Town of Gill

Investment Grade Audit

Prepared by:

Siemens Industry Inc
Building Technologies Division
85 John Road, Unit 1
Canton, MA 02021

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The purpose of the Investment Grade Audit is to identify and develop energy conservation measures to provide an overall self-funding project. For the purposes of this IGA for the Town of Gill, Siemens has also developed work at the Elementary School for the replacement of the boiler and domestic hot water. This particular work would not normally self-fund, but the capital cost is being offset by a $150,000 EECBG grant through the Massachusetts DOER.

Details about the buildings audited are listed in the tables below:

	Total Sq.Ft (sq.ft)
Town Hall	5,548
Public Safety Complex (Town Garage)	12,600
Pumping Station	228
Riverside Municipal Building	7,791
Gill ES	18,320
Library	2,417
Total	**46,904**

UTILITY DATA

The benchmark analysis was performed using energy consumption and cost data provided by the Town of Gill.

	Annual Electricity Consumption (kWh)	Annual Electricity Spend ($)	Annual Fuel Oil Consumption (Gals)	Annual Fuel Oil Spend ($)
Town Hall	16,966	$3,120	1,053	$2,234
Public Safety Complex (Town Garage)	41,207	$6,928	3,178	$6,715
Pumping Station	8,768	$1,774	-	-
Riverside Municipal Building	8,225	$1,639	3,314	$7,085
Library	1,331	$560	558	$1,217
Bridge Lights	2,150	$512	-	-
Gill ES	82,606	$11,565	11,060	$28,386
Street Lights	22,247	$5,685	-	-
	100,894	**$20,218**	**8,102**	**$17,250**

GENERAL FACILITY DESCRIPTIONS

Town Hall

BUILDING DESCRIPTION

The Gill Town Hall comprises of a 2-story, clapboard building with single pane windows and exterior storm windows. In addition part of the buildings basement is utilized for office space as well. Occupied by 3 people, the Town Hall operates 4 days per week Mon 9:00 a.m. - 6:30 p.m., Tue - Thu 9:00 a.m. - 4:30 p.m.

SYSTEM DESCRIPTIONS

Lighting

Majority of the lighting system consists of T-8 fluorescent fixtures.

Mechanical Systems

Heating for the building is provided by a single H.B. Smith, cast iron sectional hot water boiler. This boiler uses # 2 heating oil and has an output capacity of 174.8 MBH. Heating hot water is distributed via two fractional horsepower zone pumps to baseboard radiation located throughout the facility.

Energy Management System

There is no energy management system at this building. Building space temperature control is achieved with a programmable thermostat for the office area and a wall mounted thermostat without setback capability in the second floor auditorium.

Miscellaneous

Domestic hot water for the Town Hall is provided by a tankless hot water system. The associated heat exchanger is fed by the exiting boiler. It was noted that the building appears to have moisture problems in the basement. A large dehumidifier manufactured by Comfort Air was found in the basement as well as a sump pump located in a small mechanical area adjacent to set unit.

Gill Public Safety Complex

BUILDING DESCRIPTION

This building consists of a single story, brick faced building with original double pane, aluminum frame sliding windows. The facility serves the local police department, the volunteer fire department, the highway department and a small community center. Given its nature, the facility utilizes a variety of overhead doors for vehicle access. Only constant occupants for this building is the highway department.

SYSTEM DESCRIPTIONS

Lighting

Like the Town Hall, majority of the lighting fixtures are older technology T-8 fluorescent fixtures even in the garage area with the high ceilings.

Mechanical Systems

The heating system for this facility comprises of a single, oil-fired cast iron sectional steam boiler manufactured by H.B. Smith. It is apparent that this boiler has reached the end of its physical life and should be replaced. This boiler provides low pressure steam for the garage as well as heating hot water for the PD and FD hydronic heating system. Heating hot water is produced with a steam to hot water heat exchanger. Several rooms of this building are also air conditioned via the use of thru-the-wall air conditioning units of various ages and efficiencies.

Energy Management System

Only means of space temperature controls are wall mounted thermostats without night setback capabilities.

Miscellaneous Equipment

One Residential type refrigerator, (1) cold snack machine and (1) snack machine were observed during our initial walk thru. It was stated that the garage area is seldom heated during the heating season.

Riverside

BUILDING DESCRIPTION

Riverside is a single story, wooden shingle sided facility with single pane, wooden sash windows with exterior storm and an asphalt shingled roof. The building is currently occupied by the Four Winds School; an independent middle school, as well as the historical society. The school has only two classrooms and operates 168 days per year.

SYSTEM DESCRIPTIONS

Lighting

The majority of lighting fixtures comprise of T-8 fluorescent fixtures.

Mechanical Systems

Low pressure steam for heating is provided by a single H.B. Smith, cast iron sectional boiler. This boiler fires on # 2 fuel oil and shows clear signs of physical deterioration. The steam is distributed to cast iron radiators located throughout the building via a single pipe system.

Energy Management System

A single programmable thermostat was observed in on e of the classrooms of the Four Winds School. Given that no zone controls were found on the boiler this appears to be the only means of space temperature control and night setback.

Miscellaneous Equipment

Domestic hot water is provided by a single instantaneous hot water heater located in the basement. It appears that only a couple of sinks are end users.

Slate Memorial Library

BUILDING DESCRIPTION

Originally build in 1921, the Slate Memorial Library comprises of a single story cinder block building with wooden sash windows and exterior storms. The building has a slate roof and a full basement. It was noted that the ridge cap is not wide enough and may cause water do be driven into the roof area during a heavy storm. We also noticed that the basement windows do not seal tight anymore and thus are cause for water damage and infiltration. The interior of the library has a drop ceiling with fiber glass lay-in panels.

In addition, R-19 bat insulation was added to the top of the ceiling as well. Operating hours for the library are Mondays 2 pm – 6 PM, Thursdays 2 PM – 8 PM and Saturdays 10 AM – 2 PM.

SYSTEM DESCRIPTIONS

Lighting

Original T-12 fluorescent fixtures are utilized to illuminate this facility.

Mechanical Systems

A single, oil fired hot air furnace is utilized to provide heating for the building. The furnace is manufactured by Williamson and is equipped with a Clarin oil burner.

Energy Management System

Room temperature is controlled with a single, wall mounted thermostat without night setback capabilities.

Gill Elementary School

BUILDING DESCRIPTION

With a total of 18,320 square feet the Gill Elementary is the smallest school within the Gill – Montague Regional School District. The school consists of a single story, brick faced building with aluminum frame, double pane windows and a sloped asphalt shingled roof. Occupied by 133 students and 21 teachers/ staff members building operating hours are 7:45 AM to 4:30 PM, Mon.-Fri.

SYSTEM DESCRIPTIONS

Lighting

Lighting fixtures of the school are predominately T-8 fluorescent. T-5 HID fixtures were found in the multi purpose room.

Mechanical Systems

The buildings heating load requirements are met by a single Peerless steam boiler that appears to be original. It shows clear signs of age and physical deterioration and should be replaced. # 2 oil is the primary fuel source and the burner has an input rating of 18.8 GPH. Based on the name plate data this boiler does not seem to provide burner modulating capabilities. Steam is used by the original classroom unit ventilators, and the single heating and ventilation unit that handles the multi purpose room. Heating hot water is produced through the utilization of a steam to hot water heat exchanger. Two in-line circulator pumps distribute the heating hot water to fin tube perimeter heating..

