

A SHELTER JOURNEY

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# What Should We Know About Manufactured Homes

*What we think we know — What we should know*

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# Affordable MH Communities



**Oak Creek, Arkansas**



**Oak Grove, Connecticut**

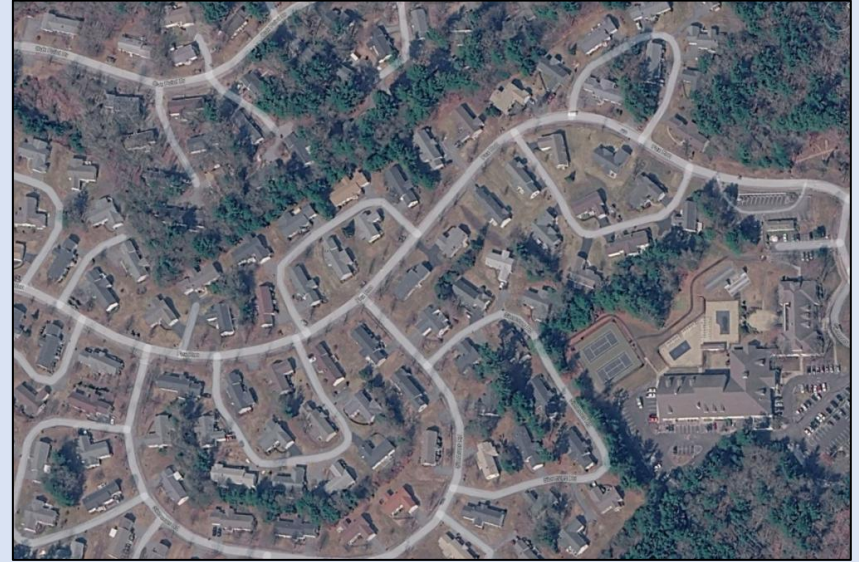
**Oak Creek** - \$650–\$950 Per month depending on age/size of the home (Includes land lease)

**Oak Grove** - \$400,000 Typical Home Price (Plus a land lease)

# Affordable MH Communities



**Oak Creek, Arkansas**



**Oak Grove, Connecticut**

**Oak Creek** - 67 Homes 1997-99 - Comes with Asphalt Pad to Park 2 Trucks, Dogs allowed

**Oak Grove** - 800 Homes 1998-2000 - 55+ Community, 55 min to NYC, (15 from Subway), Pool, Pickleball, Gym, Billiard room



# HUD Code: The 1976 Dividing Line

## A short timeline

**Pre-1976**

“Mobile homes.” No federal construction standard — source of most lingering stigma.

**1976**

HUD Manufactured Home Construction & Safety Standards (The HUD Code) takes effect.

**2000**

Manufactured Housing Improvement Act — federal installer training & licensing.

**Sept 2025**

90 new or updated standards; biggest overhaul in 30+ years.

Both Communities are all “HUD Code” Homes.  
HUD Includes Enforcement, Model Installation Standards

(CFR) Title 24, Subtitle B, Chapter XX, Part 3280 (2, 6)

HUD is a Preemptive Standard – Designs are 3rd Party Approved, Performance Code, Overrides local Codes

States Have on-Site Jurisdiction: Stairs, Decks, Land Use

Third Party Construction Inspections at the Factory

Transportable, Retains the Chassis



# Always a HUD Code Home

## CODES

HUD CODE HOME- Factory Built - National  
Construction Code - MHCSS

Not a STICK BUILT HOME - Site Built - IRC

Not a MODULAR HOME - Factory-Built - IRC

Not a TINY HOME – IRC Appendix Q

Not a PARK MODEL HOME - RV Code

Not a FEMA Next Generation Home

(Mixed Codes: Local Code for Local Work)

HUD Code are “personal Property” Unless on a permanent foundation and converted.

Not eligible for Conventional loans.

Permanent Chassis – Transportable.

Properly anchored homes meet wind-zone requirements; install quality is variable.

Land-owned units appreciate; chattel-financed units lag — financing, not construction.

Placement – Zoning Restrictions.

HUD Home Insurance Policies (20 -25 yrs).



