PROJECT DEVELOPMENT AGREEMENT (PDA)

VILLAGE OF IRVINGTON
NEW YORK

INCORPORATED 1872

DENNIS P. FLOOD
MAYOR

TRUSTEES
DAVID A. KLASSEN
NICOLA S. CODDINGTON
ERIN MALLOY
PATRICIA J. RYAN

DONALD P. MARRA
VILLAGE ADMINISTRATOR

LAWRENCE S. SCHOPFER
VILLAGE CLERK-TREASURER

KEVIN J. PLUNKETT, ESQ.
VILLAGE ATTORNEY

May 3, 2007

RECEIVED
MAY 11 2007
WENDEL

Scott F. Smith
General Manager
Wendel Energy Services, LLC
140 John James Audubon Parkway, Suite 201
Amherst, New York 14228

PROJECT DEVELOPMENT LETTER AGREEMENT

Dear Mr. Smith:

The purpose of this Letter Agreement is to engage Wendel Energy Services, LLC, hereinafter "Wendel", to develop an energy performance project with associated Assured Performance Guarantee pursuant to the RFP issued by the Village of Irvington and responded to by a proposal from Wendel dated March 7, 2007.

The scope of Project Development Work is defined below.

Energy Survey Data Collection and Review.

Wendel agrees to undertake an energy survey to determine the baseline consumption and operational characteristics of the premises and to identify energy conservation and revenue generating measures. To enable the expeditious evaluation of the potential benefits of the envisioned project, a process of data collection and analysis described below will be utilized by Wendel.

- Review master facilities plan and other existing strategic planning documents to determine mission and related needs.
- Review energy consumption data for up to three (3) years and other data as may be needed to develop a baseline for future energy use.
- Review current capital budget and asset replacement plan.
- Review descriptions of any anticipated changes in facility structures or their heating, cooling, lighting, or other systems, or their energy requirements.
- Survey energy-consuming or energy-saving equipment used at the facilities.
- Survey energy management and other relevant operational or maintenance procedures utilized at the facilities.
- Install devices (e.g. light and motor loggers) that will measure actual hours for specific subsystems.

85 MAIN STREET - IRVINGTON, N.Y. 10533
TELEPHONE: (914) 591-7070 - FAX: (914) 591-4072
E-MAIL: office@irvingtonny.gov - WEB SITE: http://www.irvingtonny.gov

- Perform both field and bench testing of a sample of water meters to determine baseline accuracy.
- Review previous facility assessment studies, occupancy and usage information, square footage by buildings, etc.
- Review construction drawings for the facilities.
- Review summary of expenditures for outsourced maintenance, repairs or replacements on the premises.
- Review copies of representative current tenant leases, if any.

The Owner agrees to provide its cooperation in the collection of data for the completion of this survey.

Energy Survey Recommendations.

Wendel will present recommendations for facility improvement measures that when implemented will satisfy the Owner's goals and objectives. A projection of cash flow that will include cost estimates for turnkey installation, financing, service, energy and operational savings will also be presented.

Financial Assistance Review.

Wendel will investigate potential sources of financial assistance including, but not limited to, local utility companies and the New York State Energy Research and Development Agency (NYSERDA), and estimate the assistance that may be available to Owner.

Financing Availability Review.

Wendel will identify appropriate financing mechanisms such that Owner can implement the improvements to the facilities.

Measurement and Verification (M&V) Plan.

Wendel will develop a measurement and verification plan to validate ongoing savings achieved after completion of the project.

Comprehensive Energy Audit and Project Contract Documents.

Wendel and the Owner will work together to define a final scope of work for the energy performance project based on the energy survey, financial assistance review, financing availability review and M&V plan. Wendel will present to Owner (i) a Comprehensive Energy Audit and (ii) Project Contract Documents for implementation of the energy performance project.

The Comprehensive Energy Audit will detail the specific energy conservation and revenue generating measures that Owner has chosen to implement, and provide an estimate of the project costs and energy and operating savings that will be achieved by the chosen facility improvement measures.

Within a mutually agreed upon time frame after Wendel's submission of the Comprehensive Energy Audit, Wendel will submit appropriate Project Contract Documents to implement the energy conservation measures, procedures, and services identified in the Comprehensive Energy Audit. The Project Contract Documents include:

1. Design Documents. The design documents will be the documents from which the project will be constructed. These documents take the scope of work identified in the Comprehensive Energy Audit and translate it in to engineering drawings and specifications.

2. Draft Assured Performance Guarantee. This document defines the guarantee and the methods for verifying the savings identified in the Comprehensive Energy Audit. This document will be re-issued as part of the ESPC Contract when pricing is finalized.

3. Draft Project Build Contract. This is the construction contract that establishes the scope of work and the cost to construct the project defined by the Design Documents. This document will be re-issued as part of the ESPC Contract when pricing is finalized.

The Project Contract Documents will be prepared on standardized Wendel contract forms, which will comply with applicable state law and regulations, and will be made available to Owner in advance upon request.

Estimated Project Schedule

It is the intent and commitment of Wendel and Owner to work diligently, and cause others under their direction to work diligently, toward meeting the following timeline:

Task	Estimated Completion Date
Signed Project Development Letter Agreement	04/30/07
Complete and present preliminary results of the energy survey	05/30/07
Deliver Comprehensive Energy Audit	06/15/07
Deliver Project Contract Documents	08/15/07

Project Development Fee

Upon receipt of this Letter Agreement, it is expected that Wendel will begin the Project Development work. If the Owner chooses to cancel the project for any reason, Owner shall reimburse Wendel for costs incurred through the time of written notice of cancellation, along with any project related costs that cannot be mitigated upon Owner's cancellation. The Project Development Fee shall not exceed $95,410.89 plus any Owner pre-approved reimbursable expenditures made by Wendel on Owner's behalf, e.g. manufacturer required deposits for custom built or other equipment with long delivery lead times.

The Project Development Fee shall be divided into the following elements per Wendel Energy Services proposal:

	Project Development Fee	Net Fee	Total Fee	
Comprehensive Energy Audit	$0.00	$0.00	$0.00	
Design and Specifications	$74,208.47	$0.00	$74,208.47	(7%)
Project Management and Administration	$21,202.42	$21,202.42	$42,404.84	(4%)
Cost of Risk (Guarantees)	$0.00	$21,202.42	$21,202.42	(2%)
Construction Management	$0.00	$63,607.26	$63,607.26	(6%)
Hazardous Waste Administration	$0.00	$10,601.21	$10,601.21	(1%)
Profit	$0.00	$21,202.42	$21,202.42	(2%)
Training	$0.00	$10,601.21	$10,601.21	(1%)
Post Commissioning M&V	$0.00	$10,601.21	$10,601.21	(1%)
	$ 95,410.89	$159,018.15	$254,429.04	(24%)

Payments

The above Project Development Fee shall be invoiced and paid monthly based upon the percent of the Project Development work completed. The above fees were calculated using the fees in the Wendel proposal and assuming a $1,060,121 construction cost. Fees shall be adjusted based on the final project cost.

The Project Development work shall be considered 100% complete upon delivery of the Comprehensive Energy Audit and Project Contract Documents to Owner. The Net fee shall be payable upon submission of progress payment applications during construction.

Funding Considerations

If the project proceeds and bank financing is acquired and escrowed (the "Project Fund"), the amount of payments made on this Agreement by the Owner prior to Project Funding will be reimbursed to Owner by Wendel within ten (10) business days after Wendel receives such amounts from the Project Fund.

Terms and Conditions

This Letter Agreement shall be subject to the attached terms and conditions.

We trust that the above meets your requirements and look forward to working with you on this project. If you find this Letter Agreement acceptable, please sign both originals, initial the attachments and return one executed copy to this office.

Sincerely,

Signature

Printed Name
Donald P. Marra

Title
Village Administrator

Attachments: 1 Terms and Conditions

ACCEPTANCE By Wendel Energy Services, LLC:

Accepted this 15th day of May, 2007.

Signature

Scott F. Smith
Printed Name

General Manager
Title

LETTER AGREEMENT TERMS AND CONDITIONS

Obligations of Owner. Owner will work in a diligent and timely manner with Wendel to develop the aforementioned analyses. To ensure a cooperative and successful effort, Owner will commit to open disclosure of information required to do an accurate assessment, will properly position Wendel with its staff, and will make available subject matter knowledgeable staff in a timely manner to address unforeseen circumstances or other conditions that may arise.

Obligations of Wendel. Wendel commits to work in a diligent and timely manner with Owner to deliver the aforementioned analyses necessary to present a facility operations and maintenance solution. Wendel will provide adequate and qualified resources to meet the schedule, and will work with Owner's management in a manner that enables Owner's management to make an informed decision.

Design Services. Architectural and engineering services ("Design Services") shall be procured from independent design professionals licensed to provide Design Services in the geographic location of the Facilities (the "Architect/Engineer"), who shall be retained by Design-Builder pursuant to a separate agreement between Design-Builder and the Architect/Engineer. The standard of care for Design Services performed under this Agreement shall be the care and skill ordinarily used by members of the architectural and engineering professions practicing under similar conditions at the same time in the geographic location of the Facilities.

Termination. Termination of this Letter Agreement can be effected by written notice by the terminating Party to the other Party. Upon termination by the Owner, Owner shall pay Wendel for all work executed up to the date of termination.

Indemnity. The Parties agree that Wendel shall be responsible only for such injury, loss, or damage as may be caused by the intentional misconduct or negligent acts and/or omissions of Wendel, its officers, agents, directors and employees. Each Party agrees to indemnify the other, including their respective officers, agents, directors, and employees, harmless from all claims, demands, or suits of any kind, including all legal costs and attorney's fees, resulting from the intentional misconduct, negligent act and/or omission of their respective officers, agents, directors or employees.

Consequential Damages. NEITHER PARTY WILL BE RESPONSIBLE TO THE OTHER FOR ANY SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES.

Non-appropriations Clause. This contract shall be deemed executory only to the extent of the monies appropriated and available for the purpose of the contract, and no liability on account therefore shall be incurred beyond the amount of such monies. It is understood that neither this contract nor any representation by any public employee or officer creates any legal or moral obligation to request, appropriate or make available monies for the purpose of the contract.

Confidentiality. Wendel shall not disclose or permit the disclosure of any confidential information except to its employees and other consultants who need such confidential information in order to properly prepare the construction documents. No information relative to the project shall be released by Wendel for publication, advertising or for any other purpose without prior approval of the Owner.

Project Documents. All documents, drawings, specifications, electronic data and information prepared, provided or procured by Wendel, its Architect/Engineer, subcontractors and consultants, including the Comprehensive Energy Audit, (collectively the "Project Documents") under this Letter Agreement are and remain the property of Wendel as instruments of service. Owner's rights in the Project Documents will be provided for in the Project Design Contract. Owner will receive full ownership rights in the Comprehensive Energy Audit upon payment of the fee therefore. Any use by Owner of the Comprehensive Energy audit is at Owner's sole risk, and OWNER will indemnify and save harmless Wendel for any liability that may arise out of Owner's use or reuse of the Comprehensive Energy Audit or other Project Documents.

Force Majeure. Wendel cannot be responsible for delays occasioned by factors beyond its control, nor by factors which could not reasonably have been foreseen at the time this Letter Agreement was prepared and executed.

Purchase Orders. Owner acknowledges and agrees that any purchase order issued by Owner in accordance with this Letter Agreement is intended only to establish payment authority for Owner's internal accounting purposes. No purchase order shall be considered to be a counteroffer, amendment, modification, or other revision to the terms of this Letter Agreement.

Waiver. No waiver by either Party hereto or any failure or refusal by the other party hereto to comply with its obligations hereunder shall be deemed a waiver of any other or subsequent failure or refusal by such Party to so comply.

Governing Law. This Letter Agreement shall be governed by, construed in accordance with, the laws of the State of New York, without regard to principles of conflict of laws.

Binding. This Letter Agreement shall be binding upon and shall inure to the benefit of the Parties hereto and their respective successors and assigns.

Entire Agreement. This Letter Agreement, together with the RFP and Response embody and constitute the entire understanding between the parties with respect to the transaction contemplated hereby.

Authority. Each Party represents and warrants to the other that it has the requisite authority to execute, deliver and perform this Letter Agreement, and, that upon such execution and delivery, this Letter Agreement shall constitute a valid and binding obligation of such party, enforceable against such party to the fullest extent permitted by law and in accordance with the terms and conditions hereof.

VILLAGE OF IRVINGTON
NEW YORK

INCORPORATED 1872

ERIN MALLOY
MAYOR

TRUSTEES
JOHN MALONE
NICOLA S. CODDINGTON
WALTER MONTGOMERY
PATRICIA J. RYAN

LAWRENCE S. SCHOPFER
VILLAGE ADMINISTRATOR

EDWARD J. RITTER
VILLAGE CLERK-TREASURER

J. HENRY NEALE, JR.
VILLAGE ATTORNEY

AMENDMENT 1 TO PROJECT DEVELOPMENT LETTER AGREEMENT

This Amendment Number One to the Project Development Letter Agreement ("Contract") between Wendel Energy Services, LLC (hereinafter "Wendel") and the Village of Irvington, New York (hereinafter "Owner"), collectively the "Parties", entered into on May 15, 2007 for design services in connection with a proposed facilities improvement project (the "Project") is hereby entered into effective on the 1st day of October, 2007.

WHEREAS, Owner has upon review of the proposed Project chosen to expand the scope of the Project beyond that originally indicated in the Contract, and

WHEREAS, Wendel under the direction of the Owner has provided preliminary design services commensurate with the expanded scope requested by the Owner, and

WHEREAS, the Contract provides for the adjustment of the Project Development Fees and payment therefore in the section entitled "Payments",

NOW, THEREFORE, in consideration of the mutual promises contained herein and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties agree that the Contract is hereby amended as follows:

1. **Replace.** The table set forth in the section entitled "Project Development Fee" is replaced in its entirety with the following table. This revision is based on increasing the estimated construction cost from $1,060,121 (as stated in the original proposal) to $2,077,682 (as stated in the CEA).

	Project Development Fee	Net Fee	Total Fee	
Comprehensive Energy Audit	$0.00	$0.00	$0.00	
Design and Specifications	$145,437.74	$0.00	$145,437.74	(7%)
Project Management and Administration	$41,553.64	$41,553.64	$83,107.28	(4%)
Cost of Risk (Guarantees)	$0.00	$41,553.64	$41,553.64	(2%)
Construction Management	$0.00	$124,660.92	$124,660.92	(6%)
Hazardous Waste Administration	$0.00	$20,776.82	$20,776.82	(1%)
Profit	$0.00	$41,553.64	$41,553.64	(2%)
Training	$0.00	$20,776.82	$20,776.82	(1%)
Post Commissioning M&V	$0.00	$20,776.82	$20,776.82	(1%)
	$186,991.38	$311,652.30	$498,643.68	(24%)

(continued on next page)

AMENDMENT 1 TO PROJECT DEVELOPMENT LETTER AGREEMENT

Full Force and Effect. Except to the extent expressly provided for in this Amendment, the terms and conditions of the Contract shall remain in full force and effect.

Wendel

Signature

Scott F. Smith
Printed Name

General Manager
Title

Date

Owner

Signature

Edward J. Ritter
Printed Name

Clerk-Treasurer
Title

November 7, 2007
Date

Acknowledgement taken in New York State

State of New York, County of _____, ss:

On the _____ day of _____, in the year 200__, before me, the undersigned, personally appeared

_____

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s) or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public

Acknowledgement taken in New York State

State of New York, County of Westchester, ss:

On the 7 day of Nov., in the year 2007, before me, the undersigned, personally appeared

Edward J. Ritter

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s) or the person upon behalf of which the individual(s) acted, executed the instrument.

Ida A. DiBianco
Notary Public

Ida A DiBianco
Notary Public State Of New York
No. 01DI5062348
Qualified In Westchester County
Commission Expires 6/24/2010

AMENDMENT NO. 2 TO PROJECT DEVELOPMENT LETTER AGREEMENT

This Amendment Number Two to the Project Development Letter Agreement ("Contract") between Wendel Energy Services, LLC (hereinafter "Wendel") and Village of Irvington (hereinafter "Owner"), collectively the "Parties", entered into on May 15, 2007 for design services in connection with a proposed facilities improvement project (the "Project") indicated immediately below is hereby entered into effective on the 3rd day of November, 2008.

WHEREAS, Wendel under the aforementioned Contract has conducted a Comprehensive Energy Audit ("CEA") and developed a Project Scope of Work (hereinafter the "Work:"), and

WHEREAS, Owner upon review of the CEA and proposed Project Scope of Work desires to proceed with the implementation of the Project, and has obtained the necessary approvals to proceed with Project funding efforts and subsequent Project implementation, and

WHEREAS, the parties wish to expand upon the terms and conditions under which the entirety of the Project design work will be undertaken,

NOW, THEREFORE, in consideration of the mutual promises contained herein and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties agree that the Contract is hereby amended as follows:

1. GENERAL TERMS AND CONDITIONS

The Contract attachment labeled "Letter Agreement Terms and Conditions" is hereby replaced in its entirety with the General Terms and Conditions, incorporated herein as Exhibit A by this reference made a part hereof.

2. OWNERSHIP OF DOCUMENTS

2.1 **On Final Payment for Completed Work.** Upon the making of final payment pursuant to this Contract, Owner shall receive ownership of the property rights, except for copyrights, of all documents, drawings, specifications, electronic data and information prepared, provided or procured by Wendel, its Architect/Engineer, Subcontractors and consultants and distributed to Owner under the Contract. ("Build Documents").

2.2 **On Termination by Owner for Cause.** If this PDA is terminated by Owner for cause, Owner shall receive ownership of the property rights, except for copyrights, of any Build Documents upon payment for all Work performed in accordance with the Contract, at which time Owner shall have the right to use, reproduce and make derivative works from the Build Documents to complete the Work.

2.3 **On Termination by Owner without Cause.** If a Contract is terminated pursuant to Section 20.4 of the General Terms and Conditions, Owner shall receive ownership of the property rights, except for copyrights, of the Build Documents upon payment of all sums provided in Section 20.4 of the General Terms and Conditions, at which time Owner shall have the right to use, reproduce and make derivative works from the Build Documents to complete the Work.

2.4 Owner's Use of Design-Build Documents.

2.4.1 Renovation and Remodeling of Work. Owner may use, reproduce and make derivative works from the Build Documents for subsequent renovation and remodeling of the Work.

2.4.2 Other Projects. Owner shall not use, reproduce or make derivative works from the Build Documents for other projects without the written authorization of Wendel, which authorization shall not be unreasonably withheld.

2.5 **Risk of Owner's Use of Design-Build Documents.** Owner's use of the Build Documents without Wendel's involvement or on other projects is at Owner's sole risk, except for Wendel's indemnification obligation pursuant to Section 18 of the General Terms and Conditions, and Owner shall defend, indemnify and hold harmless Wendel, its Architect/Engineer, Subcontractors and consultants, and the agents, officers, directors and employees of each of them from and

against any and all claims, damages, losses, costs and expenses, including but not limited to attorney's fees, costs and expenses incurred by them in connection with, arising out of or resulting from Owner's use of the Build Documents before or after the termination or expiration of this Contract.

2.6 **Wendel's Property Rights Obligation.** Wendel shall obtain from its Architect/Engineer, Subcontractors and consultants property rights and rights of use that correspond to the rights given by Wendel to Owner under a Contract.

3. ROYALTIES, PATENTS AND COPYRIGHTS

Wendel shall pay all royalties and license fees which may be due on the inclusion of any patented or copyrighted materials, methods or systems selected by Wendel and incorporated in the Project, Wendel shall defend, indemnify and hold Owner harmless from all suits or claims for infringement of any patent rights or copyrights arising out of such selection. Owner agrees to defend, indemnify and hold Wendel harmless from all suits or claims of infringement of any patent rights or copyrights arising out of any patented or copyrighted materials, methods or systems specified by Owner.

4. FULL FORCE AND EFFECT; REAFFIRMATION

Except to the extent expressly provided for in this Amendment, the terms and conditions of the Contract shall remain in full force and effect.

5. ADDITIONAL FEES

Additional fees for the design work associated with the removed Village Hall windows (7% of material & labor costs), and the effort required to re-bid the water meters & the lease financing and the additional project management administration for the seven (7) month delay period. The additional fees amount to $28,102.24.

AMENDMENT NO. 2 TO PROJECT DEVELOPMENT LETTER AGREEMENT

Wendel

Signature

Scott F. Smith
Printed Name

General Manager
Title

11/26/08
Date

Owner

Signature

Lawrence S. Schopfer
Printed Name

Village Administrator
Title

11/24/08
Date

Acknowledgement taken in New York State

State of New York, County of Erie, ss:

On the 26th day of November, in the year 2008, before me, the undersigned, personally appeared

SCOTT F. SMITH

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s) or the person upon behalf of which the individual(s) acted, executed the instrument.

Angela Lipinski
Notary Public

ANGELA LIPINSKI
Notary Public, State of New York
Qualified in Erie County
My Commission Expires May 15, 2010

Acknowledgement taken in New York State

State of New York, County of Westchester, ss:

On the 24 day of November, in the year 2008, before me, the undersigned, personally appeared

Lawrence S. Schopfer

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s) or the person upon behalf of which the individual(s) acted, executed the instrument.

Sarah Palermo
Notary Public

SARAH PALERMO
NOTARY PUBLIC, STATE OF NEW YORK
WESTCHESTER COUNTY
LIC # 01PA6182438
COMM. EXP. FEBRUARY 25, 2012

EXHIBIT A – GENERAL TERMS AND CONDITIONS

(See General Terms and Conditions Section)

ASSURED PERFORMANCE CONTRACT

ASSURED PERFORMANCE CONTRACT

(with Measurement and Verification Services)

This Assured Performance Contract ("Contract") is entered into effective this 3rd day of November, 2008 ("Effective Date") by and between the Village of Irvington, New York, having it's principle office at 85 Main Street, Irvington, New York 10533 ("Owner") and Wendel Energy Services, LLC, having it's principle office at 140 John James Audubon Parkway, Suite 201, Amherst, New York 14228 ("Wendel"), herein collectively referred to as the Parties

WHEREAS, Wendel, in conjunction with an energy performance project, and as may be required by available state and federal government supported energy savings incentive programs and financing options selected by Owner, can provide this Assured Performance Guarantee ("APG") for the achievement of identified future (i) energy savings (ii) energy cost avoidance, and (iii) other financial benefits, and

WHEREAS, any Assured Performance Guarantee is dependent upon Measurement and Verification Services ("M&V") to measure and evaluate the ongoing operational performance of an energy performance project, and

WHEREAS, Owner desires an Assured Performance Guarantee for that energy performance project as described in Section 1,

NOW, THEREFORE, in consideration of the mutual promises and covenants contained herein, the Parties to this Contract warrant that they have read and agree to be bound by these terms and conditions, and that the signatory below is properly authorized to extend these terms and conditions and execute this Agreement:

1. PROJECT NAME, LOCATION AND DESCRIPTION

The descriptive components of the applicable energy performance project set forth in this Section 1 shall be herein collectively referred to as the "Project".

Name: Village of Irvington, NY

Address: 85 Main Street
Irvington, New York 10533

Description: Energy efficiency and operational improvements at the Village Buildings and the Water District.

Contracts: Project Development Letter Agreement ("PDA") dated May 3, 2007, and Project Build Contract dated November 3, 2008 ("Project Build Contract"), herein collectively referred to as the "Project Documents".

2. CONTRACT DOCUMENTS

This Contract shall be deemed binding upon the Parties only after the legally authorized representatives of each have affixed their respective signatures hereto. The following documents are attached hereto and by this reference made a part hereof, ("Contract Documents")

Exhibit A	Project Scope of Work
Exhibit B	Annual Reconciliation and Savings/Revenue Allocation
Exhibit C	Stipulated Savings
Exhibit D	Responsibilities of Wendel and Owner
Exhibit E	Unit Energy Costs and Percentage Annual Increase
Exhibit F	Occupancy Schedule
Exhibit G	Calculation of Benchmark and Performance Savings
Exhibit H	Measurement and Verification Services Annual Fees
Exhibit I	Comprehensive Energy Audit

3. SCOPE OF AGREEMENT

3.1 **Performance Guarantee.** This Contract provides a performance guarantee for the Project defined in Section 1 and necessary M&V to provide to Owner annual reports of savings achieved as a result of the Measures and Improvements implemented by the Project. The M&V savings reports shall contain total energy savings for each designated unit identified therein, providing both the amount of energy saved and the cost savings relative to a baseline(s) established during the implementation of the Project.

3.2 **Appropriations.** This Contract shall be deemed executory only to the extent of the monies appropriated and available for the purpose of the Contract, and no liability on account therefore shall be incurred beyond the amount of such monies. It is understood that neither this Contract nor any representation by any public employee or officer creates any legal or moral obligation to request, appropriate or make available monies for the purpose of this Contract.

4. GUARANTEE TERM

One hundred eighty (180) months beginning on the first day of the month following the last Date of Substantial Completion ("Guarantee Term").

5. CONTRACT TERM AND TERMINATION

5.1 This Contract takes effect upon the date first indicated above and will continue for an initial term of one (1) year. It will automatically renew on a year-to-year basis after the initial term ends until the Guarantee Term expires, unless Owner or Wendel gives the other written Notice of Termination at least thirty (30) days in advance of the annual renewal date.

5.2 If for any reason Owner cancels or breaches this Contract, and with respect to such breach, Owner fails to cure the breach within ten (10) business days of receipt of written notice from Wendel identifying the breach, the Assured Performance Guarantee(s) shall automatically terminate.

6. FEES AND INVOICING

M&V fees set forth In Exhibit H will be due in advance and payable by Owner upon receipt of Wendel's annual invoice. Annual fees for services are subject to modification (i) upon annual renewal per Exhibit H, (ii) a Change in Use or Condition (see Section 9) or (iii) regulatory change (see Section 17.1). Wendel will provide Owner with forty-five (45) days advance written notice of any change in Annual Fees.

7. DEFINITIONS

7.1 **"Annual Guaranteed Savings"** means the portion of the Total Guaranteed Savings guaranteed to be achieved in any one (1) year of the Guarantee Term (see Exhibit B), calculated and adjusted as set forth in Exhibits C and G.

7.2 **"Annual Savings"** means the Measurable Savings that occur in any single Annual Savings period of the Guarantee Term, plus the Stipulated Savings deemed achieved for that annual period. Each Annual Savings period of the Guarantee Term shall commence each year on the first calendar day of the calendar month following the last Date of Substantial Completion.

7.3 **"CEA"** means Comprehensive Energy Audit (see Exhibit A).

7.4 **"Date of Substantial Completion"** means that date upon which the Project, or a definable portion there of, has been completed to such extent that energy savings and/or other benefits begin to accrue to the Owner.

7.5 **"Excess Savings"** means the amount by which the actual Annual Savings for any Annual Savings period exceeds the projected Annual Guaranteed Savings for that Annual Savings period.

7.6 **"Equipment"** means the products to be installed per the Project Documents.

7.7 **"Guarantee Term"** is as defined in Section 4.

7.8 **"Installation Period"** means the calendar period between the Effective Date of the Energy Performance Project Implementation Contract referenced in Section 1 and the first day of the month following the last Date of Substantial Completion.

7.9 **"Measures and Improvements"** means the energy conservation measures, facility improvement measures and operational efficiency improvements implemented by the Project.

7.10 **"Measurable Savings"** means the savings achieved and calculated as set forth in Exhibits C and G.

7.11 **"Performance Guarantee"** is as defined in Section 8.1.

7.12 **"Project"** is as defined in Section 1.

7.13 **"Project Documents"** is as defined in Section 1.

7.14 **"Savings"** means the energy, operational and other savings plus the additional revenues, if any, that are identified in Exhibit C and G.

7.15 **"Stipulated Savings"** means those savings that the Parties have agreed to be deemed as achieved on a Date of Substantial Completion, as set forth in Exhibit C. Wendel and Owner agree that Stipulated Savings may include, but are not limited to, future capital or operational costs avoided as a result of the implementation of the Energy Performance Project. Owner hereby acknowledges that it has evaluated sufficient information to believe that the Stipulated Savings will occur, and that Stipulated Savings will not be measured or monitored at any time during the Guarantee Term. Owner agrees and hereby acknowledges that Wendel shall not be responsible for the achievement of Stipulated Savings, as the actual realization of those savings is not within Wendel's control.

7.16 **"Total Guaranteed Savings"** means the amount of savings guaranteed to be achieved or deemed achieved during the Guarantee Term, calculated and adjusted as set forth in Exhibits C and G.

7.17 **"Total Savings"** means the amount of Measurable Savings actually achieved plus the Stipulated Savings, calculated and adjusted as set forth in Exhibit C. Total Savings include all savings achieved during the Energy Performance Project Installation Contract period as well as Annual Savings during each year of the Guarantee Term.

8. ASSURED PERFORMANCE

8.1 **Guarantee.** Wendel guarantees that Owner will during the Guarantee Term achieve the Total Guaranteed Savings set forth in Exhibit B, calculated and adjusted as set forth in Exhibit C and G ("Performance Guarantee").

8.2 **Limitations.** To the extent that the Project's Total Guaranteed Savings are dependent on the continued operation and maintenance of (i) Equipment and (ii) service components set forth in this Contract Documents, Owner agrees, to the extent permitted by law, that such specifications and standards will be maintained for the duration of this Contract, including in Owner's planning and implementation of future capital projects. Owner may choose not to maintain specifications and standards, but such choice (i) may result in a Change in Use or Condition in accordance with Section 9, or (ii) be deemed a material breach of this Contract, in which case Wendel may, at its sole discretion, choose to terminate this Contract.

9. CHANGES IN USE OR CONDITION

9.1 **Owner's Obligation.** With respect to the Project, Owner agrees to notify Wendel within fifteen (15) business days of any actual or intended changes in the use of any facility or of any other condition arising before or after the Effective Date of this Contract that reasonably could be expected to affect the amount of energy used at any facility to which this Contract applies ("Change in Use or Condition"). Such a Change in Use or Condition would include, but is not limited to, changes in the primary use of any facility; changes to the hours of operation of any facility; changes or modifications to the Project Equipment, failure of the premises to meet local building codes; changes in utility suppliers, method of utility billing, or method of utility purchasing;

improper maintenance or discontinued use of Project Equipment or of any related equipment; changes to the Project Equipment or to any facility required by changes to local building codes; or additions or deletions of energy-consuming equipment at any facility. See Exhibit D for a detailed list of Wendel and Owner responsibilities regarding the Performance Guarantee.

9.2 **Wendel's Observations.** In the event that Owner fails to provide a Notice of any Change in Use or Condition independently observed by Wendel, Wendel may make reasonable estimates as to the impact of the observed Change in Use or Condition and as to the date on which such Change in Use or Condition first arose.

9.3 **Adjustment.** Pursuant to Section 9.1 or 9.2 Wendel shall, at Owners expense, re-calculate and send to Owner a Notice of Adjustment to the Base Line or Benchmark ("Adjustment") to reflect the impact of a Change in Use or Condition, and the Adjustment shall become effective as of the date that the Change in Use or Condition first arose. A Change in Use or Condition need not be presently identified in the Base Line or Benchmark in order for Wendel to make an Adjustment.

9.4 **Owner's Approval.** The Adjustment shall be subject to the consent of the Owner, which consent shall not be unreasonably withheld, and which shall be made in accordance with the following procedure: within thirty (30) business days of Wendel's submittal of the Adjustment, Owner shall, in writing which sets forth good reason, either object to the Adjustment or request an extension of time necessary to render a decision in regard to the Adjustment. If Owner fails to provide a written response within thirty (30) business days, then the Adjustment submitted by Wendel shall be deemed accepted. If the Parties cannot reach an agreement with respect to any aspect under Section 9.3, either Party may seek relief in accordance with Section 16.

10. ANNUAL RECONCILIATION

10.1 **Measureable Savings.** The frequency and the methods of measuring Project energy savings and cost avoidance ("Measureable Savings") to be used for the measurement and reporting of Annual and Total Guaranteed Savings during the Guarantee Term, as set forth in Exhibits C and G, have been reviewed and approved by Owner. Except by mutual agreement of the Parties, no changes to the methods for calculating Measureable Savings may be made during the Guarantee Term; but if there is a Change in Use or Condition as defined in Section 9.1, Wendel may modify the methods for calculating Measureable Savings to appropriately represent the Change in Use or Condition and request an Adjustment pursuant to Section 9.3.

10.2 **Installation Period Savings and Avoidance.** Within one hundred twenty calendar (120) days after the last Date of Substantial Completion Wendel will calculate the applicable savings achieved and/or cost avoided during the Installation Period and advise Owner of the amount thereof, and such amount shall be attributable to the Project's reconciliation periods during the Guarantee Term.

10.3 **Stipulated Savings.** The Stipulated Savings set forth in Exhibit C shall be deemed achieved on the last Date of Substantial Completion.

10.4 **Savings Shortfalls.** If the Annual Savings in any single year of the Guarantee Term are less than the projected Annual Guaranteed Savings for that year, Wendel shall pay or credit Owner with the difference, as described in this Section10.4. Such payment or credit shall be the sole and exclusive remedy of Owner for any failure to achieve the projected Annual Guaranteed Savings, including any alleged breach of any other express or implied warranty of savings. Wendel may credit any Excess Savings, in whole or in part, toward the Total Guaranteed Savings in accordance with the following.

10.4.1 If the actual Annual Savings during a specific year of the Guarantee Term (plus amounts credited from the Installation Period for the first year of the Guarantee, and/or the previous year of the Guarantee Term for year 2 through the end of the Agreement), are less than the projected Annual Guaranteed Savings for that year, Wendel retains the right of offset against any monies owed to Wendel by Owner.

10.4.2 If there are any remaining amounts owed by Wendel, Wendel may (a) carry over the difference to the next year only of the Performance Contract so as to increase the Annual

Guaranteed Savings in that year or (b) at Owner's written election, pay Owner the remaining amounts.

10.4.3 Upon the mutual agreement of the Parties, Wendel may also provide additional products or services, in the value of the shortfall, at no additional costs to Owner.

10.4.4 Where shortfalls have occurred, Wendel reserves the right, subject to the approval of Owner, which shall not be unreasonably withheld, to implement additional operational improvements or conservation measures, at no cost to Owner, that will generate additional savings in future years of the Guarantee Term.

10.4.5 In addition to the other options available under this Section 10.4, Wendel may elect, if the actual Annual Savings for any measured specific facility improvement measure are less than the projected Annual Guaranteed Savings for that year, to calculate the present value of the total difference for all years of the Guarantee Term, discounted at the same rate used to calculate Owner's monthly payments under this Performance Contract (or, if no such rate, the Federal Treasury rate as published in the Federal Register then in effect) and pay or credit Owner that amount, within 90 days after the end of the annual savings year.

11. OWNER'S OBLIGATIONS AND COMMITMENTS TO WENDEL

11.1 Owner warrants that, to the best of Owner's knowledge, all Equipment is in good working condition and Owner has provided Wendel with all information of which Owner is aware concerning the condition of the Equipment.

11.2 Owner acknowledges that its failure to meet the obligations below will relieve Wendel of any responsibility for providing complete annual M&V reports in a timely manner. Owner agrees that, during the term of this Agreement, Owner will:

11.2.1 operate and maintain the Equipment according to the manufacturer's recommendations;

11.2.2 keep accurate and current work logs and information on the Equipment as recommended by the manufacturer;

11.2.3 provide an adequate environment for Equipment as recommended by the manufacturer or as recommended by Wendel, including but not limited to adequate space, electrical power, air conditioning, and humidity control;

11.2.4 notify Wendel immediately of any Equipment malfunction, breakdown, or other condition affecting the operation of the Equipment;

11.2.5 allow Wendel to start and stop, periodically turn off, or otherwise change or temporarily suspend equipment operations so that Wendel can perform the M&V services required under this Contract;

11.2.6 provide proper water treatment, as necessary, for the proper functioning of Covered Equipment, if such services are not Wendel's responsibility under this Agreement.

11.2.7 provide trend logs and other operating data collected by any utilized energy management system as may be required to complete the annual savings reports.

12. ACCESS

Owner will provide Wendel full access to all Equipment, supporting or related equipment, energy management systems, etc. that may have an affect on the energy savings capabilities of the Project Equipment. If access cannot be provided, Wendel's duties and guarantee obligations and liabilities under this Contract will be suspended until such access is provided. Matters necessitating Wendel's access to the equipment may include, but are not limited to, the removal, replacement, repair, refinishing, restoration, reconstruction, or other remedial actions taken by Owner with respect to Equipment, other equipment or Owner's facility. Suspension of applicable Wendel contractual obligations under this Section 12 for Owner's denial of access will not cancel or suspend any of Owner's contractual obligations under this Contract.

13. ASBESTOS AND HAZAROUS WASTE

13.1 Wendel's M&V services under this Contract exclude anything connected or associated with asbestos or hazardous materials that was not specifically set forth in the Project Documents. Wendel shall not be required to perform any identification, abatement, cleanup, control, or removal of asbestos or hazardous material other than as specifically set forth in the Project Documents. Should Wendel become aware of or suspect the presence of asbestos or hazardous materials, Wendel shall have the right to stop work in the affected area immediately and notify the Owner. The Owner will be responsible for doing whatever is necessary to correct the condition in accordance with all applicable statutes and regulations. The Owner agrees to assume responsibility for any claims arising out of or relating to the presence of asbestos or hazardous materials in the Owner's facilities, except to the extent such claims arise out of or relate to Wendel's negligence.

13.2 Hazardous wastes remain the property and the responsibility of Owner even when removed from equipment or replaced by Wendel as may be provided by the terms of this Agreement. Owner shall be responsible for the proper storage and disposal of hazardous wastes. This includes, but is not limited to, used oil, contaminated or uncontaminated refrigerant, and PCBs.

14. INDEMNITY

Wendel and Owner agree to indemnify and hold each other harmless from any and all claims, actions, costs, expenses, damages and liabilities, including reasonable attorney fees resulting from bodily injury or damage to property of others, arising out of, connected with or resulting from the negligent acts or omissions, or willful misconduct of their or their subcontractors respective officers, members, employees or other agents in connection with their activities within the scope of this Agreement. However, neither Party shall indemnify the other against claims, actions, costs, expenses, damages or liabilities resulting from the negligent acts or omissions, or willful misconduct, of the other Party. If the Parties are both at fault, then the obligation to indemnify shall be proportional to fault. The duty to indemnify will continue in full force and effect notwithstanding the expiration or early termination of this Agreement with respect to any claims based on facts or conditions which occurred prior to termination. The indemnification obligations set forth in this Section 14 shall survive the termination this Agreement and any contract entered into pursuant to its terms and conditions.

15. LIMITATION ON LIABILITIES

15.1 EXCEPTING INDEMNIFICATION OBLIGATIONS FOR THIRD PARTY CLAIMS SET FORTH IN SECTION 14, NEITHER WENDEL NOR OWNER WILL BE RESPONSIBLE OR LIABLE TO THE OTHER FOR ANY SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES FOR ANY OCCURENCE, HAPPENING, EVENT, INCIDENT, EPISODE OR CIRCUMSTANCE ARISING OUT OF OR RELATED TO THIS AGREEMENT.

15.2 WENDEL ACCEPTS NO LIABILITY FOR ANY SITUATION, DAMAGE, MALFUNCTION, EQUIPMENT OR SYSTEMS ARISING FROM OR RELATED TO OWNER'S OR OTHER PARTIES (I) IMPROPER USE OR MISUSE OF EQUIPMENT OR SYSTEMS, (II) ENTRY OF EQUIPMENT OR SYSTEMS DATA OR (III) THE GENERATION OF DATABASES THAT MAY BE REQUIRED BY THE EQUIPMENT OR SYSTEMS.

15.3 IF THIS AGREEMENT COVERS FIRE SAFETY OR SECURITY EQUIPMENT, OWNER UNDERSTANDS THAT WENDEL IS NOT AN INSURER REGARDING SUCH SERVICES. WENDEL SHALL NOT BE RESPONSIBLE NOR LIABLE FOR ANY DAMAGE OR LOSS THAT MAY RESULT FROM FIRE SAFETY OR SECURITY EQUIPMENT THAT FAILS TO PERFORM PROPERLY OR FAILS TO PREVENT A CASUALTY LOSS.

15.4 WENDEL IS NOT RESPONSIBLE NOR LIABLE FOR ANY INJURY, LOSS, OR DAMAGE CAUSED BY EQUIPMENT THAT IS NOT COVERED EQUIPMENT.

15.5 IN THE ABSENCE OF A PARTY'S INTENTIONAL MISCONDUCT OR NEGLIGENCE, A PARTY WILL NOT BE RESPONSIBLE TO THE OTHER PARTY FOR DAMAGES, LOSS, INJURY, OR DELAY CAUSED BY CONDITIONS THAT ARE BEYOND THAT PARTY'S REASONABLE

CONTROL. SUCH CONDITIONS INCLUDE, BUT ARE NOT LIMITED TO, ACTS OF GOD, ACTS OF GOVERNMENT AGENCIES, STRIKES, LABOR DISPUTES, FIRE, EXPLOSIONS, THEFTS, VANDALISM, RIOTS, TERRORISM, WAR, OR UNAVAILABILITY OF PARTS, MATERIALS OR SUPPLIES.

15.6 THE PROVISIONS OF THIS SECTION 15 SHALL GOVERN IN THE EVENT OF THE TERMINATION OF THIS AGREEMENT AND SHALL SURVIVE SUCH TERMINATION.

16. DISPUTE RESOLUTION

16.1 **Direct Discussions.** If a dispute between the Parties arises out of or relates to this Contract or a breach thereof, the Parties shall endeavor to settle the dispute first through direct discussions.

16.2 **Non-Binding Mediation.** If the dispute cannot be settled through direct discussions, the Parties shall endeavor to settle the dispute by informal, nonbinding mediation. The location of the mediation proceedings shall be the location of the Project.

16.3 **Administration.** Once a Party serves a Notice of Request for Mediation with the other Party, the Parties agree to immediately commence and conclude such mediation within sixty (60) days of the service of the Notice of Request for Mediation. Either Party may terminate the mediation at any time after the first session, but the decision to terminate must be delivered in person by the terminating Party's representative to the other Party's representative and the mediator.

16.4 **Costs.** Each Party shall bear its own expenses and an equal share of the expenses of a mediator and any mediation fees.

16.5 **Other Remedies.** If a dispute is not resolved by mediation, the Parties shall have the right to resort to any remedies permitted by law. Defenses based on the passage of time are suspended for the subject matter of the dispute upon submitting a dispute to the mediator and during the mediation, and the time period during the mediation shall be disregarded in calculating such defenses. Nothing in this clause shall be construed to preclude any Party from seeking injunctive relief in order to protect its rights during mediation. A request by a Party to a court for injunctive relief shall not be deemed a waiver of the obligation to mediate.

16.6 **Multi-Party Proceeding.** The Parties agree that all Parties necessary to resolve a claim shall be Parties to the same dispute resolution proceeding. Appropriate provisions shall be included in all other contracts relating to the Work to provide for the consolidation of such dispute resolution proceedings.

17. MISCELLANEOUS

17.1 **Regulatory Changes.** Should any changes to relevant regulations, laws or codes substantially affect Wendel's services or obligations under this Contract, Owner agrees to negotiate with Wendel for appropriate changes to the scope and/or price of services provided hereunder, and Wendel reserves the right to terminate this Contract if the Parties cannot agree.

17.2 **Wendel Employees.** Owner acknowledges that Wendel's employees are a valuable asset to Wendel and agrees not to solicit for the purpose of employment any Wendel employee at any time during such employee's performance of services for Owner and for twelve (12) months thereafter.

17.3 **Wendel Equipment.** Wendel may provide tools, documentation, panels, or other control equipment in support of the services being provided at Owner facilities. All such items shall remain Wendel's property, and Wendel retains the right of access to Owner facilities for the removal such items at any time during or after the termination of this Contract.

17.4 **Notice.** Any Notice that is required to be given under this Contract must be in writing and sent return receipt requested to the party at the address noted at the beginning of this Contract.

17.5 **Purchase Orders.** Owner acknowledges and agrees that any purchase order issued by Owner, in accordance with this Contract, is intended only to establish payment authority for Owner's internal accounting purposes. No purchase order shall be considered to be a counteroffer,

amendment, modification, or otherwise revise the terms of this Contract. No term or condition included in the Owner's purchase order will have any force or effect.

17.6 **Force Majeure.** In the absence of a Party's intentional misconduct or negligence, a Party will not be responsible to the other Party for damages, loss, injury, or delay caused by conditions that are beyond that Party's reasonable control. Such conditions include, but are not limited to, acts of God, acts of government agencies, strikes, labor disputes, fire, explosions, thefts, vandalism, riots, terrorism, war, or unavailability of parts, materials or supplies.

17.7 **Joint and Several Liability.** If there is more than one Owner named in this Agreement, the liability of each shall be joint and several.

17.8 **Assignment.** Neither Party shall assign its interest in this Agreement without the written consent of the other. The terms and conditions of this Agreement shall be binding upon both parties, their partners, successors, assigns and legal representatives.

17.9 **Costs.** If any formal mediation or arbitration dispute resolution process or action at law or in equity is necessary to enforce or interpret this Agreement between the Parties, the prevailing Party shall be entitled to reasonable arbitrator and/or attorneys' fees, administrative and/or legal costs, and necessary disbursements, in addition to any other relief to which it may be entitled.

17.10 **Independent Contractor.** Wendel, in accordance with its status as an independent contractor, covenants and agrees that it will conduct itself consistent with such status, that it will neither hold itself out as, nor claim to be, an officer or employee of the Owner by reason hereof, and that it will not, by reason hereof, make any claim to or application for any right or privilege applicable to an officer or employee of the Owner, including, but nor limited to Worker's Compensation coverage, Unemployment Insurance Benefits, Social Security coverage or Retirement Membership or credit.

17.11 **Severability.** If any provision of this Agreement is held to be illegal, unenforceable or void, then the Parties will be relieved of obligations arising under such provision, but only to the extent that such provision is illegal, unenforceable or void, it being the intent and agreement of the Parties that the provision, as applicable, will be deemed amended by modifying such provision to the extent necessary to make it legal and enforceable while preserving its intent or, if that is not possible, by substituting therefore another provision which is legal and enforceable and achieves the required objectives of the Parties.

17.12 **No Waiver of Performance.** The failure of either party to insist, in any one or more instances, on the performance of any of the terms, covenants or conditions of this Agreement, or to exercise any of its rights, shall not be construed as a waiver or relinquishment of such term, covenant, condition or right with respect to further performance.

17.13 **Governing Law.** This Agreement shall be governed by the laws of the State of New York.

17.14 **Entire Agreement.** This Agreement is the full Agreement between Wendel and Owner as of the date it is signed. All previous conversations, correspondence, agreements, or representations related to this Agreement are not part of this Agreement between Wendel and Owner and are superseded by this Agreement. No modifications to this Agreement are binding on Owner or Wendel unless made in writing and signed by the Parties.

Assured Performance Contract

Wendel

Signature

Scott F. Smith
Printed Name

General Manager
Title

11/26/08
Date

Owner

Signature

Lawrence S. Schopfer
Printed Name

Village Administrator
Title

11/24/08
Date

Acknowledgement taken in New York State

State of New York, County of Erie, ss:

On the 26th day of November, in the year 2008, before me, the undersigned, personally appeared

Scott F. Smith

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s) or the person upon behalf of which the individual(s) acted, executed the instrument.

Angela Lipinski
Notary Public

ANGELA LIPINSKI
Notary Public, State of New York
Qualified in Erie County
My Commission Expires May 15, 2010

Acknowledgement taken in New York State

State of New York, County of Westchester, ss:

On the 24 day of November, in the year 2008, before me, the undersigned, personally appeared

Lawrence S. Schopfer

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s) or the person upon behalf of which the individual(s) acted, executed the instrument.

Sarah Palermo
Notary Public

SARAH PALERMO
NOTARY PUBLIC, STATE OF NEW YORK
WESTCHESTER COUNTY
LIC # 01PA6182438
COMM. EXP. FEBRUARY 25, 2012

PERFORMANCE CONTRACT
EXHIBIT A

ASSURED PERFORMANCE CONTRACT
EXHIBIT A – PROJECT SCOPE OF WORK

1. TOTAL PROJECT SUMMARY

1.1 See attached to this Schedule, the Total Project Summaries (Villages Building and Water District) dated August 25, 2008 (the "Summaries")

1.2 It is understood by and between Wendel and Owner that the Summaries set forth a list of various energy conservation measures, facility improvement measures and operational efficiency improvements (collectively the "Measures and Improvements"), which will result in energy savings, increased revenues or allow the Owner to avoid future capital or operation costs. The parties further agree that the pricing and scope of work set forth in the Summaries, is only an estimate, and, at the time of the execution of this Assured Performance Contract, Wendel is in the process of procuring final pricing and that the scope of work may be modified due to the Owner, Wendel or regulatory agency requests.

1.3 **Project Modifications.** The parties agree that at the time of the execution of this Assured Performance Contract, (i) Wendel is in the process of procuring final pricing for the Project set forth in the Project Development Letter Agreement and (ii) that the Project Scope of Work may be subject to modification through Project Build Contract change orders at the request of Owner, Wendel or regulatory and/or funding entities having jurisdiction. Subsequently, the parties agree that at the time of Contract signing the Project price and scope of work set forth in the Exhibits attached hereto and summarized in the Total Project Summary (Exhibit A, Attachment 1 & 2) is a reasonable estimate subject to potential reassessment and modification due to subsequent changes in the Project. When the Project price and scope of work has been finalized, Wendel will timely provide Owner with updated versions of the attached Exhibits to reflect the final Project.

1.4 Once the final pricing and scope of work is determined, Wendel will provide Owner with the final pricing and scope of work for all those Measures and Improvements for which the final pricing is in accord with the estimates provided by Wendel. Based on the foregoing, it is agreed by the parties that within fifteen (15) days of Wendel providing Owner with the final pricing and scope of work described in this Exhibit A, Owner shall provide Wendel with its final project selection, which shall include all of the Measures and Improvements for which the final pricing is in accord with the estimates provided by Wendel. Thereafter, the parties will undertake good faith efforts to supplement this Contract within thirty (30) days by written modification, and thereby incorporate any changes to (1) the Project Scope of Work

2. SUMMARY OF MEASURES AND IMPROVEMENTS

The following summarizes the Measures and Improvements applicable to the Project set forth in Section 1 of this Contract. A detailed description of the Measures and Improvements can be found in the Project Documents.

FIM-1: High Efficency Lighting & Lighting Controls

The general measure involves upgrading the lighting in the Village Hall, Senior Center, Firehouse, Library, Pump House, Recreation Center, Department of Public Works (DPW) Complex. The proposed lighting upgrade focuses on optimizing the current lighting design by replacing and retrofitting lighting fixtures and installing lighting control sensors in various Village and Waster District buildings. The design will focus on reducing the electrical energy consumption of the overall lighting system while providing an aesthetically pleasing lighting plan that will improve the working environment of the occupants. The proposed design will follow industry standard guidelines to ensure that proper lighting levels are maintained while maximizing the energy efficiency of the proposed lighting system. Where applicable, occupancy sensors will be installed to further reduce lighting energy consumption in unoccupied areas.

FIM-2: Direct Digital Control System

This measure involves the installation of programmable digital thermostats (i.e. local control) in the Village Hall, Recreation Center, Fire House, and Senior Center, and centralized Direct Digital Control (DDC) system in the Library.

FIM-3: Boiler Replacement

This measure recommends the removal of the existing oil-fired, hot water boilers and installation of new high efficiency cast iron units at the Recreation Center, Village Hall, Fire House and Pump House. The new boilers will be tied into the existing hot water supply and return headers, and will provide hot water to the building perimeter convectors. The boilers will be connected to existing breechings. The boilers at the Village Hall and Fire House will be equipped with dual fuel burners, however gas service will not be provided as part of this scope.

FIM-4: Window Replacement

The measure will address the window replacements at the Recreation Center and the Fire House. The proposed windows will be thermally-broken with high performance glass.

FIM-5: Roof Replacement

This measure recommends replacement of the roof at the Fire House. The proposed system would be a fully-adhered, membrane roof made of fiber-reinforced, EPDM membrane. The EPDM sheets will be fully-adhered to the substrate with a special bonding adhesive and overlapped along the seams to provide a watertight seal. The system would be light weight – less than two pounds per square foot and will provide additional insulation (Minimum average R-value of 24) to enhance the energy performance of the facility.

FIM-6: Street Lighting

The proposed measure will include an upgrade to all remaining inefficient fixtures and an updated inventory for all street lighting throughout the Village to reflect the as-built condition of each fixture. All remaining Mercury Vapor fixtures that have not been replaced with high efficiency HPS lamps and ballasts will be identified and upgraded accordingly. Upon completion of all remaining fixture upgrades, Wendel will prepare an accurate as-built inventory and submit to NYPA for review and approval.. The Village's monthly rate would be adjusted to reflect the correct billing, resulting in full realization of the energy savings.

FIM-7: Building Envelope Improvements

This measure will include Building Envelope Improvements at the DPW Complex, Village Hall, the Recreation Center, Senior Center, Library, Fire House and Water District Pump House. This measure will utilize commercial grade door sweeps and weather stripping to help decrease existing infiltration rates. The sweep units will be constructed from a vinyl strip that will not corrode or conduct temperatures like aluminum door sweeps. Weather-stripping around exterior doors and door jambs will also be installed to minimize the infiltration rate to the building.

The measure will also address the sealing of pipe and ductwork penetrations, roof/wall joints, passive vents, and the perimeter of rooftop ventilators.

FIM-8: Water Meter Replacements

It is proposed to replace each existing water meter with both a new water meter and radio transmitter. This includes all residential and commercial water meters in the Village. The new Automatic Meter Reading (AMR) system will include all software, hardware, and training necessary for a complete installation. In addition, the Village's current billing system software will be upgraded to interface with the meter reading software.

FIM-9: Pump Station Upgrades

This measure will include an upgrade of the existing Ardsley and Astor Street pump stations with new pumps, new controls, and dialer alarms. The project will also include the rebuilding of both pumps at each location to be used as a spare backup pumps.

FIM-10: Steel Water Tank Rehabilitation

The tank rehabilitation will consist of: removing the tank from service, sandblasting the interior and exterior down to bare metal to completely remove old coatings, pit filling, seam weld repair, and installation of new frost-proof vent. The tank will then be recoated on interior and exterior surfaces with a three coat part epoxy coating manufactured for use in coating water tanks. There are no savings associated with this measure.

FIM-11: PRV Replacement

This measure includes the replacement of the existing PRV valves at Ardsley Avenue West and Station Road. There are no savings associated with this measure.

FIM-12: Packaged Engine Generators

This measure includes the installation of packaged engine generators at the Ardsley and Astor Street pump stations. There are no savings associated with this measure.

ASSURED PERFORMANCE CONTRACT
EXHIBIT A – PROJECT SCOPE OF WORK

Attachment 1 – Total Project Summary Village Buildings

(Refer to Total Project Summary Table on the Next Page)

Village of Irvington
Table 1-1a: Total Project Summary
August 25, 2008
Village Buildings
Comprehensive Energy Audit (CEA)

Measure No.	FACILITY	FACILITY IMPROVEMENT MEASURE	TOTAL MEASURE COST	ANNUAL ELECTRIC SAVINGS (kWh)	ANNUAL DEMAND SAVINGS (kW)	ANNUAL FUEL SAVINGS (mmBtu)	ANNUAL OPERATING SAVINGS	ANNUAL ENERGY SAVINGS	TOTAL ANNUAL SAVINGS	SIMPLE PAYBACK
1a	DPW Complex	High Efficiency Lighting & Lighting Controls	$15,382	6,491	31.8	-6	$47	$777	$823	18.7
1b	Recreation Center	High Efficiency Lighting & Lighting Controls	$8,227	6,815	34.9	-6	$39	$849	$888	9.3
1c	Fire House	High Efficiency Lighting & Lighting Controls	$11,708	11,076	40.3	-9	$38	$1,102	$1,140	10.3
1d	Library	High Efficiency Lighting & Lighting Controls	$3,912	2,780	7.5	-2	-$23	$225	$201	19.4
1e	Senior Center	High Efficiency Lighting & Lighting Controls	$5,214	982	3.2	-1	-$4	$91	$87	60.0
1f	Village Hall	High Efficiency Lighting & Lighting Controls	$28,528	26,469	114.4	-23	$257	$2,951	$3,209	8.9
2a	Village Hall	Direct Digital Control System	$3,710	0	0.0	50	$0	$1,176	$1,176	3.2
2b	Recreation Center	Direct Digital Control System	$2,482	0	0.0	29	$0	$427	$427	5.8
2c	Fire House	Direct Digital Control System	$2,482	0	0.0	47	$0	$650	$650	3.8
2d	Library	Direct Digital Control System	$99,095	110,163	0.0	187	$1,300	$8,749	$10,049	9.9
2e	Senior Center	Direct Digital Control System	$3,710	0	0.0	25	$0	$379	$379	9.8
3a	Recreation Center	Boiler Replacement	$27,211	0	0.0	45	$320	$670	$990	27.5
3b	Village Hall	Boiler Replacement	$45,838	0	0.0	99	$320	$1,399	$1,719	26.7
3c	Fire House	Boiler Replacement	$41,709	0	0.0	105	$320	$1,450	$1,770	23.6
4b	Fire House	Window Replacement	$144,760	6,100	9.2	181	$0	$2,909	$2,909	49.8
4c	Recreation Center	Window Replacement	$210,907	2,743	5.4	80	$0	$1,387	$1,387	152.1
5	Fire House	Roof Replacement	$92,367	0	0.0	97	$1,050	$1,348	$2,398	38.5
6	Village Streets	Street Lighting	$12,726	100,774	0.0	0	$0	$15,217	$15,217	0.8
7a	DPW Complex	Building Envelope Improvements	$13,648	0	0.0	166	$0	$1,722	$1,722	7.2
7b	Village Hall	Building Envelope Improvements	$3,042	0	0.0	69	$0	$734	$734	4.1
7c	Recreation Center	Building Envelope Improvements	$491	0	0.0	5	$0	$58	$58	8.4
7d	Senior Center	Building Envelope Improvements	$1,432	0	0.0	16	$0	$181	$181	7.9
7e	Library	Building Envelope Improvements	$982	0	0.0	11	$0	$130	$130	7.5
7f	Fire House	Building Envelope Improvements	$6,040	0	0.0	85	$0	$885	$885	6.8
Add-Fee	Contract	Additional Fees	$8,661	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		PROGRAM TOTALS - Recommended Measures	$794,263	274,393	246.7	1,251	$3,663	$45,465	$49,128	16.2

Village of Irvington
Table 1-2a: Total Project Summary
August 25, 2008
Water District
Comprehensive Energy Audit (CEA)

Measure No.	FACILITY	FACILITY IMPROVEMENT MEASURE	TOTAL MEASURE COST	ANNUAL ELECTRIC SAVINGS (kWh)	ANNUAL DEMAND SAVINGS (kW)	ANNUAL FUEL SAVINGS (mmBtu)	ANNUAL OPERATING SAVINGS	ANNUAL ENERGY SAVINGS	TOTAL ANNUAL SAVINGS	SIMPLE PAYBACK
1g	Pump House	High Efficiency Lighting & Lighting Controls	$7,841	2,904	32.5	-2	$7	$514	$522	15.0
3d	Pump House	Boiler Replacement	$31,964	0	0.0	44	$320	$661	$981	32.6
7g	Pump House	Building Envelope Improvements	$10,447	0	0.0	169	$0	$1,878	$1,878	5.6
8	Water District	Water Meter Replacement	$962,756	0	0.0	0	$161,046	$0	$161,046	6.0
9	Water District	Pump Station Upgrades	$140,626	0	0.0	0	$0	$0	$0	N/A
10	Water District	Steel Water Tank Rehabilitation	$409,132	0	0.0	0	$0	$0	$0	N/A
11	Water District	PRV Replacement	$29,900	0	0.0	0	$0	$0	$0	N/A
12	Water District	Packaged Engine Generators	$167,115	0	0.0	0	$0	$0	$0	N/A
Add-Fee	Contract	Additional Fees	$19,442	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		PROGRAM TOTALS - Recommended Measures	$1,779,221	2,904	32.5	210	$161,374	$3,053	$164,427	10.8

Attachment 2 – Total Project Summary Water District

(Refer to Total Project Summary Table on the Next Page)

PERFORMANCE CONTRACT
EXHIBIT B

ASSURED PERFORMANCE CONTRACT
EXHIBIT B - ANNUAL RECONCILIATION AND SAVINGS/REVENUE ALLOCATION

Village Buildings

Year	Measurable Energy Savings	Stipulated Energy Savings	Stipulated O&M Savings	Guaranteed Savings	Cumulative Savings
1	$9,514	$35,951	$3,663	$49,128	$49,128
2	$9,685	$36,598	$3,773	$50,057	$99,185
3	$9,865	$37,277	$3,887	$51,029	$150,214
4	$10,054	$37,991	$4,003	$52,048	$202,262
5	$10,252	$38,740	$4,123	$53,115	$255,377
6	$10,460	$39,527	$4,247	$54,234	$309,611
7	$10,679	$40,352	$4,374	$55,406	$365,017
8	$10,908	$41,220	$4,506	$56,634	$421,650
9	$11,149	$42,130	$4,641	$57,920	$479,570
10	$11,402	$43,086	$4,780	$59,269	$538,829
11	$12,886	$48,692	$4,923	$66,051	$605,340
12	$13,165	$49,746	$5,071	$67,982	$673,322
13	$13,458	$50,853	$5,223	$69,534	$742,855
14	$13,765	$52,015	$5,380	$71,160	$814,015
15	$14,088	$53,235	$5,541	$72,865	$886,880
Total	$171,331	$647,413	$68,136	$886,880	N/A

Assured Performance Contract
EXHIBIT B - ANNUAL RECONCILIATION AND SAVINGS/REVENUE ALLOCATION

Water District

Year	Measurable Energy Savings	Stipulated Energy Savings	Measur-able O & M Savings	Stipulated O&M Savings	Guaranteed Savings	Cumulative Savings
1	$1,176	$1,878	$161,046	$327	$164,427	$164,427
2	$1,912	$1,196	$165,877	$337	$169,323	$333,750
3	$1,947	$1,219	$170,854	$348	$174,367	$508,117
4	$1,985	$1,242	$175,979	$358	$179,564	$687,681
5	$2,024	$1,266	$181,259	$369	$184,918	$872,599
6	$2,065	$1,292	$186,696	$380	$190,433	$1,063,032
7	$2,108	$1,319	$192,297	$391	$196,116	$1,259,147
8	$2,153	$1,347	$198,066	$403	$201,970	$1,461,117
9	$2,201	$1,377	$204,008	$415	$208,001	$1,669,119
10	$2,251	$1,408	$210,129	$428	$214,215	$1,883,334
11	$2,544	$1,592	$216,432	$440	$221,008	$2,104,342
12	$2,599	$1,626	$222,925	$454	$227,604	$2,331,946
13	$2,656	$1,662	$229,613	$467	$234,399	$2,566,345
14	$2,717	$1,700	$236,501	$481	$241,400	$2,807,745
15	$2,781	$1,740	$243,597	$496	$248,613	$3,056,358
Total	$33,117	$21,866	$2,995,281	$6,094	$3,056,358	N/A

PERFORMANCE CONTRACT
EXHIBIT C

ASSURED PERFORMANCE CONTRACT
EXHIBIT C – STIPULATED SAVINGS

The savings identified below shall be Stipulated Savings under this Exhibit. Stipulated Savings are mutually agreed upon by the Owner and Wendel as set forth below to be achieved upon execution of the applicable Certificate of Substantial Completion and shall not be measured or monitored during the Term. The effort to measure and verify these savings would be cost prohibitive. Refer to the Comprehensive Energy Audit for the detailed calculations used to estimate these savings. The Stipulated Savings shall be deemed to increase during each year of the Term by the escalation percentages set forth below.

Years 2009 through 2024

Source of Savings	First Year Savings	Escalation
Direct Digital Control System	$11,381	See Note 1
Window Replacement	$4,296	See Note 1
Roof Replacement	$1,348	See Note 1
Street Lighting	$15,217	See Note 1
Building Envelope Improvements	$5,588	See Note 1
O & M Savings	$3,990	3%
TOTAL STIPULATED SAVINGS	**$41,820**	**N/A**

Note 1: Energy unit costs are escalated per the schedule outlined in Exhibit E.

Stipulated Savings Description

Direct Digital Control System

This measure focuses on improving the efficiency of the HVAC equipment in the Village Hall Buildings by installing digital programmable thermostats in the Village Hall, Recreation Center, Fire House, and Senior Center, and by implementing a central DDC system in the Library. The new thermostats will be utilized to implement a set-back strategy. The existing local controllers at the Library will be replaced and will be integrated into a centralized DDC system. Additionally, AHUs 1, 2, 3, and 4 will have VFDs installed on the supply and return fan motors and the existing temperature based economizer will be upgraded to one based on enthalpy. This new control scenario will result in reduced energy usage in terms of cooling and heating for the Library.

	Savings($)	Units
• Village Hall	$1,176	50 mmBtu
• Recreation Center	$427	29 mmBtu
• Fire House	$650	47 mmBtu
• Library	$8,749	187 mmBtu & 110,163 kWh
• Senior Center	$379	25 mmBtu
NET TOTAL	$11,381	

Assured Performance Contract
EXHIBIT C – STIPULATED SAVINGS

Window Replacement

This measure recommends the replacement of the windows at the Fire House and the Recreation Center. The proposed windows will be thermally-broken frame windows with high performance glass. The new window configurations will be comprised of a combination of double-hung and fixed windows, and will be furnished with heavy duty hardware. This measure will reduce the heat loss of the building through conduction and infiltration, thereby, enhancing the thermal performance of these facilities.

	Savings($)	Units
• Fire House	$2,909	181 mmBtu & 6,100 kWh
• Recreation Center	$1,387	80 mmBtu & 2,743 kWh
NET TOTAL	$4,296	

Roof Replacement

This measure recommends the replacement of the existing roof on the Fire House. The new roof will be an EPDM membrane roof. The EPDM sheets will be fully-adhered to the substrate with a special bonding adhesive and overlapped along the seams to provide a watertight seal. The system would be light weight, i.e. less than two pounds per square foot. The new roof will also have a minimum R-Value of 24, providing additional energy savings over the existing roof material.

	Savings($)	Units
• Fire House	$1,348	97 mmBtu
NET TOTAL	$1,348	

Street Lighting

The proposed measure will include an upgrade to all remaining inefficient fixtures and an updated inventory for all street lighting throughout the Village to reflect the as-built configuration of each fixture. All remaining Mercury Vapor fixtures that have not been replaced with high efficiency HPS lamps and ballasts will be identified and upgraded accordingly. Upon completion of all remaining fixture upgrades, Wendel will prepare an accurate as-built inventory and submit to NYPA for review and approval. Wendel will coordinate all inspections required by NYPA and insure that the billing rate is appropriately charged. The Village's monthly rate would be adjusted to reflect the correct billing, resulting in full realization of the energy savings.

	Savings($)	Units
• Street Lighting	$15,217	100,774 kWh
NET TOTAL	$15,217	

Building Envelope Upgrades

The Village Buildings and Water District Pump House were evaluated for building envelope improvements and areas allowing excess amount of outdoor air infiltration were documented. The doorways and roof top ventilators at several buildings were found to allow excessive air infiltration resulting in increased energy costs to condition this air, as well as reduced occupant comfort. Replacing the weather stripping around exterior doors, and resealing the perimeters will reduce infiltration of excess outdoor air. Improvements to the building envelope will result in energy savings through this reduction of excess outdoor air that requires heating and cooling. This measure addresses the following seven (7) buildings:

	Savings($)	Units
• DPW Complex	$1,722	166 mmBtu

Assured Performance Contract
EXHIBIT C – STIPULATED SAVINGS

• Village Hall	$734	69 mmBtu
• Recreation Center	$58	5 mmBtu
• Senior Center	$181	16 mmBtu
• Library	$130	11 mmBtu
• Fire House	$885	85 mmBtu
• Pump House	$1,878	169 mmBtu
NET TOTAL	$5,588	

Operation and Maintenance Savings

The following annual savings were agreed upon by the Village and Wendel.

	Savings($)
High Efficiency Lighting & Lighting Controls	$360

- Reduction in the number of lamps and ballasts replaced annually and the prolonged life associated with fluorescent lamps.

	Savings($)
Direct Digital Control System	$1,300

- The Operation and Maintenance savings associated with the Direct Digital Control system will result in the HVAC systems being run more efficiently thereby extending the life of the equipment and will eliminate costly maintenance and service visits

	Savings($)
Boiler Replacement	$1,280

- Operational and maintenance gains associated with the reduction in annual boiler repair work.

	Savings($)
Roof Replacement	$1,050

- Operational and maintenance gains associated with the roof replacement is associated with the reduction on maintenance the existing roof which requires patching and repair work.

PERFORMANCE CONTRACT
EXHIBIT D

ASSURED PERFORMANCE CONTRACT
EXHIBIT D – RESPONSIBILITIES OF WENDEL AND OWNER

This Exhibit details the individual responsibilities of Wendel and Owner not otherwise set forth in this Contract, in connection with the management and administration of the Assured Performance Guarantee.

WENDEL ENERGY SERVICES (Wendel)

Wendel will be responsible for performance management and consultation as described in this Assured Performance Contract.

OWNER

Owner is responsible for maintaining related equipment in proper operation condition.

Owner is responsible for replacing any Equipment installed in this contract not covered under any extended warranty should it fail prior to the end of the Agreement, with equipment of equal or greater efficiency.

Upon request, Owner agrees to provide documentation of Equipment replacements and any maintenance activities on the newly installed equipment carried out independent of Wendel.

Owner will notify Wendel within fifteen (15) working days of any changes, replacements, and/or additions of any equipment, schedule changes, building square footage, and/or operating conditions relating in any way to the reconciliation of this guarantee.

Owner will provide for electronic access to utility bills to Wendel.

PERFORMANCE CONTRACT
EXHIBIT E

ASSURED PERFORMANCE CONTRACT
EXHIBIT E – UNIT ENERGY COSTS

The unit energy costs by month for the Performance Guarantee are set forth below. The rates shown below shall be designated the floor rates and shall be the minimum rate used for all calculations made in this Exhibit G "Calculation of Benchmarks and Performance Savings". Modifications to the floor rates can only be done per Exhibit G.

Electric Unit Costs

Facility	Electric Demand ($/kW)	Electric Usage ($/kWh)
Village Hall	23.30	0.048
Library	23.27	0.048
Fire House	23.19	0.048
Recreation Center	23.27	0.048
Senior Citizens Center	23.18	0.048
DPW - 30 South Buckhout Street & Highway Garage	23.33	0.048
DPW - Sanitation Garage	N/A	0.26
DPW - Mechanic's Garage	23.28	0.048
Pump House	N/A	0.19
Astor Street Pump Station	23.33	0.048
Ardsley Pump Station	N/A	0.26

Natural Gas Unit Costs

Facility	Natural Gas Usage ($/mmBtu)
Library	16.52
DPW - 30 South Buckhout Street & Highway Garage	16.59

Oil Unit Costs

Facility	Oil Usage ($/mmBtu)
Village Hall	14.11
Fire House	13.87
Recreation Center	14.84
Senior Center	15.13
Pump House	15.15
DPW - Sanitation Garage	13.63
DPW - Mechanic's Garage	13.67

ASSURED PERFORMANCE CONTRACT
EXHIBIT E – UNIT ENERGY COSTS

Water Unit Costs

Rate	Usage ($/ccf)
Water	3.48
Wastewater	0.33

ASSURED PERFORMANCE CONTRACT
EXHIBIT E – UNIT ENERGY COSTS

Annual Energy Costs Increase

The following table identifies the % increase that will be made to floor amounts in the tables above for each succeeding year of the Guarantee.

Year	Electric Usage Costs ($/kWh)	Electric Demand Costs ($/kW)	Natural Gas Usage Costs ($/mmBtu)	Fuel Oil Usage Costs ($/mmBtu)	Water Usage Costs ($/ccf)	O&M Costs ($)
1	0%	0%	5%	5%	3%	3%
2	0%	0%	5%	5%	3%	3%
3	0%	0%	5%	5%	3%	3%
4	0%	0%	5%	5%	3%	3%
5	0%	0%	5%	5%	3%	3%
6	0%	0%	5%	5%	3%	3%
7	0%	0%	5%	5%	3%	3%
8	0%	0%	5%	5%	3%	3%
9	0%	0%	5%	5%	3%	3%
10	0%	0%	5%	5%	3%	3%
11	20%	20%	5%	5%	3%	3%
12	0%	0%	5%	5%	3%	3%
13	0%	0%	5%	5%	3%	3%
14	0%	0%	5%	5%	3%	3%
15	0%	0%	5%	5%	3%	3%

PERFORMANCE CONTRACT
EXHIBIT F

ASSURED PERFORMANCE CONTRACT
EXHIBIT F – OCCUPANCY SCHEDULE

In order to accurately assess the effectiveness of the Measures and Improvements, it is necessary to be able to make comparisons of pre-retrofit and post-retrofit conditions under similar terms. The occupancy schedules below are mutually agreed to accurately represent the pre-retrofit conditions and serve as the basis for post-retrofit analysis.

ASSURED PERFORMANCE CONTRACT
EXHIBIT F – OCCUPANCY SCHEDULE

OCCUPANCY SCHEDULE (VILLAGE HALL)

Auditorium

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	9:30 AM	12:30 PM
Tuesday	9:30 AM	12:30 PM
Wednesday	9:30 AM	12:30 PM
Thursday	9:30 AM	12:30 PM
Friday	9:30 AM	12:30 PM
Saturday	9:30 PM	12:30 PM
Sunday	N/A	N/A
Annual Hours	936	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Exterior & Hallways

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	7:00 PM
Tuesday	8:30 AM	7:00 PM
Wednesday	8:30 AM	7:00 PM
Thursday	8:30 AM	7:00 PM
Friday	8:30 AM	7:00 PM
Saturday	8:30 AM	7:00 PM
Sunday	N/A	N/A
Annual Hours	3276	
*Typical average lighting operating times. These hours include normal operating hours and a utilization factor.		

Authorized Owner Representative:

Mechanical & Storage Rooms

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	12:30 PM
Tuesday	8:30 AM	12:30 PM
Wednesday	8:30 AM	12:30 PM
Thursday	8:30 AM	12:30 PM
Friday	8:30 AM	12:30 PM
Saturday	8:30 AM	12:30 PM
Sunday	N/A	N/A
Annual Hours	936	
*Typical average lighting operating times. These hours include normal work day and custodial activities.		

Authorized Owner Representative:

ASSURED PERFORMANCE CONTRACT
EXHIBIT F – OCCUPANCY SCHEDULE

Offices & Toilets

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	4:30 PM
Tuesday	8:30 AM	4:30 PM
Wednesday	8:30 AM	4:30 PM
Thursday	8:30 AM	4:30 PM
Friday	8:30 AM	4:30 PM
Saturday	N/A	N/A
Sunday	N/A	N/A
Annual Hours	2080	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

OCCUPANCY SCHEDULE (LIBRARY)

Hallways

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	7:00 PM
Tuesday	8:30 AM	7:00 PM
Wednesday	8:30 AM	7:00 PM
Thursday	8:30 AM	7:00 PM
Friday	8:30 AM	7:00 PM
Saturday	8:30 AM	7:00 PM
Sunday	N/A	N/A
Annual Hours	3276	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Library (Main Area)

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	7:00 PM
Tuesday	8:30 AM	7:00 PM
Wednesday	8:30 AM	7:00 PM
Thursday	8:30 AM	7:00 PM
Friday	8:30 AM	7:00 PM
Saturday	8:30 AM	7:00 PM
Sunday	N/A	N/A
Annual Hours	3276	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Toilets

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	7:00 PM
Tuesday	8:30 AM	7:00 PM
Wednesday	8:30 AM	7:00 PM
Thursday	8:30 AM	7:00 PM
Friday	8:30 AM	7:00 PM
Saturday	8:30 AM	7:00 PM
Sunday	N/A	N/A
Annual Hours	3276	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

ASSURED PERFORMANCE CONTRACT
EXHIBIT F – OCCUPANCY SCHEDULE

OCCUPANCY SCHEDULE (FIRE HOUSE)

Exterior

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	7:00 PM
Tuesday	8:30 AM	7:00 PM
Wednesday	8:30 AM	7:00 PM
Thursday	8:30 AM	7:00 PM
Friday	8:30 AM	7:00 PM
Saturday	8:30 AM	7:00 PM
Sunday	N/A	N/A
Annual Hours	3276	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Hallway

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	12:00 AM	12:00 AM
Tuesday	12:00 AM	12:00 AM
Wednesday	12:00 AM	12:00 AM
Thursday	12:00 AM	12:00 AM
Friday	12:00 AM	12:00 AM
Saturday	12:00 AM	12:00 AM
Sunday	12:00 AM	12:00 AM
Annual Hours	8760	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Mechanical Room

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	7:00 PM
Tuesday	8:30 AM	7:00 PM
Wednesday	8:30 AM	7:00 PM
Thursday	8:30 AM	7:00 PM
Friday	8:30 AM	7:00 PM
Saturday	8:30 AM	7:00 PM
Sunday	N/A	N/A
Annual Hours	3276	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

ASSURED PERFORMANCE CONTRACT
EXHIBIT F – OCCUPANCY SCHEDULE

Offices

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	7:00 PM
Tuesday	8:30 AM	7:00 PM
Wednesday	8:30 AM	7:00 PM
Thursday	8:30 AM	7:00 PM
Friday	8:30 AM	7:00 PM
Saturday	8:30 AM	7:00 PM
Sunday	N/A	N/A
Annual Hours	3276	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Storage Rooms

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	12:30 PM
Tuesday	8:30 AM	12:30 PM
Wednesday	8:30 AM	12:30 PM
Thursday	8:30 AM	12:30 PM
Friday	8:30 AM	12:30 PM
Saturday	8:30 AM	12:30 PM
Sunday	N/A	N/A
Annual Hours	936	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Toilets

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	7:00 PM
Tuesday	8:30 AM	7:00 PM
Wednesday	8:30 AM	7:00 PM
Thursday	8:30 AM	7:00 PM
Friday	8:30 AM	7:00 PM
Saturday	8:30 AM	7:00 PM
Sunday	N/A	N/A
Annual Hours	3276	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

ASSURED PERFORMANCE CONTRACT
EXHIBIT F – OCCUPANCY SCHEDULE

OCCUPANCY SCHEDULE (RECREATION CENTER)

Exterior

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	7:00 PM
Tuesday	8:30 AM	7:00 PM
Wednesday	8:30 AM	7:00 PM
Thursday	8:30 AM	7:00 PM
Friday	8:30 AM	7:00 PM
Saturday	8:30 AM	7:00 PM
Sunday	N/A	N/A
Annual Hours	3276	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Gym

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	4:30 PM
Tuesday	8:30 AM	4:30 PM
Wednesday	8:30 AM	4:30 PM
Thursday	8:30 AM	4:30 PM
Friday	8:30 AM	4:30 PM
Saturday	N/A	N/A
Sunday	N/A	N/A
Annual Hours	2080	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Hallway

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	7:00 PM
Tuesday	8:30 AM	7:00 PM
Wednesday	8:30 AM	7:00 PM
Thursday	8:30 AM	7:00 PM
Friday	8:30 AM	7:00 PM
Saturday	8:30 AM	7:00 PM
Sunday	N/A	N/A
Annual Hours	3276	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

ASSURED PERFORMANCE CONTRACT
EXHIBIT F – OCCUPANCY SCHEDULE

Office

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	4:30 PM
Tuesday	8:30 AM	4:30 PM
Wednesday	8:30 AM	4:30 PM
Thursday	8:30 AM	4:30 PM
Friday	8:30 AM	4:30 PM
Saturday	N/A	N/A
Sunday	N/A	N/A
Annual Hours	2080	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Storage

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	12:30 PM
Tuesday	8:30 AM	12:30 PM
Wednesday	8:30 AM	12:30 PM
Thursday	8:30 AM	12:30 PM
Friday	8:30 AM	12:30 PM
Saturday	8:30 AM	12:30 PM
Sunday	N/A	N/A
Annual Hours	936	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Toilet

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	4:30 PM
Tuesday	8:30 AM	4:30 PM
Wednesday	8:30 AM	4:30 PM
Thursday	8:30 AM	4:30 PM
Friday	8:30 AM	4:30 PM
Saturday	N/A	N/A
Sunday	N/A	N/A
Annual Hours	2080	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

ASSURED PERFORMANCE CONTRACT
EXHIBIT F – OCCUPANCY SCHEDULE

OCCUPANCY SCHEDULE (SENIOR CENTER)

Offices

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	4:30 PM
Tuesday	8:30 AM	4:30 PM
Wednesday	8:30 AM	4:30 PM
Thursday	8:30 AM	4:30 PM
Friday	8:30 AM	4:30 PM
Saturday	N/A	N/A
Sunday	N/A	N/A
Annual Hours	2080	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Storage

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	12:30 PM
Tuesday	8:30 AM	12:30 PM
Wednesday	8:30 AM	12:30 PM
Thursday	8:30 AM	12:30 PM
Friday	8:30 AM	12:30 PM
Saturday	8:30 AM	12:30 PM
Sunday	N/A	N/A
Annual Hours	936	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Toilet

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	4:30 PM
Tuesday	8:30 AM	4:30 PM
Wednesday	8:30 AM	4:30 PM
Thursday	8:30 AM	4:30 PM
Friday	8:30 AM	4:30 PM
Saturday	N/A	N/A
Sunday	N/A	N/A
Annual Hours	2080	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

ASSURED PERFORMANCE CONTRACT
EXHIBIT F – OCCUPANCY SCHEDULE

OCCUPANCY SCHEDULE (DPW COMPLEX)

Hallways

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	7:00 PM
Tuesday	8:30 AM	7:00 PM
Wednesday	8:30 AM	7:00 PM
Thursday	8:30 AM	7:00 PM
Friday	8:30 AM	7:00 PM
Saturday	8:30 AM	7:00 PM
Sunday	N/A	N/A
Annual Hours	3276	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Work Areas

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	7:00 PM
Tuesday	8:30 AM	7:00 PM
Wednesday	8:30 AM	7:00 PM
Thursday	8:30 AM	7:00 PM
Friday	8:30 AM	7:00 PM
Saturday	8:30 AM	7:00 PM
Sunday	N/A	N/A
Annual Hours	3276	
*Typical average lighting operating times. These hours include normal operating hours and a utilization factor.		

Authorized Owner Representative:

Offices

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	4:30 PM
Tuesday	8:30 AM	4:30 PM
Wednesday	8:30 AM	4:30 PM
Thursday	8:30 AM	4:30 PM
Friday	8:30 AM	4:30 PM
Saturday	N/A	N/A
Sunday	N/A	N/A
Annual Hours	2080	
*Typical average lighting operating times. These hours include normal operating hours and a utilization factor.		

