DESIGN JOURNAL 2023/24 SEMESTER A

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Architecture

Advanced Technology
5CTA1140-0906-2023

Unit: 1
Roberta Colombo

Façade design + U-value calculations

University of Hertfordshire UH

SUSTAINABLE BUILDING
PRINCIPLES FOR FAÇADE DESIGN

STUDY OF CLIMATE CLASSIFICATIONS
WORLD MAP OF KÖPPEN-GEIGER CLASSIFICATION

TROPICAL

Casa Del Cuidandero
Colombia – Tropical Rainforest



High placed variety of windows for sunlight and warmth
Bricks are locally made
Native vegetation. Natural way of shadow
Brown tablet floor. Absorbs heat during day to release it at night (adaptable)
Slopping roofs for rain

Alive Residence
Thailand – Tropical Savanna



Native vegetation. Natural way of shadow
Large windows for sunlight. Wooden slats for shadow
Slopping roofs for rain
Use of local wooden material

DRY

Kapadia Residence
Pakistan – Dys Arid Dessert Hot



Small windows and openings for easy ventilation and sunlight
White exterior for less heat absorption
The wind orientated façade is composed of a weave of hollow concrete blocks
Sloped profile on the roof for ventilation

Cuatro Aguas House
Chile – Dry Semi-Arid Cold



Local Materials. Brick walls and Chilean Muslera tile roof
Roof creates natural shadow
Natural vegetation for shadow

TEMPERATE

Martelaar House
Belgium – Temp. No Dry S. Warm Sum.



Native vegetation. Natural way of shadow
Combination between indoor and outdoor areas
Windows for sunlight and warmth
Bricks and wood are locally made
Pitched roof for rain

K1 Villa
Greece – Temp. Dry Sum. Hot Sum.



Local Materials resistant against the heat
White exterior walls for less heat absorption
Combination between indoor and outdoor areas
Flat roof
Windows for sunlight

CONTINENTAL

Villa Koivikko
Finland – Cont. No Dry S. Warm sum.



Windows for sunlight and warmth
Renovation of an old local villa. Local materials
Native vegetation. Natural way of shadow
Pitched roofs for rain and shadow

The Namyangju Detached House
South Korea – Cont. Dry. W. Hot. S.



Local Materials
Pitched roof creates natural shadow
Rooftop yard. Natural vegetation for shadow
White exterior walls for less heat absorption
Windows on both sides for cross-ventilation
Folding screen windows adaptable to the weather

CONCLUSION

General Conclusion

Most of the countries are using local materials:
They adjust the using of the material to the temperature and weather conditions.
Counties where the weather is warmer prefer white walls so the sun will reflect.
Or adaptable materials, absorbs heat during day to release it at night.
The form of the roof depends on the climate:
Countries where it's raining a lot (colder) have sloped – pitched roofs.
Counties where the weather is warmer have flat roofs, sometimes they prefer sloped roofs for shadow.
Every country tries to keep the native vegetation, this is a way of creation natural shadow, and having a beautiful view at the same time.
"This is also in important thing for temperate regions to have a combination between indoor and outdoor areas." (personal note)

Conclusion
Advanced Technology

Project: Case Study 1
Dorte Mandrup, Wadden Sea Centre
Country: Denmark
Climate Classification: Cfb
Temperate – No Dry Season – Warm Summer

SOME ASPECTS:
Native vegetation. Natural way of shadow
Combination between indoor and outdoor areas
Windows for sunlight and warmth
Locally made materials
Pitched roof for rain

Conclusion
Design Studio

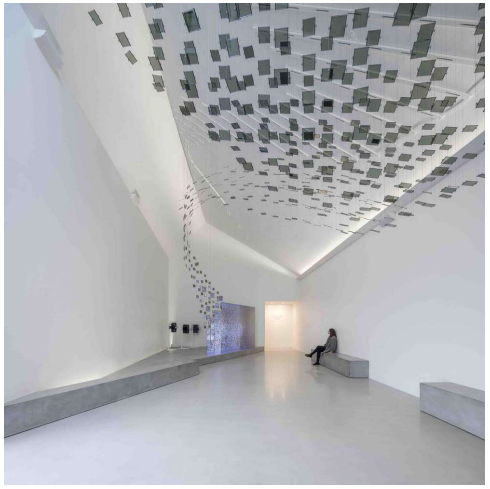
Project: Museum Arts Centre
Country: UK
Climate Classification: Cfb
Temperate – No Dry Season – Warm Summer

SOME ASPECTS:
Native vegetation. Natural way of shadow
Combination between indoor and outdoor areas
Windows for sunlight and warmth
Locally made materials
Pitched roof for rain

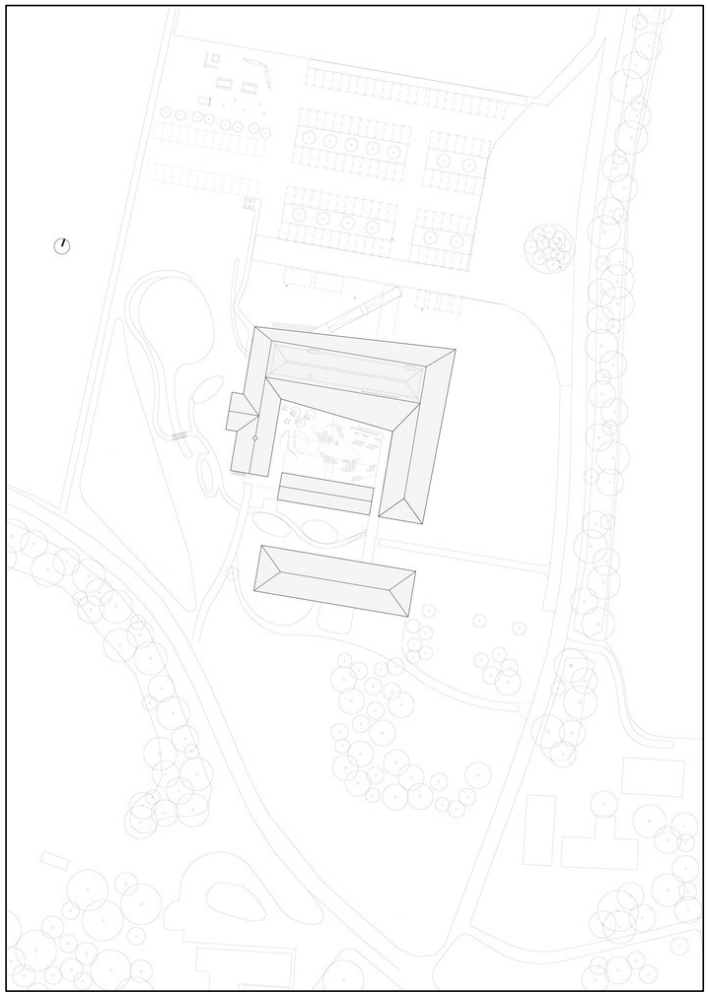
2 / PowerPoint on Research Climate Classification

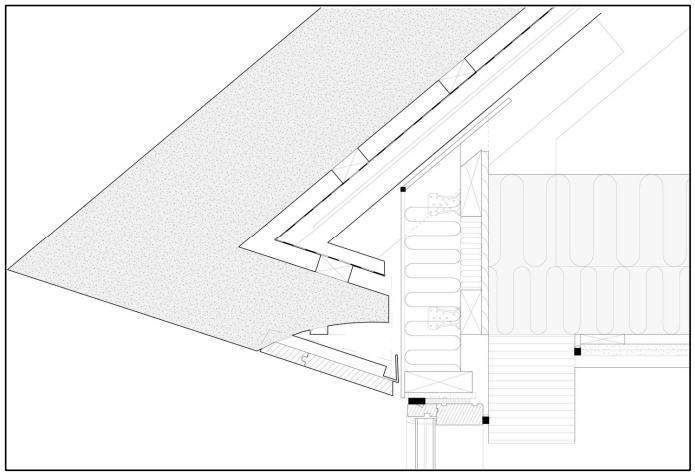
02/10/23 **WK 1**

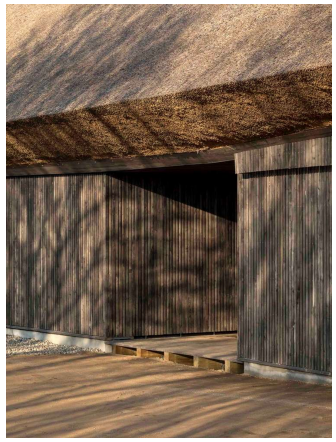


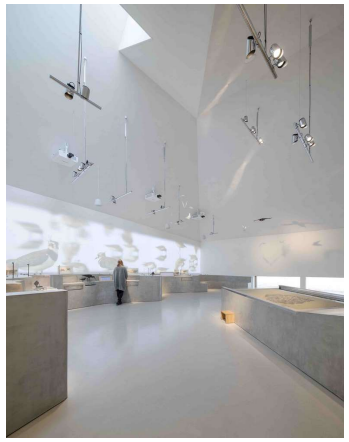












3 / Familiarize with Case Study 1

Personal Research:

- Climate classification

- General information about the building
“ultramodern, sculptural architecture rooted in local tradition”

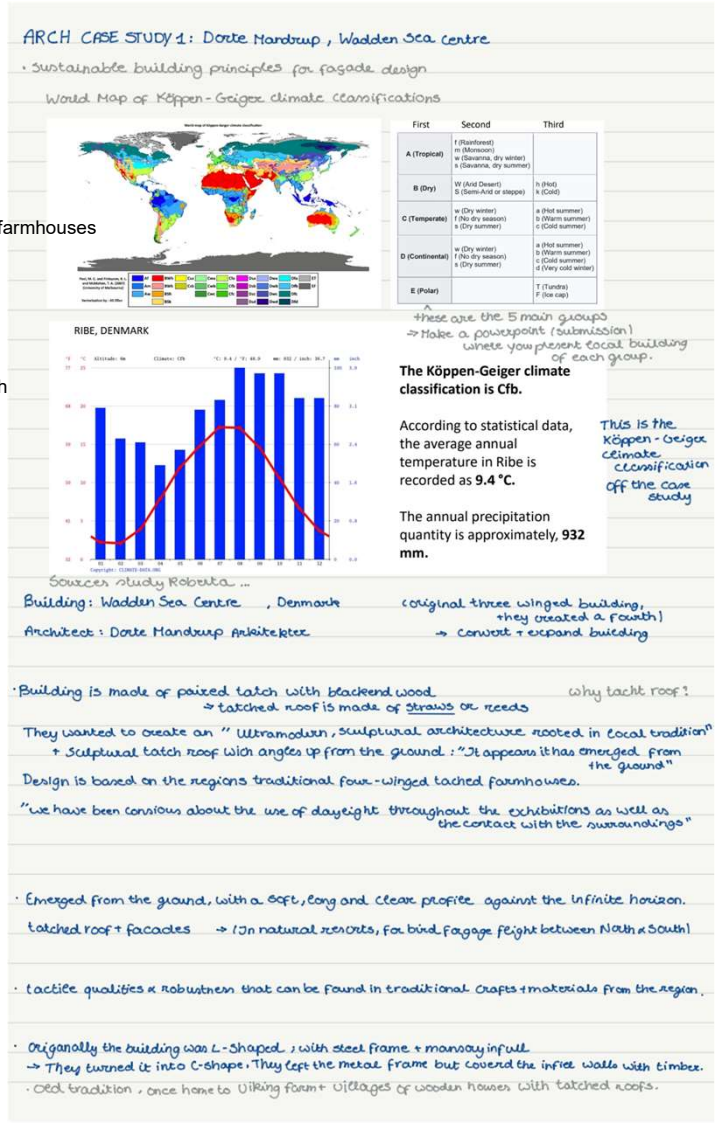
Design is based on the regions traditional four-winged tached farmhouses

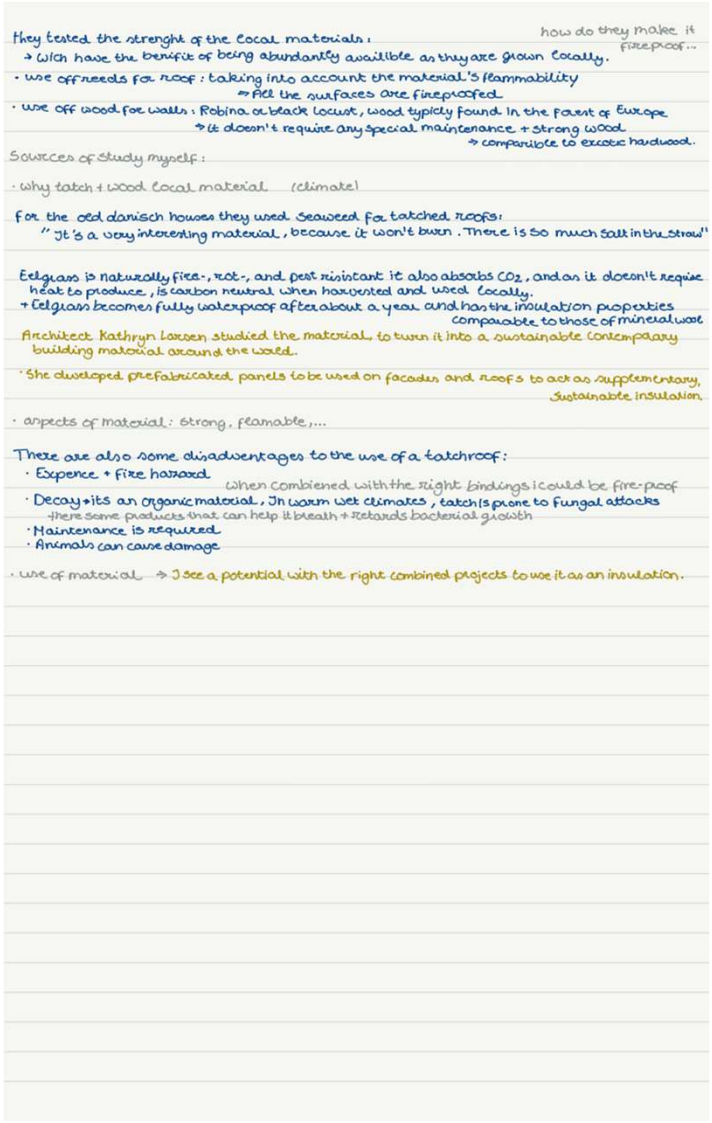
“we have been conscious about the use of daylight throughout the exhibitions as well as the contract with the surroundings”

Emerged from the ground, with a soft, long and clear profile
Against the infinite horizon.
(In a natural resort, for bird forage flight between North & South

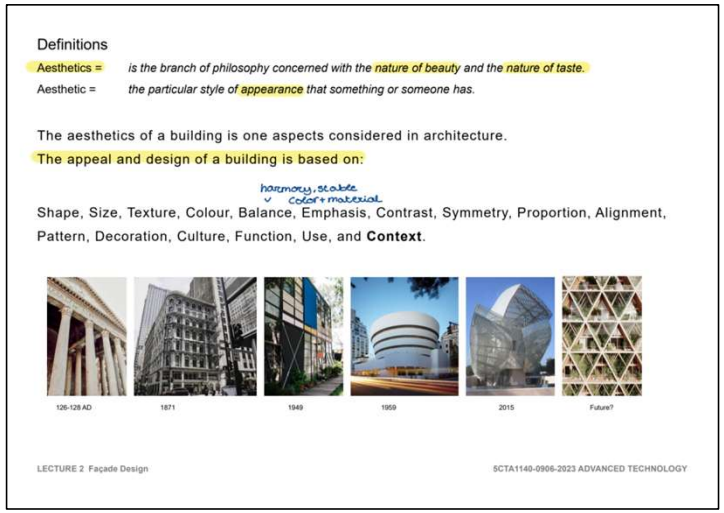
- General information about the materials
“Thatch is a very interesting material, because it won’t burn. There is so much salt in the straw”

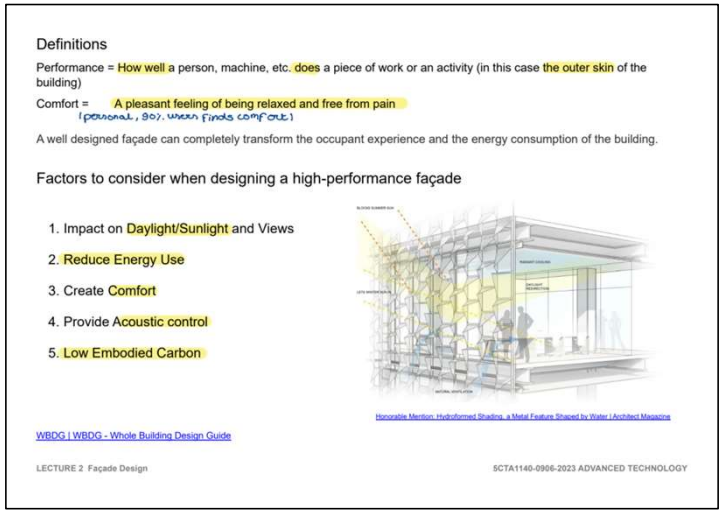
Naturally, fire, rot and pest- resistant
(Not in Warm and wet climates – Needs Wind)