Domestic hot water is supplied by a 80 gal, oil fired domestic hot water

heater.

The general observation was made that much of the pipe located in the boiler room was uninuslated.

Energy Management System

Space temperature control is achieved via an original, pneumatic control system. Maintenance personnel stated that this system is no longer operating in a reliable fashion and needs to be recommissioned or replaced.

Miscellaneous
The facility has a fully operating all-electric cafeteria.

LIGHTING WORK SCOPE

Summary of Recommended Lighting Retrofit
FRCOG - Town of Gill - Riverside Municipal Bldg. - S2

ESCO Code	Qty	Description
ADF/N-I100-QSS-UNV	5	REPLACE 100 WATT INCANDESCENT FIXTURE WITH NEW 4' 1 LAMP FLUORESCENT FIXTURE WITH QHEN NORMAL POWER SUPER SAVER ELECTRONIC BALLAST, REFLECTOR, AND (1) 4' T8 28 WATT SUPER SAVER LAMP
ADF/N-I75-QLSS-UNV	2	REPLACE 75 WATT INCANDESCENT FIXTURE WITH NEW 4' FLUORESCENT FIXTURE WITH QHEL LOW POWER SUPER SAVER ELECTRONIC BALLAST, REFLECTOR, AND (1) 4' T8 28 WATT SUPER SAVER LAMP
AF/N-I100-QLSS-UNV	1	REPLACE 100 WATT INCANDESCENT FIXTURE WITH NEW 4' 1 LAMP FLUORESCENT FIXTURE WITH QHEL LOW POWER SUPER SAVER ELECTRONIC BALLAST, REFLECTOR, AND (2) 4' T8 28 WATT SUPER SAVER LAMP
A-QLSS-UNV	2	IN 2 LAMP 4' FLUORESCENT FIXTURE INSTALL QHEL SUPER SAVER ELECTRONIC BALLAST AND (2) 4' T8 28 WATT SUPER SAVER LAMPS
A-T8-QLSS-UNV	6	IN 2 LAMP 4' T8 FLUORESCENT FIXTURE INSTALL QHEL SUPER SAVER ELECTRONIC BALLAST AND (2) 4' T8 28W SUPER SAVER LAMPS
B-T8-QLSS-UNV	18	IN 4 LAMP 4' T8 FLUORESCENT FIXTURE INSTALL QHEL SUPER SAVER ELECTRONIC BALLAST AND (4) 4' T8 28W SUPER SAVER LAMPS
CSS-120	3	INSTALL CEILING MOUNTED OCCUPANCY SENSOR SYSTEM
K1BB-(2)I18-UNV	1	REPLACE EXIT SIGN CONTAINING (2) 18 WATT INCANDESCENT BULBS WITH NEW SINGLE FACE L.E.D. EXIT SIGN WITH BATTERY BACK-UP
NOUPGRADE-4'4L32WT8NP	4	NO UPGRADE OR RETROFIT IS BEING PERFORMED ON EXISTING 4' 4 LAMP T8 32 WATT ELECTRONIC NORMAL POWER BALLAST FIXTURES
PULL CHAINS	1	INSTALL PULL CHAIN TO EXISTING OR NEW FIXTURE BEING INSTALLED
SLS15-I100-120	2	REPLACE EXISTING 100 WATT INCANDESCENT LAMP WITH SLS15 COMPACT FLUORESCENT LAMP

LIGHTING WORK SCOPE

Summary of Recommended Lighting Retrofit

FRCOG - Town of Gill - Riverside Municipal Bldg. - S2

ESCO Code	Qty	Description
V2X13-I100-120	2	REPLACE 100 WATT INCANDESCENT FIXTURE WITH NEW SURFACE DRUM FIXTURE CONTAINING (2) HARD WIRED COMPACT FLUORESCENT BALLASTS AND (2) PL 13 WATT COMPACT FLUORESCENT LAMPS
V2X13-I60-120	4	REPLACE 60 WATT INCANDESCENT FIXTURE WITH NEW SURFACE DRUM FIXTURE CONTAINING (2) HARD WIRED COMPACT FLUORESCENT BALLASTS AND (2) PL 13 WATT COMPACT FLUORESCENT LAMPS
	51	

LIGHTING WORK SCOPE

Fixture Locations
FRCOG - Town of Gill - Riverside Municipal Bldg. - S2
Gill, MA

Map	Location	Hours	Qty	Code	Notes
1	Front Entry Hall	1,440	4	V2X13-I60-120	Replacing 60W Incandescent
2	Classroom 1	1,440	6	B-T8-QLSS-UNV	Access
2	Classroom 1	1,440	2	A-T8-QLSS-UNV	Existing 4' 2l T8 Ice Cube
2	Classroom 1	1,440	1	CSS-120	WVPDT
3	Classroom 2	1,440	6	B-T8-QLSS-UNV	Access
3	Classroom 2	1,440	2	A-T8-QLSS-UNV	Existing 4' 2l T8 Ice Cube
3	Classroom 2	1,440	1	CSS-120	WVPDT
4	Classroom 3	1,440	1	CSS-120	WVPDT
4	Classroom 3	1,440	6	B-T8-QLSS-UNV	Access
4	Classroom 3	1,440	2	A-T8-QLSS-UNV	Existing 4' 2l T8 Ice Cube
5	Bathroom	1,000	1	V2X13-I100-120	Replacing 100W Incandescent
5	Bathroom	1,000	1	PULL CHAINS	
5	Bathroom	-	1	V2X13-I100-120	Replacing 100W Incandescent
6	Hallway By Stairs	8,760	1	K1BB-(2)I18-UNV	Replacing (2) 18W Incandescent
7	Basement Shop	500	4	NOUPGRADE-4'4L32WT8NP	Existing 8' 4L T8 Wrap
8	Boiler Room	500	2	ADF/N-I75-QLSS-UNV	Replacing 75W Incandescent
9	Oil Tank Room	500	1	AF/N-I100-QLSS-UNV	Replacing 100W Incandescent
10	Old Bathroom/Storage	500	1	ADF/N-I100-QSS-UNV	Replacing 100W Incandescent
11	Another Old Bathroom/Storage Area	500	1	ADF/N-I100-QSS-UNV	Replacing 100W Incandescent
12	Open Storage	500	2	SLS15-I100-120	Replacing 100W Incandescent
12	Open Storage	500	2	A-QLSS-UNV	Existing 4' 2L T12 Ind
13	Basement Hall	800	3	ADF/N-I100-QSS-UNV	Replacing 100W Incandescent
	Total		51		

LIGHTING WORK SCOPE

Energy Savings Analysis
FRCOG - Town of Gill - Riverside Municipal Bldg. - S2
Gill, MA

