



BANALCHEMY

Retain, Recycle, Generosity

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Masters Thesis Semester 4

Spring Semester 2021

The Royal Danish Academy of Architecture

Masters In Architecture: Strategic Design & Entrepreneurship



The Gleaners

“To gather grain or other produce left behind in a field after harvest. v.tr. 1. a. To gather (grain or other produce) left behind after harvest.” Oxford Dictionary

A potato when harvested is sold to market only if it is between 2-4 inches in diameter and fully intact without any slices or cuts.

Gleaners as they are named is an old profession and usually consists of a group that forage for disregarded produce, overlooked and discarded by society due to perhaps perceived abundance and unknown ability to transform the nature of this raw ingredient.

Potatoes should not be seen as fertiliser, and can be very simply through the right recipe transformed into something worthy of a dining experience. The gleaners supply many successful restaurants across France.



The Gleaners and Me by Agnes Varda



BANALCHEMY

Retain: *Using what's in front of you.*

Recycle: *Transformation of discarded materials into valuable material, through using architectural tectonics.*

Generosity: *Providing generous architecture to all stakeholders involved. Economically, environmentally and socially.*



PHILOSOPHY

'We use what is already there, and intervene proportionally with what we find'.

- Dialogue between academic and commercial practice.
- Generating architecture projects, where projects don't exist. Budgets too low to generate interest from established firms.
- Relying upon what is already there, forces us to be sustainable, where we use what is already there on site and then designing according to the recycled material geometry.
- The project to the left was realised using discarded construction plywood as the frame, and donated parachute material.
- 5000KR Budget SQM 65



Herzog De Meuron. Apartment Building
along a Part Wall

THESIS

Is it possible to retain rather than demolish, and intervene with an architecture made of recycled materials?



Chosen Site on Peter Ipsens Alle Nordvest

1. STRATEGY

2. PROCESS

3. SYNTHESIS



Demolished buildings adjacent to site.

1.0 STRATEGIC AIM

“ Construction, is the largest industry in the global economy...companies that can adjust their business models stand to benefit handsomely, while others may struggle to survive”. (Mckinsey CID 2019 Report)

1. Retaining 80% of the Building

Showing the client that a building is an assembly of building elements and that these are assets that can be retained, recomposed or recycled.

2. Securing ‘recycle streams’

Centralised vs Decentralised recycle streams.

3. Proportionally intervening with 20% using recycled vs standardised materials.



Chosen Site on Peter Ipsens Alle Nordvest

1.2 LINEAR VS CIRCULAR MODEL

EU countries already fulfilled the recovery target of 2020, with most countries already exceeding the target in 2016. (EU Environmental Agency. Construction and Demolition Report 2020)

The linear construction model:

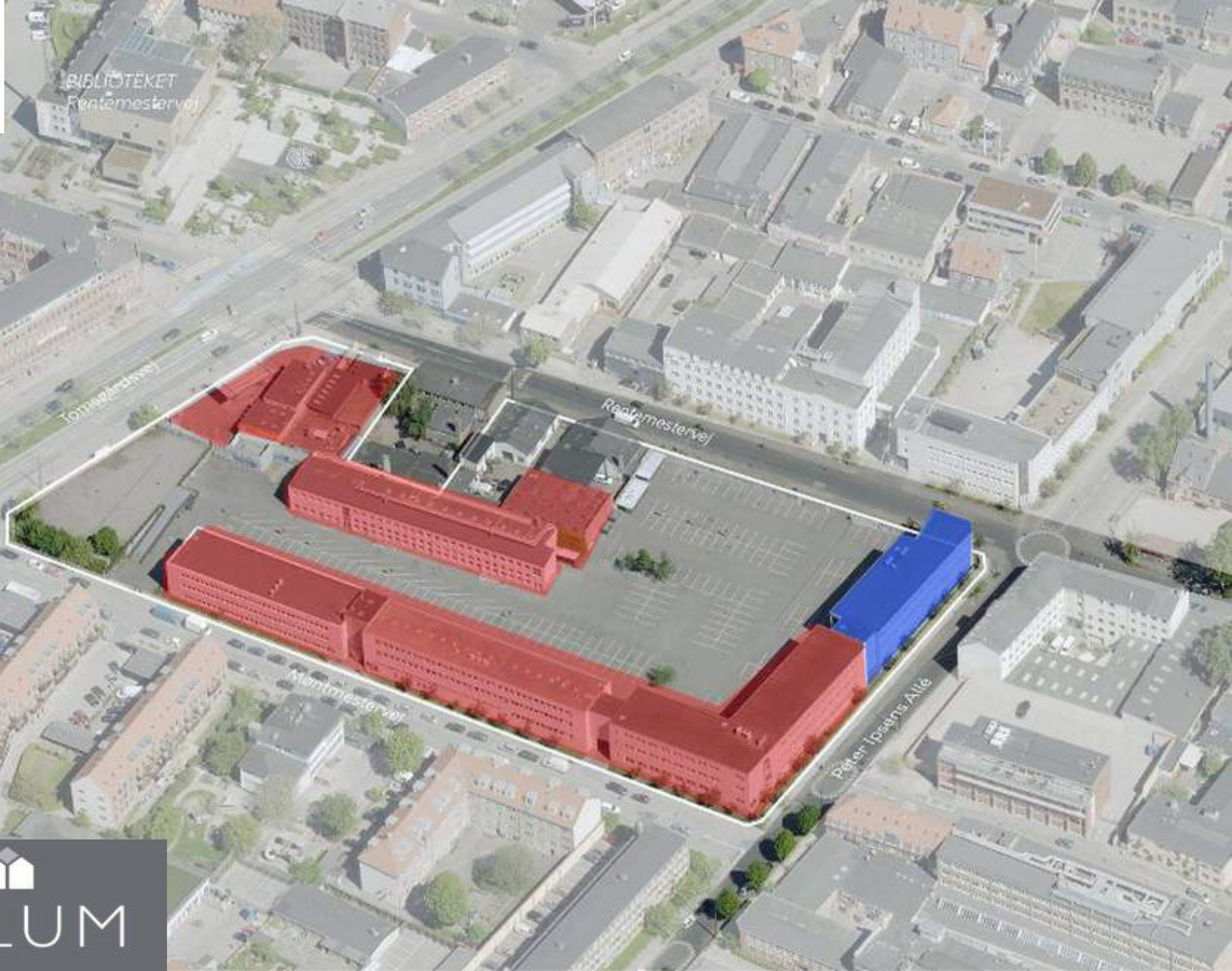
‘Take-make-consume-dispose’ economic model still dominates, although incentives and penalties are beginning to be imposed by the European Union.

The circular model:

Focus shifts from waste perceived as an expense and becomes an asset with a deteriorating lifespan. The aim becomes on retaining material longevity, maintaining value/quality and minimizing material toxicity.



BIBLIOTEKET
Rådmandsternvej



Torshøjvej

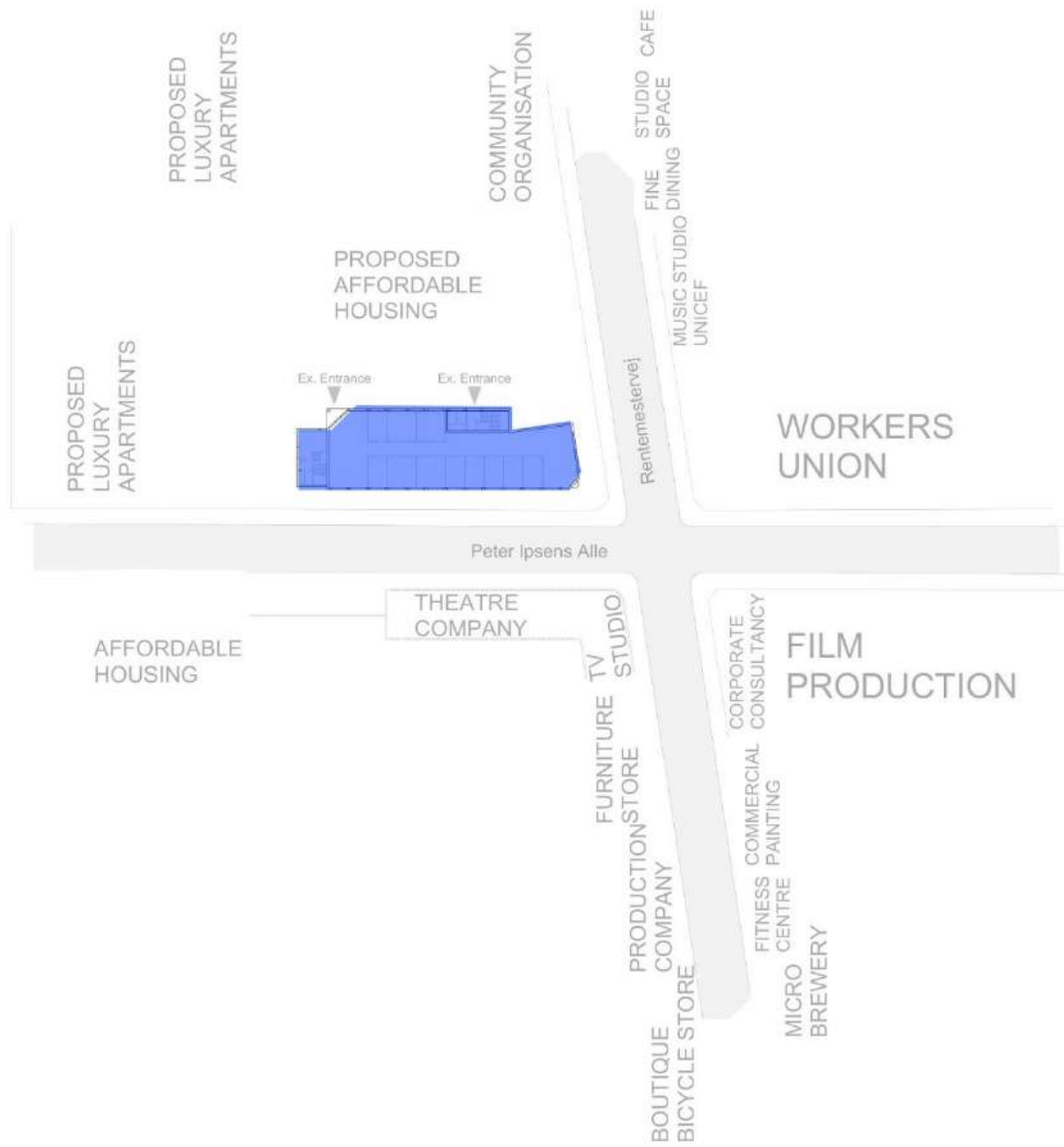
Rådmandsternvej

Mentzingersvej

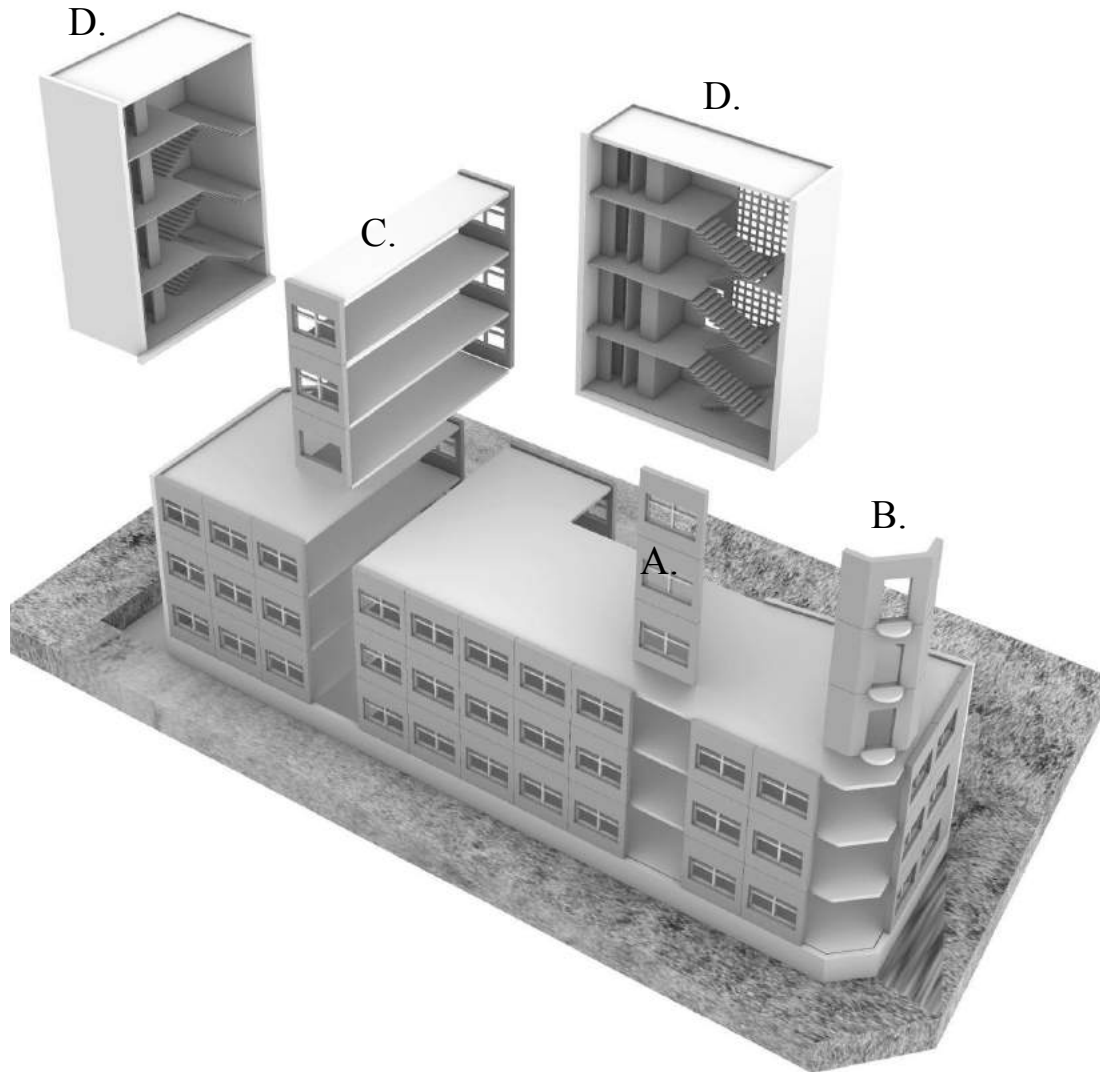
Peter Ipsens Alle



CALUM



1. Inventory of Existing Building Elements



- A. Load Bearing Facade Panel - Window: 54
- B. Load Bearing Facade Panel - Balcony: 6
- C. Modular Precast Floor Panel: 117
- D. Service Core, Amenities, Stairwell: 2



Actors


CALUM
Soren Lund, Construction Director
 Retained building because of planning stipulations to provide commercial + community infrastructure.