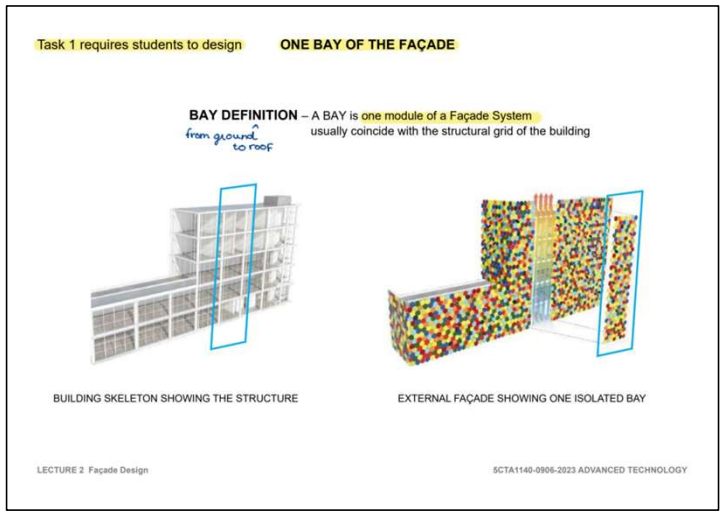


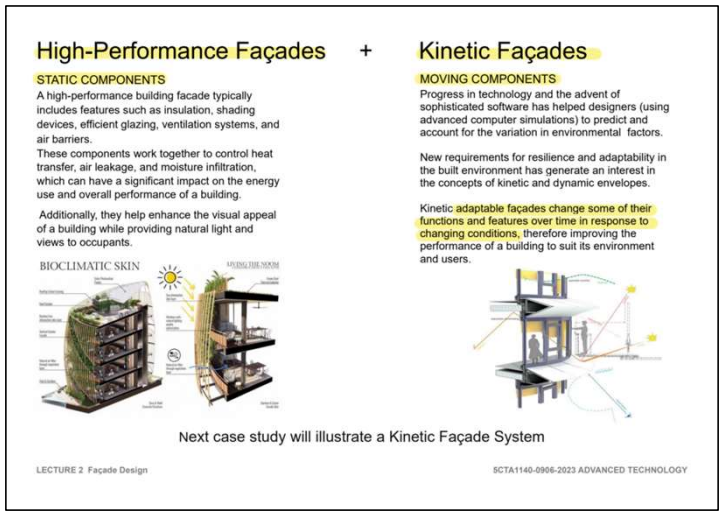


09/10/23 WK 2









Class façade design:

- Aesthetics
Shape – beauty to the building + quality

- Performance + Comfort
Shelter from the outside – Light in building
Adaptable to cold + warm weather outside (summer and winter)

- Task 1 requires students to design:
"one bay of the façade system"

Bay definition: A bay is one module of a façade system from ground to roof usually coincide with the structural grid of the building.

- High-Performance facades – Static
vs. Kinetic facades – Moving
Adaptable façades change some of their functions and features over time in response to changing conditions

5 / Class about Façade design – Aesthetics, Performance and comfort

09/10/23 WK 2

Notes Teacher:
Plan on showing variation of north-south façade
+ explain climate-wise

Show site Analysis
Wind + material + descriptions…

Why do they use thatch + explain material

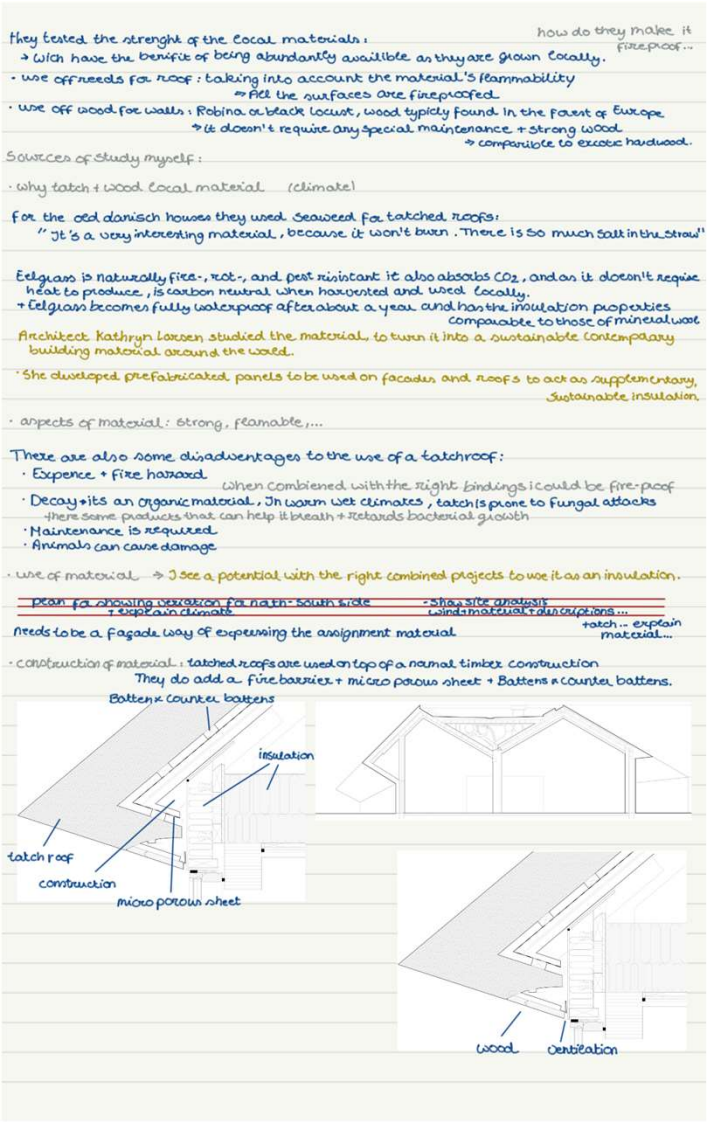
Personal Research:

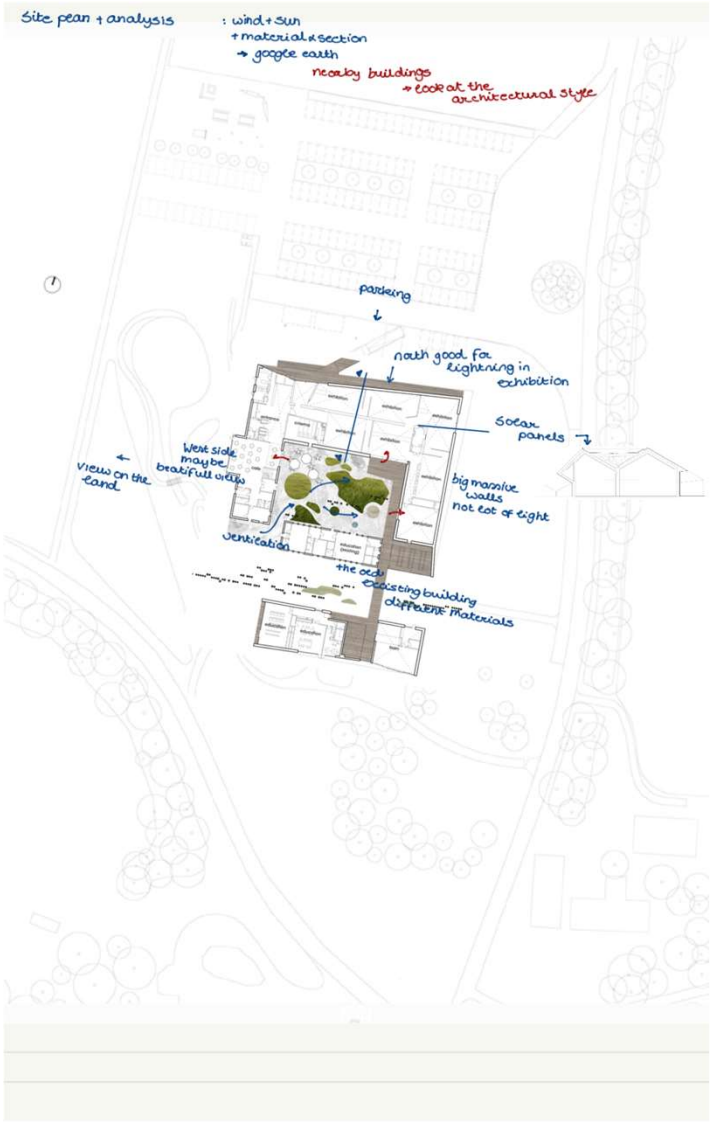
- Sections

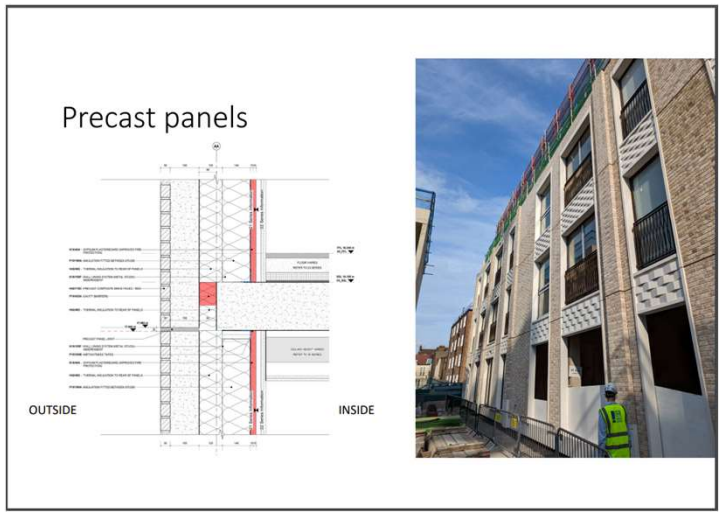
- Site analysis
Ventilation – way off adjusting the façade material

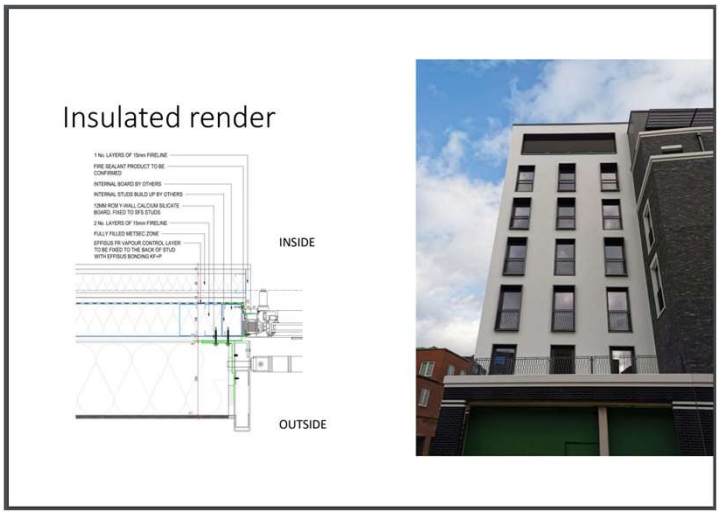
Looks like a very-natural building but has lots of technology

Exhibition rooms – massive walls + northside
better lighting for inside the rooms
Café – west side
better view and better sunlight









Class façade technology:

- Precast panels

Cast before its on the site, gap between precast because expandation of material they rest it on the structural slab.

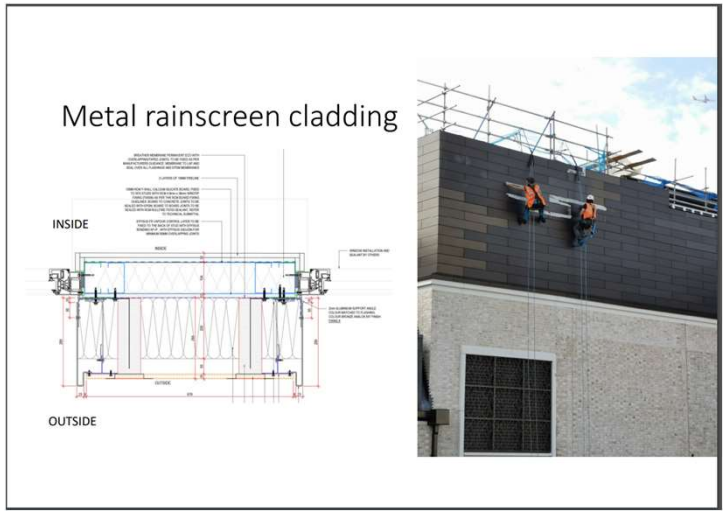
Metal studs with insulation in between
Steel colom = more expensive, but less space

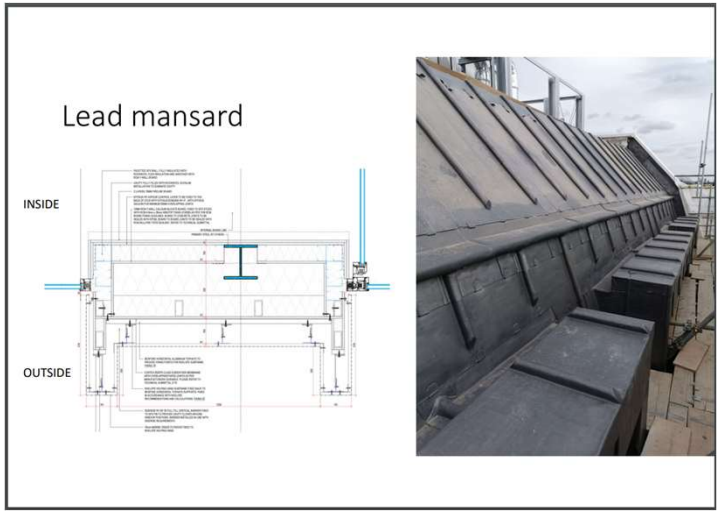
Fire resistant wall + gap electricity + plaster wall

- Insulated render

Render is a tick paint on top of the insulation

Board drilled into installations – attached to stud structure





- Metal rainscreen cladding

Metal rainscreen cladding locks in the insulation (waterproof) with airgap in between, for rain

Small metal structure connects its to the building structure

VCL – vapid layer on the inside of wall to insulation, no molt inside the building – condensation on inside off the window – warm part.

