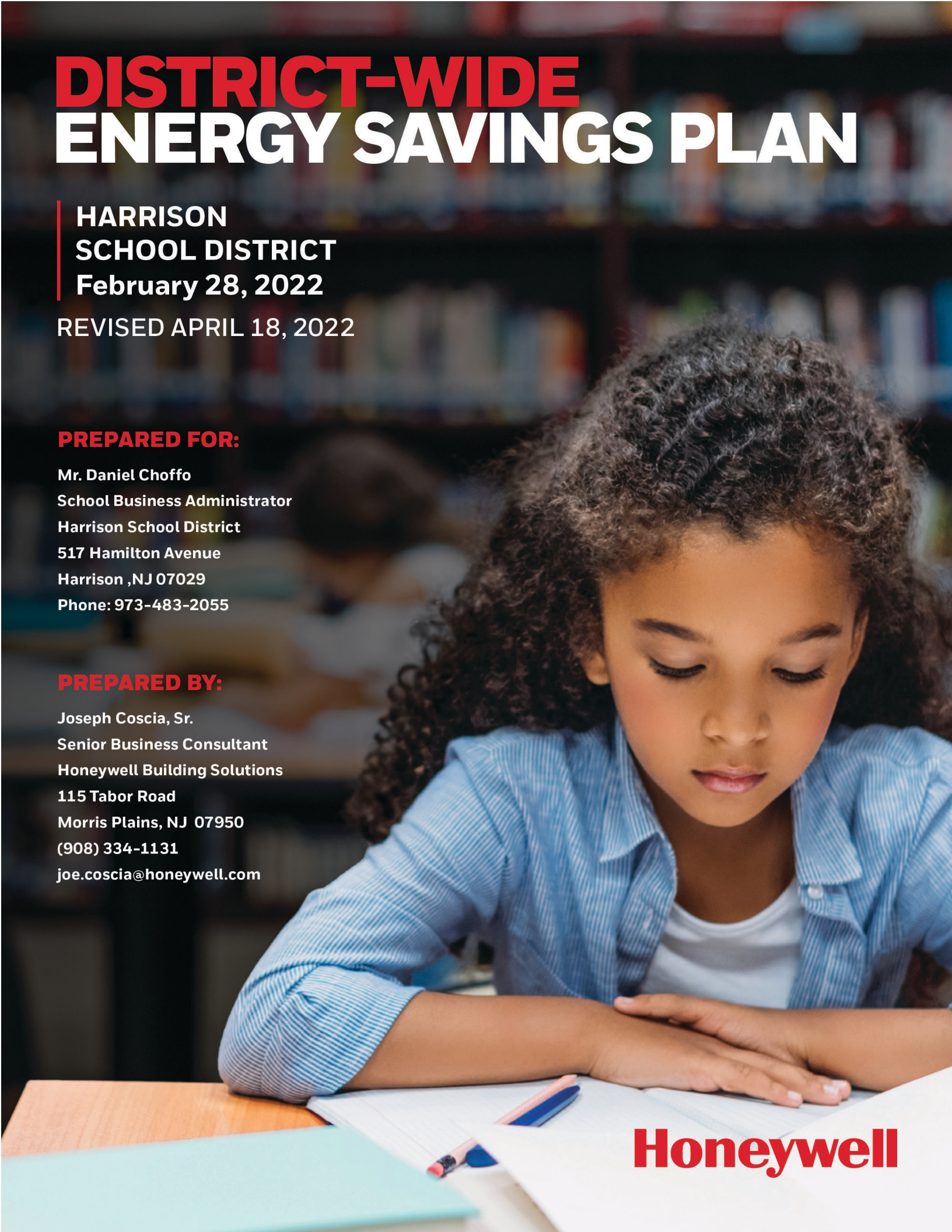
DISTRICT-WIDE ENERGY SAVINGS PLAN

HARRISON SCHOOL DISTRICT
February 28, 2022

REVISED APRIL 18, 2022



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Honeywell

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Honeywell has reviewed the Request for Proposals and, if selected, reserves the right to negotiate mutually acceptable terms and conditions of any resulting contract.

Budgetary Proposal

Notwithstanding any other provision of this document, this budgetary proposal is provided for information and planning purposes only, is non-binding, and does not constitute an offer capable of acceptance. Honeywell will be pleased to provide a firm price proposal upon request, subject to its internal approval requirements.

Honeywell reserves the right, in its discretion, to increase the price(s) set forth in this Proposal in the event that tariffs (or similar governmental charges) imposed by the United States or other countries result in any increase in the costs that Honeywell used to determine such price(s).

Equitable Extension of Time

Notwithstanding anything to the contrary, in light of the COVID-19 pandemic, the effects of which cannot be foreseen, the parties agree that Honeywell shall be entitled to an equitable extension of time to deliver or perform its work and appropriate additional compensation to the extent Honeywell's delivery or performance, or the delivery or performance of its suppliers and/or subcontractors, is in any way delayed, hindered or otherwise affected by the COVID-19 pandemic.

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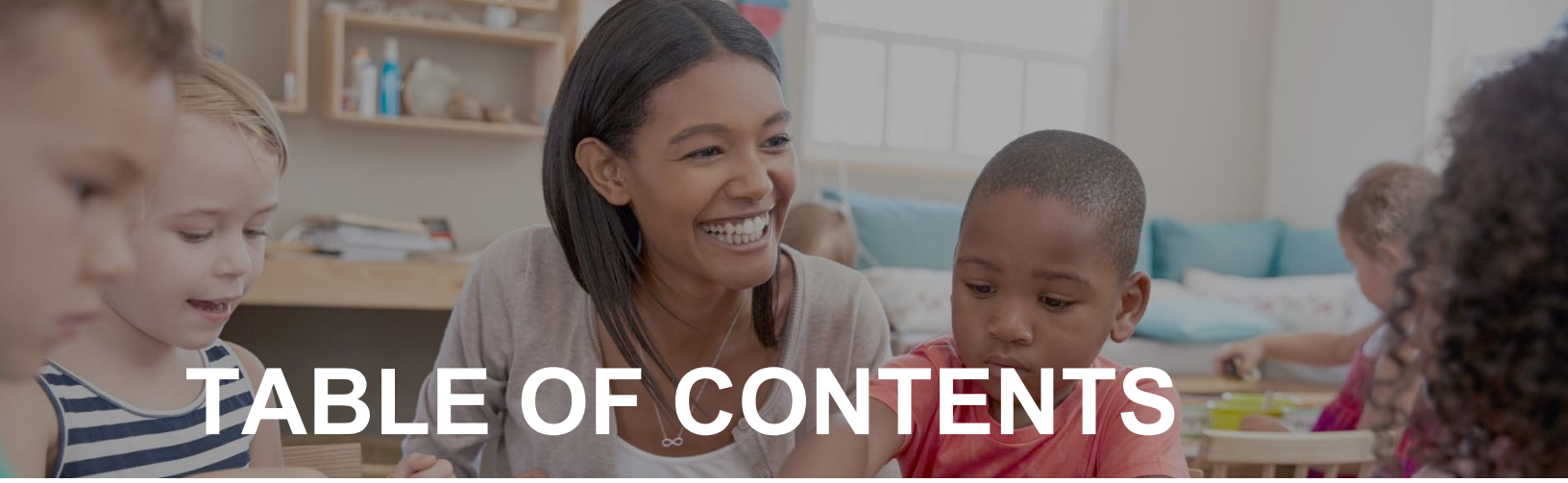

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SECTION A —
EXECUTIVE SUMMARY

Section A — Executive Summary

Thank you for using your Omnia membership to engage Honeywell to develop an Energy Savings Plan for the Harrison School District (District).

It is clearly understood for this Energy Savings Plan that the School District selected Honeywell via the Omnia Cooperative to identify conservation measures, plan, design, oversee, supervise and commission the services offered via the Omnia Partnership COOP, but Honeywell is not allowed to perform any "public works" activity as part of this project.

It is understood that in order to remain compliant with the services of the COOP for the Harrison School District; that ALL public works in conjunction with the School District and in accordance with NJ Public Contract Law (NJSA 18A:18A-1 et seq.) will be procured according to State requirements. To clarify further, this applies to a public works projects including and not limited to installing electrical, lighting, plumbing, HVAC, BMS systems etc.

During the development of the Energy Savings Plan, Honeywell has completed a thorough investment grade energy audit of the Harrison School District buildings and grounds. Based on the audit findings and Honeywell's extensive experience in working with school districts, we can confidently state this plan can identify a project that is financially viable in a comprehensive manner to address Harrison School District's facility concerns and goals.

This Energy Savings Plan includes projects that achieve energy and operational efficiencies, create a more comfortable and productive environment and are actionable via the New Jersey Energy Savings Improvement Program (NJ ESIP) in accordance with NJ PL2012, c.55.

The Energy Savings Plan is the core of the NJ ESIP process. It describes the energy conservation measures that are planned and the cost calculations that support how the plan will pay for itself through the resulting energy savings. Under the law, the Energy Savings Plan must address the following elements:

- A description of the energy conservation measures (ECMs) that will comprise the program.
- An estimate of greenhouse gas reductions resulting from those energy savings.
- Identification of all design and compliance issues and identification of who will provide these services.
- An assessment of risks involved in the successful implementation of the plan.
- Identify the eligibility for, and costs and revenues associated with, the PJM Independent System Operator for demand response and curtail-able service activities.
- Schedules showing calculations of all costs of implementing the proposed energy conservation measures and the projected energy savings.
- Maintenance requirements necessary to ensure continued energy savings, and describe how they will be provided; and

Additionally, the use of Omnia Cooperative in the selection of Honeywell is allowed under NJ Public Contracts law as outlined in LFN 2012-10 and consists of the following elements and authorized by DLGS/DCA as well as the following elements:

- an organization (profit or not-for-profit) that coordinates and aggregates contracts from different state and local governments and promotes their use."
- in the context of the LPCL and PSCL, the provisions of this notice apply when the aggregate value of the goods or services (see N.J.A.C. 5:34-8.2) exceeds the contracting unit's bid threshold."
- the national cooperative contract must have been advertised as a national or regional cooperative and awarded pursuant to a competitive bidding process that complies with the laws applicable.
- The LFN requires that if a national cooperative contract is chosen, the calculation of cost savings from using this approach must be documented: The Law requires that a contracting unit can use national cooperatives only when the contracting unit determines "that the use of the cooperative purchasing agreement shall result in cost savings after all factors, including charges for service, material, and delivery, have been considered."
- The LFN states that if using an online ordering system, local officials must put "appropriate internal controls" in place to ensure that purchases are documented and that an audit trail exists
- Per the LFN, the Harrison BOE must verify that the selected vendor complies with applicable New Jersey procurement documentation requirements by submitting the following required forms.
  - New Jersey Business Registration Certificate for the contractor and any subcontractors (i.e., copy of certificate)
  - Statement of Corporate Ownership (an original form prepared for the contracting agency awarding the contract)
  - Public Contract EEO Compliance (Employee Information Report form or proof of participation in a federally approved affirmative action program)
  - Non-collusion Affidavit

The purpose of this document is to provide all the information required for the Harrison School District to determine the best path forward in the implementation of a District-Wide NJ ESIP Project. It is important to note that the Energy Savings Plan provides a comprehensive evaluation of ALL potential ECMs within the Harrison School District. This is not meant to infer that all the ECMs identified can be implemented. However, if the ECM is part of this plan, it may be implemented later as additional funding becomes available or technology changes to provide for an improved financial return.

This Energy Savings Plan is structured to clearly demonstrate compliance with the NJ ESIP law, while also presenting the information in an organized manner which allows for informed decisions to be made. The information is divided into the following sections:

A. **Executive Summary** (This Section)

B. **Preliminary Utility Analysis** – The Preliminary Utility Analysis (PUA) defines the utility baseline for the Harrison School District buildings included in the Energy Savings Plan. It provides an overview of the current usage and a cost per square foot by building of utility expenses.

C. The report also compares the Harrison School District's utility consumption to that of other districts in the same region on a per square foot basis.

D. **Energy Conservation Measures** – This section includes a detailed description of the ECMs we have selected and identified for your School District. It is specific to your facilities in scope, savings methodology and environmental impact. It is intended to provide a basis of design for each measure in narrative form. It is not intended to be a detailed specification for construction. ALL potential ECMs for the Harrison School District are identified for the purposes of potential inclusion in the program. Final selected ECMs are to be determined solely by the Harrison School District and the financial goals outlined within the ESIP program to be self-funding within existing budget guidelines.

E. **Technical and Financial Summary** – This section includes an accounting of all technical and financial outcomes associated with the ECMs as presented. The information detailed on the forms includes projected implementation hard costs, projected energy savings, projected operational savings and projected environmental impact. Form VI: Annual Cash Flow Analysis provides a

"rolled-up" view of the overall project financials, inclusive of financing costs, on an annual basis as well as over the entire 15-year term of the agreement.

F. **Measurement & Verification and Maintenance Plan** – This section identifies the intended methods of verification and measurement for calculating energy savings. These methods are compliant with the International Measurement and Verification Protocols (IMVP), as well as other protocols previously approved by the Board of Public Utilities (BPU) in New Jersey. This section also includes the recommended maintenance requirements for each type of equipment. Consistent maintenance is essential to achieving the energy savings projected in this plan.

Appendices 1-3 – The following files have been uploaded to the USB drive included with our submission:

- Appendix 1 — Harrison Public Schools ECM Calcs.pdf
- Appendix 2 — EQUIPMENT CUTSHEETS (zip file)
- Appendix 3 — Harrison Lighting Line By Line.pdf
- Appendix 4 — Omnia Cooperative / NJ Procurement Documentation.pdf

Benefits

The measures investigated in this Energy Savings Plan could result in an annual utility savings of 1,311,236 kWh of electricity. Additionally, these energy savings will result in a net reduction of greenhouse gases and will reduce the school district's carbon footprint by 840 MTE of CO2 annually. This is equivalent to removing 177 cars from the road annually and /or 795 forested acres per year. All these savings are achieved while improving the classroom environment and renewing many items that have been in service beyond useful life expectancy.

Overall, it is evident that the Harrison School District is well positioned to implement a program that will upgrade your facilities, while funding itself within the requirements of the law and with zero impact on your taxpayer base. We appreciate the opportunity to provide the Harrison School District with this guideline to improve the comfort and efficiency of your facilities through the successful implementation of this Energy Savings Plan should the district decide to move forward with a project.

Sincerely,

Joseph Coscia

Senior Business Consultant

SECTION B — PRELIMINARY UTILITY ANALYSIS

Section B — Preliminary Utility Analysis

Honeywell

Preliminary Utility Analysis

Harrison Public Schools
Harrison, NJ

Helping customers manage energy resources to improve financial performance

Executive Summary

Honeywell would like to thank you for the opportunity of providing you with this Preliminary Utility Analysis. A one year detailed billing analysis was completed for all utility data provided by your staff. The facility's electric and gas consumption were compared to a benchmark of typical facilities of similar use and location. It should be noted however, that some of Buildings which make up the benchmarking standards are not equipped with mechanical cooling (air conditioning). Therefore, these buildings may unjustly appear to be less efficient in comparison.

Through our Energy Services offerings, Honeywell's goal is to form a long term partnership for the purpose of meeting your current infrastructure needs by focusing to:

- Improve Operational Cost Structures
- Ensure Satisfaction
- Upgrade Infrastructure While Reducing Costs
- Meet Strategic Initiatives
- Leverage Teamwork
- Pursue Mutual Interests
- Provide Financing Options

How does it work?

Under an energy retrofit solution, Honeywell installs new, energy efficient equipment and optimizes your facility, as part of a multi-year service contract. Most of these improvements are cost-justified by energy and operational savings. Some of the energy conservation measures provide for a quick payback, and as such, would help offset other capital intensive energy conservation measures such as, boilers, package rooftop units, domestic hot water heaters, etc. The objective is to provide you with reduced operating costs, increased equipment reliability, optimized equipment use, and improved occupant comfort.

After review of the utility analysis, you can authorize Honeywell to proceed with the development of a detailed engineering report. The report development phase allows Honeywell to prepare an acceptable list of proposed energy conservation measures, which are specific to the selected facility. Some examples of typical Energy Conservation Measures include:

- Lighting
- Control Systems
- Boilers
- AC Units/Condensers
- Building Enevelope
- Package Rooftop Units
- Domestic Hot Water Heaters
- Plug Load Management

Why Honeywell?

- Honeywell is one of the world leaders in providing infrastructure improvements
- With Honeywell as your building partner, you gain the advantage of more than 115 years of leadership in building services
- Honeywell has the infrastructure and manpower in place to manage and successfully implement your project
- Honeywell has over 30 years experience in the energy retrofit marketplace with over $5 Billion in customer energy savings
- Honeywell provides you with "Single Source Responsibility" - from Engineering to Implementation, Servicing and Financing (if desired)

Energy Benchmarking

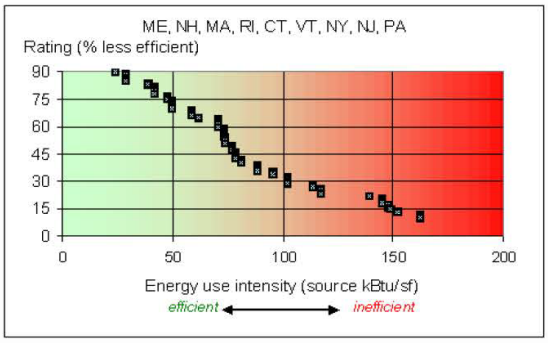
The calculation of EUI (Energy Use Intensity) is shown below. EUI, expressed in kBtu/sf, is normalized for floor area, the most dominant influence on energy use in most buildings. Its use usually provides a good approximation of how your building's energy performance compares to others. Site EUI indicates the rate at which energy is used at your building (the point of use). Source EUI indicates the rate at which energy is used at the generation sources serving your building (the point of source) and indicates the societal energy penalty due to your building The lower the EUI, the higher the rating, indicating that the building is more efficient than other buildings. The greater the EUI, the lower the rating, indicating that there is an opportunity for higher potential benefits from operational improvements.

The Source EUI below has been applied to a Department of Energy statistical model from the Oak Ridge National Laboratory. The Department of Energy has estimated energy use and cost reductions for building source EUI ratings (percentiles) in the table below. Please see the DOE Regional Source EUI Comparison graph below to rate your building in relation to the regional distribution of similar type buildings. (Note: The Source EUI includes the inefficiencies of electrical generation and transmission. A reduction in 'electrical' source EUI includes a benefit in terms of reduction of air pollution emissions and green house gases, and is thus an indicator of societal benefit.)

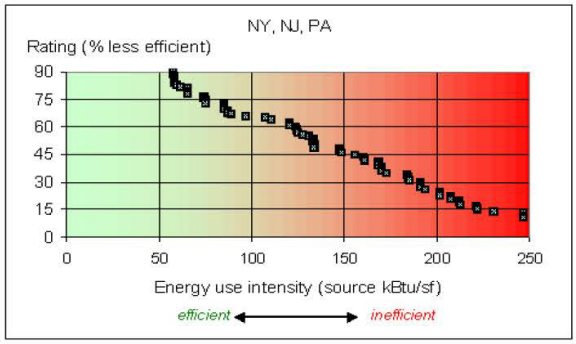
Source EUI Rating for your Building	Energy use and cost reduction potential (%)	Walk-thru energy assessment recommended?
above 60%	below 25%	No
40 to 60%	20 to 35%	Maybe
20 to 40%	35 to 50%	Yes
Below 20%	above 50%	Definitely

Site EUI Rank		Annual Total Electrical Use (kWh)	Annual Total Non-Electrical Fuel Use (Therms)	Building Gross Floor Area (sq-ft)	Site EUI Rating	Source EUI: Annual Total Source Energy Use per Sq-Ft (kBtu/sf)	Rating (Regional Source EUI Comparison)
1	Harrison High School	3,087,158	70,284	157,000	**112**	**248**	**20%**
2	Washington Middle School	568,937	64,087	116,700	72	**105**	**28%**
3	Hamilton Intermediate School	111,737	12,856	39,600	**42**	**62**	**34%**
4	Lincoln Elementary School	229,439	25,579	66,495	**50**	74	**30%**
5	Kennedy Elementary School	665,400	13,555	67,800	**53**	**121**	**32%**
6	Harrison High School Stadium	60,762	81	177,618	**1**	**4**	**22%**
		4,723,433					

School Facilities



Offices



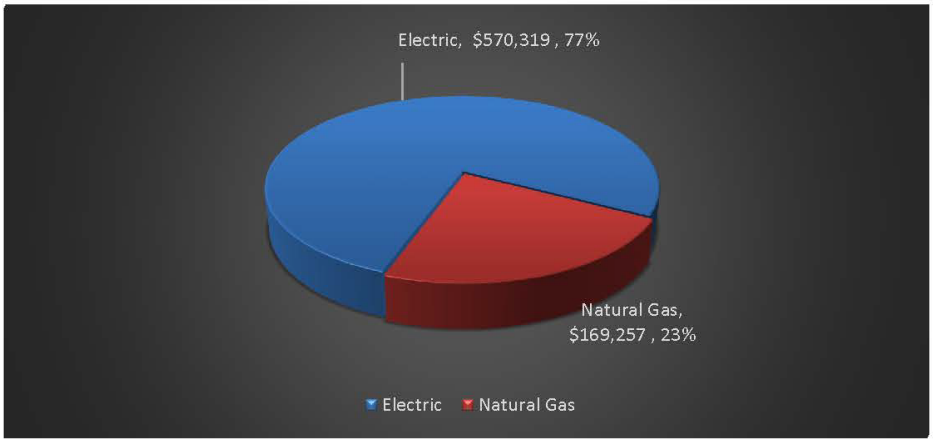
Historical Summary

Utility Analysis Period:
September 2020 - August 2021

	Electric	Natural Gas
Utility Costs*	$570,319	$169,257
Utility Usage (kWh, Therms)	4,723,433	186,442
$ Cost/Unit (kWh, Therms)	$0.12074	$0.908
Annual Electric Demand (kW)	11,961	

* Costs include energy and demand components, as well as taxes, surcharges, etc.