Authorized Owner Representative:

OCCUPANCY SCHEDULE (PUMP HOUSE)

Exterior

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	7:00 PM
Tuesday	8:30 AM	7:00 PM
Wednesday	8:30 AM	7:00 PM
Thursday	8:30 AM	7:00 PM
Friday	8:30 AM	7:00 PM
Saturday	8:30 AM	7:00 PM
Sunday	N/A	N/A
Annual Hours	3276	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Mechanical Room

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	12:30 PM
Tuesday	8:30 AM	12:30 PM
Wednesday	8:30 AM	12:30 PM
Thursday	8:30 AM	12:30 PM
Friday	8:30 AM	12:30 PM
Saturday	8:30 AM	12:30 PM
Sunday	N/A	N/A
Annual Hours	936	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

Offices

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	12:30 PM
Tuesday	8:30 AM	12:30 PM
Wednesday	8:30 AM	12:30 PM
Thursday	8:30 AM	12:30 PM
Friday	8:30 AM	12:30 PM
Saturday	8:30 AM	12:30 PM
Sunday	N/A	N/A
Annual Hours	936	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

ASSURED PERFORMANCE CONTRACT
EXHIBIT F – OCCUPANCY SCHEDULE

Storage Rooms

	Lighting *	
	Time On	Time Off
52 Weeks		
Monday	8:30 AM	12:30 PM
Tuesday	8:30 AM	12:30 PM
Wednesday	8:30 AM	12:30 PM
Thursday	8:30 AM	12:30 PM
Friday	8:30 AM	12:30 PM
Saturday	8:30 AM	12:30 PM
Sunday	N/A	N/A
Annual Hours	936	
*Typical average lighting operating times. These hours include normal work day, custodial activities, and utilization factor.		

Authorized Owner Representative:

PERFORMANCE CONTRACT
EXHIBIT G

ASSURED PERFORMANCE CONTRACT
EXHIBIT G – CALCULATION OF BENCHMARK AND PERFORMANCE SAVINGS

PART I: BENCHMARKS

Objectives

In order to accurately assess the effectiveness of Measures and Improvements, it is necessary to be able to make comparisons of pre-retrofit and post-retrofit conditions under similar terms. To do this, Base Lines are established to document pre-retrofit conditions and serve as the basis for post-retrofit analysis. For the purpose of this schedule "Baseline" is defined as a specific period of time and any data, used for, or resulting from, the analysis of that period.

The following methodology will be used to calculate unit savings:

ANNUAL ELECTRIC AND NATURAL GAS CONSUMPTION

The Owner purchases electricity from NYPA, fuel oil from Metro Fuel Corp., and natural gas from ConEdison. The utility usages for the buildings studied in this report have been analyzed for a 12-month period. Electric utility bills were analyzed from April 2005 to April 2006. Natural gas utility bills were analyzed from November 2005 to November 2006. For the buildings included in this project, there are eleven (11) electric service accounts, two (2) active natural gas service, and three (3) oil delivery accounts in the pool of buildings studied.

Electrical and natural gas consumption data and overall costs were obtained from utility bills provided by the Owner.

BASIS FOR ENERGY COSTS

Electricity

For calculating electrical cost savings the following rates were used:

Village Hall
- Unit Demand Rate (UDR) = $23.30 per kW Demand (total rate from tariff)
- Unit Consumption Rate (UCR) = $0.048 per kWh

Library
- Unit Demand Rate (UDR) = $23.27 per kW Demand (total rate from tariff)
- Unit Consumption Rate (UCR) = $0.048 per kWh

Firehouse
- Unit Demand Rate (UDR) = $23.19 per kW Demand (total rate from tariff)
- Unit Consumption Rate (UCR) = $0.048 per kWh

Recreation Center
- Unit Demand Rate (UDR) = 23.27 per kW Demand (total rate from tariff)
- Unit Consumption Rate (UCR) = $0.048 per kWh

Senior Center
- Unit Demand Rate (UDR) = 23.18 per kW Demand (total rate from tariff)
- Unit Consumption Rate (UCR) = $0.048 per kWh

30 South Buckhout St. and Highway Garage
- Unit Demand Rate (UDR) = 23.33 per kW Demand (total rate from tariff)
- Unit Consumption Rate (UCR) = $0.048 per kWh

Sanitation Garage
- Unit Demand Rate (UDR) = N/A
- Unit Consumption Rate (UCR) = $0.26 per kWh

Mechanics Garage
- Unit Demand Rate (UDR) = 23.28 per kW Demand (total rate from tariff)
- Unit Consumption Rate (UCR) = $0.048 per kWh

Pump House
- Unit Demand Rate (UDR) = N/A
- Unit Consumption Rate (UCR) = $0.19 per kWh

Astor Street Pump Station
- Unit Demand Rate (UDR) = $23.33 per kW Demand (total rate from tariff)
- Unit Consumption Rate (UCR) = $0.048 per kWh

Ardsley Pump Station
- Unit Demand Rate (UDR) = N/A
- Unit Consumption Rate (UCR) = $0.26 per kWh

The unit kWh cost for the above facilities was calculated by adding the annual supply and delivery costs minus the annual demand costs (including delivery and transition charges) from the bills provided by the Owner, and dividing this total by the annual kWh consumption.

Natural Gas

For calculating natural gas cost savings the following rates were used:

Library
- Natural Gas Rate (NGR) = $16.52 per mmBtu

30 South Buckhout Street & Highway Garage
- Natural Gas Rate (NGR) = $16.59 per mmBtu

These unit natural gas costs were calculated by dividing the total annual natural gas costs by the total annual consumption in mmBtu. Natural gas usage is reported in MCF (thousand cubic feet). The thermal content of 1 MCF is assumed to be 1,000,000 Btu throughout this report. Savings are reported in mmBtu. Therefore, 1 MCF is equal to 1 mmBtu.

Fuel Oil

For calculating fuel oil cost savings the following rates were used:

Village Hall
- Fuel Oil Rate (FOR) = $14.11 per mmBtu

Firehouse
- Fuel Oil Rate (FOR) = $13.87 per mmBtu

Recreation Center
- Fuel Oil Rate (FOR) = $14.84 per mmBtu

Senior Center
- Fuel Oil Rate (FOR) = $15.13 per mmBtu

Pump House
- Fuel Oil Rate (FOR) = $15.15 per mmBtu

DPW – Sanitation Garage
- Fuel Oil Rate (FOR) = $13.63 per mmBtu

DPW – Mechanic's Garage
- Fuel Oil Rate (FOR) = $13.67 per mmBtu

These unit fuel oil costs were calculated by dividing the total annual fuel oil costs by the total annual consumption in mmBtu. Fuel oil usage is reported in gallons. The thermal content of 1 gallon is assumed to be 0.140 mmBtu throughout this report. Savings are reported in mmBtu.

Pursuant to the above analysis, the rates shown above were used to determine the energy savings for the Measures and Improvements. These rates will be the floor rates for the purpose of this Performance Guarantee. The annual calculated rate for electricity, natural gas and fuel oil shall never drop below the floor rates. In the event they do, the floor rates will be substituted for the annual calculated rate. The annual calculated rate will be determined by using formulas B-1 through B-6 defined below.

CALCULATION OF BENCHMARKS AND PERFORMANCE SAVINGS

The unit costs for energy and demand have been used in some of the calculations for electrical cost savings. Some measures may result in reduced energy use without affecting the monthly peak demand; these will calculate savings for energy (kWh) costs only. Other measures that are likely to reduce the monthly peak demand will have energy and demand (kW) savings calculated.

The following formulas will be used to calculate the annual calculated rate for electricity:

FORMULA B-1

$$UDR = \Sigma TKW_{1\text{-}12} \div \Sigma KWH_{1\text{-}12}$$

Where:
UDR: Annual Calculated Unit Demand Rate (Dollars per kW)
$\Sigma TKW_{1\text{-}12}$: Sum Total of Monthly kW Costs (Dollars) for months 1 through 12
$\Sigma KW_{1\text{-}12}$: Sum Total of Monthly kW Use for Months 1 Through 12

FORMULA B-2

$$UCR = \Sigma TKWH_{1\text{-}12} \div \Sigma KWH_{1\text{-}12}$$

Where:
UCR Annual Calculated Unit Consumption Rate (Dollars per kWh)
$\Sigma TKWH_{1\text{-}12}$: Sum Total of Monthly kWh Costs (Dollars) including Fuel Adjustment Cost and other related Energy Charges for Months 1 Through 12
$\Sigma KWH_{1\text{-}12}$: Sum Total of Monthly kWh Use for Months 1 Through 12

The following formulas will be used to calculate the annual calculated rate for natural gas:

FORMULA B-3

$NGR = \Sigma TGC_{1-12} \div \Sigma TGU_{1-12}$

Where:

NGR: Annual Calculated Natural Gas Rate (Dollars per CCF)

ΣTGC_{1-12}: Sum Total of Monthly Gas Costs (Dollars) for months 1 through 12

ΣTGU_{1-12}: Sum Total of Monthly Gas Purchased (CCF) for Months 1Through 12

FORMULA B-4

NGR1 (mmBtu) = NGR x 10

Where:

NGR: Annual Calculated Natural Gas Rate (Dollars per CCF)

The following formulas will be used to calculate the annual calculated rate for fuel oil:

FORMULA B-5

$FOR = \Sigma TOC_{1-12} \div \Sigma TOU_{1-12}$

Where:

FOR: Annual Calculated Fuel Oil Rate (Dollars per gallon)

ΣTOC_{1-12}: Sum Total of Monthly Oil Costs (Dollars) for months 1 through 12

ΣTOU_{1-12}: Sum Total of Monthly Oil Purchased (gallons) for Months 1Through 12

FORMULA B-6

FOR1 (mmBtu) = FOR x 0.139

Where:

FOR1: Annual Calculated Fuel Oil Rate (Dollars per gallon)

ANNUAL BILLED WATER AND WASTEWATER

The water supply for the Village is purchased from the Town of Greenburgh. The annual amount of water and wastewater billed by the Village has been analyzed for a one (1) year period.

BASIS FOR WATER AND WASTEWATER REVENUE

Water

The existing Village water rate was used for calculating increased water revenue and is listed below:

- $3.48 per CCF* (UWR)

* One CCF = 100 cubic feet or approximately 748 gallons

Wastewater

The existing Village wastewater rate was used for calculating increased water revenue and is listed below:

- $0.33 per CCF (UWWR)

These water and wastewater rates were provided by the Village for the year 2007.

Pursuant to the above analysis, the above water and wastewater rates were used to determine the additional revenue for this Performance Contract. These rates will be the floor rates for the purpose of this Performance Guarantee. The annual water and wastewater rates used to determine the post-retro revenue will be the actual water and wastewater rates in effect at the time. The annual calculated rate for water and wastewater shall never drop below the floor rates. In the event they do, the floor rates will be substituted for the annual calculated rate to be provided by the Village.

Utility Cost Savings and Additional Revenue

Utility cost savings and additional revenue are the result of applying the appropriate annual calculated rate to the utility units. The method of selecting the annual calculated rate is documented above and will be used throughout the term of the agreement to assign costs to the utility units.

Total dollar savings is the sum of the utility cost savings from each utility type plus any other savings.

Miscellaneous Adjustments

The Owner and Wendel acknowledge that the method of billing used by the applicable utility providing the energy source may be modified or subject to variation during the term of this Contract. In such event, the calculations used to determine energy savings shall be subject to such adjustments as necessary to equate the modified or varied method of billing to the method in effect at the time the relevant billing variables were incorporated into this contract.

PART II: LIGHTING RETROFIT

The energy savings verification method for the lighting retrofit measure is based on Option A of the International Performance Measurement & Verification Protocol (IPMVP). This method is based on stipulating the lighting fixture wattages through the use of a standard fixture wattage table for the existing fixture wattages and manufacturers' data for new fixture wattages. The operating hours are stipulated based on mutually agreed to numbers as defined in the occupancy schedules located in Exhibit G of this document.

FOR ALL LIGHTING MEASURES (PRE-RETROFIT)

Fixture Quantity:

The quantity of each fixture type is mutually agreed upon as defined in the CEA. The existing quantity of each fixture type was used to determine the energy savings and shall remain constant. These values can be adjusted to reflect an increase in quantity based on actual fixtures installed. Fixtures described in the CEA that are replaced by the owner prior to the lighting retrofit as defined in this contract will be used to determine the existing and new annual electrical cost defined below.

Annual Burn Hours (ABH):

Annual Burn Hours **(ABH)** are defined as the average number of hours the lighting equipment operates in a given year. For the purposes of this agreement, the ABH are mutually agreed to be as shown in Exhibit F of this document.

These values shall be known as the floor-annual-burn-hours (ABH). These values can be adjusted to reflect an increase in lighting use based on either mutually agreed upon operational changes or monitored values from representative areas within the facility. The ABH shall never go below the floor values. In the event that they do, the floor value will be substituted for the annual measured hours in the savings calculations.

Existing Average Watts (EAW):

WENDEL utilized a standard table of lighting wattages to determine the EAW. WENDEL opened fixtures throughout the Village of Irvington Buildings and determined the percentage of standard wattage lamps and standard magnetic ballasts for the T12 light fixtures. These values were combined to determine an average wattage for each T-12 fixture type from the standard table. Actual wattages have been used for incandescent lighting. For the purposes of this agreement, the EAW is mutually agreed to be the values shown in the comprehensive energy audit (CEA).

Existing Annual Electrical Cost (EAEC):

WENDEL will utilize the unit demand ($/kW) and consumption ($/kWh) rates, shown in Exhibit G for the lighting calculations.

WENDEL will then determine the Existing Annual Electrical Cost (EAEC) for the existing lighting system according to the following formula:

FORMULA L-1

$$EAEC = \{\Sigma EAW_i * UDR * NM\} + \{\Sigma EAW_i * ABH * UCR\}$$

Where:

EAEC:	Existing annual electrical Cost for the Existing Lighting System ($)
ΣEAW_i:	The Sum of The Existing Average Watts for All Fixture Types (kilo-watts)
UDR:	Unit Demand Rate ($/kW)
NM:	Number of Months
UCR:	Unit Consumption Rate ($/kWh)
ABH:	Annual Burn Hours as defined in the Benchmark section of this Document.

FOR ALL LIGHTING MEASURES (POST-RETROFIT):

Monitored Hours (MH):

Upon retrofit completion WENDEL will trend hours of use for the Village of Irvington buildings through the use of lighting loggers for a sample number of rooms that have had an occupancy sensor installed. These monitored hours (MH) will be used to determine energy consumption. Occupancy sensors, depending on usage patterns, typically save in the range of 15-50%. It is mutually agreed that occupancy sensor savings will be a minimum of 50% on kWh and 5% on kW for restrooms and a minimum of 15% on kWh and 5% on kW in all other locations. The ABH may be adjusted based on monitored data.

New Average Watts (NAW):

New average watts (NAW) per fixture will be obtained from manufacturer's published data.

New Annual Electrical Cost (NAEC):

WENDEL will utilize the same unit demand and consumption rates as defined above in the EAEC description. WENDEL will then determine the New Annual Electrical Cost (NAEC) for the new lighting system according to the following formulas:

For areas in the Village of Irvington buildings with occupancy sensors installed, WENDEL will determine New Annual Electrical Cost (NAEC) for the new lighting system according to the following formula:

FORMULA L-2

$$NAEC1 = \{\Sigma NAW_i * UDR * NM\} + \{\Sigma NAW_i * MH * UCR\}$$

Where:

NAEC1:	New Annual Electrical Cost for the New Lighting System ($)
ΣNAW_i:	The Sum of The New Average Watts for All Fixture Types (kilo-watts)
UDR:	Unit Demand Rate ($/kW)
NM:	Number of Months
MH:	Monitored Hours as defined above.
UCR:	Unit Consumption Rate ($/kWh)

For areas in the Village of Irvington buildings without occupancy sensors installed, WENDEL will determine New Annual Electrical Cost (NAEC) for the new lighting system according to the following formula:

FORMULA L-3

$$NAEC2 = \{\Sigma NAW_i * UDR * NM\} + \{\Sigma NAW_i * ABH * UCR\}$$

Where:

NAEC2:	New Annual Electrical Cost for the New Lighting System ($)
ΣNAW_i:	The Sum of The New Average Watts for All Fixture Types (kilo-watts)
UDR:	Unit Demand Rate ($/kW)
NM:	Number of Months
ABH:	Annual Burn Hours as defined in the Benchmark Section of this Document.
UCR:	Unit Consumption Rate ($/kWh)

CALCULATION OF SAVINGS:

For The Lighting Energy Conservation Measures:

WENDEL will determine utility cost savings resulting from the Lighting Energy Conservation Measures according to the following formula:

FORMULA L-4

NLS = EAEC – NAEC1 –NAEC2

Where:

NLS:	Net Annual Savings (Utility Cost Savings $)
EAEC:	Existing Annual Electrical Cost (Dollars)
NAEC1:	New Annual Electrical Cost with occupancy sensors(Dollars)
NAEC2:	New Annual Electrical Cost without occupancy sensors(Dollars)

PART III: BOILER REPLACEMENT

(Pre-retrofit):

The existing oil-fired hot water boilers serve to provide space heating to the Village Hall, Recreation Center, Fire House and the Pump House in the Village of Irvington. The existing boilers operate with estimated thermal efficiencies of 71%. Fuel oil utility data for November 2005 through April 2006 was used to establish a baseline operation and was normalized using the 30 year average heating degree day (HDD) for Newburgh, NY.

(Post-Retrofit):

The new equipment will consist of higher efficiency oil-fired cast iron sectional boiler. Savings are calculated based on the fuel oil savings that would result from the increased effective heating efficiency of the proposed unit.

The following formulas will be used to calculate Utility Cost Savings:

FORMULA mmBtu-1

Pre-FOC = Post FOC x (OE÷NE) x WN

Where:

Pre FOC: Existing fuel oil consumption in mmBtu prior to replacement

Post FOC: 12 month fuel oil consumption of new equipment from utility bills (mmBtu).

NE: Thermal efficiency of new hot water boiler (refer to the CEA for values)

OE: Thermal efficiency of old hot water boiler (based on field estimated value)

WN: Weather Normalization

FORMULA mmBtu-2

Fuel Oil Saved = Pre FOC – Post FOC

Where:

Pre FOC: Boiler fuel oil consumption in mmBtu prior to replacement

Post FOC: 12 month fuel oil consumption of new boilers from utility bills (mmBtu).

FORMULA mmBtu-3

Dollars Saved = Fuel Oil Saved x NGR1

Where:

Dollars Saved: Boiler savings ($)

Fuel Oil Saved: Fuel oil saved with new boiler

FOR1: Fuel oil rate (per Benchmarks)

In order to remove the impact of varying building use, a floor post fuel oil consumption (FOCf) is established. The formula for FOCf is shown below. The Post FOC shall never go below this floor value. In the event that it does, the FOCf (formula mmBtu-4) will be substituted for the Post FOC in formulas mmBtu-1 and mmBtu-2. If the new boilers are operated with natural gas, then the existing boiler efficiency would be determined and the savings would be recalculated using natural gas as the fuel.

FORMULA mmBtu-4

FOCf = BFOU x (NE÷OE)

Where:

BFOU: Base year annual fuel oil consumption in mmBtu prior to replacement

FOCf: Floor post fuel oil consumption.

NE: Thermal Efficiency of New Boiler

OE: Thermal Efficiency of Old Boiler

FORMULA mmBtu-5

BFOU: Base year annual fuel oil usage in mmBtu based on values in the CEA

PART IV: WATER METER REPLACEMENT

Water Meter Replacement Measure (pre-retrofit):

WES will determine the pre-retrofit revenue based on an annual amount of billed water and waste water and the associated rates per unit. This is documented in the CEA.

The following Formula WM-1 will be used to calculate the Pre-retrofit revenue:

FORMULA WM-1

Pre-REV = (EWB * UWR) + (EWWB * UWWR)

Where:

Pre-REV = Pre-retrofit Water and Wastewater Revenue

EWB: Pre-retrofit annual billed Water in CCF per year base on values in CEA

EWWB: Pre-retrofit annual billed Wastewater in CCF per year base on values in CEA

UWR: Unit Water Rate ($/CCF)

UWWR: Unit Wastewater Rate ($/CCF)

Water Meter Replacement Measure (Post-Retrofit):

WES will determine the post-retrofit revenue based upon actual billed water and wastewater rates and amounts as provided by the Village.

The following formula will be used to calculate the Post-retrofit revenue:

FORMULA WM-2A

Post-REV = (PWB / UWR) + (PWWB / UWWR)

Where:

Post-REV = Post-retrofit Water and Wastewater Revenue

PWB: Actual post retrofit annual billed water in CCF per year provided by the Village

PWWB: Actual Post-retrofit annual billed wastewater in CCF per year provided by the Village

UWR: Unit Water Rate ($/CCF)

UWWR: Unit Wastewater Rate ($/CCF)

Formula WM-2B below will be the floor Post-revenue calculation. If the actual Post-retrofit revenue as calculated in Formula WM-2A is less than the amount in Formula WM-2B, then the Formula in WM-2B will be substituted for WM-2A in the performance guarantee.

FORMULA WM-2B

Post-REV = (EWB * UWR) * (1 + MAI) + (EWWB * UWWR) * (1 + MAI)

Where:

Post-REV = Post-retrofit Water and Wastewater Revenue

EWB: Pre-retrofit annual billed water in CCF per year base on values in CEA

EWWB: Pre-retrofit annual billed waste water in CCF per year base on values in CEA

MAI: Water meter accuracy improvement (%) as mutually agreed upon in the CEA

UWR: Unit Water Rate ($/CCF)

UWWR: Unit Wastewater Rate ($/CCF)

Water Meter Replacement Measure (Increased Revenue):

WES will determine the annual revenue increase based on Formula WM-4 below.

FORMULA WM-4

REV Inc = (Post-REV) - (Pre-REV)

Where:

Pre-REV = Pre-retrofit Water and Wastewater Revenue

Post-REV = Post-retrofit Water and Wastewater Revenue

PERFORMANCE CONTRACT
EXHIBIT H

ASSURED PERFORMANCE CONTRACT
EXHIBIT H – MEASUREMENT AND VERIFICATION ANNUAL FEES

It is agreed by the parties that the fee for Measurement and Verification Services will be paid by the Owner to Wendel annually in advance installments as shown below. The payments will be due and payable when Owner receives an invoice from Wendel.

Village Buildings

YEAR 1	$1,500
YEAR 2	$1,545
YEAR 3	$1,591
YEAR 4	$1,639
YEAR 5	$1,688
YEAR 6	$1,739
YEAR 7	$1,791
YEAR 8	$1,845
YEAR 9	$1,900
YEAR 10	$1,957
YEAR 11	$2,016
YEAR 12	$2,076
YEAR 13	$2,139
YEAR 14	$2,203
YEAR 15	$2,269

* Includes annual escalation rate of 3%.

Water District

YEAR 1	$1,500
YEAR 2	$1,545
YEAR 3	$1,591
YEAR 4	$1,639
YEAR 5	$1,688
YEAR 6	$1,739
YEAR 7	$1,791
YEAR 8	$1,845
YEAR 9	$1,900
YEAR 10	$1,957
YEAR 11	$2,016
YEAR 12	$2,076
YEAR 13	$2,139
YEAR 14	$2,203
YEAR 15	$2,269

* Includes annual escalation rate of 3%.

PERFORMANCE CONTRACT
EXHIBIT I

ASSURED PERFORMANCE CONTRACT
EXHIBIT I – COMPREHENSIVE ENERGY AUDIT

Comprehensive Energy Audit (CEA)

For

Village of Irvington ESPC
Irvington, New York

March 1, 2008

Prepared by

WENDEL

Amherst · Lockport · Smithtown · Washington D.C.

Wendel Project No. 4307-01

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Section 1

Executive Summary

EXECUTIVE SUMMARY

The Village of Irvington is located in the County of Westchester, approximately twenty miles North of New York City. The Village is located between the western end of the Town of Greenburgh and eastern bank of the Hudson River. The Village was founded in 1850 as 'Dearman', but in 1854 changed its name, by popular vote, to Irvington, after the American author Washington Irving. As with all river communities in Westchester County, Irvington is traversed by a stretch of the Croton Aqueduct — about 3-miles of aqueduct run through village, which is now part of the Old Croton Trailway State Park.

The Village has a total area of 4.0 square miles, where 2.8 square miles of it is land and 1.2 square miles of it is water. According to the 2000 census, the population is 6,632.

As part of the Project Development Agreement and follow-up to the Preliminary Audit, Wendel performed a detailed assessment and analyses, also know as a Comprehensive Energy Audit (CEA), of the buildings within the Village of Irvington with specific emphasis on reducing energy consumption, improving system performance and minimizing operating and maintenance costs. This audit was prepared using utility consumption/cost data and general operations information provided by facility personnel. The final material and labor pricing contained herein was established through negotiating and/or bidding firm material, equipment and installation costs for the defined scopes of work and specifications as defined in the design documents. For each facility, Wendel examined the mechanical/electrical subsystems as well as the overall building envelope. This specifically included an evaluation of the main heating, ventilation and air conditioning systems; control systems; lighting systems; water systems; roofing, windows and doors at:

- Village Hall
- Recreation Center
- Fire House
- Library
- Senior Center
- Department of Public Works (DPW) Complex

- Pump House (on Station Road)
- Astor Street and Ardsley Pump Stations
- Street Lighting throughout the Village

Wendel also performed an assessment of the revenue gains (i.e. operational savings) that will be obtained from replacing old and inaccurate water meters (owned by the Village of Irvington Water District) with new, more accurate meters and an automated meter reading system (AMR). The water meter assessment was based on an existing inventory of meters, past records on actual water and sewer consumption, and a meter testing survey conducted during the audit.

As a result of this audit, Wendel identified twelve (12) Facility Improvement Measures (FIMs) that are recommended for implementation. These are:

1. **High Efficiency Lighting & Lighting Controls:** at the DPW Complex, Recreation Center, Fire House, Library, Senior Center, Village Hall, and the Pump House;
2. **Direct Digital Controls System:** at Village Hall, the Recreation Center, Fire House, Library and Senior Center;
3. **Boiler Replacement:** at the Recreation Center, Village Hall, Fire House and Pump House;
4. **Window Replacement:** at the Village Hall, Fire House, and Recreation Center;
5. **Roof Replacement:** at the Fire House;
6. **Street Lighting:** throughout the Village;
7. **Building Envelope Improvements:** at the DPW Complex, Village Hall, Recreation Center, Senior Center, Library, Fire House, and Pump House;
8. **Water Meter Replacement:** throughout the Village;
9. **Pump Station Upgrades:** at the Astor Street and Ardsley Pump Stations;
10. **Steel Water Tank Rehabilitation:** at Mountain Road facility;
11. **PRV Replacement:** at Station Road and Ardsley Avenue West;
12. **Packaged Engine Generators:** at the Astor Street and Ardsley Pump Stations.

Since the Village Buildings and the Water District each operate within their own separate budgets, the recommended improvements and accompanying economics are summarized separately for each entity. The project, however, will be financed and executed under one Energy Saving

Performance Contract.

Implementation of the Village Building measures will result in a reduction in consumption of electricity and fossil fuel, along with additional savings associated with operation and maintenance cost reductions. Using final pricing for material and installation labor yields a total estimated installed cost (with PSCO mark-up, a 10% construction contingency, and a $100,000 buy-down) of $902,204. Based on Wendel's analysis, implementation of these measures will provide estimated total annual savings of approximately $51,382 with a simple payback of 17.6 years. A detailed economic summary (individually and in aggregate) of the Facility Improvement Measures (FIMs) and associated cash flow analysis for the Village Buildings are provided in Table 1-1a and 1-1b, respectively.

Implementation of the Water District measures will result in increased water revenue, labor savings and a reduction in consumption of electricity. Using final pricing for material and installation labor yields a total estimated installed cost (with PSCO mark-up and a 10% construction contingency) of $1,470,316. Based on Wendel's energy and water analysis, implementation of these measures would provide estimated total annual energy and operational savings of approximately $164,427. This yields a simple payback of approximately 8.9 years. A detailed economic summary (individually and in aggregate) of the Facility Improvement Measures (FIMs) and associated cash flow analysis for the Water District are provided in Table 1-2a and 1-2b, respectively.

As part of this audit, Wendel also performed an evaluation of potential incentives or grant monies that could aid in funding the installation of the recommended measures. Through this process, it was determined that this project is not eligible for incentives through Public Energy Solutions, a Consolidated Edison DSM Contractor.

Village of Irvington
Table 1-1a: Total Project Summary
February 11, 2008
Village Buildings
Comprehensive Energy Audit (CEA)

Measure No.	FACILITY	FACILITY IMPROVEMENT MEASURE	TOTAL MEASURE COST	ANNUAL ELECTRIC SAVINGS (kWh)	ANNUAL DEMAND SAVINGS (kW)	ANNUAL FUEL SAVINGS (mmBtu)	ANNUAL OPERATING SAVINGS	ANNUAL ENERGY SAVINGS	TOTAL ANNUAL SAVINGS	SIMPLE PAYBACK
1a	DPW Complex	High Efficiency Lighting & Lighting Controls	$14,053	6,491	31.8	-6	$47	$777	$823	17.1
1b	Recreation Center	High Efficiency Lighting & Lighting Controls	$7,516	6,815	34.9	-6	$39	$849	$888	8.5
1c	Fire House	High Efficiency Lighting & Lighting Controls	$10,696	11,076	40.3	-9	$38	$1,102	$1,140	9.4
1d	Library	High Efficiency Lighting & Lighting Controls	$3,574	2,780	7.5	-2	-$23	$225	$201	17.8
1e	Senior Center	High Efficiency Lighting & Lighting Controls	$4,763	982	3.2	-1	-$4	$91	$87	54.8
1f	Village Hall	High Efficiency Lighting & Lighting Controls	$26,018	26,469	114.4	-23	$257	$2,951	$3,209	8.1
2a	Village Hall	Direct Digital Control System	$3,710	0	0.0	50	$0	$1,176	$1,176	3.2
2b	Recreation Center	Direct Digital Control System	$2,482	0	0.0	29	$0	$427	$427	5.8
2c	Fire House	Direct Digital Control System	$2,482	0	0.0	47	$0	$650	$650	3.8
2d	Library	Direct Digital Control System	$97,662	110,163	0.0	187	$1,300	$8,749	$10,049	9.7
2e	Senior Center	Direct Digital Control System	$3,710	0	0.0	25	$0	$379	$379	9.8
3a	Recreation Center	Boiler Replacement	$25,173	0	0.0	45	$320	$670	$990	25.4
3b	Village Hall	Boiler Replacement	$42,154	0	0.0	99	$320	$1,399	$1,719	24.5
3c	Fire House	Boiler Replacement	$38,390	0	0.0	105	$320	$1,450	$1,770	21.7
4a	Village Hall	Window Replacement	$154,900	1,504	0.0	155	$0	$2,253	$2,253	68.7
4b	Fire House	Window Replacement	$141,223	6,100	9.2	181	$0	$2,909	$2,909	48.6
4c	Recreation Center	Window Replacement	$206,004	2,743	5.4	80	$0	$1,387	$1,387	148.6
5	Fire House	Roof Replacement	$80,803	0	0.0	97	$1,050	$1,348	$2,398	33.7
6	Village Streets	Street Lighting	$11,255	100,774	0.0	0	$0	$15,217	$15,217	0.7
7a	DPW Complex	Building Envelope Improvements	$13,648	0	0.0	166	$0	$1,722	$1,722	7.2
7b	Village Hall	Building Envelope Improvements	$3,042	0	0.0	69	$0	$734	$734	4.1
7c	Recreation Center	Building Envelope Improvements	$491	0	0.0	5	$0	$58	$58	8.4
7d	Senior Center	Building Envelope Improvements	$1,432	0	0.0	16	$0	$181	$181	7.9
7e	Library	Building Envelope Improvements	$982	0	0.0	11	$0	$130	$130	7.5
7f	Fire House	Building Envelope Improvements	$6,040	0	0.0	85	$0	$885	$885	6.8
		PROGRAM TOTALS - Recommended Measures	$902,204	275,897	246.7	1,405	$3,663	$47,718	$51,382	17.6

Preliminary Information; Not for Public Dissemination

Village of Irvington
Table 1-1b: Cashflow Analysis
Village Buildings
Comprenensive Energy Audit (CEA)
15-Year Term, 3.54% Interest Rate

Project Financing (Annual Payments per RFP)

	Municipal Lease
Project Cost	$ 902,204
Project Buydown (Village of Irvington)	$ 100,000
Municipal Lease Financed Amount	$ 802,204
Interest Rate	3.54%
Term of Financing (15 Years)	15
Payment Frequency	Annual

Note: Project cost includes Design fees and all other overheads costs.

	A1	A2	A = A1-A2	B	C	D=A+B+C	E	F	G=E+F	D-G	
Year	Annual Energy Cost W/O Improvements (1)	Annual Energy Costs With Improvements	Annual Energy Savings	Annual Operational Savings	Net Energy Incentives	Total Annual Savings	Municipal Lease Payments	Annual M&V Costs	Net Annual Costs	Annual Cash Flow	Cumulative Cash Flow
Installation			$ 23,859		$ -	$ 23,859				$ 23,859	$ 23,859
1	$ 341,000.00	$ 293,282	$ 47,718	$ 3,663	$ -	$ 51,382	$ (69,850)	$ (1,500)	$ (71,350)	$ (19,968)	$ 3,891
2	$ 347,138.00	$ 298,561	$ 48,577	$ 3,773	$ -	$ 52,350	$ (69,850)	$ (1,545)	$ (71,395)	$ (19,044)	$ (15,153)
3	$ 353,582.90	$ 304,104	$ 49,479	$ 3,887	$ -	$ 53,365	$ (69,850)	$ (1,591)	$ (71,441)	$ (18,076)	$ (33,229)
4	$ 360,350.05	$ 309,924	$ 50,426	$ 4,003	$ -	$ 54,429	$ (69,850)	$ (1,639)	$ (71,489)	$ (17,060)	$ (50,289)
5	$ 367,455.55	$ 316,035	$ 51,420	$ 4,123	$ -	$ 55,543	$ (69,850)	$ (1,688)	$ (71,538)	$ (15,995)	$ (66,283)
6	$ 374,916.32	$ 322,452	$ 52,464	$ 4,247	$ -	$ 56,711	$ (69,850)	$ (1,739)	$ (71,589)	$ (14,877)	$ (81,161)
7	$ 382,750.14	$ 329,190	$ 53,560	$ 4,374	$ -	$ 57,935	$ (69,850)	$ (1,791)	$ (71,641)	$ (13,706)	$ (94,867)
8	$ 390,975.65	$ 336,264	$ 54,711	$ 4,506	$ -	$ 59,217	$ (69,850)	$ (1,845)	$ (71,694)	$ (12,477)	$ (107,344)
9	$ 399,612.43	$ 343,692	$ 55,920	$ 4,641	$ -	$ 60,561	$ (69,850)	$ (1,900)	$ (71,750)	$ (11,189)	$ (118,533)
10	$ 408,681.05	$ 351,492	$ 57,189	$ 4,780	$ -	$ 61,969	$ (69,850)	$ (1,957)	$ (71,807)	$ (9,838)	$ (128,371)
11	$ 461,851.10	$ 397,222	$ 64,630	$ 4,923	$ -	$ 69,553	$ (69,850)	$ (2,016)	$ (71,866)	$ (2,313)	$ (130,684)
12	$ 471,849.26	$ 405,821	$ 66,029	$ 5,071	$ -	$ 71,100	$ (69,850)	$ (2,076)	$ (71,926)	$ (826)	$ (131,510)
13	$ 482,347.32	$ 414,850	$ 67,498	$ 5,223	$ -	$ 72,721	$ (69,850)	$ (2,139)	$ (71,988)	$ 733	$ (130,777)
14	$ 493,370.29	$ 424,330	$ 69,040	$ 5,380	$ -	$ 74,420	$ (69,850)	$ (2,203)	$ (72,052)	$ 2,368	$ (128,410)
15	$ 504,944.40	$ 434,285	$ 70,660	$ 5,541	$ -	$ 76,201	$ (69,850)	$ (2,269)	$ (72,119)	$ 4,083	$ (124,327)
Totals	$ 6,140,824.47	$ 5,281,503	$ 883,180	$ 68,136	$ -	$ 951,316	$ (1,047,745)	$ (27,898)	$ (1,075,643)	**$ (124,327)**	

Village of Irvington
Table 1-2a: Total Project Summary
February 11, 2008
Water District
Comprehensive Energy Audit (CEA)

Measure No.	FACILITY	FACILITY IMPROVEMENT MEASURE	TOTAL MEASURE COST	ANNUAL ELECTRIC SAVINGS (kWh)	ANNUAL DEMAND SAVINGS (kW)	ANNUAL FUEL SAVINGS (mmBtu)	ANNUAL OPERATING SAVINGS	ANNUAL ENERGY SAVINGS	TOTAL ANNUAL SAVINGS	SIMPLE PAYBACK
1g	Pump House	High Efficiency Lighting & Lighting Controls	$7,163	2,904	32.5	-2	$7	$514	$522	13.7
3d	Pump House	Boiler Replacement	$29,997	0	0.0	44	$320	$661	$981	30.6
7g	Pump House	Building Envelope Improvements	$9,984	0	0.0	169	$0	$1,878	$1,878	5.3
8	Water District	Water Meter Replacement	$751,561	0	0.0	0	$161,046	$0	$161,046	4.7
9	Water District	Pump Station Upgrades	$122,624	0	0.0	0	$0	$0	$0	N/A
10	Water District	Steel Water Tank Rehabilitation	$376,287	0	0.0	0	$0	$0	$0	N/A
11	Water District	PRV Replacement	$27,182	0	0.0	0	$0	$0	$0	N/A
12	Water District	Packaged Engine Generators	$145,518	0	0.0	0	$0	$0	$0	N/A
		PROGRAM TOTALS - Recommended Measures	$1,470,316	2,904	32.5	210	$161,374	$3,053	$164,427	8.9

Preliminary Information; Not for Public Dissemination

Village of Irvington
Table 1-2b: Cashflow Analysis
Water District
Comprehensive Energy Audit (CEA)
15 Year Term, 3.54% Interest Rate

Project Financing (Annual Payments)

	Municipal Lease
Project Cost	$ 1,470,316
Project Buydown (Village of Irvington)	$ -
Municipal Lease Financed Amount	$ 1,470,316
Interest Rate	3.54%
Term of Financing (15 Years)	15
Payment Frequency	Annual

Note: Project cost includes Design fees and all other overheads costs.

	A1	A2	A = A1-A2	B	C	D=A+B+C	E	F	G=E+F	D-G	
Year	Annual Energy Cost W/O Improvements (1)	Annual Energy Costs With Improvements	Annual Energy Savings	Annual Operational Savings	Net Energy Incentives	Total Annual Savings	Municipal Lease Payments	Annual M&V Costs	Net Annual Costs	Annual Cash Flow	Cumulative Cash Flow
Installation			$ 1,527		$ -	$ 1,527				$ 1,527	$ 1,527
1	$ 22,000	$ 18,947	$ 3,053	$ 161,374	$ -	$ 164,427	$ (128,024)	$ (1,500)	$ (129,524)	$ 34,903	$ 36,430
2	$ 22,396	$ 19,288	$ 3,108	$ 166,215	$ -	$ 169,323	$ (128,024)	$ (1,545)	$ (129,569)	$ 39,754	$ 76,184
3	$ 22,812	$ 19,646	$ 3,166	$ 171,201	$ -	$ 174,367	$ (128,024)	$ (1,591)	$ (129,615)	$ 44,752	$ 120,936
4	$ 23,248	$ 20,022	$ 3,226	$ 176,337	$ -	$ 179,564	$ (128,024)	$ (1,639)	$ (129,663)	$ 49,901	$ 170,837
5	$ 23,707	$ 20,417	$ 3,290	$ 181,627	$ -	$ 184,918	$ (128,024)	$ (1,688)	$ (129,712)	$ 55,206	$ 226,043
6	$ 24,188	$ 20,831	$ 3,357	$ 187,076	$ -	$ 190,433	$ (128,024)	$ (1,739)	$ (129,763)	$ 60,671	$ 286,714
7	$ 24,694	$ 21,267	$ 3,427	$ 192,689	$ -	$ 196,116	$ (128,024)	$ (1,791)	$ (129,815)	$ 66,301	$ 353,014
8	$ 25,224	$ 21,724	$ 3,501	$ 198,469	$ -	$ 201,970	$ (128,024)	$ (1,845)	$ (129,869)	$ 72,101	$ 425,116
9	$ 25,781	$ 22,203	$ 3,578	$ 204,423	$ -	$ 208,001	$ (128,024)	$ (1,900)	$ (129,924)	$ 78,077	$ 503,193
10	$ 26,367	$ 22,707	$ 3,659	$ 210,556	$ -	$ 214,215	$ (128,024)	$ (1,957)	$ (129,981)	$ 84,234	$ 587,428
11	$ 29,797	$ 25,662	$ 4,135	$ 216,873	$ -	$ 221,008	$ (128,024)	$ (2,016)	$ (130,040)	$ 90,968	$ 678,396
12	$ 30,442	$ 26,217	$ 4,225	$ 223,379	$ -	$ 227,604	$ (128,024)	$ (2,076)	$ (130,100)	$ 97,504	$ 775,900
13	$ 31,119	$ 26,800	$ 4,319	$ 230,080	$ -	$ 234,399	$ (128,024)	$ (2,139)	$ (130,162)	$ 104,237	$ 880,137
14	$ 31,830	$ 27,413	$ 4,418	$ 236,983	$ -	$ 241,400	$ (128,024)	$ (2,203)	$ (130,226)	$ 111,174	$ 991,310
15	$ 32,577	$ 28,056	$ 4,521	$ 244,092	$ -	$ 248,613	$ (128,024)	$ (2,269)	$ (130,293)	$ 118,321	$ 1,109,631
Totals	$ 396,182	$ 341,199	$ 56,510	$ 3,001,375	$ -	$ 3,057,885	$ (1,920,355)	$ (27,898)	$ (1,948,254)	**$ 1,109,631**	

Section 2

Facility Description

FACILITY DESCRIPTION

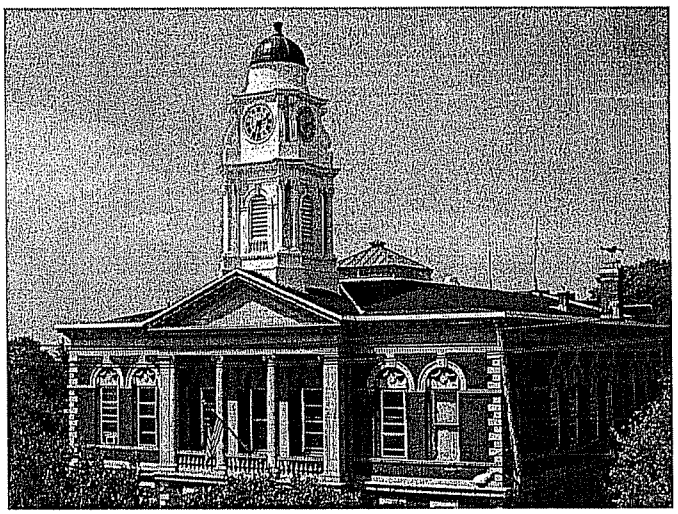
During the CEA, Wendel surveyed and assessed nine (9) facilities, located throughout the Village, on the basis of energy and operational performance. The buildings serve various functions and are occupied and utilized under different schedules, which directly impacts the energy utilization for each facility. The following table provides a summary of the facility vital statistics, such as age, square footage, and the energy utilization indices.

Building	Area (ft^2)	Construction Date	Electric (kWh/ft^2)	Thermal ($mmBtu/ft^2$)
Village Hall	19,488	1869	9.82	0.044
Library	18,406	Renovated 2002	23.87	0.098
Fire House	4,561	1965	9.70	0.118
Recreation Center	5,494	1871	4.48	0.038
Senior Citizens Center	7,224	1960	18.83	0.032
DPW Complex	13,033	1940	7.49	0.104
Pump House	2,300	1934	2.41	0.088
Astor Street Pump Station	150	Circa 1940	6.81	N/A
Ardsley Pump Station	150	Circa 1940	10.90	N/A

The majority of the facilities are occupied a minimum of forty (40) hours per week, with the exception of the special service buildings such as the fire house and community centers, each with varying occupancy and hours. The pump stations are unoccupied during normal operation.

VILLAGE HALL

General



The Irvington Village Hall is located at 85 Main Street. The colonial-style building was erected in 1869 and has a brick façade with prominent colonnade and clock tower. Under a renovation project executed in conjunction with the New York State Historical Preservation Office (NYSHPO), the interior of the facility and clock tower were both restored to near original condition. The interior renovation took place during 2001, while the clock tower was restored in 2006.

The facility is a two-story structure (with a basement sublevel) and has a total of 19,488 square feet of utilized (occupied) space. The building serves as the primary office for the Village Administration, Building and Police Departments. The basement level currently houses the Police Department, Village Council Room, and the mechanical equipment room. The first floor houses the Village Administrator and Clerk/Treasurer's Offices and the Building Department.

The second floor houses the Town Hall Theatre. The Theatre was built in 1902 and is nearly an identical replica of the Ford Theatre in Washington, D.C. The Theatre has a 432-seat capacity and serves as the Village Concert Hall/Music Theatre.

The regular hours of operation are from 8:30 am to 4:30 pm Monday through Friday, giving the building a total weekly operation of 40 hours. In the off-hours, the Village Hall sees usage during weeknights (primarily Council Room use) and some use on weekends (Theatre use). Total off-hour use is estimated at an additional six (6) hours during a typical week.

HVAC Systems

The Village Hall has two boilers that serve the building's heating needs. A newly replaced steam boiler provides dedicated service to the Village Theatre and a hot water boiler that serves seven (7) heating zones that heat the administrative offices, police headquarters and the remainder of the building. The hot water boiler at the Village Hall is a Weil McLain (Model BL-576) cast iron sectional fired by a Carlin oil burner.

Cooling is provided to the office areas in the basement and first floor by approximately fifteen (15) Mitsubishi Slim-line units with external condensers, visible along the periphery of the building. In terms of cooling, the hallways, stairwells and the Theatre are unconditioned.

Building Envelope

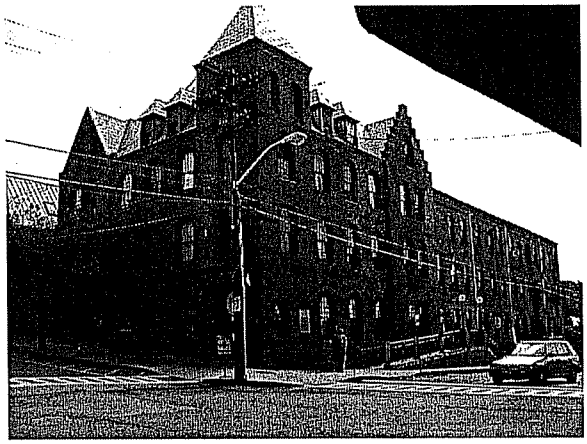
The windows on the Village Hall are made from wood and are single-glazed. There is approximately 1,320 square feet of glass with a U-value of 0.84. Although the windows vary in size, the typical window measures 3'-9" by 7'-6". The Theatre has a large skylight located over the main seating area.

Lighting

The Village Hall lighting was upgraded during a recent NYPA project. Lighting in the office areas and police department consists primarily of four foot T8 lamps, with electronic ballasts. Some decorative chandeliers with incandescent lighting are located in the Theatre to meet with the aesthetic requirements of a historic building. Wherever possible, reproduction antique fixtures are used, and these lighting fixtures are equipped with compact fluorescent lamps that simulate the light emitted from standard incandescent lamps.

LIBRARY

General



The Library is a great example of late Victorian, Industrial Architecture and is officially designated as a historical landmark. The building is a four-story brick façade structure, located at the corner of South Astor and Main Streets. Its date of construction predates the Revolutionary War. At that time, the building served as a manor. The building changed hands over the years and in 1849 became an industrial site, which housed the Lord and Burnham Company. It remained so for over one hundred years, and, then, in the late 1980's the building became vacant.

In 2002, the entire building was renovated, the ground floor and the sublevel (18,406 square feet) were dedicated to the Library, while the remaining three stories were set aside as affordable housing. The hours of operation are: Monday, Wednesday, and Friday, 10:00 am to 5:00 pm; Tuesday and Thursday, 10:00 am to 9:00 pm; and Saturday, 10:00 am to 1:00 pm. The Library is open 45 hours per week and has a total of twenty-two (22) people on staff.

HVAC/Control Systems

There are two Weil McClain (Model LGB-7) hot water boilers that are located in the sublevel boiler/mechanical equipment room, one boiler is dedicated to the Library and the second to the apartments located above the Library. The net IBR output for each is 549 MBH. The hot water is pumped through the system by two (2) Bell & Gossett circulator pump, each rated for 65 gpm. The boiler serving the Library supplies hot water to the air handlers.

The chiller for the building is a McQuay (Model ALS 070A) with a seventy (70) ton cooling capacity. The chiller supplies chilled water to the library and to the apartments via a Bell & Gossett Series

1510 pump, rated for 160 gpm.

There are four (4) air handling units that service the Library. Three service the South, East, and West sections of the Library, while one is a multipurpose. These air handlers are all located in the basement. All four air handlers are Trane Modulars with constant speed, vortex-vane supply and return fans. The air handlers provide the conditioned space with both cooling and heating. Air is delivered to the conditioned space via VAV boxes distributed throughout the Library and the basement.

There is no centralized control system for the Library; each major piece of equipment operates autonomously through its own local controller.

Building Envelope

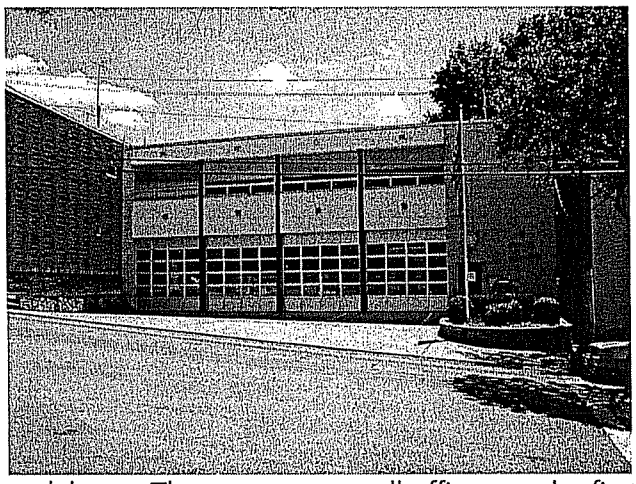
The windows on the Library were replaced during the 2002 renovation effort and are constructed of single-pane glass and wood frames.

Lighting/Electrical Systems

The facility was renovated in 2002 and the lighting was completely upgraded. Majority of the lamps are fluorescent with a mix of four-foot T8s, with electronic ballasts and fluorescent bi-axial lamp fixtures.

FIRE HOUSE

General



Originally built in 1965, the Fire House, located at 88 Main Street, is home to the Village of Irvington Volunteer Fire Department. The building is a two-story, cream-colored brick building with a flat roof. This facility has 4,561 square feet of utilized (occupied) area. There are approximately sixty-three (63) employees the frequent the facility.

The first floor is primarily dedicated to the four truck bays. There are two small offices on the first floor: one in the loft area, located at the rear of the truck bays and one located off the side entrance. The second floor serves as an assembly area and has a small kitchen and lounge area. The basement houses an equipment storage area where SCUBA equipment is stored and a boiler room that houses the heating system.

The regular hours of operation are from 10:00 am to 3:00 pm, Monday through Friday. Periodically, the Fire House sees usage during weeknights primarily for training sessions and meetings. These are usually held in the second floor assembly area. The total off-hour use is estimated at an additional ten (10) hours during a typical week.

HVAC Systems

The boiler at the Fire House is an oil-fired, H.B. Smith 25, 5-section, cast iron boiler with a net output rating of 426,000 Btu/hr. The boiler serves three zones, each controlled by a wall-mounted thermostat. Oil to the boiler is supplied by a 2,000 gallon underground storage tank.

The domestic hot water is supplied by a 32 gallon, Bock oil-fired water heater that has a heat recovery rate of 95 gallons per hour.

The second floor assembly area is cooled by a three (3) ton packaged rooftop air conditioning unit.

Building Envelope

The windows and side door on the Fire House are constructed from aluminum framing and single-pane glass. Neither the windows nor doors are thermally broken. The fire house garage bay doors were recently replaced.

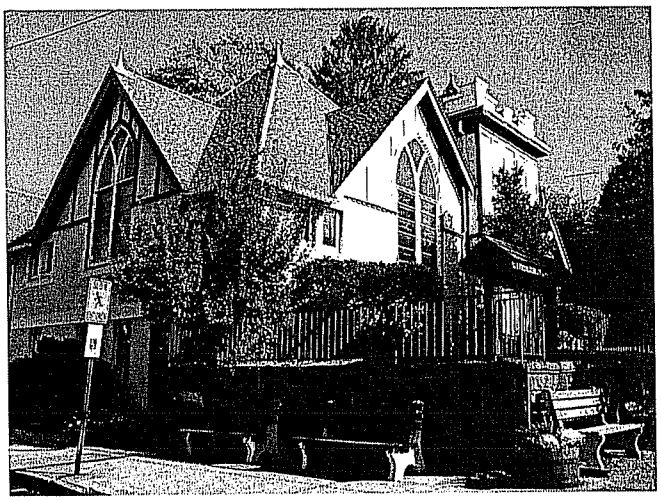
The existing roof has a surface area of approximately 2,850 square feet and is constructed from a multi-layer system comprised of a fibrous insulation layer and a layer of bituminous, built-up roofing (BUR) material.

Lighting

The standard T12 fixtures are found throughout the facility, primarily 4-foot lamps with magnetic ballasts. There are some incandescent fixtures in the bathrooms and mechanical rooms.

RECREATION CENTER

General



The building was erected in 1871 and is distinguished in appearance, with steeply sloped roofs and large arched windows, and vaulted ceilings. The facility is home to the Parks Department and is the recreational facility for the Village. This facility has a total floor area of 5,494 square feet. The typical hours of operation are: Monday, Wednesday, and Thursday, 9:00 am to 6:00 pm; Tuesday and Friday, 9:00 am to 5:00 pm; and Saturday, 10:00 am to 2:00 pm.

HVAC Systems

The Recreation center has one oil-fired Burnham hot water boiler that has a gross output of 302 Mbtu/hr. The building is split up into three zones and each zone with one pump supplying each zone. A 275 gallon underground oil tank, located at the rear of the building provides the boiler with fuel.

Cooling is provided by two (2) small, split systems: York (Model H2CB036S25A) and a Climate Control (Model B0803), each with two (2) tons of refrigeration capacity.

Building Envelope

There are two distinct types of windows at the Recreation Center: single-glazed wood and single-glazed steel. There is approximately 535 square feet of glass on the building. The single-glazed wood windows comprise 443 square feet. The single-glazed steel windows account for approximately 92 square feet.

Lighting

The lamps in the upper level are incandescent and are contained in suspended globe fixtures. Office areas are primarily lit by four foot T12 lamps with magnetic ballasts, contained in standard four foot fixtures.

SENIOR CITIZENS CENTER

General

The facility was erected in 1960. The facility is located at 29 Bridge Street and has a brick façade and a flat roof, typical of the industrial style seen at the waterfront. It has recently been renovated and a reception hall, with a sloped metal roof, was added. The new addition is located at the rear of the original structure and its large windows provide a picturesque view of the Hudson. The building is two stories and has 7,224 square feet of floor area. The hours of operation are Monday through Friday 8:00 am to 3:00 pm.

HVAC Systems

The heating system consists of two (2) Crown oil-fired boilers, each boiler is rated for a input capacity of 239 MBtu/hr and a net rating of 207 MBtu/hr. The boilers are located in the ground-level mechanical room, one provides hot water the original portion of the building, that contains offices, meeting rooms, and lounge areas, and the second provides hot water to the new extension. The hot water is pumped through the building to the baseboard radiators.

Cooling is provided by three (3) packaged air handler units on the roof. Each is controlled by a local automated logic controller. Two of the units are Carrier WeatherMaster Model 50HJ-007-521 air handler units, and the third unit is a Carrier Model 38ARZ008-501. The WheatherMasters are rated for six (6) tons of cooling capacity and are designed to supply 2,100 cfm. The third Carrier unit has a net cooling capacity of 90,000 Btu/hr, with an EER of 10.6. Together, the units deliver cooling to various zones in the building zones via the duct system.

Building Envelope

The doors and windows were replaced during the recent renovation and are to current energy code standards. Windows are constructed from double-pane glass with aluminum frames, and the doors are adequately weather-stripped.

The roof over the original portion is a Firestone membrane roof with polyisocyanurate foam as insulation. The roof covering the extension is a painted, standing seam, metal roof.

Lighting

The facility was also recently upgraded. Lighting is provided by a mixture of T8s, with electronic ballasts and compact fluorescent lamp fixtures.

DEPARTMENT OF PUBLIC WORKS (DPW) COMPLEX

General

The facility was erected in 1940 and for a long time served as the sewer plant for the Village. Since that time the site has been reconfigured to serve as the Village DPW Complex. The headquarters are located at the 30 South Buckhout Street, also referred to as the Superintendent's Office. The main building is of brick and concrete construction with a rounded front. The building is built into to hill and the second story comes level to the South Buckhout Street. The main building is used as the primarily as the superintendent's office, storage, and contains the remnants of a decommissioned sewer plant in the sublevel.

There are three garages on the site: Sanitation, Highway, and Mechanic's Garages. The largest of the three, Highway Garage is constructed of galvanized steel aluminum paneling and framing. The Highway garage is primarily used to house large equipment and DPW trucks.

The two smaller buildings, Sanitation and Mechanic's Garage, are constructed of a combination of galvanized steel and concrete. The entire complex has approximately 12,900 square feet of floor area. The hours of operation for the complex are from 7:00 am to 3:30 pm. The complex is home to approximately thirty-five (35) 35 employees. The Sanitation garage is primarily used for the cleaning and servicing the Village Sanitation Trucks. The Mechanic's Garage is used for servicing the other Village vehicles, such as DPW trucks and Police Department vehicles.

HVAC Systems

Heating is supplied to 30 South Buckhout Street by a new Burnham Series 2 gas boiler. The boiler is approximately four (4) years old and has a net rating of 130,000 Btu/hr.

The heating system for the Highway garage consists of four (4) Dayton gas-fired radiant heaters, each rated at 75,000 Btu/h.

The heating system for the Sanitation Garage consists of a large, oil-fired, Modine unit air heater with a 300 oil gallon tank.

The heating system for the Mechanic's Garage is comprised of a small hot water boiler located in the rear of the garage bay. The boiler is oil-fired; however, the make of the boiler and its output could not be verified due to the lack of nameplate information. The hot water from the boiler is circulated through commercial radiant fin circuit along the periphery of the garage.

Building Envelope

The 30 South Buckhout Street Building has single-pane windows and doors that are original to the building. The building has a built-up tar roof.

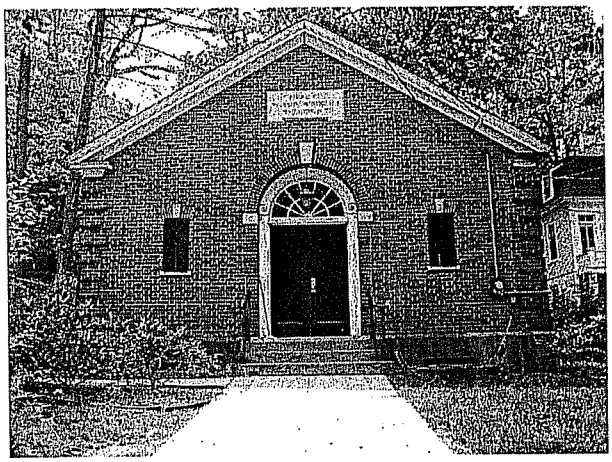
The remaining buildings, the Garages, have large overhead doors (3 per building) and limited windows..

Lighting

Majority of the lighting at the DPW is T12 in either eight or four foot lamps, with standard magnetic ballasts. Exit signs are the incandescent type. Some incandescent fixtures are present in the bathroom areas and basement areas.

PUMP HOUSE

General



This facility is located at the intersection of Station Road and Broadway. The building is single-story (with a sublevel) and is constructed of red brick and has approximately 2,300 square feet of floor space. The building was constructed in 1934 and was originally used as a pump station for the Village, when it received water from the Croton Reservoir. The facility currently is home to the Village Water Department and houses the offices for four (4) employees. The typical hours of operation are from 9am to 4pm on weekdays.

HVAC Systems

Heating is supplied to the Pump House by an old Burnham Jubilee hot water boiler installed circa 1960. The unit has a net output rating of 245,700 Btu/hr, which corresponds to an oil consumption rate of 2.25 gallons/hr. The unit is fired by a Mobil Jet-R oil burner and serves a single zone in the building.

Building Envelope

The windows and doors on the Pump House are original to the building. Windows are single-pane glass and the doors are poorly weather-stripped.

Lighting

The pump house lighting is original to the building. Lighting consists primarily of incandescent bulb fixtures. There are some four foot T12 lamps, with magnetic ballasts, located in the office area.

ASTOR STREET PUMP STATION

General

The Astor Street wastewater pump station is located on the northwest corner of the DPW facility. The pump station consists of a two story facility, one above grade and one below grade. The above grade structure consists of a small brick building that primarily functions as the control room. The below grade structure consists of a dual concrete chamber wetwell and drywell system. The wetwell is the wastewater storage volume. Pumps are triggered on and off thru float level controls. The drywell is an adjacent concrete chamber where the pumps, motors and related piping and ancillary facilities are housed. Pump suction lines penetrate the common wetwell/dryell wall and the discharge lines on the pumps are manifolded together and discharge to a forcemain offsite. Heat is provided to the station via an electric unit heater.

The existing pumps are a pair of Flygt Model C-3102 pumps operating at 3.7 horsepower. Normal operation is for one pump to cycle on and off with the other as backup. During extreme wet weather events both pumps run in order to maintain capacity.

ARDSLEY PUMP STATION

General

The Ardsley Station wastewater pump station is located adjacent to Hudson Avenue. The design and facilities are very similar to the Astor street station including the above grade brick control building with electric unit heater and below grade wetwell/drywell system.

The existing pumps at this station are a pair Flygt Model C-3127 pumps operating at 7.4 horsepower. Operational protocol is same as Astor pump station.

Section 3

Utility Description

UTILITY DESCRIPTION

VILLAGE HALL

The Electricity is purchased from NYPA (Account Number: 59-0906-0663-4300-9) and is billed according to the NYPA11-2, H-1 rate tariff. This rate is considered General use large (SC-69). The electrical utility bills were analyzed from April 2005 to April 2006.

The company responsible for the delivery of fuel oil to Village Hall is Metro Fuel Corporation. The fuel oil utility bills were analyzed from November 2005 to April 2006. Fuel oil unit costs were calculated by dividing the total annual oil costs by the total annual consumption (in mmBtu). Oil usage is reported in Gallons. The thermal content of one (1) Gallon is assumed to be 0.14 mmBtu throughout this report. Savings are reported in mmBtu.

Monthly consumption details and graphs may be found in Appendix A of this report. The table below summarizes the rates used for this study based on the utility data provided to Wendel.

Village Hall	Unit Cost ($)	Units
Electric Usage	0.048	/kWh
Electric Demand	23.30	/kW
Natural Gas	N/A	/mmBtu
Fuel Oil	14.11	/mmBtu
Water	N/A	/kgal

LIBRARY

The Electricity is purchased from NYPA (Account Number: 59-0906-0663-1301-0) and is billed according to the NYPA11-2, H-1 rate tariff. This rate is considered General Use Large (SC-69). The electrical utility bills were analyzed from April 2005 to April 2006.

The building utilizes natural gas that is purchased from Consolidated Edison (Account Number: 59-

0906-2763-8000-7) and the utility bills were analyzed from November 2005 to November 2006. Natural gas unit costs were calculated by dividing the total annual natural gas costs by the total annual consumption (in mmBtu). Natural gas usage is reported in Therms. The thermal content of one (1) Therm is assumed to be 100,000 Btu throughout this report. Savings are reported in mmBtu. Therefore, ten (10) Therms are equal to one (1) mmBtu.

Monthly consumption details and graphs may be found in Appendix A of this report. The table below summarizes the rates used for this study based on the utility data provided to Wendel.

Library	Unit Cost ($)	Units
Electric Usage	0.048	/kWh
Electric Demand	23.27	/kW
Natural Gas	16.52	/mmBtu
Fuel Oil	N/A	/mmBtu
Water	N/A	/kgal

FIRE HOUSE

The Electricity is purchased from NYPA (account number is 59-0906-0663-5700-9) and is billed according to the NYPA 11-2, H-1 rate tariff. This rate is considered General Use Large (SC-69). The electrical utility bills were analyzed from April 2005 to April 2006.

The company responsible for fuel oil deliveries to Fire House is Metro Fuel Corporation. The fuel oil utility bills were analyzed November 2005 to April 2006. Fuel oil unit costs were calculated by dividing the total annual fuel oil costs by the total annual consumption (in mmBtu). Oil usage is reported in Gallons. The thermal content of 1 Gallon is assumed to be 0.14 mmBtu throughout this report. Savings are reported in mmBtu.

Monthly consumption details and graphs may be found in Appendix A of this report. The table below summarizes the rates used for this study based on the utility data provided to Wendel.

Fire House	Unit Cost ($)	Units
Electric Usage	0.048	/kWh
Electric Demand	23.19	/kW
Natural Gas	N/A	/mmBtu
Fuel Oil	13.87	/mmBtu
Water	N/A	/kgal

RECREATION CENTER

The Electricity is purchased from NYPA (account number is 59-0906-0663-5500-3) and is billed according to the NYPA 11-2 H-1 rate tariff. This rate is considered General Use large (SC-69). The electrical utility bills were analyzed from April 2005 to April 2006.

The company responsible for the delivery of fuel oil to the Recreation Center is Metro Fuel Corporation. The fuel oil utility bills were analyzed December 2005 to April 2006. Fuel oil unit costs were calculated by dividing the total annual oil costs by the total annual consumption (in mmBtu). Oil usage is reported in gallons. The thermal content of one (1) gallon is assumed to be 0.14 mmBtu throughout this report. Savings are reported in mmBtu.

Monthly consumption details and graphs may be found in Appendix A of this report. The table below summarizes the rates used for this study based on the utility data provided to Wendel.

Recreation Center	Unit Cost ($)	Units
Electric Usage	0.048	/kWh
Electric Demand	23.27	/kW
Natural Gas	N/A	/mmBtu
Fuel Oil	14.84	/mmBtu
Water	N/A	/kgal

SENIOR CITIZENS CENTER

The electricity is purchased from NYPA (Account Number: 59-0906-0663-7000-2) is billed according to the NYPA 11-2, H-1 rate tariff. This rate is considered General Use Large (SC-69). The electrical utility bills were analyzed from April 2005 to April 2006.

The company responsible for the oil deliveries to the Senior Center is Metro Fuel Corporation. The fuel oil utility bills were analyzed December 2005 to April 2006. Fuel oil unit costs were calculated by dividing the total annual natural gas costs by the total annual consumption (in mmBtu). Oil usage is reported in gallons. The thermal content of one (1) gallon is assumed to be 0.14 mmBtu throughout this report. Savings are reported in mmBtu.

Monthly consumption details and graphs may be found in Appendix A of this report. The table below summarizes the rates used for this study based on the utility data provided to Wendel.

Senior Center	Unit Cost ($)	Units
Electric Usage	0.048	/kWh
Electric Demand	23.18	/kW
Natural Gas	N/A	/mmBtu
Fuel Oil	15.13	/mmBtu
Water	N/A	/kgal

DEPARTMENT OF PUBLIC WORKS COMPLEX

During the audit, the 30 South Buckhout Street Building and the Highway Garage were found to be on both the same electric and gas meters, both located in the sublevel of 30 South Buckhout Street. The Electricity for the two buildings is purchased from NYPA (Account Number: 59-0906-0663-7000-2) and is billed according to the NYPA 11-2, H-1 rate tariff. This rate is considered General Use Large (SC-69). The electrical utility bills were analyzed from April 2005 to April 2006.

The 30 South Buckhout Street Building and the Highway Garage utilize natural gas that is

purchased from Consolidated Edison (Account Number: 59-0906-2763-7800-1) and the utility bills were analyzed from November 2005 to November 2006. Natural gas unit costs are calculated by dividing the total annual natural gas costs by the total annual consumption (in mmBtu). Natural gas usage is reported in Therms. The thermal content of one (1) Therm is assumed to be 100,000 Btu throughout this report. Savings are reported in mmBtu. Therefore, 10 Therms are equal to 1 mmBtu.

Monthly consumption details and graphs may be found in Appendix A of this report. The table below summarizes the rates used for this study based on the utility data provided to Wendel.

30 South Buckhout Street & Highway Garage	**Unit Cost ($)**	**Units**
Electric Usage	0.048	/kWh
Electric Demand	23.33	/kW
Natural Gas	16.59	/mmBtu
Fuel Oil	N/A	/mmBtu
Water	N/A	/kgal

The electricity for the Mechanic's Garage is purchased from NYPA (Account Number: 59-0906-0663-1000-8) and is billed according to the NYPA 11-2, H-1. This rate is considered General Use Large (SC-69). The electrical utility bills were analyzed from April 2005 to April 2006.

The electricity for the Sanitation Garage is purchased from NYPA (Account Number: 59-0906-0663-1101-4) and is billed according to the NYPA 11-1, C-1 rate tariff. This rate is considered General Use Small (SC-62) and does not have a rate charge associated with demand (kW). The electrical utility bills were analyzed from April 2005 to April 2006.

The company responsible for the delivery of oil to the Sanitation and Mechanic's Garages (separate oil storage tanks) is Metro Fuel Corporation. The fuel oil utility bills were analyzed from November 2005 to March 2006 (Sanitation Garage) and December 2005 to March 2006 (Mechanic's Garage). Fuel unit costs were calculated by dividing the total annual oil costs by the total annual

consumption (in mmBtu). Oil usage is reported in Gallons. The thermal content of one (1) gallon is assumed to be 0.14 mmBtu throughout this report. Savings are reported in mmBtu.

Monthly consumption details and graphs for the two buildings may be found in Appendix A of this report. The tables below summarize the rates used for this study based on the utility data provided to Wendel.

Sanitation Garage	Unit Cost ($)	Units
Electric Usage	0.26	/kWh
Electric Demand	N/A	/kW
Natural Gas	N/A	/mmBtu
Fuel Oil	13.63	/mmBtu
Water	N/A	/kgal

Mechanic's Garage	Unit Cost ($)	Units
Electric Usage	0.048	/kWh
Electric Demand	23.28	/kW
Natural Gas	0.00	/mmBtu
Fuel Oil	13.67	/mmBtu
Water	N/A	/kgal

PUMP HOUSE

The Electricity is purchased from NYPA (Account number is 59-0906-0663-9200-6) and is billed according to the NYPA11-1 C-1 rate tariff. This rate is considered General Use Small (SC-62). The electrical utility bills were analyzed from April 2005 to April 2006.

The company responsible for the oil deliveries to the Pump House is Metro Fuel Corporation. The fuel oil utility bills were analyzed November 2005 to April 2006. Fuel Oil unit costs were calculated by dividing the total annual natural gas costs by the total annual consumption (in mmBtu). Oil usage is reported in gallons, where the thermal content of 1 Gallon is assumed to be 0.14 mmBtu throughout this report. Savings are reported in mmBtu.

Monthly consumption details and graphs may be found in Appendix A of this report. The table below summarizes the rates used for this study based on the utility data provided to Wendel.

Pump House	Unit Cost ($)	Units
Electric Usage	0.19	/kWh
Electric Demand	N/A	/kW
Natural Gas	N/A	/mmBtu
Fuel Oil	15.15	/mmBtu
Water	N/A	/kgal

ASTOR STREET PUMP STATION

The Astor Street Pump Station is supplied electricity from the same meter as the 30 South Buckhout Street Building. Please refer to the 30 South Buckhout Street utility description for electric rates. There is no fuel use at the station.

ARDSLEY PUMP STATION

The Electricity is purchased from NYPA (Account number is 59-0906-0663-9300-4) and is billed according to the NYPA 11-1, C-1 rate tariff. This rate is considered General Use Small (SC-62). The electrical utility bills were analyzed from April 2005 to April 2006.

Monthly consumption details and graphs may be found in Appendix A of this report. The table below summarizes the rates used for this study based on the utility data provided to Wendel.

Ardsley Pump Station	Unit Cost ($)	Units
Electric Usage	0.26	/kWh
Electric Demand	N/A	/kW
Natural Gas	N/A	/mmBtu
Fuel Oil	N/A	/mmBtu
Water	N/A	/kgal

WEATHER NORMALIZATION

Some calculations in this report use 30 year weather data for Newburgh, NY to predict the energy savings likely to result in a given measure. The normal number of heating degree-days (HDD) for this area is 4,777 HDD and the normal number of cooling degree days (CDD) is 1,141 CDD. Weather information was obtained from the NYSERDA website.

Section 4

FIM #1: High Efficiency Lighting & Lighting Controls

FIM #1: HIGH EFFICIENCY LIGHTING & LIGHTING CONTROLS

INVESTIGATION

As is the case with most municipalities, the Village of Irvington's buildings have undergone renovation and additions over time, and the wide variety of lighting reflects these changes. Some buildings have been completely renovated, while others have seen few changes. The Village has already made an effort to reduce lighting energy consumption by replacing some of the fluorescent lighting with T8 lamps and electronic ballasts. Similarly, many of the original incandescent exit signs have been replaced with reduced energy consuming LED exit signs. There are opportunities to improve the energy efficiency of the lighting systems. The following discusses the most prevalent types of spaces in the building.

For each measure evaluated, energy cost savings calculations were based on the current operation of the systems and were compared to a projected future operation of new higher efficient equipment and systems.

RECOMMENDATIONS

The proposed lighting upgrade focuses on optimizing the current lighting design by replacing and retrofitting lighting fixtures and installing lighting control sensors throughout the Village buildings. The design will focus on reducing the electrical energy consumption of the overall lighting system while providing an aesthetically pleasing lighting plan that will improve the working environment of the occupants. The proposed design will follow industry standard guidelines to ensure that proper lighting levels are maintained while maximizing the energy efficiency of the proposed lighting system.

Proposed System

Department of Public Works (DPW) Complex

- Replace incandescent fixtures with new T-8 fixtures;
- Replace T-12 fixtures with new T-8 fixtures;

- Replace all incandescent Exit sign with LED signs with battery back-up LED 3-Watt fixtures;
- Replace T-12 fixtures with T-8 lamps, electronic ballasts and centering kits.

Recreation Center

- Re-lamp incandescent bulbs with screw-in compact fluorescent bulbs;
- Replace incandescent fixtures with T-8 fixtures;
- Replace T-12 fixtures with new T-8 fixtures;
- Replace all incandescent exit sign with battery back-up LED 3-Watt fixtures;
- Retrofit T-12 fixtures with T-8 lamps and electronic ballasts;
- Replace T-12 fixtures with T-8 lamps, electronic ballasts and centering kit;
- Provide occupancy sensors in the offices, storage, and restrooms.

Fire House

- Retrofit incandescent bulbs with screw-in compact fluorescent bulbs;
- Replace incandescent fixtures with T-8 fixtures;
- Replace T-12 fixtures with new T-8 fixtures;
- Replace all incandescent exit sign with battery back-up LED 3-Watt fixtures;
- Retrofit T-12 fixtures with T-8 lamps and electronic ballasts;
- Provide occupancy sensors in the offices, storage, and restrooms.

Library

- Retrofit incandescent lamps with compact fluorescent lamps;
- Install occupancy sensors in the offices and restrooms.

Senior Center

- Retrofit incandescent lamps with compact fluorescent lamps;
- Install occupancy sensors in the office areas, restrooms, and storage rooms.

Village Hall

- Retrofit incandescent bulbs with screw-in compact fluorescent bulbs;
- Replace T-12 fixtures with new T-8 fixtures;
- Replace all incandescent exit sign with battery back-up LED 3-Watt fixtures;

- Retrofit T-12 fixtures with T-8 lamps and electronic ballasts;
- Replace T-12 fixtures with T-8 lamps and electronic ballasts, and centering kit;
- Provide additional T-8 fixtures to improve light levels;
- Provide occupancy sensors in the offices, storage, and restrooms.

Pump House

- Retrofit incandescent lamps with compact fluorescent lamps;
- Replace incandescent fixtures with T-8 fixtures;
- Replace T-12 fixtures with new T-8 fixtures;
- Provide occupancy sensors in the offices, storage and restrooms;

The design will also take into account the operation and maintenance required to maintain consistent lighting throughout all the buildings. Standardization of the lighting system that unifies the lamp and ballast types and minimizes inventory size will be addressed. The intent is to further reduce maintenance time by equipping lighting fixtures with universal lamps and ballast that will be applicable to the majority of the lighting fixtures throughout the Village buildings. This will also decrease the need for a large inventory of spare lighting material.

The fluorescent lamps and ballasts proposed as part of the lighting measure will consist of 41K temperature T8 lamps manufactured by one of the widely accepted manufacturers such as Phillips, Osram/Sylvania or GE. The lamps and ballasts will also have a 3 and 5 year warranty period, respectively, that includes free replacement of materials in the event of failure.

The installation of occupancy sensors are recommended for most offices, closets, and restrooms. Occupancy sensors will turn off the lights when the space has become unoccupied for a specified length of time. Typical energy savings in office space range from 15% to 30%+ while restrooms savings often exceed 50%. The use of dual technology sensors (infrared and ultrasonic) will help eliminate false on's as well as false off's. The light switches will still be operational for turning the lights off when viewing an overhead projector image or for any other reason.

