


# Centre Gilbert Raby (78)

by [Gaston Tolila](#) / 2023-05-24 15:21:14 / France / 365 / FR

**New Construction**



**Primary energy need :**

15 kWhep/m<sup>2</sup>.an

(Calculation method : RT 2012 )

**ENERGY CONSUMPTION**

*Economical building* *Building*

< 50	A
51 à 90	B
91 à 150	C
151 à 230	D
231 à 330	E
331 à 450	F
> 450	G

*Energy-intensive building*

**Building Type** : Public or private hospital  
**Construction Year** : 2022  
**Delivery year** : 2023  
**Address 1 - street** : 2 avenue du Maréchal Joffre 78000 MEULAN-EN-YVELINES, France  
**Climate zone** : [Cfb] Marine Mild Winter, warm summer, no dry season.

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**Net Floor Area** : 877 m<sup>2</sup> SU  
**Construction/refurbishment cost** : 3 230 000 €  
**Number of Bed** : 15 Bed  
**Cost/m2** : 3683.01 €/m<sup>2</sup>

## General information

The project consists of the construction of a new building on two levels hosting the functions of therapeutic workshops, laundry, day hospital and pharmacy. The building is inserted into the slope of the land, giving level access to the two levels which have entirely independent operations. On the ground floor, the therapeutic workshops and the laundry are intended for patients accommodated on the site and accessible from the North. On the ground floor, the day hospital welcomes patients in follow-up care on a daily basis, from the South. The use of the pharmacy, also on the ground floor to the west, is reserved for hospital staff. A wide bioclimatic interior street provides access to all the premises on two levels while offering a climatic transition space between the exterior and the interior. This sustainable design is associated with a wooden structure, raw earth bricks inside and bio-sourced wood fiber insulation.

The project is set up in a plot now occupied by several buildings forming the Center Gilbert Raby, a private health establishment of collective interest (ESPIC) participating in the public hospital service, specializing in addictology and the treatment of addiction. It is administered by the Elan Retrouvé Foundation. The building slips into the slope towards the Seine, under a two-sided roof. The project develops a simple and functional architecture while remaining compact and robust, highlighting a sober building in its structure and forms. Visually, the project blends harmoniously into the wooded context with which it resonates through a sleek design but also through its materiality: the exposed wooden structural elements of the cantilevered roofs, the exterior cladding made of shingles of pre-graded larch, highlighting French know-how, and the varnished wooden joinery naturally echoes the context.

Inside, the logic of interaction with the natural elements is preserved: it has indeed been proven that evolving in contact with natural elements induces a level of well-being higher by 15%. The workshops and medical offices are organized in symmetry around a generous interior circulation, largely illuminated by the set of roofs, which constitutes the nerve center of the bioclimatic functioning of the project. The first step is to make it a true autonomous interior / exterior transition space by offering generous visual continuity to the exterior and the Seine through the North and South glazed facades. The organization of the premises around the bioclimatic circulation has been thought out according to the uses accommodated in such a way as to optimize the flows and deal with the source of the

thermo-acoustic constraints. Unheated, it is designed to be temperate in winter by being largely illuminated by the interplay of roofs: this accentuates the effect of freedom and openness sought via a carefully sized glazed strip zenithal and protected by removable blinds . Its seasonal thermal stability is ensured by its raw earth brick walls coupled in summer with a logic of discharge by night ventilation independent of the other premises via motorized dampers integrated in the North and South curtain walls and in the vertical roof strip.

From a constructive point of view, a logic of frugality was sought: on the ground floor, the semi-buried configuration of the building led to the preference for a reinforced concrete structure less sensitive to water than wood. External Thermal Insulationcork is then made in order to take advantage of the thermal inertia of the concrete and eliminate the risk of condensation in the walls. On this concrete structure of the ground floor rests on the ground floor, an aerial wooden structure. The continuous shape of the facade allows easy implementation of the works as well as a reduction of thermal bridges.