- Lead Mansard

Lead is a moldable material – needs to be fixed on other material such ass wood (not fireproof)

Lead can heat up & expand

16/10/23 WK 3

Notes Teacher:

Plan on showing variation of north-south façade
+ explain climate-wise
Part thatch – part wood – why wind + sun + heat
Why does the building have a slope

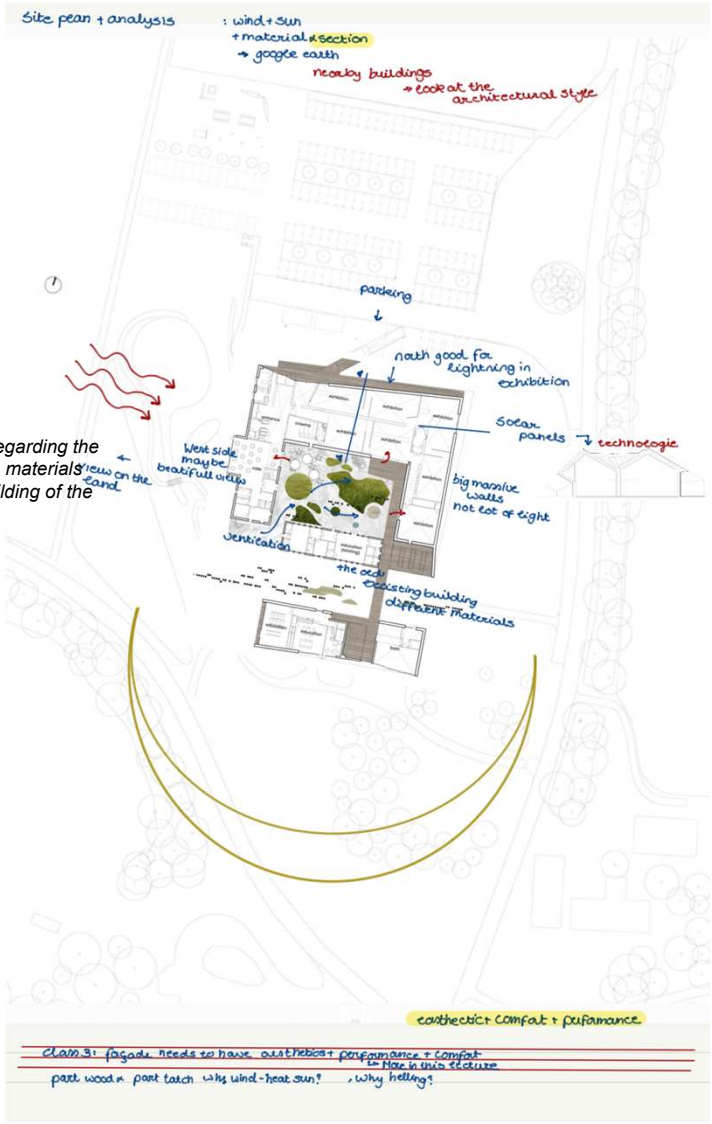
Show site Analysis
Wind + Sun + material + descriptions…
Check google earth for vision
Nearby buildings -> look at the architectural style

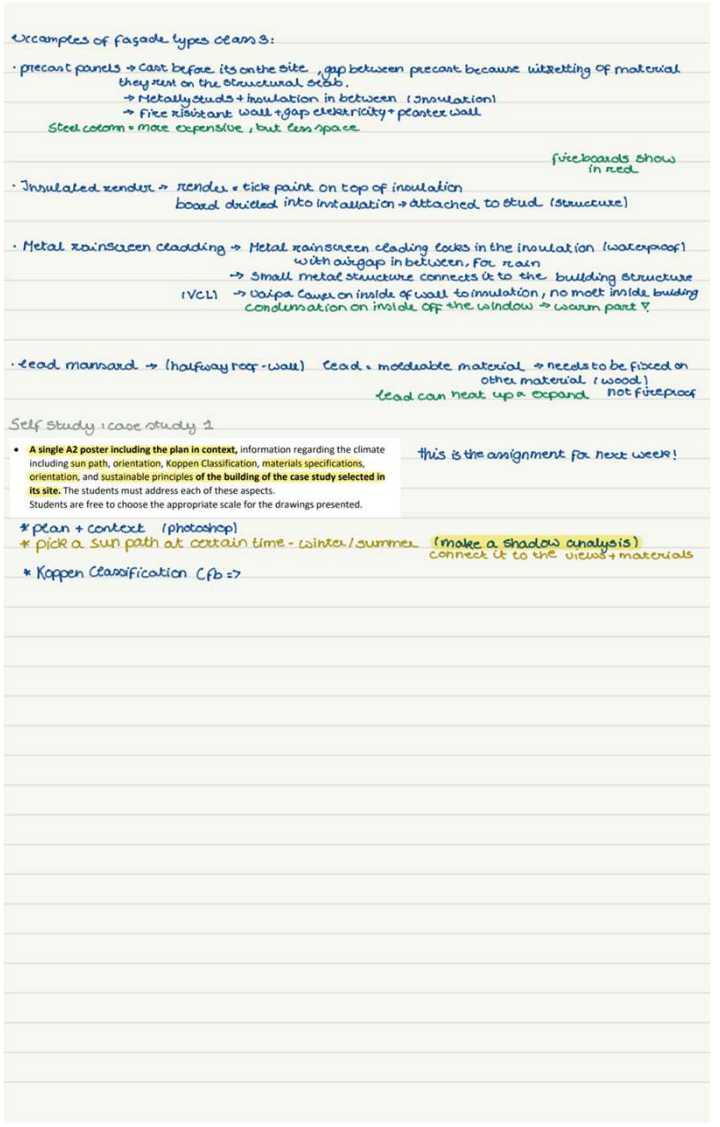
Explain trough aesthetic + comfort + performance

Personal Research:

Research depended on the assignment:

A single A2 poster including the plan in context, information regarding the climate including sun path, orientation, Koppen Classification, materials specification, orientation, and sustainable principles of the building of the case study selected in its site.



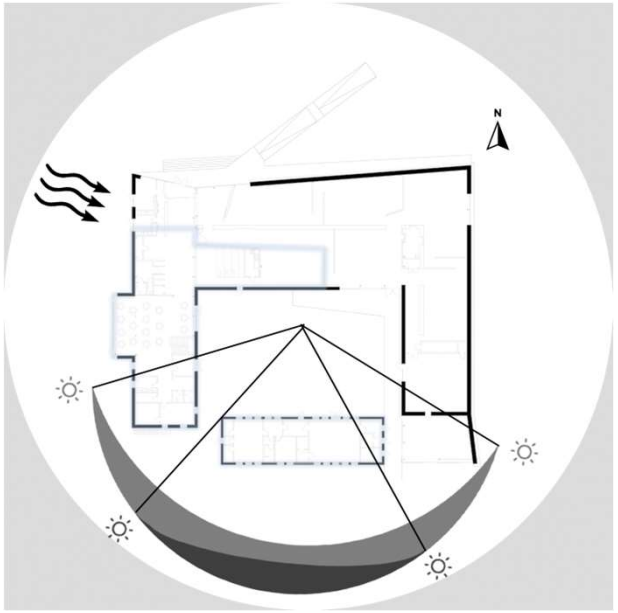


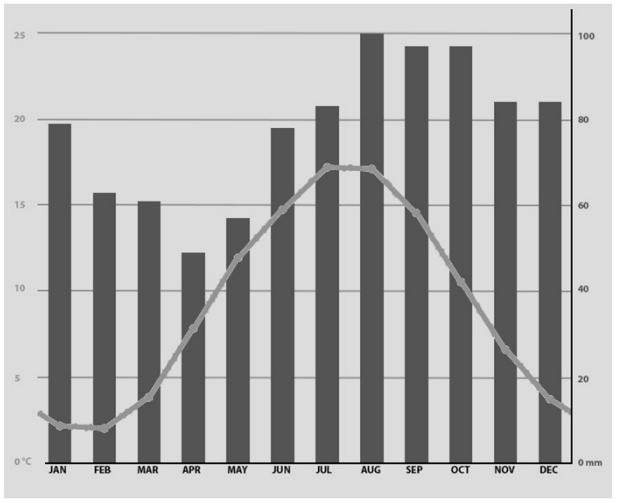














16/10/23 WK 3

9 / Creating an A2-Poster for the 1ST CRIT

1

23/10/23 WK 4



DESIGN DISCUSSION RECORD

10 / 1ST CRIT PRESENTATION

1

23/10/23 WK 4

DESIGN DISCUSSION RECORD

MAIN POINTS OF DESIGN DISCUSSION (FEEDBACK):

Personal Notes:

Put in the title – lecture name + advanced technology + case study analysis

More concrete about the thatch material:
How do they put it together – thatch in contemporary building.
Choose thatch – or choose Robina wood

Connect site to the pictures + climate

Look at examples – link site analysis to climate
Thatch doesn't need that much **support compared to concrete light structure….**

Talk about windows – why not much window (connect windows to the site)

More symbols to show stuff

Details connected to explanation

Do own research next to the brief
Thermically – comfort – water – energy – cold & warm

Teacher Notes GENERAL COMMENTS:

Overall, each of you missed out on some of the element that a full analysis should have included.

- Start with the setting of the location/setting perhaps one photo of the location
- Followed by the climatic data of the region -> site climatic/environmental analysis

(sun path, north point, prevailing winds, existing vegetation, possible noise, views and access to the site and the building)

- Then form that assessment, address the materiality. Are the materials local? Is the selection based on local building craftmanship? Where the materials selected to represent the quality and design principles of the project? How sustainable are they? Use some images of the outside to show what they look like.

- Then using a sectional drawing review each material characteristic and performance.
Focus primarily on the external walls and all the layers/components used.

- Finish with Investigation and conclusions on each of the materials

Teacher Notes PERSONAL COMMENTS:

- Make the Koppen Classification smaller
- use the general plan for the sun path and other information

The order of information from top to bottom should be reversed. First are climatic and environmental data and characteristics

There is no visual understanding of the wider settings of this building which is actually key to the form development, ***graphics are more powerful.***

After climate move to form and aesthetics – Followed by the materials…

1

23/10/23 WK 4

DESIGN DISCUSSION RECORD

MAIN AREAS TO ADDRESS TO TAKE MY DESIGN FORWARD (FEEDFORWARD):

Change the order: first climate + site
– then material information



12 / Take my design forward after 1ST CRIT

30/10/23 WK 5

Personal Research:

Research depended on the assignment:

A single A2 poster in which students design a modular façade solution inspired by one of the selected case studies for the art gallery extension building produced in Studio2.

A bay of the Façade must be explored and represented in different geometrical, material and structural solutions.

A Few Link – websites about Thath:

Core Insulation with ecological building material made from reed (hiss-reet.de)

Reed Board - A&DS Materials Library (ads.org.uk)

Fibra Architectures | Exhibitions | Pavillon de l'Arsenal (pavillon-arsenal.com)

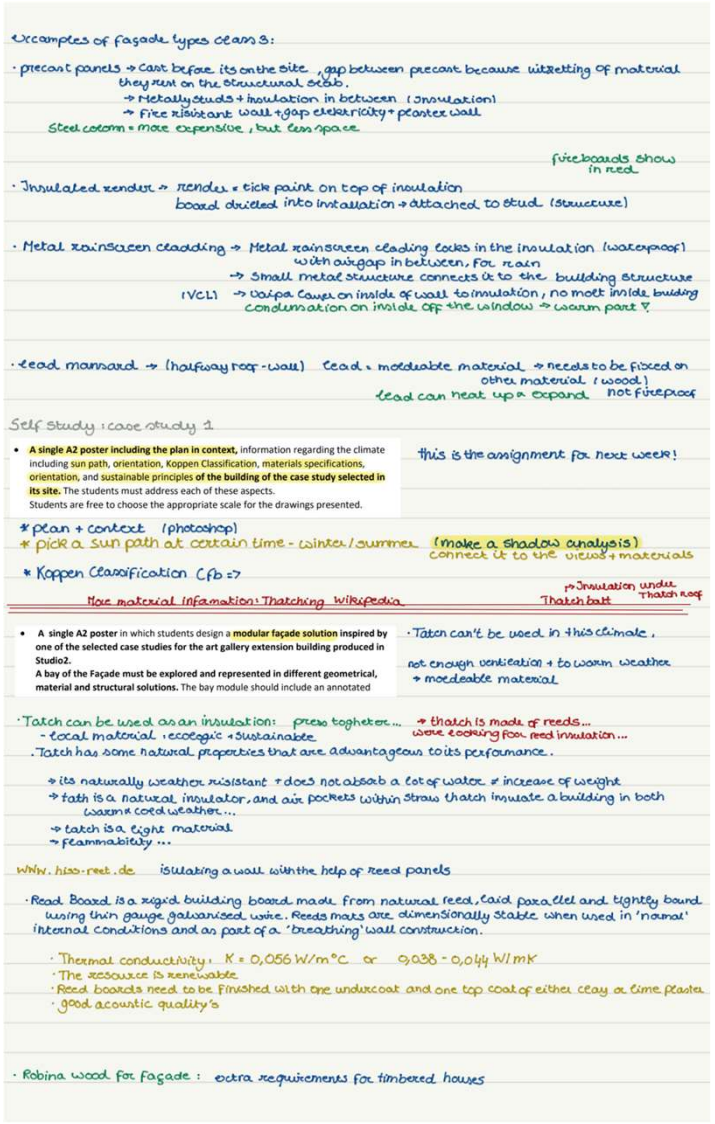
Find more information – interresting
Warum Lehm für Bauherren? - Claytec

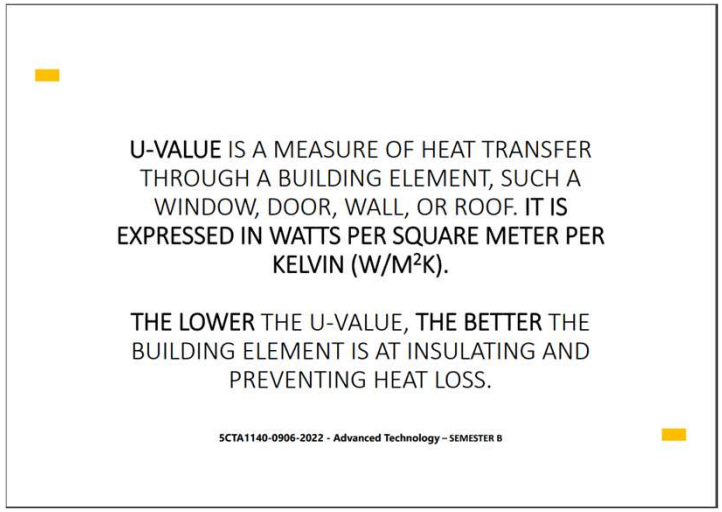
Leem interiour + reed combination

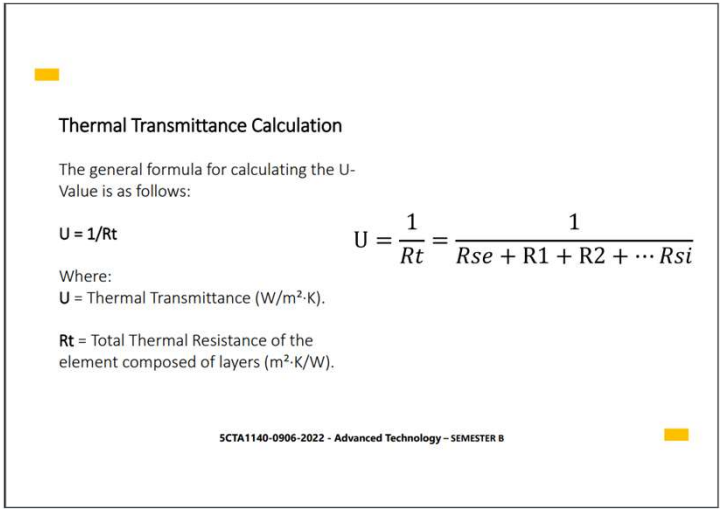
Information + Idea concept :

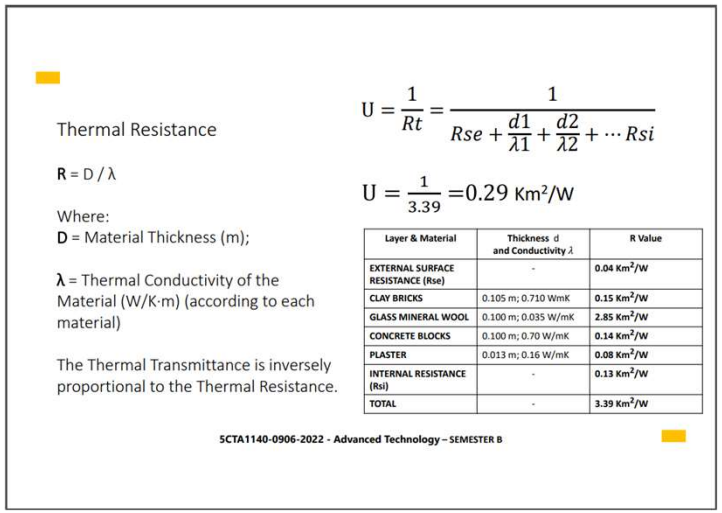
- Thatch can't be used in this climate – needs enough ventilation + warm weather -> moldable material

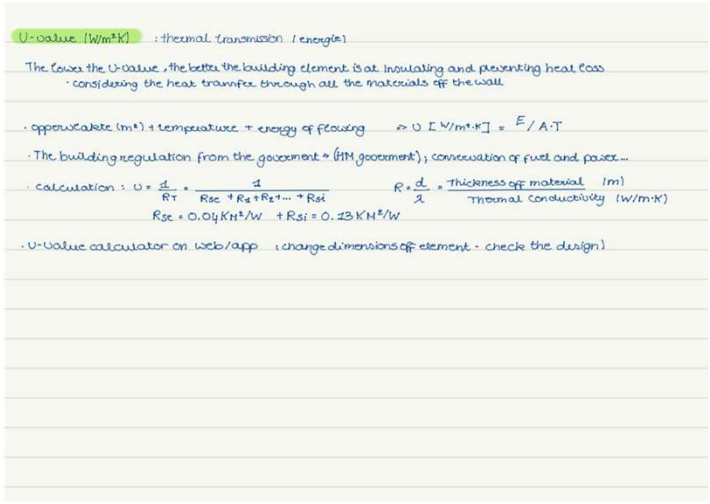
Thatch can be used as an insulation: press together (reeds insulation)
Local material: ecologic and sustainable
Thatch has some natural properties that are advantageous to its performance
Weather resistant + does not absorb lots of water, no increase of weight
Natural insulator, air pockets within straws make sure of insulation
Thatch is a light material











U-value calculation:

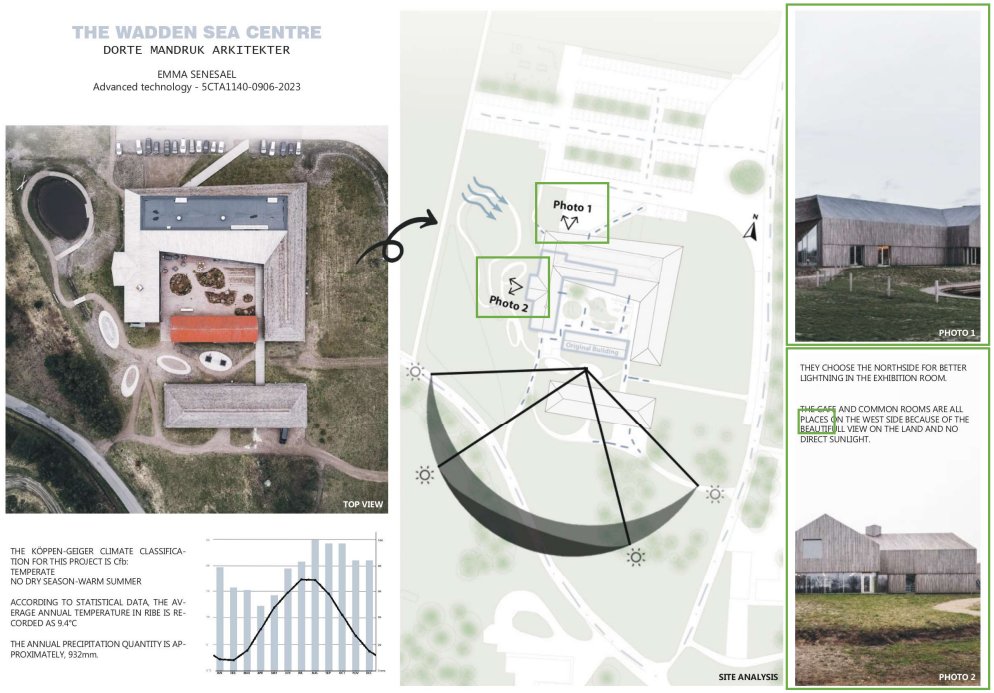
U-value is a measure of heat transfer through a building element, such a window, door, wall, of roof.
It is expressed in watts per square meter per kelvin (W/m²K)

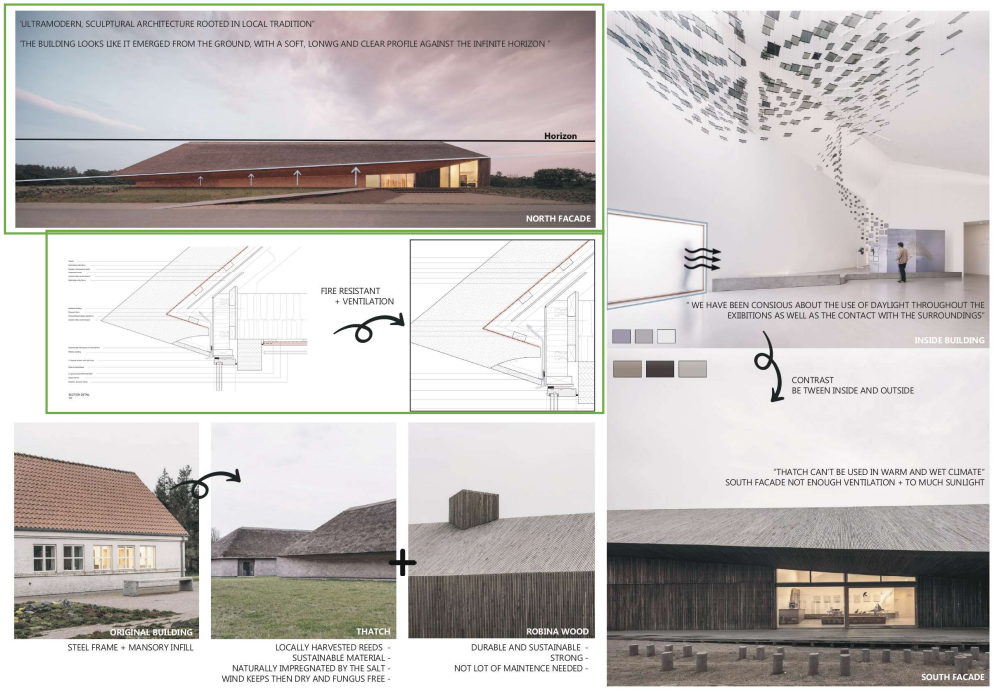
The lower the U-value, the better the building element is at insulating and preventing heat loss.

The general formula for calculation the U-value is U= 1/Rt

Rt is the thermal resistant of the elements composed of layers
And it's depended on the
D = Material thickness (m)
Lambda = Thermal conductivity (W/Km)
How higher value the Lambda of a material how better

14 / Class about U-value





Teacher notes:

For accuracy of symbols used, if the arrows show what you see in the pictures, then they should be pointing the other way. In your diagram the arrows suggest a view out of the building and not a view towards the building. I know the note of the café suggests the view out but there is no photo of such a view in the board. However, I understand the limitation of space on the page.

Shame that both photo 1 and 2 are cropped showing the building cut off. Very good analysis

The horizon is where the land meets the sky. I am not sure what the 2 similar section diagrams are showing. If I was you, I would use the section drawing + an image of that corner of the building and write your own larger annotations.
And write the annotation manually so that they are clear to read. (or similar approach)

STUDY WEEK 13/11/23 WK 7

THE WADDEN SEA CENTRE

DORTE MANDRUK ARKITEKTER

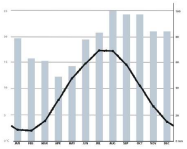
EMMA SENESAEL
Advanced technology - 5CTA1140-0906-2023

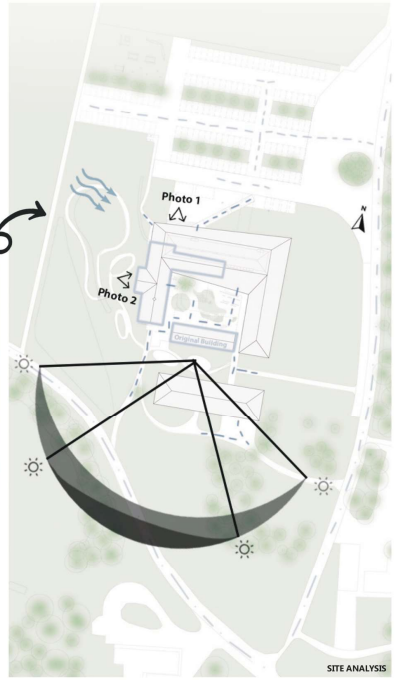


THE KÖPPEN-GEIGER CLIMATE CLASSIFICATION FOR THIS PROJECT IS Cfb:
TEMPERATE
NO DRY SEASON-WARM SUMMER

ACCORDING TO STATISTICAL DATA, THE AVERAGE ANNUAL TEMPERATURE IN RIBE IS RECORDED AS 9.4°C

THE ANNUAL PRECIPITATION QUANTITY IS APPROXIMATELY, 932mm.



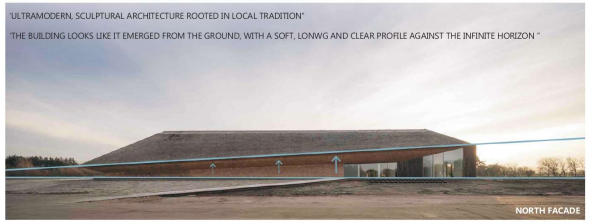


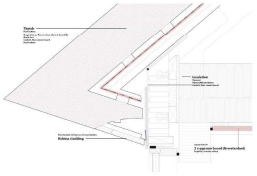


THEY CHOOSE THE NORTHSIDE FOR BETTER LIGHTNING IN THE EXHIBITION ROOM.

THE CAFE AND COMMON ROOMS ARE ALL PLACED ON THE WEST SIDE BECAUSE OF THE BEAUTIFULL VIEW ON THE LAND AND NO DIRECT SUNLIGHT.







FIRE RESISTANT
+ VENTILATION

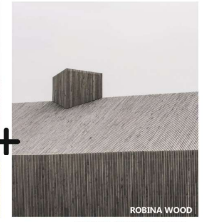




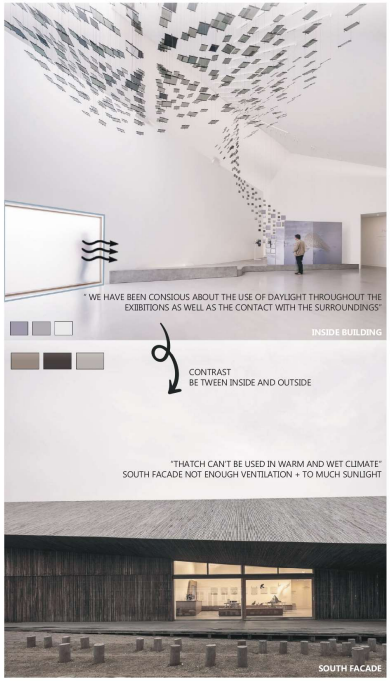
STEEL FRAME + MANSORY INFILL



LOCALLY HARVESTED REEDS -
SUSTAINABLE MATERIAL -
NATURALLY IMPREGNATED BY THE SALT -
WIND KEEPS THEN DRY AND FUNGUS FREE -

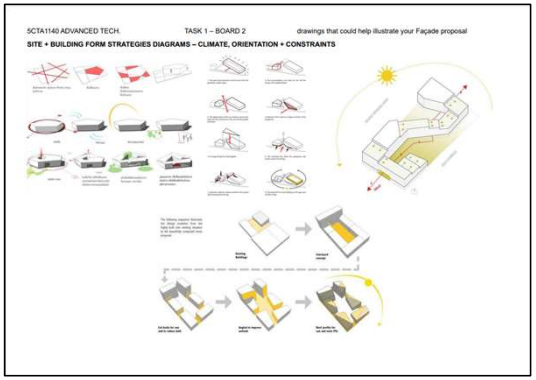


DURABLE AND SUSTAINABLE -
STRONG -
NOT LOT OF MAINTENCE NEEDED -



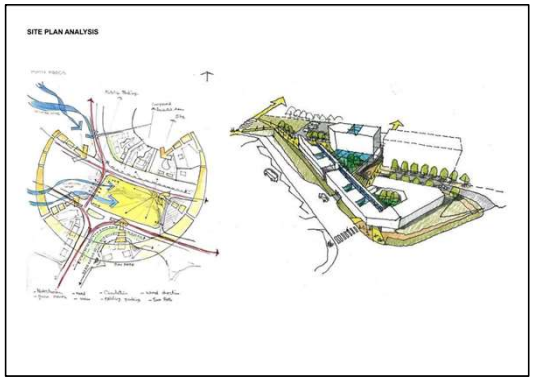
16 / Adjusting Design of first Crit

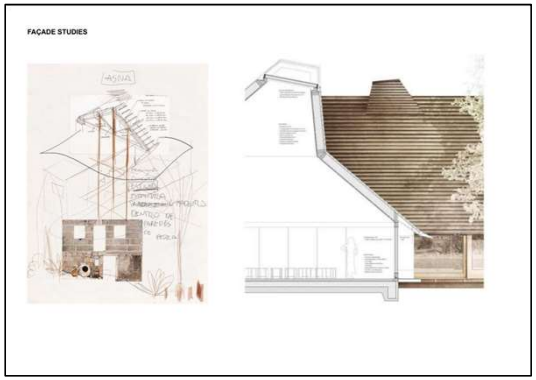
STUDY WEEK 13/11/23 WK 7

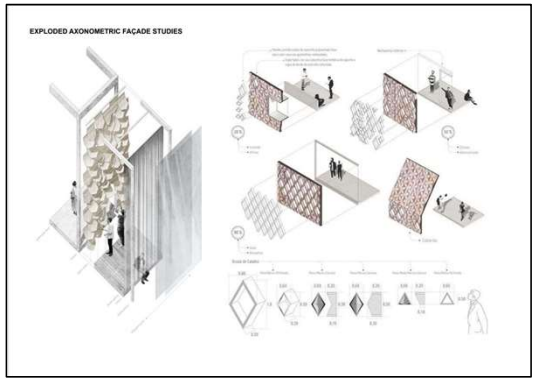


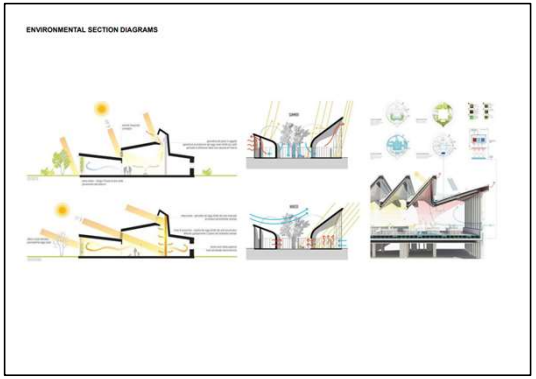


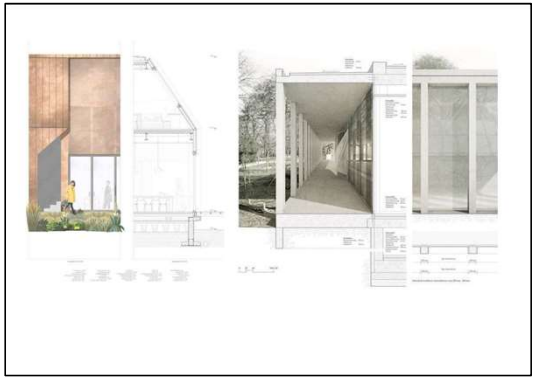


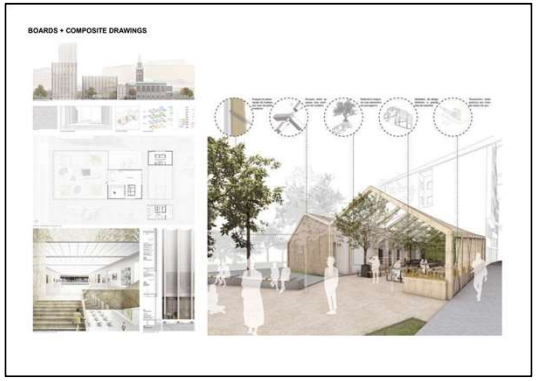












17 / Façade solution - Content Ideas

STUDY WEEK 13/11/23 WK 7

Inspiration page – Façade solution: Nabasco 8010

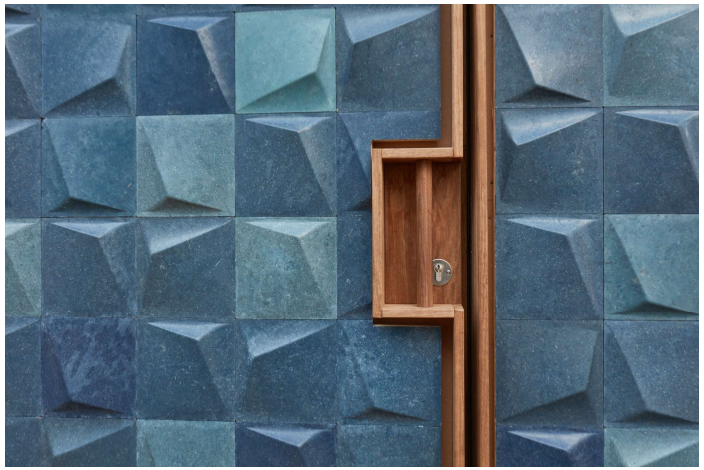
Nabasco circular bio-composite product are made from biobased or substitute materials: For example, Dutch reed, recycling and renewable softening lime, in combination with a partially biobased resin.
So it is durable and maintenance free very suitable for demanding outdoor use such as façade cladding…

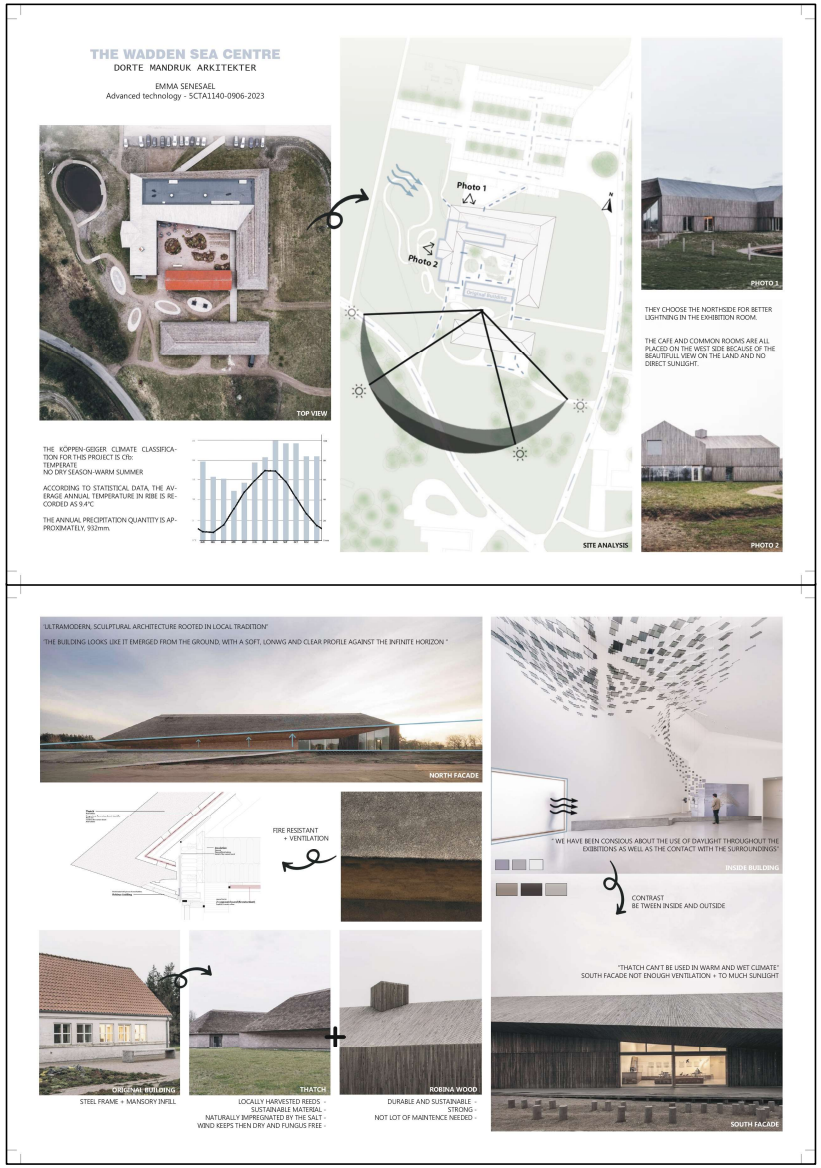
Form freedom: bio-composites are produced under heigh pressure to press into a mold, this gives three dimensional products without loss of material or additional processing costs.
This gives the designer an opportunity to create a to apply its own identity to the façade.

