

MicaMORE - Project Phase
(can affordable housing do more?)

Enough
Master Thesis

Excess
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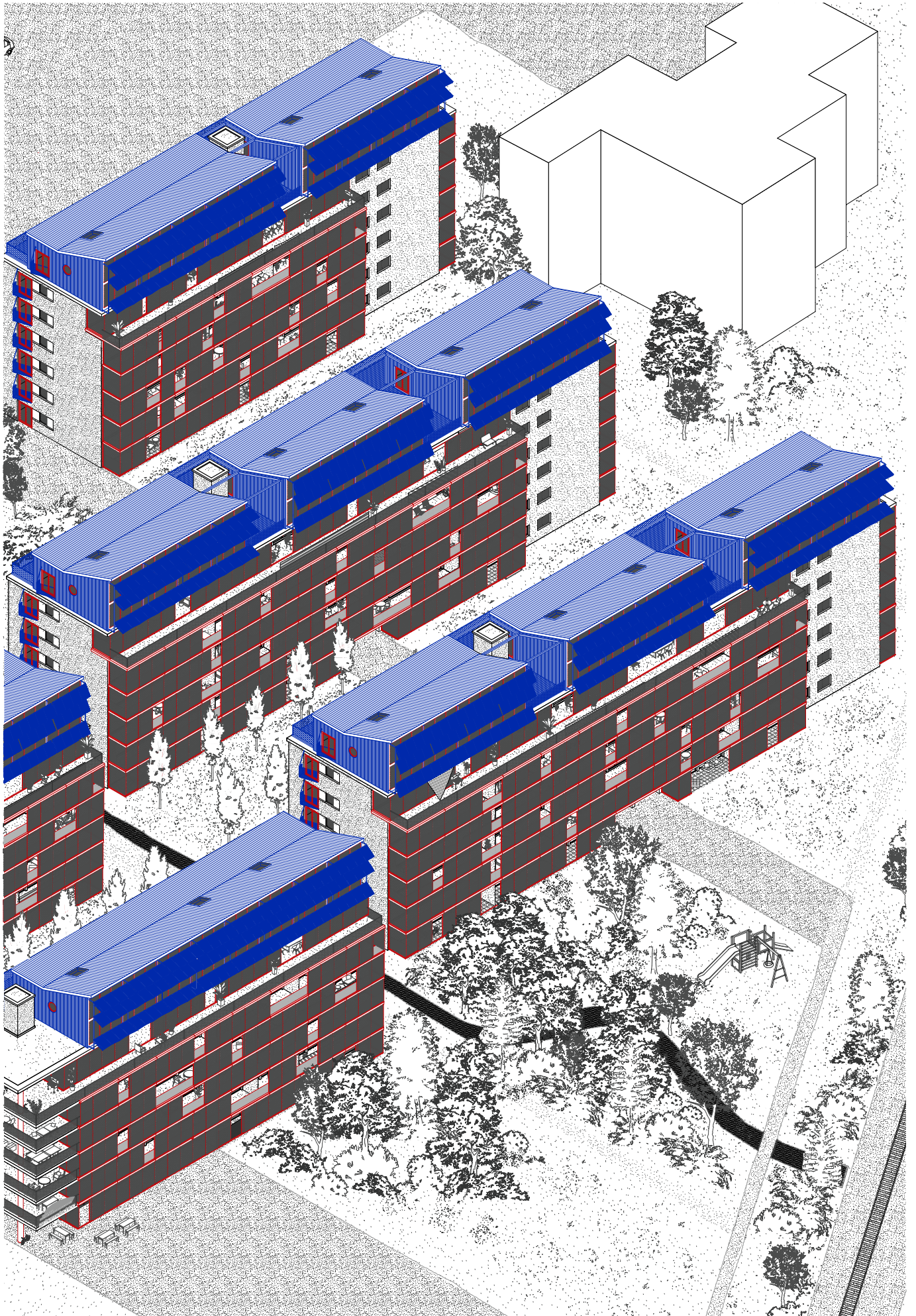
Aim of the Project

Aim of the project is to maintain social structures inside the residential development while improving living conditions in the dense apartment complex. Key points such as the lack of community spaces, access to the proper surroundings and thermal comfort were of the same importance as preserving and valuing the invested resources.



