



Co-funded by the Horizon 2020
Framework Programme
of the European Union



BUILDING REVERSIBLE IN CONCEPTION (BRIC)

PRESENTATIONS & VISITS pilot projects BAMB - 13/10/2017



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DESCRIPTION OF THE PILOT PROJECT

- Type of construction: new construction with partly reclaimed materials
- Function & Size

BRIC 1 (73 m ²)	BRIC 2 (77 m ²)	BRIC 3 (?)
Office Meeting room	Office Meeting room Shop / exhibition space	Office Meeting room Coffee shop / dining room Mobile terrace

- Location: Brussels, Belgium
- Budget: € 494 100 (estimation construction costs BRIC 1: € 78 500)

DESCRIPTION OF THE PILOT PROJECT - CONTEXT



- Pedagogical module build at educational center EFP
- 3x Build - Deconstruct- Rebuild within 3 years

Focus on

- Reversible design
- The use of new circular building materials and reclaimed/reused materials
- Short circuits and continuous loops
- Circular design focussing on high energy performance and the sustainable use of water

DESCRIPTION OF THE PILOT PROJECT - CONTEXT

Part of the Regional program for circular economy of the Brussels Government.

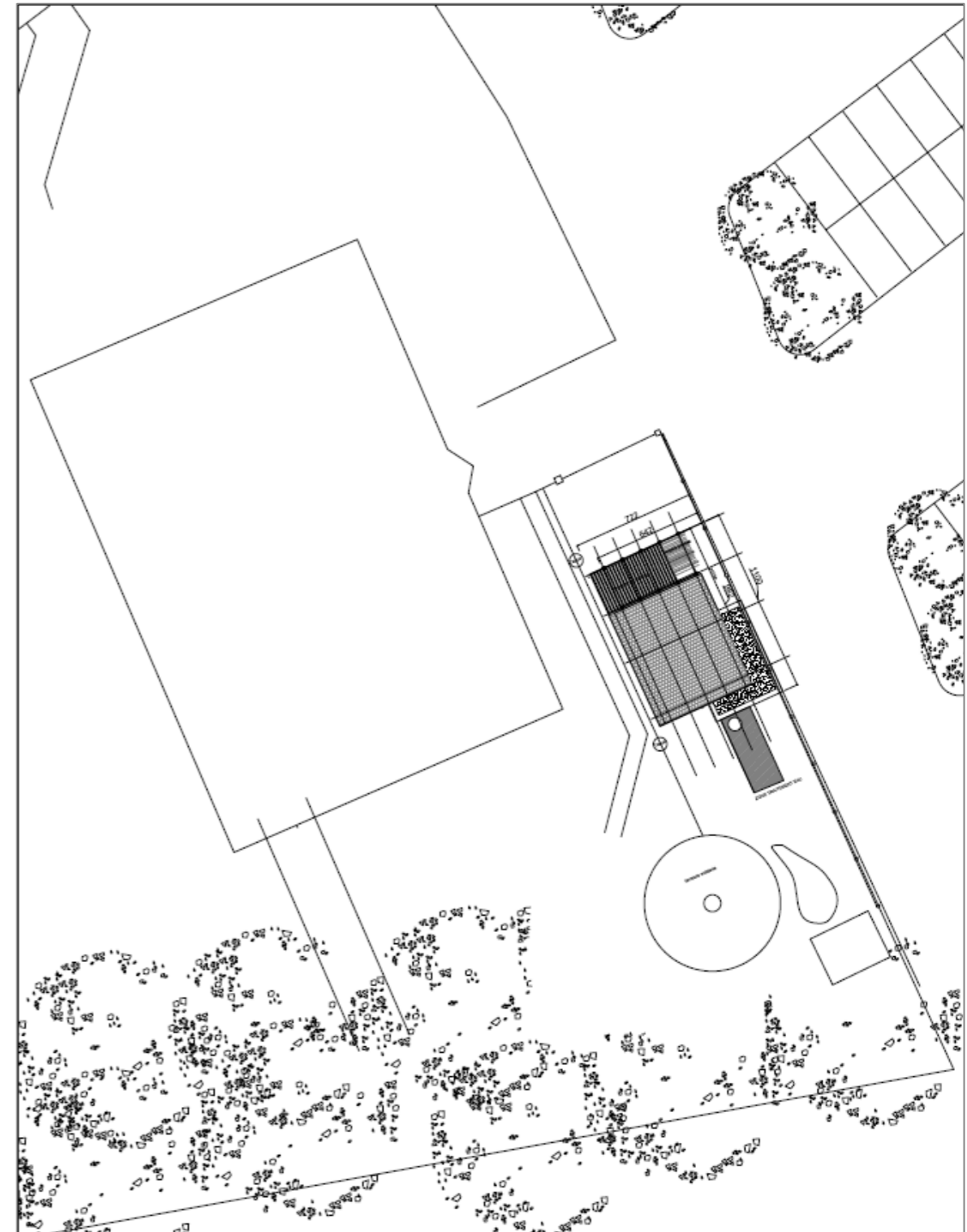
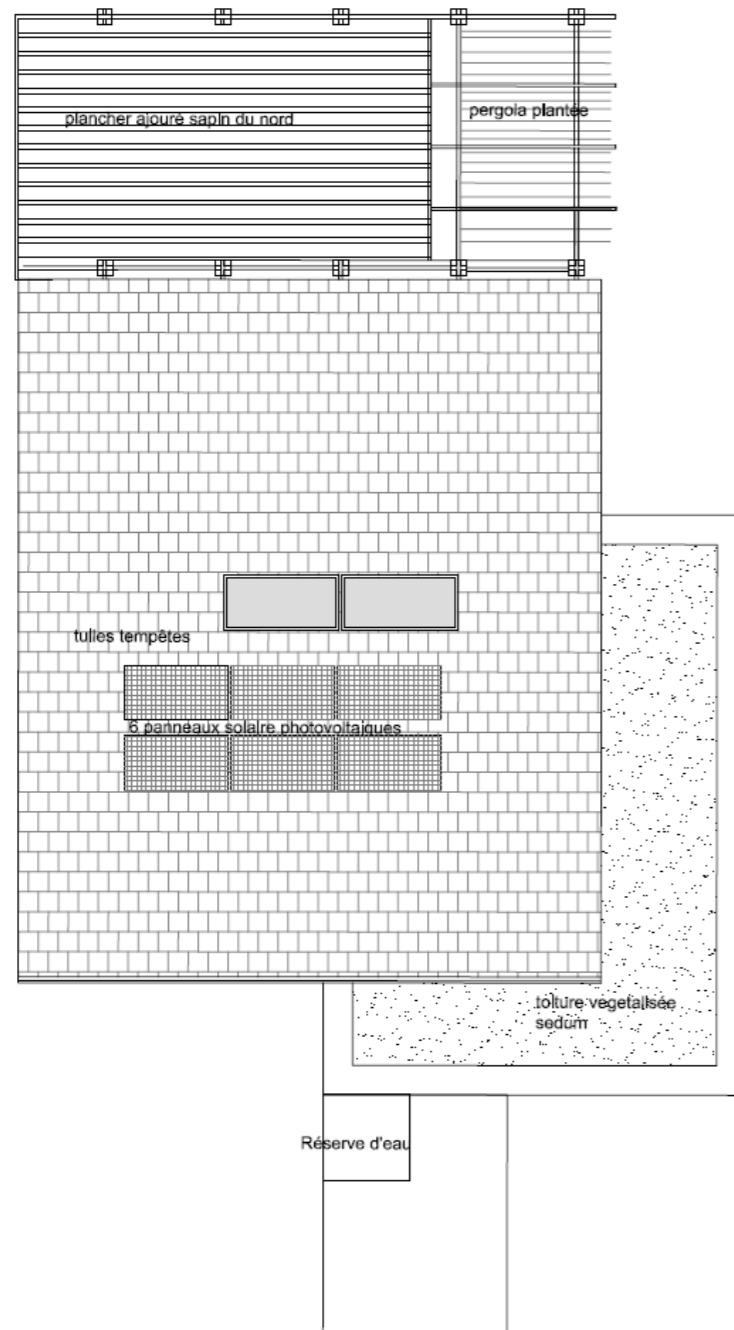
1. Transform the environmental objectives to economic opportunities;
2. Anchor the Brussels economy to produce locally whenever possible, reduce displacements, optimize use of the territory and create added value for the Brussels people;
3. Contribution to job creation.