# HUD Home, Non-Subsidized

**HUD CODE** - Free Market



**FEMA** - Subsidized



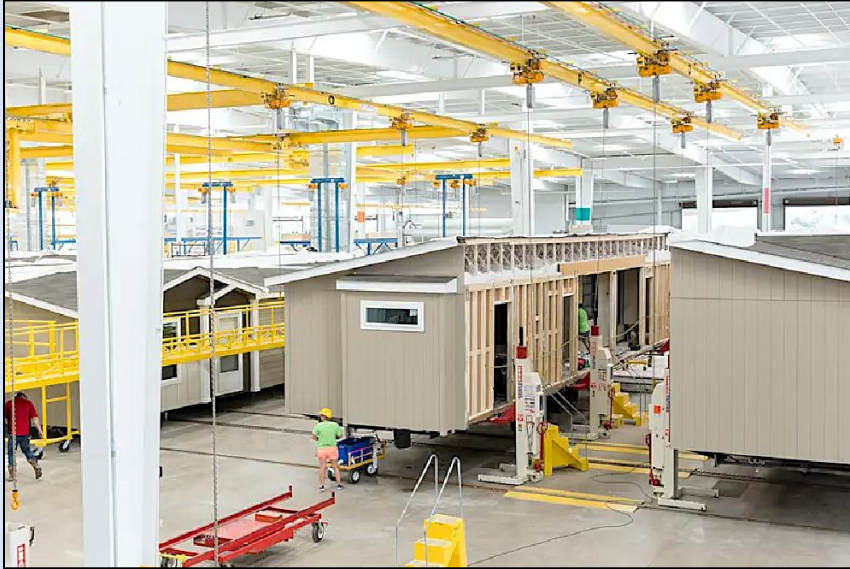
Manufactured housing is considered the “largest source of unsubsidized affordable housing in the country.” There is a fierce competition to have the best curb appeal, most featured, lowest cost, easiest financing, comfortable home.

Arguably a FEMA style home could be more affordable, but has less curb appeal.



# HUD Factory Built Construction

## Factory Built Construction



## On Site Setup, Installation



Factory construction delivers controlled indoor building, faster assembly, stronger precision, and consistent in-house quality control and HUD-certified 3<sup>rd</sup> party inspections.

On-site Home setup may be challenging due to weather, soil conditions, tight access, lack of power, difficult alignment with little inspection oversight. There are many setup details to get right.

# Oak Creek Community



**Oak Creek, Arkansas**

## **Oak Creek Community Plan:**

Buy Used/Foreclosed Single-Section Homes.

Do “Makeover” type repairs.

Manager with construction experience (Not MH) to repair and maintain.

Site in the County away from pesky setup inspectors.

Rent affordable homes, Rent Lots.

