

S T U D I O

BLUE

A R C H I T E C T S



AN INTRODUCTION TO GREEN HOUSING CONCEPTS

## WHAT ARE WE LOOKING AT TODAY?...

- DEFINITIONS: DE-CARBONISATION / PASSIVE HOUSE / SUSTAINABLE DESIGN

- AN OVERVIEW OF THE CONCEPTS / ISSUES

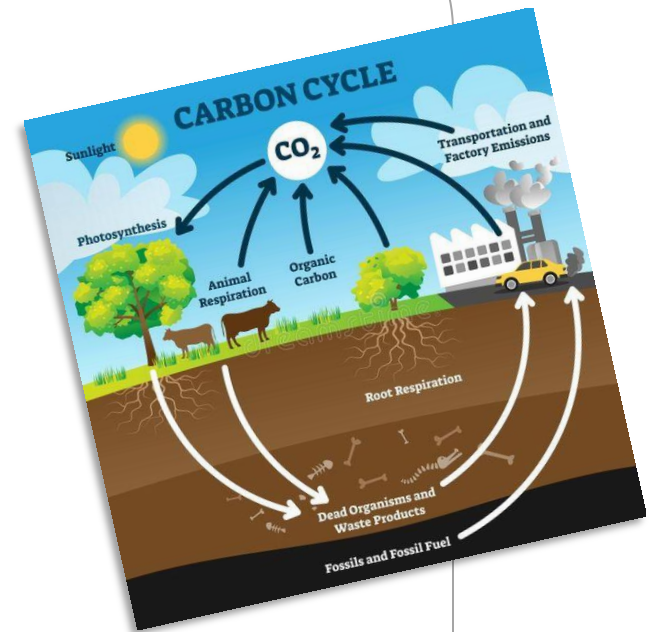
- HISTORIC SOLUTIONS & CURRENT PROBLEMS

- A CASE STUDY – RED RESIDENCE

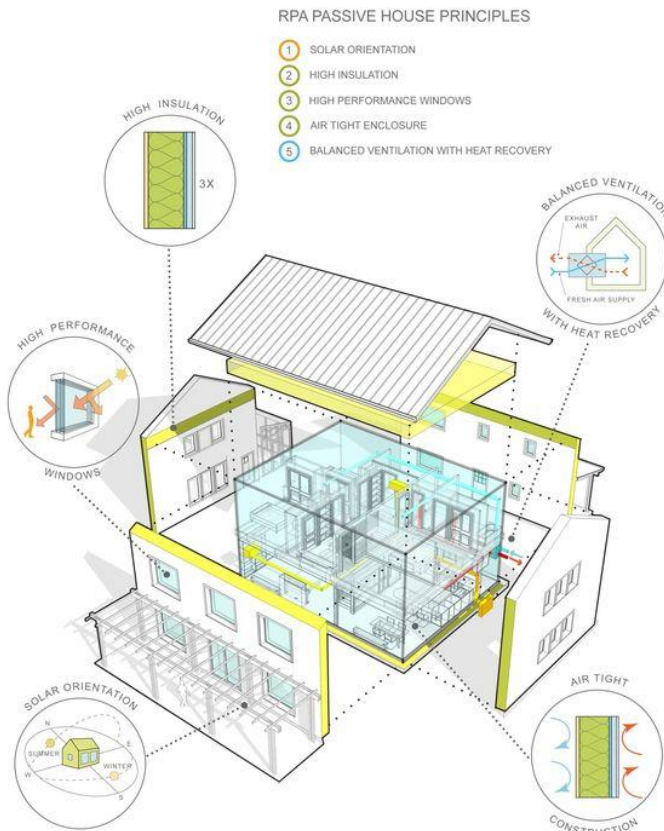


## WHAT IS DE-CARBONIZATION?

“Decarbonization refers to the removal of carbon from the environment. In the case of housing, homeowners can reduce energy use and reliance on fossil fuels and choose building materials that require either low amounts of carbon emissions to manufacture and transport, or actively sequester carbon by storing carbon that is drawn from the atmosphere.”