ESCO CODE	QTY	AVG. ANNUAL HOURS TOTAL	AVG. ANNUAL ON PK HOURS	AVG. ANNUAL OFF PK HOURS	UNIT KW BEFORE	TOTAL KW BEFORE	UNIT KW AFTER	TOTAL KW AFTER	UNIT KW SAVED	TOTAL KW SAVED	ANNUAL ON PK KWH SAVED	ANNUAL OFF PK KWH SAVED	ANNUAL TOTAL KWH SAVED	ON PK SAVINGS @ $0.1500 PER KWH	OFF PK SAVINGS @ $0.1500 PER KWH	DEMAND SAVINGS @ $0.00 PER KW	TOTAL SAVINGS
ADF/N-I100-QSS-UNV	5	680	680	-	0.100	0.50	0.025	0.13	0.075	0.38	255	-	255	38	-	0	38
ADF/N-I75-QLSS-UNV	2	500	500	-	0.075	0.15	0.022	0.04	0.053	0.11	53	-	53	8	-	0	8
AF/N-I100-QLSS-UNV	1	500	500	-	0.100	0.10	0.042	0.04	0.058	0.06	29	-	29	4	-	0	4
A-QLSS-UNV	2	500	500	-	0.070	0.14	0.042	0.08	0.028	0.06	28	-	28	4	-	0	4
A-T8-QLSS-UNV	6	1,440	1,440	-	0.060	0.36	0.042	0.25	0.018	0.11	156	-	156	23	-	0	23
B-T8-QLSS-UNV	18	1,440	1,440	-	0.112	2.02	0.084	1.51	0.028	0.50	726	-	726	109	-	0	109
CSS-120	3	432	432	-	0.588	1.76	-	-	0.588	1.76	762	-	762	114	-	0	91
K1BB-(2)I18-UNV	1	8,760	8,760	-	0.036	0.04	0.001	0.00	0.035	0.03	307	-	307	46	-	0	46
NOUPGRADE-4'4L32WT8NP	4	500	500	-	0.112	0.45	0.112	0.45	-	-	-	-	-	-	-	0	-
PULL CHAINS	1	1,000	1,000	-	-	-	-	-	-	-	-	-	-	-	-	0	-
SLS15-I100-120	2	500	500	-	0.100	0.20	0.015	0.03	0.085	0.17	85	-	85	13	-	0	13
V2X13-I100-120	2	500	500	-	0.100	0.20	0.030	0.06	0.070	0.14	70	-	70	11	-	0	11
V2X13-I60-120	4	1,440	1,440	-	0.060	0.24	0.030	0.12	0.030	0.12	173	-	173	26	-	0	26
Total	**51**					**6.15**		**2.72**	**56%**	**3.44**	**2,643**	**-**	**2,643**	**396**	**-**	**0**	**374**

LIGHTING WORK SCOPE

Summary of Recommended Lighting Retrofit FRCOG - Town of Gill - Safety Complex-Garage - S1		
ESCO Code	**Qty**	**Description**
A1-T8-QLSS-UNV	1	IN 1 LAMP 4' T8 FLUORESCENT FIXTURE INSTALL QHEL SUPER SAVER ELECTRONIC BALLAST AND (1) 4' T8 28 WATT SUPER SAVER LAMP
A-T8-QLSS-UNV	30	IN 2 LAMP 4' T8 FLUORESCENT FIXTURE INSTALL QHEL SUPER SAVER ELECTRONIC BALLAST AND (2) 4' T8 28W SUPER SAVER LAMPS
NOUPGRADE-2'3LT8NP	4	NO UPGRADE OR RETROFIT IS BEING PERFORMED ON EXISTING 2' 3 LAMP T8 F17 LAMPS WITH T8 NORMAL POWER ELECTRONIC BALLASTS FIXTURES
NOUPGRADE-4'1L32WT8NP	4	NO UPGRADE OR RETROFIT IS BEING PERFORMED ON EXISTING 4' 1 LAMP T8 32 WATT ELECTRONIC NORMAL POWER BALLAST FIXTURES
NOUPGRADE-4'2L32WT8NP	1	NO UPGRADE OR RETROFIT IS BEING PERFORMED ON EXISTING 4' 2 LAMP T8 32 WATT ELECTRONIC NORMAL POWER BALLAST FIXTURES
NOUPGRADE-4'4L32WT8NP	4	NO UPGRADE OR RETROFIT IS BEING PERFORMED ON EXISTING 4' 4 LAMP T8 32 WATT ELECTRONIC NORMAL POWER BALLAST FIXTURES
NOUPGRADE-8'2LT8	25	EXISTING 8' 2 LAMP T8 ELECTRONIC BALLAST FIXTURE - NO UPGRADE OR RETROFIT IS BEING PERFORMED
V2X13-I60-120	3	REPLACE 60 WATT INCANDESCENT FIXTURE WITH NEW SURFACE DRUM FIXTURE CONTAINING (2) HARD WIRED COMPACT FLUORESCENT BALLASTS AND (2) PL 13 WATT COMPACT FLUORESCENT LAMPS
WSS-120	4	REPLACE STANDARD ON / OFF SWITCH WITH WALL MOUNTED OCCUPANCY SENSOR
	76	

LIGHTING WORK SCOPE

Fixture Locations
FRCOG - Town of Gill - Safety Complex-Garage - S1
Gill, MA

Map	Location	Hours	Qty	Code	Notes
1	Main Truck Bays	2,500	8	NOUPGRADE-8'2LT8	Existing 8' 2L T8 Ind
2	Generator room	800	1	NOUPGRADE-4'2L32WT8NP	Existing 4' 2L T8 Wrap
3	Fire Station Hall	1,000	2	A-T8-QLSS-UNV	Existing 4' 2L T8 Troffer
4	Ambulance/Fire Trucks	1,000	9	NOUPGRADE-8'2LT8	Existing 8' 2L T8 Ind
5	Dispatch	1,000	2	NOUPGRADE-2'3LT8NP	Existing 2' 3L T8 F17 Troffer
5	Dispatch	1,000	1	WSS-120	
6	Chief's Office	1,000	1	WSS-120	
6	Chief's Office	1,000	2	NOUPGRADE-2'3LT8NP	Existing 2' 3L T8 F17 Troffer
7	Men's Room	1,000	2	A-T8-QLSS-UNV	Existing 4' 2L T8 Troffer
8	Women's Room	1,000	2	A-T8-QLSS-UNV	Existing 4' 2L T8 Troffer
9	Training Room	1,000	4	A-T8-QLSS-UNV	Existing 4' 2L T8 Troffer
10	Kitchen	1,000	1	V2X13-I60-120	Replacing 60W Incandescent
11	Entry Hall	1,000	1	V2X13-I60-120	Replacing 60W Incandescent
12	2nd Garage Bay	1,000	4	NOUPGRADE-4'4L32WT8NP	Existing 8' 4L T8 Strip
13	2nd DPW Bay	2,500	5	NOUPGRADE-8'2LT8	Existing 8' 2L T8 Ind
13	2nd DPW Bay	2,500	2	NOUPGRADE-4'1L32WT8NP	Existing 4' 1L T8 Ind
14	Crib	2,500	2	NOUPGRADE-4'1L32WT8NP	Existing 4' 1L T8 Ind
15	Office	2,500	1	A-T8-QLSS-UNV	Existing 4' 2L T8 Wrap
16	Break Room	2,500	1	A-T8-QLSS-UNV	Existing 4' 2L T8 Wrap
17	Entry	2,500	1	V2X13-I60-120	Replacing 60W Incandescent
18	Tool Room	2,500	1	NOUPGRADE-8'2LT8	Existing 8' 2L T8 Ind
19	Police Chief	2,250	3	A-T8-QLSS-UNV	Existing 4' 2L T8 Wrap
19	Police Chief	2,250	1	WSS-120	WSD-PDT
20	Sergeant's Office	2,250	3	A-T8-QLSS-UNV	Existing 4' 2L T8 Wrap
20	Sergeant's Office	2,250	1	WSS-120	WSD-PDT
21	Hallway	2,250	1	A-T8-QLSS-UNV	Existing 4' 2L T8 Wrap

