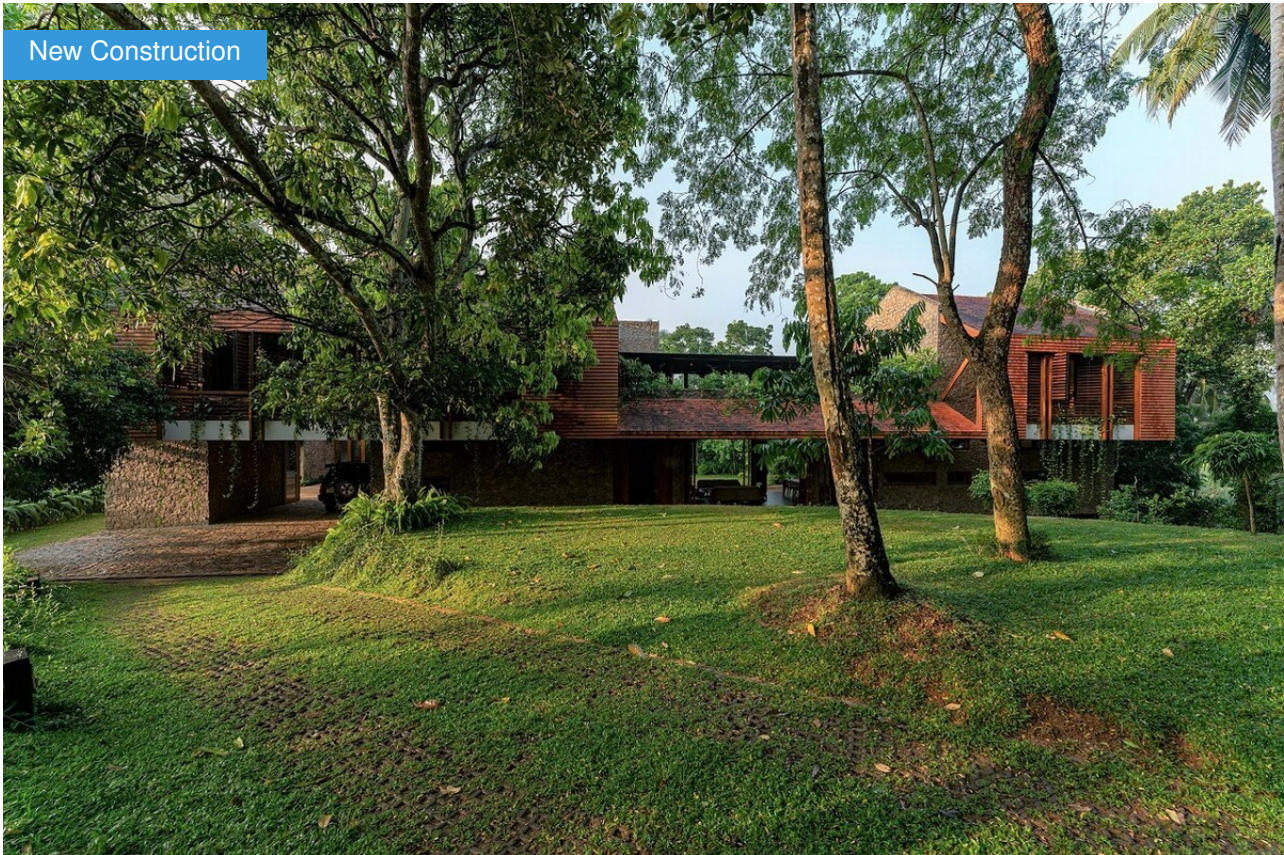


# "Blurred Envelop" - Home for Mr. & Mrs. Bandara

by narein perera / 2021-03-23 15:30:44 / International / 3261 / EN



New Construction

**Building Type** : Isolated or semi-detached house  
**Construction Year** : 2017  
**Delivery year** : 2020  
**Address 1 - street** : Malwatta 70160 GODAKAWELA, Sri Lanka  
**Climate zone** : [Af] Tropical Wet. No dry season.

**Net Floor Area** : 962 m<sup>2</sup> Other  
**Construction/refurbishment cost** : 455 000 €  
**Cost/m2** : 472.97 €/m<sup>2</sup>

Primary energy need :

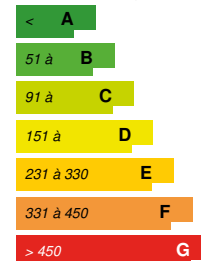
**1.45** kWhpe/m<sup>2</sup>.year

(Calculation method : Other )

## ENERGY CONSUMPTION

Economical building

Building



Energy-intensive building

Description

The home for Mr & Mrs. Bandara is conceptualised as an interpretation of the "Waluwa" or Manor house of vernacular tradition, in Sri Lanka. The Waluwa signifies and announces the status of a member of the community. It becomes a focus of activity that brings together people of various strata of the community, albeit in harmony.