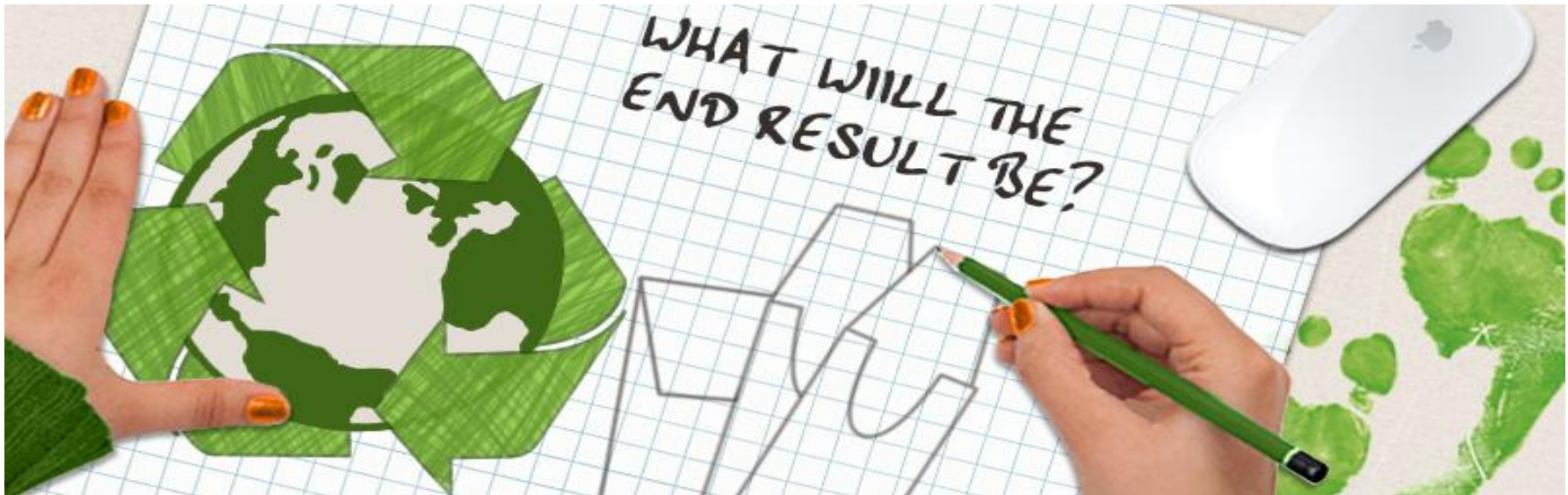


## WHAT IS A PASSIVE HOUSE?



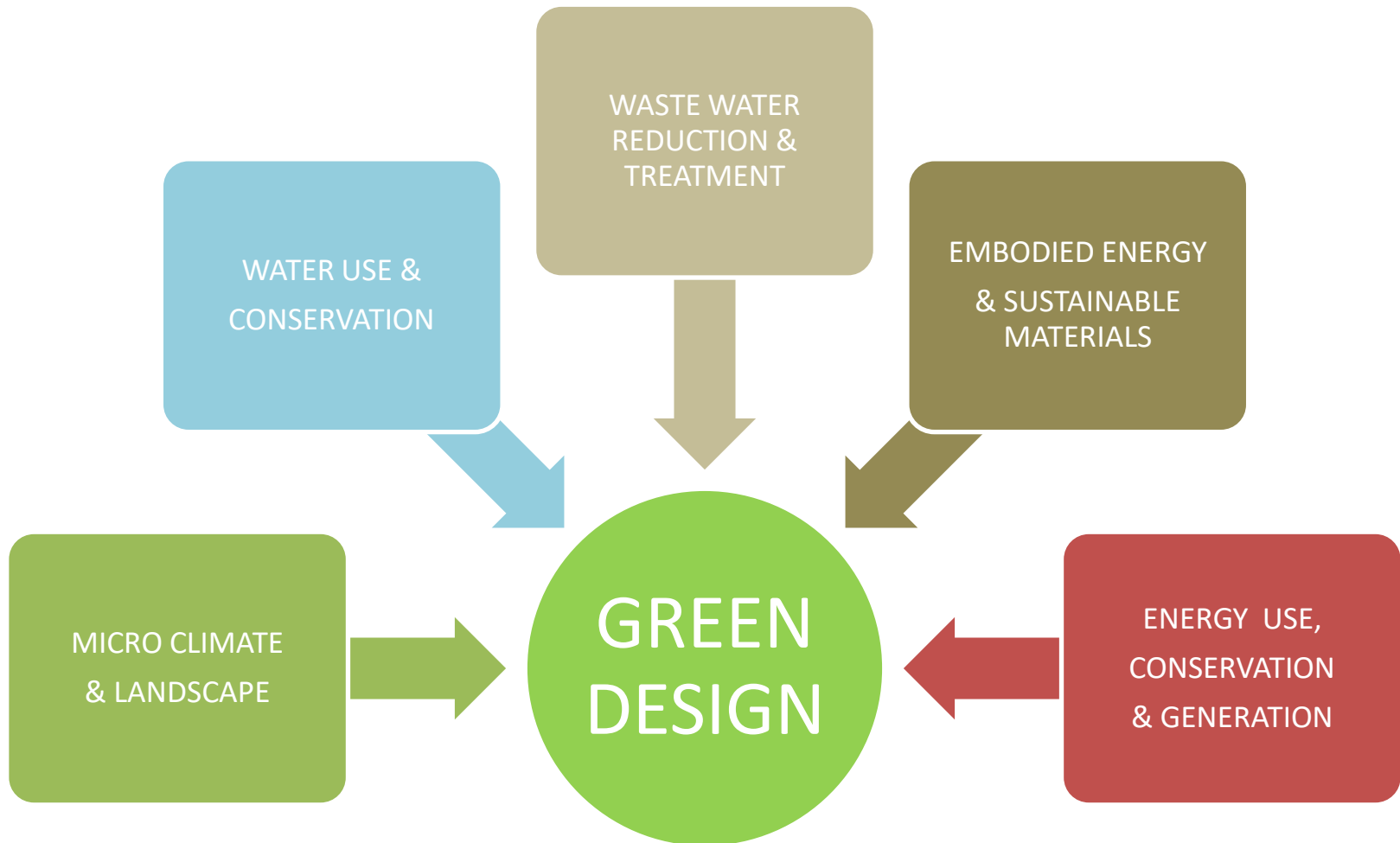
“Passive House / Passivhaus is a voluntary standard for energy efficiency in a building, which reduces the building's ecological footprint. It results in ultra-low energy buildings that require little energy for space heating or cooling.”

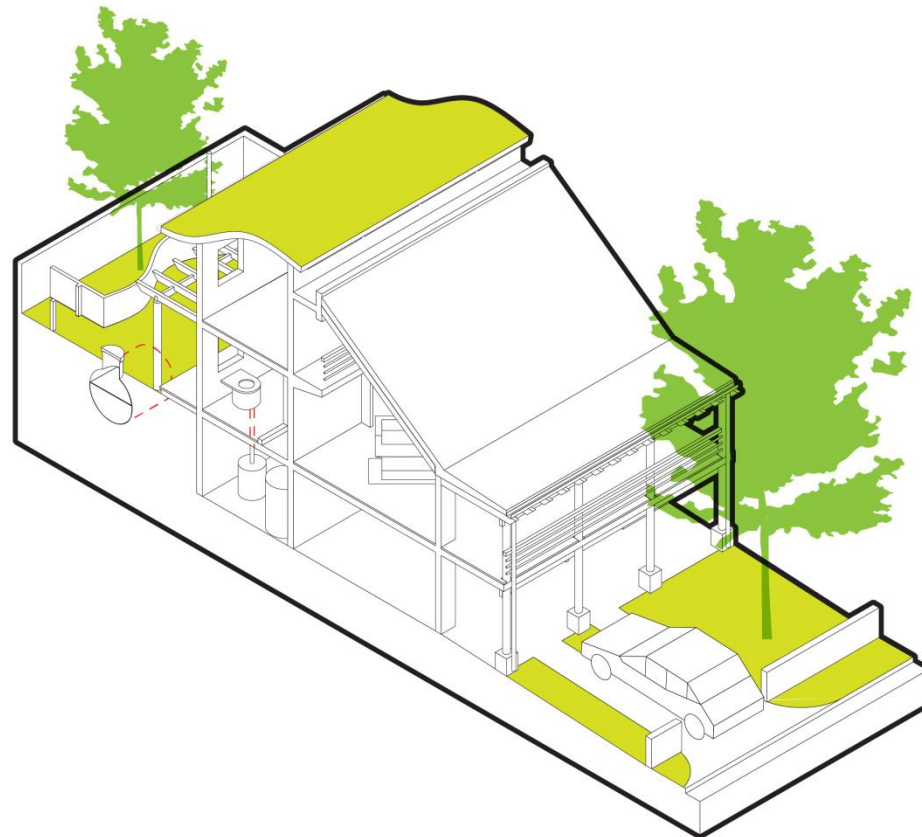
## WHAT IS SUSTAINABLE ARCHITECTURE / DESIGN?



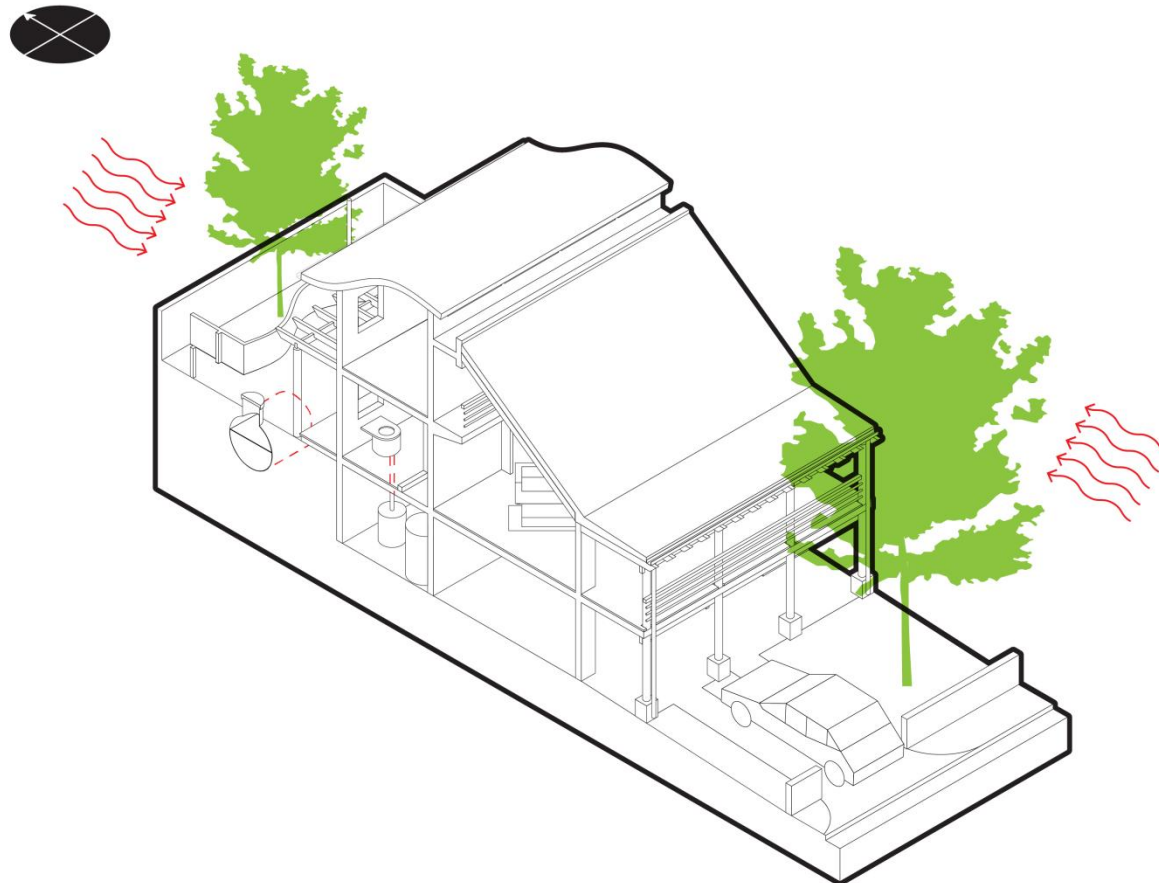
“....a design which meets the needs of present generations without compromising the ability of future generations to meet their own needs.....”