LIGHTING RETROFIT

DPW

Project No.: 4307-01

Measure Summary Table

1-Jan-09

Savings		
Average Demand Savings	2.7	kW/Month
Electrical Energy Savings	6,491	kWh/Year
Fossil Fuel Savings	(6)	mmBtu/Year
Operational & Maintenance Savings	$47	Per Year
Energy Savings ($)	$777	Per Year
Total Energy & O&M Savings	$823	Per Year
Project Costs		
Total Measure Cost	$14,053	
Payback		
Simple Payback	17.1	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	17.1	Year(s)

DPW

	LIGHTING DESCRIPTION	Measure # 1	Measure # 2	Measure # 3	Measure # 4	Measure # 5	Measure # 6
1	Existing Equipment	1-F96T12/1-SMB	2-F96T12HO/1-SMB	2-F96T12/1-SMB	2-F96T12/1-SMB	2-F40T12U/1-SMB	4-F40T12/2-SMB
2	Replacement Equipment	2-F32T8/1-EB/REFIX/8'strip	6-F32T8/2-EB/REFIX/8'IND	4-F32T8/1-EB/REFIX/8'INDP	4-F32T8/1-EB/REFIX/8'S	2-F17T8/1-EB/RETRO/REFL	2-F32T8/1-EB/REFIX/(1/2)8'WW
3	fixture code	A8S-R	B8HOIND-R(C)	B8IND-R(B)	B8S-RS	BUTR2-(RFLBBB)	D2TW-RWW(B)
4	Floor/Room	0	0	0	0	0	0
5	Lowest Recorded Lighting Level @Task	0	0	0	0	0	0
6	Min. Required Lighting Level for Task						
7	Total Annual Hours	3,276	1,872	2,902	3,276	1,872	3,276
	CONNECTED KW/LUMINAIRE						
8	Existing Luminaire kW	0.087	0.220	0.136	0.136	0.074	0.148
9	New Luminaire kW	0.058	0.176	0.110	0.110	0.033	0.055
	KW/KWH SAVINGS						
10	# of Existing Units	2	6	15	8	13	2
11	# of New Units	2	6	15	8	13	2
12	Total Existing Connected kW	0.175	1.317	2.033	1.084	0.960	0.296
13	Total New Connected kW	0.116	1.056	1.650	0.880	0.429	0.110
14	Total Customer Monthly kW Savings	0.059	0.261	0.383	0.204	0.531	0.186
15	Total Existing Annual kWh	571.662	2465.424	5897.502	3551.184	1797.822	968.058
16	Total New Annual kWh	380.016	1976.832	4787.640	2882.880	803.088	360.360
17	Total Customer Annual kWh Savings	192	489	1110	668	995	608
	MEASURE INSTALLATION COST						
18	Material Cost Each	$50.00	$99.00	$66.00	$50.00	$31.00	$51.00
19	Installation Cost Each	$96.00	$96.00	$96.00	$96.00	$33.00	$48.00
20	Total Material & Installation Cost Each	$146.00	$195.00	$162.00	$146.00	$64.00	$99.00
21	Total Material Cost	$100.00	$594.00	$990.00	$400.00	$403.00	$102.00
22	Total Installation Cost	$192.00	$576.00	$1,440.00	$768.00	$429.00	$96.00
23	Total Material & Installation Cost	$292.00	$1,170.00	$2,430.00	$1,168.00	$832.00	$198.00
	HAZARDOUS MATERIAL DISPOSAL COST						
24	Total # Haz.Mat. Ballasts To Be Disposed	2	6	15	8	13	4
25	Total # Lamps	2	12	30	16	26	8
26	Total Cost for Disposal	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	PROJECT COST						
27	Including Costs - Before Rebates	$362.08	$1,450.80	$3,013.20	$1,448.32	$1,031.68	$245.52
28	Total Rebates	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
29	Including Costs - After Rebates	$362.08	$1,450.80	$3,013.20	$1,448.32	$1,031.68	$245.52
	ANNUAL BILL SAVINGS						
30	Calculated Bill Savings	$21.48	$78.25	$133.59	$74.91	$159.32	$68.12
31	Payback Before Rebates (Years)	16.9	18.5	22.6	19.3	6.5	3.6
32	Payback After Rebates (Years)	16.9	18.5	22.6	19.3	6.5	3.6

DPW

	LIGHTING DESCRIPTION	Measure # 7	Measure # 8	Measure # 9	Measure # 10	Measure # 11	Measure # 12	Measure # 13
1	Existing Equipment	4-F96T12/2-SMB	4-F40T12/2-SMB	4-F40T12/2-SMB	INC 100W	(2) INC 15W	2-F32T8/1-EB	SENSORS
2	Replacement Equipment	4-F32T8/1-EB/REFIX/8'IND	6-F32T8/2-EB/REFIX/8'IND	2-F32T8/1-EB/REFIX/4"WW	2-F17T8/1-EB/REFIX/2'S	LED/REFIX/BATTERY BACKUP	Leave as is	
3	fixture code	D8IND-R(B)	D8IND-R(C)	DW-RWW(B)	I100BB-RS(BBB)	X30	Z-BT8	0
4	Floor/Room	0	0	0	0	0	0	0
5	Lowest Recorded Lighting Level @Task	0	0	0	0	0	0	0
6	Min. Required Lighting Level for Task							
7	Total Annual Hours	3,276	3,276	3,276	1,872	3,276	2,434	0
	CONNECTED KW/LUMINAIRE							
8	Existing Luminaire kW	0.271	0.148	0.148	0.100	0.030	0.058	
9	New Luminaire kW	0.110	0.176	0.058	0.033	0.003	0.058	
	KW/KWH SAVINGS							
10	# of Existing Units	2	6	2	10	1	10	0
11	# of New Units	2	6	2	10	1	10	0
12	Total Existing Connected kW	0.542	0.887	0.296	1.000	0.030	0.580	0.000
13	Total New Connected kW	0.220	1.056	0.116	0.330	0.003	0.580	0.000
14	Total Customer Monthly kW Savings	0.322	-0.170	0.180	0.670	0.027	0.000	0.000
15	Total Existing Annual kWh	1775.592	2904.174	968.058	1872.000	98.280	1411.488	0.000
16	Total New Annual kWh	720.720	3459.456	380.016	617.760	9.828	1411.488	0.000
17	Total Customer Annual kWh Savings	1055	-555	588	1254	88	0	0
	MEASURE INSTALLATION COST							
18	Material Cost Each	$66.00	$99.00	$60.00	$89.00	$50.00	$0.00	$0.00
19	Installation Cost Each	$96.00	$96.00	$75.00	$57.00	$50.00	$0.00	$0.00
20	Total Material & Installation Cost Each	$162.00	$195.00	$135.00	$146.00	$100.00	$0.00	$0.00
21	Total Material Cost	$132.00	$594.00	$120.00	$890.00	$50.00	$0.00	$0.00
22	Total Installation Cost	$192.00	$576.00	$150.00	$570.00	$50.00	$0.00	$0.00
23	Total Material & Installation Cost	$324.00	$1,170.00	$270.00	$1,460.00	$100.00	$0.00	$0.00
	HAZARDOUS MATERIAL DISPOSAL COST							
24	Total # Haz.Mat. Ballasts To Be Disposed	4	12	4	0	0	0	
25	Total # Lamps	8	24	8	10	2	0	
26	Total Cost for Disposal	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	PROJECT COST							
27	Including Costs - Before Rebates	$401.76	$1,450.80	$334.80	$1,810.40	$124.00	$0.00	$0.00
28	Total Rebates	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
29	Including Costs - After Rebates	$401.76	$1,450.80	$334.80	$1,810.40	$124.00	$0.00	$0.00
	ANNUAL BILL SAVINGS							
30	Calculated Bill Savings	$118.24	($62.24)	$65.92	$200.88	$9.91	$0.00	$0.00
31	Payback Before Rebates (Years)	3.4	-23.3	5.1	9.0	12.5	0.0	0.0
32	Payback After Rebates (Years)	3.4	-23.3	5.1	9.0	12.5	0.0	0.0

DPW

DPW Operation & Maintenance		Measure # 1	Measure # 2	Measure # 3	Measure # 4	Measure # 5	Measure # 6
1	Existing Equipment	1-F96T12/1-SMB	2-F96T12HO/1-SMB	2-F96T12/1-SMB	2-F96T12/1-SMB	2-F40T12U/1-SMB	4-F40T12/2-SMB
2	Replacement Equipment	2-F32T8/1-EB/REFIX/8'strip	6-F32T8/2-EB/REFIX/8'IND	4-F32T8/1-EB/REFIX/8'INDP	4-F32T8/1-EB/REFIX/8'S	2-F17T8/1-EB/RETRO/REFL	2-F32T8/1-EB/REFIX/(1/2)8'WW
3	fixture code	A8S-R	B8HOIND-R(C)	B8IND-R(B)	B8S-RS	BUTR2-(RFLBBB)	D2TW-RWW(B)
Current Lamps							
4	Lamps Per Fixture	1	2	2	2	2	4
5	Annual Run Hours	3,276	1,872	2,902	3,276	1,872	3,276
6	Cost Per Lamp	$4.20	$4.20	$4.20	$4.20	$3.00	$2.60
7	Lamp Life (hours)	12000	12000	12000	12000	20000	20000
8	Number of fixtures	2	6	15	8	13	2
9	Maintenance Cost Per Year	$2.29	$7.86	$30.47	$18.35	$7.30	$3.41
Proposed Lamps							
10	Lamps Per Fixture	2	6	4	4	2	4
11	Annual Run Hours	3,276	1,872	2,902	3,276	1,872	3,276
12	Cost Per Lamp	$2.60	$2.60	$2.60	$2.60	$3.00	$2.60
13	Lamp Life (hours)	20000	20000	20000	20000	20000	20000
14	Number of fixtures	2	6	15	8	13	2
15	Maintenance Cost Per Year	$1.70	$8.76	$22.63	$13.63	$7.30	$3.41
Total Savings							
16	Maintenance Savings	$0.59	-$0.90	$7.83	$4.72	$0.00	$0.00

Current Ballasts							
17	Ballasts Per Fixture	1	1	1	1	1	2
18	Annual Run Hours	3,276	1,872	2,902	3,276	1,872	3,276
19	Cost Per Ballast	$15.00	$15.00	$15.00	$15.00	$17.00	$18.75
20	Ballast Life (hours)	50000	50000	50000	50000	50000	50000
21	Number of fixtures	2	6	15	8	13	2
22	Maintenance Cost Per Year	$1.97	$3.37	$13.06	$7.86	$8.27	$4.91
Proposed Ballasts							
23	Ballasts Per Fixture	1	1	1	1	1	0.5
24	Annual Run Hours	3,276	1,872	2,902	3,276	1,872	3,276
25	Cost Per Ballast	$15.50	$18.75	$18.75	$18.75	$17.00	$18.75
26	Ballast Life (hours)	50000	50000	50000	50000	50000	50000
27	Number of fixtures	2	6	15	8	13	2
28	Maintenance Cost Per Year	$2.03	$4.21	$16.32	$9.83	$8.27	$1.23
Total Savings							
29	Maintenance Savings	-$0.07	-$0.84	-$3.26	-$1.97	$0.00	$3.69

DPW

DPW Operation & Maintenance		Measure # 7	Measure # 8	Measure # 9	Measure # 10	Measure # 11	Measure # 12	Measure # 13
1	Existing Equipment	4-F96T12/2-SMB	4-F40T12/2-SMB	4-F40T12/2-SMB	INC 100W	(2) INC 15W	2-F32T8/1-EB	SENSORS
2	Replacement Equipment	4-F32T8/1-EB/REFIX/8'IND	6-F32T8/2-EB/REFIX/8'IND	2-F32T8/1-EB/REFIX/4"WW	2-F17T8/1-EB/REFIX/2'S	LED/REFIX/BATTERY BACKUP	Leave as is	
3	fixture code	D8IND-R(B)	D8IND-R(C)	DW-RWW(B)	I100BB-RS(BBB)	X30	Z-BT8	0
Current Lamps								
4	Lamps Per Fixture	4	4	4	1	2	0	
5	Annual Run Hours	3,276	3,276	3,276	1,872	3,276	2,434	
6	Cost Per Lamp	$2.60	$4.20	$2.60	$1.00	$1.00	$0.00	
7	Lamp Life (hours)	20000	12000	20000	1000	1000	0	
8	Number of fixtures	2	6	2	10	1	10	
9	Maintenance Cost Per Year	$3.41	$27.52	$3.41	$18.72	$6.55	$0.00	
Proposed Lamps								
10	Lamps Per Fixture	4	6	2	2	0	0	
11	Annual Run Hours	3,276	3,276	3,276	1,872	3,276	2,434	
12	Cost Per Lamp	$2.60	$2.60	$2.60	$3.00	0	0	
13	Lamp Life (hours)	20000	20000	20000	20000	0	0	
14	Number of fixtures	2	6	2	10	1	10	
15	Maintenance Cost Per Year	$3.41	$15.33	$1.70	$5.62	$0.00	$0.00	
Total Savings								
16	Maintenance Savings	$0.00	$12.19	$1.70	$13.10	$6.55	$0.00	
Current Ballasts								
17	Ballasts Per Fixture	2	2	2	0	0	0	
18	Annual Run Hours	3,276	3,276	3,276	1,872	3,276	2,434	
19	Cost Per Ballast	$18.75	$15.00	$18.75	$0.00	$0.00	$0.00	
20	Ballast Life (hours)	50000	50000	50000	0	0	0	
21	Number of fixtures	2	6	2	10	1	10	
22	Maintenance Cost Per Year	$4.91	$11.79	$4.91	$0.00	$0.00	$0.00	
Proposed Ballasts								
23	Ballasts Per Fixture	1	1	1	1	0	0	
24	Annual Run Hours	3,276	3,276	3,276	1,872	3,276	2,434	
25	Cost Per Ballast	$18.75	$18.75	$15.50	$17.00	$0.00	$0.00	
26	Ballast Life (hours)	50000	50000	50000	50000	100000	0	
27	Number of fixtures	2	6	2	10	1	10	
28	Maintenance Cost Per Year	$2.46	$7.37	$2.03	$6.36	$0.00	$0.00	
Total Savings								
29	Maintenance Savings	$2.46	$4.42	$2.88	-$6.36	$0.00	$0.00	

DPW

Average Watts Calculations

4-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*44*
Two-lamp	*74*
Three-lamp	*117*
Four-lamp	*148*

4-foot flourescent fixtures - High Output

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

*Ballats are all Standard Magnetic

	Average Watts
One-Lamp	*81*
Two-lamp	*138*
Three-lamp	*219*
Four-lamp	*275*

3-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*42*
Two-lamp	*70*
Three-lamp	*112*
Four-lamp	*140*

2-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*25*
Two-lamp	*47*
Three-lamp	*72*
Four-lamp	*94*

DPW

Average Watts Calculations

8-foot flourescent fixtures - High Output

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*128*
Two-lamp	*220*
Three-lamp	*347*
Four-lamp	*439*

8-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*87*
Two-lamp	*136*
Three-lamp	*223*
Four-lamp	*271*

LIGHTING RETROFIT

Rec Center

Project No.: 4307-01

Measure Summary Table

1-Jan-09

Savings		
Average Demand Savings	2.9	kW/Month
Electrical Energy Savings	6,815	kWh/Year
Fossil Fuel Savings	(6)	mmBtu/Year
Operational & Maintenance Savings	$39	Per Year
Energy Savings ($)	$849	Per Year
Total Energy & O&M Savings	$888	Per Year
Project Costs		
Total Measure Cost	$7,516	
Payback		
Simple Payback	8.5	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	8.5	Year(s)

Rec Center

	LIGHTING DESCRIPTION	Measure # 1	Measure # 2	Measure # 3	Measure # 4	Measure # 5	Measure # 6
1	Existing Equipment	1-F40T12/1-SMB	2-F40T12/1-SMB	2-F40T12U/1-SMB	4-F40T12/2-SMB	4-F40T12/2-SMB	4-F40T12/2-SMB
2	Replacement Equipment	1-F32T8/1-EB/RETRO	2-F32T8/1-EB/RETRO	2-F17T8/1-EB/RETRO/REFL	4-F32T8/1-EB/RETRO	2-F32T8/1-EB/REFIX/(1/2)8'WW	2-F32T8/1-EB/REFIX/4"WW
3	fixture code	A	B	BUTR2-(RFLBBB)	D	D2TW-RWW(B)	DW-RWW(B)
4	Floor/Room	0	0	0	0	0	0
5	Lowest Recorded Lighting Level @Task	0	0	0	0	0	0
6	Min. Required Lighting Level for Task						
7	Total Annual Hours	3,276	1,404	1,872	3,276	1,872	1,872
	CONNECTED KW/LUMINAIRE						
8	Existing Luminaire kW	0.044	0.074	0.074	0.148	0.148	0.148
9	New Luminaire kW	0.032	0.058	0.033	0.110	0.055	0.058
	KW/KWH SAVINGS						
10	# of Existing Units	1	2	2	1	10	5
11	# of New Units	1	2	2	1	10	5
12	Total Existing Connected kW	0.044	0.148	0.148	0.148	1.478	0.739
13	Total New Connected kW	0.032	0.116	0.066	0.110	0.550	0.290
14	Total Customer Monthly kW Savings	0.012	0.032	0.082	0.038	0.928	0.449
15	Total Existing Annual kWh	143.939	207.441	276.588	484.029	2765.880	1382.940
16	Total New Annual kWh	104.832	162.864	123.552	360.360	1029.600	542.880
17	Total Customer Annual kWh Savings	39	45	153	124	1736	840
	MEASURE INSTALLATION COST						
18	Material Cost Each	$20.00	$22.00	$31.00	$33.00	$51.00	$60.00
19	Installation Cost Each	$25.00	$25.00	$33.00	$30.00	$48.00	$75.00
20	Total Material & Installation Cost Each	$45.00	$47.00	$64.00	$63.00	$99.00	$135.00
21	Total Material Cost	$20.00	$44.00	$62.00	$33.00	$510.00	$300.00
22	Total Installation Cost	$25.00	$50.00	$66.00	$30.00	$480.00	$375.00
23	Total Material & Installation Cost	$45.00	$94.00	$128.00	$63.00	$990.00	$675.00
	HAZARDOUS MATERIAL DISPOSAL COST						
24	Total # Haz.Mat. Ballasts To Be Disposed	1	2	2	2	20	10
25	Total # Lamps	1	4	4	4	40	20
26	Total Cost for Disposal	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	PROJECT COST						
27	Including Costs - Before Rebates	$55.80	$116.56	$158.72	$78.12	$1,227.60	$837.00
28	Total Rebates	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
29	Including Costs - After Rebates	$55.80	$116.56	$158.72	$78.12	$1,227.60	$837.00
	ANNUAL BILL SAVINGS						
30	Calculated Bill Savings	$4.38	$8.79	$24.47	$13.84	$277.59	$134.30
31	Payback Before Rebates (Years)	12.7	13.3	6.5	5.6	4.4	6.2
32	Payback After Rebates (Years)	12.7	13.3	6.5	5.6	4.4	6.2

Rec Center

	LIGHTING DESCRIPTION	Measure # 7	Measure # 8	Measure # 9	Measure # 10	Measure # 11	Measure # 12	Measure # 13	Measure # 14	Measure # 15
1	Existing Equipment	INC 100W	INC 150W	INC 60W	INC 75W	INC 75W	INC 90W	(2) INC 15W	2-F32T8/1-EB	SENSORS
2	Replacement Equipment	2-F17T8/1-EB/REFIX/2'S	2-F17T8/1-EB/REFIX/2'W	1-SLS-25W	1-SLS-18W	2-F17T8/1-EB/REFIX/2'BX	1-SLS-20W-FLD	LED/REFIX/BATTERY BACKUP	Leave as is	
3	fixture code	I100BB-RS(BBB)	I150BB-RW(BBB)	I60BB-RSI25	I75BB-RSI18	I75DR-RBX(BBB)	I90BB-RSIFLD	X30	Z-BT8	0
4	Floor/Room	0	0	0	0	0	0	0	0	0
5	Lowest Recorded Lighting Level @Task	0	0	0	0	0	0	0	0	0
6	Min. Required Lighting Level for Task									
7	Total Annual Hours	3,276	1,716	3,276	2,574	1,872	3,276	8,760	2,083	17,784
	CONNECTED KW/LUMINAIRE									
8	Existing Luminaire kW	0.100	0.150	0.060	0.075	0.075	0.090	0.030	0.058	
9	New Luminaire kW	0.033	0.033	0.027	0.020	0.033	0.023	0.003	0.058	
	KW/KWH SAVINGS									
10	# of Existing Units	1	3	3	10	2	2	2	20	0
11	# of New Units	1	3	3	10	2	2	2	20	10
12	Total Existing Connected kW	0.100	0.450	0.180	0.750	0.150	0.180	0.060	1.160	0.000
13	Total New Connected kW	0.033	0.099	0.081	0.200	0.066	0.046	0.006	1.160	0.000
14	Total Customer Monthly kW Savings	0.067	0.351	0.099	0.550	0.084	0.134	0.054	0.000	0.027
15	Total Existing Annual kWh	327.600	772.200	589.680	1930.500	280.800	589.680	525.600	2415.816	0.000
16	Total New Annual kWh	108.108	169.884	265.356	514.800	123.552	150.696	52.560	2415.816	0.000
17	Total Customer Annual kWh Savings	219	602	324	1416	157	439	473	0	248
	MEASURE INSTALLATION COST									
18	Material Cost Each	$89.00	$89.00	$10.00	$10.00	$89.00	$11.00	$50.00	$0.00	$33.00
19	Installation Cost Each	$57.00	$57.00	$5.00	$5.00	$57.00	$5.00	$50.00	$0.00	$99.35
20	Total Material & Installation Cost Each	$146.00	$146.00	$15.00	$15.00	$146.00	$16.00	$100.00	$0.00	$132.35
21	Total Material Cost	$89.00	$267.00	$30.00	$100.00	$178.00	$22.00	$100.00	$0.00	$330.00
22	Total Installation Cost	$57.00	$171.00	$15.00	$50.00	$114.00	$10.00	$100.00	$0.00	$993.50
23	Total Material & Installation Cost	$146.00	$438.00	$45.00	$150.00	$292.00	$32.00	$200.00	$0.00	$1,323.50
	HAZARDOUS MATERIAL DISPOSAL COST									
24	Total # Haz.Mat. Ballasts To Be Disposed	0	0	0	0	0	0	0	0	
25	Total # Lamps	1	3	3	10	2	2	4	0	
26	Total Cost for Disposal	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	PROJECT COST									
27	Including Costs - Before Rebates	$181.04	$543.12	$55.80	$186.00	$362.08	$39.68	$248.00	$0.00	$1,641.14
28	Total Rebates	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
29	Including Costs - After Rebates	$181.04	$543.12	$55.80	$186.00	$362.08	$39.68	$248.00	$0.00	$1,641.14
	ANNUAL BILL SAVINGS									
30	Calculated Bill Savings	$24.57	$102.42	$36.30	$183.14	$25.14	$49.13	$34.02	$0.00	$17.54
31	Payback Before Rebates (Years)	7.4	5.3	1.5	1.0	14.4	0.8	7.3	0.0	93.6
32	Payback After Rebates (Years)	7.4	5.3	1.5	1.0	14.4	0.8	7.3	0.0	93.6

Rec Center

	Rec Center *Operation & Maintenance*	Measure # 1	Measure # 2	Measure # 3	Measure # 4	Measure # 5	Measure # 6
1	Existing Equipment	1-F40T12/1-SMB	2-F40T12/1-SMB	2-F40T12U/1-SMB	4-F40T12/2-SMB	4-F40T12/2-SMB	4-F40T12/2-SMB
2	Replacement Equipment	1-F32T8/1-EB/RETRO	2-F32T8/1-EB/RETRO	2-F17T8/1-EB/RETRO/REFL	4-F32T8/1-EB/RETRO	2-F32T8/1-EB/REFIX/(1/2)8'WW	2-F32T8/1-EB/REFIX/4"WW
3	fixture code	A	B	BUTR2-(RFLBBB)	D	D2TW-RWW(B)	DW-RWW(B)
	Current Lamps						
4	Lamps Per Fixture	1	2	2	4	4	4
5	Annual Run Hours	3,276	1,404	1,872	3,276	1,872	1,872
6	Cost Per Lamp	$2.60	$2.60	$3.00	$2.60	$2.60	$2.60
7	Lamp Life (hours)	20000	20000	20000	20000	20000	20000
8	Number of fixtures	1	2	2	1	10	5
9	Maintenance Cost Per Year	$0.43	$0.73	$1.12	$1.70	$9.73	$4.87
	Proposed Lamps						
10	Lamps Per Fixture	1	2	2	4	4	2
11	Annual Run Hours	3,276	1,404	1,872	3,276	1,872	1,872
12	Cost Per Lamp	$2.60	$2.60	$3.00	$2.60	$2.60	$2.60
13	Lamp Life (hours)	20000	20000	20000	20000	20000	20000
14	Number of fixtures	1	2	2	1	10	5
15	Maintenance Cost Per Year	$0.43	$0.73	$1.12	$1.70	$9.73	$2.43
	Total Savings						
16	Maintenance Savings	$0.00	$0.00	$0.00	$0.00	$0.00	$2.43

	Current Ballasts						
17	Ballasts Per Fixture	1	1	1	2	2	2
18	Annual Run Hours	3,276	1,404	1,872	3,276	1,872	1,872
19	Cost Per Ballast	$17.00	$15.50	$17.00	$18.75	$18.75	$18.75
20	Ballast Life (hours)	50000	50000	50000	50000	50000	50000
21	Number of fixtures	1	2	2	1	10	5
22	Maintenance Cost Per Year	$1.11	$0.87	$1.27	$2.46	$14.04	$7.02
	Proposed Ballasts						
23	Ballasts Per Fixture	1	1	1	1	0.5	1
24	Annual Run Hours	3,276	1,404	1,872	3,276	1,872	1,872
25	Cost Per Ballast	$17.00	$15.50	$17.00	$18.75	$18.75	$15.50
26	Ballast Life (hours)	50000	50000	50000	50000	50000	50000
27	Number of fixtures	1	2	2	1	10	5
28	Maintenance Cost Per Year	$1.11	$0.87	$1.27	$1.23	$3.51	$2.90
	Total Savings						
29	Maintenance Savings	$0.00	$0.00	$0.00	$1.23	$10.53	$4.12

Rec Center

Rec Center		Measure # 7	Measure # 8	Measure # 9	Measure # 10	Measure # 11	Measure # 12	Measure # 13	Measure # 14	Measure # 15
Operation & Maintenance										
1	Existing Equipment	INC 100W	INC 150W	INC 60W	INC 75W	INC 75W	INC 90W	(2) INC 15W	2-F32T8/1-EB	SENSORS
2	Replacement Equipment	2-F17T8/1-EB/REFIX/2'S	2-F17T8/1-EB/REFIX/2'W	1-SLS-25W	1-SLS-18W	2-F17T8/1-EB/REFIX/2'BX	1-SLS-20W-FLD	LED/REFIX/BATTERY BACKUP	Leave as is	
3	fixture code	I100BB-RS(BBB)	I150BB-RW(BBB)	I60BB-RSI25	I75BB-RSI18	I75DR-RBX(BBB)	I90BB-RSIFLD	X30	Z-BT8	0
Current Lamps										
4	Lamps Per Fixture	1	1	1	1	1	1	2	0	
5	Annual Run Hours	3,276	1,716	3,276	2,574	1,872	3,276	8,760	2,083	
6	Cost Per Lamp	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$0.00	
7	Lamp Life (hours)	1000	1000	1000	1000	1000	1000	1000	0	
8	Number of fixtures	1	3	3	10	2	2	2	20	
9	Maintenance Cost Per Year	$3.28	$5.15	$9.83	$25.74	$3.74	$6.55	$35.04	$0.00	
Proposed Lamps										
10	Lamps Per Fixture	2	2	1	1	2	1	0	0	
11	Annual Run Hours	3,276	1,716	3,276	2,574	1,872	3,276	8,760	2,083	
12	Cost Per Lamp	$3.00	$3.00	$10.00	$10.00	$3.00	$11.00	0	0	
13	Lamp Life (hours)	20000	20000	10000	24000	20000	10000	0	0	
14	Number of fixtures	1	3	3	10	2	2	2	20	
15	Maintenance Cost Per Year	$0.98	$1.54	$9.83	$10.73	$1.12	$7.21	$0.00	$0.00	
Total Savings										
16	Maintenance Savings	$2.29	$3.60	$0.00	$15.02	$2.62	-$0.66	$35.04	$0.00	
Current Ballasts										
17	Ballasts Per Fixture	0	0	0	0	0	0	0	0	
18	Annual Run Hours	3,276	1,716	3,276	2,574	1,872	3,276	8,760	2,083	
19	Cost Per Ballast	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
20	Ballast Life (hours)	0	0	0	0	0	0	0	0	
21	Number of fixtures	1	3	3	10	2	2	2	20	
22	Maintenance Cost Per Year	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
Proposed Ballasts										
23	Ballasts Per Fixture	1	1	0	1	1	0	0	0	
24	Annual Run Hours	3,276	1,716	3,276	2,574	1,872	3,276	8,760	2,083	
25	Cost Per Ballast	$17.00	$17.00	$0.00	$65.00	$17.00	$0.00	$0.00	$0.00	
26	Ballast Life (hours)	50000	50000	0	50000	50000	0	100000	0	
27	Number of fixtures	1	3	3	10	2	2	2	20	
28	Maintenance Cost Per Year	$1.11	$1.75	$0.00	$33.46	$1.27	$0.00	$0.00	$0.00	
Total Savings										
29	Maintenance Savings	-$1.11	-$1.75	$0.00	-$33.46	-$1.27	$0.00	$0.00	$0.00	

Rec Center

Average Watts Calculations

4-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*44*
Two-lamp	*74*
Three-lamp	*117*
Four-lamp	*148*

4-foot flourescent fixtures - High Output

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

*Ballats are all Standard Magnetic

	Average Watts
One-Lamp	*81*
Two-lamp	*138*
Three-lamp	*219*
Four-lamp	*275*

3-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*42*
Two-lamp	*70*
Three-lamp	*112*
Four-lamp	*140*

2-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*25*
Two-lamp	*47*
Three-lamp	*72*
Four-lamp	*94*

Rec Center

Average Watts Calculations

8-foot flourescent fixtures - High Output

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*128*
Two-lamp	*220*
Three-lamp	*347*
Four-lamp	*439*

8-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*87*
Two-lamp	*136*
Three-lamp	*223*
Four-lamp	*271*

LIGHTING RETROFIT

Fire Hall

Project No.: 4307-01

Measure Summary Table

1-Jan-09

Savings		
Average Demand Savings	3.4	kW/Month
Electrical Energy Savings	11,076	kWh/Year
Fossil Fuel Savings	(9)	mmBtu/Year
Operational & Maintenance Savings	$38	Per Year
Energy Savings ($)	$1,102	Per Year
Total Energy & O&M Savings	$1,140	Per Year
Project Costs		
Total Measure Cost	$10,696	
Payback		
Simple Payback	9.4	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	9.4	Year(s)

Fire Hall

	LIGHTING DESCRIPTION	Measure # 1	Measure # 2	Measure # 3	Measure # 4	Measure # 5	Measure # 6	Measure # 7
1	Existing Equipment	1-F40T12/1-SMB	1-F30T12/1-SMB	2-F40T12/1-SMB	2-F96T12HO/1-SMB	2-F96T12HO/1-SMB	3-F40T12/2-SMB	INC 100W
2	Replacement Equipment	1-F32T8/1-EB/RETRO	1-F25T8/1-EB/RETRO	2-F32T8/1-EB/RETRO	4-F32T8/1-EB/REFIX/8'IND	6-F32T8/2-EB/REFIX/8'IND	3-F32T8/1-EB/RETRO	2-F17T8/1-EB/REFIX/2'S
3	fixture code	A	AA	B	B8HOIND-R(B)	B8HOIND-R(C)	C	I100BB-RS(BBB)
4	Floor/Room	0	0	0	0	0	0	0
5	Lowest Recorded Lighting Level @Task	0	0	0	0	0	0	0
6	Min. Required Lighting Level for Task							
7	Total Annual Hours	3,276	3,276	2,756	3,276	3,276	3,276	3,276
	CONNECTED KW/LUMINAIRE							
8	Existing Luminaire kW	0.044	0.042	0.074	0.220	0.220	0.117	0.100
9	New Luminaire kW	0.032	0.026	0.058	0.110	0.176	0.088	0.033
	KW/KWH SAVINGS							
10	# of Existing Units	2	1	18	4	14	18	2
11	# of New Units	2	1	18	4	14	18	2
12	Total Existing Connected kW	0.088	0.042	1.330	0.878	3.073	2.109	0.200
13	Total New Connected kW	0.064	0.026	1.044	0.440	2.464	1.584	0.066
14	Total Customer Monthly kW Savings	0.024	0.016	0.286	0.438	0.609	0.525	0.134
15	Total Existing Annual kWh	287.879	138.411	3664.791	2876.328	10067.148	6910.313	655.200
16	Total New Annual kWh	209.664	85.176	2877.264	1441.440	8072.064	5189.184	216.216
17	Total Customer Annual kWh Savings	78	53	788	1435	1995	1721	439
	MEASURE INSTALLATION COST							
18	Material Cost Each	$20.00	$20.00	$22.00	$66.50	$98.50	$27.00	$89.00
19	Installation Cost Each	$25.00	$25.00	$25.00	$96.00	$96.00	$29.50	$57.00
20	Total Material & Installation Cost Each	$45.00	$45.00	$47.00	$162.50	$194.50	$56.50	$146.00
21	Total Material Cost	$40.00	$20.00	$396.00	$266.00	$1,379.00	$486.00	$178.00
22	Total Installation Cost	$50.00	$25.00	$450.00	$384.00	$1,344.00	$531.00	$114.00
23	Total Material & Installation Cost	$90.00	$45.00	$846.00	$650.00	$2,723.00	$1,017.00	$292.00
	HAZARDOUS MATERIAL DISPOSAL COST							
24	Total # Haz.Mat. Ballasts To Be Disposed	2	1	18	4	14	18	0
25	Total # Lamps	2	1	36	8	28	54	2
26	Total Cost for Disposal	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	PROJECT COST							
27	Including Costs - Before Rebates	$111.60	$55.80	$1,049.04	$806.00	$3,376.52	$1,261.08	$362.08
28	Total Rebates	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
29	Including Costs - After Rebates	$111.60	$55.80	$1,049.04	$806.00	$3,376.52	$1,261.08	$362.08
	ANNUAL BILL SAVINGS							
30	Calculated Bill Savings	$8.74	$5.95	$97.44	$160.29	$222.87	$192.27	$49.04
31	Payback Before Rebates (Years)	12.8	9.4	10.8	5.0	15.2	6.6	7.4
32	Payback After Rebates (Years)	12.8	9.4	10.8	5.0	15.2	6.6	7.4

Fire Hall

	LIGHTING DESCRIPTION	Measure # 8	Measure # 9	Measure # 10	Measure # 11	Measure # 12	Measure # 13
1	Existing Equipment	INC 60W	INC 75W	INC 90W	(2) INC 15W	2-F32T8/1-EB	SENSORS
2	Replacement Equipment	1-SLS-25W	1-SLS-18W	1-SLS-20W-FLD	LED/REFIX/BATTERY BACKUP	Leave as is	
3	fixture code	I60BB-RSI25	I75BB-RSI18	I90BB-RSIFLD	X30	Z-BT8	0
4	Floor/Room	0	0	0	0	0	0
5	Lowest Recorded Lighting Level @Task	0	0	0	0	0	0
6	Min. Required Lighting Level for Task						
7	Total Annual Hours	3,276	1,605	3,276	8,760	3,413	14,040
	CONNECTED KW/LUMINAIRE						
8	Existing Luminaire kW	0.060	0.075	0.090	0.030	0.058	
9	New Luminaire kW	0.027	0.020	0.023	0.003	0.058	
	KW/KWH SAVINGS						
10	# of Existing Units	7	7	9	3	40	0
11	# of New Units	7	7	9	3	40	5
12	Total Existing Connected kW	0.420	0.525	0.810	0.090	2.320	0.000
13	Total New Connected kW	0.189	0.140	0.207	0.009	2.320	0.000
14	Total Customer Monthly kW Savings	0.231	0.385	0.603	0.081	0.000	0.027
15	Total Existing Annual kWh	1375.920	842.400	2653.560	788.400	7918.392	0.000
16	Total New Annual kWh	619.164	224.640	678.132	78.840	7918.392	0.000
17	Total Customer Annual kWh Savings	757	618	1975	710	0	507
	MEASURE INSTALLATION COST						
18	Material Cost Each	$10.00	$9.00	$11.00	$50.00	$0.00	$33.00
19	Installation Cost Each	$5.00	$5.00	$5.00	$50.00	$0.00	$95.70
20	Total Material & Installation Cost Each	$15.00	$14.00	$16.00	$100.00	$0.00	$128.70
21	Total Material Cost	$70.00	$63.00	$99.00	$150.00	$0.00	$165.00
22	Total Installation Cost	$35.00	$35.00	$45.00	$150.00	$0.00	$478.50
23	Total Material & Installation Cost	$105.00	$98.00	$144.00	$300.00	$0.00	$643.50
	HAZARDOUS MATERIAL DISPOSAL COST						
24	Total # Haz.Mat. Ballasts To Be Disposed	0	0	0	0	0	
25	Total # Lamps	7	7	9	6	0	
26	Total Cost for Disposal	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	PROJECT COST						
27	Including Costs - Before Rebates	$130.20	$121.52	$178.56	$372.00	$0.00	$797.94
28	Total Rebates	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
29	Including Costs - After Rebates	$130.20	$121.52	$178.56	$372.00	$0.00	$797.94
	ANNUAL BILL SAVINGS						
30	Calculated Bill Savings	$84.54	$110.01	$220.67	$50.96	$0.00	$29.89
31	Payback Before Rebates (Years)	1.5	1.1	0.8	7.3	0.0	26.7
32	Payback After Rebates (Years)	1.5	1.1	0.8	7.3	0.0	26.7

Fire Hall

Fire Hall		Measure # 1	Measure # 2	Measure # 3	Measure # 4	Measure # 5	Measure # 6	Measure # 7
Operation & Maintenance								
1	Existing Equipment	1-F40T12/1-SMB	1-F30T12/1-SMB	2-F40T12/1-SMB	2-F96T12HO/1-SMB	2-F96T12HO/1-SMB	3-F40T12/2-SMB	INC 100W
2	Replacement Equipment	1-F32T8/1-EB/RETRO	1-F25T8/1-EB/RETRO	2-F32T8/1-EB/RETRO	4-F32T8/1-EB/REFIX/8'IND	6-F32T8/2-EB/REFIX/8'IND	3-F32T8/1-EB/RETRO	2-F17T8/1-EB/REFIX/2'S
3	fixture code	A	AA	B	B8HOIND-R(B)	B8HOIND-R(C)	C	I100BB-RS(BBB)
Current Lamps								
4	Lamps Per Fixture	1	1	2	2	2	3	1
5	Annual Run Hours	3,276	3,276	2,756	3,276	3,276	3,276	3,276
6	Cost Per Lamp	$2.60	$2.60	$2.60	$4.20	$4.20	$2.60	$1.00
7	Lamp Life (hours)	20000	20000	20000	12000	12000	20000	1000
8	Number of fixtures	2	1	18	4	14	18	2
9	Maintenance Cost Per Year	$0.85	$0.43	$12.90	$9.17	$32.10	$23.00	$6.55
Proposed Lamps								
10	Lamps Per Fixture	1	1	2	4	6	3	2
11	Annual Run Hours	3,276	3,276	2,756	3,276	3,276	3,276	3,276
12	Cost Per Lamp	$2.60	$3.00	$2.60	$2.60	$2.60	$2.60	$3.00
13	Lamp Life (hours)	20000	20000	20000	20000	20000	20000	20000
14	Number of fixtures	2	1	18	4	14	18	2
15	Maintenance Cost Per Year	$0.85	$0.49	$12.90	$6.81	$35.77	$23.00	$1.97
Total Savings								
16	Maintenance Savings	$0.00	-$0.07	$0.00	$2.36	-$3.67	$0.00	$4.59
Current Ballasts								
17	Ballasts Per Fixture	1	1	1	1	1	1	0
18	Annual Run Hours	3,276	3,276	2,756	3,276	3,276	3,276	3,276
19	Cost Per Ballast	$17.00	$17.00	$15.50	$15.00	$15.00	$18.75	$0.00
20	Ballast Life (hours)	50000	50000	50000	50000	50000	50000	0
21	Number of fixtures	2	1	18	4	14	18	2
22	Maintenance Cost Per Year	$2.23	$1.11	$15.38	$3.93	$13.76	$22.11	$0.00
Proposed Ballasts								
23	Ballasts Per Fixture	1	1	1	1	1	1	1
24	Annual Run Hours	3,276	3,276	2,756	3,276	3,276	3,276	3,276
25	Cost Per Ballast	$17.00	$17.00	$15.50	$18.75	$18.75	$18.75	$17.00
26	Ballast Life (hours)	50000	50000	50000	50000	50000	50000	50000
27	Number of fixtures	2	1	18	4	14	18	2
28	Maintenance Cost Per Year	$2.23	$1.11	$15.38	$4.91	$17.20	$22.11	$2.23
Total Savings								
29	Maintenance Savings	$0.00	$0.00	$0.00	-$0.98	-$3.44	$0.00	-$2.23

Fire Hall

Fire Hall *Operation & Maintenance*		Measure # 8	Measure # 9	Measure # 10	Measure # 11	Measure # 12	Measure # 13
1	Existing Equipment	INC 60W	INC 75W	INC 90W	(2) INC 15W	2-F32T8/1-EB	SENSORS
2	Replacement Equipment	1-SLS-25W	1-SLS-18W	1-SLS-20W-FLD	LED/REFIX/BATTERY BACKUP	Leave as is	
3	fixture code	I60BB-RSI25	I75BB-RSI18	I90BB-RSIFLD	X30	Z-BT8	0
Current Lamps							
4	Lamps Per Fixture	1	1	1	2	0	
5	Annual Run Hours	3,276	1,605	3,276	8,760	3,413	
6	Cost Per Lamp	$1.00	$1.00	$1.00	$1.00	$0.00	
7	Lamp Life (hours)	1000	1000	1000	1000	0	
8	Number of fixtures	7	7	9	3	40	
9	Maintenance Cost Per Year	$22.93	$11.23	$29.48	$52.56	$0.00	
Proposed Lamps							
10	Lamps Per Fixture	1	1	1	0	0	
11	Annual Run Hours	3,276	1,605	3,276	8,760	3,413	
12	Cost Per Lamp	$10.00	$10.00	$11.00	0	0	
13	Lamp Life (hours)	10000	24000	10000	0	0	
14	Number of fixtures	7	7	9	3	40	
15	Maintenance Cost Per Year	$22.93	$4.68	$32.43	$0.00	$0.00	
Total Savings							
16	Maintenance Savings	$0.00	$6.55	-$2.95	$52.56	$0.00	

Current Ballasts							
17	Ballasts Per Fixture	0	0	0	0	0	
18	Annual Run Hours	3,276	1,605	3,276	8,760	3,413	
19	Cost Per Ballast	$0.00	$0.00	$0.00	$0.00	$0.00	
20	Ballast Life (hours)	0	0	0	0	0	
21	Number of fixtures	7	7	9	3	40	
22	Maintenance Cost Per Year	$0.00	$0.00	$0.00	$0.00	$0.00	
Proposed Ballasts							
23	Ballasts Per Fixture	0	1	0	0	0	
24	Annual Run Hours	3,276	1,605	3,276	8,760	3,413	
25	Cost Per Ballast	$0.00	$65.00	$0.00	$0.00	$0.00	
26	Ballast Life (hours)	0	50000	0	100000	0	
27	Number of fixtures	7	7	9	3	40	
28	Maintenance Cost Per Year	$0.00	$14.60	$0.00	$0.00	$0.00	
Total Savings							
29	Maintenance Savings	$0.00	-$14.60	$0.00	$0.00	$0.00	

Fire Hall

Average Watts Calculations

4-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*44*
Two-lamp	*74*
Three-lamp	*117*
Four-lamp	*148*

4-foot flourescent fixtures - High Output

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

*Ballats are all Standard Magnetic

	Average Watts
One-Lamp	*81*
Two-lamp	*138*
Three-lamp	*219*
Four-lamp	*275*

3-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*42*
Two-lamp	*70*
Three-lamp	*112*
Four-lamp	*140*

2-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*25*
Two-lamp	*47*
Three-lamp	*72*
Four-lamp	*94*

Fire Hall

Average Watts Calculations

8-foot flourescent fixtures - High Output

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*128*
Two-lamp	*220*
Three-lamp	*347*
Four-lamp	*439*

8-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*87*
Two-lamp	*136*
Three-lamp	*223*
Four-lamp	*271*

LIGHTING RETROFIT

Library

Project No.: 4307-01

Measure Summary Table

1-Jan-09

Savings		
Average Demand Savings	0.6	kW/Month
Electrical Energy Savings	2,780	kWh/Year
Fossil Fuel Savings	(2)	mmBtu/Year
Operational & Maintenance Savings	($23)	Per Year
Energy Savings ($)	$225	Per Year
Total Energy & O&M Savings	$201	Per Year
Project Costs		
Total Measure Cost	$3,574	
Payback		
Simple Payback	17.8	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	17.8	Year(s)

Library

	LIGHTING DESCRIPTION	Measure # 1	Measure # 2	Measure # 3
1	Existing Equipment	INC 75W	2-F32T8/1-EB	SENSORS
2	Replacement Equipment	1-SLS-18W	Leave as is	
3	fixture code	I75BB-RSI18	Z-BT8	0
4	Floor/Room	0	0	0
5	Lowest Recorded Lighting Level @Task	0	0	0
6	Min. Required Lighting Level for Task			
7	Total Annual Hours	3,276	3,276	26,208
	CONNECTED KW/LUMINAIRE			
8	Existing Luminaire kW	0.075	0.058	
9	New Luminaire kW	0.020	0.058	
	KW/KWH SAVINGS			
10	# of Existing Units	10	40	0
11	# of New Units	10	40	8
12	Total Existing Connected kW	0.750	2.320	0.000
13	Total New Connected kW	0.200	2.320	0.000
14	Total Customer Monthly kW Savings	0.550	0.000	0.073
15	Total Existing Annual kWh	2457.000	7600.320	0.000
16	Total New Annual kWh	655.200	7600.320	0.000
17	Total Customer Annual kWh Savings	1802	0	979
	MEASURE INSTALLATION COST			
18	Material Cost Each	$10.00	$0.00	$79.50
19	Installation Cost Each	$5.00	$0.00	$118.25
20	Total Material & Installation Cost Each	$15.00	$0.00	$197.75
21	Total Material Cost	$100.00	$0.00	$636.00
22	Total Installation Cost	$50.00	$0.00	$946.00
23	Total Material & Installation Cost	$150.00	$0.00	$1,582.00
	HAZARDOUS MATERIAL DISPOSAL COST			
24	Total # Haz.Mat. Ballasts To Be Disposed	0	0	
25	Total # Lamps	10	0	
26	Total Cost for Disposal	$0.00	$0.00	$0.00
	PROJECT COST			
27	Including Costs - Before Rebates	$186.00	$0.00	$1,961.68
28	Total Rebates	$0.00	$0.00	$0.00
29	Including Costs - After Rebates	$186.00	$0.00	$1,961.68
	ANNUAL BILL SAVINGS			
30	Calculated Bill Savings	$201.67	$0.00	$62.15
31	Payback Before Rebates (Years)	0.9	0.0	31.6
32	Payback After Rebates (Years)	0.9	0.0	31.6

Library

Library		Measure # 1	Measure # 2	Measure # 3
Operation & Maintenance				
1	Existing Equipment	INC 75W	2-F32T8/1-EB	SENSORS
2	Replacement Equipment	1-SLS-18W	Leave as is	
3	fixture code	I75BB-RSI18	Z-BT8	0
Current Lamps				
4	Lamps Per Fixture	1	0	
5	Annual Run Hours	3,276	3,276	
6	Cost Per Lamp	$1.00	$0.00	
7	Lamp Life (hours)	1000	0	
8	Number of fixtures	10	40	
9	Maintenance Cost Per Year	$32.76	$0.00	
Proposed Lamps				
10	Lamps Per Fixture	1	0	
11	Annual Run Hours	3,276	3,276	
12	Cost Per Lamp	$10.00	0	
13	Lamp Life (hours)	24000	0	
14	Number of fixtures	10	40	
15	Maintenance Cost Per Year	$13.65	$0.00	
Total Savings				
16	Maintenance Savings	$19.11	$0.00	

Current Ballasts				
17	Ballasts Per Fixture	0	0	
18	Annual Run Hours	3,276	3,276	
19	Cost Per Ballast	$0.00	$0.00	
20	Ballast Life (hours)	0	0	
21	Number of fixtures	10	40	
22	Maintenance Cost Per Year	$0.00	$0.00	
Proposed Ballasts				
23	Ballasts Per Fixture	1	0	
24	Annual Run Hours	3,276	3,276	
25	Cost Per Ballast	$65.00	$0.00	
26	Ballast Life (hours)	50000	0	
27	Number of fixtures	10	40	
28	Maintenance Cost Per Year	$42.59	$0.00	
Total Savings				
29	Maintenance Savings	-$42.59	$0.00	

Library

Average Watts Calculations

4-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*44*
Two-lamp	*74*
Three-lamp	*117*
Four-lamp	*148*

4-foot flourescent fixtures - High Output

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

*Ballats are all Standard Magnetic

	Average Watts
One-Lamp	*81*
Two-lamp	*138*
Three-lamp	*219*
Four-lamp	*275*

3-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*42*
Two-lamp	*70*
Three-lamp	*112*
Four-lamp	*140*

2-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*25*
Two-lamp	*47*
Three-lamp	*72*
Four-lamp	*94*

Library

Average Watts Calculations

8-foot flourescent fixtures - High Output

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*128*
Two-lamp	*220*
Three-lamp	*347*
Four-lamp	*439*

8-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*87*
Two-lamp	*136*
Three-lamp	*223*
Four-lamp	*271*

LIGHTING RETROFIT

Senior Center

Project No.: 4307-01

Measure Summary Table

1-Jan-09

Savings		
Average Demand Savings	0.3	kW/Month
Electrical Energy Savings	982	kWh/Year
Fossil Fuel Savings	(1)	mmBtu/Year
Operational & Maintenance Savings	($4)	Per Year
Energy Savings ($)	$91	Per Year
Total Energy & O&M Savings	$87	Per Year
Project Costs		
Total Measure Cost	$4,763	
Payback		
Simple Payback	54.8	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	54.8	Year(s)

Senior Center

	LIGHTING DESCRIPTION	Measure # 1	Measure # 2	Measure # 3
1	Existing Equipment	INC 75W	2-F32T8/1-EB	SENSORS
2	Replacement Equipment	1-SLS-18W	Leave as is	
3	fixture code	I75BB-RSI18	Z-BT8	0
4	Floor/Room	0	0	0
5	Lowest Recorded Lighting Level @Task	0	0	0
6	Min. Required Lighting Level for Task			
7	Total Annual Hours	1,872	1,841	17,784
	CONNECTED KW/LUMINAIRE			
8	Existing Luminaire kW	0.075	0.058	
9	New Luminaire kW	0.020	0.058	
	KW/KWH SAVINGS			
10	# of Existing Units	3	61	0
11	# of New Units	3	61	10
12	Total Existing Connected kW	0.225	3.538	0.000
13	Total New Connected kW	0.060	3.538	0.000
14	Total Customer Monthly kW Savings	0.165	0.000	0.105
15	Total Existing Annual kWh	421.200	6514.560	0.000
16	Total New Annual kWh	112.320	6514.560	0.000
17	Total Customer Annual kWh Savings	309	0	673
	MEASURE INSTALLATION COST			
18	Material Cost Each	$10.00	$0.00	$126.00
19	Installation Cost Each	$5.00	$0.00	$129.85
20	Total Material & Installation Cost Each	$15.00	$0.00	$255.85
21	Total Material Cost	$30.00	$0.00	$1,260.00
22	Total Installation Cost	$15.00	$0.00	$1,298.50
23	Total Material & Installation Cost	$45.00	$0.00	$2,558.50
	HAZARDOUS MATERIAL DISPOSAL COST			
24	Total # Haz.Mat. Ballasts To Be Disposed	0	0	
25	Total # Lamps	3	0	
26	Total Cost for Disposal	$0.00	$0.00	$0.00
	PROJECT COST			
27	Including Costs - Before Rebates	$55.80	$0.00	$3,172.54
28	Total Rebates	$0.00	$0.00	$0.00
29	Including Costs - After Rebates	$55.80	$0.00	$3,172.54
	ANNUAL BILL SAVINGS			
30	Calculated Bill Savings	$49.25	$0.00	$54.29
31	Payback Before Rebates (Years)	1.1	0.0	58.4
32	Payback After Rebates (Years)	1.1	0.0	58.4

Senior Center

Senior Center *Operation & Maintenance*		Measure # 1	Measure # 2	Measure # 3
1	Existing Equipment	INC 75W	2-F32T8/1-EB	SENSORS
2	Replacement Equipment	1-SLS-18W	Leave as is	
3	fixture code	I75BB-RSI18	Z-BT8	0
Current Lamps				
4	Lamps Per Fixture	1	0	
5	Annual Run Hours	1,872	1,841	
6	Cost Per Lamp	$1.00	$0.00	
7	Lamp Life (hours)	1000	0	
8	Number of fixtures	3	61	
9	Maintenance Cost Per Year	$5.62	$0.00	
Proposed Lamps				
10	Lamps Per Fixture	1	0	
11	Annual Run Hours	1,872	1,841	
12	Cost Per Lamp	$10.00	0	
13	Lamp Life (hours)	24000	0	
14	Number of fixtures	3	61	
15	Maintenance Cost Per Year	$2.34	$0.00	
Total Savings				
16	Maintenance Savings	$3.28	$0.00	

Current Ballasts				
17	Ballasts Per Fixture	0	0	
18	Annual Run Hours	1,872	1,841	
19	Cost Per Ballast	$0.00	$0.00	
20	Ballast Life (hours)	0	0	
21	Number of fixtures	3	61	
22	Maintenance Cost Per Year	$0.00	$0.00	
Proposed Ballasts				
23	Ballasts Per Fixture	1	0	
24	Annual Run Hours	1,872	1,841	
25	Cost Per Ballast	$65.00	$0.00	
26	Ballast Life (hours)	50000	0	
27	Number of fixtures	3	61	
28	Maintenance Cost Per Year	$7.30	$0.00	
Total Savings				
29	Maintenance Savings	-$7.30	$0.00	

Senior Center

Average Watts Calculations

4-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*44*
Two-lamp	*74*
Three-lamp	*117*
Four-lamp	*148*

4-foot flourescent fixtures - High Output

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

*Ballats are all Standard Magnetic

	Average Watts
One-Lamp	*81*
Two-lamp	*138*
Three-lamp	*219*
Four-lamp	*275*

3-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*42*
Two-lamp	*70*
Three-lamp	*112*
Four-lamp	*140*

2-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*25*
Two-lamp	*47*
Three-lamp	*72*
Four-lamp	*94*

Senior Center

Average Watts Calculations

8-foot flourescent fixtures - High Output

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*128*
Two-lamp	*220*
Three-lamp	*347*
Four-lamp	*439*

8-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*87*
Two-lamp	*136*
Three-lamp	*223*
Four-lamp	*271*

LIGHTING RETROFIT

Village Hall

Project No.: 4307-01

Measure Summary Table

1-Jan-09

Savings		
Average Demand Savings	9.5	kW/Month
Electrical Energy Savings	26,469	kWh/Year
Fossil Fuel Savings	(23)	mmBtu/Year
Operational & Maintenance Savings	$257	Per Year
Energy Savings ($)	$2,951	Per Year
Total Energy & O&M Savings	$3,209	Per Year
Project Costs		
Total Measure Cost	$26,018	
Payback		
Simple Payback	8.1	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	8.1	Year(s)

Village Hall

	LIGHTING DESCRIPTION	Measure # 1	Measure # 2	Measure # 3	Measure # 4	Measure # 5	Measure # 6	Measure # 7
1	Existing Equipment	2-F40T12/1-SMB	2-F20T12/1-SMB	2-F40T12U/1-SMB	4-F40T12/2-SMB	4-F40T12/2-SMB	INC 100W	INC 100W
2	Replacement Equipment	2-F32T8/1-EB/RETRO	2-F17T8/1-EB/RETRO	2-F17T8/1-EB/RETRO/REFL	4-F32T8/1-EB/RETRO	2-F32T8/1-EB/RETRO/REFL	1-SLS-25W	2-F17T8/1-EB/REFIX/2'W
3	fixture code	B	BBB	BUTR2-(RFLBBB)	D	DTR-(RFLB)	I100BB-RSI25	I100BB-RVAN(BBB)
4	Floor/Room	0	0	0	0	0	0	0
5	Lowest Recorded Lighting Level @Task	0	0	0	0	0	0	0
6	Min. Required Lighting Level for Task							
7	Total Annual Hours	2,507	1,872	5,807	3,276	3,814	1,560	4,848
	CONNECTED KW/LUMINAIRE							
8	Existing Luminaire kW	0.074	0.047	0.074	0.148	0.148	0.100	0.100
9	New Luminaire kW	0.058	0.033	0.033	0.110	0.058	0.027	0.033
	KW/KWH SAVINGS							
10	# of Existing Units	14	1	13	1	22	3	2
11	# of New Units	14	1	13	1	22	3	2
12	Total Existing Connected kW	1.034	0.047	0.960	0.148	3.251	0.300	0.200
13	Total New Connected kW	0.812	0.033	0.429	0.110	1.276	0.081	0.066
14	Total Customer Monthly kW Savings	0.222	0.014	0.531	0.038	1.975	0.219	0.134
15	Total Existing Annual kWh	2593.013	87.516	5576.972	484.029	12398.589	468.000	969.600
16	Total New Annual kWh	2035.800	61.776	2491.236	360.360	4867.128	126.360	319.968
17	Total Customer Annual kWh Savings	557	26	3086	124	7531	342	650
	MEASURE INSTALLATION COST							
18	Material Cost Each	$20.00	$20.00	$31.00	$31.00	$40.00	$9.50	$89.00
19	Installation Cost Each	$25.00	$25.00	$33.00	$29.50	$33.00	$5.00	$57.00
20	Total Material & Installation Cost Each	$45.00	$45.00	$64.00	$60.50	$73.00	$14.50	$146.00
21	Total Material Cost	$280.00	$20.00	$403.00	$31.00	$880.00	$28.50	$178.00
22	Total Installation Cost	$350.00	$25.00	$429.00	$29.50	$726.00	$15.00	$114.00
23	Total Material & Installation Cost	$630.00	$45.00	$832.00	$60.50	$1,606.00	$43.50	$292.00
	HAZARDOUS MATERIAL DISPOSAL COST							
24	Total # Haz.Mat. Ballasts To Be Disposed	14	1	13	2	44	0	0
25	Total # Lamps	28	2	26	4	88	3	2
26	Total Cost for Disposal	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	PROJECT COST							
27	Including Costs - Before Rebates	$781.20	$55.80	$1,031.68	$75.02	$1,991.44	$53.94	$362.08
28	Total Rebates	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
29	Including Costs - After Rebates	$781.20	$55.80	$1,031.68	$75.02	$1,991.44	$53.94	$362.08
	ANNUAL BILL SAVINGS							
30	Calculated Bill Savings	$73.35	$4.12	$259.54	$13.85	$775.56	$62.32	$59.28
31	Payback Before Rebates (Years)	10.7	13.5	4.0	5.4	2.6	0.9	6.1
32	Payback After Rebates (Years)	10.7	13.5	4.0	5.4	2.6	0.9	6.1

Village Hall

	LIGHTING DESCRIPTION	Measure # 8	Measure # 9	Measure # 10	Measure # 11	Measure # 12	Measure # 13	Measure # 14	Measure # 15	Measure # 16
1	Existing Equipment	INC 120W	INC 150W	INC 60W	INC 60W	INC 75W	INC 90W	(2) INC 15W	2-F32T8/1-EB	SENSORS
2	Replacement Equipment	3-F32T8/1-EB/REFIX/4'IND	2-F17T8/1-EB/REFIX/2'W	1-SLS-25W	1-SLS-25W-GLB	1-SLS-18W	1-SLS-20W-FLD	LED/REFIX/BATTERY BACKUP	Leave as is	
3	fixture code	I120CH-RIND(C)	I150BB-RW(BBB)	I60BB-RSI25	I60BB-RSI25GLB	I75BB-RSI18	I90BB-RSIFLD	X30	Z-BT8	0
4	Floor/Room	0	0	0	0	0	0	0	0	0
5	Lowest Recorded Lighting Level @Task	0	0	0	0	0	0	0	0	0
6	Min. Required Lighting Level for Task									
7	Total Annual Hours	936	936	1,129	1,872	2,582	3,276	8,760	2,738	151,320
	CONNECTED KW/LUMINAIRE									
8	Existing Luminaire kW	0.120	0.150	0.060	0.060	0.075	0.090	0.030	0.058	
9	New Luminaire kW	0.088	0.033	0.027	0.027	0.020	0.023	0.003	0.058	
	KW/KWH SAVINGS									
10	# of Existing Units	42	6	17	3	13	6	13	219	0
11	# of New Units	20	6	17	3	13	6	13	219	41
12	Total Existing Connected kW	5.040	0.900	1.020	0.180	0.975	0.540	0.390	12.702	0.000
13	Total New Connected kW	1.760	0.198	0.459	0.081	0.260	0.138	0.039	12.702	0.000
14	Total Customer Monthly kW Savings	3.280	0.702	0.561	0.099	0.715	0.402	0.351	0.000	0.291
15	Total Existing Annual kWh	4717.440	842.400	1151.280	336.960	2517.300	1769.040	3416.400	34778.424	0.000
16	Total New Annual kWh	1647.360	185.328	518.076	151.632	671.280	452.088	341.640	34778.424	0.000
17	Total Customer Annual kWh Savings	3070	657	633	185	1846	1317	3075	0	3370
	MEASURE INSTALLATION COST									
18	Material Cost Each	$68.00	$89.00	$9.50	$11.00	$9.00	$11.00	$50.00	$0.00	$69.29
19	Installation Cost Each	$73.50	$57.00	$5.00	$5.00	$5.00	$5.00	$50.00	$0.00	$113.18
20	Total Material & Installation Cost Each	$141.50	$146.00	$14.50	$16.00	$14.00	$16.00	$100.00	$0.00	$182.48
21	Total Material Cost	$1,360.00	$534.00	$161.50	$33.00	$117.00	$66.00	$650.00	$0.00	$2,841.00
22	Total Installation Cost	$3,087.00	$342.00	$85.00	$15.00	$65.00	$30.00	$650.00	$0.00	$4,640.50
23	Total Material & Installation Cost	$4,447.00	$876.00	$246.50	$48.00	$182.00	$96.00	$1,300.00	$0.00	$7,481.50
	HAZARDOUS MATERIAL DISPOSAL COST									
24	Total # Haz.Mat. Ballasts To Be Disposed	0	0	0	0	0	0	0	0	
25	Total # Lamps	42	6	17	3	13	6	26	0	
26	Total Cost for Disposal	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
	PROJECT COST									
27	Including Costs - Before Rebates	$5,514.28	$1,086.24	$305.66	$59.52	$225.68	$119.04	$1,612.00	$0.00	$9,277.06
28	Total Rebates	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
29	Including Costs - After Rebates	$5,514.28	$1,086.24	$305.66	$59.52	$225.68	$119.04	$1,612.00	$0.00	$9,277.06
	ANNUAL BILL SAVINGS									
30	Calculated Bill Savings	$835.18	$178.75	$148.04	$29.66	$238.54	$147.51	$221.19	$0.00	$222.72
31	Payback Before Rebates (Years)	6.6	6.1	2.1	2.0	0.9	0.8	7.3	0.0	41.7
32	Payback After Rebates (Years)	6.6	6.1	2.1	2.0	0.9	0.8	7.3	0.0	41.7

Village Hall

Village Hall Operation & Maintenance		Measure # 1	Measure # 2	Measure # 3	Measure # 4	Measure # 5	Measure # 6	Measure # 7
1	Existing Equipment	2-F40T12/1-SMB	2-F20T12/1-SMB	2-F40T12U/1-SMB	4-F40T12/2-SMB	4-F40T12/2-SMB	INC 100W	INC 100W
2	Replacement Equipment	2-F32T8/1-EB/RETRO	2-F17T8/1-EB/RETRO	2-F17T8/1-EB/RETRO/REFL	4-F32T8/1-EB/RETRO	2-F32T8/1-EB/RETRO/REFL	1-SLS-25W	2-F17T8/1-EB/REFIX/2'W
3	fixture code	B	BBB	BUTR2-(RFLBBB)	D	DTR-(RFLB)	I100BB-RSI25	I100BB-RVAN(BBB)
Current Lamps								
4	Lamps Per Fixture	2	2	2	4	4	1	1
5	Annual Run Hours	2,507	1,872	5,807	3,276	3,814	1,560	4,848
6	Cost Per Lamp	$2.60	$3.00	$3.00	$2.60	$2.60	$1.00	$1.00
7	Lamp Life (hours)	20000	20000	20000	20000	20000	1000	1000
8	Number of fixtures	14	1	13	1	22	3	2
9	Maintenance Cost Per Year	$9.13	$0.56	$22.65	$1.70	$43.64	$4.68	$9.70
Proposed Lamps								
10	Lamps Per Fixture	2	2	2	4	2	1	2
11	Annual Run Hours	2,507	1,872	5,807	3,276	3,814	1,560	4,848
12	Cost Per Lamp	$2.60	$3.00	$3.00	$2.60	$2.60	$10.00	$3.00
13	Lamp Life (hours)	20000	20000	20000	20000	20000	10000	20000
14	Number of fixtures	14	1	13	1	22	3	2
15	Maintenance Cost Per Year	$9.13	$0.56	$22.65	$1.70	$21.82	$4.68	$2.91
Total Savings								
16	Maintenance Savings	$0.00	$0.00	$0.00	$0.00	$21.82	$0.00	$6.79

Current Ballasts								
17	Ballasts Per Fixture	1	1	1	2	2	0	0
18	Annual Run Hours	2,507	1,872	5,807	3,276	3,814	1,560	4,848
19	Cost Per Ballast	$15.50	$17.00	$17.00	$18.75	$18.75	$0.00	$0.00
20	Ballast Life (hours)	50000	50000	50000	50000	50000	0	0
21	Number of fixtures	14	1	13	1	22	3	2
22	Maintenance Cost Per Year	$10.88	$0.64	$25.67	$2.46	$62.94	$0.00	$0.00
Proposed Ballasts								
23	Ballasts Per Fixture	1	1	1	1	1	0	1
24	Annual Run Hours	2,507	1,872	5,807	3,276	3,814	1,560	4,848
25	Cost Per Ballast	$15.50	$17.00	$17.00	$18.75	$15.50	$0.00	$17.00
26	Ballast Life (hours)	50000	50000	50000	50000	50000	0	50000
27	Number of fixtures	14	1	13	1	22	3	2
28	Maintenance Cost Per Year	$10.88	$0.64	$25.67	$1.23	$26.01	$0.00	$3.30
Total Savings								
29	Maintenance Savings	$0.00	$0.00	$0.00	$1.23	$36.92	$0.00	-$3.30

Village Hall

Village Hall		Measure # 8	Measure # 9	Measure # 10	Measure # 11	Measure # 12	Measure # 13	Measure # 14	Measure # 15	Measure # 16
Operation & Maintenance										
1	Existing Equipment	INC 120W	INC 150W	INC 60W	INC 60W	INC 75W	INC 90W	(2) INC 15W	2-F32T8/1-EB	SENSORS
2	Replacement Equipment	3-F32T8/1-EB/REFIX/4'IND	2-F17T8/1-EB/REFIX/2'W	1-SLS-25W	1-SLS-25W-GLB	1-SLS-18W	1-SLS-20W-FLD	LED/REFIX/BATTERY BACKUP	Leave as is	
3	fixture code	I120CH-RIND(C)	I150BB-RW(BBB)	I60BB-RSI25	I60BB-RSI25GLB	I75BB-RSI18	I90BB-RSIFLD	X30	Z-BT8	0
Current Lamps										
4	Lamps Per Fixture	1	1	1	1	1	1	2	0	
5	Annual Run Hours	936	936	1,129	1,872	2,582	3,276	8,760	2,738	
6	Cost Per Lamp	$2.60	$1.00	$1.00	$1.00	$1.00	$1.00	$1.00	$0.00	
7	Lamp Life (hours)	20000	1000	1000	1000	1000	1000	1000	0	
8	Number of fixtures	42	6	17	3	13	6	13	219	
9	Maintenance Cost Per Year	$5.11	$5.62	$19.19	$5.62	$33.56	$19.66	$227.76	$0.00	
Proposed Lamps										
10	Lamps Per Fixture	3	2	1	1	1	1	0	0	
11	Annual Run Hours	936	936	1,129	1,872	2,582	3,276	8,760	2,738	
12	Cost Per Lamp	$2.60	$3.00	$10.00	$11.00	$10.00	$11.00	0	0	
13	Lamp Life (hours)	20000	20000	10000	10000	24000	10000	0	0	
14	Number of fixtures	20	6	17	3	13	6	13	219	
15	Maintenance Cost Per Year	$7.30	$1.68	$19.19	$6.18	$13.99	$21.62	$0.00	$0.00	
Total Savings										
16	Maintenance Savings	-$2.19	$3.93	$0.00	-$0.56	$19.58	-$1.97	$227.76	$0.00	

Current Ballasts										
17	Ballasts Per Fixture	0	0	0	0	0	0	0	0	
18	Annual Run Hours	936	936	1,129	1,872	2,582	3,276	8,760	2,738	
19	Cost Per Ballast	$18.75	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
20	Ballast Life (hours)	50000	0	0	0	0	0	0	0	
21	Number of fixtures	42	6	17	3	13	6	13	219	
22	Maintenance Cost Per Year	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
Proposed Ballasts										
23	Ballasts Per Fixture	1	1	0	0	1	0	0	0	
24	Annual Run Hours	936	936	1,129	1,872	2,582	3,276	8,760	2,738	
25	Cost Per Ballast	$18.75	$17.00	$0.00	$0.00	$65.00	$0.00	$0.00	$0.00	
26	Ballast Life (hours)	50000	50000	0	0	50000	0	100000	0	
27	Number of fixtures	20	6	17	3	13	6	13	219	
28	Maintenance Cost Per Year	$7.02	$1.91	$0.00	$0.00	$43.63	$0.00	$0.00	$0.00	
Total Savings										
29	Maintenance Savings	-$7.02	-$1.91	$0.00	$0.00	-$43.63	$0.00	$0.00	$0.00	

Village Hall

Average Watts Calculations

4-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*44*
Two-lamp	*74*
Three-lamp	*117*
Four-lamp	*148*

4-foot flourescent fixtures - High Output

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

*Ballats are all Standard Magnetic

	Average Watts
One-Lamp	*81*
Two-lamp	*138*
Three-lamp	*219*
Four-lamp	*275*

3-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*42*
Two-lamp	*70*
Three-lamp	*112*
Four-lamp	*140*

2-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*25*
Two-lamp	*47*
Three-lamp	*72*
Four-lamp	*94*

Village Hall

Average Watts Calculations

8-foot flourescent fixtures - High Output

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*128*
Two-lamp	*220*
Three-lamp	*347*
Four-lamp	*439*

8-foot flourescent fixtures

Lamp type

25%	Standard Lamps
75%	Energy Efficient Lamps

Ballast type

25%	Standard Magnetic Ballasts
75%	Energy Efficient Magnetic Ballasts

	Average Watts
One-Lamp	*87*
Two-lamp	*136*
Three-lamp	*223*
Four-lamp	*271*

Section 5

FIM #2: Direct Digital Control System Upgrades

FIM #2: DIRECT DIGITAL CONTROL SYSTEM UPGRADES

INVESTIGATION

Wendel surveyed the Village Hall, Recreation Center, Fire House, Library, and Senior Center for opportunities to implement a Direct Digital Control System that would serve to integrate the existing de-centralized HVAC controls.

Presently, these buildings have control systems comprised of local controllers in the mechanical rooms and zone thermostats in areas that the systems serve. While these systems can control the existing HVAC equipment in the buildings, they often require manual intervention to ensure proper operation and, as a result, may not be providing optimum control of HVAC equipment. This "slippage" in performance results in more energy usage and longer run time of equipment to achieve the required set point. In addition to consuming more energy than required, this longer run time will also reduce the life expectancy of the mechanical equipment.

Initially, Wendel proposed a centralized DDC for the entire Village. However, after discussions with the Village administration, it was discovered that the various facilities operate autonomously of one another and that it would not be possible to assign a single person to oversee and manage the entire system. Furthermore, the cost of installing a level one controller at each site to control the few pieces of equipment resulted in extremely long simple paybacks for each facility.

Existing System

Village Hall

System is comprised of zone thermostats that control the boiler heating zones and the split system cooling zones. Thermostats for the split systems are digital.

Recreation Center

System is comprised of zone thermostats that control the boiler heating zones and the split system cooling zones.

Fire House

System is comprised of zone thermostats that control the boiler heating zones and the packaged rooftop unit cooling zones.

Senior Center

System is comprised of zone thermostats that control the boiler heating zones and the packaged rooftop unit cooling zones.

Library

Although, the library has a centralized HVAC system, each piece of equipment is operated by a stand-alone Automated Logic controller. There is currently no operator terminal to administer the system. Any time the system settings require altering, the Village is forced to call an independent service contractor to connect to the system via a portable operator terminal and adjust settings such as temperatures and operating schedules to suit needs.

The system has problems with proper operating settings. For example, it was observed that both chilled water pumps run at the same time, even though one pump has sufficient capacity to deliver the chilled water flow requirements for the entire facility. The librarian indicated that in the middle of the heating season, the chiller would spontaneously activate, causing the boiler to work overtime in order to achieve space temperature settings.

RECOMMENDATIONS

This measure involves the installation of programmable digital thermostats (i.e. local control) in the Village Hall, Recreation Center, Fire House, and Senior Center, and centralized Direct Digital Control (DDC) system in the Library.

Proposed System

Village Hall

Install eight (8) password-protected digital thermostats with scheduling capability for the heating zones located throughout the Village Hall. The thermostats will be programmed for temperature

setback.

Recreation Center

Install five (5) password-protected digital thermostats with scheduling capability for three (3) heating zones and the two (2) split cooling systems. The thermostats will be programmed for temperature setback.

Fire House

Install five (5) password-protected digital thermostats with scheduling capability for four (4) heating zones and one (1) for the packaged rooftop unit. The thermostats will be programmed for temperature setback.

Senior Center

Install six (6) password-protected digital thermostats with scheduling capability for the three (3) heating zones and the three (3) packaged rooftop units. The thermostats will be programmed for temperature setback.

Library

A centralized DDC system, complete with a graphical user interface (GUI) and operator terminal, is recommended for the Library. The system will allow an operator to monitor and regulate boilers, chiller, air handling units, system pumps, room temperature and other ancillary HVAC equipment from a central location.

Stand-alone microprocessor-based controllers will provide direct digital control of equipment. The new controllers will be self-contained units, providing automatic control sequences including start-stop (as appropriate), outdoor air control, monitoring and alarms.

The DDC energy management and control system will provide energy savings and space comfort conditioning improvements by providing the following sequences:

- PID control and stabilization functions, which allow the controlled variable (i.e., hot water discharge temperature or space temperature) to avoid "overshooting" or "undershooting" the desired set point.

- Advance scheduling capabilities, which include optimal start/stop and space occupancy scheduling.
- Provide night setback control to lower space temperature during unoccupied periods.

This would be achieved by implementing the following work scope:

- Provide a Johnson Controls FX-40 web-based controller;
- Remove and properly dispose existing Automated Logic controllers from the four (4) air handling units;
- Install Johnson Controls DX-9100 controllers in place of Automated Logic controllers;
- Reconfigure existing wiring for new controllers;
- Provide inputs for the outside air temperature and relative humidity;
- Provide inputs for return air temperature and humidity;
- Provide start/stop/status for the hot water boiler;
- Provide start/stop/status for the air-cooled chiller;
- Install sensors to monitor supply and return chilled water temperature;
- Implement temperature set-back strategies for the entire system;
- Implement enthalpy-based economizer controls for the four air handling units;
- Install variable frequency drives (VFDs) on the four (4) supply fans and four (4) return fans on the air handlers.

Wendel designs DDC-based Energy Management and Control Systems around open networking protocols. The control network can be designed to operate using either BACNet or Modbus compatible firmware, facilitating future expansion and changes without being restricted by proprietary equipment. This measure is based on providing Johnson Controls Metasys systems in an open protocol platform.

