Columbia High School	1		GUIDANCE OFFICE		3,000	2	44T8	114 W	0.23 kW	684 kWh	2	LB24HPDL	60 W	0.12 kW	360 kWh	0 kWh	360 kWh			0.11 kW	324 kWh	0 kWh	324 kWh
233	Soutern Columbia High School	1		SMALL GROUP A		2,200	12	34T8	87 W	1.04 kW	2,297 kWh	12	LB34LP	57 W	0.68 kW	1,505 kWh	-451 kWh	1,053 kWh	30%	X	0.36 kW	792 kWh	451 kWh	1,243 kWh
234	Soutern Columbia High School	1		SHOWCASE		3,000	2	14EE	43 W	0.09 kW	258 kWh	2	LB14	25 W	0.05 kW	150 kWh	0 kWh	150 kWh			0.04 kW	108 kWh	0 kWh	108 kWh
235	Soutern Columbia High School	1		CLASSROOM		2,200	12	34T8	87 W	1.04 kW	2,297 kWh	12	LB34LP	57 W	0.68 kW	1,505 kWh	-451 kWh	1,053 kWh	30%	X	0.36 kW	792 kWh	451 kWh	1,243 kWh
236	Soutern Columbia High School	1		SHAFT		1,000	1	65	65 W	0.07 kW	65 kWh	1	CF20	20 W	0.02 kW	20 kWh	0 kWh	20 kWh			0.05 kW	45 kWh	0 kWh	45 kWh
237	Soutern Columbia High School	1		CLASSROOM		2,200	15	34T8	87 W	1.31 kW	2,871 kWh	15	LB34LP	57 W	0.86 kW	1,881 kWh	-564 kWh	1,317 kWh	30%	X	0.45 kW	990 kWh	564 kWh	1,554 kWh
238	Soutern Columbia High School	1		CLASSROOM		2,200	15	34T8	87 W	1.31 kW	2,871 kWh	15	LB34LP	57 W	0.86 kW	1,881 kWh	-564 kWh	1,317 kWh	30%	X	0.45 kW	990 kWh	564 kWh	1,554 kWh
239	Soutern Columbia High School	1		VESTIBULE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
240	Soutern Columbia High School	1		CLASSROOM		2,200	12	34T8	87 W	1.04 kW	2,297 kWh	12	LB34LP	57 W	0.68 kW	1,505 kWh	-451 kWh	1,053 kWh	30%	X	0.36 kW	792 kWh	451 kWh	1,243 kWh
241	Soutern Columbia High School	1	118	CLASSROOM		2,200	12	34T8	87 W	1.04 kW	2,297 kWh	12	LB34LP	57 W	0.68 kW	1,505 kWh	-451 kWh	1,053 kWh	30%	X	0.36 kW	792 kWh	451 kWh	1,243 kWh
242	Soutern Columbia High School	1		VESTIBULE		3,000	10	24T8	59 W	0.59 kW	1,770 kWh	10	LB24LP	39 W	0.39 kW	1,170 kWh	0 kWh	1,170 kWh			0.20 kW	600 kWh	0 kWh	600 kWh
243	Soutern Columbia High School	1		VESTIBULE		3,000	10	22T8	32 W	0.32 kW	960 kWh	10	LB22	26 W	0.26 kW	780 kWh	0 kWh	780 kWh			0.06 kW	180 kWh	0 kWh	180 kWh
244	Soutern Columbia High School	1		VESTIBULE		3,000	2	14T8	30 W	0.06 kW	180 kWh	2	LB14	25 W	0.05 kW	150 kWh	0 kWh	150 kWh			0.01 kW	30 kWh	0 kWh	30 kWh
245	Soutern Columbia High School	1		VESTIBULE		3,000	6	30	30 W	0.18 kW	540 kWh	6	LED6-MR16	6 W	0.04 kW	108 kWh	0 kWh	108 kWh			0.14 kW	432 kWh	0 kWh	432 kWh
246	Soutern Columbia High School	1		VESTIBULE		3,000	1	PL26X2	54 W	0.05 kW	162 kWh	1	EXTR	54 W	0.05 kW	162 kWh	0 kWh	162 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
247	Soutern Columbia High School	1		LOBBY		3,000	6	24T8	59 W	0.35 kW	1,062 kWh	6	LB24LP	39 W	0.23 kW	702 kWh	0 kWh	702 kWh			0.12 kW	360 kWh	0 kWh	360 kWh
248	Soutern Columbia High School	1		LOBBY		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
249	Soutern Columbia High School	1		LOBBY		3,000	2	22T8	32 W	0.06 kW	192 kWh	2	LB22	26 W	0.05 kW	156 kWh	0 kWh	156 kWh			0.01 kW	36 kWh	0 kWh	36 kWh
250	Soutern Columbia High School	1		LOBBY		3,000	2	14T8	30 W	0.06 kW	180 kWh	2	LB14	25 W	0.05 kW	150 kWh	0 kWh	150 kWh			0.01 kW	30 kWh	0 kWh	30 kWh
251	Soutern Columbia High School	1		LOBBY		3,000	1	12T8	18 W	0.02 kW	54 kWh	1	EXTR	18 W	0.02 kW	54 kWh	0 kWh	54 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
252	Soutern Columbia High School	1		LOBBY		3,000	12	24T8	59 W	0.71 kW	2,124 kWh	12	LB24LP	39 W	0.47 kW	1,404 kWh	0 kWh	1,404 kWh			0.24 kW	720 kWh	0 kWh	720 kWh

Attahcment B - Lighting Audit

Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
253	Soutern Columbia High School	1		LOBBY		3,000	12	22T8	32 W	0.38 kW	1,152 kWh	12	LB22	26 W	0.31 kW	936 kWh	0 kWh	936 kWh			0.07 kW	216 kWh	0 kWh	216 kWh
254	Soutern Columbia High School	1		LOBBY		3,000	7	PL26X2	54 W	0.38 kW	1,134 kWh	7	EXTR	54 W	0.38 kW	1,134 kWh	0 kWh	1,134 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
255	Soutern Columbia High School	1		SHOWCASE		3,000	9	24T8	59 W	0.53 kW	1,593 kWh	9	LB24LP	39 W	0.35 kW	1,053 kWh	0 kWh	1,053 kWh			0.18 kW	540 kWh	0 kWh	540 kWh
256	Soutern Columbia High School	1		CONCESSION		1,680	4	24T8	59 W	0.24 kW	396 kWh	4	LB24LP	39 W	0.16 kW	262 kWh	0 kWh	262 kWh			0.08 kW	134 kWh	0 kWh	134 kWh
257	Soutern Columbia High School	1		MENS TOILET		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
258	Soutern Columbia High School	1		JANITOR CLOSET		700	1	24T8	59 W	0.06 kW	41 kWh	1	LB24LP	39 W	0.04 kW	27 kWh	0 kWh	27 kWh			0.02 kW	14 kWh	0 kWh	14 kWh
259	Soutern Columbia High School	1		FAMILY TOILET		1,820	1	24T8	59 W	0.06 kW	107 kWh	1	LB24LP	39 W	0.04 kW	71 kWh	0 kWh	71 kWh			0.02 kW	36 kWh	0 kWh	36 kWh
260	Soutern Columbia High School	1		WOMENS TOILET		2,600	4	24T8	59 W	0.24 kW	614 kWh	4	LB24LP	39 W	0.16 kW	406 kWh	0 kWh	406 kWh			0.08 kW	208 kWh	0 kWh	208 kWh
261	Soutern Columbia High School	1		AUDITORIUM		1,000	30	150	150 W	4.50 kW	4,500 kWh	30	CF40	40 W	1.20 kW	1,200 kWh	0 kWh	1,200 kWh			3.30 kW	3,300 kWh	0 kWh	3,300 kWh
262	Soutern Columbia High School	1		STAGE		1,000	6	200	200 W	1.20 kW	1,200 kWh	6	CF60	60 W	0.36 kW	360 kWh	0 kWh	360 kWh			0.84 kW	840 kWh	0 kWh	840 kWh
263	Soutern Columbia High School	1		STAGE		1,000	9	150	150 W	1.35 kW	1,350 kWh	9	CF40	40 W	0.36 kW	360 kWh	0 kWh	360 kWh			0.99 kW	990 kWh	0 kWh	990 kWh
264	Soutern Columbia High School	1		STAGE		1,000	4	24EE	72 W	0.29 kW	288 kWh	4	LB24LP	39 W	0.16 kW	156 kWh	0 kWh	156 kWh			0.13 kW	132 kWh	0 kWh	132 kWh
265	Soutern Columbia High School	1		STAGE		1,000	2	100	100 W	0.20 kW	200 kWh	2	CF23	23 W	0.05 kW	46 kWh	0 kWh	46 kWh			0.15 kW	154 kWh	0 kWh	154 kWh
266	Soutern Columbia High School	1		STAGE		1,000	3	100	100 W	0.30 kW	300 kWh	3	CF23	23 W	0.07 kW	69 kWh	0 kWh	69 kWh			0.23 kW	231 kWh	0 kWh	231 kWh
267	Soutern Columbia High School	1		GYM		2,600	36	84T8	228 W	8.21 kW	21,341 kWh	36	EXTR	228 W	8.21 kW	21,341 kWh	0 kWh	21,341 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
268	Soutern Columbia High School	1		STUDENT STORE		2,400	2	24T8	59 W	0.12 kW	283 kWh	2	LB24LP	39 W	0.08 kW	187 kWh	0 kWh	187 kWh			0.04 kW	96 kWh	0 kWh	96 kWh
269	Soutern Columbia High School	1		ELEC		1,000	1	24T8	59 W	0.06 kW	59 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.02 kW	20 kWh	0 kWh	20 kWh
270	Soutern Columbia High School	1		IT ROOM		1,000	1	24T8	59 W	0.06 kW	59 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.02 kW	20 kWh	0 kWh	20 kWh
271	Soutern Columbia High School	1		VESTIBULE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
272	Soutern Columbia High School	1		STORAGE		1,000	4	24T8	59 W	0.24 kW	236 kWh	4	LB24LP	39 W	0.16 kW	156 kWh	0 kWh	156 kWh			0.08 kW	80 kWh	0 kWh	80 kWh
273	Soutern Columbia High School	1		TEAM 1		1,680	4	24T8	59 W	0.24 kW	396 kWh	4	LB24LP	39 W	0.16 kW	262 kWh	0 kWh	262 kWh			0.08 kW	134 kWh	0 kWh	134 kWh
274	Soutern Columbia High School	1		TEAM 1		2,400	6	24T8	59 W	0.35 kW	850 kWh	6	LB24LP	39 W	0.23 kW	562 kWh	0 kWh	562 kWh			0.12 kW	288 kWh	0 kWh	288 kWh
275	Soutern Columbia High School	1		PE OFFICE		2,100	2	34T8	87 W	0.17 kW	365 kWh	2	LB34LP	57 W	0.11 kW	239 kWh	0 kWh	239 kWh			0.06 kW	126 kWh	0 kWh	126 kWh
276	Soutern Columbia High School	1		VESTIBULE		3,000	1	24T8	59 W	0.06 kW	177 kWh	1	LB24LP	39 W	0.04 kW	117 kWh	0 kWh	117 kWh			0.02 kW	60 kWh	0 kWh	60 kWh
277	Soutern Columbia High School	1		REFEREES		1,680	2	24T8	59 W	0.12 kW	198 kWh	2	LB24LP	39 W	0.08 kW	131 kWh	0 kWh	131 kWh			0.04 kW	67 kWh	0 kWh	67 kWh
278	Soutern Columbia High School	1		REFEREES		2,400	1	PL13X2	29 W	0.03 kW	70 kWh	1	EXTR	29 W	0.03 kW	70 kWh	0 kWh	70 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
279	Soutern Columbia High School	1		SHOWER		2,400	2	24T8	59 W	0.12 kW	283 kWh	2	LB24LP	39 W	0.08 kW	187 kWh	0 kWh	187 kWh			0.04 kW	96 kWh	0 kWh	96 kWh
280	Soutern Columbia High School	1		SHOWER		2,400	1	PL26X2	54 W	0.05 kW	130 kWh	1	EXTR	54 W	0.05 kW	130 kWh	0 kWh	130 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
281	Soutern Columbia High School	1		VESTIBULE		3,000	1	24T8	59 W	0.06 kW	177 kWh	1	LB24LP	39 W	0.04 kW	117 kWh	0 kWh	117 kWh			0.02 kW	60 kWh	0 kWh	60 kWh
282	Soutern Columbia High School	1		REFEREE 2		2,400	2	24T8	59 W	0.12 kW	283 kWh	2	LB24LP	39 W	0.08 kW	187 kWh	0 kWh	187 kWh			0.04 kW	96 kWh	0 kWh	96 kWh
283	Soutern Columbia High School	1		REFEREE 2		2,400	1	PL26X2	54 W	0.05 kW	130 kWh	1	EXTR	54 W	0.05 kW	130 kWh	0 kWh	130 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
284	Soutern Columbia High School	1		TEAM 2		2,400	4	24T8	59 W	0.24 kW	566 kWh	4	LB24LP	39 W	0.16 kW	374 kWh	0 kWh	374 kWh			0.08 kW	192 kWh	0 kWh	192 kWh
285	Soutern Columbia High School	1		TEAM 2		2,400	6	24T8	59 W	0.35 kW	850 kWh	6	LB24LP	39 W	0.23 kW	562 kWh	0 kWh	562 kWh			0.12 kW	288 kWh	0 kWh	288 kWh
286	Soutern Columbia High School	1		SHOWER		2,400	2	24T8	59 W	0.12 kW	283 kWh	2	LB24LP	39 W	0.08 kW	187 kWh	0 kWh	187 kWh			0.04 kW	96 kWh	0 kWh	96 kWh
287	Soutern Columbia High School	1		SHOWER		2,400	1	PL26X2	54 W	0.05 kW	130 kWh	1	EXTR	54 W	0.05 kW	130 kWh	0 kWh	130 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
288	Soutern Columbia High School	1		PE OFFICE		3,000	2	34T8	87 W	0.17 kW	522 kWh	2	LB34LP	57 W	0.11 kW	342 kWh	0 kWh	342 kWh			0.06 kW	180 kWh	0 kWh	180 kWh