View from the Hermetschloostrasse





Axonometric View of the MicaMORE Complex

Methodology

After the research phase it was clear that not all apartments are equal. Especially units in the comb structure, which includes smaller distances between buildings than the free volumes, are lacking lighting and privacy especially on the lower floors.

On the other hand the backbone of the volume which bridges the whole distance between the Badener- and Hermetschloostrasse was almost solely used to house balconies and winter-gardens. Unlike the south facing balconies, direct sunlight is rare and most people used improvised screens to shield themselves from their neighbours looks. More than not the winter gardens were converted into bedrooms for kids which show is even more concerning regarding the lack of privacy, natural lighting and proper insulation.

My intention was to remove said units and use the freed up space for community and commercial spaces. as well as spacious apartments with a new orientation. To compensate any lost units I conducted a short research on the capacity of the existing structure to bear additional floors. The scope was to not construct additional foundations as excavation and concrete made up two thirds of the original structure. These boundaries were my starting point and guidance for any further decisions.

Apartment Mix

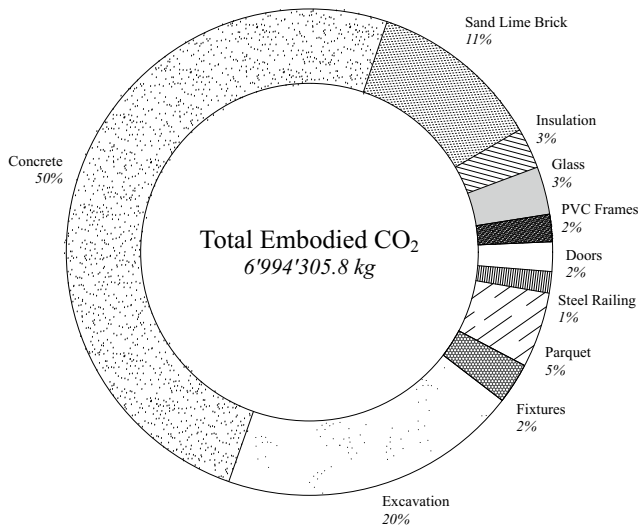
Apartment Size	Quantity	Size	Occupancy	Space p.P
1.5 Rooms	6	37 m2	1.3	28 m2
2.5 Rooms	89	66 m2	1.4	47 m2
3.5 Rooms	57	90 m2	2.4	38 m2
4.5 Rooms	89	110 m2	2.8	39 m2
5.5 Rooms	6	130 m2	3.2	41 m2
Total and ø	247	88 m2	2.18	41 m2
Removed	- 39	Apartments		
Reorganised	+ 18	Apartments		
	+ 550 m ²	Commercial Space		
	+ 1100 m ²	Community Spaces		
Newly built	+ 31	Apartments		



Inside the Structure at Noon in August)

Lending Foundations

	Type	Material	Volume	Area	Dead Load	Dead Weight	Capacity	Live Load	Live Weight
Micafil Laboratory	Structure	Reinforced Concrete	2'139 m3	143 m2	25 kN/m3	60'693 kN	13'500 kN/m2	-	-
	Floor	Reinforced Concrete	1'750 m3	2'325 m2	25 kN/m3	49'658 kN	-	6 kN/m2	83'700 kN
	Load (incl. Security Factor)		317'311 kN		Saved CO ₂ (maximum Amount)		0 kg		
	Lowest Floor Capacity		320'843 kN		New Apartments (maximally)		0		
	Possible Additional Load		3'531 kN						
			Generic Construction		Timber Construction		Light Weight Construction		
Additional Floors			0.06		0.09		0.12		