Mr. Bandara is a self-made entrepreneur, who is now the head of a successful dairy based business, that reaches all over Sri Lanka. Yet, as was with people of old, in rural Sri Lanka, the Bandaras are well grounded in their approach to life, especially within the community and welcomed a 'Home' that allows them to connect and build relationships.

The challenge was to interpret the scale and accessibility of a manor house, yet establish it as an exploration of contemporary architecture, that draws upon the uniqueness of the site and its users.

The solution envisioned a "Blurred Envelop", that re-interprets the dominant roof of the tropical vernacular. An envelop that redefines the boundaries between roof and wall, to one that is neither wall nor roof. An envelop that shades - minimising solar heat gain; an envelop that screens and filters - allowing maximum ventilation together with ensuring privacy and security; an envelop that insulates - ensuring thermal comfort - yet welcomes the outdoors into its spaces; most importantly an envelop that creates 'places' - thus invite people to stay.

The materiality of the envelop is especially important to form and space making. The heavy stone base with the terracotta tile 'umbrella' alternate emphasis - both internally and externally - creating distinct zones of activity and contemplation.

## Data reliability

Self-declared

## Photo credit

Archt. Pasindu Kithmina and Archt. Lahiru Wimalarathne

## Stakeholders

### Contractor

**Name** : Mr. and Mrs. Kapila Bandara - The Client

**Contact** : kapila.chello[a]gmail.com

### Construction Manager

**Name** : Archt. Dr. Narein Perera - The Architect

**Contact** : nareinperera[a]gmail.com

### Stakeholders

**Function** : Designer

Archt. Dr. Narein Perera

nareinperera[a]gmail.com

Principle Architect

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**Function** : Structures calculist

Eng. Keerthi Ratnayake

keerthi[a]clefcon.com

Structural Design

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**Function** : Construction company

Saman Gamage

samanbgamage[a]gmail.com

General Contractor

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**Function** : Manufacturer

Archt. Shashikala Ranasinghe / Electroplastic Engineering Co.(PVT) LTD

shashi125[a]yahoo.com

Lighting Consultant, Luminaire Design and Manufacture

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**Function** : Manufacturer

**Function :** Other consultancy agency

CQS Sunanda Gnanasiri

ccccqs[a]gmail.com

Cost Consultant / Quantity Surveyor

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**Function :** Other consultancy agency

Eng. Kelum Perera and Eng. Rifai Mohamed

kak.perera[a]gmail.com, rifaas[a]gmail.com

M&E Engineering Consultants

## Contracting method

General Contractor

## Owner approach of sustainability

The primary motivation for sustainability stemmed from the decision to explore the build as a completely passively designed entity. A passive design that drew from its microclimate that was well suited for natural light and ventilation. Ultimately in its functional energy use to be 'off-grid' as much as possible.

## The site

The site for such a large property that is almost an acre large was chosen such that new ground was not used. Rather the site chosen was that of an existing house that was on the site. Although the footprint and extent exceeded that of the old house, no trees were cut, or ground cover cleared.

The orientation of the form mimicked that of the existing and enhanced the north and south facades, while consciously solidifying the east and west facades. The land extended in a north and south direction; therefore, it was only natural that spaces opened towards them. The existing access path was utilised as is, thus preserving existing vegetation and ground cover.

## Natural Light and Ventilation

The envelop is designed so that the spaces it encloses benefit from natural light and ventilation, that does not hinder its level of thermal comfort and daylight spaces.

The approach to light within spaces was one that mimicked the quality of light in the heavily planted tree canopy of the site in which light filters through. The low – yet comfortable – level of diffused light, reflecting off natural surfaces was a key objective.

The emphasis in placemaking was spaces that encourage people to stay. Therefore, the link between outside and inside are enhanced, blurring its boundaries.

## A green building initiative

This is not the Architect's first green building project. The Architect strives to consciously build according to the Warm Humid Climatic context of Sri Lanka, and thus, this project is taken as another, yet important opportunity to do so.

A key difference in the project was that the site is situated in a semi-rural context, devoid of much of the drawbacks of congested urban contexts and living. This is taken as an opportunity to freely open living spaces to the immediate microclimate and beyond, while ensuring comfort.

The construction processes have the added advantage that local material is freely available and is procured in a sustainable manner. Thus, concerns and decisions based on low carbon materials are made easier and more effective, both in terms of the impact on the environment and that of cost.