- no maintence needed
- no coating
- colored in mass – little damage no effect on view
- lifespan of minimum 50 years
- extreme weather: temperature drops & rainy weather…











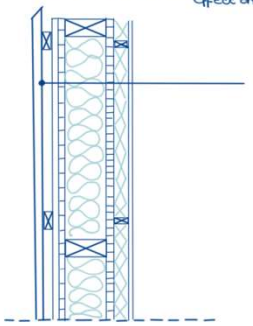
· Wall Finish: Nabasco Façade

nabasco circular bio-composite products are made from biobased or substitute materials.

For example Dutch reed, recycling and renewable softening lime, in combination with a partially biobased resin. So it is durable and maintenance free very suitable for demanding outdoor use Such as Façade cladding.

Form freedom: bio-composites are produced under heigh pressure to press into a mold.
This gives three-dimensional products without loss of material or additional processing costs.
This gives the designer a opportunity to create a to apply its own identity to the façade.

- no maintence needed
- no coating
- colored in mass little damage no effect on view
- lifespan of minimum 50 years
- extreme weather: temperature drops x rainy weather.



· Cladding wall system:

Wall Finish (wood cladding or biocomposiet nabasco 80101) (6mm - 32mm
air cavity - horizontal slats (22 mm x 45 mm)
air cavity - vertical slats (22 mm x 45 mm)
windproof vapour-poermeable fibreboard - celit (22 mm)
construction beams and columns (240 mm)
+ Thermic insulation
Airtight vapour barrier stiffening plate - OSB3-plaat (18 mm)
pipe cavity - slats + Thermic insulation
wall finish - gypsum fibreboard

DESIGN DISCUSSION RECORD

19 / 2ND CRIT PRESENTATION

2

20/11/23 **WK 8**

DESIGN DISCUSSION RECORD

MAIN POINTS OF DESIGN DISCUSSION (FEEDBACK):

Personal Notes:

Technical information + material information -> views + plans
Drawing with ventilation – overheating – environmental aspects + light analysis

- Name on sheet + project name …

- Pick a side of building + apply material for the whole bay – floor + wall + roof
(Think about technical stuff – collecting water trough water pipe..)

- Light study, do you need controlled light, material use..

- Decision, why did you select this material – Thach choice, why ?
    Thermal use – sustainable (made + transport)

- U value calculations, dimensions important

- Precedent inspiration … (explore)
    Detailed drawing + axonometry – angled section
    Look at placing windows + which windows

- Work out sketches + research material

- Put in dimensions of the material

- Put a scale on the drawings

Teacher Notes PERSONAL COMMENTS:

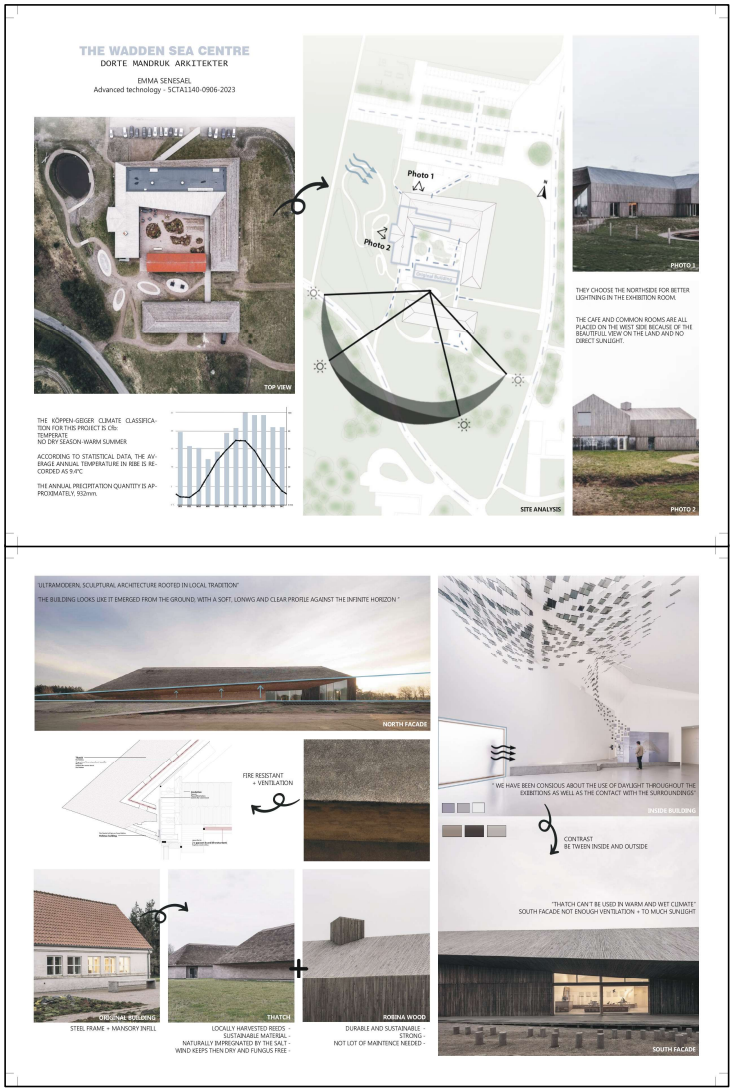
NABASCO – Category Other Naturals – Code ONA419 – Country Netherlands
"Research on the material" + Material Properties

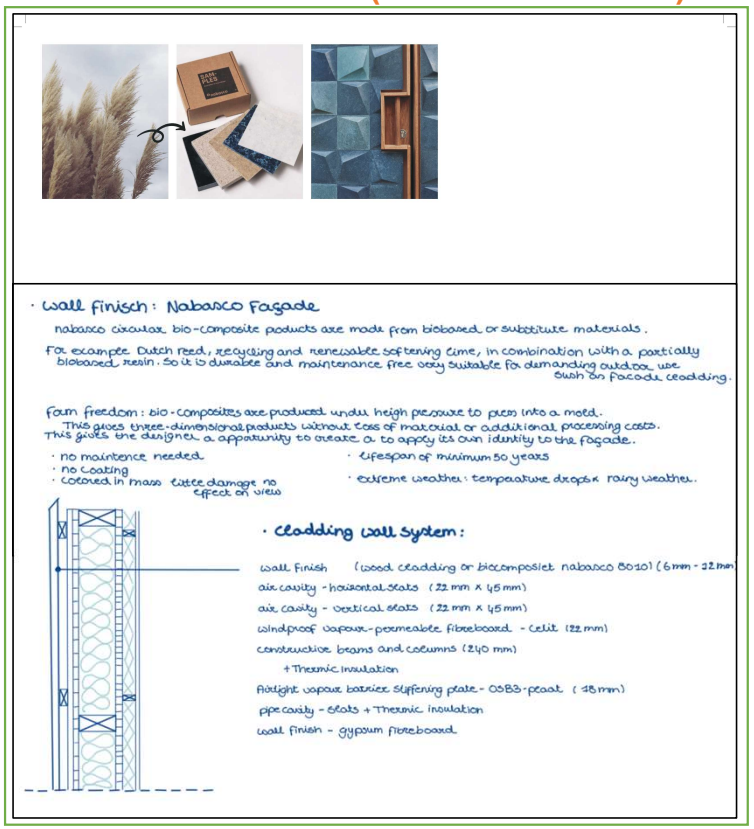
- Develop your façade details using both good quality technical and visual graphics.
    Starting from the overall section through the façade from ground to roof.

(Annotated + How the façade responds to environmental factors)

- Render visual materiality drawing showing the feeling of what it may look like

MAIN AREAS TO ADDRESS TO TAKE MY DESIGN FORWARD (FEEDFORWARD):





Layout + Lots of information Missing …

- Technical information
- Environmental Information

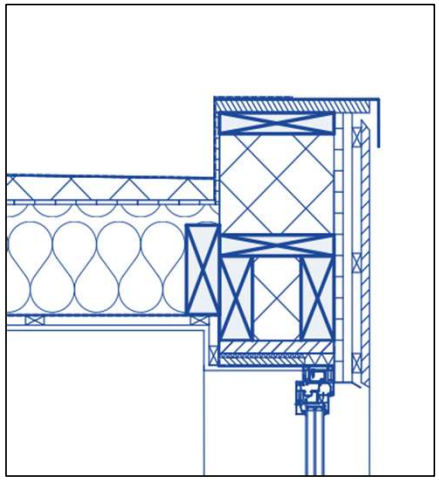
21 / Take my design forward after 2ND CRIT

Personal Research + **TO-DO LIST**:

Research depended on the second assignment:

- **Detail section(s):** showing construction layers of the element selected between roof, walls and foundations

Inspiration sections Cladding:



Cladding Wall:

- Wall finish biocomposiet nabasco 8010
- Air cavity – Horizontal slats
- Air cavity – Vertical slats
- Windproof vapour permeable fibreboard – celit
- Constructive Beams and Columns + Thermic insulation
- Airtight vapour barrier stiffing plate – OSB3-plaat
- Pipe cavity – Slats + Thermic insulation possible …
- Wall finish – gypsum fibreboard

Roof Structure:

- Wall finish – gyspum fibreboard
- Pipe cavity – Slats
- Vapour barrier PE-foil
- Constructive Beams and Columns + Thermic insulation
- Airtight vapour barrier stiffing plate – OSB3-plaat
- Insulation slope for watering

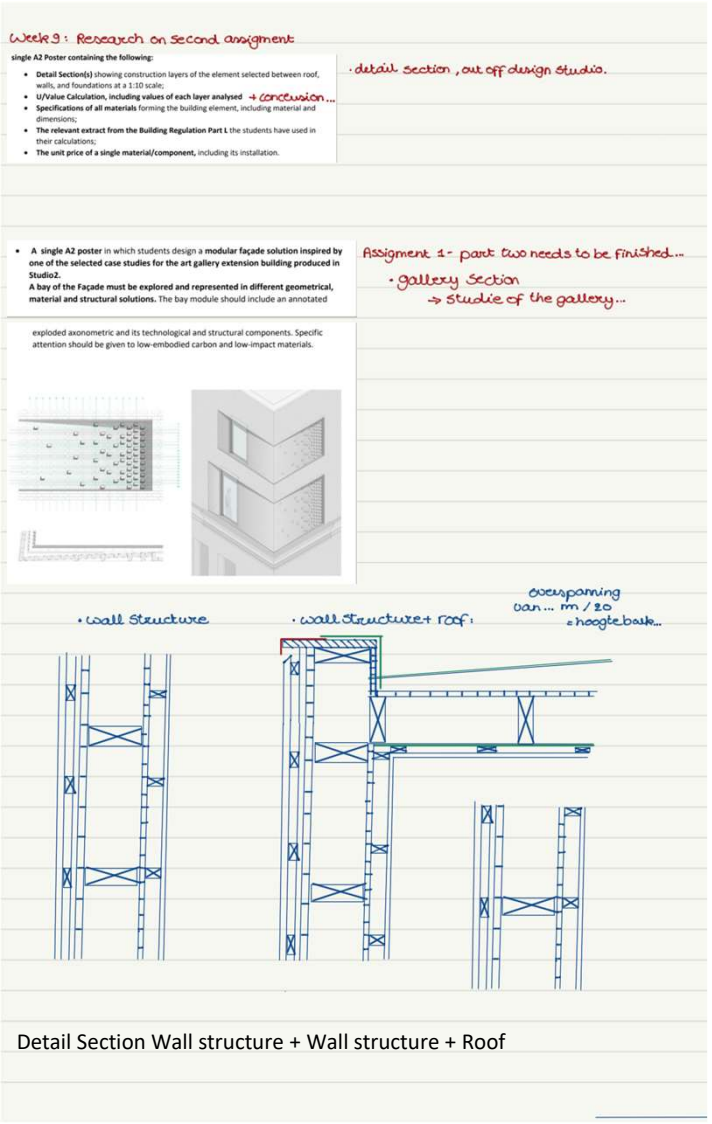
- **U/Value Calculation**, including values of each layer analysed **+ Conclusion**

- **Specifications of all materials ->** Showing in a section, Materials + Dimensions

- **The Relevance extract from the Building Regulations Part L**

- **The Unit Price of a single material/component,** including its installation.

Research depended on the second part off first assignment …



Detail Section Wall structure + Wall structure + Roof

PROGRESS ABSENT DUE TO ILLNESS
22 / Personal Research

To-do List Assignment 1 –Part 2:

- Site + Building form strategies Diagrams – Climate, orientation and constraints
- Environmental Section Diagrams
- Section Studies – Quality of Light
- Façade Studies
- Exploded axonometric façade studies

Notes Teacher:

Section trough the event room

- Think about amount of sunlight you want inside
  Heating during summer period…

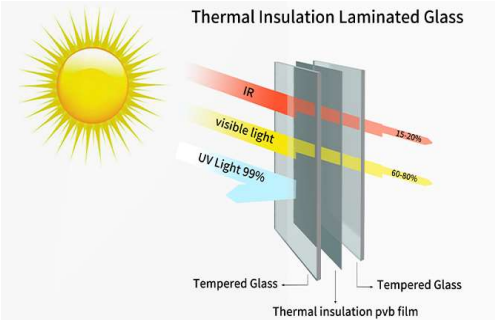
- Possibility for making the room darker – no sunlight for readings…
Good possible environmental solution might be Thermal insulated windows…

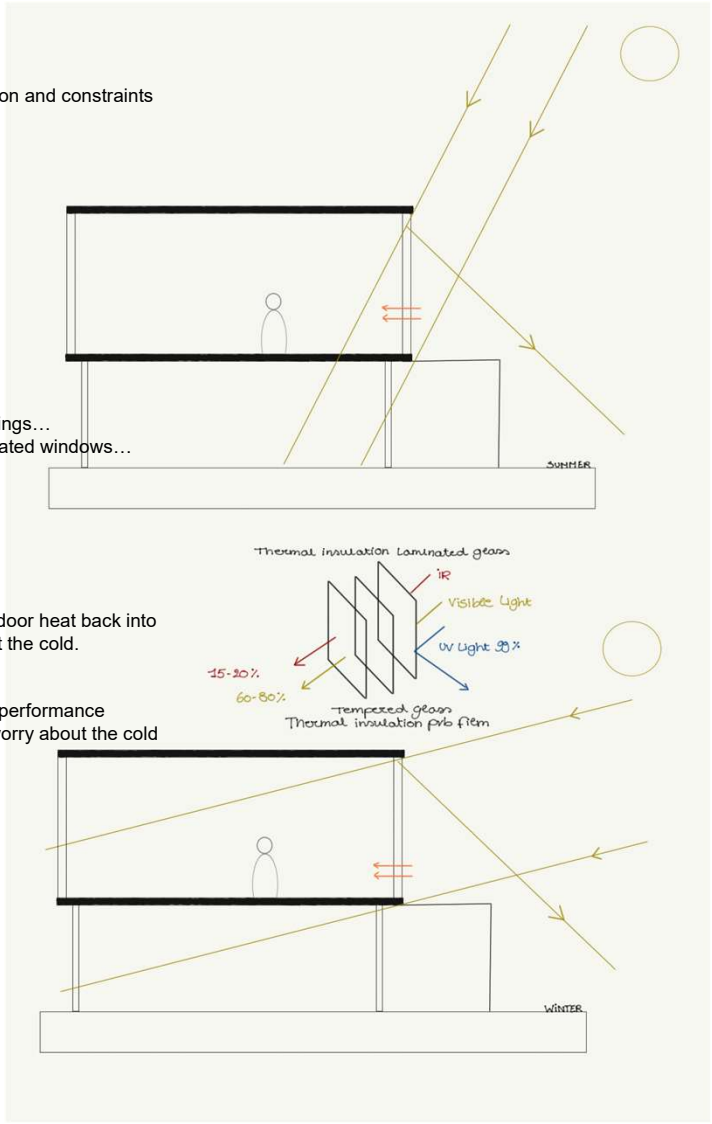
Personal Research:

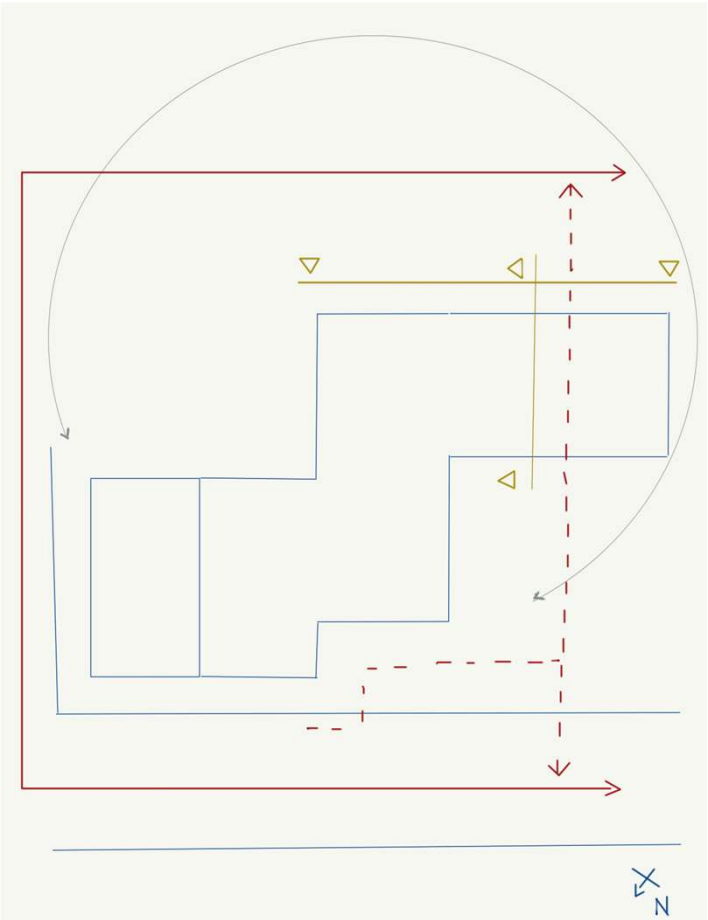
Thermal insulation glass = Low emissivity glass

Let's the sun's rays pass through the glass yet reflects any indoor heat back into the room so that it does not escape – forming a shield against the cold.

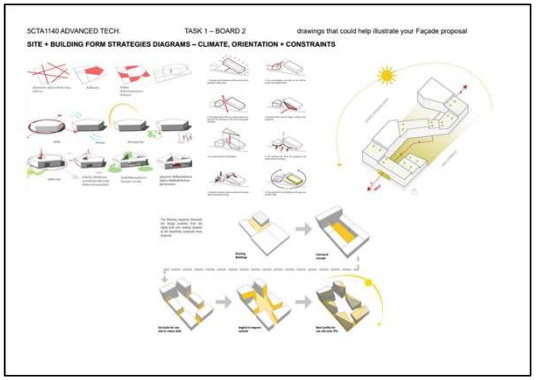
Generally used it double or triple glazing
Saves energy thanks to excellent thermal insulation performance
it allows to install larger windows without having to worry about the cold

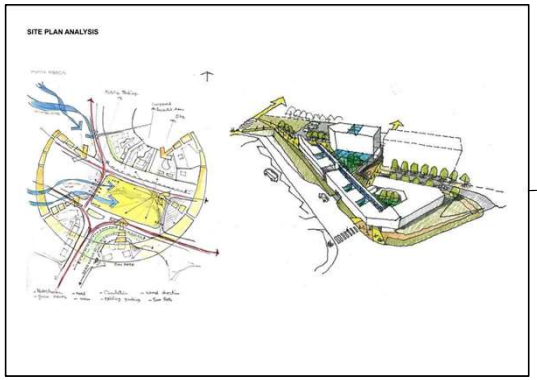




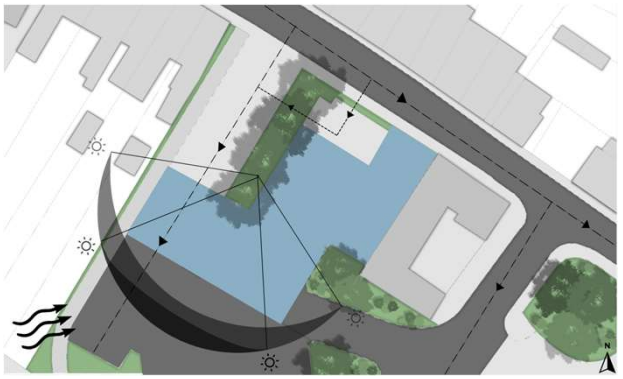


Site Analysis sketch – Climate, Orientation + Constraints …
Sun analysis and walking pattern…

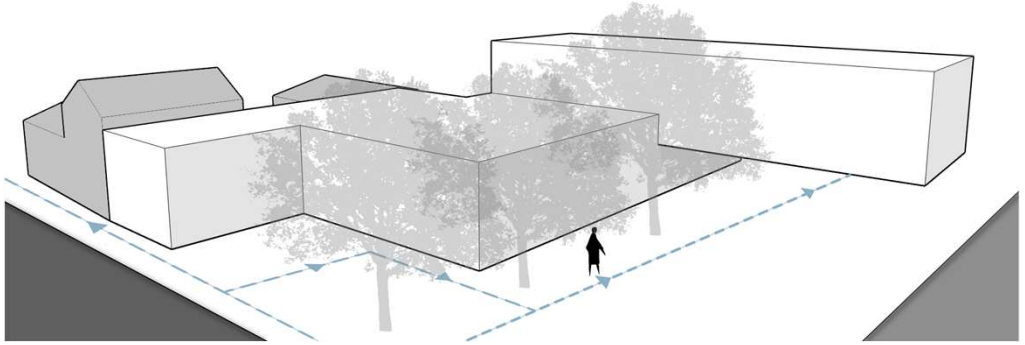




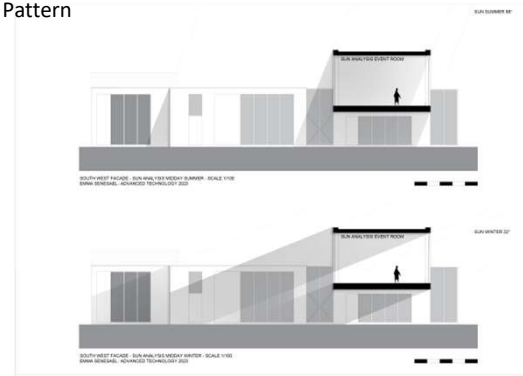




Site analysis + Sunlight – Walking Patterns



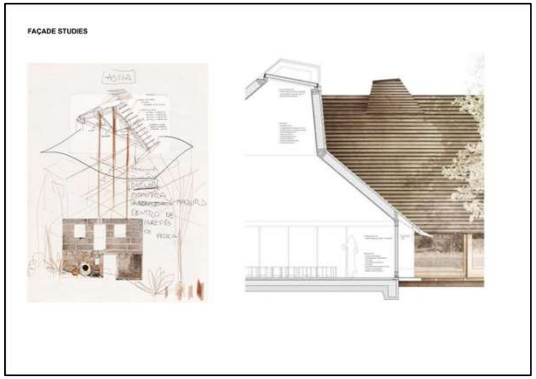
Building form strategies diagram – 3D – Walking Pattern



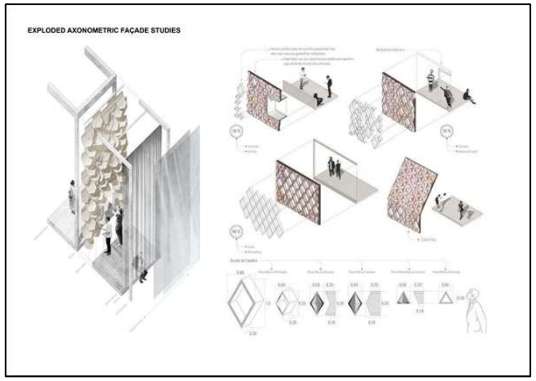
Section studies – Quality of light

24 / Site + Building form strategies diagrams – Section studies / Quality of light

04/12/23 **WK 10**

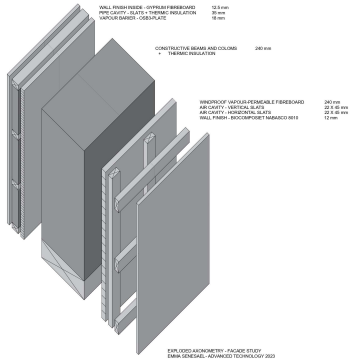








Façade studie off event room



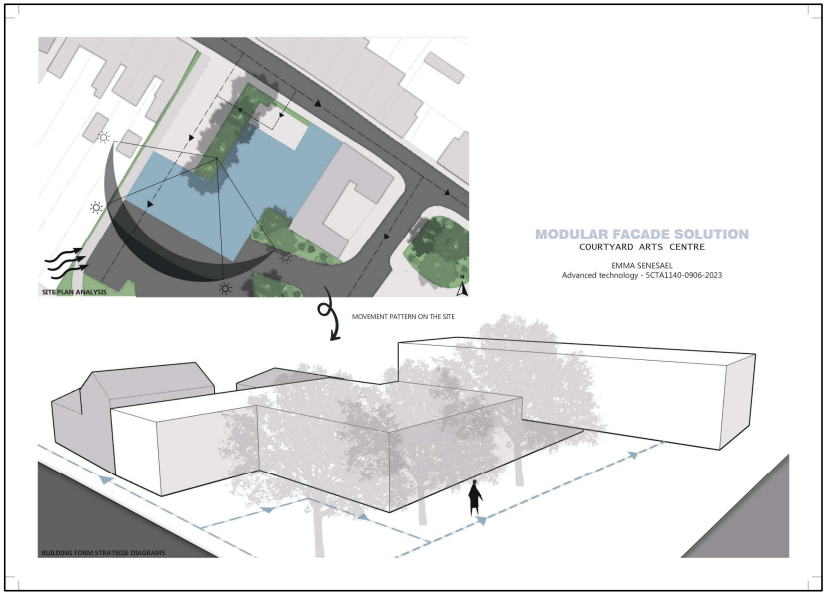
Exploded axonometric façade studie – Shape off Cladding Missing

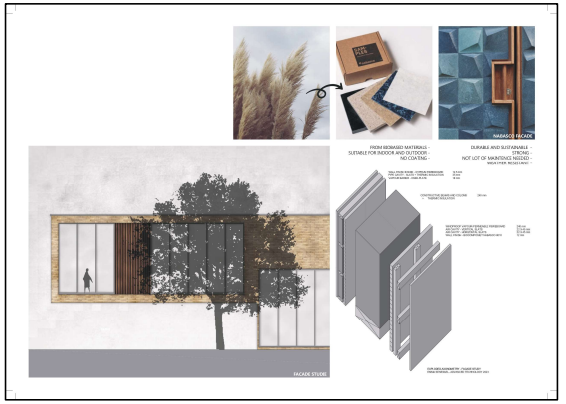
25 / Façade studie – Exploded axonometric façade studie

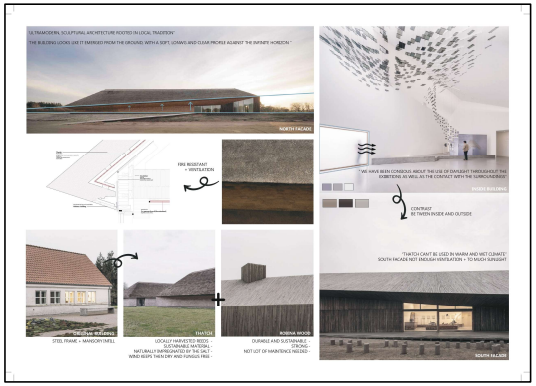
3

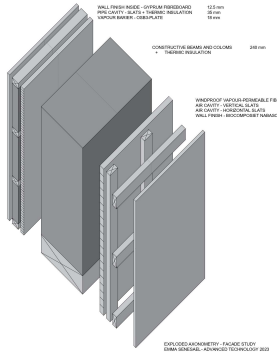
11/12/23 WK 11

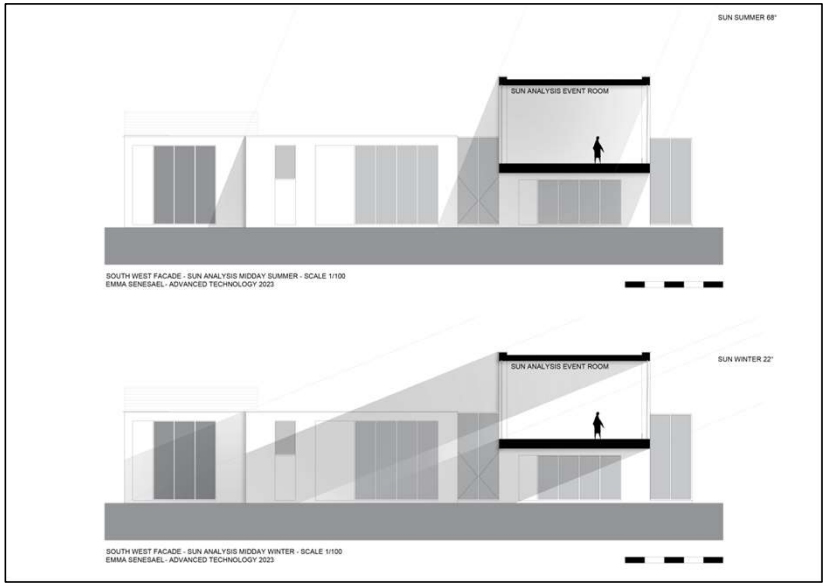














DESIGN DISCUSSION RECORD

26 / 3TH CRIT PRESENTATION

3

11/12/23 **WK 11**

DESIGN DISCUSSION RECORD

MAIN POINTS OF DESIGN DISCUSSION (FEEDBACK):

Personal Notes Questions:

- scale 1/10 SECTION is not fitting
  Detail not a Section …

- Cost of materials
  Needed Research

- Page A2 is not fitting
  Don't put it on two pages – Put on one page (Keep to Assignment)

- Allowed extra documents – (Keep to Assignment)

Personal Notes:

- Cladding shape missing – study on shape of the cladding

- Environmental façade study needed – combine with sunlight study

- Add hatches to sections

- Add dimensions on the sections
  Material name + Dimensions

- Add in a "Legende"