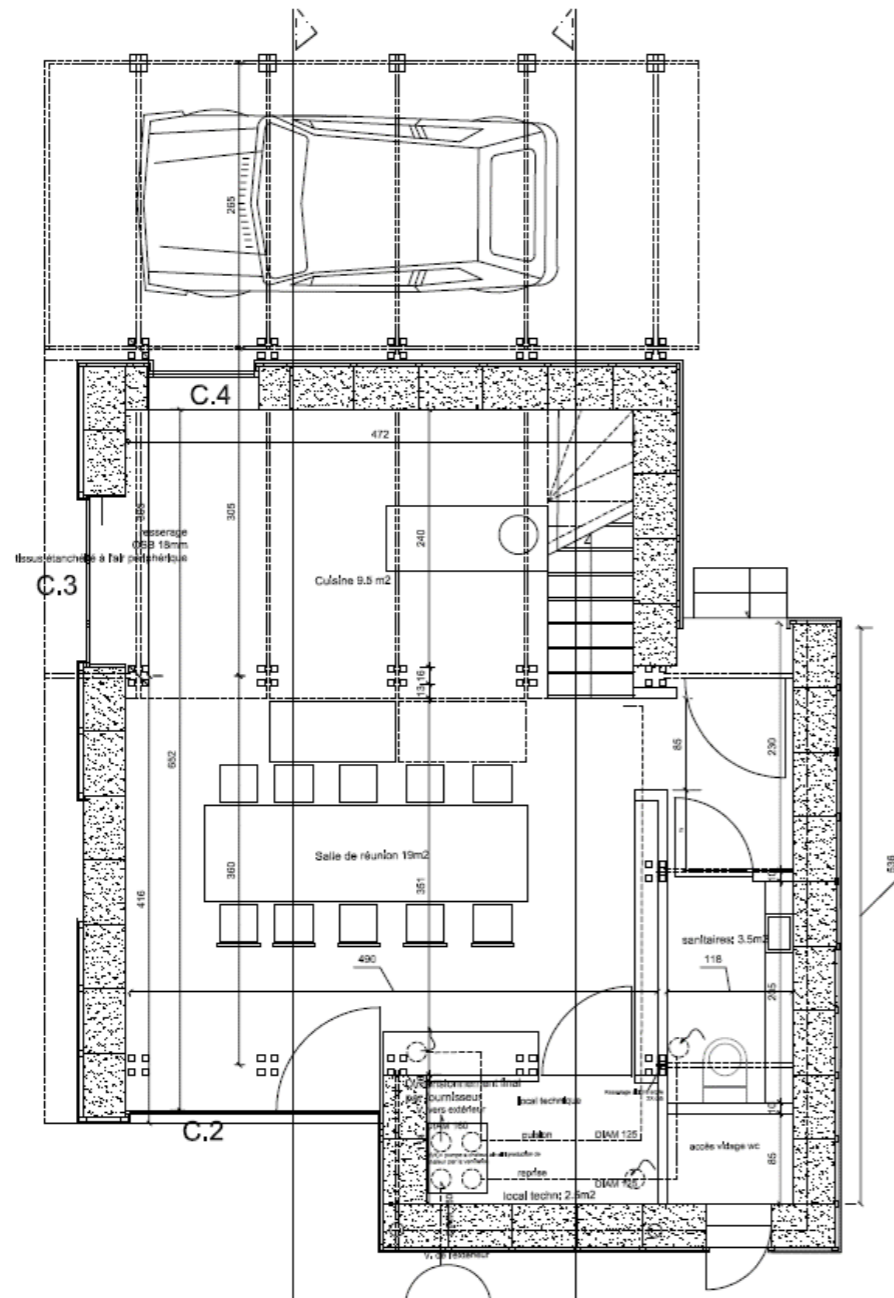
DESCRIPTION OF THE PILOT PROJECT - OBJECTIVES

- Train future contractors into circular building construction and refurbishment (+/- 220 / year)
 - Construction (carpenter, electrician, sanitary installer, heating installer, garden design, refrigeration, painter, roof worker)
 - Art & Media (furniture designer, interior designer)
 - Services (real estate agent, insurance agent)
- Investigation of innovative design and implementation of reversible building solutions with local stakeholders
- Use of reclaimed and recyclable materials

