
Enterprise®
What is Passive Habitability
PRENTICE HALL
WORLD GEOGRAPHY
BUILDING A GLOBAL PERSPECTIVE
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Enterprise: Who We Are

Create opportunity for low- and moderate-income people through fit, affordable housing in diverse, thriving communities.

How Enterprise Supports Communities

Policy

- CDBG-DR Standing Allocation
- National Flood Insurance Program
- Local Advocacy
- Code

Solutions

- Technical Assistance
- Developing Guidance Tools for Resilient Housing
- Piloting Housing Innovation models

Capital

- Grants for Recovery
- Grants for Resilience
- Loan Capital
- Investment




“People who are already vulnerable, including lower-income and other marginalized communities, have lower capacity to prepare for and cope with extreme weather and climate-related events and are expected to experience greater impacts”

-National Climate Assessment 2019

To all Tenants of the Sea Horse RV Park:

We regret to inform you due to the severity of damage done by Hurricane Irma we must close the RV Park. We have a number of potential life safety issues and it is not safe to stay at the park.

Please remove all your belongings that have not been damaged by the hurricane and seek housing off the grounds. We recommend you contact FEMA using these contact numbers and websites, they can help you with temporary housing and financial assistance.

Call: 1-800-621-3362 FEMA – Federal Emergency Management Agency
By computer: DisasterAssistance.gov

Electricity service and water supply will not be returned to the park as the damage is too severe to allow it to be connected. Within the next week we will be removing damaged trailers and disassembling any

What is at Stake if we Stand still?


FEMA
FEMA

Resilience … to prepare, endure, adapt and thrive in a disruptive and changing world.

Faces of Resilience

People	The extent of personal discomfort, harm, injury, or loss of life.
Physical Assets	Loss or damage to structural and architectural building components, MEP and IT equipment, utilities, landscaping, contents.
Operations	Disruption to building operations and functionality, occupancy, egress/ingress, critical systems, or lab activities.
Revenue	Loss of revenue due to business interruption, specifically in relation to tenants.
Reputation	Negative media attention or impact on industry reputation in the aftermath of an impactful shock or stress.

Strategies for Multifamily Housing Resilience

Community

Strategies that encourage behavior which enhances resilience.

Adaptation

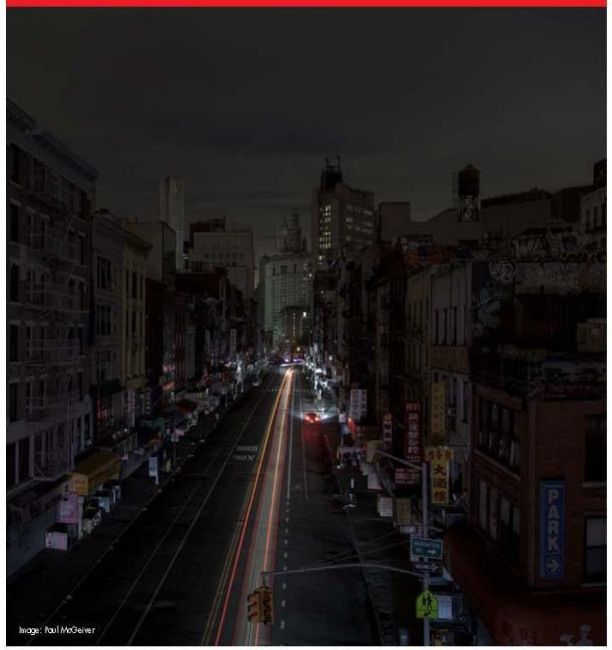
Strategies that improve a facility's ability to adapt to changing climate conditions.

Protection

Strategies to reduce a building's vulnerability to extreme weather.

Backup

Strategies that provide critical needs when a facility loses power or other services.



Puerto Rico – The Impacts of Maria

Source: Getty Images

Cascading Impacts

RICARDO ARDUENGO/AFP/Getty Images

ALEX WROBLEWSKI/Getty Images

Impact of Hurricane Maria

90% BUILDING DESTROYED

84% OF EDUCATION FACILITIES WERE COMPROMISED.