LIGHTING WORK SCOPE

Fixture Locations
FRCOG - Town of Gill - Safety Complex-Garage - S1
Gill, MA

Map	Location	Hours	Qty	Code	Notes
22	Police Desk	4,000	2	A-T8-QLSS-UNV	Existing 4' 2L T8 Troffer
22	Police Desk	4,000	1	A1-T8-QLSS-UNV	Existing 4' 1L T8 Wrap
23	Small Office	1,000	1	A-T8-QLSS-UNV	Existing 4' 2L T8 Troffer
24	Police Training Room	1,000	2	A-T8-QLSS-UNV	Existing 4' 2L T8 Troffer
24	Police Training Room	1,000	1	A-T8-QLSS-UNV	Existing 4' 2L T8 Wrap
25	Booking Room	500	2	A-T8-QLSS-UNV	Existing 4' 2L T8 Troffer
26	Evidence Room	500	2	A-T8-QLSS-UNV	Existing 4' 2L T8 Wrap
27	Bathroom	1,000	1	A-T8-QLSS-UNV	Existing 4' 2L T8 Troffer
28	Police Garage	1,000	2	NOUPGRADE-8'2LT8	Existing 8' 2L T8 Ind
	Total		76		

LIGHTING WORK SCOPE

Energy Savings Analysis
FRCOG - Town of Gill - Safety Complex-Garage - S1
Gill, MA

ESCO CODE	QTY	AVG. ANNUAL HOURS TOTAL	AVG. ANNUAL ON PK HOURS	AVG. ANNUAL OFF PK HOURS	UNIT KW BEFORE	TOTAL KW BEFORE	UNIT KW AFTER	TOTAL KW AFTER	UNIT KW SAVED	TOTAL KW SAVED	ANNUAL ON PK KWH SAVED	ANNUAL OFF PK KWH SAVED	ANNUAL TOTAL KWH SAVED	ON PK SAVINGS @ $0.1500 PER KWH	OFF PK SAVINGS @ $0.1500 PER KWH	DEMAND SAVINGS @ $0.00 PER KW	TOTAL SAVINGS
A1-T8-QLSS-UNV	1	4,000	4,000	-	0.030	0.03	0.022	0.02	0.008	0.01	32	-	32	5	-	0	5
A-T8-QLSS-UNV	30	1,525	1,525	-	0.060	1.80	0.042	1.26	0.018	0.54	823	-	823	124	-	0	124
NOUPGRADE-2'3LT8NP	4	1,000	1,000	-	0.050	0.20	0.050	0.20	-	-	-	-	-	-	-	0	-
NOUPGRADE-4'1L32WT8NP	4	2,500	2,500	-	0.030	0.12	0.030	0.12	-	-	-	-	-	-	-	0	-
NOUPGRADE-4'2L32WT8NP	1	800	800	-	0.060	0.06	0.060	0.06	-	-	-	-	-	-	-	0	-
NOUPGRADE-4'4L32WT8NP	4	1,000	1,000	-	0.112	0.45	0.112	0.45	-	-	-	-	-	-	-	0	-
NOUPGRADE-8'2LT8	25	1,840	1,840	-	0.109	2.72	0.109	2.72	-	-	-	-	-	-	-	0	-
V2X13-I60-120	3	1,500	1,500	-	0.060	0.18	0.030	0.09	0.030	0.09	135	-	135	20	-	0	20
WSS-120	4	525	525	-	0.113	0.45	-	-	0.113	0.45	237	-	237	36	-	0	28
Total	**76**					**6.01**		**4.92**	**18%**	**1.09**	**1,228**	**-**	**1,228**	**184**	**-**	**0**	**177**

LIGHTING WORK SCOPE

Summary of Recommended Lighting Retrofit
FRCOG - Town of Gill - Town Hall - S1

ESCO Code	Qty	Description
A2'W/N-I60-QLXPS-UNV	1	REMOVE EXISTING 60 WATT INCANDESCENT FIXTURE AND INSTALL NEW 2' (2) LAMP WRAP FLUORESCENT FIXTURE CONTAINING QHEL LOW POWER SUPER SAVER ELECTRONIC BALLAST, (2) 2' T8 XPS ENERGY SAVER LAMPS
A-T8-QLSS-UNV	8	IN 2 LAMP 4' T8 FLUORESCENT FIXTURE INSTALL QHEL SUPER SAVER ELECTRONIC BALLAST AND (2) 4' T8 28W SUPER SAVER LAMPS
B-T8-QLSS-UNV	27	IN 4 LAMP 4' T8 FLUORESCENT FIXTURE INSTALL QHEL SUPER SAVER ELECTRONIC BALLAST AND (4) 4' T8 28W SUPER SAVER LAMPS
CSS-120	4	INSTALL CEILING MOUNTED OCCUPANCY SENSOR SYSTEM
HPS70-(2)I65-120	1	REPLACE (2) 65 WATT INCANDESCENT FIXTURE WITH NEW 70 WATT HIGH PRESSURE SODIUM FIXTURE
NO UPGRADE	1	SEE FIXTURE LOCATION KEY FOR NOTES ON CASES WHERE NO UPGRADE OR RETROFIT IS BEING PERFORMED
NOUPGRADE-4'2L32WT8NP	5	NO UPGRADE OR RETROFIT IS BEING PERFORMED ON EXISTING 4' 2 LAMP T8 32 WATT ELECTRONIC NORMAL POWER BALLAST FIXTURES
NOUPGRADE-HPS70	3	NO UPGRADE OR RETROFIT IS BEING PERFORMED ON EXISTING 70 WATT HIGH PRESSURE SODIUM FIXTURE
NOUPGRADE-LEDEXIT	3	NO UPGRADE OR RETROFIT IS BEING PERFORMED ON EXISTING LED EXIT SIGN
VT2X13-I75-120	2	REPLACE 75 WATT INCANDESCENT WITH NEW VAPOR TIGHT SURFACE DRUM FIXTURE CONTAINING (2) HARD WIRED COMPACT FLUORESCENT BALLASTS AND (2) PL 13 WATT COMPACT FLUORESCENT LAMPS

