

Bond Hearing District Wide Infrastructure Repair and Replacement

January 17, 2023

District Wide Infrastructure Repair & Replacement

LONDONDERRY SCHOOLS -DISTRICT WIDE INFRASTRUCTURE REPAIR AND REPLACEMENT							
SCHOOL	PROJECT	BUDGET	Aprprox In Service Date	Approx Years In Service	BOMA Life Expectancy	Potential Incentives	Yearly Energy Savings
Middle School	Heating Plant	\$550,000	1982	40	20-25 years	35,200	20,000
South School	Multi-purpose Room Ventilation	\$500,000	1975	47	15-20 years		
High School	Pneumatic Replacement	\$170,000	1972	50	20 years		
High School	Heating Plant	\$1,300,000	1984	38	20-25 years	40,000	30,000
Middle School	Pneumatic Replacement	\$325,000	1982	40	20 years		
High School	ERU Replacements	\$775,000	1984	38	15 years		
South School	Heating Plant	\$575,000	1972	50	20-25 years	35,000	15,000
District Wide	Pump House	\$300,000				110,200	65,000
	Subtotal	\$4,495,000					
	Contingency	\$505,000					
BOND VALUE FOR WARRANT		\$5,000,000				\$110,200	\$65,000



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Priority Level 1

Middle School Heating Plant





Priority Level 1

– Middle School Heating Plant

Budget - \$550,000.00 - Likely Incentives - \$35,200.00 Estimated Yearly Energy Savings - \$20,000.00

Scope

Replace existing 40+ year old boilers with new natural gas condensing-style with new hot water circulating pumps and VFD's

Justifications

Boilers and pumps are well beyond their expected useful life (25-30 years according to BOMA)

Incentives are available currently and are not always

Energy savings will result on both the pumps (with the addition of variable frequency drives) and boilers (thermal efficiency will rise from the existing of 75-85% to 93% with condensing-style)

Modulation of boilers with turn down ratios on average of 20:1 which will allow:

- Longer run times at loads that match the building heat loads, which eliminates the hundreds of start stop cycles seen in the existing systems.
- Better utilization of outdoor reset of the hot water supply temperature, which will
 - Reduce overheating issues
 - Utilize the condensing technologies of the boiler plant



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Priority Level 1

– Ventilation for South School Multipurpose Room

Budget - Low Range \$425,000.00 – High Range \$550,000.00

Scope

Properly sized Energy Recovery Unit installed on adjacent roof with new ductwork in multipurpose room. Hot water coil shall be in the ductwork inside the building and new Siemens control panel installed in kitchen area

Justifications

The multipurpose room is served by (4) air handler that have reached end of useful life and are inaccessible for maintenance. This has led to these units becoming inoperable and left this space without ventilation



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Priority Level 1

- Replace pneumatic and standalone controls at High School and integrate into Siemens Desigo CC





Priority Level 1

Replace pneumatic and standalone controls at High School and integrate into Siemens Desigo CC

Budget - Low Range \$160,000.00 – High Range \$175,000.00

Scope

Replace all control systems and devices that currently operate pneumatically with new electronic. Replace all standalone control devices and systems with electronic and integrate both into Siemens BAS.

Justification

Many classrooms, offices and corridors Phases 2, 3 & 4 of the High School still operate using pneumatic (air-based) controls, a technology that has been obsolete for several decades and fewer and fewer HVAC technicians have expertise in.

Pneumatic systems of this age typically have many failures of aging devices that are no longer available for replacement. The older polyurethane tubing begins to loosen around the barbed fittings, resulting in air leaks that create difficulty in maintaining temperature setpoints as well as causing the air compressor to run far more frequently than it otherwise would, resulting in wasted energy use.

Making matter worse, several classrooms have roof-mounted AC that are not integrated with the baseboard and duct-mounted hot water coils,



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Priority Level 1

– High School Heating Plant





Priority Level 1 – High School Heating Plant

Budget - \$1,300,000.00 - Likely Incentives - \$40,000.00 Estimated Yearly Energy Savings - \$30,000.00

Scope

Replace existing 25+ year old boilers with new natural gas condensing-style with 10 new hot water circulating pumps and VFD's

Justifications

BOMA, (Building Owners and Management Association) predicts that the useful life of a fire tube boiler and base-mounted pump set are 25 years. It is apparent that many portions of the High School's core mechanical systems have exceeded their useful life.