Attahcment B - Lighting Audit

Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
289	Soutern Columbia High School	2		CORRIDOR @ 201		2,600	14	24T8	59 W	0.83 kW	2,148 kWh	14	LB24LP	39 W	0.55 kW	1,420 kWh	0 kWh	1,420 kWh			0.28 kW	728 kWh	0 kWh	728 kWh
290	Soutern Columbia High School	2		STORAGE		1,000	2	24EE	72 W	0.14 kW	144 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.07 kW	66 kWh	0 kWh	66 kWh
291	Soutern Columbia High School	2		STORAGE		1,000	1	60X2	120 W	0.12 kW	120 kWh	1	NF2-2X13	32 W	0.03 kW	32 kWh	0 kWh	32 kWh			0.09 kW	88 kWh	0 kWh	88 kWh
292	Soutern Columbia High School	2	201	CLASSROOM		2,200	20	34T8	87 W	1.74 kW	3,828 kWh	20	LB34LP	57 W	1.14 kW	2,508 kWh	-752 kWh	1,756 kWh	30%	X	0.60 kW	1,320 kWh	752 kWh	2,072 kWh
293	Soutern Columbia High School	2	201	STORAGE		1,000	2	24T8	59 W	0.12 kW	118 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.04 kW	40 kWh	0 kWh	40 kWh
294	Soutern Columbia High School	2		STORAGE		1,000	5	24T8	59 W	0.30 kW	295 kWh	5	LB24LP	39 W	0.20 kW	195 kWh	0 kWh	195 kWh			0.10 kW	100 kWh	0 kWh	100 kWh
295	Soutern Columbia High School	2	202	CLASSROOM		2,200	14	34T8	87 W	1.22 kW	2,680 kWh	14	LB34LP	57 W	0.80 kW	1,756 kWh	-527 kWh	1,229 kWh	30%	X	0.42 kW	924 kWh	527 kWh	1,451 kWh
296	Soutern Columbia High School	2	204	CLASSROOM		2,200	15	34T8	87 W	1.31 kW	2,871 kWh	15	LB34LP	57 W	0.86 kW	1,881 kWh	-564 kWh	1,317 kWh	30%	X	0.45 kW	990 kWh	564 kWh	1,554 kWh
297	Soutern Columbia High School	2	205	CLASSROOM	48/34	2,200	15	34T8	87 W	1.31 kW	2,871 kWh	15	LB34LP	57 W	0.86 kW	1,881 kWh	-564 kWh	1,317 kWh	30%	X	0.45 kW	990 kWh	564 kWh	1,554 kWh
298	Soutern Columbia High School	2	205	STORAGE		1,000	1	24T8	59 W	0.06 kW	59 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.02 kW	20 kWh	0 kWh	20 kWh
299	Soutern Columbia High School	2	206	CLASSROOM		2,200	15	34T8	87 W	1.31 kW	2,871 kWh	15	LB34LP	57 W	0.86 kW	1,881 kWh	-564 kWh	1,317 kWh	30%	X	0.45 kW	990 kWh	564 kWh	1,554 kWh
300	Soutern Columbia High School	2		GIRLS TOILET		1,820	3	24T8	59 W	0.18 kW	322 kWh	3	LB24LP	39 W	0.12 kW	213 kWh	0 kWh	213 kWh			0.06 kW	109 kWh	0 kWh	109 kWh
301	Soutern Columbia High School	2		JANITOR CLOSET		1,000	1	60X2	120 W	0.12 kW	120 kWh	1	NF2-2X13	32 W	0.03 kW	32 kWh	0 kWh	32 kWh			0.09 kW	88 kWh	0 kWh	88 kWh
302	Soutern Columbia High School	2		DATA		1,000	1	24EE	72 W	0.07 kW	72 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.03 kW	33 kWh	0 kWh	33 kWh
303	Soutern Columbia High School	2		BOYS TOILET		1,820	3	24T8	59 W	0.18 kW	322 kWh	3	LB24LP	39 W	0.12 kW	213 kWh	0 kWh	213 kWh			0.06 kW	109 kWh	0 kWh	109 kWh
304	Soutern Columbia High School	2	208	CLASSROOM		1,540	15	34T8	87 W	1.31 kW	2,010 kWh	15	LB34LP	57 W	0.86 kW	1,317 kWh	0 kWh	1,317 kWh			0.45 kW	693 kWh	0 kWh	693 kWh
305	Soutern Columbia High School	2	207	CLASSROOM		1,540	12	34T8	87 W	1.04 kW	1,608 kWh	12	LB34LP	57 W	0.68 kW	1,053 kWh	0 kWh	1,053 kWh			0.36 kW	554 kWh	0 kWh	554 kWh
306	Soutern Columbia High School	2	210	CLASSROOM		1,540	15	34T8	87 W	1.31 kW	2,010 kWh	15	LB34LP	57 W	0.86 kW	1,317 kWh	0 kWh	1,317 kWh			0.45 kW	693 kWh	0 kWh	693 kWh
307	Soutern Columbia High School	2	209	CLASSROOM		1,540	12	34T8	87 W	1.04 kW	1,608 kWh	12	LB34LP	57 W	0.68 kW	1,053 kWh	0 kWh	1,053 kWh			0.36 kW	554 kWh	0 kWh	554 kWh
308	Soutern Columbia High School	2	211	CLASSROOM		1,540	12	34T8	87 W	1.04 kW	1,608 kWh	12	LB34LP	57 W	0.68 kW	1,053 kWh	0 kWh	1,053 kWh			0.36 kW	554 kWh	0 kWh	554 kWh
309	Soutern Columbia High School	2		CORRIDOR @ 212		2,600	4	24T8	59 W	0.24 kW	614 kWh	4	LB24LP	39 W	0.16 kW	406 kWh	0 kWh	406 kWh			0.08 kW	208 kWh	0 kWh	208 kWh
310	Soutern Columbia High School	2		FACULTY TOILET		2,600	1	22SS	53 W	0.05 kW	138 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.03 kW	70 kWh	0 kWh	70 kWh
311	Soutern Columbia High School	2		FACULTY TOILET		2,600	1	22SS	53 W	0.05 kW	138 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.03 kW	70 kWh	0 kWh	70 kWh
312	Soutern Columbia High School	2	212	CLASSROOM		1,540	12	34T8	87 W	1.04 kW	1,608 kWh	12	LB34LP	57 W	0.68 kW	1,053 kWh	0 kWh	1,053 kWh			0.36 kW	554 kWh	0 kWh	554 kWh
313	Soutern Columbia High School	2		JANITOR CLOSET		1,000	1	65	65 W	0.07 kW	65 kWh	1	CF20	20 W	0.02 kW	20 kWh	0 kWh	20 kWh			0.05 kW	45 kWh	0 kWh	45 kWh
314	Soutern Columbia High School	2		INST PLANNING		2,100	5	24T8	59 W	0.30 kW	620 kWh	5	LB24LP	39 W	0.20 kW	410 kWh	0 kWh	410 kWh			0.10 kW	210 kWh	0 kWh	210 kWh
315	Soutern Columbia High School	2		INST PLANNING		8,760	1	DRINK	400 W	0.40 kW	3,504 kWh	1	EXTR	400 W	0.40 kW	3,504 kWh	-1,647 kWh	1,857 kWh	47%	X	0.00 kW	0 kWh	1,647 kWh	1,647 kWh
316	Soutern Columbia High School	2	214	CLASSROOM		2,200	13	34T8	87 W	1.13 kW	2,488 kWh	13	LB34LP	57 W	0.74 kW	1,630 kWh	-489 kWh	1,141 kWh	30%	X	0.39 kW	858 kWh	489 kWh	1,347 kWh
317	Soutern Columbia High School	2	213	CLASSROOM		2,200	15	34T8	87 W	1.31 kW	2,871 kWh	15	LB34LP	57 W	0.86 kW	1,881 kWh	-564 kWh	1,317 kWh	30%	X	0.45 kW	990 kWh	564 kWh	1,554 kWh
318	Soutern Columbia High School	2		CORRIDOR		2,600	5	24T8	59 W	0.30 kW	767 kWh	5	LB24LP	39 W	0.20 kW	507 kWh	0 kWh	507 kWh			0.10 kW	260 kWh	0 kWh	260 kWh
319	Soutern Columbia High School	2		CORRIDOR @ 215		2,600	14	34T8	87 W	1.22 kW	3,167 kWh	14	LB34LP	57 W	0.80 kW	2,075 kWh	0 kWh	2,075 kWh			0.42 kW	1,092 kWh	0 kWh	1,092 kWh
320	Soutern Columbia High School	2	215	CLASSROOM		2,200	12	34T8	87 W	1.04 kW	2,297 kWh	12	LB34LP	57 W	0.68 kW	1,505 kWh	-451 kWh	1,053 kWh	30%	X	0.36 kW	792 kWh	451 kWh	1,243 kWh
321	Soutern Columbia High School	2		WOMENS TOILET		2,600	3	34T8	87 W	0.26 kW	679 kWh	3	LB34LP	57 W	0.17 kW	445 kWh	0 kWh	445 kWh			0.09 kW	234 kWh	0 kWh	234 kWh
322	Soutern Columbia High School	2		CORRIDOR @ TOILET		2,600	2	PL26X2	54 W	0.11 kW	281 kWh	2	EXTR	54 W	0.11 kW	281 kWh	0 kWh	281 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
323	Soutern Columbia High School	2		BOYS TOILET		2,600	2	34T8	87 W	0.17 kW	452 kWh	2	LB34LP	57 W	0.11 kW	296 kWh	0 kWh	296 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
324	Soutern Columbia High School	2		BOYS TOILET		2,600	2	PL13X2	29 W	0.06 kW	151 kWh	2	EXTR	29 W	0.06 kW	151 kWh	0 kWh	151 kWh			0.00 kW	0 kWh	0 kWh	0 kWh

Attahcment B - Lighting Audit

Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
325	Soutern Columbia High School	2		JANITOR CLOSET		1,000	1	24T8	59 W	0.06 kW	59 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.02 kW	20 kWh	0 kWh	20 kWh
326	Soutern Columbia High School	2	216	CLASSROOM		2,200	12	34T8	87 W	1.04 kW	2,297 kWh	12	LB34LP	57 W	0.68 kW	1,505 kWh	-451 kWh	1,053 kWh	30%	X	0.36 kW	792 kWh	451 kWh	1,243 kWh
327	Soutern Columbia High School	2	217	CLASSROOM		2,200	12	34T8	87 W	1.04 kW	2,297 kWh	12	LB34LP	57 W	0.68 kW	1,505 kWh	-451 kWh	1,053 kWh	30%	X	0.36 kW	792 kWh	451 kWh	1,243 kWh
328	Soutern Columbia High School	2	220	CLASSROOM		2,200	12	34T8	87 W	1.04 kW	2,297 kWh	12	LB34LP	57 W	0.68 kW	1,505 kWh	-451 kWh	1,053 kWh	30%	X	0.36 kW	792 kWh	451 kWh	1,243 kWh
329	Soutern Columbia High School	2	218	CLASSROOM		2,200	12	34T8	87 W	1.04 kW	2,297 kWh	12	LB34LP	57 W	0.68 kW	1,505 kWh	-451 kWh	1,053 kWh	30%	X	0.36 kW	792 kWh	451 kWh	1,243 kWh
330	Soutern Columbia High School	2	214	CLASSROOM		2,200	12	34T8	87 W	1.04 kW	2,297 kWh	12	LB34LP	57 W	0.68 kW	1,505 kWh	-451 kWh	1,053 kWh	30%	X	0.36 kW	792 kWh	451 kWh	1,243 kWh
331	Soutern Columbia High School	2		STORAGE		1,000	2	24T8	59 W	0.12 kW	118 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.04 kW	40 kWh	0 kWh	40 kWh
332	Soutern Columbia High School	2		STORAGE		1,000	3	24T8	59 W	0.18 kW	177 kWh	3	LB24LP	39 W	0.12 kW	117 kWh	0 kWh	117 kWh			0.06 kW	60 kWh	0 kWh	60 kWh
333	Soutern Columbia High School	2	221	CLASSROOM		2,200	11	34T8	87 W	0.96 kW	2,105 kWh	11	LB34LP	57 W	0.63 kW	1,379 kWh	-414 kWh	966 kWh	30%	X	0.33 kW	726 kWh	414 kWh	1,140 kWh
334	Soutern Columbia High School	2	221	CLASSROOM		2,200	1	23T8	45 W	0.05 kW	99 kWh	1	LB23	36 W	0.04 kW	79 kWh	-24 kWh	55 kWh	30%		0.01 kW	20 kWh	24 kWh	44 kWh
335	Soutern Columbia High School	2	222	CLASSROOM	41/22	2,200	14	24T8	59 W	0.83 kW	1,817 kWh	14	LB24LP	39 W	0.55 kW	1,201 kWh	-360 kWh	841 kWh	30%	X	0.28 kW	616 kWh	360 kWh	976 kWh
336	Soutern Columbia High School	2	222	STORAGE		700	1	24T8	59 W	0.06 kW	41 kWh	1	LB24LP	39 W	0.04 kW	27 kWh	0 kWh	27 kWh			0.02 kW	14 kWh	0 kWh	14 kWh
337	Soutern Columbia High School	2		CORRIDOR		2,600	1	44T8	114 W	0.11 kW	296 kWh	1	LB24HPDL	60 W	0.06 kW	156 kWh	0 kWh	156 kWh			0.05 kW	140 kWh	0 kWh	140 kWh
338	Soutern Columbia High School	2		CORRIDOR		2,600	11	24T8	59 W	0.65 kW	1,687 kWh	11	LB24LP	39 W	0.43 kW	1,115 kWh	0 kWh	1,115 kWh			0.22 kW	572 kWh	0 kWh	572 kWh
339	Soutern Columbia High School	2		CORRIDOR		2,600	10	PL13X2	29 W	0.29 kW	754 kWh	10	EXTR	29 W	0.29 kW	754 kWh	0 kWh	754 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
340	Soutern Columbia High School	2		BOYS TOILET		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
341	Soutern Columbia High School	2		STAFF TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
342	Soutern Columbia High School	2		JANITOR CLOSET		1,000	1	24T8	59 W	0.06 kW	59 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.02 kW	20 kWh	0 kWh	20 kWh
343	Soutern Columbia High School	2		GIRLS TOILET		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
344	Soutern Columbia High School	2	223	CLASSROOM		2,200	17	34T8	87 W	1.48 kW	3,254 kWh	17	LB34LP	57 W	0.97 kW	2,132 kWh	-640 kWh	1,492 kWh	30%	X	0.51 kW	1,122 kWh	640 kWh	1,762 kWh
345	Soutern Columbia High School	2	223	CLASSROOM		2,200	1	23T8	45 W	0.05 kW	99 kWh	1	LB23	36 W	0.04 kW	79 kWh	-24 kWh	55 kWh	30%		0.01 kW	20 kWh	24 kWh	44 kWh
346	Soutern Columbia High School	2	223	STORAGE		700	2	24T8	59 W	0.12 kW	83 kWh	2	LB24LP	39 W	0.08 kW	55 kWh	0 kWh	55 kWh			0.04 kW	28 kWh	0 kWh	28 kWh
347	Soutern Columbia High School	2	224	CLASSROOM		1,540	11	34T8	87 W	0.96 kW	1,474 kWh	11	LB34LP	57 W	0.63 kW	966 kWh	0 kWh	966 kWh			0.33 kW	508 kWh	0 kWh	508 kWh
348	Soutern Columbia High School	2	224	CLASSROOM		1,540	1	23T8	45 W	0.05 kW	69 kWh	1	LB23	36 W	0.04 kW	55 kWh	0 kWh	55 kWh			0.01 kW	14 kWh	0 kWh	14 kWh
349	Soutern Columbia High School	2	225	CLASSROOM		1,540	11	34T8	87 W	0.96 kW	1,474 kWh	11	LB34LP	57 W	0.63 kW	966 kWh	0 kWh	966 kWh			0.33 kW	508 kWh	0 kWh	508 kWh
350	Soutern Columbia High School	2	225	CLASSROOM		1,540	1	32T8	46 W	0.05 kW	71 kWh	1	LB32LP	32 W	0.03 kW	49 kWh	0 kWh	49 kWh			0.01 kW	22 kWh	0 kWh	22 kWh
351	Soutern Columbia High School	2	226	CLASSROOM		1,540	11	34T8	87 W	0.96 kW	1,474 kWh	11	LB34LP	57 W	0.63 kW	966 kWh	0 kWh	966 kWh			0.33 kW	508 kWh	0 kWh	508 kWh
352	Soutern Columbia High School	2	226	CLASSROOM		1,540	1	32T8	46 W	0.05 kW	71 kWh	1	LB32LP	32 W	0.03 kW	49 kWh	0 kWh	49 kWh			0.01 kW	22 kWh	0 kWh	22 kWh
353	Soutern Columbia High School	2	227	CLASSROOM		1,540	6	34T8	87 W	0.52 kW	804 kWh	6	LB34LP	57 W	0.34 kW	527 kWh	0 kWh	527 kWh			0.18 kW	277 kWh	0 kWh	277 kWh
354	Soutern Columbia High School	2	228	CLASSROOM		1,540	6	34T8	87 W	0.52 kW	804 kWh	6	LB34LP	57 W	0.34 kW	527 kWh	0 kWh	527 kWh			0.18 kW	277 kWh	0 kWh	277 kWh
355	Soutern Columbia High School	2	229	CLASSROOM		1,540	11	34T8	87 W	0.96 kW	1,474 kWh	11	LB34LP	57 W	0.63 kW	966 kWh	0 kWh	966 kWh			0.33 kW	508 kWh	0 kWh	508 kWh
356	Soutern Columbia High School	2	229	CLASSROOM		2,200	1	32T8	46 W	0.05 kW	101 kWh	1	LB32LP	32 W	0.03 kW	70 kWh	-21 kWh	49 kWh	30%		0.01 kW	31 kWh	21 kWh	52 kWh
357	Soutern Columbia High School	2		STAIR		2,600	5	24T8	59 W	0.30 kW	767 kWh	5	LB24LP	39 W	0.20 kW	507 kWh	0 kWh	507 kWh			0.10 kW	260 kWh	0 kWh	260 kWh
358	Soutern Columbia High School	2		STAIR		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
359	Soutern Columbia High School	2		STAIR @ 220		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
360	Soutern Columbia High School			STAIR @ 220		2,600	5	PL13X2	29 W	0.15 kW	377 kWh	5	EXTR	29 W	0.15 kW	377 kWh	0 kWh	377 kWh			0.00 kW	0 kWh	0 kWh	0 kWh