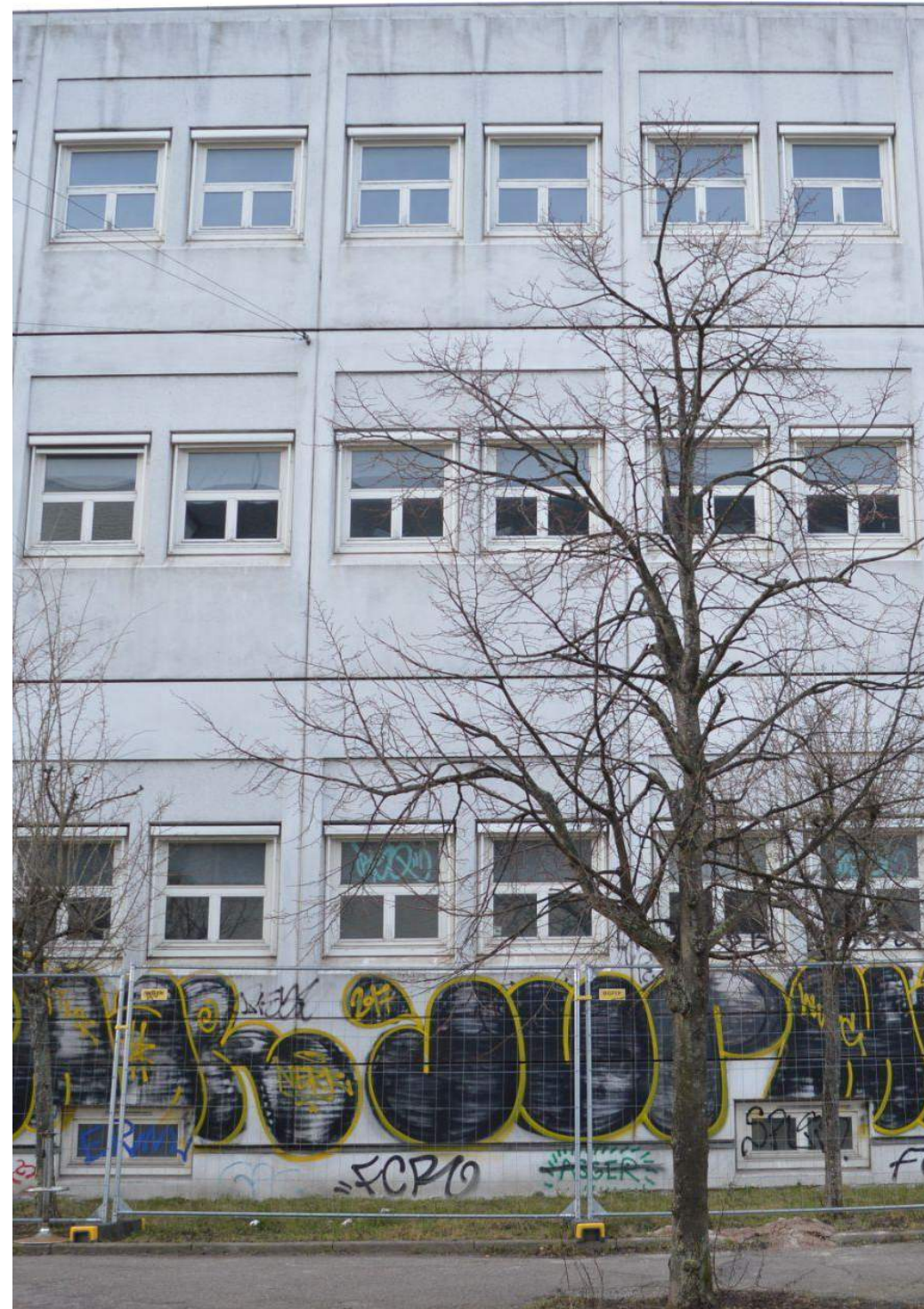
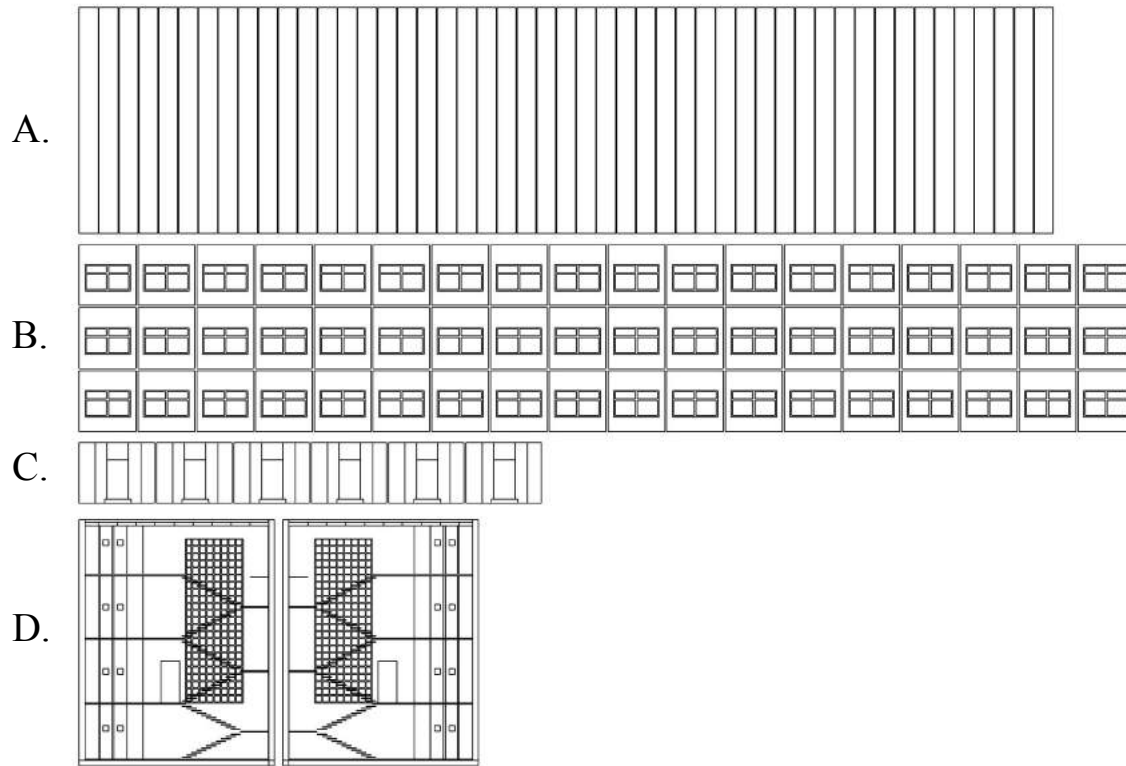


Jonas, Director. Kjaer Richter
 Engaged to complete interior fit out of retained building.



Johan, Partner, WDD:
 Involved in early stages, however less influential and heard as project progressed.

1. Inventory of Existing Building Elements



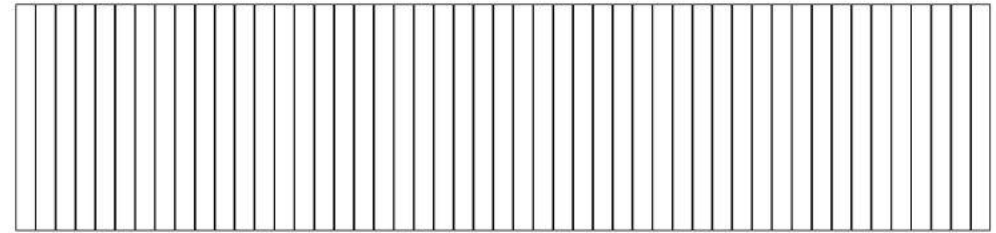
- A. Modular Precast Floor Panel: 117
- B. Load Bearing Facade Panel - Window: 54
- C. Load Bearing Facade Panel - Balcony: 6
- D. Service Core, Amenities, Stairwell: 2

1. Inventory of Existing Building Elements

- A. Modular Precast Floor Panel: 117 Units
Material: Prefabricated Reinforced hollow core module.
Geometry: 12000x900x200
Weight: 20 Tonne



Total Modular Floor Weight: 20 Tonne x 117 Units = 2340 Tonnes

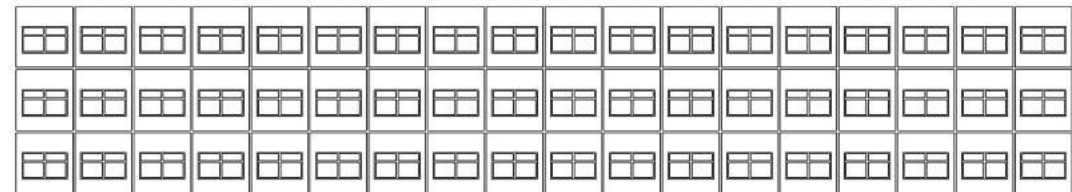


Heavy haul truck delivery = 39 Return Trips

- B. Load Bearing Facade Panel - Window: 54 Units
Material: Prefabricated reinforced concrete module
Geometry: 3200x3000x300
Weight: 5 Tonne



Total Modular Facade Weight: 5 Tonne x 54 Units = 270 Tonnes



Heavy haul truck delivery = 5 Return Trips



Heavy haul truck Payload* = 60 tonnes

1. Cost / Sqm Analysis of Existing Building Elements

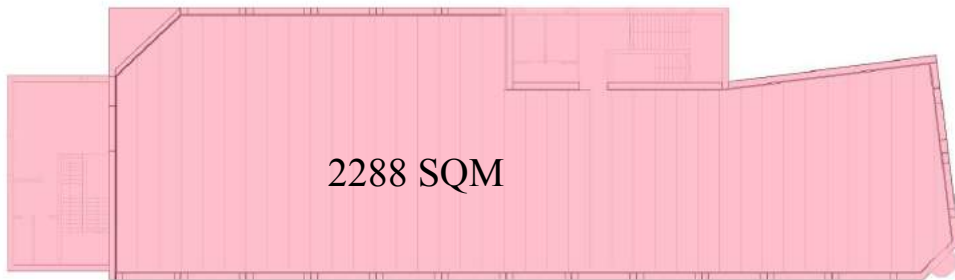
Total Reconstruction Cost

Cost of reconstruction to achieve same SQM

Average Construction cost/SQM: 20,000 DKK / SQM

572 SQM x 4 Levels = 2,288 SQM

Total Reconstruction Cost = 2,288 x 20,000DKK = 45,760,000DKK



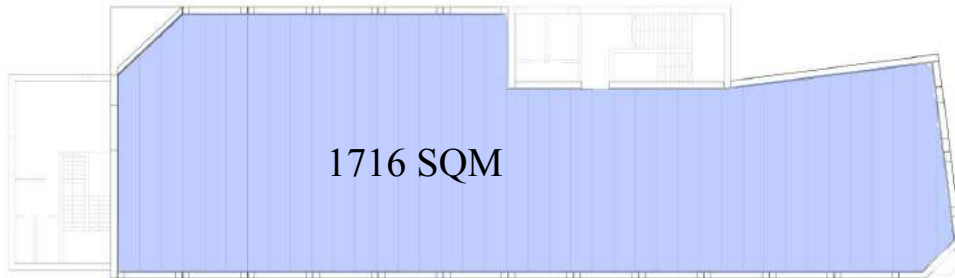
Renovation for Municipality Planning Approval