A modular design approach, that will provide redundancy, without the oversized boilers presently utilized (i.e., three smaller boilers at 50% capacity each for a large school such as the High school)

A modular boiler plant utilizing Viessman, Cleaver Brooks, Lochinvar or other condensing boiler will allow for the following efficiency gains:

- Thermal efficiencies of up to 93%
- Boiler modulation with 20-1 turn-down ratios
- Better utilization of outdoor reset strategy
- Reduce overheating issues

New pumps that will allow for the replacement of the aging building pumps. It is important to know that most major pump manufacturers have eliminated the support of many older pump styles, and this trend will continue as efficiency standards force manufacturers to adapt.

New pumps can be better selected to meet the current flow needs, not the needs of the original building designs



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Priority Level 1

- Replace unitary pneumatic controls at Middle School and integrate into Siemens Desigo CC





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Priority Level 1

Replace unitary pneumatic controls at Middle School and integrate into Siemens Designo CC

Budget - Low Range \$315,000.00 – High Range \$325,000.00

Scope

Replace all unitary control devices that currently operate pneumatically with new electronic and integrate into Siemens BAS.

Justification

The classrooms, offices and corridors of both the original Middle School and the addition still operate using pneumatic (air-based) controls, a technology that has been obsolete for several decades and fewer and fewer HVAC technicians have expertise in.

Pneumatic systems of this age typically have many failures of aging devices that are no longer available for replacement. The older polyurethane tubing begins to loosen around the barbed fittings, resulting in air leaks that create difficulty in maintaining temperature setpoints as well as causing the air compressor to run far more frequently than it otherwise would, resulting in wasted energy use.

Operational savings would result from this upgrade as facility staff currently spend a good deal of time maintaining HVAC controls in these areas



Priority Level 1

– High School Rooftop ERV Replacements





Priority Level 1

– High School Rooftop ERU Replacements

Budget - \$775,000.00

Scope

Demo and dispose of 3 roof mounted DesChamps Energy Recovery Units.
Furnish and install 3 Greenheck ERUs of similar size.
Furnish and install an adapter curb for one ERU
Furnish and install ductwork connections to existing roof mounted exhaust ductwork.
Reconnect to existing controls

Justifications

Energy Recovery Ventilators life cycle vary greatly by manufacturer, however, the existing DesChamps units have exceeded the lifecycle expectations of even the best equipment.



Priority Level 1

– South Elementary School Heating Plant

Budget - \$575,000.00 - Likely Incentives - \$35,00.00 - Estimated Yearly Energy Savings - \$15,000.00

Scope

Replace 2 existing 1.6 MBH Weil McLain boilers with new propane-fired condensing-style.
Propane supplied by new tanks behind school
Install VFD's on pumps

Justifications

- Boilers and pumps are nearing their expected useful life
 - Incentives are available currently and are not always
- Substantial savings switching both fuel source and style boilers
 - Electrical savings installing VFD's





PUMP HOUSE \$300,000

Modifications would generally include an automatic vacuum prime system for the pumps, providing a means to maintain the small pond water level, which could include setting up an automated pump control to pump water from the large pond to the smaller pond and/or a municipal water supply line constructed to the pond if feasible. Currently refilling the small pond is conducted manually with pumping from the large pond to the small pond. The new system would include telecommunications to the operator on the pump operations, water levels, power, etc. with ability to operate/manage remotely.

Budgetary cost range \$150,000 - \$300,000 and does not include bringing 3 phase power to site.