Attahcment B - Lighting Audit

Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
361	Soutern Columbia High School			STAIR		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
362	Soutern Columbia High School			STAIR		2,600	1	60	60 W	0.06 kW	156 kWh	1	NF14-LED-1KL	21 W	0.02 kW	55 kWh	0 kWh	55 kWh			0.04 kW	101 kWh	0 kWh	101 kWh
363	Soutern Columbia High School Exterior			EXTERIOR		4,000	8	70S	91 W	0.73 kW	2,912 kWh	8	NF16-LED-2KL	25 W	0.20 kW	800 kWh	0 kWh	800 kWh			0.53 kW	2,112 kWh	0 kWh	2,112 kWh
364	Soutern Columbia High School Exterior			EXTERIOR		4,000	1	50S	66 W	0.07 kW	264 kWh	1	NF16-LED-2KL	25 W	0.03 kW	100 kWh	0 kWh	100 kWh			0.04 kW	164 kWh	0 kWh	164 kWh
365	Soutern Columbia High School Exterior			EXTERIOR		4,000	15	175MH	210 W	3.15 kW	12,600 kWh	15	NF15-LED-7KL	71 W	1.07 kW	4,260 kWh	0 kWh	4,260 kWh			2.09 kW	8,340 kWh	0 kWh	8,340 kWh
366	Soutern Columbia High School Exterior			EXTERIOR		4,000	1	70S	91 W	0.09 kW	364 kWh	1	NF16-LED-2KL	25 W	0.03 kW	100 kWh	0 kWh	100 kWh			0.07 kW	264 kWh	0 kWh	264 kWh
367	Soutern Columbia High School Exterior			EXTERIOR		4,000	11	50MH	72 W	0.79 kW	3,168 kWh	11	NF16-LED-2KL	25 W	0.28 kW	1,100 kWh	0 kWh	1,100 kWh			0.52 kW	2,068 kWh	0 kWh	2,068 kWh
368	Soutern Columbia High School Exterior			EXTERIOR		4,000	2	LED	30 W	0.06 kW	240 kWh	2	EXTR	30 W	0.06 kW	240 kWh	0 kWh	240 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
369	Soutern Columbia High School Exterior			EXTERIOR		4,000	17	50MH	72 W	1.22 kW	4,896 kWh	17	NF16-LED-2KL	25 W	0.43 kW	1,700 kWh	0 kWh	1,700 kWh			0.80 kW	3,196 kWh	0 kWh	3,196 kWh
370	Soutern Columbia High School Exterior			EXTERIOR		4,000	1	50S	66 W	0.07 kW	264 kWh	1	NF16-LED-2KL	25 W	0.03 kW	100 kWh	0 kWh	100 kWh			0.04 kW	164 kWh	0 kWh	164 kWh
371	Soutern Columbia High School Exterior			EXTERIOR		4,000	7	PL26X2	54 W	0.38 kW	1,512 kWh	7	EXTR	54 W	0.38 kW	1,512 kWh	0 kWh	1,512 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
372	Soutern Columbia High School Exterior			EXTERIOR		4,000	1	150	150 W	0.15 kW	600 kWh	1	CF40	40 W	0.04 kW	160 kWh	0 kWh	160 kWh			0.11 kW	440 kWh	0 kWh	440 kWh
373	Soutern Columbia High School Exterior			EXTERIOR		4,000	3	150S	188 W	0.56 kW	2,256 kWh	3	NF16-LED-8KL	72 W	0.22 kW	864 kWh	0 kWh	864 kWh			0.35 kW	1,392 kWh	0 kWh	1,392 kWh
374	Soutern Columbia High School Exterior			EXTERIOR		4,000	5	LED	30 W	0.15 kW	600 kWh	5	EXTR	30 W	0.15 kW	600 kWh	0 kWh	600 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
375	Soutern Columbia High School Exterior			EXTERIOR		4,000	14	400MH	458 W	6.41 kW	25,648 kWh	14	LED70-RETRO V	70 W	0.98 kW	3,920 kWh	0 kWh	3,920 kWh			5.43 kW	21,728 kWh	0 kWh	21,728 kWh
376	Soutern Columbia High School Exterior			EXTERIOR		4,000	12	400MH	458 W	5.50 kW	21,984 kWh	12	LED70-RETRO V	70 W	0.84 kW	3,360 kWh	0 kWh	3,360 kWh			4.66 kW	18,624 kWh	0 kWh	18,624 kWh
377	Soutern Columbia High School			EXIT		8,760	60	EXIT LED	4 W	0.24 kW	2,102 kWh	60	EXTR	4 W	0.24 kW	2,102 kWh	0 kWh	2,102 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
378	Hartman Elementary Center	B		CORRIDOR @ 3		2,600	9	24EE	72 W	0.65 kW	1,685 kWh	9	LB24LP	39 W	0.35 kW	913 kWh	0 kWh	913 kWh			0.30 kW	772 kWh	0 kWh	772 kWh
379	Hartman Elementary Center	B		STORAGE		1,000	6	24EE	72 W	0.43 kW	432 kWh	6	LB24LP	39 W	0.23 kW	234 kWh	0 kWh	234 kWh			0.20 kW	198 kWh	0 kWh	198 kWh
380	Hartman Elementary Center	B		MENS TOILET		2,600	2	24EE	72 W	0.14 kW	374 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.07 kW	172 kWh	0 kWh	172 kWh
381	Hartman Elementary Center	B		WOMENS TOILET		2,600	2	24EE	72 W	0.14 kW	374 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.07 kW	172 kWh	0 kWh	172 kWh
382	Hartman Elementary Center	B	3	CLASSROOM	105/52	1,800	12	44T8	114 W	1.37 kW	2,462 kWh	12	LB24HPDL	60 W	0.72 kW	1,296 kWh	-389 kWh	907 kWh	30%	X	0.65 kW	1,166 kWh	389 kWh	1,555 kWh
383	Hartman Elementary Center	B	3	CLASSROOM		1,800	4	44T8	114 W	0.46 kW	821 kWh	4	LB24HPDL	60 W	0.24 kW	432 kWh	-130 kWh	302 kWh	30%	X	0.22 kW	389 kWh	130 kWh	518 kWh
384	Hartman Elementary Center	B	2	CLASSROOM		1,800	5	44T8	114 W	0.57 kW	1,026 kWh	5	LB24HPDL	60 W	0.30 kW	540 kWh	-162 kWh	378 kWh	30%	X	0.27 kW	486 kWh	162 kWh	648 kWh
385	Hartman Elementary Center	B	2	CLASSROOM		1,800	10	24T8	59 W	0.59 kW	1,062 kWh	10	LB24LP	39 W	0.39 kW	702 kWh	-211 kWh	491 kWh	30%	X	0.20 kW	360 kWh	211 kWh	571 kWh
386	Hartman Elementary Center	G	1	CLASSROOM		1,800	15	44T8	114 W	1.71 kW	3,078 kWh	15	LB24HPDL	60 W	0.90 kW	1,620 kWh	-486 kWh	1,134 kWh	30%	X	0.81 kW	1,458 kWh	486 kWh	1,944 kWh
387	Hartman Elementary Center	G		CORRIDOR @ 025		2,600	6	24T8	59 W	0.35 kW	920 kWh	6	LB24LP	39 W	0.23 kW	608 kWh	0 kWh	608 kWh			0.12 kW	312 kWh	0 kWh	312 kWh
388	Hartman Elementary Center	G		CORRIDOR @ TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
389	Hartman Elementary Center	G	025	CLASSROOM	46	1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
390	Hartman Elementary Center	G	023	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
391	Hartman Elementary Center	G	022	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
392	Hartman Elementary Center	G	024	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
393	Hartman Elementary Center	G		STORAGE		1,000	4	24EE	72 W	0.29 kW	288 kWh	4	LB24LP	39 W	0.16 kW	156 kWh	0 kWh	156 kWh			0.13 kW	132 kWh	0 kWh	132 kWh
394	Hartman Elementary Center	G		GIRLS TOILET		1,820	5	24T8	59 W	0.30 kW	537 kWh	5	LB24LP	39 W	0.20 kW	355 kWh	0 kWh	355 kWh			0.10 kW	182 kWh	0 kWh	182 kWh
395	Hartman Elementary Center	G		GIRLS TOILET		2,600	1	14T8	30 W	0.03 kW	78 kWh	1	LB14	25 W	0.03 kW	65 kWh	0 kWh	65 kWh			0.01 kW	13 kWh	0 kWh	13 kWh
396	Hartman Elementary Center	G		GIRLS TOILET		2,600	1	PL13X2	29 W	0.03 kW	75 kWh	1	EXTR	29 W	0.03 kW	75 kWh	0 kWh	75 kWh			0.00 kW	0 kWh	0 kWh	0 kWh

Attahcment B - Lighting Audit

Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
397	Hartman Elementary Center	G		BOYS TOILET		1,820	4	24T8	59 W	0.24 kW	430 kWh	4	LB24LP	39 W	0.16 kW	284 kWh	0 kWh	284 kWh			0.08 kW	146 kWh	0 kWh	146 kWh
398	Hartman Elementary Center	G		BOYS TOILET		2,600	1	14T8	30 W	0.03 kW	78 kWh	1	LB14	25 W	0.03 kW	65 kWh	0 kWh	65 kWh			0.01 kW	13 kWh	0 kWh	13 kWh
399	Hartman Elementary Center	G		BOYS TOILET		2,600	1	PL13X2	29 W	0.03 kW	75 kWh	1	EXTR	29 W	0.03 kW	75 kWh	0 kWh	75 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
400	Hartman Elementary Center	G		JANITOR CLOSET		1,000	1	24EE	72 W	0.07 kW	72 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.03 kW	33 kWh	0 kWh	33 kWh
401	Hartman Elementary Center	G		CORRIDOR @ 019		2,600	7	24T8	59 W	0.41 kW	1,074 kWh	7	LB24LP	39 W	0.27 kW	710 kWh	0 kWh	710 kWh			0.14 kW	364 kWh	0 kWh	364 kWh
402	Hartman Elementary Center	G	019	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
403	Hartman Elementary Center	G	021	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
404	Hartman Elementary Center	G	020	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
405	Hartman Elementary Center	G		CORRIDOR @ 018		2,600	4	24T8	59 W	0.24 kW	614 kWh	4	LB24LP	39 W	0.16 kW	406 kWh	0 kWh	406 kWh			0.08 kW	208 kWh	0 kWh	208 kWh
406	Hartman Elementary Center	G		VESTIBULE		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
407	Hartman Elementary Center	G	018	CLASSROOM	55	1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
408	Hartman Elementary Center	G		VESTIBULE		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
409	Hartman Elementary Center	G		GIRLS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
410	Hartman Elementary Center	G		GIRLS TOILET		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
411	Hartman Elementary Center	G		BOYS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
412	Hartman Elementary Center	G		BOYS TOILET		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
413	Hartman Elementary Center	G		JANITOR CLOSET		1,000	1	100	100 W	0.10 kW	100 kWh	1	CF23	23 W	0.02 kW	23 kWh	0 kWh	23 kWh			0.08 kW	77 kWh	0 kWh	77 kWh
414	Hartman Elementary Center	G	017	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
415	Hartman Elementary Center	G		CORRIDOR @ 017		2,600	6	24T8	59 W	0.35 kW	920 kWh	6	LB24LP	39 W	0.23 kW	608 kWh	0 kWh	608 kWh			0.12 kW	312 kWh	0 kWh	312 kWh
416	Hartman Elementary Center	G		CORRIDOR @ 016		2,600	9	24T8	59 W	0.53 kW	1,381 kWh	9	LB24LP	39 W	0.35 kW	913 kWh	0 kWh	913 kWh			0.18 kW	468 kWh	0 kWh	468 kWh
417	Hartman Elementary Center	G	014	CLASSROOM	63	1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
418	Hartman Elementary Center	G		CORRIDOR @ 015	20	2,600	2	44T8	114 W	0.23 kW	593 kWh	2	LB24HPDL	60 W	0.12 kW	312 kWh	0 kWh	312 kWh			0.11 kW	281 kWh	0 kWh	281 kWh
419	Hartman Elementary Center	G	015	CLASSROOM		1,800	12	44T8	114 W	1.37 kW	2,462 kWh	12	LB24HPDL	60 W	0.72 kW	1,296 kWh	-389 kWh	907 kWh	30%	X	0.65 kW	1,166 kWh	389 kWh	1,555 kWh
420	Hartman Elementary Center	G	016	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
421	Hartman Elementary Center	G		BREAK ROOM		2,400	4	24T8	59 W	0.24 kW	566 kWh	4	LB24LP	39 W	0.16 kW	374 kWh	0 kWh	374 kWh			0.08 kW	192 kWh	0 kWh	192 kWh
422	Hartman Elementary Center	G		VESTIBULE		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
423	Hartman Elementary Center	G		WOMENS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
424	Hartman Elementary Center	G		WOMENS TOILET		2,600	2	22T8	32 W	0.06 kW	166 kWh	2	LB22	26 W	0.05 kW	135 kWh	0 kWh	135 kWh			0.01 kW	31 kWh	0 kWh	31 kWh
425	Hartman Elementary Center	G		MENS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
426	Hartman Elementary Center	G		MENS TOILET		2,600	1	22T8	32 W	0.03 kW	83 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.01 kW	16 kWh	0 kWh	16 kWh
427	Hartman Elementary Center	G		CUSTODIAN		2,400	1	24EE	72 W	0.07 kW	173 kWh	1	LB24LP	39 W	0.04 kW	94 kWh	0 kWh	94 kWh			0.03 kW	79 kWh	0 kWh	79 kWh
428	Hartman Elementary Center	G		TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
429	Hartman Elementary Center	G		TOILET		2,600	1	100	100 W	0.10 kW	260 kWh	1	CF23	23 W	0.02 kW	60 kWh	0 kWh	60 kWh			0.08 kW	200 kWh	0 kWh	200 kWh
430	Hartman Elementary Center	G		BOILER RM		2,400	34	24EE	72 W	2.45 kW	5,875 kWh	34	LB24LP	39 W	1.33 kW	3,182 kWh	0 kWh	3,182 kWh			1.12 kW	2,693 kWh	0 kWh	2,693 kWh
431	Hartman Elementary Center	G		CORRIDOR @ 013		2,600	4	24T8	59 W	0.24 kW	614 kWh	4	LB24LP	39 W	0.16 kW	406 kWh	0 kWh	406 kWh			0.08 kW	208 kWh	0 kWh	208 kWh
432	Hartman Elementary Center	G		VESTIBULE		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh

Attahcment B - Lighting Audit

Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
433	Hartman Elementary Center	G		GIRLS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
434	Hartman Elementary Center	G		GIRLS TOILET		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
435	Hartman Elementary Center	G		BOYS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
436	Hartman Elementary Center	G		BOYS TOILET		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
437	Hartman Elementary Center	G		JANITOR CLOSET		1,000	1	60X2	120 W	0.12 kW	120 kWh	1	NF2-2X13	32 W	0.03 kW	32 kWh	0 kWh	32 kWh			0.09 kW	88 kWh	0 kWh	88 kWh
438	Hartman Elementary Center	G	013	CLASSROOM	51	1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
439	Hartman Elementary Center	G		ELEV EQUIP		1,000	1	24EE	72 W	0.07 kW	72 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.03 kW	33 kWh	0 kWh	33 kWh
440	Hartman Elementary Center	G		CORRIDOR		2,600	2	34T8	87 W	0.17 kW	452 kWh	2	LB34LP	57 W	0.11 kW	296 kWh	0 kWh	296 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
441	Hartman Elementary Center	G		STORAGE		1,000	5	34T8	87 W	0.44 kW	435 kWh	5	LB34LP	57 W	0.29 kW	285 kWh	0 kWh	285 kWh			0.15 kW	150 kWh	0 kWh	150 kWh
442	Hartman Elementary Center	G	2000012	COMP LAB		1,800	9	24T8	59 W	0.53 kW	956 kWh	9	LB24LP	39 W	0.35 kW	632 kWh	-190 kWh	442 kWh	30%	X	0.18 kW	324 kWh	190 kWh	514 kWh
443	Hartman Elementary Center	G		CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
444	Hartman Elementary Center	G	011	CORRIDOR @ 012		2,600	9	24T8	59 W	0.53 kW	1,381 kWh	9	LB24LP	39 W	0.35 kW	913 kWh	0 kWh	913 kWh			0.18 kW	468 kWh	0 kWh	468 kWh
445	Hartman Elementary Center	G	010	CLASSROOM		1,800	12	44T8	114 W	1.37 kW	2,462 kWh	12	LB24HPDL	60 W	0.72 kW	1,296 kWh	-389 kWh	907 kWh	30%	X	0.65 kW	1,166 kWh	389 kWh	1,555 kWh
446	Hartman Elementary Center	G		CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
447	Hartman Elementary Center	G		VESTIBULE		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
448	Hartman Elementary Center	G		GIRLS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
449	Hartman Elementary Center	G		GIRLS TOILET		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
450	Hartman Elementary Center	G		BOYS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
451	Hartman Elementary Center	G		BOYS TOILET		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
452	Hartman Elementary Center	G		JANITOR CLOSET		1,000	1	60X2	120 W	0.12 kW	120 kWh	1	NF2-2X13	32 W	0.03 kW	32 kWh	0 kWh	32 kWh			0.09 kW	88 kWh	0 kWh	88 kWh
453	Hartman Elementary Center	G		STORAGE		1,000	2	24UEE	72 W	0.14 kW	144 kWh	2	LB22HPREF	37 W	0.07 kW	74 kWh	0 kWh	74 kWh			0.07 kW	70 kWh	0 kWh	70 kWh
454	Hartman Elementary Center	G		VESTIBULE		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
455	Hartman Elementary Center	G		STAIR		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
456	Hartman Elementary Center	1		VESTIBULE		2,600	2	24UT8	59 W	0.12 kW	307 kWh	2	LB22HPREF	37 W	0.07 kW	192 kWh	0 kWh	192 kWh			0.04 kW	114 kWh	0 kWh	114 kWh
457	Hartman Elementary Center	1		VESTIBULE		2,600	6	24T8	59 W	0.35 kW	920 kWh	6	LB24LP	39 W	0.23 kW	608 kWh	0 kWh	608 kWh			0.12 kW	312 kWh	0 kWh	312 kWh
458	Hartman Elementary Center	1		VESTIBULE		2,600	2	22T8	32 W	0.06 kW	166 kWh	2	LB22	26 W	0.05 kW	135 kWh	0 kWh	135 kWh			0.01 kW	31 kWh	0 kWh	31 kWh
459	Hartman Elementary Center	1		LOBBY		2,600	7	44T8	114 W	0.80 kW	2,075 kWh	7	LB24HPDL	60 W	0.42 kW	1,092 kWh	0 kWh	1,092 kWh			0.38 kW	983 kWh	0 kWh	983 kWh
460	Hartman Elementary Center	1		LOBBY		2,600	19	CF40	40 W	0.76 kW	1,976 kWh	19	EXTR	40 W	0.76 kW	1,976 kWh	0 kWh	1,976 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
461	Hartman Elementary Center	1		LOBBY		2,600	7	150	150 W	1.05 kW	2,730 kWh	7	CF40	40 W	0.28 kW	728 kWh	0 kWh	728 kWh			0.77 kW	2,002 kWh	0 kWh	2,002 kWh
462	Hartman Elementary Center	1		LOBBY		2,600	6	PL26X2	54 W	0.32 kW	842 kWh	6	EXTR	54 W	0.32 kW	842 kWh	0 kWh	842 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
463	Hartman Elementary Center	1		LOBBY		2,600	4	100	100 W	0.40 kW	1,040 kWh	4	CF23	23 W	0.09 kW	239 kWh	0 kWh	239 kWh			0.31 kW	801 kWh	0 kWh	801 kWh
464	Hartman Elementary Center	1		LGA		2,600	30	44T8	114 W	3.42 kW	8,892 kWh	30	LB24HPDL	60 W	1.80 kW	4,680 kWh	0 kWh	4,680 kWh			1.62 kW	4,212 kWh	0 kWh	4,212 kWh
465	Hartman Elementary Center	1		LGA		2,600	2	24UEE	72 W	0.14 kW	374 kWh	2	LB22HPREF	37 W	0.07 kW	192 kWh	0 kWh	192 kWh			0.07 kW	182 kWh	0 kWh	182 kWh
466	Hartman Elementary Center	1		LGA		2,600	19	150	150 W	2.85 kW	7,410 kWh	19	CF40	40 W	0.76 kW	1,976 kWh	0 kWh	1,976 kWh			2.09 kW	5,434 kWh	0 kWh	5,434 kWh
467	Hartman Elementary Center	1		LGA		2,600	7	90	90 W	0.63 kW	1,638 kWh	7	LED18-DIMR38	18 W	0.13 kW	328 kWh	0 kWh	328 kWh			0.50 kW	1,310 kWh	0 kWh	1,310 kWh
468	Hartman Elementary Center	1		LGA		2,600	5	150	150 W	0.75 kW	1,950 kWh	5	CF40	40 W	0.20 kW	520 kWh	0 kWh	520 kWh			0.55 kW	1,430 kWh	0 kWh	1,430 kWh

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							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
469	Hartman Elementary Center	1		STORAGE		1,000	1	24EE	72 W	0.07 kW	72 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.03 kW	33 kWh	0 kWh	33 kWh
470	Hartman Elementary Center	1		CORRIDOR @ OFFICE		2,600	3	150	150 W	0.45 kW	1,170 kWh	3	CF40	40 W	0.12 kW	312 kWh	0 kWh	312 kWh			0.33 kW	858 kWh	0 kWh	858 kWh
471	Hartman Elementary Center	1		CORRIDOR @ OFFICE		2,600	12	24T8	59 W	0.71 kW	1,841 kWh	12	LB24LP	39 W	0.47 kW	1,217 kWh	0 kWh	1,217 kWh			0.24 kW	624 kWh	0 kWh	624 kWh
472	Hartman Elementary Center	1		CORRIDOR @ OFFICE		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
473	Hartman Elementary Center	1		SUPPLY RM		1,000	4	44EE	144 W	0.58 kW	576 kWh	4	LB24HPDL	60 W	0.24 kW	240 kWh	0 kWh	240 kWh			0.34 kW	336 kWh	0 kWh	336 kWh
474	Hartman Elementary Center	1		ELEM OFFICE		3,000	6	24T8	59 W	0.35 kW	1,062 kWh	6	LB24LP	39 W	0.23 kW	702 kWh	0 kWh	702 kWh			0.12 kW	360 kWh	0 kWh	360 kWh
475	Hartman Elementary Center	1		MAIL ROOM		3,000	4	24T8	59 W	0.24 kW	708 kWh	4	LB24LP	39 W	0.16 kW	468 kWh	0 kWh	468 kWh			0.08 kW	240 kWh	0 kWh	240 kWh
476	Hartman Elementary Center	1		MAIL ROOM		3,000	1	22SS	53 W	0.05 kW	159 kWh	1	LB22	26 W	0.03 kW	78 kWh	0 kWh	78 kWh			0.03 kW	81 kWh	0 kWh	81 kWh
477	Hartman Elementary Center	1		STORAGE		1,000	2	24T8	59 W	0.12 kW	118 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.04 kW	40 kWh	0 kWh	40 kWh
478	Hartman Elementary Center	1		CORRIDOR		2,600	6	24UT8	59 W	0.35 kW	920 kWh	6	LB22HPREF	37 W	0.22 kW	577 kWh	0 kWh	577 kWh			0.13 kW	343 kWh	0 kWh	343 kWh
479	Hartman Elementary Center	1		PRINCIPAL OFFICE		3,000	4	24T8	59 W	0.24 kW	708 kWh	4	LB24LP	39 W	0.16 kW	468 kWh	0 kWh	468 kWh			0.08 kW	240 kWh	0 kWh	240 kWh
480	Hartman Elementary Center	1		PRINCIPAL OFFICE		3,000	1	24T8	59 W	0.06 kW	177 kWh	1	LB24LP	39 W	0.04 kW	117 kWh	0 kWh	117 kWh			0.02 kW	60 kWh	0 kWh	60 kWh
481	Hartman Elementary Center	1		MENS TOILET		2,600	1	22SS	53 W	0.05 kW	138 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.03 kW	70 kWh	0 kWh	70 kWh
482	Hartman Elementary Center	1		WOMENS TOILET		2,600	1	22SS	53 W	0.05 kW	138 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.03 kW	70 kWh	0 kWh	70 kWh
483	Hartman Elementary Center	1		CONFERENCE		2,400	4	24T8	59 W	0.24 kW	566 kWh	4	LB24LP	39 W	0.16 kW	374 kWh	0 kWh	374 kWh			0.08 kW	192 kWh	0 kWh	192 kWh
484	Hartman Elementary Center	1		GUIDANCE OFFICE	56	3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
485	Hartman Elementary Center	1		CONFERENCE		2,400	2	24T8	59 W	0.12 kW	283 kWh	2	LB24LP	39 W	0.08 kW	187 kWh	0 kWh	187 kWh			0.04 kW	96 kWh	0 kWh	96 kWh
486	Hartman Elementary Center	1		NURSE OFFICE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
487	Hartman Elementary Center	1		TREATMENT RM		3,000	3	24T8	59 W	0.18 kW	531 kWh	3	LB24LP	39 W	0.12 kW	351 kWh	0 kWh	351 kWh			0.06 kW	180 kWh	0 kWh	180 kWh
488	Hartman Elementary Center	1		TOILET		1,820	1	24T8	59 W	0.06 kW	107 kWh	1	LB24LP	39 W	0.04 kW	71 kWh	0 kWh	71 kWh			0.02 kW	36 kWh	0 kWh	36 kWh
489	Hartman Elementary Center	1		NURSE OFFICE		2,100	1	34T8	87 W	0.09 kW	183 kWh	1	LB34LP	57 W	0.06 kW	120 kWh	0 kWh	120 kWh			0.03 kW	63 kWh	0 kWh	63 kWh
490	Hartman Elementary Center	1		EXAM RM		2,100	2	24T8	59 W	0.12 kW	248 kWh	2	LB24LP	39 W	0.08 kW	164 kWh	0 kWh	164 kWh			0.04 kW	84 kWh	0 kWh	84 kWh
491	Hartman Elementary Center	1		OFFICE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
492	Hartman Elementary Center	1		COPY RM		3,000	4	44T8	114 W	0.46 kW	1,368 kWh	4	LB24HPDL	60 W	0.24 kW	720 kWh	0 kWh	720 kWh			0.22 kW	648 kWh	0 kWh	648 kWh
493	Hartman Elementary Center	1		COPY RM		3,000	1	44T8	114 W	0.11 kW	342 kWh	1	LB24HPDL	60 W	0.06 kW	180 kWh	0 kWh	180 kWh			0.05 kW	162 kWh	0 kWh	162 kWh
494	Hartman Elementary Center	1		JANITOR CLOSET		1,000	1	24T8	59 W	0.06 kW	59 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.02 kW	20 kWh	0 kWh	20 kWh
495	Hartman Elementary Center	1		VESTIBULE		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
496	Hartman Elementary Center	1		COMMON SPACE	9	2,600	13	24T8	59 W	0.77 kW	1,994 kWh	13	LB24LP	39 W	0.51 kW	1,318 kWh	0 kWh	1,318 kWh			0.26 kW	676 kWh	0 kWh	676 kWh
497	Hartman Elementary Center	1		VESTIBULE		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
498	Hartman Elementary Center	1		GIRLS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
499	Hartman Elementary Center	1		GIRLS TOILET		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
500	Hartman Elementary Center	1		BOYS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
501	Hartman Elementary Center	1		BOYS TOILET		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
502	Hartman Elementary Center	1		JANITOR CLOSET		1,000	1	60X2	120 W	0.12 kW	120 kWh	1	NF2-2X13	32 W	0.03 kW	32 kWh	0 kWh	32 kWh			0.09 kW	88 kWh	0 kWh	88 kWh
503	Hartman Elementary Center	1	103	CLASSROOM	51	1,800	13	44T8	114 W	1.48 kW	2,668 kWh	13	LB24HPDL	60 W	0.78 kW	1,404 kWh	-421 kWh	983 kWh	30%	X	0.70 kW	1,264 kWh	421 kWh	1,685 kWh
504	Hartman Elementary Center	1	103	CLASSROOM		1,800	1	40X2	80 W	0.08 kW	144 kWh	1	NF2-2X13	32 W	0.03 kW	58 kWh	-17 kWh	40 kWh	30%		0.05 kW	86 kWh	17 kWh	104 kWh