Direct Digital Control System
Village Hall
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	50	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$1,176	Per Year
Total Energy & O&M Savings	$1,176	Per Year
Project Costs		
Total Measure Cost	$3,710	
Payback		
Simple Payback	3.2	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	3.2	Year(s)

Village Hall
Temperature Setback Savings - Heating

Assumptions:

Occ. Indoor Temp.	73
Reduced Occ Temp,	71
Unocc. Indoor Temp.	62.5
Peak Heating Load	445 MBH

Existing Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	2	8	3
Unoccupied	6	0	5
Weekends			
Occupied	0	5	0
Unoccupied	8	3	8
% Occupied	17.86%	89.29%	26.79%

Proposed Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	1	8	2
Unoccupied	7	0	6
Weekends			
Occupied	0	3	0
Unoccupied	8	5	8
% Occupied	8.93%	82.14%	17.86%

Bin Temperature Data (Heating Only)				Occ % Load at IAT = 73	Red. Occ % Load at IAT = 71	Unocc % Load at IAT = 62.5	Existing Conditions					Proposed Condiitions					Total Reduced Usage (mmBtu)	Total Reduced Cost ($)
	Hours/Bin						Occupied		Unoccupied		Total Usage (mmBtu)	Occupied		Unoccupied		Total Usage (mmBtu)		
Bin Temp	0 - 8	8 - 16	16 - 24				Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)		Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)			
-17.5	1	0	0	100%	100%	88%	445	0.1	394	0.3	0.4	445	0.0	394	0.4	0.4	0.0	$0.07
-12.5	2	0	0	94%	94%	83%	421	0.2	369	0.6	0.8	420	0.1	369	0.7	0.7	0.0	$0.13
-7.5	5	0	1	89%	89%	77%	396	0.5	344	1.7	2.1	395	0.2	344	1.9	2.1	0.0	$0.40
-2.5	9	1	3	83%	83%	72%	371	1.2	320	3.1	4.3	370	0.8	320	3.5	4.3	0.1	$0.88
2.5	24	6	9	78%	77%	66%	347	4.2	295	8.0	12.1	345	3.0	295	9.0	11.9	0.2	$2.73
7.5	50	16	25	72%	72%	61%	322	9.6	271	16.5	26.2	319	7.1	271	18.7	25.7	0.5	$6.58
12.5	76	37	51	67%	66%	55%	298	17.9	246	25.5	43.5	294	13.6	246	29.0	42.6	0.9	$12.37
17.5	108	58	80	61%	60%	50%	273	25.3	221	34.0	59.2	269	19.3	221	38.6	57.9	1.4	$19.19
22.5	148	90	121	56%	55%	44%	248	34.6	197	43.3	77.8	244	26.5	197	49.3	75.8	2.1	$29.02
27.5	215	139	168	50%	49%	39%	224	46.5	172	54.2	100.6	219	35.8	172	61.8	97.5	3.1	$43.70
32.5	298	225	269	45%	44%	33%	199	65.0	148	68.8	133.8	194	50.3	148	78.6	128.9	4.9	$68.97
37.5	271	238	271	39%	38%	28%	175	58.2	123	54.9	113.2	169	45.2	123	63.0	108.2	5.0	$70.80
42.5	235	214	215	34%	32%	22%	150	43.6	98	36.7	80.4	143	33.7	98	42.2	75.9	4.4	$62.57
47.5	231	193	200	28%	27%	17%	125	33.5	74	26.3	59.9	118	25.4	74	30.2	55.6	4.3	$60.01
52.5	250	177	217	23%	21%	11%	101	26.3	49	18.9	45.2	93	19.2	49	21.5	40.7	4.4	$62.29
57.5	269	211	235	17%	15%	6%	76	22.8	25	10.2	33.1	68	16.3	25	11.7	28.0	5.1	$71.95
62.5	278	216	246	12%	10%	0%	52	15.9	0	0.0	15.9	43	10.5	0	0.0	10.5	5.4	$76.25
Total	2,470	1,821	2,111					405			808		307		459	766	42	$587.85

Calculations:

% Load = actual delta T / max design delta T
where T= temperature
MBH = Peak Heating Load x % Load
mmBtu = MBH / 1,000 x % Occupied x BIN Hours

853 Annual Usage (mmBtu)
0.0% Savings
$14.11 /mmBtu

Annual Savings Summary	
Fuel (mmBtu)	42
Cost ($)	$587.85

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Village Hall	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Direct Digital Control System	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Direct Digital Controls	1	LS	$1,200.00	$1,200.00	$1,200.00	$1,200.00	$2,400.00
2	Bonds	1	LS	$160.00	$160.00	$160.00	$160.00	$320.00
3	Per ITC North Bid January 22, 2008				$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$1,360.00		$1,360.00	$2,720.00
						Contingency:	10.0%	$272.00
							TOTAL DIRECT CONSTRUCTION COST:	$2,992.00
						Audit, Engineering, & Construction Management:	24.0%	$718.08
							SUBTOTAL:	$3,710.08
							Asbestos Abatement Services:	$0.00
						Contingency:	0.0%	$0.00
							TOTAL ASBESTOS CONSTRUCTION COST:	$0.00
						Asbestos Abatement Services Fee:	0.0%	$0.00
							Asbestos SUBTOTAL:	$0.00
							TOTAL:	$3,710.08

Direct Digital Control System

Recreation Center

Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	29	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$427	Per Year
Total Energy & O&M Savings	$427	Per Year
Project Costs		
Total Measure Cost	$2,482	
Payback		
Simple Payback	5.8	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	5.8	Year(s)

Recreation Center
Temperature Setback Savings - Heating

Assumptions:

Occ. Indoor Temp.	74
Reduced Occ Temp,	72
Unocc. Indoor Temp.	62.5
Peak Heating Load	190 MBH

Existing Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	0	8	4
Unoccupied	8	0	4
Weekends			
Occupied	0	8	0
Unoccupied	8	0	8
% Occupied	0.00%	100.00%	35.71%

Proposed Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	0	7	2
Unoccupied	8	1	6
Weekends			
Occupied	0	4	0
Unoccupied	8	4	8
% Occupied	0.00%	76.79%	17.86%

Bin Temperature Data (Heating Only)				Occ % Load at IAT =	Red. Occ % Load at IAT =	Unocc % Load at IAT =	Existing Conditions					Proposed Condiitions					Total Reduced Usage	Total Reduced Cost
	Hours/Bin						Occupied		Unoccupied		Total	Occupied		Unoccupied		Total		
Bin Temp	0 - 8	8 - 16	16 - 24	74	72	62.5	Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)	Usage (mmBtu)	(mmBtu)	($)
-17.5	1	0	0	100%	100%	87%	190	0.0	166	0.2	0.2	190	0.0	166	0.2	0.2	0.0	$0.00
-12.5	2	0	0	95%	94%	82%	180	0.0	156	0.3	0.3	179	0.0	156	0.3	0.3	0.0	$0.00
-7.5	5	0	1	89%	89%	77%	169	0.1	145	0.8	0.9	169	0.0	145	0.8	0.9	0.0	$0.06
-2.5	9	1	3	84%	83%	71%	159	0.3	135	1.5	1.8	158	0.2	135	1.6	1.8	0.0	$0.29
2.5	24	6	9	78%	78%	66%	148	1.4	125	3.7	5.1	148	0.9	125	4.1	5.0	0.1	$1.15
7.5	50	16	25	73%	72%	60%	138	3.4	114	7.5	11.0	137	2.3	114	8.5	10.8	0.2	$3.19
12.5	76	37	51	67%	66%	55%	128	7.1	104	11.3	18.3	126	4.7	104	13.1	17.9	0.5	$7.05
17.5	108	58	80	62%	61%	49%	117	10.2	93	14.9	25.1	116	6.8	93	17.5	24.3	0.8	$11.25
22.5	148	90	121	56%	55%	44%	107	14.2	83	18.8	33.0	105	9.5	83	22.3	31.8	1.2	$17.56
27.5	215	139	168	51%	50%	38%	97	19.2	73	23.5	42.7	94	12.9	73	28.0	40.9	1.8	$26.30
32.5	298	225	269	45%	44%	33%	86	27.7	62	29.3	57.0	84	18.5	62	35.6	54.1	2.9	$43.13
37.5	271	238	271	40%	39%	27%	76	25.4	52	23.1	48.5	73	16.9	52	28.5	45.4	3.1	$45.48
42.5	235	214	215	34%	33%	22%	65	19.0	42	15.5	34.5	63	12.7	42	19.2	31.9	2.7	$39.59
47.5	231	193	200	29%	27%	16%	55	14.6	31	11.2	25.8	52	9.6	31	13.7	23.3	2.5	$36.77
52.5	250	177	217	23%	22%	11%	45	11.4	21	8.1	19.5	41	7.2	21	9.7	17.0	2.5	$36.71
57.5	269	211	235	18%	16%	5%	34	10.1	10	4.4	14.5	31	6.3	10	5.3	11.6	2.9	$42.76
62.5	278	216	246	13%	11%	0%	24	7.3	0	0.0	7.3	20	4.2	0	0.0	4.2	3.0	$44.89
Total	2,470	1,821	2,111					171			345		113		208	321	24	$356.18

Calculations:

% Load = actual delta T / max design delta T
where T= temperature
MBH = Peak Heating Load x % Load
mmBtu = MBH / 1,000 x % Occupied x BIN Hours

209 Annual Usage (mmBtu)
0.0% Savings
$14.84 /mmBtu

Annual Savings Summary	
Fuel (mmBtu)	24
Cost ($)	$356.18

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Recreation Center	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Direct Digital Control System	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Direct Digital Controls	1	LS	$750.00	$750.00	$750.00	$750.00	$1,500.00
2	Bonds	1	LS	$160.00	$160.00	$160.00	$160.00	$320.00
3	Per ITC North Bid January 22, 2008				$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$910.00		$910.00	$1,820.00

Contingency:	10.0%	$182.00
TOTAL DIRECT CONSTRUCTION COST:		$2,002.00
Audit, Engineering, & Construction Management:	24.0%	$480.48
SUBTOTAL:		$2,482.48
Asbestos Abatement Services:		$0.00
Contingency:	0.0%	$0.00
TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
Asbestos Abatement Services Fee:	0.0%	$0.00
Asbestos SUBTOTAL:		$0.00
TOTAL:		$2,482.48

Direct Digital Control System

Fire House

Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	47	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$650	Per Year
Total Energy & O&M Savings	$650	Per Year
Project Costs		
Total Measure Cost	$2,482	
Payback		
Simple Payback	3.8	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	3.8	Year(s)

Fire House
Temperature Setback Savings - Heating

Assumptions:

Occ. Indoor Temp.	74
Reduced Occ Temp,	72
Unocc. Indoor Temp.	62.5
Peak Heating Load	322 MBH

Existing Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	0	8	3
Unoccupied	8	0	5
Weekends			
Occupied	0	5	0
Unoccupied	8	3	8
% Occupied	0.00%	89.29%	26.79%

Proposed Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	0	5	2
Unoccupied	8	3	6
Weekends			
Occupied	0	3	0
Unoccupied	8	5	8
% Occupied	0.00%	55.36%	17.86%

Bin Temperature Data (Heating Only)				Occ	Red. Occ	Unocc	Existing Conditions					Proposed Condiitions					Total	Total
	Hours/Bin			% Load	% Load	% Load	Occupied		Unoccupied		Total	Occupied		Unoccupied		Total	Reduced	Reduced
Bin Temp	0 - 8	8 - 16	16 - 24	at IAT = 74	at IAT = 72	at IAT = 62.5	Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)	Usage (mmBtu)	Usage (mmBtu)	Cost ($)
-17.5	1	0	0	100%	100%	87%	322	0.0	281	0.3	0.3	322	0.0	281	0.3	0.3	0.0	$0.00
-12.5	2	0	0	95%	94%	82%	304	0.0	264	0.5	0.5	304	0.0	264	0.5	0.5	0.0	$0.00
-7.5	5	0	1	89%	89%	77%	286	0.1	246	1.4	1.5	286	0.1	246	1.4	1.5	0.0	$0.05
-2.5	9	1	3	84%	83%	71%	269	0.5	228	2.6	3.0	268	0.3	228	2.7	3.0	0.0	$0.36
2.5	24	6	9	78%	78%	66%	251	2.0	211	6.6	8.5	250	1.2	211	7.2	8.4	0.1	$1.70
7.5	50	16	25	73%	72%	60%	234	4.9	193	13.5	18.4	232	3.1	193	15.0	18.1	0.3	$4.66
12.5	76	37	51	67%	66%	55%	216	10.1	176	20.6	30.7	214	6.3	176	23.6	29.9	0.8	$10.56
17.5	108	58	80	62%	61%	49%	199	14.5	158	27.3	41.9	196	9.1	158	31.6	40.7	1.2	$16.80
22.5	148	90	121	56%	55%	44%	181	20.4	141	34.6	55.0	178	12.7	141	40.4	53.1	1.9	$26.29
27.5	215	139	168	51%	50%	38%	163	27.6	123	43.4	71.0	160	17.1	123	51.1	68.2	2.9	$40.09
32.5	298	225	269	45%	44%	33%	146	39.8	105	54.7	94.5	142	24.5	105	65.3	89.8	4.7	$65.66
37.5	271	238	271	40%	39%	27%	128	36.6	88	43.5	80.1	124	22.3	88	52.7	75.0	5.0	$69.62
42.5	235	214	215	34%	33%	22%	111	27.5	70	29.2	56.7	106	16.6	70	35.6	52.3	4.4	$61.72
47.5	231	193	200	29%	27%	16%	93	21.0	53	21.0	42.0	88	12.5	53	25.4	37.9	4.1	$56.81
52.5	250	177	217	23%	22%	11%	76	16.3	35	15.0	31.4	70	9.6	35	17.8	27.4	4.0	$54.95
57.5	269	211	235	18%	16%	5%	58	14.6	18	8.1	22.7	52	8.3	18	9.8	18.0	4.7	$64.87
62.5	278	216	246	13%	11%	0%	40	10.5	0	0.0	10.5	34	5.6	0	0.0	5.6	4.9	$67.64
Total	2,470	1,821	2,111					246			569		149		380	530	39	$541.78

Calculations:

% Load = actual delta T / max design delta T
where T= temperature
MBH = Peak Heating Load x % Load
mmBtu = MBH / 1,000 x % Occupied x BIN Hours

575 Annual Usage (mmBtu)
6.8% Savings
$13.87 /mmBtu

Annual Savings Summary	
Fuel (mmBtu)	39
Cost ($)	$541.78

LABOR & MATERIAL ESTIMATE

WENDEL

Project : Fire House	Estimated by: SVG	
Project #: 4307-01	Checked by: JD	
Measure: Direct Digital Control System	Approved by: SVG	
Date: 01/22/08	File: Cost Estimate	

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Direct Digital Controls	1	LS	$750.00	$750.00	$750.00	$750.00	$1,500.00
2	Bonds	1	LS	$160.00	$160.00	$160.00	$160.00	$320.00
3	Per ITC North Bid January 22, 2008				$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$910.00		$910.00	$1,820.00

Contingency:	10.0%	$182.00
TOTAL DIRECT CONSTRUCTION COST:		$2,002.00
Audit, Engineering, & Construction Management:	24.0%	$480.48
SUBTOTAL:		$2,482.48
Asbestos Abatement Services:		$0.00
Contingency:	0.0%	$0.00
TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
Asbestos Abatement Services Fee:	0.0%	$0.00
Asbestos SUBTOTAL:		$0.00
TOTAL:		$2,482.48

Direct Digital Control System
Library
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	110,163	kWh/Year
Fossil Fuel Savings	187	mmBtu/Year
Operational & Maintenance Savings	$1,300	Per Year
Energy Savings ($)	$ 8,748.82	Per Year
Total Energy & O&M Savings	$10,049	Per Year
Project Costs		
Total Measure Cost	$97,662	
Payback		
Simple Payback	9.7	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	9.7	Year(s)

Library
Temperature Setback Savings - Heating

Assumptions:

Occ. Indoor Temp.	73
Reduced Occ Temp,	71
Unocc. Indoor Temp.	62.5
Peak Heating Load	1,200 MBH

Existing Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	3	8	4
Unoccupied	5	0	4
Weekends			
Occupied	1	4	3
Unoccupied	7	4	5
% Occupied	30.36%	85.71%	46.43%

Proposed Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	1	8	2
Unoccupied	7	0	6
Weekends			
Occupied	0	4	1
Unoccupied	8	4	7
% Occupied	8.93%	85.71%	21.43%

Bin Temperature Data (Heating Only)				Occ % Load at IAT = 73	Red. Occ % Load at IAT = 71	Unocc % Load at IAT = 62.5	Existing Conditions					Proposed Condiitions					Total Reduced Usage (mmBtu)	Total Reduced Cost ($)
	Hours/Bin						Occupied		Unoccupied		Total Usage (mmBtu)	Occupied		Unoccupied		Total Usage (mmBtu)		
Bin Temp	0 - 8	8 - 16	16 - 24				Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)		Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)			
-17.5	1	0	0	100%	100%	88%	1,200	0.4	1,061	0.7	1.1	1,200	0.1	1,061	1.0	1.1	0.0	$0.49
-12.5	2	0	0	94%	94%	83%	1,134	0.7	994	1.4	2.1	1,132	0.2	994	1.8	2.0	0.1	$0.99
-7.5	5	0	1	89%	89%	77%	1,067	2.1	928	3.7	5.8	1,064	0.7	928	5.0	5.7	0.2	$3.07
-2.5	9	1	3	83%	83%	72%	1,001	5.0	862	6.9	11.9	997	2.3	862	9.2	11.5	0.4	$6.33
2.5	24	6	9	78%	77%	66%	935	15.5	796	17.8	33.3	929	8.6	796	23.7	32.3	1.1	$17.92
7.5	50	16	25	72%	72%	61%	869	35.2	729	36.8	72.0	861	20.3	729	49.2	69.5	2.5	$41.93
12.5	76	37	51	67%	66%	55%	802	62.9	663	56.7	119.7	793	39.2	663	76.0	115.2	4.5	$74.12
17.5	108	58	80	61%	60%	50%	736	88.0	597	75.4	163.4	725	55.5	597	101.1	156.6	6.8	$112.48
22.5	148	90	121	56%	55%	44%	670	119.4	530	95.9	215.2	658	76.5	530	128.7	205.2	10.0	$165.55
27.5	215	139	168	50%	49%	39%	603	158.3	464	120.5	278.8	590	102.8	464	161.3	264.2	14.6	$241.40
32.5	298	225	269	45%	44%	33%	537	219.2	398	152.7	371.9	522	144.7	398	204.8	349.5	22.4	$370.14
37.5	271	238	271	39%	38%	28%	471	194.0	331	122.0	315.9	454	130.0	331	163.7	293.7	22.2	$367.33
42.5	235	214	215	34%	32%	22%	404	143.4	265	82.1	225.5	386	96.8	265	109.7	206.5	19.0	$313.85
47.5	231	193	200	28%	27%	17%	338	111.0	199	58.8	169.8	319	72.9	199	78.6	151.5	18.3	$302.51
52.5	250	177	217	23%	21%	11%	272	89.3	133	41.9	131.1	251	55.3	133	56.1	111.5	19.6	$324.41
57.5	269	211	235	17%	15%	6%	206	76.4	66	22.8	99.1	183	46.7	66	30.5	77.2	21.9	$362.47
62.5	278	216	246	12%	10%	0%	139	53.4	0	0.0	53.4	115	30.3	0	0.0	30.3	23.2	$382.49
Total	2,470	1,821	2,111					1,374			2,269		883		1,199	2,082	187	$3,086.99

Calculations:

% Load = actual delta T / max design delta T
where T= temperature
MBH = Peak Heating Load x % Load
mmBtu = MBH / 1,000 x % Occupied x BIN Hours

1,807 Annual Usage (mmBtu)
10.3% Savings
$16.52 /mmBtu

Annual Savings Summary	
Fuel (mmBtu)	187
Cost ($)	$3,086.99

AHU Economizer Control
Library

Assumptions:

			(Y/N)
Occ. Indoor Temp.	72	Existing Economizer - Occ	N
Unocc. Indoor Temp.	78	Existing Economizer - Unocc	N
Occ. Indoor enthalpy	26.2	Proposed Economizer - Occ	Y
Unocc. Indoor enthalpy	31	Proposed Economizer - Unocc	Y

Peak Cooling Load	70	Tons
Min Cooling Load	20	Tons
Estimated Cooling Eff.	1.23	kW/Ton
Peak Cooling Load	86.1	kW
Cost per kWh	$ 0.048	

Existing Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	3	8	4
Unoccupied	5	0	4
Weekends			
Occupied	1	4	3
Unoccupied	7	4	5
% Occupied	30.36%	85.71%	46.43%

Proposed Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	1	8	2
Unoccupied	7	0	6
Weekends			
Occupied	0	4	1
Unoccupied	8	4	7
% Occupied	8.93%	85.71%	21.43%

Bin Temperature Data (Cooling Only)								Existing Conditions					Proposed Conditions					Total	Total
		Hours/Bin						Occupied		Unoccupied		Total	Occupied		Unoccupied		Total	Reduced	Reduced
Enthalpy	Bin Temp	0 - 8	8 - 16	16 - 24	Occ % Load	Unocc % Load	hours	Load (Tons)	Usage (kWh)	Load (Tons)	Usage (kWh)	Usage (kWh)	Load (Tons)	Usage (kWh)	Load (Tons)	Usage (kWh)	Usage (kWh)	Usage (kWh)	Cost ($)
18.8	52.5	250	177	217	29%	29%	184	20	8,077.6	20	7,764.8	15,842.4	0	0.0	0	0.0	0.0	15,842.4	$760.44
21.7	57.5	269	211	235	29%	29%	204	20	9,142.0	20	8,447.0	17,589.0	0	0.0	0	0.0	0.0	17,589.0	$844.27
24.1	62.5	278	216	246	29%	29%	211	20	9,440.3	20	8,763.8	18,204.0	0	0.0	0	0.0	0.0	18,204.0	$873.79
26.7	67.5	259	236	264	29%	29%	217	20	9,925.7	20	8,745.7	18,671.4	20	6,936.8	0	0.0	6,936.8	11,734.6	$563.26
28.8	72.5	155	257	256	29%	29%	191	20	9,500.4	20	6,932.4	16,432.8	20	7,109.0	0	0.0	7,109.0	9,323.8	$447.54
31.0	77.5	32	256	168	44%	29%	130	31	11,539.6	20	3,661.9	15,201.5	31	9,704.0	20	4,863.8	14,567.8	633.7	$30.42
32.5	82.5	3	204	84	57%	29%	83	40	10,590.6	20	1,875.3	12,465.9	40	9,523.3	20	2,407.7	11,931.1	534.8	$25.67
34.8	87.5	0	110	27	78%	35%	47	55	7,190.6	24	897.6	8,088.3	55	6,736.3	24	1,098.4	7,834.7	253.6	$12.17
36.4	92.5	0	27	6	93%	49%	16	65	2,070.1	34	298.9	2,369.0	65	1,950.3	34	362.3	2,312.6	56.4	$2.71
37.2	97.5	0	5	1	100%	56%	3	70	409.0	39	60.7	469.6	70	387.5	39	72.8	460.2	9.4	$0.45
Total		1,246	1,699	1,504					77,886			125,334		42,347		8,805	51,152	74,182	$3,560.73

1288
899

Calculations:

% Load = actual delta H / max design delta H
where H = enthalpy, and indoor relative humidity = 50%
Tons (Load) = % Load * Peak Cooling Load
kWh = Tons (Load) x kW/Ton x BIN hours

Annual Savings Summary	
Electric (kWh)	74,182
Cost ($)	$3,560.73

Library
AHU-1 Supply & Return Fan VFDs

Minimum Air Flow Rate =	60.0%
Maximum Air Flow Rate =	95.0%
VSD Efficiency =	97.0%
Fan Motor Loading =	75.0%

Fan Data	HP	BHP	Existing Efficiency	Proposed Efficiency	Existing kW	Proposed kW
Supply Fan	3.0	2.3	89.5%	89.5%	1.9	1.9
Return Fan	1.5	1.1	83.7%	83.7%	1.0	1.0
Total	4.5	3.4			2.9	2.9

Bin Temperature Data (Heating & Cooling)				Existing Conditions	Proposed Conditions			Fan Energy Savings (kWh)
	Hours/Bin							
Bin Temp	0 - 8	8 - 16	16 - 24	Usage (kWh)	%CFM	VSD Fan kW	Usage (kWh)	
2.5	24	6	9	47.8	95%	2.65	24.4	23
7.5	50	16	25	116.6	92%	2.47	58.1	58
12.5	76	37	51	225.8	89%	2.30	113.5	112
17.5	108	58	80	344.3	86%	2.13	162.9	181
22.5	148	90	121	513.0	83%	1.97	229.0	284
27.5	215	139	168	755.2	80%	1.82	316.6	439
32.5	298	225	269	1,174.9	77%	1.67	462.7	712
37.5	271	238	271	1,186.0	74%	1.53	437.9	748
42.5	235	214	215	1,020.5	71%	1.40	349.8	671
47.5	231	193	200	945.2	68%	1.27	290.8	654
52.5	250	177	217	945.0	65%	1.15	253.6	691
57.5	269	211	235	1,069.6	62%	1.04	264.6	805
62.5	278	216	246	1,104.5	60%	0.96	253.3	851
67.5	259	236	264	1,161.3	77%	1.67	470.8	690
72.5	155	257	256	1,111.5	80%	1.82	524.8	587
77.5	32	256	168	884.0	83%	1.97	508.6	375
82.5	3	204	84	618.1	86%	2.13	411.2	207
87.5	0	110	27	307.4	89%	2.30	229.8	78
92.5	0	27	6	74.6	92%	2.47	60.3	14
97.5	0	5	1	13.7	95%	2.65	11.9	2
Total	2,902	2,915	2,913	13,619			5,435	8,184

Existing Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	3	8	4
Unoccupied	5	0	4
Weekends			
Occupied	1	4	3
Unoccupied	7	4	5
% Occupied	30.36%	85.71%	46.43%

Proposed Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	1	8	2
Unoccupied	7	0	6
Weekends			
Occupied	0	4	1
Unoccupied	8	4	7
% Occupied	8.93%	85.71%	21.43%

kWh Rates	$ 0.0480
Total Saved (kWh)	8,184.4
Savings ($)	$ 392.85

Library
AHU-2 Supply & Return Fan VFDs

Minimum Air Flow Rate =	60.0%
Maximum Air Flow Rate =	95.0%
VSD Efficiency =	97.0%
Fan Motor Loading =	75.0%

Fan Data	HP	BHP	Existing Efficiency	Proposed Efficiency	Existing kW	Proposed kW
Supply Fan	7.0	5.3	89.5%	89.5%	4.4	4.4
Return Fan	3.5	2.6	83.7%	83.7%	2.3	2.3
Total	10.5	7.9			6.7	6.7

Bin Temperature Data (Heating & Cooling)				Existing Conditions	Proposed Conditions			Fan Energy Savings (kWh)
	Hours/Bin							
Bin Temp	0 - 8	8 - 16	16 - 24	Usage (kWh)	%CFM	VSD Fan kW	Usage (kWh)	
2.5	24	6	9	111.5	95%	6.18	57.0	55
7.5	50	16	25	272.0	92%	5.76	135.6	136
12.5	76	37	51	526.9	89%	5.36	264.8	262
17.5	108	58	80	803.5	86%	4.97	380.1	423
22.5	148	90	121	1,197.1	83%	4.59	534.3	663
27.5	215	139	168	1,762.2	80%	4.24	738.8	1,023
32.5	298	225	269	2,741.4	77%	3.90	1,079.5	1,662
37.5	271	238	271	2,767.4	74%	3.57	1,021.9	1,746
42.5	235	214	215	2,381.3	71%	3.26	816.3	1,565
47.5	231	193	200	2,205.5	68%	2.96	678.4	1,527
52.5	250	177	217	2,205.1	65%	2.68	591.8	1,613
57.5	269	211	235	2,495.7	62%	2.42	617.3	1,878
62.5	278	216	246	2,577.1	60%	2.25	591.1	1,986
67.5	259	236	264	2,709.6	77%	3.90	1,098.5	1,611
72.5	155	257	256	2,593.5	80%	4.24	1,224.6	1,369
77.5	32	256	168	2,062.6	83%	4.59	1,186.8	876
82.5	3	204	84	1,442.3	86%	4.97	959.5	483
87.5	0	110	27	717.4	89%	5.36	536.1	181
92.5	0	27	6	174.1	92%	5.76	140.8	33
97.5	0	5	1	31.9	95%	6.18	27.8	4
Total	2,902	2,915	2,913	31,778			12,681	19,097

Existing Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	3	8	4
Unoccupied	5	0	4
Weekends			
Occupied	1	4	3
Unoccupied	7	4	5
% Occupied	30.36%	85.71%	46.43%

Proposed Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	1	8	2
Unoccupied	7	0	6
Weekends			
Occupied	0	4	1
Unoccupied	8	4	7
% Occupied	8.93%	85.71%	21.43%

kWh Rates	$ 0.0480
Total Saved (kWh)	19,097.0
Savings ($)	$ 916.65

Library
AHU-3 Supply & Return Fan VFDs

Minimum Air Flow Rate =	60.0%
Maximum Air Flow Rate =	95.0%
VSD Efficiency =	97.0%
Fan Motor Loading =	75.0%

Fan Data	HP	BHP	Existing Efficiency	Proposed Efficiency	Existing kW	Proposed kW
Supply Fan	3.0	2.3	89.5%	89.5%	1.9	1.9
Return Fan	1.5	1.1	83.7%	89.5%	1.0	0.9
Total	4.5	3.4			2.9	2.8

Bin Temperature Data (Heating & Cooling)				Existing Conditions	Proposed Conditions			Fan Energy Savings (kWh)
	Hours/Bin							
Bin Temp	0 - 8	8 - 16	16 - 24	Usage (kWh)	%CFM	VSD Fan kW	Usage (kWh)	
2.5	24	6	9	47.8	95%	2.59	23.9	24
7.5	50	16	25	116.6	92%	2.41	56.8	60
12.5	76	37	51	225.8	89%	2.24	110.9	115
17.5	108	58	80	344.3	86%	2.08	159.2	185
22.5	148	90	121	513.0	83%	1.92	223.8	289
27.5	215	139	168	755.2	80%	1.78	309.5	446
32.5	298	225	269	1,174.9	77%	1.63	452.2	723
37.5	271	238	271	1,186.0	74%	1.50	428.1	758
42.5	235	214	215	1,020.5	71%	1.37	342.0	679
47.5	231	193	200	945.2	68%	1.24	284.2	661
52.5	250	177	217	945.0	65%	1.12	247.9	697
57.5	269	211	235	1,069.6	62%	1.01	258.6	811
62.5	278	216	246	1,104.5	60%	0.94	247.6	857
67.5	259	236	264	1,161.3	77%	1.63	460.2	701
72.5	155	257	256	1,111.5	80%	1.78	513.0	599
77.5	32	256	168	884.0	83%	1.92	497.2	387
82.5	3	204	84	618.1	86%	2.08	401.9	216
87.5	0	110	27	307.4	89%	2.24	224.6	83
92.5	0	27	6	74.6	92%	2.41	59.0	16
97.5	0	5	1	13.7	95%	2.59	11.7	2
Total	2,902	2,915	2,913	13,619			5,312	8,307

Existing Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	3	8	4
Unoccupied	5	0	4
Weekends			
Occupied	1	4	3
Unoccupied	7	4	5
% Occupied	30.36%	85.71%	46.43%

Proposed Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	1	8	2
Unoccupied	7	0	6
Weekends			
Occupied	0	4	1
Unoccupied	8	4	7
% Occupied	8.93%	85.71%	21.43%

kWh Rates	$ 0.0480
Total Saved (kWh)	8,307.1
Non-Summer kWh ($)	$ 398.74

Library
AHU-4 Supply & Return Fan VFDs

Minimum Air Flow Rate =	60.0%
Maximum Air Flow Rate =	95.0%
VSD Efficiency =	97.0%
Fan Motor Loading =	75.0%

Fan Data	HP	BHP	Existing Efficiency	Proposed Efficiency	Existing kW	Proposed kW
Supply Fan	3.0	2.3	89.5%	89.5%	1.9	1.9
Return Fan	1.5	1.1	83.7%	83.7%	1.0	1.0
Total	4.5	3.4			2.9	2.9

Bin Temperature Data (Heating & Cooling)				Existing Conditions	Proposed Conditions			Fan Energy Savings (kWh)
	Hours/Bin							
Bin Temp	0 - 8	8 - 16	16 - 24	Usage (kWh)	%CFM	VSD Fan kW	Usage (kWh)	
2.5	24	6	9	47.8	95%	2.65	24.4	23
7.5	50	16	25	116.6	92%	2.47	58.1	58
12.5	76	37	51	225.8	89%	2.30	113.5	112
17.5	108	58	80	344.3	86%	2.13	162.9	181
22.5	148	90	121	513.0	83%	1.97	229.0	284
27.5	215	139	168	755.2	80%	1.82	316.6	439
32.5	298	225	269	1,174.9	77%	1.67	462.7	712
37.5	271	238	271	1,186.0	74%	1.53	437.9	748
42.5	235	214	215	1,020.5	71%	1.40	349.8	671
47.5	231	193	200	945.2	68%	1.27	290.8	654
52.5	250	177	217	945.0	65%	1.15	253.6	691
57.5	269	211	235	1,069.6	62%	1.04	264.6	805
62.5	278	216	246	1,104.5	60%	0.96	253.3	851
67.5	259	236	264	1,161.3	77%	1.67	470.8	690
72.5	155	257	256	1,111.5	80%	1.82	524.8	587
77.5	32	256	168	884.0	83%	1.97	508.6	375
82.5	3	204	84	618.1	86%	2.13	411.2	207
87.5	0	110	27	307.4	89%	2.30	229.8	78
92.5	0	27	6	74.6	92%	2.47	60.3	14
97.5	0	5	1	13.7	95%	2.65	11.9	2
Total	2,902	2,915	2,913	13,619			5,435	8,184

Existing Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	3	8	4
Unoccupied	5	0	4
Weekends			
Occupied	1	4	3
Unoccupied	7	4	5
% Occupied	30.36%	85.71%	46.43%

Proposed Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	1	8	2
Unoccupied	7	0	6
Weekends			
Occupied	0	4	1
Unoccupied	8	4	7
% Occupied	8.93%	85.71%	21.43%

kWh Rates	$ 0.0480
Total Saved (kWh)	8,184.4
Non-Summer kWh ($)	$ 392.85

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Library	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Direct Digital Control System	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material		Labor		Total Cost
				Unit Price	Total	Unit Price	Total	Labor & Material
1	Direct Digital Controls	1	LS	$35,640.00	$35,640.00	$35,640.00	$35,640.00	$71,280.00
2	Bonds	1	LS	$160.00	$160.00	$160.00	$160.00	$320.00
3					$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9	Per ITC North Bid January 22, 2008				$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$35,800.00		$35,800.00	$71,600.00
						Contingency:	10.0%	$7,160.00
						TOTAL DIRECT CONSTRUCTION COST:		$78,760.00
						Audit, Engineering, & Construction Management:	24.0%	$18,902.40
						SUBTOTAL:		$97,662.40
						Asbestos Abatement Services:		$0.00
						Contingency:	0.0%	$0.00
						TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
						Asbestos Abatement Services Fee:	0.0%	$0.00
						Asbestos SUBTOTAL:		$0.00
						TOTAL:		$97,662.40

Direct Digital Control System
Senior Center
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	25	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$379	Per Year
Total Energy & O&M Savings	$379	Per Year
Project Costs		
Total Measure Cost	$3,710	
Payback		
Simple Payback	9.8	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	9.8	Year(s)

Senior Center
Temperature Setback Savings - Heating

Assumptions:

Occ. Indoor Temp.	74
Reduced Occ Temp,	71
Unocc. Indoor Temp.	62.5
Peak Heating Load	131 MBH

Existing Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	2	8	3
Unoccupied	6	0	5
Weekends			
Occupied	0	6	0
Unoccupied	8	2	8
% Occupied	17.86%	92.86%	26.79%

Proposed Building Schedule:

Weekdays	(12 AM - 8 AM)	(8 AM - 4 PM)	(4 PM - 12 AM)
Occupied	0	8	0
Unoccupied	8	0	8
Weekends			
Occupied	0	2	0
Unoccupied	8	6	8
% Occupied	0.00%	78.57%	0.00%

Bin Temperature Data (Heating Only)				Occ % Load at IAT = 74	Red. Occ % Load at IAT = 71	Unocc % Load at IAT = 62.5	Existing Conditions					Proposed Condiitions					Total Reduced Usage (mmBtu)	Total Reduced Cost ($)
	Hours/Bin						Occupied		Unoccupied		Total Usage (mmBtu)	Occupied		Unoccupied		Total Usage (mmBtu)		
Bin Temp	0 - 8	8 - 16	16 - 24				Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)		Load (MBH)	Usage (mmBtu)	Load (MBH)	Usage (mmBtu)			
-17.5	1	0	0	100%	100%	87%	131	0.0	115	0.1	0.1	131	0.0	115	0.1	0.1	0.0	$0.04
-12.5	2	0	0	95%	94%	82%	124	0.0	107	0.2	0.2	124	0.0	107	0.2	0.2	0.0	$0.09
-7.5	5	0	1	89%	89%	77%	117	0.1	100	0.5	0.6	116	0.0	100	0.6	0.6	0.0	$0.29
-2.5	9	1	3	84%	83%	71%	110	0.4	93	0.9	1.3	109	0.1	93	1.1	1.2	0.0	$0.65
2.5	24	6	9	78%	77%	66%	102	1.3	86	2.3	3.6	102	0.5	86	2.9	3.4	0.1	$1.95
7.5	50	16	25	73%	72%	60%	95	2.9	79	4.8	7.7	94	1.2	79	6.2	7.4	0.3	$4.70
12.5	76	37	51	67%	66%	55%	88	5.4	72	7.3	12.8	87	2.5	72	9.7	12.2	0.6	$8.75
17.5	108	58	80	62%	60%	49%	81	7.7	64	9.8	17.4	79	3.6	64	12.9	16.5	0.9	$13.39
22.5	148	90	121	56%	55%	44%	74	10.5	57	12.4	22.9	72	5.1	57	16.5	21.6	1.3	$19.96
27.5	215	139	168	51%	49%	38%	67	14.2	50	15.5	29.7	64	7.0	50	20.7	27.7	1.9	$29.36
32.5	298	225	269	45%	44%	33%	59	19.9	43	19.7	39.6	57	10.1	43	26.5	36.5	3.0	$45.75
37.5	271	238	271	40%	38%	27%	52	17.9	36	15.7	33.6	50	9.3	36	21.2	30.5	3.1	$46.21
42.5	235	214	215	34%	32%	22%	45	13.5	29	10.5	24.0	42	7.1	29	14.2	21.3	2.6	$39.87
47.5	231	193	200	29%	27%	16%	38	10.4	21	7.5	17.9	35	5.3	21	10.2	15.4	2.5	$37.77
52.5	250	177	217	23%	21%	11%	31	8.2	14	5.4	13.6	27	3.8	14	7.2	11.0	2.6	$39.09
57.5	269	211	235	18%	15%	5%	24	7.3	7	2.9	10.2	20	3.3	7	3.9	7.3	2.9	$44.33
62.5	278	216	246	13%	10%	0%	16	5.2	0	0.0	5.2	13	2.1	0	0.0	2.1	3.1	$46.49
Total	2,470	1,821	2,111					125			240		61		154	215	25	$378.65

Calculations:

% Load = actual delta T / max design delta T
where T= temperature
MBH = Peak Heating Load x % Load
mmBtu = MBH / 1,000 x % Occupied x BIN Hours

235 Annual Usage (mmBtu)
10.6% Savings
$15.13 /mmBtu

Annual Savings Summary	
Fuel (mmBtu)	25
Cost ($)	$378.65

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Senior Center	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Direct Digital Control System	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Direct Digital Controls	1	LS	$1,200.00	$1,200.00	$1,200.00	$1,200.00	$2,400.00
2	Bonds	1	LS	$160.00	$160.00	$160.00	$160.00	$320.00
3	Per ITC North Bid January 22, 2008				$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$1,360.00		$1,360.00	$2,720.00
						Contingency:	10.0%	$272.00
						TOTAL DIRECT CONSTRUCTION COST:		$2,992.00
						Audit, Engineering, & Construction Management:	24.0%	$718.08
							SUBTOTAL:	$3,710.08
						Asbestos Abatement Services:		$0.00
						Contingency:	0.0%	$0.00
						TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
						Asbestos Abatement Services Fee:	0.0%	$0.00
							Asbestos SUBTOTAL:	$0.00
							TOTAL:	$3,710.08

Section 6

FIM #3: Boiler Replacement

FIM #3: BOILER REPLACEMENT

INVESTIGATION

Wendel conducted an extensive survey of the Village Building heating systems and identified the following potential energy savings opportunities. The existing oil-fired boilers in the, the Recreation Center, Village Hall, Fire House, and the Pump House (on Station Road) produce hot water, which is distributed to the building via radiators and other forms of terminal units. While these units still continue to function as intended, they are old and have exceeded their normal rated life expectancy. As such, Wendel recommends replacement in order to provide long-term reliable and energy efficient service.

Existing Systems

Recreation Center

The boiler at the Recreation Center is an oil-fired Burnham V-36 boiler with a net output rating of 282,000 Btu/hr, which corresponds to an oil consumption rate of 2.8 gallons/hr. The boiler supplies hot water to three zones in the building. Each zone is controlled by an individual wall-mounted thermostat.

Village Hall

The Village Hall has two boilers that serve the building: a steam boiler dedicated to the replica of the Ford Theatre and a hot water boiler that serves office areas in the remainder of the building. The steam boiler has been replaced recently with a new cast iron sectional with an oil-fired burner. The hot water boiler at the Village Hall is a Weil McLain BL-576 cast iron sectional. The unit is fired by a Carlin oil burner and serves seven (7) zones throughout the building.

Fire House

The boiler at the Fire House is a H.B. Smith 25, 5-section, cast iron boiler with a net output rating of 426,000 Btu/hr, which corresponds to an oil consumption rate of 4.5 gallons/hr. The boiler serves three zones, each controlled by a wall-mounted thermostat.

Pump House

The boiler at the Pump House is a Burnham Jubilee hot water boiler installed circa 1960. The unit has a net output rating of 245,700 Btu/hr, which corresponds to an oil consumption rate of 2.25 gallons/hr. The unit is fired by a Mobil Jet-R oil burner and serves a single zone in the building.

OPTIONS

Wendel considered the following boiler options during the survey:

- Oil-fired cast iron sectional boilers;
- Gas-fired condensing boilers;
- Dual-fuel cast iron sectional boilers

The oil-fired option was selected based on the Village's immediate needs and acceptable payback. Con Edison gas service incentives were investigated, but were unavailable due to the prohibitive cost associated with running gas service to the building.

RECOMMENDATIONS

This measure recommends the removal of the existing oil-fired boilers and installation of new high efficiency cast iron units. Cast iron sectional boilers are ideal for this application, since they can be easily delivered in pieces and assembled within the mechanical room once the existing units are removed. Furthermore, the cast iron units can be assembled without welding, thereby, eliminating disruption to the building occupants due to welding fumes.

The new boilers will be tied into the existing hot water supply and return headers, and will provide hot water to the building perimeter convectors as it does currently. The boilers will be connected to existing breechings. These new units will be furnished with high efficiency dual-fuel burners in the event that the Village decides to bring gas service into these buildings in the future (there is a Consolidated Edison gas main that runs along Main Street).

All boilers, proposed for replacement, currently lack insulation on the near-boiler piping. This presents an opportunity for additional savings and will be included as part of this measure.

Environmental testing shall be performed prior to final design to identify if any asbestos containing material will be affected by the proposed work so that abatement can be handled appropriately.

Ancillary equipment such as the circulator pumps and valves are also original to the boilers, but upon closer examination were found to be in fair condition and as a result will not be replaced under this measure.

Proposed System

Recreation Center

The new hot water boiler will be seven section cast iron Buderus model #G215/7 with a Riello oil burner.

Village Hall

The new hot water boiler will be six section cast iron Buderus model #G315/5 with a PoweFlame dual-fuel burner (with spark ignition).

Fire House

The new hot water boiler will be six section cast iron Buderus model #G315/6 with a PoweFlame dual-fuel burner (with spark ignition).

Pump House

The new hot water boiler will be seven section cast iron Buderus model #G215/7 with a Riello oil burner.

The boiler manufacturer selected has a 'no minimum water temperature requirement'. This feature allows for a full outdoor reset without additional piping, controls, and circulators.

The scope of work for this measure will include:

- The disconnection and safe-off of all utilities for the demolition of the boiler, breeching, oil lines.
- Provide new operating controls, probe type low water cut-off and the required factory

supplied trim materials.

- Burners on the boilers shall be furnished with gas trains. These will be included as part of this installation, but will be capped for future use.
- Provide new concrete housekeeping pads for all floor mounted equipment.
- Receive and rig new boiler sections into the mechanical rooms. Set and assemble new boilers sections on the concrete housekeeping pads.
- Assemble jackets, oil burners and operating controls.
- Supply and install one (1) new ASME rated expansion tank per location. Tank shall be sized for the system it services.
- Furnish and install required the required supply and return piping. Piping shall be either schedule 40 steel and fittings or Type L copper tubing and fittings.
- All oil piping shall be made of copper tubing and fittings.
- Reconfigure and supply galvanized flue piping. Installation shall satisfy the Village building department clearance to combustible requirements.
- Furnish labor and material for line voltage requirements.
- Burners shall be adjusted to the appropriate factory specifications. Start-up documentation and training to be furnished by factory trained technician.

Boiler Replacement (Oil Option)

Recreation Center

Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	45	mmBtu/Year
Operational & Maintenance Savings	$320	Per Year
Energy Savings ($)	$670	Per Year
Total Energy & O&M Savings	$990	Per Year
Project Costs		
Total Measure Cost	$25,173	
Payback		
Simple Payback	25.4	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	25.4	Year(s)

Estimate of Project Savings
Boiler Replacement (Oil Option)
Recreation Center

Month	Existing Facilit Usage(Therms	Existing Facility Usage(Dollars)	Existing Facility Usage(Gallons)	Existing Facility Usage(Dollars)	Existing Facility Usage (mmBtu)	Existing Facility Usage(Dollars)	Existing Estimated Boiler Usage(mmBtu)	Proposed Boiler Usage with new Boiler(mmBtu)	Estimated Savings (mmBtu)	Estimated Savings (Dollars)
Apr-06	0.00	$0.00	238.30	$522.03	33.60	$522.03	33.60	27.74	5.86	$86.97
Mar-06	0.00	$0.00	45.90	$87.82	6.47	$87.82	6.47	5.34	1.13	$16.75
Mar-06	0.00	$0.00	64.40	$126.36	9.08	$126.36	9.08	7.50	1.58	$23.50
Feb-06	0.00	$0.00	115.40	$203.18	16.27	$203.18	16.27	13.43	2.84	$42.12
Feb-06	0.00	$0.00	123.00	$220.08	17.34	$220.08	17.34	14.32	3.02	$44.89
Feb-06	0.00	$0.00	93.40	$184.57	13.17	$184.57	13.17	10.87	2.30	$34.09
Feb-06	0.00	$0.00	86.70	$170.48	12.22	$170.48	12.22	10.09	2.13	$31.64
Jan-06	0.00	$0.00	90.80	$174.93	12.80	$174.93	12.80	10.57	2.23	$33.14
Jan-06	0.00	$0.00	99.00	$189.75	13.96	$189.75	13.96	11.52	2.43	$36.13
Jan-06	0.00	$0.00	121.90	$245.88	17.19	$245.88	17.19	14.19	3.00	$44.49
Jan-06	0.00	$0.00	98.00	$284.40	13.82	$284.40	13.82	11.41	2.41	$35.77
Dec-05	0.00	$0.00	250.60	$493.58	35.33	$493.58	35.33	29.17	6.16	$91.46
Dec-05	0.00	$0.00	68.10	$203.83	9.60	$203.83	9.60	7.93	1.67	$24.85
Totals	-	$0	1495.50	$3,106.89	210.87	$3,106.89	210.87	174.09	36.78	$545.80
					Using Normalized Data		258.85	213.70	45.15	$669.99

2006 HDD	3,690
30 YR HDD	4,777
Normalization	22.8%

Assumptions:

1 mmBtu = 1 Mcf
Summer = June, July, August
operating hours are unchanged.

71.0%	Existing Boiler System Efficiency (average)		
86.0%	Proposed Boiler System Efficiency		
100.0%	Estimated consumption due to boilers		
$0.00	Cost per CCF	$0.00	Cost per mmBtu(gas)
$2.08	Cost per Gallor	$14.84	Cost per mmBtu(oil)
		$14.84	Cost per mmBtu(as agreed by dist)

Total Base/Summer Load

Consumption	0.00
% of total	0.00%

Total Space Heating/Winter Load

Consumption	210.87
% of total	100.00%

Building Area

5,494 square feet

Building Annual Energy Values

$0.57 Cost per square foot
0.038 mmBtu per square foot

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Recreation Center	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Boiler Replacement (Oil Option)	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Lump Sum for Boiler Replacement	1	LS	$7,710.00	$7,710.00	$7,710.00	$7,710.00	$15,420.00
2	Buderas Model # G215/7 w/ Riello Burner				$0.00		$0.00	$0.00
3	Bonds	1	LS	$285.00	$285.00	$285.00	$285.00	$570.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6	Per Lewis Mechanical Bid January 22, 2008				$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8	Air Monitoring (Boiler Gasket)	1	LS	$250.00	$250.00	$250.00	$250.00	$500.00
9					$0.00		$0.00	$0.00
10	Per Weston Solutions Bid January 22, 2008				$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12	Asbestos Abatement (Boiler Gasket)	1	LS	$982.50	$982.50	$982.50	$982.50	$1,965.00
13					$0.00		$0.00	$0.00
14	Per LVI Environmental Bid January 22, 2008				$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$9,227.50		$9,227.50	$18,455.00
						Contingency:	10.00%	$1,845.50
						TOTAL DIRECT CONSTRUCTION COST:		$20,300.50
						Audit, Engineering, & Construction Management:	24.0%	$4,872.12
							SUBTOTAL:	$25,172.62
						Asbestos Abatement Services:		$0.00
						Contingency:	0.00%	$0.00
						TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
						Asbestos Abatement Services Fee:	0.0%	$0.00
							Asbestos SUBTOTAL:	$0.00
							TOTAL:	$25,172.62

Boiler Replacement (Oil Option)
Village Hall
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	99	mmBtu/Year
Operational & Maintenance Savings	$320	Per Year
Energy Savings ($)	$1,399	Per Year
Total Energy & O&M Savings	$1,719	Per Year
Project Costs		
Total Measure Cost	$42,154	
Payback		
Simple Payback	24.5	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	24.5	Year(s)

Estimate of Project Savings
Boiler Replacement (Oil Option)
Village Hall

Month	Existing Facility Usage(Therms)	Existing Facility Usage(Dollars)	Existing Facility Usage(Gallons)	Existing Facility Usage(Dollars)	Existing Facility Usage (mmBtu)	Existing Facility Usage(Dollars)	Existing Estimated Boiler Usage(mmBtu)	Proposed Boiler Usage with new Boiler(mmBtu)	Estimated Savings (mmBtu)	Estimated Savings (Dollars)
Apr-06	0.00	$0.00	430.44	$942.92	60.69	$942.92	60.69	51.18	9.51	$134.25
Mar-06	0.00	$0.00	144.72	$276.89	20.41	$276.89	20.41	17.21	3.20	$45.14
Mar-06	0.00	$0.00	118.74	$232.98	16.74	$232.98	16.74	14.12	2.62	$37.03
Mar-06	0.00	$0.00	323.88	$635.49	45.67	$635.49	45.67	38.51	7.16	$101.02
Feb-06	0.00	$0.00	218.64	$384.94	30.83	$384.94	30.83	26.00	4.83	$68.19
Feb-06	0.00	$0.00	273.24	$488.91	38.53	$488.91	38.53	32.49	6.04	$85.22
Feb-06	0.00	$0.00	242.64	$479.48	34.21	$479.48	34.21	28.85	5.36	$75.68
Feb-06	0.00	$0.00	89.40	$259.44	12.61	$259.44	12.61	10.63	1.98	$27.88
Jan-06	0.00	$0.00	103.44	$199.28	14.59	$199.28	14.59	12.30	2.29	$32.26
Jan-06	0.00	$0.00	67.74	$129.83	9.55	$129.83	9.55	8.05	1.50	$21.13
Jan-06	0.00	$0.00	50.64	$146.96	7.14	$146.96	7.14	6.02	1.12	$15.79
Jan-06	0.00	$0.00	226.20	$431.16	31.89	$431.16	31.89	26.89	5.00	$70.55
Dec-05	0.00	$0.00	8.04	$23.34	1.13	$23.34	1.13	0.96	0.18	$2.51
Dec-05	0.00	$0.00	336.30	$662.51	47.42	$662.51	47.42	39.98	7.43	$104.89
Dec-05	0.00	$0.00	505.74	$954.13	71.31	$954.13	71.31	60.13	11.18	$157.74
Nov-05	0.00	$0.00	514.80	$969.68	72.59	$969.68	72.59	61.21	11.38	$160.56
Totals	-	$0	3654.60	$7,217.93	515.30	$7,217.93	515.30	434.52	80.78	$1,139.85
					Using Normalized Data		632.55	533.39	99.17	$1,399.22

2006 HDD	3,690
30 YR HDD	4,777
Normalization	22.8%

Assumptions:
1 mmBtu = 1 Mcf
Summer = June, July, August
operating hours are unchanged.

71.0%	Existing Boiler System Efficiency (average)		
84.2%	Proposed Boiler System Efficiency		
100.0%	Estimated consumption due to boilers		
$0.00	Cost per CCF	$0.00	Cost per mmBtu(gas)
$1.98	Cost per Gallon	$14.11	Cost per mmBtu(oil)
		$14.11	Cost per mmBtu(as agreed by dist)

Total Base/Summer Load

Consumption	0.00
% of total	0.00%

Total Space Heating/Winter Load

Consumption	515.30
% of total	100.00%

Building Area
19,488 square feet

Building Annual Energy Values
$0.37 Cost per square foot
0.026 mmBtu per square foot

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Village Hall	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Boiler Replacement (Oil Option)	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Lump Sum for Boiler Replacement	1	LS	$12,165.00	$12,165.00	$12,165.00	$12,165.00	$24,330.00
2	Buderas Model # G315/5 w/ PowerFlame Burner				$0.00		$0.00	$0.00
3	Bonds	1	LS	$285.00	$285.00	$285.00	$285.00	$570.00
4	Outside Air Damper	0	LS	$1,575.00	$0.00	$1,575.00	$0.00	$0.00
5	Dual-Fuel Burner for Steam Boiler	0	LS	$3,660.00	$0.00	$3,660.00	$0.00	$0.00
6	Electric Heater	1	LS	$1,770.00	$1,770.00	$1,770.00	$1,770.00	$3,540.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10	Per Lewis Mechanical Bid January 22, 2008				$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12	Air Monitoring (Boiler Gasket)	1	LS	$250.00	$250.00	$250.00	$250.00	$500.00
13					$0.00		$0.00	$0.00
14	Per Weston Solutions Bid January 22, 2008				$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16	Asbestos Abatement (Boiler Gasket)	1	LS	$982.50	$982.50	$982.50	$982.50	$1,965.00
17					$0.00		$0.00	$0.00
18	Per LVI Environmental Bid January 22, 2008				$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$15,452.50		$15,452.50	$30,905.00

Contingency:	10.00%	$3,090.50
TOTAL DIRECT CONSTRUCTION COST:		$33,995.50
Audit, Engineering, & Construction Management:	24.0%	$8,158.92
SUBTOTAL:		$42,154.42
Asbestos Abatement Services:		$0.00
Contingency:	0.00%	$0.00
TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
Asbestos Abatement Services Fee:	0.0%	$0.00
Asbestos SUBTOTAL:		$0.00
TOTAL:		$42,154.42

Boiler Replacement (Oil Option)

Fire House

Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	105	mmBtu/Year
Operational & Maintenance Savings	$320	Per Year
Energy Savings ($)	$1,450	Per Year
Total Energy & O&M Savings	$1,770	Per Year
Project Costs		
Total Measure Cost	$38,390	
Payback		
Simple Payback	21.7	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	21.7	Year(s)

Estimate of Project Savings
Boiler Replacement (Oil Option)
Fire House

Month	Existing Facilit Usage(Therms	Existing Facility Usage(Dollars)	Existing Facility Usage(Gallons)	Existing Facility Usage(Dollars)	Existing Facility Usage (mmBtu)	Existing Facility Usage(Dollars)	Existing Estimated Boiler Usage(mmBtu)	Proposed Boiler Usage with new Boiler(mmBtu)	Estimated Savings (mmBtu)	Estimated Savings (Dollars)
Apr-06	0.00	$0.00	465.80	$1,020.38	65.68	$1,020.38	65.68	55.32	10.36	$143.72
Mar-06	0.00	$0.00	86.70	$165.88	12.22	$165.88	12.22	10.30	1.93	$26.75
Mar-06	0.00	$0.00	138.70	$272.15	19.56	$272.15	19.56	16.47	3.09	$42.80
Feb-06	0.00	$0.00	238.90	$420.61	33.68	$420.61	33.68	28.37	5.31	$73.71
Feb-06	0.00	$0.00	215.40	$385.42	30.37	$385.42	30.37	25.58	4.79	$66.46
Feb-06	0.00	$0.00	142.60	$281.79	20.11	$281.79	20.11	16.93	3.17	$44.00
Feb-06	0.00	$0.00	152.20	$299.26	21.46	$299.26	21.46	18.07	3.39	$46.96
Jan-06	0.00	$0.00	369.60	$712.07	52.11	$712.07	52.11	43.89	8.22	$114.04
Jan-06	0.00	$0.00	65.00	$125.23	9.17	$125.23	9.17	7.72	1.45	$20.06
Jan-06	0.00	$0.00	100.30	$202.31	14.14	$202.31	14.14	11.91	2.23	$30.95
Jan-06	0.00	$0.00	592.30	$1,128.98	83.51	$1,128.98	83.51	70.34	13.18	$182.75
Dec-05	0.00	$0.00	501.10	$986.96	70.66	$986.96	70.66	59.51	11.15	$154.61
Nov-05	0.00	$0.00	761.00	$1,433.42	107.30	$1,433.42	107.30	90.37	16.93	$234.80
Totals	-	$0	3829.60	$7,434.48	539.97	$7,434.48	539.97	454.78	85.19	$1,181.61
					Using Normalized Data		662.84	558.27	104.58	$1,450.48

2006 HDD	3,690
30 YR HDD	4,777
Normalization	22.8%

Assumptions:

1 mmBtu = 1 Mcf
Summer = June, July, August
operating hours are unchanged.

71.0%	Existing Boiler System Efficiency (average)		
84.3%	Proposed Boiler System Efficiency		
100.0%	Estimated consumption due to boilers		
$0.00	Cost per CCF	$0.00	Cost per mmBtu(gas)
$1.94	Cost per Gallor	$13.87	Cost per mmBtu(oil)
		$13.87	Cost per mmBtu(as agreed by dist)

Total Base/Summer Load

Consumption	0.00
% of total	0.00%

Total Space Heating/Winter Load

Consumption	539.97
% of total	100.00%

Building Area

4,561 square feet

Building Annual Energy Values

$1.63 Cost per square foot
0.118 mmBtu per square foot

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Fire House	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Boiler Replacement (Oil Option)	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Lump Sum for Boiler Replacement	1	LS	$12,555.00	$12,555.00	$12,555.00	$12,555.00	$25,110.00
2	Buderas Model # G315/6 w/ PowerFlame Burner				$0.00		$0.00	$0.00
3	Bonds	1	LS	$285.00	$285.00	$285.00	$285.00	$570.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6	Per Lewis Mechanical Quotation January 22, 2008				$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8	Air Monitoring (Boiler Gasket)	1	LS	$250.00	$250.00	$250.00	$250.00	$500.00
9					$0.00		$0.00	$0.00
10	Per Weston Solutions Bid January 22, 2008				$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12	Asbestos Abatement (Boiler Gasket)	1	LS	$982.50	$982.50	$982.50	$982.50	$1,965.00
13					$0.00		$0.00	$0.00
14	Per LVI Environmental Bid January 22, 2008				$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$14,072.50		$14,072.50	$28,145.00
						Contingency:	10.00%	$2,814.50
						TOTAL DIRECT CONSTRUCTION COST:		$30,959.50
						Audit, Engineering, & Construction Management:	24.0%	$7,430.28
							SUBTOTAL:	$38,389.78
							Asbestos Abatement Services:	$0.00
						Contingency:	0.00%	$0.00
						TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
						Asbestos Abatement Services Fee:	0.0%	$0.00
							Asbestos SUBTOTAL:	$0.00
							TOTAL:	$38,389.78

Boiler Replacement (Oil Option)

Pump House

Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	44	mmBtu/Year
Operational & Maintenance Savings	$320	Per Year
Energy Savings ($)	$661	Per Year
Total Energy & O&M Savings	$981	Per Year
Project Costs		
Total Measure Cost	$29,997	
Payback		
Simple Payback	30.6	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	30.6	Year(s)

Estimate of Project Savings
Boiler Replacement (Oil Option)
Pump House

Month	Existing Facility Usage(Therms)	Existing Facility Usage(Dollars)	Existing Facility Usage(Gallons)	Existing Facility Usage(Dollars)	Existing Facility Usage (mmBtu)	Existing Facility Usage(Dollars)	Existing Estimated Boiler Usage(mmBtu)	Proposed Boiler Usage with new Boiler(mmBtu)	Estimated Savings (mmBtu)	Estimated Savings (Dollars)
Apr-06	0.00	$0.00	172.50	$377.88	24.32	$377.88	24.32	20.08	4.24	$64.27
Mar-06	0.00	$0.00	31.20	$59.69	4.40	$59.69	4.40	3.63	0.77	$11.62
Mar-06	0.00	$0.00	50.40	$98.89	7.11	$98.89	7.11	5.87	1.24	$18.78
Mar-06	0.00	$0.00	110.40	$216.61	15.57	$216.61	15.57	12.85	2.72	$41.13
Feb-06	0.00	$0.00	78.60	$138.39	11.08	$138.39	11.08	9.15	1.93	$29.29
Feb-06	0.00	$0.00	80.30	$143.68	11.32	$143.68	11.32	9.35	1.97	$29.92
Feb-06	0.00	$0.00	54.10	$106.90	7.63	$106.90	7.63	6.30	1.33	$20.16
Feb-06	0.00	$0.00	63.20	$124.27	8.91	$124.27	8.91	7.36	1.55	$23.55
Jan-06	0.00	$0.00	43.60	$126.53	6.15	$126.53	6.15	5.08	1.07	$16.24
Jan-06	0.00	$0.00	61.80	$179.34	8.71	$179.34	8.71	7.19	1.52	$23.03
Jan-06	0.00	$0.00	62.90	$182.54	8.87	$182.54	8.87	7.32	1.55	$23.44
Jan-06	0.00	$0.00	63.00	$182.83	8.88	$182.83	8.88	7.33	1.55	$23.47
Dec-05	0.00	$0.00	36.40	$105.63	5.13	$105.63	5.13	4.24	0.90	$13.56
Dec-05	0.00	$0.00	126.60	$249.40	17.85	$249.40	17.85	14.74	3.11	$47.17
Dec-05	0.00	$0.00	222.70	$420.15	31.40	$420.15	31.40	25.92	5.48	$82.97
Nov-05	0.00	$0.00	188.30	$354.69	26.55	$354.69	26.55	21.92	4.63	$70.16
Totals	-	$0	1446.00	$3,067.42	203.89	$3,067.42	203.89	168.32	35.56	$538.76
					Using Normalized Data		250.28	206.63	43.65	$661.35

2006 HDD	3,690
30 YR HDD	4,777
Normalization	22.8%

Assumptions:
1 mmBtu = 1 Mcf
Summer = June, July, August
operating hours are unchanged.

71.0%	Existing Boiler System Efficiency (average)		
86.0%	Proposed Boiler System Efficiency		
100.0%	Estimated consumption due to boilers		
$0.00	Cost per CCF	$0.00	Cost per mmBtu(gas)
$2.12	Cost per Gallon	$15.15	Cost per mmBtu(oil)
		$15.15	Cost per mmBtu(as agreed by dist)

Total Base/Summer Load

Consumption	0.00
% of total	0.00%

Total Space Heating/Winter Load

Consumption	203.89
% of total	100.00%

Building Area
4,561 square feet

Building Annual Energy Values
$0.67 Cost per square foot
0.045 mmBtu per square foot

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Pump House	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Boiler Replacement (Oil Option)	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Lump Sum for Boiler Replacement	1	LS	$7,440.00	$7,440.00	$7,440.00	$7,440.00	$14,880.00
2	Buderus Model #G215/7 w/ Riello Burner				$0.00		$0.00	$0.00
3	Bonds	1	LS	$285.00	$285.00	$285.00	$285.00	$570.00
4					$0.00		$0.00	$0.00
5	Per Lewis Mechanical Bid, January 22, 2008				$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7	Asbestos Abatement (Piping)	1	LS	$982.50	$982.50	$982.50	$982.50	$1,965.00
8	Bonds	1	LS	$56.00	$56.00	$56.00	$56.00	$112.00
9	Asbestos Abatement (Boiler Gasketing)	1	LS	$982.50	$982.50	$982.50	$982.50	$1,965.00
10					$0.00		$0.00	$0.00
11	Per LVI Environmental Services Bid January 22, 2008				$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13	Air Monitoring	1	LS	$1,250.00	$1,250.00	$1,250.00	$1,250.00	$2,500.00
14					$0.00		$0.00	$0.00
15	Per Westron Solutions Bid January 22, 2008				$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$10,996.00		$10,996.00	$21,992.00
						Contingency:	10.00%	$2,199.20
						TOTAL DIRECT CONSTRUCTION COST:		$24,191.20
						Audit, Engineering, & Construction Management:	24.0%	$5,805.89
							SUBTOTAL:	$29,997.09
							Asbestos Abatement Services:	$0.00
							Contingency: 0.00%	$0.00
							TOTAL ASBESTOS CONSTRUCTION COST:	$0.00
							Asbestos Abatement Services Fee: 0.0%	$0.00
							Asbestos SUBTOTAL:	$0.00
							TOTAL:	$29,997.09

Section 7

FIM #4: Window Replacement

FIM #4: WINDOW REPLACEMENT

INVESTIGATION

The buildings considered for this measure are the Village Hall, Fire House, and Recreation Center. All three buildings have old windows in poor condition. The existing windows are single-glazed and poorly weather-stripped, resulting in substantial heat losses due to conduction and air infiltration.

Given the varying building types and age of construction, the existing window systems vary in type and operation. Sensitivity to the requirements of the New York State Historic Preservation Office (NYSHPO) shall be taken into account in measures that affect the physical structure of a potentially historic building. Since the Village Hall is in excess of 50 years old and is designated as a historic landmark, SHPO assistance will be requested to facilitate the development of this measure and ensure that the buildings are modified correctly.

Existing System

Village Hall

The Village Hall is a designated SHPO site and will require special considerations. The windows on the Village Hall are made from wood and are single-glazed. There is approximately 1320 square feet of glass with a U-value of 0.84. Although the windows vary in size, the typical window measures 3'-9" by 7'-6". The window area is distributed by elevation as follows: East, 494 square feet; South 442 square feet; and West, 484 square feet.

Fire House

The windows and side door on the Fire House are constructed from aluminum framing and single-pane glass. Windows and doors are not thermally broken. There is approximately 844 square feet of glass with a U-value of 1.16 (the higher the U-value the higher the heat loss). The window area is distributed by elevation as follows: North, 284 square feet; West, 134 square feet; and South, 426 square feet.

Recreation Center

There are two distinct types of windows at the Recreation Center: single-glazed wood and single-glazed steel. There is approximately 535 square feet of glass on the building. The single-glazed wood windows comprise 443 square feet and possess a U-value of 0.84. The single-glazed steel windows account for approximately 92 square feet and possess a U-value of 1.06.

OPTIONS

An internal storm window option was considered and examined for implementation at the Village Hall. It involved use of the product developed and marketed by Advanced Energy Panels, Inc. The storm windows are constructed from an aluminum frame and polyolefin plastic. Although the economics for the measure were favorable (low cost and a simple payback in the six year range), the Village opted not to proceed with this option based on the aesthetics, functionality, and the questionable durability of the product in a public work environment.

RECOMMENDATIONS

The proposed windows will be thermally-broken, aluminum frame windows with high performance glass (1-inch insulated, low-E glass, Argon-filled). The new window configurations will be comprised of a combination of double-hung and fixed windows, and will be furnished with heavy duty hardware.

Proposed System

Village Hall

The proposed windows shall be aluminum clad wood windows that will maintain the historical significance of the building, while eliminating the maintenance costs associated painting the exterior portions of the frames and sashes. Aluminum clad windows have been used in the past on various municipal historical projects have met with approval by SHPO. All efforts will be made to duplicate the exterior perimeter as closes as possible to the existing exterior casings. Furthermore, all attempts will be made to reuse the interior trim. The new windows would have insulated, high performance glass with a U-value of 0.35. Windows on the Police Department, located in the

sublevel, would be made from laminated glass.

Fire House

The proposed replacement windows shall be thermally-broken, aluminum window with high performance insulated glass. The new windows will have a U-value of 0.55. The function and operation of the existing windows would be maintained. The color and finish of the windows shall be selected by the Village during the design phase.

Recreation Center

As mentioned previously, there are two different types of windows at the recreation Center: wood and steel frame. Both types - all 535 square feet of glass - shall be replaced with aluminum-clad, wood windows with high performance insulating glass. The new windows shall possess a U-value of 0.35. Extra care will be taken into consideration to match the architectural characteristics of the existing windows and building. The existing interior wood trim and finish would be matched as close as possible. The exterior finish of the new windows will be chosen by the Village from a selection of fifty (50) standard color choices.

The scope of work for the window upgrades includes:

- The demolition and removal of the existing sashes and/or frames;
- Preparation of the openings;
- Setting of the new windows;
- Installation of perimeter insulation;
- Installation of perimeter exterior caulking;
- Installation of perimeter interior trim;
- The removal and proper disposal of debris from the construction site.
- Final cleaning.

During the design phase, Wendel contracted Weston Solution, Inc., an environmental design firm, specializing in asbestos abatement and lead paint removal, to sample the windows at the three buildings. The windows at the Village Hall and the Fire House tested positive for Asbestos Containing Materials (ACM) in the glazing compound and the exterior caulking. The paint on these windows also tested positive for lead-based paint. The window subcontractor selected for the work

is responsible for the asbestos abatement and lead removal procedures associated with the replacement of the existing windows. The final pricing submitted with this report includes costs for the asbestos abatement and lead paint removal.

Window Replacement
Village Hall
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	1,504	kWh/Year
Fossil Fuel Savings	155	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$2,253	Per Year
Total Energy & O&M Savings	$2,253	Per Year
Project Costs		
Total Measure Cost	$154,900	
Payback		
Simple Payback	68.7	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	68.7	Year(s)

Project Name: Village Hall
Project Number: 4307-01
Calculated By: SVG
Checked By: JD
Date: 1/22/2008

ECM # CO240C

Window Replacement - Heating and Cooling Seasons

BASE CASE		
	Cooling Season	Heating Season
Conduction (Btu/yr)	7,396,250	220,856,882
Infiltration (Btu/yr)	2,442,957	10,227,875
Solar (Btu/yr)	144,668,967	0
Total (Btu/yr)	154,508,175	231,084,758
A/C Equipment COP	0.96	N/A
Annual Fuel Usage (mmBtu/yr)	0	272
Annual Energy Usage (kWh/yr)	47,171	0
Monthly Average Peak Demand (kW/mo)	11.49	0
Annual Average Peak Demand (kW/yr)	68.93	0

MEASURE CASE		
	Cooling Season	Heating Season
Conduction (Btu/yr)	3,081,771	92,023,701
Infiltration (Btu/yr)	1,832,218	7,670,907
Solar (Btu/yr)	144,668,967	0
Total (Btu/yr)	149,582,956	99,694,608
A/C Equipment COP	0.96	N/A
Annual Fuel Usage (mmBtu/yr)	0	117
Annual Energy Usage (kWh)	45,667	0
Monthly Average Peak Demand (kW/mo)	11.49	0
Annual Average Peak Demand (kW/yr)	68.93	0

SAVINGS		
	Cooling Season	Heating Season
Conduction Savings (Btu/yr)	4,314,479	128,833,181
Infiltration Savings (Btu/yr)	610,739	2,556,969
Solar Savings (Btu/yr)	0	N/A
Total Savings (Btu/yr)	4,925,219	131,390,150
Total Fuel Savings (mmBtu/yr)	0	155
Annual Energy Usage Savings (kWh/yr)	1,504	0
Average Monthly Peak Demand (kW/mo)	0.00	0
Annual Average Peak Demand (kW/yr)	0.00	0
Electric Energy Cost ($/kWh)	$0.0480	N/A
Electric Demand Cost ($/kW)	$23.27	N/A
Heating System Efficiency	N/A	0.85
Natural Gas Energy Cost ($/mmBtu)	N/A	$14.11
Annual Cost Savings ($)	$72	$2,181

Total Annual Cost Savings ($/yr)	$2,253
Total Implementation Cost ($)	$154,900

Payback (years)	68.7

MEASURE CASE - CONDUCTION

q dot = UA(Ti - To)

Summer Indoor Design DB Temp (F): 74

Window Type	Glass Area (ft^2)	Window Quantity	Total Glass Area (ft^2)	U (Btu/hr-ft^2-F)	UA Glass (Btu/hr-F)	Heat Transfer Rate at Bin Temps (Btu/hr)				
						97.5	92.5	87.5	82.5	77.5
A	24.00	55	1320	0.35	462.00	10,857	8,547	6,237	3,927	1,617
B	0.00	0	0	0.00	0.00	0	0	0	0	0
C	0.00	0	0	0.00	0.00	0	0	0	0	0
D	0.00	0	0	0.00	0.00	0	0	0	0	0
E	0.00	0	0	0.00	0.00	0	0	0	0	0
F	0.00	0	0	0.00	0.00	0	0	0	0	0
G	0.00	0	0	0.00	0.00	0	0	0	0	0
H	0.00	0	0	0.00	0.00	0	0	0	0	0
I	0.00	0	0	0.00	0.00	0	0	0	0	0
J	0.00	0	0	0.00	0.00	0	0	0	0	0
K	0.00	0	0	0.00	0.00	0	0	0	0	0
L	0.00	0	0	0.00	0.00	0	0	0	0	0
						10,857	8,547	6,237	3,927	1,617
						6	33	137	291	456
						65,142	282,051	854,469	1,142,757	737,352
										3,081,771

Heat Transfer Rate Totals (Btu/hr)	
Bin Hours (hrs/yr)	
Heat Transfer (Btu/yr)	
Grand Total (Btu/yr)	

Summer Peak Cooling Load (Btu/hr):	10,857
A/C Equipment COP:	0.96
Summer Peak Demand (kW):	3.31

Winter Indoor Design DB Temp (F): 72

Window Type	Glass Area (ft^2)	Window Quantity	Total Glass Area (ft^2)	U (Btu/hr-ft^2-F)	UA Glass (Btu/hr-F)	Heat Transfer Rate at Bin Temps (Btu/hr)													
						67.5	62.5	57.5	52.5	47.5	42.5	37.5	32.5	27.5	22.5	17.5	12.5	7.5	2.5
A	24.00	55	1320	0.35	462.00	2,079	4,389	6,699	9,009	11,319	13,629	15,939	18,249	20,559	22,869	25,179	27,489	29,799	32,109
B	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
						2,079	4,389	6,699	9,009	11,319	13,629	15,939	18,249	20,559	22,869	25,179	27,489	29,799	32,109
						759	740	715	644	624	664	780	792	522	359	246	164	91	39
						1,577,961	3,247,860	4,789,785	5,801,796	7,063,056	9,049,656	12,432,420	14,453,208	10,731,798	8,209,971	6,194,034	4,508,196	2,711,709	1,252,251
																			92,023,701

Heat Transfer Rate Totals (Btu/hr)	
Bin Hours (hrs/yr)	
Heat Transfer (Btu/yr)	
Grand Total (Btu/yr)	

BASE CASE - CONDUCTION

q dot = UA(Ti - To)

Summer Indoor Design DB Temp (F): 74

Window Type	Glass Area (ft^2)	Window Quantity	Total Glass Area (ft^2)	U (Btu/hr-ft^2-F)	UA Glass (Btu/hr-F)	Heat Transfer Rate at Bin Temps (Btu/hr)				
						97.5	92.5	87.5	82.5	77.5
A	24.00	55	1320	0.84	1108.80	26,057	20,513	14,969	9,425	3,881
B	0.00	0	0	0.00	0.00	0	0	0	0	0
C	0.00	0	0	0.00	0.00	0	0	0	0	0
D	0.00	0	0	0.00	0.00	0	0	0	0	0
E	0.00	0	0	0.00	0.00	0	0	0	0	0
F	0.00	0	0	0.00	0.00	0	0	0	0	0
G	0.00	0	0	0.00	0.00	0	0	0	0	0
H	0.00	0	0	0.00	0.00	0	0	0	0	0
I	0.00	0	0	0.00	0.00	0	0	0	0	0
J	0.00	0	0	0.00	0.00	0	0	0	0	0
K	0.00	0	0	0.00	0.00	0	0	0	0	0
L	0.00	0	0	0.00	0.00	0	0	0	0	0
						26,057	20,513	14,969	9,425	3,881
						6	33	137	291	456
						156,341	676,922	2,050,726	2,742,617	1,769,645

Heat Transfer Rate Totals (Btu/hr)	
Bin Hours (hrs/yr)	
Heat Transfer (Btu/yr)	
Grand Total (Btu/yr)	7,396,250

Summer Peak Cooling Load (Btu/hr):	26,057
A/C Equipment COP:	0.96
Summer Peak Demand (kW):	7.96

Winter Indoor Design DB Temp (F): 72

Window Type	Glass Area (ft^2)	Window Quantity	Total Glass Area (ft^2)	U (Btu/hr-ft^2-F)	UA Glass (Btu/hr-F)	Heat Transfer Rate at Bin Temps (Btu/hr)													
						67.5	62.5	57.5	52.5	47.5	42.5	37.5	32.5	27.5	22.5	17.5	12.5	7.5	2.5
A	24.00	55	1320	0.84	1108.80	4,990	10,534	16,078	21,622	27,166	32,710	38,254	43,798	49,342	54,886	60,430	65,974	71,518	77,062
B	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
						4,990	10,534	16,078	21,622	27,166	32,710	38,254	43,798	49,342	54,886	60,430	65,974	71,518	77,062
						759	740	715	644	624	664	780	792	522	359	246	164	91	39
						3,787,106	7,794,864	11,495,484	13,924,310	16,951,334	21,719,174	29,837,808	34,687,699	25,756,315	19,703,930	14,865,682	10,819,670	6,508,102	3,005,402

Heat Transfer Rate Totals (Btu/hr)	
Bin Hours (hrs/yr)	
Heat Transfer (Btu/yr)	
Grand Total (Btu/yr)	220,856,882

MEASURE CASE - SOLAR HEAT GAIN

Exposure	North	South	East	West
Total Area (ft2)	432	456	432	0

Cooling Load Factors for Glass without Interior Shading, North Latitudes
(Light Construction = 1, Medium Construction = 2, Heavy Construction = 3)
Construction = 3

Heavy Construction					
	Noon	8:00 AM	10:00 AM	2:00 PM	4:00 PM
North	0.69	0.49	0.60	0.72	0.70
East	0.36	0.45	0.49	0.29	0.24
South	0.51	0.17	0.33	0.55	0.43
West	0.16	0.13	0.14	0.30	0.49

Factor for Percentage of Clear Days = 0.65 (Handbook for the Energy Professional "little red book", pg 175)
Cooling Season Run Hours = 1,290
Shading Coefficent = 0.66 (SC = SHGC/0.87)

(Ch. 27, Table 23A, 1981 ASHRAE Fundamentals Handbook)

Solar Heat Gain - Noon (Btu/hr)					
Exposure	North	South	East	West	Total
May	7279	17344	4106	0	28729
June	7476	14582	4208	0	26266
July	7476	16730	4208	0	28415
August	6886	22870	3900	0	33656
September	5902	30698	3285	0	39884
October	4918	35917	2771	0	43606
					200556

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at Noon				
	North	East	South	West
May	37	40	113	40
June	38	41	95	41
July	38	41	109	41
August	35	38	149	38
September	30	32	200	32
October	25	27	234	27

Solar Heat Gain - 8:00 AM (Btu/hr)					
Exposure	North	South	East	West	Total
May	3772	1484	28227	0	33483
June	4191	1484	27714	0	33389
July	3912	1535	27714	0	33160
August	3353	2098	27714	0	33164
September	2375	3633	26302	0	32310
October	1537	4554	22197	0	28287
					193793

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 8 AM				
	North	East	South	West
May	27	220	29	25
June	30	216	29	27
July	28	216	30	26
August	24	216	41	23
September	17	205	71	17
October	11	173	89	11

Solar Heat Gain 10:00 AM (Btu/hr)					
Exposure	North	South	East	West	Total
May	5816	8243	20677	0	34737
June	5988	6853	20258	0	33098
July	5988	8045	20397	0	34430
August	5474	11521	20956	0	37951
September	4619	16387	20677	0	41683
October	3593	19466	19420	0	42478
					224377

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 10 AM				
	North	East	South	West
May	34	148	83	34
June	35	145	69	35
July	35	146	81	35
August	32	150	116	32
September	27	148	165	27
October	21	139	196	21

Solar Heat Gain 2:00 PM (Btu/hr)					
Exposure	North	South	East	West	Total
May	6980	13739	2811	0	23530
June	7185	11421	2894	0	21500
July	7185	13408	2894	0	23487
August	6569	19201	2646	0	28416
September	5543	27312	2232	0	35087
October	4311	32443	1736	0	38491
					170512

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 2 PM				
	North	East	South	West
May	34	34	83	148
June	35	35	69	145
July	35	35	81	146
August	32	32	116	150
September	27	27	165	148
October	21	21	196	139

Solar Heat Gain 4:00 PM (Btu/hr)					
Exposure	North	South	East	West	Total
May	5389	3753	1711	0	10852
June	5988	3753	1848	0	11588
July	5588	3882	1779	0	11250
August	4790	5306	1574	0	11670
September	3393	9188	1163	0	13745
October	2195	11518	753	0	14466
					73571

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 4 PM				
	North	East	South	West
May	27	25	29	220
June	30	27	29	216
July	28	26	30	216
August	24	23	41	216
September	17	17	71	205
October	11	11	89	173

Total Load (Btu/yr)	144,668,967
A/C Equipment COP	0.96

	Peak Cooling Load (Btu/hr)	Avg. Peak Demand (kW)
May	34,737	10.60
June	33,389	10.19
July	34,430	10.51
August	37,951	11.59
September	41,683	12.73
October	43,606	13.31
Total/Avg:	225,796	11.49

BASE CASE - SOLAR HEAT GAIN

Exposure	North	South	East	West
Total Area (ft2)	432	456	432	0

Cooling Load Factors for Glass without Interior Shading, North Latitudes
(Light Construction = 1, Medium Construction = 2, Heavy Construction = 3)
Construction = 3

Heavy Construction					
	Noon	8:00 AM	10:00 AM	2:00 PM	4:00 PM
North	0.69	0.49	0.60	0.72	0.70
East	0.36	0.45	0.49	0.29	0.24
South	0.51	0.17	0.33	0.55	0.43
West	0.16	0.13	0.14	0.30	0.49

Factor for percentage of clear days = 0.65 (Handbook for the Energy Professional "little red book", pg 175)
Cooling Season Run Hours = 1,290
Shading Coefficent = 0.66 (SC = SHGC/0.87)

(Ch. 27, Table 23A, 1981 ASHRAE Fundamentals Handbook)

Solar Heat Gain - Noon (Btu/hr)					
Exposure	North	South	East	West	Total
May	7279	17344	4106	0	28729
June	7476	14582	4208	0	26266
July	7476	16730	4208	0	28415
August	6886	22870	3900	0	33656
September	5902	30698	3285	0	39884
October	4918	35917	2771	0	43606
					200556

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at Noon				
	North	East	South	West
May	37	40	113	40
June	38	41	95	41
July	38	41	109	41
August	35	38	149	38
September	30	32	200	32
October	25	27	234	27

Solar Heat Gain - 8:00 AM (Btu/hr)					
Exposure	North	South	East	West	Total
May	3772	1484	28227	0	33483
June	4191	1484	27714	0	33389
July	3912	1535	27714	0	33160
August	3353	2098	27714	0	33164
September	2375	3633	26302	0	32310
October	1537	4554	22197	0	28287
					193793

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 8 AM				
	North	East	South	West
May	27	220	29	25
June	30	216	29	27
July	28	216	30	26
August	24	216	41	23
September	17	205	71	17
October	11	173	89	11

Solar Heat Gain - 10:00 AM (Btu/hr)					
Exposure	North	South	East	West	Total
May	5816	8243	20677	0	34737
June	5988	6853	20258	0	33098
July	5988	8045	20397	0	34430
August	5474	11521	20956	0	37951
September	4619	16387	20677	0	41683
October	3593	19466	19420	0	42478
					224377

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 10 AM				
	North	East	South	West
May	34	148	83	34
June	35	145	69	35
July	35	146	81	35
August	32	150	116	32
September	27	148	165	27
October	21	139	196	21

Solar Heat Gain - 2:00 PM (Btu/hr)					
Exposure	North	South	East	West	Total
May	6980	13739	2811	0	23530
June	7185	11421	2894	0	21500
July	7185	13408	2894	0	23487
August	6569	19201	2646	0	28416
September	5543	27312	2232	0	35087
October	4311	32443	1736	0	38491
					170512

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 2 PM				
	North	East	South	West
May	34	34	83	148
June	35	35	69	145
July	35	35	81	146
August	32	32	116	150
September	27	27	165	148
October	21	21	196	139

Solar Heat Gain - 4:00 PM (Btu/hr)					
Exposure	North	South	East	West	Total
May	5389	3753	1711	0	10852
June	5988	3753	1848	0	11588
July	5588	3882	1779	0	11250
August	4790	5306	1574	0	11670
September	3393	9188	1163	0	13745
October	2195	11518	753	0	14466
					73571

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 4 PM				
	North	East	South	West
May	27	25	29	220
June	30	27	29	216
July	28	26	30	216
August	24	23	41	216
September	17	17	71	205
October	11	11	89	173

Total Load (Btu/yr)	144,668,967
A/C Equipment COP	0.96

	Peak Cooling	Avg. Peak

MEASURE CASE - INFILTRATION

Assumptions:

North - Infiltration Value (cfh/ft) =	0	
West - Infiltration Value (cfh/ft) =	15	
East - Infiltration Value (cfh/ft) =	15	
South - Infiltration Value (cfh/ft) =	15	
Heating Degree Days (HDD65) =	4,777	(ASHRAE/IESNA Standard 90.1-1999, Table D-1)
Cooling Degree Days (CDD50) =	1,141	(ASHRAE/IESNA Standard 90.1-1999, Table D-1)
Factor for Latent Loads =	35.7%	
Cooling Season Run Hours (hrs) =	1,290	
Building Occupancy (%)	33%	

Heating Load = Perimeter (ft) * (Infiltration Value (cfm/ft) * 1.085 (Btu/hr-cfm-F)
*HDD (F day/yr) * 24 hr/day * Building Occupancy (%) = Btu/yr

Cooling Load = Perimeter (ft) * (Infiltration Value (cfm/ft) * 1.085 (Btu/hr-cfm-F)
* CDD (F day/yr) * 24 hr/day * Building Occupancy (%) * Factor for Latent Loads (%)= Btu/yr

Heating Season			
Wind Direction	**Perimeter (ft)**	**Proposed Infiltration Value (cfm/ft)**	**Heating Load (Btu/yr)**
North	360.00	0.00	0
West	0.00	0.25	0
East	360.00	0.25	3,731,792
South	380.00	0.25	3,939,114
			7,670,907

Cooling Season			
Wind Direction	**Perimeter (ft)**	**Proposed Infiltration Value (cfm/ft)**	**Cooling Load (Btu/yr)**
North	360.00	0.00	0
West	0.00	0.25	0
East	360.00	0.25	891,349
South	380.00	0.25	940,869

Total Cooling Load (Btu/yr):	**1,832,218**
Peak Cooling Load (Btu/hr):	**1,421**
A/C Equipment COP:	**0.96**
Peak Demand (kW):	**0.43**

BASE CASE - INFILTRATION

Assumptions:

North - Infiltration Value (cfh/ft) =	0	
West - Infiltration Value (cfh/ft) =	20	
East - Infiltration Value (cfh/ft) =	20	
South - Infiltration Value (cfh/ft) =	20	
Heating Degree Days (HDD65) =	4,777	(ASHRAE/IESNA Standard 90.1-1999, Table D-1)
Cooling Degree Days (CDD50) =	1,141	(ASHRAE/IESNA Standard 90.1-1999, Table D-1)
Factor for Latent Loads =	35.7%	
Cooling Season Run Hours (hrs) =	1,290	
Building Occupancy (%) =	33%	

Heating Load = Perimeter (ft) * (Infiltration Value (cfm/ft) * 1.085 (Btu/hr-cfm-F)
*HDD (F day/yr) * 24 hr/day * Building Occupancy (%) = Btu/yr

Cooling Load = Perimeter (ft) * (Infiltration Value (cfm/ft) * 1.085 (Btu/hr-cfm-F)
* CDD (F day/yr) * 24 hr/day * Building Occupancy (%) * Factor for Latent Loads (%)= Btu/yr

Heating Season			
Wind Direction	**Perimeter (ft)**	**Existing Infiltration Value (cfm/ft)**	**Heating Load (Btu/yr)**
North	360.00	0.00	0
West	0.00	0.33	0
East	360.00	0.33	4,975,723
South	380.00	0.33	5,252,152
			10,227,875

Cooling Season			
Wind Direction	**Perimeter (ft)**	**Existing Infiltration Value (cfm/ft)**	**Cooling Load (Btu/yr)**
North	360.00	0.00	0
West	0.00	0.33	0
East	360.00	0.33	1,188,466
South	380.00	0.33	1,254,491

Total Cooling Load (Btu/yr):	**2,442,957**
Average Cooling Load (Btu/hr):	**1,894**
A/C Equipment COP:	**0.96**
Average Demand (kW):	**0.58**

Infiltration Values (ft3) per Foot of Crack per Hour - (cfh/ft)

		Wind Velocity (mph)					
Type of Opening	**Conditions**	**5**	**10**	**15**	**20**	**25**	**30**
Dbl-hung wood window	Average fit (not weather-stripped)	6	20	40	60	80	100
Dbl-hung wood window	Average fit (weather-stripped)	5	15	25	35	50	65
Dbl-hung wood window	Poor fit (weather-stripped)	6	20	35	50	70	90
Dbl-hung metal window	Not weather-stripped	20	45	70	100	135	170
Dbl-hung metal window	Weather-stripped	6	18	30	44	58	75
Steel sash	Casement, good fit	6	18	30	44	58	75
Steel sash	Casement, average fit	12	30	50	75	100	125
Steel sash	Industrial type	50	110	175	240	30	375
Doors	Good fit (not weather-stripped)	30	70	110	155	200	250
Doors	Good fit (weather-stripped)	15	35	55	75	100	125
Doors	Poor fit (not weather-stripped)	55	140	225	310	400	500
Doors	Poor fit (weather-stripped)	30	70	110	155	200	250

*** Use of storm sash permits a 50% infiltration reductions in poorly fitting windows only.**

Reference
(Handbook for the Energy Professional "little red book", pg 50)

DB Temp	Total: May - October 0:00-7:59 Bin Hours	8:00-15:59 Bin Hours	16:00-23:59 Bin Hours		Total Cooling Hours
57.5	243	129	179		144
62.5	267	170	219		183
67.5	256	209	250		217
72.5	155	242	250		235
77.5	32	247	165		220
82.5	3	200	83		172
87.5	0	109	27		92
92.5	0	27	6		23
97.5	0	5	1		4
	956	1338	1180		**1,290**

Building Schedule:

Monday - Friday	0:00-7:59	8:00-15:59	16:00-23:59
Occupied	1.0	8.0	1.0
Unoccupied	7.0	0.0	7.0
Weekends			
Occupied	0.0	3.0	0.0
Unoccupied	8.0	5.0	8.0
% Occupied	8.93%	82.14%	8.93%

Weekday Hours	50.00
Weekend Hours	6.00
% Occupied	33.3%

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Village Hall	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Window Replacement	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Install 1320 sq-ft of Aluminum Clad Wood	1	LS	$54,583.50	$54,583.50	$54,583.50	$54,583.50	$109,167.00
2	Windows.				$0.00		$0.00	$0.00
3	Bonds	1	LS	$598.00	$598.00	$598.00	$598.00	$1,196.00
4	Per BR Johnson Bid January 22, 2008				$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6	Air Monitoring	1	LS	$3,200.00	$3,200.00		$0.00	$3,200.00
7	Per Weston Solutions Bid January 24, 2008				$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$58,381.50		$55,181.50	$113,563.00

Contingency:	10.0%	$11,356.30
TOTAL DIRECT CONSTRUCTION COST:		$124,919.30
Audit, Engineering, & Construction Management:	24.0%	$29,980.63
SUBTOTAL:		$154,899.93
Asbestos Abatement Services:		$0.00
Contingency:	0.0%	$0.00
TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
Asbestos Abatement Services Fee:	0.0%	$0.00
Asbestos SUBTOTAL:		$0.00
TOTAL:		$154,899.93

Window Replacement
Fire House
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.8	kW/Month
Electrical Energy Savings	6,100	kWh/Year
Fossil Fuel Savings	181	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$2,909	Per Year
Total Energy & O&M Savings	$2,909	Per Year
Project Costs		
Total Measure Cost	$141,223	
Payback		
Simple Payback	48.6	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	48.6	Year(s)

Project Name: Fire House
Project Number: 4307-01
Calculated By: SVG
Checked By: JD
Date: 1/22/2008

ECM # CO240C

Window Replacement - Heating and Cooling Seasons

BASE CASE	Cooling Season	Heating Season
Conduction (Btu/yr)	4,756,957	196,396,903
Infiltration (Btu/yr)	9,260,128	38,769,177
Solar (Btu/yr)	91,765,478	0
Total (Btu/yr)	105,782,563	235,166,080
A/C Equipment COP	0.96	N/A
Annual Fuel Usage (mmBtu/yr)	0	314
Annual Energy Usage (kWh/yr)	32,295	0
Monthly Average Peak Demand (kW/mo)	7.20	0
Annual Average Peak Demand (kW/yr)	43.18	0

MEASURE CASE	Cooling Season	Heating Season
Conduction (Btu/yr)	2,255,454	93,119,221
Infiltration (Btu/yr)	1,515,294	6,344,047
Solar (Btu/yr)	82,032,776	0
Total (Btu/yr)	85,803,523	99,463,268
A/C Equipment COP	0.96	N/A
Annual Fuel Usage (mmBtu/yr)	0	133
Annual Energy Usage (kWh)	26,195	0
Monthly Average Peak Demand (kW/mo)	6.43	0
Annual Average Peak Demand (kW/yr)	38.60	0