LIGHTING WORK SCOPE

Fixture Locations
FRCOG - Town of Gill - Town Hall - S1
Gill, MA

Map	Location	Hours	Qty	Code	Notes
1	Exterior - Rear	1,000	1	HPS70-(2)I65-120	Existing (2) 65W Incandescent Flood
1	Front Entry	1,000	1	VT2X13-I75-120	Fixture
1	Side Entry	1,000	1	VT2X13-I75-120	Fixture
1	Exterior	1,000	3	NOUPGRADE-HPS70	Existing HPS70 Wall Pack
2	Entry Lobby	500	2	NOUPGRADE-4'2L32WT8NP	Existing 4' 2L T8 Wrap
3	Men's Room	500	1	NOUPGRADE-4'2L32WT8NP	Existing 4' 2L T8 Wrap
4	Stairs to Basement	1,600	1	A2'W/N-I60-QLXPS-UNV	Replacing 60W Incandescent
5	Lower Hall	1,200	2	B-T8-QLSS-UNV	Existing 8' 4L T8 Wrap
5	Lower Hall	1,200	1	CSS-120	CM-9; Controlling (2) B-T8
5	Lower Hall	1,200	1	B-T8-QLSS-UNV	Existing 8' 4L T8 Wrap
5	Lower Hall	8,760	1	NOUPGRADE-LEDEXIT	Existing LED Exit
6	Assessor's Office	1,200	3	B-T8-QLSS-UNV	Existing 8' 4L T8 Wrap
6	Assessor's Office	1,200	1	CSS-120	CM-9
7	File Room	1,200	1	CSS-120	CM-9
7	File Room	1,200	1	B-T8-QLSS-UNV	Existing 8' 4l T8 Wrap
8	Storage	500	1	A-T8-QLSS-UNV	Existing 4' 2L T8 Wrap
9	Small Hall/Elevator Alcove	1,200	1	B-T8-QLSS-UNV	Existing 8' 4L T8 Wrap
9	Small Hall/Elevator Alcove	1,200	1	A-T8-QLSS-UNV	Existing 4' 2L T8 Wrap
9	Small Hall/Elevator Alcove	1,200	1	CSS-120	CM-9
10	Unused Office	100	1	NO UPGRADE	Existing 8' 4L T8 Wrap
11	Board Health Office	800	2	B-T8-QLSS-UNV	Existing 8' 4L T8 Wrap
12	Boiler Room	300	1	NOUPGRADE-4'2L32WT8NP	Existing 4' 2L T8 Ind
13	Electrical Room/Oil Tank	300	1	NOUPGRADE-4'2L32WT8NP	Existing 4' 2L T8 Wrap
14	2nd Floor Meeting Room	500	9	B-T8-QLSS-UNV	Existing 8' 4L T8 Wrap
14.1	Stage	500	1	B-T8-QLSS-UNV	Existing 8' 4L T8 Wrap
14.1	Stage	500	1	A-T8-QLSS-UNV	Existing 4' 2L T8 Wrap

LIGHTING WORK SCOPE

Fixture Locations
FRCOG - Town of Gill - Town Hall - S1
Gill, MA

Map	Location	Hours	Qty	Code	Notes
15	Selectboard Office	1,600	2	B-T8-QLSS-UNV	Existing 8' 4L T8 Wrap
16	Main Office	8,760	2	NOUPGRADE-LEDEXIT	Existing LED Exit
16	Main Office	1,600	5	B-T8-QLSS-UNV	Existing 8' 4L T8 Wrap
16	Main Office	1,600	5	A-T8-QLSS-UNV	Existing 4' 2L T8 Wrap
	Total		55		

LIGHTING WORK SCOPE

Energy Savings Analysis
FRCOG - Town of Gill - Town Hall - S1
Gill, MA

ESCO CODE	QTY	AVG. ANNUAL HOURS TOTAL	AVG. ANNUAL ON PK HOURS	AVG. ANNUAL OFF PK HOURS	UNIT KW BEFORE	TOTAL KW BEFORE	UNIT KW AFTER	TOTAL KW AFTER	UNIT KW SAVED	TOTAL KW SAVED	ANNUAL ON PK KWH SAVED	ANNUAL OFF PK KWH SAVED	ANNUAL TOTAL KWH SAVED	ON PK SAVINGS @ $0.1500 PER KWH	OFF PK SAVINGS @ $0.1500 PER KWH	DEMAND SAVINGS @ $0.00 PER KW	TOTAL SAVINGS
A2'W/N-I60-QLXPS-UNV	1	1,600	1,600	-	0.060	0.06	0.026	0.03	0.034	0.03	54	-	54	8	-	0	8
A-T8-QLSS-UNV	8	1,275	1,275	-	0.060	0.48	0.042	0.34	0.018	0.14	184	-	184	28	-	0	28
B-T8-QLSS-UNV	27	1,014	1,014	-	0.112	3.02	0.084	2.27	0.028	0.76	767	-	767	115	-	0	115
CSS-120	4	377	377	-	0.136	0.55	-	-	0.136	0.55	206	-	206	31	-	0	25
HPS70-(2)I65-120	1	1,000	1,000	-	0.130	0.13	0.095	0.09	0.035	0.03	35	-	35	5	-	0	5
NO UPGRADE	1	100	100	-	-	-	-	-	-	-	-	-	-	-	-	0	-
NOUPGRADE-4'2L32WT8NP	5	420	420	-	0.060	0.30	0.060	0.30	-	-	-	-	-	-	-	0	-
NOUPGRADE-HPS70	3	1,000	1,000	-	0.090	0.27	0.090	0.27	-	-	-	-	-	-	-	0	-
NOUPGRADE-LEDEXIT	3	8,760	8,760	-	0.001	0.00	0.001	0.00	-	-	-	-	-	-	-	0	-
VT2X13-I75-120	2	1,000	1,000	-	0.075	0.15	0.030	0.06	0.045	0.09	90	-	90	14	-	0	14
Total	**55**					**4.96**		**3.36**	**32%**	**1.61**	**1,336**	**-**	**1,336**	**200**	**-**	**0**	**194**

LIGHTING WORK SCOPE

Summary of Recommended Lighting Retrofit
FRCOG - Town of Gill - Pump Station - S1

ESCO Code	Qty	Description
ADF-QSS-UNV	3	IN 2 LAMP 4' FLUORESCENT FIXTURE INSTALL QHEN SUPER SAVER ELECTRONIC BALLAST, REFLECTOR, AND (1) 4' T8 28 WATT SUPER SAVER LAMP
A-QSS-UNV	2	IN 2 LAMP 4' FLUORESCENT FIXTURE INSTALL QHEN SUPER SAVER ELECTRONIC BALLAST AND (2) 4' T8 28 WATT SUPER SAVER LAMPS
	5	

Fixture Locations
FRCOG - Town of Gill - Pump Station - S1
Gill, MA

Map	Location	Hours	Qty	Code	Notes
1	Pumping Station	500	2	A-QSS-UNV	Existing 4' 2L T12 Wrap
1	Pumping Station	500	3	ADF-QSS-UNV	Existing 4' 2L T12 Ind
Total			5		

Energy Savings Analysis
FRCOG - Town of Gill - Pump Station - S1
Gill, MA

ESCO CODE	QTY	AVG. ANNUAL HOURS TOTAL	AVG. ANNUAL ON PK HOURS	AVG. ANNUAL OFF PK HOURS	UNIT KW BEFORE	TOTAL KW BEFORE	UNIT KW AFTER	TOTAL KW AFTER	UNIT KW SAVED	TOTAL KW SAVED	ANNUAL ON PK KWH SAVED	ANNUAL OFF PK KWH SAVED	ANNUAL TOTAL KWH SAVED	ON PK SAVINGS @ $0.1500 PER KWH	OFF PK SAVINGS @ $0.1500 PER KWH	DEMAND SAVINGS @ $0.00 PER KW	TOTAL SAVINGS
ADF-QSS-UNV	3	500	500	-	0.080	0.24	0.025	0.08	0.055	0.16	82	-	82	12	-	0	12
A-QSS-UNV	2	500	500	-	0.070	0.14	0.048	0.10	0.022	0.04	22	-	22	3	-	0	3
Total	5					0.38		0.17	55%	0.21	104	-	104	16	-	0	16