Community, Retail and Commercial Space

572 SQM x 3 Levels = 1716 SQM (Excluding Basement)

Average Renovation cost/SQM: 10,000 DKK / SQM

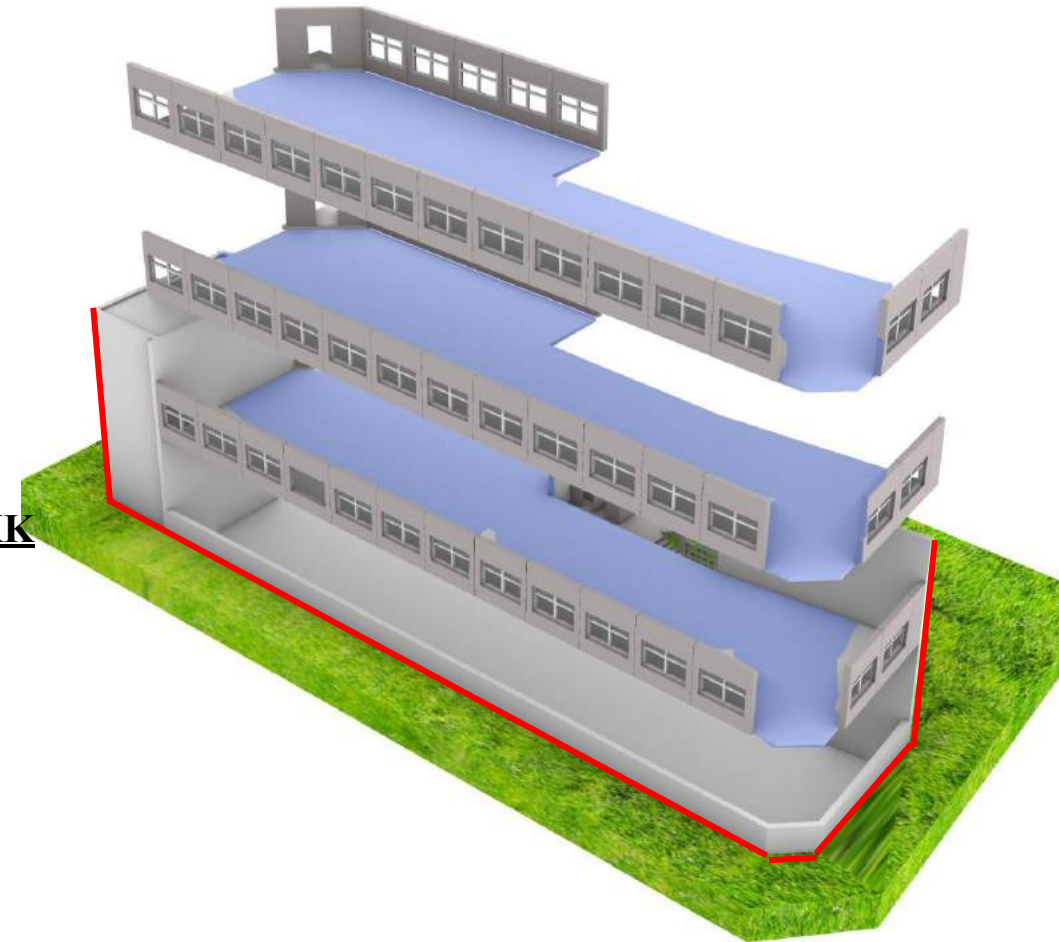
Total Renovation Cost=1716SQM x 10,000DKK = 17,160,000DKK



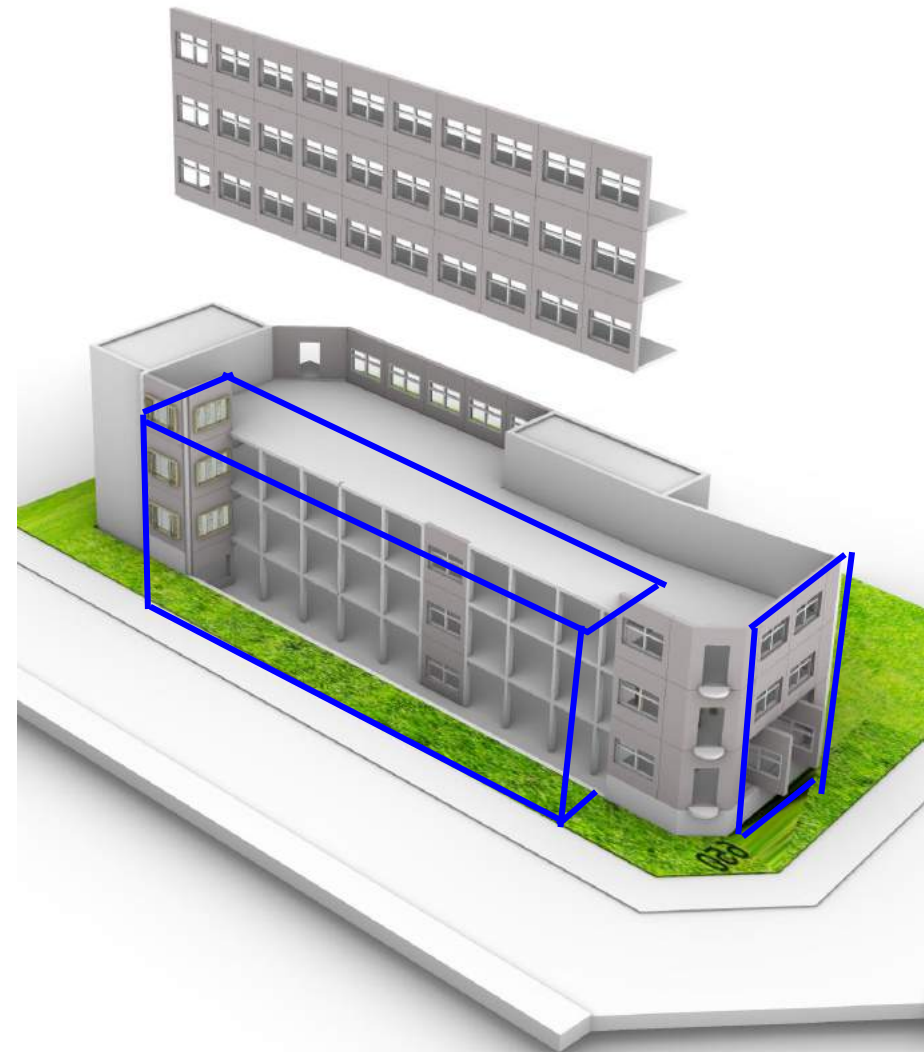
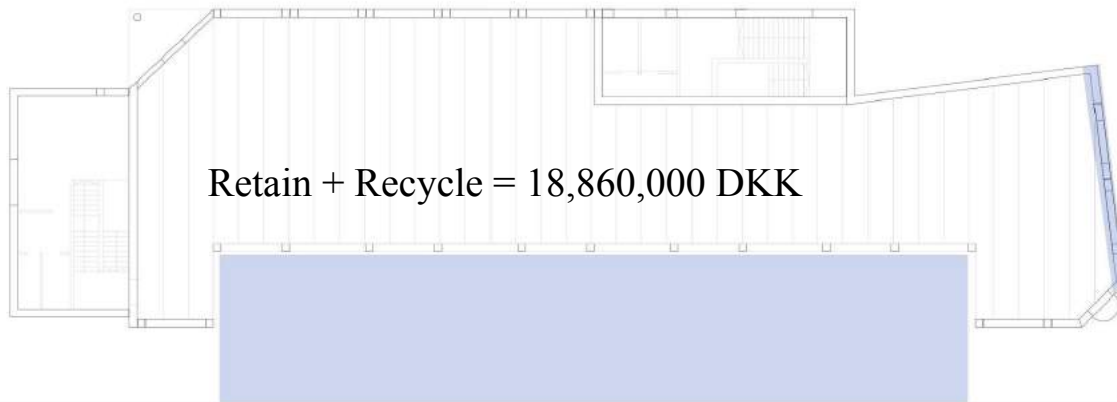
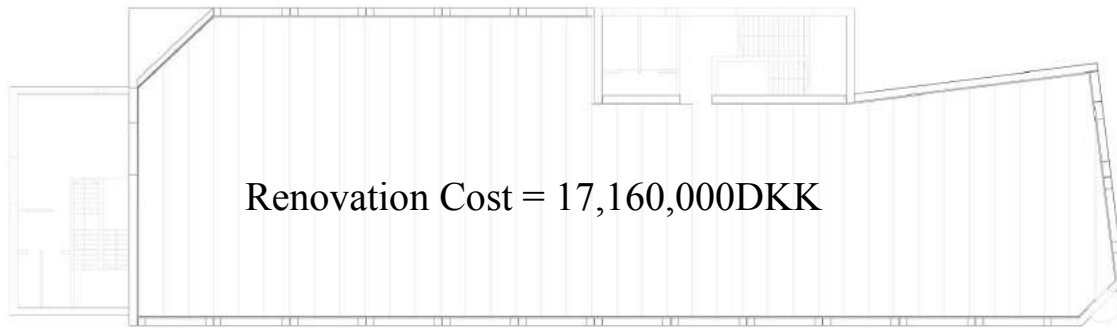
Soren Lund, Developer
Retained building
because of economic
incentive to fit
commercial +
community
infrastructure.
into retained building.



København
Kommune
Planning
approval granted
under condition
that community,
commercial and
retail space is
provided.



1. Cost / Sqm Analysis of Proposed Building Elements



Proposed Cost

Average Construction cost/SQM: 20,000 DKK / SQM

Facade 183 SQM x 4 Levels = 733 SQM + Renovation 210SQM (Including Basement)

Proposed Cost = 943 x 20,000DKK = **18,860,000DKK**

RECYCLE STREAM

Centralised VS Decentralised**

“Approximately 45% of the waste is recycled and maximum use is made of the residual waste to generate heat for the city’s district heating network.” (Stateofgreen, 2020)



Model based upon infrastructure that collects sorts and redistributes recyclable waste into 9 material properties. *Cardboard, paper, tree, hard plastic, metal....*



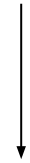
Guerilla style self regulated and self negotiated between owner and consumer.

CENTRALISED RECYCLE STREAMS

Infrastructure

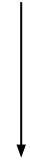
1. Production Facility

Off cuts are standard geometry and disposed into sorting recycled bins, awaiting collection service.



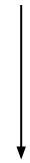
2. Recycling Centre [Suburban Node]

Categorised recycling material is sorted with other material from recycling nodes.

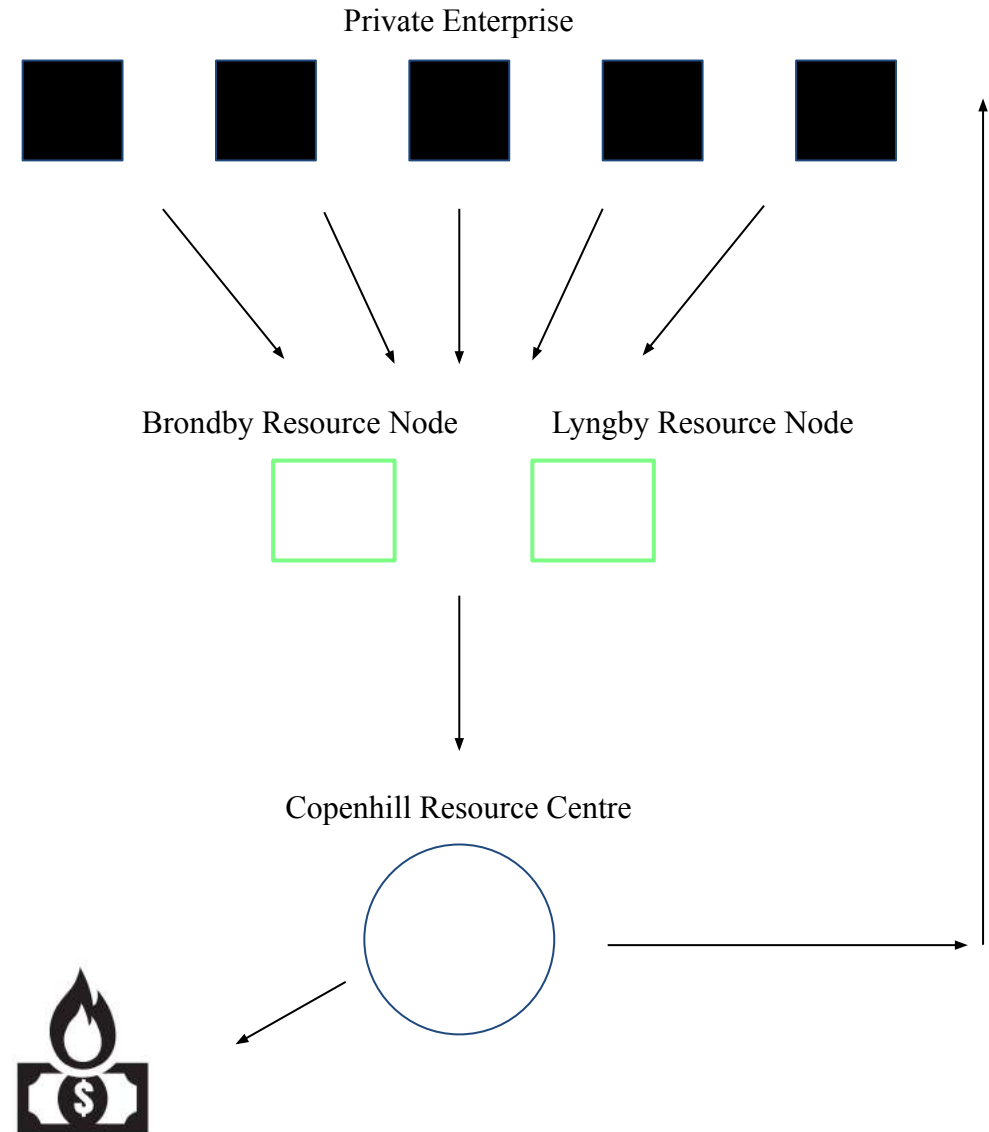


3. Refined into raw standardised material.

Recycled Protocol
Condition
Geometry



4. Distributed to contracted partners or used as bio-fuel.





CENTRALISED RECYCLE STREAMS

Benefits

- A) Constant and reliable supply.
- B) Standardised Geometry
- C) Large capital investment in recycling infrastructure.

Challenges

- A) Systematized infrastructure barriers to entry
- B) Highly competitive to secure sustainable resource contracts
- B) Dominated by large players

“Because of high demand and the current recycling infrastructure in Copenhagen timber is mostly burnt to produce energy rather than recycled.” (Stateofgreen, 2020)



John Thesmer,
Resource
Manager,
Copenhill
Dialogue of
procuring a waste
stream from
Copenhill.



Stine, Head of
Production,
Stykka Factory
Currently
providing
access to
production
waste timber,
metal, paper
and glass.

