

Westwood Public Schools
Hanlon Elementary School
Building Project
Sustainability Subcommittee

09.24.2020



Agenda

- **Geothermal: Tier 2 vs. Tier 3
Recommendation to SBC**

Life Cycle Cost Analysis – Summary

Baseline	System	Annual Elec. Cons. (kWh)	Combined Utility Cost	Annual Utility \$/s.f.	Annual kBTU/s.f. (EUI)	Combined Expense Savings*	Energy Cost Savings Percentage
IECC 2018 Baseline	1. IECC 2018 Envelope (Wall Insulation R-13 + R-7.5 c.i., Roof Insulation R-30 c.i., Windows 0.45 U-Value/0.38 SHGC, Curtainwall 0.38 U-Value/0.38 SHGC, Skylights 0.50 U-Value/0.40 SHGC) 2. IECC 2018 Mechanical Systems (System 1 - Electric Heating/Chilled Water Cooling VAV System with Terminal Fan-Powered VAV Boxes w/ Electric Reheat Coils with Water-Cooled Chiller Plant) 3. IECC 2018 Lighting System (0.81 w/s.f.) 4. Electric Domestic Hot Water Systems	1,152,200	\$230,445	\$2.04	34.75	-	-
Baseline					34.75		

Option	System	Annual Elec. Cons. (kWh)	Combined Utility Cost	Annual Utility \$/s.f.	Annual kBTU/s.f. (EUI)	Combined Expense Savings*	Energy Cost Savings Percentage
Tier 2 Design Building	1. Design Envelope (Wall Insulation R-24 c.i., Roof Insulation R-60 c.i., Curtainwall/Windows 0.35 U-Value/0.40 SHGC, Skylights 0.25 U-Value/0.40 SHGC) 2. Design Mechanical Systems (Refer to Tier 2 Option) 3. Design High-Efficiency Lighting System (0.45 w/s.f.) 4. Electric Domestic Hot Water Systems	693,790	\$138,757	\$1.23	20.92	\$91,688	39.8%
Tier 2					20.92		39.8%
Tier 3 Design Building	1. Design Envelope (Wall Insulation R-24 c.i., Roof Insulation R-60 c.i., Curtainwall/Windows 0.35 U-Value/0.40 SHGC, Skylights 0.25 U-Value/0.40 SHGC) 2. Design Mechanical Systems (Refer to Tier 3 Option) 3. Design High-Efficiency Lighting System (0.45 w/s.f.) 4. Electric Domestic Hot Water Systems	766,320	\$153,265	\$1.35	23.11	\$77,180	33.5%
Tier 3					23.11		33.5%

*Combined expense savings is the difference between the combined annual expense of the baseline and building design option.

Tier 2 vs. Tier 3 – Heating/Cooling Systems

Tier 2: Geothermal Source Heat Pump System

Approximately 80 Wells

EUI: 20.9

\$138K Annual Electrical Costs

\$3.8 M capital costs

39.8% above baseline energy model

Tier 3: Geothermal Source Heat Pump System with supplemental electric boiler

Approximately 70 Wells

EUI: 23.1

\$153k Annual Electrical Costs

\$3.7 M capital costs

33.5% above baseline energy model

100% AC and increased air-flow (gym, cafeteria are primary drivers) has increased design by 10 wells, and associated increase in geothermal costs.

Cost Comparison of Tier 2 to Tier 3: Tier 2 increased wells is offset by increased costs in electric boilers, electrical service, and increase in electrical service size in Tier 3, resulting in \$100k difference

Emergency Back-Up System

Emergency Back-Up System:

- a. Depending on final HVAC system design, an exterior 350 – 650 kW diesel stand-by generator with sound attenuated enclosure and a 48-hour reserve base mounted tank with alarms will be provided.
- b. The generator will be sized to provide power for emergency lighting, fire safety systems, heating system and circulating pumps, elevator, kitchen refrigeration, communications and security systems.
- c. The generator will also include heating and ventilation for HVAC equipment serving a portion of the main administration area (500 sf) and nurse's suite (500 sf), as well as what is required to **maintain a minimum temperature of 40 degrees F if a sustained power outage should occur.**

An electric boiler will not provide emergency back-up

A young girl with blonde hair, wearing a blue and white striped shirt and pink shorts, is sitting on a wooden staircase. She is looking down at a tablet device she is holding in her hands. The staircase has wooden treads and light blue risers. The walls are white with a white handrail. The background wall is painted yellow.

Next Meeting

Review LEED Checklist

Summarize Sustainability Project Goals