SAVINGS	Cooling Season	Heating Season
Conduction Savings (Btu/yr)	2,501,503	103,277,682
Infiltration Savings (Btu/yr)	7,744,834	32,425,130
Solar Savings (Btu/yr)	9,732,702	N/A
Total Savings (Btu/yr)	19,979,040	135,702,811
Total Fuel Savings (mmBtu/yr)	0	181
Annual Energy Usage Savings (kWh/yr)	6,100	0
Average Monthly Peak Demand (kW/mo)	0.76	0
Annual Average Peak Demand (kW/yr)	4.58	0
Electric Energy Cost ($/kWh)	$0.0480	N/A
Electric Demand Cost ($/kW)	$23.19	N/A
Heating System Efficiency	N/A	0.75
Fuel Energy Cost ($/mmBtu)	N/A	$13.87
Annual Cost Savings ($)	$399	$2,510

Total Annual Cost Savings ($/yr)	$2,909
Total Implementation Cost ($)	$141,223

Payback (years)	48.6

MEASURE CASE - CONDUCTION

q dot = UA(Ti - To)

Summer Indoor Design DB Temp (F): 76

Window Type	Glass Area (ft^2)	Window Quantity	Total Glass Area (ft^2)	U (Btu/hr-ft^2-F)	UA Glass (Btu/hr-F)	Heat Transfer Rate at Bin Temps (Btu/hr)				
						97.5	92.5	87.5	82.5	77.5
A	50.00	17	850	0.55	467.50	10,051	7,714	5,376	3,039	701
B	0.00	0	0	0.00	0.00	0	0	0	0	0
C	0.00	0	0	0.00	0.00	0	0	0	0	0
D	0.00	0	0	0.00	0.00	0	0	0	0	0
E	0.00	0	0	0.00	0.00	0	0	0	0	0
F	0.00	0	0	0.00	0.00	0	0	0	0	0
G	0.00	0	0	0.00	0.00	0	0	0	0	0
H	0.00	0	0	0.00	0.00	0	0	0	0	0
I	0.00	0	0	0.00	0.00	0	0	0	0	0
J	0.00	0	0	0.00	0.00	0	0	0	0	0
K	0.00	0	0	0.00	0.00	0	0	0	0	0
L	0.00	0	0	0.00	0.00	0	0	0	0	0
						10,051	7,714	5,376	3,039	701
						6	33	137	291	456
						60,308	254,554	736,546	884,276	319,770
										2,255,454

Heat Transfer Rate Totals (Btu/hr)	
Bin Hours (hrs/yr)	
Heat Transfer (Btu/yr)	
Grand Total (Btu/yr)	

Summer Peak Cooling Load (Btu/hr):	10,051
A/C Equipment COP:	0.96
Summer Peak Demand (kW):	3.07

Winter Indoor Design DB Temp (F): 72

Window Type	Glass Area (ft^2)	Window Quantity	Total Glass Area (ft^2)	U (Btu/hr-ft^2-F)	UA Glass (Btu/hr-F)	Heat Transfer Rate at Bin Temps (Btu/hr)													
						67.5	62.5	57.5	52.5	47.5	42.5	37.5	32.5	27.5	22.5	17.5	12.5	7.5	2.5
A	50.00	17	850	0.55	467.50	2,104	4,441	6,779	9,116	11,454	13,791	16,129	18,466	20,804	23,141	25,479	27,816	30,154	32,491
B	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
						2,104	4,441	6,779	9,116	11,454	13,791	16,129	18,466	20,804	23,141	25,479	27,816	30,154	32,491
						759	740	715	644	624	664	780	792	522	359	246	164	91	39
						1,596,746	3,286,525	4,846,806	5,870,865	7,147,140	9,157,390	12,580,425	14,625,270	10,859,558	8,307,709	6,267,773	4,561,865	2,743,991	1,267,159
																			93,119,221

Heat Transfer Rate Totals (Btu/hr)	
Bin Hours (hrs/yr)	
Heat Transfer (Btu/yr)	
Grand Total (Btu/yr)	

BASE CASE - CONDUCTION

q dot = UA(Ti - To)

Summer Indoor Design DB Temp (F): 76

Window Type	Glass Area (ft^2)	Window Quantity	Total Glass Area (ft^2)	U (Btu/hr-ft^2-F)	UA Glass (Btu/hr-F)	Heat Transfer Rate at Bin Temps (Btu/hr)				
						97.5	92.5	87.5	82.5	77.5
A	50.00	17	850	1.16	986.00	21,199	16,269	11,339	6,409	1,479
B	0.00	0	0	0.00	0.00	0	0	0	0	0
C	0.00	0	0	0.00	0.00	0	0	0	0	0
D	0.00	0	0	0.00	0.00	0	0	0	0	0
E	0.00	0	0	0.00	0.00	0	0	0	0	0
F	0.00	0	0	0.00	0.00	0	0	0	0	0
G	0.00	0	0	0.00	0.00	0	0	0	0	0
H	0.00	0	0	0.00	0.00	0	0	0	0	0
I	0.00	0	0	0.00	0.00	0	0	0	0	0
J	0.00	0	0	0.00	0.00	0	0	0	0	0
K	0.00	0	0	0.00	0.00	0	0	0	0	0
L	0.00	0	0	0.00	0.00	0	0	0	0	0
						21,199	16,269	11,339	6,409	1,479
						6	33	137	291	456
						127,194	536,877	1,553,443	1,865,019	674,424
										4,756,957

Heat Transfer Rate Totals (Btu/hr)	
Bin Hours (hrs/yr)	
Heat Transfer (Btu/yr)	
Grand Total (Btu/yr)	

Summer Peak Cooling Load (Btu/hr):	21,199
A/C Equipment COP:	0.96
Summer Peak Demand (kW):	6.47

Winter Indoor Design DB Temp (F): 72

Window Type	Glass Area (ft^2)	Window Quantity	Total Glass Area (ft^2)	U (Btu/hr-ft^2-F)	UA Glass (Btu/hr-F)	Heat Transfer Rate at Bin Temps (Btu/hr)													
						67.5	62.5	57.5	52.5	47.5	42.5	37.5	32.5	27.5	22.5	17.5	12.5	7.5	2.5
A	50.00	17	850	1.16	986.00	4,437	9,367	14,297	19,227	24,157	29,087	34,017	38,947	43,877	48,807	53,737	58,667	63,597	68,527
B	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
C	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
						4,437	9,367	14,297	19,227	24,157	29,087	34,017	38,947	43,877	48,807	53,737	58,667	63,597	68,527
						759	740	715	644	624	664	780	792	522	359	246	164	91	39
						3,367,683	6,931,580	10,222,355	12,382,188	15,073,968	19,313,768	26,533,260	30,846,024	22,903,794	17,521,713	13,219,302	9,621,388	5,787,327	2,672,553
																			196,396,903

Heat Transfer Rate Totals (Btu/hr)	
Bin Hours (hrs/yr)	
Heat Transfer (Btu/yr)	
Grand Total (Btu/yr)	

MEASURE CASE - SOLAR HEAT GAIN

Exposure	North	South	East	West
Total Area (ft2)	300	300	250	0

Cooling Load Factors for Glass without Interior Shading, North Latitudes
(Light Construction = 1, Medium Construction = 2, Heavy Construction = 3)
Construction = 3

Heavy Construction					
	Noon	8:00 AM	10:00 AM	2:00 PM	4:00 PM
North	0.69	0.49	0.60	0.72	0.70
East	0.36	0.45	0.49	0.29	0.24
South	0.51	0.17	0.33	0.55	0.43
West	0.16	0.13	0.14	0.30	0.49

Factor for Percentage of Clear Days = 0.65 (Handbook for the Energy Professional "little red book", pg 175)
Cooling Season Run Hours = 1,290
Shading Coefficent = 0.59 (SC = SHGC/0.87)

(Ch. 27, Table 23A, 1981 ASHRAE Fundamentals Handbook)

Solar Heat Gain - Noon (Btu/hr)					
Exposure	North	South	East	West	Total
May	4519	10201	2124	0	16843
June	4641	8576	2177	0	15394
July	4641	9839	2177	0	16657
August	4275	13450	2018	0	19743
September	3664	18054	1699	0	23417
October	3053	21123	1434	0	25610
					117664

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at Noon				
	North	East	South	West
May	37	40	113	40
June	38	41	95	41
July	38	41	109	41
August	35	38	149	38
September	30	32	200	32
October	25	27	234	27

Solar Heat Gain - 8:00 AM (Btu/hr)					
Exposure	North	South	East	West	Total
May	2342	873	14603	0	17817
June	2602	873	14337	0	17812
July	2428	903	14337	0	17668
August	2082	1234	14337	0	17652
September	1474	2136	13607	0	17218
October	954	2678	11483	0	15115
					103281

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 8 AM				
	North	East	South	West
May	27	220	29	25
June	30	216	29	27
July	28	216	30	26
August	24	216	41	23
September	17	205	71	17
October	11	173	89	11

Solar Heat Gain 10:00 AM (Btu/hr)					
Exposure	North	South	East	West	Total
May	3611	4848	10697	0	19156
June	3717	4030	10480	0	18227
July	3717	4731	10552	0	19000
August	3398	6776	10841	0	21015
September	2867	9638	10697	0	23202
October	2230	11448	10046	0	23725
					124325

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 10 AM				
	North	East	South	West
May	34	148	83	34
June	35	145	69	35
July	35	146	81	35
August	32	150	116	32
September	27	148	165	27
October	21	139	196	21

Solar Heat Gain 2:00 PM (Btu/hr)					
Exposure	North	South	East	West	Total
May	4333	8080	1454	0	13867
June	4460	6717	1497	0	12675
July	4460	7885	1497	0	13843
August	4078	11293	1369	0	16739
September	3441	16063	1155	0	20659
October	2676	19081	898	0	22655
					100438

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 2 PM				
	North	East	South	West
May	34	34	83	148
June	35	35	69	145
July	35	35	81	146
August	32	32	116	150
September	27	27	165	148
October	21	21	196	139

Solar Heat Gain 4:00 PM (Btu/hr)					
Exposure	North	South	East	West	Total
May	3345	2207	885	0	6437
June	3717	2207	956	0	6880
July	3469	2283	920	0	6673
August	2974	3121	814	0	6908
September	2106	5404	602	0	8112
October	1363	6774	389	0	8526
					43537

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 4 PM				
	North	East	South	West
May	27	25	29	220
June	30	27	29	216
July	28	26	30	216
August	24	23	41	216
September	17	17	71	205
October	11	11	89	173

Total Load (Btu/yr)	82,032,776
A/C Equipment COP	0.96

	Peak Cooling Load (Btu/hr)	Avg. Peak Demand (kW)
May	19,156	5.85
June	18,227	5.56
July	19,000	5.80
August	21,015	6.42
September	23,417	7.15
October	25,610	7.82
Total/Avg:	126,425	6.43

BASE CASE - SOLAR HEAT GAIN

Exposure	North	South	East	West
Total Area (ft2)	300	300	250	0

Cooling Load Factors for Glass without Interior Shading, North Latitudes
(Light Construction = 1, Medium Construction = 2, Heavy Construction = 3)
Construction = 3

Heavy Construction					
	Noon	8:00 AM	10:00 AM	2:00 PM	4:00 PM
North	0.69	0.49	0.60	0.72	0.70
East	0.36	0.45	0.49	0.29	0.24
South	0.51	0.17	0.33	0.55	0.43
West	0.16	0.13	0.14	0.30	0.49

Factor for percentage of clear days = 0.65 (Handbook for the Energy Professional "little red book", pg 175)
Cooling Season Run Hours = 1,290
Shading Coefficent = 0.66 (SC = SHGC/0.87)

(Ch. 27, Table 23A, 1981 ASHRAE Fundamentals Handbook)

Solar Heat Gain - Noon (Btu/hr)					
Exposure	North	South	East	West	Total
May	5055	11411	2376	0	18842
June	5192	9593	2435	0	17220
July	5192	11007	2435	0	18634
August	4782	15046	2257	0	22085
September	4099	20196	1901	0	26195
October	3416	23629	1604	0	28649
					131624

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at Noon				
	North	East	South	West
May	37	40	113	40
June	38	41	95	41
July	38	41	109	41
August	35	38	149	38
September	30	32	200	32
October	25	27	234	27

Solar Heat Gain - 8:00 AM (Btu/hr)					
Exposure	North	South	East	West	Total
May	2620	976	16335	0	19931
June	2911	976	16038	0	19925
July	2717	1010	16038	0	19764
August	2328	1380	16038	0	19747
September	1649	2390	15221	0	19260
October	1067	2996	12845	0	16908
					115535

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 8 AM				
	North	East	South	West
May	27	220	29	25
June	30	216	29	27
July	28	216	30	26
August	24	216	41	23
September	17	205	71	17
October	11	173	89	11

Solar Heat Gain - 10:00 AM (Btu/hr)					
Exposure	North	South	East	West	Total
May	4039	5423	11966	0	21428
June	4158	4508	11723	0	20390
July	4158	5293	11804	0	21255
August	3802	7579	12128	0	23509
September	3208	10781	11966	0	25955
October	2495	12807	11238	0	26540
					139075

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 10 AM				
	North	East	South	West
May	34	148	83	34
June	35	145	69	35
July	35	146	81	35
August	32	150	116	32
September	27	148	165	27
October	21	139	196	21

Solar Heat Gain - 2:00 PM (Btu/hr)					
Exposure	North	South	East	West	Total
May	4847	9039	1627	0	15513
June	4990	7514	1675	0	14178
July	4990	8821	1675	0	15485
August	4562	12632	1531	0	18726
September	3849	17969	1292	0	23110
October	2994	21344	1005	0	25343
					112354

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 2 PM				
	North	East	South	West
May	34	34	83	148
June	35	35	69	145
July	35	35	81	146
August	32	32	116	150
September	27	27	165	148
October	21	21	196	139

Solar Heat Gain - 4:00 PM (Btu/hr)					
Exposure	North	South	East	West	Total
May	3742	2469	990	0	7201
June	4158	2469	1069	0	7696
July	3881	2554	1030	0	7465
August	3326	3491	911	0	7728
September	2356	6045	673	0	9074
October	1525	7577	436	0	9538
					48702

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 4 PM				
	North	East	South	West
May	27	25	29	220
June	30	27	29	216
July	28	26	30	216
August	24	23	41	216
September	17	17	71	205
October	11	11	89	173

Total Load (Btu/yr)	91,765,478
A/C Equipment COP	0.96

	Peak Cooling	Avg. Peak

MEASURE CASE - INFILTRATION

Assumptions:

North - Infiltration Value (cfh/ft) =	18	
West - Infiltration Value (cfh/ft) =	0	
East - Infiltration Value (cfh/ft) =	18	
South - Infiltration Value (cfh/ft) =	18	
Heating Degree Days (HDD65) =	4,777	(ASHRAE/IESNA Standard 90.1-1999, Table D-1)
Cooling Degree Days (CDD50) =	1,141	(ASHRAE/IESNA Standard 90.1-1999, Table D-1)
Factor for Latent Loads =	35.7%	
Cooling Season Run Hours (hrs) =	1,290	
Building Occupancy (%)	33%	

Heating Load = Perimeter (ft) * (Infiltration Value (cfm/ft) * 1.085 (Btu/hr-cfm-F)
*HDD (F day/yr) * 24 hr/day * Building Occupancy (%) = Btu/yr

Cooling Load = Perimeter (ft) * (Infiltration Value (cfm/ft) * 1.085 (Btu/hr-cfm-F)
* CDD (F day/yr) * 24 hr/day * Building Occupancy (%) * Factor for Latent Loads (%)= Btu/yr

Heating Season			
Wind Direction	**Perimeter (ft)**	**Proposed Infiltration Value (cfm/ft)**	**Heating Load (Btu/yr)**
North	180.00	0.30	2,239,075
West	0.00	0.00	0
East	150.00	0.30	1,865,896
South	180.00	0.30	2,239,075
			6,344,047

Cooling Season			
Wind Direction	**Perimeter (ft)**	**Proposed Infiltration Value (cfm/ft)**	**Cooling Load (Btu/yr)**
North	180.00	0.30	534,810
West	0.00	0.00	0
East	150.00	0.30	445,675
South	180.00	0.30	534,810

Total Cooling Load (Btu/yr):	**1,515,294**
Peak Cooling Load (Btu/hr):	**1,175**
A/C Equipment COP:	**0.96**
Peak Demand (kW):	**0.36**

BASE CASE - INFILTRATION

Assumptions:

North - Infiltration Value (cfh/ft) =	110	
West - Infiltration Value (cfh/ft) =	0	
East - Infiltration Value (cfh/ft) =	110	
South - Infiltration Value (cfh/ft) =	110	
Heating Degree Days (HDD65) =	4,777	(ASHRAE/IESNA Standard 90.1-1999, Table D-1)
Cooling Degree Days (CDD50) =	1,141	(ASHRAE/IESNA Standard 90.1-1999, Table D-1)
Factor for Latent Loads =	35.7%	
Cooling Season Run Hours (hrs) =	1,290	
Building Occupancy (%) =	33%	

Heating Load = Perimeter (ft) * (Infiltration Value (cfm/ft) * 1.085 (Btu/hr-cfm-F)
*HDD (F day/yr) * 24 hr/day * Building Occupancy (%) = Btu/yr

Cooling Load = Perimeter (ft) * (Infiltration Value (cfm/ft) * 1.085 (Btu/hr-cfm-F)
* CDD (F day/yr) * 24 hr/day * Building Occupancy (%) * Factor for Latent Loads (%)= Btu/yr

Heating Season			
Wind Direction	**Perimeter (ft)**	**Existing Infiltration Value (cfm/ft)**	**Heating Load (Btu/yr)**
North	180.00	1.83	13,683,239
West	0.00	0.00	0
East	150.00	1.83	11,402,699
South	180.00	1.83	13,683,239
			38,769,177

Cooling Season			
Wind Direction	**Perimeter (ft)**	**Existing Infiltration Value (cfm/ft)**	**Cooling Load (Btu/yr)**
North	180.00	1.83	3,268,280
West	0.00	0.00	0
East	150.00	1.83	2,723,567
South	180.00	1.83	3,268,280

Total Cooling Load (Btu/yr):	**9,260,128**
Average Cooling Load (Btu/hr):	**7,180**
A/C Equipment COP:	**0.96**
Average Demand (kW):	**2.19**

Infiltration Values (ft3) per Foot of Crack per Hour - (cfh/ft)

		Wind Velocity (mph)					
Type of Opening	**Conditions**	**5**	**10**	**15**	**20**	**25**	**30**
Dbl-hung wood window	Average fit (not weather-stripped)	6	20	40	60	80	100
Dbl-hung wood window	Average fit (weather-stripped)	5	15	25	35	50	65
Dbl-hung wood window	Poor fit (weather-stripped)	6	20	35	50	70	90
Dbl-hung metal window	Not weather-stripped	20	45	70	100	135	170
Dbl-hung metal window	Weather-stripped	6	18	30	44	58	75
Steel sash	Casement, good fit	6	18	30	44	58	75
Steel sash	Casement, average fit	12	30	50	75	100	125
Steel sash	Industrial type	50	110	175	240	30	375
Doors	Good fit (not weather-stripped)	30	70	110	155	200	250
Doors	Good fit (weather-stripped)	15	35	55	75	100	125
Doors	Poor fit (not weather-stripped)	55	140	225	310	400	500
Doors	Poor fit (weather-stripped)	30	70	110	155	200	250

*** Use of storm sash permits a 50% infiltration reductions in poorly fitting windows only.**

Reference
(Handbook for the Energy Professional "little red book", pg 50)

DB Temp	Total: May - October 0:00-7:59 Bin Hours	8:00-15:59 Bin Hours	16:00-23:59 Bin Hours		Total Cooling Hours
57.5	243	129	179		144
62.5	267	170	219		183
67.5	256	209	250		217
72.5	155	242	250		235
77.5	32	247	165		220
82.5	3	200	83		172
87.5	0	109	27		92
92.5	0	27	6		23
97.5	0	5	1		4
	956	1338	1180		**1,290**

Building Schedule:

Monday - Friday	0:00-7:59	8:00-15:59	16:00-23:59
Occupied	1.0	8.0	1.0
Unoccupied	7.0	0.0	7.0
Weekends			
Occupied	0.0	3.0	0.0
Unoccupied	8.0	5.0	8.0
% Occupied	8.93%	82.14%	8.93%

Weekday Hours	50.00
Weekend Hours	6.00
% Occupied	33.3%

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Fire House	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Window Replacement	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Install 844 sq-ft of Thermally Broken	1	LS	$49,870.00	$49,870.00	$49,870.00	$49,870.00	$99,740.00
2	Aluminum Window				$0.00		$0.00	$0.00
3	Bonds	1	LS	$598.00	$598.00	$598.00	$598.00	$1,196.00
4	Per BR Johnson Bid January 22, 2008				$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6	Air Monitoring	1	LS	$2,600.00	$2,600.00		$0.00	$2,600.00
7	Per Weston Solutions Bid January 24, 2008				$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$53,068.00		$50,468.00	$103,536.00
						Contingency:	10.0%	$10,353.60
						TOTAL DIRECT CONSTRUCTION COST:		$113,889.60
						Audit, Engineering, & Construction Management:	24.0%	$27,333.50
							SUBTOTAL:	$141,223.10
							Asbestos Abatement Services:	$0.00
						Contingency:	0.0%	$0.00
						TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
						Asbestos Abatement Services Fee:	0.0%	$0.00
							Asbestos SUBTOTAL:	$0.00
							TOTAL:	$141,223.10

Window Replacement
Recreation Center
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.4	kW/Month
Electrical Energy Savings	2,743	kWh/Year
Fossil Fuel Savings	80	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$1,387	Per Year
Total Energy & O&M Savings	$1,387	Per Year
Project Costs		
Total Measure Cost	$206,004	
Payback		
Simple Payback	148.6	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	148.6	Year(s)

Project Name: Recreation Center
Project Number: 4307-01
Calculated By: SVG
Checked By: JD
Date: 1/22/2008

ECM # CO240C

Window Replacement - Heating and Cooling Seasons

BASE CASE		
	Cooling Season	**Heating Season**
Conduction (Btu/yr)	2,424,047	98,446,406
Infiltration (Btu/yr)	1,011,252	4,233,788
Solar (Btu/yr)	68,595,487	0
Total (Btu/yr)	72,030,786	102,680,194
A/C Equipment COP	0.96	N/A
Annual Fuel Usage (mmBtu/yr)	0	**137**
Annual Energy Usage (kWh/yr)	**21,991**	0
Monthly Average Peak Demand (kW/mo)	4.24	0
Annual Average Peak Demand (kW/yr)	**25.45**	0

MEASURE CASE		
	Cooling Season	**Heating Season**
Conduction (Btu/yr)	966,491	39,251,532
Infiltration (Btu/yr)	758,439	3,175,341
Solar (Btu/yr)	61,320,208	0
Total (Btu/yr)	63,045,138	42,426,873
A/C Equipment COP	0.96	N/A
Annual Fuel Usage (mmBtu/yr)	0	**57**
Annual Energy Usage (kWh)	**19,247**	0
Monthly Average Peak Demand (kW/mo)	3.79	0
Annual Average Peak Demand (kW/yr)	**22.75**	0

SAVINGS		
	Cooling Season	**Heating Season**
Conduction Savings (Btu/yr)	1,457,556	59,194,874
Infiltration Savings (Btu/yr)	252,813	1,058,447
Solar Savings (Btu/yr)	7,275,279	N/A
Total Savings (Btu/yr)	8,985,648	60,253,321
Total Fuel Savings (mmBtu/yr)	0	**80**
Annual Energy Usage Savings (kWh/yr)	**2,743**	0
Average Monthly Peak Demand (kW/mo)	0.45	0
Annual Average Peak Demand (kW/yr)	**2.70**	0
Electric Energy Cost ($/kWh)	$0.0480	N/A
Electric Demand Cost ($/kW)	$23.27	N/A
Heating System Efficiency	N/A	0.75
Fuel Energy Cost ($/mmBtu)	N/A	$14.84
Annual Cost Savings ($)	**$194**	**$1,192**

Total Annual Cost Savings ($/yr)	**$1,387**
Total Implementation Cost ($)	**$206,004**

Payback (years)	**148.6**

MEASURE CASE - CONDUCTION

q dot = UA(Ti - To)

Summer Indoor Design DB Temp (F): 74

Window Type	Glass Area (ft^2)	Window Quantity	Total Glass Area (ft^2)	U (Btu/hr-ft^2-F)	UA Glass (Btu/hr-F)	Heat Transfer Rate at Bin Temps (Btu/hr) 97.5	92.5	87.5	82.5	77.5
A	110.67	4	443	0.35	155.05	3,644	2,868	2,093	1,318	543
B	23.00	4	92	0.35	32.20	757	596	435	274	113
C	0.00	0	0	0.00	0.00	0	0	0	0	0
D	0.00	0	0	0.00	0.00	0	0	0	0	0
E	0.00	0	0	0.00	0.00	0	0	0	0	0
F	0.00	0	0	0.00	0.00	0	0	0	0	0
G	0.00	0	0	0.00	0.00	0	0	0	0	0
H	0.00	0	0	0.00	0.00	0	0	0	0	0
I	0.00	0	0	0.00	0.00	0	0	0	0	0
J	0.00	0	0	0.00	0.00	0	0	0	0	0
K	0.00	0	0	0.00	0.00	0	0	0	0	0
L	0.00	0	0	0.00	0.00	0	0	0	0	0
						4,400	3,464	2,528	1,592	655
						1	19	98	237	414
						4,400	65,818	247,732	377,215	271,325
										966,491

Heat Transfer Rate Totals (Btu/hr)	
Bin Hours (hrs/yr)	
Heat Transfer (Btu/yr)	
Grand Total (Btu/yr)	

Summer Peak Cooling Load (Btu/hr):	4,400
A/C Equipment COP:	0.96
Summer Peak Demand (kW):	1.34

Winter Indoor Design DB Temp (F): 72

Window Type	Glass Area (ft^2)	Window Quantity	Total Glass Area (ft^2)	U (Btu/hr-ft^2-F)	UA Glass (Btu/hr-F)	Heat Transfer Rate at Bin Temps (Btu/hr) 67.5	62.5	57.5	52.5	47.5	42.5	37.5	32.5	27.5	22.5	17.5	12.5	7.5	2.5
A	110.67	4	443	0.35	155.05	698	1,473	2,248	3,023	3,799	4,574	5,349	6,124	6,900	7,675	8,450	9,225	10,001	10,776
B	23.00	4	92	0.35	32.20	145	306	467	628	789	950	1,111	1,272	1,433	1,594	1,755	1,916	2,077	2,238
C	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
D	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
F	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
G	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
H	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
I	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
J	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
K	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
L	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0
						843	1,779	2,715	3,651	4,588	5,524	6,460	7,396	8,333	9,269	10,205	11,141	12,078	13,014
						755	718	675	656	655	651	780	937	625	402	247	172	72	23
						636,182	1,277,232	1,832,709	2,395,302	3,004,894	3,596,043	5,038,898	6,930,403	5,207,891	3,726,088	2,520,666	1,916,317	869,589	299,319
																			39,251,532

Heat Transfer Rate Totals (Btu/hr)	
Bin Hours (hrs/yr)	
Heat Transfer (Btu/yr)	
Grand Total (Btu/yr)	

BASE CASE - CONDUCTION

q dot = UA(Ti - To)

Summer Indoor Design DB Temp (F): 74

Window Type	Glass Area (ft^2)	Window Quantity	Total Glass Area (ft^2)	U (Btu/hr-ft^2-F)	UA Glass (Btu/hr-F)	Heat Transfer Rate at Bin Temps (Btu/hr) 97.5	92.5	87.5	82.5	77.5	
A	110.67	4	443	0.84	372.12	8,745	6,884	5,024	3,163	1,302	
B	23.00	4	92	1.06	97.52	2,292	1,804	1,317	829	341	
C	0.00	0	0	0.00	0.00	0	0	0	0	0	
D	0.00	0	0	0.00	0.00	0	0	0	0	0	
E	0.00	0	0	0.00	0.00	0	0	0	0	0	
F	0.00	0	0	0.00	0.00	0	0	0	0	0	
G	0.00	0	0	0.00	0.00	0	0	0	0	0	
H	0.00	0	0	0.00	0.00	0	0	0	0	0	
I	0.00	0	0	0.00	0.00	0	0	0	0	0	
J	0.00	0	0	0.00	0.00	0	0	0	0	0	
K	0.00	0	0	0.00	0.00	0	0	0	0	0	
L	0.00	0	0	0.00	0.00	0	0	0	0	0	
						11,037	8,688	6,340	3,992	1,644	Heat Transfer Rate Totals (Btu/hr)
						1	19	98	237	414	Bin Hours (hrs/yr)
						11,037	165,078	621,334	946,090	680,508	Heat Transfer (Btu/yr)
										2,424,047	Grand Total (Btu/yr)

Summer Peak Cooling Load (Btu/hr):	11,037
A/C Equipment COP:	0.96
Summer Peak Demand (kW):	3.37

Winter Indoor Design DB Temp (F): 72

Window Type	Glass Area (ft^2)	Window Quantity	Total Glass Area (ft^2)	U (Btu/hr-ft^2-F)	UA Glass (Btu/hr-F)	Heat Transfer Rate at Bin Temps (Btu/hr) 67.5	62.5	57.5	52.5	47.5	42.5	37.5	32.5	27.5	22.5	17.5	12.5	7.5	2.5	
A	110.67	4	443	0.84	372.12	1,675	3,535	5,396	7,256	9,117	10,978	12,838	14,699	16,559	18,420	20,281	22,141	24,002	25,862	
B	23.00	4	92	1.06	97.52	439	926	1,414	1,902	2,389	2,877	3,364	3,852	4,340	4,827	5,315	5,802	6,290	6,778	
C	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
D	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
E	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
F	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
G	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
H	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
I	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
J	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
K	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
L	0.00	0	0	0.00	0.00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
						2,113	4,462	6,810	9,158	11,506	13,854	16,203	18,551	20,899	23,247	25,595	27,944	30,292	32,640	Heat Transfer Rate Totals (Btu/hr)
						755	718	675	656	655	651	780	937	625	402	247	172	72	23	Bin Hours (hrs/yr)
						1,595,602	3,203,414	4,596,602	6,007,635	7,536,548	9,019,201	12,638,012	17,382,081	13,061,863	9,345,366	6,322,059	4,806,296	2,181,008	750,720	Heat Transfer (Btu/yr)
																			98,446,406	Grand Total (Btu/yr)

MEASURE CASE - SOLAR HEAT GAIN

Exposure	North	South	East	West
Total Area (ft2)	134	134	134	134

Cooling Load Factors for Glass without Interior Shading, North Latitudes
(Light Construction = 1, Medium Construction = 2, Heavy Construction = 3)
Construction = 2

Medium Construction					
	Noon	8:00 AM	10:00 AM	2:00 PM	4:00 PM
North	0.70	0.46	0.59	0.75	0.74
East	0.39	0.44	0.51	0.31	0.26
South	0.52	0.14	0.31	0.58	0.47
West	0.14	0.10	0.12	0.29	0.50

Factor for Percentage of Clear Days = 0.65 (Handbook for the Energy Professional "little red book", pg 175)
Cooling Season Run Hours = 1,517
Shading Coefficent = 0.59 (SC = SHGC/0.87)

(Ch. 27, Table 23A, 1981 ASHRAE Fundamentals Handbook)

Solar Heat Gain - Noon (Btu/hr)					
Exposure	North	South	East	West	Total
May	2043	4634	1230	442	8349
June	2098	3896	1261	453	7708
July	2098	4470	1261	453	8282
August	1932	6111	1169	420	9631
September	1656	8202	984	353	11196
October	1380	9596	830	298	12105
					57270

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at Noon				
	North	East	South	West
May	37	40	113	40
June	38	41	95	41
July	38	41	109	41
August	35	38	149	38
September	30	32	200	32
October	25	27	234	27

Solar Heat Gain - 8:00 AM (Btu/hr)					
Exposure	North	South	East	West	Total
May	980	320	7634	197	9131
June	1088	320	7495	213	9117
July	1016	331	7495	205	9048
August	871	453	7495	181	9000
September	617	784	7114	134	8648
October	399	983	6003	87	7472
					52416

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 8 AM				
	North	East	South	West
May	27	220	29	25
June	30	216	29	27
July	28	216	30	26
August	24	216	41	23
September	17	205	71	17
October	11	173	89	11

Solar Heat Gain 10:00 AM (Btu/hr)					
Exposure	North	South	East	West	Total
May	1582	2029	5953	322	9886
June	1629	1687	5832	331	9479
July	1629	1980	5872	331	9813
August	1489	2836	6033	303	10661
September	1256	4034	5953	256	11499
October	977	4792	5591	199	11559
					62896

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 10 AM				
	North	East	South	West
May	34	148	83	34
June	35	145	69	35
July	35	146	81	35
August	32	150	116	32
September	27	148	165	27
October	21	139	196	21

Solar Heat Gain 2:00 PM (Btu/hr)					
Exposure	North	South	East	West	Total
May	2011	3797	831	3385	10024
June	2070	3156	856	3316	9399
July	2070	3705	856	3339	9970
August	1893	5306	782	3431	11412
September	1597	7548	660	3385	13190
October	1242	8966	513	3179	13900
					67895

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 2 PM				
	North	East	South	West
May	34	34	83	148
June	35	35	69	145
July	35	35	81	146
August	32	32	116	150
September	27	27	165	148
October	21	21	196	139

Solar Heat Gain 4:00 PM (Btu/hr)					
Exposure	North	South	East	West	Total
May	1576	1075	513	8675	11839
June	1751	1075	554	8518	11897
July	1634	1112	533	8518	11797
August	1401	1520	472	8518	11910
September	992	2632	349	8084	12056
October	642	3299	226	6822	10988
					70487

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 4 PM				
	North	East	South	West
May	27	25	29	220
June	30	27	29	216
July	28	26	30	216
August	24	23	41	216
September	17	17	71	205
October	11	11	89	173

Total Load (Btu/yr)	61,320,208
A/C Equipment COP	0.96

	Peak Cooling Load (Btu/hr)	Avg. Peak Demand (kW)
May	11,839	3.61
June	11,897	3.63
July	11,797	3.60
August	11,910	3.64
September	13,190	4.03
October	13,900	4.24
Total/Avg:	74,532	3.79

BASE CASE - SOLAR HEAT GAIN

Exposure	North	South	East	West
Total Area (ft2)	134	134	134	134

Cooling Load Factors for Glass without Interior Shading, North Latitudes
(Light Construction = 1, Medium Construction = 2, Heavy Construction = 3)
Construction = 2

Medium Construction					
	Noon	8:00 AM	10:00 AM	2:00 PM	4:00 PM
North	0.70	0.46	0.59	0.75	0.74
East	0.39	0.44	0.51	0.31	0.26
South	0.52	0.14	0.31	0.58	0.47
West	0.14	0.10	0.12	0.29	0.50

Factor for percentage of clear days = 0.65 (Handbook for the Energy Professional "little red book", pg 175)
Cooling Season Run Hours = 1,517
Shading Coefficent = 0.66 (SC = SHGC/0.87)

(Ch. 27, Table 23A, 1981 ASHRAE Fundamentals Handbook)

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at Noon				
	North	East	South	West
May	37	40	113	40
June	38	41	95	41
July	38	41	109	41
August	35	38	149	38
September	30	32	200	32
October	25	27	234	27

Solar Heat Gain - Noon (Btu/hr)					
Exposure	North	South	East	West	Total
May	2285	5184	1376	494	9339
June	2347	4358	1411	506	8622
July	2347	5001	1411	506	9264
August	2161	6836	1307	469	10774
September	1853	9175	1101	395	12524
October	1544	10735	929	333	13541
					64065

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 8 AM				
	North	East	South	West
May	27	220	29	25
June	30	216	29	27
July	28	216	30	26
August	24	216	41	23
September	17	205	71	17
October	11	173	89	11

Solar Heat Gain - 8:00 AM (Btu/hr)					
Exposure	North	South	East	West	Total
May	1096	358	8540	221	10215
June	1217	358	8385	238	10199
July	1136	371	8385	229	10121
August	974	506	8385	203	10068
September	690	877	7958	150	9675
October	446	1099	6716	97	8358
					58635

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 10 AM				
	North	East	South	West
May	34	148	83	34
June	35	145	69	35
July	35	146	81	35
August	32	150	116	32
September	27	148	165	27
October	21	139	196	21

Solar Heat Gain - 10:00 AM (Btu/hr)					
Exposure	North	South	East	West	Total
May	1770	2270	6659	360	11059
June	1822	1887	6524	371	10604
July	1822	2215	6569	371	10977
August	1666	3173	6749	339	11926
September	1405	4513	6659	286	12863
October	1093	5360	6254	222	12930
					70358

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 2 PM				
	North	East	South	West
May	34	34	83	148
June	35	35	69	145
July	35	35	81	146
August	32	32	116	150
September	27	27	165	148
October	21	21	196	139

Solar Heat Gain - 2:00 PM (Btu/hr)					
Exposure	North	South	East	West	Total
May	2250	4247	930	3787	11213
June	2316	3531	957	3710	10514
July	2316	4145	957	3735	11153
August	2117	5936	875	3838	12766
September	1787	8443	738	3787	14755
October	1390	10029	574	3556	15549
					75950

Solar Intensity and Solar Heat Gain Factor (Btu/hr-ft2) at 4 PM				
	North	East	South	West
May	27	25	29	220
June	30	27	29	216
July	28	26	30	216
August	24	23	41	216
September	17	17	71	205
October	11	11	89	173

Solar Heat Gain - 4:00 PM (Btu/hr)					
Exposure	North	South	East	West	Total
May	1763	1202	573	9705	13243
June	1959	1202	619	9528	13309
July	1828	1244	596	9528	13196
August	1567	1700	528	9528	13323
September	1110	2944	390	9043	13487
October	718	3690	252	7631	12292
					78850

Total Load (Btu/yr)	68,595,487
A/C Equipment COP	0.96

	Peak Cooling	Avg. Peak

MEASURE CASE - INFILTRATION

Assumptions:

North - Infiltration Value (cfh/ft) =	15	
West - Infiltration Value (cfh/ft) =	15	
East - Infiltration Value (cfh/ft) =	15	
South - Infiltration Value (cfh/ft) =	15	
Heating Degree Days (HDD65) =	4,777	(ASHRAE/IESNA Standard 90.1-1999, Table D-1)
Cooling Degree Days (CDD50) =	1,141	(ASHRAE/IESNA Standard 90.1-1999, Table D-1)
Factor for Latent Loads =	35.7%	
Cooling Season Run Hours (hrs) =	1,517	
Building Occupancy (%)	42%	

Heating Load = Perimeter (ft) * (Infiltration Value (cfm/ft) * 1.085 (Btu/hr-cfm-F)
*HDD (F day/yr) * 24 hr/day * Building Occupancy (%) = Btu/yr

Cooling Load = Perimeter (ft) * (Infiltration Value (cfm/ft) * 1.085 (Btu/hr-cfm-F)
* CDD (F day/yr) * 24 hr/day * Building Occupancy (%) * Factor for Latent Loads (%)= Btu/yr

Heating Season			
Wind Direction	**Perimeter (ft)**	**Proposed Infiltration Value (cfm/ft)**	**Heating Load (Btu/yr)**
North	61.26	0.25	793,835
West	61.26	0.25	793,835
East	61.26	0.25	793,835
South	61.26	0.25	793,835
			3,175,341

Cooling Season			
Wind Direction	**Perimeter (ft)**	**Proposed Infiltration Value (cfm/ft)**	**Cooling Load (Btu/yr)**
North	61.26	0.25	189,610
West	61.26	0.25	189,610
East	61.26	0.25	189,610
South	61.26	0.25	189,610

Total Cooling Load (Btu/yr):	**758,439**
Peak Cooling Load (Btu/hr):	**500**
A/C Equipment COP:	**0.96**
Peak Demand (kW):	**0.15**

BASE CASE - INFILTRATION

Assumptions:

North - Infiltration Value (cfh/ft) =	20	
West - Infiltration Value (cfh/ft) =	20	
East - Infiltration Value (cfh/ft) =	20	
South - Infiltration Value (cfh/ft) =	20	
Heating Degree Days (HDD65) =	4,777	(ASHRAE/IESNA Standard 90.1-1999, Table D-1)
Cooling Degree Days (CDD50) =	1,141	(ASHRAE/IESNA Standard 90.1-1999, Table D-1)
Factor for Latent Loads =	35.7%	
Cooling Season Run Hours (hrs) =	1,517	
Building Occupancy (%) =	42%	

Heating Load = Perimeter (ft) * (Infiltration Value (cfm/ft) * 1.085 (Btu/hr-cfm-F)
*HDD (F day/yr) * 24 hr/day * Building Occupancy (%) = Btu/yr

Cooling Load = Perimeter (ft) * (Infiltration Value (cfm/ft) * 1.085 (Btu/hr-cfm-F)
* CDD (F day/yr) * 24 hr/day * Building Occupancy (%) * Factor for Latent Loads (%)= Btu/yr

Heating Season			
Wind Direction	**Perimeter (ft)**	**Existing Infiltration Value (cfm/ft)**	**Heating Load (Btu/yr)**
North	61.26	0.33	1,058,447
West	61.26	0.33	1,058,447
East	61.26	0.33	1,058,447
South	61.26	0.33	1,058,447
			4,233,788

Cooling Season			
Wind Direction	**Perimeter (ft)**	**Existing Infiltration Value (cfm/ft)**	**Cooling Load (Btu/yr)**
North	61.26	0.33	252,813
West	61.26	0.33	252,813
East	61.26	0.33	252,813
South	61.26	0.33	252,813

Total Cooling Load (Btu/yr):	**1,011,252**
Average Cooling Load (Btu/hr):	**667**
A/C Equipment COP:	**0.96**
Average Demand (kW):	**0.20**

Infiltration Values (ft3) per Foot of Crack per Hour - (cfh/ft)

		Wind Velocity (mph)					
Type of Opening	**Conditions**	**5**	**10**	**15**	**20**	**25**	**30**
Dbl-hung wood window	Average fit (not weather-stri	6	20	40	60	80	100
Dbl-hung wood window	Average fit (weather-strippe	5	15	25	35	50	65
Dbl-hung wood window	Poor fit (weather-stripped)	6	20	35	50	70	90
Dbl-hung metal window	Not weather-stripped	20	45	70	100	135	170
Dbl-hung metal window	Weather-stripped	6	18	30	44	58	75
Steel sash	Casement, good fit	6	18	30	44	58	75
Steel sash	Casement, average fit	12	30	50	75	100	125
Steel sash	Industrial type	50	110	175	240	30	375
Doors	Good fit (not weather-stripp	30	70	110	155	200	250
Doors	Good fit (weather-stripped)	15	35	55	75	100	125
Doors	Poor fit (not weather-strippe	55	140	225	310	400	500
Doors	Poor fit (weather-stripped)	30	70	110	155	200	250

*** Use of storm sash permits a 50% infiltration reductions in poorly fitting windows only.**

Reference
(Handbook for the Energy Professional "little red book", pg 50)

DB Temp	Total: May - October 0:00-7:59 Bin Hours	8:00-15:59 Bin Hours	16:00-23:59 Bin Hours		Total Cooling Hours
57.5	232	124	184		181
62.5	249	173	221		236
67.5	247	217	259		285
72.5	139	255	219		299
77.5	39	240	131		253
82.5	4	171	61		169
87.5	0	81	17		77
92.5	0	18	1		16
97.5	0	1	0		1
	910	1280	1093		**1,517**

Building Schedule:

Monday - Friday	0:00-7:59	8:00-15:59	16:00-23:59
Occupied	1.0	8.0	3.0
Unoccupied	7.0	0.0	5.0
Weekends			
Occupied	0.0	5.0	0.0
Unoccupied	8.0	3.0	8.0
% Occupied	8.93%	89.29%	26.79%

Weekday Hours	60.00
Weekend Hours	10.00
% Occupied	41.7%

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Recreation Center	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Window Replacement	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Installation of Aluminum Clad Wood Windows	1	LS	$74,916.50	$74,916.50	$74,916.50	$74,916.50	$149,833.00
2	Bonds	1	LS	$598.00	$598.00	$598.00	$598.00	$1,196.00
3	Per BR Johnson Bid January 22, 2008				$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$75,514.50		$75,514.50	$151,029.00

Contingency:	10.0%	$15,102.90
TOTAL DIRECT CONSTRUCTION COST:		$166,131.90
Audit, Engineering, & Construction Management:	24.0%	$39,871.66
SUBTOTAL:		$206,003.56
Asbestos Abatement Services:		$0.00
Contingency:	0.0%	$0.00
TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
Asbestos Abatement Services Fee:	0.0%	$0.00
Asbestos SUBTOTAL:		$0.00
TOTAL:		$206,003.56

Section 8

FIM #5: Roof Replacement

FIM #5: ROOF REPLACEMENT

INVESTIGATION

The roof considered for this measure is at the Fire House. The existing roof has an estimated area of approximately 2,850 square feet and is constructed from a multi-layer system comprised of a fibrous insulation layer and a layer of bituminous, built-up roofing (BUR) material and Tectum decking. The roof exhibits signs of weathering and puddles of standing water and, although not critical at this time, will soon be in need of replacement.

OPTIONS

Wendel considered three options for this measure: a base case roof (R-value of 24 and black EPDM), a roof with R-value of 50, and a roof with a white membrane.

The additional insulation, although beneficial in terms of decreasing heat loss, adds significant cost and increases the simple payback period.

The white EPDM helps to reduce the heat island effect, but is only practical in climates where the cooling degree-days (CDD) greatly out number the heating degree-days (HDD). In Irvington the opposite is true. Furthermore, maintenance (cleaning) costs must be factored into the cost of a white membrane. A white membrane does not always remain white, a 35 to 50% drop in reflectivity is generally observed in the first three years of installed life.

RECOMMENDATIONS

Single-ply roofing is controlling an increasingly larger share of the commercial roofing market. By far, the most popular product in the single-ply market is Ethylene Propylene Diene Monomer (EPDM). Its dependability and durability are among the primary factors driving to the increase in demand for this type of roofing.

The proposed system would be a fully-adhered, membrane roof made of fiber-reinforced, 60 mil,

EPDM membrane. The EPDM sheets will be fully-adhered to the substrate with a special bonding adhesive and overlapped along the seams to provide a watertight seal. The system would be light weight – less than two pounds per square foot. The new roof will also have a minimum R-Value of 24 (the current roof has an R-Value of 5), providing additional energy savings over the existing roof material. The existing roofing warranty of 20 years will apply.

The scope of work for the roof upgrade includes:

- Remove and properly dispose of the existing roofing to Tectum deck;
- Inspect deck for soundness;
- Install a 1/8" per foot tapered polyisocyanurate system with an average R-value of 24 (25 psi minimum);
- Insulation installed on a layer of adhesive. Adhesive beads will be spaced 12" on-center in the field of the roof and 6" on-center for the 8-foot perimeter.
- The membrane will be a fully-adhered, 60mil, fiber-reinforced EPDM membrane. Gum seam tape (6-inch) will be used for all splices. All details will be executed to preserve manufacturer's warranty;
- Flash all roof penetrations (i.e. roof drains, vent pipes, and HVAC ductwork) according to manufacturer's standard details;
- Install Aluminum metal fascia (40mil) at all perimeters. Color shall be selected by the Village.

Roof Replacement
Fire House
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	97	mmBtu/Year
Operational & Maintenance Savings	$1,050	Per Year
Energy Savings ($)	$ 1,348.31	Per Year
Total Energy & O&M Savings	$2,398	Per Year
Project Costs		
Total Measure Cost	$80,803	
Payback		
Simple Payback	33.7	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	33.7	Year(s)

Project Name:	Fire House	ECM#	244
Project Number:	4307-01		
Calculated By:	SVG		
Checked By:	JD		
Date:	1/22/2008		

Roof Replacement

Existing Condition:

Modified bitumen roofing with 1/2-inch fiberboard.

Proposed Condition:

Tapered polyisocyanurate insulated roof with fully adhered EPDM membrane.

Given and Assumed Data:

R Value of Proposed Roofing (R_{new}):	24.0	hr*ft^2*F/Btu
R Value of Exisitng Roofing (R_{old}):	4.0	hr*ft^2*F/Btu
Roof Area	3,258.0	ft^2
Heating Degree Days (HDD):	4,774	hrs
Efficency of Heating Equipment:	80%	
Dollar Cost Per Energy Unit:	$13.870	$/mmBtu

Calculations:

Rate of Heat Transfer for Proposed Roofing (Q_{new}=(A*HDD*24)/R_{new}):	15,553,692	Btu
Rate of Heat Transfer for Existing Roofing (Q_{old}=(A*HDD*24)/R_{old}):	93,322,152	Btu
Annual Fuel Savings:	97.2	mmBtu
Annual Energy Savings ($):	$ 1,348.31	

References:

LABOR & MATERIAL ESTIMATE

WENDEL

Project : Fire House	Estimated by: SVG
Project #: 4307-01	Checked by: JD
Measure: Roof Replacement	Approved by: SVG
Date: 01/22/08	File: Cost Estimate

Item No.	Description	Qty.	Unit	Material		Labor		Total Cost
				Unit Price	Total	Unit Price	Total	Labor & Material
1	Installation of R=24 Fully-Adhered EPDM Roof	1	LS	$28,900.00	$28,900.00	$28,900.00	$28,900.00	$57,800.00
2	Bonds	1	LS	$720.00	$720.00	$720.00	$720.00	$1,440.00
3					$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7	Per HVR Bid January 22, 2008				$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$29,620.00		$29,620.00	$59,240.00

Contingency:	10.0%	$5,924.00
TOTAL DIRECT CONSTRUCTION COST:		$65,164.00
Audit, Engineering, & Construction Management:	24.0%	$15,639.36
SUBTOTAL:		$80,803.36
Asbestos Abatement Services:		$0.00
Contingency:	0.0%	$0.00
TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
Asbestos Abatement Services Fee:	0.0%	$0.00
Asbestos SUBTOTAL:		$0.00
TOTAL:		$80,803.36

Section 9

FIM #6: Street Lighting Upgrades

FIM #6: STREET LIGHTING UPGRADES

INVESTIGATION

Wendel examined the opportunity for energy efficiency improvements to the outside lighting at all parks and along street and walkways throughout the Village. Wendel identified potential opportunities with the Street Lighting throughout the Village.

Wendel evaluated upgrading the existing Street Lighting throughout the Village to obtain energy savings in association with replacing old inefficient fixtures with new high efficiency fixtures. Using the existing Street Lighting inventory provided to the Village by the New York Power Authority (NYPA), Wendel's analysis yielded significant savings by replacing old inefficient Mercury Vapor fixtures with high efficiency High Pressure Sodium fixtures. However, as determined through subsequent conversations with Village maintenance staff, most of the Mercury Vapor fixtures shown on the inventory had already been replaced by the maintenance staff with a combination of 70, 100, 150, 250 and 400 watt High Pressure Sodium fixtures. The maintenance staff estimated that nearly all of the old Incandescent and Mercury Vapor fixtures have been replaced with more efficient HPS fixtures, reducing the energy saving opportunity to the remaining handful of the Mercury Vapor fixtures. However, since the Village is being billed for Street Lighting on a flat rate per fixture and, the rate being used is based on the old inventory, the Village can realize the energy savings for 100% of the fixtures while only incurring the cost associated with upgrading the remaining Mercury Vapor fixtures (since the Village has already incurred the cost of upgrading the majority of their fixtures, but is not realizing the benefits of a lower utility rate).

RECOMMENDATIONS

The proposed measure will include an upgrade to all remaining inefficient fixtures and an updated inventory for all street lighting to reflect the as-built configuration of each fixture post construction. All remaining Mercury Vapor fixtures that have not been replaced with high efficiency HPS lamps and ballasts will be identified and upgraded accordingly. Upon completion of all remaining fixture upgrades, Wendel will prepare an accurate as-built inventory and submit to NYPA for review and approval. Wendel will coordinate all inspections required by NYPA and insure that the billing rate

is appropriately charged. The Village's monthly rate would be adjusted to reflect the correct billing, resulting in the realization of the energy savings.

Street Lighting
Village of Irvington
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	100,774	kWh/Year
Fossil Fuel Savings	0	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$15,217	Per Year
Total Energy & O&M Savings	$15,217	Per Year
Project Costs		
Total Measure Cost	$11,255	
Payback		
Simple Payback	0.7	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	N/A	Year(s)

Calculated By:

Checked By:
Date:

Summary

Total kW Existing	115.7
Total kW Proposed	92.1
Total kW Savings	23.6
Annual Usage	4271
Total kWh Savings	100,774.25
kWh unit Cost	$0.15
Total kWh Cost Savings	$15,216.91

Type	Lamp	Actual Wattage Input	pulse start
1	70	91	95
2	100	128	130
3	150	188	185
4	250	295	290
5	400	464	452

ID	Street	Location Description	Pole Number	Type of Lamp Installed	HPS Wattage	HPS Wattage Usage	Existing Wattage	Savings		
2	Ardsley Avenue		2	1	70	91	230	139	83	-8
3	Ardsley Avenue		6	1	70	91	83	-8	83	-8
4	Ardsley Avenue	Ardsley Avenue West	10	1	70	91	230	139	83	-8
5	Ardsley Avenue		12	1	70	91	83	-8	83	-8
6	Ardsley Avenue	1EO Clifton Place	16	1	70	91	230	139	83	-8
7	Ardsley Avenue	2EO Clifton Place	10	1	70	91	83	-8	83	-8
8	Ardsley Avenue	AT Hancock PLL	8	1	70	91	83	-8	83	-8
9	Ardsley Avenue	1EO Hancock PLL	7	1	70	91	83	-8	83	-8
10	Ardsley Avenue	At Bertha Place	5	1	70	91	83	-8	83	-8
11	Ardsley Avenue	1WO Broadway	2	1	70	91	85	-6	85	-6
12	Ardsley Avenue	At Clinton	0	1	70	91	85	-6	85	-6
13	Ardsley Avenue	2EO Broadway	32	1	70	91	230	139	85	-6
14	Ardsley Avenue	At Erie Street	0	1	70	91	83	-8	83	-8
15	Ardsley Avenue	Ardsley Avenue East	20	1	70	91	230	139	83	-8
16	Ardsley Avenue	At Washington	22	1	70	91	83	-8	83	-8
17	Ardsley Avenue	Ardsley Avenue West6814	24	1	70	91	230	139	83	-8
20	Ardsley Place		1	1	70	91	101	10	101	10
21	Ardsley Place	At Station Plaza	133	3	150	188	101	-87	101	-87
22	Ardsley Place		2	1	70	91	230	139	85	-6
25	Barbara Lane	At Janet Terrace	2	1	70	91	230	139	85	-6
26	Barbara Lane	South Janet Terrace	5	1	70	91	230	139	85	-6
29	Beachwood Lane		1	3	150	188	200	12	193	5
30	Beachwood Lane		2	3	150	188	200	12	193	5
31	Beachwood Lane		3	3	150	188	200	12	193	5
32	Beachwood Lane		4	3	150	188	200	12	193	5
33	Beachwood Lane		5	3	150	188	193	5	193	5
36	Belmont Drive		0	1	70	91	230	139	85	-6
37	Belmont Drive		8	1	70	91	230	139	85	-6
38	Belmont Drive		6	1	70	91	92	1	85	-6
39	Belmont Drive		5	1	70	91	230	139	85	-6
40	Belmont Drive		4	1	70	91	230	139	85	-6
42	Belmont Drive	1 Light Belmont Drive	2	1	70	91	85	-6	85	-6
43	Belmont Drive		0	1	70	91	230	139	85	-6
46	Bertha Place		2	1	70	91	230	139	85	-6
47	Bertha Place	3N Hudson West		1	70	91	230	139	85	-6
48	Bertha Place		6	1	70	91	230	139	85	-6
49	Bertha Place		5	1	70	91	85	-6	85	-6
50	Bridge Street		1	2	100	128	85	-43	85	-43
51	Brook Place		11	1	70	91	85	-6	85	-6
52	Butterwood Lane East		0	3	150	188	175	-13	175	-13
53	Butterwood Lane East		2	3	150	188	175	-13	175	-13
54	Buttonwood Lane West		1	3	150	188	175	-13	175	-13
55	Buttonwood Lane West		2	3	150	188	175	-13	175	-13
56	Carla Lane	1EO Victory	0	1	70	91	230	139	85	-6
57	Carla Lane	At Dead End	0	1	70	91	230	139	85	-6
58	Castle Road		6	3	150	188	100	-88	100	-88
59	Castle Road		7	3	150	188	100	-88	100	-88
60	Castle Road		8	3	150	188	100	-88	100	-88
61	Ceadarlawn Road		3	1	70	91	85	-6	85	-6
62	Ceadarlawn Road		5	1	70	91	92	1	85	-6
63	Ceadarlawn Road		7	1	70	91	85	-6	85	-6
64	Ceadarlawn Road		10	1	70	91	85	-6	85	-6
65	Ceadarlawn Road		13	3	150	188	313	125	313	125
66	Ceadarlawn Road	1EO Riverview	5	1	70	91	230	139	85	-6
67	Center Street	At Park Avenue	4	1	70	91	230	139	85	-6
68	Center Street	Fo 87	2	1	70	91	230	139	85	-6
69	Center Street		5	1	70	91	230	139	85	-6
70	Circle Drive	2NO Riverview	2	1	70	91	230	139	85	-6
71	Circle Drive	2EO Broadway	2	1	70	91	230	139	85	-6

72	Clifton Place		6	1	70	91	200	109	193	102
73	Clifton Place		4	1	70	91	230	139	85	-6
74	Clifton Place		2	1	70	91	230	139	85	-6
75	Croton Place		0	1	70	91	85	-6	85	-6
76	Croton Place		0	1	70	91	85	-6	85	-6
77	Croton Place	In Car Lot	2	1	70	91	290	199	193	102
78	Deep Hollow Clos	At Havermeyer	0	1	70	91	230	139	85	-6
79	Deep Hollow Clos	EO Havermeyer	0	1	70	91	230	139	85	-6
80	Deep Hollow Clos	EO Havermeyer		1	70	91	92	1	85	-6
81	Dogwood Lane	1EO Sycamore	1	3	150	188	200	12	193	5
82	Dogwood Lane	2EO Sycamore	2	3	150	188	200	12	193	5
83	Dogwood Lane		3	3	150	188	200	12	130	-58
84	Dogwood Lane	3EO Sycamore	4	3	150	188	200	12	193	5
85	Dogwood Lane	4EO Sycamore	5	3	150	188	200	12	193	5
86	Dogwood Lane	OPP 45	6	3	150	188	200	12	193	5
87	Dogwood Lane	At Dead End	7	3	150	188	200	12	193	5
88	Dows Lane	2WO Broadway	0	2	100	128	230	102	85	-43
89	Dows Lane	3W Broadway	4	2	100	128	230	102	85	-43
90	Dows Lane	1WO Broadway	3	2	100	128	230	102	85	-43
91	Dows Lane	Foot of Dows Lane		2	100	128	120	-8	120	-8
92	Dunham Place		0	2	100	128	230	102	85	-43
93	East Sunnyside Lane		13	2	100	128	230	102	85	-43
94	East Clinton Avenue		1	2	100	128	230	102	85	-43
95	East Clinton Avenue		3	2	100	128	230	102	85	-43
96	East Clinton Avenue		4	2	100	128	230	102	85	-43
97	East Clinton Avenue	EO Huston Place Deadend	5	2	100	128	230	102	85	-43
98	Erie Street	At Ardsley	0	1	70	91	230	139	85	-6
99	Erie Street	At Ardsley	4	1	70	91	230	139	85	-6
100	Fargo Lane		7	1	70	91	230	139	85	-6
101	Fargo Lane		16	1	70	91	86	-5	86	-5
102	Fargo Lane		18	1	70	91	86	-5	86	-5
103	Fargo Lane	1SSWO Meadowbrook	12	1	70	91	86	-5	86	-5
104	Fieldpoint Drive		1	3	150	188	170	-18	170	-18
105	Fieldpoint Drive		2	3	150	188	170	-18	170	-18
106	Fieldpoint Drive		3	3	150	188	170	-18	170	-18
107	Fieldpoint Drive		4	3	150	188	170	-18	170	-18
108	Fieldpoint Drive		5	3	150	188	175	-13	175	-13
109	Fieldpoint Drive		6	3	150	188	175	-13	175	-13
110	Fieldpoint Drive		7	3	150	188	175	-13	175	-13
111	Fieldpoint Drive		8	3	150	188	175	-13	175	-13
112	Fieldpoint Drive		9	3	150	188	175	-13	175	-13
113	Fieldpoint Drive		10	3	150	188	150	-38	130	-58
114	Fieldpoint Drive		11	3	150	188	150	-38	130	-58
115	Fieldpoint Drive		14	3	150	188	150	-38	130	-58
116	Fieldpoint Drive		12	3	150	188	150	-38	130	-58
117	Fieldpoint Drive		13	3	150	188	150	-38	130	-58
118	Fieldpoint Drive		15	3	150	188	150	-38	130	-58
119	Fieldpoint Drive		16	3	150	188	150	-38	130	-58
120	Fieldpoint Drive		17	3	150	188	150	-38	130	-58
121	Fieldpoint Drive		18	3	150	188	150	-38	130	-58
122	Fieldpoint Drive		19	3	150	188	150	-38	130	-58
123	Fieldpoint Drive		19	3	150	188	150	-38	130	-58
124	Fieldpoint Drive		21	3	150	188	150	-38	130	-58
125	Fieldpoint Drive		22	3	150	188	150	-38	130	-58
126	Fieldpoint Drive		23	3	150	188	150	-38	130	-58
127	Fieldpoint Drive		24	3	150	188	150	-38	130	-58
128	Fieldpoint Drive		25	3	150	188	150	-38	130	-58
129	Field Terrace	1st Light Field Terrace	2	1	70	91	85	-6	85	-6
130	Field Terrace		3	1	70	91	85	-6	85	-6
131	Field Terrace		5	1	70	91	85	-6	85	-6
132	Field Terrace		0	1	70	91	85	-6	85	-6
133	Field Terrace		7	1	70	91	85	-6	85	-6
134	Greyrock Terrace		4	1	70	91	85	-6	85	-6
135	Greyrock Terrace		7	1	70	91	85	-6	85	-6
136	Grinnel Street		1	1	70	91	230	139	85	-6
137	Half Moon Lane	At West Clinton Avenue	25	2	100	128	193	65	193	65
138	Half Moon Lane	At Dead End	0	2	100	128	189	61	85	-43
139	Half Moon Lane		1	2	100	128	230	102	85	-43
140	Half Moon Lane		3	2	100	128	230	102	85	-43
141	Half Moon Lane		5	2	100	128	230	102	85	-43
142	Half Moon Lane	South End OPP Hendrick West	6	2	100	128	85	-43	85	-43
143	Hamilton Road	1E0 South Broadway	1	2	100	128	230	102	85	-43
144	Hamilton Road	4E0 South Broadway	7	2	100	128	230	102	85	-43

145	Hamilton Road	6E0 South Broadway	11	2	100	128	230	102	85	-43
146	Hamilton Road		13	2	100	128	85	-43	85	-43
147	Hamilton Road	2E0 South Broadway	3	2	100	128	230	102	85	-43
148	Hamilton Road	5E0 South Broadway	9	2	100	128	230	102	85	-43
149	Hamilton Road	3EO South Broadway	5	2	100	128	230	102	85	-43
150	Hamilton Road		2	2	100	128	170	42	170	42
151	Hankcock Place	2 SO Ardsley	2	1	70	91	230	139	85	-6
152	Hankcock Place	ES 3N Hudson Road West	4	1	70	91	230	139	85	-6
153	Hankcock Place	1NO Hudson	6	1	70	91	230	139	85	-6
154	Harriman Road		31	3	150	188	85	-103	85	-103
155	Harriman Road	Last Light Harriman Road	33	3	150	188	170	-18	170	-18
156	Harriman Road	EO SO Bway	25	3	150	188	200	12	130	-58
157	Harriman Road		21	3	150	188	85	-103	85	-103
158	Harriman Road	At Sycamore Lane	18	3	150	188	230	42	85	-103
159	Harriman Road		61	3	150	188	83	-105	83	-105
160	Harriman Road		13	3	150	188	83	-105	83	-105
161	Harriman Road	At Lewis RDD	26	3	150	188	230	42	85	-103
162	Harriman Road		1	2	100	128	92	-36	85	-43
163	Harriman Road	EO SO Bway	27	3	150	188	200	12	130	-58
164	Harriman Road	At Reservior RD	33	3	150	188	230	42	85	-103
165	Harriman Road	1 NO Daisy	28	2	100	128	85	-43	85	-43
166	Harriman Road	SS1E Meadow Way	24	2	100	128	230	102	85	-43
167	Harriman Road		0	2	100	128	85	-43	85	-43
168	Harriman Road		15	2	100	128	85	-43	85	-43
169	Harriman Road		20	2	100	128	85	-43	85	-43
170	Harriman Road	EO SO Bway	23	3	150	188	200	12	130	-58
171	Harriman Road		23	3	150	188	92	-96	85	-103
172	Havermeyer		3	1	70	91	230	139	85	-6
173	Havermeyer		5	1	70	91	230	139	85	-6
174	Havermeyer		8	1	70	91	230	139	85	-6
175	Havermeyer		10	1	70	91	230	139	85	-6
176	Havermeyer		11	1	70	91	230	139	85	-6
177	Hendrick Lane NO		54	1	70	91	230	139	85	-6
178	Hendrick Lane SO		1	1	70	91	230	139	85	-6
179	Hillside Terrace	At Cedar Lawn	1	1	70	91	230	139	85	-6
180	Hillside Terrace		3	1	70	91	85	-6	85	-6
181	Hillside Terrace		6	1	70	91	85	-6	85	-6
182	Hillside Terrace	Last Light Hillside	0	1	70	91	85	-6	85	-6
183	Home Place		3	1	70	91	230	139	85	-6
184	Home Place		4	1	70	91	230	139	85	-6
185	Home Place	At Grinnell Street	3	1	70	91	230	139	85	-6
186	Hudson Avenue	At Center Street Road	11	1	70	91	230	139	85	-6
187	Hudson Avenue	FO 79	14	1	70	91	230	139	85	-6
188	Hudson Avenue	1WO Washington	38	1	70	91	230	139	85	-6
189	Hudson Avenue	At Park Avenue	2	1	70	91	230	139	85	-6
190	Hudson Avenue	At Bertha Place	25	1	70	91	83	-8	83	-8
191	Hudson Avenue		23	1	70	91	92	1	85	-6
192	Hudson Avenue		21	1	70	91	92	1	85	-6
193	Hudson Avenue		19	1	70	91	92	1	85	-6
194	Hudson Avenue		17	1	70	91	92	1	85	-6
195	Hudson Avenue		15	1	70	91	230	139	85	-6
196	Hudson Avenue		5633	1	70	91	290	199	193	102
197	Hudson Avenue		1	1	70	91	230	139	85	-6
198	Hudson Avenue	FO 15	4	2	100	128	230	102	85	-43
199	Hudson Avenue	FO 31	6	2	100	128	230	102	85	-43
200	Hudson Avenue	FO 61	10	2	100	128	230	102	85	-43
201	Hudson Avenue	FO 48	8	2	100	128	230	102	85	-43
202	Hudson Avenue	FO 85	12	2	100	128	230	102	85	-43
203	Hudson Avenue	Last Pole	15	1	70	91	230	139	85	-6
204	Hudson RD	AT Clifton Place	17	1	70	91	85	-6	85	-6
205	Hudson RD	At Hancock	21	1	70	91	85	-6	85	-6
206	Hudson RD	Hudson View West	13	1	70	91	85	-6	85	-6
207	Hudson RD	WSSD Ardsley PL27866	8	1	70	91	290	199	193	102
208	Hudson RD	SSWO SO Bway	27	1	70	91	85	-6	85	-6
209	Hudson RD	WS SO Ardsley Pl	5	3	150	188	92	-96	85	-103
210	Hudson RD	WSSO Ardsley Pl	7	3	150	188	92	-96	85	-103
211	Hudson RD East		1	1	70	91	230	139	85	-6
212	Hudson RD East		2	1	70	91	230	139	85	-6
213	Hudson RD East		3	1	70	91	230	139	85	-6
214	Ilinka Lane	At Hamilton	1	2	100	128	200	72	193	65
215	Ilinka Lane	1 SO Hamilton	2	2	100	128	200	72	193	65
216	Ilinka Lane	At Dead End	3	2	100	128	200	72	193	65
217	Janet Terr	WO Barbara Lane	2	1	70	91	230	139	85	-6

218	Janet Terr	At Dead End	4	1	70	91	230	139	85	-6
219	Langdon Ave	At Belmont DR	16	1	70	91	230	139	85	-6
220	Langdon Ave	SS2E Washington AVE	14	1	70	91	230	139	85	-6
221	Langdon Ave	At Washington	12	1	70	91	101	10	101	10
222	Langdon Ave		10	1	70	91	230	139	85	-6
223	Langdon Ave	At Erie St	8	1	70	91	230	139	85	-6
224	Langdon Ave	SS WO Erie St	6	1	70	91	230	139	85	-6
225	Langdon Ave	EO Broadway	4	1	70	91	230	139	85	-6
226	Langdon Ave	EO Broadway	2	1	70	91	230	139	85	-6
227	Langdon Ave		10	1	70	91	92	1	85	-6
228	Leafwood Terrace		2	3	150	188	100	-88	100	-88
229	Leafwood Terrace		3	3	150	188	100	-88	100	-88
230	Lewis Road		10	1	70	91	85	-6	85	-6
231	Lewis Road	1 SO Harriman	0	1	70	91	230	139	85	-6
232	Lewis Road	5S Harriman Rd	5	1	70	91	230	139	85	-6
233	Lewis Road		10	1	70	91	230	139	85	-6
234	Lewis Road	ES OPP Private ROW	12	1	70	91	230	139	85	-6
235	Lewis Road		8	1	70	91	230	139	85	-6
236	Main St		3	4	250	295	450	155	270	-25
237	Main St	CR Croton PL	8	4	250	295	290	-5	193	-102
238	Main St		10	4	250	295	290	-5	193	-102
239	Main St		11	4	250	295	290	-5	193	-102
240	Main St		13	4	250	295	290	-5	193	-102
241	Main St	At NO Ecker St	16	4	250	295	290	-5	193	-102
242	Main St	ES AT Ecker St	15	4	250	295	450	155	270	-25
243	Main St	At N Dutcher	19	4	250	295	290	-5	193	-102
244	Main St	CR SO Dutcher	18	4	250	295	450	155	270	-25
245	Main St	1st Inn off Main St	2	4	250	295	450	155	270	-25
246	Main St	SS At Cottnt St	21	4	250	295	450	155	270	-25
247	Main St	And Main St	24	4	250	295	290	-5	193	-102
248	Main St	SS At Buckt Stt	23	4	250	295	450	155	270	-25
249	Main St		27	4	250	295	290	-5	193	-102
250	Main St	NWCR Aqueduct	6	4	250	295	290	-5	193	-102
251	Main St	EO Ferris	12	4	250	295	290	-5	193	-102
252	Main St	At Corner NO Dutcher	14	4	250	295	290	-5	193	-102
253	Main St	NSCR Cottenet	17	4	250	295	290	-5	193	-102
254	Main St		20	4	250	295	290	-5	193	-102
255	Main St		22	4	250	295	290	-5	193	-102
256	Main St	SWCR River	25	4	250	295	101	-194	101	-194
257	Main St		2	4	250	295	290	-5	193	-102
258	Main St	SSWO River St	0	4	250	295	200	-95	193	-102
259	Main St		5	4	250	295	92	-203	85	-210
260	Main St		5	4	250	295	290	-5	193	-102
261.	Main St		0	4	250	295	85	-210	85	-210
262	Main St		14	4	250	295	290	-5	193	-102
263	Main St	OPP 59	17	4	250	295	290	-5	193	-102
264	Main St		20	4	250	295	290	-5	193	-102
265	Main St		22	4	250	295	290	-5	193	-102
266	Main St	1ESSO Astor St	25	4	250	295	290	-5	193	-102
267	Main St		7	4	250	295	92	-203	85	-210
268	Main St	SS3W River STT	31	4	250	295	230	-65	85	-210
269	Main St	CR NO Dearman	4	4	250	295	450	155	270	-25
270	Main St	SWCR River	25	4	250	295	189	-106	85	-210
271	Main St	EO North Ferris ST	9	4	250	295	313	18	313	18
272	Maple St		2	1	70	91	85	-6	85	-6
273	Maple St		4	1	70	91	85	-6	85	-6
274	Meadow Way		7	1	70	91	230	139	85	-6
275	Meadow Way		1	1	70	91	85	-6	85	-6
276	Meadow Way		5	1	70	91	230	139	85	-6
277	Meadow Way	WS 9N Harriman Rd	9	1	70	91	230	139	85	-6
278	Meadow Way		3	1	70	91	230	139	85	-6
279	Meadow Way		2	1	70	91	230	139	85	-6
280	Meadow Brook Rd	1 WO NO Bway	2	1	70	91	230	139	85	-6
281	Meadow Brook Rd	5 WO NO Bway	6	1	70	91	230	139	85	-6
282	Meadow Brook Rd		4	1	70	91	86	-5	86	-5
283	Meadow Brook Rd		8	1	70	91	86	-5	86	-5
284	Meadow Brook Rd		10	1	70	91	86	-5	86	-5
285	NO Aqueduct Pl		1	1	70	91	230	139	85	-6
286	NO Astor St	3N Main St	3	3	150	188	230	42	85	-103
287	NO Astor St		2	3	150	188	230	42	85	-103
288	NO Astor St	And Main St	1	3	150	188	450	262	270	82
289	NO Broadway			5	400	464	450	-14	270	-194
290	NO Broadway	ES AT Sunnyside	1	5	400	464	450	-14	270	-194

291	NO Broadway		5	5	400	464	290	-174	193	-271
292	NO Broadway		11	5	400	464	450	-14	270	-194
293	NO Broadway	WS At Mdwbrk Rd	13	5	400	464	450	-14	270	-194
294	NO Broadway		15	5	400	464	450	-14	270	-194
295	NO Broadway		21	5	400	464	450	-14	270	-194
296	NO Broadway		27	5	400	464	450	-14	270	-194
297	NO Broadway		29	5	400	464	450	-14	270	-194
298	NO Broadway		34	5	400	464	485	21	485	21
299	NO Broadway		40	5	400	464	450	-14	270	-194
300	NO Broadway	At St Barnabas	30	5	400	464	485	21	485	21
301	NO Broadway		19	4	250	295	450	155	270	-25
302	NO Broadway		352	4	250	295	450	155	270	-25
303	NO Broadway		35	4	250	295	313	18	313	18
304	NO Broadway		301	4	250	295	450	155	270	-25
305	NO Broadway		341	4	250	295	450	155	270	-25
306	NO Broadway	1 SO Main ST	351	4	250	295	485	190	485	190
307	NO Broadway	At Riverview	25	5	400	464	450	-14	270	-194
308	NO Broadway		4	5	400	464	485	21	485	21
309	NO Broadway		23	5	400	464	450	-14	270	-194
310	NO Broadway		32	5	400	464	450	-14	270	-194
311	NO Broadway		39	5	400	464	450	-14	270	-194
312	NO Broadway		1	5	400	464	450	-14	270	-194
313	NO Broadway		6	5	400	464	450	-14	270	-194
314	NO Broadway	At Fargo	171	5	400	464	450	-14	270	-194
315	NO Broadway	WS OP CRCL DR	24	5	400	464	450	-14	270	-194
316	NO Broadway	WSSO Riverview Rd	27	5	400	464	450	-14	270	-194
317	NO Broadway	SO Riverview Rd		5	400	464	450	-14	270	-194
318	NO Broadway		22	5	400	464	450	-14	270	-194
319	NO Broadway		4	5	400	464	450	-14	270	-194
320	NO Broadway		10	5	400	464	450	-14	270	-194
321	NO Broadway		12	5	400	464	450	-14	270	-194
322	NO Broadway		14	5	400	464	450	-14	270	-194
323	NO Broadway		8	5	400	464	450	-14	270	-194
324	NO Broadway		16	5	400	464	482	18	482	18
325	NO Buckout St		28	2	100	128	85	-43	85	-43
326	NO Buckout St		8	2	100	128	280	152	193	65
327	NO Buckout St		3	2	100	128	230	102	85	-43
328	WS NO Main St		27	3	150	188	230	42	85	-103
329	NO Cottenet St		1	1	70	91	85	-6	85	-6
330	NO Cottenet St		2	1	70	91	85	-6	85	-6
331	NO Dearman St		0	1	70	91	85	-6	85	-6
332	NO Dearman St	ES At Main St	4	1	70	91	230	139	85	-6
333	NO Dutcher St		2	1	70	91	85	-6	85	-6
334	NO Dutcher St		3	1	70	91	230	139	85	-6
335	NO Dutcher St	OPP 15	0	1	70	91	85	-6	85	-6
336	North Eckar St		14	1	70	91	85	-6	85	-6
337	North Eckar St		2	1	70	91	230	139	85	-6
338	North Eckar St		1	1	70	91	85	-6	85	-6
339	Oak St		2	1	70	91	125	34	85	-6
340	Osceola Ave	SS2E Field Terr	8	1	70	91	230	139	85	-6
341	Osceola Ave		10	1	70	91	92	1	85	-6
342	Osceola Ave	4NSEO Field Terr	10	1	70	91	230	139	85	-6
343	Osceola Ave	At Field Terr	0	1	70	91	230	139	85	-6
344	Park Ave		2	1	70	91	92	1	85	-6
345	Park Ave		4	1	70	91	85	-6	85	-6
346	Park Ave		6	1	70	91	85	-6	85	-6
347	Palliser Road		1	1	70	91	100	9	100	9
348	Palliser Road		4	1	70	91	100	9	100	9
349	Palliser Road		5	1	70	91	100	9	100	9
350	Park Road	At Palliser Rd	5	1	70	91	230	139	85	-6
351	Park Road		3	1	70	91	230	139	85	-6
352	Parkside Way	Off Hariman Rd	2	1	70	91	230	139	85	-6
353	Parkside Way	NO Harriman Rd	5	1	70	91	230	139	85	-6
354	River St	1 S0 Bridge St	2	1	70	91	189	98	85	-6
355	River St		1	1	70	91	230	139	85	-6
356	River St		5	1	70	91	85	-6	85	-6
357	Riverview Rd	3 EO Irving PL	15	1	70	91	230	139	85	-6
358	Riverview Rd		21	1	70	91	230	139	85	-6
359	Riverview Rd	1 EO Broadway	1	1	70	91	230	139	85	-6
360	Riverview Rd		3	1	70	91	230	139	85	-6
361	Riverview Rd	At Circle Dr	5	1	70	91	230	139	85	-6
362	Riverview Rd	1 EO Circle Dr	6	1	70	91	230	139	85	-6
363	Riverview Rd	3 EO Circle Dr	8	1	70	91	230	139	85	-6

364	Riverview Rd		9	1	70	91	230	139	85	-6
365	Riverview Rd		10	1	70	91	230	139	85	-6
366	Riverview Rd	At Irving Pl	12	1	70	91	230	139	85	-6
367	Riverview Rd		17	1	70	91	230	139	85	-6
368	Riverview Rd		19	1	70	91	230	139	85	-6
369	Riverview Rd	3WO Barbara La	22	1	70	91	230	139	85	-6
370	Riverview Rd	At Barbara La	25	1	70	91	230	139	85	-6
371	Riverview Terr	At Cedar Lawn	1	1	70	91	189	98	85	-6
372	Riverview Terr		3	1	70	91	85	-6	85	-6
373	Riverview Terr	Dead End lawn	6	1	70	91	230	139	85	-6
374	Riverview Terr		4	1	70	91	230	139	85	-6
375	Roland Rd	At Erie	5	1	70	91	230	139	85	-6
376	Roland Rd	3 EO Broadway	3	1	70	91	230	139	85	-6
377	SO Astor St	4 SO Main St	3	1	70	91	230	139	85	-6
378	SO Astor St		8	1	70	91	290	199	193	102
379	SO Astor St	3RD Pole FR Main St	6	1	70	91	200	109	193	102
380	SO Astor St	SO Astor CR Lot	1	0	0	0	200	200	270	270
381	SO Astor St	SO Astor Car Lot	2	0	0	0	450	450	270	270
382	SO Astor St	SO Astor Car Lot	3	0	0	0	290	290	193	193
383	SO Astor St	SO Astor CR Lot	4	0	0	0	290	290	270	270
384	SO Astor St	OFF Pole 20	5	1	70	91	450	359	270	179
385	SO Astor St	OFF Pole 20	6	1	70	91	290	199	193	102
386	SO Astor St	OFF Pole 20	7	1	70	91	290	199	193	102
387	SO Astor St	3 WO Buckout	20	1	70	91	230	139	85	-6
388	SO Astor St	2PWO Buckout St	19	1	70	91	230	139	85	-6
389	SO Astor St	At SO Buckout	20	1	70	91	230	139	85	-6
390	SO Astor St	At Main St	5886	4	250	295	313	18	313	18
391	SO Broadway		73	5	400	464	450	-14	270	-194
392	SO Broadway		46	5	400	464	290	-174	193	-271
393	SO Broadway		48	4	250	295	313	18	313	18
394	SO Broadway		49	4	250	295	313	18	313	18
395	SO Broadway		53	4	250	295	290	-5	193	-102
396	SO Broadway	At Dows Lane	55	5	400	464	313	-151	313	-151
397	SO Broadway		59	4	250	295	290	-5	193	-102
398	SO Broadway	SW West Clinton Av	62	5	400	464	450	-14	270	-194
399	SO Broadway		62	4	250	295	450	155	270	-25
400	SO Broadway	At Dows Lane	69	5	400	464	450	-14	270	-194
401	SO Broadway		75	4	250	295	290	-5	193	-102
402	SO Broadway	1 SO Dows Lane	57	5	400	464	313	-151	313	-151
403	SO Broadway		79	4	250	295	290	-5	193	-102
404	SO Broadway		83	4	250	295	450	155	270	-25
405	SO Broadway		84	4	250	295	485	190	485	190
406	SO Broadway		77	4	250	295	313	18	313	18
407	SO Broadway	HDSN Rd WST SO BWAY	88	5	400	464	85	-379	85	-379
408	SO Broadway	1 NO Clinton Ave	61	5	400	464	450	-14	270	-194
409	SO Broadway	South Broadway	71	5	400	464	85	-379	85	-379
410	SO Broadway		52	4	250	295	313	18	313	18
411	SO Broadway		91	4	250	295	450	155	270	-25
412	SO Broadway		80	4	250	295	450	155	270	-25
413	SO Broadway		60	4	250	295	450	155	270	-25
414	SO Broadway		50	4	250	295	313	18	313	18
415	SO Broadway	WS OPP Hamlton Rd	67	5	400	464	450	-14	270	-194
416	SO Broadway	WS SO Clinton Av	64	5	400	464	450	-14	270	-194
417	SO Broadway	At Back Rd	74	5	400	464	450	-14	270	-194
418	SO Broadway		39	4	250	295	313	18	313	18
419	SO Broadway		40	4	250	295	313	18	313	18
420	SO Broadway		41	4	250	295	313	18	313	18
421	SO Broadway	AT Harriman Rd	4553	5	400	464	313	-151	313	-151
422	SO Broadway	At Station Rd	46	5	400	464	313	-151	313	-151
423	SO Broadway	1 SO Station Rd	47	5	400	464	313	-151	313	-151
424	SO Broadway		37	4	250	295	313	18	313	18
425	SO Broadway		69	4	250	295	189	-106	85	-210
426	SO Broadway		0	4	250	295	313	18	313	18
427	SO Broadway		42	4	250	295	313	18	313	18
428	SO Broadway		54	4	250	295	313	18	313	18
429	SO Broadway		86	4	250	295	450	155	270	-25
430	SO Broadway		38	4	250	295	313	18	313	18
431	SO Broadway	BET W CLNTN & W ARDS W	65	5	400	464	313	-151	313	-151
432	SO Broadway	BET W CLNTN & W ARDS W	719	4	250	295	313	18	313	18
433	SO Broadway	BET W CLNTN & W ARDS W	72	4	250	295	313	18	313	18
434	SO Broadway	BET W CLNTN & W ARDS W	75	4	250	295	313	18	313	18
435	SO Broadway	BET W CLNTN & W ARDS W	78	4	250	295	313	18	313	18
436	SO BUCKOUT		16	4	250	295	230	-65	85	-210

437	SO BUCKOUT		0	3	150	188	85	-103	85	-103
438	SO BUCKOUT			3	150	188	230	42	85	-103
439	SO BUCKOUT		10	3	150	188	189	1	85	-103
440	SO BUCKOUT	OPP STATION RD	21	3	150	188	85	-103	85	-103
441	SO BUCKOUT	SOUTH BUCKOUT ST	17	3	150	188	85	-103	85	-103
442	SO BUCKOUT		14	3	150	188	230	42	85	-103
443	SO BUCKOUT		18	3	150	188	85	-103	85	-103
444	SO BUCKOUT		13	3	150	188	92	-96	85	-103
445	SO BUCKOUT		1	2	100	128	193	65	193	65
446	SO BUCKOUT	FO 322	3	2	100	128	193	65	193	65
447	SO BUCKOUT	FO 284	5	2	100	128	193	65	193	65
448	SO BUCKOUT		7	2	100	128	193	65	193	65
449	SO BUCKOUT		9	2	100	128	193	65	193	65
450	SO BUCKOUT		11	2	100	128	193	65	193	65
451	SO BUCKOUT		13	2	100	128	193	65	193	65
452	SO BUCKOUT		24	3	150	188	230	42	85	-103
453	SO BUCKOUT	FO 104	14	3	150	188	230	42	85	-103
454	SO BUCKOUT		19	3	150	188	85	-103	85	-103
455	SO BUCKOUT		20	3	150	188	85	-103	85	-103
456	SO BUCKOUT	CS Main	0	3	150	188	85	-103	85	-103
457	SO BUCKOUT		16	3	150	188	230	42	85	-103
458	SO BUCKOUT	FO100	15	3	150	188	230	42	85	-103
459	SO COTTENET ST		4	1	70	91	85	-6	85	-6
460	SO COTTENET ST		5	1	70	91	85	-6	85	-6
461	SO DEARMAN ST		0	1	70	91	85	-6	85	-6
462	SO DUTCHER ST		6	1	70	91	85	-6	85	-6
463	SO DUTCHER ST		8	1	70	91	85	-6	85	-6
464	SO DUTCHER ST		21	1	70	91	85	-6	85	-6
465	SOUTH ECKAR ST		7	1	70	91	85	-6	85	-6
466	SOUTH ECKAR ST	FO 11	2	1	70	91	230	139	85	-6
467	SOUTH ECKAR ST		6	1	70	91	85	-6	85	-6
468	SO FERRIS ST		7	1	70	91	230	139	85	-6
469	SO FERRIS ST		6	1	70	91	230	139	85	-6
470	SO FERRIS ST			1	70	91	230	139	85	-6
471	SO FERRIS ST		0	1	70	91	85	-6	85	-6
472	SO FERRIS ST		0	1	70	91	85	-6	85	-6
473	SO FERRIS ST		0	1	70	91	85	-6	85	-6
474	SO FERRIS ST		0	1	70	91	85	-6	85	-6
475	SO FERRIS ST		0	1	70	91	85	-6	85	-6
476	STATION RD		8	1	70	91	230	139	85	-6
477	STATION RD	AT IRVINGTON RD	31	2	100	128	230	102	85	-43
478	STATION RD	STATION RD	4	1	70	91	85	-6	85	-6
479	STATION RD	OPP 83	5	1	70	91	230	139	85	-6
480	STATION RD		7	1	70	91	230	139	85	-6
481	STATION RD	AT WOODBINE RD	13	2	100	128	189	61	85	-43
482	STATION RD	AT WOODBINE RD	13	2	100	128	125	-3	85	-43
483	STATION RD	AT WILLOW ST	15	2	100	128	85	-43	85	-43
484	STATION RD		17	2	100	128	85	-43	85	-43
485	STATION RD		18	2	100	128	92	-36	85	-43
486	STATION RD		20	2	100	128	92	-36	85	-43
487	STATION RD		16	2	100	128	85	-43	85	-43
488	STATION RD	AT BROOK PL	10	2	100	128	125	-3	85	-43
489	STATION RD		8	1	70	91	85	-6	85	-6
490	STATION RD		1	1	70	91	85	-6	85	-6
491	STATION RD		19	1	70	91	92	1	85	-6
492	STATION RD		9	1	70	91	85	-6	85	-6
493	STATION RD	2SSWO BROADWAY	2	2	100	128	200	72	193	65
494	STATION RD		2	2	100	128	290	162	193	65
495	SUNNYSIDE LA	AT NO BROADWAY	1	2	100	128	230	102	85	-43
496	SUNNYSIDE LA		3	2	100	128	230	102	85	-43
497	SUNNYSIDE LA		5	2	100	128	101	-27	85	-43
498	SUNNYSIDE LA		11	2	100	128	230	102	85	-43
499	SUNNYSIDE LA	AT HUDSON VIEW PARK	14	2	100	128	230	102	85	-43
500	SUNNYSIDE LA		118	2	100	128	230	102	85	-43
501	SUNNYSIDE LA	OPP QUARRY LANE	0	2	100	128	85	-43	85	-43
502	SUNNYSIDE LA		26	2	100	128	230	102	85	-43
503	SUNNYSIDE LA		28	2	100	128	230	102	85	-43
504	SUNNYSIDE LA		5721	2	100	128	85	-43	85	-43
505	SUNNYSIDE LA		10	2	100	128	125	-3	85	-43
506	SUNNYSIDE LA	2 EO HUDSON AVE	16	2	100	128	85	-43	85	-43
507	SUNNYSIDE LA	AT QUARRY LANE	20	2	100	128	450	322	270	142
508	SYCAMORE LA		1	3	150	188	200	12	193	5
509	SYCAMORE LA		2	3	150	188	200	12	193	5

510	SYCAMORE LA		3	3	150	188	200	12	193	5
511	SYCAMORE LA		4	3	150	188	200	12	193	5
512	SYCAMORE LA		5	3	150	188	200	12	193	5
513	SYCAMORE LA		6	3	150	188	200	12	193	5
514	SYCAMORE LA		7	3	150	188	200	12	193	5
515	SYCAMORE LA		8	3	150	188	200	12	193	5
516	VICTOR DR	1 SO HARRIMAN	0	2	100	128	230	102	85	-43
517	VICTOR DR	AT CARLA LANE	0	2	100	128	230	102	85	-43
518	VICTOR DR	FO 30	0	1	70	91	230	139	85	-6
519	VICTOR DR	AT DEAD END	0	1	70	91	230	139	85	-6
520	WASHINGTON AVE	WASHINGTON AVE	12	1	70	91	85	-6	85	-6
521	WASHINGTON AVE	AT ROLAND	5	1	70	91	85	-6	85	-6
522	WASHINGTON AVE	AT HUDSON ST	8	1	70	91	85	-6	85	-6
523	WASHINGTON AVE	FO 23	3	1	70	91	85	-6	85	-6
524	WEST CLINTON AV	7W SO BWAY	12	3	150	188	230	42	85	-103
525	WEST CLINTON AV	ARDSLEY TERR	20	3	150	188	230	42	85	-103
526	WEST CLINTON AV	1W SO BWAY	6	3	150	188	230	42	85	-103
527	WEST CLINTON AV	3W SO BWAY	8	3	150	188	230	42	85	-103
528	WEST CLINTON AV	5W SO BWAY	10	3	150	188	230	42	85	-103
529	WEST CLINTON AV	9W SO BWAY	14	3	150	188	230	42	85	-103
530	WEST CLINTON AV	4E ARSLEY TERR	16	3	150	188	230	42	85	-103
531	WEST CLINTON AV	2E ARDSLEY TERR	18	3	150	188	230	42	85	-103
532	WEST CLINTON AV	1W BLATCHFORD PL	22	3	150	188	230	42	85	-103
533	W SUNNYSIDE LA	WO SO BROADWAY	4	1	70	91	200	109	193	102
534	W SUNNYSIDE LA	6WSO BROADWAY	6	1	70	91	230	139	85	-6
535	W SUNNYSIDE LA	WO SO BROADWAY	9	1	70	91	125	34	85	-6
536	W SUNNYSIDE LA	WO SO BROADWAY	16	1	70	91	230	139	85	-6
537	W SUNNYSIDE LA	2 EO FARGO	12	1	70	91	230	139	85	-6
538	WILLOW ST	2S STATION RD	2	1	70	91	230	139	85	-6
539	WOODBINE RD	SO STATION RD	2	1	70	91	189	98	85	-6
540	WOODBINE RD	SO STATION	2	1	70	91	125	34	85	-6
541	WOODBINE RD	AT BUSHOP EDWARD DAG	10	1	70	91	485	394	485	394
						92,106	115,701	**23,595**		-17932
						proposed	existing	savings		

LABOR & MATERIAL ESTIMATE

WENDEL

Project : Village of Irvington	Estimated by: SVG
Project #: 4307-01	Checked by: JD
Measure: Street Lighting	Approved by: SVG
Date: 01/22/08	File: Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Clean and Wipe Lens	0	EA	$50.00	$0.00	$0.00	$0.00	$0.00
2	Replace Lamp, Clean and Wipe Lens	0	EA	$63.50	$0.00	$19.00	$0.00	$0.00
3	Replace Lamp and Ballast, Clean and Wipe Lens	0	EA	$85.00	$0.00	$184.00	$0.00	$0.00
4	Replace Fixture with New Fixture	10	EA	$255.00	$2,550.00	$550.00	$5,500.00	$8,050.00
5	Hazardous Waste Disposal	0	LS	$0.00	$0.00	$700.00	$0.00	$0.00
6	Bonds	1	LS	$0.00	$0.00	$201.25	$201.25	$201.25
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$2,550.00		$5,701.25	$8,251.25

Contingency:	10.0%	$825.13
TOTAL DIRECT CONSTRUCTION COST:		$9,076.38
Audit, Engineering, & Construction Management:	24.0%	$2,178.33
SUBTOTAL:		$11,254.71
Asbestos Abatement Services:		$0.00
Contingency:	0.0%	$0.00
TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
Asbestos Abatement Services Fee:	0.0%	$0.00
Asbestos SUBTOTAL:		$0.00
TOTAL:		$11,254.71

Section 10

FIM #7: Building Envelope Improvements

FIM #7: BUILDING ENVELOPE IMPROVEMENTS

INVESTIGATION

The Village buildings were designed and constructed at varying times, and significantly differ in architectural styles. The buildings identified for this measure include: the DPW Complex, Village Hall, Recreation Center, Senior Center, Library, and the Fire House. The poor performance of the caulking and weather stripping in these buildings contributes to the overall infiltration of air. A weatherization energy measure therefore, results in decreased energy usage as well as added occupant comfort by minimizing drafts in the winter and conserving cooling in the summer.