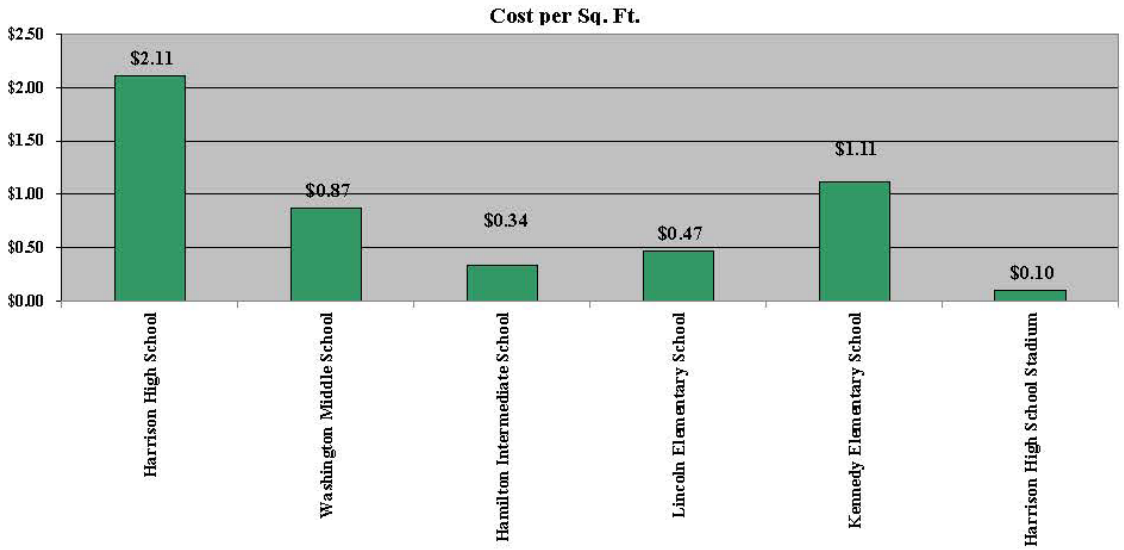
Actual Cost by Utility
September 2020 - August 2021

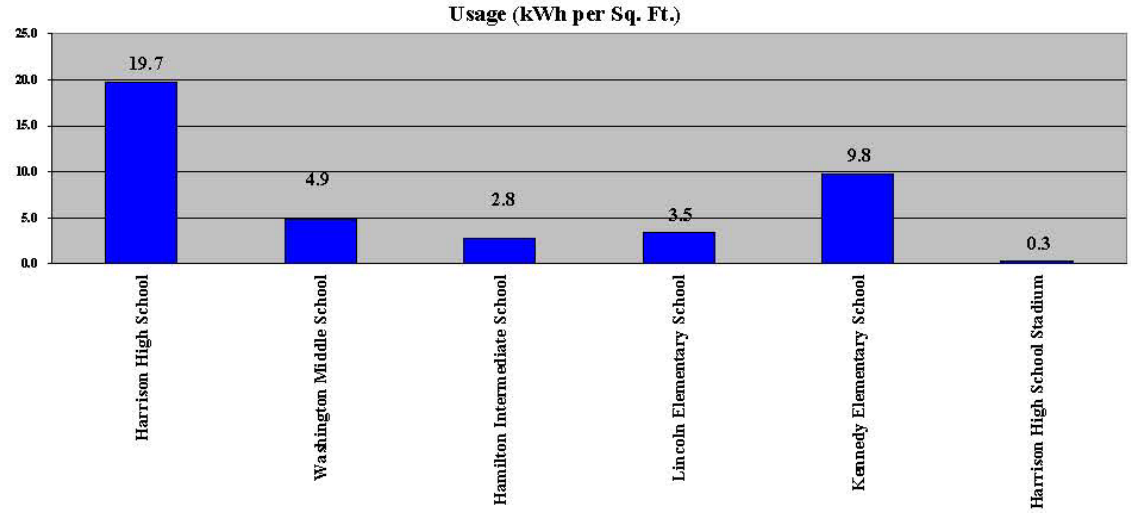


Total Cost
$739,576

Utility Analysis
Electric

Square Footage Analysis

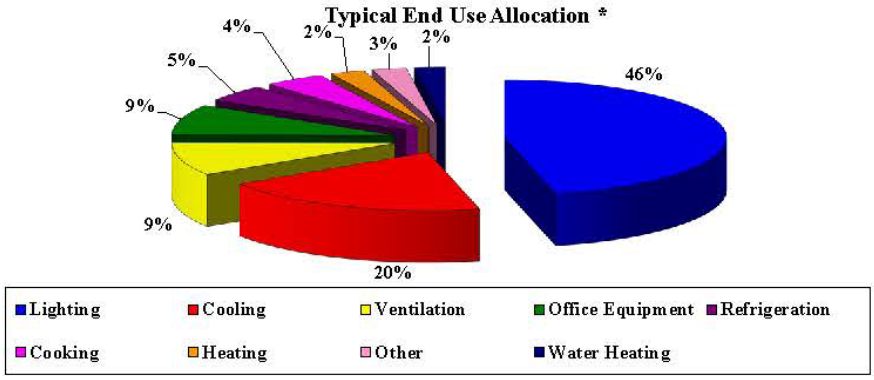




Note: Average kWh/SF for School buildings in this climate zone is 9.0

Electric

Sources of Electric Consumption

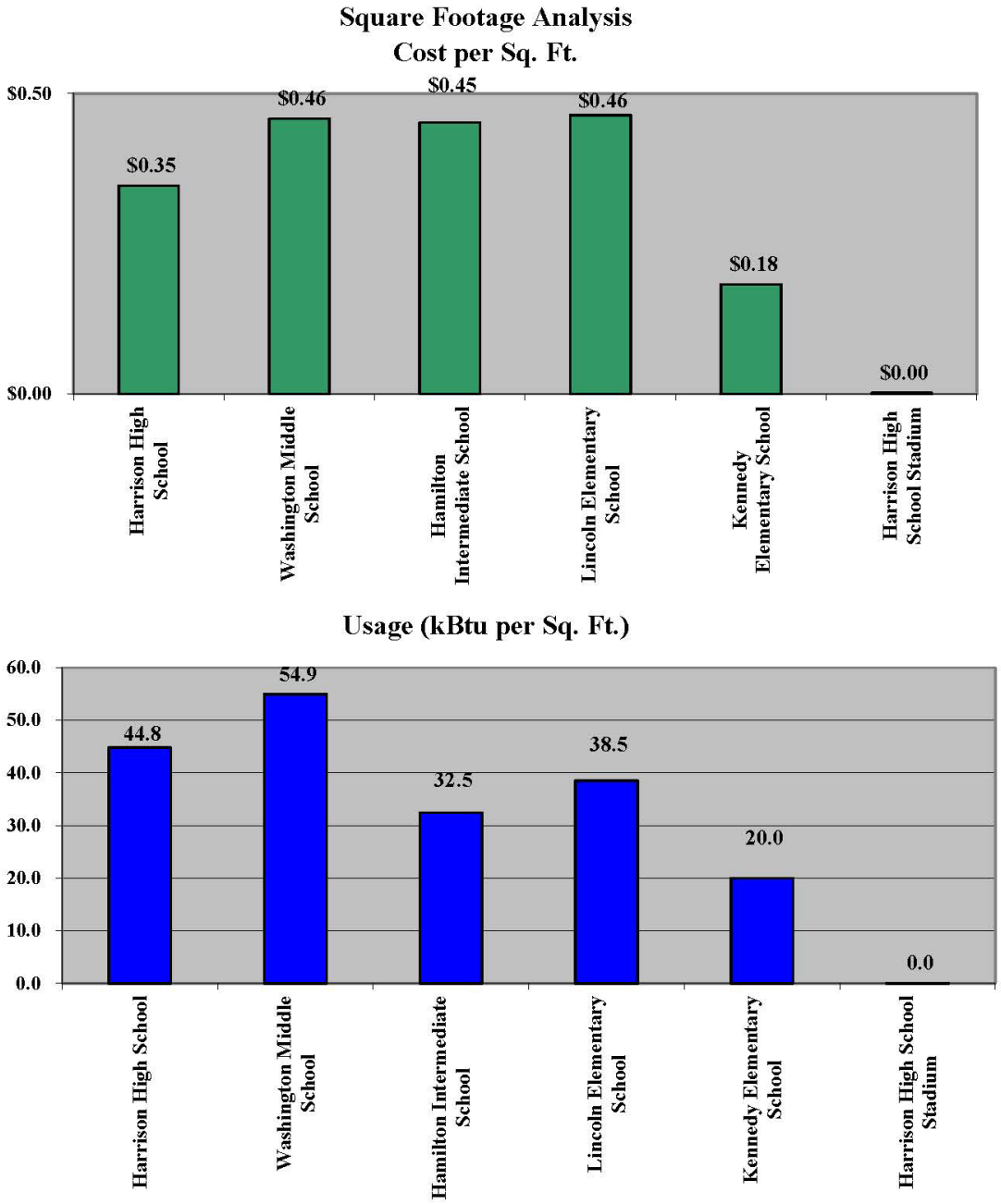


**This allocation is generic and is not a representation of the actual end use in your buildings included in this report.

Typical Allocation Applied to Your Electric Cost**

	Lighting	$264,058
	Cooling	$111,783
	Ventilation	$52,469
	Office Equipment	$49,047
	Refrigeration	$26,805
	Cooking	$25,094
	Heating	$14,258
	Other	$14,258
	Water Heating	$12,547
Your Total Cost	**September 2020 - August 2021**	**$570,319**

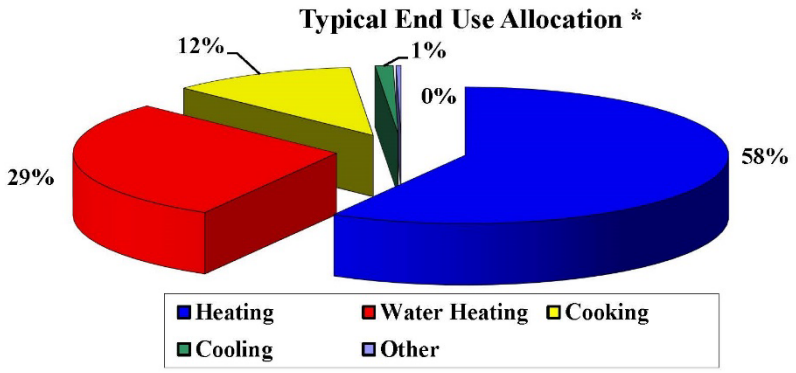
Utility Analysis
Natural Gas



Note: Average kBTU/SF for School buildings in this climate zone is 46.1

Utility Analysis
Natural Gas

Sources of Usage
Natural Gas



**This allocation is generic and is not a representation of the actual end use in your buildings included in this rep

Typical Allocation Applied to Your Cost**
Natural Gas

Heating	$98,677
Water Heating	$48,915
Cooking	$19,295
Cooling	$1,862
Other	$508
Your Total Cost September 2020 - August 2021	**$169,257**

Annual Emissions & Environmental Impact

Harrison Public Schools

September 2020 - August 2021

Based on the US Environmental Protection Agency -
Greenhouse Gas Equivalencies Calculator
http://www.epa.gov/cleanenergy/energy-resources/calculator.html

The following energy usage, cost and pollution have been quantified:

Total Annual Electric usage	4,723,433	kWh
Annual Natural Gas usage	186,442	Therms

Electric Emissions	
0.00070742	$MTeCO_2$ per kWh saved
Natural Gas Emissions	
0.05302541	$MTeCO_2$ per MMBtu saved
Equillivent Cars	
0.214132762	Cars/ 1MTeCO2
Forrested Acres	
1.3063142	Forested Acres Factor/ 1MTeCO2

Annual Greenhouse Gas Emissions (Metric tons of equivalent of CO2)		
eCO2 (Electric)	3,341	MT
eCO2 (Gas)	987	MT
Total eCO2	4,328.066	MT

This is equivalent to one of the following:	
930	No. of passenger vehicles - annual greenhouse gas emissions
5654	No. of acres of U.S. forests - carbon sequestered annually

Potential Retrofits

Retrofit Description	Utility/Fuel Type	Common Recommendations for Action
LED Lighting	Electric/Natural Gas	Upgrade lighting from flourecent to LED
Stadium LED Lighting	Electric	Upgrade lighting from HID to LED
De-Stratification Fans w/ Air Purification	Electric/Natural Gas	Redistribution of Conditioned Air
Boiler Replacements	Natural Gas	Install high efficient boilers
Ventilation Upgrades - Air Handling Units	Electric/Natural Gas	Higher Efficiency Units
Pool Heater and Domestic Water Replacements	Natural Gas	Higher Efficiency Units
Replace Unit Ventilators	Natural Gas	Higher Efficiency Units Increased Ventilation Quality
Building Controls/Retro-Commissioning	Electric/Natural Gas	Control Building Temperature, Comfort and Energy Use
Building Envelope Improvements	Electric/Natural Gas	Decrease building leakage, Increase efficiency
Cogeneration CHP	Electric/Natural Gas	Convert thermal energy to electrical power and hydronic energy
Pool Filter and Motor VFD Upgrade	Electric	Reduce equipment run-time and provide better chemical control
Permanent Load Reduction	Electric	Decrease Buildings Power Usage

SECTION C — ENERGY CONSERVATION MEASURES

Section C — Energy Conservation Measures

Introduction

The information used to develop this section was obtained through the independent energy audit building surveys to collect equipment information, interviews with operators and end users, and an understanding of the components to the systems at the sites listed below. The information obtained includes nameplate data, equipment age, condition, the system's design and actual load, operational practices and schedules, and operations and maintenance history.

- Harrison High School
- Washington Middle School
- Hamilton Intermediate School
- Lincoln Elementary School
- Kennedy Elementary School
- Harrison High School Stadium

Honeywell has done a review of the ECMs which would provide energy and cost savings for the Harrison Public Schools. This report aims to be an assessment of the feasibility and cost effectiveness of such measures, and an indication of the potential for their implementation. The ECMs listed below in the table below have been reviewed throughout your facilities for consideration within a complete ESP. What follows is a general description of the energy auditing process and the detailed descriptions of the ECMs for your facilities listed below.

ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
1A LED Lighting	●	●	●	●	●	
1B Stadium LED Lighting						●
1C De-Stratification Fans w/ Air Purification	●	●	●	●	●	
2A Boiler Replacements		●	●	●		
2B Ventilation Upgrades - Air Handling Units		●				
2C Pool and Domestic Water Heater Replacements		●	●			
2D Replace Unit Ventilators		●	●	●		
3A Building Controls/Retro-Commissioning	●	●	●	●	●	
4A Building Envelope Improvements	●	●	●	●	●	
5A Cogeneration CHP	●					
6A Pool Filter and Motor VFD Upgrade		●				
7A Permanent Load Reduction	●	●	●	●	●	●

Overview

Honeywell has closely evaluated and audited the Harrison School District to develop the optimum mix of energy saving measures. These site-specific measures have been selected and developed using the following process:

- Review Site Audits
- Engineering Team Site Visits
- Develop Measures
- Review Measures with Team

Reject and Accept Measures Based On

- Alignment with Critical Success Factors (CSF)
- Value to the School
- Economic Financial Payback
- Equipment Service Life
- Effect on Current Space Conditions

In developing the proposed measures, the following considerations were critical:

- Reduction of space heating and cooling loads by performing a systems review, with complete consideration of current indoor environmental quality standards.
- Review and redesign lighting systems noting reductions in the internal heat gain in the affected spaces.
- Load reduction measures always precede optimization measures.

Bin weather data was used from a 15-year average reported from Newark, NJ. Ventilation rates, taken from ASHRAE published standard, were predicted by using the building's population multiplied by cfm/person during occupied hours.

Reasonable infiltration rates were assumed based on the building's fenestration conditions and expected values for typical buildings. A reduced infiltration rate was assumed for the unoccupied hours. Envelope heat loss calculations assumed a reasonable heat transmission rate (U value) based on the construction of the buildings. Wall area and glass area were estimated by supplied drawings and field photographs.

Current efficiencies were derived from assumed and later to be measured boiler efficiencies, and assumed system losses due to thermal losses, distribution losses and loose operational control. The current assumed boiler system efficiencies were then applied to the calculated load and calibrated to last year's actual fuel consumption.

Demand Sensitive Operation

Review existing and proposed thermal loads. For example, the review process will facilitate the application of:

- Optimized flow rates (steam, water, and air).
- Optimized operation of equipment, matching current occupancy use profiles, and considering both outside and indoor space temperatures.

Benefits of Mechanical Improvements

Listed below are some of the benefits that the Harrison School District would reap from the mechanical portion of the measures:

- Avoid costly repairs and replace equipment that would have to be replaced in the next five years.
- Improved compliance with ASHRAE Ventilation Standards.
- Ability to trend ventilation rates; thus, ensuring compliance through documentation.
- Operating a more weather sensitive facility.
- Allowing for a greater capability of central monitoring and troubleshooting via remote.
- Greater operating flexibility to reduce costs and optimize staff efficiency.

Indoor Air Quality

The American Council of Governmental Industrial Hygienists (ACGIH) in their booklet “Threshold Limit Values,” has published air quality standards for the industrial environment. No such standards currently exist for the residential, commercial, and institutional environments, although the ACGIH standards are typically and perhaps inappropriately used. The EPA has been working to develop residential and commercial standards for quite some time.

Recent studies indicate that for even the healthiest students, indoor air pollution can reduce the ability to learn. As an example, if you were to place several students in a room where it is hot, there is little or no air circulation, and other children are coughing and sneezing, exposing the student body to airborne related illnesses such as the cold or flu. Honeywell has addressed this issue by focusing on the proper operation and replacement of the unit ventilators and air handler equipment which will assure IAQ standards are met.

Section C1 — Energy Savings Plan: Energy Conservation Measures

Introduction

The information used to develop this section was obtained through the independent energy audit building surveys to collect equipment information, interviews with operators and end users, and an understanding of the components to the systems at the sites. The information obtained includes nameplate data, equipment age, condition, the system's design and actual load, operational practices and schedules, and operations and maintenance history.

Honeywell has done a review of the Energy Conservation Measures (ECMs) which would provide energy and cost savings to the District. This report aims to be an assessment of the feasibility and cost effectiveness of such measures, and an indication of the potential for their implementation. The ECMs listed below have been reviewed throughout your facilities for consideration within a complete Energy Savings Plan. What follows is a general description of the energy auditing process and the detailed descriptions of the ECMs for your facilities.

ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
1A LED Lighting	●	●	●	●	●	
1B Stadium LED Lighting						●
1C De-Stratification Fans w/ Air Purification	●	●	●	●	●	
2A Boiler Replacements		●	●	●		
2B Ventilation Upgrades - Air Handling Units		●				
2C Pool and Domestic Water Heater Replacements		●	●			
2D Replace Unit Ventilators		●	●	●		
3A Building Controls/Retro-Commissioning	●	●	●	●	●	
4A Building Envelope Improvements	●	●	●	●	●	
5A Cogeneration CHP	●					
6A Pool Filter and Motor VFD Upgrade		●				
7A Permanent Load Reduction	●	●	●	●	●	●

ECM 1A LED Lighting

The key benefits of this ECM include:

Energy savings from reducing total energy consumption with more efficient, state of the art technology. Today's most efficient way of illumination and lighting has an estimated energy efficiency of 80%-90% when compared to traditional lighting and conventional light bulbs. Lighting controls reduce or eliminate reliance on occupants or staff to turn lights off when spaces are unoccupied by automatically turning lighting fixtures off thereby reducing electrical energy consumption.

Improved teacher and student performance from enhanced lighting quality that translates to an enhanced learning working environment.

Improved equipment longevity by reducing amount of light usage and extending the useful life of your lighting system. LED bulbs and diodes have an outstanding operational lifetime expectation of up to 100,000 hours. This is 11 years of continuous operation, or 22 years of 50% operation. Operational savings in terms of bulb and ballast replacement are significant based on this technology.

Reduced maintenance and operational costs by modernizing your lighting system, reducing the runtime of lighting system and components, and providing for longer lasting and technologically advanced lights, without the need to address deficient or bad ballasts.

Ecologically friendly LED lights are free of toxic chemicals. Most conventional fluorescent lighting bulbs contain a multitude of materials like mercury that are dangerous for the environment. LED lights contain no toxic materials and are 100% recyclable and will help to reduce carbon footprint by up to a third. The long operational lifetime span mentioned above means also that one LED light bulb can save material and production of 25 incandescent light bulbs. A big step towards a greener future!

ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
1A LED Lighting	●	●	●	●	●	

EXISTING CONDITIONS

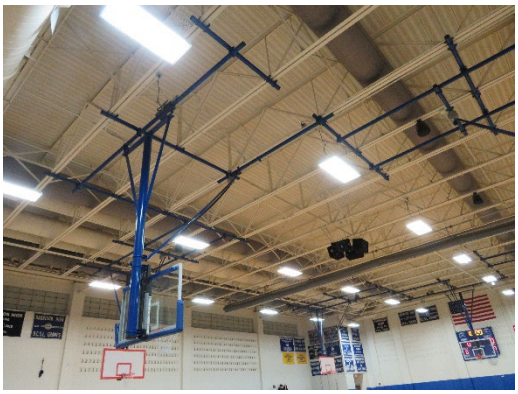
Indoor lighting predominantly consists of T-8 lamps, with a small quantity of T-12 and compact fluorescent lamps (CFLs) along with incandescent bulbs. In general, lighting is operated on switches.

SCOPE OF WORK

The proposed lighting system is based on the recent investment grade lighting system audit where existing lighting systems were analyzed and inventoried. Honeywell proposes to retrofit all existing T-8 and T-12 fixtures with high efficiency Light Emitting Diode (LED) lamps.

The District will receive many benefits from the lighting system upgrade.

Lighting at Kennedy Elementary School



Existing Lighting at Harrison High School

LED OUTDOOR LIGHTING UPGRADES

EXISTING CONDITIONS

The District has various types of High Intensity Discharge (HID) light fixtures and older LED fixtures, which are not as efficient as modern LED types. Parking lot and building exterior lights consist of pole mounted shoe-box type and wall pack HID fixtures.

SCOPE OF WORK

The exterior wall-packs and pole-mounted shoebox fixtures are currently high wattage HID lamps. These will be replaced with lower wattage LED fixtures. The LED technologies offer significant advantages such as extended lamp life, minimal lumen depreciation, “instant on” and very high energy conversion efficiency. These fixtures will provide substantial maintenance savings via the new 100,000-hour LED lamp life versus the 20,000 hours of the existing metal halide lamps.

CHANGES IN INFRASTRUCTURE

New LED lamps and fixtures will be installed as part of this ECM. Existing poles and shoe box fixtures will be utilized where possible.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced electric energy usage. A slight increase in heating energy is resultant from the reduced heat output of more efficient lamps.
Waste Production	All lamps and ballasts that are removed will be properly disposed.
Environmental Regulations	No environmental impact is expected.

ECM 1B Stadium LED Lighting

The key benefits of this ECM include:

Energy savings from reducing total energy consumption with more efficient, state of the art technology. New stadium lighting will reduce energy and maintenance costs over typical high intensity discharge (HID) equipment.

Reduced maintenance and operational costs by reducing the runtime of lighting system and components.

ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
1B Stadium LED Lighting						●

EXISTING CONDITIONS

Harrison High School Stadium has existing 1500-Watt HID equipment. HID lamps have a lifespan of approximately 2,000 hours. HIDs are responsible for producing glares and do not provide instant light when turned on, they need time to warm-up.

SOLUTION

Honeywell proposes the installation of Musco factory built, wired, aimed and tested lighting. The factory aimed and assembled luminaires include Ball Tracker technology. This Ball Tracker technology allows for targeted, aerial light which optimizes visibility of the ball in play with no glare for players and reduces spill light making it better for neighbors. The Control-Link System allows for remote on/off control and performance monitoring with 24/7 customer support.

