

**Energy \$mart Schools
at the**

**West Hawaii
Explorations Academy**



Our School

- **A public charter high school**
- **120 students-8th thru 12th grade**
- **Project driven curriculum**

Our School - Cont.

- **Main Emphasis :**

- **Ocean Science**

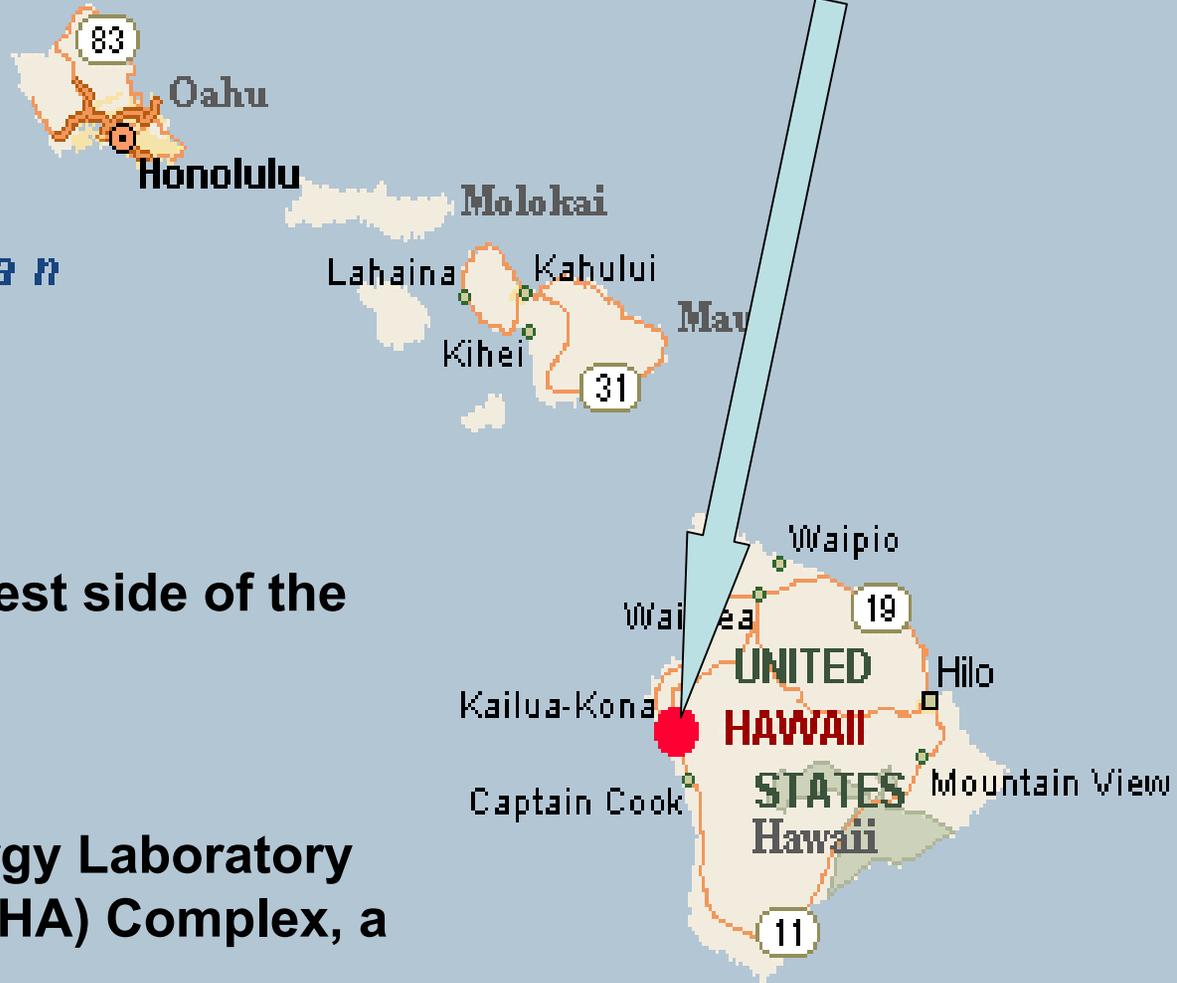
- **Plant Life Studies**

- **Alternative Energy**



Location

Pacific Ocean



- On the Ocean on the west side of the Big Island of Hawaii.
- Part of the Natural Energy Laboratory of Hawaii Authority (NELHA) Complex, a research park

Naturally Occurring Features

- **Most sunshine of any coastal location in the U.S.**

 - **Ideal location for photo-voltaic system.**

- **Availability of Warm and Cold seawater**

 - **Unique air conditioning system**

- **School is mostly outdoors due to average annual high temperature variation of only 5 degrees F**

What was Learned

- Worksheets used to practice calculating volts, amps, Kilowatt Hours.
- Built several electric circuits: buzzer, series and parallel lighting, electric motor.
- Learned to survey home energy usage.
- Analyzed electrical usage of a commercial building.