A field survey was conducted to asses the condition of each of these buildings. The findings were analyzed using a spreadsheet that calculates building heat losses based on crack length and width. Using Heating Degree Day (HDD) data and the contractor's implementation pricing, Wendel developed a scope of work for the successful implementation of this measure. Simple paybacks are in the 6-7 year range.

RECOMMENDATIONS

The purpose of this measure is to reduce the infiltration rate to the buildings, thereby retaining the cooling or heating produced by the HVAC and reducing the energy consumption required to maintain an acceptable working environment.

This measure will utilize commercial grade door sweeps and weather stripping to help decrease existing infiltration rates. The sweep units will be constructed from a vinyl strip that will not corrode or conduct temperatures like aluminum door sweeps. Weather-stripping around exterior doors and door jambs will also be installed to minimize the infiltration rate to the building.
The measure will also address the sealing of pipe and ductwork penetrations, roof/wall joints, passive vents, and the perimeter of rooftop ventilators.

Proposed Measure

The detailed scope of work for the measure is as follows:

DPW Complex

- Seven (7) single commercial doors to be weather-stripped.

Village Hall

- One (1) double commercial door to be weather-stripped;
- Four (4) single commercial doors to be weather-stripped;
- One (1) 12" x 16" vent to be sealed;
- Five (5) vents in the stairwell to be sealed;
- One (1) rooftop ventilator to be opened, perimeter sealed, dampers lubricated (12 linear feet).

Recreation Center

- Two (2) single commercial doors to be weather-stripped.

Senior Center

- One (1) double commercial door to be weather-stripped;
- Three (3) single commercial doors to be weather-stripped;
- One (1) rooftop ventilator to be opened, perimeter sealed, dampers lubricated (8 linear feet).

Library

- Two (2) single commercial doors to be weather-stripped;
- One (1) double commercial door to be weather-stripped.

Fire House

- Two (2) double commercial doors to be weather-stripped;
- Five (5) single commercial doors to be weather-stripped;
- Two hundred thirty-four (234) feet of roof/wall joint to be sealed.

Pump House

- One (1) double commercial door to be weather-stripped;
- One (1) single commercial door to be weather-stripped;
- 1,260 square feet of Cellulose insulation to be installed in attic;
- Three (3) square feet of by-pass to be sealed;
- Seal of all wall penetrations;
- Seal pipe and ductwork penetrations, roof/wall joints, and passive vents;
- Seal the perimeter of rooftop ventilators.

Building Envelope Improvements
DPW Complex
Project No.: 4307-01

Measure Summary Table

5-Jul-07

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	166	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$1,722	Per Year
Total Energy & O&M Savings	$1,722	Per Year
Project Costs		
Total Measure Cost	$12,407	
Payback		
Simple Payback	7.2	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	7.2	Year(s)

Project: 4307-01
Building: 30 South Buckhout Street
Date: 7/5/2007

Annual Heating Degree-Days:	4754	
Annual Heating Degree-hours:	57048 F-hr/yr	AA
Heating System Efficiency:	78%	BB
Average Fuel Cost:	$16.59 /MMBtu	CC
Correction Factor:	60%	DD

Work to be completed	No. of Units	Perimeter (ft)	Crackage (ft)	Crackage (ft)		Product	
Exit Doors	3	20	1/16	1/12	=	0.3125	
RTV's	-	0	1/6	1/12	=	0	
Roof/ Wall Joint	-	0	1/8	1/12	=	0	
OH Door	-	0	1/6	1/12	=	0	
Install 12 x 12 Damper	-	0	-	-	=	0	
					Total =	0.3125	A

Infiltration Savings

Total Crack Area (SF)	Average Wind Speed (MPH)	Average Wind Speed (FPM)	Windward Diversity (%)	Infiltration Savings (CFM)	Heat Loss Savings (MMBtu/yr)	Fuel Savings (klbs/yr)	Cost Savings ($/yr)
A	B	C = B x 5280 / 60	D	E = A x C x D	F = 1.08*E*AA 10^6	G = F / BB	H = G x CC x DD
0.31	9.3	818.4	50%	127.875	7.879	10.101	100.543

Project: 4307-01
Building: Mechanic's & Highway Garages
Date: 7/5/2007

Annual Heating Degree-Days:	4754	
Annual Heating Degree-hours:	57048 F-hr/yr	AA
Heating System Efficiency:	80%	BB
Average Fuel Cost:	$13.67 /MMBtu	CC
Correction Factor:	60%	DD

Work to be completed	No. of Units	Perimeter (ft)	Crackage (ft)	Crackage (ft)		Product	
Exit Doors	3	20	1/16	1/12	=	0.3125	
RTV's		0	1/6	1/12	=	0	
Roof/ Wall Joint	-	0	1/8	1/12	=	0	
OH Door	6	276	1/6	1/12	=	3.833333333	
Sweeps only (Doors)	-	0	1/16	1/12	=	0	
					Total =	4.145833333	A

Infiltration Savings

Total Crack Area (SF)	Average Wind Speed (MPH)	Average Wind Speed (FPM)	Windward Diversity (%)	Infiltration Savings (CFM)	Heat Loss Savings (MMBtu/yr)	Fuel Savings (klbs/yr)	Cost Savings ($/yr)
A	B	C = B x 5280 / 60	D	E = A x C x D	F = 1.08*E*AA 10^6	G = F / BB	H = G x CC x DD
4.15	9.3	818.4	50%	1696.475	104.523	130.654	1071.622

Project: 4307-01
Building: Sanitation Garage
Date: 7/5/2007

Annual Heating Degree-Days:	4754	
Annual Heating Degree-hours:	57048 F-hr/yr	AA
Heating System Efficiency:	80%	BB
Average Fuel Cost:	$13.63 /MMBtu	CC
Correction Factor:	60%	DD

Work to be completed	No. of Units	Perimeter (ft)	Crackage (ft)	Crackage (ft)		Product	
Exit Doors	1	20	1/16	1/12	=	0.104166667	
RTV's	-	0	1/6	1/12	=	0	
Roof/ Wall Joint	-	0	1/8	1/12	=	0	
OH Door	3	146	1/6	1/12	=	2.027777778	
Sweeps only (Doors)	-	0	1/16	1/12	=	0	
					Total =	2.131944444	A

Infiltration Savings

Total Crack Area (SF)	Average Wind Speed (MPH)	Average Wind Speed (FPM)	Windward Diversity (%)	Infiltration Savings (CFM)	Heat Loss Savings (MMBtu/yr)	Fuel Savings (klbs/yr)	Cost Savings ($/yr)
A	B	C = B x 5280 / 60	D	E = A x C x D	F = 1.08*E*AA 10^6	G = F / BB	H = G x CC x DD
2.13	9.3	818.4	50%	872.392	53.750	67.187	549.456

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	DPW Complex	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Building Envelope Improvements	Approved by:	SVG
Date:	07/05/07	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	30 South Buckhout Street	1	LS	$270.00	$270.00	$270.00	$270.00	$540.00
2					$0.00		$0.00	$0.00
3	Sanitation Garage	1	LS	$1,550.00	$1,550.00	$1,550.00	$1,550.00	$3,100.00
4					$0.00		$0.00	$0.00
5	Mechanic's & Highway Garages	1	LS	$3,030.00	$3,030.00	$3,030.00	$3,030.00	$6,060.00
6					$0.00		$0.00	$0.00
7	Bonds	1	LS	$306.00	$306.00		$0.00	$306.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$5,156.00		$4,850.00	$10,006.00

Contingency:	0.0%	$0.00
TOTAL DIRECT CONSTRUCTION COST:		$10,006.00
Audit, Engineering, & Construction Management:	24.0%	$2,401.44
SUBTOTAL:		$12,407.44
Asbestos Abatement Services:		$0.00
Contingency:	0.0%	$0.00
TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
Asbestos Abatement Services Fee:	0.0%	$0.00
Asbestos SUBTOTAL:		$0.00
TOTAL:		$12,407.44

Building Envelope Improvements
Village Hall
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	69	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$734	Per Year
Total Energy & O&M Savings	$734	Per Year
Project Costs		
Total Measure Cost	$3,042	
Payback		
Simple Payback	4.1	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	4.1	Year(s)

Project: Village
Building: Village Hall
Date: 3/4/2008

Annual Heating Degree-Days:	4754	
Annual Heating Degree-hours:	57048 F-hr/yr	AA
Heating System Efficiency:	80%	BB
Average Fuel Cost:	$14.11 /MMBtu	CC
Correction Factor:	60%	DD

Work to be completed	No. of Units	Perimeter (ft)	Crackage (ft)	Crackage (ft)		Product	
Exit Doors	6	20	1/16	1/12	=	0.625	
RTV's	1	12	1/6	-	=	2	
Roof/ Wall Joint	-	0	1/8	-	=	0	
OH Door	-	0	1/6	-	=	0	
Vents	6	2	1/16	-	=	0.125	
					Total =	2.75	A

Infiltration Savings

Total Crack Area (SF)	Average Wind Speed (MPH)	Average Wind Speed (FPM)	Windward Diversity (%)	Infiltration Savings (CFM)	Heat Loss Savings (MMBtu/yr)	Fuel Savings (klbs/yr)	Cost Savings ($/yr)
A	B	C = B x 5280 / 60	D	E = A x C x D	F = 1.08*E*AA 10^6	G = F / BB	H = G x CC x DD
2.75	9.3	818.4	50%	1125.300	69.332	86.665	733.704

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Village Hall	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Building Envelope Improvements	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Village Hall	1	LS	1,115.00	$1,115.00	1,115.00	$1,115.00	$2,230.00
2					$0.00		$0.00	$0.00
3					$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$1,115.00		$1,115.00	$2,230.00

Contingency:	10.0%	$223.00
TOTAL DIRECT CONSTRUCTION COST:		$2,453.00
Audit, Engineering, & Construction Management:	24.0%	$588.72
SUBTOTAL:		$3,041.72
Asbestos Abatement Services:		$0.00
Contingency:	0.0%	$0.00
TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
Asbestos Abatement Services Fee:	0.0%	$0.00
Asbestos SUBTOTAL:		$0.00
TOTAL:		$3,041.72

Building Envelope Improvements
Recreation Center
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	5	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$58	Per Year
Total Energy & O&M Savings	$58	Per Year
Project Costs		
Total Measure Cost	$491	
Payback		
Simple Payback	8.4	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	8.4	Year(s)

Project: 4307-01
Building: Recreation Center
Date: 1/22/2008

Annual Heating Degree-Days:	4753	
Annual Heating Degree-hours:	57036 F-hr/yr	AA
Heating System Efficiency:	80%	BB
Average Fuel Cost:	$14.84 /MMBtu	CC
Correction Factor:	60%	DD

Work to be completed	No. of Units	Perimeter (ft)	Crackage (ft)	Crackage (ft)		Product	
Exit Doors	2	20	1/16	1/12	=	0.208333333	
RTV's	-	0	1/6	1/12	=	0	
Roof/ Wall Joint	-	0	1/8	1/12	=	0	
OH Door	-	0	1/6	1/12	=	0	
Sweeps only (Doors)	-	0	1/16	1/12	=	0	
					Total =	0.208333333	A

Infiltration Savings

Total Crack Area (SF)	Average Wind Speed (MPH)	Average Wind Speed (FPM)	Windward Diversity (%)	Infiltration Savings (CFM)	Heat Loss Savings (MMBtu/yr)	Fuel Savings (klbs/yr)	Cost Savings ($/yr)
A	B	C = B x 5280 / 60	D	E = A x C x D	F = 1.08*E*AA 10^6	G = F / BB	H = G x CC x DD
0.21	9.3	818.4	50%	85.250	5.251	6.564	58.447

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Recreation Center	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Building Envelope Improvements	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Recreation Center	1	LS	$180.00	$180.00	$180.00	$180.00	$360.00
2					$0.00		$0.00	$0.00
3					$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$180.00		$180.00	$360.00

Contingency:	10.0%	$36.00
TOTAL DIRECT CONSTRUCTION COST:		$396.00
Audit, Engineering, & Construction Management:	24.0%	$95.04
SUBTOTAL:		$491.04
Asbestos Abatement Services:		$0.00
Contingency:	0.0%	$0.00
TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
Asbestos Abatement Services Fee:	0.0%	$0.00
Asbestos SUBTOTAL:		$0.00
TOTAL:		$491.04

Building Envelope Improvements
Senior Center
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	16	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$181	Per Year
Total Energy & O&M Savings	$181	Per Year
Project Costs		
Total Measure Cost	$1,432	
Payback		
Simple Payback	7.9	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	7.9	Year(s)

Project: 4307-01
Building: Senior Center
Date: 1/22/2008

Annual Heating Degree-Days:	4754	
Annual Heating Degree-hours:	57048 F-hr/yr	AA
Heating System Efficiency:	80%	BB
Average Fuel Cost:	$15.13 /MMBtu	CC
Correction Factor:	60%	DD

Work to be completed	No. of Units	Perimeter (ft)	Crackage (ft)	Crackage (ft)		Product	
Exit Doors	5	20	1/16	1/12	=	0.520833333	
RTV's	1	8	1/6	1/12	=	0.111111111	
Roof/ Wall Joint	0	0	1/8	1/12	=	0	
OH Door	-	0	1/6	1/12	=	0	
Sweeps only (Doors)	-	0	1/16	1/12	=	0	
					Total =	0.631944444	A

Infiltration Savings

Total Crack Area (SF)	Average Wind Speed (MPH)	Average Wind Speed (FPM)	Windward Diversity (%)	Infiltration Savings (CFM)	Heat Loss Savings (MMBtu/yr)	Fuel Savings (klbs/yr)	Cost Savings ($/yr)
A	B	C = B x 5280 / 60	D	E = A x C x D	F = 1.08*E*AA 10^6	G = F / BB	H = G x CC x DD
0.63	9.3	818.4	50%	258.592	15.932	19.915	180.792

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Senior Center	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Building Envelope Improvements	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Senior Center	1	LS	$525.00	$525.00	$525.00	$525.00	$1,050.00
2					$0.00		$0.00	$0.00
3					$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$525.00		$525.00	$1,050.00

Contingency:	10.0%	$105.00
TOTAL DIRECT CONSTRUCTION COST:		$1,155.00
Audit, Engineering, & Construction Management:	24.0%	$277.20
SUBTOTAL:		$1,432.20
Asbestos Abatement Services:		$0.00
Contingency:	10.0%	$0.00
TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
Asbestos Abatement Services Fee:	9.0%	$0.00
Asbestos SUBTOTAL:		$0.00
TOTAL:		$1,432.20

Building Envelope Improvements
Library
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	11	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$130	Per Year
Total Energy & O&M Savings	$130	Per Year
Project Costs		
Total Measure Cost	$982	
Payback		
Simple Payback	7.5	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	7.5	Year(s)

Project: 4307-01
Building: Library
Date: 1/22/2008

Annual Heating Degree-Days:	4754	
Annual Heating Degree-hours:	57048 F-hr/yr	AA
Heating System Efficiency:	80%	BB
Average Fuel Cost:	$16.52 /MMBtu	CC
Correction Factor:	60%	DD

Work to be completed	No. of Units	Perimeter (ft)	Crackage (ft)	Crackage (ft)		Product	
Exit Doors	4	20	1/16	1/12	=	0.416666667	
RTV's	-	0	1/6	1/12	=	0	
Roof/ Wall Joint	-	0	1/8	1/12	=	0	
OH Door	-	0	1/6	1/12	=	0	
Sweeps only (Doors)	-	0	1/16	1/12	=	0	
					Total =	0.416666667	A

Infiltration Savings

Total Crack Area (SF)	Average Wind Speed (MPH)	Average Wind Speed (FPM)	Windward Diversity (%)	Infiltration Savings (CFM)	Heat Loss Savings (MMBtu/yr)	Fuel Savings (klbs/yr)	Cost Savings ($/yr)
A	B	C = B x 5280 / 60	D	E = A x C x D	F = 1.08*E*AA 10^6	G = F / BB	H = G x CC x DD
0.42	9.3	818.4	50%	170.500	10.505	13.131	130.155

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Library	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Building Envelope Improvements	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Library	1	LS	$360.00	$360.00	$360.00	$360.00	$720.00
2					$0.00		$0.00	$0.00
3					$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$360.00		$360.00	$720.00
						Contingency:	10.0%	$72.00
						TOTAL DIRECT CONSTRUCTION COST:		$792.00
						Audit, Engineering, & Construction Management:	24.0%	$190.08
							SUBTOTAL:	$982.08
						Asbestos Abatement Services:		$0.00
						Contingency:	0.0%	$0.00
						TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
						Asbestos Abatement Services Fee:	0.0%	$0.00
							Asbestos SUBTOTAL:	$0.00
							TOTAL:	$982.08

Building Envelope Improvements

Fire House

Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	85	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$885	Per Year
Total Energy & O&M Savings	$885	Per Year
Project Costs		
Total Measure Cost	$6,040	
Payback		
Simple Payback	6.8	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	6.8	Year(s)

Project: 4307-01
Building: Fire House
Date: 1/22/2008

Annual Heating Degree-Days:	4754	
Annual Heating Degree-hours:	57048 F-hr/yr	AA
Heating System Efficiency:	80%	BB
Average Fuel Cost:	$13.87 /MMBtu	CC
Correction Factor:	60%	DD

Work to be completed	No. of Units	Perimeter (ft)	Crackage (ft)	Crackage (ft)		Product	
Exit Doors	9	20	1/16	1/12	=	0.9375	
RTV's	-	0	1/6	1/12	=	0	
Roof/ Wall Joint	-	234	1/8	1/12	=	2.4375	
OH Door	-	0	1/6	1/12	=	0	
Sweeps only (Doors)	-	0	1/16	1/12	=	0	
					Total =	3.375	A

Infiltration Savings

Total Crack Area (SF)	Average Wind Speed (MPH)	Average Wind Speed (FPM)	Windward Diversity (%)	Infiltration Savings (CFM)	Heat Loss Savings (MMBtu/yr)	Fuel Savings (klbs/yr)	Cost Savings ($/yr)
A	B	C = B x 5280 / 60	D	E = A x C x D	F = 1.08*E*AA 10^6	G = F / BB	H = G x CC x DD
3.38	9.3	818.4	50%	1381.050	85.089	106.361	885.139

LABOR & MATERIAL ESTIMATE

WENDEL

Project : Fire House	Estimated by: SVG
Project #: 4307-01	Checked by: JD
Measure: Building Envelope Improvements	Approved by: SVG
Date: 01/22/08	File: Cost Estimate

Item No.	Description	Qty.	Unit	Material		Labor		Total Cost Labor & Material
				Unit Price	Total	Unit Price	Total	
1	Fire House	1	LS	$2,214.00	$2,214.00	$2,214.00	$2,214.00	$4,428.00
2					$0.00		$0.00	$0.00
3					$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$2,214.00		$2,214.00	$4,428.00

Contingency:	10.0%	$442.80
TOTAL DIRECT CONSTRUCTION COST:		$4,870.80
Audit, Engineering, & Construction Management:	24.0%	$1,168.99
SUBTOTAL:		$6,039.79
Asbestos Abatement Services:		$0.00
Contingency:	0.0%	$0.00
TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
Asbestos Abatement Services Fee:	0.0%	$0.00
Asbestos SUBTOTAL:		$0.00
TOTAL:		$6,039.79

Building Envelope Improvements

Pump House

Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	169	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$1,878	Per Year
Total Energy & O&M Savings	$1,878	Per Year
Project Costs		
Total Measure Cost	$9,984	
Payback		
Simple Payback	5.3	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	5.3	Year(s)

Project: 4307-01
Building: Pump House
Date: 1/22/2008

Annual Heating Degree-Days:	4754	
Annual Heating Degree-hours:	57048 F-hr/yr	AA
Heating System Efficiency:	80%	BB
Average Fuel Cost:	$15.15 /MMBtu	CC
Correction Factor:	60%	DD

Work to be completed	No. of Units	Perimeter (ft)	Crackage (ft)	Crackage (ft)		Product	
Exit Doors	3	20	1/16	1/12	=	0.3125	
RTV's	-	0	1/6	1/12	=	0	
Roof/ Wall Joint	-	0	1/8	1/12	=	0	
OH Door	-	0	1/6	1/12	=	0	
Bypass	-	3	1/16	1/12	=	3	
					Total =	3.3125	A

Infiltration Savings

Total Crack Area (SF)	Average Wind Speed (MPH)	Average Wind Speed (FPM)	Windward Diversity (%)	Infiltration Savings (CFM)	Heat Loss Savings (MMBtu/yr)	Fuel Savings (klbs/yr)	Cost Savings ($/yr)
A	B	C = B x 5280 / 60	D	E = A x C x D	F = 1.08*E*AA 10^6	G = F / BB	H = G x CC x DD
3.31	9.3	818.4	50%	1355.475	83.513	104.392	948.920

Project: 4307-01
Building: Pump House
Date: 1/22/2008

Degree-F-Days:	4754	CC
Degree-F-Hrs:	114096	DD
Heating System Efficiency:	80%	EE
Fuel Cost:	$13.63 /MMBtu	FF
Correction Factor:	80%	GG

Roof Area

Building Section	Attic Area	Attic U-Value Existing R = 2	Attic U-Value New R = 38	Heat Loss (MMBtu/yr)	Fuel Savings (MMBtu/yr)	Cost Savings ($/yr)
	A	B	C	D = Ax(B-C)xDD/10^6	E = D / EE	F = E x FF x GG
	1,260	0.5	0.026	68.143	85.178	928.7849334

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Pump House	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD
Measure:	Building Envelope Improvements	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Pump House	1	LS	$3,660.00	$3,660.00	$3,660.00	$3,660.00	$7,320.00
2					$0.00		$0.00	$0.00
3					$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$3,660.00		$3,660.00	$7,320.00

Contingency:	10.0%	$732.00
TOTAL DIRECT CONSTRUCTION COST:		$8,052.00
Audit, Engineering, & Construction Management:	24.0%	$1,932.48
SUBTOTAL:		$9,984.48
Asbestos Abatement Services:		$0.00
Contingency:	0.0%	$0.00
TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
Asbestos Abatement Services Fee:	0.0%	$0.00
Asbestos SUBTOTAL:		$0.00
TOTAL:		$9,984.48

Section 11

FIM #8: Water Meter Replacements

FIM #8: WATER METER REPLACEMENTS

INVESTIGATION

The Village of Irvington currently determines water usage from approximately 1,573 residential and commercial water meters. The water meters consist of (379) 5/8" residential water meters, (408) 5/8" x ¾" meters, (314) ¾" meters, (164) 1" water meters, (160) 1-1/2" water meters, (23) 2" water meters, (31) water meters greater than 2", and (94) water meters with unknown sizes. The accuracy of the existing water meters vary according to installation dates which range from the early 1980's to the present. The older meters are less accurate than the newer meters and report water usage less than the amount consumed. The Village of Irvington is therefore losing revenue due to the reduced accuracy of the existing meters.

The Village of Irvington utilizes water consumption data to determine water billing. The current water rates are $4.65 per 1000 gallons used. The Village of Irvington currently purchases an average of 359,105,000 gallons of water annually. For the purpose of this report, additional water revenue was based on a percentage of the average annual water billing from the recent historical usage as provided by the Village.

During the study phase of this project, WES and the Village conducted a water meter testing pilot program to verify the inaccuracy of the existing water meters. Testing was performed on 10 existing water meters using a calibrated portable meter for in-place testing. The data from the in-place testing and the bench testing revealed that the existing meters lose 0.70% accuracy for each year they are installed. The inaccuracy for meters installed within the last five years was assumed to be 0%. For meters greater than five years old, the meter inaccuracy was assumed to be the meter age (years) x 0.70% per year. The average age of the water meters in the Village is 16.25 years resulting in an average inaccuracy of 11.31%. Although the testing indicated a weighted-average inaccuracy of 11.31%, an average inaccuracy of 10% was used in the increased revenue calculation in an effort to use a more conservative approach.

The Village of Irvington currently utilizes a manual collection and data entry system to generate water and sewer bills. Village water department personnel manually record the water meter

readings quarterly. Each residential water meter is read twice per year with water use estimated the two quarters that it is not read. The data collected is then manually typed into the current billing software. The existing system has the potential for manual reading and recording errors in the field, and data entry errors when transcribing the numbers into the billing software. The Village also must perform manual corrections on any discrepancies from the recorded and estimated readings. The manual readings and double entry is both labor intensive and increases the likelihood of costly errors.

RECOMMENDATIONS

It is proposed to retrofit each existing water meter with both a new water meter and radio transmitter. This includes all residential and commercial water meters in the Village. The new Automatic Meter Reading (AMR) system will include all software, hardware, and training necessary for a complete installation. In addition, the Village's current billing system software will be upgraded to interface with the meter reading software.

The installation of a radio-enabled Automatic Meter Reading (AMR) system will allow the Village to significantly reduce the amount of labor hours required for reading meters. No credit has been taken for these labor savings in the economic evaluation.

Assumptions

The water use values provided by the Village of Irvington are as follows:

Annual Water Billed:	359,105,000 gallons per year

Additional water revenue was calculated using the following assumptions:

Number of connections =	1,573
Weighted Avg. Meter Inaccuracy:	10%

Water Meter Replacement
Water District

22-Jan-08

Summary Table		
Operational & Maintenance Savings ($)	$0	
Annual Water Revenue Increase ($)	$145,203	
Annual Sewer Revenue Increase ($)	$15,843	
Project Costs		
Total Measure Cost	$751,561	
Payback		
Total Annual Savings & Revenue Increase	$161,046	
Simple Payback	4.7	
Potential Incentives	$0.00	

Village of Irvington
Water Meter Replacement Analysis
Revenue Increase

Assumptions:

A	Connected Units	1,573
B	Water Rate per 1000 gallons for 2007	$4.65
C	Sewer Rate per 1000 gallons for 2007	$0.44
D	Annual Water Use	359,105,000 GPY
E	Annual Sewer Use	359,105,000 GPY
F	Weigted Avg. Meter Inaccuracy	10.0%

Calculations:

G	Additional Revenue from Water (D x F x B)	$145,203 *
H	Additional Revenue from Sewer (E x F x C)	$15,843
I	Operational Savings	$0
J	Total Project Cost (includes all overhead costs and contigency)	$751,561
K	Simple Payback J / (G + H + I)	4.7 years

* It was assumed that 15% of the water use was lost due to waterline leaks, fire fightin flushing and miscellaneous Village use.

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Village of Irvington	Estimated by:	BMS
Project #:	4307-01	Checked by:	JD/JDT
Measure:	Water Meter Replacement	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material		Labor		Total Cost Labor & Material
				Unit Price	Total	Unit Price	Total	
1	Water Meter Replacement	1	LS	$272,248.80	$272,248.80	$272,248.80	$272,248.80	$544,497.60
2	Bonds	1	LS	$3,250.00	$3,250.00	$3,250.00	$3,250.00	$6,500.00
3					$0.00		$0.00	$0.00
4	Per Team MBS Bid January 21, 2008				$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$275,498.80		$275,498.80	$550,997.60
						Contingency:	10.0%	$55,099.76
						TOTAL DIRECT CONSTRUCTION COST:		$606,097.36
						Audit, Engineering, & Construction Management:	24.0%	$145,463.37
							SUBTOTAL:	$751,560.73
						Asbestos Abatement Services:		$0.00
						Contingency:	0.0%	$0.00
						TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
						Asbestos Abatement Services Fee:	0.0%	$0.00
							Asbestos SUBTOTAL:	$0.00
							TOTAL:	$751,560.73

Section 12

FIM #9: Pump Station Upgrades

FIM #9: PUMP STATION UPGRADES

INVESTIGATION

As requested by the Village, Wendel evaluated the Ardsley Station and Astor Street Station wastewater pump stations for potential energy efficiency and capital upgrades.

Both of these stations are older pump stations with Flygt centrifugal pumps. Since this type of design contains pump motors that are an integral part of the pump, the motor cannot be separately replaced with one of a higher efficiency. Although replacement in kind (with a new version of this style pump) will only yield minimal efficiency gains, the existing equipment is at the end of its useful life and both stations are at or near capacity during heavy rain events.

RECOMMENDATIONS

Rehabilitation of the existing pump stations with new pumps, new controls, and dialer alarms is recommended. Emergency generator upgrades are addressed in FIM #12. The project will also include the rebuilding of both pumps at each location to be used as a spare backup pump. The energy savings associated with this upgrade are negligible; however, this measure will extend the useful life of this station by replacing the key items. The upgraded station will enhance reliability and flexibility during the heavy rain events while reducing overall operation and maintenance costs.

Pump Station Upgrades

Water District

Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	0	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$0	Per Year
Total Energy & O&M Savings	$0	Per Year
Project Costs		
Total Measure Cost	$122,624	
Payback		
Simple Payback	N/A	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	N/A	Year(s)

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Water District	Estimated by:	BMS
Project #:	4307-01	Checked by:	JD/JDT
Measure:	Pump Station Upgrades	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Pump Station Upgrades	1	LS	$44,050.00	$44,050.00	$44,050.00	$44,050.00	$88,100.00
2	Bonds	1	LS	$900.00	$900.00	$900.00	$900.00	$1,800.00
3					$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$44,950.00		$44,950.00	$89,900.00
						Contingency:	10.0%	$8,990.00
						TOTAL DIRECT CONSTRUCTION COST:		$98,890.00
						Audit, Engineering, & Construction Management:	24.0%	$23,733.60
							SUBTOTAL:	$122,623.60
						Asbestos Abatement Services:		$0.00
						Contingency:	0.0%	$0.00
						TOTAL ASBESTOS CONSTRUCTION COST:		$0.00
						Asbestos Abatement Services Fee:	0.0%	$0.00
							Asbestos SUBTOTAL:	$0.00
							TOTAL:	$122,623.60

Section 13

FIM #10: Steel Water Tank Rehabilitation

FIM #10: STEEL WATER TANK REHABILITATION

INVESTIGATION

It was requested that Wendel evaluate rehabilitation of the Village's Mountain Road Water Tank. This water tank is a 600,000 gallon ground water storage tank. The tank has deteriorated due to age with the existing interior and exterior coatings at the end of their useful service life and showing signs of failure. Continued degradation of the existing coatings will put the steel tank walls and other components at risk for failure, as well as potentially result in paint and other particles in the finished water.

RECOMMENDATIONS

Our office discussed the requirements with tank coating suppliers to develop an appropriate repair and tank painting program. The recommended tank rehabilitation will consist of removing the following:

- Drain and remove the tank from service;
- Sandblasting the interior and exterior down to bare metal to completely remove old coatings;
- Pit filling;
- Seam weld repair;
- Installation of new frost-proof vent.

The tank will then be recoated on interior and exterior surfaces with a three coat part epoxy coating manufactured for use in coating water tanks.

During the design phase, Weston Solutions, Inc. was contracted to test for the presence of lead in the exterior paint. The test results came back positive for lead and the final cost for this measure includes the removal of lead paint.

Steel Water Tank Rehabilitation
Mountain Road
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	0	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$0	Per Year
Total Energy & O&M Savings	$0	Per Year
Project Costs		
Total Measure Cost	$376,287	
Payback		
Simple Payback	N/A	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	N/A	Year(s)

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Mountain Road	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD/JDT
Measure:	Steel Water Tank Rehabilitation	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Steel Water Tank Rehabilitation	1	LS	$133,935.00	$133,935.00	$133,935.00	$133,935.00	$267,870.00
2	Bonds	1	LS	$4,000.00	$4,000.00	$4,000.00	$4,000.00	$8,000.00
3					$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$137,935.00		$137,935.00	$275,870.00
						Contingency:	10.0%	$27,587.00
							TOTAL DIRECT CONSTRUCTION COST:	$303,457.00
						Audit, Engineering, & Construction Management:	24.0%	$72,829.68
							SUBTOTAL:	$376,286.68
							Asbestos Abatement Services:	$0.00
						Contingency:	0.0%	$0.00
							TOTAL ASBESTOS CONSTRUCTION COST:	$0.00
						Asbestos Abatement Services Fee:	0.0%	$0.00
							Asbestos SUBTOTAL:	$0.00
							TOTAL:	$376,286.68

Section 14

FIM #11: PRV Replacement

FIM #11: PRV REPLACEMENT

INVESTIGATION

The Village of Irvington has two Pressure Regulating Valves (PRV) within the water distribution system that are in need of replacement. These PRV valves maintain zone pressure control between the higher and lower areas of the Village water system.

RECOMMENDATIONS

It is recommended to replace the existing GA Industries PRVs. The new PRVs will help enhance pressure zone control allowing the Village to more effectively control the supply of water and associated pressure to the lower and upper zones.

Pressure Reducing Valves
Water District
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	0	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$0	Per Year
Total Energy & O&M Savings	$0	Per Year
Project Costs		
Total Measure Cost	$27,182	
Payback		
Simple Payback	N/A	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	N/A	Year(s)

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Water District	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD/JDT
Measure:	Pressure Reducing Valves	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Steel Water Tank Rehabilitation	1	LS	$9,964.00	$9,964.00	$9,964.00	$9,964.00	$19,928.00
2	Bonds (Included in Cost of Material and Labor)				$0.00		$0.00	$0.00
3					$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$9,964.00		$9,964.00	$19,928.00
						Contingency:	10.0%	$1,992.80
							TOTAL DIRECT CONSTRUCTION COST:	$21,920.80
							Audit, Engineering, & Construction Management: 24.0%	$5,260.99
							SUBTOTAL:	$27,181.79
							Asbestos Abatement Services:	$0.00
							Contingency: 0.0%	$0.00
							TOTAL ASBESTOS CONSTRUCTION COST:	$0.00
							Asbestos Abatement Services Fee: 0.0%	$0.00
							Asbestos SUBTOTAL:	$0.00
							TOTAL:	$27,181.79

Section 15

FIM #12: Packaged Engine Generators

FIM #12: PACKAGED ENGINE GENERATORS

INVESTIGATION

As requested by the Village, Wendel evaluated the Ardsley Station and Astor Street Station wastewater pump stations for potential capital upgrades to install packaged engine generators at each pump station.

Both of these stations are older pump stations without backup emergency generators. Wendel investigated options for installing packaged engine generators at each of the two pump stations. This will allow the Village to keep both of these pump stations operational during power outages and prevent the backup of wastewater into the system during power outages which often occur during severe rain events.

RECOMMENDATIONS

Installation of packaged engine emergency generators is recommended at each of the two pump stations. This measure will enhance the operational reliability and flexibility during the power outage events while reducing the overall potential for wastewater backups or bypass pumping. There are no energy savings associated with this upgrade.

Packaged Engine Generators
Water District
Project No.: 4307-01

Measure Summary Table

22-Jan-08

Savings		
Average Demand Savings	0.0	kW/Month
Electrical Energy Savings	0	kWh/Year
Fossil Fuel Savings	0	mmBtu/Year
Operational & Maintenance Savings	$0	Per Year
Energy Savings ($)	$0	Per Year
Total Energy & O&M Savings	$0	Per Year
Project Costs		
Total Measure Cost	$145,518	
Payback		
Simple Payback	N/A	Year(s)
Potential Incentives	$0	
Simple Payback with Incentives	N/A	Year(s)

LABOR & MATERIAL ESTIMATE

WENDEL

Project :	Water District	Estimated by:	SVG
Project #:	4307-01	Checked by:	JD/JDT
Measure:	Packaged Engine Generators	Approved by:	SVG
Date:	01/22/08	File:	Cost Estimate

Item No.	Description	Qty.	Unit	Material Unit Price	Material Total	Labor Unit Price	Labor Total	Total Cost Labor & Material
1	Packaged EngineGenerators	1	LS	$52,342.50	$52,342.50	$52,342.50	$52,342.50	$104,685.00
2	Bonds	1	LS	$1,000.00	$1,000.00	$1,000.00	$1,000.00	$2,000.00
3					$0.00		$0.00	$0.00
4					$0.00		$0.00	$0.00
5					$0.00		$0.00	$0.00
6					$0.00		$0.00	$0.00
7					$0.00		$0.00	$0.00
8					$0.00		$0.00	$0.00
9					$0.00		$0.00	$0.00
10					$0.00		$0.00	$0.00
11					$0.00		$0.00	$0.00
12					$0.00		$0.00	$0.00
13					$0.00		$0.00	$0.00
14					$0.00		$0.00	$0.00
15					$0.00		$0.00	$0.00
16					$0.00		$0.00	$0.00
17					$0.00		$0.00	$0.00
18					$0.00		$0.00	$0.00
19					$0.00		$0.00	$0.00
20					$0.00		$0.00	$0.00
21					$0.00		$0.00	$0.00
22					$0.00		$0.00	$0.00
23					$0.00		$0.00	$0.00
24					$0.00		$0.00	$0.00
25					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
					$0.00		$0.00	$0.00
				SUBTOTALS:	$53,342.50		$53,342.50	$106,685.00
						Contingency:	10.0%	$10,668.50
							TOTAL DIRECT CONSTRUCTION COST:	$117,353.50
						Audit, Engineering, & Construction Management:	24.0%	$28,164.84
							SUBTOTAL:	$145,518.34
							Asbestos Abatement Services:	$0.00
						Contingency:	0.0%	$0.00
							TOTAL ASBESTOS CONSTRUCTION COST:	$0.00
						Asbestos Abatement Services Fee:	0.0%	$0.00
							Asbestos SUBTOTAL:	$0.00
							TOTAL:	$145,518.34

Section 16

Energy Incentives Evaluation

ENERGY INCENTIVES EVALUATION

As part of this audit, Wendel also performed an evaluation of potential incentives or grant monies that could aid in funding the installation of the recommended measures. Through this process, it was determined that this project is not eligible for incentives through Public Energy Solutions, a Consolidated Edison DSM Contractor.

Appendix

Utility Data

Project Name: Village of Irvington - Ballfield
Project Address: Irvington, NY

Facility Area: sq.ft.

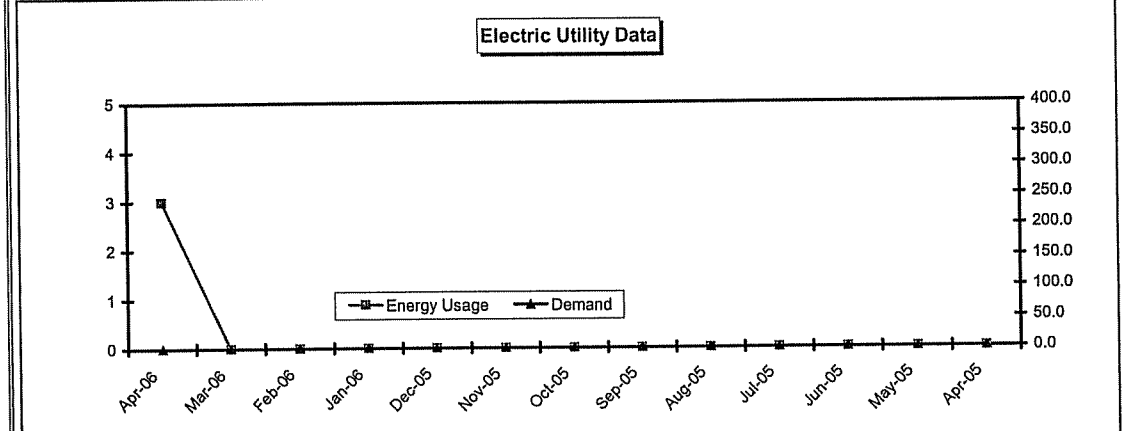
Utility Company: NYPA
Acct. No.: 59 0906 0663 0201 3
Meter # 7162346
Rate: 11-1 C-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kwh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
04/07/06	0.0	$0	3	$3	$3	30	720	NA
03/08/06	0.0	$0	0	$0	$0	29	696	NA
02/07/06	0.0	$0	0	$0	$0	32	768	NA
01/06/06	0.0	$0	0	$0	$0	24	576	NA
12/13/05	0.0	$0	0	$0	$0	36	864	NA
11/07/05	0.0	$0	0	$0	$0	32	768	NA
10/06/05	0.0	$0	0	$0	$0	28	672	NA
09/08/05	0.0	$0	0	$0	$0	23	552	NA
08/16/05	0.0	$0	0	$0	$0	40	960	NA
07/07/05	0.0	$0	0	$0	$0	30	720	NA
06/07/05	0.0	$0	0	$0	$0	28	672	NA
05/10/05	0.0	$0	0	$0	$0	34	816	NA
04/06/05	0.0	$0	0	$0	$0	30	720	NA
Year Total	**0.0**	**$0**	**3**	**$3**	**$3**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**N/A**	**Avg. Cost/kWh:**	**$1.003**
Blended Cost (inc.demand)/kWh:	**$1.003**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - N Broadway Lot
Project Address: Irvington, NY

Utility Company: NYPA
Acct. No.: 59 0906 0663 0800 2
Meter # 713140
Rate: 11-1 C-1
Date: 3/4/2008

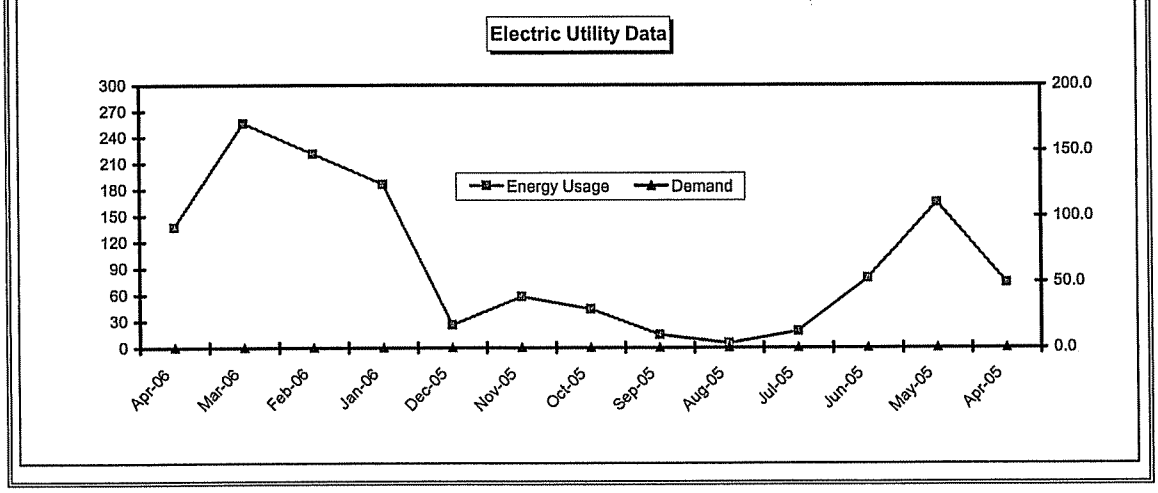
Facility Area: sq.ft.

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
04/07/06	0.0	$0	137	$30	$30	30	720	NA
03/08/06	0.0	$0	256	$48	$48	29	696	NA
02/07/06	0.0	$0	221	$43	$43	32	768	NA
01/06/06	0.0	$0	186	$37	$37	24	576	NA
12/13/05	0.0	$0	26	$13	$13	36	864	NA
11/07/05	0.0	$0	58	$17	$17	32	768	NA
10/06/05	0.0	$0	44	$15	$15	28	672	NA
09/08/05	0.0	$0	15	$11	$11	23	552	NA
08/16/05	0.0	$0	5	$5	$5	40	960	NA
07/07/05	0.0	$0	19	$11	$11	30	720	NA
06/07/05	0.0	$0	79	$20	$20	28	672	NA
05/10/05	0.0	$0	165	$33	$33	34	816	NA
04/06/05	0.0	$0	74	$19	$19	30	720	NA
Year Total	**0.0**	**$0**	**1,285**	**$301**	**$301**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**N/A**	**Avg. Cost/kWh:**	**$0.235**
Blended Cost (inc.demand)/kWh:	**$0.235**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Chemical Plant
Project Address: Hermite Rd
Irvington, NY
Building Name: Chemical Plant
Facility Area: sq.ft.

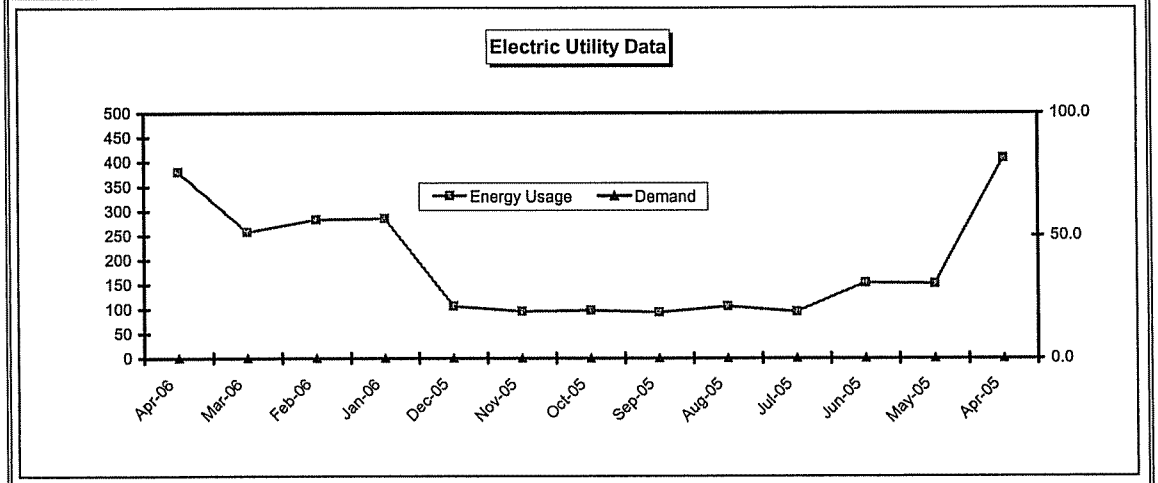
Utility Company: NYPA
Acct. No.: 59 090606 0663 0900 0
Meter # 5553140
Rate: 11-1 C-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
04/07/06	0.0	$0	380	$67	$67	30	720	NA
03/08/06	0.0	$0	258	$48	$48	29	696	NA
02/07/06	0.0	$0	283	$52	$52	32	768	NA
01/06/06	0.0	$0	285	$52	$52	24	576	NA
12/13/05	0.0	$0	106	$25	$25	36	864	NA
11/07/05	0.0	$0	96	$23	$23	32	768	NA
10/06/05	0.0	$0	98	$23	$23	28	672	NA
09/08/05	0.0	$0	94	$23	$23	23	552	NA
08/16/05	0.0	$0	106	$25	$25	40	960	NA
07/07/05	0.0	$0	95	$23	$23	30	720	NA
06/07/05	0.0	$0	154	$32	$32	28	672	NA
05/10/05	0.0	$0	152	$31	$31	34	816	NA
04/06/05	0.0	$0	408	$67	$67	30	720	NA
Year Total	**0.0**	**$0**	**2,515**	**$491**	**$491**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**N/A**	**Avg. Cost/kWh:**	**$0.195**
Blended Cost (inc.demand)/kWh:	**$0.195**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Warehouse
Project Address: 8 Astor St
Irvington, NY

Facility Area: 1,287 sq.ft.

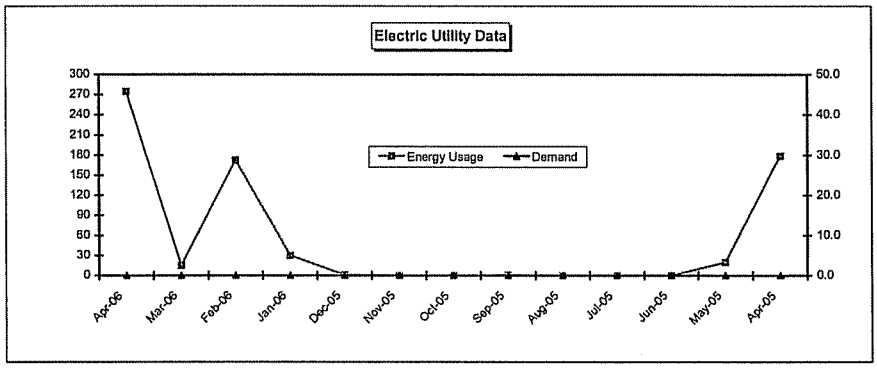
Utility Company: NYPA
Acct. No.: 59 0906 0663 1101 4
Meter # 6460965
Rate: 11-1 C-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A			B	C			D	E	F		
Billing Date	Demand Total (kW)	Demand Cost	Demand Cost Delivery	Total Demand Cost	Usage	Usage Production	Usage Delivery	Total Usage Cost	Total Cost	Billing Days	Hours per month	Load
2005-2006												
04/07/06	0.0	$0.00	$0.00	$0	275	$23.44	$32.49	$55.93	$56	30	720	NA
03/08/06	0.0	$0.00	$0.00	$0	15	$1.28	$9.80	$11.08	$11	30	720	NA
02/07/06	0.0	$0.00	$0.00	$0	173	$14.75	$33.17	$47.92	$48	32	768	NA
01/06/06	0.0	$0.00	$0.00	$0	30	$2.56	$11.64	$14.20	$14	32	768	NA
12/13/05	0.0	$0.00	$0.00	$0	1	$0.09	$0.94	$1.03	$1	31	744	NA
11/07/05	0.0	$0.00	$0.00	$0	0	$0.00	$0.00	$0.00	$0	29	696	NA
10/06/05	0.0	$0.00	$0.00	$0	0	$0.00	$0.00	$0.00	$0	30	720	NA
09/08/05	0.0	$0.00	$0.00	$0	1	$0.09	$0.95	$1.04	$1	29	696	NA
08/16/05	0.0	$0.00	$0.00	$0	0	$0.00	$0.00	$0.00	$0	32	768	NA
07/07/05	0.0	$0.00	$0.00	$0	0	$0.00	$0.00	$0.00	$0	30	720	NA
06/07/05	0.0	$0.00	$0.00	$0	0	$0.00	$0.00	$0.00	$0	29	696	NA
05/10/05	0.0	$0.00	$0.00	$0	20	$1.70	$9.99	$11.69	$12	31	744	NA
04/06/05	0.0	$0.00	$0.00	$0	179	$15.26	$21.95	$37.21	$37	32	768	NA
Year Total	**0.0**	**$0**	**$0**	**$0**	**694**	**$59**	**$121**	**$180**	**$180**		**9,528**	

Annual Energy Intensity (kWh/sq.ft.):	**0.54**	**Avg. Cost/kWh:**	**$0.259**
Blended Cost (inc.demand)/kWh:	**$0.259**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Road Tank
Project Address: 29 Riverview
Irvington, NY

Facility Area: 5,000 sq.ft.

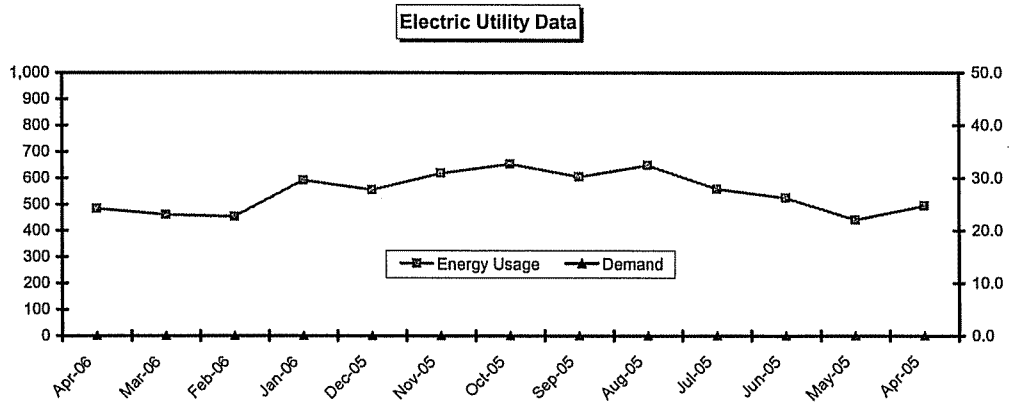
Utility Company: NYPA
Acct. No.: 59 0906 1200 4
Meter # 6914691
Rate: 11-1 C-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
2004-2006								
04/07/06	0.0	$0	484	$83	$83	30	720	NA
03/08/06	0.0	$0	461	$79	$79	29	696	NA
02/07/06	0.0	$0	454	$78	$78	32	768	NA
01/06/06	0.0	$0	591	$99	$99	24	576	NA
12/13/05	0.0	$0	555	$93	$93	36	864	NA
11/07/05	0.0	$0	618	$102	$102	32	768	NA
10/06/05	0.0	$0	652	$107	$107	28	672	NA
09/08/05	0.0	$0	604	$100	$100	23	552	NA
08/16/05	0.0	$0	648	$107	$107	40	960	NA
07/07/05	0.0	$0	558	$93	$93	30	720	NA
06/07/05	0.0	$0	525	$88	$88	28	672	NA
05/10/05	0.0	$0	441	$73	$73	34	816	NA
04/06/05	0.0	$0	495	$80	$80	30	720	NA
Year Total	**0.0**	**$0**	**7,086**	**$1,183**	**$1,183**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**1.417**	**Avg. Cost/kWh:**	**$0.167**
Blended Cost (inc.demand)/kWh:	**$0.167**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - S Br Lot
Project Address: Irvington, NY

Facility Area: sq.ft.

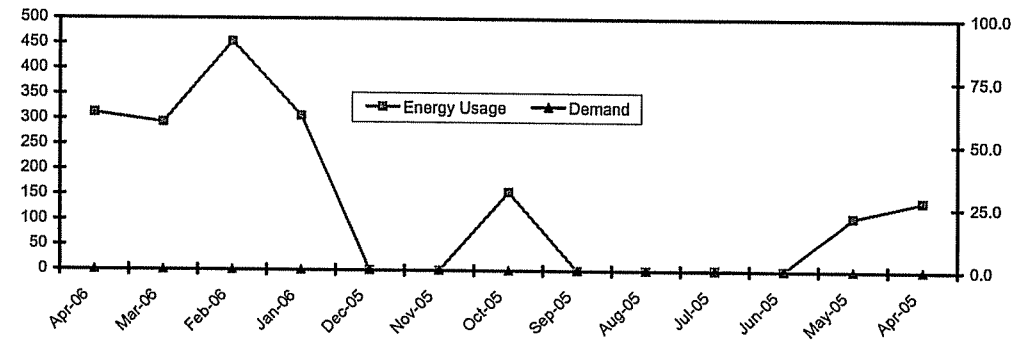
Utility Company: NYPA
Acct. No.: 59 0906 0663 2001 5
Meter # 6018629
Rate: 11-1 C-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
04/07/06	0.0	$0	312	$57	$57	30	720	NA
03/08/06	0.0	$0	293	$53	$53	29	696	NA
02/07/06	0.0	$0	453	$78	$78	32	768	NA
01/06/06	0.0	$0	306	$55	$55	24	576	NA
12/13/05	0.0	$0	0	$0	$0	36	864	NA
11/07/05	0.0	$0	0	$0	$0	32	768	NA
10/06/05	0.0	$0	156	$32	$32	28	672	NA
09/08/05	0.0	$0	0	$0	$0	23	552	NA
08/16/05	0.0	$0	0	$0	$0	40	960	NA
07/07/05	0.0	$0	1	$1	$1	30	720	NA
06/07/05	0.0	$0	0	$0	$0	28	672	NA
05/10/05	0.0	$0	107	$24	$24	34	816	NA
04/06/05	0.0	$0	138	$28	$28	30	720	NA
Year Total	**0.0**	**$0**	**1,766**	**$329**	**$329**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**N/A**	**Avg. Cost/kWh:**	**$0.186**
Blended Cost (inc.demand)/kWh:	**$0.186**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Beach
Project Address: Mathiessen Beach
Irvington, NY

Facility Area: sq.ft.

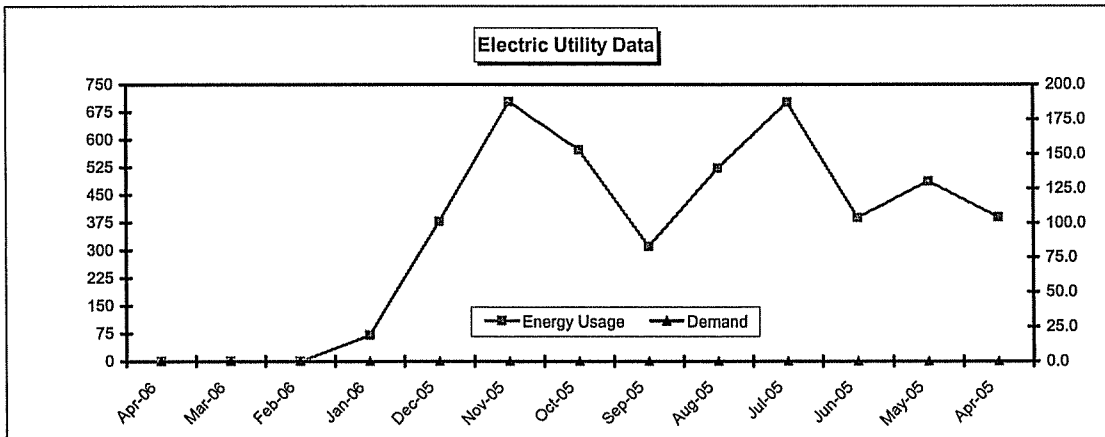
Utility Company: NYPA
Acct. No.: 59 0906 0663 2200 3
Meter # 5915995
Rate: 11-1 C-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
2004-2006								
04/07/06	0.0	$0	0	$0	$0	30	720	NA
03/08/06	0.0	$0	0	$0	$0	29	696	NA
02/07/06	0.0	$0	0	$0	$0	32	768	NA
01/06/06	0.0	$0	71	$20	$20	24	576	NA
12/13/05	0.0	$0	378	$66	$66	36	864	NA
11/07/05	0.0	$0	703	$115	$115	32	768	NA
10/06/05	0.0	$0	573	$95	$95	28	672	NA
09/08/05	0.0	$0	310	$55	$55	23	552	NA
08/16/05	0.0	$0	523	$88	$88	40	960	NA
07/07/05	0.0	$0	702	$115	$115	30	720	NA
06/07/05	0.0	$0	388	$67	$67	28	672	NA
05/10/05	0.0	$0	487	$80	$80	34	816	NA
04/06/05	0.0	$0	390	$65	$65	30	720	NA
Year Total	**0.0**	**$0**	**4,135**	**$702**	**$702**		**8,784**	

Annual Energy Intensity (kWh/sq.ft.):	**N/A**	**Avg. Cost/kWh:**	**$0.170**
Blended Cost (inc.demand)/kWh:	**$0.170**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Harriman Road Pump
Project Address: Irvington, NY

Utility Company: NYPA
Acct. No.: 59 0906 0663 3000 6
Meter # 4886880
Rate: 11-1 C-1
Date: 3/4/2008

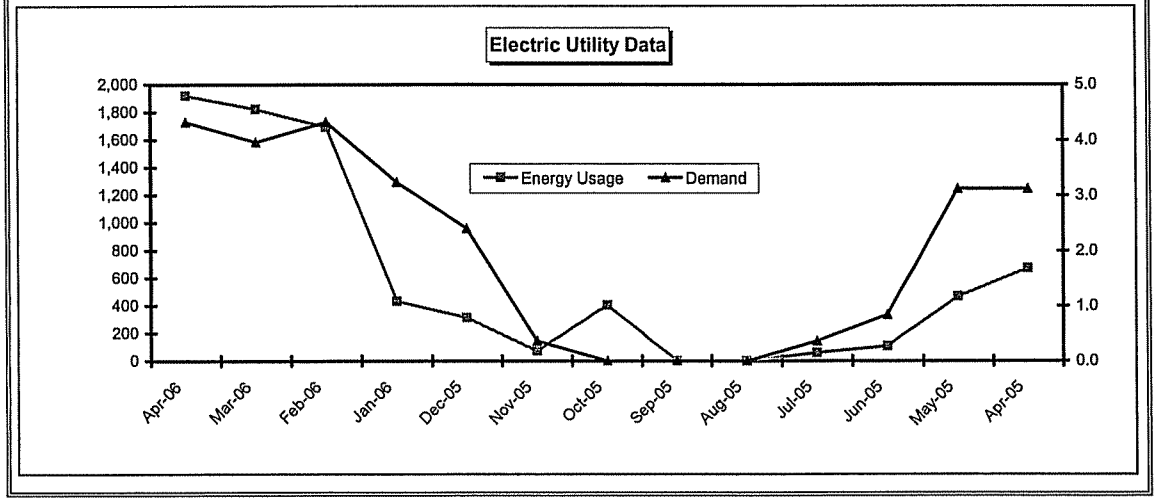
Facility Area: sq.ft.

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
2005-2006								
04/07/06	4.3	$0	1,920	$290	$290	30	720	0.62
03/08/06	4.0	$0	1,824	$275	$275	29	696	0.66
02/07/06	4.3	$0	1,692	$256	$256	32	768	0.51
01/06/06	3.2	$0	432	$75	$75	24	576	0.23
12/13/05	2.4	$0	312	$56	$56	36	864	0.15
11/07/05	0.4	$0	72	$19	$19	32	768	0.26
10/06/05	0.0	$0	405	$70	$70	28	672	NA
09/08/05	0.0	$0	0	$0	$0	23	552	NA
08/16/05	0.0	$0	0	$0	$0	40	960	NA
07/07/05	0.4	$0	60	$18	$18	30	720	0.23
06/07/05	0.8	$0	108	$25	$25	28	672	0.19
05/10/05	3.1	$0	468	$77	$77	34	816	0.18
04/06/05	3.1	$0	672	$106	$106	30	720	0.30
Year Total	**26.0**	**$0**	**7,965**	**$1,267**	**$1,267**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**N/A**	**Avg. Cost/kWh:**	**$0.159**
Blended Cost (inc.demand)/kWh:	**$0.159**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Peter Bont Road Pump
Project Address: Irvington, NY

Utility Company: NYPA
Acct. No.: 59 0906 0663 8900 2
Meter # 6375291
Rate: 11-1 C-1
Date: 3/4/2008

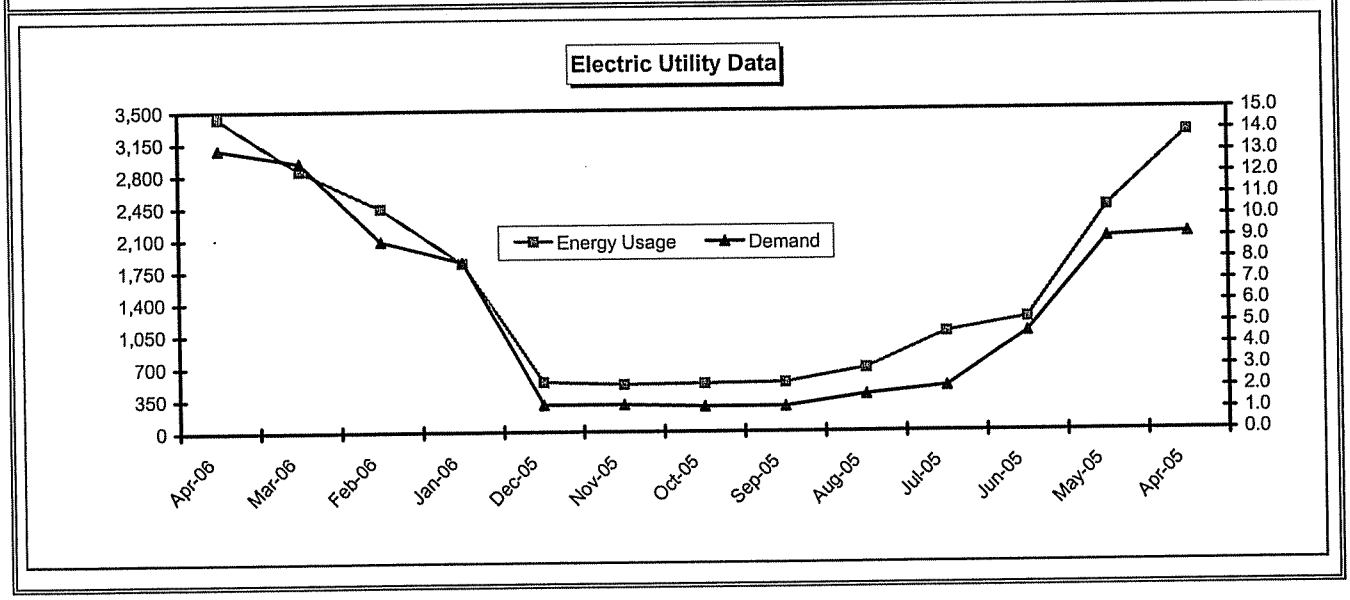
Facility Area: sq.ft.

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
2005-2006								
04/07/06	13.2	$0	3,429	$501	$501	30	720	0.36
03/08/06	12.6	$0	2,853	$419	$419	29	696	0.33
02/07/06	8.9	$0	2,439	$360	$360	32	768	0.36
01/06/06	7.9	$0	1,836	$276	$276	24	576	0.40
12/13/05	1.3	$0	540	$91	$91	36	864	0.50
11/07/05	1.3	$0	513	$86	$86	32	768	0.53
10/06/05	1.2	$0	522	$88	$88	28	672	0.66
09/08/05	1.2	$0	531	$89	$89	23	552	0.82
08/16/05	1.7	$0	684	$113	$113	40	960	0.42
07/07/05	2.1	$0	1,071	$169	$169	30	720	0.72
06/07/05	4.6	$0	1,224	$189	$189	28	672	0.40
05/10/05	9.0	$0	2,439	$349	$349	34	816	0.33
04/06/05	9.2	$0	3,249	$452	$452	30	720	0.49
Year Total	**74.1**	**$0**	**21,330**	**$3,180**	**$3,180**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**N/A**	**Avg. Cost/kWh:**	**$0.149**
Blended Cost (inc.demand)/kWh:	**$0.149**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Station Pump
Project Address: Irvington, NY

Facility Area: 2,300 sq.ft.

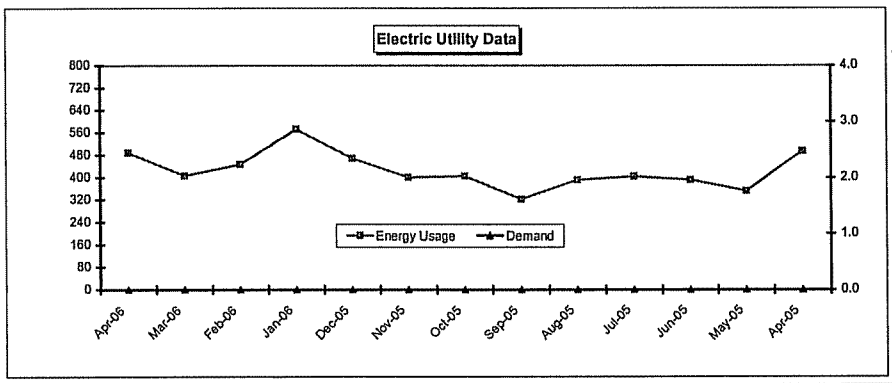
Utility Company: NYPA
Acct. No.: 59 0906 0663 9200 6
Meter # 5067258
Rate: 11-1 C-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A			B	C			D	E	F		
Billing Date	Demand Total (kW)	Demand Cost	Demand Cos Delivery	Total Demand Cost	Usage	Usage Production	Usage Delivery	Total Usage Cost	Total Cost	Billing Days	Hours per month	Load
2005-2006												
04/07/06	0.0	$0.00	$0.00	$0	489	$41.68	$50.70	$92.38	$92	30	720	NA
03/08/06	0.0	$0.00	$0.00	$0	406	$34.61	$43.07	$77.68	$78	29	696	NA
02/07/06	0.0	$0.00	$0.00	$0	447	$38.10	$47.13	$85.23	$85	32	768	NA
01/06/06	0.0	$0.00	$0.00	$0	573	$48.84	$57.85	$106.69	$107	24	576	NA
12/13/05	0.0	$0.00	$0.00	$0	468	$39.89	$48.64	$88.53	$89	36	864	NA
11/07/05	0.0	$0.00	$0.00	$0	401	$34.18	$42.37	$76.55	$77	32	768	NA
10/06/05	0.0	$0.00	$0.00	$0	405	$34.52	$42.99	$77.51	$78	28	672	NA
09/08/05	0.0	$0.00	$0.00	$0	322	$27.45	$35.64	$63.09	$63	23	552	NA
08/16/05	0.0	$0.00	$0.00	$0	392	$33.41	$42.45	$75.86	$76	40	960	NA
07/07/05	0.0	$0.00	$0.00	$0	404	$34.44	$42.90	$77.34	$77	30	720	NA
06/07/05	0.0	$0.00	$0.00	$0	391	$33.33	$41.51	$74.84	$75	28	672	NA
05/10/05	0.0	$0.00	$0.00	$0	352	$30.00	$36.86	$66.86	$67	34	816	NA
04/06/05	0.0	$0.00	$0.00	$0	495	$42.19	$46.79	$88.98	$89	30	720	NA
Year Total	**0.0**	**$0**	**$0**	**$0**	**5,545**	**$473**	**$579**	**$1,052**	**$1,052**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**2.41**	**Avg. Cost/kWh:**	**$0.190**
Blended Cost (Inc.demand)/kWh:	**$0.190**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Hudson Aven Pump
Project Address: Irvington, NY

Facility Area: 150 sq.ft.

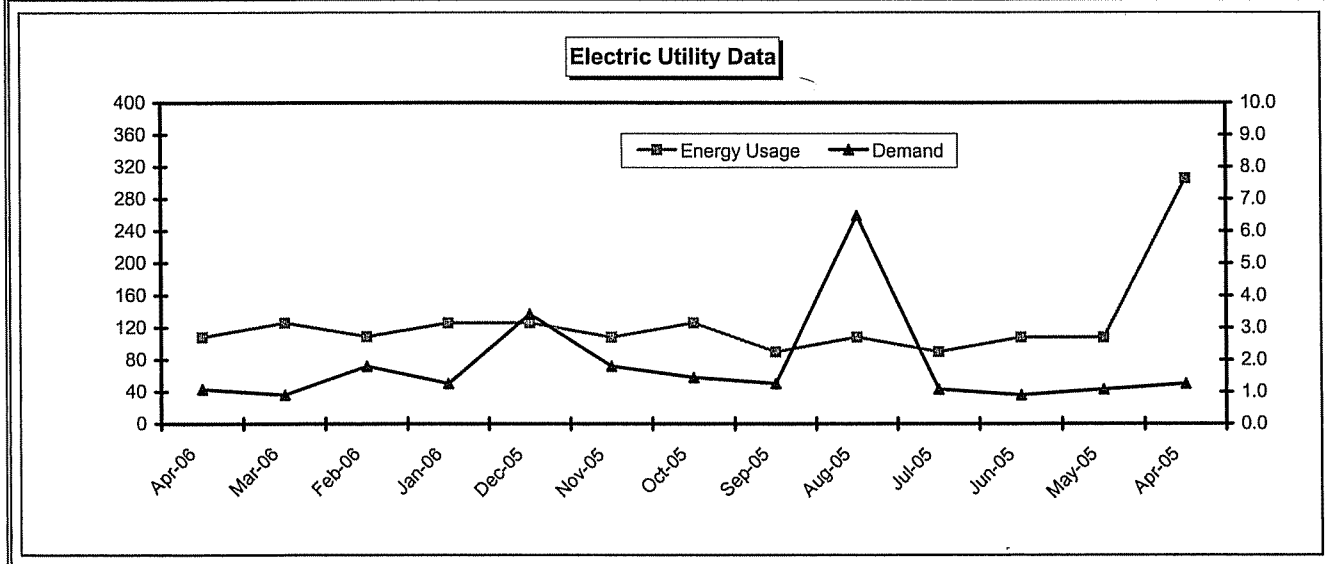
Utility Company: NYPA
Acct. No.: 59 0906 0663 9300 4
Meter # 6646955
Rate: 11-1 C-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
2005-2006								
04/07/06	1.1	$0	108	$26	$26	30	720	0.14
03/08/06	0.9	$0	126	$28	$28	29	696	0.20
02/07/06	1.8	$0	109	$26	$26	32	768	0.08
01/06/06	1.3	$0	126	$96	$96	24	576	0.17
12/13/05	3.4	$0	126	$28	$28	36	864	0.04
11/07/05	1.8	$0	108	$25	$25	32	768	0.08
10/06/05	1.4	$0	126	$28	$28	28	672	0.13
09/08/05	1.3	$0	90	$22	$22	23	552	0.13
08/16/05	6.5	$0	108	$25	$25	40	960	0.02
07/07/05	1.1	$0	90	$22	$22	30	720	0.12
06/07/05	0.9	$0	108	$25	$25	28	672	0.18
05/10/05	1.1	$0	108	$24	$24	34	816	0.12
04/06/05	1.3	$0	306	$53	$53	30	720	0.34
Year Total	**23.8**	**$0**	**1,639**	**$426**	**$426**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**11**	**Avg. Cost/kWh:**	**$0.260**
Blended Cost (inc.demand)/kWh:	**$0.260**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Riverview Road Pump
Project Address: Irvington, NY

Facility Area: sq.ft.