Harrison High School Stadium Field Lighting

Harrison High School Stadium Field Lighting

Install Stadium field LED lighting which is factory built, wired, aimed and tested as listed in Table 1B.1 – Stadium Field Lighting. Use existing poles for new lighting.

Stadium Field Lighting

Building	Manufacture	Model	Watts	Qty
Harrison High School	Musco	TLC-LED-1500	1500	34
Harrison High School	Musco	TLC-LED-1200	1200	10
Harrison High School	Musco	TLC-BT-575	575	13
Harrison High School	Musco	TLC-LED-900	900	4

Example of Stadium Lighting Fixture

Example of Stadium Lighting

SCOPE OF WORK

New lighting will be installed s lower cost by adjusting light levels by occupancy, turning lights off when not needed.

CHANGES IN INFRASTRUCTURE

New LED lighting will be installed as part of this ECM.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced electric energy usage.
Waste Production	Proper disposal of any waste generated.
Environmental Regulations	No environmental impact is expected.

ECM 1C De-Stratification Fans w/ Air Purification

The key benefits of this ECM include:

Improved efficiency and energy savings through more equal distribution of conditioned air space.

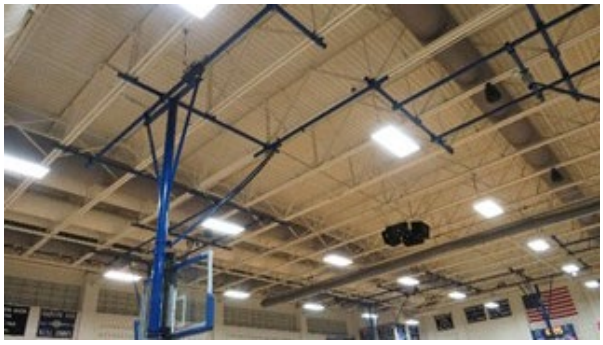
Equipment longevity due to lower utilization of equipment to condition air.

Increased comfort of students and teachers.

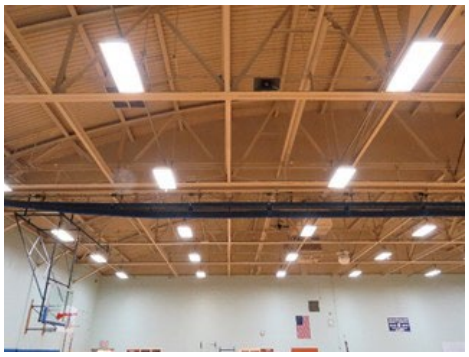
EXISTING CONDITIONS

Warm air stratifies close to the ceiling in high ceiling areas such as in a gymnasium or auditorium. Elevated levels of heat transfer through the high walls and roof causes elevated heat loss.

ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
1C De-Stratification Fans w/ Air Purification	●	●	●	●	●	



Harrison High School – Main Gym



Washington Midddle School Main Gym

PROPOSED SOLUTION

In areas with 20+ foot ceiling heights, there is approximately a 15°F+ temperature difference between the floor and the ceiling. With higher ceilings, it is even greater. That means to generate the heat necessary to maintain a comfortable 70°F temperature at the floor level, where student activities occur, the ceiling could be 85°F or higher.

De-stratification fans even out the air temperature to a zero to 3°F differential from floor to ceiling and wall to wall. This will allow HVAC systems to run for a shorter duration because of the absence of extreme temperatures to heat or cool, thus allowing the local thermostats to be satisfied for longer periods of time.

SYSTEMS EVALUATION AND SELECTION

An energy-efficient motor drives a near-silent fan that forces a column of hotter air from the ceiling to the cooler floor below. As this column of warm air nears the floor, it begins to flare out in a circular pattern and rise again creating a torus. While doing so, it warms the cooler air and mixes with air near the floor, increasing the temperature and comfort of occupants. Through a natural law of physics, this torus will continue to re-circulate air,

mixing warmer air from the ceiling with cooler air near the floor until the ceiling and air temperatures are nearly equal. As this happens, it will require less and less energy to comfortably heat the work area, allowing thermostats to be lowered and energy savings to be realized. Once started, the entire process of "thermal equalization" will take on average less than 24 hours.

Airius PureAir Series is an air purification and airflow circulation fan system, incorporating the latest in PHI (Photohydroionization) Cell technology to efficiently and effectively neutralize up to 99% of all harmful germs, bacteria, viruses, mold and other contaminants in any internal environment. The PHI Cell emits 'Ionized Hydroperoxides', a naturally occurring cleaning agent, which are circulated throughout spaces via the fan. As the fans continue to circulate internal atmosphere, the PHI circulates its neutralizing Ionized Hydroperoxides, providing 24/7 continuous Air Purification. The PureAir also provides all the features and benefits of the world's most popular destratification and airflow circulation fan, balancing temperatures, improving comfort, reducing heating and cooling costs and reducing carbon emissions.

Based on preliminary site investigation conducted by our staff, we propose to install the de-stratification fans as indicated in the table below.

Install De-Stratification Fans with Air Purification at the following locations as listed in Table 1C.1 – De-Stratification Fan Locations and Models.

De-Stratification Fan Locations and Models

School	Location	Airius Model	Qty PureAir	Qty Air Pear
Harrison High School	Main Gym	A-45-P4-STD-120-W	6	3
Harrison High School	Weight Room	A-25-SP-STD-120-W	1	-
Harrison High School	Auxiliary Gym	A-25-SP-STD-120-W	2	2
Washington Middle School	Gym	A-45-P4-STD-120-W	-	3
Washington Middle School	Gym	A-25-SP-STD-120-W	5	1
Hamilton Intermediate School	Gym	A-25-SP-STD-120-W	2	2
Lincoln Elementary School	Gym	S-25-SP-SH-120-W	2	1
Kennedy Elementary School	Gym	S-25-SP-SH-120-W	2	1
Kennedy Elementary School	Cafetorium	S-25-SP-SH-120-W	3	1
Total			**23**	**14**

SCOPE OF WORK

Per De-Stratification Fan:

- Shut off the main electric power to the area in which the unit(s) will be installed.
- Install new de-stratification fan and wiring.
- Re-energize.
- Inspect unit operation by performing electrical and harmonics testing.

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. The District and Honeywell will determine final selections.
Equipment Identification	As part of the ECM design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

New de-stratification fans will be installed as part of this ECM.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced thermal energy usage. A slight increase in electrical energy is resultant from the operation of the fan motors.
Waste Production	Proper disposal of any waste generated.
Environmental Regulations	No environmental impact is expected.

ECM 2A Boiler Replacements

The key benefits of this ECM include:

Reduced energy usage from improved boiler efficiency resulting from replacement of older equipment, and in certain instances, oversized boilers.

Lower operational costs through less frequent maintenance and operational issues.

ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
2A Boiler Replacements		●	●	●		

EXISTING CONDITIONS

Some boilers within the Harrison School District are near or past the end of their useful life and are less efficient compared to new boilers. Some existing boilers can be replaced with high efficiency condensing boilers or high efficiency steam boilers.

Hamilton Intermediate School - Boilers

Lincoln Elementary School - Boilers

Honeywell will replace existing boilers listed in ***Existing Boilers Table*** below with new units listed in ***New Boilers Table***.

Existing Boilers

Building	Manufacturer	Model	Qty	Capacity MBH	Heating Medium	Fuel
Washington Middle School	Smith	4500A-18	2	4,793	Steam	Natural Gas
Lincoln Elementary School	HB Smith	28-14	3	2,913	Hot Water	Natural Gas
Hamilton Intermediate School	HB Smith	28-12	2	2,205	Steam	Natural Gas

PROPOSED SOLUTION

It is recommended that the boilers listed in the table above be replaced with boilers operating at higher efficiency as provided in table below. New condensing hot water boilers have thermal efficiencies that range from 88% – 95% depending on the return hot water temperature from the heating loop. With proper design, it is typical to see thermal efficiencies of around 92%. Thermal efficiency is only one part of the equation that makes up the seasonal efficiency of a boiler.

New boiler sizes and quantities will be based on the heat load of the building with redundancy, taking into account the existing system sizing and level of redundancy.

New Boilers

Building	Manufacturer	Model	Qty	Capacity MBH	Heating Medium	Fuel
Washington Middle School	Weil Mclain	1888	2	4,857	Steam	Natural Gas
Lincoln Elementary School	Weil Mclain	1488	3	3,225	Hot Water	Natural Gas
Hamilton Intermediate School	Weil Mclain	1288	2	2,434	Steam	Natural Gas

SCOPE OF WORK

The following outlines the boiler replacement:

- Disconnect gas back to shutoff valve and electric back to source panelboard.
- Remove existing boilers.
- Install new boilers.
- Connect gas and heating hot water appurtenances to new boilers.
- Terminate and power new boiler electric circuiting.
- Start up, commissioning, and operator training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

In general, Honeywell uses the following approach to determine savings for this specific measure:

Existing Boiler Efficiency ***Proposed Boiler Efficiency*** ***Energy Savings $***	*= Existing Heat Production/ Existing Fuel Input* *= Proposed Heat Production/ Proposed Fuel Input* *= Heating Production (Proposed Efficiency – Existing Efficiency)*

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. The District and Honeywell will determine final selections.
Equipment Identification	As part of the ECM design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

New boilers will be installed in itemized locations; in addition, training for maintenance personnel will be required, as well as on-going, annual preventive maintenance.

O&M IMPACT

The new boilers will decrease the O&M cost for maintaining the boilers.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods. Continuity of service must be maintained for the customer.

ENVIRONMENTAL ISSUES

Resource Use	Annual savings will result from greater combustion efficiency, reduced maintenance costs, and better control and setback.
Waste Production	Existing boilers scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected; all regulations will be adhered to in accordance with EPA and local code requirements.

ECM 2B Ventilation Upgrades - Air Handling Units

The key benefits of this ECM include:

Reduced energy usage from improved efficiency resulting from replacement of older equipment.

Lower operational costs through less frequent maintenance and operational issues.

ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
2B Ventilation Upgrades - Air Handling Units		●				

EXISTING CONDITIONS

Some Rooftop Units (RTUs) and Heating and Ventilation (H&V) Units serving the locations photographed below are inefficient or past their useful lives. Replacing these units with new, high efficiency units will save energy costs over the long term while reducing repair costs that would otherwise have been necessary to keep the old RTUs in operation.

Washington MS Pool H&V

Washington MS Pool Locker Room H&V

H&V and Make-up Air Units Scope Overview

Building	Existing	New	Qty
Washington Middle School	Natatorium is currently served by two H&V Units one (1) located in Mechanical Room and second located on the Natatorium Roof which is inoperable.	Replace Rooftop H&V Unit with PoolPak Unit	1
Washington Middle School	Natatorium locker rooms and entrance hall are currently served by an H&V Unit located on the Locker Room Roof which is inoperable.	Replace Rooftop H&V Unit with RTU Unit. One (1) 7.5 Tons Replace existing exhaust fans with new units Four (4) x 750 CFM Two (2) x 250 CFM	1

Existing Ventilation Units

Building	Area	Heating/Cooling	Unit	Model	Type	Unit Qty
Washington Middle School	Pool Area	Steam	H&V Unit		H&V Unit	1
Washington Middle School	Pool Locker Rooms	Steam	H&V Unit		H&V Unit	1
Washington Middle School	Pool Filter Room	Steam	H&V Unit		H&V Unit	1
Washington Middle School	Pool Locker Rooms	Exhaust	Loren Cook	120ACEB	Exhaust Fan	2

PROPOSED SOLUTION

Honeywell proposes replacing the existing rooftop units in the above table. The new units will be installed in the same location as the existing units. Existing electrical power supply will be reconnected to the new units. The new units will be equipped with factory-installed microprocessor controls that improve unit efficiency. The units will also communicate with the building management system.

New Ventilation Units

Building	Area	Heating/Cooling	Unit	Model	Type	Unit Qty
Washington Middle School	Pool Area	Steam/DX	PoolPak	PPK-080	Roof Top Unit	1
Washington Middle School	Pool Locker Rooms	Gas/DX	Trane	OABD096	Roof Top Unit	1
Washington Middle School	Pool Filter Room	Steam	Trane	UCCAC	H&V Unit	1
Washington Middle School	Pool Locker Rooms	Exhaust	Loren Cook	120ACEB	Exhaust Fan	2

SCOPE OF WORK

The following outlines the scope of work to install the rooftop units stated in the above table:

- Disconnect existing RTU electric connections.
- Disconnect piping and air ducts from the unit.
- Remove unit from the base.
- Modify base for new unit if necessary.
- Rig and set new unit at the base.
- Inspect piping and air ducts before reconnecting them to the unit.
- Reconnect piping and air ducts.
- Repair duct and piping insulation.
- Connect electric power.
- Start up and commissioning of new unit.
- Maintenance operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based on the energy efficiency between the existing and new units. The savings are generally calculated as:

Electric Energy savings	*= Existing unit energy consumption (kWh) – replacement unit energy consumption (kWh)*

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. Honeywell and the customer will determine final selections.
Equipment Identification	As part of the ECM design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

New rooftop units will be installed in itemized locations; in addition, training for maintenance personnel will be required, as well as on-going, annual preventive maintenance.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from higher efficiency units.
Waste Production	Existing unit scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2C Pool and Domestic Water Heater Replacements

The key benefits of this ECM include:

Reduced energy usage from improved efficiency resulting from replacement of older equipment.

Lower operational costs through less frequent maintenance and operational issues.

ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
2C Pool and Domestic Water Heater Replacements		●	●			

EXISTING CONDITIONS

The existing Pool and Domestic Water heaters are generally in poor condition. are not high-efficiency units. Some use electrical power to heat water, which is not cost effective.

Hamilton Intermediate School Water Heater

Washington Middle School Pool Water Heater

Existing Water Heaters

Building	Manufacturer	Model	Qty	Capacity MBH	Heating Medium	Fuel
Hamilton Intermediate School	RUUD	G100310A	1	248	Hot Water	Natural Gas
Washington Middle School	Zodiac	EHE350NC	2	333	Hot Water	Natural Gas

PROPOSED SOLUTION

Honeywell proposes replacing the existing water heaters at the above locations with highly efficient condensing water heaters. New condensing water heaters have efficiencies between 94% - 98%. They provide better control with capabilities as night setback, temperature adjustments and demand control hot water.

New Water Heaters

Building	Manufacturer	Model	Qty	Capacity MBH	Heating Medium	Fuel
Hamilton Intermediate School	AO Smith	BTH-250	1	249	Hot Water	Natural Gas
Washington Middle School	Lochinvar	ERN-302	2	300	Hot Water	Natural Gas

SCOPE OF WORK

The following outlines the boiler replacement:

- Demolish and remove old water heaters.
- Furnish and install condensing gas fired domestic hot water heaters as specified in the table above.
- Install all required piping, controls, and breeching as needed.
- Install mixing valve.
- Install circulators where needed for building use and kitchen supply.
- Test and commission.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings are calculated from the domestic hot water heater efficiency differences.

Existing Boiler Efficiency	*= Existing Boiler Efficiency + Existing Heat Exchanger Efficiency*
Proposed Boiler Efficiency	*= Efficiency of the New Domestic Hot Water Heater*
Energy Savings $	*= DHW Load x (Existing Equipment Efficiency – New Equipment Efficiency)*

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available.
Equipment Identification	As part of the measure design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

A new controller for each DHW heater will be installed and programmed. In addition to the controllers, training for maintenance personnel will be required.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from improved thermal efficiency.
Waste Production	Proper disposal of any waste generated.
Environmental Regulations	No environmental impact is expected.

ECM 2D Unit Ventilator Replacements

The key benefits of this ECM include:

Reduced energy usage from improved efficiency resulting from replacement of older equipment.

Lower operational costs through less frequent maintenance and operational issues.

ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
2D Replace Unit Ventilators		●	●	●		

EXISTING CONDITIONS

Honeywell observed that the existing unit ventilators are beyond the useful life with many being inoperable or unrepairable.

Washington MS – Typical Unit Ventilator

Lincoln ES – Typical Unit Ventilator

Ventilation Scope Overview

Building	Manufacturer	Model	Qty
Lincoln Elementary School	Hot Water Unit Ventilators	Replace Hot Water Unit Ventilators with New	40
Hamilton Intermediate School	Steam Unit Ventilators	Replace Steam Unit Ventilators with New	19
Washington Middle School	Hot Water/Chilled Water Ventilators	Replace Hot Water and Hot Water/Chilled Unit Ventilators with New	65

Ventilation Unit Detailed Scope of Work

Building	Room	Heating/Cooling	Unit	Model	Type	Unit Qty
Lincoln Elementary School	304	Hot Water	Trane	VUV*100	Vertical	1
Lincoln Elementary School	305	Hot Water	Trane	VUV*100	Vertical	1
Lincoln Elementary School	306	Hot Water	Trane	VUV*100	Vertical	1
Lincoln Elementary School	308	Hot Water	Trane	VUV*100	Vertical	1
Lincoln Elementary School	315/314	Hot Water	Trane	HUV*100	Ceiling UV	1
Lincoln Elementary School	316	Hot Water	Trane	VUV*125	Vertical	1

Building	Room	Heating/Cooling	Unit	Model	Type	Unit Qty
Lincoln Elementary School	317	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	313	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	312	Hot Water	Trane	VUV*075	Vertical	1
Lincoln Elementary School	309	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	307	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	301	Hot Water	Trane	HUV*125	Ceiling UV	1
Lincoln Elementary School	202	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	201	Hot Water	Trane	VUV*100	Vertical	1
Lincoln Elementary School	205	Hot Water	Trane	VUV*100	Vertical	1
Lincoln Elementary School	206	Hot Water	Trane	VUV*100	Vertical	1
Lincoln Elementary School	207	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	209	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	208	Hot Water	Trane	VUV*100	Vertical	1
Lincoln Elementary School	212	Hot Water	Trane	VUV*075	Vertical	1
Lincoln Elementary School	213	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	214	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	205	Hot Water	Trane	VUV*100	Vertical	1
Lincoln Elementary School	112	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	113	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	115/114	Hot Water	Trane	HUV*100	Ceiling UV	1
Lincoln Elementary School	117	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	116	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	110	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	109	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	107108	Hot Water	Trane	VUV*125	Vertical	1
Lincoln Elementary School	106	Hot Water	Trane	HUV*100	Ceiling UV	1
Lincoln Elementary School	Office	Hot Water	Trane	HUV*100	Ceiling UV	1
Lincoln Elementary School	B5	Hot Water	Trane	HUV*125	Ceiling UV	1
Lincoln Elementary School	Teachers Room	Hot Water	Trane	VUV*100	Vertical	1
Lincoln Elementary School	B-1	Hot Water	Trane	VUV*075	Vertical	1
Lincoln Elementary School	B-2	Hot Water	Trane	VUV*075	Vertical	1
Lincoln Elementary School	B-3	Hot Water	Trane	VUV*075	Vertical	1
Lincoln Elementary School	B-4	Hot Water	Trane	VUV*075	Vertical	1

Building	Room	Heating/Cooling	Unit	Model	Type	Unit Qty
Hamilton Intermediate School	Maintenance Office LL2	Steam	Trane	VUV*100	Vertical	1
Hamilton Intermediate School	LL3	Steam	Trane	VUV*100	Vertical	1
Hamilton Intermediate School	LL4	Steam	Trane	VUV*100	Vertical	1
Hamilton Intermediate School	111	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	112	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	114	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	115	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	116	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	225	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	226	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	224	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	223	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	225	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	221	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	331	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	332	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	333	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	336	Steam	Trane	HUV*100	Ceiling UV	1
Hamilton Intermediate School	337	Steam	Trane	HUV*100	Ceiling UV	1
Washington Middle School	9D	Hot Water	Trane	VUV*100	Vertical	2
Washington Middle School	9C	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	9A	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	9	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	10	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	11	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	Nurse	Hot Water/Chilled Water	Trane	VUV*100	Vertical	1

Building	Room	Heating/Cooling	Unit	Model	Type	Unit Qty
Washington Middle School	Guidance Room	Hot Water/Chilled Water	Trane	VUV*100	Vertical	3
Washington Middle School	Vice principal	Hot Water/Chilled Water	Trane	VUV*100	Vertical	1
Washington Middle School	Principal	Hot Water/Chilled Water	Trane	VUV*100	Vertical	1
Washington Middle School	1	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	2	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	2B	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	Kitchen	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	3B	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	3A	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	5	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	6	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	7	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	8	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	25	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	Counseling Room	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	26	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	27	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	28	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	29	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	30	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	31	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	32	Hot Water	Trane	VUV*100	Vertical	2
Washington Middle School	Faculty Lounge	Hot Water/Chilled Water	Trane	VUV*100	Vertical	3
Washington Middle School	33	Hot Water/Chilled Water	Trane	VUV*100	Vertical	2
Washington Middle School	14 A	Hot Water/Chilled Water	Trane	VUV*100	Vertical	3
Washington Middle School	14 B	Hot Water/Chilled Water	Trane	VUV*100	Vertical	3
Washington Middle School	15	Hot Water/Chilled Water	Trane	VUV*100	Vertical	3
Washington Middle School	16	Hot Water/Chilled Water	Trane	VUV*100	Vertical	3
Washington Middle School	17	Hot Water/Chilled Water	Trane	VUV*100	Vertical	3

Building	Room	Heating/Cooling	Unit	Model	Type	Unit Qty
Washington Middle School	18	Hot Water/Chilled Water	Trane	VUV*100	Vertical	1
Washington Middle School	19	Hot Water/Chilled Water	Trane	VUV*100	Vertical	3
Washington Middle School	20	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	22	Hot Water	Trane	VUV*100	Vertical	2
Washington Middle School	21	Hot Water	Trane	VUV*100	Vertical	1
Washington Middle School	24	Hot Water	Trane	VUV*100	Vertical	2
Washington Middle School	23	Hot Water	Trane	VUV*100	Vertical	2

PROPOSED SOLUTION

Honeywell proposes to replace existing unit ventilators with new units. New units will be equipped with open protocol factory mounted controls which can be tied into existing BMS system.

SCOPE OF WORK

The following outlines the unit ventilator replacements:

- Secure electrical power and thermal loads to each unit.
- Disconnect electrical power and control wiring.
- Disconnect steam, hot water or chilled water to each unit as specified.
- Remove existing units and dispose of properly.
- Inspect existing outside air plenum and building opening. Make repairs as necessary.
- Install new units in existing locations
- Reconnect steam, hot water or chilled water piping as required per unit.
- Reconnect controls and wiring.
- Reconnect electrical power and re-energize each unit.
- Start-up and commissioning of each unit for proper operation.
- Conduct operation training for staff and maintenance personnel.