Electrical Savings Achieved

- **New refrigerator**

- 2200 kwh > 500 kwh annually

- 2 year payout

- **Computer turn off program**

- Non School Hours saves 30% of annual electric usage

- **Low pressure compressor**

- Replaced with more efficient motor.

- Saves 6% per year.

Dissemination Activity

- **Tours**
 - 3000 grade school students visit on field trips
 - **Guests of NELHA**
 - **Parents**
 - **Adult visitors from schools and businesses**
- 
- A group of children in red shirts are gathered around a large, colorful display case. The display case is decorated with illustrations of marine life, including a jellyfish, a crab, and a fish. The display case is placed on a wooden table. In the background, several people are sitting on a bench under a blue canopy. The setting appears to be an outdoor educational area.

Dissemination Activity – Cont.



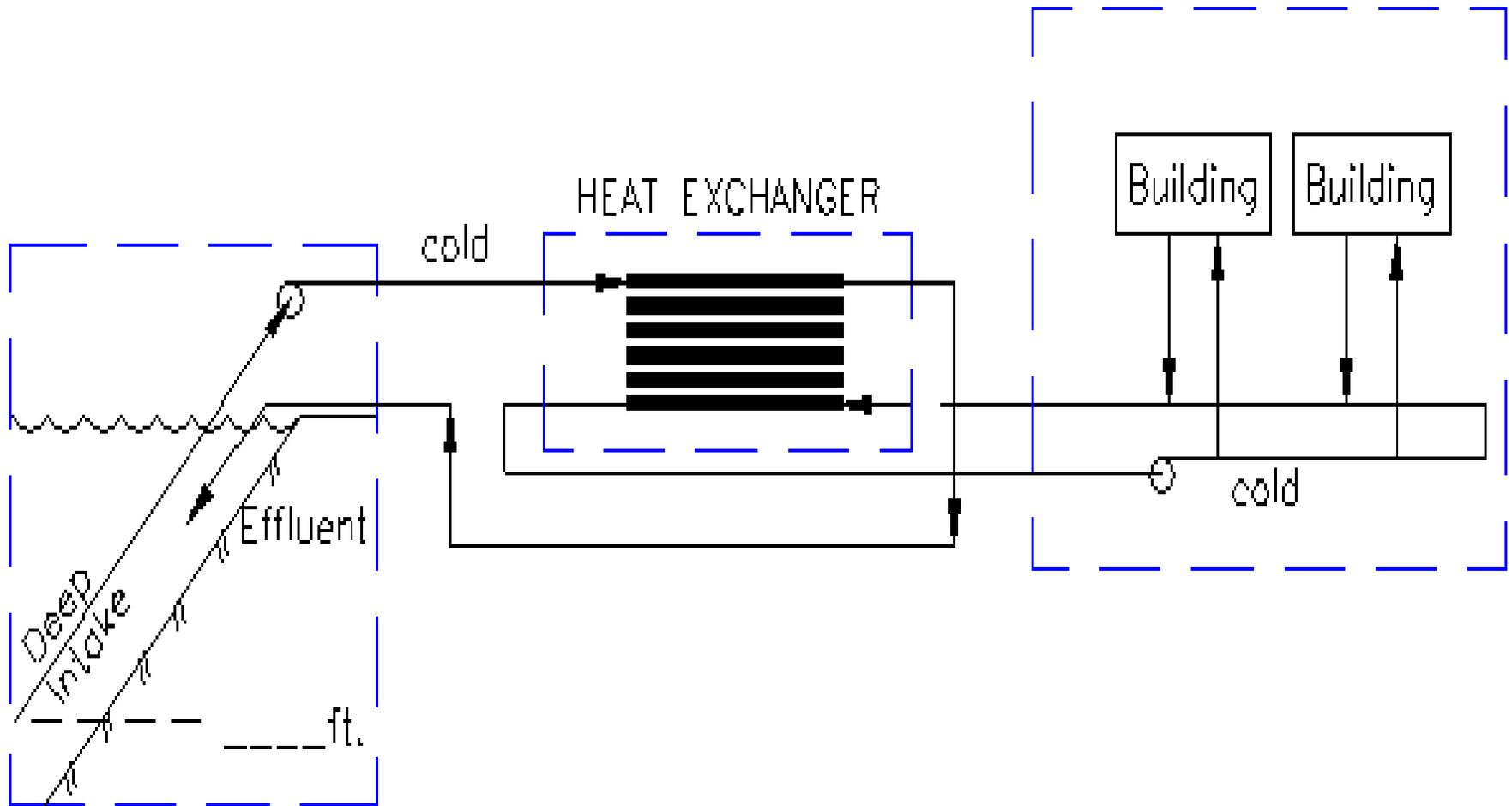
Unique Approach to Air Conditioning

- Seawater available at 45 degrees F.
from offshore depth of 2000 feet.**

Section of Cold Seawater Supply Line



Cold Seawater Air-Conditioning



Unique Approach to Air Conditioning - Cont.

