

Quiz #2

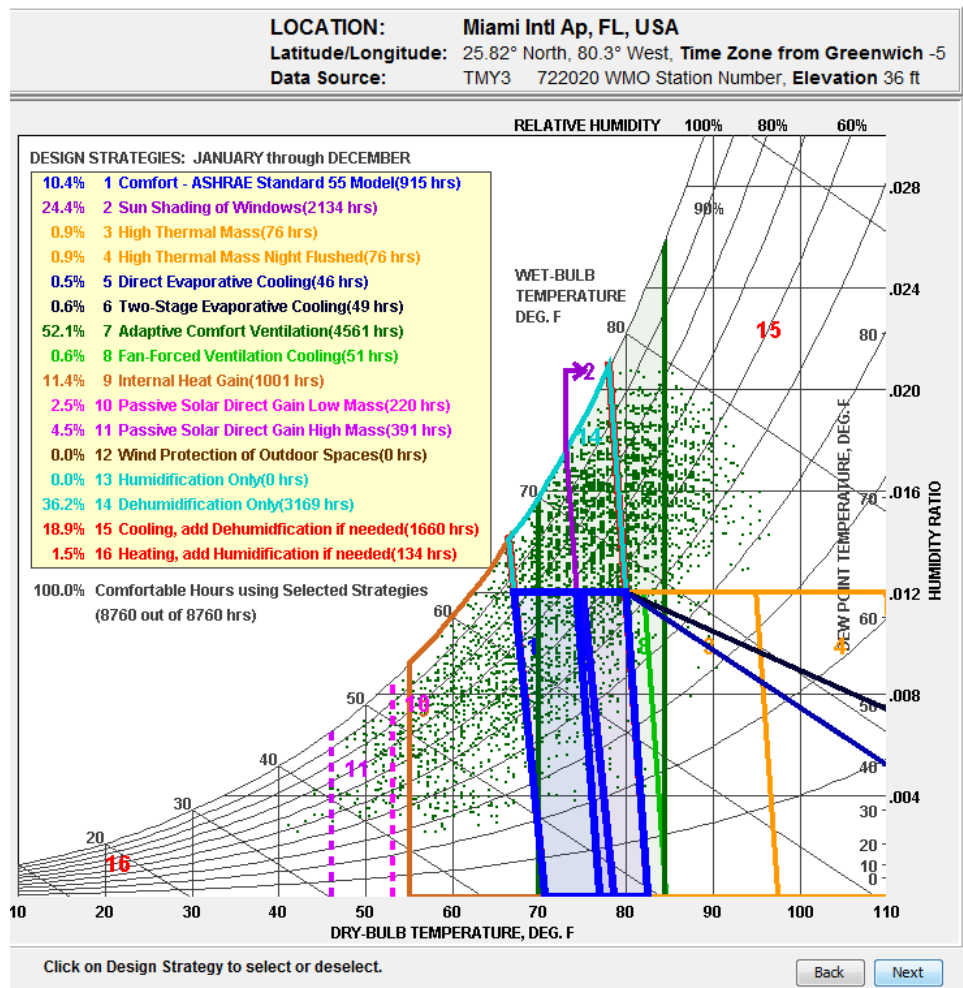
# "Affordable, Sustainable?"

For this problem you are the passive design consultant for a community group that wants to build a new affordable, sustainable homes in Miami, Florida. They are fascinated with the work of the Apan Housing Laboratory in Apan, Mexico. They've selected a model that they would like to replicate, House #26 described on page 3. Your role is to analyze House #26 and to suggest subtle changes to improve its passive performance in its new climate.

**Miami Context.** A flat, barren site on the corner of NE 17th St and NE 2nd Ave that was formerly 3 blocks of residential has been donated to the project. The site is 750' x 300' with site boundaries running true N-S and E-W.

**Climate Context.** For a naturally ventilated house in Miami indoor comfort can be attained almost 100% of the time by using the proper passive strategies described below. The wind wheel for March through October (critical cooling months) is on page 2.

## READ EVERY-THING FIRST!







## Apan House #26

Tactic-A Architects

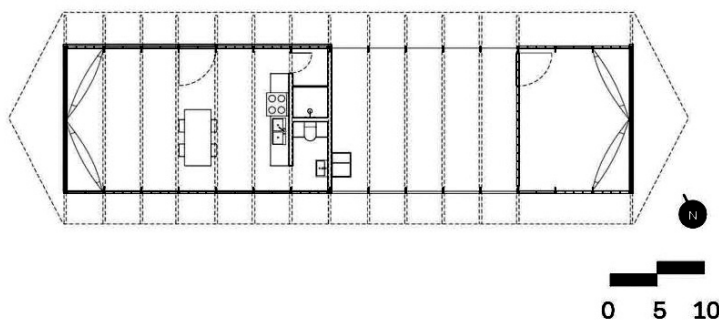
Ciudad Valles, San Luis Potosi, Mexico

Architecture August 2019

Designed for a warm, semihumid climate.

