Jonathan Cann

Mechanical Option

Advisor: Dr. Treado

Thesis Presentation Outline

Introduction (1 slide)

Building Overview (1 slide)

Existing Conditions

- Architectural (3 slides)
  - Spaces
  - Floors
  - Orientation
- Mechanical System (3 slides)
  - System layout
  - System details

Proposed Alternative (2 slides)

- Depth: Ground Source Heat Pump (6 slides)
  - Design and Assumptions
  - Layout
  - Pump/ condenser units
- Breath: Construction Management (4 slides)
  - Schedule Impact
  - Site Layout
  - Cost Analysis
- Breath: Acoustics (1 slide)

Energy Comparison

- LEED (1 slide)
- Payback Period (1 slide)

Conclusion (1 slide)

Acknowledgements (1 slide)

Discussion Slides (x slides)

Total= 25 slides

ELEMENTARY SCHOOL ONE

TOWN, MARYLAND

Jonathan Cann
Mechanical Option
MAE/BAE

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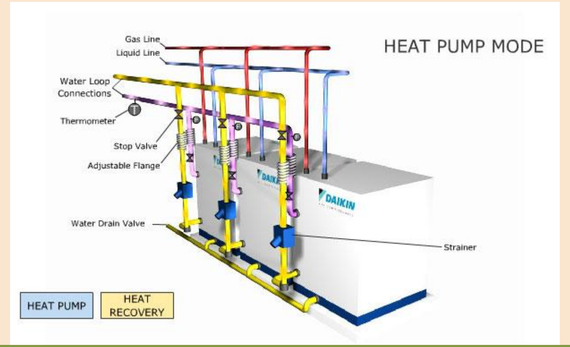
Presentation Outline

Introduction
Building Overview
Existing Conditions
Proposed Alternative
- Mechanical Depth
- Construction Breath
- Acoustical Breath

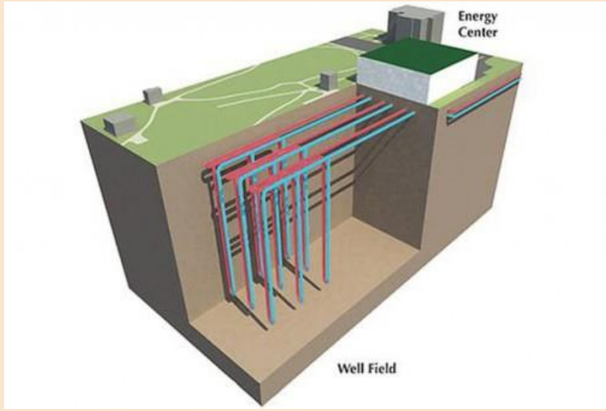
Energy Comparison
Conclusion
Acknowledgements

Ground Source Heat Pump

Replace the air-cooled VRF condensers to water-cooled condensers.



Couple the water-cooled condensers with a closed loop ground source heat pump.



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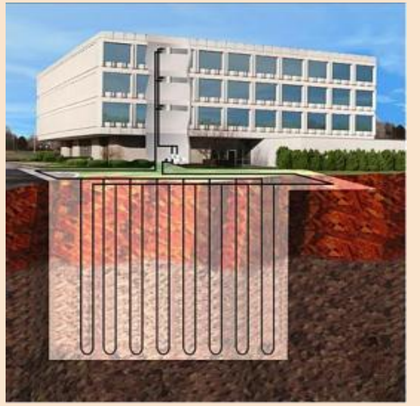
Ground Source Heat Pump

Water-cooled VRF Condenser coupled with ground source heat pump.

- Cooling Load =1,930,000 BTU/h
- Heating Load= 1,100,000 BTU/h
- Well Length = 33,700 ft
- Well Depth= 400 ft
- Number of Wells= 85 wells
- Total Flow = 480 gpm
- Well Flow= 5.65 gpm

	Water			Refrigerant			Air	
	Tin	Tout	GPM	Tin	Tout	GPM	Supply	Return
Cooling	74	83	480	76	50	280	53-55	78-80
Heating	44	36	480	105	89	280	78-81	68-70



	Cooling	Heating
Qa	240,500	275,000
Rga	0.23	0.23
Qlc	1924000	1100000
Wc	75,000	75,000
Rb	0.14	0.14
PLFm	1	1
Rgm	0.14	0.14
Rgd	0.12	0.12
Fsc	1.05	1.05
Tg	54	54
Twi	74	44
Two	83	36
Tp	2	2
	732624.5	406015.5
Length	27646.20755	33834.63

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Site Layout

85 wells @ 15ft spacing = 15,020 ft62
Spaced used = 19,125 ft^2
6.5 in SDR 11 pipe