



HVAC Piping Study
for
Lincolnwood Middle School
Lincolnwood, Illinois

IMEG #21002994.00
June 21, 2021

A. Introduction

1. On Wednesday, June 9th, 2021, Jeff Oke and Connor O'Brien from IMEG Corp. visited Lincolnwood Middle School to investigate the HVAC piping system. The heating water piping system consists of two sets of pumps. Pumps 3 and 4 each have a capacity of 340 GPM and serve the existing hot water system. Pumps 7 and 8 each have a capacity of 100 GPM and serve the new hot water system. Pumps 3 and 4 are running at constant volume with triple duty valves that are partially closed, and pumps 7 and 8 are run with VFDs. Pumps 7 and 8 currently run at 50% speed each. In operation, pumps 3 and 4 run in lead lag operation while pumps 7 and 8 run simultaneously. Pumps 3 and 4 and pumps 7 and 8 are fed by a 5" heating water main reduced to 3" at CV 7 to serve each set. This size does not suit the full flow GPM causing cavitation during operation. The heating water lines for pumps 3 and 4 were tracked out of the mechanical room to a cabinet heater where it was confirmed that they have 2-way control valves.

B. IMEG RECOMMENDATIONS

1. VFDs could be installed to serve pumps 3 and 4 to reduce pump energy during low load operation. The triple duty valves would need to be fully opened with the addition of the VFDs.
2. Controls must be updated so that pumps 3 and 4 and pumps 7 and 8 run in lead lag operation because the piping serving each set of pumps will be sized for one pump operating at its full capacity GPM. The second pump was intended for redundancy.
3. Piping serving pumps 3 and 4 must be increased from 3" to 5" to accommodate the pump capacity of 340 GPM. Contractor to size new CV 7 to provide a pressure drop at 440 GPM of 1 to 4 PSI.
4. Piping for pumps 7 and 8 can remain 3" as this fits the 100 GPM capacity when one pump is set up for total flow.
5. Install bridge gauges across the strainer and pump for pumps 3 and 4.

6. Change bypass line to pumps 3 and 4 from 3" to 5" and install a new bypass valve.
7. The 3" pipe size downstream of pumps 3 and 4 is questionable for the 340 GPM capacity. If problems persist after the proposed changes, further investigation of the pipes downstream of pumps 3 and 4 will need to be investigated.
8. Please refer to the attached sketch of the flow diagram for further clarification.

Prepared by: Connor O'Brien and Jeff Oke

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