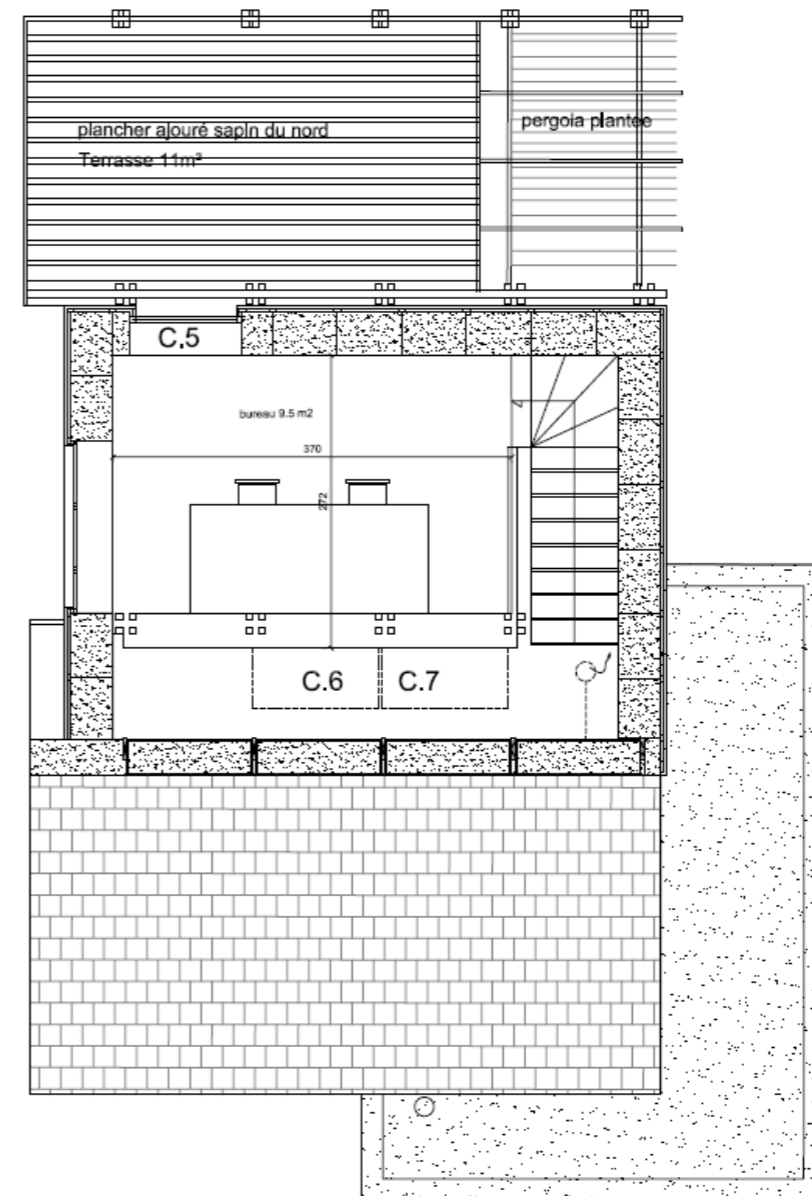
SCENARIOS - LOCATION



SCENARIOS - DESIGN PLANS BRIC 1

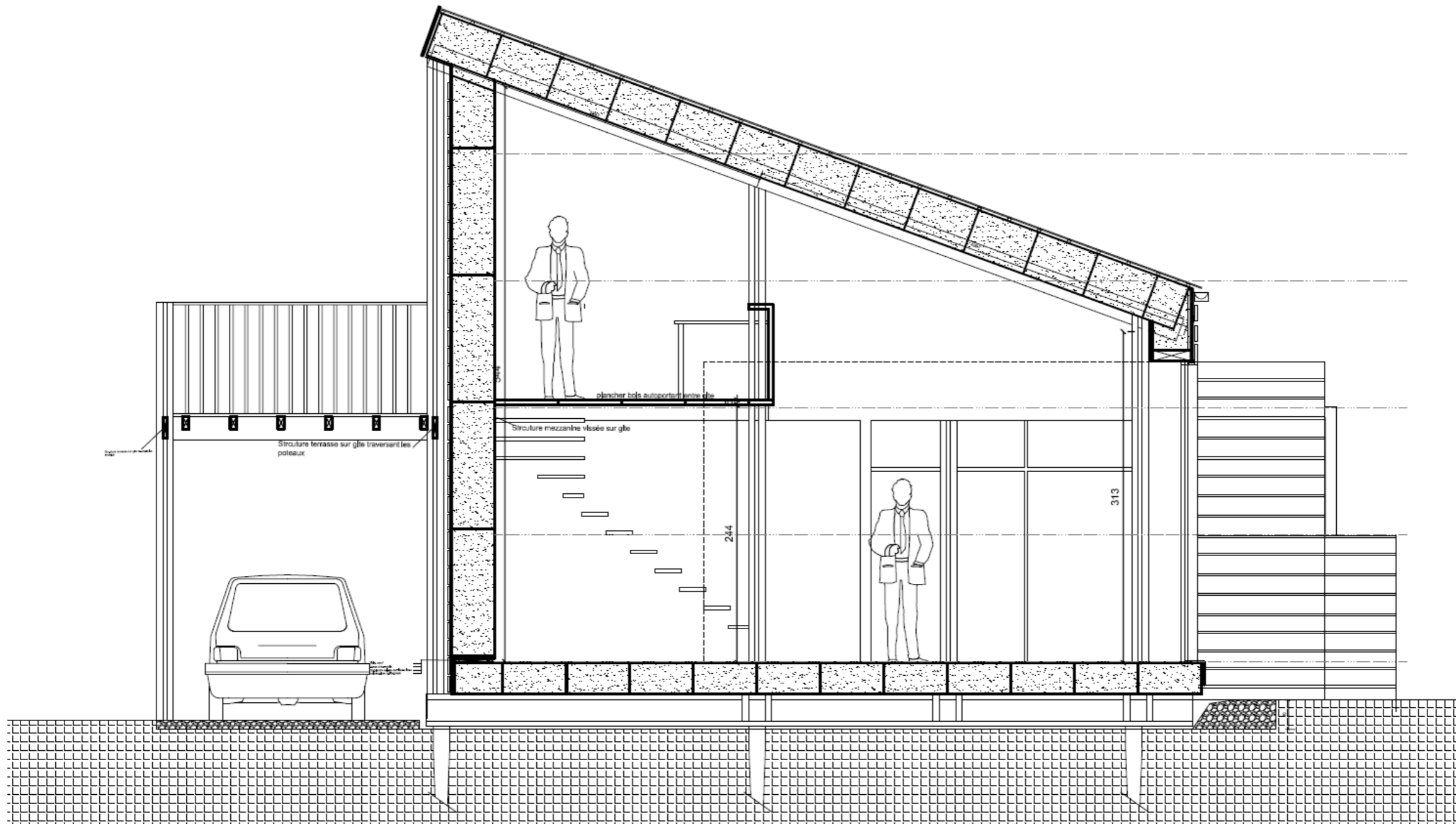


GROUND FLOOR

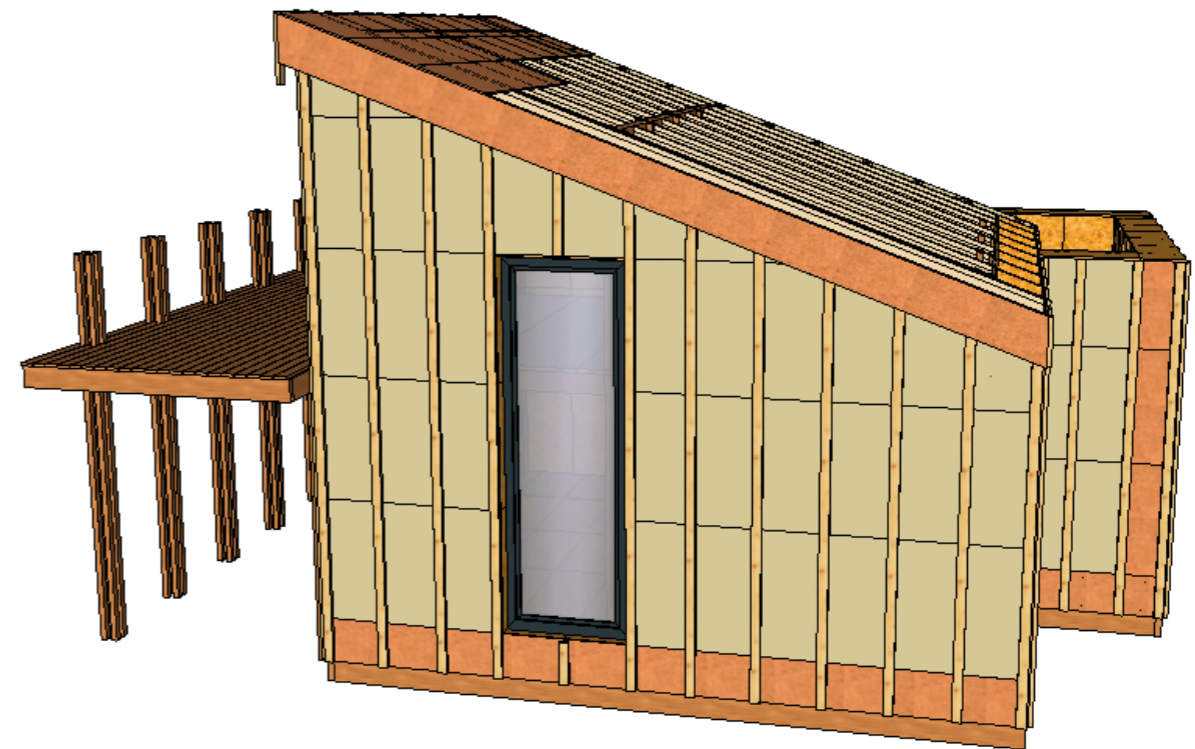
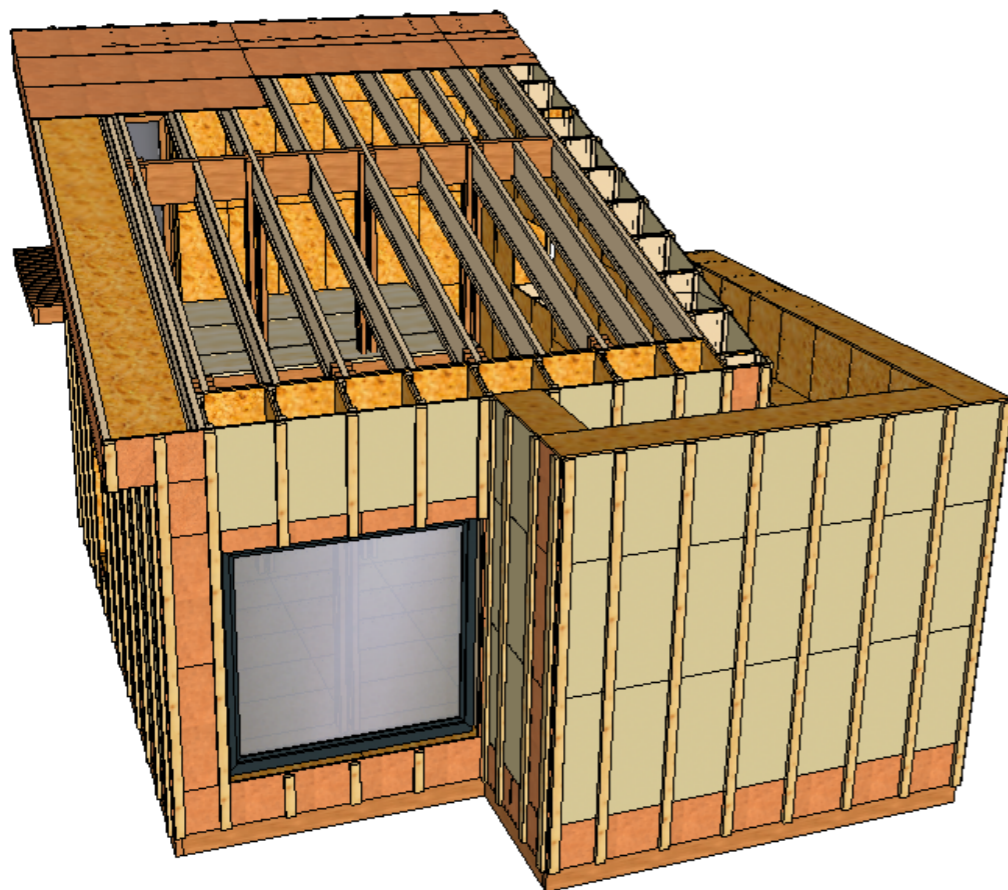