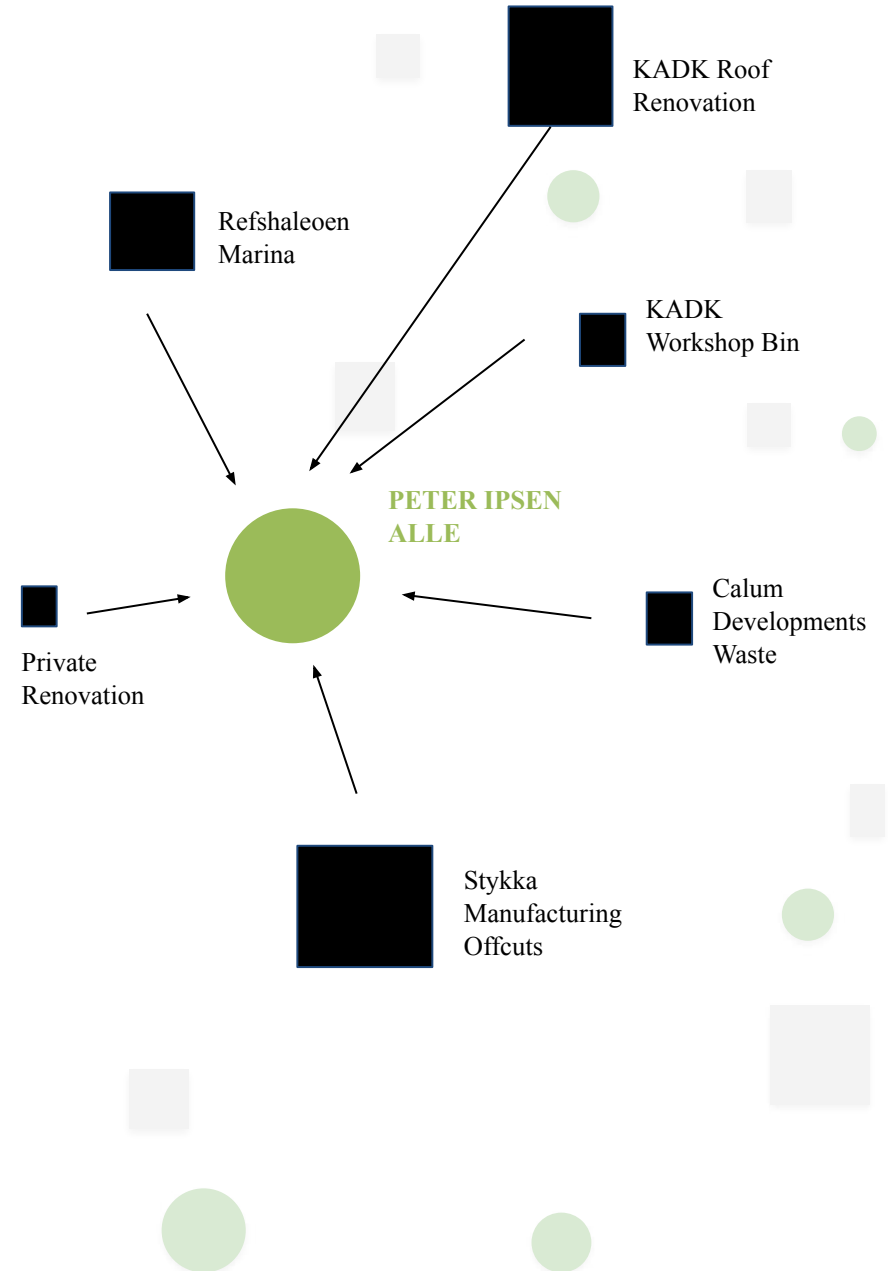


The Royal
Academy

DECENTRALISED RECYCLING STREAMS

Decentralised Protocol

- 1. Waste Stream:** “Usable leftover material from production”
- 2. Waste Categorised**
Waste is “self-sorted” similar to existing expectations from centralised waste networks.
- 3. Material and Proximity Information Shared to Network**
 - Location
 - Material
 - Quantity
 - Geometry
 - Life Span
 - Condition
- 4. Self Organised Supplier-User Exchange Agreement**
 - Re-distribution is self organised between waste stream supplier and material consumer.





DECENTRALISED RECYCLING STREAMS

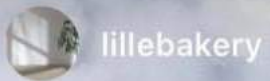
Benefits

- A) Democratised access for all players: small, mid, large tier.
- B) High variation of material protocols

Challenges

- A) Self regulated and legal acceptance.
- B) Higher levels of risk: Quantity and quality.
- B) Low scalability.

“Because of high demand and the current recycling infrastructure in Copenhagen timber is mostly burnt to produce energy rather than recycled.” (Stateofgreen, 2020)



lillebakery

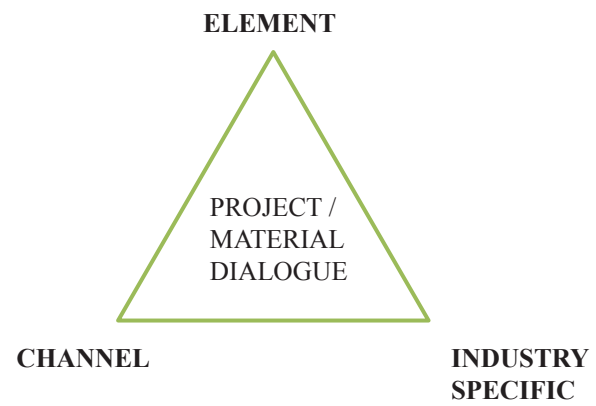
come and check out
our beautiful sail installation
by our super talented friend Levi

@levihayesstudio

PROJECT-MATERIAL DIALOGUE

STREAMS ACROSS INDUSTRY

	MARINE	YACHTING	CONSTRUCTION	CIVIL
ELEMENT / UTILITY	FIXING	TEXTILE	FRAME	PANEL
INDUSTRY SPECIFIC	SAILING BOLLARD	JIB + SPINNAKER SAILS	FORMWORK CONSTRUCTION PLYWOOD	STREET PAVER
CHANNEL	REFSHALEON MARINE	HELLERUP MARINA PROSHOP	NORDVEST RECYCLING CENTRE	MUNICIPALITY WASTE STREAM





Demolished buildings adjacent to site.

2.0 PROCESS

W1. Panel + Frame language

W2. Spatial Resources

W3. Retaining and recomposing

W4. Architectural Signaling

W5. Guerilla Trash

W6. Designing proportionally

W7. 1:1 Revisitting panel and frame

PANEL + FRAME

Banal International Proliferation

For people who travel, they see pretty much the same airport... when you leave the London airport to go to Rome, there are the same hostesses, there are the same uniforms, there are the same airlines, there is the same brand of gasoline... And in the end there is the same roads and the same lampposts... Good, so that the “buildings” which are built look alike... Those of Paris are the same as those of New York... As those of Montreal, where I was yesterday afternoon... Good, then if you will, on this part of the uniform decoration and which is all the same quite cold, isn't it... And which has been studied a little to live at “attention”... That I have tried, myself, to defend the personality and the individual... If something does not work, we can still see Mr. Marcel who comes with a screwdriver to fix what did not work... In the end, to give, to try to give a little humanity.

Jacques Tati. The Observer 1977

PANEL + FRAME

Roof Door Wall

Stair Window

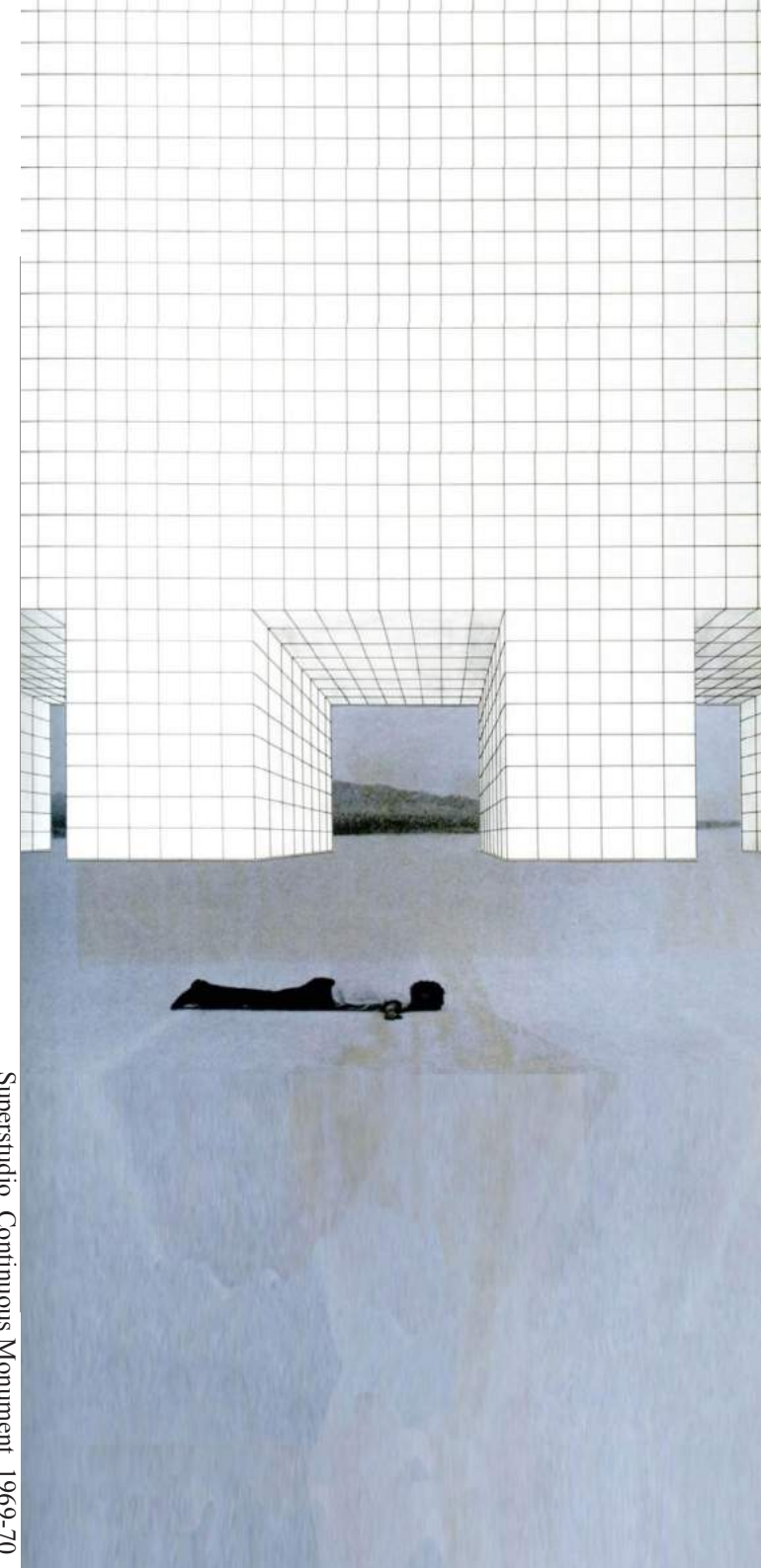
Facade Balcony

Corridor amp

Floor Ceiling

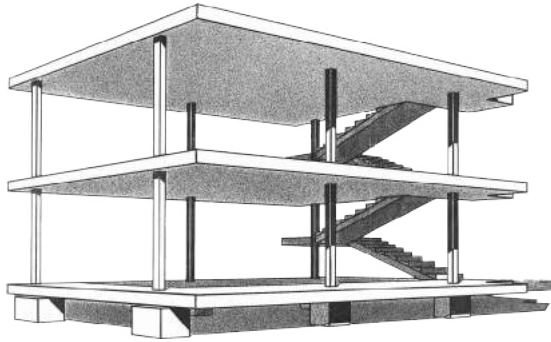
Road Street Park

Square



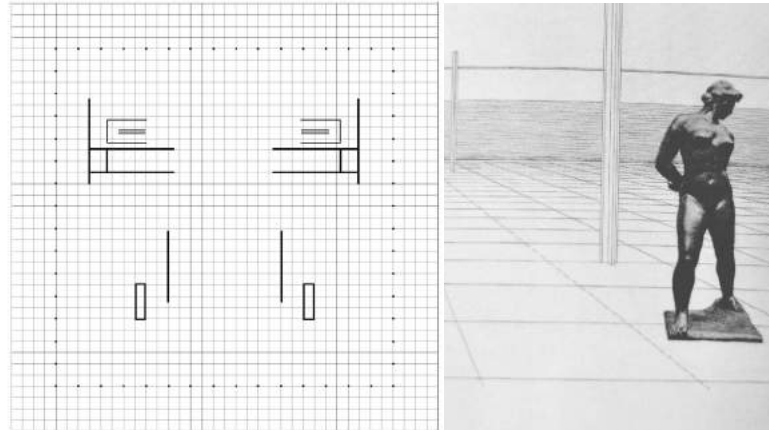
Superstudio, Continuous Monument, 1969-70.

FLOOR



Freely Floating: Maison Domino

Blank Slate: Maison Domino Le Corbusiers Framework of floor and thin columns.



Emptiness: Neue Nationalgalerie, Berlin

Mies Van Der Rohe 1963 floor plane endless and obstructed only by glass, partition and column.



Endlessness: Super Surface Happy Island

Supersurface Happy Island, 1972. Collage. Cristiano Toraldo di Francia.



Homogenous Monotony: Matrix I

Repetitive building elements that provide little to no variation in their atmospheric tone.



Standardised Repetition: Playtime

Copy and paste building elements until perceptive bearing and orientating reference points can no longer be found.



Smooth, Shiny and reflective:

A material unashamably artificial makes no apologies in it's shine and reflection, tough enough to withstand human 'wear and tear' at the scale of the metropolis.

CEILING



Endless-Grid: Office Space

Endless grid of ceiling panels suspended from structural floor above. The false ceiling hides the building systems above.



Infinity: Playtime

The never ending ceiling grid composed of opaque and transparent panels feeding artificial light into the space below.



