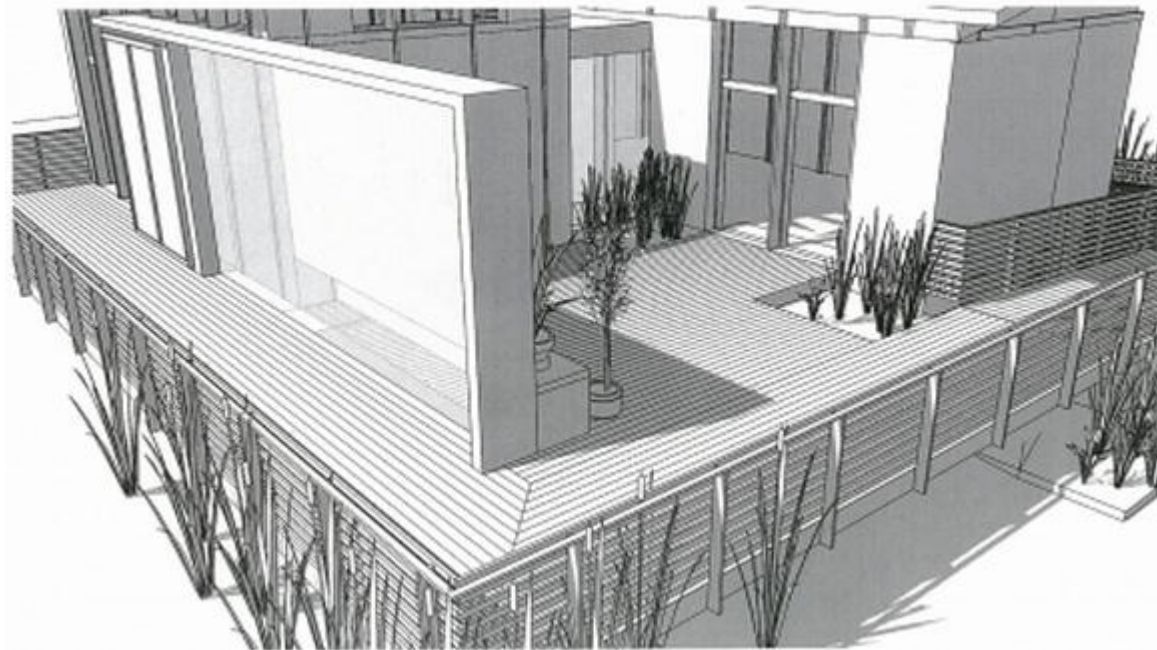# SOLAR DECATHLON
UNIVVERSITY OF MARYLAND
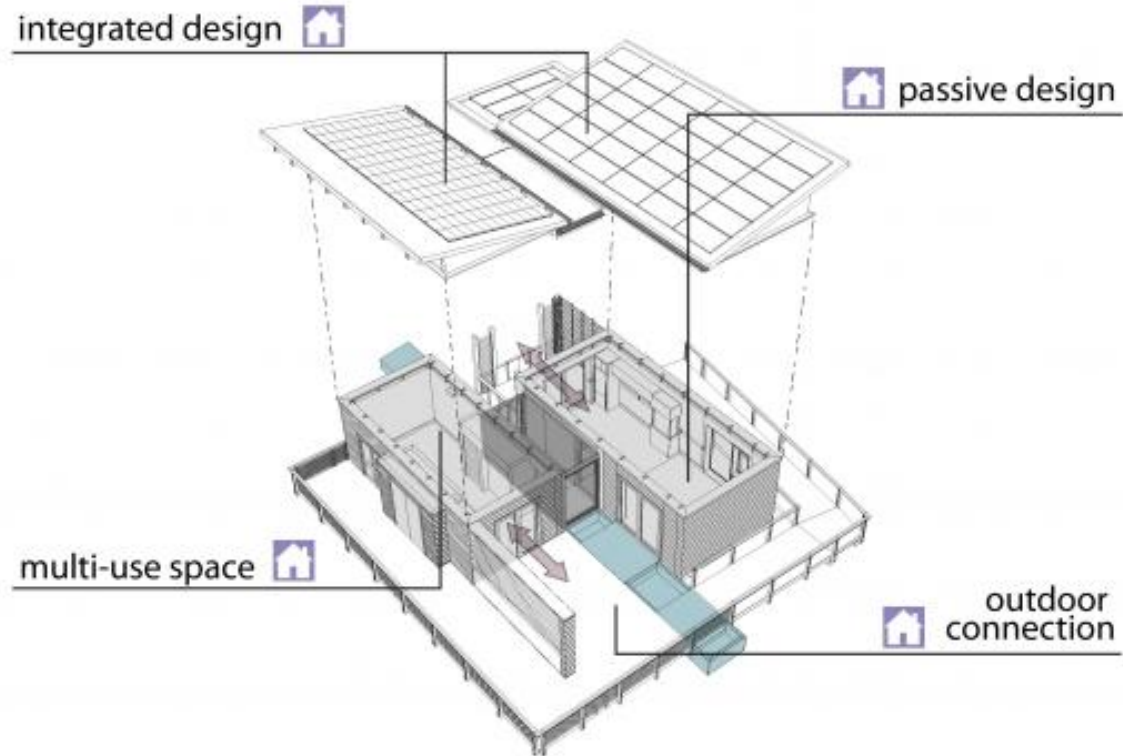# WATER SHED HOUSE

