



earthtech

geothermal heating and cooling - water wells - site utilities

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# History of Earth Tech

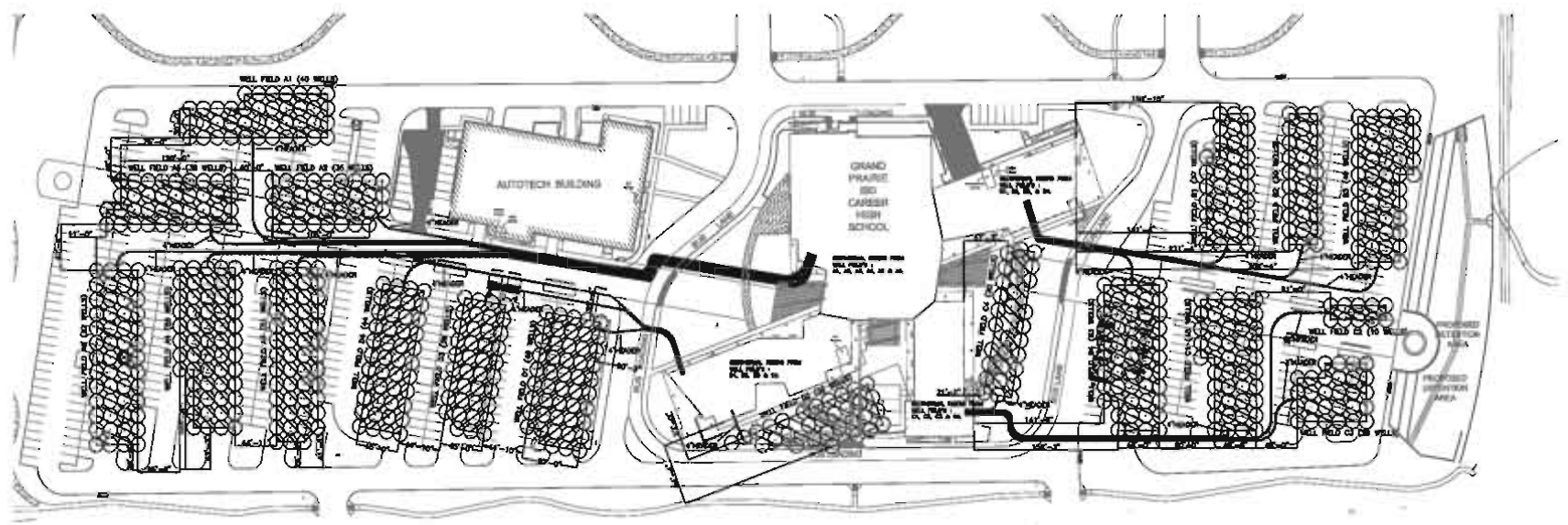
Earth Tech was started in 2003 by Jimmy Gaffney and Bret Delisle. Earth Tech is located in Frisco, Texas about 30 miles north of Dallas in a high growth area. The Geothermal division consists of 9 drill rigs, 3 grout machines, 2 purge trailers, 3 excavators, and 6 backhoes. Nearly all work for Geothermal Systems is completed for school districts in the Dallas/Fort Worth area. Earth Tech has worked for a variety of School Districts, General Contractors, and Mechanical Companies that would all give high recommendations. Earth Tech has also been ranked two consecutive years in the Dallas 100 (Top 100 fastest growing privately owned business in the Dallas area) that is put on by Southern Methodist University. Earth Tech is a member of IGSHPA, TREIA, Driller Licensed/Certified, Installer Certification, and Fusion Certification.

**All piping used in Geothermal Systems  
is DR11 HDPE fusion welded**



# Middle School Well Field Locations





1 MECHANICAL GEOTHERMAL WELL FIELD PLAN  
1" = 30'

REVISIONS	
NO.	DATE
1	7/2/06
2	
3	
4	
5	
6	
7	
8	
9	
10	



**BERGER ENGINEERING COMPANY**  
 AIR CONDITIONING CONTRACTORS  
 10800 SHADY TRL. DALLAS, TEXAS 75220 (214) 358-1451 FAX 351-2854

