

# LILAC: Low Impact Living Affordable Community

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New Construction

**Building Type** : Collective housing > 50m  
**Construction Year** : 2013  
**Delivery year** : 2013  
**Address 1 - street** : Lilac Grove, Victoria Park Ave LS5 3AG LEEDS, United Kingdom  
**Climate zone** : [Cfc] Marine Cool Winter & summer- Mild with no dry season.

**Net Floor Area** : 1 676 m<sup>2</sup> Useful area (es)  
**Construction/refurbishment cost** : 2 221 617 €  
**Cost/m<sup>2</sup>** : 1325.55 €/m<sup>2</sup>

Primary energy need :

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

(Calculation method : Primary energy needs )

## ENERGY CONSUMPTION

Economical building

Building

< **A**

51 à **B**

91 à **C**

151 à **D**

231 à 330 **E**

331 à 450 **F**

> 450 **G**

Energy-intensive building

**B**

## Description

LILAC is the UK's first affordable, ecological cohousing project. A community of 20 households and common house, the buildings are made with the ModCell prefabricated straw bale construction system, assembled by LILAC members using local straw. The excellent insulation properties of straw, combined with airtight construction, triple glazing, and heat recovery ventilation, reduce energy and CO<sub>2</sub> emissions to a minimum. A community owned Solar Hot Water & Photovoltaic scheme reduces energy & CO<sub>2</sub> emissions further. The site has a sustainable urban drainage system to minimise water use and run-off, and the landscape includes herb gardens and allotments shared with the wider community.

The LILAC homes have received UK Energy Performance Certification (EPC), according to the SAP 2009 assessment procedure.

## Data reliability

3rd part certified

## Stakeholders

### Stakeholders

**Function :** Developer

LILAC MHOS Ltd.

**Function :** Designer

White Design Associates Ltd.

mail@white-design.co.uk

**Function :** Manufacturer

ModCell

enquiries@modcell.com

**Function :** Contractor

Lindum

**Function :** Thermal consultancy agency

ProGETIC SCP

progetic@progetic.com

**Function :** Others

Co-Ho Ltd.

**Function :** Structures calculist

Integral Engineering Design

**Function :** Others

BWA Quantity Surveyor

## Contracting method

General Contractor

## Owner approach of sustainability

The aim of LILAC is to:

- Reduce our impact on the environment
- Respond to the housing crisis
- Make a positive contribution to the surrounding community.

## Architectural description

The units use the innovative 'ModCell' building system to provide an environmentally sensitive approach to suburban housing which is unique to the UK. The construction is a mixture of timber frame and straw bale structural panels finished in a mixture of lime render and timber, with timber frame internal partitioning.

The site arrangement is in a courtyard formation and approximately one third of the site is landscape and allotment gardens, which is used by the residents to reduce their ecological footprint. The number of car spaces is limited to reduce the carbon emissions from the residents and all residents sign a pledge which commits them to the philosophy of the group. The design is contemporary and sets a new standard for both environmental performance and house design in suburban environments.

## Energy

## Energy consumption

Primary energy need : 62,78 kWhpe/m<sup>2</sup>.year

Primary energy need for standard building : 200,00 kWhpe/m<sup>2</sup>.year

Calculation method : Primary energy needs

Final Energy : 104,95 kWhfe/m<sup>2</sup>.year

Breakdown for energy consumption :

Space heating [kWh/m<sup>2</sup>.a] average = 35.73

Hot tap water [kWh/m<sup>2</sup>.a] average = 39.22

Lighting & appliances [kWh/m<sup>2</sup>.a] estimated = 30.00

More information :

Billing data is currently being collected.

## Envelope performance

Envelope U-Value : 0,19 W.m<sup>-2</sup>.K<sup>-1</sup>

More information :

The external walls and roof construction is a glulam timber frame, filled with straw bales the internal walls and floors uses a conventional timber frame. The external walls are rendered using lime render and finished with cedar cladding to cover the structural frame elements, floor and roof levels.

ModCell is a prefabricated system consisting of load bearing, storey-height glulam framed panels. The panels are filled with straw and lime rendered on both sides providing the internal and external finish. The ground floor panels are delivered to site and craned into position. Prefabricated floor cassettes are fixed into position over the ground floor structure, followed by the next storey of panels. The roof structure is also formed using straw filled ModCell panels. Typically, there are 16-18 panels needed to build a three-bedroom house and a two-storey home can be erected in just 2.5 days.

The ModCell panels are not manufactured in a conventional factory. Instead, a Flying Factory is set up to provide temporary manufacturing facilities near to the construction site. This reduces transport emissions and fits in with the ethos of benefiting local communities. Appropriately, ModCell uses farmers' barns to produce the panels and the straw is often sourced from the same farm or from nearby, again this reduces transport emissions and keeps the value of the project in the local economy.

Pre-shaped and drilled glulam sections are delivered to the Flying Factory in Ikea-like, flat pack form ready for assembly into the structural frames. The straw bales are shaved down to size using a bandsaw to provide an even surface ready for rendering. The bales are placed in the frame and built up in layers in a stretcher bond. Wooden dowels are driven in to the bales to ensure they are locked in position to each other and the glulam frame.

Lime render is applied to both sides of the panel, two build up coats are spray applied and levelled with a day or two between coats. After 10 days the render has cured sufficiently to allow the panels to be transported to site ready for installation. A finish coat of render is applied post installation. Lime render is used because of its breathability allowing moisture to move freely in and out of the wall. LILAC residents got involved in the assembly of the panels in the Flying Factory.