ENERGY SAVINGS METHODOLOGY AND RESULTS

In general, Honeywell uses the following approach to determine savings for this specific measure:

Existing Univent Efficiency **Proposed Univent Efficiency** **Energy Savings $**	= Heat Input x Existing Efficiency = Heat Input x New Efficiency = Heating Production (Proposed Efficiency – Existing Efficiency)

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. The District and Honeywell will determine final selections.
Equipment Identification	As part of the ECM design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

New unit ventilators will be installed and programmed in the locations listed above; in addition, training for maintenance personnel will be required as well as on-going, annual preventive maintenance.

O&M IMPACT

The new unit ventilators will decrease the O&M cost for maintaining the equipment .

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods. Continuity of service must be maintained for the customer.

ENVIRONMENTAL ISSUES

Resource Use	Minor support will be required for the interruption of utilities for brief tie-in periods. Continuity of service must be maintained for the customer.
Waste Production	Existing units scheduled for removal will be disposed of properly.
Environmental Regulations	Minor support will be required for the interruption of utilities for brief tie-in periods. Continuity of service must be maintained for the customer.

ECM 3A Building Controls/Retro-Commissioning

The key benefits of this ECM include:

Improve Air Quality by more precise control of air filtration, air composition and ultra-violet cleaning to create a healthier school building environment.

Operational efficiency resulting from better control and system wide visibility.

Remote operation of HVAC systems via mobile phone or off-site computer.

Energy savings from reducing total energy consumption with more efficient, state of the art technology.

Occupancy comfort and productivity resulting from enhanced temperature and humidity control throughout your buildings.

Deliver a comprehensive open protocol Building Management System. Verify design is customized for each building yet uniform throughout the district. Assure longevity of control system with proper commissioning and training.

ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
3A Building Controls/Retro-Commissioning	●	●	●	●	●	

EXISTING CONDITIONS

District-Wide

The Harrison School District currently employs two Building Management Systems (BMS) to control the HVAC equipment throughout the District. The older system is a Schneider Electric Continuum front end that is used to access the High School, Washington Middle School, Hamilton Intermediate School, and Lincoln Elementary. Most of the HVAC systems controlled by this system do not have individual graphical representations and require long loading times to view or change control points. The Continuum system is approaching the end of life and will no longer be supported by Schneider Electric over the next few years. A newer Schneider Electric EcoStruxure™ system was recently installed at Kennedy Elementary School. These two systems operate independently of one another and can only be accessed from separate operator workstations. Equipment serviceability and operator ease-of-use could be greatly improved by migrating all building controls to a single system.

Harrison High School Controller

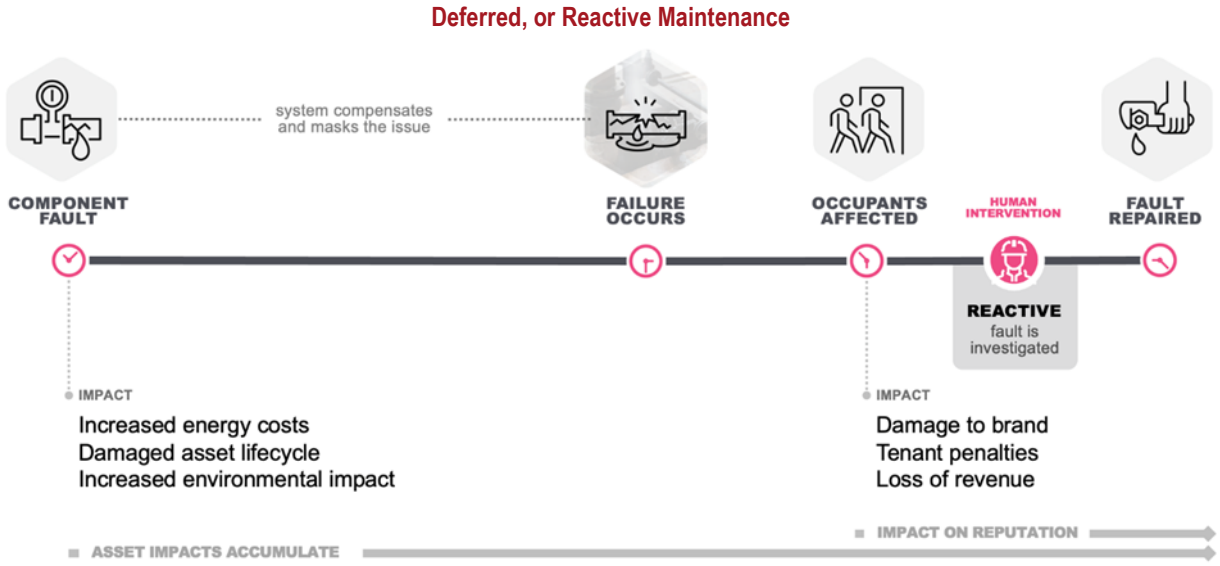
Lincoln School BMS Controller

Jersey State Controls (JSC) is the District's current controls service partner and has installed all building automation components throughout the District. As a Schneider Electric partner, JSC has the capability to upgrade the existing Continuum systems to create a District-wide EcoStruxure™ BMS.

(Include the following if Forge is to be proposed)

The current facility maintenance and control service teams utilizes a traditional scheduled preventative and reactive maintenance approach which is not an effective way to deliver the kind of resiliency that a manufacturing facility requires to maintain competitive advantage and ensure productivity due to the following challenges:

- **Inefficient Planned Maintenance** – Scheduled and routine maintenance plans spend too much time inspecting and maintaining assets that are not broken.
- **Poor Asset Performance Visibility** – Break fix and scheduled maintenance make it difficult to track and validate asset optimization and vendors costs.
- **Low Vendor Accountability** – Lack of transparency makes it difficult to measure vendor compliance and ROI.
- **Aging, Shrinking Workforce** – Large groups of maintenance staff are approaching retirement age, with a smaller, less skilled workforce to replace them.
- **Complex Vendor Management** – Building operators have to maintain several contracts with multiple vendors, making it difficult and costly to manage.



Harrison High School

The High School is currently controlled by the Continuum BMS. A review of the Graphical User Interface (GUI) revealed several concerning operational deficiencies that are contributing to significant energy waste. The building control system is currently operating on a 24/7/365 exception schedule, which is effectively running all equipment in "manually on" continuously. In this "occupied" state, outdoor ventilation air is being conditioned when there are no occupants in the building and fan motors are needlessly running. Temperature setpoints are not being set back, causing the primary boilers and chillers will need to run more frequently. These factors are causing substantial utility and operational expenses. Facility maintenance personnel have stated that the reason for this exception schedule is that the building has difficulty recovering temperatures after a night setback. It had been suggested that the

root cause for the recovery problem is that the air handling units are undersized. There is potential to reduce these excess energy cost through the following upgrades:

- Air balancing of AHUs and VAV boxes.
- Morning warmup and "after hours" sequence
- Retro-Commission all systems
- Increased zoning and schedule optimization

In addition to the above deficiencies, the GUI only has graphical representation of the plant equipment and main air handling units. The control points for terminal fan coil units and VAV boxes are only visible as large summary tables that take a very long time to load. This system is in need of a graphics upgrade that includes new floor plan layout with links to individual equipment pages.

Washington Middle School

The Washington Middle School is currently controlled by the Continuum BMS. A review of the GUI showed the building is currently being operated in "occupied" between 4:30AM and 10:00PM during the weekdays. The actual occupancy hours cover a much smaller window of time each day. Facility personnel stated that the extended hours are meant to recover the building and to keep temperatures high for the afterhours cleaning staff. There is potential to reduce these excess energy cost through the following upgrades:

- Increased zoning and schedule optimization
- Morning warmup and "after hours" sequence
- Retro-Commission all systems

In addition to the above deficiencies, the GUI only has graphical representation of the plant equipment and main air handling units. The control points for terminal fan coil units and VAV boxes are only visible as large summary tables that take a very long time to load. This system is in need of a graphics upgrade that includes new floor plan layout with links to individual equipment pages.

Hamilton Intermediate School

The Hamilton Intermediate School is equipped with a very limited control system on the Continuum BMS. A review of the GUI showed the building is currently being operated in "occupied" between 5:00AM and 6:00PM during the weekdays. The system has very limited control of the steam boiler plant, only reading the outside air temperature and enabling the boiler plant. The classroom unit ventilators that are shown on the system appear to have significant issues. Most of the space temperatures are in the high 70's and several of the units have been powered down by teachers to reduce temperatures. There is potential to reduce these excess energy cost through the following upgrades:

- Adding modern digital controls throughout the boiler plant
- Increased zoning and schedule optimization
- Morning warmup and "after hours" sequence
- Retro-Commission all systems

In addition to the above deficiencies, the GUI does not have graphical representation of any equipment. The control points for unit ventilators are only visible as large summary tables that take a very long time to load. This system is in need of a graphics upgrade that includes new floor plan layout with links to individual equipment pages.

Lincoln Elementary School

The Lincoln Elementary School is equipped with a very limited control system on the Continuum BMS. A review of the GUI showed the building is currently being operated in "occupied" between 5:00AM and 7:00PM during the weekdays. The classroom unit ventilators that are shown on the system appear to have significant issues. Most of the space temperatures are in the high 70's and several of the units have been powered down by teachers to reduce temperatures. There is potential to reduce these excess energy cost through the following upgrades:

- Increased zoning and schedule optimization
- Morning warmup and "after hours" sequence
- Retro-Commission all systems

In addition to the above deficiencies, the GUI only has graphical representation of the plant equipment and main air handling units. The control points for unit ventilators are only visible as large summary tables that take a very long time to load. This system is in need of a graphics upgrade that includes new floor plan layout with links to individual equipment pages.

Kennedy Elementary School

The Kennedy Elementary School is currently controlled by a new Schneider Electric EcoStruxure™ BMS. A review of the GUI showed the building is currently being operated in "occupied" between 5:00AM and 8:00PM during the weekdays. The entire building is a new construction, and the newly installed controls appear to be operating without notable issue, as seen from a brief review of the BMS.

There is a limited potential for energy savings through the following upgrades:

- Increased zoning and schedule optimization
- Hot water plant and rooftop unit optimization

PROPOSED SCOPE OF WORK

District-Wide

ADD ALTERNATE 1: Install new EcoStruxure™ BMS

Provide and install Schneider Electric EcoStruxure™ Enterprise Server software on a customer provided virtual server and connect new and existing ASP edge server controllers. Provide new graphics for each piece of equipment, new floor plan graphics, alarms, and trending.

ADD ALTERNATE 2: District-Wide Honeywell Forge Predictive Maintenance Solution

We propose to deploy Honeywell Forge Predictive Maintenance, an application that automates the detection of faults and anomalies in the operation of building heating, ventilation, and air conditioning (HVAC) systems which impact building comfort, energy consumption or the life cycle of the assets. Faults are raised in the way of service cases containing actionable recommendations about how to address the fault and are presented to the building operator via the enterprise dashboards. By adopting a Predictive Maintenance program, building operators can transition from costly preventative and reactive maintenance programs to a pro-active or just-in-time maintenance program. The benefits of a Predictive Maintenance program include:

- Reduced labor/subcontract cost associated with performing preventative maintenance activities
- Reduced labor/subcontract cost by identification of Service Case root cause with recommended actions to resolve the fault
- Reduced energy cost by immediately identifying and addressing anomalies which impact energy consumption

- Increased occupant productivity by immediately identifying and addressing anomalies which impact occupant comfort
- Reduced capital and operational expenses by identifying and addressing anomalies which impact the life cycle of equipment and components
- Boost operational continuity by reducing equipment failures and reactive activity

Harrison High School

Install EcoStruxure™ Supervisory Devices

Furnish and install new ASP edge server controllers as needed to replace existing Infinity and Continuum network controllers. Integrate all building DDC controllers into the new District-wide BMS.

Additional Scope Details:

- Provide graphics, trending and alarms, scheduling, and M&V summary screens.
- Provide all drivers that may be required to integrate all existing field controllers.
- Provide onsite training for facility personnel.

ADD ALTERNATE 3: Integrate New Cogeneration Heat and Power Unit

Provide integration of the new Cogen unit that will be installed as part of this project. Extend communication cable to connect the manufacturer controller. Integrate the new units into the BMS and provide graphics and scheduling.

Additional Scope Details:

- Furnish controls and instrumentation as necessary to accomplish the design intent described, including controllers, sensors, end-devices.
- Furnish integration labor as necessary to accomplish the design intent described, including communication wiring, programming, graphics.

Sequence Upgrades

Implement the following sequences of operation upgrades.

- Building-wide
  - Optimized Start / Stop
  - Standardized Schedules and Setpoints
    - After Hours Schedule
  - Increase Zoning (TBD)
  - HW and CHW Outside Air Reset
  - Morning Boost / Cooldown
  - Unoccupied HW Temperature Offset
- AHUs, FCUs, VAVs
  - Economizer
  - Discharge Air Reset
  - Demand Control Ventilation
    - AHU-8

Additional Scope Details:

- Furnish controls and instrumentation as necessary to accomplish the design intent described, including controllers, sensors, end-devices.
- Furnish integration labor as necessary to accomplish the design intent described, including communication wiring, programming, graphics.

Exhaust Fan Control Upgrades

Provide new DDC controls for 10 exhaust fans. Provide new graphics and scheduling.

Additional Scope Details:

- Furnish controls and instrumentation as necessary to accomplish the design intent described, including controllers, sensors, end-devices.
- Furnish integration labor as necessary to accomplish the design intent described, including communication wiring, programming, graphics.

Washington Middle School

Install EcoStruxure™ Supervisory Devices

Furnish and install new ASP edge server controllers as needed to replace existing Infinity and Continuum network controllers. Integrate all building DDC controllers into the new District-wide BMS.

Additional Scope Details:

- Provide graphics, trending and alarms, scheduling, and M&V summary screens.
- Provide all drivers that may be required to integrate all existing field controllers.
- Provide onsite training for facility personnel.

Integrate New Rooftop Units

Provide integration of the new PoolPak unit and associated RTU for the pool locker rooms. Extend communication cable to connect two rooftop manufacturer unit controllers. Integrate the new units into the BMS and provide graphics and scheduling.

Additional Scope Details:

- Furnish controls and instrumentation as necessary to accomplish the design intent described, including controllers, sensors, end-devices.
- Furnish integration labor as necessary to accomplish the design intent described, including communication wiring, programming, graphics.

ADD ALTERNATE 4: Unit Ventilator Control Upgrades

Provide new DDC controls for 65 Unit Ventilators that will be replaced as part of this project. Units will be provided by the manufacturer as “DDC-Ready” with a terminal strip provided for ATC use. Provide new graphics and scheduling.

Additional Scope Details:

- Furnish controls and instrumentation as necessary to accomplish the design intent described, including controllers, sensors, end-devices.
- Reuse existing panels, transformers, power supplies, relays, conduit, wiring, and sensors if functional. All reused material shall be warrantied for one year after project acceptance.
- Furnish integration labor as necessary to accomplish the design intent described, including communication wiring, programming, graphics.

Retro-Commission Existing Field Controllers

Provide point-to-point checkout and functional testing of all existing field controllers. Provide repairs to defective sensors and control devices as needed to provide a fully functioning system. Provide retro-commissioning report that includes a list of any mechanical equipment found to be defective.

Equipment included:

- Boiler Plant

- Chiller Plant
- 11 Air Handling Units
- 4 Packaged RTUs
- The Pool Heat Exchanger
- 65 Unit Ventilators

Additional Scope Details:

- Provide calibration of all airflow and RH sensors.
- Note the programming changes listed in the “Sequence Upgrades” section herein.

Sequence Upgrades

Implement the following sequences of operation upgrades.

- Building-wide
  - Optimized Start / Stop
  - Standardized Schedules and Setpoints
    - After Hours Schedule
  - Increase Zoning (TBD)
- Hot Water Outside Air Reset
  - Morning Boost
  - Unoccupied Offset
- • AHUs and UVs
  - Economizer
  - Discharge Air Reset
  - Demand Control Ventilation:
    - 4 Hallway H&V Units
    - Auditorium AHU
    - 2 Gym AHUs

Additional Scope Details:

- Furnish controls and instrumentation as necessary to accomplish the design intent described, including controllers, sensors, end-devices.
- Furnish integration labor as necessary to accomplish the design intent described, including communication wiring, programming, graphics.

Exhaust Fan Control Upgrades

Furnish and install new DDC controls for 15 exhaust fans. Provide new graphics and scheduling.

Additional Scope Details:

- Furnish controls and instrumentation as necessary to accomplish the design intent described, including controllers, sensors, end-devices.
- Furnish integration labor as necessary to accomplish the design intent described, including communication wiring, programming, graphics.

Hamilton Intermediate School

Install EcoStruxure™ Supervisory Devices

Furnish and install new ASP edge server controllers as needed to replace existing Infinity and Continuum network controllers. Integrate all building DDC controllers into the new District-wide BMS.

Additional Scope Details:

- Provide graphics, trending and alarms, scheduling, and M&V summary screens.
- Provide all drivers that may be required to integrate all existing field controllers.
- Provide onsite training for facility personnel.

ADD ALTERNATE 5: Boiler Plant Control Upgrade
Furnish and install new DDC control of the two steam boilers. Provide new graphics, scheduling, steam pressure reset.

Additional Scope Details:

- Furnish controls and instrumentation as necessary to accomplish the design intent described, including controllers, sensors, end-devices.
- Furnish integration labor as necessary to accomplish the design intent described, including communication wiring, programming, graphics.

ADD ALTERNATE 6: Unit Ventilator Control Upgrades
Provide new DDC controls for 20 Unit Ventilators that will be replaced as part of this project. Units will be provided by the manufacturer as "DDC-Ready" with a terminal strip provided for ATC use. Provide new graphics and scheduling.

Additional Scope Details:

- Furnish controls and instrumentation as necessary to accomplish the design intent described, including controllers, sensors, end-devices.
- Reuse existing panels, transformers, power supplies, relays, conduit, wiring, and sensors if functional. All reused material shall be warrantied for one year after project acceptance.
- Furnish integration labor as necessary to accomplish the design intent described, including communication wiring, programming, graphics.

Retro-Commission Existing Field Controllers
Provide point-to-point checkout and functional testing of all existing field controllers. Provide repairs to defective sensors and control devices as needed to provide a fully functioning system. Provide retro-commissioning report that includes a list of any mechanical equipment found to be defective.

Equipment included:

- Boiler Plant
- 20 Unit Ventilators

Additional Scope Details:

- Provide calibration of all airflow and RH sensors.
- Note the programming changes listed in the "Sequence Upgrades" section herein.

Sequence Upgrades
Implement the following sequences of operation upgrades.

- Building-wide
  - Optimized Start / Stop
  - Standardized Schedules and Setpoints
    - After Hours Schedule
  - Increase Zoning (TBD)

Additional Scope Details:

- Furnish controls and instrumentation as necessary to accomplish the design intent described, including controllers, sensors, end-devices.
- Furnish integration labor as necessary to accomplish the design intent described, including communication wiring, programming, graphics.

Lincoln Elementary School

Install EcoStruxure™ Supervisory Devices

Furnish and install new ASP edge server controllers as needed to replace existing Infinity and Continuum network controllers. Integrate all building DDC controllers into the new District-wide BMS.

Additional Scope Details:

- Provide graphics, trending and alarms, scheduling, and M&V summary screens.
- Provide all drivers that may be required to integrate all existing field controllers.
- Provide onsite training for facility personnel.

ADD ALTERNATE 7: Unit Ventilator Control Upgrades

Provide new DDC controls for 40 Unit Ventilators that will be replaced as part of this project. Units will be provided by the manufacturer as "DDC-Ready" with a terminal strip provided for ATC use. Provide new graphics and scheduling.

Additional Scope Details:

- Furnish controls and instrumentation as necessary to accomplish the design intent described, including controllers, sensors, end-devices.
- Reuse existing panels, transformers, power supplies, relays, conduit, wiring, and sensors if functional. All reused material shall be warrantied for one year after project acceptance.
- Furnish integration labor as necessary to accomplish the design intent described, including communication wiring, programming, graphics.

Retro-Commission Existing Field Controllers

Provide point-to-point checkout and functional testing of all existing field controllers. Provide repairs to defective sensors and control devices as needed to provide a fully functioning system. Provide retro-commissioning report that includes a list of any mechanical equipment found to be defective.

Equipment included:

- Boiler Plant
- 2 Air Handling Units
- 40 Unit Ventilators

Additional Scope Details:

- Provide calibration of all CO2, airflow, and RH sensors.
- Note the programming changes listed in the "Sequence Upgrades" section herein.

Sequence Upgrades

Implement the following sequences of operation upgrades.

- • Building-wide
  - Optimized Start / Stop
  - Standardized Schedules and Setpoints
    - After Hours Schedule
  - Increase Zoning (TBD)

  - HW Outside Air Reset
  - Morning Boost
  - Unoccupied HW Temperature Offset
- AHUs and UVs
  - Economizer
  - Discharge Air Reset

Additional Scope Details:

- Furnish controls and instrumentation as necessary to accomplish the design intent described, including controllers, sensors, end-devices.
- Furnish integration labor as necessary to accomplish the design intent described, including communication wiring, programming, graphics.

Kennedy Elementary School

Integrate EcoStruxure™ Supervisory Devices

Migrate all building DDC controllers into the new District-wide BMS.

Sequence Upgrades

Implement the following sequences of operation upgrades.

- Building-wide
  - Optimized Start / Stop
  - Standardized Schedules and Setpoints
    - After Hours Schedule
  - Increase Zoning (TBD)
  - HW Outside Air Reset
  - Morning Boost
  - Unoccupied HW Temperature Offset
- RTUs
  - Economizer
  - Discharge Air Reset

Additional Scope Details:

- Furnish controls and instrumentation as necessary to accomplish the design intent described, including controllers, sensors, end-devices.
- Furnish integration labor as necessary to accomplish the design intent described, including communication wiring, programming, graphics.

Specification Overview

- Harrison School District will be responsible to provide and terminate all new LAN connections in each building, as required, which will be used to connect a new or existing supervisory controllers to the customer LAN. If the BMS contractor chooses to use IP based field controllers, then the installation of the CAT6 cabling between those controllers is their responsibility.
- Reuse existing panels, transformers, power supplies, relays, conduit, wiring, and sensors if found to be functional. Warranty components as new.
- All control wiring will be run in conduit in mechanical rooms. Wire mold is acceptable in exposed areas. Plenum rated wiring can be run above drop ceilings.
- All newly installed field controllers will be open source BACnet Direct Digital Controls. The communication protocol shall be BACnet.
- The commissioning and recommissioning scope requires the BMS vendor to provide point-to-point checkout sheets and functional checkout sheets for each piece of equipment on the BMS.