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							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
505	Hartman Elementary Center	1	104	CLASSROOM		1,800	13	44T8	114 W	1.48 kW	2,668 kWh	13	LB24HPDL	60 W	0.78 kW	1,404 kWh	-421 kWh	983 kWh	30%	X	0.70 kW	1,264 kWh	421 kWh	1,685 kWh
506	Hartman Elementary Center	1	104	CLASSROOM		1,800	1	40X2	80 W	0.08 kW	144 kWh	1	NF2-2X13	32 W	0.03 kW	58 kWh	-17 kWh	40 kWh	30%		0.05 kW	86 kWh	17 kWh	104 kWh
507	Hartman Elementary Center	1	105	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
508	Hartman Elementary Center	1	106	CLASSROOM		1,800	12	44T8	114 W	1.37 kW	2,462 kWh	12	LB24HPDL	60 W	0.72 kW	1,296 kWh	-389 kWh	907 kWh	30%	X	0.65 kW	1,166 kWh	389 kWh	1,555 kWh
509	Hartman Elementary Center	1	107	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
510	Hartman Elementary Center	1		CORRIDOR @ 108		2,600	9	24T8	59 W	0.53 kW	1,381 kWh	9	LB24LP	39 W	0.35 kW	913 kWh	0 kWh	913 kWh			0.18 kW	468 kWh	0 kWh	468 kWh
511	Hartman Elementary Center	1	108	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
512	Hartman Elementary Center	1		VESTIBULE		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
513	Hartman Elementary Center	1		GIRLS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
514	Hartman Elementary Center	1		GIRLS TOILET		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
515	Hartman Elementary Center	1		BOYS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
516	Hartman Elementary Center	1		BOYS TOILET		2,600	1	24EE	72 W	0.07 kW	187 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.03 kW	86 kWh	0 kWh	86 kWh
517	Hartman Elementary Center	1		JANITOR CLOSET		1,000	1	60X2	120 W	0.12 kW	120 kWh	1	NF2-2X13	32 W	0.03 kW	32 kWh	0 kWh	32 kWh			0.09 kW	88 kWh	0 kWh	88 kWh
518	Hartman Elementary Center	1	110	CLASSROOM	66	1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
519	Hartman Elementary Center	1	111	CLASSROOM		1,800	12	44T8	114 W	1.37 kW	2,462 kWh	12	LB24HPDL	60 W	0.72 kW	1,296 kWh	-389 kWh	907 kWh	30%	X	0.65 kW	1,166 kWh	389 kWh	1,555 kWh
520	Hartman Elementary Center	1		CORRIDOR @ 112		2,600	8	24T8	59 W	0.47 kW	1,227 kWh	8	LB24LP	39 W	0.31 kW	811 kWh	0 kWh	811 kWh			0.16 kW	416 kWh	0 kWh	416 kWh
521	Hartman Elementary Center	1	112	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
522	Hartman Elementary Center	1		LIBRARY	53	2,600	50	24T8	59 W	2.95 kW	7,670 kWh	50	LB24LP	39 W	1.95 kW	5,070 kWh	0 kWh	5,070 kWh			1.00 kW	2,600 kWh	0 kWh	2,600 kWh
523	Hartman Elementary Center	1		LIBRARY		2,600	4	24T8	59 W	0.24 kW	614 kWh	4	LB24LP	39 W	0.16 kW	406 kWh	0 kWh	406 kWh			0.08 kW	208 kWh	0 kWh	208 kWh
524	Hartman Elementary Center	1		OFFICE	63	3,000	3	24T8	59 W	0.18 kW	531 kWh	3	LB24LP	39 W	0.12 kW	351 kWh	0 kWh	351 kWh			0.06 kW	180 kWh	0 kWh	180 kWh
525	Hartman Elementary Center	1		OFFICE		3,000	1	22SS	53 W	0.05 kW	159 kWh	1	LB22	26 W	0.03 kW	78 kWh	0 kWh	78 kWh			0.03 kW	81 kWh	0 kWh	81 kWh
526	Hartman Elementary Center	1	109	STORAGE		1,000	4	44T8	114 W	0.46 kW	456 kWh	4	LB24HPDL	60 W	0.24 kW	240 kWh	0 kWh	240 kWh			0.22 kW	216 kWh	0 kWh	216 kWh
527	Hartman Elementary Center	1		STORAGE		1,000	3	24T8	59 W	0.18 kW	177 kWh	3	LB24LP	39 W	0.12 kW	117 kWh	0 kWh	117 kWh			0.06 kW	60 kWh	0 kWh	60 kWh
528	Hartman Elementary Center	1		LOUNGE		2,400	3	24T8	59 W	0.18 kW	425 kWh	3	LB24LP	39 W	0.12 kW	281 kWh	0 kWh	281 kWh			0.06 kW	144 kWh	0 kWh	144 kWh
529	Hartman Elementary Center	1		LOUNGE		8,760	1	DRINK	400 W	0.40 kW	3,504 kWh	1	EXTR	400 W	0.40 kW	3,504 kWh	-1,647 kWh	1,857 kWh	47%	X	0.00 kW	0 kWh	1,647 kWh	1,647 kWh
530	Hartman Elementary Center	1		LOUNGE		8,760	1	SNACK	100 W	0.10 kW	876 kWh	1	EXTR	100 W	0.10 kW	876 kWh	-412 kWh	464 kWh	47%	X	0.00 kW	0 kWh	412 kWh	412 kWh
531	Hartman Elementary Center	1		VESTIBULE		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
532	Hartman Elementary Center	1		STAFF TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
533	Hartman Elementary Center	1		STAFF TOILET		2,600	2	22SS	53 W	0.11 kW	276 kWh	2	LB22	26 W	0.05 kW	135 kWh	0 kWh	135 kWh			0.05 kW	140 kWh	0 kWh	140 kWh
534	Hartman Elementary Center	1		STAFF TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
535	Hartman Elementary Center	1		STAFF TOILET		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
536	Hartman Elementary Center	1	113	CLASSROOM		1,800	8	44T8	114 W	0.91 kW	1,642 kWh	8	LB24HPDL	60 W	0.48 kW	864 kWh	-259 kWh	605 kWh	30%	X	0.43 kW	778 kWh	259 kWh	1,037 kWh
537	Hartman Elementary Center	1	113	CLASSROOM		1,800	4	90	90 W	0.36 kW	648 kWh	4	LED18-DIMR38	18 W	0.07 kW	130 kWh	-39 kWh	91 kWh	30%	X	0.29 kW	518 kWh	39 kWh	557 kWh
538	Hartman Elementary Center	1		STORAGE		1,000	1	44EE	144 W	0.14 kW	144 kWh	1	LB24HPDL	60 W	0.06 kW	60 kWh	0 kWh	60 kWh			0.08 kW	84 kWh	0 kWh	84 kWh
539	Hartman Elementary Center	1		CORRIDOR @ 114		2,600	5	24T8	59 W	0.30 kW	767 kWh	5	LB24LP	39 W	0.20 kW	507 kWh	0 kWh	507 kWh			0.10 kW	260 kWh	0 kWh	260 kWh
540	Hartman Elementary Center	1		CORRIDOR @ 115		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh

Attahcment B - Lighting Audit

Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
541	Hartman Elementary Center	1	115	CLASSROOM		1,800	12	44T8	114 W	1.37 kW	2,462 kWh	12	LB24HPDL	60 W	0.72 kW	1,296 kWh	-389 kWh	907 kWh	30%	X	0.65 kW	1,166 kWh	389 kWh	1,555 kWh
542	Hartman Elementary Center	1	118	CLASSROOM		1,800	6	44T8	114 W	0.68 kW	1,231 kWh	6	LB24HPDL	60 W	0.36 kW	648 kWh	-194 kWh	454 kWh	30%	X	0.32 kW	583 kWh	194 kWh	778 kWh
543	Hartman Elementary Center	1	117	CLASSROOM		1,800	15	44T8	114 W	1.71 kW	3,078 kWh	15	LB24HPDL	60 W	0.90 kW	1,620 kWh	-486 kWh	1,134 kWh	30%	X	0.81 kW	1,458 kWh	486 kWh	1,944 kWh
544	Hartman Elementary Center	1		STORAGE		1,000	2	44T8	114 W	0.23 kW	228 kWh	2	LB24HPDL	60 W	0.12 kW	120 kWh	0 kWh	120 kWh			0.11 kW	108 kWh	0 kWh	108 kWh
545	Hartman Elementary Center	1	116	CONFERENCE		2,400	3	44T8	114 W	0.34 kW	821 kWh	3	LB24HPDL	60 W	0.18 kW	432 kWh	0 kWh	432 kWh			0.16 kW	389 kWh	0 kWh	389 kWh
546	Hartman Elementary Center	1	116	OPEN OFFICE		3,000	5	44T8	114 W	0.57 kW	1,710 kWh	5	LB24HPDL	60 W	0.30 kW	900 kWh	0 kWh	900 kWh			0.27 kW	810 kWh	0 kWh	810 kWh
547	Hartman Elementary Center	1		DIRECTOR OFFICE		3,000	6	44T8	114 W	0.68 kW	2,052 kWh	6	LB24HPDL	60 W	0.36 kW	1,080 kWh	0 kWh	1,080 kWh			0.32 kW	972 kWh	0 kWh	972 kWh
548	Hartman Elementary Center	1		SECRETARY OFFICE		3,000	3	44T8	114 W	0.34 kW	1,026 kWh	3	LB24HPDL	60 W	0.18 kW	540 kWh	0 kWh	540 kWh			0.16 kW	486 kWh	0 kWh	486 kWh
549	Hartman Elementary Center	1	114	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
550	Hartman Elementary Center	1		BOYS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
551	Hartman Elementary Center	1		BOYS TOILET		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
552	Hartman Elementary Center	1		JANITOR CLOSET		1,000	1	60X2	120 W	0.12 kW	120 kWh	1	NF2-2X13	32 W	0.03 kW	32 kWh	0 kWh	32 kWh			0.09 kW	88 kWh	0 kWh	88 kWh
553	Hartman Elementary Center	1		GIRLS TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
554	Hartman Elementary Center	1		GIRLS TOILET		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
555	Hartman Elementary Center	1		VESTIBULE		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
556	Hartman Elementary Center	1	119	CLASSROOM	46	1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
557	Hartman Elementary Center	1	121	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
558	Hartman Elementary Center	1	122	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
559	Hartman Elementary Center	1	120	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
560	Hartman Elementary Center	1		CORRIDOR @ 120		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
561	Hartman Elementary Center	1		CORRIDOR @ 125		2,600	7	24T8	59 W	0.41 kW	1,074 kWh	7	LB24LP	39 W	0.27 kW	710 kWh	0 kWh	710 kWh			0.14 kW	364 kWh	0 kWh	364 kWh
562	Hartman Elementary Center	1		BOYS TOILET		1,820	4	24EE	72 W	0.29 kW	524 kWh	4	LB24LP	39 W	0.16 kW	284 kWh	0 kWh	284 kWh			0.13 kW	240 kWh	0 kWh	240 kWh
563	Hartman Elementary Center	1		BOYS TOILET		2,600	1	24EE	72 W	0.07 kW	187 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.03 kW	86 kWh	0 kWh	86 kWh
564	Hartman Elementary Center	1		BOYS TOILET		2,600	1	PL13	16 W	0.02 kW	42 kWh	1	EXTR	16 W	0.02 kW	42 kWh	0 kWh	42 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
565	Hartman Elementary Center	1		JANITOR CLOSET		1,000	1	24EE	72 W	0.07 kW	72 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.03 kW	33 kWh	0 kWh	33 kWh
566	Hartman Elementary Center	1		GIRLS TOILET		2,600	4	24EE	72 W	0.29 kW	749 kWh	4	LB24LP	39 W	0.16 kW	406 kWh	0 kWh	406 kWh			0.13 kW	343 kWh	0 kWh	343 kWh
567	Hartman Elementary Center	1		GIRLS TOILET		2,600	1	24EE	72 W	0.07 kW	187 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.03 kW	86 kWh	0 kWh	86 kWh
568	Hartman Elementary Center	1		GIRLS TOILET		2,600	1	PL13	16 W	0.02 kW	42 kWh	1	EXTR	16 W	0.02 kW	42 kWh	0 kWh	42 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
569	Hartman Elementary Center	1		STORAGE		1,000	4	24EE	72 W	0.29 kW	288 kWh	4	LB24LP	39 W	0.16 kW	156 kWh	0 kWh	156 kWh			0.13 kW	132 kWh	0 kWh	132 kWh
570	Hartman Elementary Center	1	125	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
571	Hartman Elementary Center	1	123	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
572	Hartman Elementary Center	1	124	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
573	Hartman Elementary Center	1	126	CLASSROOM		1,800	9	44T8	114 W	1.03 kW	1,847 kWh	9	LB24HPDL	60 W	0.54 kW	972 kWh	-292 kWh	680 kWh	30%	X	0.49 kW	875 kWh	292 kWh	1,166 kWh
574	Hartman Elementary Center	1		STAIRS		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
575	Hartman Elementary Center	1		STAIRS		2,600	2	24EE	72 W	0.14 kW	374 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.07 kW	172 kWh	0 kWh	172 kWh
576	Hartman Elementary Center	1		CORRIDOR @ 127		2,600	4	24T8	59 W	0.24 kW	614 kWh	4	LB24LP	39 W	0.16 kW	406 kWh	0 kWh	406 kWh			0.08 kW	208 kWh	0 kWh	208 kWh