# Oak Creek Community



## **Makeover:**

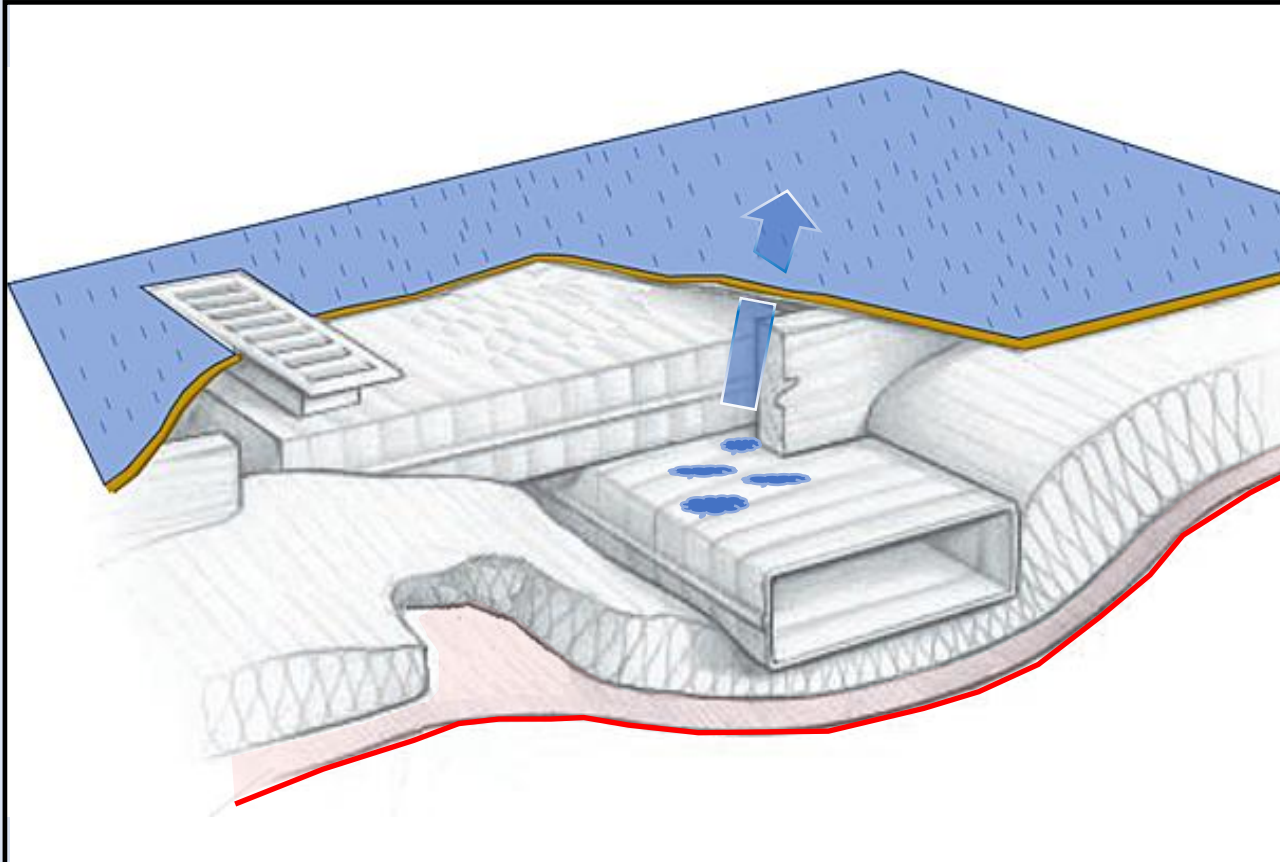
Early in the makeover, the old carpeted floor covering was replaced a vinyl plank flooring product. Wainscoting was added to walls that were stained.

## **Building Science Analysis:**

This makeover has replaced a vapor permeable carpet with a vapor barrier floor covering. This eliminates the drying potential from above.

There are no singular changes, all changes have consequences.