## TO MAKE BARBADOS' HOUSING GREENER WE NEED TO TACKLE.....



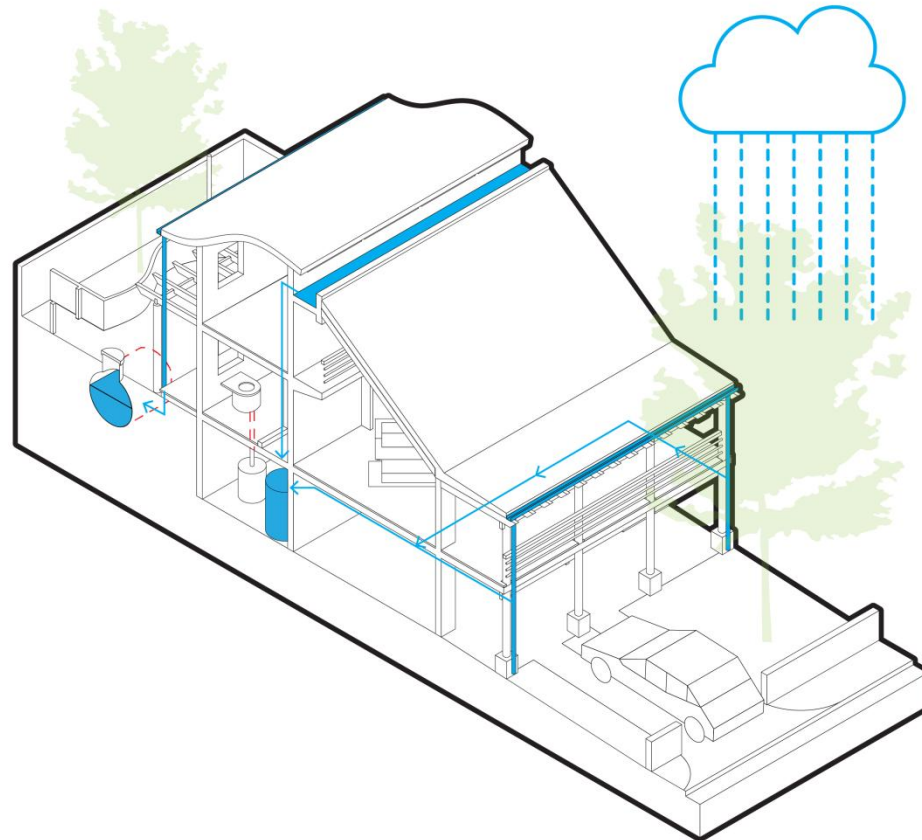


## GREEN SURFACES

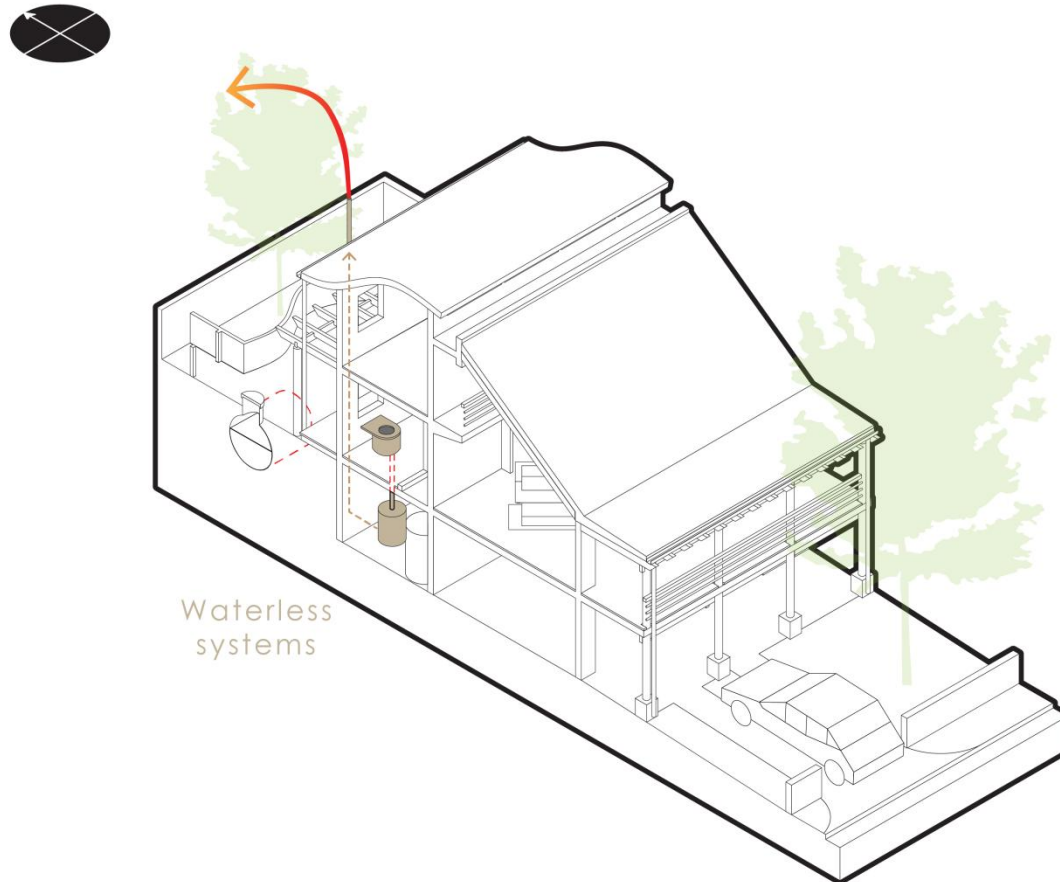


## BUFFERS & FILTRATION



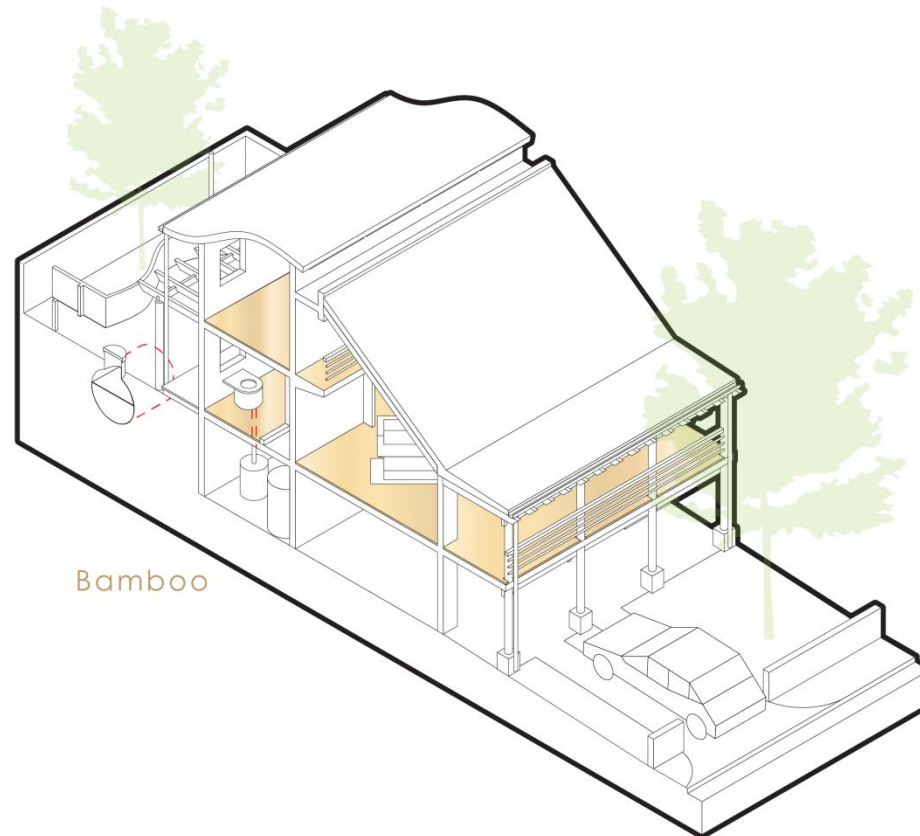