FIRST FLOOR

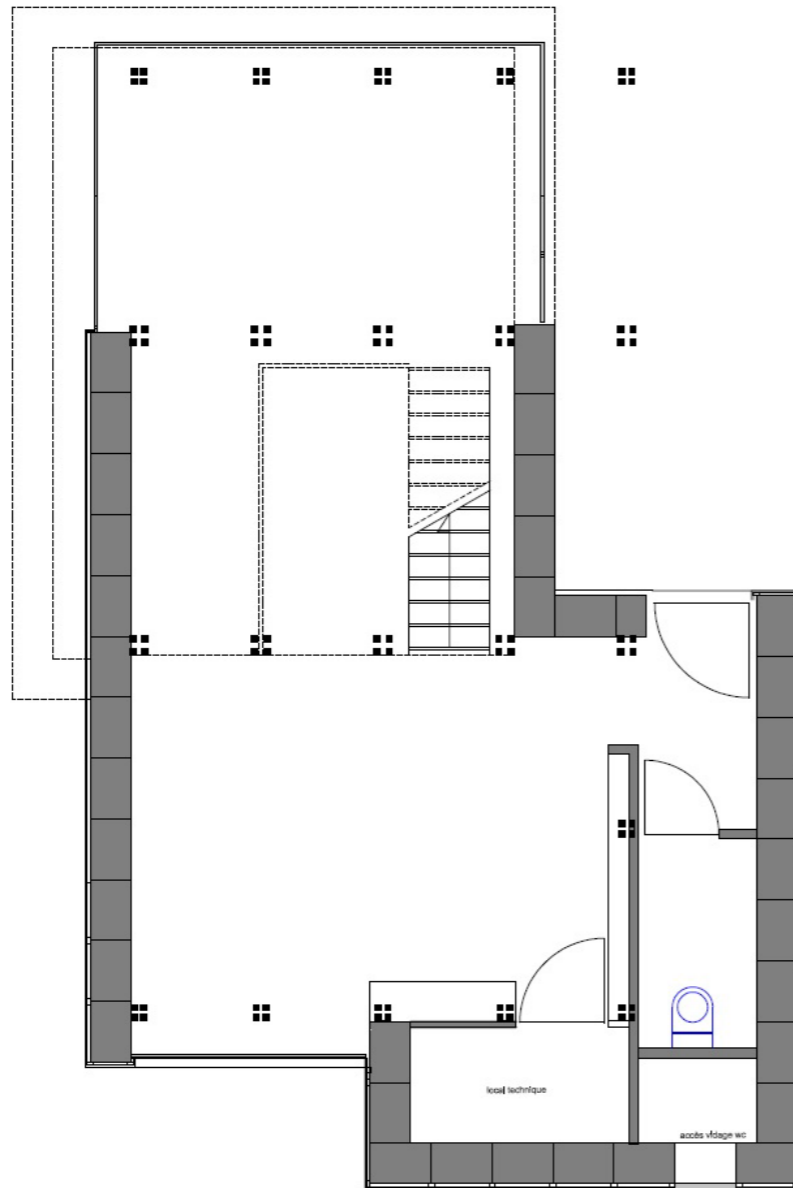
SCENARIOS - SECTION BRIC 1



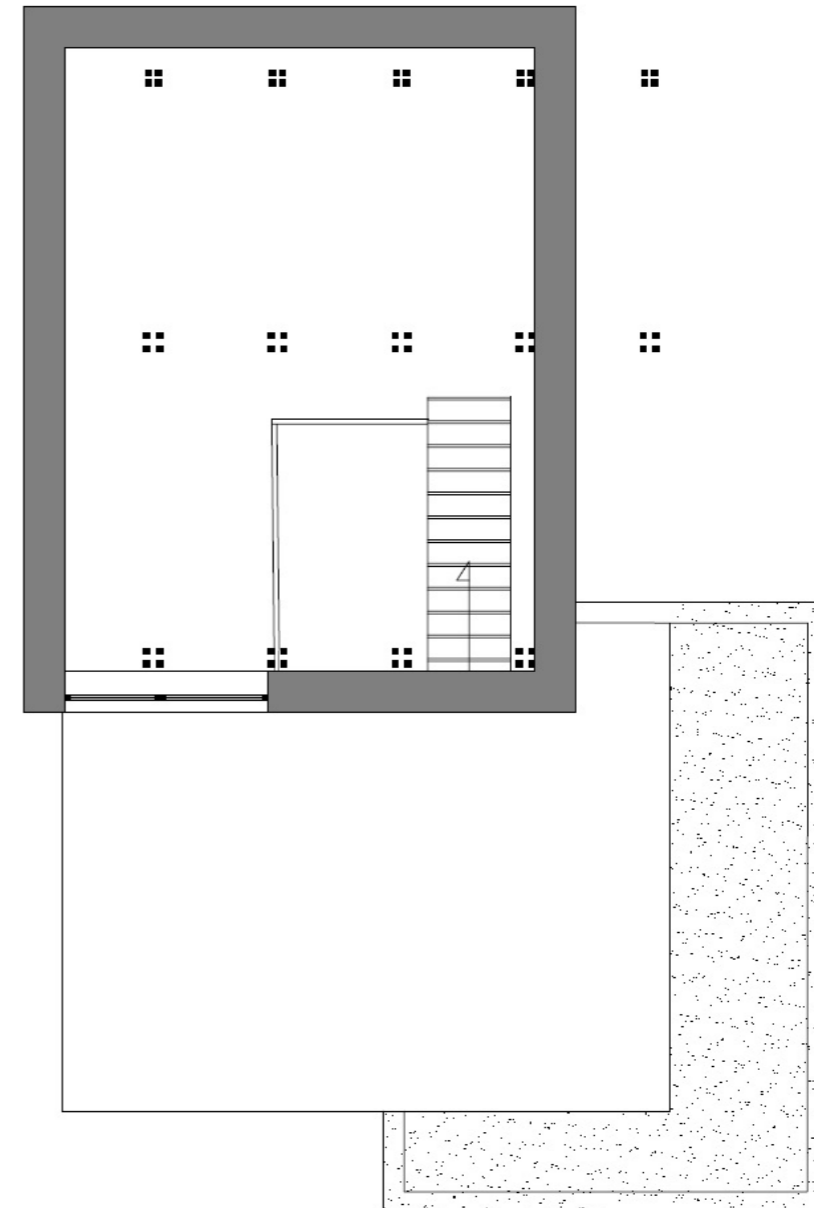
SCENARIO - 3D MODEL OF BRIC1



SCENARIOS - DESIGN PLANS BRIC 2



GROUND FLOOR



FIRST FLOOR

SCENARIOS - DIMENSIONS

Function	BRIC 1	BRIC 2
meeting room	19,45m ²	19,45m ²
office	10m ²	25m ²
kitchen unit	13,30m ²	13,30m ²
sanitary unit	4,3m ²	4,3m ²
technical space	2,1m ²	2,1m ²
carport	12,7m ²	
outdoor terrass space	12m ²	
Shop / exhibition space		12,7m ²
Total	73,85 m²	76,85m²

SCENARIO - TRANSFORMATION

EXTERNAL TRANSFORMATION

- Rockpanel cladding : panels > battens
- Roofing: shed roof (roof tiles) > flat roof (EPDM)

