

Executive Summary

This report includes four analysis activities for Pershing Hill Elementary school; replacing the traditional roof with a green roof, installing a geothermal mechanical system, replacing the stick built masonry façade with a pre-fabricated system, and pursuing LEED certification.

A green roof would offset the additional rainwater runoff due to the new building. To equalize the amount of runoff from the new building and existing structures would require a green roof with approximately 11.5 inches of growing media, which would represent a significant structural load. This green roof would result in the existing structural members needing to be resized, an increased need for coordination between the mechanical and roof contractors, and increased schedule duration for the roofing contractor.

A geothermal system would represent a significant upfront cost, as well as impact the project schedule. The internal rate of return was found to be less than 2% and would not be expected to beat inflation. This resulted in an estimated lifecycle cost of \$271,412.27, based on a 3% annual inflation rate.

Preconstruction would have a favorable impact to the project schedule, but would have mixed effects on the constructability of the project. These effects include additional crane usage, additional coordination between the steel erector and masonry contractor, eliminating the need for scaffolding, and eliminating the need for cold weather construction techniques.

Pursuing LEED Certification would result in additional cost for Pershing Hill Elementary School. The additional initial costs of 6.8% are much higher than the literature suggested. This is partially due to a difference in methods for tabulating the costs of pursuing LEED certification.