LEARNING TIME FOR STUDENTS WAS DECREASED BY AT 40%

KEEP SAFE

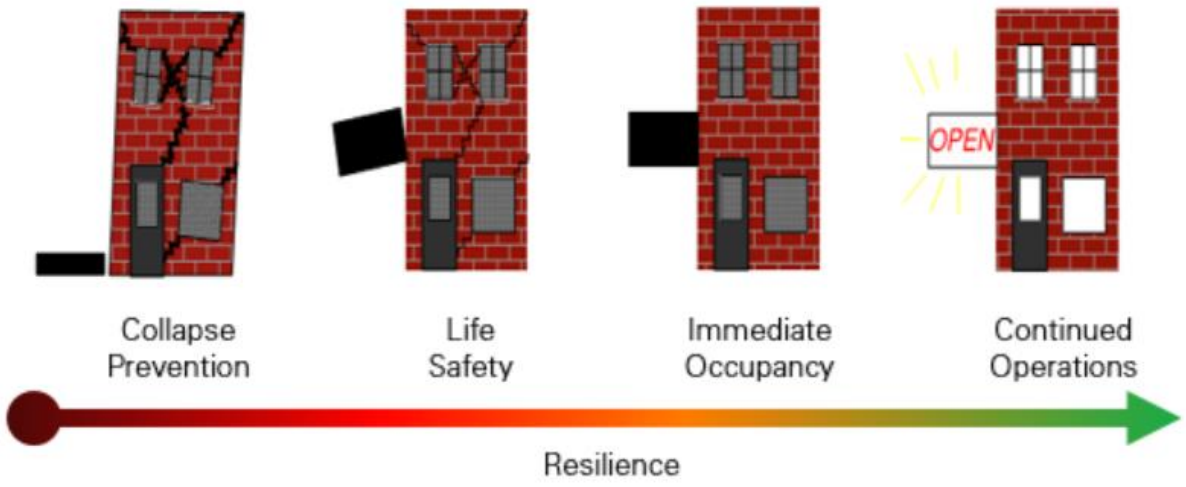
A GUIDE TO RESILIENT HOUSING DESIGN IN ISLAND COMMUNITIES

Enterprise

KEEP SAFE: A GUIDE FOR RESILIENT HOUSING DESIGN AND CONSTRUCTION IN ISLAND COMMUNITIES

Hurricanes Maria and Irma devastated 87 percent of the homes in Puerto Rico. More than half of the homes in the U.S. Virgin Islands suffered damage. A quarter of the homes in the Florida Keys were destroyed.

Performance Objectives



Building Performance Levels

Collapse Prevention	Building sustains damage and retains no margin against collapse post-event.
Life Safety	Building is damaged but retains a margin of safety.
Immediate Occupancy	Building structure retains its strength, building is safe and functional to re-occupy.
Continued Operations	Very light damage, building is operational during and immediately after the event.