- M&V Requirements:
- Minimum of 6 graphic screens
- 1 graphic per ECM or Equipment Type (i.e. AHU, VAV, U/V, etc.)
- 1 graphic per building for Guarantee Period Operating Parameters (unless all building-zones can fit clearly on one screen)
- Summary screen parameters must include a quick link to applicable trend data
- Occ/Unocc (D/N) scheduling
- Include hard coded vertical list of start / stop time (and equivalent occ hours per month) for Occ/Unocc scheduling per zone
- Next to this list provide current Occ/Unocc time setpoints and equivalent occ hours per month
- Next to this provide actual overall hours: 1) running for 1 month then reset on day 1 of next month and add last monthly number to list of monthly values 2) same but on annual basis
- Next to this list quantity of times in month with same roll over and storage
- Next to this same for annual values
- Next to this 1) the quantity of times that setback or setup temperature triggered equipment run during Unocc period and 2) duration of run time.
- Similar concept for Occ/Unocc (D/N) temperature setpoints vs. running average actual temperature per zone.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based upon reducing the amount of energy that needs to pre-heat or cool the outside air. The savings are generally calculated as:

Existing Heating BTU & Cost per BTU	*= Metered data from existing meter readings*
Cost of Existing Heating	*= Average site data $/CCF or $/Gallon*
Reduction in Heating/Cooling BTU	*= Reduction in outside air CFM x 1.08 x Delta T x Operating Hours*
Cost of Proposed Heating/Cooling	*= Reduced BTU x Cost per BTU*
Energy Savings $	*= Existing Costs – Proposed Costs*

The baseline adjustment calculations are included with the energy calculations.

CHANGES IN INFRASTRUCTURE

None.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced energy.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 4A Building Envelope Improvements

The key benefits of this ECM include:

Energy savings from reducing unwanted outside air infiltration.

Equipment longevity due to more efficient and less wasteful equipment utilization.

Occupancy comfort and productivity by way of enhanced temperature and humidity control throughout your buildings.

Improved building envelope from addressing building gaps that allow unconditioned air penetration.

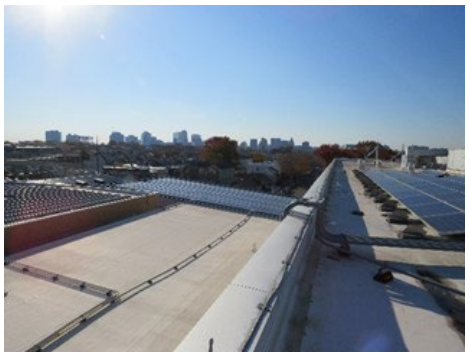
ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
4A Building Envelope Improvements	●	●	●	●	●	

EXISTING CONDITIONS

Heat loss due to infiltration is a common problem, particularly in places with long and cold winter seasons such as NJ. This problem has been shown to represent the single largest source of heat loss or gain through the building envelopes of nearly all types of buildings. Our work has found 30% to 50% of heat loss attributable to air leaks in buildings.

Honeywell uncovered several leaks that allow for heat loss to occur during the winter season and unwanted heat gains during the summer season. These problems include door gaps, exhaust fans in poor condition, open windows or windows in poor condition, lack of air sealing, and insulation.

Lincoln ES - Building Envelope



Harrison HS - Building Envelope

Honeywell has helped customers like you to address these problems with a comprehensive and thorough building envelope solution that seals up your buildings to improve occupancy comfort and help eliminate unwanted energy waste. We propose to conduct a comprehensive weatherization job to weatherproof doors and windows, caulk and seal leaks, and install spray foam and rigid foam boards to stop unwanted air movement and provide a thermal barrier between spaces. Part of this process may include decoupling floor-to-floor and compartmentalizing of components of the building to equalize pressure differences.

PROPOSED SOLUTION

Roof-Wall Joints

- Existing – Buildings throughout the Harrison Public Schools were found to require roof-wall joint air sealing.
- Proposed – Honeywell recommends using a high-performance sealant. In some buildings, two-component foam will be used. Any cantilevers off the buildings will be sealed with backer rod and sealant. Finally, the inside vestibule corners should be sealed with backer rod and sealant.

Roof Penetrations

- Existing - There are many roof top exhaust fans that require damper cleaning, lubrication, and inspection for proper operation and to seal the roof deck to prevent penetration. Some units may be deemed to be too oversized for this service. Some buildings have roof-top AHUs with ducts that may show air leak during an IGA.
- Proposed – Honeywell recommends if there is leak, these duct penetrations will be sealed with two-component polyurethane foam. Skylights will also be sealed. Sealant will be injected behind the drip cap to eliminate airflow.

Roof Overhangs

- Existing – We found that roof overhangs at exterior doors are open to the drop ceilings, providing a pathway allowing heated and cooled air to escape between the interior and exterior of the building.
- Proposed – Honeywell proposes to install rigid foam boards and seal the perimeter and any penetrations with spray foam to prevent air leak and provide a sufficient thermal barrier between the spaces.

Windows

- Existing - The operable windows in most of your buildings could present air leak issues that require weather stripping with fuzz or gasket type materials.
- Proposed – Honeywell recommends installing weather stripping and door sweeps to prevent air leak.

Doors

- Existing – Doors in this facility need full weather-stripping replacement and/or door sweeps.
- Proposed – Honeywell recommends new weather stripping and door sweeps to be installed where needed.

Benefits

This work will allow for more efficient operation of your buildings by reducing heating and cooling losses throughout the year. In addition, the draftiness of the buildings and hot and cold spots will be significantly reduced. A reduction in air infiltration will also minimize potential concerns for dirt infiltration or indoor air quality concerns including allergies.

SCOPE OF WORK

Building Envelope Detailed Scope of Work

School	Buck Frame Air Sealing (LF)	Caulking (LF)	Door - Install Jamb Spacer (Units)	Door Weather Striping - Doubles (Units)	Door Weather Stripping - Singles (Units)	Overhang Air Sealing (SF)	Roof-Wall Intersection Air Sealing (SF)
Hamilton Intermediate School	1,507	6,339		3	3		
Harrison High School		340		15	3		
Kennedy Elementary School				4	6		
Lincoln Elementary School		3,578	2	2	12		
Washington Middle School	388	360		16	3	156	742
Total Quantity	1,895	10,616	2	40	27	156	742

ENERGY SAVINGS METHODOLOGY AND RESULTS

The energy savings for this ECM are realized at the buildings' HVAC equipment. The improved building envelope will limit conditioned air infiltration through openings in the building air barrier. Less infiltration means less heating required by the heating system.

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. The District and Honeywell will determine final selections.
Equipment Identification	As part of the ECM design and approval process, specific product selection will be provided for your review and approval.

ECM 5A Cogeneration CHP

The key benefits of this ECM include:

Energy savings from utilizing a Combined Heat and Power (CHP) system to supplement the existing heating system.

Operational savings resulting from improved operational efficiencies unique to CHP technology.

ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
5A Cogeneration CHP	●					

EXISTING CONDITIONS

No Combined Heat and Power (i.e. cogeneration) units are currently located within the Harrison Public Schools.

Cogeneration Configuration

Ecopower CHP

PROPOSED SOLUTION

Honeywell recommends the installation of the ecopower micro-cogeneration system provides heat and electrical power in a cost effective and environmentally friendly manner. Using a natural gas or propane fueled Marathon Engine, the system captures thermal energy for space heating or domestic hot water. The mCHP uses heat generated by an internal combustion engine to produce between 13,000 - 47,000 BTU of heat per hour while simultaneously co-generating 1.2 - 4.4kW of electricity per hour. The system is thermally driven. The ecopower will anticipate the heat demand from sensors located in the house, buffer tank or outside and varies its output to satisfy the demand. It will modulate (slow down or speed up) to run at a level to maintain a constant heat requirement in order to keep the engine running as long as possible, ensuring maximum electrical generation.

SCOPE OF WORK

Proposed Cogeneration Units

Building	Type	Manufacturer	Model
Harrison High School	Axiom	Ecopower	1

ENERGY SAVINGS METHODOLOGY AND RESULTS

Savings are based on energy conversion of natural gas to thermal and electrical energy.

EQUIPMENT INFORMATION

Manufacturer and Type	Axiom Ecopower, Electrical Output 1.2-4.4 kW, Thermal Output 13,000 -47,000 Btu/hr., Overall efficiency 93%
Equipment Identification	Product cut sheets and specifications for generally used are available upon request. As part of the measure design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

The proposed micro-generator unit would reside in or near the boiler room.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods. The customer and Honeywell will decide upon the exact location of the CHP installation.

ENVIRONMENTAL ISSUES

Resource Use	Energy will be generated to supplement energy purchased from the electrical utility.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	Aside from the environmental benefits from on-site energy generation, no other environmental impact is expected.

ECM 6A Pool Filter and Motor VFD Upgrade

The key benefits of this ECM include:

Reduced utility costs.

Reduced energy usage from improved efficiency resulting from replacement of older equipment.

Lower Operational Costs through less frequent maintenance and operational issues.

ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
6A Pool Filter and Motor VFD Upgrade		●				

ECM OVERVIEW

Existing Conditions

Washington School currently is equipped with an antiquated open filtration system. The open filtration system causes corrosive effects to the machinery in the filtration room. It also presents a safety hazard for anyone who enters the filtration room. The corrosive environment degrades the current equipment, causing problems with the two running pumps. As a result, these two water pumps need to be consistently repaired/replaced. Removing the two-pump, open filtration system and replacing with a closed, one pump, energy efficient system will eliminate the unnecessary operation costs while lowering energy consumption.

Washington MS Existing Pool Filters

Washington MS Existing Pool Filter Pumps

Exiting Filtration System

Building	Description	Manufacturer	Model	GPM	Efficiency	Qty
Washington Middle School	7.5 HP Pool Filter Pump	Marathon	CMK-750		84%	2
Washington Middle School	Closed Pressurized Sand Filter	Paddock	6723-V-2C	166.5		2

PROPOSED SOLUTION

Honeywell recommends installing a closed filtration system. This includes a pressurized sand filtration system, operated with a single, high-efficiency motor. This will eliminate the corrosive effects caused be an open system.

Proposed Filtration System

Building	Description	Manufacturer	Model	Efficiency	Qty
Washington Middle School	10 HP Pool Filter Pump	Pentair	WHISPERFLO XF® VS	92.5%	1
Washington Middle School	Variable Frequency Drive	Pentair		Up to 98%	1
Washington Middle School	Closed Pressurized Sand Filter	Pentair	THS4284		1

SCOPE OF WORK

The following outlines the open filtration system replacement:

- Remove all existing equipment with current filtration system.
- Provide power and safety controls to operate the variable frequency drive.
- Fit and install new, larger diameter piping.
- Install new pump and configure with variable frequency drive.
- Train operator(s).

ENERGY SAVINGS METHODOLOGY AND RESULTS

In general, Honeywell uses the following approach to determine savings for this specific measure:

Existing Water Pump(s) Consumption	= *Existing HP of Motor * (.746 kWh/HP) * Load Factor / Existing Efficiency*
Proposed Water Pump Consumption	= *New HP of Motor * (.746 kWh/HP) * Load Factor / New Efficiency*
Energy Savings $	= *(Existing Consumption – Proposed Consumption) * (Price Per kWh) * (Yearly Runtime)*

ENERGY SAVINGS METHODOLOGY AND RESULTS

Savings are based on the difference in flow and amount of energy used to move the pool water

CHANGES IN INFRASTRUCTURE

New VFD will be installed on the wall near the pump and disconnect. All new equipment will be installed in the existing room, no expansion of the facility will be necessary.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required.

ENVIRONMENTAL ISSUES

Resource Use	None.
Waste Production	None.
Environmental Regulations	Aside from the environmental benefits of increasing energy awareness no other environmental impact is expected.

ECM 7A Permanent Load Reduction

The key benefits of this ECM include:

Reduced utility costs.

Reduced energy usage from improved efficiency resulting from replacement of older equipment.

ECM Description	Harrison High School	Washington Middle School	Hamilton Intermediate School	Lincoln Elementary School	Kennedy Elementary School	Harrison High School Stadium
7A Permanent Load Reduction	●	●	●	●	●	●

ECM OVERVIEW

This measure evaluates the savings from the decrease in power (KW) usage and the rebates associated with that reduction through the PJM Permanent Reduction Program. Honeywell proposes to continue to utilize a registered Demand Response Curtailment Service Provider (CSP) to provide energy response services to the School District. Through the CSP, the School District will participate in the PJM Capacity Market Program and PJM Energy Efficiency Program. These programs are offered through the PJM Regional Transmission Organization (RTO), and Independent System Operator (ISO). The Capacity Market Program allows PJM customers the ability to respond to capacity emergencies when called upon by PJM, and the energy efficiency program pays PJM customers for implementing Energy Conservation measures (ECMs) that result in permanent load reductions during defined hours.

Washington MS - Typical Electric Meter

Harrison HS -Typical Electric Panel

PJM Capacity Market Program

Capacity represents the need to have adequate resources to ensure that the demand for electricity can be met at all times. For PJM, that means that a utility or other electricity supplier, load serving entity, is required to have the resources to meet its consumers' demand plus a reserve amount. Electricity suppliers, load serving entities, can meet that requirement by owning and operating generation capacity, by purchasing capacity from others or by obtaining capacity through PJM's capacity market auctions.

Permanent Load Reduction KW per Building

Building	Average Monthly KW	Permanent Load Reduction (KW)
Harrison High School	465	67
Washington Middle School	170	37
Hamilton Intermediate School	46	12
Lincoln Elementary School	66	19
Kennedy Elementary School	155	21
Harrison High School Stadium	94	53
Total Reduction		**209**

PJM operates a capacity market, called the Reliability Pricing Model (RPM). It is designed to ensure that adequate resources are available to meet the demand for electricity at all times. In the RPM, those resources include not only generating stations, but also demand response actions and energy efficiency measures by consumers to reduce their demand for electricity.

PJM must keep the electric grid operating in balance by ensuring there is adequate generation of electricity to satisfy the demand for electricity at every location in the region both now and in the future. PJM's markets for energy and ancillary services help maintain the balance now while the PJM market for capacity aims to keep the system in balance in the future. Resources, even if they operate infrequently, must receive enough revenue to cover their costs. Payments for capacity provide a revenue stream to maintain and keep current resources operating and to develop new resources. Investors need sufficient long-term price signals to encourage the maintenance and development of generation, transmission and demand-side resources. The RPM, based on making capacity commitments in advance of the energy need, creates a long-term price signal to attract needed investments for reliability in the PJM region.

PROPOSED SOLUTION

Honeywell proposes to work with a PJM Regional Transmission Organization (RTO), CSR to implement a Demand Response energy curtailment program which will generate revenue streams for the School District. Honeywell's Demand Response agent acting as the CSP will notify the district prior to potential events in order to advise and coordinate load curtailment participation in accordance with RTO program requirements and will work with the School District to benefit from energy efficiency improvements.

The PJM Markets are further described below.

The PJM Energy Efficiency Program

Energy efficiency measures consist of installing more efficient devices or implementing more efficient processes/systems that exceed then-current building codes or other relevant standards. An energy efficiency resource must achieve a permanent, continuous reduction in demand for electricity. Energy efficiency measures are fully implemented throughout the delivery year without any requirement of notice, dispatch, or operator intervention. A demand response resource can reduce its demand for electricity when instructed; this means PJM considers it a "dispatchable resource". A demand response resource can participate in the RPM market for as long as its ability to reduce its demand continues. A demand response resource must be willing to reduce demand for electricity up to 10 times each year when called for a reduction. In a year without any reduction calls, the demand response resource is required to demonstrate the ability to reduce demand for electricity during a test of reduction capability. Data will be submitted by the demand response resource to prove compliance with reductions from actual calls or

reductions from capability tests. An energy efficiency resource is one that reduced their demand for electricity through an energy efficiency measure that does not require any additional action by the consumer.

ENERGY SAVINGS METHODOLOGY AND RESULTS

Revenue is generated through participation in the PJM DR program.

CHANGES IN INFRASTRUCTURE

None.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Initiation of demand response curtailment will be required.

ENVIRONMENTAL ISSUES

Resource Use	None.
Waste Production	This measure will produce no waste by-products.
Environmental Regulations	None.

SECTION D — TECHNICAL & FINANCIAL SUMMARY

Section D — Technical & Financial Summary

1. Recommended ESIP Project

Recommended ESIP Project	
Value of Project	$2,825,932
Term of Repayment	15 Years
Projected Savings Over Term	$3,662,030
Projected NJ Rebates & Incentives	$48,162
Projected Interest Rate	2.4%

Form II: Recommended Project — Energy Conservation Measures (ECMs) Summary Form

FORM II
ESCO's ENERGY SAVINGS PLAN (ESP):
ENERGY CONSERVATION MEASUREs (ECMs) SUMMARY FORM
HARRISON PUBLIC SCHOOLS
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: Honeywell International

Proposed Preliminary Energy Savings Plan: ECMs (Base Project)	Estimated Installed Hard Costs [1] $	Estimated Annual Savings $	Estimated Simple Payback (years)
1A LED Lighting	$ 811,106	$ 184,885	4.39
1B Stadium Lighting	$ 587,418	$ 18,860	31.15
1C De-Stratification Fans w/ Air Purification	$ 111,919	$ 5,573	20.08
3A Building Controls/Retro-Commissioning	$ 399,259	$ 21,941	18.20
4A Building Envelope Improvements	$ 99,543	$ 12,029	8.28
7A Permanent Load Reduction	$ -	$ -	-
			-
			-
Add additional lines as needed* **Project Summary:**	$ 2,009,244	$ 243,287	8.26

Optional ECMs Considered, but not included with base project at this time	Estimated Installed Hard Costs [1] $	Estimated Annual Savings $	Estimated Simple Payback (years)
2A Boiler Replacements	$ 806,382	$ 6,729	119.84
2B Ventilation Upgrades - Air Handling Units	$ 838,688	$ 1,239	676.98
2C Pool Heater and Domestic Water Replacements	$ 103,615	$ 525	197.40
2D Replace Unit Ventilators	$ 1,461,518	$ 833	1,755.38
5A Cogeneration CHP	$ 89,940	$ 991	90.74
6A Pool Filter and Motor VFD Upgrade	$ 53,018	$ 2,978	17.80
0	$ -	$ -	-
0	$ -	$ -	-

Add additional lines as needed*

(1) The total value of Hard Costs is defined in accordance with standard AIA definitions that include: Labor Costs, Subcontractor Costs, Cost of Materials & Equipment, Temporary Facilities and Related Items, and Miscellaneous Costs such as Permits, Bonds Taxes, Insurance, Mark-ups, Overhead, Profit, etc.

Form III: Recommended Project — Projected Annual Energy Savings Data Form

FORM III
ESCO's ENERGY SAVINGS PLAN (ESP)
PROJECTED ANNUAL ENERGY SAVINGS DATA FORM
HARRISON PUBLIC SCHOOLS
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: **Honeywell International**

The projected annual savings for each fuel type MUST be completed using the following format. Data should be given in the form of fuel units that

Energy/Water	ESCO Developed Baseline (Units)	ESCO Developed Baseline (Costs $)	Proposed Annual Savings (Units)	Proposed Annual Savings (Costs $)
Electric Demand (KW)	11,961	$76,258	4,119	$27,308
Electric Energy (KWH)	4,723,433	$570,319	1,310,976	$148,378
Natural Gas (therms)	186,442	$169,257	18,272	$18,234
Fuel Oil (Gal)	0	$0	0	$0
Steam (Pounds)				
Water (gallons)				
Other (Specify Units)				
Other (Specify Units)				
Avoided Emissions (1)	Provide in Pounds (Lbs)			
NOX	1,256			
SO2	878			
CO2	1,907,564			

(1) ESCOs are to use the rates provided as part of this RFP to calculate Avoided Emissions. Calculation for all project energy savings and greenhouse
(2) "ESCOs Developed Baseline": Board's current annual usages and costs as determined by the proposing ESCO; based off Board's utility information
(3) "Proposed Annual Savings": ESCOs proposed annual savings resulting from the Board's implementation of the proposed ESP, as based upon "ESCOs

Form IV: Recommended Project — Projected Annual Energy Savings Data Form in MMBTUs

FORM IV

ESCO's ENERGY SAVINGS PLAN (ESP):
PROJECTED ANNUAL ENERGY SAVINGS DATA FORM IN MMBTUs
HARRISON PUBLIC SCHOOLS
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: **Honeywell International**

The projected annual energy savings for each fuel type MUST be completed using the following format. Data should be given in equivalent

ENERGY	ESCO Developed Baseline	ESCO Proposed Savings Annual	Comments
Electric Energy (MMBTUs)	16,116	4,473	
Natural Gas (MMBTUs)	18,644	1,827	
Fuel Oil (MMBTUs)			
Steam (MMBTUs)			
Other (Specify) (MMBTUs)			
Other (Specify)			

NOTE: MMBTU Defined: A standard unit of measurement used to denote both the amount of heat energy in fuels and the ability of appliances

Form VI: Recommended Project — Projected Cost Form For 15 Year @ 2% Interest Rate

ESCO Name: **Honeywell International**

Note: Proposers must use the following assumptions in all financial calculations:
(a) The cost of all types of energy should be assume **2.4%** gas, **2.2%** electric per year

1. Term of Agreement: **15** (Years) (Months)
2. Construction Period [2] (months): **12**
3. Cash Flow Analysis Format:

Project Hard Cost:	$	2,009,244
Investment Grade Energy Audit	$	21,097
Design Engineering Fees	$	120,555
ction Management & Project Administration	$	120,555
System Commissioning	$	30,139
Contingency	$	140,647
Overhead & Profit	$	301,387
Project Value:	$	2,743,623
Omnia Fee Structure	$	82,309
Financed Value:	**$**	**2,825,932**

Interest Rate to Be Used for Proposal Purposes: **2.4%**

Year	Annual Energy Savings	Annual Operational Savings	Energy Rebates/Incentives[4]	Total Annual Savings	Annual Project Costs	Board Costs	Annual Service Costs[3]	Net Cash-Flow to Client	Cumulative Cash Flow
Installation	$ 56,524		$ -	$ 56,524	$ -	$ -	$ -	$ 56,524	$ 56,524
1	$ 188,415	$ 49,367	$ 36,825	$ 274,607	$ (262,007)	$ (290,267)	$ (28,259)	$ 12,600	$ 69,124
2	$ 192,597	$ 49,367	$ 3,779	$ 245,742	$ (233,142)	$ (233,142)	$ -	$ 12,600	$ 81,724
3	$ 196,871	$ 49,367	$ 3,779	$ 250,017	$ (237,417)	$ (237,417)	$ -	$ 12,600	$ 94,324
4	$ 201,240	$ 49,367	$ 3,779	$ 254,386	$ (241,786)	$ (241,786)	$ -	$ 12,600	$ 106,924
5	$ 205,707	$ 49,367	$ -	$ 255,074	$ (242,474)	$ (242,474)	$ -	$ 12,600	$ 119,524
6	$ 210,273		$ -	$ 210,273	$ (197,673)	$ (197,673)	$ -	$ 12,600	$ 132,124
7	$ 214,940		$ -	$ 214,940	$ (202,340)	$ (202,340)	$ -	$ 12,600	$ 144,724
8	$ 219,710		$ -	$ 219,710	$ (207,110)	$ (207,110)	$ -	$ 12,600	$ 157,324
9	$ 224,587		$ -	$ 224,587	$ (211,987)	$ (211,987)	$ -	$ 12,600	$ 169,924
10	$ 229,572		$ -	$ 229,572	$ (216,972)	$ (216,972)	$ -	$ 12,600	$ 182,524
11	$ 234,668		$ -	$ 234,668	$ (222,068)	$ (222,068)	$ -	$ 12,600	$ 195,124
12	$ 239,877		$ -	$ 239,877	$ (227,277)	$ (227,277)	$ -	$ 12,600	$ 207,724
13	$ 245,201		$ -	$ 245,201	$ (232,601)	$ (232,601)	$ -	$ 12,600	$ 220,324
14	$ 250,644		$ -	$ 250,644	$ (238,044)	$ (238,044)	$ -	$ 12,600	$ 232,924
15	$ 256,208		$ -	$ 256,208	$ (243,913)	$ (243,913)	$ -	$ 12,295	$ 245,219
Totals	$ 3,367,033	$ 246,835	$ 48,162	$ 3,662,030	$ (3,416,811)	$ (3,445,070)	$ (28,259)	$ 245,219	$ 245,219

Total Cash Flow	$	245,219

NOTES:
(1) Includes: Hard costs and project service fees defined in ESCO's PROPOSED "FORM V"
(2) No payments are made by HARRISON PUBLIC SCHOOLS during the construction period.
(3) This figure should equal the value indicated on the ESCO's PROPOSED "FORM V". DO NOT include in the Financed Project Costs.
(4) As of July 1, 2021, all of former NJ Clean Energy Program incentive programs transitioned over to the investor-owned gas and electric utility companies. Subsequently, the BPU is requiring that all ESIP projects consult with the DCA and follow all DCA guidance regarding the procurement of all subcontractors
***Annual Service only applies if customer accepts energy guarantee.**

Honeywell is not acting as a municipal advisor of fiduciary on your behalf. Any municiapl securities or financial products information provided is for general information and educational purposes only and you should obtain the advice of a licensed and qualified financial advisor regarding such information.