Attahcment B - Lighting Audit

Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
577	Hartman Elementary Center	1	127	CLASSROOM		1,800	17	24T8	59 W	1.00 kW	1,805 kWh	17	LB24LP	39 W	0.66 kW	1,193 kWh	-358 kWh	835 kWh	30%	X	0.34 kW	612 kWh	358 kWh	970 kWh
578	Hartman Elementary Center	1		STORAGE		1,000	8	24T8	59 W	0.47 kW	472 kWh	8	LB24LP	39 W	0.31 kW	312 kWh	0 kWh	312 kWh			0.16 kW	160 kWh	0 kWh	160 kWh
579	Hartman Elementary Center	1	128	CLASSROOM		1,800	17	24T8	59 W	1.00 kW	1,805 kWh	17	LB24LP	39 W	0.66 kW	1,193 kWh	-358 kWh	835 kWh	30%	X	0.34 kW	612 kWh	358 kWh	970 kWh
580	Hartman Elementary Center	1		CORRIDOR @ 128		2,600	11	24T8	59 W	0.65 kW	1,687 kWh	11	LB24LP	39 W	0.43 kW	1,115 kWh	0 kWh	1,115 kWh			0.22 kW	572 kWh	0 kWh	572 kWh
581	Hartman Elementary Center	1		VESTIBULE		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
582	Hartman Elementary Center	1		WOMENS LOCKER RM		1,680	8	24T8	59 W	0.47 kW	793 kWh	8	LB24LP	39 W	0.31 kW	524 kWh	0 kWh	524 kWh			0.16 kW	269 kWh	0 kWh	269 kWh
583	Hartman Elementary Center	1		WOMENS LOCKER RM		2,400	4	24T8	59 W	0.24 kW	566 kWh	4	LB24LP	39 W	0.16 kW	374 kWh	0 kWh	374 kWh			0.08 kW	192 kWh	0 kWh	192 kWh
584	Hartman Elementary Center	1		WOMENS LOCKER RM		2,400	1	24T8	59 W	0.06 kW	142 kWh	1	LB24LP	39 W	0.04 kW	94 kWh	0 kWh	94 kWh			0.02 kW	48 kWh	0 kWh	48 kWh
585	Hartman Elementary Center	1		SHOWER		2,400	2	60X2	120 W	0.24 kW	576 kWh	2	NF2-2X13	32 W	0.06 kW	154 kWh	0 kWh	154 kWh			0.18 kW	422 kWh	0 kWh	422 kWh
586	Hartman Elementary Center	1		WOMENS LOCKER RM		2,400	2	90	90 W	0.18 kW	432 kWh	2	LED18-DIMR38	18 W	0.04 kW	86 kWh	0 kWh	86 kWh			0.14 kW	346 kWh	0 kWh	346 kWh
587	Hartman Elementary Center	1		VESTIBULE		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
588	Hartman Elementary Center	1		MENS LOCKER RM		2,400	4	24T8	59 W	0.24 kW	566 kWh	4	LB24LP	39 W	0.16 kW	374 kWh	0 kWh	374 kWh			0.08 kW	192 kWh	0 kWh	192 kWh
589	Hartman Elementary Center	1		MENS LOCKER RM		2,400	1	24T8	59 W	0.06 kW	142 kWh	1	LB24LP	39 W	0.04 kW	94 kWh	0 kWh	94 kWh			0.02 kW	48 kWh	0 kWh	48 kWh
590	Hartman Elementary Center	1		SHOWER		2,400	2	60X2	120 W	0.24 kW	576 kWh	2	NF2-2X13	32 W	0.06 kW	154 kWh	0 kWh	154 kWh			0.18 kW	422 kWh	0 kWh	422 kWh
591	Hartman Elementary Center	1		MENS LOCKER RM		2,400	2	90	90 W	0.18 kW	432 kWh	2	LED18-DIMR38	18 W	0.04 kW	86 kWh	0 kWh	86 kWh			0.14 kW	346 kWh	0 kWh	346 kWh
592	Hartman Elementary Center	1		MENS LOCKER RM		1,680	8	24T8	59 W	0.47 kW	793 kWh	8	LB24LP	39 W	0.31 kW	524 kWh	0 kWh	524 kWh			0.16 kW	269 kWh	0 kWh	269 kWh
593	Hartman Elementary Center	1		VESTIBULE		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
594	Hartman Elementary Center	1		PE OFFICE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
595	Hartman Elementary Center	1		JANITOR CLOSET		1,000	1	24EE	72 W	0.07 kW	72 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.03 kW	33 kWh	0 kWh	33 kWh
596	Hartman Elementary Center	1		GYM		2,600	19	5 BIAX	190 W	3.61 kW	9,386 kWh	19	NF28-44HP-OS	144 W	2.74 kW	7,114 kWh	-2,134 kWh	4,980 kWh	30%		0.87 kW	2,272 kWh	2,134 kWh	4,406 kWh
597	Hartman Elementary Center	1		GYM		2,600	6	150	150 W	0.90 kW	2,340 kWh	6	CF40	40 W	0.24 kW	624 kWh	0 kWh	624 kWh			0.66 kW	1,716 kWh	0 kWh	1,716 kWh
598	Hartman Elementary Center	1		GYM		2,600	8	200	200 W	1.60 kW	4,160 kWh	8	CF60	60 W	0.48 kW	1,248 kWh	0 kWh	1,248 kWh			1.12 kW	2,912 kWh	0 kWh	2,912 kWh
599	Hartman Elementary Center	1		CORRIDOR @ KITCHEN		2,600	2	24UEE	72 W	0.14 kW	374 kWh	2	LB22HPREF	37 W	0.07 kW	192 kWh	0 kWh	192 kWh			0.07 kW	182 kWh	0 kWh	182 kWh
600	Hartman Elementary Center	1		DISHWASH		1,800	4	44EE	144 W	0.58 kW	1,037 kWh	4	LB24HPDL	60 W	0.24 kW	432 kWh	0 kWh	432 kWh			0.34 kW	605 kWh	0 kWh	605 kWh
601	Hartman Elementary Center	1		STORAGE		1,000	1	60X2	120 W	0.12 kW	120 kWh	1	NF2-2X13	32 W	0.03 kW	32 kWh	0 kWh	32 kWh			0.09 kW	88 kWh	0 kWh	88 kWh
602	Hartman Elementary Center	1		CAFÉ		1,800	9	24T8	59 W	0.53 kW	956 kWh	9	LB24LP	39 W	0.35 kW	632 kWh	0 kWh	632 kWh			0.18 kW	324 kWh	0 kWh	324 kWh
603	Hartman Elementary Center	1		KITCHEN		1,800	14	24T8	59 W	0.83 kW	1,487 kWh	14	LB24LP	39 W	0.55 kW	983 kWh	0 kWh	983 kWh			0.28 kW	504 kWh	0 kWh	504 kWh
604	Hartman Elementary Center	1		KITCHEN		1,800	8	CF13	13 W	0.10 kW	187 kWh	8	EXTR	13 W	0.10 kW	187 kWh	0 kWh	187 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
605	Hartman Elementary Center	1		KITCHEN		2,400	2	24EE	72 W	0.14 kW	346 kWh	2	LB24LP	39 W	0.08 kW	187 kWh	0 kWh	187 kWh			0.07 kW	158 kWh	0 kWh	158 kWh
606	Hartman Elementary Center	1		KITCHEN		2,600	1	22SS	53 W	0.05 kW	138 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.03 kW	70 kWh	0 kWh	70 kWh
607	Hartman Elementary Center	1		OFFICE		3,000	2	24EE	72 W	0.14 kW	432 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.07 kW	198 kWh	0 kWh	198 kWh
608	Hartman Elementary Center	1		ELEC		1,000	1	24EE	72 W	0.07 kW	72 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.03 kW	33 kWh	0 kWh	33 kWh
609	Hartman Elementary Center	1		CORRIDOR		2,600	2	100	100 W	0.20 kW	520 kWh	2	CF23	23 W	0.05 kW	120 kWh	0 kWh	120 kWh			0.15 kW	400 kWh	0 kWh	400 kWh
610	Hartman Elementary Center	1		CORRIDOR @ 101A		2,600	4	44T8	114 W	0.46 kW	1,186 kWh	4	LB24HPDL	60 W	0.24 kW	624 kWh	0 kWh	624 kWh			0.22 kW	562 kWh	0 kWh	562 kWh
611	Hartman Elementary Center	1		CORRIDOR @ 101A		2,600	8	24T8	59 W	0.47 kW	1,227 kWh	8	LB24LP	39 W	0.31 kW	811 kWh	0 kWh	811 kWh			0.16 kW	416 kWh	0 kWh	416 kWh
612	Hartman Elementary Center	1		CORRIDOR @ 101A		2,600	8	24T8	59 W	0.47 kW	1,227 kWh	8	LB24LP	39 W	0.31 kW	811 kWh	0 kWh	811 kWh			0.16 kW	416 kWh	0 kWh	416 kWh

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							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
613	Hartman Elementary Center	1		CORRIDOR @ 101A		2,600	6	24T8	59 W	0.35 kW	920 kWh	6	LB24LP	39 W	0.23 kW	608 kWh	0 kWh	608 kWh			0.12 kW	312 kWh	0 kWh	312 kWh
614	Hartman Elementary Center	1		CORRIDOR @ 101A		2,600	4	24T8	59 W	0.24 kW	614 kWh	4	LB24LP	39 W	0.16 kW	406 kWh	0 kWh	406 kWh			0.08 kW	208 kWh	0 kWh	208 kWh
615	Hartman Elementary Center	1		CORRIDOR @ 101A		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
616	Hartman Elementary Center	1		CORRIDOR @ 101A		8,760	1	DRINK	400 W	0.40 kW	3,504 kWh	1	EXTR	400 W	0.40 kW	3,504 kWh	-1,647 kWh	1,857 kWh	47%	X	0.00 kW	0 kWh	1,647 kWh	1,647 kWh
617	Hartman Elementary Center	1	102	CLASSROOM		1,800	5	44T8	114 W	0.57 kW	1,026 kWh	5	LB24HPDL	60 W	0.30 kW	540 kWh	-162 kWh	378 kWh	30%	X	0.27 kW	486 kWh	162 kWh	648 kWh
618	Hartman Elementary Center	1		MENS TOILET		2,600	2	24T8	59 W	0.12 kW	307 kWh	2	LB24LP	39 W	0.08 kW	203 kWh	0 kWh	203 kWh			0.04 kW	104 kWh	0 kWh	104 kWh
619	Hartman Elementary Center	1		WOMENS TOILET		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
620	Hartman Elementary Center	1	111A	CLASSROOM		1,800	5	24T8	59 W	0.30 kW	531 kWh	5	LB24LP	39 W	0.20 kW	351 kWh	-105 kWh	246 kWh	30%	X	0.10 kW	180 kWh	105 kWh	285 kWh
621	Hartman Elementary Center	1	101	CLASSROOM		1,800	9	24T8	59 W	0.53 kW	956 kWh	9	LB24LP	39 W	0.35 kW	632 kWh	-190 kWh	442 kWh	30%	X	0.18 kW	324 kWh	190 kWh	514 kWh
622	Hartman Elementary Center	1		STAFF TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
623	Hartman Elementary Center	1		STAFF TOILET		2,600	1	22T8	32 W	0.03 kW	83 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.01 kW	16 kWh	0 kWh	16 kWh
624	Hartman Elementary Center	1		STAFF TOILET		2,600	1	24T8	59 W	0.06 kW	153 kWh	1	LB24LP	39 W	0.04 kW	101 kWh	0 kWh	101 kWh			0.02 kW	52 kWh	0 kWh	52 kWh
625	Hartman Elementary Center	1		STAFF TOILET		2,600	1	22T8	32 W	0.03 kW	83 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.01 kW	16 kWh	0 kWh	16 kWh
626	Hartman Elementary Center	1		STORAGE		700	3	24T8	59 W	0.18 kW	124 kWh	3	LB24LP	39 W	0.12 kW	82 kWh	0 kWh	82 kWh			0.06 kW	42 kWh	0 kWh	42 kWh
627	Hartman Elementary Center	1		JANITOR CLOSET		1,000	1	60X2	120 W	0.12 kW	120 kWh	1	NF2-2X13	32 W	0.03 kW	32 kWh	0 kWh	32 kWh			0.09 kW	88 kWh	0 kWh	88 kWh
628	Hartman Elementary Center	1		CORRIDOR @ DIST OFF		2,600	8	24T8	59 W	0.47 kW	1,227 kWh	8	LB24LP	39 W	0.31 kW	811 kWh	0 kWh	811 kWh			0.16 kW	416 kWh	0 kWh	416 kWh
629	Hartman Elementary Center	1		CORRIDOR @ D.O.		2,600	3	24T8	59 W	0.18 kW	460 kWh	3	LB24LP	39 W	0.12 kW	304 kWh	0 kWh	304 kWh			0.06 kW	156 kWh	0 kWh	156 kWh
630	Hartman Elementary Center	1		CORRIDOR @ D.O.		2,600	1	24UEE	72 W	0.07 kW	187 kWh	1	LB22HPREF	37 W	0.04 kW	96 kWh	0 kWh	96 kWh			0.04 kW	91 kWh	0 kWh	91 kWh
631	Hartman Elementary Center	1		MENS TOILET		2,600	1	44EE	144 W	0.14 kW	374 kWh	1	LB24HPDL	60 W	0.06 kW	156 kWh	0 kWh	156 kWh			0.08 kW	218 kWh	0 kWh	218 kWh
632	Hartman Elementary Center	1		WOMENS TOILET		2,600	2	22SS	53 W	0.11 kW	276 kWh	2	LB22	26 W	0.05 kW	135 kWh	0 kWh	135 kWh			0.05 kW	140 kWh	0 kWh	140 kWh
633	Hartman Elementary Center	1		S.E.SEC OFFICE	45	3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
634	Hartman Elementary Center	1		DIR SESS OFFICE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
635	Hartman Elementary Center	1		SI 545 MAR OFFICE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
636	Hartman Elementary Center	1		BREAK ROOM		2,400	6	44T8	114 W	0.68 kW	1,642 kWh	6	LB24HPDL	60 W	0.36 kW	864 kWh	0 kWh	864 kWh			0.32 kW	778 kWh	0 kWh	778 kWh
637	Hartman Elementary Center	1		BREAK ROOM		2,400	1	22SS	53 W	0.05 kW	127 kWh	1	LB22	26 W	0.03 kW	62 kWh	0 kWh	62 kWh			0.03 kW	65 kWh	0 kWh	65 kWh
638	Hartman Elementary Center	1		STORAGE		1,000	2	44T8	114 W	0.23 kW	228 kWh	2	LB24HPDL	60 W	0.12 kW	120 kWh	0 kWh	120 kWh			0.11 kW	108 kWh	0 kWh	108 kWh
639	Hartman Elementary Center	1		ACCT PAYABLE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
640	Hartman Elementary Center	1		PAYROLL		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
641	Hartman Elementary Center	1		BUSINESS MGR		3,000	4	24T8	59 W	0.24 kW	708 kWh	4	LB24LP	39 W	0.16 kW	468 kWh	0 kWh	468 kWh			0.08 kW	240 kWh	0 kWh	240 kWh
642	Hartman Elementary Center	1		SECRETARY OFFICE		3,000	2	24T8	59 W	0.12 kW	354 kWh	2	LB24LP	39 W	0.08 kW	234 kWh	0 kWh	234 kWh			0.04 kW	120 kWh	0 kWh	120 kWh
643	Hartman Elementary Center	1		SUPER OFFICE	44	3,000	3	24T8	59 W	0.18 kW	531 kWh	3	LB24LP	39 W	0.12 kW	351 kWh	0 kWh	351 kWh			0.06 kW	180 kWh	0 kWh	180 kWh
644	Hartman Elementary Center	1		CONFERENCE		3,000	7	44T8	114 W	0.80 kW	2,394 kWh	7	LB24HPDL	60 W	0.42 kW	1,260 kWh	0 kWh	1,260 kWh			0.38 kW	1,134 kWh	0 kWh	1,134 kWh
645	Hartman Elementary Center	1		CONFERENCE		3,000	9	100	100 W	0.90 kW	2,700 kWh	9	CF23	23 W	0.21 kW	621 kWh	0 kWh	621 kWh			0.69 kW	2,079 kWh	0 kWh	2,079 kWh
646	Hartman Elementary Center	1		SUPER TOILET		2,600	1	22SS	53 W	0.05 kW	138 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.03 kW	70 kWh	0 kWh	70 kWh
647	Hartman Elementary Center	1		OPEN OFFICE		3,000	4	24T8	59 W	0.24 kW	708 kWh	4	LB24LP	39 W	0.16 kW	468 kWh	0 kWh	468 kWh			0.08 kW	240 kWh	0 kWh	240 kWh
648	Hartman Elementary Center	1		VESTIBULE		2,600	8	24T8	59 W	0.47 kW	1,227 kWh	8	LB24LP	39 W	0.31 kW	811 kWh	0 kWh	811 kWh			0.16 kW	416 kWh	0 kWh	416 kWh