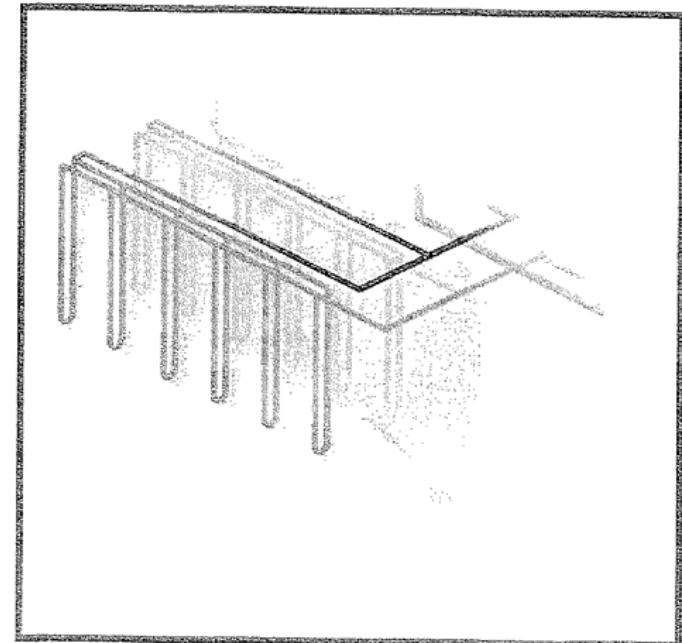
<b>PROJECT</b>	<b>GRID FILE NO.</b>	<b>SCALE:</b> 1" = 30'
GPISD - CAREER HIGH SCHOOL		DRAWN BY: HJLVV
GRAND PRAIRIE INDEPENDENT SCHOOL DISTRICT		CHECK BY:
GRAND PRAIRIE, TEXAS		APPROVED BY:
<b>CONTRACTOR:</b>	<b>DESCRIPTION:</b>	<b>JOB NO.:</b>
BERGER ENGINEERING COMPANY	GEOTHERMAL WELL FIELD PLAN - MECHANICAL	06-020
<b>SHEET NO.</b>		
<b>GWF-1</b>		
<b>DATE:</b> 7/2/06		

# Preferred Well Field Design

## ✦ Vertical Wells

### ✦ Advantages

- ✦ Requires least amount of Land
- ✦ Least amount of total piping
- ✦ Least amount of Pumping Energy - less than 25 feet of head.
- ✦ More Consistent Ground Temperature versus Horizontal Well Fields
- ✦ Well Field square footage similar to square footage of space being conditioned.



# Drilling 250 Foot Geo Wells on a 499 Well Project



# Well Field (Closed Loop System) manifold 4 foot below future parking lot, sand imbedded, and compacted



# Well Field (Supply and Return) with reverse return



# Pressure Test Each Field to 100 PSI to Ensure Integrity Prior to Backfill



# Locate Disks are Placed on Each Corner of Field along with Ditch tape for Protection and Future Verification of Well Field