### FROM THE ARCHITECTS:

This proposal works to use the smallest possible number of components to achieve a greater economy of means, all while using the most adaptable and modifiable forms possible. Floor (concrete) and end walls (brick) are constructed in traditional materials, with all remaining elements fabricated and assembled on-site, individually configured according to resident needs and preferences. The house is oriented east-west to take advantage of prevailing winter winds and sun; operable windows and doors are placed across both long facades to achieve yearlong cross-ventilation.



view from NW corner

Notes: The primary element and expression of this project is its hexagonal-shaped roof with an oversized dormer (*over the kitchen and bathroom areas*). Demonstrating its construction by assigning each building element its own materiality and quality, the house creates a clear path for inhabitant-initiated growth. Recuperating the farmhouse type, capped on either end by covered porches for socialization, it is more an object in the landscape than an infill project.

### Project Details:

Constructed Surface: 64.63 M<sup>2</sup>

Roof Type: Gable/Other

Option(s): Vertical; Interior

Floor Type: Concrete Slab

Roofing: Wood Trusses and Corrugated Metal Sheeting

Floor-to-ceiling height: 2.72 M

Orientation: N-S Growth

Wall Type: Wood Frame

Structure: Wood Frame and Plywood

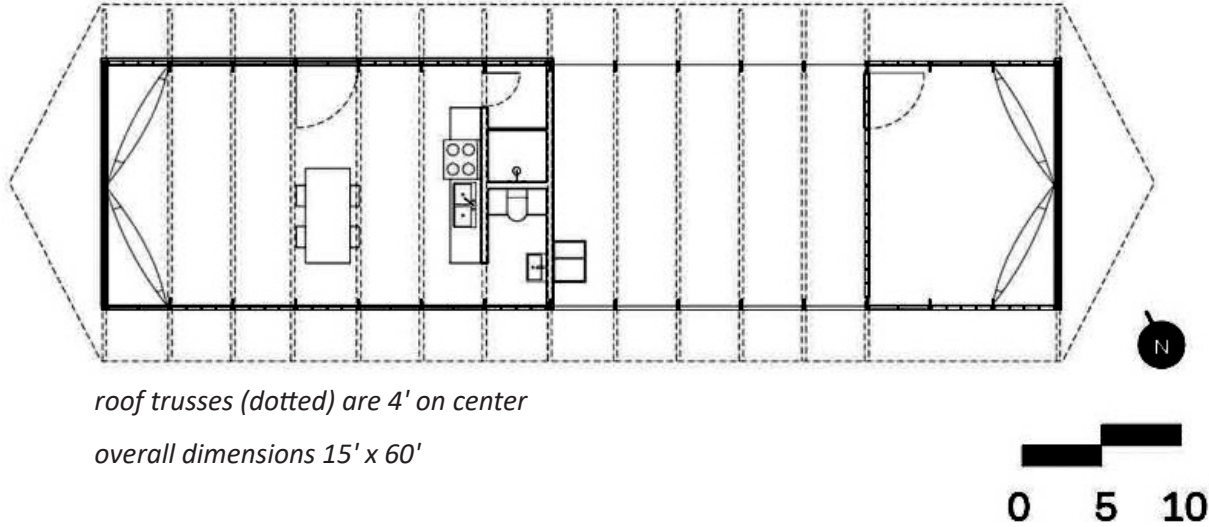
Details: Metal Vents

3 points

# Miami Passive Strategies

1. Here's the plan of House #26. Identify three passive cooling strategies used in its design. Critique each one based on its effectiveness in Miami.

porch   living area   dining   kitchen/bath   breezeway   sleeping   porch



*4 points*

## Miami Passive Design Details

2. Respond to these two passive building design issues.

**A. The oversized dormer above the kitchen/bath areas has the potential to remove heat from the building. Explain how it could work a.) when the wind blows and b.) when it is calm. Sketch to make your ideas clear.**

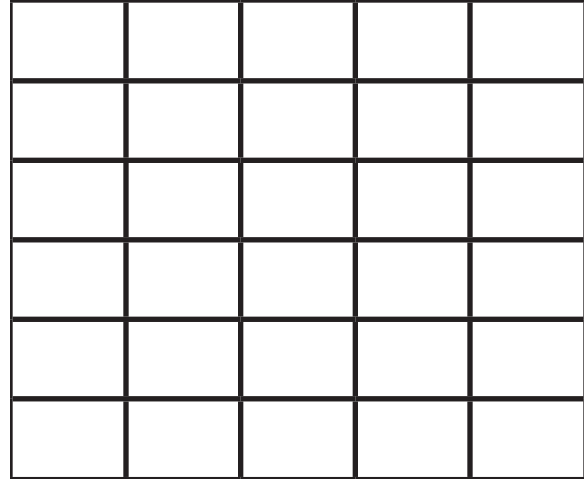


**B. The architects said, "...the farmhouse type, capped on either end by covered porches for socialization." Write a narrative explaining how they would be used all day on a hot day for a neighborhood party.**

3 points

## Miami Site Design

3. The three city block site is completely flat and barren. The community group intends to occupy each 250' x 300' block with at least 10 House #26 units on 50' x 100' plots. On the one-block site plan below show where you'd place and orient the 15' x 60' dwellings to take advantage of Miami's cooling season wind flow and where you'd plant palm trees to support your passive design goals. Explain your decisions!



250' x 300' site divided into 50' x 50' squares.  
North is up.

1 point **Extra Credit: Name and illustrate a two microclimatic wind effects that occur on this Miami site.**