Note: To see the source of named ranges, use the dropdown menu to the left of the formula bar.

Building-by-Building Simple Payback Summary (Hard Costs Only)

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
Hamilton Intermediate School	**$ 5,336**	**$ 2,186**	**$ 5,624**	**$ 16,859**	**$ 3,714**	**$ 124,904**	**6.1**
1A LED Lighting	$ 4,712	$ 2,186	$ (615)	$ 9,997	$ 3,714	$ 48,415	3.5
4A Building Envelope Improvements	$ 668	$ -	$ 4,332	$ 5,000	$ -	$ 34,753	7.0
1C De-Stratification Fans w/ Air Purification	$ (44)	$ -	$ 1,026	$ 981	$ -	$ 11,917	12.1
3A Building Controls/Retro-Commissioning	$ -	$ -	$ 880	$ 880	$ -	$ 29,819	33.9
Harrison High School	**$ 62,462**	**$ 7,305**	**$ 3,343**	**$ 90,044**	**$ 16,934**	**$ 612,885**	**5.7**
1A LED Lighting	$ 53,388	$ 7,305	$ (2,642)	$ 74,984	$ 16,934	$ 382,910	4.2
4A Building Envelope Improvements	$ 292	$ -	$ 783	$ 1,076	$ -	$ 10,563	9.8
1C De-Stratification Fans w/ Air Purification	$ (112)	$ -	$ 1,959	$ 1,847	$ -	$ 42,384	22.9
3A Building Controls/Retro-Commissioning	$ 8,894	$ -	$ 3,243	$ 12,137	$ -	$ 177,028	14.6
Harrison High School Stadium	**$ 14,003**	**$ 4,856**	**$ -**	**$ 18,860**	**$ -**	**$ 587,418**	**31.1**
1B Stadium Lighting	$ 14,003	$ 4,856	$ -	$ 18,860	$ -	$ 587,418	31.1
Kennedy Elementary School	**$ 11,297**	**$ 3,682**	**$ 1,159**	**$ 24,032**	**$ 7,895**	**$ 143,117**	**4.5**
1A LED Lighting	$ 9,653	$ 3,682	$ (516)	$ 20,714	$ 7,895	$ 98,768	3.5
4A Building Envelope Improvements	$ 98	$ -	$ 184	$ 283	$ -	$ 3,352	11.9
1C De-Stratification Fans w/ Air Purification	$ (88)	$ -	$ 929	$ 841	$ -	$ 20,855	24.8
3A Building Controls/Retro-Commissioning	$ 1,633	$ -	$ 562	$ 2,195	$ -	$ 20,142	9.2
Lincoln Elementary School	**$ 10,493**	**$ 3,028**	**$ 2,914**	**$ 23,871**	**$ 7,436**	**$ 165,621**	**5.3**
1A LED Lighting	$ 10,170	$ 3,028	$ (744)	$ 19,890	$ 7,436	$ 91,369	3.3
4A Building Envelope Improvements	$ 369	$ -	$ 1,502	$ 1,871	$ -	$ 15,576	8.3
1C De-Stratification Fans w/ Air Purification	$ (46)	$ -	$ 598	$ 552	$ -	$ 8,938	16.2
3A Building Controls/Retro-Commissioning	$ -	$ -	$ 1,558	$ 1,558	$ -	$ 49,738	31.9
Washington Middle School	**$ 44,787**	**$ 6,250**	**$ 5,195**	**$ 69,621**	**$ 13,389**	**$ 375,300**	**4.5**
1A LED Lighting	$ 41,295	$ 6,250	$ (1,635)	$ 59,299	$ 13,389	$ 189,644	2.6
4A Building Envelope Improvements	$ 1,241	$ -	$ 2,558	$ 3,799	$ -	$ 35,298	9.3
1C De-Stratification Fans w/ Air Purification	$ 8	$ -	$ 1,344	$ 1,352	$ -	$ 27,825	20.6
3A Building Controls/Retro-Commissioning	$ 2,243	$ -	$ 2,928	$ 5,171	$ -	$ 122,533	23.7
Project Total	$ 148,378	$ 27,308	$ 18,234	$ 243,287	$ 49,367	$ 2,009,244	6.9

2. Utility and Other Rebates & Incentives

New Jersey Department of Clean Energy

In 2018, Governor Murphy signed into law the landmark legislation known as the Clean Energy Act. The law called for a significant overhaul of New Jersey's clean energy systems by building sustainable infrastructure in order to fight climate change and reduce carbon emissions, which will in turn create well-paying local jobs, grow the state's economy, and improve public health while ensuring a cleaner environment for current and future residents.

As part of this statewide undertaking, the Clean Energy Act required New Jersey's investor-owned gas and electric utility companies to reduce their customers' use of gas and electricity by set percentages over time. To help reach these targets, the New Jersey Board of Public Utilities approved a comprehensive suite of efficiency programs that would transition the state to some of the highest energy savings in the country.

These "next generation" energy efficiency programs feature new ways of managing and delivering programs historically administered by New Jersey's Clean Energy Program™ (NJCEP). While NJCEP will continue to offer some energy efficiency programs, all of the investor-owned gas and electric utility companies will now also offer complementary energy efficiency programs directly to their customers,

Incentives, Rebates and Grants Summary

Honeywell has a great deal of experience in applying for, and successfully securing, all available incentives, rebates and grants for our clients. We have been approved and allocated for over $9M of incentives on behalf of our New Jersey customers alone since the introduction of the Energy Savings Improvement Program legislation in 2009. The New Jersey programs employed included primarily the Office of Clean Energy's Direct Install, Prescriptive Rebate Program and Cogeneration Incentives as applicable. All of these programs are available through your local utility company. Through this ESIP program, Honeywell will coordinate all activities with achieving the highest rebate amount available to support the financials of the overall project

ENERGY STAR Portfolio Manager

Honeywell will also utilize the ENERGY STAR Program with Portfolio Manager, EPA's interactive tool that allows facility managers to track and evaluate energy and water consumption across all their buildings. The tool provides the opportunity to load in the characteristics and energy usage of your buildings and determine an energy performance benchmark score. You can then assess energy management goals over time, identify strategic opportunities for savings, and receive EPA recognition for superior energy performance.

Incentives, Rebates and Grants History

A table of the incentive amounts on a per project basis is provided below.

NJ Customers	Rebate Amount
Hudson County (Projected)	$2,369,012
East Brunswick Public Schools (Projected)	$1,601,318
West Orange Board of Education	$1,399,747
City of Newark	$1,242,368
Passaic County (Projected)	$1,209,061
Old Bridge Board of Education	$1,085,614
Bridgewater-Raritan Regional District	$963,034
Elizabeth Schools	$934,209
Parsippany-Troy Hills Board of Education	$831,175
Camden County Technical Schools	$734,803
West Orange Board of Education	$644,744
Hillsborough Board of Education	$584,736
NH-Voorhees Regional HS District	$511,558
School District of the Chathams	$419,056
West Morris Regional High School (Projected)	$392,700
Phillipsburg School District	$274,278
Educational Services Commission of NJ	$260,603
Somerset County Vocational	$246,095
Robbinsville Public School District	$231,015
Bloomfield Board of Education	$225,868
Mountain Lakes Board of Education	$194,722
Lower Cape May Regional	$190,658
Verona School District	$171,015
Hanover Township School District	$169,882
City of Perth Amboy	$137,441
Town of Kearny	$84,147
Frankford School District	$30,743

Honeywell has determined that the Harrison School District is eligible for **$48,162** in estimated total incentives for the projects included in the Prescriptive Lighting and Permanent Load Reduction Programs Please refer to the tables on below for a breakdown of Harrison School District incentive levels on a building by building basis for each type of incentive.

Rebates and Incentives

Location	Prescriptive Lighting (Initial Installation)	Permanent Load Reduction (Per Year for Four Years)
Harrison High School	$33,046	$1,202
Washington Middle School		$673
Hamilton Intermediate School		$221
Lincoln Elementary School		$346
Kennedy Elementary School		$375
Harrison High School Stadium		$962
Totals	**$33,046**	**$3,779**

Total Rebates and Incentives

Year	Prescriptive Lighting	Permanent Load Reduction	Total Incentives
Installation	$33,046		$33,046
Year 1		$3,779	$3,779
Year 2		$3,779	$3,779
Year 3		$3,779	$3,779
Year 4		$3,779	$3,779
Totals	**$33,046**	**$15,116**	**$48,162**

3. Financing the ESIP

In accordance with P.L.2012, c.55 an ESIP can be financed through energy savings obligations. The term refers to the two primary financing tools, debt and lease-purchase instruments. Each of these options is discussed below.

Energy savings obligations shall not be used to finance maintenance, guarantees, or the required third-party verification of energy conservation measures guarantees. Energy saving obligations, however, may include the costs of an energy audit and the cost of verification of energy savings as part of adopting an energy savings plan or upon commissioning. While the audit and verification costs may be financed, they are not to be considered in the energy savings plan as a cost to be offset with savings.

In all cases, maturity schedules of lease-purchase agreements or energy savings obligations shall not exceed the estimated average useful life of the energy conservation measures.

An ESIP can also include installation of renewable energy facilities, such as solar panels. Under an energy savings plan, solar panels can be installed, and the reduced cost of energy reflected as savings.

The law also provides that the cost of energy saving obligations may be treated as an element of the local unit's utility budget, as it replaces energy costs.

Debt Issuance

The law specifically authorizes municipalities, school districts, cities, counties, and fire districts to issue refunding bonds as a general obligation, backed with full faith and credit of the local unit to finance the ESIP. Because an ESIP does not effectively authorize new costs or taxpayer obligations, the refunding bond is appropriate, as it does not affect debt limits, or in the case of a board of education, require voter approval. The routine procedures for refunding bonds found in the Local Bond Law and Public-School Bond Law would be followed for issuance of debt, along with any required Bond Anticipation Notes as authorized pursuant to law.

Regarding bonds for public schools, the Department of Education (DOE) has concluded that debt financed ESIP projects are not covered by State aid for debt service or a "Section 15 EFFCA Grant" as there is no new local debt being authorized.

Tax-Exempt Lease Purchase Financing

The tax-exempt lease is a common form of financing for ESIP projects. Tax-exempt leasing is a tool that meets the basic objectives of debt, spreading the cost of financing over the life of an asset, while avoiding constitutional or statutory limitations on issuing public debt. If structured properly, by including non-appropriation language in the financing documents, the tax-exempt lease will not be considered debt for state law purposes but will be considered debt for federal income tax purposes. Thus, for federal purposes, the interest component of the lease payment is tax-exempt.

Under the New Jersey Energy Savings Improvement Program (ESIP), the Harrison School District may authorize a lease purchase agreement between the Harrison School District and a financier. Ownership of the equipment or improved facilities will pass to the Harrison School District when all the lease payments have been made. There are legal expenses and other minimal closing costs associated with this type of structure. The lease purchase agreement may not exceed 15 years (commencing upon completion of the construction work), or 20 years where a combined heat and power or cogeneration

plant is included in the project. The primary benefits of a lease are lower rates and the acquisition of essential use property without creating debt.

Under a lease there is typically a single investor. The lease may have non-appropriation language that allows the Harrison School District to access low tax-exempt rates. Some previous customers have chosen to remove the non-appropriation language which has resulted in lower competitive rates.

Repayment of the lease payments is tailored to meet the requirements of the Harrison School District. Payments are typically scheduled to commence after the construction is complete and acceptance of the project has been received by the Harrison School District. Typically, payment terms are structured so there is no up-front capital expense to the Harrison School District and payments are aligned within your cash flow and fiscal limits.

Certificates of Participation (COP's)

Certificates of Participation are another form of a lease purchase agreement with the differentiating factor being that there are multiple investors participating in the purchase of the lease. COP's require financial disclosure and are typically utilized on higher value projects where one investor doesn't have the capacity to hold a high value lease for a single customer.

Energy Savings Obligations

Energy Savings Obligations can be issued as refunding bonds in accordance with the requirements of N.J.S.A 40A:11-4.6(c)(3). These bonds may be funded through appropriation for the utility services in the annual budget of the contract unit and may be issued as refunding bonds pursuant to N.J.S.40A:2-52 et seq., including the issuance of bond anticipation notes as may be necessary, provided that all such bonds and notes mature within the periods authorized for such energy savings obligations. Energy savings obligations may be issued either through the contracting unit or another public agency authorized to undertake financing on behalf of the unit but does not require bond referendum.

SECTION E — MEASUREMENT & VERIFICATION AND MAINTENANCE PLAN

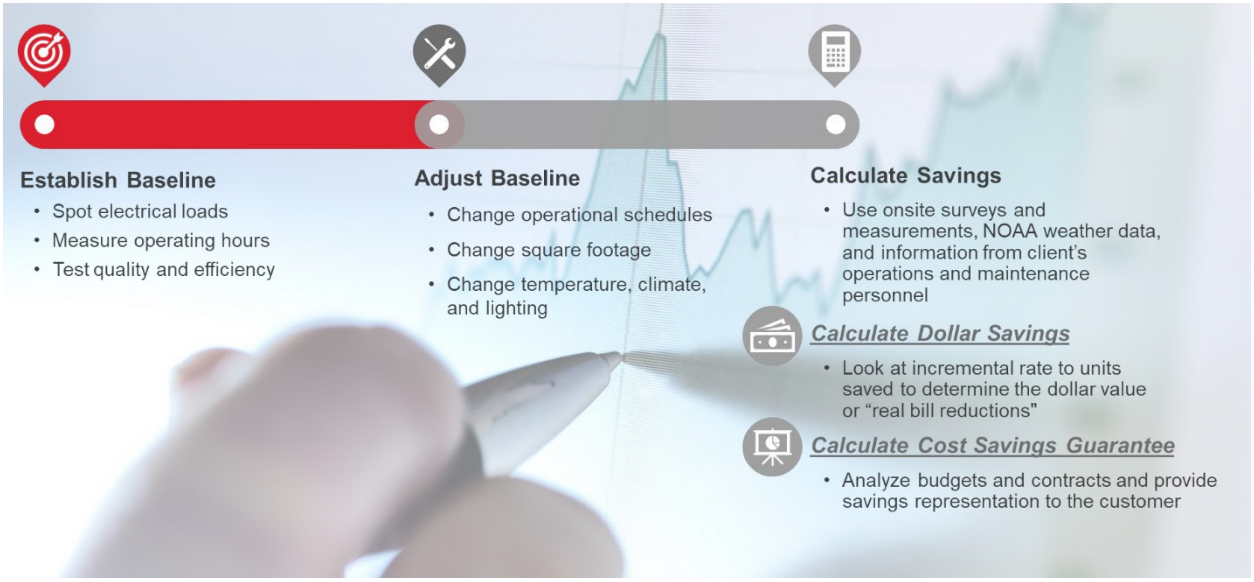
Section E — Measurement & Verification and Maintenance Plan

1. Baseline

The purpose for establishing a baseline for an energy performance project is to accurately predict what the energy consumption and costs would have been as if the energy project was never completed. The baseline can then be used to measure the improvement in efficiency and determine the overall energy savings of the project. Since the energy consumption of all facilities is somewhat affected by variable weather conditions, a baseline for heating and cooling systems is typically dependent on degree-days or outside temperature. A baseline also needs to incorporate changes in facility use, such as a change in hours of operation or increased levels of outside air. Once again, if these changes would have occurred in the absence of the energy project, they should be incorporated into the project's baseline.

Honeywell calculated the baseline based on the systems and operating conditions as they currently exist prior to the pandemic. The baseline was established from 2/2019-2/2020 in accordance with BPU guidelines as being considered a pre-pandemic baseline. Baseline development is most accurate if specific measurements are taken on equipment over a period of time (early in the audit phase) to determine actual kW, kWh, oil and gas consumption, cfm, gpm, hours of use, etc. A summary of some of the methods, which was used by Honeywell to establish baselines and support, calculated savings are listed below.

1. Spot measurements of electrical loads such as lighting, fan and pump motors, chillers, electric heat, etc.
2. Measurement of equipment operating hours using electric data recorders.
3. Measurement of existing operating conditions using data recorders for space temperature and humidity, air handler temperatures (mixed, return, cooling and heating coil discharges), and space occupancy using lighting loggers.



4. Spot measurement for boiler efficiencies, water use.
5. Running measurements of chiller operation, including simultaneous measurement of input kWh or steam flow, and chilled water supply and return temperatures and flow (gpm).
6. Records of operating conditions from building management systems and utility-grade meters.

The data from the above is used to calculate existing energy use, which is then reconciled with current facility utility bills, and adjusted as required to provide a mutually agreed baseline.

To provide valid savings evaluations, Honeywell's maintains a significant inventory of metering equipment utilized by its auditors and Energy Engineers to ascertain critical data about the operation of the facility.

Typically, auditors use the following equipment for their onsite measurements:

1. Recording and instantaneous power and harmonic analyzers.
2. Data loggers for pressures, temperatures, flow rates, humidity and CO2.
3. Lighting level and recording profile/run-hour and occupancy meters.
4. Multimeters, handheld kW meters.
5. Combustion analyzers.
6. Ultrasonic flow meters.
7. Infrared thermometers

The ECMs installed in many projects allow for energy savings to be identified by direct metering or a combination of metering and calculations with accepted assumptions. In the case of lighting, for example, it is relatively easy to meter representative samples of unique fixture types, both before and after a retrofit, to determine the power consumption difference in Watts. When multiplied by the quantity of each fixture type, the total connected load reduction can be derived. In combination with run time assumptions, or meters, the electrical reduction can be accurately determined. Where possible, direct measurement of ECMs during construction (before and after the retrofit) coupled with energy savings calculations is a method considered to be very accurate and cost-effective.

Due to the nature of some ECMs, or when a combination of ECMs is installed, individual (discrete) metering may not be either possible or able to fully document a baseline and calculate savings. Many of these situations can be handled by combining results from metering along with either engineering-based calculations or output from nationally recognized building simulation programs such as DOE II, ASEAM, TRACE or HAP. This method would be used for ECMs such as night setback, and where no other ECMs have significant interaction with the setback measure.

Formulas exercised in energy savings calculations follow the laws of physics, and many are included in the ASHRAE Handbook of Fundamentals. However, such calculations (i.e. equipment operation profiles) must be tempered by experience, past retrofit practice, and expectations of future operating conditions to arrive at achievable values in practice. The result is a coupled project where the final savings are equal to or greater than anticipated.

2. Adjustment to Baseline Methodology

The methodology0F for establishing and adjusting the baseline is determined by the characteristics of the facility, the conservation technology being installed, the technology being replaced, the type of measurement and verification the Harrison School District requires and the needs of the Harrison School District for future changes in facility use.

The purpose of this flexible approach is to make the most accurate possible measurement of the changes in energy uses that are specifically attributable to the installed ECMs. This creates the ability over the life of the contract to continue measuring only savings achieved by the ECM and leaves the Harrison School District free to make future changes to the building or systems without affecting the savings agreement. It also necessitates fewer provisions for making adjustments to the baseline.

Modifications to the energy baseline or savings will be made for any of the following:

1. Changes in the number of days in the annual review cycle.
2. Changes in the square footage of the facilities.
3. Changes in the operational schedules of the facilities.
4. Changes in facility indoor temperatures.
5. Significant changes in climate.
6. Significant changes in the amount of equipment or lighting utilized in the facility.

Examples of situations where the baseline needs to be adjusted are:

1. Changes in the amount of space being air conditioned,
2. Changes in auxiliary systems (towers, pumps, etc.) and
3. Changes in occupancy or schedule.

If the baseline conditions for these factors are not well documented it becomes difficult, if not impossible, to properly adjust them when they change and require changes to payment calculations. To compensate for any addition and deletion of buildings and impact on the baseline model, An M&V report should use sound technical methodologies to adjust the baseline. An example would be to add or delete building energy impact via the calculated cooling load in tons as a percentage of the existing campus tonnage baseline or use indices like W/ft2 and Btu/ft2 to calculate the energy consumption of the building and then add or subtract the energy usage to or from the baseline energy consumption.

3. Energy Savings Calculations

In calculating energy savings, Honeywell's highly experienced audit staff uses onsite surveys and measurements, National Oceanic and Atmospheric Administration weather data, detailed discussions with the client's operations and maintenance personnel and engineers, utility records, and other sources to ensure accurate energy, water and O&M savings.

Typically, the following data is gathered:

- Local weather data.
- Utility bills and sub-metered consumption trends.
- Utility rate structure.
- Facility use and occupancy data.
- Internal equipment loads.
- Interviews of operations and maintenance staff and management.
- Building construction, age, use and layout.
- Schematics of energy and water distribution systems.
- Identification and inventory of HVAC equipment.
- Identification and inventory of process equipment.
- Design, configuration and operating characteristics of HVAC systems.
- Design, configuration and operating characteristics of process systems.
- Control strategies and sequences of operation for HVAC and other process equipment.
- Identification and count of all lighting fixtures and determination of power consumption for each type.
- Identification and inventory of lighting control methods.
- Measurement of foot-candle levels at sample locations.
- Power quality and harmonics, power factor.
- Indoor air quality issues.