# Well Field Under Parking Lot



# Medrano MS, Dallas ISD



04/21/2009

# All Purge Assemblies and Manifolds Shop Fabricated



# Purge Assemblies Mounted Inside Building



# Inside Piping Supported by V-Bottom Hangers, Placed in a V-Track with Non-Potable Water Stickers

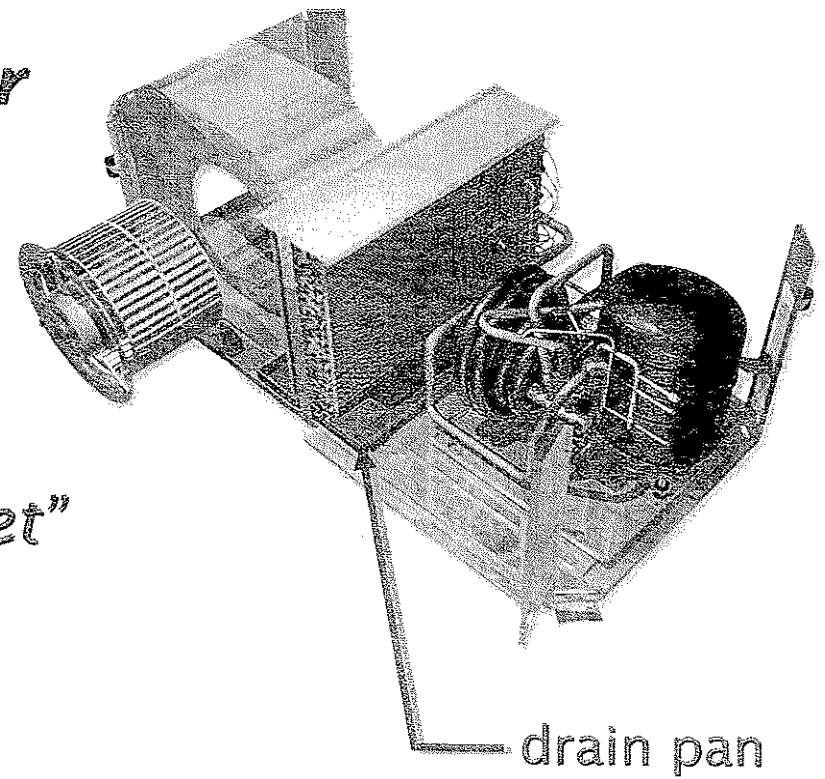