## WATER STORAGE

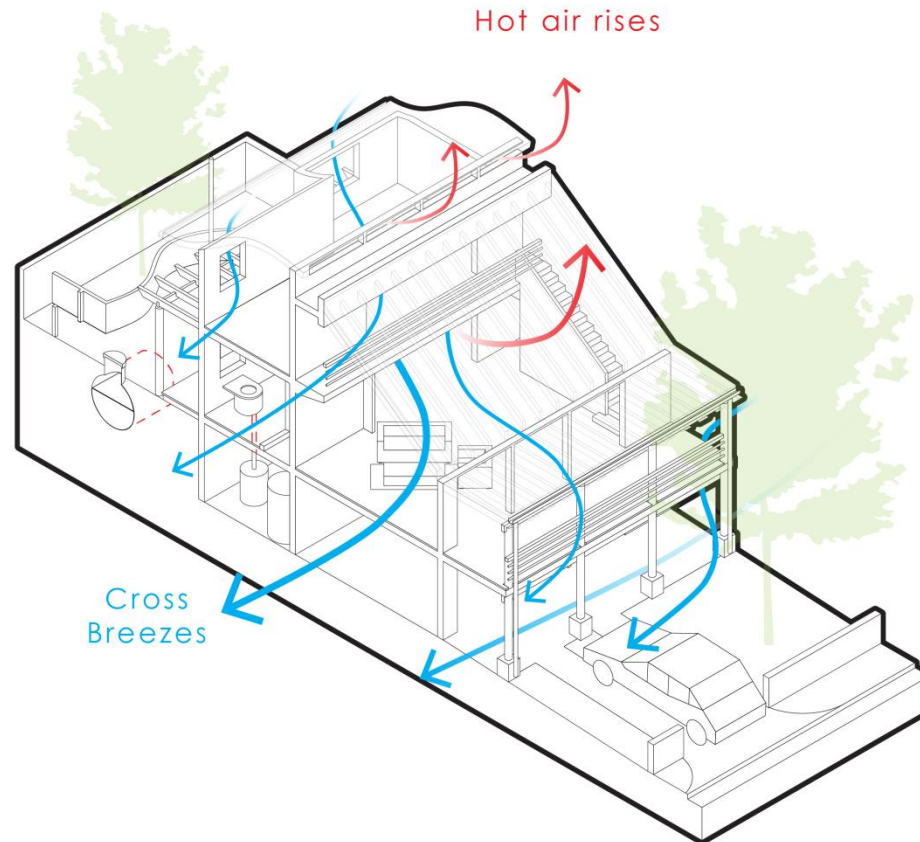


Waterless  
systems

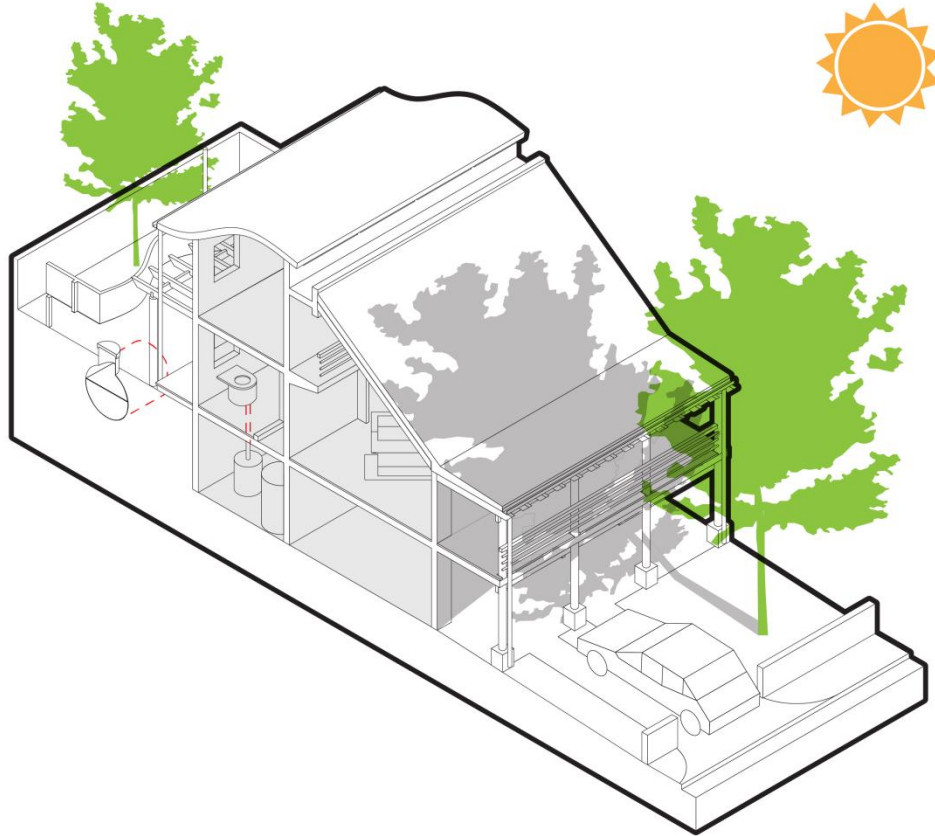
## COMPOST TOILET SYSTEMS



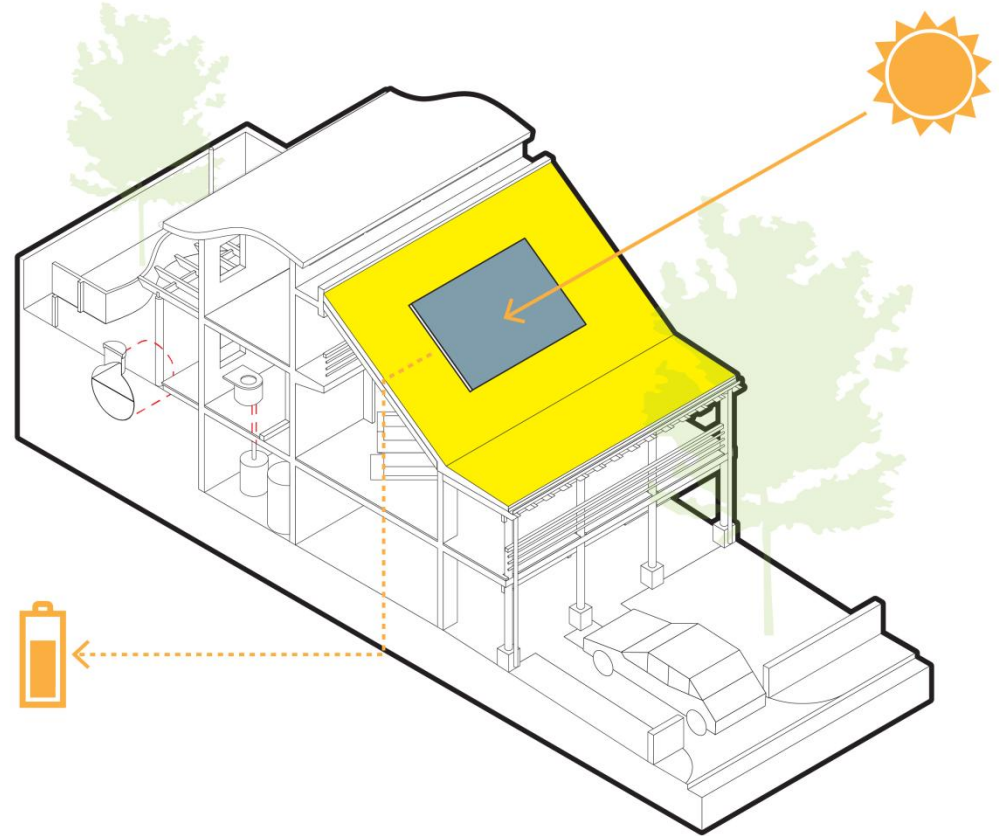