The uValue of the ModCell walls is 0.19. The roof at LILAC, also made using straw as insulation, and has a uValue of 0.15. This exceeds the current building regulation requirements for walls at 0.35 and roofs at 0.25. The airtightness of the panels is also very good. The combination of high levels of insulation, airtightness and triple glazing used at LILAC results in significantly reduced energy consumption. The scheme as a whole meets CSH Level 4. Preliminary modelling showed that the apartments would have a yearly space heating demand of 22.78 kWh/m<sup>2</sup> and the houses 33.23 kWh/m<sup>2</sup>. Using the ModCell system means that homes are 25% more energy efficient than traditionally constructed homes built to the 2010 Building Regulations Part L. The use of renewable materials like straw and timber, that absorb CO<sub>2</sub> out of the atmosphere as they grow, means that there is an average of 12.25 tonnes of CO<sub>2</sub> locked up in each house.

Indicator : EN 13829 - q50 » (en m<sup>3</sup>/h.m<sup>3</sup>)

Air Tightness Value : 2,75

## Renewables & systems

### Systems

Heating system :

- Gas boiler

Hot water system :

- Gas boiler
- Solar Thermal

Cooling system :

- No cooling system

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- Solar photovoltaic
- Solar Thermal

Renewable energy production : 30,00 %

## GHG emissions

GHG in use : 10,60 KgCO<sub>2</sub>/m<sup>2</sup>/year

Methodology used : SAP & SBEM UK Energy Certification Methodology [Dwelling Emissions Rate]

Building lifetime : 80,00 year(s)

## Indoor Air quality

Good indoor air quality is achieved through the use of natural, renewable, non-toxic building materials and finishes, including straw, PEFC timber, lime renders, and low-VOC water based paints and varnishes. Whole house ducted heat recovery ventilation brings continuous fresh air into the buildings.

## Products

### Product

ModCell Traditional Panel

ModCell

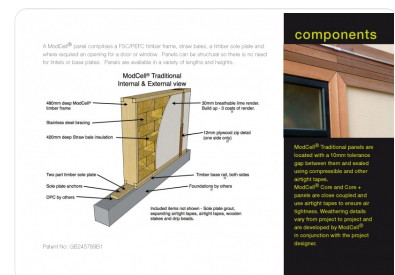
enquiries@modcell.com

Product category : Structural work / Passive system

ModCell® is one of the first products to make large-scale, carbon-negative building a commercial reality.

The ModCell® system utilises the excellent thermal insulation qualities of straw bale construction to form prefabricated panels, made in a local Flying Factory™.

ModCell® allows super-insulated, high-performance, low energy 'passive' buildings to be built using renewable, locally sourced, carbon sequestering materials that include straw bale and hemp to create a less than zero carbon construction system.



## Costs

### Construction and exploitation costs

Reference global cost : 4 251 338,00 €

Renewable energy systems cost : 38 471,00 €

## Urban Environment

### Urban environment

As a co-housing scheme, members share facilities in what is known as a common house, which includes a laundry, communal cooking and eating space, a play area and office space. The common house is a place to meet and socialise as well as where the day to day management of the society is based. Each house and apartment has their own kitchen and bathroom like any other home. This communal approach to sharing, cuts energy use and promotes a sustainable way of life as residents are encouraged to grow food and provide a supportive environment for older and vulnerable members.

White Design also designed the landscape and the principles of cohousing informs many aspects of the layout of the site. The houses and apartments are arranged around an informal courtyard with a pond at its centre. The pond harvests rainwater as part of the Sustainable Urban Drainage scheme (SUDs). One third of the site is set up as a shared landscape with allotment gardens, which will be used by the residents to grow their own food and reduce their ecological footprint. Car spaces are also limited to reduce the carbon emissions from transport and all residents sign an agreement on joining which commits them to the philosophy of the society.

LILAC's community and sustainability agenda, was the reason it chose to build using straw. "We chose straw for its environmental credentials and because it allowed the community to get involved in the construction process," explains Paul Chatterton, resident and co-founder of LILAC.

### Land plot area

5 000,00 m<sup>2</sup>

### Built-up area

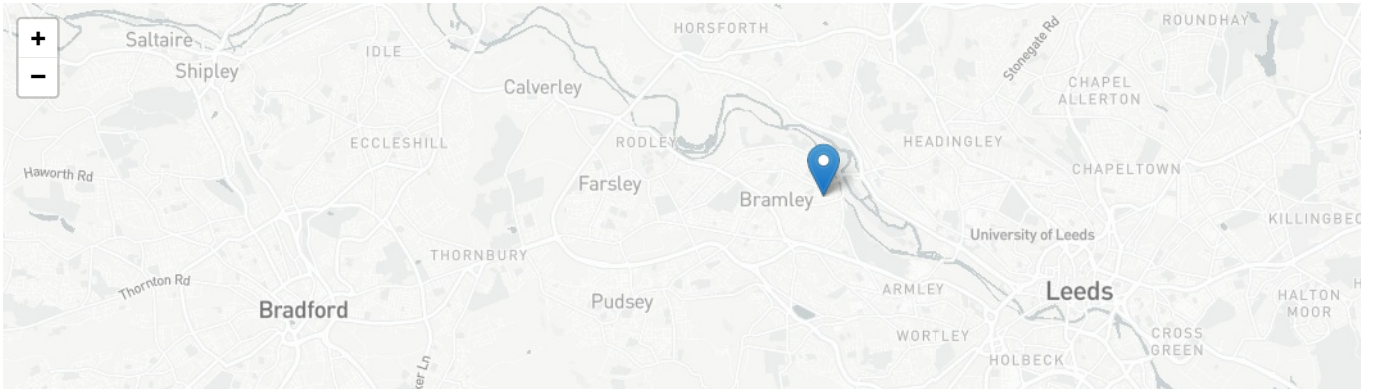
16,00 %

## Green space

1 000,00

## Parking spaces

There is limited on-site parking and ample cycle storage facilities



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