# Heat Pump with Circulating Pump Kit

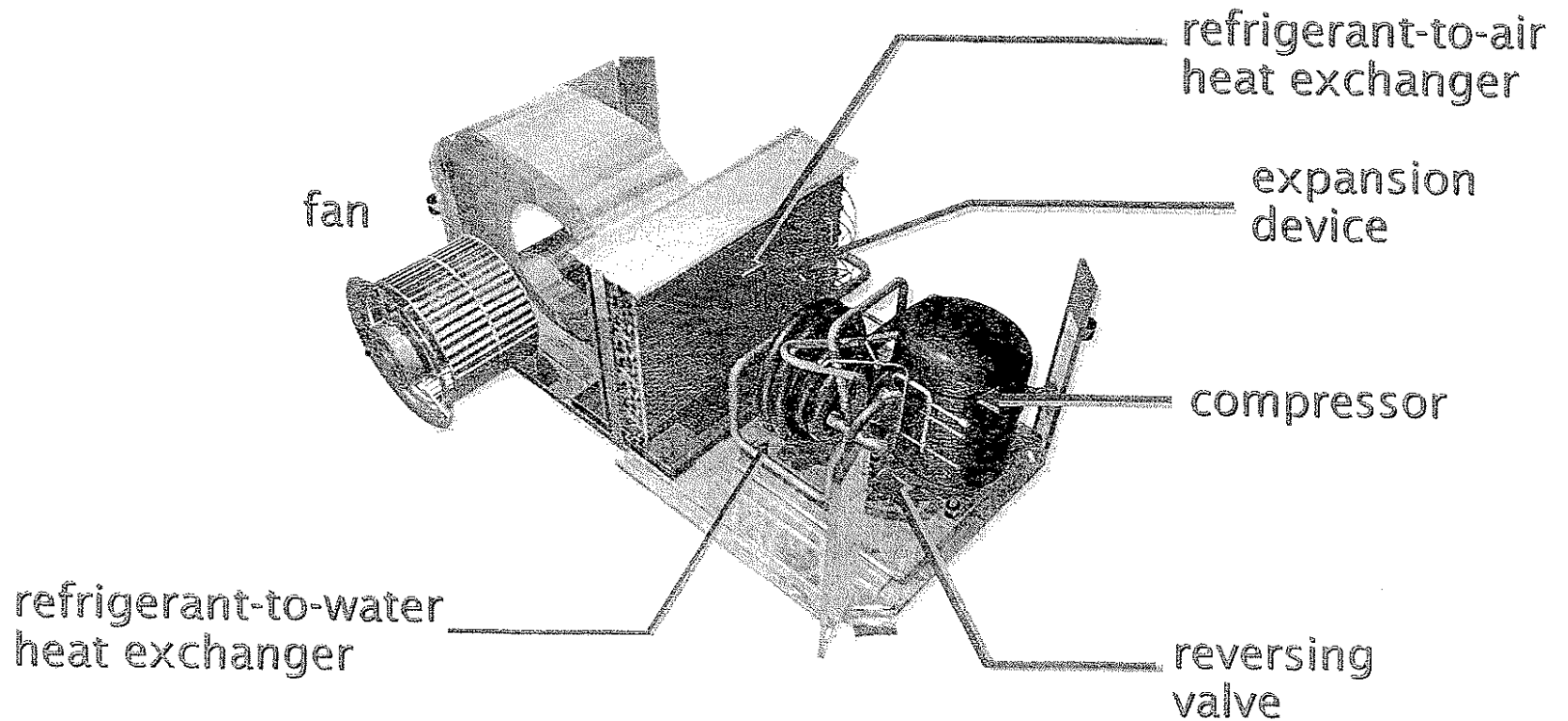


# Geothermal Heat Pumps

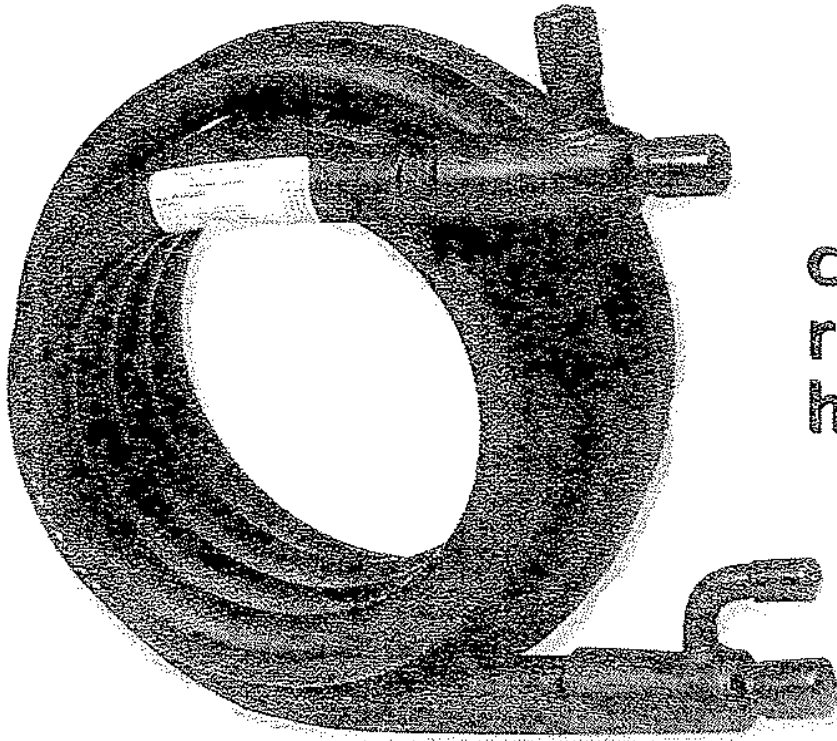
- ✦ *Inspect and replace filter*
- ✦ *Inspect and clean...*
  - ✦ *Drain pan*
  - ✦ *Refrigerant-to-air heat exchanger*
  - ✦ *Internal surfaces in “wet” section*
  - ✦ *Fan*