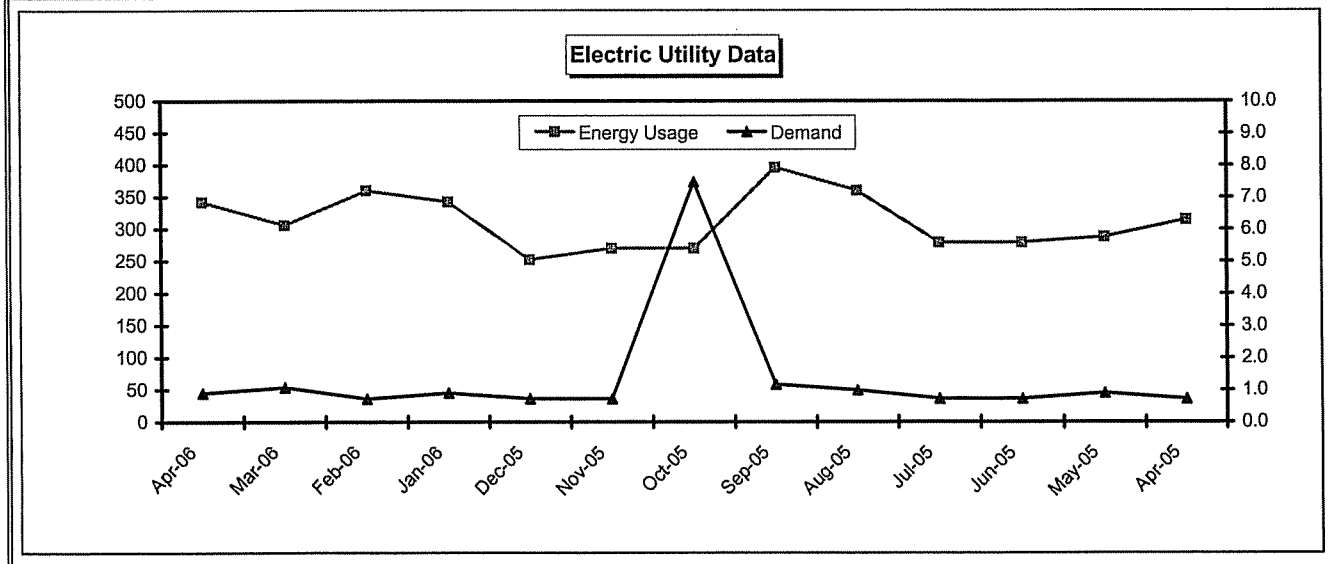
Utility Company: NYPA
Acct. No.: 59 0906 0663 9300 4
Meter # 6646955
Rate: 11-1 C-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
2005-2006								
04/07/06	0.9	$0	342	$61	$61	30	720	0.53
03/08/06	1.1	$0	306	$55	$55	29	696	0.41
02/07/06	0.7	$0	360	$64	$64	32	768	0.65
01/06/06	0.9	$0	342	$61	$61	24	576	0.66
12/13/05	0.7	$0	252	$47	$47	36	864	0.41
11/07/05	0.7	$0	270	$49	$49	32	768	0.49
10/06/05	7.5	$0	270	$49	$49	28	672	0.05
09/08/05	1.2	$0	396	$68	$68	23	552	0.61
08/16/05	1.0	$9	360	$55	$64	40	960	0.38
07/07/05	0.7	$0	279	$51	$51	30	720	0.54
06/07/05	0.7	$0	279	$51	$51	28	672	0.58
05/10/05	0.9	$0	288	$51	$51	34	816	0.39
04/06/05	0.7	$0	315	$54	$54	30	720	0.61
Year Total	**17.7**	**$9**	**4,059**	**$716**	**$725**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**N/A**	**Avg. Cost/kWh:**	**$0.176**
Blended Cost (inc.demand)/kWh:	**$0.179**	**Avg. Cost/kW:**	**$0.50**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington
Project Address: 1 S Bway Pklt
Irvington, NY

Facility Area: sq.ft.

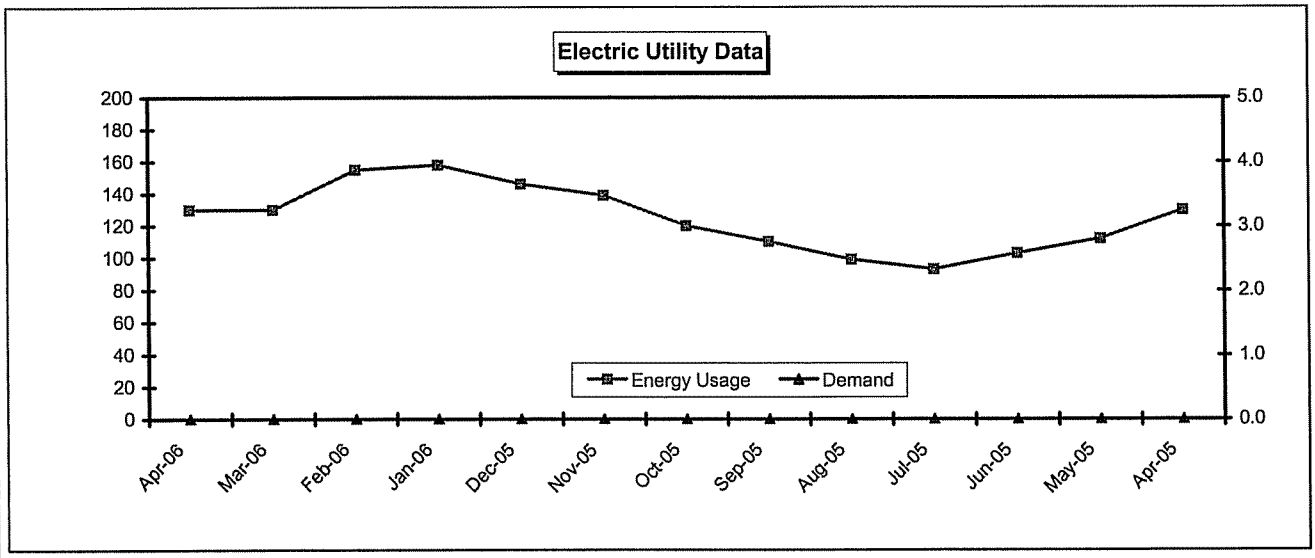
Utility Company: NYPA
Acct. No.: 59 9019 1963 1000 4
Meter # 0
Rate: 11-1 C-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
2005-2006								
04/07/06	0.0	$0	130	$29	$29	30	720	NA
03/08/06	0.0	$0	130	$28	$28	29	696	NA
02/07/06	0.0	$0	155	$33	$33	32	768	NA
01/06/06	0.0	$0	158	$32	$32	24	576	NA
12/13/05	0.0	$0	146	$32	$32	36	864	NA
11/07/05	0.0	$0	139	$29	$29	32	768	NA
10/06/05	0.0	$0	120	$27	$27	28	672	NA
09/08/05	0.0	$0	110	$25	$25	23	552	NA
08/16/05	0.0	$0	99	$24	$24	40	960	NA
07/07/05	0.0	$0	93	$22	$22	30	720	NA
06/07/05	0.0	$0	103	$24	$24	28	672	NA
05/10/05	0.0	$0	112	$26	$26	34	816	NA
04/06/05	0.0	$0	130	$27	$27	30	720	NA
Year Total	**0.0**	**$0**	**1,625**	**$358**	**$358**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**N/A**	**Avg. Cost/kWh:**	**$0.220**
Blended Cost (inc.demand)/kWh:	**$0.220**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Astor St Pkl
Project Address: Irvington, NY

Facility Area: sq.ft.

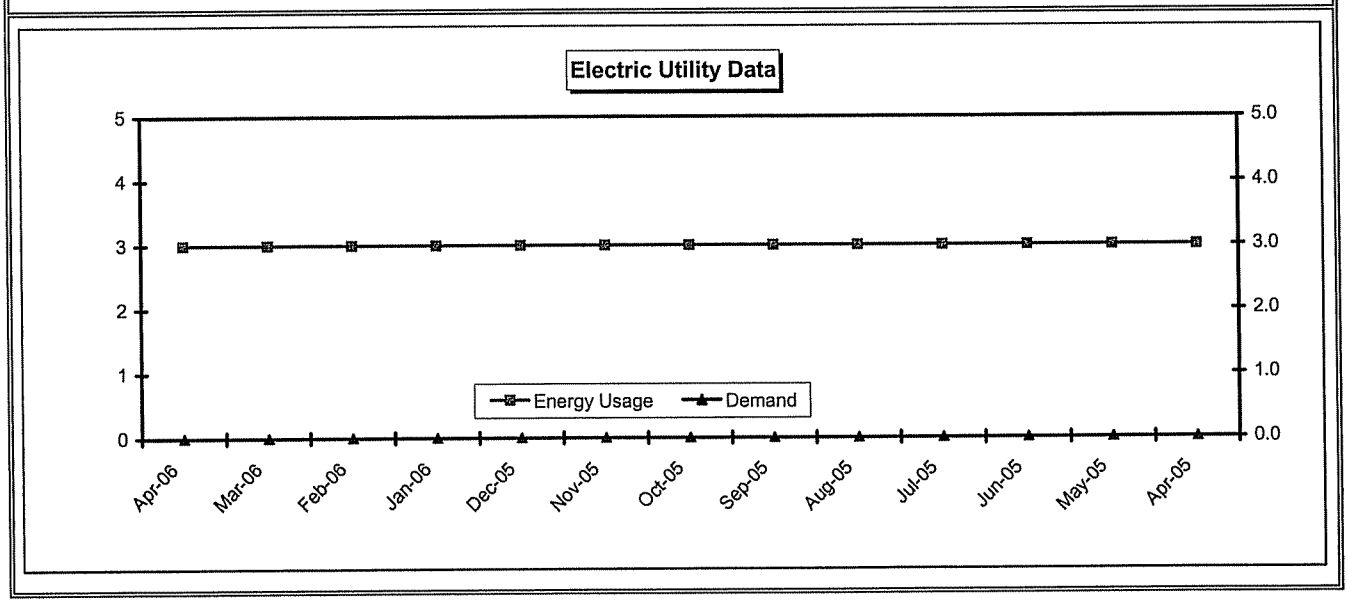
Utility Company: NYPA
Acct. No.: 59 9068 1963 0101 8
Meter # 0
Rate: 11-1 C-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
2005-2006								
04/07/06	0.0	$0	3	$3	$3	30	720	NA
03/08/06	0.0	$0	3	$3	$3	29	696	NA
02/07/06	0.0	$0	3	$3	$3	32	768	NA
01/06/06	0.0	$0	3	$3	$3	24	576	NA
12/13/05	0.0	$0	3	$3	$3	36	864	NA
11/07/05	0.0	$0	3	$3	$3	32	768	NA
10/06/05	0.0	$0	3	$3	$3	28	672	NA
09/08/05	0.0	$0	3	$3	$3	23	552	NA
08/16/05	0.0	$0	3	$3	$3	40	960	NA
07/07/05	0.0	$0	3	$3	$3	30	720	NA
06/07/05	0.0	$0	3	$3	$3	28	672	NA
05/10/05	0.0	$0	3	$3	$3	34	816	NA
04/06/05	0.0	$0	3	$3	$3	30	720	NA
Year Total	**0.0**	**$0**	**39**	**$39**	**$39**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**N/A**	**Avg. Cost/kWh:**	**$0.999**
Blended Cost (inc.demand)/kWh:	**$0.999**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Astor St. Garage
Project Address: 4 Astor St.
Irvington, NY

Facility Area: 2,000 sq.ft.

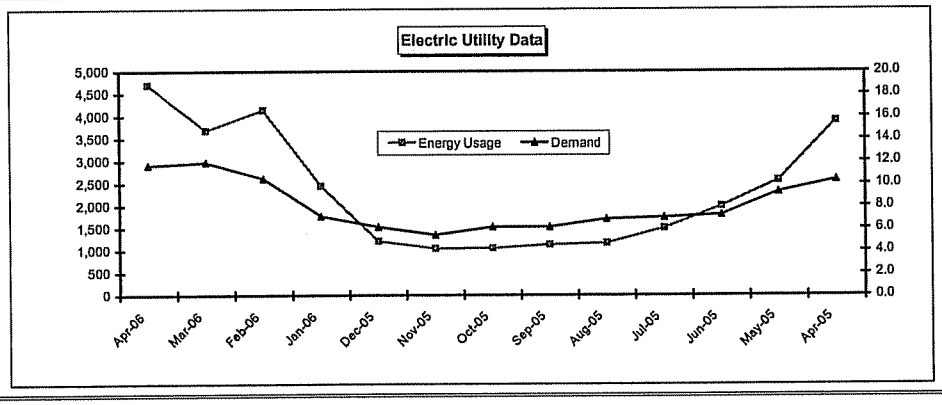
Utility Company: NYPA
Acct. No.: 59 0906 0663 1000 8
Meter # 6027703
Rate: 11-2 H-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A			B	C			D	E	F		
Billing Date	Demand Total (kW)	Demand Cost	Demand Cost Delivery	Total Demand Cost	Usage	Usage Production	Usage Delivery	Total Usage Cost	Total Cost	Billing Days	Hours per month	Load
2005-2006												
04/07/06	11.6	$98.24	$182.39	$281	4,704	$223.63	$0.19	$223.82	$504	30	720	0.56
03/08/06	11.9	$100.27	$174.52	$275	3,684	$175.14	$0.18	$175.32	$450	29	696	0.45
02/07/06	10.4	$88.11	$163.59	$252	4,140	$196.82	$0.22	$197.03	$449	32	768	0.52
01/06/06	7.1	$59.76	$110.94	$171	2,448	$116.38	$0.15	$116.53	$287	24	576	0.60
12/13/05	6.1	$51.65	$92.90	$145	1,212	$57.62	$0.12	$57.74	$202	36	864	0.23
11/07/05	5.4	$45.58	$76.68	$122	1,044	$49.63	$0.10	$49.73	$172	32	768	0.25
10/06/05	6.1	$51.65	$89.90	$142	1,056	$50.20	$0.12	$50.32	$192	28	672	0.26
09/08/05	6.1	$51.65	$86.91	$139	1,128	$53.63	$0.12	$53.74	$192	23	552	0.33
08/16/05	6.8	$57.73	$107.18	$165	1,164	$55.34	$0.14	$55.48	$220	40	960	0.18
07/07/05	7.0	$58.74	$102.24	$161	1,500	$71.31	$0.14	$71.45	$232	30	720	0.30
06/07/05	7.2	$60.77	$102.24	$163	1,992	$94.70	$0.14	$94.84	$258	28	672	0.41
05/10/05	9.2	$77.99	$133.42	$211	2,568	$122.08	$0.18	$122.26	$334	34	816	0.34
04/06/05	10.3	$87.10	$140.15	$227	3,888	$184.84	$1.41	$186.24	$413	30	720	0.52
Year Total	**105.4**	**$889**	**$1,563**	**$2,452**	**30,528**	**$1,451**	**$3**	**$1,455**	**$3,907**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**15.26**	**Avg. Cost/kWh:**	**$0.048**
Blended Cost (inc.demand)/kWh:	**$0.128**	**Avg. Cost/kW:**	**$23.28**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Library
Project Address: 2 Main St.
Irvington, NY

Facility Area: 18,408 sq.ft.

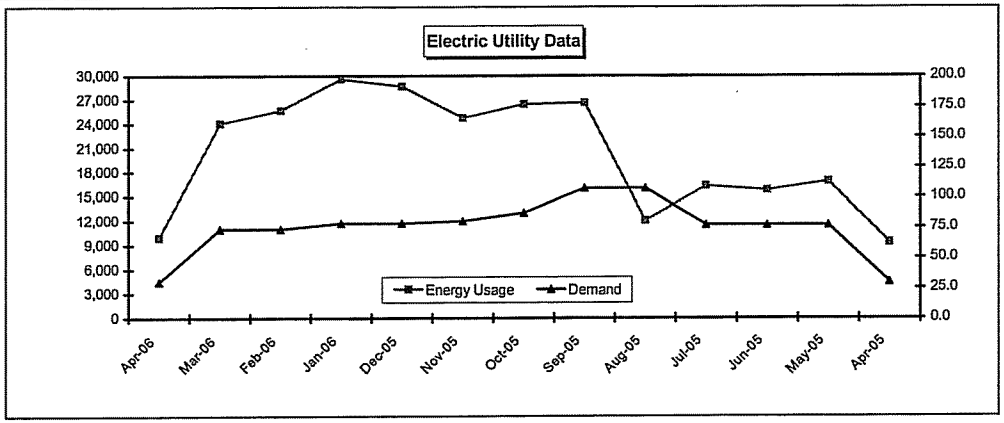
Utility Company: NYPA
Acct. No.: 59 0906 0663 1301 0
Meter # 6621436
Rate: 11-2 H-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A			B	C			D	E	F		
Billing Date	Demand Total (kW)	Demand Cost	Demand Cost Delivery	Total Demand Cost	Usage	Usage Production	Usage Delivery	Total Usage Cost	Total Cost	Billing Days	Hours per month	Load
2005-2006												
04/07/06	30.0	$253.20	$470.08	$723	9,960	$473.50	$0.50	$473.99	$1,197	30	720	0.46
03/08/06	73.2	$617.81	$1,075.31	$1,693	24,080	$1,144.76	$1.13	$1,145.90	$2,839	29	696	0.47
02/07/06	73.2	$617.81	$1,147.00	$1,765	25,720	$1,222.73	$1.53	$1,224.25	$2,989	32	768	0.46
01/06/06	78.0	$658.32	$1,222.21	$1,881	29,600	$1,407.18	$1.63	$1,408.81	$3,289	24	576	0.66
12/13/05	78.0	$658.32	$1,184.01	$1,842	28,680	$1,363.45	$1.57	$1,365.02	$3,207	36	864	0.43
11/07/05	80.0	$675.20	$1,136.03	$1,811	24,760	$1,177.09	$1.51	$1,178.60	$2,990	32	768	0.40
10/06/05	86.8	$732.59	$1,275.09	$2,008	26,480	$1,258.86	$1.70	$1,260.56	$3,268	28	672	0.45
09/08/05	106.8	$901.39	$1,516.60	$2,418	26,680	$1,268.37	$2.02	$1,270.38	$3,688	23	552	0.45
08/16/05	106.8	$901.39	$1,673.48	$2,575	12,040	$572.38	$2.23	$574.61	$3,149	40	960	0.12
07/07/05	76.8	$648.19	$1,128.19	$1,776	16,320	$775.85	$1.50	$777.35	$2,554	30	720	0.30
06/07/05	76.8	$648.19	$1,090.59	$1,739	15,800	$751.13	$1.45	$752.58	$2,491	28	672	0.31
05/10/05	76.8	$648.19	$1,108.97	$1,757	16,880	$802.48	$1.47	$803.95	$2,561	34	816	0.27
04/06/05	30.0	$253.20	$407.40	$661	9,360	$444.97	$4.08	$449.06	$1,110	30	720	0.43
Year Total	**973.2**	**$8,214**	**$14,435**	**$22,649**	**266,360**	**$12,663**	**$22**	**$12,685**	**$35,334**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**14.47**	**Avg. Cost/kWh:**	**$0.048**
Blended Cost (inc.demand)/kWh:	**$0.133**	**Avg. Cost/kW:**	**$23.27**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Lane Park
Project Address: Irvington, NY

Facility Area: sq.ft.

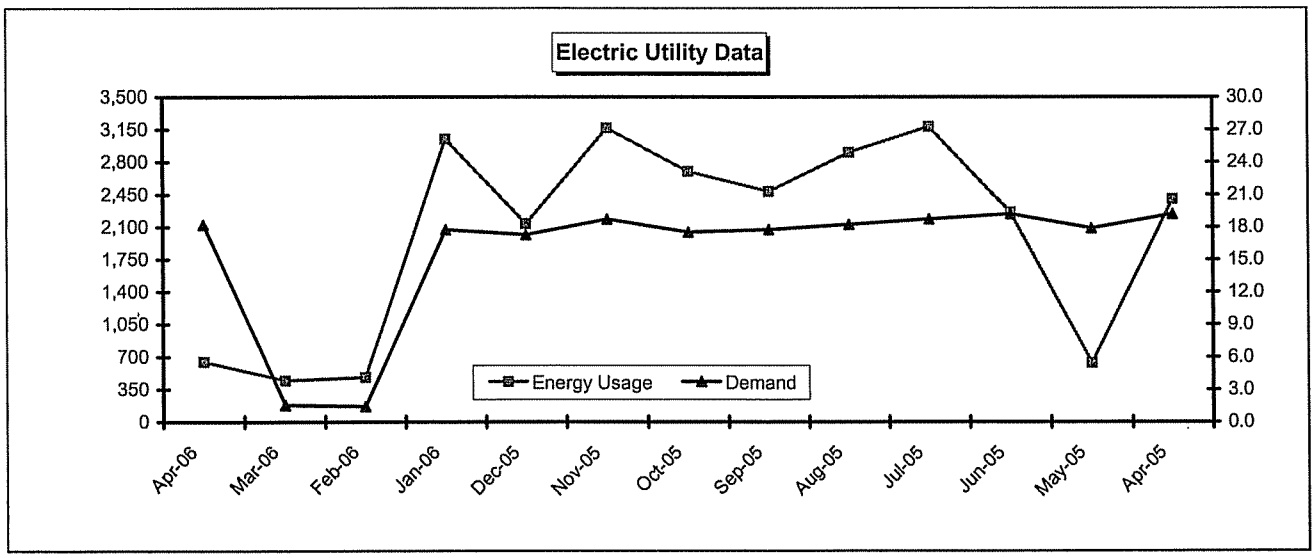
Utility Company: NYPA
Acct. No.: 59 0906 0663 3600 3
Meter # 3639725
Rate: 11-2 H-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
2005-2006								
04/07/06	18.2	$408	648	$25	$433	30	720	0.05
03/08/06	1.6	$33	444	$17	$50	29	696	0.41
02/07/06	1.4	$32	480	$18	$50	32	768	0.43
01/06/06	17.8	$395	3,048	$113	$508	24	576	0.30
12/13/05	17.3	$375	2,136	$80	$455	36	864	0.14
11/07/05	18.7	$388	3,168	$118	$506	32	768	0.22
10/06/05	17.5	$372	2,700	$100	$473	28	672	0.23
09/08/05	17.8	$369	2,484	$92	$461	23	552	0.25
08/16/05	18.2	$405	2,904	$108	$513	40	960	0.17
07/07/05	18.7	$398	3,180	$118	$516	30	720	0.24
06/07/05	19.2	$398	2,256	$84	$482	28	672	0.17
05/10/05	17.9	$375	636	$24	$399	34	816	0.04
04/06/05	19.2	$403	2,400	$89	$492	30	720	0.17
Year Total	**203.5**	**$4,353**	**26,484**	**$986**	**$5,339**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**N/A**	**Avg. Cost/kWh:**	**$0.037**
Blended Cost (inc.demand)/kWh:	**$0.202**	**Avg. Cost/kW:**	**$21.39**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Town Hall
Project Address: 85 Main St
Irvington, NY

Facility Area: 19,488 sq.ft.

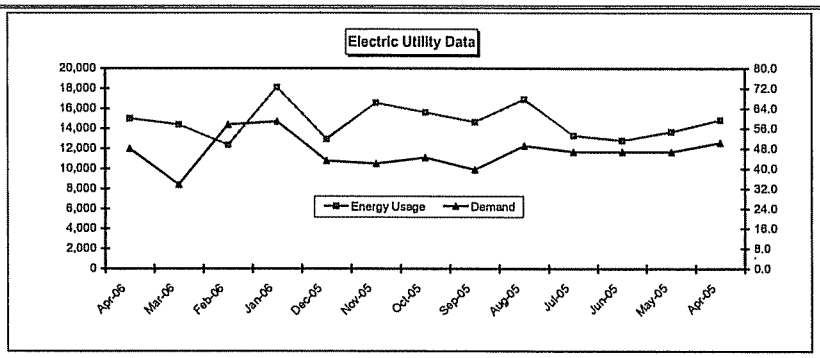
Utility Company: NYPA
Acct. No.: 59 0906 0663 4300 9
Meter # 5649084
Rate: 11-2 H-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A			B	C			D	E	F		
Billing Date	Demand Total (kW)	Demand Cost	Demand Cos Delivery	Total Demand Cost	Usage	Usage Production	Usage Delivery	Total Usage Cost	Total Cost	Billing Days	Hours per month	Load
2005-2006												
04/07/06	48.0	$405.12	$752.13	$1,157	15,000	$713.10	$0.79	$713.89	$1,871	30	720	0.43
03/08/06	33.6	$283.58	$493.58	$777	14,400	$684.58	$0.52	$685.10	$1,462	29	696	0.62
02/07/06	57.6	$486.14	$902.55	$1,389	12,360	$587.59	$1.20	$588.79	$1,977	32	768	0.28
01/06/06	58.8	$496.27	$921.36	$1,418	18,120	$861.42	$1.23	$862.65	$2,280	24	576	0.54
12/13/05	43.2	$364.61	$655.76	$1,020	12,960	$616.12	$0.87	$616.99	$1,637	36	864	0.35
11/07/05	42.0	$354.48	$596.41	$951	16,560	$787.26	$0.79	$788.06	$1,739	32	768	0.51
10/06/05	44.4	$374.74	$652.24	$1,027	15,600	$741.62	$0.87	$742.49	$1,769	28	672	0.52
09/08/05	39.6	$334.22	$562.22	$896	14,640	$695.99	$0.75	$696.73	$1,593	23	552	0.67
08/16/05	49.2	$415.25	$770.93	$1,186	16,920	$804.38	$1.03	$805.40	$1,992	40	960	0.36
07/07/05	46.8	$394.99	$687.49	$1,082	13,320	$633.23	$0.91	$634.15	$1,717	30	720	0.40
06/07/05	46.8	$394.99	$665.58	$1,061	12,840	$610.41	$0.89	$611.30	$1,672	28	672	0.41
05/10/05	46.8	$394.99	$675.78	$1,071	13,680	$650.35	$0.90	$651.25	$1,722	34	816	0.36
04/06/05	50.4	$425.38	$684.43	$1,110	14,880	$707.40	$6.86	$714.26	$1,824	30	720	0.41
Year Total	**607.2**	**$5,125**	**$9,020**	**$14,145**	**191,280**	**$9,093**	**$18**	**$9,111**	**$23,256**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**9.82**	**Avg. Cost/kWh:**	**$0.048**
Blended Cost (inc.demand)/kWh:	**$0.122**	**Avg. Cost/kW:**	**$23.30**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Rec. Center
Project Address: 71 Main St
Irvington, NY

Facility Area: 5,494 sq.ft.

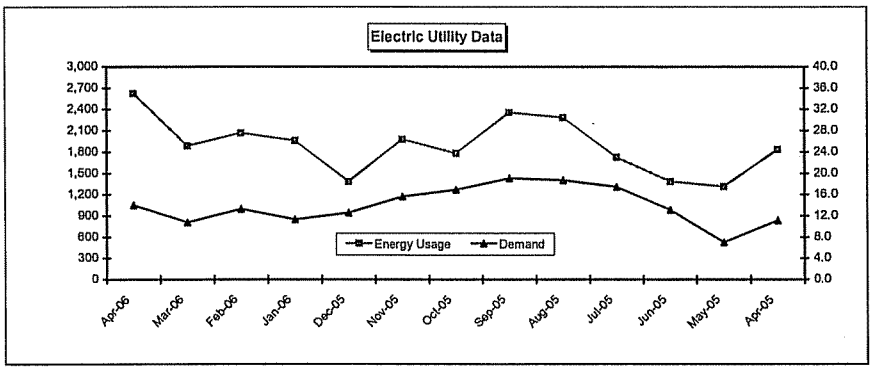
Utility Company: NYPA
Acct. No.: 59 0906 0663 5500 3
Meter # 7144028
Rate: 11-2 H-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A			B	C			D	E	F		
Billing Date	Demand Total (kW)	Demand Cost	Demand Cost Delivery	Total Demand Cost	Usage	Usage Production	Usage Delivery	Total Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
2005-2006												
04/07/06	14.0	$118.50	$220.00	$338	2,628	$124.94	$0.23	$125.17	$464	30	720	0.26
03/08/06	10.8	$91.15	$158.65	$250	1,890	$89.85	$0.17	$90.02	$340	29	696	0.25
02/07/06	13.3	$112.42	$208.72	$321	2,070	$98.41	$0.28	$98.69	$420	32	768	0.20
01/06/06	11.3	$95.71	$177.69	$273	1,962	$93.27	$0.24	$93.51	$367	24	576	0.30
12/13/05	12.6	$106.34	$191.26	$298	1,386	$65.89	$0.25	$66.14	$364	36	864	0.13
11/07/05	15.7	$132.17	$222.38	$355	1,980	$94.13	$0.30	$94.42	$449	32	768	0.16
10/06/05	16.9	$142.80	$248.55	$391	1,782	$84.72	$0.33	$85.05	$476	28	672	0.16
09/08/05	19.1	$161.04	$270.94	$432	2,358	$112.10	$0.36	$112.46	$544	23	552	0.22
08/16/05	18.7	$158.00	$293.33	$451	2,286	$108.68	$0.39	$109.07	$560	40	960	0.13
07/07/05	17.5	$147.36	$256.49	$404	1,728	$82.15	$0.34	$82.49	$486	30	720	0.14
06/07/05	13.1	$110.90	$186.59	$297	1,386	$65.89	$0.25	$66.14	$364	28	672	0.16
05/10/05	7.0	$59.25	$101.36	$161	1,314	$62.47	$0.13	$62.60	$223	34	816	0.23
04/06/05	11.2	$94.19	$151.55	$246	1,836	$87.28	$1.52	$88.80	$335	30	720	0.23
Year Total	**181.3**	**$1,530**	**$2,688**	**$4,217**	**24,606**	**$1,170**	**$5**	**$1,175**	**$5,392**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**4.48**	**Avg. Cost/kWh:**	**$0.048**
Blended Cost (Inc.demand)/kWh:	**$0.219**	**Avg. Cost/kW:**	**$23.27**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington
Project Address: 88 Main ST
Irvington, NY

Facility Area: 4,561 sq.ft.

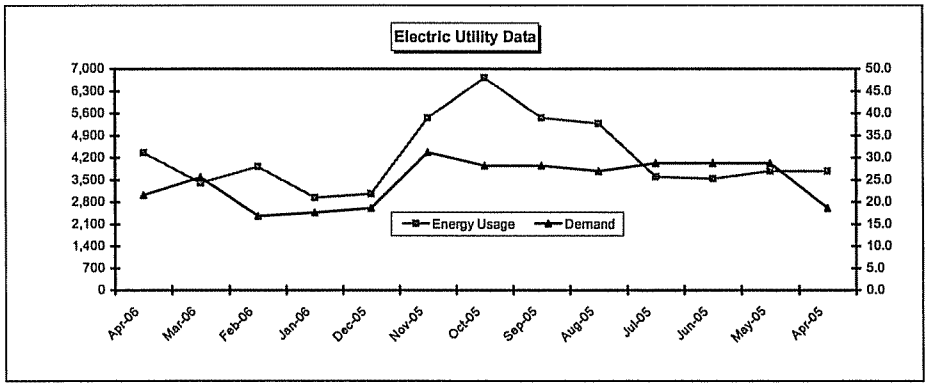
Utility Company: NYPA
Acct. No.: 59 0906 0663 5700 9
Meter # 7294401
Rate: 11-2 H-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A			B	C			D	E	F		
Billing Date	Demand Total (kW)	Demand Cost	Demand Cost Delivery	Total Demand Cost	Usage	Usage Production	Usage Delivery	Total Usage Cost	Total Cost	Billing Days	Hours per month	Load
2005-2006												
04/07/06	21.6	$182.30	$338.46	$521	4,360	$207.27	$0.36	$207.63	$728	30	720	0.28
03/08/06	25.6	$216.06	$376.06	$592	3,400	$161.64	$0.40	$162.03	$754	29	696	0.19
02/07/06	16.8	$141.79	$263.24	$405	3,920	$186.36	$0.35	$186.71	$592	32	768	0.30
01/06/06	17.6	$148.54	$275.78	$424	2,940	$139.77	$0.37	$140.13	$564	24	576	0.29
12/13/05	18.6	$156.98	$282.34	$439	3,060	$145.47	$0.38	$145.85	$585	36	864	0.19
11/07/05	31.2	$263.33	$443.05	$706	5,460	$259.57	$0.59	$260.16	$967	32	768	0.23
10/06/05	28.2	$238.01	$414.26	$652	6,720	$319.47	$0.55	$320.02	$972	28	672	0.35
09/08/05	28.2	$238.01	$400.45	$638	5,460	$259.57	$0.53	$260.10	$899	23	552	0.35
08/16/05	27.0	$227.88	$423.07	$651	5,280	$251.01	$0.56	$251.57	$903	40	960	0.20
07/07/05	28.8	$243.07	$423.07	$666	3,600	$171.14	$0.56	$171.71	$838	30	720	0.17
06/07/05	28.8	$243.07	$408.97	$652	3,540	$168.29	$0.54	$168.84	$821	28	672	0.18
05/10/05	28.8	$243.07	$415.86	$659	3,780	$179.70	$0.55	$180.25	$839	34	816	0.16
04/06/05	18.6	$156.98	$252.59	$410	3,780	$179.70	$2.53	$182.23	$592	30	720	0.28
Year Total	**319.8**	**$2,699**	**$4,717**	**$7,416**	**55,300**	**$2,629**	**$8**	**$2,637**	**$10,054**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**12.12**	**Avg. Cost/kWh:**	**$0.048**
Blended Cost (inc.demand)/kWh:	**$0.182**	**Avg. Cost/kW:**	**$23.19**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Sewer
Project Address: S Buckout St
Irvington, NY

Facility Area: 9,596 sq.ft.

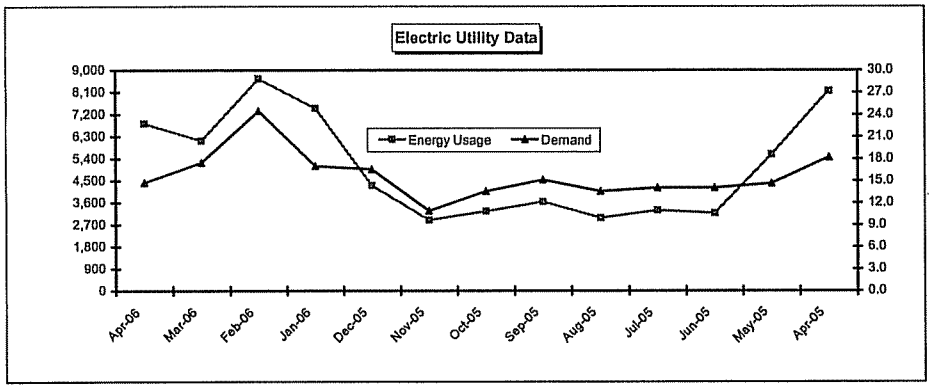
Utility Company: NYPA
Acct. No.: 59 0906 0663 6400 5
Meter # 4909340
Rate: 11-2 H-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A			B	C			D	E	F		
Billing Date	Demand Total (kW)	Demand Cost	Demand Cost Delivery	Total Demand Cost	Usage	Usage Production	Usage Delivery	Total Usage Cost	Total Cost	Billing Days	Hours per month	Load
2005-2006												
04/07/06	14.8	$124.57	$231.28	$356	6,831	$324.75	$0.24	$324.99	$681	30	720	0.64
03/08/06	17.5	$147.36	$256.49	$404	6,129	$291.37	$0.27	$291.64	$695	29	696	0.50
02/07/06	24.5	$206.61	$383.59	$590	8,649	$411.17	$0.51	$411.68	$1,002	32	768	0.46
01/06/06	17.0	$143.56	$266.54	$410	7,452	$354.27	$0.35	$354.62	$765	24	576	0.76
12/13/05	16.6	$139.77	$251.38	$391	4,302	$204.52	$0.33	$204.85	$596	36	864	0.30
11/07/05	10.9	$91.91	$154.64	$247	2,889	$137.34	$0.21	$137.55	$384	32	768	0.35
10/06/05	13.6	$114.70	$199.64	$314	3,258	$154.89	$0.27	$155.15	$469	28	672	0.36
09/08/05	15.1	$127.61	$214.71	$342	3,645	$173.28	$0.29	$173.57	$516	23	552	0.44
08/16/05	13.6	$114.70	$212.95	$328	2,979	$141.62	$0.28	$141.90	$470	40	960	0.23
07/07/05	14.0	$118.50	$206.25	$325	3,294	$156.60	$0.27	$156.87	$482	30	720	0.33
06/07/05	14.0	$118.50	$206.25	$325	3,177	$151.03	$0.27	$151.31	$476	28	672	0.34
05/10/05	14.7	$123.81	$211.83	$336	5,580	$265.27	$0.28	$265.55	$601	34	816	0.47
04/06/05	18.2	$153.44	$246.88	$400	8,163	$388.07	$2.48	$390.54	$791	30	720	0.62
Year Total	**204.4**	**$1,725**	**$3,042**	**$4,767**	**66,348**	**$3,154**	**$6**	**$3,160**	**$7,928**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**6.91**	**Avg. Cost/kWh:**	**$0.048**
Blended Cost (inc.demand)/kWh:	**$0.119**	**Avg. Cost/kW:**	**$23.33**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington
Project Address: 29 -100 Bridge St
Irvington, NY

Facility Area: 7,224 sq.ft.

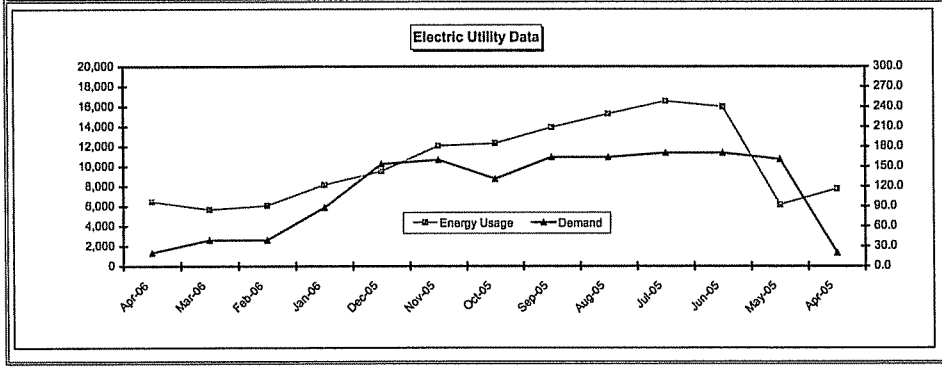
Utility Company: NYPA
Acct. No.: 59 0906 0663 7000 2
Meter # 6688974
Rate: 11-2 H-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A			B	C			D	E	F		
Billing Date	Demand Total (kW)	Demand Cost Production	Demand Cost Delivery	Total Demand Cost	Usage Total (kWh)	Usage Productio Cost	Usage Delivery Cost	Total Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
2005-2006												
04/07/06	20.0	$168.80	$313.39	$482	6,480	$308.06	$0.33	$308.39	$791	30	720	0.45
03/08/06	39.2	$330.85	$575.85	$907	5,680	$270.03	$0.61	$270.63	$1,177	29	696	0.21
02/07/06	39.2	$330.85	$614.24	$945	6,080	$289.04	$0.82	$289.86	$1,235	32	768	0.20
01/06/06	88.0	$742.72	$1,378.90	$2,122	8,160	$387.93	$1.83	$389.76	$2,511	24	576	0.16
12/13/05	153.6	$1,296.38	$2,331.60	$3,628	9,520	$452.58	$3.10	$455.68	$4,084	36	864	0.07
11/07/05	160.0	$1,350.40	$2,272.05	$3,622	12,080	$574.28	$3.02	$577.31	$4,200	32	768	0.10
10/06/05	131.2	$1,107.33	$1,927.33	$3,035	12,320	$585.69	$2.56	$588.26	$3,623	28	672	0.14
09/08/05	164.0	$1,384.16	$2,328.85	$3,713	13,920	$661.76	$3.10	$664.85	$4,378	23	552	0.15
08/16/05	164.0	$1,384.16	$2,569.77	$3,954	15,280	$726.41	$3.42	$729.83	$4,684	40	960	0.10
07/07/05	170.4	$1,438.18	$2,503.18	$3,941	16,560	$787.26	$3.33	$790.59	$4,732	30	720	0.13
06/07/05	170.4	$1,438.18	$2,419.74	$3,858	16,000	$760.64	$3.22	$763.86	$4,622	28	672	0.14
05/10/05	160.8	$1,357.15	$2,321.89	$3,679	6,160	$292.85	$3.09	$295.93	$3,975	34	816	0.05
04/06/05	20.0	$168.80	$271.60	$440	7,760	$368.91	$2.72	$371.63	$812	30	720	0.54
Year Total	**1,480.8**	**$12,498**	**$21,828**	**$34,326**	**136,000**	**$6,465**	**$31**	**$6,497**	**$40,823**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**18.83**	**Avg. Cost/kWh:**	**$0.048**
Blended Cost (inc.demand)/kWh:	**$0.300**	**Avg. Cost/kW:**	**$23.18**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington
Project Address: Irvington, NY

Facility Area: sq.ft.

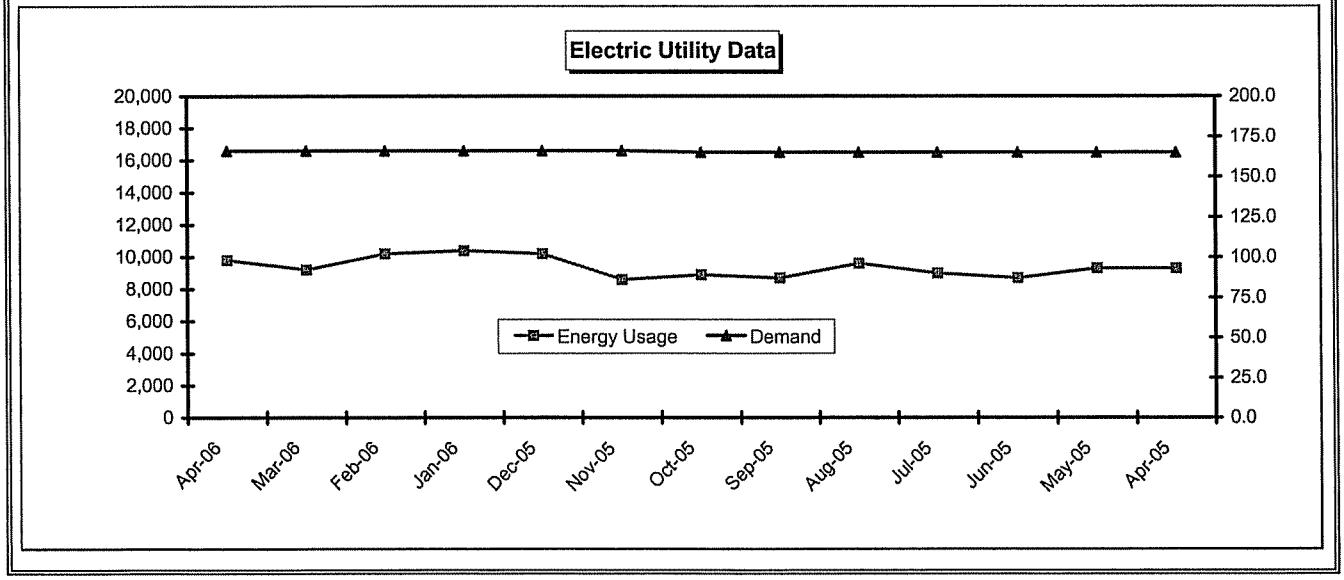
Utility Company: NYPA
Acct. No.: 59 0906 0663 8802 0
Meter # 7247635
Rate: 11-2 H-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A		B		C	D	E	F
Billing Date	Demand Total (kW)	Demand Cost	Usage Total (kWh)	Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
2005-2006								
04/07/06	166.0	$3,715	9,800	$374	$4,089	30	720	0.08
03/08/06	166.0	$3,552	9,200	$351	$3,903	29	696	0.08
02/07/06	166.0	$3,697	10,200	$383	$4,080	32	768	0.08
01/06/06	166.0	$3,688	10,400	$389	$4,077	24	576	0.11
12/13/05	166.0	$326	10,200	$143	$469	36	864	0.07
11/07/05	166.0	$3,445	8,600	$322	$3,767	32	768	0.07
10/06/05	165.0	$3,505	8,900	$333	$3,838	28	672	0.08
09/08/05	165.0	$3,424	8,700	$326	$3,749	23	552	0.10
08/16/05	165.0	$3,666	9,600	$359	$4,026	40	960	0.06
07/07/05	165.0	$3,505	9,000	$337	$3,841	30	720	0.08
06/07/05	165.0	$3,424	8,700	$326	$3,749	28	672	0.08
05/10/05	165.0	$3,463	9,300	$348	$3,811	34	816	0.07
04/06/05	165.0	$3,321	9,300	$367	$3,689			#DIV/0!
Year Total	**2,151.0**	**$42,731**	**121,900**	**$4,357**	**$47,088**		**8,784**	

Annual Energy Intensity (kWh/sq.ft.):	**N/A**	**Avg. Cost/kWh:**	**$0.036**
Blended Cost (inc.demand)/kWh:	**$0.386**	**Avg. Cost/kW:**	**$19.87**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington
Project Address: 4A Manor Pond Lane Pump
Irvington, NY

Facility Area: sq.ft.

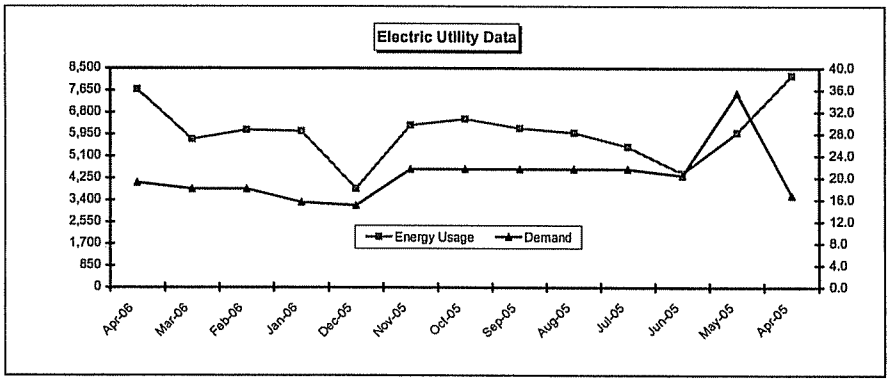
Utility Company: NYPA
Acct. No.: 59 0906 0663 9101 6
Meter # 6315834
Rate: 39388
Date: 3/4/2008
11-2 H-1

ANNUAL ELECTRIC UTILITY DATA

	A			B	C			D	E	F		
Billing Date	Demand Total (kW)	Demand Cos Production	Demand Delivery	Total Demand Cost	Usage Total (kWh)	sage Producti Cost	Usage Deliver Cost	Total Usage Cost	Total Cost	Billing Days	Hours per month	Load Factor
2005-2006												
04/07/06	19.2	$162.05	$300.85	$463	7,680	$365.11	$0.32	$365.42	$828	30	720	0.56
03/08/06	18.0	$151.92	$264.42	$416	5,760	$273.83	$0.28	$274.11	$690	29	696	0.46
02/07/06	18.0	$151.92	$282.05	$434	6,120	$290.94	$0.38	$291.32	$725	32	768	0.44
01/06/06	15.6	$131.66	$244.44	$376	6,060	$288.09	$0.33	$288.42	$665	24	576	0.67
12/13/05	15.0	$126.60	$227.70	$354	3,840	$182.55	$0.30	$182.86	$537	36	864	0.30
11/07/05	21.6	$182.30	$306.73	$489	6,300	$299.50	$0.41	$299.91	$789	32	768	0.38
10/06/05	21.6	$182.30	$317.30	$500	6,540	$310.91	$0.42	$311.33	$811	28	672	0.45
09/08/05	21.6	$182.30	$306.73	$489	6,180	$293.80	$0.41	$294.21	$783	23	552	0.52
08/16/05	21.6	$182.30	$338.46	$521	6,000	$285.24	$0.45	$285.69	$806	40	960	0.29
07/07/05	21.6	$182.30	$317.30	$500	5,460	$259.57	$0.42	$259.99	$760	30	720	0.35
06/07/05	20.4	$172.18	$289.69	$462	4,440	$211.08	$0.39	$211.46	$673	28	672	0.32
05/10/05	35.4	$298.78	$511.17	$810	6,000	$285.24	$0.68	$285.92	$1,096	34	816	0.21
04/06/05	16.8	$141.79	$228.14	$370	8,220	$390.78	$2.29	$393.07	$763	30	720	0.68
Year Total	**266.4**	**$2,248**	**$3,935**	**$6,183**	**78,600**	**$3,737**	**$7**	**$3,744**	**$9,927**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**#DIV/0!**	**Avg. Cost/kWh:**	**$0.048**
Blended Cost (inc.demand)/kWh:	**$0.126**	**Avg. Cost/kW:**	**$23.21**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)



Project Name: Village of Irvington - Street Lights
Project Address: Irvington, NY

Facility Area: sq.ft.

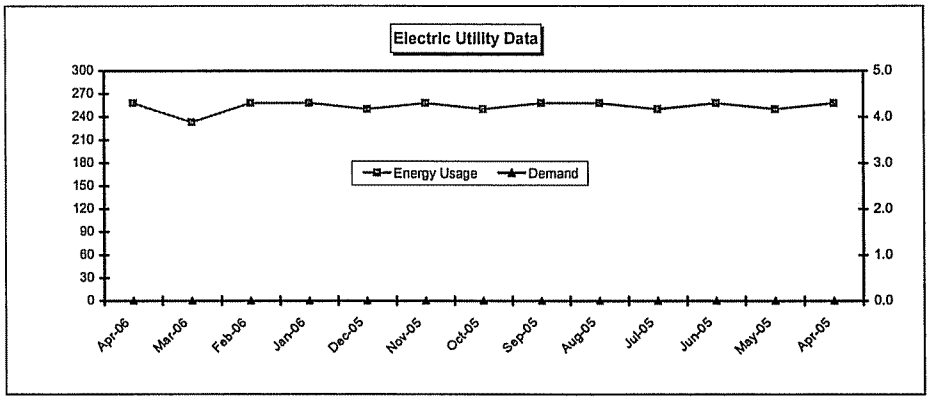
Utility Company: NYPA
Acct. No.: 63 1563 0000 0000 0
Meter #
Rate: 11-3 F-1
Date: 3/4/2008

ANNUAL ELECTRIC UTILITY DATA

	A			B	C			D	E	F		
Billing Date	Demand Total (kW)	Demand Cost	Demand Cos Delivery	Total Demand Cost	Usage	Usage Production	Usage Delivery	Total Usage Cost	Total Cost	Billing Days	Hours per month	Load
2005-2006												
04/07/06	0.0	$0.00	$0.00	$0	258	$18.50	$20.54	$39.04	$39	30	720	NA
03/08/06	0.0	$0.00	$0.00	$0	233	$16.71	$18.55	$35.26	$35	29	696	NA
02/07/06	0.0	$0.00	$0.00	$0	258	$18.50	$20.54	$39.04	$39	32	768	NA
01/06/06	0.0	$0.00	$0.00	$0	258	$18.50	$20.54	$39.04	$39	24	576	NA
12/13/05	0.0	$0.00	$0.00	$0	250	$17.93	$19.90	$37.83	$38	36	864	NA
11/07/05	0.0	$0.00	$0.00	$0	258	$18.50	$20.54	$39.04	$39	32	768	NA
10/06/05	0.0	$0.00	$0.00	$0	250	$17.93	$19.90	$37.83	$38	28	672	NA
09/08/05	0.0	$0.00	$0.00	$0	258	$18.50	$20.54	$39.04	$39	23	552	NA
08/16/05	0.0	$0.00	$0.00	$0	258	$18.50	$20.54	$39.04	$39	40	960	NA
07/07/05	0.0	$0.00	$0.00	$0	250	$17.93	$19.90	$37.83	$38	30	720	NA
06/07/05	0.0	$0.00	$0.00	$0	258	$18.50	$20.54	$39.04	$39	28	672	NA
05/10/05	0.0	$0.00	$0.00	$0	250	$17.93	$19.90	$37.83	$38	34	816	NA
04/06/05	0.0	$0.00	$0.00	$0	258	$18.50	$18.99	$37.49	$37	30	720	NA
Year Total	**0.0**	**$0**	**$0**	**$0**	**3,297**	**$236**	**$261**	**$497**	**$497**		**9,504**	

Annual Energy Intensity (kWh/sq.ft.):	**N/A**	**Avg. Cost/kWh:**	**$0.151**
Blended Cost (Inc.demand)/kWh:	**$0.151**	**Avg. Cost/kW:**	**N/A**

Table Formulas: Hours per Month = D x 24 Load Factor = B/(A x E)

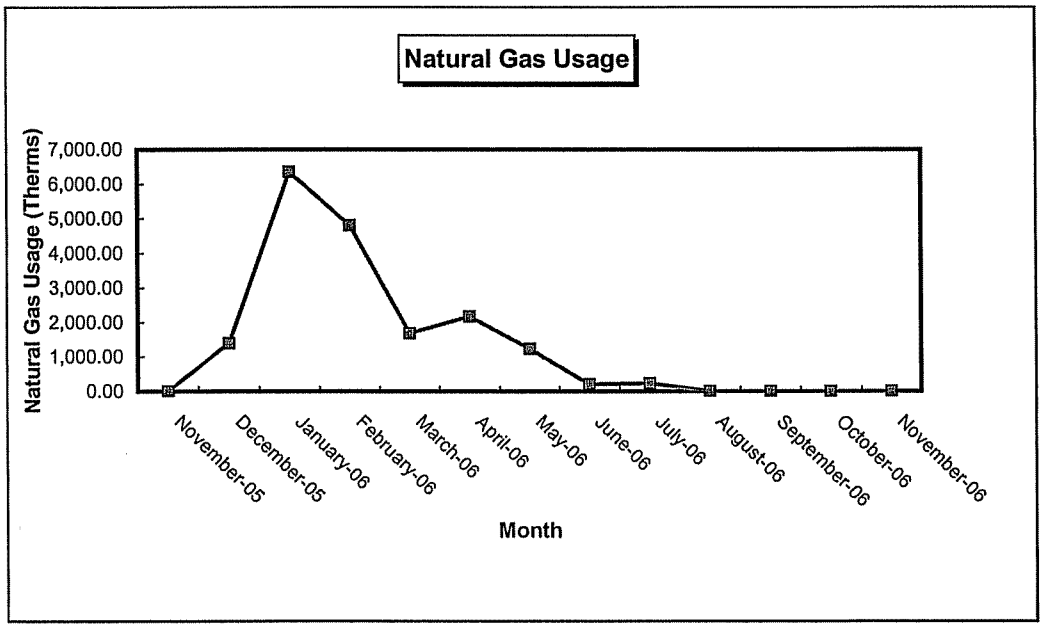


Project Name: Village of Irvington
Project Address: 2 Main St - Library

Utility Company: ConEdision
Account No.:
Date: 3/4/2008
Facility Area: 18,406 sq.ft.

ANNUAL NATURAL GAS USAGE

Usage Period	Consumption (Therms)	Therm Factor	Total Therms	Total
2005-2006				
November-06	0	1.029	0.00	$12.13
October-06	0	1.028	0.00	$12.55
September-06	0	1.028	0.00	$12.13
August-06	0	1.034	0.00	$13.39
July-06	224	1.034	231.62	$361.09
June-06	194	1.035	200.79	$341.86
May-06	1,193	1.033	1,232.37	$1,790.86
April-06	2,104	1.031	2,169.22	$3,157.22
March-06	1,621	1.036	1,679.36	$2,874.70
February-06	4,637	1.038	4,813.21	$7,563.20
January-06	6,129	1.037	6,355.77	$10,249.36
December-05	1,351	1.033	1,395.58	$2,435.52
November-05	0	1.025	0.00	$12.09
Totals:	**17,453**		**18,077.92**	**$28,836**
Energy Intensity (MMBTU/SQ FT):				**0.098**
Average Cost per Unit ($/MMBTU):				**$16.52**

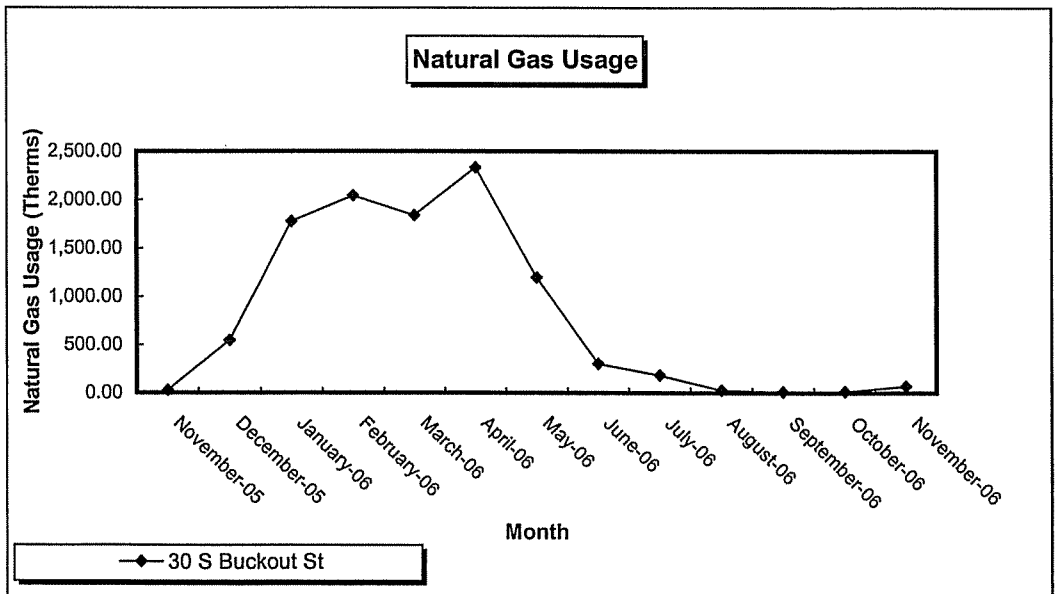


Project Name: Village of Irvington DPW
Project Address: 30 S Buckout St

Utility Company: ConEdison
Account No.:
Date: 3/4/2008
Facility Area: 1 sq.ft.

ANNUAL NATURAL GAS USAGE

Usage Period	Consumption (Therms)	Therm Factor	Total Therms	Total
2005-2006				
November-06	66	1.029	67.91	$113.49
October-06	12	1.028	12.34	$28.89
September-06	11	1.028	11.31	$26.98
August-06	24	1.034	24.82	$51.87
July-06	178	1.034	184.05	$292.18
June-06	291	1.035	301.19	$502.03
May-06	1,158	1.033	1,196.21	$1,739.33
April-06	2,261	1.031	2,331.09	$3,390.81
March-06	1,775	1.036	1,838.90	$3,145.99
February-06	1,969	1.038	2,043.82	$3,308.06
January-06	1,714	1.037	1,777.42	$2,988.64
December-05	528	1.033	545.42	$968.42
November-05	25	1.025	25.63	$55.17
Totals:	**10,012**		**10,360.11**	**$16,612**
Energy Intensity (MMBTU/SQ FT):				**1036.011**
Average Cost per Unit ($/MMBTU):				**$16.59**

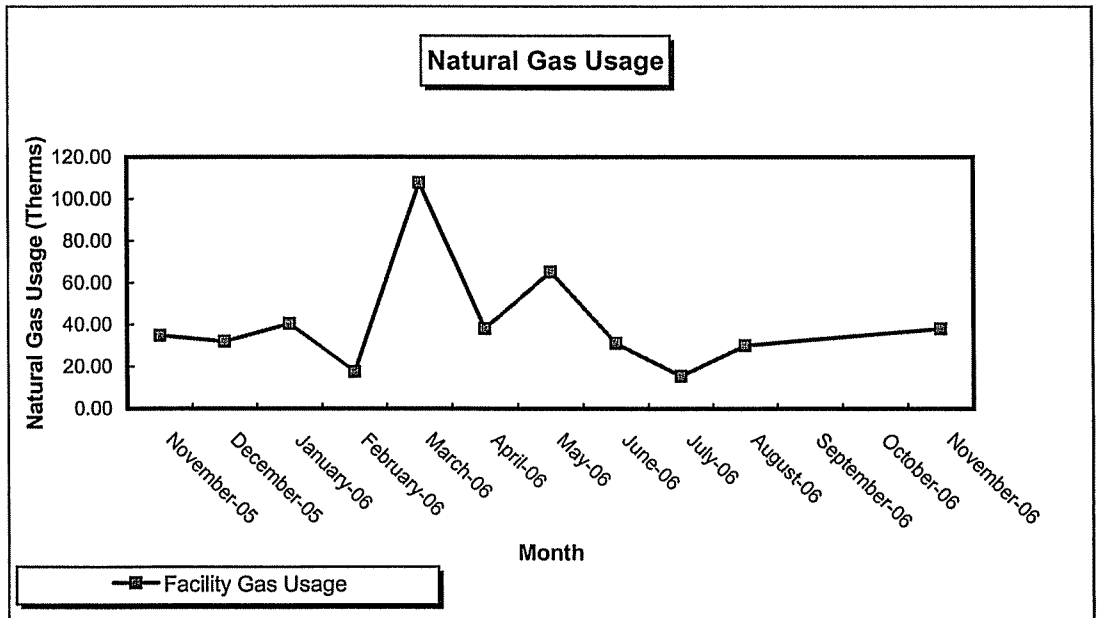


Project Name: Village of Irvington
Project Address: 4A Manorpond Lane

Utility Company: ConEdison
Account No.:
Date: 3/4/2008
Facility Area: 1 sq.ft.

ANNUAL NATURAL GAS USAGE

Usage Period	Consumption (Therms)	Therm Factor	Total Therms	Total
2005-2006				
November-06	37	1.029	38.07	$68.06
August-06	29	1.034	29.99	$59.56
July-06	15	1.034	15.51	$36.95
June-06	30	1.035	31.05	$65.07
May-06	63	1.033	65.08	$115.94
April-06	37	1.031	38.15	$73.58
March-06	104	1.036	107.74	$211.02
February-06	17	1.038	17.65	$43.85
January-06	39	1.037	40.44	$85.76
December-05	31	1.033	32.02	$72.44
November-05	34	1.025	34.85	$70.63
Totals:	**436**		**450.55**	**$903**
Energy Intensity (MMBTU/SQ FT):				**45.055**
Average Cost per Unit ($/MMBTU):				**$20.71**



Project Name:	Village of Irvington - Senior Center
Project Address:	29 Bridge ST
Utility Company:	Metro Fuel Oil Corp
Account No.:	107898
Date:	3/4/2008
Facility Area:	1 sq.ft.

ANNUAL NATURAL GAS USAGE

Usage Period	Quantity Used (Therms)	Trans. Cost		Distr. Cost	Total
No Gas Service					

ANNUAL FUEL OIL DELIVERY

No. 2 Fuel Oil = 0.14 mmBtu/gal

Delivery Date	Quantity Gallons	Unit Cost	Other	Total Cost
24-Apr-06	351	$2.19	$1.05	$768.46
16-Mar-06	78	$1.91	$0.24	$149.43
9-Mar-06	82	$1.96	$0.24	$159.91
23-Feb-06	140	$1.76	$0.42	$246.31
16-Feb-06	141	$1.79	$0.42	$252.29
9-Feb-06	116	$1.97	$0.35	$229.03
2-Feb-06	107	$1.96	$0.32	$211.18
26-Jan-06	132	$1.92	$0.39	$254.11
19-Jan-06	157	$1.91	$0.47	$300.14
12-Jan-06	116	$2.01	$0.35	$233.38
5-Jan-06	133	$1.90	$132.56	$385.10
29-Dec-05	124	$1.97	$116.27	$360.72
Totals	1,676			$3,550.06
Totals:	**1,676**			**$3,550**
Total MMBTU				**235**
Energy Intensity (MMBTU/SQ FT):				**234.612**
Average Cost per Unit ($/MMBTU):				**$15.13**

Project Name:	Village of Irvington - Fire House
Project Address:	80 Main St.
Utility Company:	Metro Fuel Oil Corp
Account No.:	107913
Date:	3/4/2008
Facility Area:	4,561 sq.ft.

ANNUAL NATURAL GAS USAGE

Usage Period	Quantity Used (Therms)	Trans. Cost		Distr. Cost	Total
No Gas Service					

ANNUAL FUEL OIL DELIVERY

No. 2 Fuel Oil = 0.14 mmBtu/gal

Delivery Date	Quantity Gallons	Unit Cost	Other	Total Cost
20-Apr-06	466	$2.19	$1.40	$1,020.38
16-Mar-06	87	$1.91	$0.26	$165.88
9-Mar-06	139	$1.96	$0.42	$272.15
23-Feb-06	239	$1.76	$0.72	$420.61
16-Feb-06	215	$1.79	$0.65	$385.42
9-Feb-06	143	$1.97	$0.43	$281.79
2-Feb-06	152	$1.96	$0.45	$299.26
26-Jan-06	370	$1.92	$1.11	$712.07
21-Jan-06	65	$1.92	$0.20	$125.23
12-Jan-06	100	$2.01	$0.30	$202.31
5-Jan-06	592	$1.90	$1.77	$1,128.98
24-Dec-05	501	$1.97	$1.50	$986.96
22-Nov-05	761	$1.88	$2.28	$1,433.42
Totals	3,830			$7,434.48
Totals:	**3,830**			**$7,434**
Total MMBTU				**536**
Energy Intensity (MMBTU/SQ FT):				**0.118**
Average Cost per Unit ($/MMBTU):				**$13.87**

Project Name:	Village of Irvington - Village Hall
Project Address:	85 Main St.
Utility Company:	Metro Fuel Oil Corp
Account No.:	107905
Date:	3/4/2008
Facility Area:	19,488 sq.ft.

ANNUAL NATURAL GAS USAGE

Usage Period	Quantity Used (Therms)	Trans. Cost		Distr. Cost	Total
No Gas Service					

ANNUAL FUEL OIL DELIVERY

No. 2 Fuel Oil = 0.14 mmBtu/gal

Delivery Date	Quantity Gallons	Unit Cost	Other	Total Cost
20-Apr-06	717	$2.19	$2.15	$1,571.53
16-Mar-06	241	$1.91	$0.72	$461.48
9-Mar-06	198	$1.96	$0.60	$388.31
4-Mar-06	540	$1.96	$1.62	$1,059.14
23-Feb-06	364	$1.76	$1.09	$641.56
16-Feb-06	455	$1.79	$1.37	$814.85
9-Feb-06	404	$1.97	$1.21	$799.13
2-Feb-06	149	$1.96	$139.87	$432.40
26-Jan-06	172	$1.92	$0.51	$332.14
19-Jan-06	113	$1.91	$0.34	$216.39
12-Jan-06	84	$2.01	$74.94	$244.93
5-Jan-06	377	$1.90	$1.13	$718.60
29-Dec-05	13	$1.97	$12.54	$38.89
24-Dec-05	561	$1.97	$1.68	$1,104.18
13-Dec-05	843	$1.88	$2.53	$1,590.22
22-Nov-05	858	$1.88	$2.58	$1,616.13
Totals	6,091			$12,029.89
Totals:	**6,091**			**$12,030**
Total MMBTU				**853**
Energy Intensity (MMBTU/SQ FT):				**0.044**
Average Cost per Unit ($/MMBTU):				**$14.11**

Project Name:	Village of Irvington - Recreation Center
Project Address:	71 Main St.
Utility Company:	Metro Fuel Oil Corp
Account No.:	107947
Date:	3/4/2008
Facility Area:	5,494 sq.ft.

ANNUAL NATURAL GAS USAGE

Usage Period	Quantity Used (Therms)	Trans. Cost		Distr. Cost	Total

No Gas Service

ANNUAL FUEL OIL DELIVERY

No. 2 Fuel Oil = 0.14 mmBtu/gal

Delivery Date	Quantity Gallons	Unit Cost	Other	Total Cost
20-Apr-06	238	$2.19	$0.72	$522.03
16-Mar-06	46	$1.91	$0.14	$87.82
9-Mar-06	64	$1.96	$0.19	$126.36
23-Feb-06	115	$1.76	$0.35	$203.18
16-Feb-06	123	$1.79	$0.37	$220.08
9-Feb-06	93	$1.97	$0.28	$184.57
2-Feb-06	87	$1.96	$0.26	$170.48
26-Jan-06	91	$1.92	$0.27	$174.93
19-Jan-06	99	$1.91	$0.30	$189.75
12-Jan-06	122	$2.01	$0.36	$245.88
5-Jan-06	98	$1.90	$97.90	$284.40
29-Dec-05	251	$1.97	$0.75	$493.58
13-Dec-05	68	$1.88	$75.56	$203.83
Totals	1,496			$3,106.89
Totals:	**1,496**			**$3,107**
Total MMBTU				**209**
Energy Intensity (MMBTU/SQ FT):				**0.038**
Average Cost per Unit ($/MMBTU):				**$14.84**

Project Name:	Village of Irvington - Pump House
Project Address:	Station Rd
Utility Company:	Metro Fuel Oil Corp
Account No.:	107939
Date:	3/4/2008
Facility Area:	1 sq.ft.

ANNUAL NATURAL GAS USAGE

Usage Period	Quantity Used (Therms)	Trans. Cost		Distr. Cost	Total
No Gas Service					

ANNUAL FUEL OIL DELIVERY

No. 2 Fuel Oil = 0.14 mmBtu

Delivery Date	Quantity Gallons	Unit Cost	Other	Total Cost
20-Apr-06	173	$2.19	$0.52	$377.88
16-Mar-06	31	$1.91	$0.09	$59.69
9-Mar-06	50	$1.96	$0.15	$98.89
4-Mar-06	110	$1.96	$0.33	$216.61
23-Feb-06	79	$1.76	$0.24	$138.39
16-Feb-06	80	$1.79	$0.24	$143.68
9-Feb-06	54	$1.97	$0.16	$106.90
2-Feb-06	63	$1.96	$0.19	$124.27
26-Jan-06	44	$1.92	$42.66	$126.53
19-Jan-06	62	$1.91	$61.08	$179.34
12-Jan-06	63	$2.01	$55.85	$182.54
5-Jan-06	63	$1.90	$62.93	$182.83
29-Dec-05	36	$1.97	$34.05	$105.63
24-Dec-05	127	$1.97	$0.38	$249.40
13-Dec-05	223	$1.88	$0.67	$420.15
22-Nov-05	188	$1.88	$0.57	$354.69
Totals	1,446			$3,067.42
Totals:	**1,446**			**$3,067**
Total MMBTU				**202**
Energy Intensity (MMBTU/SQ FT):				**202.440**
Average Cost per Unit ($/MMBTU):				**$15.15**

Project Name:	Village of Irvington - Mechanics Garage
Project Address:	6 S Astor St
Utility Company:	Metro Fuel Oil Corp
Account No.:	107559
Date:	3/4/2008
Facility Area:	2,000 sq.ft.

ANNUAL NATURAL GAS USAGE

Usage Period	Quantity Used (Therms)	Trans. Cost		Distr. Cost	Total
No Gas Service					

ANNUAL FUEL OIL DELIVERY

No. 2 Fuel Oil = 0.14 mmBtu

Delivery Date	Quantity Gallons	Unit Cost	Other	Total Cost
16-Mar-06	66	$1.91	$0.20	$125.90
9-Mar-06	70	$1.96	$0.21	$137.74
23-Feb-06	114	$1.76	$0.34	$199.83
16-Feb-06	124	$1.79	$0.37	$222.59
9-Feb-06	92	$1.97	$0.27	$182.39
2-Feb-06	89	$1.96	$0.27	$174.81
26-Jan-06	112	$1.92	$0.33	$215.39
19-Jan-06	110	$1.91	$0.33	$210.06
12-Jan-06	88	$2.01	$0.27	$177.91
5-Jan-06	154	$1.90	$0.46	$293.73
24-Dec-05	304	$1.97	$0.91	$598.95
16-Nov-05	283	$1.88	$0.85	$532.87
Totals	1,606			$3,072.16
Totals:	**1,606**			**$3,072**
Total MMBTU				**225**
Energy Intensity (MMBTU/SQ FT):				**0.112**
Average Cost per Unit ($/MMBTU):				**$13.67**

Project Name:	Village of Irvington - Sanitation
Project Address:	8 S Astar St
Utility Company:	Metro Fuel Oil Corp
Account No.:	107921
Date:	3/4/2008
Facility Area:	1,287 sq.ft.

ANNUAL NATURAL GAS USAGE

Usage Period	Quantity Used (Therms)	Trans. Cost		Distr. Cost	Total
No Gas Service					

ANNUAL FUEL OIL DELIVERY

No. 2 Fuel Oil = 0.14 mmBtu

Delivery Date	Quantity Gallons	Unit Cost	Other	Total Cost
16-Mar-06	20	$1.91	$0.06	$37.50
9-Mar-06	4	$1.96	$0.01	$7.65
23-Feb-06	124	$1.76	$0.37	$217.79
16-Feb-06	43	$1.79	$0.13	$76.41
9-Feb-06	88	$1.97	$0.27	$174.30
2-Feb-06	59	$1.96	$0.18	$116.80
26-Jan-06	53	$1.92	$0.16	$102.11
19-Jan-06	29	$1.91	$0.09	$56.16
12-Jan-06	8	$2.01	$0.03	$15.34
5-Jan-06	4	$1.90	$0.01	$7.62
29-Dec-05	196	$1.97	$0.59	$385.26
8-Dec-05	6	$1.82	$0.02	$10.23
Totals	633			$1,207.16
Totals:	**633**			**$1,207**
Total MMBTU				**89**
Energy Intensity (MMBTU/SQ FT):				**0.069**
Average Cost per Unit ($/MMBTU):				**$13.63**

PROJECT BUILD CONTRACT

PROJECT BUILD CONTRACT

This Project Build Contract ("Contract"), effective as of this 3rd day of November, 2008, is by and between Wendel Energy Services, LLC ("Wendel") and the Village of Irvington, New York ("Owner"), collectively herein the "Parties", and is for construction services for the following facilities improvement project:

Project Name, Location and Description

Name: Village of Irvington, NY

Address: 85 Main Street
Irvington, New York 10533

Description: Energy efficiency and operational improvements throughout the Village Buildings and Water District.

Estimated Construction Duration

Start Date	12/15/2008
Substantial Completion Date	07/08/2009
Final Completion Date	10/27/2009

Architect-Engineer

Wendel Duchscherer Architects & Engineers, PC
140 John James Audubon Parkway, Suite 201
Amherst, New York 14228

Contract Documents

Upon signing, this Contract and any documents listed below constitute Contract Documents

Attachment 1 – Approved Subcontractors
Exhibit A – General Terms and Conditions
Exhibit B – Supplemental Terms and Conditions
Exhibit C – Owner Bonding Requirements
Exhibit D – Certificate Of Substantial Completion
Exhibit E – Certificate of Final Completion
Exhibit F – Construction Documents

Required Approvals

Owner's rights to terminate this Contract in the absence of obtaining Required Approvals are set forth in Section 18.1 of the General Terms and Conditions. Applicable Required Approvals are as follows:

Municipal Financing

Deliverables

As described in Exhibit F - Construction Documents.

Project Build Contract Fee and Payment

Estimated: $2,573,484

Unless otherwise specifically set forth herein, progress payments shall be made in accordance Section 7 of the General Terms and Conditions.

1. SCOPE OF SERVICES

1.1 Wendel shall construct the Work in accordance with the Construction Documents and as required by the Contract Documents.

2. CERTIFICATE OF SUBSTANTIAL COMPLETION

A Certificate of Substantial Completion (Exhibit D) shall be submitted by Wendel to Owner upon the substantial completion of the Work, or a logical portion thereof if applicable. The Certificate of Substantial Completion acknowledges that the applicable Work has been completed such that the

benefits of the Work have begun to accrue to the Owner and applicable warranties thereupon have commenced, but does not constitute an acceptance of the Work by the Owner. Owner shall within thirty (30) calendar days of receipt of a Certificate of Substantial Completion either (a) execute the Certificate of Substantial Completion or (b) inform Wendel in writing of any applicable Work issues that would preclude Owner from executing the Certificate of Substantial Completion. In the event Owner fails to exercise either option within the thirty (30) days, the Work will be deemed accepted by Owner.

3. CERTIFICATE OF FINAL COMPLETION.

A Certificate of Final Completion (Exhibit E) shall be submitted by Wendel to Owner upon final completion of the Work for the entirety of the project build. Owner shall within thirty (30) calendar days either (a) execute the Certificate of Final Completion or (b) inform Wendel in writing of any Work issues that would preclude Owner from executing the Certificate of Final Completion. In the event Owner fails to exercise either option within the thirty (30) days, the Work will be deemed accepted by Owner.

4. BONDING REQUIREMENTS

Wendel shall furnish applicable construction bonding as required by Owner and set forth in Exhibit C.

5. APPROVED SUBCONTRACTORS.

Approved subcontractors are set forth in Attachment 1 hereto. Any additions, deletions or replacements of subcontractors will require Wendel's advance notice to and approval by Owner.

6. PROJECT CLOSE OUT FEES

If decision making by the Owner necessary to close out the Project is not forthcoming through no fault of Wendel or its subcontractors, or change orders that extend the Project Date of Final Completion, commencing December 1st, 2009 Owner will be assessed a project management continuation fee of two thousand dollars ($2,000.00) per month.

PROJECT BUILD CONTRACT

Wendel Energy Services, LLC

Signature

Scott F. Smith
Printed Name

General Manager
Title

11/26/08
Date

Owner

Signature

Lawrence S. Schopfer
Printed Name

Village Administrator
Title

11/24/08
Date

Acknowledgement taken in New York State

State of New York, County of Erie, ss:

On the 26th day of November, in the year 2008, before me, the undersigned, personally appeared

Scott F Smith

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s) or the person upon behalf of which the individual(s) acted, executed the instrument.

angela Lipinski
Notary Public

ANGELA LIPINSKI
Notary Public, State of New York
Qualified in Erie County
My Commission Expires May 15, 2010

Acknowledgement taken in New York State

State of New York, County of Westchester, ss:

On the 24 day of November, in the year 2008, before me, the undersigned, personally appeared

Lawrence S. Schopfer

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s) or the person upon behalf of which the individual(s) acted, executed the instrument.

Notary Public

SARAH PALERMO
NOTARY PUBLIC, STATE OF NEW YORK
WESTCHESTER COUNTY
LIC # 01PA6182438
COMM. EXP. FEBRUARY 25, 2012

ATTACHMENT 1 – APPROVED SUBCONTRACTORS

Company Name	Contact Name	Office Phone	Subcontract
BR Johnson, Inc.	Anthony Minieri	(315) 437-1234	Window Replacement
Candella Systems Corporation	James Bernardo	(914) 248-8900	High Efficiency Lighting & Lighting Controls and Street Lighting
ECP Building Envelope, Inc.	Randy Wisher	(518) 569-0579	Building Envelope Improvements
F.A. Burchetta Co. Inc.	Michael Kear	(914) 271-4165	Packaged Engine Generators & Pump Station Upgrades
Hudson Valley Roofing	Jay Modi	(845) 565-6700	Roof Replacement
ITC North, Inc.	Mike Butler	(845) 225-6959	Direct Digital Control System
JNP Construction Corp.	Nick Parairos	(201) 440-8994	Steel Water Tank Rehabilitation
Koester Associates, Inc.	Mark Koester	(315) 697-3800	PRV Replacement
Lewis Mechanical, Inc.	Keith Ohara	(203) 258-0277	Boiler Replacements
LVI Environmental Services, Inc.	Robert Giordano	(518) 218-0820	Asbestos Abatement
In-Line Services, Inc.	David Stothoff	(908) 782-3740	Water Meter Replacement
Weston Solutions, Inc.	Steven Eget	(732) 417-5829	Air Monitoring

PROJECT BUILD CONTRACT
EXHIBIT A

PROJECT BUILD CONTRACT
EXHIBIT A - GENERAL TERMS AND CONDITIONS

(See Section Labeled General Terms & Conditions)

PROJECT BUILD CONTRACT
EXHIBIT B

PROJECT BUILD CONTRACT
EXHIBIT B – SUPPLEMENTAL CONDITIONS

(Not applicable in this Agreement)

PROJECT BUILD CONTRACT
EXHIBIT C

PROJECT BUILD CONTRACT
EXHIBIT C - OWNER BONDING REQUIREMENTS

Performance and Labor and Material Payment Bonds

All subcontractors shall, before commencing any work or placing any materials upon any site, deliver to Wendel and the Owner, in a sum equal to the total amount of the applicable subcontract construction costs, (i) performance bonds and (ii) labor and material payment bonds executed by a solvent surety corporation as a surety with an A- or better rating authorized to do business in the State of New York and naming Wendel and Owner as obligee, or equivalent instruments, which shall be subject to approval by Wendel and the Owner, which approval shall not be unreasonably withheld, respectively guaranteeing (i) the faithful performance of all work in accordance with the plans, specifications, conditions and obligations of the subcontract and Contract Documents and the maintenance of the subcontract improvements for a period of one year from the date of substantial completion of the improvement and (ii) the payment of all persons performing labor and furnishing materials under the subcontract.

PROJECT BUILD CONTRACT
EXHIBIT D

PROJECT BUILD CONTRACT
EXHIBIT D – CERTIFICATE OF SUBSTANTIAL COMPLETION

Project:	Owner:	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.:

THIS CERTIFICATE OF SUBSTANTIAL COMPLETION APPLIES TO:

☐ All Work under the Contract Documents: ☐ The following specified portions:

_____

_____

_____

_____
Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner and Wendel, and found to be complete based on our inspection, and to the best of our knowledge, information and belief the Work has been completed in accordance with the terms and conditions of the Contract Documents.

A list of items, if any, to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of Wendel to complete all Work in accordance with the Contract Documents.

Except as provided otherwise in the Contract Documents, the Owner accepts responsibility for security, operation, safety, maintenance, heat, utilities, insurance and warranties of the Work or portion(s) thereof as set forth in this Certificate of Substantial Completion.