STRATEGY

"Water Shed is a solar-powered home inspired and guided by the Chesapeake Bay ecosystem, interconnecting the house with its landscape, and leading its dwellers toward a more sustainable lifestyle."
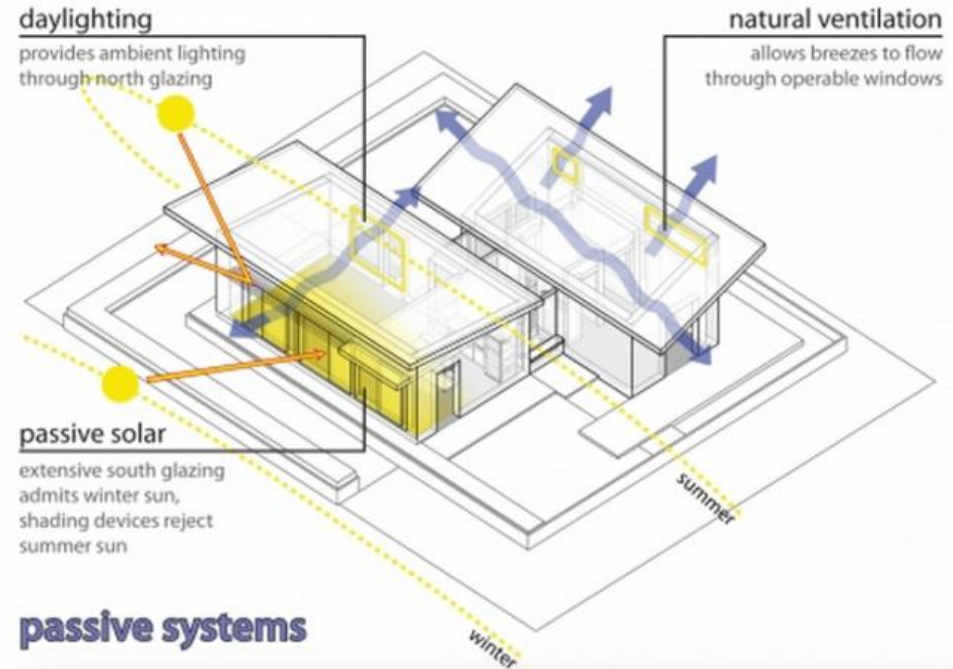
ARCHITECTURE

- **North volume**
 (living room+kitchen)
- **South volume**
 (Bedroom+office)
- **Intermediate volume**
 (Bathroom+hallway)

- **Roof**
 (solar panels+green roof)