- Name and Project number should be mentioned on every page

- GYPSUM THERMAL – BREATHER MEMBRANE

- View of site is not that clear – show the way its floating …

- Explain more how you take the material + use it Nabasco 8010

- Add in texture in axonometry -> color + material

- Scale bar, Add in numbers to show the scale

- Make sure you look for rainwater options in section …

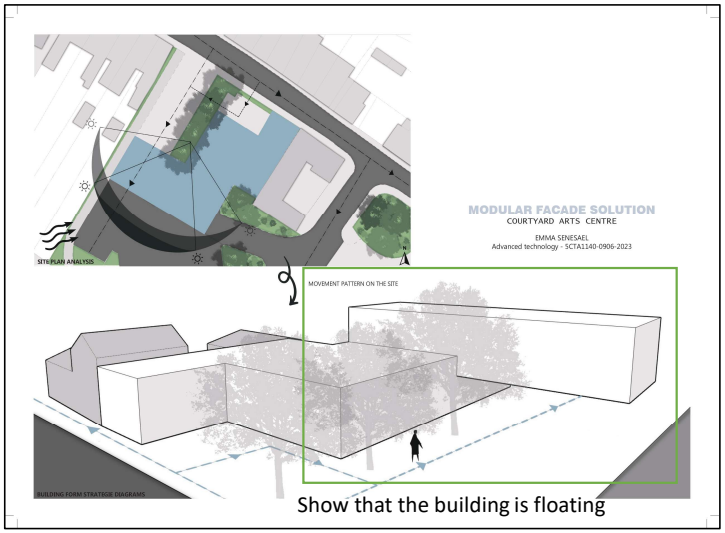
- Use the split section sigh if needed

3

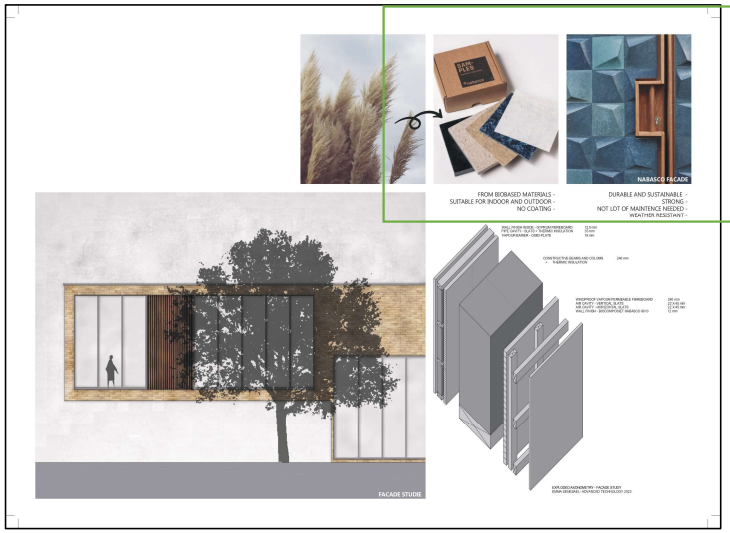
11/12/23 WK 11

DESIGN DISCUSSION RECORD

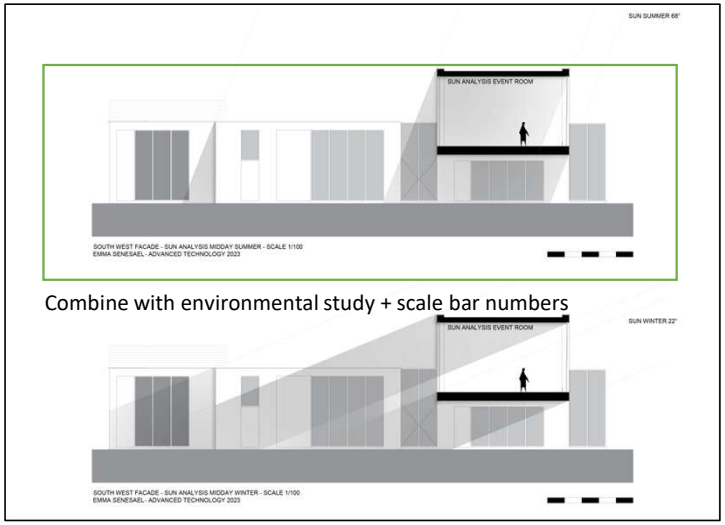
MAIN AREAS TO ADDRESS TO TAKE MY DESIGN FORWARD (FEEDFORWARD):



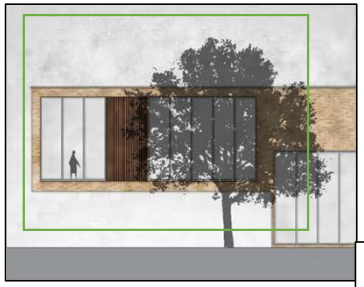
Show that the building is floating



Explain the material more …



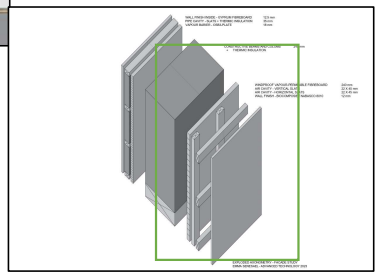
Combine with environmental study + scale bar numbers



3rd page missing - scale 1/10 SECTION is not fitting
Add hatches + Dimensions to the section

- Cost of materials
  Needed Research

ADD IN A FUNCTION TO THE WOODEN PANELS
Combine with environmental study



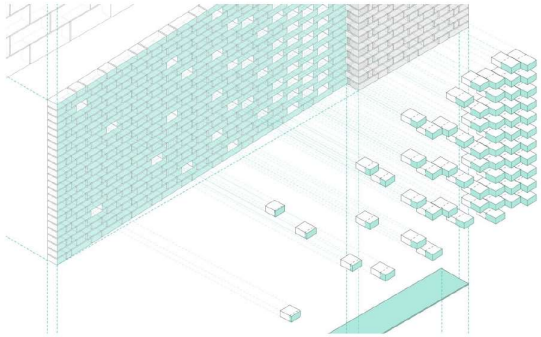
Cladding shape missing
Add Materials

ADJUST EVERYTHING TO ONE A2-PAGE – STICK TO ASSIGNMENT

28 / Take my design forward after 3TH CRIT

5CTA1140-0906-2023
ADVANCED TECHNOLOGY

Task 1: SUSTAINABLE PRINCIPLES FOR FAÇADE DESIGN



For this first part, students are asked to analyse one of the three case studies proposed in its material, tectonic and environmental aspects. At the end of this process, students are asked to re-design a modular façade implementing the knowledge acquired in the research. The three case studies are the following:

- Dorte Mandrup, Wadden Sea Centre, Denmark.
- IDK, OUTSIDE project, United Kindom.
- Ko Architects, Yves Saint Laurent Museum, Marrakesh, Morocco.

The case studies have been selected as examples of architectural adaptation to the local climate and the different materials implemented according to the specific built environment.

In particular, students must produce **two A2 posters** containing the following:

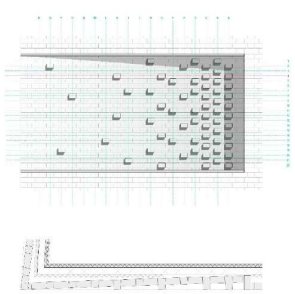
- **A single A2 poster including the plan in context,** information regarding the climate including sun path, orientation, Koppen Classification, materials specifications, orientation, and sustainable principles **of the building of the case study selected in its site.** The students must address each of these aspects.
  Students are free to choose the appropriate scale for the drawings presented.

- **A single A2 poster** in which students design a **modular façade solution inspired by one of the selected case studies for the art gallery extension building produced in Studio2.**
  A bay of the Façade must be explored and represented in different geometrical, material and structural solutions. The bay module should include an annotated

ASSIGNMENT BRIEF TASK 1

5CTA1140-0906-2023
ADVANCED TECHNOLOGY

exploded axonometric and its technological and structural components. Specific attention should be given to low-embodied carbon and low-impact materials.





Students are required to conduct their own research for this part of the submission using the material in the task tabs on Canvas and consulting the materials of the following reading list.

READING LISTS

Allen, E., & Rand, P. (2016). Architectural detailing: Function, constructability, aesthetics: Third edition.

Ching, F. (1995). A visual dictionary of architecture. Van Nostrand Reinhold.

Ching, F. D. K. (2014). Architecture: Form, Space, and Order (4th ed.). John Wiley & Sons, Incorporated.

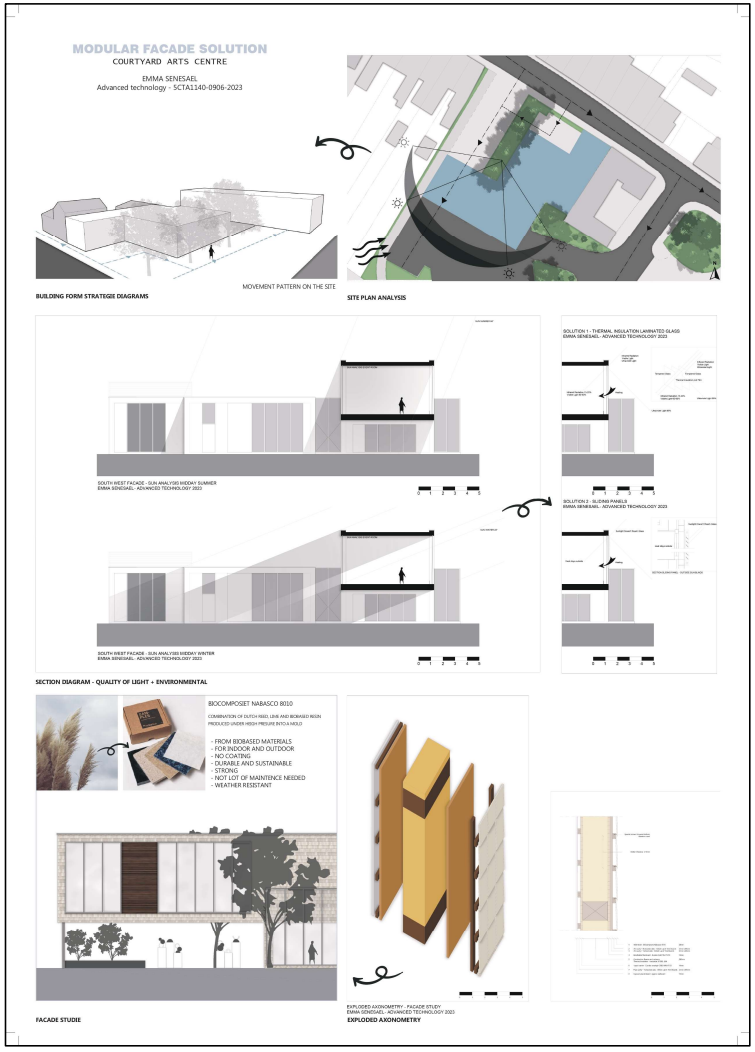
Hetreed, J., Ross, A., & Baden-Powell, C. (2017). Architect's Pocket Book (5th ed.). Routledge.

Silver, P. (., & McLean, W. (2021). Introduction to architectural technology (Third). Laurence King Publishing.

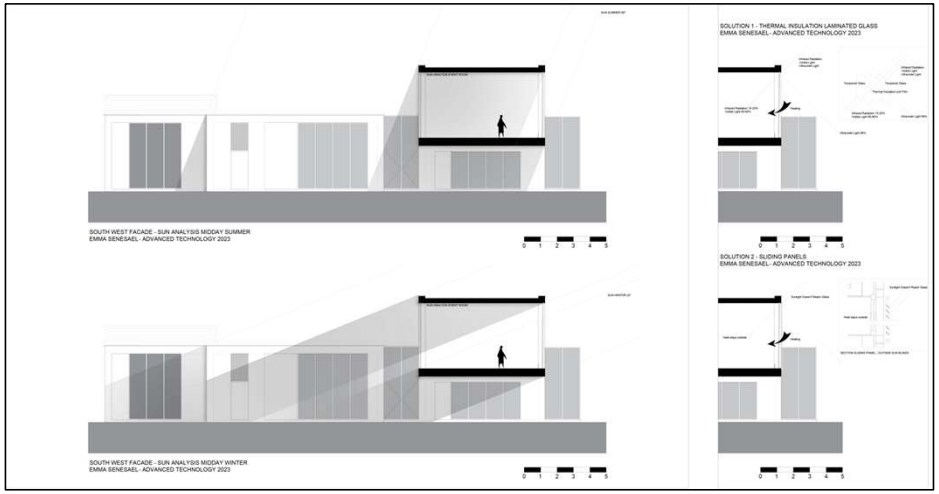
WEB RESOURCES

Brick Development Association

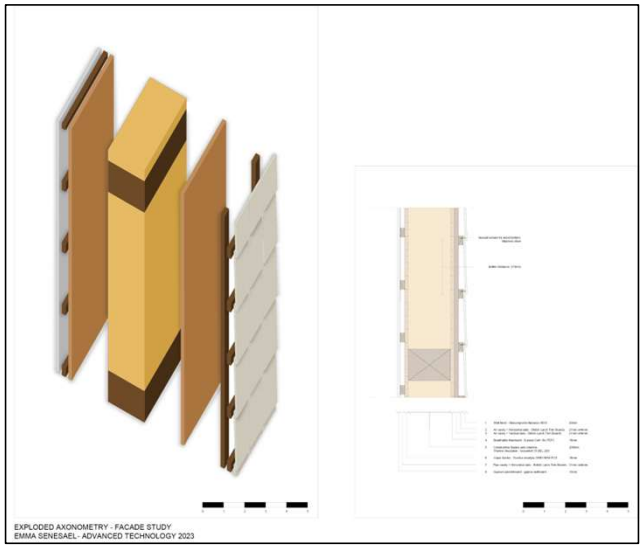
https://www.brick.org.uk/



ADJUSTMENTS AFTER CRIT



ENVIRONMENTAL STUDIE INCLUDED
- THERMAL INSULATED LAMINATED GLASS
- SLIDING PANELS



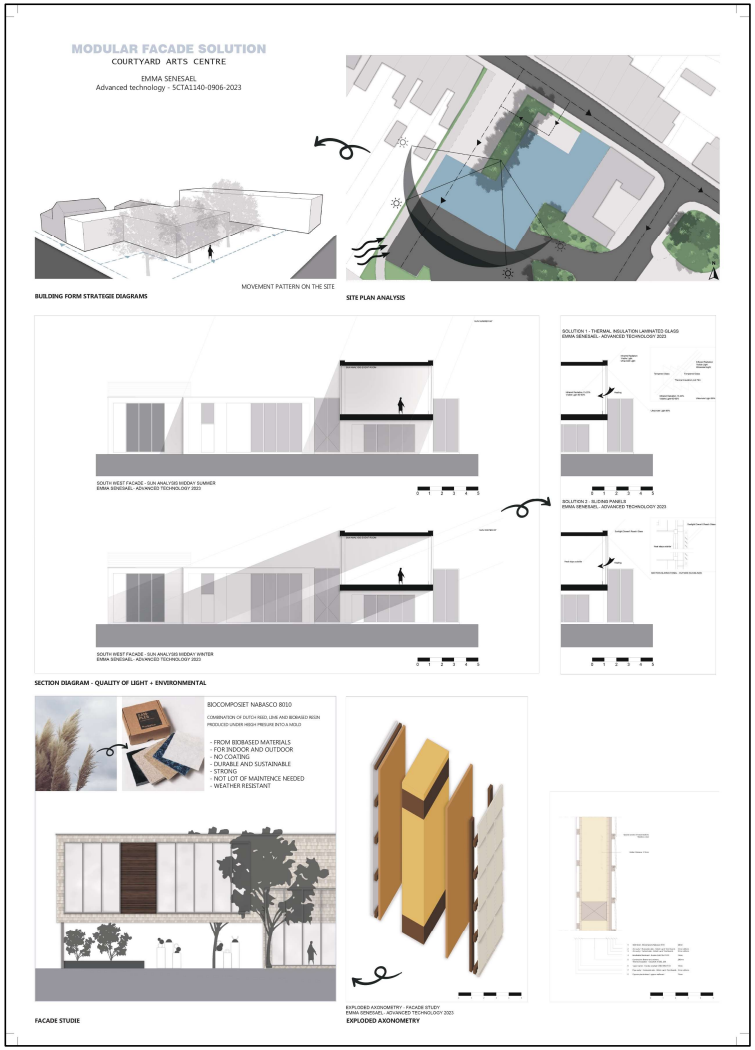
AXONOMETRY



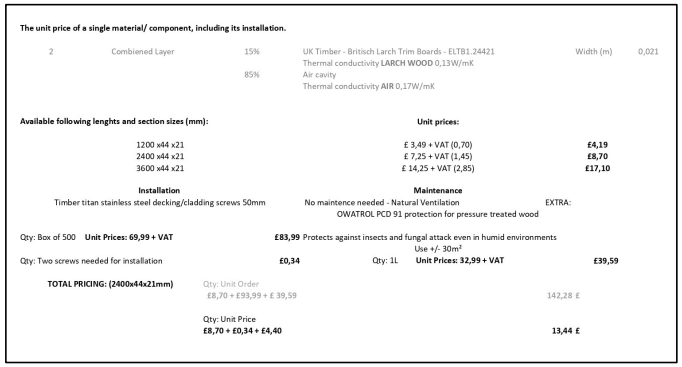
FAÇADE DESIGN


THE WADDEN SEA CENTRE
DORTE MANDRUK ARKITEKTER
EMMA SENESAEL
Advanced technology - SCTA1140-0906-2023
TOP VIEW
Photo 1
Photo 2
SITE ANALYSIS
PHOTO 1
PHOTO 2
THEY CHOOSE THE NORTHSIDE FOR BETTER LIGHTNING IN THE EXHIBITION ROOM.
THE CAFE AND COMMON ROOMS ARE ALL PLACED ON THE WEST SIDE BECAUSE OF THE BEAUTIFULL VIEW ON THE LAND AND NO DIRECT SUNLIGHT.
THE KOPPEN-GEIGER CLIMATE CLASSIFICATION FOR THIS PROJECT IS Cfb: TEMPERATE
NO DRY SEASON-WARM SUMMER
ACCORDING TO STATISTICAL DATA, THE AVERAGE ANNUAL TEMPERATURE IN RIBE IS RECORDED AS 9.4°C.
THE ANNUAL PRECIPITATION QUANTITY IS APPROXIMATELY, 932mm.
ULTRAMODERN, SCULPTURAL ARCHITECTURE ROOTED IN LOCAL TRADITION"
"THE BUILDING LOOKS LIKE IT EMERGED FROM THE GROUND, WITH A SOFT, LONWG AND CLEAR PROFILE AGAINST THE INFINITE HORIZON "
NORTH FACADE
FIRE RESISTANT
+ VENTILATION
" WE HAVE BEEN CONSCIOUS ABOUT THE USE OF DAYLIGHT THROUGHOUT THE EXIBITIONS AS WELL AS THE CONTACT WITH THE SURROUNDINGS"
INSIDE BUILDING
CONTRAST
BETWEEN INSIDE AND OUTSIDE
"THATCH CAN'T BE USED IN WARM AND WET CLIMATE"
SOUTH FACADE NOT ENOUGH VENTILATION + TO MUCH SUNLIGHT
SOUTH FACADE
ORIGINAL BUILDING
STEEL FRAME + MANSORY INFILL
THATCH
LOCALLY HARVESTED REEDS - SUSTAINABLE MATERIAL - NATURALLY IMPREGNATED BY THE SALT - WIND KEEPS THEN DRY AND FUNGUS FREE -
ROBINA WOOD
DURABLE AND SUSTAINABLE - STRONG - NOT LOT OF MAINTENCE NEEDED -