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Accepted by Wendel	Date
Accepted by Owner	Date
Accepted by	Date

PROJECT BUILD CONTRACT
EXHIBIT E

PROJECT BUILD CONTRACT
EXHIBIT E – CERTIFICATE OF FINAL COMPLETION

Project:	Owner:	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.:

THIS CERTIFICATE OF FINAL COMPLETION APPLIES TO ALL WORK UNDER THE CONTRACT DOCUMENTS:

The Work to which this Certificate applies has been inspected by authorized representatives of Owner and Wendel, and found to be complete based on our inspection. To the best of our knowledge, information and belief the Work has been completed in accordance with the terms and conditions of the Contract Documents.

A list of items, if any, to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of Wendel to complete all Work in accordance with the Contract Documents.

Except as provided otherwise in the Contract Documents, the Owner herewith accepts responsibility for security, operation, safety, maintenance, heat, utilities, insurance and warranties that have not been previously transferred from the Contractor.

Accepted by Wendel _____ Date _____

Accepted by Owner _____ Date _____

Accepted by _____ Date _____

PROJECT BUILD CONTRACT
EXHIBIT F

EXHIBIT F – CONSTRUCTION DOCUMENTS

Refer to Project Manual dated December, 2007 under separate cover and the following attached Addendums:

Water Meters, HVAC Upgrades, Street Lighting, Overhead Doors, Windows and CEA

WENDEL DUCHSCHERER
ARCHITECTS & ENGINEERS
140 John James Audubon Parkway, Suite 201, Amherst, New York 14228
P 716.688.0766 **F** 716.625.6825

CIVIL ADDENDUM NO. 1

Village of Irvington - ESPC

DATE

January 15, 2008

OWNER

Village of Irvington
85 Main Street
Irvington, NY 10533

ARCHITECT/ENGINEER

Wendel Duchscherer
140 John James Audubon Parkway
Suite 201
Amherst, NY 14228
Phone: 716-688-0766
Fax: 716-625-6825

Project No. 4307-01

This Addendum is being issued to clarify the bid documents and shall supersede and supplement all portions of previously issued bid documents with which it conflicts. It shall be made an integral part of the construction documents.

WENDEL DUCHSCHERER
ARCHITECTS & ENGINEERS
40 John James Audubon Parkway, Suite 201, Amherst, New York 14228
P 716.688.0766 F 716.625.6825

Project **Village of Irvington - ESPC**

Addendum No. **1**

Contract

Wendel Duchscherer Project No. **4307-01**

Date **1/15/08**

ARTICLE - **1**

DRAWING NO. **N/A**

SPEC PAGE **ITB-1**

The bid deadline has been revised for the following Contracts; Water Meter Replacement, Steel Water Tank Rehabilitation, PRV Replacement, Pump Station Upgrades, and Packaged Engine Generators. All bids must be received by WES, 140 John James Audubon Parkway, Amherst, NY 14228 on or before 4:00 pm local time on Monday, January 21, 2008.

ARTICLE -

DRAWING NO.

SPEC PAGE

ARTICLE -

DRAWING NO.

SPEC PAGE

WENDEL DUCHSCHERER
ARCHITECTS & ENGINEERS
40 John James Audubon Parkway, Suite 201, Amherst, New York 14228
P 716.688.0766 F 716.625.6825

Project **Village of Irvington - ESPC**

Addendum No. **1**

Contract

Wendel Duchscherer Project No. **4307-01**

Date **1/15/08**

ARTICLE -

DRAWING NO.

SPEC PAGE

ARTICLE -

DRAWING NO.

SPEC PAGE

ARTICLE -

DRAWING NO.

SPEC PAGE

WENDEL DUCHSCHERER
ARCHITECTS & ENGINEERS
40 John James Audubon Parkway, Suite 201, Amherst, New York 14228
P 716.688.0766 **F** 716.625.6825

Project **Village of Irvington - ESPC**

Addendum No. **1**

Contract

Wendel Duchscherer Project No. **4307-01**

Date **1/15/08**

ARTICLE -

DRAWING NO.

SPEC PAGE

ARTICLE -

DRAWING NO.

SPEC PAGE

ARTICLE -

DRAWING NO.

SPEC PAGE

WENDEL DUCHSCHERER
ARCHITECTS & ENGINEERS
40 John James Audubon Parkway, Suite 201, Amherst, New York 14228
P 716.688.0766 **F** 716.625.6825

Project **Village of Irvington - ESPC**

Addendum No. **1**

Contract

Wendel Duchscherer Project No. **4307-01**

Date **1/15/08**

ARTICLE -

DRAWING NO.

SPEC PAGE

WENDEL ENERGY SERVICES

811 Jericho Turnpike, Suite 202W, Smithtown, New York 11787
P 631.863.1930 F 631.863.1931

CIVIL - ADDENDUM NO. 2

Village of Irvington
Energy Performance Contract

DATE

September 11, 2008

OWNER

Village of Irvington
Village Hall
85 Main Street
Irvington, New York

ARCHITECT/ENGINEER

Wendel Duchscherer
140 John James Audubon Parkway
Suite 201
Amherst, NY 14228
Phone: 716-688-0766
Fax: 716-625-6825

Project No. WE4307-01

This Addendum is being issued to clarify the bid documents and shall supersede and supplement all portions of previously issued bid documents with which it conflicts. It shall be made an integral part of the construction documents.

WENDEL ENERGY SERVICES
811 Jericho Turnpike, Suite 202W, Smithtown, New York 11787
P 631.863.1930 F 631.863.1931

Project	Village of Irvington	Addendum No.	Civil No. 2
	Energy Performance Contract	Subcontract	Water Meter Supply and Installation
Wendel Energy Project No.	WE4307-01	Date	09/11/2008

ARTICLE - 1 DRAWING NO. N/A

Water Meter Supply and Installation Bid Re-Issuance SPEC PAGE ITB-1

At the request of the Owner (Village of Irvington), the bid for the Water Meter Supply and Installation Subcontract is being re-issued. Please utilize the attached Bid Form (BFWM) and the associated Bid Tables (WM-BB & WM-Alt A) for your bid submission.

All bids must be received by Wendel Energy Services (**Attention: Steve V. Grgas**), 811 Jericho Turnpike, Suite 202 W, Smithtown, New York 11787 on or before 4:00 pm local time on Thursday, September 25, 2008.

Village of Irvington
Performance Contract
Project No. 4307-01

BID FORM

Subcontract: Water Meter Supply and Installation

TO: Wendel Energy Services, LLC
811 Jericho Turnpike
Suite 202W
Smithtown, New York 11787

BASE BID

The undersigned _____ hereby proposes to furnish all labor, material, and perform all work for **Water Meter Supply and Installation for the Village of Irvington** in strict accordance with the Project Manual dated December 2007 and any subsequently issued Addenda. In addition, we have visited each site as specified in the Contract Documents and understand the scope of work. We understand that Wendel Energy Services reserves the right to award any part or all of the scope listed on this bid form. We also understand that Wendel Energy Services reserves the right to award contracts based on the price quoted for each individual item listed below or any combination of the items listed below. The bidder proposes the following bid amounts:

A. Water Meter Supply and Installation Base Bid (refer to Specification Section 11340)

1. Total from Water Meter Bid Table WM-BB:

_____ Dollars $ _____

B. Bonds

1. Lump Sum for Performance Bond:

_____ Dollars $ _____

2. Lump Sum for Payment Bond:

_____ Dollars $ _____

Lump Sum Bonds (1 + 2)

_____ Dollars $ _____

Total Base Bid (A + B)

_____ Dollars $ _____

C. Water Meter Supply and Installation Alternate A (refer Specification Section 11342)

1. Total from Water Meter Bid Table WM-ALT-A:

_____ Dollars $ _____

D. **Bonds**

1. Lump Sum for Performance Bond:

_____ Dollars $ _____

2. Lump Sum for Payment Bond:

_____ Dollars $ _____

Total Water Meter Supply, Installation and Lump Bonds (1 + 2)

_____ Dollars $ _____

Total Alternate Bid (C + D)

_____ Dollars $ _____

Village of Irvington
Performance Contract
Project No. 4307-01

PROPOSED MANUFACTURERS:

1. Water Meter Manufacturer: _____

TIME OF COMPLETION

The undersigned agrees to have the project substantially complete as indicated in Section 01011 – Summary of Work – Multiple Subcontracts.

SUBCONTRACTORS

The undersigned proposes to use the following subcontractors to complete the scope of work detailed in the Contract Document:

	SUBCONTRACTOR NAME	PHONE #	TRADE
1.			

SUMMARY OF WORK:

_____

_____

_____

	SUBCONTRACTOR NAME	PHONE #	TRADE
2.			

SUMMARY OF WORK:

_____

_____

_____

	SUBCONTRACTOR NAME	PHONE #	TRADE
3.			

SUMMARY OF WORK:

_____

_____

SUBCONTRACTOR NAME	PHONE #	TRADE
4.		

SUMMARY OF WORK:

Village of Irvington
Performance Contract
Project No. 4307-01

ADDENDA

Receipt of the following Addenda is acknowledged:

Addendum No.	_____	Dated	_____	Addendum No.	_____	Dated	_____
Addendum No.	_____	Dated	_____	Addendum No.	_____	Dated	_____
Addendum No.	_____	Dated	_____	Addendum No.	_____	Dated	_____

ACKNOWLEDGEMENT

The undersigned has read the project manual and acknowledges, by checking the below, the following administrative requirements are understood and will be complied with:

- ☐ Wendel Subcontractor Performance and Payment Bond Forms
- ☐ Subcontract Agreement and General Conditions
- ☐ Insurance Requirements (Supplementary Condition-1)
- ☐ General Requirements (Division 1)

Village of Irvington
Performance Contract
Project No. 4307-01

ACCEPTANCE

If written notice of the acceptance of this bid is mailed, telegraphed or delivered to the undersigned within 120 days after the date of the opening of the bids, or any time thereafter before the bid is withdrawn, the undersigned will, within 10 days after the date of such mailing, telegraphing or delivering of such notice, execute a contract in the form specified and give specified Performance and Payment Bonds. Failure or refusal to execute a contract and deliver specified bonds will result in forfeit of bid security (5%) to the contractor.

The undersigned hereby designates as his office to which such notice of acceptance may be sent:

_____ Phone No. _____

Date_____ _____
Legal Name of Person, Partnership or Corporation

Sign Bid Here: _____
Name and Title

Legal Business Address: _____
Street

_____
City - State

Village of Irvington
Performance Contract
Project No. 4307-01

IF BIDDER IS A FIRM OR PARTNERSHIP, COMPLETE THE FOLLOWING:

NAME OF MEMBERS OR PARTNERS	LEGAL RESIDENCE

IF BIDDER IS A CORPORATION, COMPLETE THE FOLLOWING:

State of Incorporation_____

NAME OF MEMBERS OR PARTNERS	LEGAL RESIDENCE
President	
Vice President	
Secretary	
Treasurer	

BID PROPOSAL CERTIFICATIONS

Firm Name _____

Business Address _____

Telephone Number _____ Date of Bid _____

I. General Bid Certification

The bidder certifies that he will furnish, at the prices herein quoted, the materials, equipment and/or services as proposed on this bid.

II. Non-Collusive Bidding Certification

By submission of this bid proposal, the bidder certifies that he is complying with Section 103-d of the General Municipal Law as follows:

Statement of non-collusion in bids and proposals to political subdivision of the state. Every bid or proposal hereafter made to a political subdivision of the state or any public department, agency or official thereof where competitive bidding is required by statute, rule, regulation, or local law, for work or services performed or to be performed or goods sold or to be sold, shall contain the following statement subscribed by the bidder and affirmed by such bidder as true under the penalties of perjury: Non-collusive bidding certification.

"(a) By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

(1) The prices in this bid have been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

(2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

(3) No attempt has been made or will be made by the bidder to induce any other person, partnership, or corporation to submit or not to submit a bid for the purpose of restricting competition."

(b) A bid shall not be considered for award nor shall any award be made where (a) (1) (2) and (3) above have not be complied with; provided, however, that if in any case the bidder cannot make the foregoing certification, the bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefor. Where (a) (1) (2) and (3) above have not been complied with, the bid shall not be considered for award nor shall any award be made unless the head of the purchasing unit of the political subdivision, public department, agency or official thereof to which the bid is made, or his designee, determines that such disclosure was not made for the purpose of restricting competition.

The fact that a bidder (a) has published price lists, rates, or tariffs covering items being procured, (b) has informed prospective customers of proposed or pending publication of new or revised price lists for such items, or (c) has sold the same items to other customers at the same prices being bid, does not constitute, without more, a disclosure within the meaning subparagraph one (a).

2. Any bid hereafter made to any political subdivision of the state or any public department, agency or official thereof by a corporate bidder for work or services performed or to be performed or goods sold or to be sold, where competitive bidding is required by statute, rule, regulation, or local law, and where such bid contains the certification referred to in subdivision one of the section, shall be deemed to have been authorized by the board of directors of the bidder, and such authorization shall be deemed to include the signing and submission of the bid and the inclusion therein of the certificate as to non-collusion as the act and deed of the corporation.

Signature (Authorized) _____

Title _____

BID TABLE-WM-BB

SUBCONTRACT: Water Meter Supply and Installation Base Bid

WATER METER CODE	QUANTITY	UNITS	UNIT MATERIAL PRICE	UNIT LABOR PRICE	EXTENDED TOTAL
WM-1	419	EA			
WM-2	438	EA			
WM-3	334	EA			
WM-4	168	EA			
WM-5	160	EA			
WM-6	23	EA			
WM-7	5	EA			
WM-8	12	EA			
WM-9	10	EA			
WM-10	4	EA			
WM-11	1,573	EA			
Total Bid					

Note:

- Refer to Section 11340
- Quantities may change during construction.
- Unit Prices are to be good for any quantity.

BID TABLE-WM-ALT-A

SUBCONTRACT: Water Meter Supply and Installation Alternate A

WATER METER CODE	QUANTITY	UNITS	UNIT MATERIAL PRICE	UNIT LABOR PRICE	EXTENDED TOTAL
WM A-1	419	EA			
WM A-2	438	EA			
WM A-3	334	EA			
WM A-4	168	EA			
WM A-5	160	EA			
WM A-6	23	EA			
WM A-7	5	EA			
WM A-8	12	EA			
WM A-9	10	EA			
WM A-10	4	EA			
WM A-11	1,573	EA			
Total Bid					

Note:

- Refer to Section 11342
- Quantities may change during construction.
- Unit Prices are to be good for any quantity.

WENDEL ENERGY SERVICES

811 Jericho Turnpike, Suite 202W, Smithtown, New York 11787
P 631.863.1930 F 631.863.1931

ADDENDUM NO. HVAC-1

Village of Irvington
Energy Performance Contract

DATE

January 15, 2008

OWNER

Village of Irvington
Village Hall
85 Main Street
Irvington, New York

ARCHITECT/ENGINEER

Wendel Duchscherer
140 John James Audubon Parkway
Suite 201
Amherst, NY 14228
Phone: 716-688-0766
Fax: 716-625-6825

Project No. WE4307-01

This Addendum is being issued to clarify the bid documents and shall supersede and supplement all portions of previously issued bid documents with which it conflicts. It shall be made an integral part of the construction documents.

WENDEL ENERGY SERVICES
811 Jericho Turnpike, Suite 202W, Smithtown, New York 11787
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Project	Village of Irvington	Addendum No.	HVAC-1
	Energy Performance Contract	Contract	HVAC Upgrades
Wendel Energy Project No.	WE4307-01	Date	01/15/2008

ARTICLE - 1 DRAWING NO.

Requests for Information SPEC PAGE

Question:
"The specifications indicate that all exposed piping that has been abated needs to be re-insulated. Where and how much piping are we talking about?"

Answer:
Abatement of piping is confined to the boiler at the Pump House. Approximate linear footage of the abatement is 10 linear feet.

For the remaining boiler rooms, approximately twenty (20) linear feet of exposed piping will require insulation. Contractor shall provide unit pricing for pipe insulation as indicated on the bid form.

Question:
"In the HVAC details it indicates a chemical feeder and an air separator is to be installed for the hot water boilers. Is this the case? If so, what type and size are the air separators?"

Answer:
A by-pass chemical feeder is specified in section 15181-5,2.6,F.

An air separator is required. It shall be of the type B&G model IAS or equal. The size of the fittings shall be the line size of the hot water supply on the boiler.
- *Fire House, Pump House, & Village Hall shall be 2-inch diameter fittings.*
- *Recreation Center shall be 1-1/2 inch diameter fitting.*

Question:
"Is a bid bond required? On the invitation to bid it does not indicate a bid bond is necessary or in the section titled Subcontractor Bond Forms nothing indicated a bid bond is required. On the Bid Form, it indicates that failure to produce a payment and performance bond within 10 days of notification of contract award will result in forfeit of the 5% bid bond?"

Answer:
A bid bond is not required for the Irvington Project.

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Project	Village of Irvington	Addendum No.	HVAC-1
	Energy Performance Contract	Contract	HVAC Upgrades
Wendel Energy Project No.	WE4307-01	Date	01/15/2008

ARTICLE - 2

DRAWING NO.

Infrared Heaters – Delete from Scope

SPEC PAGE

Delete:

All work associated with the installation of infrared heaters has been removed from the project scope. This includes the following items:

- Items 4 & 5 from the HVAC Upgrades Subcontract in the Summary of Work – Section 01011.
- Drawing H102 Sanitation Garage and Mechanical Garage Plans
- Details associated with the Infrared Heater located in H200 HVAC Details drawing.
- Equipment Schedules associated with the Infrared Heaters located in H300 HVAC Schedules drawing.

WENDEL ENERGY SERVICES

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P 631.863.1930 F 631.863.1931

ADDENDUM NO. Street Lighting #1

Village of Irvington
Energy Performance Contract

DATE

February 19, 2008

OWNER

Village of Irvington
Village Hall
85 Main Street
Irvington, New York 10533

ARCHITECT/ENGINEER

Wendel Duchscherer
140 John James Audubon Parkway
Suite 201
Amherst, NY 14228
Phone: 716-688-0766
Fax: 716-625-6825

Project No. WE4307-01

This Addendum is being issued to clarify the bid documents and shall supersede and supplement all portions of previously issued bid documents with which it conflicts. It shall be made an integral part of the construction documents.

WENDEL ENERGY SERVICES
811 Jericho Turnpike, Suite 202W, Smithtown, New York 11787
P 631.863.1930 F 631.863.1931

Project	Village of Irvington	Addendum No.	Street Lighting #1
	Energy Performance Contract	Contract	Street Lighting Upgrades
Wendel Energy Project No.	WE4307-01	Date	2/19/2008

ARTICLE - 1 DRAWING NO.

Summary of Work – Multiple Subcontracts SPEC PAGE **01011-7**

DELETE: Following items under the Street Lighting Subcontract Summary of Work:
2. a. (1) Wipe lens clean and if applicable relamp and/or reballastexisitng non-operable High Pressure Sodium (HPS) fixtures with new lamp and ballast with equal wattage to maintain existing light lumens according to the "Field Construction Report for Street Lighting".

WENDEL ENERGY SERVICES

811 Jericho Turnpike, Suite 202W, Smithtown, New York 11787
P 631.863.1930 F 631.863.1931

ADDENDUM NO. Overhead Doors #1

Village of Irvington
Energy Performance Contract

DATE

February 19, 2008

OWNER

Village of Irvington
Village Hall
85 Main Street
Irvington, New York 10533

ARCHITECT/ENGINEER

Wendel Duchscherer
140 John James Audubon Parkway
Suite 201
Amherst, NY 14228
Phone: 716-688-0766
Fax: 716-625-6825

Project No. WE4307-01

This Addendum is being issued to clarify the bid documents and shall supersede and supplement all portions of previously issued bid documents with which it conflicts. It shall be made an integral part of the construction documents.

WENDEL ENERGY SERVICES
811 Jericho Turnpike, Suite 202W, Smithtown, New York 11787
P 631.863.1930 F 631.863.1931

Project	Village of Irvington	Addendum No.	Overhead Doors #1
	Energy Performance Contract	Contract	Overhead Door Replacement
Wendel Energy Project No.	WE4307-01	Date	2/19/2008

ARTICLE - 1 DRAWING NO.

Summary of Work – Multiple Subcontracts SPEC PAGE **01011-7**

The following addresses the removal of the Overhead Door Replacements from the scope of work of the Performance Contract:

<u>DELETE:</u> Following article under the Summary of Work:
(1) Overhead Door Replacement Subcontract and all related items.

ARTICLE - 2 DRAWING NO.

Summary of Work – 1.3 Contracts SPEC PAGE **01011-23**

<u>DELETE:</u> Following items under the Contract section:
G. Contract Documents applicable to Overhead Door Replacement Subcontract.

ARTICLE - 3 DRAWING NO.

Summary of Work – 1.4 Schedule SPEC PAGE **01011-28**

<u>DELETE:</u> Following items under the Schedule section:
I. Overhead Door Replacement Subcontractor Schedule dates.
H. Overhead Door Replacement Subcontractor work hours.

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Project	Village of Irvington	Addendum No.	Overhead Doors #1
	Energy Performance Contract	Contract	Overhead Door Replacement
Wendel Energy Project No.	WE4307-01	Date	2/19/2008

ARTICLE - 4

DRAWING NO.

Division 8 – Doors and Windows

SPEC PAGE

DELETE: Following items under the Division 8:
(1) 08361 Sectional Overhead Doors.

WENDEL ENERGY SERVICES

811 Jericho Turnpike, Suite 202W, Smithtown, New York 11787
P 631.863.1930 F 631.863.1931

ADDENDUM NO. Windows #1

Village of Irvington
Energy Performance Contract

DATE

October 1, 2008

OWNER

Village of Irvington
Village Hall
85 Main Street
Irvington, New York 10533

ARCHITECT/ENGINEER

Wendel Duchscherer
140 John James Audubon Parkway
Suite 201
Amherst, NY 14228
Phone: 716-688-0766
Fax: 716-625-6825

Project No. WE4307-01

This Addendum is being issued to clarify the bid documents and shall supersede and supplement all portions of previously issued bid documents with which it conflicts. It shall be made an integral part of the construction documents.

WENDEL ENERGY SERVICES
811 Jericho Turnpike, Suite 202W, Smithtown, New York 11787
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Project	Village of Irvington	Addendum No.	Windows #1
	Energy Performance Contract	Contract	Window Replacement
Wendel Energy Project No.	WE4307-01	Date	10/01/2008

ARTICLE - 1 DRAWING NO.

Summary of Work – Multiple Subcontracts SPEC PAGE **01011-7**

The following addresses the removal of the Village Hall Window Replacement from the scope of work of the Performance Contract:

<u>DELETE:</u> Following article under the Summary of Work:
WINDOW REPLACEMENT SUBCONTRACT:

1. *Village Hall*
   a. *Window Replacement*
      (1) *Remove and properly dispose of one thousand three hundred twenty (1320) square feet of existing wood single pane windows.*
      (2) *Subcontractor is responsible for the abatement of asbestos associated removal of existing windows. Replacement of all forty-six (46) windows requires abatement of asbestos containing materials per the provisions of NYS ICR 56 and Specification 13281 – Asbestos Abatement.*
      (3) *The approximate quantity of ACM to be abated is:*
         (a) Window Caulking: 1,445 linear feet
         (b) Window Glazing: 1,337 square feet
      (4) *Replacement of all forty-six (46) windows requires abatement of lead-based paint per the provisions of Specification 13282 – Lead Removal*
      (5) *Provide one thousand three hundred twenty (1320) square feet of aluminum-clad, double pane windows (U-value = 0.35) per Drawings.*
      (6) *Initial cleaning.*

WENDEL ENERGY SERVICES
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Project	Village of Irvington	Addendum No.	Windows #1
	Energy Performance Contract	Contract	Window Replacement
Wendel Energy Project No.	WE4307-01	Date	10/01/2008

ARTICLE - 2 DRAWING NO.

Summary of Work – Multiple Subcontracts SPEC PAGE **01011-23**

<u>DELETE:</u> Following article under the Summary of Work:
AIR MONITORING SUBCONTRACT:

1. *Village Hall*
   a. *Air Monitoring associated with the Window Replacement.*

ARTICLE - 3 DRAWING NO.

Summary of Work – 1.3 Contracts SPEC PAGE **01011-28**

<u>DELETE:</u> Following items under the Contracts section:

2. *Drawings*
   m. *A113 Village Hall Notes, Legends, & Schedules*
   n. *A114 Village Hall Elevation Plans*
   o. *A115 Village Hall Window Details*
   p. *A116 Village Hall Door Details*
   q. *ENV101 Village Hall ACM Locations (Refer to Division 13)*

WENDEL ENERGY SERVICES

Amendment No.1

Amendment to the Comprehensive Energy Audit (CEA)

Wendel Energy Services and the Village of Irvington herewith amend the Comprehensive Energy Audit (CEA) dated March 1, 2008 as detailed below:

It is hereby agreed that the Comprehensive Energy Audit (CEA) shall be modified as follows:

- Revise Section 1 (Executive Summary), page 1-3, in the original Comprehensive Energy Audit, dated March 1, 2008 as follows:
    - Delete: Using final pricing for material and installation labor yields a total estimated installed cost (with PSCO mark-up, a 10% construction contingency, and a $100,000 buy-down) of $902,204. Based on Wendel's analysis, implementation of these measures will provide estimated total annual savings of approximately $51,382 with a simple payback of 17.6 years.
    - Add: Using final pricing for material and installation labor yields a total estimated installed cost (with PSCO mark-up, a 10% construction contingency, and a $100,000 buy-down) of $794,263. Based on Wendel's analysis, implementation of these measures will provide estimated total annual savings of approximately $49,128 with a simple payback of 16.2 years.
    - Delete: Using final pricing for material and installation labor yields a total estimated installed cost (with PSCO mark-up and a 10% construction contingency) of $1,470,316. Based on Wendel's energy and water analysis, implementation of these measures would provide estimated total annual energy and operational savings of approximately $164,427. This yields a simple payback of approximately 8.9 years.
    - Add: Using final pricing for material and installation labor yields a total estimated installed cost (with PSCO mark-up and a 10% construction

contingency) of $1,779,221. Based on Wendel's energy and water analysis, implementation of these measures would provide estimated total annual energy and operational savings of approximately $164,427. This yields a simple payback of approximately 10.8 years.

- Delete Table 1-1A (Total Project Summary - Village Buildings), dated February 11, 2008, in the original Comprehensive Energy Audit, and add Table 1-1A (Total Project Summary - Village Buildings), dated August 25, 2008, located in Attachment 1 of this Amendment.
- Delete Table 1-1B (Cashflow Analysis - Village Buildings), dated February 11, 2008, in the original Comprehensive Energy Audit, and add Table 1-1B (Cashflow Analysis - Village Buildings), dated August 25, 2008, located in Attachment 2 of this Amendment.
- Delete Table 1-2A (Total Project Summary – Water District), dated February 11, 2008, in the original Comprehensive Energy Audit, and add Table 1-2A (Total Project Summary – Water District), dated August 25, 2008, located in Attachment 3 of this Amendment.
- Delete Table 1-2B (Cashflow Analysis – Water District), dated February 11, 2008, in the original Comprehensive Energy Audit, and add Table 1-2B (Cashflow Analysis – Water District), dated August 25, 2008, located in Attachment 4 of this Amendment.

NOW THEREFORE, in consideration of mutual promises, covenants and agreements contained herein, and other good and valuable consideration the receipt of which is hereby acknowledged, the parties have hereto executed this amendment agreement, the ____ day of _____, 2008.

Village of Irvington	Wendel Energy Services, L.L.C.
_____	_____
Lawrence Schopfer, Village Administrator	Scott F. Smith, General Manager

Attachment 1: Total Project Summary - Village Buildings

Village of Irvington
Table 1-1a: Total Project Summary
August 25, 2008
Village Buildings
Comprehensive Energy Audit (CEA)

Measure No.	FACILITY	FACILITY IMPROVEMENT MEASURE	TOTAL MEASURE COST	ANNUAL ELECTRIC SAVINGS (kWh)	ANNUAL DEMAND SAVINGS (kW)	ANNUAL FUEL SAVINGS (mmBtu)	ANNUAL OPERATING SAVINGS	ANNUAL ENERGY SAVINGS	TOTAL ANNUAL SAVINGS	SIMPLE PAYBACK
1a	DPW Complex	High Efficiency Lighting & Lighting Controls	$15,382	6,491	31.8	-6	$47	$777	$823	18.7
1b	Recreation Center	High Efficiency Lighting & Lighting Controls	$8,227	6,815	34.9	-6	$39	$849	$888	9.3
1c	Fire House	High Efficiency Lighting & Lighting Controls	$11,708	11,076	40.3	-9	$38	$1,102	$1,140	10.3
1d	Library	High Efficiency Lighting & Lighting Controls	$3,912	2,780	7.5	-2	-$23	$225	$201	19.4
1e	Senior Center	High Efficiency Lighting & Lighting Controls	$5,214	982	3.2	-1	-$4	$91	$87	60.0
1f	Village Hall	High Efficiency Lighting & Lighting Controls	$28,528	26,469	114.4	-23	$257	$2,951	$3,209	8.9
2a	Village Hall	Direct Digital Control System	$3,710	0	0.0	50	$0	$1,176	$1,176	3.2
2b	Recreation Center	Direct Digital Control System	$2,482	0	0.0	29	$0	$427	$427	5.8
2c	Fire House	Direct Digital Control System	$2,482	0	0.0	47	$0	$650	$650	3.8
2d	Library	Direct Digital Control System	$99,095	110,163	0.0	187	$1,300	$8,749	$10,049	9.9
2e	Senior Center	Direct Digital Control System	$3,710	0	0.0	25	$0	$379	$379	9.8
3a	Recreation Center	Boiler Replacement	$27,211	0	0.0	45	$320	$670	$990	27.5
3b	Village Hall	Boiler Replacement	$45,838	0	0.0	99	$320	$1,399	$1,719	26.7
3c	Fire House	Boiler Replacement	$41,709	0	0.0	105	$320	$1,450	$1,770	23.6
4b	Fire House	Window Replacement	$144,760	6,100	9.2	181	$0	$2,909	$2,909	49.8
4c	Recreation Center	Window Replacement	$210,907	2,743	5.4	80	$0	$1,387	$1,387	152.1
5	Fire House	Roof Replacement	$92,367	0	0.0	97	$1,050	$1,348	$2,398	38.5
6	Village Streets	Street Lighting	$12,726	100,774	0.0	0	$0	$15,217	$15,217	0.8
7a	DPW Complex	Building Envelope Improvements	$13,648	0	0.0	166	$0	$1,722	$1,722	7.2
7b	Village Hall	Building Envelope Improvements	$3,042	0	0.0	69	$0	$734	$734	4.1
7c	Recreation Center	Building Envelope Improvements	$491	0	0.0	5	$0	$58	$58	8.4
7d	Senior Center	Building Envelope Improvements	$1,432	0	0.0	16	$0	$181	$181	7.9
7e	Library	Building Envelope Improvements	$982	0	0.0	11	$0	$130	$130	7.5
7f	Fire House	Building Envelope Improvements	$6,040	0	0.0	85	$0	$885	$885	6.8
Add-Fee	Contract	Additional Fees	$8,661	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		PROGRAM TOTALS - Recommended Measures	$794,263	274,393	246.7	1,251	$3,663	$45,465	$49,128	16.2

Attachment 2: Cashflow Analysis - Village Buildings

Preliminary Information; Not for Public Dissemination

Village of Irvington
Table 1-1b: Cashflow Analysis
Village Buildings
Comprenensive Energy Audit (CEA)
15-Year Term, 4.77% Interest Rate

Project Financing (Annual Payments per RFP)

	Municipal Lease
Project Cost	$ 794,263
Project Buydown (Village of Irvington)	$ 100,000
Municipal Lease Financed Amount	$ 694,263
Interest Rate	4.77%
Term of Financing (15 Years)	15
Payment Frequency	Annual

Note: Project cost includes Design fees and all other overheads costs.

	A1	A2	A = A1-A2	B	C	D=A+B+C	E	F	G=E+F	D-G	
Year	Annual Energy Cost W/O Improvements (1)	Annual Energy Costs With Improvements	Annual Energy Savings	Annual Operational Savings	Net Energy Incentives	Total Annual Savings	Municipal Lease Payments	Annual M&V Costs	Net Annual Costs	Annual Cash Flow	Cumulative Cash Flow
Installation			$ 22,732		$ -	$ 22,732				$ 22,732	$ 22,732
1	$ 341,000.00	$ 295,535	$ 45,465	$ 3,663	$ -	$ 49,128	$ (65,851)	$ (1,500)	$ (67,351)	$ (18,223)	$ 4,510
2	$ 347,138.00	$ 300,855	$ 46,283	$ 3,773	$ -	$ 50,057	$ (65,851)	$ (1,545)	$ (67,396)	$ (17,340)	$ (12,830)
3	$ 353,582.90	$ 306,440	$ 47,143	$ 3,887	$ -	$ 51,029	$ (65,851)	$ (1,591)	$ (67,442)	$ (16,413)	$ (29,243)
4	$ 360,350.05	$ 312,305	$ 48,045	$ 4,003	$ -	$ 52,048	$ (65,851)	$ (1,639)	$ (67,490)	$ (15,442)	$ (44,686)
5	$ 367,455.55	$ 318,463	$ 48,992	$ 4,123	$ -	$ 53,115	$ (65,851)	$ (1,688)	$ (67,539)	$ (14,424)	$ (59,110)
6	$ 374,916.32	$ 324,929	$ 49,987	$ 4,247	$ -	$ 54,234	$ (65,851)	$ (1,739)	$ (67,590)	$ (13,356)	$ (72,466)
7	$ 382,750.14	$ 331,719	$ 51,031	$ 4,374	$ -	$ 55,406	$ (65,851)	$ (1,791)	$ (67,642)	$ (12,237)	$ (84,702)
8	$ 390,975.65	$ 338,848	$ 52,128	$ 4,506	$ -	$ 56,634	$ (65,851)	$ (1,845)	$ (67,696)	$ (11,062)	$ (95,765)
9	$ 399,612.43	$ 346,333	$ 53,280	$ 4,641	$ -	$ 57,920	$ (65,851)	$ (1,900)	$ (67,751)	$ (9,831)	$ (105,596)
10	$ 408,681.05	$ 354,192	$ 54,489	$ 4,780	$ -	$ 59,269	$ (65,851)	$ (1,957)	$ (67,808)	$ (8,540)	$ (114,135)
11	$ 461,851.10	$ 400,273	$ 61,578	$ 4,923	$ -	$ 66,501	$ (65,851)	$ (2,016)	$ (67,867)	$ (1,366)	$ (115,501)
12	$ 471,849.26	$ 408,939	$ 62,911	$ 5,071	$ -	$ 67,982	$ (65,851)	$ (2,076)	$ (67,927)	$ 54	$ (115,447)
13	$ 482,347.32	$ 418,037	$ 64,310	$ 5,223	$ -	$ 69,534	$ (65,851)	$ (2,139)	$ (67,990)	$ 1,544	$ (113,903)
14	$ 493,370.29	$ 427,590	$ 65,780	$ 5,380	$ -	$ 71,160	$ (65,851)	$ (2,203)	$ (68,054)	$ 3,106	$ (110,797)
15	$ 504,944.40	$ 437,621	$ 67,323	$ 5,541	$ -	$ 72,865	$ (65,851)	$ (2,269)	$ (68,120)	$ 4,745	$ (106,052)
Totals	$ 6,140,824.47	$ 5,322,081	$ 841,476	$ 68,136	$ -	$ 909,612	$ (987,766)	$ (27,898)	$ (1,015,665)	**$ (106,052)**	

Attachment 3: Total Project Summary – Water District

Village of Irvington
Table 1-2a: Total Project Summary
August 25, 2008
Water District
Comprehensive Energy Audit (CEA)

Measure No.	FACILITY	FACILITY IMPROVEMENT MEASURE	TOTAL MEASURE COST	ANNUAL ELECTRIC SAVINGS (kWh)	ANNUAL DEMAND SAVINGS (kW)	ANNUAL FUEL SAVINGS (mmBtu)	ANNUAL OPERATING SAVINGS	ANNUAL ENERGY SAVINGS	TOTAL ANNUAL SAVINGS	SIMPLE PAYBACK
1g	Pump House	High Efficiency Lighting & Lighting Controls	$7,841	2,904	32.5	-2	$7	$514	$522	15.0
3d	Pump House	Boiler Replacement	$31,964	0	0.0	44	$320	$661	$981	32.6
7g	Pump House	Building Envelope Improvements	$10,447	0	0.0	169	$0	$1,878	$1,878	5.6
8	Water District	Water Meter Replacement	$962,756	0	0.0	0	$161,046	$0	$161,046	6.0
9	Water District	Pump Station Upgrades	$140,626	0	0.0	0	$0	$0	$0	N/A
10	Water District	Steel Water Tank Rehabilitation	$409,132	0	0.0	0	$0	$0	$0	N/A
11	Water District	PRV Replacement	$29,900	0	0.0	0	$0	$0	$0	N/A
12	Water District	Packaged Engine Generators	$167,115	0	0.0	0	$0	$0	$0	N/A
Add-Fee	Contract	Additional Fees	$19,442	N/A	N/A	N/A	N/A	N/A	N/A	N/A
		PROGRAM TOTALS - Recommended Measures	$1,779,221	2,904	32.5	210	$161,374	$3,053	$164,427	10.8

Attachment 4: Cashflow Analysis – Water District

Preliminary Information; Not for Public Dissemination

Village of Irvington
Table 1-2b: Cashflow Analysis
Water District
Comprehensive Energy Audit (CEA)
15 Year Term, 4.77% Interest Rate

Project Financing (Annual Payments)

	Municipal Lease
Project Cost	$ 1,779,221
Project Buydown (Village of Irvington)	$ -
Municipal Lease Financed Amount	$ 1,779,221
Interest Rate	4.77%
Term of Financing (15 Years)	15
Payment Frequency	Annual

Note: Project cost includes Design fees and all other overheads costs.

	A1	A2	A = A1-A2	B	C	D=A+B+C	E	F	G=E+F	D-G	
Year	Annual Energy Cost W/O Improvements (1)	Annual Energy Costs With Improvements	Annual Energy Savings	Annual Operational Savings	Net Energy Incentives	Total Annual Savings	Municipal Lease Payments	Annual M&V Costs	Net Annual Costs	Annual Cash Flow	Cumulative Cash Flow
Installation			$ 1,527		$ -	$ 1,527				$ 1,527	$ 1,527
1	$ 22,000	$ 18,947	$ 3,053	$ 161,374	$ -	$ 164,427	$ (168,760)	$ (1,500)	$ (170,260)	$ (5,833)	$ (4,306)
2	$ 22,396	$ 19,288	$ 3,108	$ 166,215	$ -	$ 169,323	$ (168,760)	$ (1,545)	$ (170,305)	$ (982)	$ (5,288)
3	$ 22,812	$ 19,646	$ 3,166	$ 171,201	$ -	$ 174,367	$ (168,760)	$ (1,591)	$ (170,351)	$ 4,016	$ (1,272)
4	$ 23,248	$ 20,022	$ 3,226	$ 176,337	$ -	$ 179,564	$ (168,760)	$ (1,639)	$ (170,399)	$ 9,165	$ 7,893
5	$ 23,707	$ 20,417	$ 3,290	$ 181,627	$ -	$ 184,918	$ (168,760)	$ (1,688)	$ (170,448)	$ 14,470	$ 22,363
6	$ 24,188	$ 20,831	$ 3,357	$ 187,076	$ -	$ 190,433	$ (168,760)	$ (1,739)	$ (170,499)	$ 19,935	$ 42,298
7	$ 24,694	$ 21,267	$ 3,427	$ 192,689	$ -	$ 196,116	$ (168,760)	$ (1,791)	$ (170,551)	$ 25,565	$ 67,862
8	$ 25,224	$ 21,724	$ 3,501	$ 198,469	$ -	$ 201,970	$ (168,760)	$ (1,845)	$ (170,605)	$ 31,365	$ 99,228
9	$ 25,781	$ 22,203	$ 3,578	$ 204,423	$ -	$ 208,001	$ (168,760)	$ (1,900)	$ (170,660)	$ 37,341	$ 136,569
10	$ 26,367	$ 22,707	$ 3,659	$ 210,556	$ -	$ 214,215	$ (168,760)	$ (1,957)	$ (170,717)	$ 43,498	$ 180,068
11	$ 29,797	$ 25,662	$ 4,135	$ 216,873	$ -	$ 221,008	$ (168,760)	$ (2,016)	$ (170,776)	$ 50,232	$ 230,300
12	$ 30,442	$ 26,217	$ 4,225	$ 223,379	$ -	$ 227,604	$ (168,760)	$ (2,076)	$ (170,836)	$ 56,768	$ 287,068
13	$ 31,119	$ 26,800	$ 4,319	$ 230,080	$ -	$ 234,399	$ (168,760)	$ (2,139)	$ (170,898)	$ 63,501	$ 350,568
14	$ 31,830	$ 27,413	$ 4,418	$ 236,983	$ -	$ 241,400	$ (168,760)	$ (2,203)	$ (170,962)	$ 70,438	$ 421,006
15	$ 32,577	$ 28,056	$ 4,521	$ 244,092	$ -	$ 248,613	$ (168,760)	$ (2,269)	$ (171,029)	$ 77,585	$ 498,591
Totals	$ 396,182	$ 341,199	$ 56,510	$ 3,001,375	$ -	$ 3,057,885	$ (2,531,395)	$ (27,898)	$ (2,559,294)	**$ 498,591**	

GENERAL TERMS & CONDITIONS

GENERAL TERMS AND CONDITIONS

1. SCOPE OF AGREEMENT

1.1 **Required Approvals.** This Contract is subject to termination by Owner pursuant to Section 20.1 in the event any required approval, clearance, and/or coordination with appropriate governmental or commercial entities as may be mandated by the subject matter of the Contract and/or the proposed financing thereof ("Required Approval") is not obtained.

1.2 **Design Professionals.** Any required architectural and engineering services ("Design Services") shall be procured from design professionals licensed to provide Design Services in the geographic location of the Facilities (the "Architect/Engineer"), who shall be retained by Wendel pursuant to a separate agreement between Wendel and the Architect/Engineer. The standard of care for Design Services performed hereunder shall be the care and skill ordinarily used by members of the architectural and engineering professions practicing under similar conditions at the same time in the geographic location of the Facilities.

1.3 **Non-appropriations Clause.** This Contract shall be deemed executory only to the extent of the monies appropriated and available for the purpose of the Contract, and no liability on account therefore shall be incurred beyond the amount of such monies. It is understood that neither this Contract nor any representation by any public employee or officer creates any legal or moral obligation to request, appropriate, or make available monies for the purpose of the Contract.

1.4 **Extent of Contract** This Contract is solely for the benefit of the Parties and supersedes all prior negotiations, representations or agreements, either written or oral, with respect to the subject matter hereof. Owner and Wendel agree to look solely to each other with respect to the performance of the Contract. The Contract and each and every provision is for the exclusive benefit of Owner and Wendel and not for the benefit of any third party nor any third party beneficiary, except to the extent that may be expressly provided for in the Contract Documents.

2. WENDEL'S RESPONSIBILITIES

2.1 Wendel shall exercise reasonable skill and judgment in the performance of the Work.

2.2 Wendel shall supervise and direct the Work and shall be solely responsible for construction means, methods, techniques, sequences and procedures and for coordinating portions of the Work.

2.3 Wendel shall provide to Owner "as built" drawings upon completion of the Work.

2.4 Wendel shall take professionally reasonable precautions to prevent buildings being worked on from harm by the Work being performed, and shall be responsible for any damages to the buildings caused by the Work.

2.5 Wendel shall coordinate all Work with the Owner's project facilitator ("Owner's Facilitator") to minimize disruption of Owner operations.

2.6 Wendel shall be responsible to pay for labor, materials, equipment, tools, construction equipment and machinery, transportation and other facilities and services necessary for the proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

2.7 Wendel shall be responsible for obtaining all permits and related permit fees associated with the Work.

2.8 Wendel shall pay sales, consumer, use, and other similar taxes, as may be required by law, and shall secure and pay for the building permit and other permits and governmental fees, licenses, and inspections necessary for proper execution, as may be required by law.

2.9 Where applicable, Wendel will assist the Owner in securing any necessary approvals, easements, assessments, or zoning changes.

2.10 If applicable and to the extent possible, Wendel will utilize Owner's tax exempt status, but makes no representations regarding the tax implications thereof or Owner's accounting treatment thereof.

2.11 Wendel shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by the Work, including but not limited to dismantled and/or uninstalled components and equipment, and, upon completion of the Work, Wendel shall remove waste materials, rubbish, tools, construction equipment, machinery, and surplus material.

3. OWNER'S RESPONSIBILITIES

3.1 Owner shall designated an Owner's Facilitator who shall be primary contact person for Owner during the performance of this Contract, with the responsibility for facilitating communications and efficient interaction between the Owner and the Wendel project manager, including the timely coordination of Work and Owner internal approvals and processes as may be required for the implementation of the project.

3.2 Owner shall provide full information in a timely manner regarding requirements for this Contract, including, but not limited to;

3.2.1 all available information describing the physical characteristics of the site, including surveys, site evaluations, legal descriptions, existing conditions, subsurface and environmental studies, reports and investigations;

3.2.2 unless otherwise provided in the Contract Documents, necessary approvals, site plan review, rezoning, easements and assessments, fees and charges required for the construction, use, occupancy or renovation of permanent structures, including legal and other required services.

3.3 Wendel shall be entitled to rely on the completeness and accuracy of the information and services provided by Owner as required by this Section 3.

4. SUBCONTRACTS

4.1 **Use of Subcontractors.** Work not performed by Wendel with its own forces shall be performed by subcontractors.

4.2 **Retaining Subcontractors.** Wendel shall not retain any subcontractor to whom Owner has a reasonable and timely objection, provided that Owner agrees to compensate Wendel for any additional costs incurred by Wendel as a result of such objection. Wendel shall not be required to retain any subcontractor to whom Wendel has a reasonable objection.

4.3 **Management of Subcontractors.** Wendel shall be responsible for the management of the subcontractors in the performance of their work.

4.4 **Assignment of Subcontracts.** Wendel shall provide for assignment of subcontracts in the event that Owner terminates this Contract for cause as provided in Paragraph 20.3. Following such termination, Owner shall notify in writing those subcontractors whose assignments will be accepted, subject to the rights of sureties.

4.5 **Binding of Subcontractors and Material Suppliers.** Wendel agrees to bind every subcontractor and material supplier (and require every subcontractor to so bind its subsubcontractors and material suppliers) to all the provisions of this Contract as they apply to the subcontractor's and material supplier's portions of the Work.

5. CHANGE ORDERS

5.1 **Change Orders.** Wendel or Owner may request a change in the Work consisting of additions, deletions or other revisions to the scope of the Work, estimated cost of the Work, compensation, Wendel's Fee, the Date of Substantial Completion and/or the Date of Final Completion (a "Change Order"). All changes in the Work shall be authorized by Change Order.

5.2 **Change Orders.** Any Change Order(s) that result(s) in exceeding the total Contract amount will be firstly subject to the Owner's approval of and signature on a Contract amendment increasing the Agreement amount to facilitate the Change Order(s). Any Change Order(s) that do(es) not result in exceeding the Contract amount will be subject to the mutual consent of the Parties, which consent shall not be unreasonably withheld, and which shall be made in accordance with the following procedure: within ten (10) business days of the submittal of a Change Order, the Parties shall, in writing which sets forth good reason, either object to the Change Order, or request an extension of time necessary to render a decision. If either Party fails to provide a written response within ten (10) business days, then the Change Order as submitted shall be deemed accepted. If the Parties cannot reach agreement under this Section 5.2, either Party may seek relief in accordance with Section 21 (Dispute Resolution) herein.

6. COMPENSATION

6.1 **Price for the Work.**

It is understood and agreed to between the Parties that the price for the Work includes Wendel overhead and administration costs, which shall be adjusted upon determination of the final cost to reflect the applicable overhead rate. The overhead rate shall be applied to all Contract costs, including but not limited to construction materials, labor, subcontractors and normal project expenses. In the event that the scope of the Work described in this Contract is reduced, Wendel shall be reimbursed for the portions of the overhead cost incurred up to the time the Work is removed from this Contract.

6.2 **Adjustment in the Price for or Scope of the Work.** Wendel may submit a Change Order for an adjustment in the price and/or scope of work under the following circumstances, subject to the provisions of Section 5.2.

6.2.1 If Required Approvals are not obtained by Owner within one hundred twenty (120) days of final pricing.

6.2.2 If applicable prevailing wage rates are at any time revised by the New York State Department of Labor.

6.2.3 For changes in the Work as provided for in Section 5.1.

6.2.4 For delays in the Work not caused by Wendel or it's subcontractors there will be an equitable adjustment in Wendel's Fee to compensate Wendel for documented increased expenses (see Section 16).

6.2.5 If the cost of this Contract exceeds any draw schedule set forth herein, as a result of changes (constructive or actual) which require Wendel to render work or services outside the scope of this Contract, Owner will reimburse Wendel for added management costs.

7. PAYMENT TERMS

7.1 **Progress Payments.** Wendel will invoice Owner monthly on a percent complete basis. Unless specifically set forth otherwise elsewhere in the Contract Documents, progress payments (including payment for equipment deposits, materials and equipment delivered either on site or off site) and work and services performed on and off-site shall be made by the financing institution to Wendel and individual subcontractors separately as follows:

7.1.1 Wendel will provide pay applications to Owner for payment once per month. The monthly pay application will be presented for all Work completed, and/or material stored on-site or off-site, and Work to be completed by the date of the invoice. The approval of Owner shall not be unreasonably withheld and shall be made in accordance with the following procedure: within fifteen (15) business days of Wendel's submittal of the invoice, Owner shall, in writing which sets forth good reason, either object to specific portions of the invoice or request an extension of time necessary to render a decision with respect to specific portions of the invoice. If Owner fails to provide a written response within fifteen (15) business days, then the invoice, submitted by Wendel shall be deemed approved. Once a pay application is approved by Owner, Owner shall within twenty-four (24) hours either (i) fax or (ii) send written authorization for the amount of the

pay application (or that portion to which Owner fails to provide reasonable objection in accordance with this paragraph), less five (5%) retainage, to the financing institution.

7.1.2 If Owner fails to authorize payment to Wendel in accordance with the terms set forth in Section 7.1.1 then after ten (10) days of the receipt of an invoice by Owner, Wendel may provide Owner with an additional eight (8) business days Notice for payment. Thereafter, if financing institution fails to provide Wendel with payment, upon an additional fourteen (14) business days Notice to Owner, Wendel may stop the Work until payment of the amount owing has been received. Applicable time frames for completion of the Work shall be extended appropriately, and the agreed upon cost of Work shall be increased by the amount of Wendel's reasonable costs of shut down, delay and start-up, plus interest at the prevailing legal rate. This Section 7.1.2 pertains to the remission of payment only and nothing herein shall extend the time frame set forth in Section 7.1.1 in which Owner may object, or seek additional time to object, to Wendel's invoice.

7.1.3 If the Parties cannot reach an agreement with respect to any aspect under this Section 7.1, either Party may seek relief in accordance with Section 21 (Dispute Resolution). Nothing in the Contract Documents shall afford Owner the right to withhold payment to the extent it fails to comply with the terms of Section 7.1.1.

7.2 **Final Payment.** Final authorization for payment, constituting the entire unpaid balance for the applicable Work plus any retainage withheld, shall be submitted to the financing institution within ten (10) days after Owner's acceptance of the Work. Final authorization for payment may be withheld on account of any material breach of this Contract by Wendel and claims by third parties (including Wendel subcontractors and material suppliers), but only to the extent that written Notice has been provided to Wendel, and Wendel has failed within ten (10) business days of the date of receipt of such Notice, to provide adequate security to protect Owner from any loss, cost, or expense related to such claims.

8. WARRANTY

8.1 Wendel warrants that materials and equipment furnished by Wendel will be of good quality and new; that the Work will be free from defects not inherent in the quality required or permitted; and that the Work will conform to the requirements of the Contract Documents.

8.2 Wendel warrants that the Work shall be free from defects in material and workmanship arising from normal usage for a period of one year from the Date of Substantial Completion, or for a longer time if so specified elsewhere in the Contract Documents.

8.3 Upon written notice from Owner, Wendel shall, at its option, re-perform, repair or replace defective Work at no additional cost to Owner.

8.4 These warranties do not extend to any Work that has not been properly and reasonably maintained, or that has been abused, altered, misused, or repaired by Owner or third parties without the supervision of and prior written approval of Wendel; or if equipment serial numbers or warranty date decals have been removed or altered.

8.5 Owner must promptly report any failure of equipment installed to Wendel in writing.

8.6 All replaced equipment, components or parts become Wendel's property.

8.7 Owner understands that Wendel is a provider of services and shall not be considered a merchant or a vendor of goods. If Wendel installs or furnishes a piece of equipment, and that equipment is covered by a warranty from the manufacturer, Wendel will transfer the benefits of that manufacturer's warranty to Owner.

8.8 EXCEPTING WARRANTIES PROVIDED BY SUBCONTRACTORS AND SUPPLIERS, THESE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THOSE OF MERCHANTABILITY AND FITNESS FOR A SPECIFIC PURPOSE.

9. SUBSTANTIAL/FINAL COMPLETION DATES

Unless the Parties agree otherwise, the Date of Substantial Completion and/or the Date of Final Completion shall be as provided for herein. Owner and Wendel may agree not to establish such dates, or in the alternative to establish one but not the other of the two dates. If such dates are not established upon the execution of a Contract, at such time as final Contract pricing is accepted, a Date of Substantial Completion and/or Date of Final Completion of the Work may be established. If final pricing is not yet established and the Parties desire to establish a Date of Substantial Completion and/or Date of Final Completion, it shall be set forth in an amendment to the Contract.

10. OWNERSHIP OF DOCUMENTS

10.1 **On Final Payment for Completed Work.** Upon the making of final payment pursuant to this Contract, Owner shall receive ownership of the property rights, except for copyrights, of all documents, drawings, specifications, electronic data and information prepared, provided or procured by Wendel, its Architect/Engineer, Subcontractors and consultants and distributed to Owner under the Contract. ("Build Documents").

10.2 **On Termination by Owner for Cause.** If this PDA is terminated by Owner for cause, Owner shall receive ownership of the property rights, except for copyrights, of any Build Documents upon payment for all Work performed in accordance with the Contract, at which time Owner shall have the right to use, reproduce and make derivative works from the Build Documents to complete the Work.

10.3 **On Termination by Owner without Cause.** If a Contract is terminated pursuant to Section 20.4 of the General Terms and Conditions, Owner shall receive ownership of the property rights, except for copyrights, of the Build Documents upon payment of all sums provided in Section 20.4 of the General Terms and Conditions, at which time Owner shall have the right to use, reproduce and make derivative works from the Build Documents to complete the Work.

10.4 **Owner's Use of Design-Build Documents.**

10.4.1 Renovation and Remodeling of Work. Owner may use, reproduce and make derivative works from the Build Documents for subsequent renovation and remodeling of the Work.

10.4.2 Other Projects. Owner shall not use, reproduce or make derivative works from the Build Documents for other projects without the written authorization of Wendel, which authorization shall not be unreasonably withheld.

10.5 **Risk of Owner's Use of Design-Build Documents.** Owner's use of the Build Documents without Wendel's involvement or on other projects is at Owner's sole risk, except for Wendel's indemnification obligation pursuant to Section 16 of the General Terms and Conditions, and Owner shall defend, indemnify and hold harmless Wendel, its Architect/Engineer, Subcontractors and consultants, and the agents, officers, directors and employees of each of them from and against any and all claims, damages, losses, costs and expenses, including but not limited to attorney's fees, costs and expenses incurred by them in connection with, arising out of or resulting from Owner's use of the Build Documents before or after the termination or expiration of this Contract.

10.6 **Wendel's Property Rights Obligation.** Wendel shall obtain from its Architect/Engineer, Subcontractors and consultants property rights and rights of use that correspond to the rights given by Wendel to Owner under a Contract.

11. WENDEL'S PROPERTY

All materials furnished by and used by Wendel personnel at the installation site and not part of the Work, including documentation, designs, schematics, test equipment, software, and associated media (excluding Build Documents) remain the exclusive property of Wendel. Owner agrees not to use such materials for any purpose at any time. Owner agrees to allow Wendel personnel to retrieve and to remove all such materials remaining after installation or maintenance operations have been completed. Owner acknowledges that any software included is proprietary

and will be delivered only under the provisions of an appropriate Software License Agreement that will limit its use to the system purchased under the applicable Contract. Any reuse of the materials without written authorization by Wendel, as appropriate, for the specific purpose intended, will be at Owner's sole risk and without liability or legal exposure to Wendel, or to Wendel's subcontractors. Owner shall indemnify and hold harmless Wendel and its subcontractors from all claims, damages, losses and expenses including attorneys' fees arising out of or resulting from the Owner's, Owner's agents or their respective employees' reuse of Wendel materials or property without the written permission of Wendel.

12. ROYALTIES, PATENTS AND COPYRIGHTS

Wendel shall pay all royalties and license fees which may be due on the inclusion of any patented or copyrighted materials, methods or systems selected by Wendel and incorporated in the Project, Wendel shall defend, indemnify and hold Owner harmless from all suits or claims for infringement of any patent rights or copyrights arising out of such selection. Owner agrees to defend, indemnify and hold Wendel harmless from all suits or claims of infringement of any patent rights or copyrights arising out of any patented or copyrighted materials, methods or systems the use or implementation of which is specifically requested by Owner contrary to Wendel recommendations. Any such conflict shall be documented in a writing.

13. SAFETY OF PERSONS AND PROPERTY

13.1 **Precautions and Programs.** Wendel shall have overall responsibility for safety precautions and programs in the performance of the Work. While the provisions of this Section 13.1 establish the responsibility for safety between Owner and Wendel, they do not relieve subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with the provisions of applicable laws and regulations. Wendel shall seek to avoid injury, loss or damage to persons or property by taking reasonable steps to protect:

13.1.1 its employees and other persons at the worksite;

13.1.2 materials, supplies and equipment stored at the worksite for use in performance of the Work; and

13.1.3 the project and all property located at the worksite and adjacent to work areas, whether or not said property or structures are part of or involved in the Work.

13.2 **Safety Representative.** Wendel shall designate an individual at the worksite who shall act as Wendel's designated safety representative with a duty to prevent accidents. Wendel will report immediately in writing all accidents and injuries occurring at the worksite to Owner. When Wendel is required to file an accident report with a public authority, Wendel shall furnish a copy of the report to Owner.

13.3 **Legal Compliance.** Wendel shall provide Owner with copies of all notices required of Wendel by law or regulation. Wendel's safety program shall comply with the requirements of governmental and quasi-governmental authorities having jurisdiction over the Work.

13.4 **Owner's Rights.** If Owner deems any part of the Work or worksite unsafe, Owner, without assuming responsibility for Wendel's safety program, may require Wendel to stop performance of the Work or take corrective measures satisfactory to Owner, or both.

13.5 **Owner's Requirements.** Wendel shall abide by Owner's facility safety requirements, if any, that may be set forth in the Contract Documents.

14. HAZARDOUS MATERIALS.

14.1 **Suspension of Services.** If after the commencement of the Work, Hazardous Material is discovered at a worksite, Wendel shall be entitled to immediately stop working in the affected area. Wendel shall report the condition to Owner and, if required, any government agency with jurisdiction. Unless specifically set forth in the Project Documents, Wendel shall not be required to perform any Work relating to or in the area of Hazardous Material without the written mutual agreement of the Parties.

14.2 **Wendel's Obligations.** Wendel's obligations expressly exclude any work or services of any nature associated or connected with the identification, abatement, cleanup, control, removal, or disposal of Hazardous Material in or on or around the worksite that is not set forth in the Contract Documents, unless specifically set forth in a mutually agreed upon Change Order.

14.3 **Owner's Obligations.** Owner shall be responsible for retaining an independent testing laboratory to determine the nature of the material encountered and whether it is a Hazardous Material requiring corrective measures and/or remedial action. Such measures shall be the sole responsibility of Owner, and shall be performed in a manner minimizing any adverse effects upon the Work of Wendel. Wendel shall resume Work in the area affected by any Hazardous Material only upon (i) written mutual agreement between the Parties or (ii) after the Hazardous Material has been removed or rendered harmless and only after approval, if necessary, of any governmental agencies with jurisdiction.

14.4 **Reassessment of Contracts.** Upon the discovery of the presence of Hazardous Material, Wendel and Owner shall mutually review and determine appropriate adjustments to any affected Statements of Work with respect to (i) pricing and guarantee(s), (ii) costs of any delays, additional actions, work and/or services required, (iii) adjustments to Dates of Substantial and Final Completion, and (iv) any other aspect affected by the discovery.

14.4.1 **Option to Terminate.** If, upon the discovery of Hazardous Material and review of the potential ramifications on any affected Statements of Work, either Party no longer wishes to proceed with all or a portion of an affected Contract, that Party may, upon written Notice setting forth good reason, terminate all or that portion of an affected Contract that warrants termination as a result of the discovery of Hazardous Material. In the event of the termination of an affected Contract, in part or in whole, Owner shall reimburse Wendel for all documented loss, cost or expense in connection with verifiable executed Work up to the date of Notice, plus any applicable demobilization costs.

14.5

14.6 **Indemnification.** Provided Wendel, its subcontractors, material suppliers and subsubcontractors, and the agents, officers, directors and employees of each of them, have not, acting under their own authority, knowingly entered upon any portion of the Work containing Hazardous Material, and to the extent not caused by the negligent acts or omissions of Wendel, its subcontractors, material suppliers and subsubcontractors, and the agents, officers, directors and employees of each of them, Owner shall defend, indemnify and hold harmless Wendel, its subcontractors, material suppliers and subsubcontractors, and the agents, officers, directors and employees of each of them, from and against any and all claims, damages, losses, costs and expenses, including but not limited to attorney's fees, costs and expenses incurred in connection with, arising out of or relating to the performance of the Work in any area affected by Hazardous Material.

14.7 **Material Safety Data Sheets.** Material Safety Data ("MSD") sheets as may be required by law and pertaining to materials or substances used or consumed in the performance of the Work, whether obtained by Wendel, subcontractors, Owner or others, shall be maintained at the worksite by Wendel and made available to Owner and subcontractors.

14.8 **Liability.** During Wendel's performance of the Work, Wendel shall be responsible for the proper handling of all materials brought to the worksite by Wendel. Upon the issuance of the Certificate of Substantial Completion, Owner shall be responsible under this Section 14 for materials and substances brought to the site by Wendel if such materials or substances are required by the Contract Documents.

14.9 **Disagreement.** If the Parties cannot reach agreement with respect to any aspect under this Section 14, either Party may seek relief in accordance with Section 21 (Dispute Resolution).

14.10 **Survival.** The terms of this Section 14 shall survive (i) the completion of any Work undertaken pursuant to this Contract and (ii) the termination of this Contract.

15. TIME

15.1 **Date of Commencement.** The Date of Commencement is the effective date of this Contract as indicated by, in order of precedence, (i) its terms and conditions or (ii) the date the last Party signs this Contract. The Work shall proceed in general accordance with a schedule of work as such schedule may be amended from time to time, subject, however, to other provisions of the Contract Documents.

15.2 **Time is of the Essence.** Time limits stated in this Contract are of the essence.

16. DELAYS IN THE WORK.

16.1 Wendel shall not be liable for any delay caused by the failure of Owner to (i) perform its contractual obligations, (ii) cooperate in the timely completion of the Work, or (iii) finalize Work selection in accordance with the provisions set forth in the Contract Documents.

16.1.1 If causes beyond Wendel's or its subcontractors' control delay the progress of the Work, Wendel's Fee and/or the Dates of Substantial and/or Final Completion shall be modified by Change Order as appropriate. Such causes shall include, but not be limited to, force majeure events as defined in Section 23.6, changes ordered in the Work, acts or omissions of Owner or others beyond Wendel's control, Owner preventing Wendel from performing the Work pending dispute resolution, Hazardous Materials or differing site conditions.

16.1.2 Wendel shall give written notice to Owner of the existence, extent of, and reason for any material delays, and an equitable adjustment in the Substantial or Final Completion Dates and/or Contract price may be submitted by Wendel pursuant to Section 5.

16.1.3 In the event delays are encountered for any reason, the Parties agree to undertake economically reasonable steps to mitigate the effect of such delays.

17. INSURANCE REQUIREMENTS

Wendel shall maintain insurance in full force and effect at all times that Work is being conducted in the minimum amounts and coverages required by Owner as set forth in Attachment 1. Prior to commencing the Work, Wendel shall provide a certificate of insurance to Owner showing its insurance coverage. Owner will be responsible for providing builder's risk insurance.

18. INDEMNITY

Wendel and Owner agree to indemnify and hold each other harmless from any and all claims, actions, costs, expenses, damages and liabilities, including reasonable attorney fees resulting from bodily injury or damage to property of others, arising out of, connected with or resulting from the negligent acts or omissions, or willful misconduct of their or their subcontractors respective officers, members, employees or other agents in connection with their activities within the scope of this Contract. However, neither Party shall indemnify the other against claims, damages, expenses or liabilities resulting from the negligent acts or omissions, or willful misconduct of the other Party. If the Parties are both at fault, then the obligation to indemnify shall be proportional to fault. The duty to indemnify will continue in full force and effect notwithstanding the expiration or early termination of this Contract with respect to any claims based on facts or conditions which occurred prior to the termination. The indemnification obligations set forth in this Section 18 shall survive the termination this Contract.

19. LIMITATIONS ON LIABILITY

19.1 EXCEPTING INDEMNIFICATION OBLIGATIONS FOR THIRD PARTY CLAIMS SET FORTH IN SECTION 18, NEITHER WENDEL NOR OWNER WILL BE RESPONSIBLE OR LIABLE TO THE OTHER FOR ANY SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES FOR ANY OCCURENCE, HAPPENING, EVENT, INCIDENT, EPISODE OR CIRCUMSTANCE ARISING OUT OF OR RELATED TO THIS CONTRACT.

19.2 SUBSEQUENT TO OWNER'S SIGNATURE ON AN APPLICABLE CERTIFICATE OF SUBSTANTIAL COMPLETION, WENDEL ACCEPTS NO LIABILITY FOR ANY SITUATION, DAMAGE, MALFUNCTION, EQUIPMENT OR SYSTEMS ARISING FROM OR RELATED TO OWNER'S OR OTHER PARTIES' (I) IMPROPER USE OR MISUSE OF EQUIPMENT OR SYSTEMS, (II) ENTRY OF EQUIPMENT OR SYSTEMS DATA OR (III) THE GENERATION OF DATABASES THAT MAY BE REQUIRED BY THE EQUIPMENT OR SYSTEMS.

19.3 IF THIS CONTRACT COVERS FIRE SAFETY OR SECURITY EQUIPMENT, OWNER UNDERSTANDS THAT WENDEL IS NOT AN INSURER OF SUCH EQUIPMENT, SYSTEMS OR RELATED SERVICES. WENDEL SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE OR LOSS THAT MAY RESULT FROM FIRE SAFETY OR SECURITY EQUIPMENT, SYSTEMS OR RELATED SERVICES THAT, AFTER EXECUTION OF A CERTIFICATE OF SUBSTANTIAL COMPLETION BY OWNER, FAIL TO PERFORM PROPERLY OR FAIL TO PREVENT A CASUALTY LOSS.

19.4 THE PROVISIONS OF THIS SECTION 19 SHALL GOVERN IN THE EVENT OF THE TERMINATION OF THIS CONTRACT AND SHALL SURVIVE SUCH TERMINATION.

20. SUSPENSION AND TERMINATION OF THE CONTRACT

20.1 Termination on Failure to Obtain Required Approvals.

20.1.1 Either Party may terminate this Contract on Notice if Owner fails to timely obtain any required approval, clearance, and/or coordination acceptable to Owner with governmental or commercial entities as may be mandated by the subject matter of this Contract, the services to be rendered, and/or the proposed financing thereof. Any applicable Required Approvals shall be enumerated in each contract.

20.1.2 Upon a termination by Wendel or Owner in accordance with this Section 20.1, Wendel shall be entitled to recover from Owner payment for all Work executed up to the date of Notice and for all verifiable loss, cost or expense in connection with the executed Work, plus all demobilization costs and reasonable damages.

20.2 Suspension by Owner for Convenience.

20.2.1 Owner may order Wendel in writing to suspend, delay or interrupt all or any part of the Work without cause for such period of time as Owner may determine to be appropriate for its convenience.

20.2.2 Adjustments caused by suspension, delay or interruption shall be made for increases in the Contract price, compensation, Wendel's Fee and/or the Date of Substantial Completion and/or the Date of Final Completion. No adjustment shall be made if Wendel is or otherwise would have been responsible for the suspension, delay or interruption of the Work, or if another provision of the Contract Documents is applied to render an equitable adjustment.

20.3 Termination by Owner for Cause and Owner's Right to Perform Wendel's Obligations.

20.3.1 If Wendel fails to perform its material obligations under this Contract, Owner may, after fifteen (15) days' written Notice, during which period Wendel fails to perform such obligations, undertake to perform such obligations. The Contract price shall be reduced by the cost to Owner of performing such obligations,

20.3.2 Upon an additional fifteen (15) days' written Notice to Wendel and Wendel's surety, if any, Owner may terminate a Contract for any of the following reasons:

(a) if Wendel utilizes improper materials and/or inadequately skilled workers;

(b) if Wendel does not make proper payment to laborers, material suppliers or subcontractors, provided that Owner is making payments to Wendel in accordance with the terms of the Contract;

(c) if Wendel fails to abide by the orders, regulations, rules, ordinances or laws of governmental authorities having jurisdiction; or

(d) if Wendel otherwise materially breaches the terms and conditions of the applicable Contract Documents.

If Wendel fails to cure or commence and continue to cure within the fifteen (15) days, Owner, without prejudice to any other right or remedy, may take possession of/deny Wendel access to the worksite and complete the Work utilizing any reasonable means, with costs to be credited against Wendel's account. In this event, Wendel shall not be paid for Work that Owner performs and shall have no right to further payment until the Work is completed.

20.3.3 In the event Owner exercises its rights under Subparagraph 20.3.1 or 20.3.2, upon the request of Wendel, Owner shall provide a detailed accounting of the cost incurred by Owner.

20.4 **Termination by Owner Without Cause**

20.4.1 If Owner terminates this Contract other than as set forth in Section 20.3, Owner shall pay Wendel for all Work executed up to the date of Notice of Termination and for all verifiable loss, cost or expense in connection with the executed Work, plus all demobilization costs. Owner shall also pay to Wendel fair compensation, either by purchase or rental at the election of Owner, for all equipment retained by Owner. Owner shall assume and become liable for obligations, commitments and unsettled claims that Wendel has previously undertaken or incurred in good faith in connection with the Work or as a result of the termination of this Contract. As a condition of receiving the payments provided under this Section 20.4, Wendel shall cooperate With Owner by taking all steps necessary to accomplish the legal assignment of Wendel's rights and benefits to Owner, including the execution and delivery of required papers.

20.5 **Termination by Wendel.**

20.5.1 Upon five (5) days' written Notice to Owner, Wendel may terminate this Contract for any of the following reasons:

(a) if the Work has been stopped for a sixty (60) day period

(1) under court order or order of other governmental authorities having jurisdiction; or

(2) as a result of the declaration of a national emergency or other governmental act during which, through no act or fault of Wendel, materials are not available;

(b) if the Work is suspended by Owner for sixty (60) consecutive days;

(c) if Owner fails to furnish reasonable evidence that sufficient funds are available and committed for the entire cost of the Contract.

20.5.2 If Owner has for thirty (30) days failed to pay sums owed Wendel on this Contract, Wendel may give written Notice of its intent to terminate this Contract. If Wendel does not receive payment within five (5) days of giving written Notice to Owner, then upon five (5) days' additional written Notice to Owner, Wendel may terminate this Contract.

20.5.3 Upon termination by Wendel in accordance with this Section 20.5, Wendel shall be entitled to recover from Owner payment for all Work executed up to the date of Notice of Termination and for all verifiable loss, cost or expense in connection with the executed Work, plus all demobilization costs and reasonable damages.

20.6 All Contract terminations or suspensions set forth in this Section 20 shall be given by Notice pursuant to Section 23.9 herein.

21. DISPUTE RESOLUTION

21.1 **Dispute Resolution.** If a dispute arises out of or relates to this Contract or a breach hereof, the Parties shall endeavor to settle the dispute first through direct discussions. If the dispute cannot be settled through direct discussions, the Parties shall endeavor to settle the dispute by informal, nonbinding mediation. The location of the mediation shall be the location of the Project. Once one Party files a Request for Mediation with the other Party, the Parties agree to conclude such mediation within sixty (60) days of filing of the request. Either Party may terminate the mediation at any time after the first session, but the decision to terminate must be delivered in person by the

Party's representative to the other Party's representative and the mediator. Each Party shall bear its own expenses and an equal share of the expenses of the mediator and any mediation fees. If the dispute is not resolved by mediation, the Parties shall have the right to resort to any remedies permitted by law. Defenses based on the passage of time are suspended upon submitting the dispute to the mediator and during the mediation, and the time period during the mediation shall be disregarded in calculating such defenses. Nothing in this clause shall be construed to preclude any Party from seeking injunctive relief in order to protect its rights during mediation. A request by a Party to a court for injunctive relief shall not be deemed a waiver of the obligation to mediate.

22. CONFIDENTIALITY

The Parties shall treat as confidential and not disclose to third persons except as is necessary for the performance of the Work, or use for its own benefit, any of the other Party's developments, confidential information, know-how, discoveries, production methods and the like that may be disclosed or acquired in connection with the Work.

23. MISCELLANEOUS PROVISIONS

23.1 **Joint and Several Liability.** If there is more than one Owner named in this Contract, the liability of each shall be joint and several.

23.2 **Assignment.** Neither Owner nor Wendel shall assign its interest in this Contract without the written consent of the other, except as to the assignment of proceeds. The terms and conditions of this Contract shall be binding upon both Parties, their partners, successors, assigns and legal representatives. Neither Party to this Contract shall assign this Contract as a whole without written consent of the other, except that Owner may assign this Contract to a wholly-owned subsidiary of Owner when Owner has fully indemnified Wendel or to an institutional lender providing construction financing for the Project as long as the assignment is no less favorable to Wendel than this Contract. In the event of such assignment, Wendel shall execute all consents reasonably required. In such event, the wholly-owned subsidiary or lender shall assume Owner's rights and obligations under the Contract Documents. If either party attempts to make such an assignment, that Party shall nevertheless remain legally responsible for all obligations under the this Contract, unless otherwise agreed by the other party.

23.3 **Modification.** This Contract may be modified only by a written amendment signed by the Parties.

23.4 **Owner Purchase Orders.** Owner acknowledges and agrees that any purchase order issued by Owner in accordance with this Contract is intended only to establish payment authority for Owner's internal accounting purposes. No purchase order shall be considered to be a counteroffer, amendment, modification, or other revision to the terms of this Contract.

23.5 **Costs.** If any action at law or in equity is necessary to enforce or interpret this Contract between the Parties, the prevailing Party shall be entitled to reasonable arbitrator and/or attorneys' fees, administrative and/or legal costs, and necessary disbursements, in addition to any other relief to which it may be entitled.

23.6 **Force Majeure.** Neither Party will be responsible to another Party for damages, loss, or injury caused by conditions that are beyond their reasonable control, and without the intentional misconduct or negligence, of that Party. Such conditions include, but are not limited to, acts of God, acts of government agencies, strikes, labor disputes, fire, explosions, thefts, vandalism, riots, terrorism, war, or unavailability of parts, materials or supplies.

23.7 **Independent Contractor.** Wendel, in accordance with its status as an independent contractor, covenants and agrees that it will conduct itself consistent with such status, that it will neither hold itself out as, nor claim to be, an officer or employee of Owner by reason hereof, and that it will not, by reason hereof, make any claim, and, or application to or for any right or privilege applicable to an officer or employee of Owner, including, but nor limited to, Worker's Compensation coverage, Unemployment Insurance Benefits, Social Security coverage or Retirement Membership or credit.

23.8 **Non-Solicitation.** Owner acknowledges that Wendel's employees are a valuable asset to Wendel and agrees not to solicit for the purpose of employment any Wendel employee at any time during such employee's performance of services for Owner and for twelve (12) months thereafter.

23.9 **Notice.** Any legal notice ("Notice") which may be or is required to be given shall be written. Notices shall be sent to the address indicated below by registered mail or certified mail, postage prepaid, return receipt requested, or by other prepaid delivery method which is traceable. A fax notice does not constitute Notice. All such Notices shall be deemed to have been given when received. Either Party may change its Notice address by giving Notice to the other Party pursuant to this Section 23.9.

For Wendel:	For Owner:
Scott Smith General Manager Wendel Energy Serrvices, LLC 140 John James Audubon Parkway, Suite 201 Amherst, NY 14228	Brenda Jeselnik Village Clerk/Treasurer Village of Irvington 85 Main Street Irvington, NY 10533

23.10 **Governing Law.** This Contract shall be governed by the laws of the State of New York.

23.11 **Severability.** If any provision of this Contract is held to be illegal, unenforceable or void, then the Parties will be relieved of obligations arising under such provision, but only to the extent that such provision is illegal, unenforceable or void, it being the intent and agreement of the Parties that the provision, as applicable, will be deemed amended by modifying such provision to the extent necessary to make it legal and enforceable while preserving its intent or, if that is not possible, by substituting therefore another provision which is legal and enforceable and achieves the required objectives of the Parties. This clause applies to all Contract provisions, including Section 18, Indemnity.

23.12 **No Waiver of Performance.** The failure of either Party to insist, in any one or more instances, on the performance of any of the terms, covenants or conditions of the Contract Documents, or to exercise any of its rights, shall not be construed as a waiver or relinquishment of such term, covenant, condition or right with respect to further performance.

23.13 **Joint Drafting.** The Parties to this Contract expressly agree that this Contract was jointly drafted, and that both had opportunity to negotiate its terms and to obtain the assistance of counsel in reviewing its terms prior to execution. Therefore, this Contract shall be construed neither against nor in favor of either Party, but shall be construed in a neutral manner.

23.14 **Titles and Groupings.** The titles given to the provisions in the Contract Documents are for ease of reference only and shall not be relied upon or cited for any other purpose. The grouping of the provisions in the Contract Documents under the various headings is solely for the purpose of convenient organization and in no event shall the grouping of provisions, the use of paragraphs or the use of headings be construed to limit or alter the meaning of any provisions.

23.15 **Survival.** Sections 8, 11, 14.6, 14.8, 18, 19, 21, 22, 23.1, 23.5 and 23.8 - 23.12 will survive any termination of this Contract.

23.16 **Entire Agreement.** This Contract is the full agreement between Wendel and Owner as of its Effective Date. All previous conversations, correspondence, agreements, or representations related to this Contract are not part of this Contract between Wendel and Owner and are superseded by this Contract. No modifications to this Contract are binding on Owner or Wendel unless made in writing and signed by the Parties.

ATTACHMENT 1 – INSURANCE REQUIREMENTS

1. GENERAL LIABILITY (COMPREHENSIVE OR COMMERCIAL FORM)

1.1 Comprehensive Form:

Premises/Operations
Products/Completed Operations
Independent Contractors
Contractual Liability
Personal Injury
Broad Form Property Damage
Explosion, Collapse and Underground Hazard

Combined Single Limit for Bodily Injury and Property Damage	$1,000,000 each occurrence $1,000,000 aggregate
Personal Injury	$1,000,000 aggregate

1.2 If the Commercial General Liability Form is used, it must contemplate the same coverages as required above for the Comprehensive Form, subject to the following limits:

Bodily Injury and Property Damage Limit	$1,000,000 each occurrence
Products/Completed Operations Limit	$1,000,000 aggregate
Personal Injury and Advertising Injury Limit	$1,000,000 each person or organization
General Aggregate Limit	$2,000,000 each project

2. AUTOMOBILE LIABILITY

Owned, Hired and Non-Owned Autos (Symbol "1" on Business Auto Policies)

Combined Single Limit for Bodily Injury And Property Damage	$1,000,000 each accident

3. EXCESS "UMBRELLA" LIABILITY

Combined Single Limit for Bodily Injury And Property Damage	$1,000,000 each occurrence

4. WORKER'S COMPENSATION AND EMPLOYERS LIABILITY

Statutory coverage complying with the New York Worker's Compensation Law.

5. COMPLETED OPERATIONS

Coverages must be maintained and evidenced for at least two (2) years after completion of the project

6. CERTIFICATES OF INSURANCE

Must be provided to and approved by Owner prior to commencing work under the Contract.

7. ADVANCE NOTICE OF CANCELLATION

At least 30 days advance written notice of the cancellation, nonrenewal or material change of any of the required coverages must be provided to Wendel.

AMENDMENT NO. 1 TO PROJECT BUILD CONTRACT

This Amendment Number 1, entered into effective on the 24th day of November, 2008, modifies the Project Build Contract ("Contract") between Wendel Energy Services, LLC (hereinafter "Wendel") and the Village of Irvington, New York (hereinafter "Owner"), entered into effective November 3, 2008, for construction services in connection with energy efficiency and operational improvements to be implemented throughout Village buildings and water district (the "Project").

WHEREAS, the parties wish to modify certain terms and conditions set forth in the General Terms and Conditions of the Contract,

NOW, THEREFORE, in consideration of the mutual promises contained herein and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties agree that the Contract is hereby amended as follows:

1. **REPLACE** Section 18, Indemnification, in it's entirety with the following language:

   "Wendel agrees to indemnify and hold Owner harmless from any and all claims, actions, costs, expenses, damages and liabilities, including reasonable attorney fees resulting from bodily injury or damage to property of others, arising out of, connected with or resulting from the negligent acts or omissions, or willful misconduct of their or their subcontractors respective officers, members, employees or other agents in connection with their activities within the scope of this Contract; provided, however, Wendel's duty to indemnify and hold harmless shall not include any claims or liability arising from the negligence acts or omissions, or willful misconduct of Owner, its agents, officers, contractors or employees. The duty to indemnify will continue in full force and effect notwithstanding the expiration or early termination of this Contract with respect to any claims based on facts or conditions which occurred prior to the termination."

2. **FULL FORCE AND EFFECT; REAFFIRMATION**

   Except to the extent expressly provided for in this Amendment, the terms and conditions of the Contract shall remain in full force and effect.

(Signature page follows)

AMENDMENT NO. 1 TO PROJECT BUILD CONTRACT

Wendel

Signature

Scott F. Smith
Printed Name

General Manager
Title

11/26/08
Date

Owner

Signature

Lawrence S. Schopfer
Printed Name

Village Administrator
Title

11/24/08
Date

Acknowledgement taken in New York State

State of New York, County of Erie, ss:

On the 26th day of November in the year 2008, before me, the undersigned, personally appeared

Scott F. Smith

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s) or the person upon behalf of which the individual(s) acted, executed the instrument.

Angela Lipinski
Notary Public

ANGELA LIPINSKI
Notary Public, State of New York
Qualified in Erie County
My Commission Expires May 15, 2010

Acknowledgement taken in New York State

State of New York, County of Westchester, ss:

On the 24 day of November, in the year 2008, before me, the undersigned, personally appeared

Lawrence S. Schopfer

personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s) or the person upon behalf of which the individual(s) acted, executed the instrument.

Notary Public

SARAH PALERMO
NOTARY PUBLIC, STATE OF NEW YORK
WESTCHESTER COUNTY
LIC # 01PA6182438
COMM. EXP. FEBRUARY 25, 2012