INTERNAL TRANSFORMATION

- Floor: massive wood > poured clay floor / clay floorbricks

NUMBERING OF THE BUILDING ELEMENTS

- Identification & numbering of all prefabricated boxes

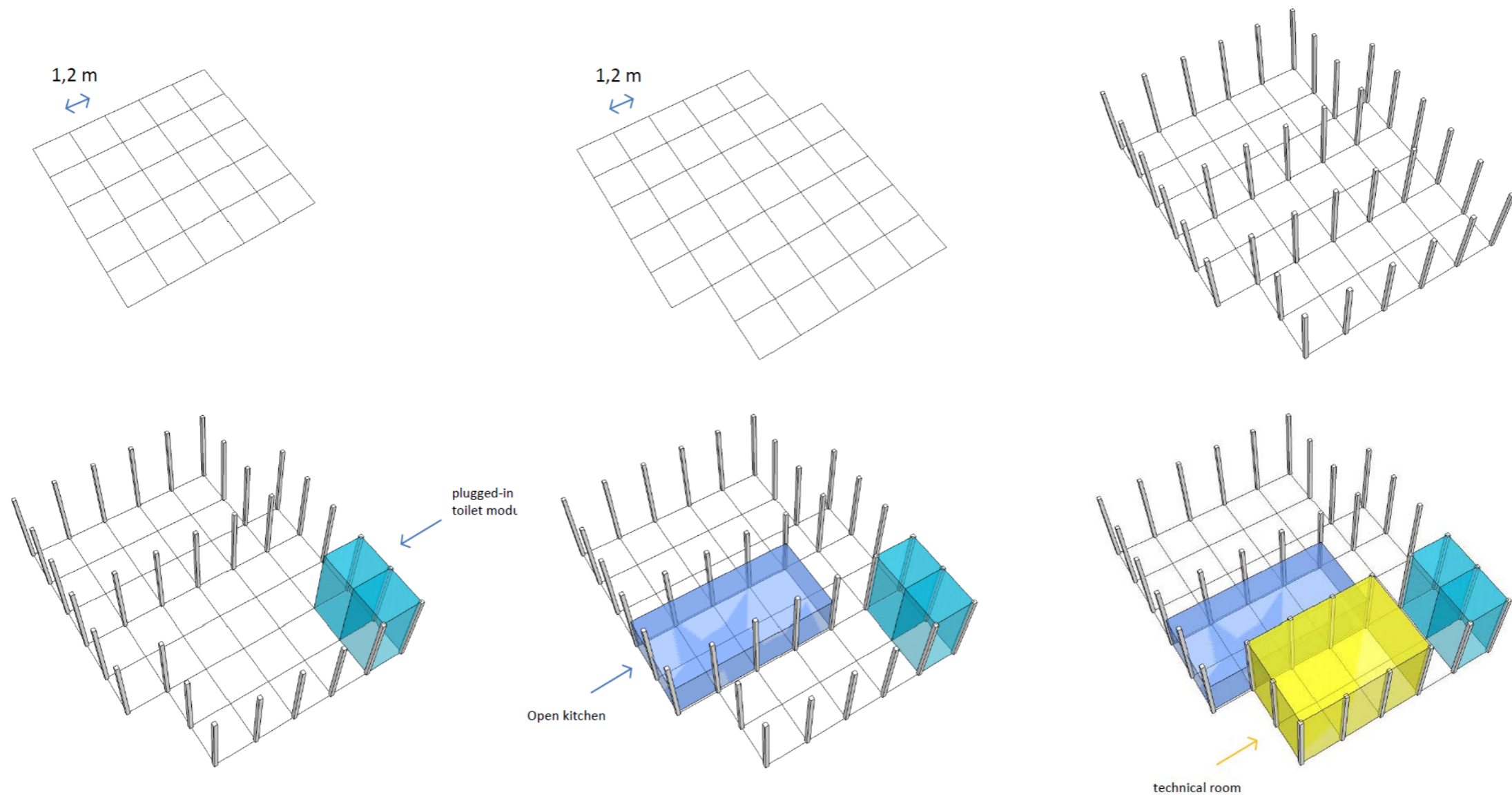


SCENARIO & END SCENARIO

	Quantity (m ² -m ³ -mc-piece)	% reusable - recyclable
Foundation	56 p	100% reusable
Structural	Beams: 132,7 mc Columns: 128,7 mc	90% reusable, 10% recyclable (because of the losses during the disassembly-adapting to the new design)
Insulation	Cork Cellulose	>100% reusable >0% reusable
Technical	Toilet: 1 p Heat pump: 1 p	100% reusable
Coating	Osب: 492 m ²	100% reusable
Electricity	Full system	100% reusable (within the courses of EFP – electrotechnical section)
Finishings	Parquet: 100 m ² Rockpanel cladding: 88 m ² Cedar cladding : 38 m ²	>90% reusable, 10% recyclable (because of the losses during the disassembly) >100% recyclable (the claddings will be sent back to the factory, where they will be recycled) >100% recyclable (the lattages will be recycled - downcycled- towards garden mulching)
Furniture	6 tables, 10 chairs, 1 sink, 1 fridge, 1 dishwasher	100% reusable
Roof	Roof tiles: 50 m ² Vapor barrier: 50m ²	>100% reusable >0% reusable