Calculating the units of energy saved is a critical measure of energy efficiency improvements, but it does not indicate the actual dollars saved. To do this, Honeywell has established the base rates that will act as "floor" rates in calculating the savings. These are usually the rates that are in effect at the time of the start of the contract or rates used for audit estimated savings.

The equation below will be used to calculate the annual savings in dollars.

$$\text{Annual Savings (\$)} = \sum_{m=1}^{12} \{(Rate_{kWH,Base} \times kWH_{saved,m}) + (Rate_{fuel\ oil,\ Base} \times Fuel\ Oil_{saved,\ gal,\ m}) + (Rate_{Steam,\ Base} \times Steam_{Saved,\ klbs,\ m}) + (Rate_{NG} \times NG_{Saved,\ MCF,\ m})\} + (Agreed\ (\$))$$

Where

Rate$_{kWH,Base}$= defined base rate for kWh consumption
kWh$_{saved,m}$= calculated kWh savings for month *m*

Rate$_{Fuel\ Oil\ Base}$= defined base rate for fuel Oil Savings (XX/gal.)
Fuel Oil$_{saved,m}$= calculated chilled water savings in gal. for month *m*

Rate$_{Steam,\ Base}$= defined base rate for steam consumption ($XX/MMBtu.)
Steam$_{saved,m}$= calculated steam savings in MMBtu. for month *m*

Rate$_{NG,\ Base}$= defined base rate for natural gas consumption ($XX/Therm)
NG$_{saved,m}$= calculated natural gas savings in Therms for month *m*

Agreed($)= Annual savings in dollars (water, sewer, maintenance, etc.)

Honeywell assigns dollar values to the true incremental value of savings for energy and water. In other words, we do not combine for example, demand and consumptions numbers so that there is an average value to savings. Honeywell looks at each incremental rate to units saved to properly determine the value (dollar) to the Harrison School District or “real bill reductions”. As noted in the cash flow, energy escalation rates will be established in accordance with New Jersey Board of Public Utility guidelines.

Based on this, Honeywell has reviewed all utility bills (hourly data), tariffs, special contracts and commodity contracts to develop the incremental value (costs) of each utility.

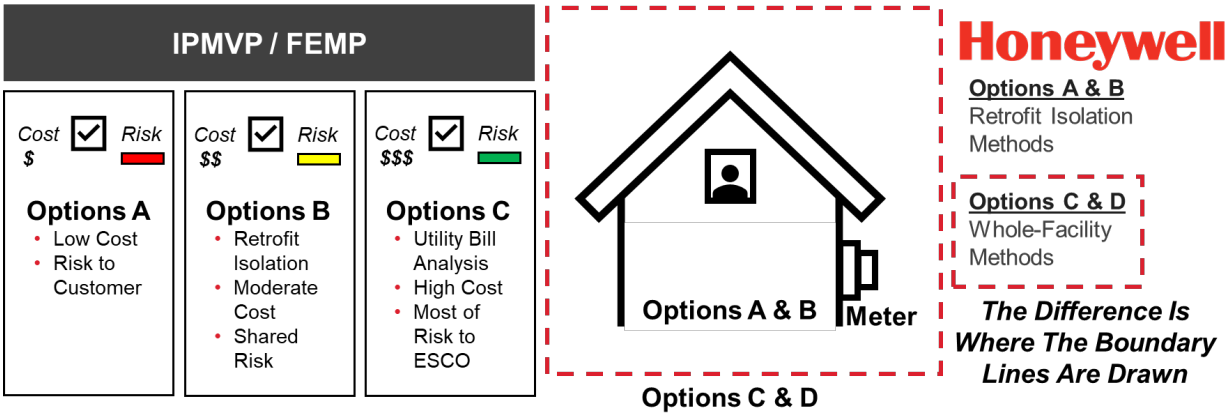
The O&M savings is typically a function of existing the Harrison School District’s budgets (labor & direct costs), maintenance contracts and operations (supplier) contracts. Honeywell has analyzed the information to provide a conservative savings representation for the Harrison School District’s review and acceptance. The information will include all calculations and assumptions.

4. Measurement & Verification

The purpose of performing any monitoring and verification is to establish an agreed upon process that provides the customer both a level of satisfaction that the improvements have been delivered and ongoing information as to their operation and performance. Additionally, this effort will be used to assess the actual dollars of savings versus the guarantee level.

It is essential for the success of this program that Honeywell and the Harrison School District agree on a mutually acceptable methodology for measuring and verifying energy savings that are attributable to the energy conservation measures (ECMs) Honeywell installs. This M&V plan provides the procedures to document the energy and cost savings of each of the proposed ECMs.

The plan for monitoring and verifying energy savings for the proposed ECMs is based on the methods described in the ***International Performance Measurement and Verification Protocol (IPMVP)***[1]. Our approach to M&V is directly consistent with, and in compliance with, the IPMVP. This protocol provides a framework for the most widely accepted and used M&V methods by the industry.



Engineering calculations of energy and cost savings for the project are based on operating parameters (such as weather, temperature settings, run hours, occupancy patterns, and space usage) and equipment performance characteristics. The M&V plan uses the operating parameters established in the baseline for all savings calculations during the term of the project. The intent of the M&V plan is to verify that the ECMs installed by Honeywell will provide the expected energy savings. Therefore, Honeywell will collect data and relative information during the post-retrofit period to demonstrate that the installed equipment is performing at expected levels. It is assumed that the Harrison School District will continue to be a dynamic institution adding or renovating buildings and desiring to retain the right to set comfort and operating characteristics. To accommodate this, Honeywell will develop its M&V plan in a way that allows the Harrison School District to adapt to the demands of future campus growth and changes without the need for the Harrison School District and Honeywell to negotiate energy baseline adjustments.

Our typical M&V plan will utilize broadband Internet access to the appropriate the Harrison School District's control interfaces to both confirm operating status and to download trend data to verify proper equipment maintenance.

[1] www.ipmvp.org.

One year after the commencement date of the ECMs, Honeywell will submit a report verifying and calculating the energy and cost savings for the first year. This report will be submitted for facility review and approval. For the remaining contract term, Honeywell will provide annual reports. These reports will include results of inspections of the installed equipment/systems, energy and cost savings, and recommendations to provide optimum energy performance.

All permanent measurement equipment will be purchased new with a calibration certificate from the manufacturer. The power multi-meter and the TSI multi-meter will be calibrated annually before using them in the annual inspection.

M&V Options

The IPMVP guidelines classify the M&V procedures into four categories, Options A, B, C and D. As shown in the table below, these options differ in their approach to the level of complexity of the M&V procedures.

M&V Option	Performance Verification Techniques
Option A Verifying that the measure has the potential to perform and to generate savings.	**Option A** is appropriate for ECMs that have energy use that can be readily quantified, such as the use of high efficiency lighting fixtures, high efficiency constant speed motors, and other standard engineering calculations. Engineering calculations before and after installation spot measurements and use of EMS data points with stipulated values.
Option B Verifying that the measure has the potential to perform and verifying actual performance by end use.	**Option B** is appropriate for ECMs that require periodic or on-going measurements to quantify energy use; such as the use of variable frequency drives on pump or fan motors. Engineering calculations with metering and monitoring strategy throughout term of the contract.
Option C Verifying that the measure has the potential to perform and verifying actual performance (whole building analysis.)	**Option C** is used for ECMs for which the energy use or energy savings cannot be measured directly, such as building envelope modifications. Option C is based on the use of utility meters to quantify building energy use. Utility meter billing analysis-using techniques from simple comparison to multivariable regression analysis.
Option D Verifying actual performance and savings through simulation of facility components and/or the whole facility	**Option D** is used for ECMs for which the energy use or energy savings cannot be measured directly, or savings for individual ECMs are heavily interdependent. Calibrated building simulation is used to separate the energy savings attributable to each ECM. Calibrated energy simulation/modeling; calibrated with hourly or monthly utility billing data and/or end-use metering.

In general,

> ECM Energy Savings = Baseline Energy Use - Post-Installation Energy Use
>
> And
>
> ***Energy Cost savings ($) = Total Energy Savings x Contractual Energy Rates***

Exceptions to this simple equation are as follows:

Projects where an on/off M&V method is used. For example, after a new energy management system is installed, control features are turned off for a set period of time to recreate baseline conditions. Thus, savings are determined after installation by comparing energy use with and without the control features activated.

Since energy use at a facility is rarely, if ever, constant, another way to define M&V is as a comparison of a facility's post-installation energy use with its usage if the ECM or system had not been installed. This takes into account situations in which baseline energy use must be adjusted to account for changing conditions, such as changes in facility operation, occupancy, or use or external factors such as weather.

Post-Retrofit M&V Activities

There are two components associated with M&V of performance contract projects:

1. Verifying the potential of the ECM to generate savings also stated as confirming that the proper equipment/systems were installed, are performing to specification and have the potential to generate the predicted savings.
2. Determining/verify energy savings achieved by the installed ECM(s).

Verifying The Potential To Generate Savings

Verifying baseline and post-installation conditions involves inspections (or observations), spot measurements, and/or commissioning activities. Commissioning includes the following activities:

- Documentation of ECM or system design assumptions
- Documentation of the ECM or system design intent for use by contractors, agencies and operators
- Functional performance testing and documentation necessary for evaluating the ECM or system for acceptance
- Adjusting the ECM or system to meet actual needs within the capability of the system

Post-Installation Verification

Post-installation M&V verification will be conducted by both Honeywell and the Client to ensure that the proper equipment/systems that were installed are operating correctly and have the potential to generate the predicted savings. Verification methods may include surveys, inspections, and/or spot or short-term metering.

Regular Interval Post-Installation Verification

At least annually, Honeywell will verify that the installed equipment/systems have been properly maintained, continue to operate correctly, and continue to have the potential to generate the predicted savings. Savings report for all the installed ECMs will be submitted each year after the acceptance date of the work performed by Honeywell.

Computation Of Energy Savings

After the ECMs are installed, energy and cost savings will be determined annually by Honeywell in accordance with an agreed-upon M&V approach, as defined in a project-specific M&V plan.

Construction/Interim Savings

Construction or Interim savings are usually measured by using the same methodology as described in the detail M&V plan for each ECM. The start and the completion time for each ECM must be agreed to between Honeywell and the Harrison School District.

Electricity and thermal savings from the ECMs where no detailed long-term data is required to be collected will be stipulated and will be based on the starting and the final completion dates and verification of the operation of the ECMs. For other ECMs where long-term data collection is required by the M&V plan, data will be used to calculate the savings using the same equations as described in the detail plan. For example, to calculate electricity savings for the installation of a VFD, the kW is spot measured at a set speed for selected motors through a sampling plan. The measured kW is subtracted from the baseline kW to calculating the savings. Thermal savings are tied to the electrical savings in the manner described in the detail M&V plan. The results are extrapolated to cover all the VFDs installed by Honeywell.

The savings for each of the monitored VFD is calculated on an interval basis as follows:

$kW_{Saved} = (kW_{Base} – kW_{Spot\ Measured})$

kWh_{Saved} = Estimated operating hours during the interim period * kW_{Saved}

The total kWh savings is the sum of the kWh_{Saved} for all the installed VFDs.

5. Site Specific M&V Plan

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
1A LED Lighting	Upgrade Lighting systems: Re-lamp/Re-ballast T8/T12 to LED, Incandescent to LED Metal Halide and Sodium Vapor to LED High Bays	Option A: Pre and Post measurements Line by Line scope and engineering calculations	Pre-M&V: Measurement of kW for 5% sample fixtures in each category Data log usage hours Data Log occupancy schedules Update Line by Line scope with measured kW and usage hours Post M&V: Measurement of kW for 5% sample fixtures in each category Usage Hours to remain same Occupancy schedules to remain same Energy Savings: Update Line by Line scope with measured kW and usage hours and compare to pre-retrofit calculated savings
1B Stadium LED Lighting	Upgrade Stadium Lighting systems: Metal Halide to LED Field Lighting	Option A: Pre and Post measurements Line by Line scope and engineering calculations	Pre-M&V: Measurement of kW for 5% sample fixtures in each category Data log usage hours Data Log occupancy schedules Update Line by Line scope with measured kW and usage hours Post M&V: Measurement of kW for 5% sample fixtures in each category Usage Hours to remain same Occupancy schedules to remain same Energy Savings: Update Line by Line scope with measured kW and usage hours and compare to pre-retrofit calculated savings
1C De-Stratification Fans w/Air Purification	Install De-Stratification fans in Gymnasiums to minimize stratification of hot air and maintain hot air flow below the fan level.	Option A: Electric energy savings - Engineering calculations based on programmed parameters. Option C: Fuel Savings Utility Bill Comparison for all fuel related measures	Pre-M&V: Verify existing operating parameters match the baseline calculation assumptions Post M&V: Verify that systems are installed as specified and controls are programmed to match the savings assumptions Electric Energy: Verify savings based on programmed parameters and engineering calculations Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
2A Boiler Replacements	Replace boilers in select locations to handle base load.	Option C: Utility Bill Comparison for all fuel related measures	Pre-M&V: Baseline annual fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days Perform combustion efficiency test on boilers Post M&V: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days Perform efficiency test on replaced boilers to ensure operating conditions are maintained
2B Ventilation Upgrades – Air Handling Units	Replace antiquated Roof Top H&V Units with new high efficiency Units with added cooling	Option A Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement units	Pre-M&V: Verify manufacturer provided data for existing unit efficiency (EER) Post M&V: Verify manufacturer provided data for new rooftop unit (EER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
2C Pool and Domestic Water Replacements	Replace heater in select locations to handle base load.	Option C Utility Bill Comparison for all fuel related measures	Pre-M&V: Baseline annual fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days Perform combustion efficiency test on boilers Post M&V: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days Perform efficiency test on replaced boilers to ensure operating conditions are maintained
ECM 2D – Replace Unit Ventilators	Refurbish antiquated Unit Ventilators.	Option C: Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement Units	Pre-M&V: Verify manufacturer provided data for existing units efficiency Post M&V: Verify manufacturer provided data for new units verify the new equipment and controls are installed and commissioned as recommended by manufacturer
3A Building Management Controls	Upgrade Building Management Systems to DDC and integrate all systems to a central platform.	Option A Electric energy savings - Engineering calculations based on programmed parameters. Option C Fuel Savings Utility Bill Comparison for all fuel related measures	Pre-M&V: Verify existing operating parameters match the baseline calculation assumptions Post M&V: Verify that systems are installed as specified and controls are programmed to match the savings assumptions Electric Energy: Verify savings based on programmed parameters and engineering calculations Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
4A Building Envelope Improvements	Install weather stripping on doors, seal roof wall joints and roof penetrations.	Option A Engineering calculations based on nameplate and manufacturer supplied data	Pre-M&V: Verify existing conditions Post M&V: Visual inspection per scope of work.

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
5A Combined Heat & Power (Cogeneration)	Install Cogeneration unit.	Option A Engineering calculations based on nameplate and manufacturer supplied data for the new unit.	Pre-M&V: Verify existing operating parameters match the baseline calculation assumptions Post M&V: Verify that systems are installed as specified and controls are programmed to match the savings assumptions
6A – Pool Filter and Motor VFD Upgrade	Install VFDs on pool pumps to operate the pump motors in response to the system load. Replace motors with new premium efficiency motors.	Option A: Engineering calculations for VFDs following pump affinity laws. Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement motors	Pre-M&V: Verify manufacturer provided data for the pump performance data and motor efficiencies. Post M&V: Obtain trend data for VFD operation from the BMS system to verify baseline calculation assumptions on system loads Verify efficiency of new motors Verify manufacturer provided data for new VFDs – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
7A – Permanent Load Reduction	Rebates for Load Reduction (KW)	N/A	N/A

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
2J Addition of Cooling	Add Cooling to interior spaces of building which are not currently cooled.	Option A Electric energy savings - Engineering calculations based on material specifications.	Pre-M&V: Verify manufacturer provided data for existing unit efficiency (kW/ton) Post M&V: Verify manufacturer provided data for new chiller (kW/ton) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
3A Building Controls	Upgrade Building Management Systems to DDC and integrate all systems to a central platform.	Option A Electric energy savings - Engineering calculations based on programmed parameters. Option C Fuel Savings Utility Bill Comparison for all fuel related measures	Pre-M&V: Verify existing operating parameters match the baseline calculation assumptions Post M&V: Verify that systems are installed as specified and controls are programmed to match the savings assumptions Electric Energy: Verify savings based on programmed parameters and engineering calculations Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
4A Building Envelope Improvements	Install weather stripping on doors, seal roof wall joints and roof penetrations	Option A Engineering calculations based on nameplate and manufacturer supplied data	Pre-M&V: Verify existing conditions Post M&V: Visual inspection per scope of work.
4B Window Replacements	Install new windows on select areas/buildings.	Option A Engineering calculations based on programmed parameters. Option C Utility Bill Comparison for fuel related measures	Pre-M&V: Verify existing operating parameters match the baseline calculation assumptions Post M&V: Verify that systems are installed as specified to match the savings assumptions Electric Energy: Verify savings based on programmed parameters and engineering calculations Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
4C Roof Replacement	Install new roofs on select areas/buildings.	Option A Engineering calculations based on programmed parameters. Option C Utility Bill Comparison for fuel related measures	Pre-M&V: Verify existing operating parameters match the baseline calculation assumptions Post M&V: Verify that systems are installed as specified to match the savings assumptions Electric Energy: Verify savings based on programmed parameters and engineering calculations Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
5A Transformer Replacements	Replace existing secondary transformers with high efficiency equivalents.	Option A Engineering calculations based on increase in transformer efficiency	Pre-M&V: Measure typical existing transformer (typical one for each size) input and output kW to establish transformer losses Post M&V: Measure input and output kW for new transformer (typical one for each size) Verify savings with engineering calculations
6A Combined Heat & Power (CHP Cogeneration)	Install Cogeneration unit	Option A Engineering calculations based on nameplate and manufacturer supplied data for the new unit	Pre-M&V: Verify existing operating parameters match the baseline calculation assumptions Post M&V: Verify that systems are installed as specified and controls are programmed to match the savings assumptions

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
7A Solar Power Purchase Agreement (PPA)	Install solar panels on selected buildings and enter into a PPA with a third party vendor	N/A	Pre-M&V: None Post M&V: None
8A Energy Sourcing/Virtual PPA	Participate in Third Party Energy Sourcing and Virtual Power Purchase Agreement programs	N/A	Pre-M&V: None Post M&V: None
9A Pay for Performance	Participate in NJ Clean Energy Pay for Performance Program for Qualified Buildings	N/A	Pre-M&V: None Post M&V: None

6. Recommended Preventive Maintenance Services

Per the NJ ESIP program, all services are required to be bid by the Harrison School District for services as desired. Based on Honeywell's vast service organization, we are uniquely qualified to develop design specification for the public bidding per NJ Law.

Honeywell strongly believes that the long-term success of any conservation program is equally dependent upon the appropriate application of energy savings technologies, as well as solid fundamental maintenance and support. One of the primary contributors to energy waste and premature physical plant deterioration is the lack of operations, personnel training and equipment maintenance.

Honeywell recommends routine maintenance on the following systems throughout the Harrison School District for the duration of an energy guarantee of savings.

Maintenance, Repair and Retrofit Services

- Mechanical Systems
- Building Automation Systems
- Temperature Control Systems
- Air Filtration

Honeywell will work with the Harrison School District to evaluate current maintenance practices and procedures. This information will be the basis of a preventive maintenance and performance management plan designed to maximize building operating efficiencies, extend the useful life of your equipment and support the designed Energy Savings Plan.

At a minimum, we recommend the following tasks be performed on a quarterly basis with the Harrison School District Wide Building Management System.

SYSTEM SUPPORT SERVICES

1. Review recent mechanical system operation and issues with customer primary contact, on a monthly basis.
2. Review online automation system operation and event history logs and provide summary status to the customer primary contact. Identify systemic or commonly re-occurring events.
3. Check with customer primary contact and logbook to verify that all software programs are operating correctly.
4. Identify issues and prioritize maintenance requests as required.
5. Provide technical support services for trouble shooting and problem solving as required during scheduled visits.
6. Provide ongoing system review and operations training support; including two semi-annual lunches and learn sessions.
7. Establish dedicated, site-specific emergency stock of spare parts to ensure prompt replacement of critical components. These will be stored in a secure location with controlled access.

CONFIGURATION MANAGEMENT

1. Update documentation and software archives with any minor changes to software made during maintenance work.
2. Verify and record operating systems and databases.
3. Record system software revisions and update levels.
4. Archive software in designated offsite Honeywell storage facility, on an annual basis.
5. Provide offline software imaging for disaster recovery procedures, updated on a regular basis.

FRONT END / PC SERVICE

1. Verify operation of personal computer and software:
2. Check for PC errors on boot up
3. Check for Windows errors on boot up
4. Check for software operations and performance, responsiveness of system, speed of software
5. Routinely backup system files, on an annual basis:
6. Trend data, alarm information and operator activity data
7. Custom graphics and other information
8. Ensure disaster recovery procedures are updated with current files
9. Clean drives and PC housing, on an annual basis:
10. Open PC and remove dust and dirt from fans and surfaces
11. Open PC interface assemblies and remove dust and dirt
12. Clean and verify operation of monitors.
13. Verify printer operation, check ribbon or ink.
14. Initiate and check log printing functions.
15. Verify modem operation (if applicable).
16. Review IVR schedule for alarms and review (if applicable).

TEMPERATURE CONTROLS

Unit Vents

Services Performed

Annual Inspection

1. Inspect motor and lubricate.
2. Lubricate fan bearings.
3. Inspect coil(s) for leaks.
4. Vacuum interior.
5. Test operation of unit controls.

Pumps

Services Performed

Preseason Inspection

1. Tighten loose nuts and bolts.
2. Check motor mounts and vibration pads.
3. Inspect electrical connections and contactors.

Seasonal Start-up

4. Lubricate pump and motor bearings per manufacturer's recommendations.
5. Visually check pump alignment and coupling.
6. Check motor operating conditions.
7. Inspect mechanical seals or pump packing.
8. Check hand valves.

Mid-season Inspection

1. Lubricate pump and motor bearings as required.
2. Inspect mechanical seals or pump packing.
3. Ascertain proper functioning.

Seasonal Shut-down

4. Switch off pump.
5. Verify position of hand valves.
6. Note repairs required during shutdown.

Packaged Air-Conditioning Systems

Services Performed

Preseason Inspection

1. Energize crankcase heater.
2. Lubricate fan and motor bearings per manufacturer's recommendations.
3. Check belts and sheaves. Adjust as required.
4. Lubricate and adjust dampers and linkages.
5. Check condensate pan.

Seasonal Start-up

1. Check crankcase heater operation.
2. Check compressor oil level.
3. Inspect electrical connections, contactors, relays, operating and safety controls.
4. Start compressor and check operating conditions. Adjust as required.
5. Check refrigerant charge.
6. Check motor operating conditions.
7. Inspect and calibrate temperature, safety and operational controls, as required.
8. Secure unit panels.
9. Pressure wash all evaporator and condenser coils (if applicable).
10. Log all operating data.