LIGHTING WORK SCOPE

Summary of Recommended Lighting Retrofit
FRCOG - Town of Gill - Library - S2

ESCO Code	Qty	Description
ADF/N-I100-QSS-UNV	1	REPLACE 100 WATT INCANDESCENT FIXTURE WITH NEW 4' 1 LAMP FLUORESCENT FIXTURE WITH QHEN NORMAL POWER SUPER SAVER ELECTRONIC BALLAST, REFLECTOR, AND (1) 4' T8 28 WATT SUPER SAVER LAMP
ADF/N-I40-QSS-UNV	1	REPLACE 40 WATT INCANDESCENT FIXTURE WITH NEW 4' 1 LAMP FLUORESCENT FIXTURE WITH QHEN NORMAL POWER SUPER SAVER ELECTRONIC BALLAST, REFLECTOR, AND (1) 4' T8 28 WATT SUPER SAVER LAMP
ADF/N-I60-QSS-UNV	4	REPLACE 60 WATT INCANDESCENT FIXTURE WITH NEW 4' 1 LAMP FLUORESCENT STRIP FIXTURE WITH QHEN NORMAL POWER SUPER SAVER ELECTRONIC BALLAST, REFLECTOR, AND (1) 4' T8 28 WATT SUPER SAVER LAMP
A-QLSS-UNV	13	IN 2 LAMP 4' FLUORESCENT FIXTURE INSTALL QHEL SUPER SAVER ELECTRONIC BALLAST AND (2) 4' T8 28 WATT SUPER SAVER LAMPS
VT2X13-I60-120	2	REPLACE 60 WATT INCANDESCENT WITH NEW VAPOR TIGHT SURFACE DRUM FIXTURE CONTAINING (2) HARD WIRED COMPACT FLUORESCENT BALLASTS AND (2) PL 13 WATT COMPACT FLUORESCENT LAMPS
	21	

LIGHTING WORK SCOPE

Energy Savings Analysis
FRCOG - Town of Gill - Library - S2
Gill, MA

ESCO CODE	QTY	AVG. ANNUAL HOURS TOTAL	AVG. ANNUAL ON PK HOURS	AVG. ANNUAL OFF PK HOURS	UNIT KW BEFORE	TOTAL KW BEFORE	UNIT KW AFTER	TOTAL KW AFTER	UNIT KW SAVED	TOTAL KW SAVED	ANNUAL ON PK KWH SAVED	ANNUAL OFF PK KWH SAVED	ANNUAL TOTAL KWH SAVED	ON PK SAVINGS @ $0.1500 PER KWH	OFF PK SAVINGS @ $0.1500 PER KWH	DEMAND SAVINGS @ $0.00 PER KW	TOTAL SAVINGS
ADF/N-I100-QSS-UNV	1	100	100	-	0.100	0.10	0.025	0.03	0.075	0.08	8	-	8	1	-	0	1
ADF/N-I40-QSS-UNV	1	100	100	-	0.040	0.04	0.025	0.03	0.015	0.01	1	-	1	0	-	0	0
ADF/N-I60-QSS-UNV	4	300	300	-	0.060	0.24	0.025	0.10	0.035	0.14	42	-	42	6	-	0	6
A-QLSS-UNV	13	700	700	-	0.070	0.91	0.042	0.55	0.028	0.36	255	-	255	38	-	0	38
VT2X13-I60-120	2	700	700	-	0.060	0.12	0.030	0.06	0.030	0.06	42	-	42	6	-	0	6
Total	21					1.41		0.76	46%	0.65	348	-	348	52	-	0	52

Fixture Locations
FRCOG - Town of Gill - Library - S2
Gill, MA

Map	Location	Hours	Qty	Code	Notes
1	Entry	700	2	VT2X13-I60-120	Existing 60W Incandescent
2	Main Rack Area	700	6	A-QLSS-UNV	Existing 4' 2l T12 Ice Cube
2	Main Rack Area	700	6	A-QLSS-UNV	Existing 4' 2l T12 Ice Cube
3	Children's Section	700	1	A-QLSS-UNV	Existing 4' 2l T12 Ice Cube
4	2nd Floor Storage	100	1	ADF/N-I100-QSS-UNV	Existing 100W Incandescent
4	2nd Floor Storage	100	1	ADF/N-I40-QSS-UNV	Existing 40W Incandescent
5	Basement	300	2	ADF/N-I60-QSS-UNV	Existing 60W Incandescent
5	Basement	300	2	ADF/N-I60-QSS-UNV	Existing 60W Incandescent
	Total		21		

BUILDING ENVELOPE WORK SCOPE

Gill – Town Hall

Doors
All doors at this facility have inadequate weather-stripping.

Attic
The attic has open floor joists that fiberglass insulation was stapled to. A suspended ceiling was installed below. Some of the insulation is falling down and in some cases removed for access. This will need a plastic air barrier installed below the existing fiberglass insulation with cellulose blown in on top. Four access hatches will need to be installed. There is a tower on the roof that is open vented and the soffits are not vented. The tower ventilation will need to be restricted, and soffit vents installed.

Town Hall

Doors	5	Ea	0.29	FT.^{2}
Attic and Walls	200	LF	3.33	FT.^{2}
TOTAL:		=	3.62	FT.^{2}

BUILDING ENVELOPE WORK SCOPE

Gill – Riverside Municipal Bldg

Doors
The wooden basement bulk head doors need to be weather-stripped.

Basement
Windows need to be sealed up better. Some penetrations in the boiler room need to be sealed up.

Windows
This facility has old wooden multi-pane windows. These are being repaired, re-glazed and refinished by a volunteer. They have exterior storm windows but still board up plastic sheeting on the exterior of these. They would like interior seasonal storm panes.

Attic
The attic has an access hatch in the front hallway (8' ceiling) that was not accessible at the time of the assessment. Personnel indicated this attic was insulated 5 years ago with cellulose blow-in insulation. They are having some icicle problems near the gables. Further investigation is recommended.

Riverside Municipal Building

Windows (Caulk & Seal)	Interior Storms	19	Ea	2.38	FT. ^{2}
Doors		3	Ea	0.18	FT. ^{2}
Basement		91	LF	0.25	FT. ^{2}
TOTAL:			=	2.81	FT. ^{2}
			=	0.26	M. ^{2}

BUILDING ENVELOPE WORK SCOPE

Gill – Slate Memorial Library

Doors
The main door and the wooden plank basement access door at this facility have inadequate weather-stripping.

Walls
The exterior is concrete block walls and a steep slate roof. The interior walls are tin plating with no insulation. The tin plating runs all the way up the roof slope to the top. The best that can be done for this is to air-seal any cracks and gaps with caulking.

Roof Penetrations
There is an open fireplace that has an inflatable air bag to seal the chimney. If this is no longer used, it should be sealed up at the bottom and capped at the top.

Library

Doors	2	Ea	0.11	FT.^{2}
Roof Penetrations	1	Ea	0.13	FT.^{2}
Roof-Wall Interface	200	LF	0.52	FT.^{2}
TOTAL:		=	0.76	FT.^{2}

BUILDING ENVELOPE WORK SCOPE

Gill – Public Safety Complex

Doors
Some of the overhead garage doors and some man doors have pieces of weather-stripping that have failed.

Roof
The new metal section of roof has a very slight pitch and has insulation plastic wrapped at the ceiling. This roof has ice damming issues and they use heating wiring to help this.