## SUSTAINABLE MATERIALS



## NATURAL VENTILATION

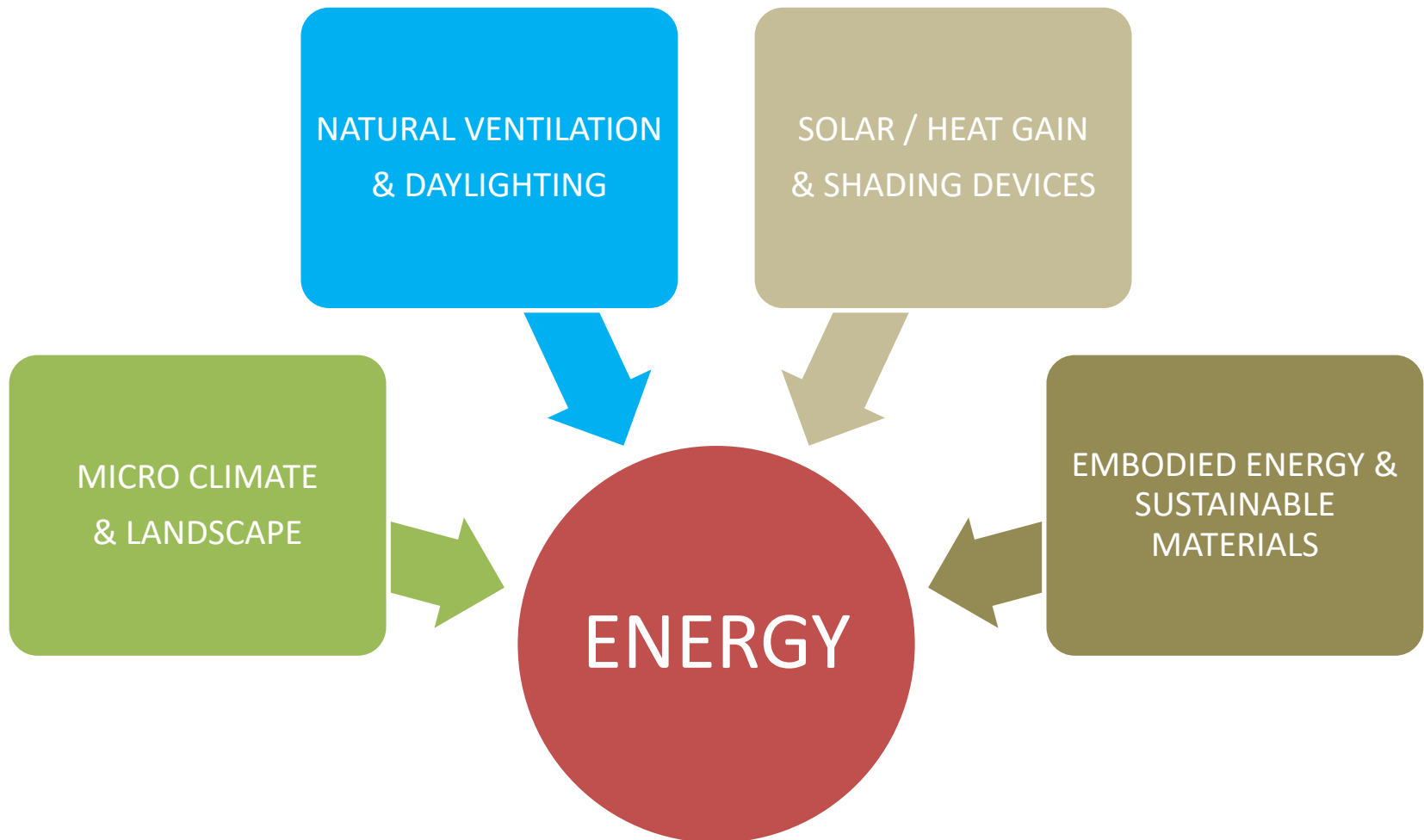


# SHADING



# SOLAR ENERGY

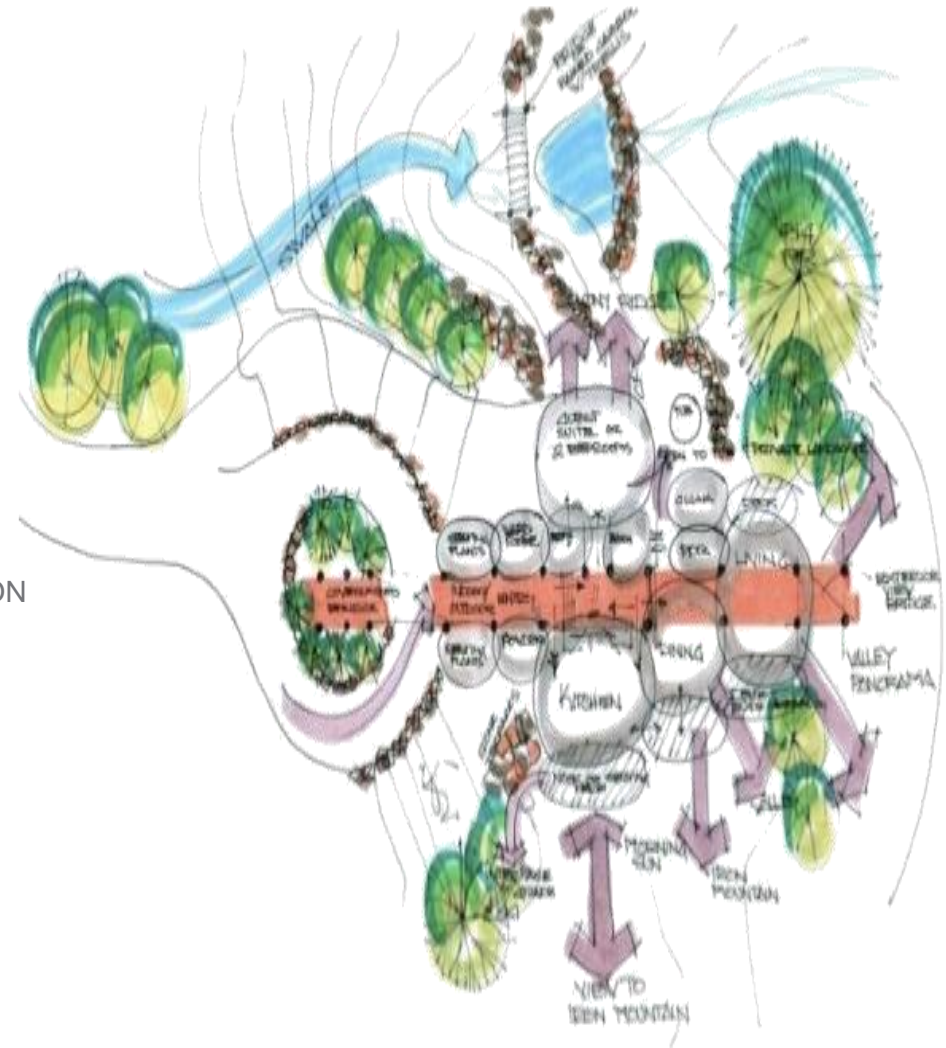
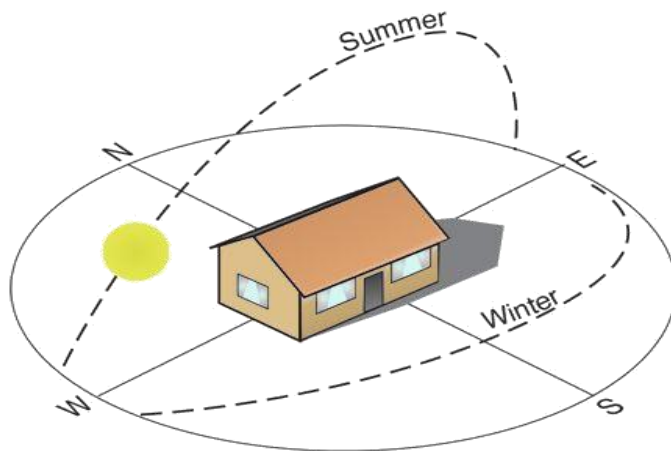
## HOW DO WE REDUCE THE ENERGY REQUIRED BY OUR HOUSING?