Mid-season Inspection

1. Lubricate fan and motor bearings per manufacturer's recommendations.
2. Check belts and sheaves. Adjust as required.
3. Check condensate pan and drain.
4. Check operating conditions. Adjust as required.
5. Log all operating data.

Seasonal Shut-down *

1. Shut down per manufacturer's recommendations.

   * If no Shut-down is required then (2) Mid-season Inspections are performed

Boilers

Services Performed

Preseason Inspection

1. Inspect fireside of boiler and record condition.
2. Brush and vacuum soot and dirt from flues (not chimneys) and combustion chamber.
3. Inspect firebrick and refractory for defects.
4. Visually inspect boiler pressure vessel for possible leaks and record condition.
5. Disassemble, inspect and clean low-water cutoff.
6. Check hand valves and automatic feed equipment. Repack and adjust as required.
7. Inspect, clean and lubricate the burner and combustion control equipment.

8. Reassemble boiler.
9. Check burner sequence of operation and combustion air equipment.
10. Check fuel piping for leaks and proper support.
11. Review manufacturer's recommendations for boiler and burner start-up.
12. Check fuel supply.
13. Check auxiliary equipment operation.

Seasonal Start-up

1. Inspect burner, boiler and controls prior to start-up.
2. Start burner and check operating controls.
3. Test safety controls and pressure relief valve.
4. Perform combustion analysis.
5. Make required control adjustments.
6. Log all operating conditions.
7. Review operating procedures and owner's log with boiler operator.

Mid-season Inspection

1. Review operator's log.
2. Check system operation.
3. Perform combustion analysis.
4. Make required control adjustments.
5. Log all operating conditions.
6. Review operating procedures and log with boiler operator.

Seasonal Shut-down

1. Review operator's log.
2. Note repairs required.

APPENDICES

For Appendices 1 - 3, please refer to the following files for their electronic version on the USB drive included along with this submission:

Appendix 1 — Harrison Public Schools ECM Calcs.pdf

Appendix 2— EQUIPMENT CUTSHEETS (zip file)

Appendix 3— Harrison Lighting Line By Line.pdf

Appendix 4 – Omnia Cooperative / NJ Procurement Documentation.pdf

Appendix 1 – ECM Calcs

Please refer to the USB drive included along with this submission.

Appendix 2 – Cutsheets

Please refer to the USB drive included along with this submission.

Appendix 3 – Lighting LXL

Please refer to the USB drive included along with this submission.

Appendix 4 – Omnia Cooperative / NJ Procurement Documentation

Since Harrison Board of Education is a member in good standing with the Omnia Cooperative, use of Omnia Cooperative in the selection of Honeywell under contract # 171201 is allowed under NJ Public Contracts law as outlined in LFN 2012-10 and consists of the following elements and authorized by DLGS/DCA as well as the following elements:

- an organization (profit or not-for-profit) that coordinates and aggregates contracts from different state and local governments and promotes their use."
- in the context of the LPCL and PSCL, the provisions of this notice apply when the aggregate value of the goods or services (see N.J.A.C. 5:34-8.2) exceeds the contracting unit's bid threshold."
- the national cooperative contract must have been advertised as a national or regional cooperative and awarded pursuant to a competitive bidding process that complies with the laws applicable.
- The LFN requires that if a national cooperative contract is chosen, the calculation of cost savings from using this approach must be documented: The Law requires that a contracting unit can use national cooperatives only when the contracting unit determines "that the use of the cooperative purchasing agreement shall result in cost savings after all factors, including charges for service, material, and delivery, have been considered."
- The LFN states that if using an online ordering system, local officials must put "appropriate internal controls" in place to ensure that purchases are documented and that an audit trail exists
- Per the LFN, the Harrison BOE must verify that the selected vendor complies with applicable New Jersey procurement documentation requirements by submitting the following required forms.
  - New Jersey Business Registration Certificate for the contractor and any subcontractors (i.e., copy of certificate)
  - Statement of Corporate Ownership (an original form prepared for the contracting agency awarding the contract)
  - Public Contract EEO Compliance (Employee Information Report form or proof of participation in a federally approved affirmative action program)
  - Non-collusion Affidavit

This document will certify the Honeywell and the use of this cooperative purchasing agreement will **remain compliant with the services of the COOP for the Harrison School District; that ALL public works in conjunction with the School District and in accordance with NJ Public Contract Law (NJSA 18A:18A-1 et seq.) will be procured according to State requirements. To clarify further, this applies to a public works projects including and not limited to installing electrical, lighting, plumbing, HVAC, BMS systems etc. Additionally, that no on-line ordering system will be used as part of this process.**

It is estimated that the cost savings to the Harrison School District by using the Cooperative Agreement will save approximately $5000 in legal fees, 100-man hours as well as $19,800 in lost energy savings per month for every month waiting to administer the RFP process on their own. Because Omnia has undertaken the competitive process on the district's behalf, the savings can be achieved as outlined in this plan approximately 10 months sooner than via a local competitive contracting approach.

APPENDIX 4 – OMNIA COOPERATIVE / NJ PROCUREMENT DOCUMENTATION

BOARD OF EDUCATION OF THE TOWN OF HARRISON, COUNTY OF HUDSON, STATE OF NEW JERSEY

RESOLUTION

SELECTION OF ESCO FOR THE IMPLEMENTATION OF AN ENERGY SAVINGS IMPROVEMEMT PROJECT (ESIP)

WHEREAS; N.J.S.A. P.L. 2011, c.139 (LFN 2012-10) enables local contracting units to utilize national cooperative contracts as a method of procurement, the Harrison Board of Education (HBOE) being a member of the Omnia Partners Public Sector National Cooperative (Omnia) and;

WHEREAS; Energy Savings Performance Contract Services are available via contract No. 171201 within the Omnia portfolio;

WHEREAS; Omnia utilized a competitive bidding process in the selection of contractors capable of implementing an Energy Savings Performance Contract and,

WHERAS; Honeywell International under contract # 171201 has competed and has been selected as a provider of Energy Savings Performance Contracts under Omnia and:

WHEREAS; Honeywell International is also designated under the Department of Management and Construction (DPMC) in the State of New Jersey under a CO36 classification as a qualified Energy Services Company (ESCO) and;

WHEREAS; Honeywell International has implemented multiple Energy Savings Performance Contracts within New Jersey as titled the Energy Savings Improvement Program (ESIP); and

WHEREAS; the HBOE has determined that the use of the cooperative purchasing agreement shall result in cost savings after all factors, including charges for service , material, and delivery, have been considered; and

WHEREAS; the HBOE has selected Honeywell International, 115 Tabor Road, Morris Plains, NJ 07950 as the qualified Energy Service Company (ESCO) to detail, design and implement an Energy Saving Plan and ESIP project for the HBOE in accordance with P.L 2012, c.55 (P.L.2009, c.4); and

WHEREAS, Honeywell will provide an Energy Savings Plan, including engineering, construction, project management as part of their proposal and that the total cost of services will be a predetermined amount and paid for out of the energy savings as calculated in accordance with P.L. 2012, c.55;

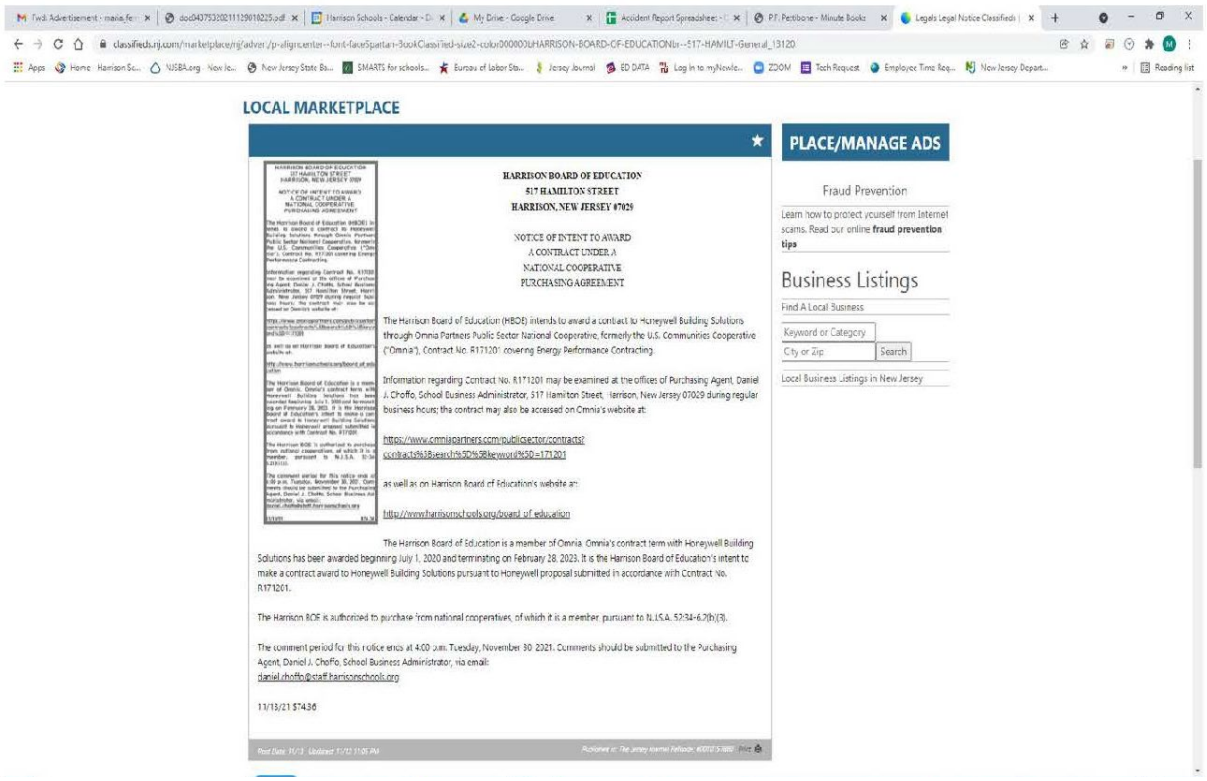
WHEREAS, there is no cost for the Energy Savings Plan and the HBOE will have an option to continue the process to full implementation of the ESIP project once the ESP has been reviewed and approved by an independent 3rd party in accordance with P.L.2012, c.55, and adopted by the HBOE.

NOW, THEREFORE, BE IT RESOLVED, that the Board of Education authorizes the Board President and School Business Administrator/Board Secretary to execute a Project Development Agreement with Honeywell upon review and approval from the Board Attorney.

Dated: 11/9/21

Maria Nilo

APPENDIX 4 – OMNIA COOPERATIVE / NJ PROCUREMENT DOCUMENTATION



LOCAL MARKETPLACE

HARRISON BOARD OF EDUCATION
517 HAMILTON STREET
HARRISON, NEW JERSEY 07029

NOTICE OF INTENT TO AWARD
A CONTRACT UNDER A
NATIONAL COOPERATIVE
PURCHASING AGREEMENT

The Harrison Board of Education (HBOE) intends to award a contract to Honeywell Building Solutions through Omnia Partners Public Sector National Cooperative, formerly the U.S. Communities Cooperative ("Omnia"), Contract No. R171201, covering Energy Performance Contracting.

Information regarding Contract No. R171201 may be examined at the offices of Purchasing Agent, Daniel J. Choffo, School Business Administrator, 517 Hamilton Street, Harrison, New Jersey 07029 during regular business hours; the contract may also be accessed on Omnia's website at:

https://www.omniapartners.com/publicsector/contracts?contracts%5Bsearch%5D%5Bkeyword%5D=171201

as well as on Harrison Board of Education's website at:

http://www.harrisonschools.org/board_of_education

The Harrison Board of Education is a member of Omnia. Omnia's contract term with Honeywell Building Solutions has been awarded beginning July 1, 2020 and terminating on February 28, 2023. It is the Harrison Board of Education's intent to make a contract award to Honeywell Building Solutions pursuant to Honeywell proposal submitted in accordance with Contract No. R171201.

The Harrison BOE is authorized to purchase from national cooperatives, of which it is a member, pursuant to N.J.S.A. 52:34-6.2(b)(3).

The comment period for this notice ends at 4:00 pm Tuesday, November 30, 2021. Comments should be submitted to the Purchasing Agent, Daniel J. Choffo, School Business Administrator, via email: daniel.choffo@staff.harrisonschools.org

11/13/21 $74.36

PLACE/MANAGE ADS

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APPENDIX 4 – OMNIA COOPERATIVE / NJ PROCUREMENT DOCUMENTATION

NON-COLLUSION AFFIDAVIT

State of New Jersey
County of Somerset ss:

I, Joseph J Coscia (name of affiant) residing in Hillsborough (name of municipality)
in the County of Somerset and State of New Jersey of full age,
being duly sworn according to law on my oath depose and say that:

I am Sr. Business Consultant (title or position) of the firm of Honeywell International (name of firm)

_____ the bidder making this Proposal for the bid

entitled Harrison Public School Energy Project (title of bid proposal), and that I executed the said proposal with
full authority to do so that said bidder has not, directly or indirectly entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free, competitive bidding in connection with the above named project; and that all statements contained in said proposal and in this affidavit are true and correct, and made with full knowledge that the Harrison Board of Education (name of contracting unit) relies upon the truth of the statements contained in said Proposal
and in the statements contained in this affidavit in awarding the contract for the said project.

I further warrant that no person or selling agency has been employed or retained to solicit or secure such contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by Honeywell International.

Subscribed and sworn to

before me this day 3rd

Joseph J Coscia
Signature

November, 2021

_____
(Type or print name of affiant under signature)

Notary public of

MATTHEW SCHORR
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires Nov. 7, 2026

My Commission expires

(Seal)

Certification 137

CERTIFICATE OF EMPLOYEE INFORMATION REPORT

RENEWAL

This is to certify that the contractor listed below has submitted an Employee Information Report pursuant to N.J.A.C. 17:27-1.1 et. seq. and the State Treasurer has approved said report. This approval will remain in effect for the period of 15-MAY-2021 to 15-MAY-2024

HONEYWELL INTERNATIONAL, INC.
115 TABOR ROAD
MORRISPLAINS NJ 07950

ELIZABETH MAHER MUOIO
State Treasurer

STATE OF NEW JERSEY
BUSINESS REGISTRATION CERTIFICATE

Taxpayer Name:	HONEYWELL INTERNATIONAL INC.
Trade Name:	ADI GLOBAL DISTRIBUTION
Address:	101 COLUMBIA RD MORRISTOWN, NJ 07960-4640
Certificate Number:	0073401
Effective Date:	August 19, 1985
Date of Issuance:	August 25, 2021

For Office Use Only:

20210825150427681

Mandatory Equal Opportunity Language

MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
N.J.S.A 10:5-31 *et seq.*, N.J.A.C. 17:27
CONSTRUCTION CONTRACTS

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, Available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex..

The contractor or subcontractor, where applicable, will send to each labor union or representative of workers will) which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer advising the labor union or workers' representative of (the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor where applicable, agrees to comply with any regulations promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 *et seq*., as amended and supplemented from time to time and the Americans with Disabilities Act.

When hiring or scheduling workers in each construction trade, the contractor or subcontractor agrees to make good faith efforts to employ minority and women workers in each construction trade consistent with the targeted employment goal prescribed by N.J.A.C. 17:27-7.2; provided, however, that the Division may, in its discretion, exempt a contractor or subcontractor from compliance with the good faith procedures prescribed by the following provisions, A, B and C, as long as the Division is satisfied that the contractor or subcontractor is employing workers provided by a union which provides evidence, in accordance with standards prescribed by the Division , that its percentage of active "card carrying" members who are minority and women workers is equal to or greater than the targeted employment goal established in accordance with N.J.A.C. 17:27-7.2.

The contractor or subcontractor agrees that, a good faith effort shall include compliance with the following procedures:

(A). If the contractor or subcontractor has a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor shall, within three business days of the contract award, seek assurances from the union that it will cooperate with the contractor or subcontractor as it fulfills its affirmative action obligations under this contract and in accordance with the rules promulgated by the Treasurer pursuant to N.J.S.A, 10:5-31 *et. seq.*, as supplemented and amended from time to time and the Americans with Disabilities Act. If the contractor or subcontractor is unable to obtain said assurances from the construction trade union at least five business days prior to the commencement of construction work, the contractor or subcontractor agrees to afford equal employment opportunities to minority and women workers directly, consistent with this chapter. If the contractor's or subcontractor's prior experience with a construction trade union, regardless of whether the union has provided said assurances, indicates a significant possibility that the trade union will not refer sufficient minority and women workers consistent with affording equal employment opportunities as specified in this chapter, the contractor or subcontractor agrees to be prepared to provide such opportunities to minority and women workers directly, consistent with this chapter, by complying with the procedures prescribed under (B) below; and the contractor or subcontractor further agrees to take said action immediately if it determines or is so notified by the Division that the union is not referring minority and women workers consistent with the equal employment opportunity goals set forth in this chapter.

(B). If good faith efforts to meet targeted employment goals have not or cannot be met for each construction grade by adhering to the procedures of (A) above, or if the contractor does not have a referral agreement or arrangement with a union for a construction trade, the contractor or subcontractor agrees to take the following actions:

1. To notify the public agency compliance officer, the Division, and minority and women referral organizations listed by the Division pursuant to N.J.A.C. 17:27-5.3, of its workforce needs, and request referral of minority and women workers;
2. To notify any minority and women workers who have been listed with it as awaiting available vacancies;
3. Prior to commencement of work, to request that the local construction trade union refer minority and , women workers to fill job openings, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade;
4. To leave standing requests for additional referral to minority and women workers with the local construction trade union, provided the contractor or subcontractor has a referral agreement or arrangement with a union for the construction trade, the State Training and Employment Service and other approved referral sources in the area;
5. If it is necessary to lay off some of the workers in a given trade on the construction site, layoffs shall be conducted in compliance with the equal employment opportunity and non-discrimination standards set forth in this regulation, as well as with applicable Federal and State court decisions;
6. To adhere to the following procedure when minority and women workers apply or are referred to the contractor or subcontractor:
    a. If said individuals have never previously received any document or certification signifying a level of qualification lower than that required in order to perform the work: of the construction trade, the contractor or subcontractor shall in good faith determine the qualifications of such individuals. The contractor or subcon-tractor shall hire or schedule those individuals who satisfy appropriate qualification

standards in conformity with the equal employment opportunity and non-discrimination principles set forth in this chapter. However, a contractor or subcontractor shall determine that die individual at least possesses the requisite skills, and experience recognized by a union, apprentice program or a referral agency, provided the referral agency is acceptable to the Division, [if necessary, the contractor or subcontractor shall hire *or* schedule minority and women workers who qualify as trainees pursuant to these rules. All of the requirements, however, are limited by the provisions of (C) below,

b. The name of any interested women or minority individual shall be maintained on a waiting list, and shall be considered for employment as described in paragraph (i) above, whenever vacancies occur. At the request of the Division, the contractor or subcontractor shall provide evidence of its good faith efforts to employ women and minorities from the list to fill vacancies.

c. If, for any reason, said contractor or subcontractor determines that a minority individual or a woman is not qualified or if the individual qualifies as an advanced trainee or apprentice, the contractor or subcontractor shall inform the individual in writing of the reasons for the determination, maintain a copy of the determination in its tiles, and send a copy to the public agency compliance officer and to the Division.

7. To keep a complete and accurate record of all requests made for the referral of workers in any trade covered by the contract, on forms made available by the Division and submitted promptly to the Division upon request.

(C). The contractor or subcontractor agrees that nothing contained in (B) above shall preclude the contractor or subcontractor from complying with the union hiring hall or apprenticeship policies in any applicable collective bargaining agreement or union hiring hail arrangement, and, where required by custom or agreement, it shall send journeymen and trainees to the union for referral, or to the apprenticeship program for admission, pursuant to such agreement or arrangement. However, where the practices of a union or apprenticeship program will result in the exclusion of minorities and women or the failure to refer minorities and women consistent with the targeted county employment goal, the contractor or subcontractor shall consider for employment persons referred pursuant to (B) above without regard to such agreement or arrangement; provided further, however, that the contractor or subcontractor shall not be required to employ women and minority advanced trainees and trainees in numbers which result in the employment of advanced trainees and trainees as a percentage of the total workforce for the construction total, which percentage significantly exceeds the apprentice to journey worker ratio specified in the applicable collective bargaining agreement, or in the absence of a collective bargaining agreement, exceeds the ratio established by practice in the area for said construction trade. Also, the contractor or subcontractor agrees that,

in implementing the procedures of (B) above it shall, where applicable, employ minority and women workers residing within the geographical jurisdiction of the union.

After notification of award, but prior to signing a construction contract, the contractor shall submit to the public agency compliance officer and the Division an initial project workforce report (Form A 201) provided to the public agency by the Division for distribution to and completion by the contractor, in accordance with N.J.A.C. 17:27-7. The contractor also agrees to submit a copy of the Monthly project Workforce Report once a month thereafter for the duration of this contract to the Division and public agency compliance officer

The contractor agrees to cooperate with the public agency in the payment of budgeted funds, as is necessary, for on-the-job and/or off-the-job programs for outreach and training of minorities and women.

(D). The contractor and its subcontractors shall furnish such reports or other documents to the Division of Public Contracts Equal Employment Opportunity Compliance as may be requested by the Division from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Division of Public Contracts Equal Employment Opportunity Compliance for conducting a compliance investigation pursuant to Subchapter 10 of New Jersey Administrative Code at N.J.A.C. 17:27.

Honeywell acknowledges the Mandatory Equal Opportunity Language requirements.

Joseph Coscia
Sr. Business Consultant

HONEYWELL INTERNATIONAL INC
115 TABOR ROAD
MORRIS PLAINS, NJ 07950

State of New Jersey

DEPARTMENT OF THE TREASURY
DIVISION OF PROPERTY MANAGEMENT AND CONSTRUCTION
33 WEST STATE STREET - P.O. BOX 034
TRENTON, NEW JERSEY 08625-0034

DPMC

NOTICE OF CLASSIFICATION

In accordance with N.J.S.A. 18A:18A-27 et seq (Department of Education) and N.J.S.A. 52:35-1 (Department of the Treasury) and any rules and regulations issued pursuant hereto, you are hereby notified of your classification to do State work for the Department (s) as previously noted.

Aggregate Amount	Trade(s) & License(s)	Effective Date	Expiration Date
Unlimited	C043 -CONTROL SYSTEMS	04/01/2021	03/31/2023
	C098 -ENERGY MANAGEMENT SYSTEMS	04/01/2021	
	C036 -ENERGY SERVICES/ESCO	04/01/2021	
	C049 -FIRE ALARM/SIGNAL SYSTEMS	04/01/2021	
	license #: P00968		
	C032 -HVACR	04/01/2021	
	license #: 19HC00404900		
	C050 -SECURITY/INTRUSION ALARMS	04/01/2021	

Thank you for considering our proposal. We look forward to working with you in the future.

Joseph Coscia, Sr., Senior Business Consultant
joe.coscia@honeywell.com
(908) 334-1131