TASK 1


MODULAR FACADE SOLUTION
COURTYARD ARTS CENTRE
EMMA SENESAEL
Advanced technology - SCTA1140-0906-2023
BUILDING FORM STRATEGIE DIAGRAMS
MOVEMENT PATTERN ON THE SITE
SITE PLAN ANALYSIS
SOUTH WEST FACADE - SUN ANALYSIS MIDDAY SUMMER
EMMA SENESAEL - ADVANCED TECHNOLOGY 2023
SOUTH WEST FACADE - SUN ANALYSIS MIDDAY WINTER
EMMA SENESAEL - ADVANCED TECHNOLOGY 2023
SOLUTION 1 - THERMAL INSULATION LAMINATED GLASS
EMMA SENESAEL - ADVANCED TECHNOLOGY 2023
SOLUTION 2 - SLIDING PANELS
EMMA SENESAEL - ADVANCED TECHNOLOGY 2023
SECTION DIAGRAM - QUALITY OF LIGHT + ENVIRONMENTAL
BIOCOMPOSIET NABASCO 8010
COMBINATION OF DUTCH REED, LINK AND BIOBASED RESIN
PRODUCED UNDER HIGH PRESURE INTO A MOLD
- FROM BIOBASED MATERIALS
- FOR INDOOR AND OUTDOOR
- NO COATING
- DURABLE AND SUSTAINABLE
- STRONG
- NOT LOT OF MAINTENCE NEEDED
- WEATHER RESISTANT
FACADE STUDIE
EXPLODED AXONOMETRY - FACADE STUDY
EMMA SENESAEL - ADVANCED TECHNOLOGY 2023
EXPLODED AXONOMETRY

08/01/24 WK 12



The unit price of a single material/ component, including its installation.

2	Combiened Layer	15%	UK Timber - Britisch Larch Trim Boards - ELTB1.24421 Thermal conductivity **LARCH WOOD** 0,13W/mK	Width (m)	0,021
		85%	Air cavity Thermal conductivity **AIR** 0,17W/mK		

Available following lenghts and section sizes (mm):

Unit prices:

1200 x44 x21	£ 3,49 + VAT (0,70)	**£4,19**
2400 x44 x21	£ 7,25 + VAT (1,45)	**£8,70**
3600 x44 x21	£ 14,25 + VAT (2,85)	**£17,10**

Installation
Timber titan stainless steel decking/cladding screws 50mm

Maintenance
No maintence needed - Natural Ventilation
EXTRA:
OWATROL PCD 91 protection for pressure treated wood

Qty: Box of 500 **Unit Prices: 69,99 + VAT** — **£83,99** Protects against insects and fungal attack even in humid environments. Use +/- 30m²

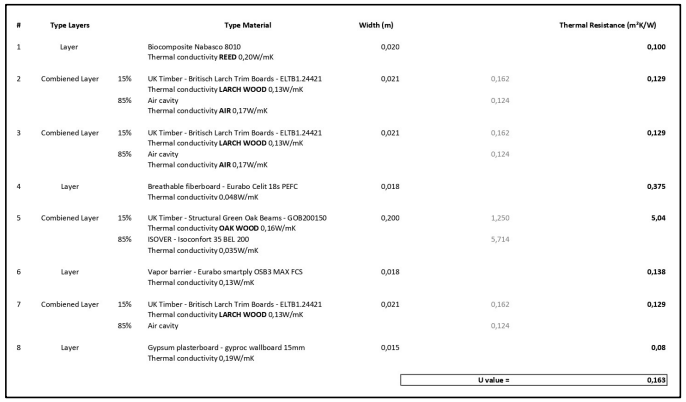
Qty: Two screws needed for installation — **£0,34** — Qty: 1L — **Unit Prices: 32,99 + VAT** — **£39,59**

TOTAL PRICING: (2400x44x21mm)

Qty: Unit Order
£8,70 + £93,99 + £ 39,59 — 142,28 £

Qty: Unit Price
£8,70 + £0,34 + £4,40 — **13,44 £**

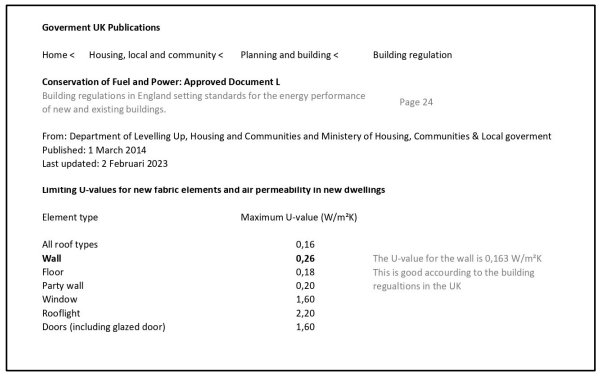
THE UNIT PRICE OF A SINGLE MATERIAL



#	Type Layers		Type Material	Width (m)		Thermal Resistance (m²K/W)
1	Layer		Biocomposite Nabasco 8010 Thermal conductivity **REED** 0,20W/mK	0,020		**0,100**
2	Combiened Layer	15%	UK Timber - Britisch Larch Trim Boards - ELTB1.24421 Thermal conductivity **LARCH WOOD** 0,13W/mK	0,021	0,162	**0,129**
		85%	Air cavity Thermal conductivity **AIR** 0,17W/mK		0,124	
3	Combiened Layer	15%	UK Timber - Britisch Larch Trim Boards - ELTB1.24421 Thermal conductivity **LARCH WOOD** 0,13W/mK	0,021	0,162	**0,129**
		85%	Air cavity Thermal conductivity **AIR** 0,17W/mK		0,124	
4	Layer		Breathable fiberboard - Eurabo Celit 18s PEFC Thermal conductivity 0,048W/mK	0,018		**0,375**
5	Combiened Layer	15%	UK Timber - Structural Green Oak Beams - GOB200150 Thermal conductivity **OAK WOOD** 0,16W/mK	0,200	1,250	**5,04**
		85%	ISOVER - Isoconfort 35 BEL 200 Thermal conductivity 0,035W/mK		5,714	
6	Layer		Vapor barrier - Eurabo smartply OSB3 MAX FCS Thermal conductivity 0,13W/mK	0,018		**0,138**
7	Combiened Layer	15%	UK Timber - Britisch Larch Trim Boards - ELTB1.24421 Thermal conductivity **LARCH WOOD** 0,13W/mK	0,021	0,162	**0,129**
		85%	Air cavity		0,124	
8	Layer		Gypsum plasterboard - gyproc wallboard 15mm Thermal conductivity 0,19W/mK	0,015		**0,08**
					U value =	**0,163**

U-VALUE CALCULATION WALL

Material list link to online:
Larch Trim Boards: https://www.uk-timber.co.uk/trim-boards/262-british-larch-trim-boards.html
Euroba Celit 18s PEFC: https://www.eurabo.be/nl/producten/celit-12s
Structural Green Oak Beams: https://www.uk-timber.co.uk/structural-green-oak-beams/56-structural-green-oak-beams-200mm-x-150mm.html
Euroba Smartyply OSB3 MAX FCS: https://www.eurabo.be/nl/producten/smartply-osb3-max-fsc
Gyproc Wallboard 15mm: https://www.british-gypsum.com/products/board-products/gyproc-wallboard-15mm



Goverment UK Publications

Home < Housing, local and community < Planning and building < Building regulation

Conservation of Fuel and Power: Approved Document L
Building regulations in England setting standards for the energy performance of new and existing buildings.

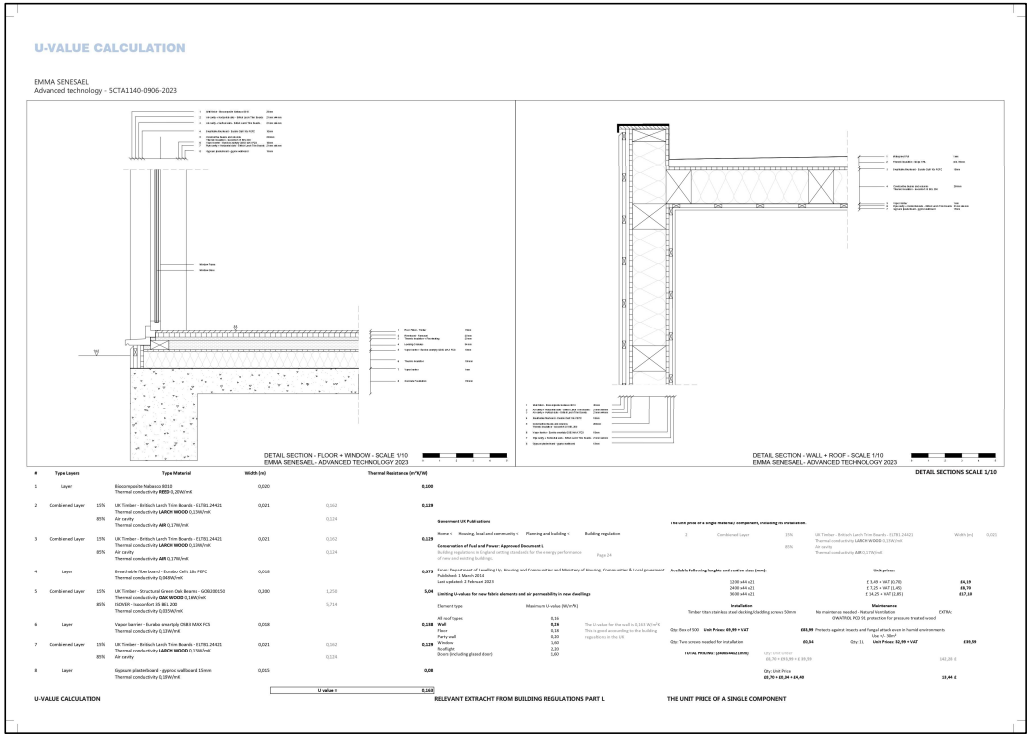
Page 24

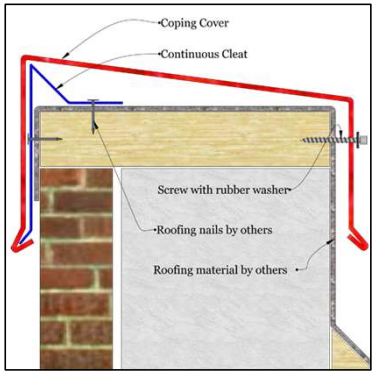
From: Department of Levelling Up, Housing and Communities and Ministery of Housing, Communities & Local goverment
Published: 1 March 2014
Last updated: 2 Februari 2023

Limiting U-values for new fabric elements and air permeability in new dwellings

Element type	Maximum U-value (W/m²K)	
All roof types	0,16	
Wall	**0,26**	The U-value for the wall is 0,163 W/m²K
Floor	0,18	This is good accourding to the building
Party wall	0,20	regualtions in the UK
Window	1,60	
Rooflight	2,20	
Doors (including glazed door)	1,60	

BUILDING REGULATIONS





INSPIRATION DETAIL

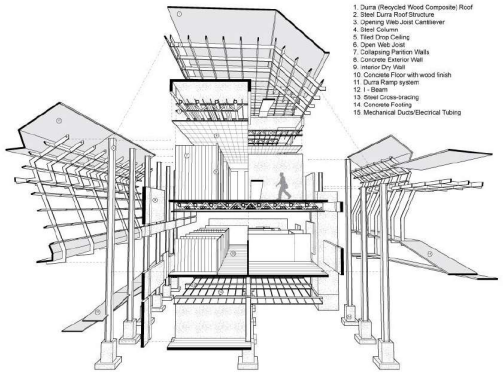
CLASS 8/01/2024 NOTES:

- SUBMISSON: 1 FILE WITH DOCUMENTS AND FILE WITH DESIGN JOURNAL
- MORE INFORMATION ABOUT STANDARD MATERIALS ...
- DETAILS CHECK - **PARAPENT FLASHING**

32 / Adjusting Design of Third Crit

5CTA1140-0906-2023
ADVANCED TECHNOLOGY

Task 2: U-VALUE Calculation



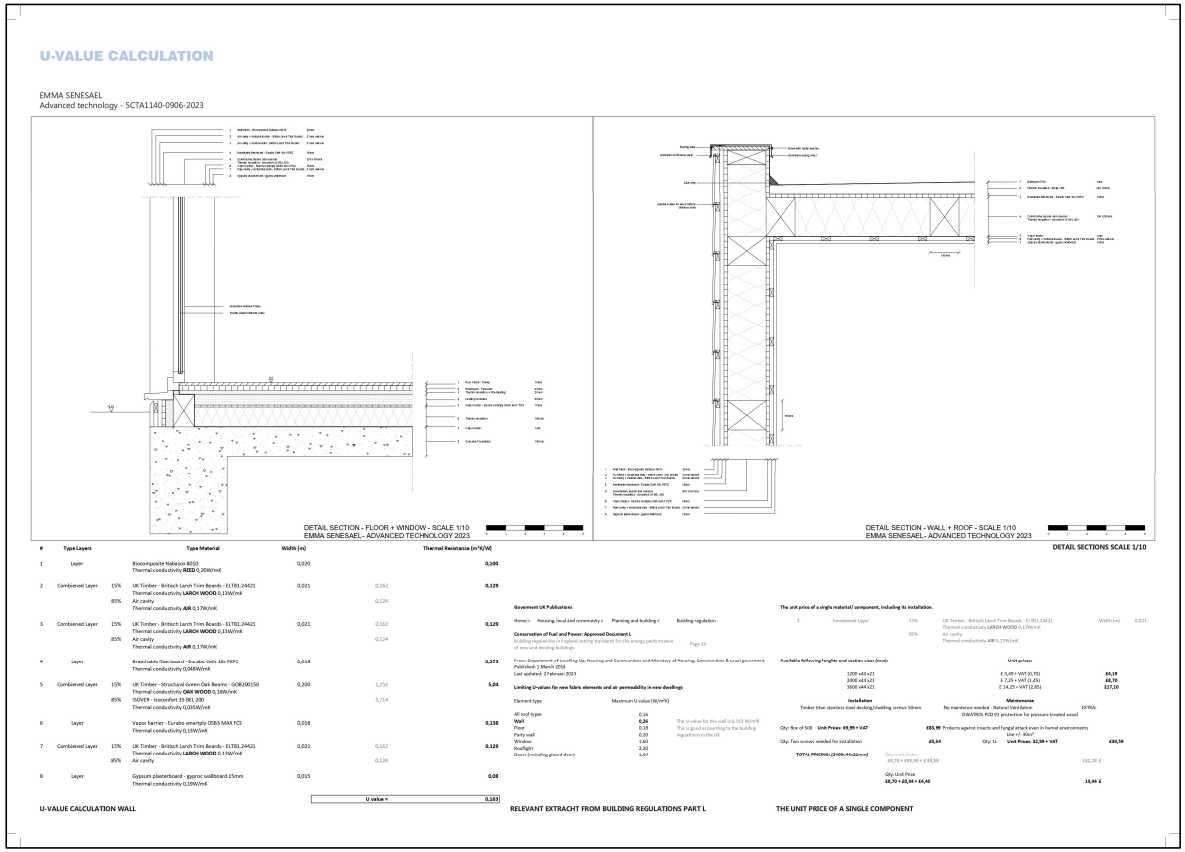
U-Values calculation

Task 2 25%

Using the building designed for the Semester A studio, students are asked to calculate the U-VALUE of one of the elements of their building (External envelope elements) and produce a **single A2 Poster containing the following:**

- **Detail Section(s)** showing construction layers of the element selected between roof, walls, and foundations at a 1:10 scale;
- **U/Value Calculation, including values of each layer analysed**
- **Specifications of all materials** forming the building element, including material and dimensions;
- **The relevant extract from the Building Regulation Part L** the students have used in their calculations;
- **The unit price of a single material/component,** including its installation.

Assignment Brief TASK 2



TASK 2