- **Exterior decks**

integrated design

passive design

multi-use space

outdoor connection
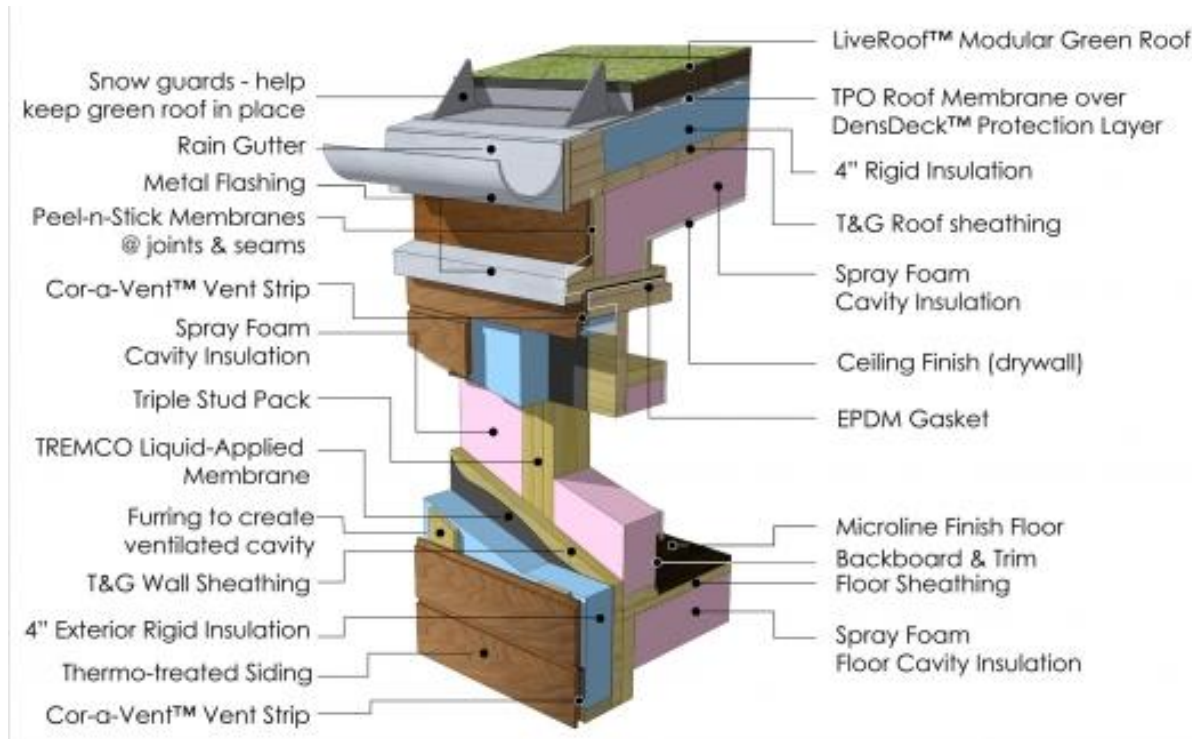
SUSTAINABLE DESIGN

- Shifted modules.
- Clerestories
- Openings on opposite sides (Natural ventilation)
- Passive solar

daylighting
provides ambient lighting through north glazing

natural ventilation
allows breezes to flow through operable windows

passive solar
extensive south glazing admits winter sun, shading devices reject summer sun

summer

winter

passive systems

STRUCTURE /ENVLOPE

Snow guards - help keep green roof in place
Rain Gutter
Metal Flashing
Peel-n-Stick Membranes @ joints & seams
Cor-a-Vent™ Vent Strip
Spray Foam Cavity Insulation
Triple Stud Pack
TREMCO Liquid-Applied Membrane
Furring to create ventilated cavity
T&G Wall Sheathing
4" Exterior Rigid Insulation
Thermo-treated Siding
Cor-a-Vent™ Vent Strip

LiveRoof™ Modular Green Roof
TPO Roof Membrane over DensDeck™ Protection Layer
4" Rigid Insulation
T&G Roof sheathing
Spray Foam Cavity Insulation
Ceiling Finish (drywall)
EPDM Gasket
Microline Finish Floor
Backboard & Trim
Floor Sheathing
Spray Foam Floor Cavity Insulation