## MICRO CLIMATE & LANDSCAPE

### SITE ANALYSIS

- ❑ ORIENTATION – WHERE IS NORTH?
- ❑ SUN PATH – WHERE DOES SUN RISE / SET?
- ❑ WIND DIRECTION (GENERALLY E - NE IN BARBADOS)
- ❑ TOPOGRAPHY (SLOPE)
- ❑ EXISTING LANDSCAPE FEATURES / TREES / WATER
- ❑ POTENTIAL SITE ORGANISATION & BUILDING LOCATION

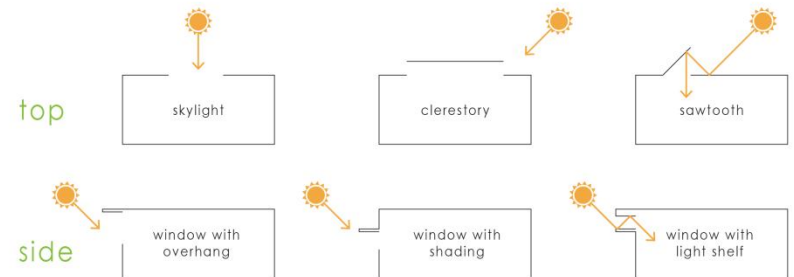
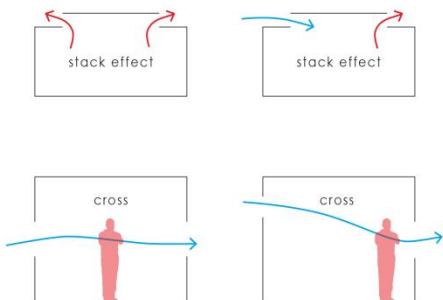




# NATURAL VENTILATION & DAYLIGHTING

maximizing natural ventilation instead of AC units and mechanical cooling devices

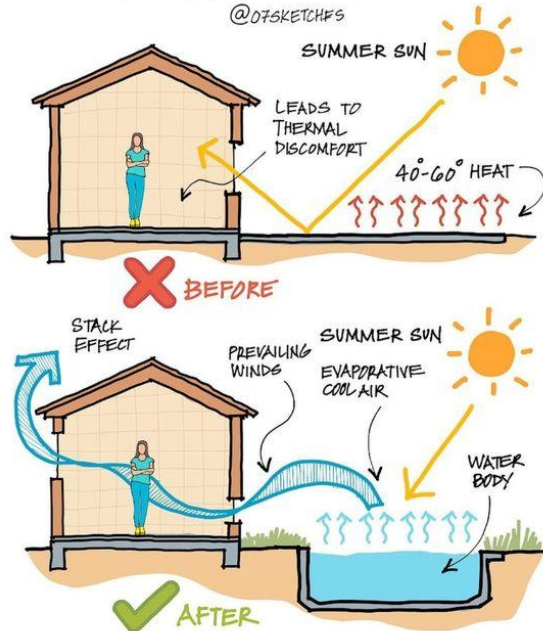
maximizing the use of natural light to perform tasks



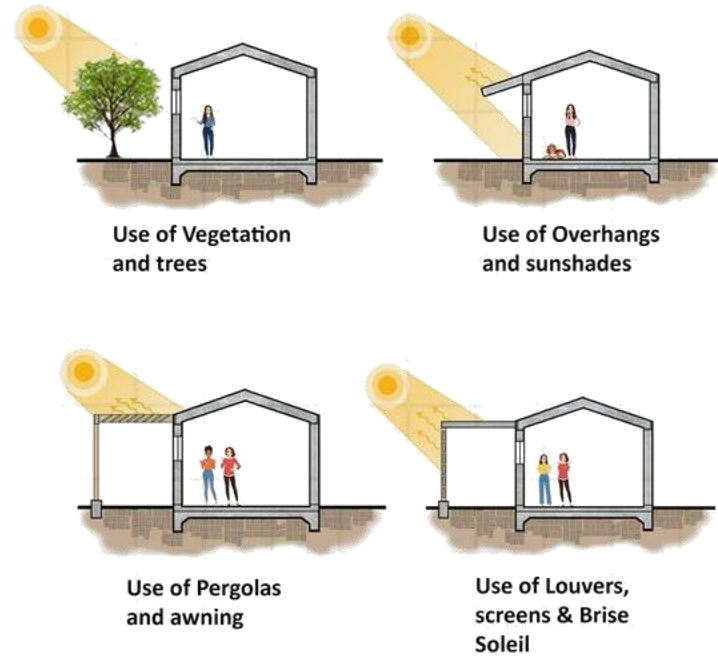
## SOLAR / HEAT GAIN & SHADING DEVICES.....

### NATURAL COOLING

@07SKETCHES



### How we can control sun radiation and heat gain?



## SOLAR / HEAT GAIN & SHADING DEVICES.....

“Verandas, covered patios, overhanging roofs, shutters and window hoods all help to shade the building from the suns rays”



## SOLAR / HEAT GAIN & SHADING DEVICES.....

.....timber slats / screens are used here to shade the patios from the direct sunshine..... while insulation keeps out the heat.....



rock wool



foil bubble

.... "rock wool" or "foil bubble" are one of many ways that provide thermal insulation from exterior climatic conditions. Thermal insulation reducing or eliminates the need for the electrical cooling equipment such as fans and AC units....