## Architectural description

### The Users' needs were a primary generator for the architectural manifestation of the residence.

As cited in the project description - The home for Mr & Mrs. Bandara is conceptualised as an interpretation of the "Walauwa" or Manor house of vernacular tradition, in Sri Lanka. The Walauwa signifies and announces the status of a member of the community. It becomes a focus of activity that brings together people of various strata of the community, albeit in harmony.

The challenge was to interpret the scale and accessibility of a manor house, yet establish it as an exploration of contemporary architecture, that draws upon the uniqueness of the site and its users.

The more public elements of the composition are fungible spaces that are conducive for family gathering, for the extended family, and importantly as a space for

Mr. Bandara's extensive social connections. This is deemed a primary reason for inclusion of the extended entertainment and indoor play area. These spaces are now used extensively, especially the badminton court and is taken as an opportunity to connect.

The more private spaces are placed within the 'envelop', protected, differentiating in terms of scale and the degree of openness to that of the more social spaces. The private areas of bedrooms are zoned such that allow a degree of privacy, are meant to encourage interaction between family members. The Bandara's four children – two boys and two girls – share rooms, rooms that again connect via a common loft. These spaces are also shared by the parents, more often than not. Further, the study area is a conscious effort to bring the family together in support of each other, as they strive to broaden their horizons.

Every one of these private spaces are afforded their own immediate verandah gardens, gardens that are protected and filtered by the 'blurred envelop'. Thus, the connection to the natural environment is accessible in close proximity as well as an extended vista.

## Materiality of the whole is one that embraces natural material in its most natural form and texture.

The terracotta tile is locally manufactured using clay collected from dredging irrigation tanks for rehabilitation. Terracotta tiles are utilised as both roof and wall as a 'blurred envelop', to develop a cohesiveness to form making. A form that celebrates the scale and shade the 'umbrella' creates.

The stone walls of base, grounds the form of the building at lower levels. Thus, the interplay between the two main materials is envisioned as one that breaks up the overall bulk of the simple form of the residence.

The inner spaces utilise timber as the primary material, a material imbued with good vibrations and invites the user to touch. A material that differentiates the interior from that of the envelop.

### If you had to do it again?

A significant aspect of the building process was the time taken for construction. The extended time for the construction was due to the responsible and sustainable procurement of materials, and the human capital heavy building process.

Yet, this is taken as a positive element in the overall scheme. This has allowed all concerned to make informed decisions and explore the labour intensive, hand-crafted approach to the creation of elements to the maximum.

### Building users opinion

The well-defined functional zones, the careful detailing of each zone in continuous consultation with the User, has resulted in the Users being extremely happy with the product. The home has been in occupation for over a year - a year that has compelled extensive use of our homes because of the COVID19 pandemic – yet, the Bandaras remain content.

A conscious decision was taken to avoid air conditioning in occupied spaces. Even with the extended occupation of the spaces during this year, the thermal comfort, in particular, is deemed satisfactory. Thus, in post occupancy evaluation it was decided to maintain all spaces as free running.

The illumination levels were kept comparatively low, to imbue spaces with a quality that encourages people to stay. This aspect is highly appreciated, and the comfort and peace of the places created, is appreciated by the Users.

Mr. & Mrs. Bandara eagerly await the day they can share their home with their friends and relations, freely and safely – without concerns of COVID19.

## Energy

### Energy consumption

Primary energy need : 1,45 kWhpe/m<sup>2</sup>.year

Primary energy need for standard building : 15,00 kWhpe/m<sup>2</sup>.year

Calculation method : Other

### Envelope performance

Envelope U-Value : 1,41 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

The envelope is dominated by the terracotta tile skin. The roof and wall elements differ in their level of insulation and internal layer :

The roof element includes a timber ceiling together with 50mm of insulation sandwiched between reflective layers.

The wall elements act as screens, thus includes only the timber structure and tiles.

The lower level of the residence uses random rubble walls. u-value = 4.38.

Building Compactness Coefficient : 0,24

## Renewables & systems

## Systems

### Heating system :

- No heating system

### Hot water system :

- Solar Thermal

### Cooling system :

- No cooling system

### Ventilation system :

- Natural ventilation

### Renewable systems :

- Solar photovoltaic

Renewable energy production : 88,70 %

No HVAC installed. Designed and run as a free running building. The spaces utilise ceiling mounted fans.

The system uses Net-metering for the solar system. Thus, there is no credit granted for excess energy produced.

Solutions enhancing nature free gains : The concept of the project is built around reducing solar heat gain, while maximising ventilation and optimising daylight integration. The building envelop is unique and developed for this purpose.

## Environment

### GHG emissions

Building lifetime : 80,00 year(s)

### Indoor Air quality

As a naturally ventilated building the possibility of CO2 concentration is minimised. Even when fully enclosed the vertical volumes of the spaces help ease any buildup of CO2.