# Components of a GHP

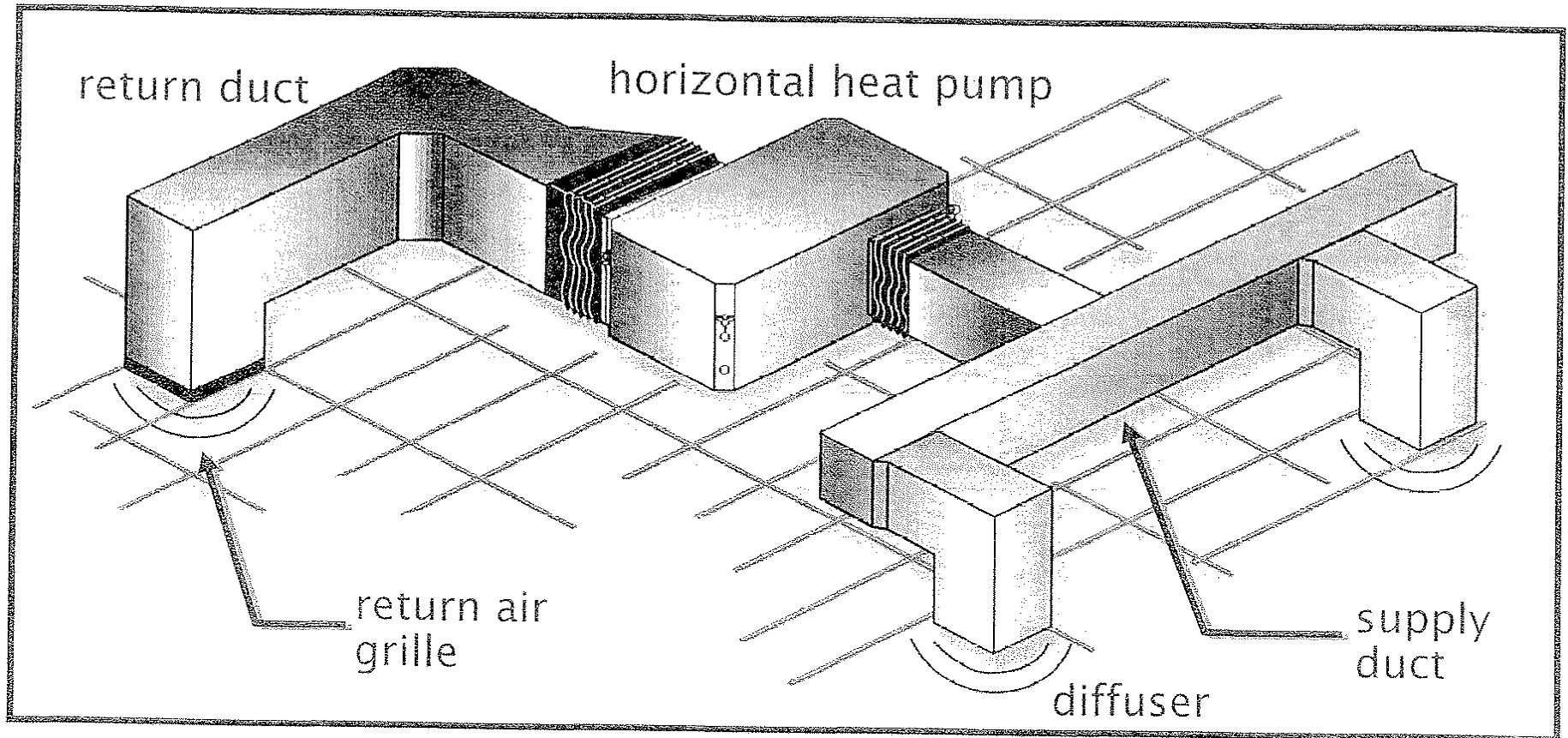


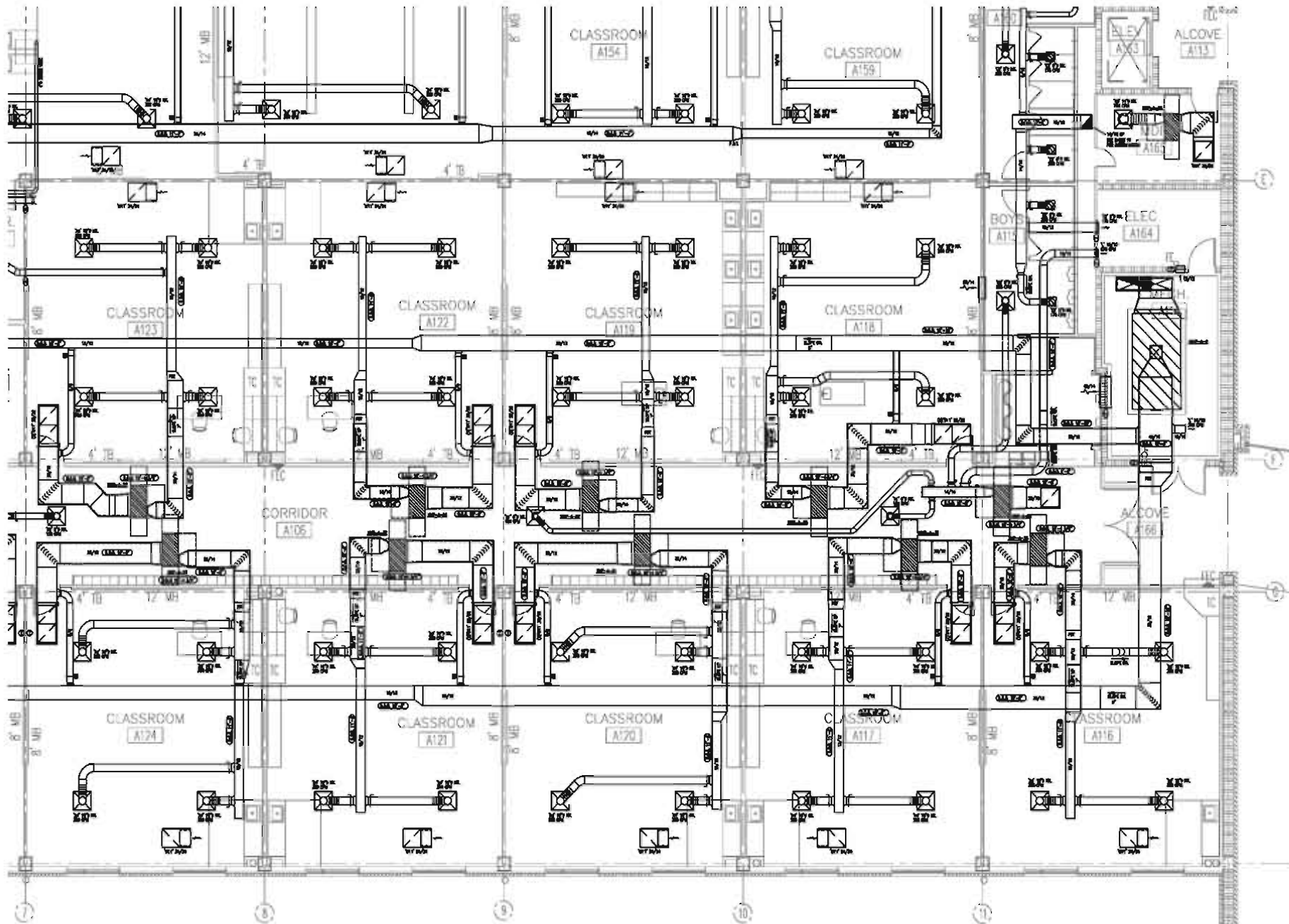
# Refrigerant To Water Heater Exchanger



coaxial  
refrigerant-to-water  
heat exchanger

# Typical Classroom Air Distribution





1 FLOOR PLAN - AREA 'A' - 1st FLOOR - MECHANICAL  
1/4" = 1'-0"

GENERAL NOTES:  
1. ALLOW 12" FROM END OF TRUNK TO LAST TAP.