Thermal performance (winter and summer) is ensured by a high-performance envelope made of biosourced materials (wood wool, prefabricated wood panels) which provide insulation in winter and thermal phase shift in summer. The rationalization of construction methods simplifies at the source the continuous implementation of airtightness works. In addition, a thermal airlock has been planned on the North entrance which limits the entry of parasitic air with each new arrival of users and the generous curtain walls are in triple glazing to the North in order to limit heat loss on this non-sunny orientation in winter.

## Building users opinion

The hospital staff has a very positive feedback on the soothing atmosphere of the establishment linked to the strong presence of biosourced materials and raw earth bricks.

## If you had to do it again?

The implementation of the reuse of earth with raw earth bricks was put in difficulty at the start because no company competent in the implementation of earth responded to the call for tenders (mainly because the site was too far for them). We therefore opted for an alternative solution: to offer specific training in the implementation of raw earth products (training provided by Cycle Terre) to a traditional masonry company. This training went very well and allowed the masons to gain skills, and the raw earth site to be carried out very well.

## BIM approach

The BIM approach (Revit modelling) was implemented from the start of the studies until the end of the construction site.

## Photo credit

Cyrille Weiner

## Stakeholders

### Contractor

Name : Fondation l'Elan Retrouvé

Contact : François Bosset

<https://www.elan-retrouve.org>

### Construction Manager

Name : Tolila+Gilliland

Contact : Gaston Tolila

<http://www.tolilagilliland.com>

### Stakeholders

Function : Other consultancy agency

Mizrahi

Eric Bournique

<https://www.sasmizrahi.com>

Thermal consultancy agency TCE: Structure, Fluids, VRD, CSSI, Economy

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Function : Structures calculist

Sylva Conseil

Antoine Baugé

<https://www.sylva-conseil.fr>

Thermal consultancy agency - Wood structure

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Function : Other consultancy agency

180 degrés ingenierie

Julien Coeurdevey

<https://180ingenierie.com>

Thermal consultancy agency environment, Biosourced materials

Function : Other consultancy agency

IPCS

Jérémy Guillemin

<https://www.ipcs-idf.com>

OPC

## Type of market

Realization

## Allocation of works contracts

Separate batches

## Energy

### Energy consumption

Primary energy need : 15,00 kWhep/m<sup>2</sup>.an

Calculation method : RT 2012

## Renewables & systems

### Systems

Heating system :

- Others

Hot water system :

- Individual electric boiler

Cooling system :

- No cooling system

Ventilation system :

- Double flow heat exchanger

Renewable systems :

- No renewable energy systems

## Environment

### Risks

Hazards to which the building is exposed :

- Flooding/Slow flood
- Geotechnical drought (Clay soil shrinkage and swelling)

### Urban environment

The project is set up in a plot occupied by hospital buildings on the edge of a wood. The building slips into the slope towards the Seine.

### Construction and exploitation costs

Total cost of the building : 3 230 000 €

## Circular Economy

### Circular economy strategy

Phase in which reuse has been integrated : Sketch study

Type of circular economy strategy implemented :

- Maximization of quantities on targeted products
- Maximization of the carbon gain
- Maximization of the mass of waste avoided

Type of circular economy strategy implemented :

The project has been eco-designed, favoring frugal, bioclimatic solutions, industrial and territorial ecology and biosourced materials (envelope in particular) and reused (raw earth).

The circular economy strategy focused on raw earth, in several aspects (in raw earth bricks and exposed earth plasters) in addition to a strategy of choosing biosourced materials (wood wool and cork insulation ) in order to reduce the overall carbon footprint as much as possible.

Deposit validation form : Yes

### Reuse : same function or different function

Batches concerned by reuse :

- Structural works
- Partitions
- others...

For each batch : Reused Materials / Products / Equipments :

- Partitions and Structural Work: 250 m<sup>2</sup> of mud brick walls
- Interior finishes: 220 m<sup>2</sup> of earthen plaster.