# Oak Creek Community

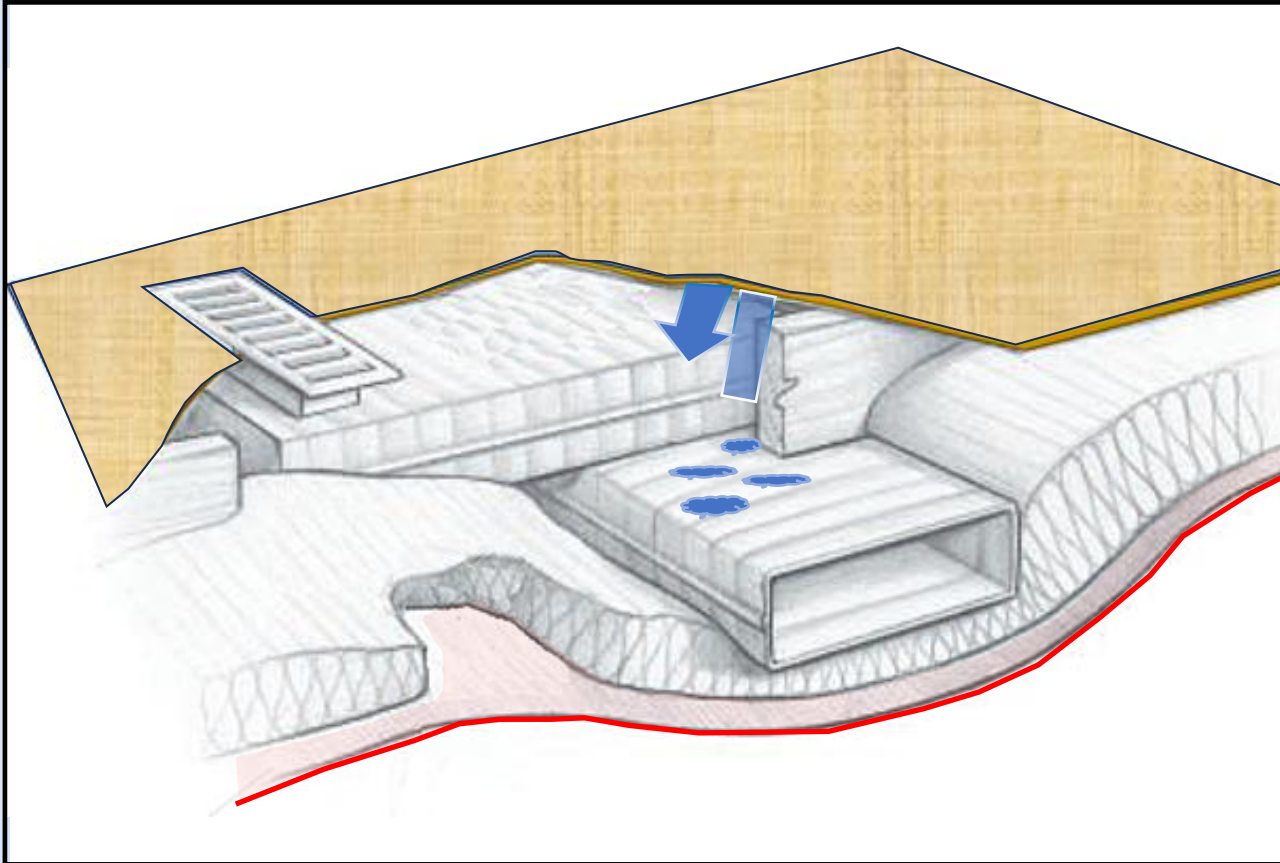


## Upside Down Floor

In a home built to the IRC, the floor sheathing under the carpet (top of the floor assembly) is the location of the air, thermal and vapor barrier. If you look in from the crawl space, you see insulation.

In a HUD Code MH, the air, thermal and vapor barrier are located on the bottom of the floor assembly. Looking in from the crawl space, you see a continuous plastic liner (belly). Water in the floor assembly can only dry upwards.