Homogenised spatial quality: Office Space

HVAC and lighting systems are identically distributed throughout entire building to ensure homogenised spatial conditions.



Blue, White, Artificial Light

Monotonous hue of light beamed down from above, reflecting off the white and shiny surfaces.



Single smooth plane: Barcelona Pavillion

Single unobstructed surface.



Illuminated Infinite Grid: DPS Electronics

Artificial outdoor interior where the body adapts to producing serotonin for longer periods of time, due to the monotonous artificial daylight.

WALL



Fixed Wall: Semi-permanent partition panel and frame

Matrix I



Low Wall: Cubicle Partition Panels

Playtime - Jacque Tati



Transparent Wall: Playtime

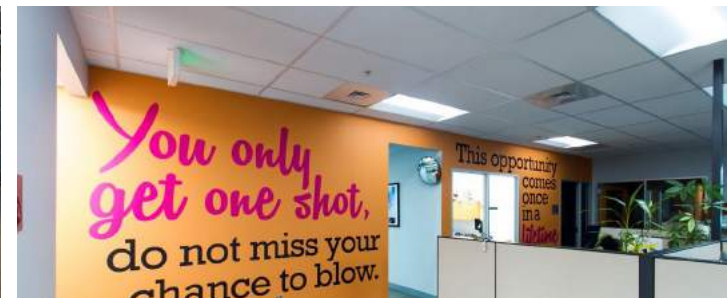
Playtime - Jacque Tati



White Framed Wall: Amazon early days.



The Break Out Space



The Feature Wall

PANEL + FRAME

Edo/Shinto: Emptyness

Mies: Endlessness

Jacobsen: Cabinetry

1. EDO | SHINTO PERIOD

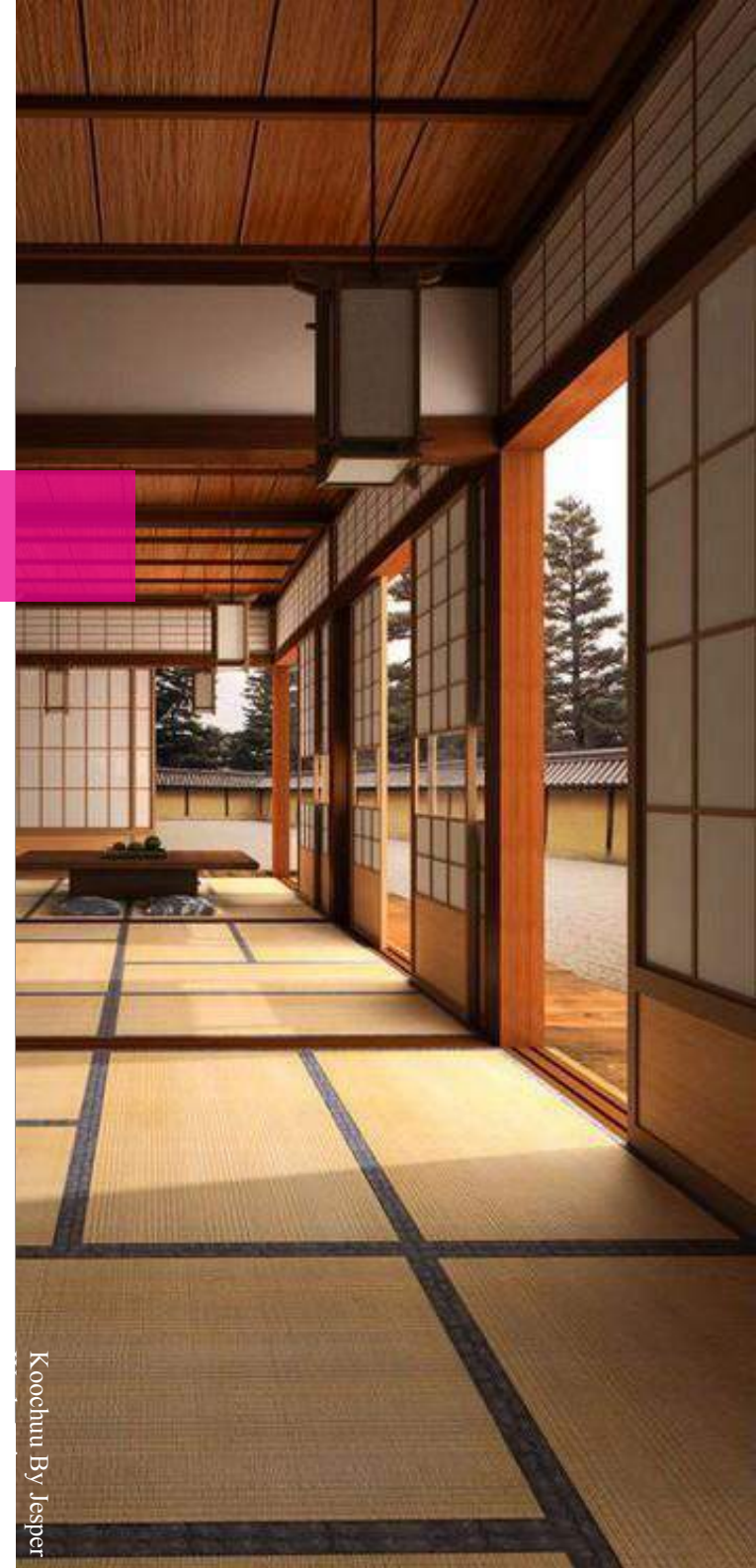
Whiteness. Emptyness.

2. ENDLESS MIES

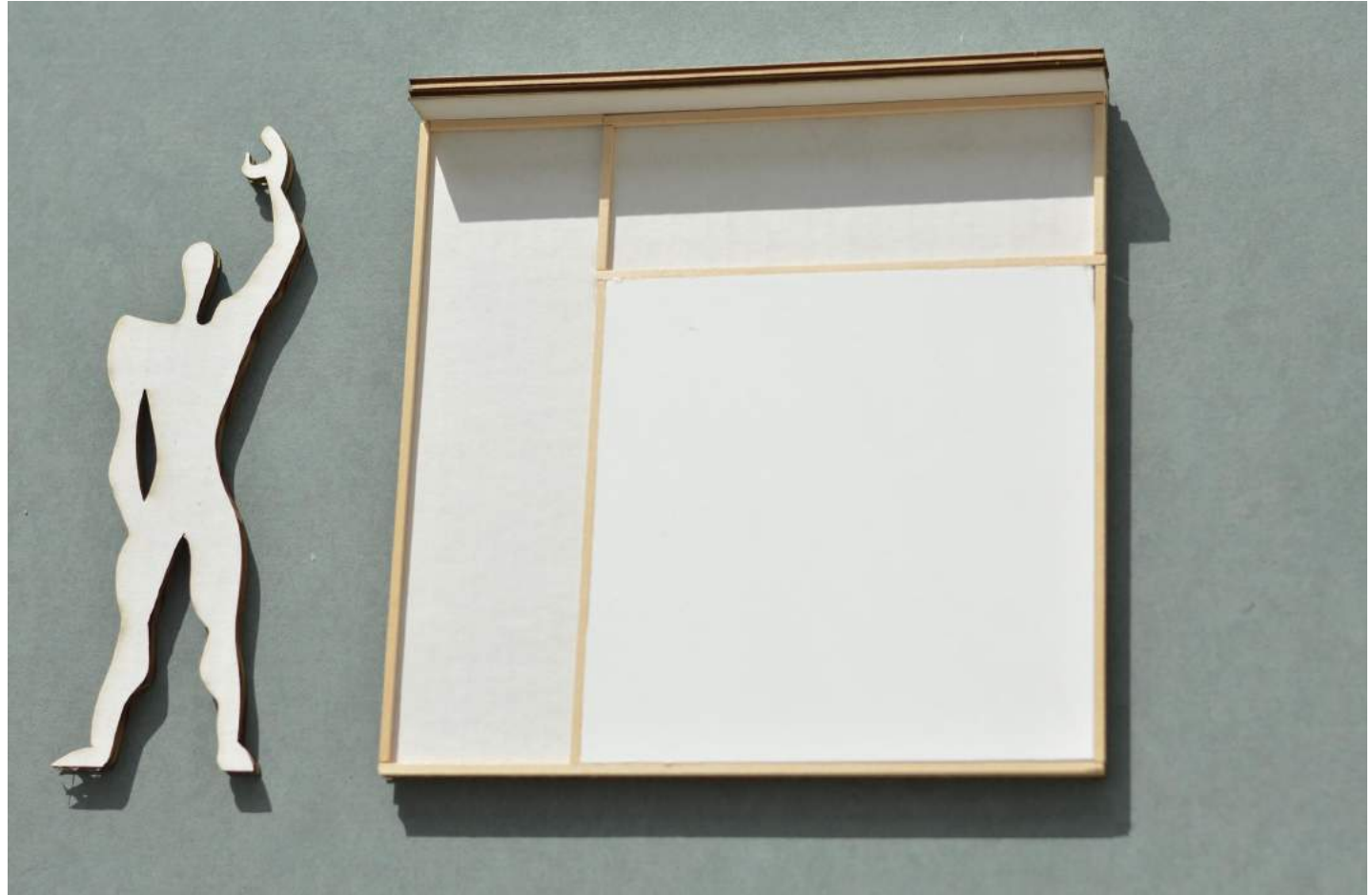
Endless expansion of exterior grid. Skeleton structural frame.

3. JACOBSEN CABINETRY

Front and frame logic. Concealed, expressed, and flush architectural language.

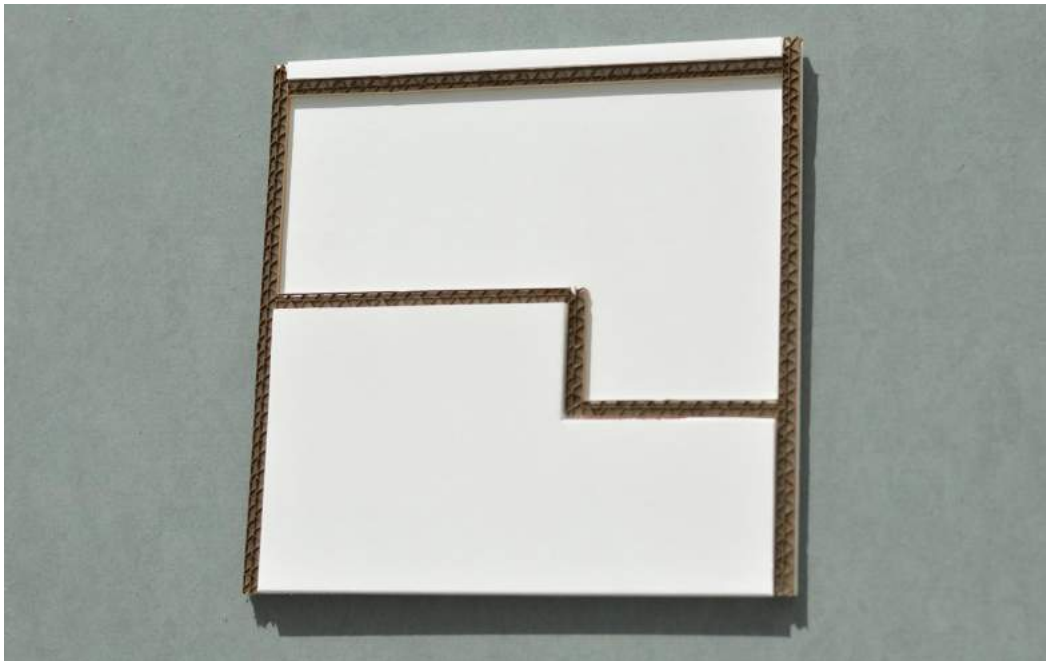


EMPTYNESS: EDO /

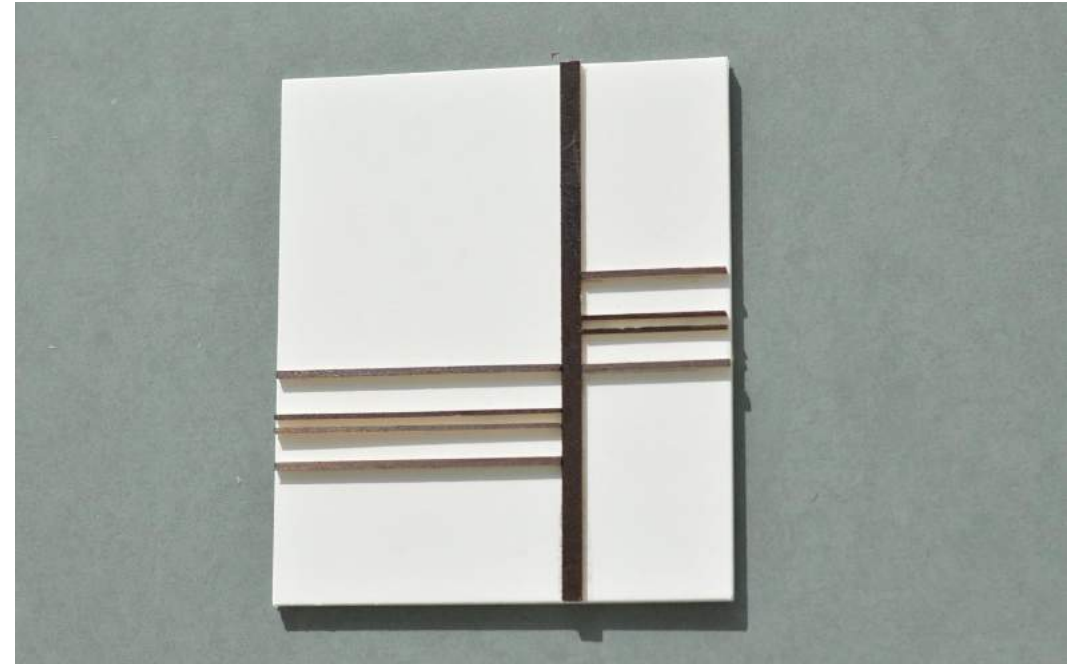


Whiteness: Ma is the space or interval between. Space or interval to give shape to the whole. In Japanese construction terms it is the space between posts.