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Southern Columbia Area SD with Union Labor

							EXISTING SYSTEM					PROPOSED SYSTEM							SENSORS		SAVINGS			
REF #	BUILDING NAME	FLR #	RM #	AREA NAME	LIGHT LEVELS	ANNUAL OPERATING HOURS	EX QTY	EXISTING CODE	EXISTING WATTAGE	PRESENT KW	PRESENT KWH	RETRO QTY	RETROFIT CODE	RETROFIT WATTAGE	RETROFIT KW	RETROFIT KWH Lighting	RETROFIT KWH Sensor	TOTAL RETROFIT KWH	SENSOR REDUCTION %	SENSORS	KW SAVINGS	KWH SAVINGS Lighting	KWH SAVINGS Sensors	TOTAL KWH SAVINGS
649	Hartman Elementary Center Exterior	1		EXTERIOR		4,000	23	50S	66 W	1.52 kW	6,072 kWh	23	NF16-LED-2KL	25 W	0.58 kW	2,300 kWh	0 kWh	2,300 kWh			0.94 kW	3,772 kWh	0 kWh	3,772 kWh
650	Hartman Elementary Center Exterior	1		EXTERIOR		4,000	12	175MH	210 W	2.52 kW	10,080 kWh	12	NF15-LED-7KL	71 W	0.85 kW	3,408 kWh	0 kWh	3,408 kWh			1.67 kW	6,672 kWh	0 kWh	6,672 kWh
651	Hartman Elementary Center Exterior	1		EXTERIOR		4,000	2	175MH	210 W	0.42 kW	1,680 kWh	2	LED55-RETRO V	55 W	0.11 kW	440 kWh	0 kWh	440 kWh			0.31 kW	1,240 kWh	0 kWh	1,240 kWh
652	Hartman Elementary Center			EXITS		8,760	38	EXIT LED	4 W	0.15 kW	1,332 kWh	38	EXTR	4 W	0.15 kW	1,332 kWh	0 kWh	1,332 kWh			0.00 kW	0 kWh	0 kWh	0 kWh
653	Bus Garage	1		GARAGE		3,200	6	24T8	59 W	0.35 kW	1,133 kWh	6	LB24LP	39 W	0.23 kW	749 kWh	0 kWh	749 kWh			0.12 kW	384 kWh	0 kWh	384 kWh
654	Bus Garage	1		GARAGE		3,200	6	44T8	114 W	0.68 kW	2,189 kWh	6	LB24HPDL	60 W	0.36 kW	1,152 kWh	0 kWh	1,152 kWh			0.32 kW	1,037 kWh	0 kWh	1,037 kWh
655	Bus Garage	1		GARAGE		3,200	24	24T8	59 W	1.42 kW	4,531 kWh	24	LB24LP	39 W	0.94 kW	2,995 kWh	0 kWh	2,995 kWh			0.48 kW	1,536 kWh	0 kWh	1,536 kWh
656	Bus Garage	1		GARAGE		3,200	2	24T8	59 W	0.12 kW	378 kWh	2	LB24LP	39 W	0.08 kW	250 kWh	0 kWh	250 kWh			0.04 kW	128 kWh	0 kWh	128 kWh
657	Bus Garage	1		STORAGE		1,000	2	24EE	72 W	0.14 kW	144 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.07 kW	66 kWh	0 kWh	66 kWh
658	Bus Garage	1		CORRIDOR		2,600	1	22SS	53 W	0.05 kW	138 kWh	1	LB22	26 W	0.03 kW	68 kWh	0 kWh	68 kWh			0.03 kW	70 kWh	0 kWh	70 kWh
659	Bus Garage	1		STORAGE		1,000	2	24EE	72 W	0.14 kW	144 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.07 kW	66 kWh	0 kWh	66 kWh
660	Bus Garage	1		STORAGE		1,000	2	24EE	72 W	0.14 kW	144 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.07 kW	66 kWh	0 kWh	66 kWh
661	Bus Garage	1		CAGE		1,000	1	24EE	72 W	0.07 kW	72 kWh	1	LB24LP	39 W	0.04 kW	39 kWh	0 kWh	39 kWh			0.03 kW	33 kWh	0 kWh	33 kWh
662	Bus Garage	1		CAGE		1,000	2	24T8	59 W	0.12 kW	118 kWh	2	LB24LP	39 W	0.08 kW	78 kWh	0 kWh	78 kWh			0.04 kW	40 kWh	0 kWh	40 kWh
663	Bus Garage	1		OFFICE		3,000	2	44EE	144 W	0.29 kW	864 kWh	2	LB24HPDL	60 W	0.12 kW	360 kWh	0 kWh	360 kWh			0.17 kW	504 kWh	0 kWh	504 kWh
664	Bus Garage Exterior	1		EXTERIOR		4,000	3	100	100 W	0.30 kW	1,200 kWh	3	CF23	23 W	0.07 kW	276 kWh	0 kWh	276 kWh			0.23 kW	924 kWh	0 kWh	924 kWh
665	Bus Garage Exterior	1		EXTERIOR		4,000	3	250S	295 W	0.89 kW	3,540 kWh	3	LED55-RETRO V	55 W	0.17 kW	660 kWh	0 kWh	660 kWh			0.72 kW	2,880 kWh	0 kWh	2,880 kWh
666	Bus Garage Exterior	1		EXTERIOR		4,000	1	100S	130 W	0.13 kW	520 kWh	1	LED35-RETRO V	35 W	0.04 kW	140 kWh	0 kWh	140 kWh			0.10 kW	380 kWh	0 kWh	380 kWh
							3,736			**315.12 kW**	**748,021 kWh**	**3,730**			**184.72 kW**	**439,506 kWh**	**-49,993 kWh**	**389,513 kWh**			**130.40 kW**	**308,515 kWh**	**49,993 kWh**	**358,508 kWh**

** Sensors that are supplied with or as part of the fixture are included in the "Lighting" totals.

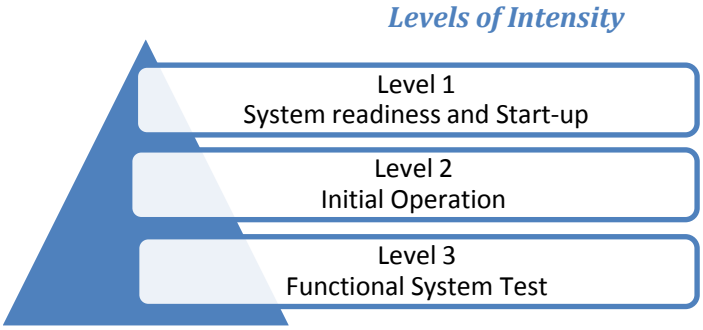
Attachment C – Commissioning Plan

Commissioning Methodology

The following sample table shows an ECM and the proposed level of commissioning. Once the final list of all ECM's is developed this table will be updated.

ECM Number	ECM Title	Level of Commissioning
1	District Wide Lighting Upgrades	Level 1
2	District Wide Building Envelope Upgrades	Level 1
3	District Wide Plug Load Management	Level 2
4	High School HVAC Upgrades	Level 3
5	Middle School HVAC Upgrades	Level 3
6	Elementary School HVAC Upgrades	Level 3
7	High School Roofing Upgrades	Level 1
8	Elementary School Roofing Upgrades	Level 1

Commissioning Levels



Proposed Energy Conservation Measures (ECMs) can vary greatly in size, scope and complexity. Systems can be of a critical or highly specialized nature or can be as simple as plugging in a new specialized control. Because of this potential for variance, McClure Company will employ three different levels of commissioning intensity.

Level 1 - System Readiness and Startup

The McClure Company project manager, commissioning supervisor, and appropriate subcontractor should perform Level 1 Commissioning during the construction and acceptance phases of the project. This level basically involves a visual inspection of the installation.

The contractor performs all required tasks. The Commissioning supervisor documents the installation. On example of an ECM specific to this project that level 1 commissioning is appropriate is the vending misers.

Level 1 commissioning is intended to:

- Ensure that the contractor meets basic contractual requirements to produce a complete installation, in accordance with the contract documents.
- Help the contractor plan, organize, and coordinate that part of his/her work related to completing the installation and getting equipment and systems ready to start properly, safely, and on schedule.

- Identify problems that may arise and provide a mechanism for problem resolution by the responsible parties, with necessary follow-up.
- Provide documentation showing that system installation is in accordance with requirements.

Level 2 - Initial Operation

Level 2 commissioning requires the pre-start up testing of the various systems. The commissioning supervisor along with the appropriate subcontractor conducts systems tests to ensure system condition and capacities.

Level 2 commissioning is proper level of commissioning for an ECM that acts as an independent system and is not a component of a larger integrated system. An example of an independent system that is proposed for this project is the steam and condensate replacement. While the replacement of the steam and condensate system will have an impact on energy savings, the replacement of the steam and condensate system once it has been pressure tested and no longer leaks, will not have an impact on heating systems.

Level 2 commissioning is intended to include comprehensive pre-start up checks and tests, and to:

- Ensure that the contractor meets basic contractual requirements to produce a fully functioning installation in accordance with the contract documents.
- Ensure that system operations are checked and that specified performance is achieved in all respects. This is where McClure Company's approach of using the service of an independent commissioning supervisor really adds value.
- Provide documentation showing that system operation is in accordance with requirements.
- Ensure that the contractor is able to operate the equipment and systems, and can demonstrate system performance according to contract requirements.
- Provide a framework for giving training demonstrations in proper systems operation to the Client(s), and for providing maintenance instructions and recommendations for the completed system.

Level 3 - Functional System Test

Level 3 commissioning is the most detailed and exhaustive application of the commissioning process.

Level 3 is the required level of commissioning when the individual components of the system are integrated into a control system. An example of a system specific to this project that will require level 3 commissioning is the dual fuel summer boiler.

Level 3 commissioning is intended to:

- Ensure that systems operation, including all control sequences, is adequately checked and that functional performance, as specified by the requirements, is achieved in all respects.
- Provide documentation that reflects system operation in accordance with requirements.
- Ensure that the contractor is able to operate the equipment and systems, and demonstrate system performance and functionality (according to contract requirements), to the client(s).
- Provide a framework for giving training in proper systems operation to the clients(s), and for providing maintenance instructions and recommendations for the completed system.

Sample Commissioning Reports

McClure Company
4101 North Sixth Street
P. O. Box 1579
Harrisburg, PA 17105-1579
Tel. 717.232.9743
Fax 717.236.5239
24-hr. Svc. 717.233.6431
www.mcclureco.com

CONTRACTORS AND ENGINEERS

HVAC Start-Up Sheet

Job Name		Unit No.	
Job No.		Mfr.	
Date		Model No.	
		Serial No.	

Evaporator / Fan Section	Cooling						Heating					
Entering Air/Water Temp.	Cool						Heat					
Leaving Air/Water Temp.	Cool						Heat					
Supply Fan Amps	Nameplate		Actual					L1		L2		L3
Return Fan Amps	Nameplate		Actual					L1		L2		L3
Lube Motor/Drive												
Belt Adjust												
Belt Replace												
Filter Inspect												
Filter Replace/Clean												
Check Electrical Connections												
Economizer Operation												
Set Points												
Filter Sizes												
Belt Sizes												
Compressor Section												
Discharge Pressure Per Circuit	Cool	1		2		3	3	1		2		3
Suction Pressure Per Circuit	Cool	1		2		3	3	1		2		3
Check Crankcase Heater												
Oil Level/Pressure												
Amps/1. L1 L2 L3	2	L1		L2		L3	3	L1		L2		L3
Volts/ 1. L1 L2 L3	2	L1		L2		L3	3	L1		L2		L3
Sight Glass Clear ?												
HI Press Cycle CI/CO												
LO Press Cycle CI/CO												
Superheat/Circuit		1		2		3						
Sub Cooling/Circuit		1		2		3						
Liquid Line Temp/Circuit		1		2		3						
Suction Line Temp/Circuit		1		2		3						
Condenser												
Volts	Nameplate		Actual					L1		L2		L3
Fan/Amps	Nameplate		Actual					L1		L2		L3
Belt Adjust												
Belt Replace												
Belt Sizes												
Lube Motor/Drive												
Entering Air/Water Temp.												
Leaving Air/Water Temp.												