# Oak Creek Community

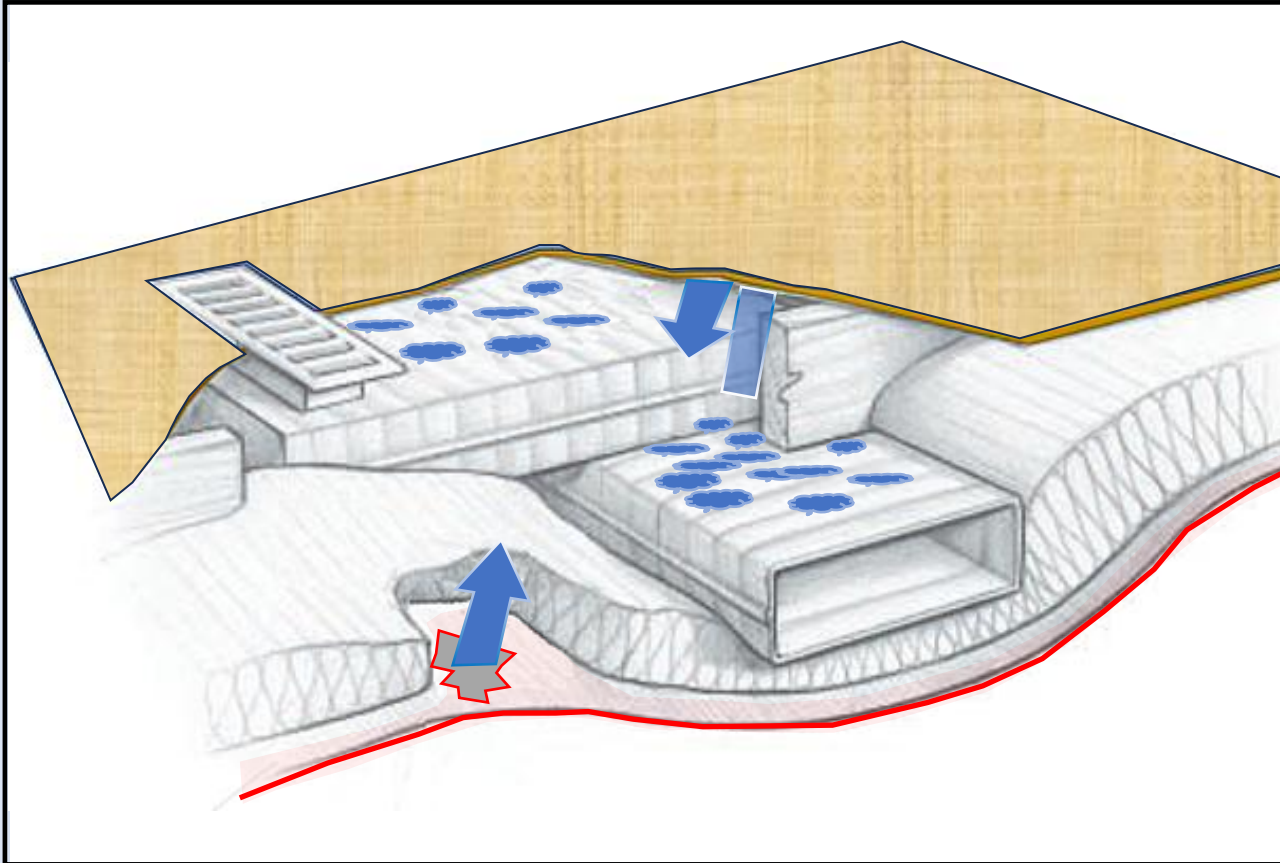


## Vapor Permeance

Carpet, carpet pad and floor sheathing products are relatively “Vapor open.” OSB is semi-permeable. It is not a vapor barrier. When dry, OSB has a perm rate of 1.5 perms. OSB becomes more permeable as its moisture content increases from humidity. In a higher moisture environment OSB has a perm rate of 2-5 perms.

Perm rating for vinyl plank flooring  $\approx$  0.01 to 0.1 perms. This is a vapor barrier.

# Oak Creek Community



## Seeking Equilibrium

Wetting Potential = How easy is it for moisture to get into the floor assembly?

Drying Potential = How easy is it for moisture to get out of the floor assembly (dry out)?

Good design aims for:  
Drying Potential  $\geq$  Wetting Potential

Holes in the bottom liner increase wetting potential during humid summers. The Moisture Level in the floor rises.

# Oak Creek Community



## Holes in the Bottom Board

Outside air bypasses the air, thermal vapor barriers.

Wetting Potential is maximized. There is minimal Drying Potential towards damp crawl space air.

Condensation is likely; & occurs on surfaces colder than the dewpoint temperature of the air. Air conditioning ducts are no longer protected by insulation and vapor barriers.

Equilibrium favors water accumulation in the floor assembly.

# Oak Creek Community



**Makeover:** Makeover also included wainscoting added to walls that were stained.

**Building Science Analysis:** Similar with the condition in the floor assembly. Older homes had low permeance vinyl covered gypsum board. Adding additional vapor barrier decreases Drying Potential. Equilibrium favors increased moisture accumulation inside the wall assemblies.

# Oak Creek Community



**Makeover Repairs:** Good idea to seal up holes in the bottom board liner. However, Spray Polyurethane Foam (SPF) is incompatible with polyethylene and polypropylene materials. SPF will not adhere to these materials without a primer.

**Building Science Analysis:** HUD Code includes accepted methods to repair these holes. Should follow the HUD Code. SPF instructions do not cite PE and PP; without proper preparation, it will fail over time.

# Oak Creek Community



## Managing Water

Water under any home is problematic; local codes and the HUD Code prohibit this.

HUD states that drainage must prevent water build-up under the home to protect the foundation supports.

The ground must slope  $\frac{1}{2}$  inch per foot for the first 10 feet away from the home or alternative drainage must be installed.

Manufacturer's require annual CS inspections.

# Oak Grove Community



**Oak Grove, Connecticut**

## **Oak Grove Community Plan:**

Conceived as a large-scale, low-maintenance, 55+ neighborhood of manufactured homes.

Operates under Connecticut laws governing manufactured housing communities, where:

- Residents own their homes.
- Land is leased from the community owner.