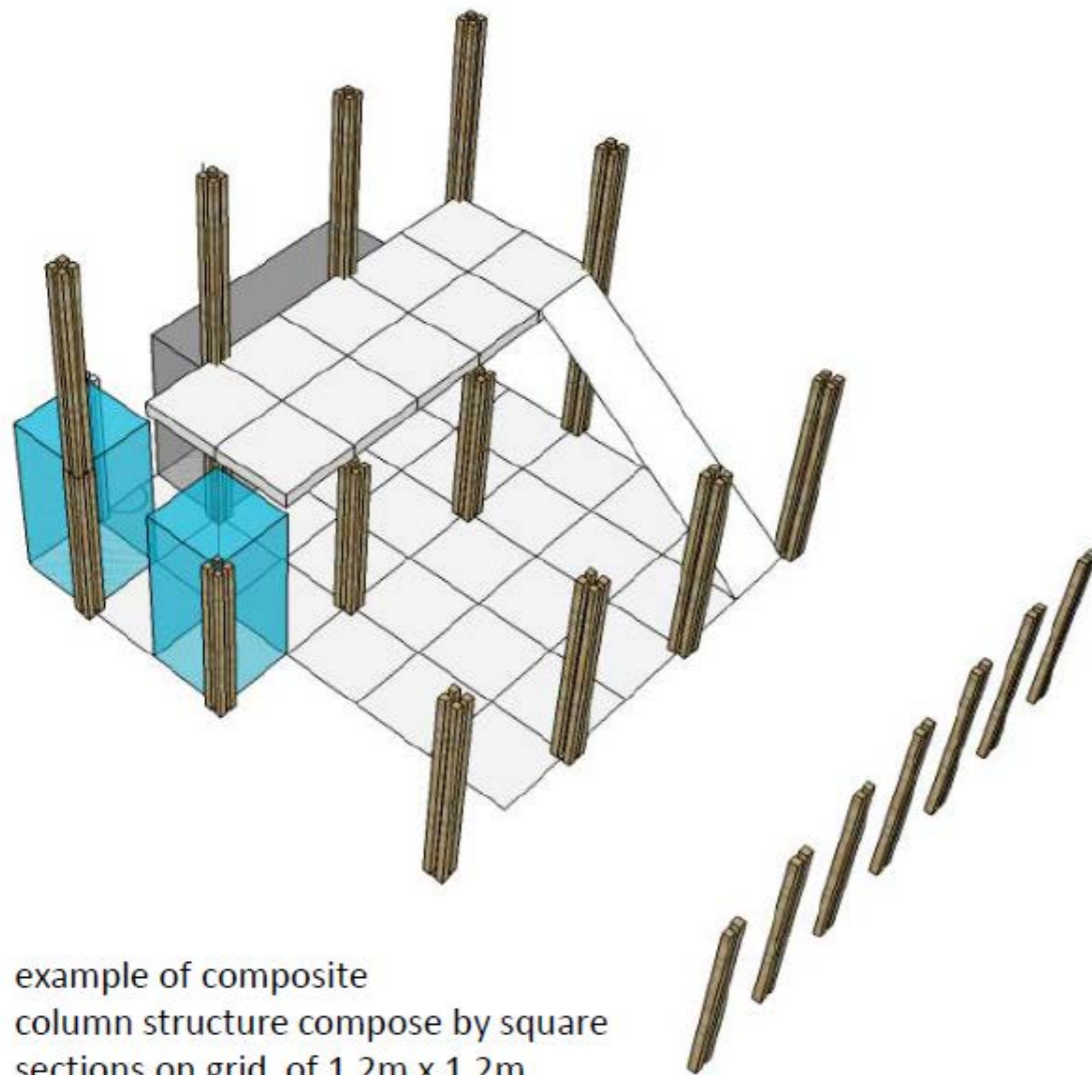
TECHNICAL ASPECTS & MATERIALS

1/ Systemised structural grid

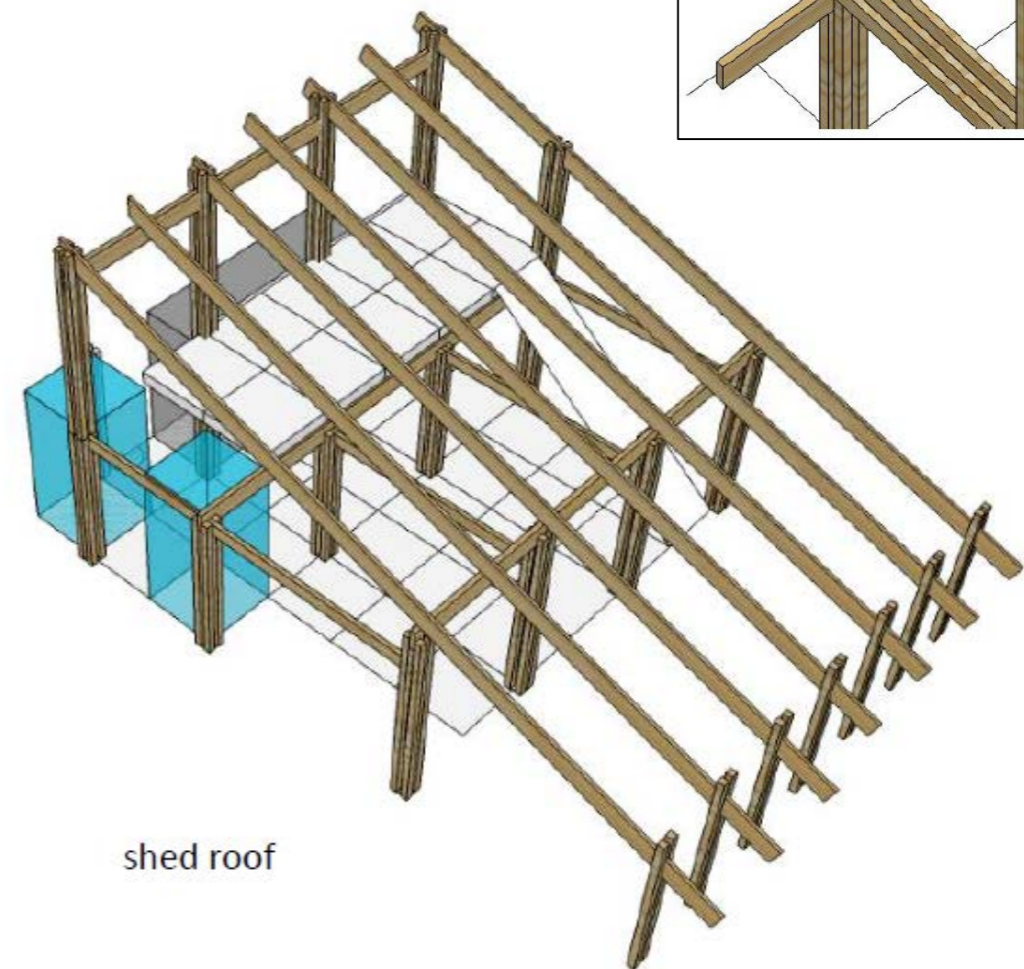


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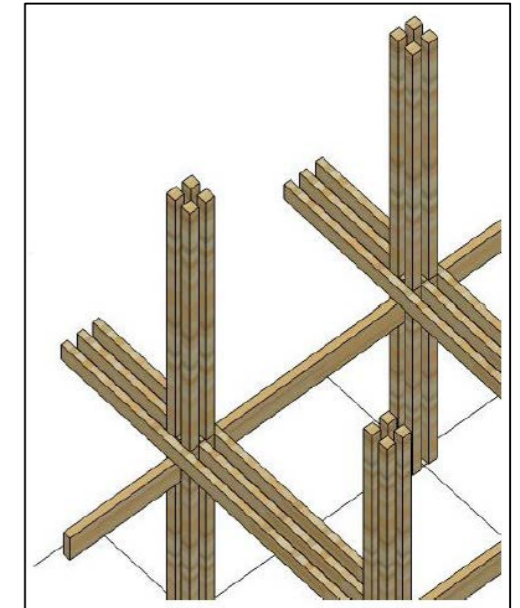
2/ Wood skeleton structure