Reused materials rate :

Compressed earth blocks, often referred to as BTC, are very slightly damp sifted earth, strongly compressed using a press. Once pressed, they are stored and left to dry for one to three weeks. After this time, they are ready to be implemented and allow the realization of all types of vertical walls.

Earth plasters do not contain artificial colors or pigments; they are made from clay, which gives them their authentic and natural character.

### Logistics

Storage of materials from external supply :

- No problem of storage, supply correlated to the progress of the works

### Insurance

Consultation of the technical controller : Yes

Specific mission given to the technical controller :

The implementation of BTCs is subject to ATEX type A.

### Economic assessment

Total cost of reuse : 90 €

Reuse quantified in the companies' offers? : Yes

Purchasing process for reused materials :

- Purchase by the company from a reuse platform

## Communication

Communication on the process : Yes

If so, please specify :

Site visit with the CAUE.

Project visit : Yes

## Circular design

Industrial and territorial economy :

### Systems in accordance with the passive approach and sanitary quality

The frugality of the architectural bias is complemented by the efficiency of the systems:

The neighboring building being equipped with an oversized gas boiler room, in a logic of cost reduction it was simply planned to manage the heating of the premises from a substation connected to the existing boiler room. External networks are systematically class 5 insulated.

Hygienic ventilation is achieved by very high-efficiency dual-flow ventilation with wheel heat exchanger and direct current fans fitted with F7 + G4 filters. The general fresh air intake is made away from sources of pollution (parking for example). Specific ventilation management is implemented for premises that are sources of odours.

To guarantee air quality worthy of the name for users, air renewal rates are 30 m<sup>3</sup>/h per occupant, much higher than required by the RSDT and the labor code. Fine watertightness of the networks has been planned and thought out: class B targeted with a measurement carried out on site.

Eco-design :

### Contemporary and vernacular, in resonance with its host site

The project develops a simple and functional architecture while remaining compact and robust, highlighting a sober building in its structure and forms.

Visually, the project fits harmoniously into the wooded context with which it resonates through a refined design but also through its materiality: the exposed wooden structural elements of the cantilevered roofs, the exterior cladding made of shingles pre-graded larch, highlighting ancestral French know-how, and the varnished wood joinery naturally echoes the context.

Inside, the logic of interaction with natural elements is preserved: it has in fact been proven that living in contact with natural elements induces a 15% higher level of well-being and sublimated creativity.

### Interclimatic circulation, in transition inside/outside

The workshops and medical offices are organized in symmetry around a generous interior circulation which constitutes the nerve center of the bioclimatic functioning of the project.

The first step is to make it a real autonomous interior / exterior transition space by offering generous visual continuity to the exterior and the Seine through the North and South curtain walls.

Unheated, it is designed to be temperate in winter by being largely illuminated by the interplay of roofs: this in fact accentuates the effect of freedom and openness sought via a zenithal glass strip carefully sized and protected so as not to penalize summer comfort. Its seasonal thermal stability is ensured by its raw earth brick walls coupled in summer with a nocturnal freecooling discharge logic independent of the other premises via motorized dampers integrated into the North and South curtain walls.

### Bioclimatism and quality of use of spaces

To simplify and rationalize the implementation, the natural lighting of the business premises is achieved via two long glazed bands on the East and West facades completed in the back of the premises by additional second days overlooking the very bright interior street.

In coordination with the architects, the organization of the premises around the bioclimatic circulation has been thought out according to the uses accommodated so as to optimize the flows and deal with the source of the thermo-acoustic constraints:

The densely occupied or high-activity group work rooms (sports / kitchen) are located to the east, while the quieter rooms with lower occupancy are positioned on the west facade - the most problematic orientation for the comfort of summer.

The technical spaces have been positioned to the north or in contact with the ground: acting as buffer spaces in winter, they limit losses.