Operational Performance Levels

L1. Maintain life safety operations

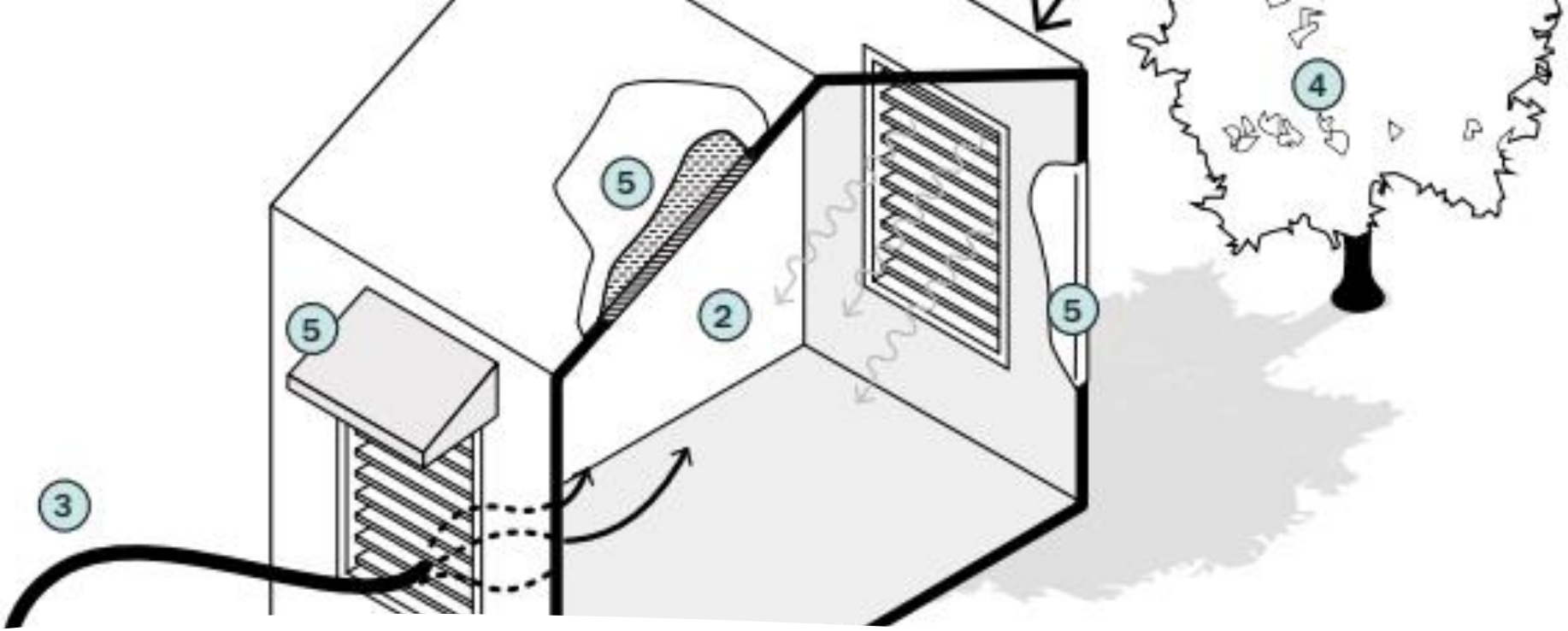
L2. Maintain life safety and other critical operations

L3. Maintain operations of all critical operations

L4. Maintain the entire building operations

29 Strategies

- Safe Site
- Protection
- Passive Habitability
- Energy
- Water
- Community + Leadership
- Emergency Preparedness
- Putting it Together



Passive Habitability

- ✓ Reduce heat transfer
- ✓ Increase ventilation
- ✓ Benefit from natural light
- ✓ Control moisture and mold
- ✓ Manage pests

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REDUCE THERMAL HEAT TRANSFER

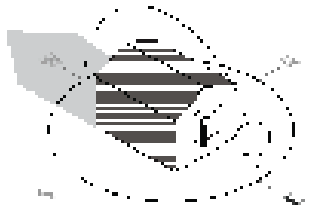
STEP 3 - SHADE THE HOME

Use vegetation and add architectural features to provide shade and prevent the Sun's heat from entering the home.

- The foliage of the tree provides the most shade. Ensure that the tree's height and location will cast shade on the right surface, at the desired time of the day.
- Keep a considerable distance between vegetation and the home to avoid damage during strong winds. The distance from the tree to the house should exceed the tree's height.

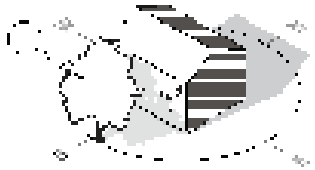
EAST

- Vertical and horizontal Shading around an east-facing window provide shading for late morning*
- Plant tall shrubs or short trees on the East side to reduce morning direct



SOUTH

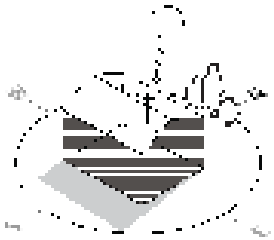
- Horizontal shading over a single south-facing window provides good shading year round. Porches, overhangs, and awnings provide similar effect, see examples below in #4.*
- Plant tall trees on the South side to reduce day-long direct sunlight. Awnings or shaded porch can also serve this purpose.