- Air conditioned 10,000 square foot
NELHA building**
- Saves \$4,000 per month**
- Research done for use at new
school location**

Deep Seawater Cooled Drinking Fountain



Photo Voltaic System at WHEA

- 10 KW system
- Avg. output = 50 KWH per day AC
- Supplies 110 percent of school needs at peak hours
- Ideal use of PV: School's needs tend to rise and fall with the sun.
- Excess generated "sold" back to utility

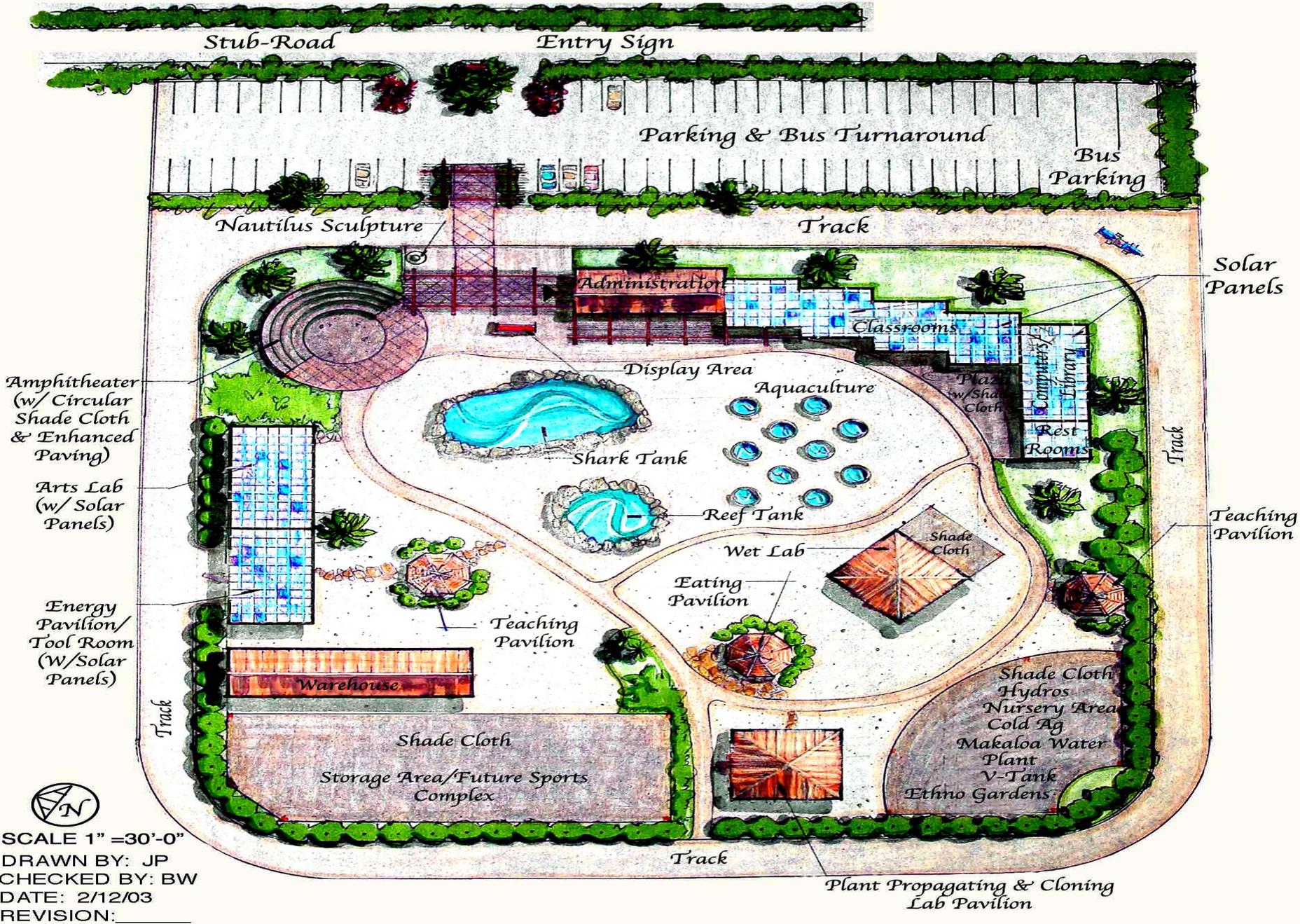
Photo Voltaic System at WHEA



Future Plans

- **School to be Re-built at New Site**

WHEA PRELIMINARY SITE PLAN



Future Plans – Cont.

- **Energy Efficient Equipment**
- **PV system is portable**
- **Plans include Daylighting of buildings**

Daylighting



Future Plans – Cont.

- **Seawater Air Conditioning**
- **Alternative Energy Studies Continuing**