### Low carbon construction and stabilization of hygrothermal conditions

From a constructive point of view, a logic of frugality was sought: on the ground floor, the semi-buried configuration of the building led to the preference for a reinforced concrete structure less sensitive to water than wood. External Thermal Insulation in wood wool is then carried out in order to take advantage of the thermal inertia of the concrete and eliminate the risk of condensation in the walls. On this concrete structure of the ground floor rests on the ground floor, an aerial wooden structure visually accessible for the greatest comfort of users. The absence of any form irregularity or façade accident allows an easy implementation of the works as well as an intrinsic reduction of thermal bridges.

### View of the framework in the construction phase

Thermal performance in winter and summer is ensured by a high-performance envelope made of biosourced materials (wood wool, prefabricated wood panels) which provide insulation in winter and thermal phase shift in summer. The rationalization of construction methods simplifies at the source the continuous implementation of airtightness works. In addition, a thermal airlock has been planned on the North entrance which limits the entry of parasitic air with each new arrival of users and the generous curtain walls are in triple glazing to the North in order to limit heat loss on this non-sunny orientation in winter.

### Sun and wind solicited as needed

Conversely, the curtain wall is in clear double glazing to the south without solar control to take advantage of direct winter sunshine and the albedo effect provided by the Seine.

The south-facing curtain walls are simply but effectively protected from direct sunlight by fixed metal sunshades. Given the context (neighboring building + dense vegetation), the business premises and offices facing East and West are simply protected by manual interior blinds in light fabric. Inertia is provided by a concrete floor screed with resin coating and the walls at the bottom of the premises in fermacell panels coated with raw earth. These will also provide natural moisture management and acoustic comfort in addition to the mineralized wood fiber false ceilings.

The thermal discharge of these spaces is made possible by cross-ventilation which also stresses the thermal draft via transfer openings giving onto the interior street and side vents in the roof of the interior street.

The air inlet is carried out directly by the facade joinery via opening limiters which allow night ventilation with air renewal rates planned around 3 volumes per hour.

## Additional information (PDF documents)

### Health and comfort

#### Indoor Air quality

All the materials used allow occupants to benefit from healthy indoor air with low levels of pollutants.

#### Comfort

##### Temperature level :

Dynamic thermal simulation studies show that the adopted bioclimatic strategy offers thermally comfortable spaces all year round. This strategy is based on an effective thermal envelope associated with appropriate solar protection and natural night ventilation to unload materials with high inertia. The STDs specify that only two spaces can be considered slightly uncomfortable in 2050 (IPCC scenario A1B).

##### Humidity control :

The BTCs allow constant hygrothermal control in the interior street.

##### Visual comfort :

Natural lighting studies (FLJ) show that all first-day spaces benefit from satisfactory access to light, even very satisfactory for some.

#### Quality of life and services

The project develops a simple and functional architecture while remaining compact and robust, highlighting a sober building in its structure and forms. Frugality, bioclimatism, biosourced and reused materials have been integrated throughout the design of the project. It has thus been designed in such a way as to promote the comfort of the interior environment, in particular thanks to:

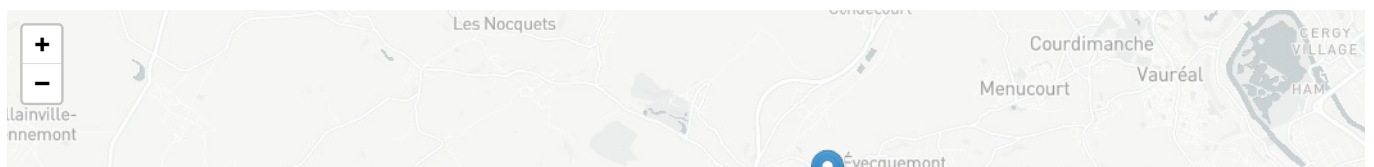
- Harmonious integration with the surrounding nature;
- An interclimatic circulation allowing seasonal thermal stability;
- A high-performance envelope made of biosourced materials that provide insulation in winter and thermal phase shift in summer.

### Carbon

#### Carbon sink

- Wood frame
- Insulation: wood fibre, cork
- Joinery: wood

### Contest





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