WEST

- Vertically and horizontally shade west facing windows to block afternoon sun.
- Plant tall shrubs or short trees on West side to reduce afternoon direct sunlight.

- Interior shade for glare control or if window is an accordian "miami" style curtain, close them slightly.
- Plant light greenery on the North side for glare control, if necessary.



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INCREASE VENTILATION

As outside air moves through a space, it affects both the temperature and the moisture content of air inside. Ventilation --replacing indoor air with outdoor air without the use of mechanical fans-- reduces moisture, equalizes air temperature and humidity, and cools our bodies as it evaporates sweat. Even humid air moving quickly across our skin will make us feel cooler, so increasing the speed and volume of air exchanged between the inside and outside of a space makes the environment feel more comfortable.

This strategy shows how using mechanical free or "passive" ventilation actions can promote air movement through and within a building to maintain a comfortable indoor temperature without use of electricity. The key to managing ventilation is making the most of prevailing winds received by Puerto Rico, which are affected by local conditions such as topography and adjacent buildings.

WHAT YOU NEED TO KNOW

- Creating clear paths for air to flow through the home encourages passive ventilation.
  - Passive ventilation relies on air currents generated by prevailing breezes, adjacent buildings and terrain and differences in temperature between spaces.
  - Window and door placement, size and operation affect ventilation rate and effectiveness.
  - Cross-ventilation refers to the concept of placing window and door openings to allow air to move into and out of a space or the whole house.
  - Island Location – Puerto Rico is exposed to Caribbean Trade Winds, which determine the predominant wind direction (North-South).

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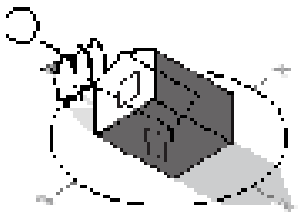
BENEFIT FROM NATURAL LIGHT

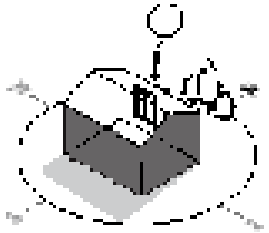
STEP 2 - CONTROL NATURAL LIGHT

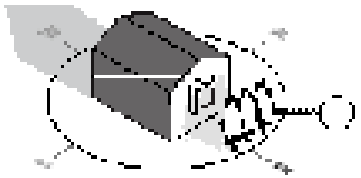
A. Vegatation

- Trees reduce direct sunlight.
- The foliage of the tree will provide the most shade. Ensure that the tree's height relates to the opening you wish to protect.
- Keep a distance between the greenery and the building to avoid damage during strong winds.

The distance from the tree to the house should exceed the tree's height.

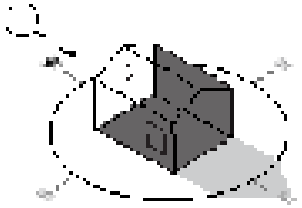


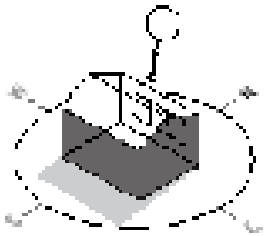


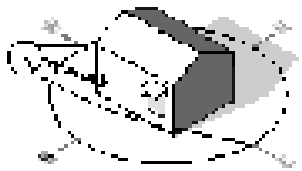


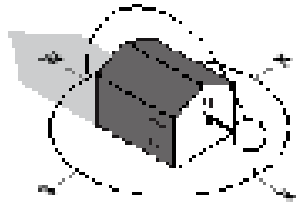
B. Window Size

- Size your windows according to sun exposure in the home.