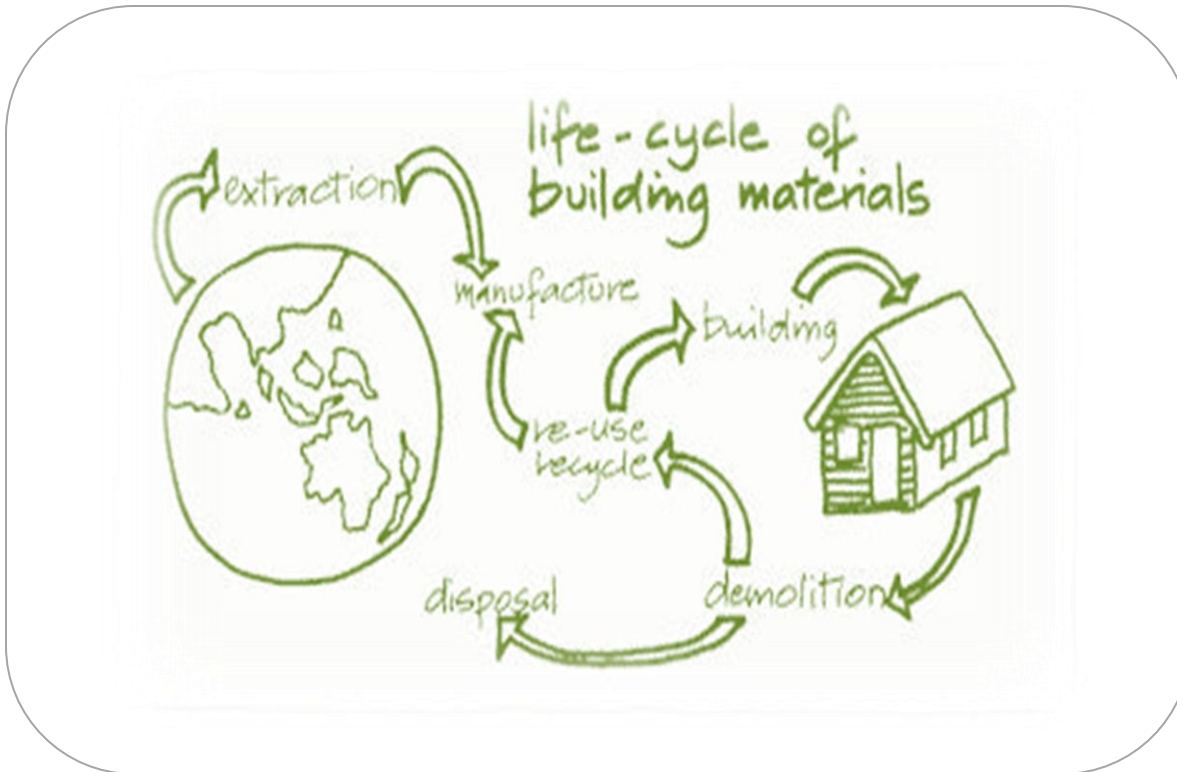


= 5 x



“The cooling effect of a mature tree transpiring 450 litres per day from its leaves has been estimated to be equivalent to 5 average size room A/C units running 20 hours per day”

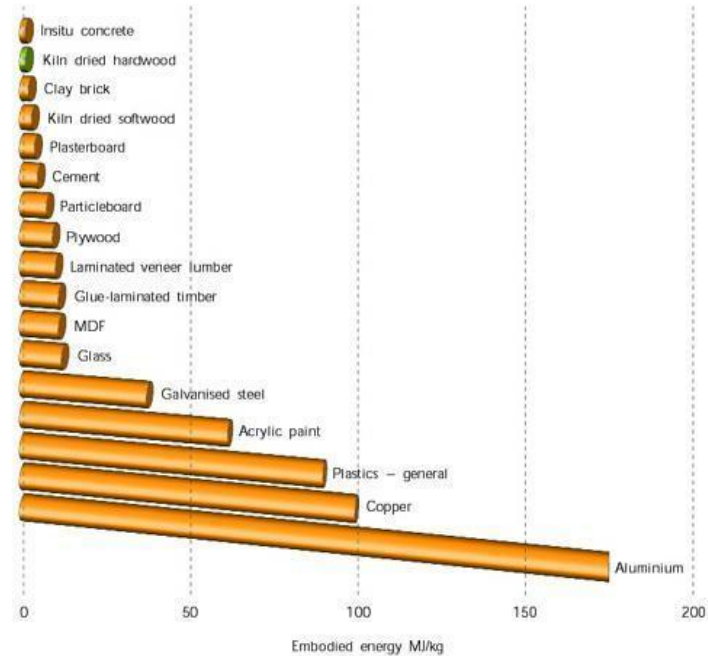
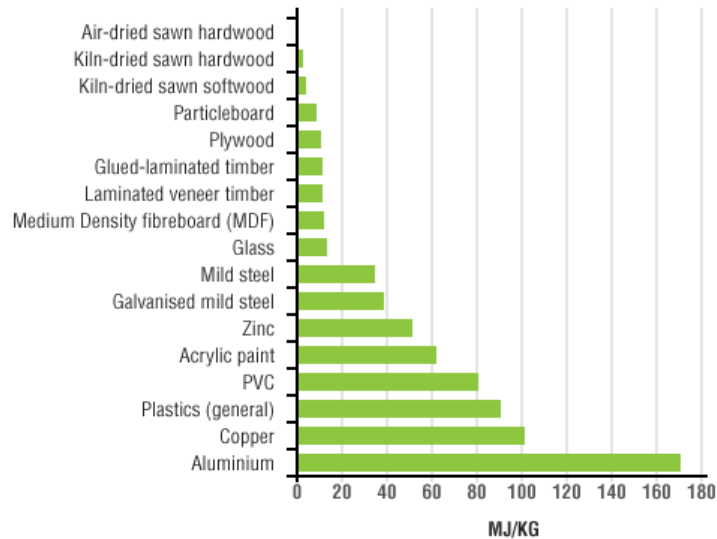
## WHAT IS EMBODIED ENERGY?



The amount of energy it takes to create an object or material and get it to the location where it is to be used...

## EMBODIED ENERGY FOR SOME COMMON MATERIALS

Process energy requirements for some common building materials



## SUSTAINABLE MATERIALS



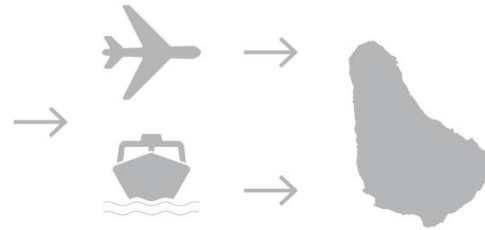
...use non toxic materials



where do your building materials come from...  
brazil, usa, europe?



foreign material VS local materials



material & resources...

Renewable, embodied energy, not harmful to environment or humans...



RECYLCE &  
REUSE MORE



composite decking



bamboo floor board



enviroshake roof tile



composite board



## HISTORIC SOLUTIONS & CURRENT PROBLEMS.....



### EVALUATION

❑ SHADING DEVICES? ..... VENTILATION PROVISIONS? ..... THERMAL MASS & HEAT STORAGE?