Public Safety Building

Doors	2	Ea	0.07	FT.^{2}
TOTAL:		=	0.07	FT.^{2}

BUILDING ENVELOPE WORK SCOPE

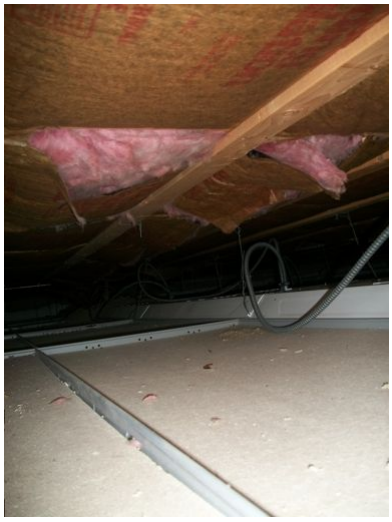
Gill Elementary School

This facility is a one story brick face and concrete block building originally built in 1955 with a 1960's era classroom addition. The building has a pitched roof with attic space, except in the gymnasium, which has a vaulted/ cathedral ceiling that appears to match the pitch of the roofline.

Doors
There are 3 double commercial doors, 12 single commercial doors and one double (1 _) door at the cafeteria. These doors are well weather stripped with a good quality weather stripping system, but many doors lack sweeps. Some of the weather strips and latches should be adjusted to form a better seal when the doors are closed.

Windows
The windows are newer, double pane commercial windows in good condition. Classroom windows are part of a curtainwall system that was replaced within the past 5 – 10 years (citation needed). No correction is recommended.

Attics
The main classroom areas have an unheated, passively vented attic space. The floor is insulated with 12" of blown cellulose insulation over 6" paper faced fiberglass batts fastened to the attic floor joists.



This method, while providing adequate "R" value as insulation, does not provide an air barrier. In places, the fiberglass attachment has failed, opening significant gaps to the conditioned space below. Additionally, there has been no air sealing around ventilation and soil pipe penetrations. This condition has resulted in significant air leakage from the conditioned space into this attic area. The heated air has caused the attic space to become heated, resulting in ice damming issues (reported, not observed), especially on the east side of the building. There is a passive damper at the south gable end that appears to be in place to increase ventilation to the attics.

This passive system (soffit vents, 4 passive "baker hat" vents and the gable vent) may actually contribute to the ice dams by de-pressurizing the attics with reference to the conditioned space and drawing heated air into the attics.

The correction for this is to air seal the attic from the classrooms by installing an air barrier below the ceiling joists. The current ceilings of the classrooms of the original wing are splined tiles fastened to the underside of the ceiling joists. In the newer addition, the classrooms have suspended ceilings that will be more cost effective to correct.

BUILDING ENVELOPE WORK SCOPE

Additional testing (removal of splined tiles and evaluation of the assembly) is required before final correction pricing can be provided.

Wall Penetrations/ Unit Ventilators

There are 10 fresh air grilles for the classroom unit ventilators that do not seal to the backs of the ventilators. When the ventilators are turned off, the gap between the ventilator damper and the wall creates a gap. The gap between the wall and the damper needs to be sealed to prevent air leakage when the units are off.

Additional Observations

The classroom exhaust ventilation is located on the interior wall (between classroom and hall). Many of these have been blocked with bookcases, etc., compromising the effectiveness of the ventilation system. These exhaust vents should be opened back up to permit adequate air changes in the classroom.

The damper to the kitchen stove exhaust grille has been propped open with a metal bar, creating a significant opening (9" diameter) to the roof. It appears that this damper may be a fire damper. This condition should be evaluated to determine the appropriate corrective action.

A. Building Envelope

1. Furnish and install new sweeps and adjust existing weather seals for 4 double and 12 single exterior doors.
2. Furnish and install a 16,220 SF of limited to the accessible ceiling areas.
3. Provide air sealing around all ceiling to attic penetrations
4. Provide air seal at all ten Unit Ventilators

Boiler Replacement and EMS WORK SCOPE

Boiler

A. Demolition

1. Remove & dispose of existing steam boiler and associated piping.
2. Steam to HW heat exchanger, serving Fin Tube Radiation to remain in place
3. Remove and dispose of existing duplex condensate receiver. Existing Tekmar duplex pump controls to remain and be reused.
4. Remove and dispose of existing 30 GAL oil-fired DHW heater.
5. Cut back insulation on piping as required to connect new boilers and associated equipment. (see clarification note 1)
6. Cut back and remove existing breaching to the extent required for new work. Existing back draft damper will be re-used or replaced.
7. Disconnect fuel oil piping and reserve for new work to the extent possible.

B. New Work

1. Furnish install new oil fired sectional steam boiler to be located in place of existing boiler.
2. Furnish site and Install new duplex condensate feed system Interlock to new boiler and existing Tekmar controller.
3. Furnish and install new 60 Gal oil fired DHW heater.
4. Modify existing combustion air duct work as required, discharging low in the boiler room via a high mounted combustion air louver including a motorized damper with an electric actuator and interlocked with boiler burner ignition. The high/low configuration shall comply with the local code.
5. Combustion air damper to be interlocked to new boiler.
6. Modify existing housekeeping pad for the new boiler as required. Provide new equipment pad for duplex condensate receiver
7. Furnish and install new steam header and equalizing line, as required to connect to new boiler including hangers and supports. Connect the new boiler to existing to existing steam header per manufacturer's recommendations.
8. Furnish and install new steam, condensate, feed water, blowdown, vents and make-up water piping and valves as required to connect to new boilers and new condensate and feedwater system including hangers and supports.
9. Furnish and install two (2) 3/4" valves with caps on the condensate return line for future chemical pot feeder.
10. Furnish and install new steam pressure and temperature gauges at the boiler steam outlet header.
11. Furnish and install new oil piping and appurtenances as required to connect new boiler and DHW heater.
12. Insulate all new piping within boiler room. Re-insulate all existing un-insulated piping within boiler room.
13. Complete electrical tie-ins for new boilers, motorized damper, safeties, etc.
14. Paint miscellaneous steel and piping that does not normally get insulated except for copper piping, stainless steel, galvanized, etc.
15. Install new boiler breaching and back draft damper as required to connect to existing stack. Insulate breaching.
16. Provide start-up of new boilers and associated equipment.
17. Hydro test new piping and clean and flush new equipment and piping. The condensate strainer shall be cleaned prior to commissioning.
18. Training for designated personnel in the maintenance, service and operation of the system.

C. Commissioning

1. Commissioning shall be a systematic process of ensuring that all plant equipment and systems perform interactively according to the design intent and the owner's operational needs. This is achieved by beginning in the design phase and continuing through construction acceptance and the warranty period with actual verification of performance.

Boiler Replacement and EMS WORK SCOPE

2. Verify and document proper performance of new equipment and systems. The subcontractor to ensure that the O & M and commissioning documentation left on site is completed and that the owner's operating and maintenance personnel are adequately trained.

E. Clarification

1. If asbestos or lead in paint is encountered, SIEMENS will stop work and seek direction from the customer.
2. SIEMENS assumes that all existing equipment valves, pipes, fittings, devices, etc. are in good working order. Failure of such components that Siemens is not replacing shall be the responsibility of the customer.
3. SIEMENS shall verify facility voltage and phase prior to ordering major equipment.
4. Any additions or modifications to the buildings existing fire protection system and existing boiler room envelope fire ratings are excluded from this scope. If such requirements are governed by local jurisdiction, codes, regulations, etc. then the direct responsibility of the work is of the Customer, and is considered outside of the scope of work.

Energy Management System

We propose to furnish and install a Siemens APOGEE Energy Management System for the project mentioned above.