All materials used in the interiors is natural and coatings used are all water based.

### Health & Comfort

#### Health & comfort :

Health and Comfort is deemed a primary concern in the siting, orientation and form making of the building in general and the building envelop in particular.

The shaded envelop ensures the direct solar heat gain into the interior spaces are minimised. The envelop itself is again shaded by vegetation adjacent to the building and vegetation on the envelop itself.

The verandah spaces outside each internal space and extensive natural ground cover around the building enhance evaporative cooling possibilities.

All fenestration is oriented to the north and south, while ensuring the glazed surfaces are shaded, by both building elements and vegetation.

The lighting of the spaces mimic and incorporate the natural rhythms of the day. Screens of timber and bamboo tat allow the user to control the intensity of light penetrating the spaces. Direct sunlight is avoided by the orientation of the fenestration, but use large opening to capture and integrate daylight, throughout the day.

## Products

### Product

Luminaires

Electroplastic Engineering Co.(PVT) LTD

shashi125@yahoo.com

Product category : HVAC, électricité / lighting



The Clients - the users of the residence - appreciate the idea of asymmetry and the soft, diffused quality of the light emanated by the luminaires. Fabric as the primary material for the ambient light luminaires works to soften the overall interior and its distinct materiality. The options for task lighting are specifically reduced in scale compared to that of the ambient fixtures. Thus less visible in general areas. All fixtures use LED lamps.

## Costs

### Construction and exploitation costs

Reference global cost : 580 000,00 €

Renewable energy systems cost : 5 700,00 €

Reference global cost/Dwelling : 580000

Total cost of the building : 505 000 €

Additional information on costs :

The total cost indicated here includes two distinct functional zones - the residence and the extended recreation / entertainment zone. The total cost also includes the complete furnishing of the spaces. All aspects were designed and custom manufactured for the project.

A distinct advantage was seen in the use and sourcing of materials from the locality, greatly reducing transport costs. Almost all of the major elements of the build was built in-situ, therefore waste was minimised to a maximum. [e.g. timber was sourced as logs from the local (State Timber Corporation), sized such that almost the whole log is utilised, as joists, rafters, timber battens etc.]

### Energy bill

Forecasted energy bill/year : 130,00 €

Real energy cost/m<sup>2</sup> : 0.14

Real energy cost/Dwelling : 130

## Urban Environment

### Urban environment

The site is a short distance from the main road, although it does not have views towards it. Therefore, it is sufficiently secluded, giving opportunities for opening of spaces, natural light and ventilation, without concern for vehicle emissions and particulate matter.

The placement of the new residence corresponded to where an existing residence was sited. The old residence was demolished, because it was in no condition for renovation. Therefore, minimal new ground area was consumed. This allowed the preservation of all existing trees on site and the conscious orientation and amalgamation of the landscape into the design.

The internal access path from the entrance to the property to the house is also one that originally existed. In its final detailing the path was paved with perforated blocks that allow grass to grow along the path, while vehicle access and surface water run-off is effectively facilitated for.

The indoor play area / badminton court, was a half built structure at the commencement of design process. Therefore, the siting and elevation was utilised as is. The structure was on an adjacent property, later amalgamated as a part of the whole.

The microclimate of the immediate context was exploited to the maximum. The shaded and vegetated context was preserved and this allowed the optimum integration of natural light and ventilation. Thereby, together with the renewable energy installation, created a Net-Zero energy building.

### Land plot area

4 222,00 m<sup>2</sup>

### Built-up area

15,00 %

### Green space

3 572,00

### Parking spaces

Dedicated Parking spaces provided for the Residence - 02

The carports are housed within the primary structure of the residence

Informal parking is available within the extent of the property, as a part of the landscape.

### Building Environmental Quality

- Building flexibility
- indoor air quality and health
- biodiversity
- works (including waste management)
- consultation - cooperation
- comfort (visual, olfactive, thermal)
- waste management (related to activity)
- water management
- energy efficiency
- renewable energies
- maintenance
- integration in the land
- building process
- products and materials

### Contest

- Passive Approach to Solar heat gain minimisation, ventilation enhancement, evaporative cooling enhancement and reducing conduction - for optimum thermal comfort within spaces.
- Building envelop as shade structure - both horizontally and vertically, double skin envelop, and as growing medium for the landscape.
- Near Net-zero energy building
- Local material and human capital emphasised construction processes. Therefore, a low embodied carbon material palette.
- Microclimate preservation and enhancement as a basis for successful natural light and ventilation based thermally comfortable spaces.

### Contest categories



Energy & Hot Climates