EMPTYNESS: EDO /



Asymmetry: Towards emulating the imperfection and natural phenomenon



Double Datum: Human and natural scale.

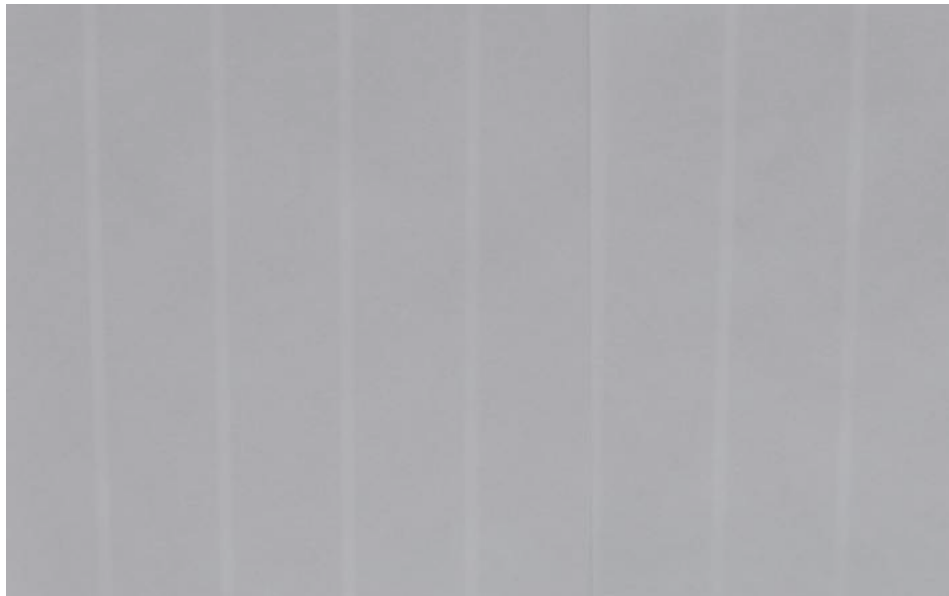
EMPTYNESS: EDO / SHINTO



Shoji Grid:



Monotonous Palette



Translucency

ENDLESSNESS:



Double extruded frame with protrusion away from the facade plane.

ENDLESSNESS:

Vertical Hierarchy: Expansion towards the sky.



Cross Section: Tapering away from the facade.

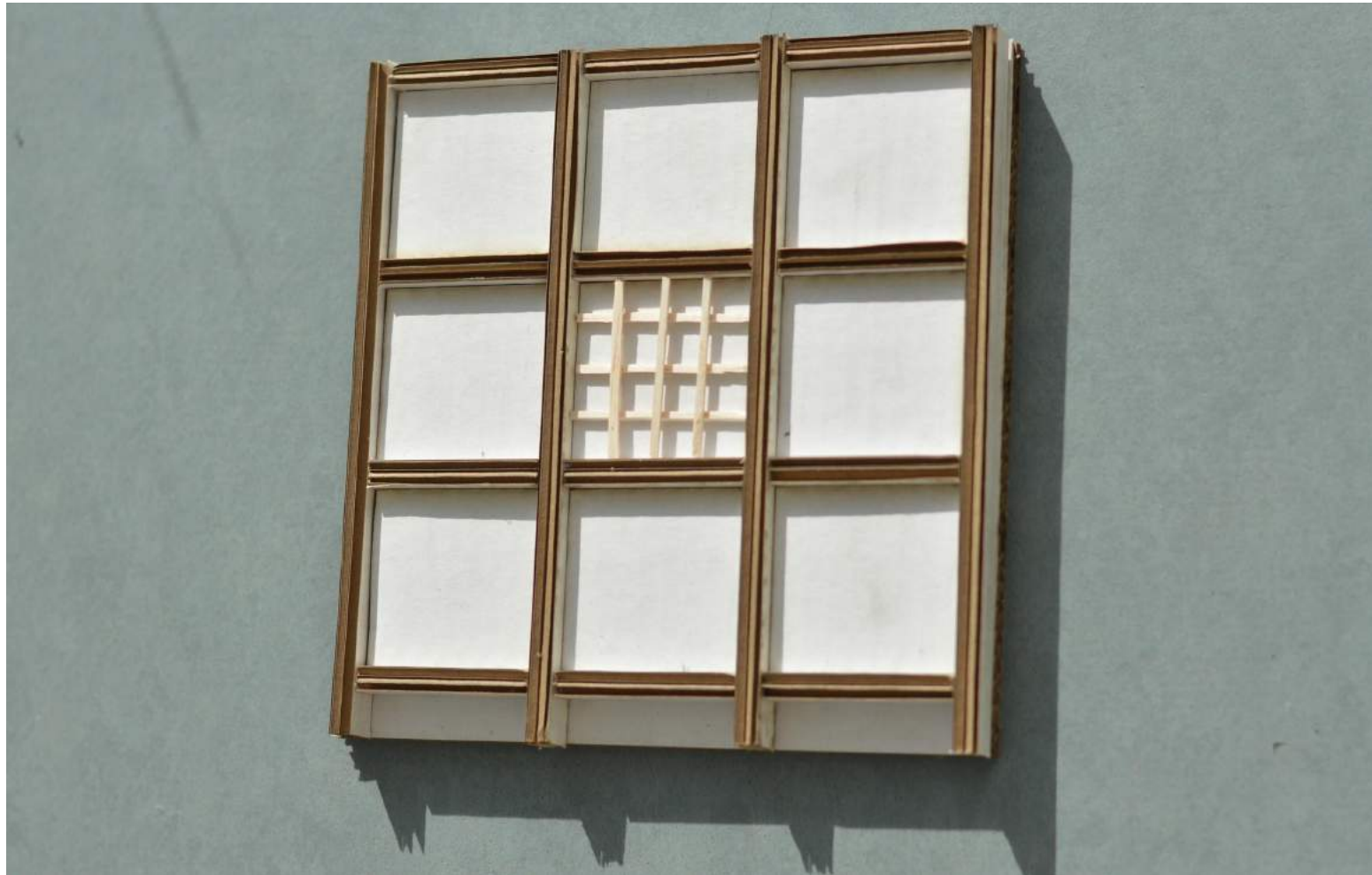


Exterior Vertical Hierarchy Grid



Single smooth plane: Barcelona Pavillion

ENDLESSNESS:

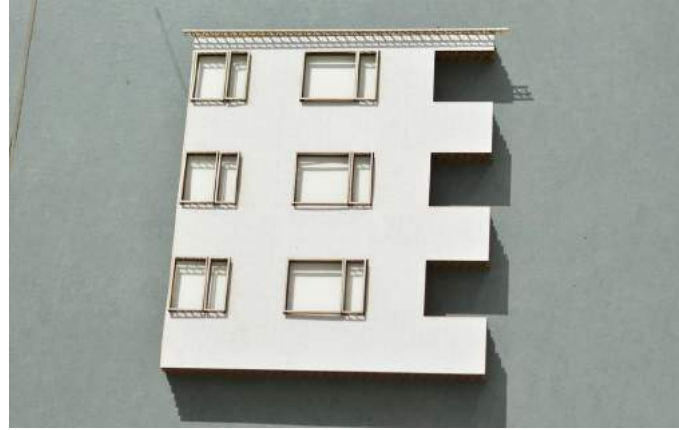


Interior Non Heirachal Grid: Ceiling Panel and frame.

CABINETS:



Front and Frame Logic: Single smooth plane is varied by extruding front.



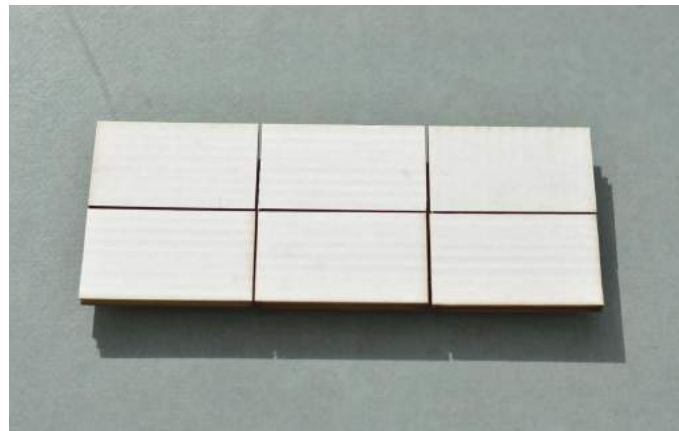
Concealed Front: Smooth front hides building frame.



Front Panels: Modular Panel logic uses shadow gap logic, revealing



Front panels are fixed to building frame behind, divided using a shadow gap.



