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## CAOLO & BIENIEK ASSOCIATES, INC.

ARCHITECTURE • PLANNING • INTERIOR DESIGN

April 2, 2018

Easthampton Public Schools  
50 Payson Avenue  
Easthampton, MA 01027

### Geothermal Analysis for Proposed School

Dear Superintendent Follansbee,

I am writing in follow up to a community question posed at the March 20, 2018 public information session regarding the decision making process followed in the selection of the high-efficiency natural gas mechanical systems over a geothermal system.

As outlined in the attached memorandum, prepared by our mechanical engineers, CES, and dated March 23, 2018, the up-front costs to install a geothermal system are significantly higher than the costs to install a high-efficiency natural gas system as currently planned for the school. Given the educational needs of the District, and the resulting scale of the preferred solution, the Building Committee has worked diligently to respond to the community's concerns surrounding the cost of the project. To that end, they have established a cap on the Total Project Budget of \$109,000,000.00. Based on our engineer's past experience, geothermal bores can be expected to cost approximately \$100,000.00 per location, and would require approximately 175 locations to support a school the size of the preferred Prekindergarten through grade 8 facility being proposed. Using these order-of-magnitude assumptions, the installation of a geothermal mechanical system can be expected up to \$2,000,000.00 in Total Project Costs for the proposed building.

Based on the efficiency of the proposed natural gas system, the pay-back period necessary to recuperate the up-front installation burden of a geothermal system is estimated at 32-48 years, which both exceeds the length of any bonding options available and approaches the 50 year life expectancy of the building. For these reasons, the Building Committee voted to pursue a natural gas mechanical system as the best option for this project.

Should you have any questions or require additional information regarding the preferred mechanical system planned for the new school building, please feel free to contact me at your convenience.

Sincerely,  
CAOLO & BIENIEK ASSOCIATES, INC.

Bertram W. Gardner IV AIA, NCARB  
Project Architect

Cc: Project File.



## Memorandum

Memorandum Date: March 23, 2018

Written To: Caolo & Bieniek Associates – Bert Gardner

Project Name: White Brook School - Easthampton

CES Project Number: 2016313.00

Regarding: Geothermal Cost Analysis/Simple Payback

Written By: Doug Lajoie

Bert,

As we are not performing the energy modeling or cost estimating for this building, the following estimates of utility consumption data and costs of construction are based on our previous experience with similar systems.

A high performing school design with conventional heating and cooling systems (as we've described within our preferred schematic design narrative) should cost the school district approximately \$2.00/sf per year for all utilities.

The typically extra first cost for a geothermal heating and cooling system is the borefield. In this schools case, the borefield would consist of approximately 175 geo-exchange bores, for a total approximate add to the project of \$1.75 million over a conventional heating and cooling system.

With a geothermal design, we've seen school districts realize an approximate 10%-15% energy savings over conventional high performing systems. In this case, the savings would equate to approximately \$36,000-\$54,000 per year for a 180,000 square foot school.

A simple payback analysis, without the cost of inflation or other factors, would be over 32-48 years.

If further analysis is required, we would suggest having the energy modeling firm finalize their energy model with all assumptions and data specific to this building and its location, etc.

Please let me know if you have any additional questions.

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