NO.	DATE	REVISIONS



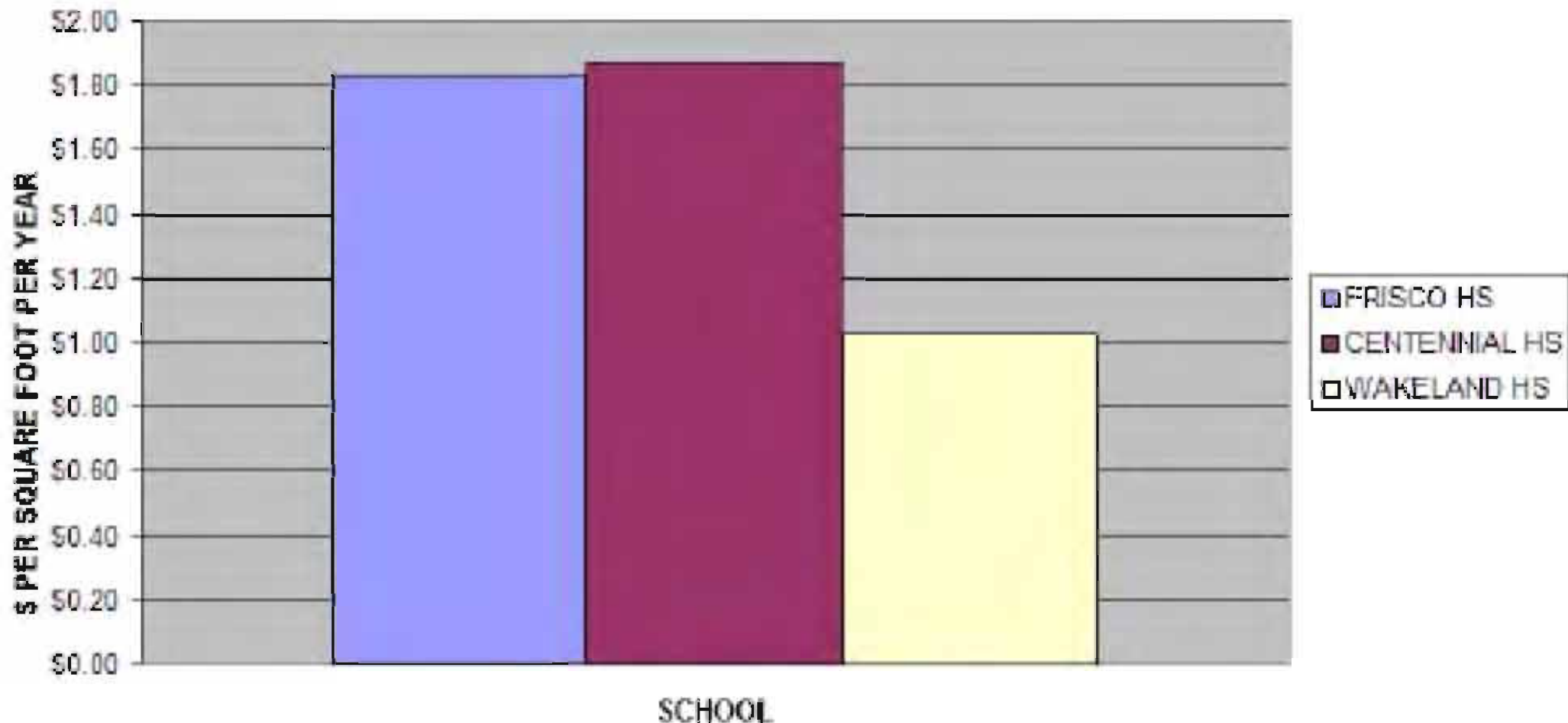
**BERGER ENGINEERING COMPANY**  
 AIR CONDITIONING CONTRACTORS  
 10840 SHADY PINE, DALLAS, TEXAS 75220 (D14) 308-4431 FAX: 301-2884

PROJECT	CAD FILE NO.
EAGLE MOUNTAIN MIDDLE SCHOOL #5	SCALE: 1/4" = 1'-0"
EAGLE MOUNTAIN - SAGINAW ISD	DRAWN BY: DJW
CONTRACTOR:	CHECK BY:
DESCRIPTION: FLOOR PLAN AREA 'A' - 1st FLOOR - MECHANICAL	APP'D BY:
	JOB NO. 08-008