STRUCTURE

- Triple 2"x6" wood stud framing @ 4' on center.
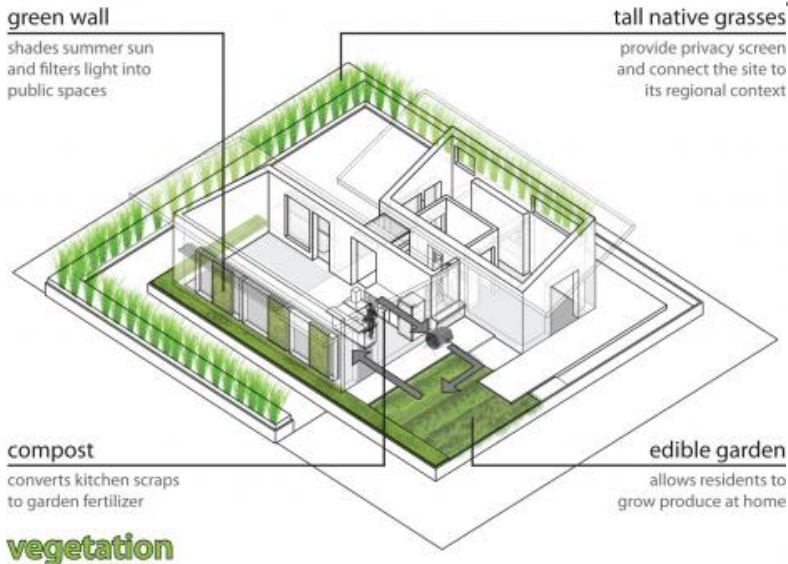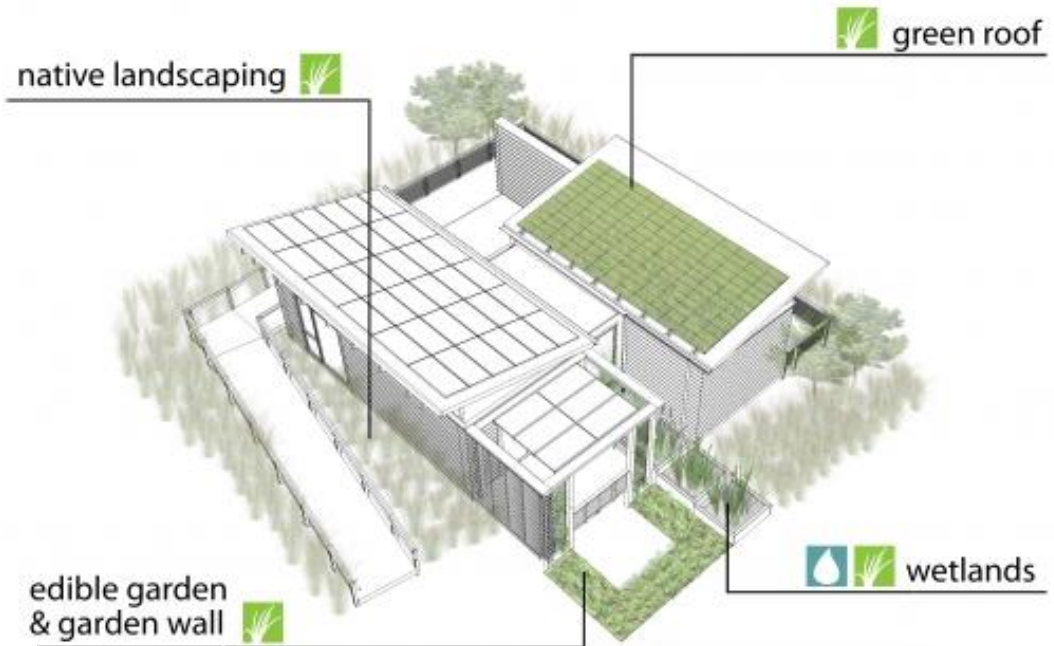- 3 separate module make up the complete Structure.

ENVELOPE

- Tongue-and-groove sheathing
- Soy-based spray foam insulation
- Liquid-applied air and water barrier
- Extruded polystyrene rigid insulation
- High-performance windows and doors:
- Translucent insulated panels
- Thermo-treated wood clad walls

LIVING SYSTEMS

Constructed Wetlands

• Filters gray water from the house and rain water to be slowly released into Surrounding landscape.

green roof

native landscaping

wetlands

edible garden & garden wall

green wall
shades summer sun and filters light into public spaces

tall native grasses
provide privacy screen and connect the site to its regional context

compost
converts kitchen scraps to garden fertilizer

edible garden
allows residents to grow produce at home

vegetation

Green Roof

- Act as an insulation by reducing roof temperature
- Protect roof from weather and radiation
- Filter pollutant from air.

Vertical garden

- Provide shading in summer.
- Filter air from particulate and pollutant.

TECHNOLOGIES

Solar Panels with Microinverters

- The photovoltaic array converts sunlight into electricity, which is used throughout the house to run everything from the air conditioners, lighting, and appliances down to water pumps and the garbage disposal.
- Microinverters transforming DC to AC which maximizes the efficiency of each individual panels.

Liquid Desiccant Wall

- a high-saline liquid solution draws humidity from the air.

Solar Thermal wall

- Uses heat from the sun to heat-up water for WaterShed needs.