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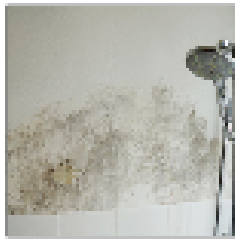
13 CONTROL MOISTURE AND MOLD

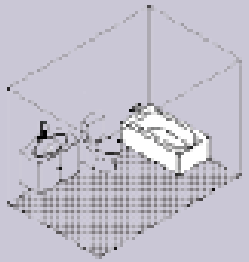
STEP 1 - INSPECT YOUR HOME

If you suspect you have mold,hire a mold inspector (see inset)

- Olfactory Inspection– Not all mold species are visible. Musty/moldy smell is an accurate indicator of the presence of mold.
- Visual Inspection – Look for changes on color and/or texture on the surface of the materials. Molds show usually as dark sets of rounded spots, although they can take other shapes and colors. Note however that not all stains caused by humidity are not always mold. Molds are often confused with efflorescence, discolorations and substance infiltrations.
- Moisture Inspection - Look for evidence of water intrusion such as drip lines, water marks, mildew, and bubbled paint. Determine the source of the water and take action to eliminate or control it. Use a moisture meter to monitor your space and find concealed mold and water damage. A moisture content above 14% indicate that your space is humid enough to develop mold.

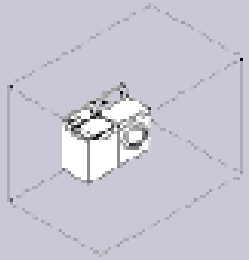


A. CHECK FOR WATER LEAKS TO PREVENT MOLD



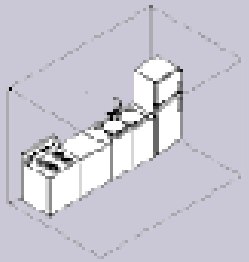
BATHROOM

Clean toilet bowl, tiles and sink regularly to prevent mold growth frequently. small



LAUNDRY ROOM

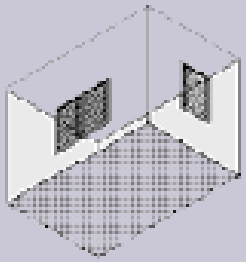
Pay close attention to the area



KITCHEN

Pay close attention to sinks and fridges, checking also their backs and underneath areas.

- Check cabinets' interior regularly.
- Keep dry the backsplash and/ or any other surface prone to condensate moisture coming

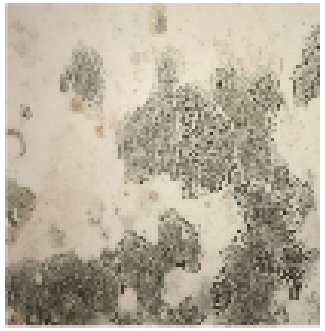


SURFACES

Identify condensation in openings, walls, or ceilings, both inside and outside.

- Identify condensation in areas that generate sudden temperature changes, as kitchen backsplashes, and surfaces nearby air conditioning units.

B. WHAT TO LOOK FOR



	MOLD	EFFLORESCENCE	RUST STAINS
WHAT IT IS	A superficial growth produced by a fungus.	Efflorescence is the deposit of salt in the surface of a porous material. It manifests itself like a white deposit composed of soluble	A discolored spot on a particular
WHERE IT DEVELOPS	Nutrient rich and moist materials like wood or concrete such as lumber, plywood, and paper facing of drywall and batt insulation. And See Strategies in the following pages.		Concrete walls or ceilings,
HOW TO PREVENT IT		Apply a hydrophobic sealant to prevent water absorption.	Contact a contractor and/ or specialist to provide advice

Resilience Building Process

Assessment of shocks and stresses

Develop holistic, integrated resilience strategy
Train and Educate

Design and build physical and operational risk reduction measures

Constant review, learning and innovation

Laurie Schoeman
Senior Program Director Resilience and Recovery
lschoeman@enterprisecommunity.org