SHEET NO.  
**M-3**  
DATE: 6-24-08

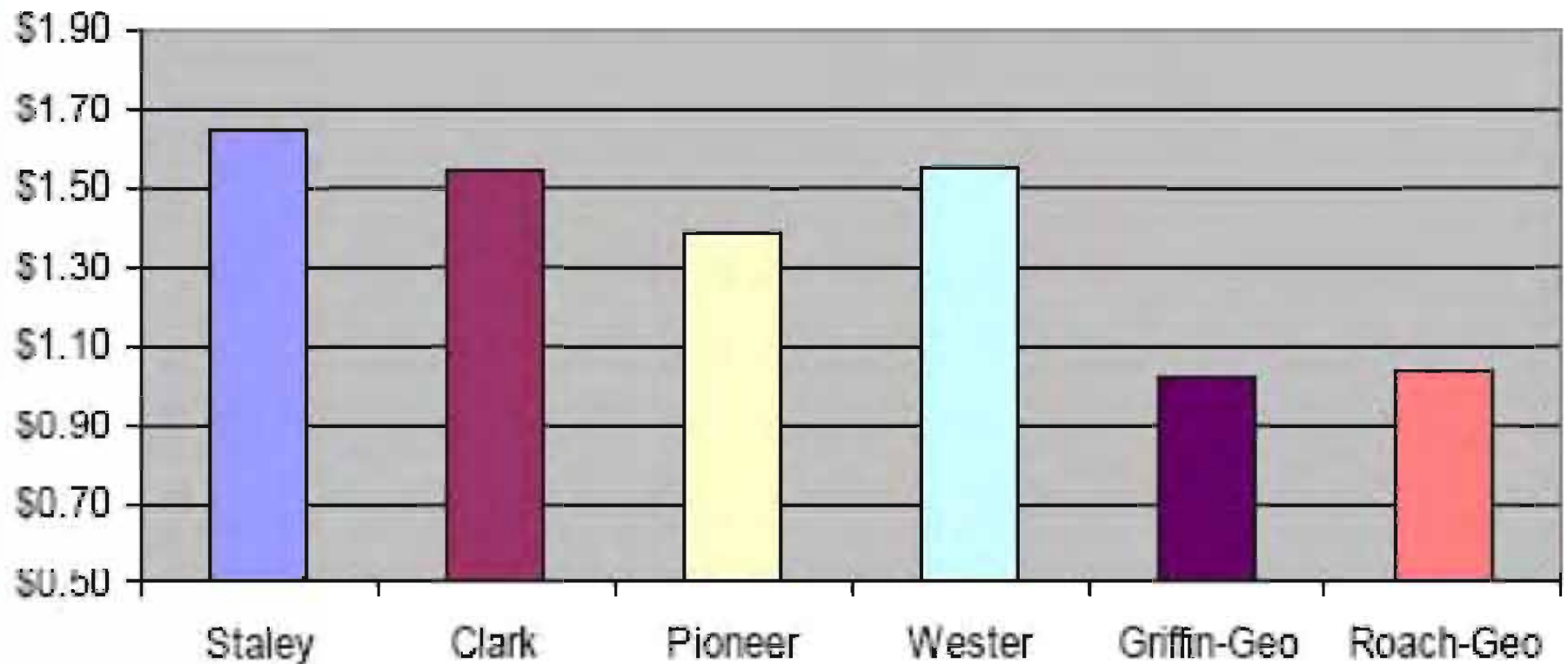
# FRISCO ISD HIGH SCHOOLS COMPARISON - YEAR 2006

FRISCO ISD HIGH SCHOOL COMPARISON - 2006 CALENDER YEAR



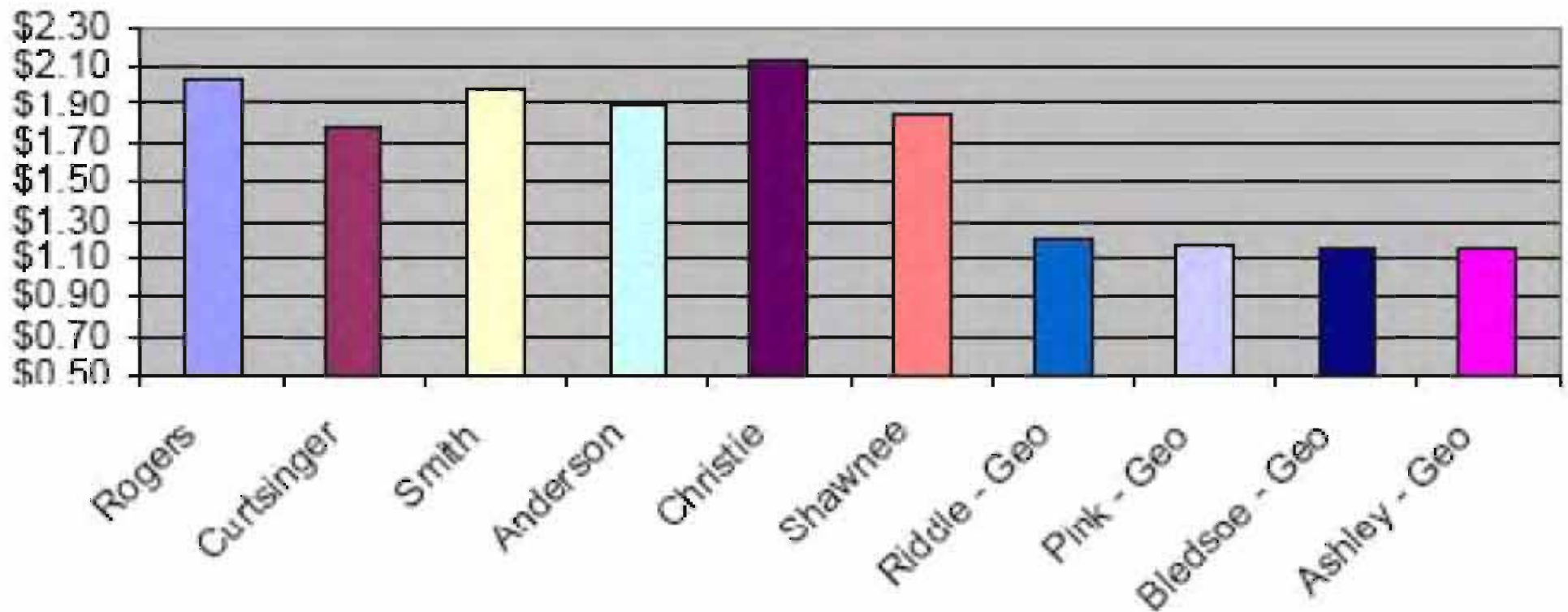
# FRISCO ISD SCHOOLS COMPARISON - YEAR 2005-2006