Panel and Concealed Frame: Concealed front with 3mm shadow gap



Illuminated Infinite Grid: DPS Electronics

SPATIAL RESOURCES

1. EX. BUILDING



2. WASTE STREAM



COMPOSITION

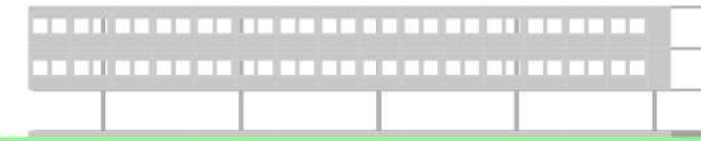




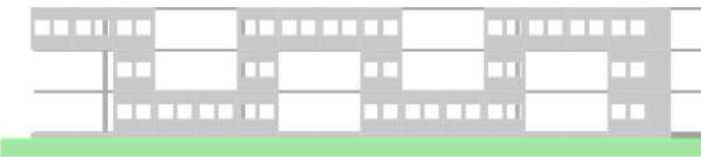
THE FACADE + SUBTRACTION



Division + Atrium



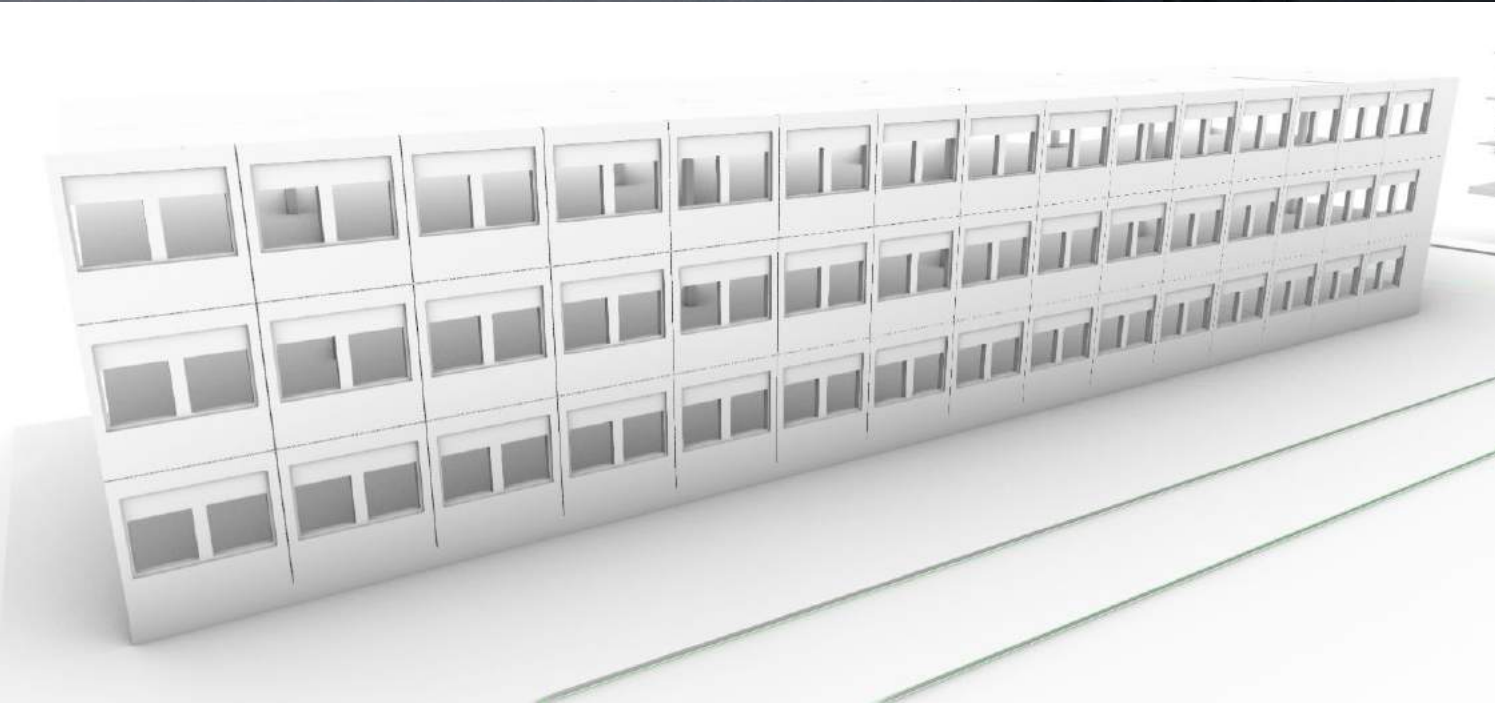
The Piloti



Formative

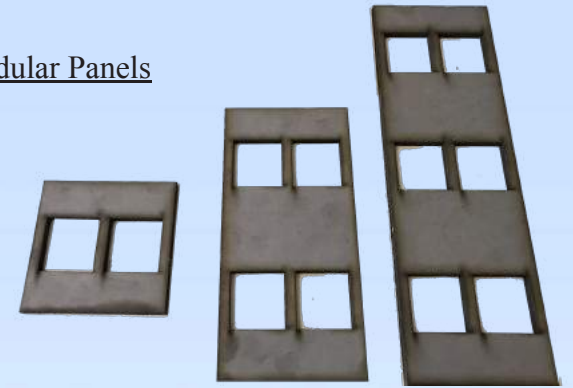


Metabolic





Modular Panels



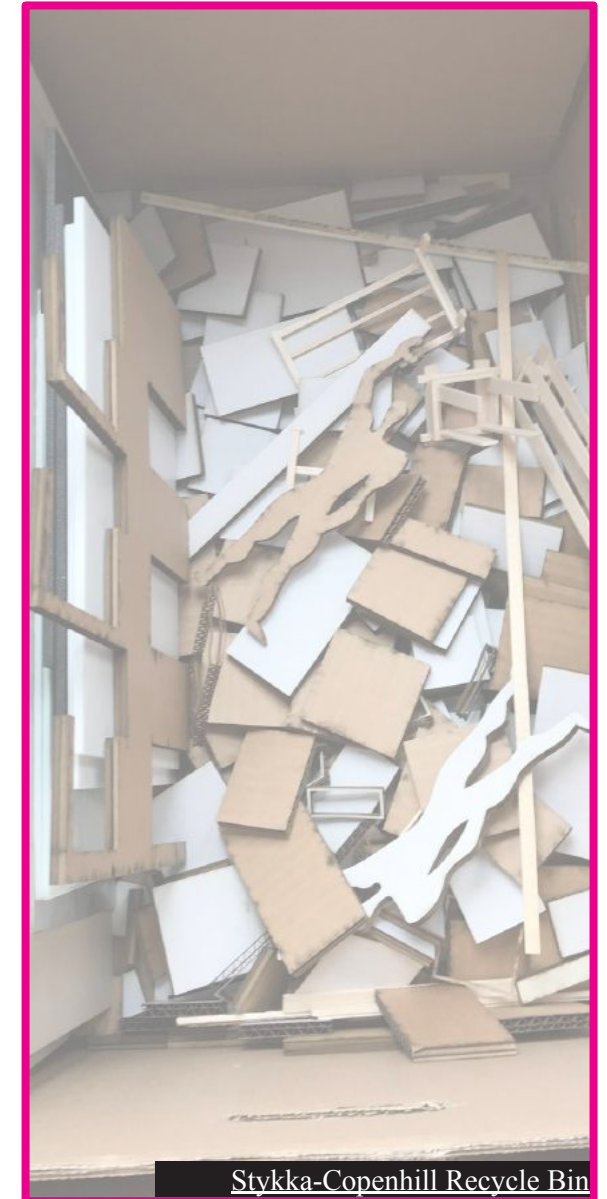
Frame



COMPRESSION + JUXTAPOSITION



WASTE EXPERIMENTS



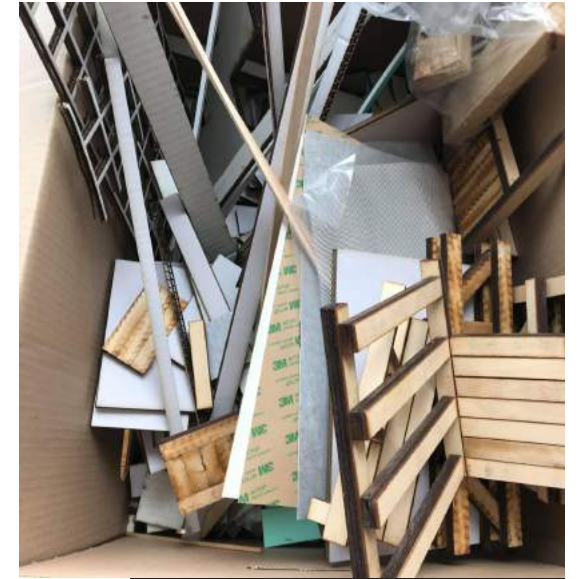
Stykka-Copenhagen Recycle Bin



Norrebro Recycle



Stykkå-Copenhill Recycle Bin



Stykkå-Copenhill Recycle Bin



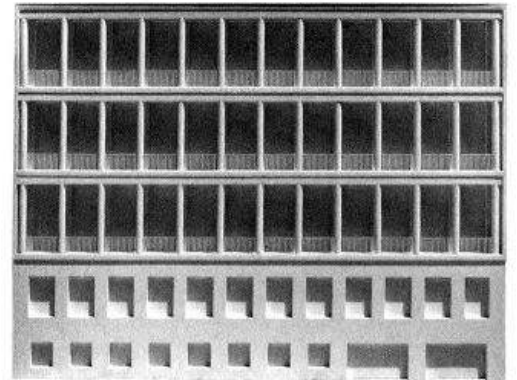
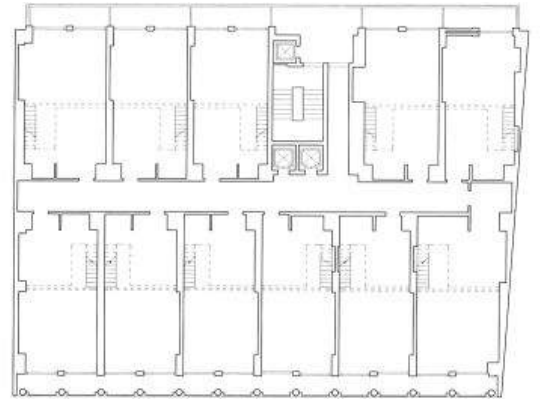
Sydhavn Recycle Center



Stykkå-Copenhill Recycle Bin



Stykkå-Copenhill Recycle Bin



Casa Albergo by Gioiolo Minoletti







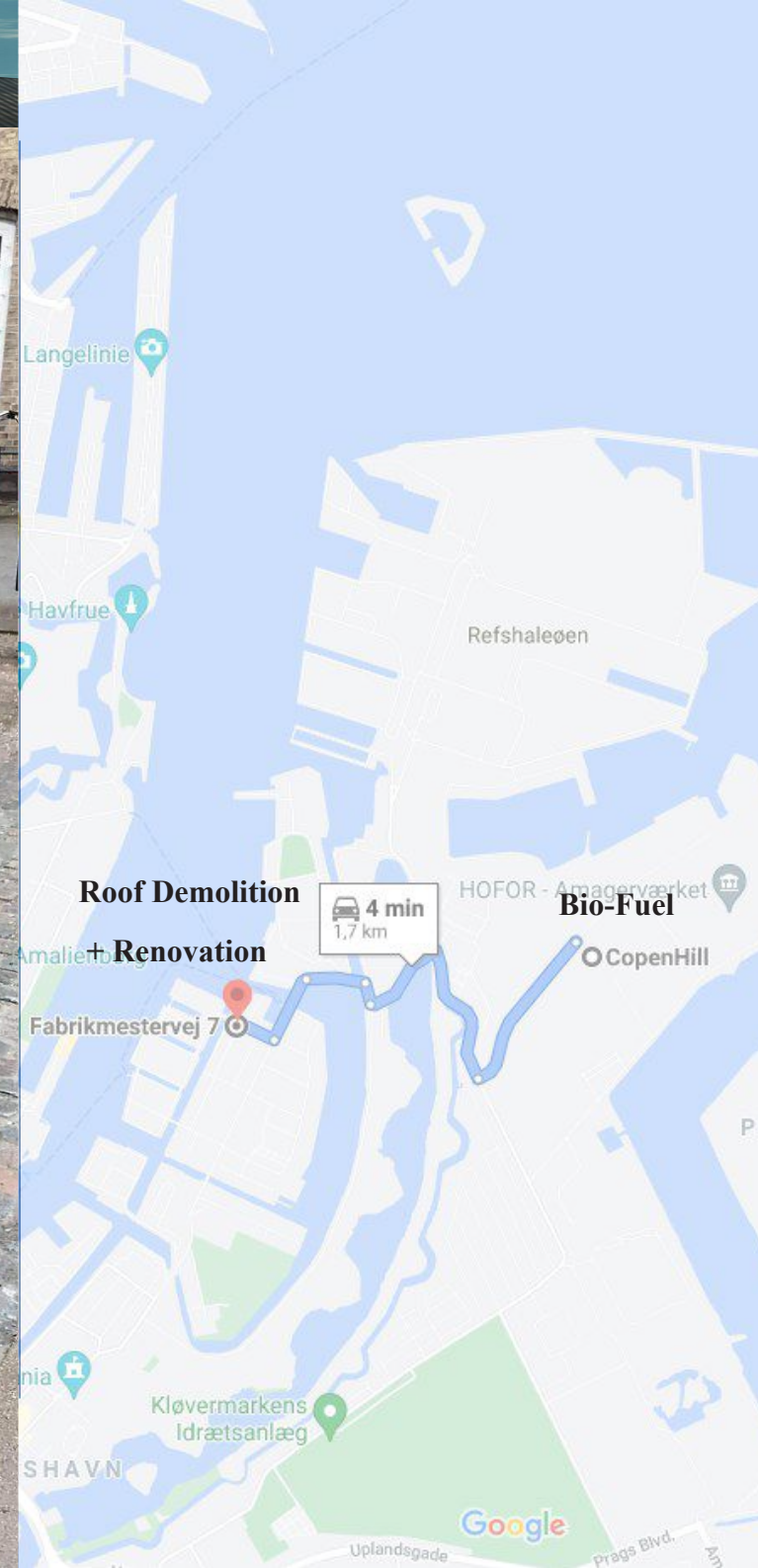






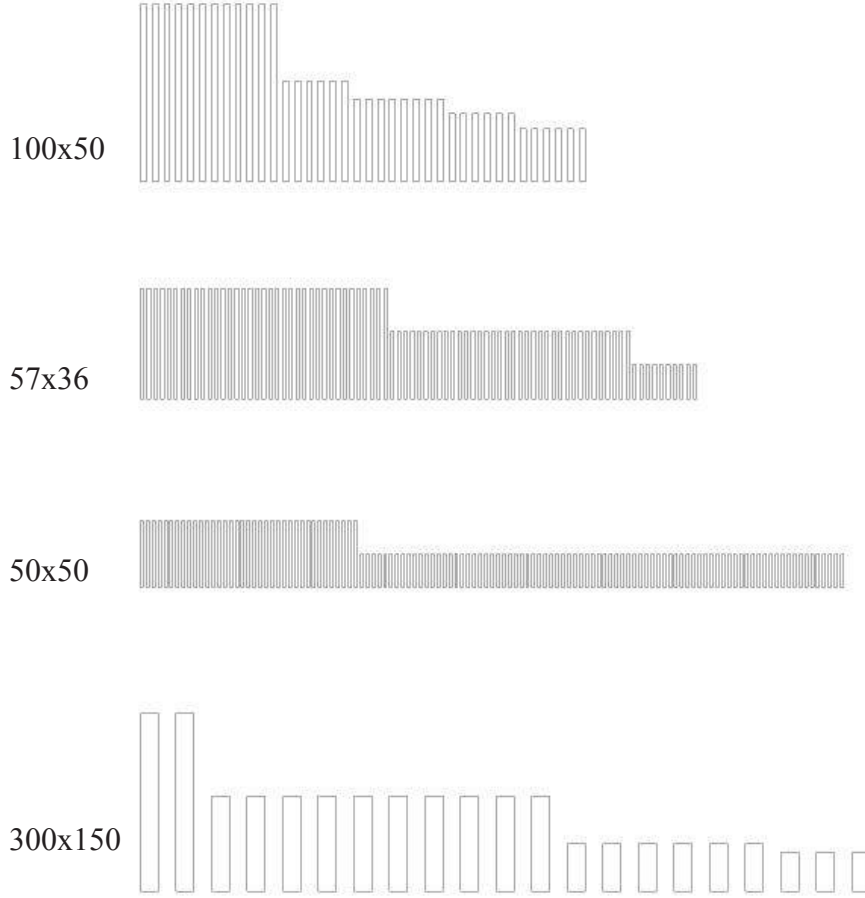


1.1 STREAM

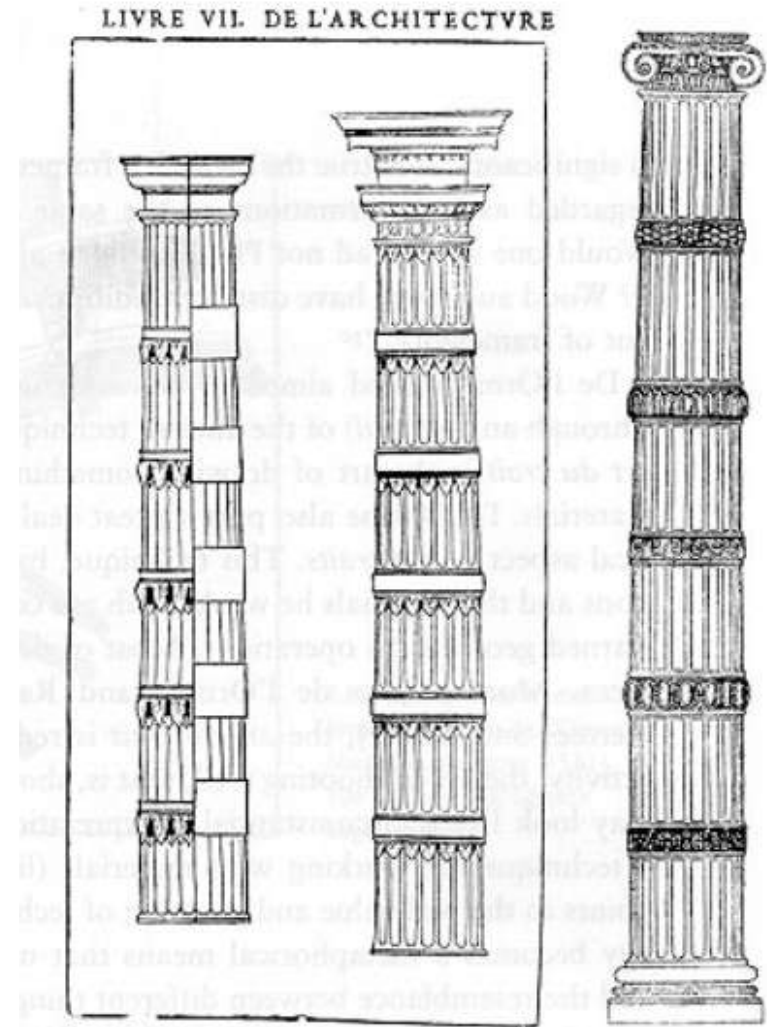


INVENTORY

Guerilla Building Resources: KADK Roof Renovation



Columns: The “Colonne Francoise; from De L’Orme



Orme, *Premier Tome*, 219v, 220v, & 221 r.