Base scope includes controls for:

- (1) Steam Boiler
  - Boiler safety/interlock wiring to be factory furnished & installed.
  - Combustion air dampers to remain. Siemens to mount new actuation.
  - Points: S/S, Alarm, Steam pressure, OA Temp

- (1) Existing Cafeteria AHU
  - Furnish and install new 1/3, 2/3 steam heating valves.
  - Furnish and install new finned tube radiation valve.
  - Demolition of existing pneumatic controls at the unit
  - Furnish and install new DDC controls with electric actuation.
  - Does not include repairs to mechanical components on the AHU.

Boiler Replacement and EMS WORK SCOPE

- (6) Provide new electronic controls for finned tube radiation zones
  - Demolish all pneumatic controls at the units
  - Furnish and install electronic control valve.
  - Siemens to provide floor plans and graphics to reflect new systems
  - Locations:
    - Principal's Office
    - Front Office
    - 2 - Bathrooms
    - 2- Rear Entrances

- (10) Provide new electronic controls for unit Ventilators
  - Demolish all pneumatic controls at the unit.
  - Furnish and install electronic control valve.
  - Furnish and Install electronic damper actuator
  - Siemens to provide floor plans and graphics to reflect new systems

- 2- Rear Entrances (1) Fan Coil Unit - Kitchen
  - Demolish all pneumatic controls at the units
  - Siemens to provide floor plans and graphics to reflect new systems
  - Does not include repairs to mechanical components.

- (1) Replacement of time clock with DDC control
  - Siemens to remove existing pneumatic system time clock and provide DDC scheduling system.

- (1) New graphics and floor plans via web based Field Panel Go software.
  - Owner to provide assistance from IT department for interfacing between BMS Ethernet network and building's IT Ethernet network

- (8) Hours of on-site owner training

General Information:

Included:

1. Control Wiring: EMT where exposed, open cable where concealed.
2. Control dampers & valves
3. Siemens to assist balancer as necessary.
4. 12 Month warranty from date of acceptance

Excluded:

1. Fire alarm company start-up/commissioning

PROPOSAL

NAME / ADDRESS
Gill Town Hall 325 Main Road Gill, MA 01354

DATE
10/4/2011

DESCRIPTION	QTY	TOTAL
Job Location: Highway Garage Boiler Price to replace existing steam boiler with new Buderus oil fired hot water boilers. Design will be two Buderus G215/6 oil fired boilers controlled by a Buderus Logomatic R2107 control for modulation and zone temperatures. System will consist of Eight zones. 1- Garage West 2- Garage East 3 - Police Station 4-4 Fire Office 5 - Cruiser Storage 6 - Fire Truck & Boat Storage 7- Fire Training 8- Fire Garage System will utilize some existing supply piping. Returns from existing system will need to be replaced. System will consist of a constant circulating loop and multiple cold start loops. The highway garage will receive three new modine heaters. One of the existing heaters in the garage will moved to zone # 6. The oil line from the outdoor tank will be replaced with a 1/2 inch coated line. All near boiler piping will be new. A parts list and copy of the piping design can be obtained from Jeff Baird at F.W. Webb Co. (413-222-8515) or (sls164@fwwebb.com) This job is quoted per prevailing wage rates.	1	50,174.00

Thank you for your business.

TOTAL *includes sales tax* $50,174.00

Mick LaClaire

From: "Jeff Baird" <sls164@fwwebb.com>
To: "'Mick LaClaire'" <Highway@gillmass.org>
Cc: <joel@tognarelliheating.com>; "'Michael Kennedy'" <mk@fwwebb.com>
Sent: Wednesday, October 19, 2011 11:24 AM
Subject: RE: question on boilers

Mick,

I'm sure I can shed a little light on what the savings will be, and where they would come from. First let me tell you that the existing distribution system in the building is a big energy consumer. The existing system is part steam/ part water system that is maintaining temperature in the boiler. This is something that must be addressed to see any real fuel savings. The piping system there is somewhat of a potpourri of added on run-outs of both steam and water piping which is all uninsulated piping. The heat distributors also in the highway dept side were grossly undersized which results in a thermostat that will never satisfy and a large boiler that will always run. Lastly on the distribution side there was limited zoning. Basically most of the zones that are existing excluding the two water zones, are just thermostats that turn on a fan while steam continues to migrate through the piping system whether is a call for heat in that area or not.
In the proposed scope I did, which was only the first quote you received. I addressed all the above issues as inexpensively as possible.

1, converting the existing system entirely to hot water using some existing piping.
2, Insulate entire piping system
3, Add three new properly sized hot water unit heaters to the Highway. And move existing one to rescue storage bay.
4, Zone the entire system to 7 individual zones with setback thermostats and lockable covers. To heat individuals zones to temps as required

These changes to the existing distribution system alone would gain approximately 15-20% fuel consumption savings

Now by converting to hot water boilers we can do a few things that help you save fuel. My proposed scope for the project was two Buderus Boilers piped in Primary/Secondary fashion. Here is how this will save fuel

The max load for the building was just under 500,000 BTU's. This amount will only be required will 3-5% of the time and approximately only half of the total load will be required 60% of the time. By having multiple smaller boilers you obviously have the benefit of firing just one smaller boiler than one large *95% of the time oversized boiler.* This in itself has a few advantages such as being able to alternate the boilers so as to wear evenly and last twice as long. By bringing the boilers down to a smaller BTU level that any burner service company can service for a fraction of the commercial boiler parts and labor/travel rates etc. In addition a water system can utilize the **outdoor reset control.** This will continually and instantaneously adjust its rate of heat delivery to match the heat loss of the building it serves. This is reflective of the changing outdoor temperature. The indoor air temperature would remain rock stable. There would be no difference in comfort regardless of outside conditions.
If you add up your ability to use only one boiler at a very low temperature because that is all that is required, for example its 40 degrees outside and only the Police Station zone is calling for heat. You would now have the ability to match the present required load of the building.
The fuel saving due two multiple boilers broken down to multiple zones with an outdoor reset control system would save an additional 15-20%

Please understand a couple things.
My estimates are actually conservative and would not be surprised to hear of 50% fuel savings first year if done according to my original design only.
I completed this mechanical design and scope at no charge for Gill a neighboring town of mine which was attempting to save as much upfront money as possible.
I am aware that My Company may not even sell the products required .And F.W Webb Company or I offer no guarantees.

Sincerely,

Jeff Baird

Jeff Baird
Commercial HVAC Sales

F.W. Webb Company
Springfield, Ma
Office 413-781-1700
Fax 413-781-1705
Northampton, Ma
Office. 413-586-8100
Fax. 413-586-6280
Cell. 413-222-8515
Sls164@fwwebb.com

From: Mick LaClaire [mailto:Highway@gillmass.org]
Sent: Tuesday, October 18, 2011 10:39 AM
To: sls164@fwwebb.com
Subject: question on boilers

Hi Jeff, Mick LaClaire from Gill Hwy dept. here to ask a question the selectboard asked me to find out. Joel has given us the proposals for the two different senario's - I need to know what cost savings the boilers will give us as far as fuel usage? I have the figures, we used the last 2 years -about 3500gals the 1st year and 3800gals about last yr. I know we talked about savings the day you were here, and I am sure we will see savings, but the selectboard asked i calculate it, but I dont know what the boilers will have for nozzle sizes or the daily run time- I know that all depends on the temp settings and air temps in and out. can you help?
Thanks again
Mick