# Oak Grove 55+ Community

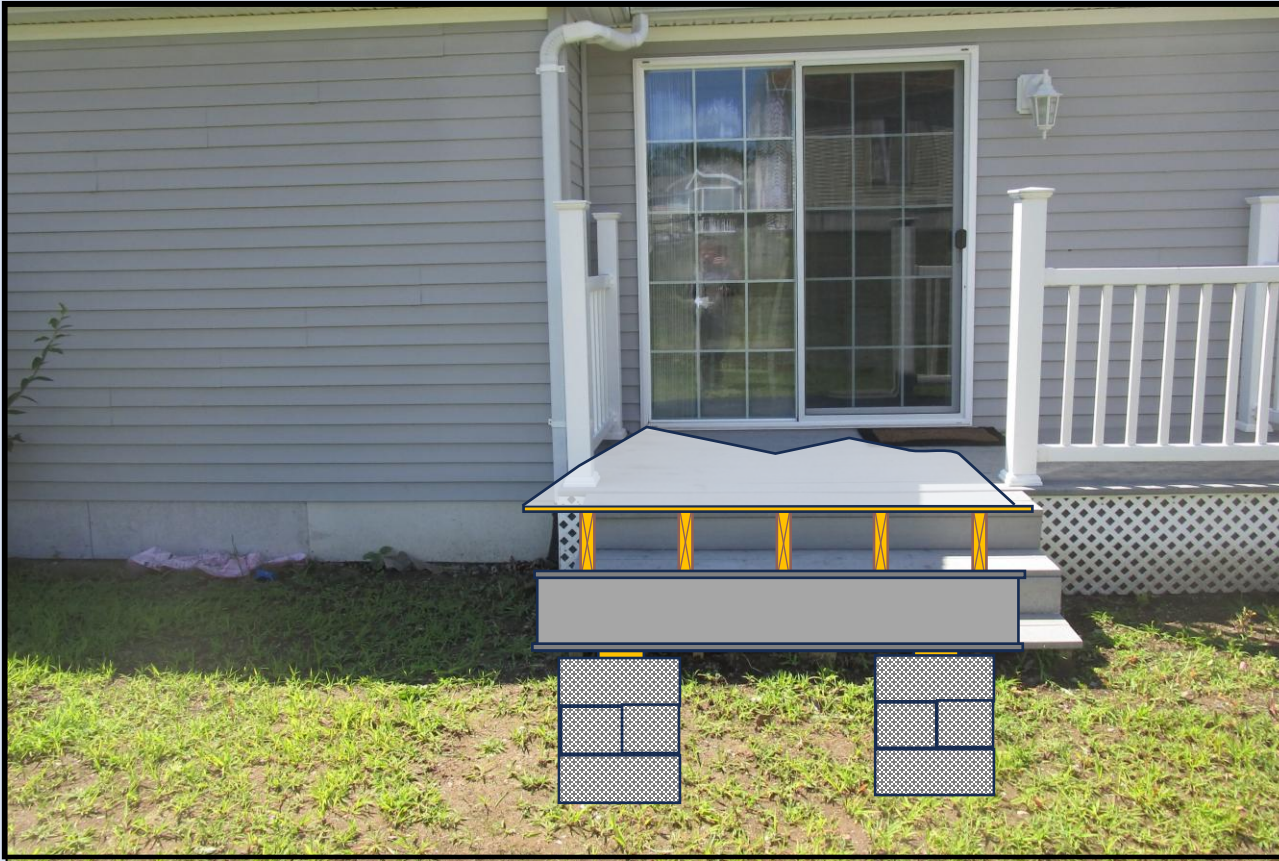


## **The Target Audience:**

Older community residents apparently have extra time on their hands; plants are everywhere. This is a selling point for the target audience, but the irrigation for the plants is a headache for the infrastructure.

Older 55+ community residents apparently don't like stairs. Manufactured homes typically have a lot of steps at the entrance. Most homes in the Oak Grove Community have fewer and shorter steps.

# Oak Creek 55+ Community



## Consequences of Fewer Steps

How can we get rid of all those steps?

The floor is built on 2 x 8 or 2 x 10-inch floor joists like every other home.

These floor joists rest on a 10 or 12-inch I-Beam, which must remain in place for a HUD Code home.

The I-Beams rest on a minimum 24-inch tall pier.

