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DOVER HIGH SCHOOL - CONSTANT VOLUME GEOTHERMAL PAYBACK SUMMARY

Option	System	Gross Capital Investment*	Annual Elec. Cons. (kWh)	Annual Gas Cons. (MBTU)	Annual Electric Cost	Annual Gas Cost	Combined Utility Cost	Annual Utility \$/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	Combined Annual Expense	Combined Expense Savings**	Simple Payback (Years)***
2	1. Dehumidification displacement ventilation diffusers with perimeter hot water heating radiation 2. 100% outside air gas-fired heating/direct expansion dehumidification CV ventilating units with energy recovery 3. 100% outside air gas-fired heating/direct expansion cooling units with energy recovery with terminal chilled/hot water coil induction units 4. Gas-fired heating/direct expansion cooling VAV RTU's with energy recovery and demand ventilation controls 5. High efficiency gas-fired condensing central boiler plant 6. High efficiency air-cooled chiller plant	\$9,113,850	2,266,900	7,965.2	\$265,676	\$102,194	\$367,870	\$1.19	50.8	\$56,150	\$424,020	-	-
4A	1. Dehumidification displacement ventilation diffusers and perimeter hot water heating radiation 2. Gas-fired heating/direct expansion dehumidification VAV ventilating units with energy recovery with terminal VAV boxes with CO2 controls 3. 100% outside air geothermal hot water coil heating/chilled water coil cooling units with energy recovery with terminal chilled/hot water coil induction units 4. Geothermal hot water coil heating/chilled water coil cooling VAV RTU's with energy recovery and demand ventilation controls 5. High efficiency gas-fired condensing central boiler plant 6. Geothermal well with water-to-water source heat pump chillers with water-to-water heat exchangers	\$10,654,750	2,271,300	7,424.7	\$266,193	\$95,259	\$361,452	\$1.17	49.1	\$57,250	\$418,702	\$5,318	290

DOVER HIGH SCHOOL - VARIABLE AIR VOLUME GEOTHERMAL PAYBACK SUMMARY

Option	System	Gross Capital Investment*	Annual Elec. Cons. (kWh)	Annual Gas Cons. (MBTU)	Annual Electric Cost	Annual Gas Cost	Combined Utility Cost	Annual Utility \$/s.f.	Annual kBTU/s.f. (EUI)	Annual Maint. Cost	Combined Annual Expense	Combined Expense Savings**	Simple Payback (Years)***
2A	1. Dehumidification displacement ventilation diffusers with perimeter hot water heating radiation 2. 100% outside air gas-fired heating/direct expansion dehumidification VAV ventilating units with energy recovery with terminal VAV boxes with CO2 controls 3. 100% outside air gas-fired heating/direct expansion cooling units with energy recovery with terminal chilled/hot water coil induction units 4. Gas-fired heating/direct expansion cooling VAV RTU's with energy recovery and demand ventilation controls 5. High efficiency gas-fired condensing central boiler plant 6. High efficiency air-cooled chiller plant	\$9,421,950	2,067,000	7,790.4	\$242,255	\$99,951	\$342,206	\$1.11	48.0	\$62,550	\$404,756	-	-
4	1. Dehumidification displacement ventilation diffusers and perimeter hot water heating radiation 2. Gas-fired heating/direct expansion dehumidification VAV ventilating units with energy recovery with terminal VAV boxes with CO2 controls 3. 100% outside air geothermal hot water coil heating/chilled water coil cooling units with energy recovery with terminal chilled/hot water coil induction units 4. Geothermal hot water coil heating/chilled water coil cooling VAV RTU's with energy recovery and demand ventilation controls 5. High efficiency gas-fired condensing central boiler plant 6. Geothermal well with water-to-water source heat pump chillers with water-to-water heat exchangers	\$10,962,850	2,109,400	7,123.8	\$247,223	\$91,399	\$338,622	\$1.10	46.3	\$63,650	\$402,272	\$2,484	620

* Gross capital investment based upon in-house cost estimate utilizing cost data from similar past projects and industry standard estimating references. Costs have been estimated for system comparison purposes only and do not necessarily incorporate all supplemental/independent HVAC system costs which would be required for all systems studied (i.e. kitchen exhaust, saltport HVAC systems, overhead and profit).

** Combined expense savings is the difference between the combined annual expense of the baseline and system in comparison.

*** Simple payback years is calculated by dividing the capital investment increase of the option divided by the annual cost savings of the option in comparison to the baseline.

Note 1: Values based on energy model performed for HVAC System Life Cycle Cost Analysis purposes. A 30% safety factor should be applied for budgeting purposes to account for potential variances to the actual operation of the building. Per ASHRAE Standard 90.1-2010:

Neither the proposed building performance nor the baseline building performance are predictions of actual energy consumption or costs for the proposed design after construction. Actual experience will differ from these calculations due to variations such as occupancy, building operation and maintenance, weather, energy use not covered by this procedure, changes in energy rates between design of the building and occupancy, and the precision of the calculation tool.