

DYSON ENGINEERING

Charles Aspinwall
Town of Millis

23 October, 2013

Dear Mr. Aspinwall,

Thank you for the opportunity to prepare a cost opinion to replace the aging boilers at Millis Town Hall. Based on my visit to the building, I recommend that the boilers be removed in their entirety, replaced with new, high-efficiency condensing boilers. This estimate includes the cost of new pumps, controls necessary to properly operate the new boilers, piping, vents, valves and fittings, and the labor necessary for a complete and functional installation. I have also provided an estimate of the cost to provide a set of plans and specifications suitable for procurement of the equipment and services.

I have analyzed the gas usage records provided to me. Over the past two years, the gas usage at Millis Town Hall has averaged 12,000 therms per year. Based on this analysis, I calculate that the superior efficiency of the new boilers will result in an annual reduction in gas usage of at least 2600 therms. At a typical current cost of \$1.20 per therm, this will net an annual fuel cost saving of approximately \$3,000.

Part of the reason for the premature failure of the existing boilers, in my opinion, is that they are oversized. Oversizing a boiler will result in short-cycling. One of the major combustion products from burning natural gas is water vapor, which can condense on surfaces in the boiler, and result in corrosion of the metal surfaces. Modern condensing boilers are made of corrosion-resistant metals, designed to stand up to this sort of attack. Condensation of this water vapor is common in oversized boilers that run for short periods of time, but boilers such as those at the Town Hall are made largely of steel and cast iron. The existing boiler plant consists of four boilers, rated for 399 MBH (input), or a total output capacity of 1,136 MBH (70% IBR rating from boiler nameplate). I have based this estimate on 2 high efficiency boilers with an input rating of 500 MBH each, and a net output of 900 MBH total.

I have attached a spreadsheet that lists my estimate of the costs for the major categories. A rebate for the new, high-efficiency condensing boilers that is currently offered by Gas Networks is \$4000 per boiler for boilers in the range of 500 to 999 MBH. Therefore, I estimate that the net cost to remove the existing boilers, install the new boilers (including pumps, piping, vents, and electrical and controls), net of rebates, is as follows:

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Total Installed Cost	\$102,240
Current Available Rebate	<u>\$8,000</u>
NET COST	\$ 94,240

I have made the assumption that the boiler vents can be run to the roof through the chase that contains the existing boiler flue. I have not had the opportunity to see the full routing of the flue, but I am making the assumption that it is a straight shot from the boiler room to the roof. If there are offsets in the flue, this would require either partial demolition of a wall at the location of the offset.

Thank you for the opportunity to provide you with this report. Please feel free to call with any questions.

Regards,

Robert E. Dyson

Robert E. Dyson, PE
Principal