INVENTORY

Institutional Building Resources: Nordvest Bio-Mass Dumpster





RETAIN + RECYCLE



RETAIN + RECYCLE



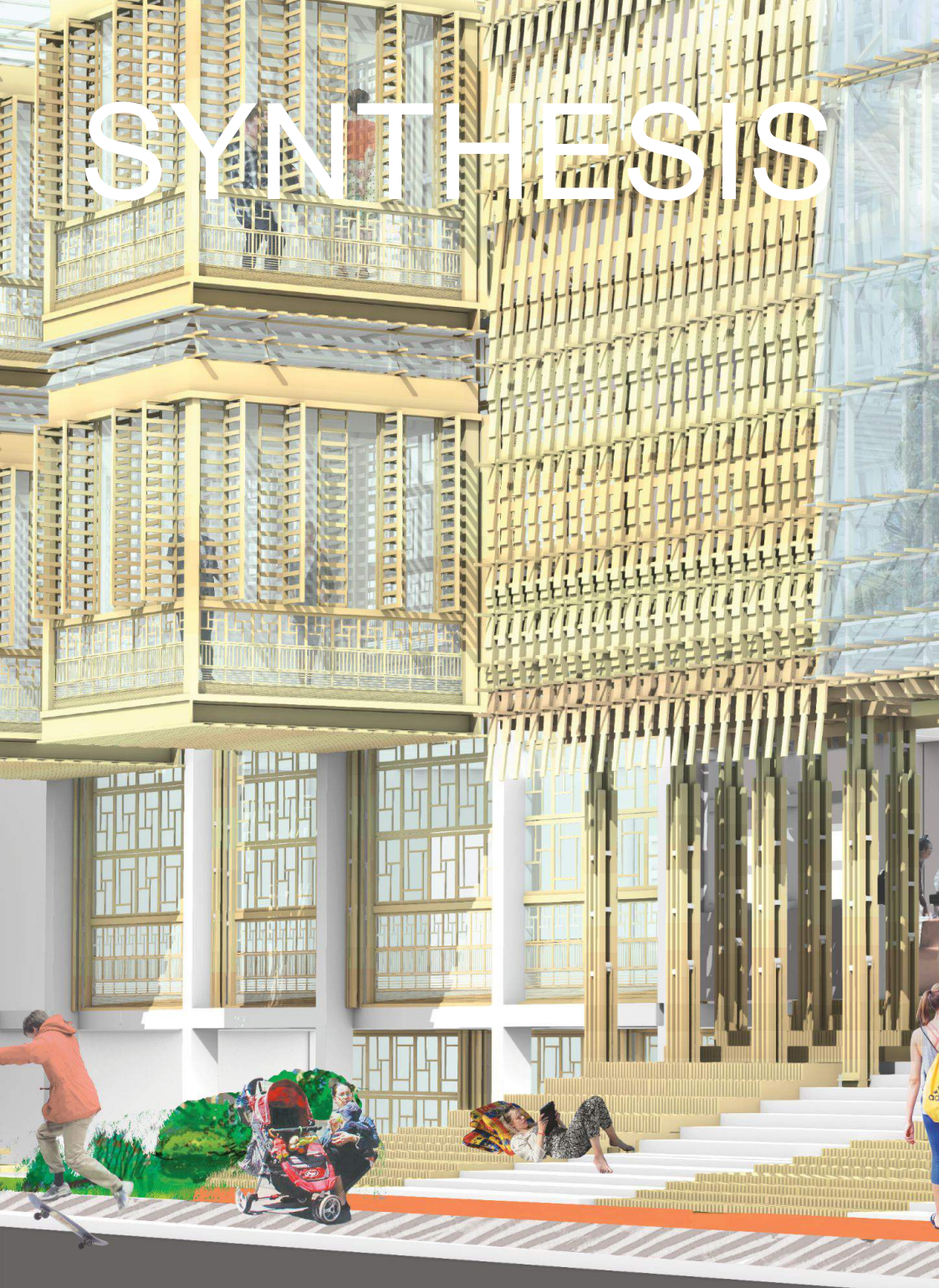
RETAIN + RECYCLE



SYNTHESIS



SYNTHESIS



SYNTHESIS



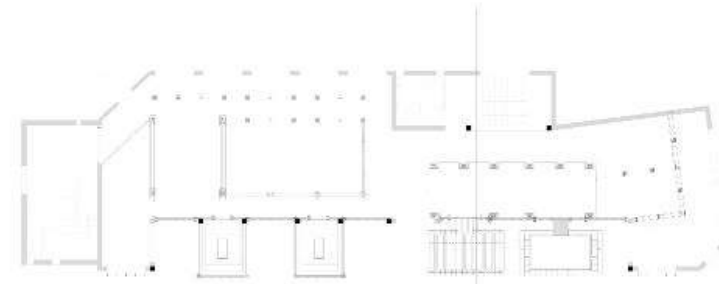
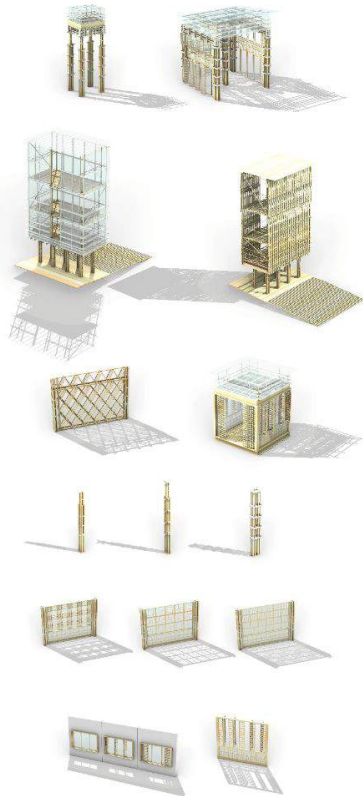
Existing Module



New Structural Frame

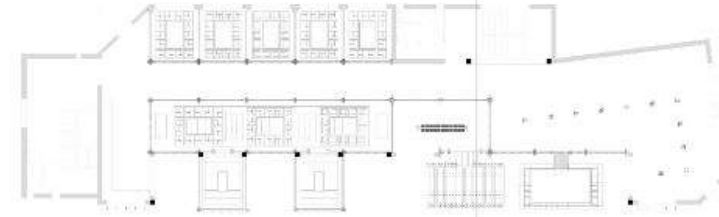


Recycled Elements

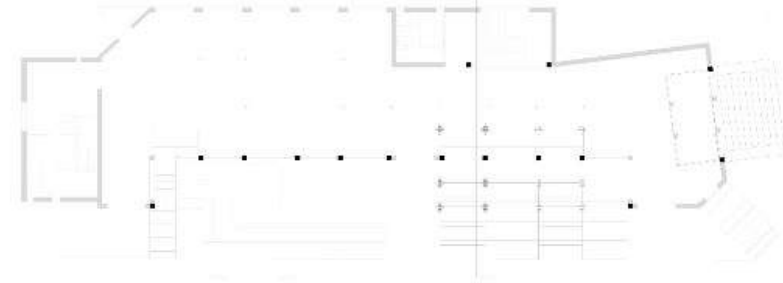


SOLARIUM: COMMUNITY

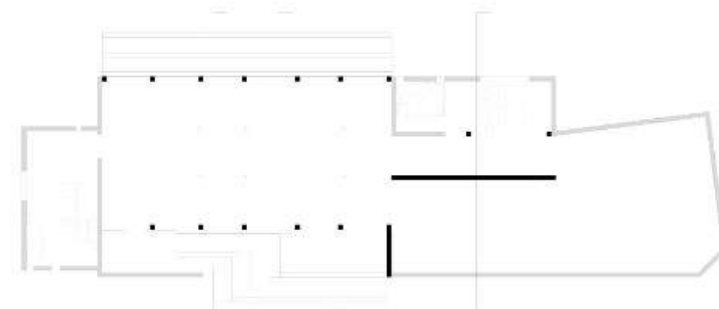
- Existing Building
- New Frame
- Recycled Interiors



FLOOR 1: COMMERCIAL



GROUND: RETAIL



AMPHITHEATRE: COMMUNITY

Summary

The Gleaners by Agnes Varda:

The Gleaner and the Chef.

Transparency by Colin Rowe & Robert Slutzky

Phenomenological transparency; Rowe and Slutzky describe the perceptive; oblique and rectilinear forces at play in affecting a subjects experience in space and how objects resonate.

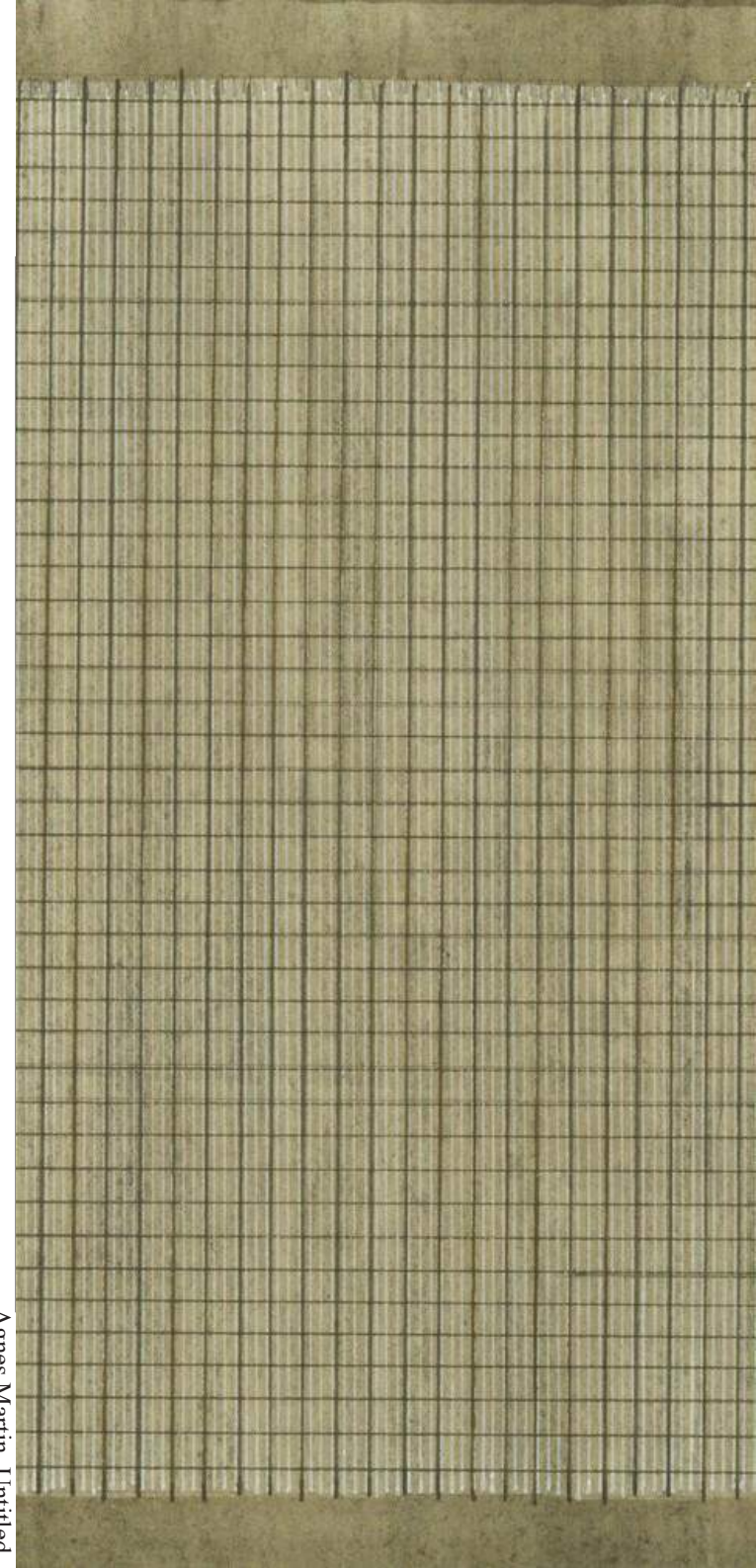
The Grid, The Cloud, And the detail by Rosalind Krauss

Phenomenological minimalism, comparing Mies to Agnes Martin and her interest in the abstract sublime. She refers to her paintings, as not about nature. *“It is not what is seen, it is what is known forever in the mind....”*

Studies in tectonic Culture by Kenneth Frampton:

Modernism is a feeling: Adventure, dynamic, unpredictable. Optimism for the future.

Themes surrounding existential endlessness, the sublime, solitude and re-orienting the users perspective; his work embodied these ideas within the material tectonic outcomes. “He calculated all dimensions in brick lengths, and seperated the under fired long bricks from the over-fired short ones, using the long in one direction and the short in the other”.



Thesis

It is possible to retain rather than demolish, and intervene with an architecture made of recycled materials.

Thank you.

The Gleaners and Me by Agnes Varda



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