Bigger Picture of the Bond

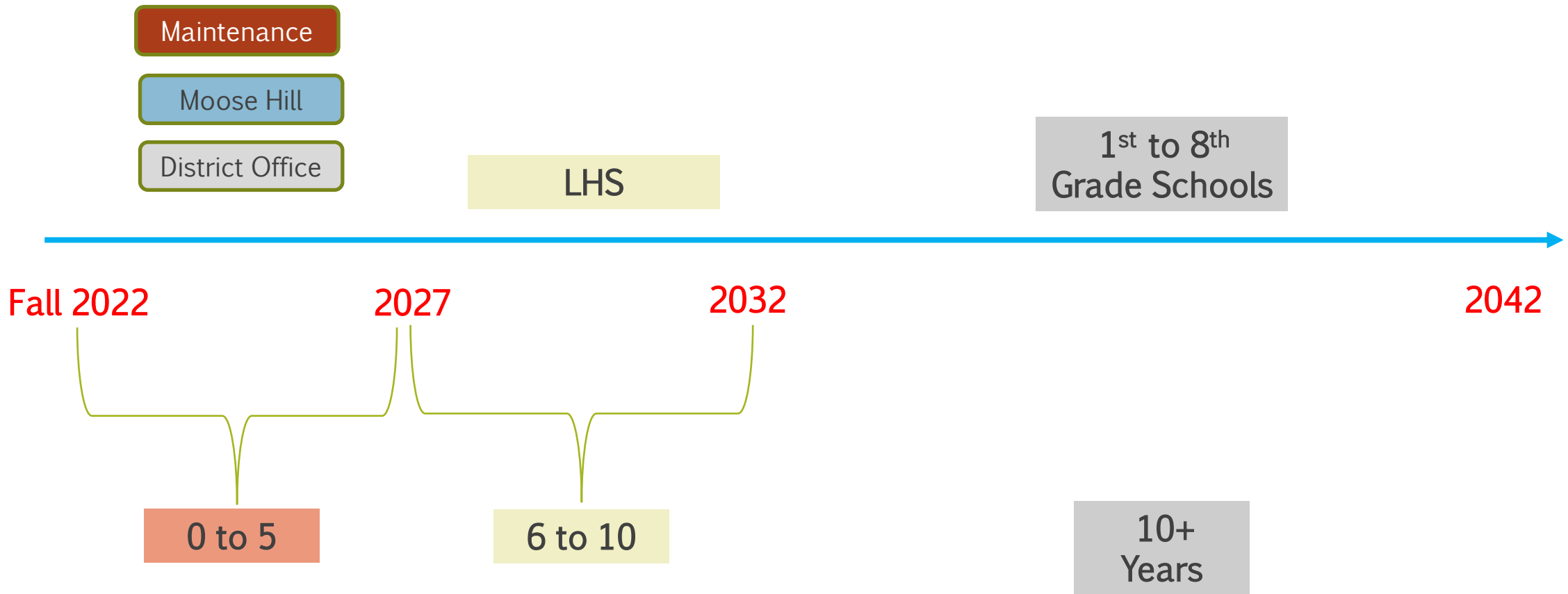
- We have old buildings – and we need to start to invest in them to keep them going. We have deferred investing in them for a long time.
- It will take us the better part of two decades (maybe more) to invest and update our buildings if Londonderry supports those plans.
- This list of projects in the bond are the bare minimum of what we need to invest in to keep our Mechanical systems working in our schools while we go through this process.
- Most of these projects are 20 years past their useful life and we do not have the funds in our budget to pay for fixing them when they break when school is in session.

Siemen's Recommendations Now in the Capital Reserve Plan

- RTU Replacements at Londonderry High School.
 - \$195,000 in 2026-27
- AHU Replacements at Londonderry High School.
 - \$675,000 from 2027 to 2029
- RTU Replacements at Londonderry Middle School.
 - \$250,000 in 2027-28

Our Buildings and Grounds Department feels they can maintain these Projects over the next couple of years and defer the updates with the Capital Reserve Fund in the coming years.

Tentative Outlook on Long Term Plan



- **If we don't update LHS by 2032**
 - The Pneumatics will be **60 years old** and **40 years past** their useful lives.
 - The Heating plant will be **46 years old** and **21 years past** its useful life.
 - The ERU Replacements will be **48 years old** and **33 years past** their useful lives.

- **If we don't update LMS by 2042**
 - The Heating plant will be **60 years old** and **35 years past** its useful life.
 - The Pneumatics will be **60 years old** and **40 years past** their useful lives.

- **If we don't update South School by 2042**
 - The Heating plant will be **70 years old** and **45 years past** its useful life.
 - The Multi-Purpose Room ventilation will be **67 years old** and **47 years past** its useful life.