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CONTRACTORS AND ENGINEERS

HVAC Start-Up Sheet

Job Name	0	Unit No.	0
Job No.	0	Mfr.	0
Date	0	Model No.	0
		Serial No.	0

Heating Section / Electric Heat	Cooling				Heating							
Volts	Nameplate		Actual			L1		L2		L3		
Amps/Stage	Nameplate		Actual			L1		L2		L3		
Stage 1			Actual			L1		L2		L3		
Stage 2			Actual			L1		L2		L3		
Stage 3			Actual			L1		L2		L3		
Check Electrical Connections												
Gas Heat												
Line Pressure Inches WC	Nameplate		Actual									
Manifold Pressure Inches WC	Nameplate		Actual									
Cooling Tower												
Fan Amps	Nameplate		Actual									
Pump Amps	Nameplate		Actual									
Sump Heater Amps	Nameplate		Actual									
Check Water Level												
Check Damper Operation												
Check Bleed Off												
Belt Sizes												

Field Notes / Additional Information
CRANK CASE HEATER 138A00
TWO COMPRESSOR
THREE CONDENSER FANS

McClure Company

System Ready to Start-up
Check List

Date		Date Req'd	
Project Manager		Construction Job #	
Foreman to Contact		Service Job #	
Owner to Contact		Job Phone #	
Address		Special Instructions	

CHILLERS	Ready Yes	No	N/A	Air Handlers / Rooftop Units / ERU	Ready Yes	No	N/A
Equip Tag:				Equip Tag:			
Unit set and secured in correct location				Shipping blocks & Hardware Removed			
Unit set level				Unit set and secured in correct location			
Air clearances adequate				Unit set level			
Service clearances around unit sufficient				Service clearances around unit sufficient			
Any visible damage				Any visible damage			
Any apparent Oil or Refrigerant leaks				Any apparent Oil or Refrigerant leaks			
Flow Switch installed				Sealed between unit & roof curb			
Temp or DP switch installed				Duct work completed			
System filled and air purged (glycol)				Filter installed correctly			
Pumps started (CHW or Condenser)				Condensate Piping complete			
Electrical Complete				Gas Piping complete			
Control wiring Completed				Gas Regulator & Valves installed			
Control Valves operable				Vibration Isolators (in free state)			
Will we have a building load				Electrical Complete			
Disconnect switch installed				Control wiring Completed			
Correct fuse installed				Disconnect switch installed			
Vibration Isolators (in free state)				Correct fuse installed			
Suction Pipe Insulated				Belts on site			
All components installed (hot gas bypass, expansion valves, solenoid valves, sight glass, driers, etc.				Economizers installed and wired			
Piping leak checked				O & M Manual on site			
Chilled Water piping insulated				Submittals on site			
O & M Manual on site				Accessories on site (in dry area)			
Submittals on site				Is there factory start-up included			
Is Relief Valves & PRV Piped to Exterior							
Flush Piping only, not chiller							
Strainer installed at chiller							
Refrigerant Monitor installed complete							
Heat Trace required							
Is there factory start-up included							

COMMISSIONING PLAN
FUNCTIONAL PERFORMANCE TESTS

Project Name

Town, PA

4101 North Sixth Street
Harrisburg, PA 17110
717-232-9743
717-236-5239 fax

Certification No. 2708

McClure Company is recognized for quality work in many technical construction market segments. Our approach is designed to deliver unexpected service at every level of the organization as it relates to specific projects, to not only meet installation standards, but also to maximize completion, budget, and quality that exceeds your expectations. Our participation in the following organizations helps to advance our standards.

MCAA

The American Society of Mechanical Engineers

ASHRAE

Mechanical Service Contractors of Am MSCA

SEAL OF QUALITY NATIONAL CERTIFIED PIPE WELDING BUREAU PIPE WELDING

TABB
TESTING, ADJUSTING AND BALANCING BUREAU
THE PROFESSIONAL'S CHOICE

SHEET METAL AND AIR CONDITIONING SMACNA CONTRACTOR

BCxA Building Commissioning Association

FUNCTIONAL PERFORMANCE TESTS

Two Pipe Unit Ventilators
UV-2_ Room No. 012 CAFETERIA

Tests:	Yes	No
The UV is indexed to occupied/un-occupied by the time of day schedule 6:00AM to 6:00PM Monday through Friday:	X	
The discharge air temperature is limited to 120°F:	X	
In the heating warm-up mode the fan is energized and the coil valve is 100% open:	X	
When the occupied space temperature is achieved the hot water coil valve modulates closed:	X	
The warm-up sequence includes an optimal start time:	X	
Whenever the UV is in the occupied mode the fan runs continuously:	X	
When the mechanical plant is in the heating mode and upon a fall in space temperature 1°F below set point the dual temperature coil valve modulates open:	X	
When the mechanical plant is in the heating mode and upon a rise in space temperature 1°F above set point the dual temperature coil valve modulates closed :	X	
When the mechanical plant is in the cooling mode and upon a fall in space temperature 1°F below set point the dual temperature coil valve modulates closed: :	X	
When the mechanical plant is in the cooling mode and upon a rise in space temperature 1°F above set point the dual temperature coil valve modulates open :	X	
The wall mounted thermostat is calibrated, actual 68°F@ thermostat, BAS reading 68.5°F:	X	
When indexed to the dual temperature coil valve is 100% open:	X	
In the heating unoccupied mode the UV fan is cycled to maintain space temperature set point 55°	X	
In the cooling unoccupied mode the valve is closed an the fan is off:	X	
A global signal is sent to the UV when the central system is in the heating or cooling mode	X	

Two Pipe Unit Ventilators w/ DX Cooling
UV-30__ Room No.

Tests:	Yes	No
The UV-30 is indexed to occupied/un-occupied by the time of day schedule 6:00AM to 6:00PM Monday through Friday:	X	
The discharge air temperature is limited to 120°F:	X	
In the heating warm-up mode the fan is energized and the coil valve is 100% open:	X	
The outdoor air damper is 100% closed:	X	
When the occupied space temperature is achieved the hot water coil valve modulates closed:	X	

The warm-up sequence includes an optimal start time:	**X**	
Whenever the UV is in the occupied mode the fan runs continuously:	**X**	
The outdoor air damper opens to the minimum position of 20%:	**X**	
When the mechanical plant is in the heating mode and upon a fall in space temperature 1°F below set point the dual temperature coil valves modulates open:	**X**	
When the mechanical plant is in the heating mode and upon a rise in space temperature 1°F above set point the dual temperature coil valves modulates closed and the mechanical cooling is enabled:	**X**	
When the mechanical plant is in the cooling mode and upon a rise in space temperature 1°F above set point the dual temperature coil valves modulates open:	**X**	
Tests:	**Yes**	**No**
The wall mounted thermostat is calibrated; actual 68°F@ thermostat, BAS reading 68°F:	**X**	
When indexed to the unoccupied mode and the mechanical plant is the heating mode, the dual temperature coil valve is 100% open:	**X**	
In the heating unoccupied mode the UV fan is cycled to maintain space temperature set point 55°	**X**	
In the cooling unoccupied mode the UV valve is closed and the fan is off:	**X**	
A global signal is sent to the UV when the mechanical plant system is in the heating or cooling mode	**X**	

Existing Air Handling Units
AH-2 Gymnasium

Tests:	**Yes**	**No**
The unit is indexed to occupied/un-occupied by the time of day schedule 6:00AM to 6:00PM Monday through Friday:	**X**	

Warm-up Mode

Tests:	**Yes**	**No**
The supply fan is energized and the outside air damper is closed:	**X**	
The hot water coil valve is open:	**X**	
When the warm-up temperature is achieved the outdoor air damper remains closed but the hot water valve modulates to maintain temperature set point:	**X**	
The warm-up sequence includes an optimal start time:	**X**	

Occupied Mode

Tests:	**Yes**	**No**
The supply fan is energized and runs continuously:	**X**	
The outdoor air damper opens to the reduced minimum position:	**X**	
When the mechanical plant is in the heating mode and upon a fall in space temperature 1°F below set point the coil valves modulates open:	**X**	

When the mechanical plant is in the heating mode and upon a rise in space temperature 1°F above set point the coil valve modulates closed:	X	
Upon a continued rise in space temperature the unit is indexed to the economizer mode of operation:	X	
The mixed air controller overrides the outdoor damper to the mixed air temperature from falling below the 50°F set point:	X	
If economizer is not available and the space temperature rises above set point the mechanical cooling is enabled:	X	
When the CO2 level in the space is above 1,200 ppm the outdoor air damper modulates open to the design minimum position:	X	
The CO2 sequence operates only in the occupied made and when the supply fan is energized:	X	
The mixed air temperature act as a low limit:	X	

Safeties and alarms

Tests:	Yes	No
When the supply fan fails an alarm is generated @ the operator work station:	X	
When the discharge air temperature is below 40°F an alarm is generated @ the operator work station:	X	
Upon smoke detection the supply and exhaust fans shut down and an alarm is generated @ the operator work station	X	
When the low limit safety switch mounted on the leaving side of the hot water reheat coil trips @ 38°F, the supply fan shuts down and the outdoor air damper closes:	X	

New Air Handling Unit
AH-1 Library

Tests:	Yes	No
The unit is indexed to occupied/un-occupied by the time of day schedule 6:00AM to 6:00PM Monday through Friday:	X	

Warm-up Mode

Tests:	Yes	No
The supply fan is energized and the outside air damper is closed:	X	
The dual temperature coil valve is open:	X	
When the warm-up temperature set point 70°F is achieved the outdoor air damper remains closed but the dual temperature valve modulates to maintain temperature set point:	X	
The warm-up sequence includes an optimal start time:	X	
When the mechanical plant is in cooling mode the duct mounted electric reheat coil replaces the AHU coil:	X	
When the mechanical plant is in cooling mode the dual temperature coil is in by-pass:	X	
The warm-up sequence includes an optimal start time:	X	

Occupied Mode

Tests:	Yes	No
The supply fan is energized and runs continuously:	X	
The outdoor air damper opens to the minimum position:	X	
Following test with the Mechanical Plant in Cooling Mode		
When the mechanical plant is in the cooling mode and upon a fall in space temperature 1°F below set point the coil valves modulates closed:	X	
When the mechanical plant is in the cooling mode and upon a continued fall in space temperature 1°F below set point the 1st stage of electric heat is energized:	X	
When the space temperature stays below the set point the 2nd stage of electric heat is energized:	X	
Upon a rise in space humidity above 58% RH the chilled water valve opens:	X	
If the discharge air temperature or space temperature fall below set point the 1st stage of electric heat is energized:	X	
When the discharge air temperature or space temperature stay below the set point the 2nd stage of electric heat is energized:	X	
When the space humidity falls below set point the unit returns to normal operation:	X	
The mixed air controller overrides the outdoor damper to the mixed air temperature from falling below the 50°F set point:	X	

Unoccupied Mode

Tests:	Yes	No
The supply fan is off:	X	
The outside air damper is closed:	X	
The dual temperature coil valve is closed:	X	
When the space temperature fall below 55°F set point the fan is on and the dual temperature coil valve modulates to maintain space temperature set point:	X	
When the Mechanical Plant is in cooling mode the electric coil is enabled upon a fall in space temperature:	X	
When the space humidity is above set point 58% RH and chilled water is available the coil valve opens:	X	
If the space temperature or discharge air temperature falls below set point and the Mechanical Plant is in cooling mode the 1st stage of electric heat is energized:	X	

Occupied Mode with the Mechanical Plant in Heating Mode

Tests:	Yes	No
The supply fan is energized and runs continuously:	X	
Upon a rise in space temperature 1°F above set point the mechanical cooling is enabled:[1]	X	
Upon a continued rise in space temperature and a 50% call for cooling the 2nd	X	

[1] There is not an economizer mode for AH-1

stage of mechanical cooling is enabled:		
Upon a fall in space temperature 1°F below set point the dual temperature coil valve modulates open:	X	
If supply air temperature cannot be maintained with the valve 100% open the 1st stage of electric heat is enabled:	X	
Upon a rise in space humidity above 60% RH the 1st stage of mechanical cooling is enabled:	X	
If the discharge air temperature or space temperature fall below set point the dual temperature coil valve modulates open:	X	
If the discharge air temperature or space temperature continue to fall below set point the 1st stage of electric heat is energized:	X	
When the discharge air temperature or space temperature stay below the set point the 2nd stage of electric heat is energized:	X	
When the space humidity falls below set point the unit returns to normal operation:	X	
When the discharge air temperature or space temperature stay below the set point the 2nd stage of electric heat is energized:	X	
With the mechanical plant in heating mode and AH-1 in the unoccupied mode and a call for humidity control. The heating the hot water coil valve modulates open to maintain space or discharge air temperature:	X	

Safeties and alarms

Tests:	Yes	No
When the supply fan fails an alarm is generated @ the operator work station:	X	
When the discharge air temperature is below40°F an alarm is generated @ the operator work station:	X	
Upon smoke detection the supply and exhaust fans shut down and an alarm is generated @ the operator work station	X	
When the low limit safety switch mounted on the leaving side of the hot water reheat coil trips @ 38°F, the supply fan shuts down and the outdoor air damper closes:	X	
When compressor #1 fails an alarm is generated @ the operator work station:	X	
When compressor #2 fails an alarm is generated @ the operator work station:	X	
A high condensate alarm is generated @ the operator work station:	X	

OPERATOR'S WORKSTATION GRAPHICS

ENERGY RECOVERY UNITS

Operator Adjustable - Commandable

Tests:	Yes	No
Unit START/STOP	X	
Space humidity set point	X	
Heat Wheel On/Off	X	
O. A. heating set point	X	
R. A. cooling set point stage 1	X	
R. A. cooling set point stage 2	X	
Occupied/Unoccupied	X	
Humidity control On/Off	X	

Reheat control On/Off	X	

Alarms at the Workstation

Tests:	Yes	No
Supply fan failed	X	
Exhaust fan failed	X	
Heat wheel failed	X	
Low discharge air temperature	X	
Freeze stat	X	

Graphics only

Tests:	Yes	No
Heating enable	X	
Heating on/off	X	
Dehumidification on/off	X	
Cooling stages on/off	X	

MECHANICAL PLANT

Operator Adjustable - Commandable

Tests:	Yes	No
Pump P-1 Stop/Start	X	
Pump P-2 Stop/Start	X	
Boiler 1 Stop/Start	X	
Boiler 2 Stop/Start	X	
Dual temperature hot water supply temperature	X	

Alarms at the Workstation

Tests:	Yes	No
P-1 failure	X	
P-2 failure	X	
Boiler #1 failure	X	
Boiler #2 failure	X	

Graphics only

Tests:	Yes	No
System return water temperature	X	
Outside air temperature	X	
Outside humidity	X	
Pump P-1 status	X	
Pump P-2 status	X	
Pump P-1 speed	X	
Pump P-2 speed	X	
Boiler 1 status	X	
Boiler 2 status	X	
Diverting valve V-1 status	X	
Isolation valve V-2 status	X	

Isolation valve V-3 status	X	
Switchover valve V-4 status	X	
Bypass valve V-5 status	X	
Hot water differential pressure	X	
Combustion damper status		

AIR HANDLING UNIT AC-1

Operator Adjustable - Commandable

Tests:	Yes	No
Space Humidity	X	
Space Temperature	X	
AC-1 stop/start	X	

Alarms at the Workstation

Tests:	Yes	No
Supply fan failure	X	
Freeze stat	X	
Smoke detector	X	
Low discharge air temperature	X	
Compressor #1 failed	X	
Compressor #2 failed	X	
High condensate	X	
Dirty filter	X	

Graphics only

Tests:	Yes	No
Electric Heat status	X	
DX cooling stage #1 status	X	
DX cooling stage #2 status	X	
Supply fan status	X	
Discharge air temperature	X	
Mixed air temperature	X	
Space relative humidity	X	
Space temperature	X	

Classroom Unit Ventilators

Operator Adjustable - Commandable

Tests:	Yes	No
Supply fan on/off	X	
Dual temperature water valve open/closed	X	
Space temperature set point	X	

Alarms at the Workstation

Tests:	Yes	No
Supply fan failed	X	
Freeze stat (UV-30 & 31) only	X	

Graphics only

Tests:	Yes	No
Supply fan status	X	
Space temperature	X	
Dual temperature valve position	X	
Outdoor air damper position (UV 30 & 31 only)	X	
DX enabled/disabled (UV-30 & 31 only)	X	