example of composite
column structure compose by square
sections on grid of 1,2m x 1,2m

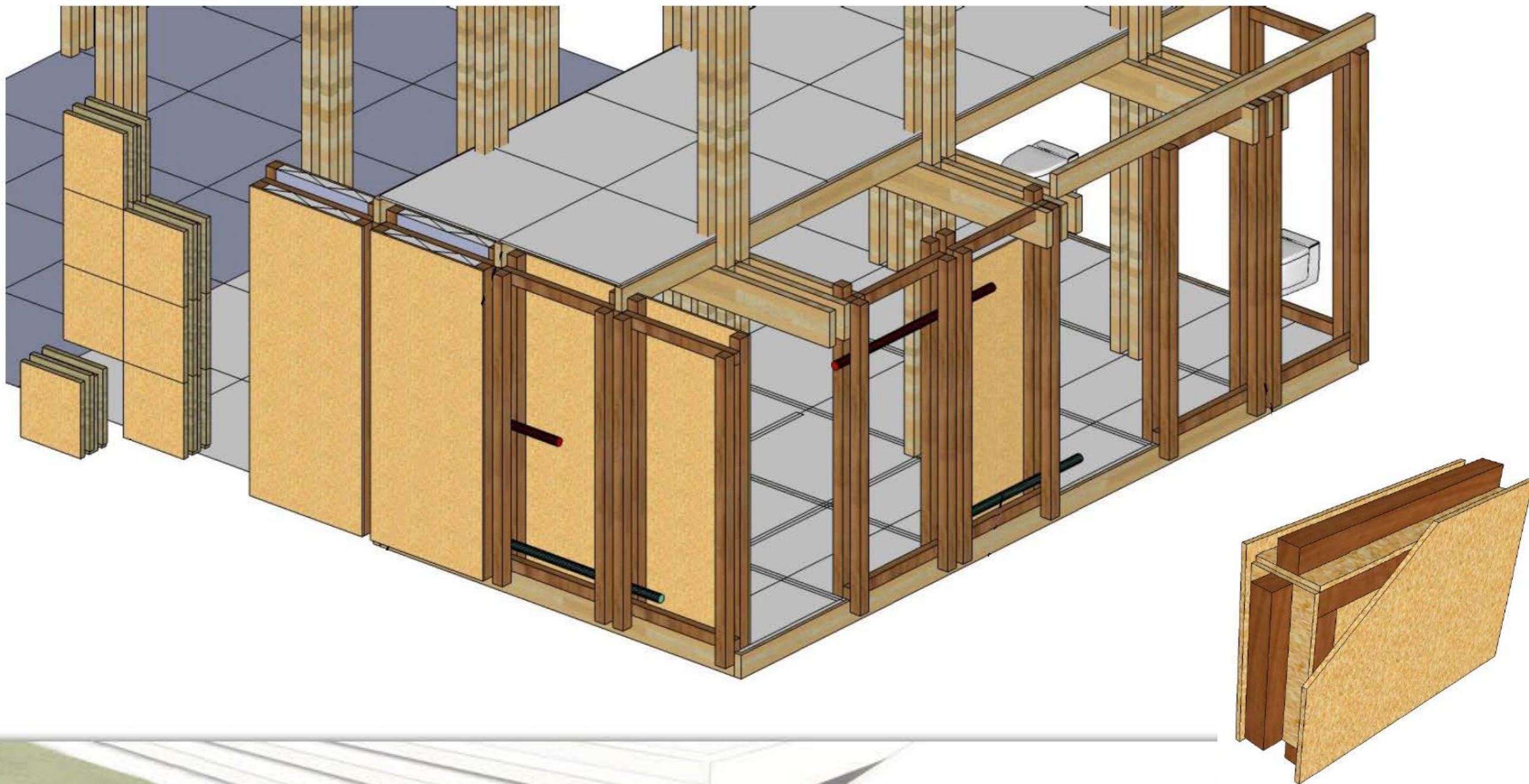


shed roof



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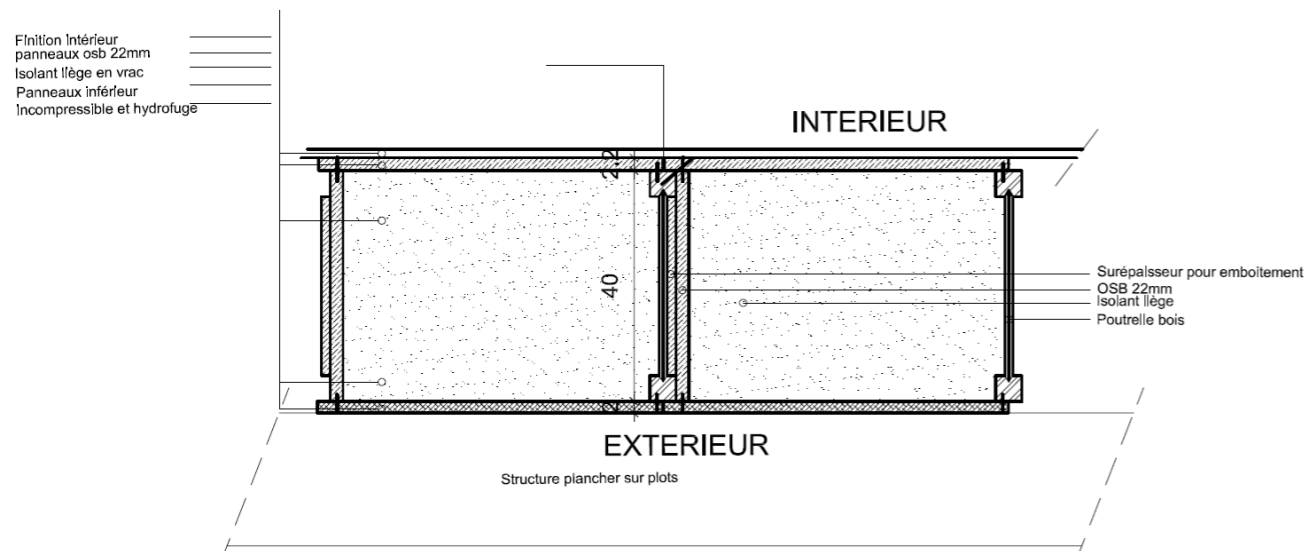
3/ Prefabricated & standardized boxes