MIDDLE SCHOOL ANNUAL  
UTILITY COST COMPARISON - \$ / SQ FT



# FRISCO ISD ELEMENTARY SCHOOLS COMPARISON - YEAR 2005-2006

ELEMENTARY SCHOOL ANNUAL  
UTILITY COST COMPARISON - \$ / SQ FT



# New Installations

- Economical / Sustainable Solution
- Multi-story Buildings
- Efficient Solution for Electric Only Sites
- Provides Maximum Roof / Envelope Integrity
- Flexible for Future Renovations / Additions

# Retrofit Capability

- Multi-Storage Buildings – Hybrid Solutions
- Efficient Solutions for Electric Only Sites
- Adaptation to existing RTU or Multi-zone System
- Coordinate with Re-roofing Projects to Provide maximum Roof/Envelope Integrity

# Benefits of Geothermal Heat Pumps

- Environmentally Friendly
- Economical
- Efficient – Multiple Wells per Site, Same first costs as a central plant – 30 to 40% less energy costs, dedicated unit and pump per zone or classroom
- IAQ Friendly – Increased latent capacity improved humidity, control versus RTU's
- No Water Treatment or Exterior Equipment

# Intangibles of a Geothermal System

- Simple Individual Space Control
- No Exterior Equipment – Vandalism / Hail Damage / Roof Leaks
- Performs Both Cooling and Heating Efficiently – Heating Supply Air 100° F+
- Flexibility and Reliability
- Well Field 50+ Year Solution
- Unit Failure does not Effect Rest of System
- 600+ Schools in the U.S. – Not an Experiment

# Economy and Cost

- As the economy has changed the initial installation cost have come more in alignment with the installation cost of conventional systems in the commercial market. These findings are based on rising prices of petroleum products and steel along with the slowing economy causing competitive equipment prices to drop overall cost. The market demand on experienced geo installers is more easily being met also driving down installation cost.

## Conventional HVAC vs Geo Thermal HVAC Cost Comparison

Project Number	Project Use	Project Sq. Ft	Net Tons	CFM	Sq. Ft. / Ton	CFM / Sq. Ft.	Gross Est.	Est. Cost Per Ft.	System Type	Date
06-003	Middle School	169,805	530	183,950	320	1.08	\$3,100,000.00	\$18.25	Conventional	2007
07-013	Middle School	169,169	522	205,570	324	1.22	\$3,900,000.00	\$23.00	Geo Thermal	2008

## Geo Thermal Estimated Installation Cost

07-051	Elementary School	55,841	266	92,925	210	1.66	\$1,500,000.00	\$26.86	Geo Thermal	
07-017*	Elementary School	92,020	398	127,000	231	1.37	\$2,000,000.00	\$21.73	Geo Thermal	
08-008	Middle School	152,457	505	186,656	302	1.22	\$3,750,000.00	\$24.59	Geo Thermal	
07-018*	Elementary School	92,020	398	127,000	231	1.37	\$2,000,000.00	\$21.73	Geo Thermal	
08-045	Middle School	145,000	506	165,900	286	1.14	\$3,200,000.00	\$22.06	Geo Thermal	

1) Estimated Installation Cost are HVAC Only.

2) \* Denotes Schools that HVAC Cost Did Not Include Controls.

3) Estimated cost reflected in this example are for demonstration purposes only. The reflected cost are intended for budget purposes only.

# What Can You Expect From a GS-System?

- **Savings** GS-Systems can cut your home heating costs as much as 60 percent in the winter, reduce your home cooling costs up to 25 percent in the summer, and provide hot water for normal household use.
- **Conservation** GS-Systems work with the environment by utilizing the earth's moderate temperature to heat your home in the winter and cool your home in the summer.
- **Cleanliness** GS-Systems, a clean alternative for heating and cooling, help preserve nature. GS-Systems minimize the present environmental problems like acid rain, air pollution or the destruction of the ozone layer.
- **Durability** GS-Systems last longer than conventional systems because they are self-contained systems housed entirely within your home and underground. These systems are sheltered from the extreme outside weather conditions that conventional systems must endure.
- **Low Maintenance** GS-Systems are not prone to breakdowns after frequent use like some conventional systems. Similar in concept to a refrigerator, a GS-System has few moving parts subject to breakdown. The heat exchanger in a GS-System, which transfers heat to and from the earth, is made of engineered plastic. It can operate efficiently fifty years after installation.
- **Low Noise** Aside from cool relief and warm comfort, a GS-System will offer no additional clues to its hard work. GS-Systems have no noisy, rattling units to disturb your family or neighbors. Without these loud reminders, you may even forget your GS-System is there.

# THANK YOU FOR YOUR TIME

Thank you for taking the time to look at this presentation regarding a Geothermal System. Earth Tech looks forward to working with you installing Geothermal Systems in becoming a leader in LEED, being green, and energy efficiency.

Earth Tech  
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