**You will need to dig a pit.**

# Oak Grove Community

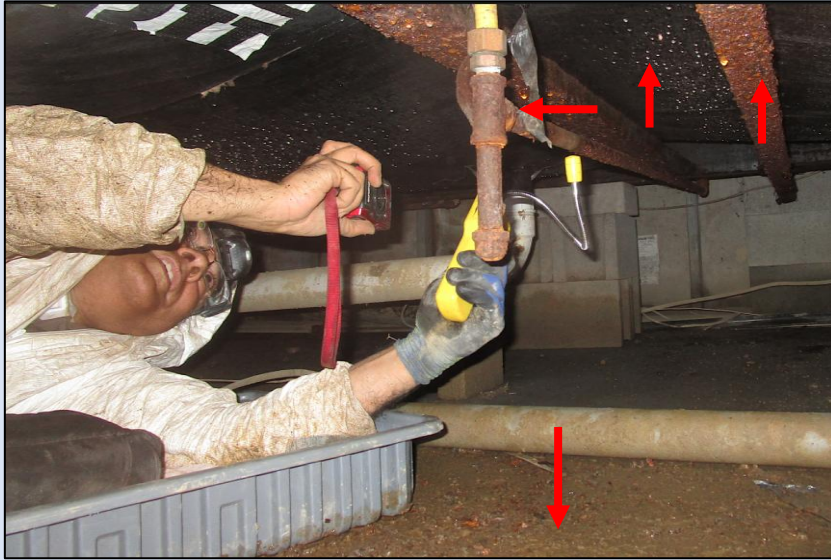


## **The Pit Inspection:**

Much to our inspection team's surprise, some of the crawl spaces we came to inspect did not have an entrance. These have not been inspected since their installation.

It did not look good.

# Oak Grove Community



**The Pit Inspection:** My colleague with the gas sniffer is inspecting the integrity of the gas lines including the amount of rust on the gas piping. Some gas lines are from the factory (some are not).

This was a muddy, tight, confined space. My selfie from my garage floor creeper shows me turning my head sideways in order to travel under a low spot. This is a difficult home to inspect or to maintain.

# Oak Grove Community



**The Pit Inspection:** Surely expect to see a higher level of compliance in this community with its \$400,000 homes; not the same bottom liner holes breaching the air, thermal and water vapor barriers that were seen at Oak Creek.

Structural damage was one of the concerns we were to document. This rusted I-Beam is an integral part of the home support system.

# Oak Grove Community



## **The Pit Inspection:**

Some homes had a high watermarks. Water under any home is prohibited by local codes and the HUD Code. HUD states that drainage must prevent water build-up under the home to protect the foundation supports.

Most of the residents were hopping mad.

# Oak Grove Community



## **The Pit Inspection:**

Where insulation was exposed, condensation also occurred on the insulation.

This gas appliance is improperly installed and penetrates the air, thermal and water vapor barriers.

# Oak Grove Community



**The Pit Inspection:** Most of the perimeter was precast, interlocking concrete panels. This Hardie Panel used for some homes is not approved for below-grade applications.

Being low to the ground resulted in many of the crawl space crossover ducts being in contact with the slab - HUD Code violation.

# What have we learned?



## Remember the Fundamentals

Manufactured Homes are a HUD Code home. Follow the HUD Code.

On-Site setup is critical. Follow the Model Install guide & Inspect annually.

Water is a relentless destroyer; 90% of home problems are water problems.

Read and follow product instructions.

Market appeal is important if people are to buy non-subsidized HUD homes (\$).

Transportable homes have hidden costs.

One can never do just one thing, every change has consequences.

Easy to maintain is a plus.

# The HUD Code Home that Bruce Built



The 1,800SF MH factory built in in 1995.  
Attic R-30, Walls R-19, and Floor R-22.  
Single pane, AL frame & interior storm.  
Set up complies with the HUD Code.  
No belly holes throughout 30 years.  
Water drains away from the home.  
Continuous thermal, vapor, & air barrier.  
Heat pump, sized by load calculation.  
Auxiliary heat strip locked out at 25°F.  
Closed crawl space with a dehumidifier.  
First year used 16,311kWh.  
Recently used 13,273kWh,-8,077kWh PV  
Now is a Net Zero Energy Home

# The Mobile Home that Bruce Repurposed