## CASE STUDY – RED RESIDENCE



**CARIBBEAN  
PROPERTY  
AWARDS**  
ARCHITECTURE

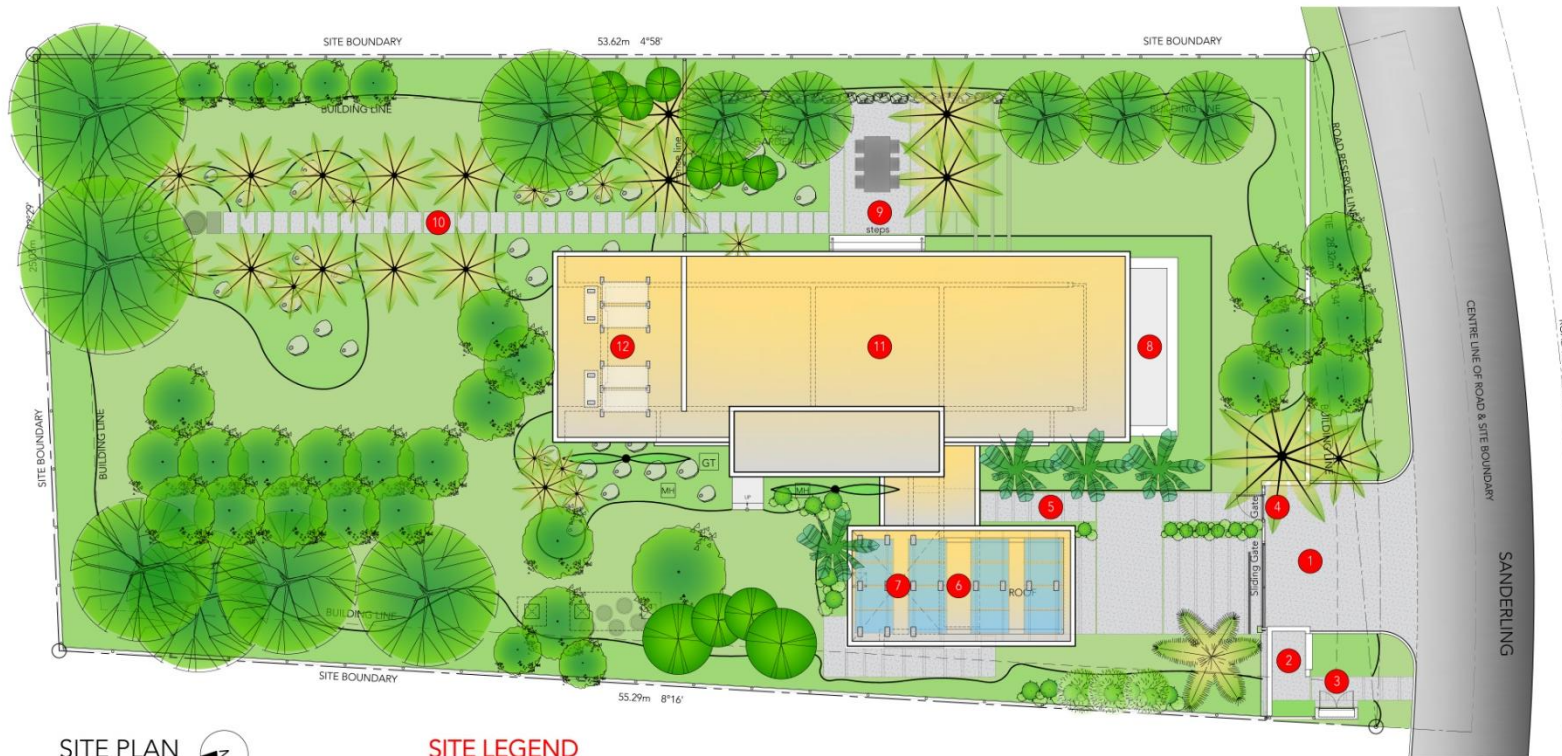


**BEST ARCHITECTURE  
SINGLE RESIDENCE  
BARBADOS**

Red  
by Studio Blue Architects Inc.

**2019-2020**

## CASE STUDY – RED RESIDENCE



### SITE PLAN

Scale 1:100



#### FLOOR AREAS

Ground Floor	- 270.5sqm / 2,911sqft
First Floor	- 202.8sqm / 2,183sqft
Roof (Internal)	- 26.5sqm / 285sqft
<b>TOTALS</b>	<b>- 499.8sqm / 5,379sqft</b>

Total Roof Area = 288.8m<sup>2</sup> / 3,108sqft

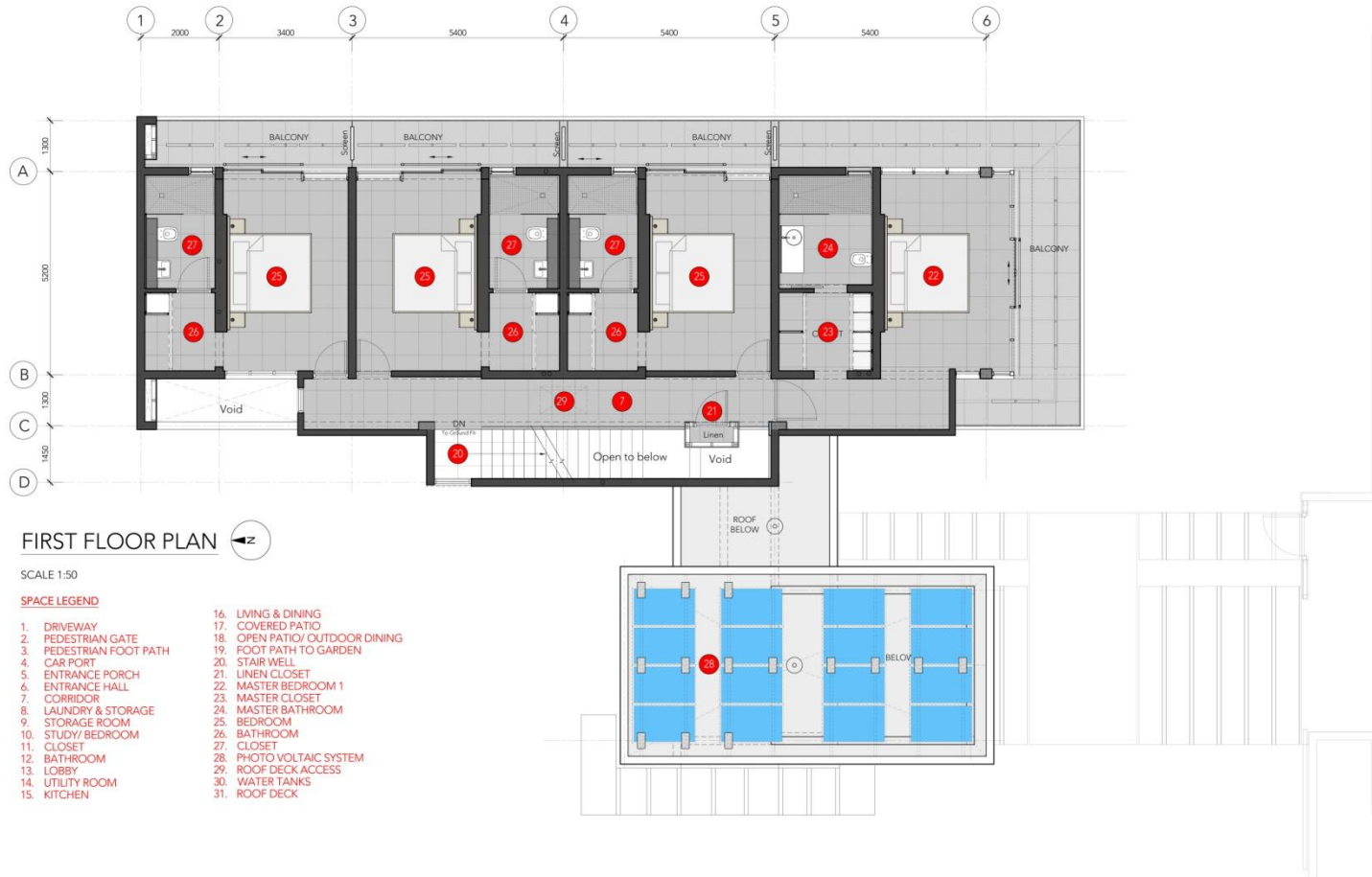
### SITE LEGEND

1. DRIVEWAY
2. TRASH ENCLOSURE
3. UTILITY METERS
4. PEDESTRIAN GATE
5. PEDESTRIAN FOOT PATH
6. PHOTO VOLTAIC ARRAY
7. 6000 GAL RAIN WATER TANK BELOW
8. PATIO
9. PATIO/ OUTDOOR DINING
10. GARDEN FOOT PATH
11. ROOF DECK
12. SOLAR WATER HEATERS

# CASE STUDY – RED RESIDENCE



# CASE STUDY – RED RESIDENCE



## CASE STUDY – RED RESIDENCE



## SUSTAINABLE HOUSING & THE ECO-SYSTEM.....



**Humans are only one factor in the ecosystem. But we don't quite see it this way. We see ourselves apart and call all the other factors or species "natural resources" – or simply "nature"**

**Once we accept that we are part of the eco-system...the objective of sustainable design then becomes "how to have a beneficial input to the ecosystem" as opposed to "how do we prevent the ecosystem from being influenced by humans"**



## THANK YOU

.....for allowing me to plant a seed for sustainability.....



Design “green” because it’s the intelligent thing to do!

Dr. Colin Hudson - British-born Barbadian, environmentalist and innovative scientist