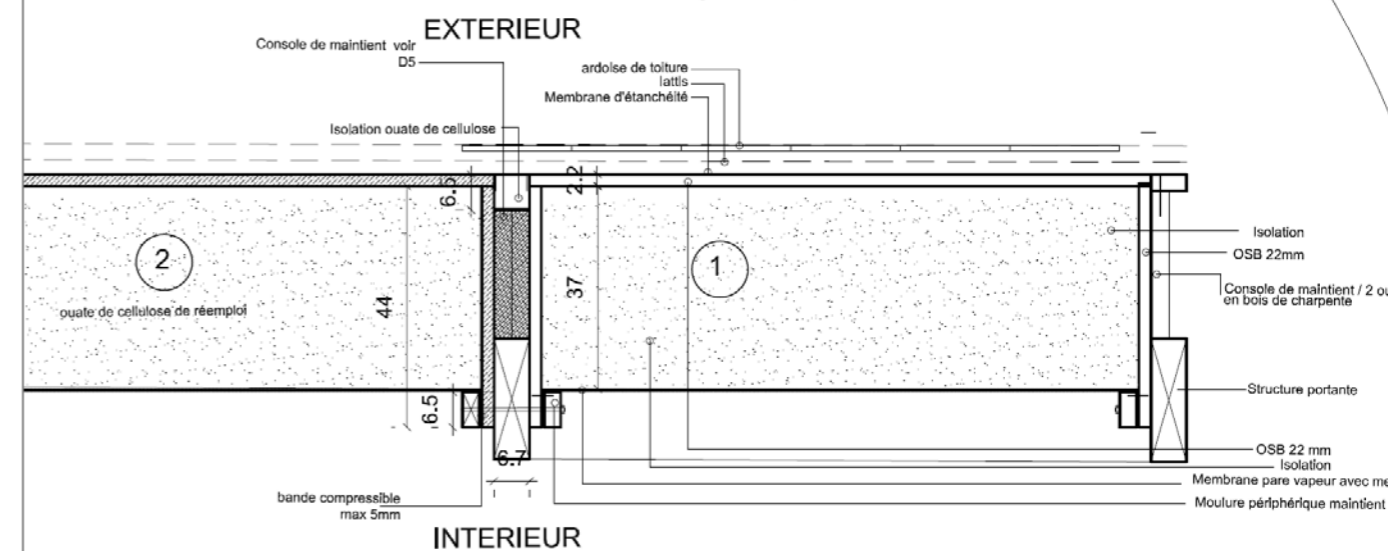
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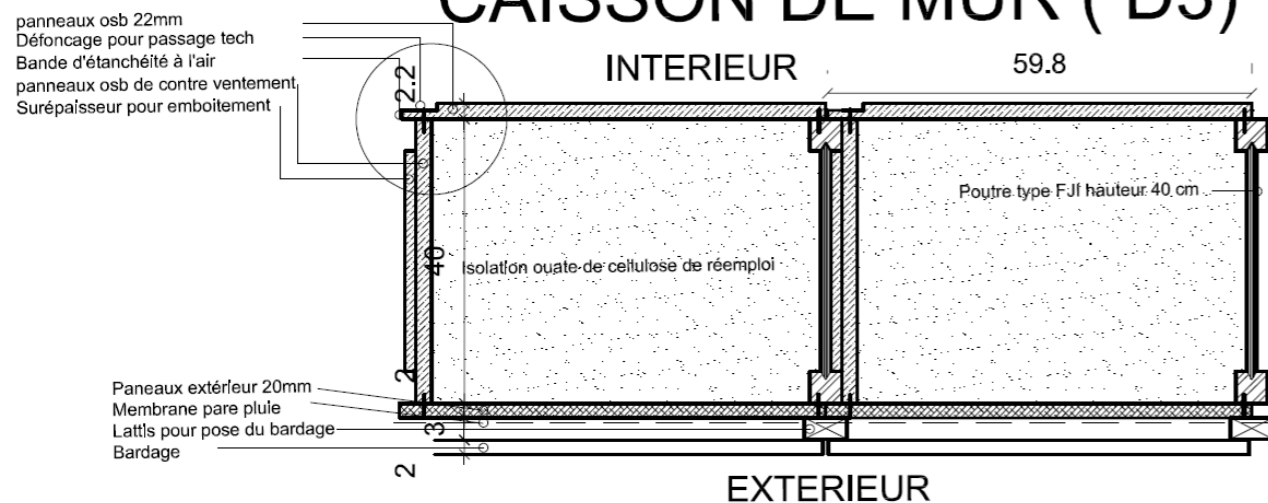
CAISSON DE SOL (D1)



CAISSON TOIT (D4)



CAISSON DE MUR (D3)



4/ Foundation: screwable foundations



TECHNICAL ASPECTS: BARRIERS & OPPORTUNITIES

BARRIERS

- Reclaimed materials > restricted by the existing materials + no warranties
- Wooden construction > living material > different humidity > unpredictable
- Airtightness test > after prefabrication

OPPORTUNITIES

- Temporary construction > no permit necessary
- Tests & analyses of innovative products
- Each transformation will be improved after lessons learned out of former module

OPPORTUNITIES & BARRIERS

BARRIERS

- Adjustment of design culture (preparation period = longer / different design thinking)
- Execution level of module = variable > depending on level & type of students.

OPPORTUNITIES

- Stakeholders eager to participate & learn about circular economy
- Stakeholders bring expertise & innovative products

STAKEHOLDERS

1. (Technical) Guidance



2. Design team and engineering



3. Industry partners

a. Donations



b. Sponsorship + maintenance



c. Discount



CONCLUSION - DESIGN

- A change in design culture is necessary
- Design in advance all details and connections
- Extended preparation period
- Standardization is necessary
- Building team is preferable

CONCLUSION - NEW BUSINESS MODELS

- Still difficult to apply new business models.
- small companies (not guarantee still in business within eg. 3 years)
- expensive to repair/recuperate materials if parts are broken.
- no services and logistics to recuperate, store and resell exhistig products
- no certification system to guarantee the performance of technical products after reusal.
- no knowledge about the value of their products per month/year

NEXT

- 07/2017 screwable foundations & prototype
- 20/09/2017 start construction
- 27/09/2017 official launch
- 09-11/2017 prefabrication & installation
- 12/2017 BRIC 1 finished
- 01-04/2017 utilization of BRIC 1
- 04-05/2017 dismantling BRIC 1





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