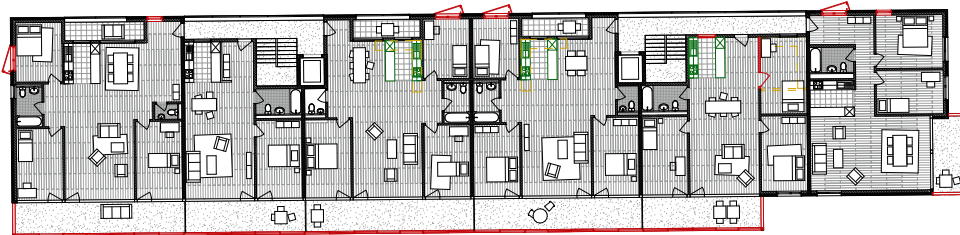


Embodied Emissions of the Original Complex

Retrofitting the Existing

As stated it is of highest importance to me to preserve the existing social structure and the invested materials and their embodied emissions. Therefore apart from the removal of certain units, changes to existing remain at a level, which should be improving the residents living conditions inside their units without being too intrusive or time consuming.

Red indicates added structures, yellow stands for torn down objects and green points to objects used from the original housing development (mainly kitchens and windows).



Standard Floor Plan

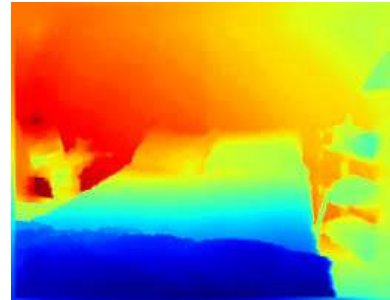


Ground Floor Plan

Adding the Buffer Zone

One of the main issues expressed by residents is extreme heating of the apartments in summer to a point that people leave their homes for a week to escape the heat. Ruth for example, stated that she went to the mountains regularly during summer months. She said that it is not ideal, but at this price point and housing market, this is something she is willing to put up with.

As temperatures fell, another problem with the completely glazed south facing facade became unignorable. The cold radiation from the big windows is especially feeling in rooms used for sleeping as the tight geometry often requires the bed to face the window and residents with struggles to stay warm during winter nights.



Bedroom facing South

Another untold problem with the glazed facade, is the need for privacy and installation of improvised screens of all types to shield personal spaces from neighbouring houses. To improve these conditions a winter garden layer is added to the existing balconies which requires no further structures and can be installed without altering the existing apartments



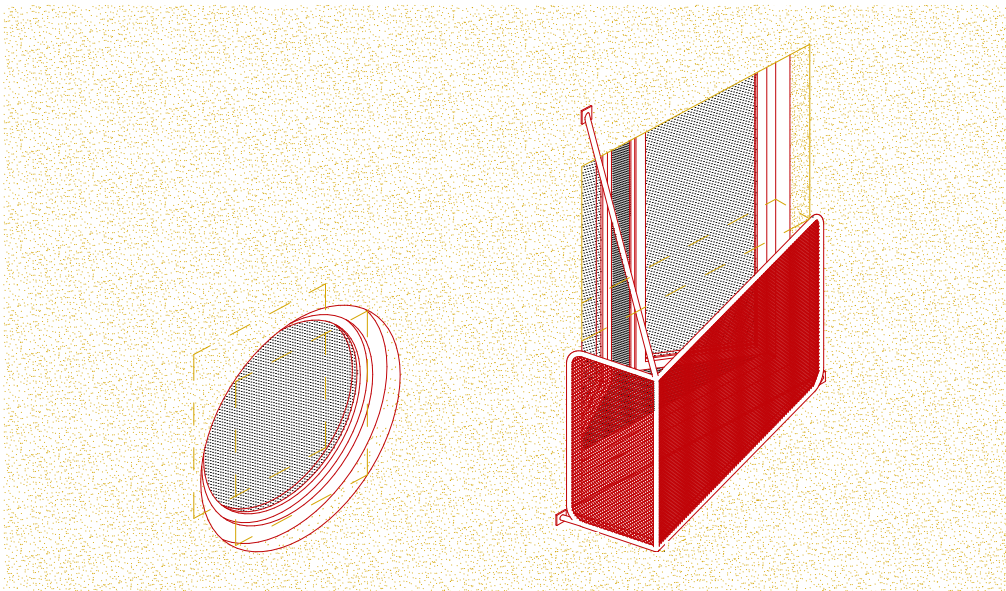
Manifested Need for Privacy



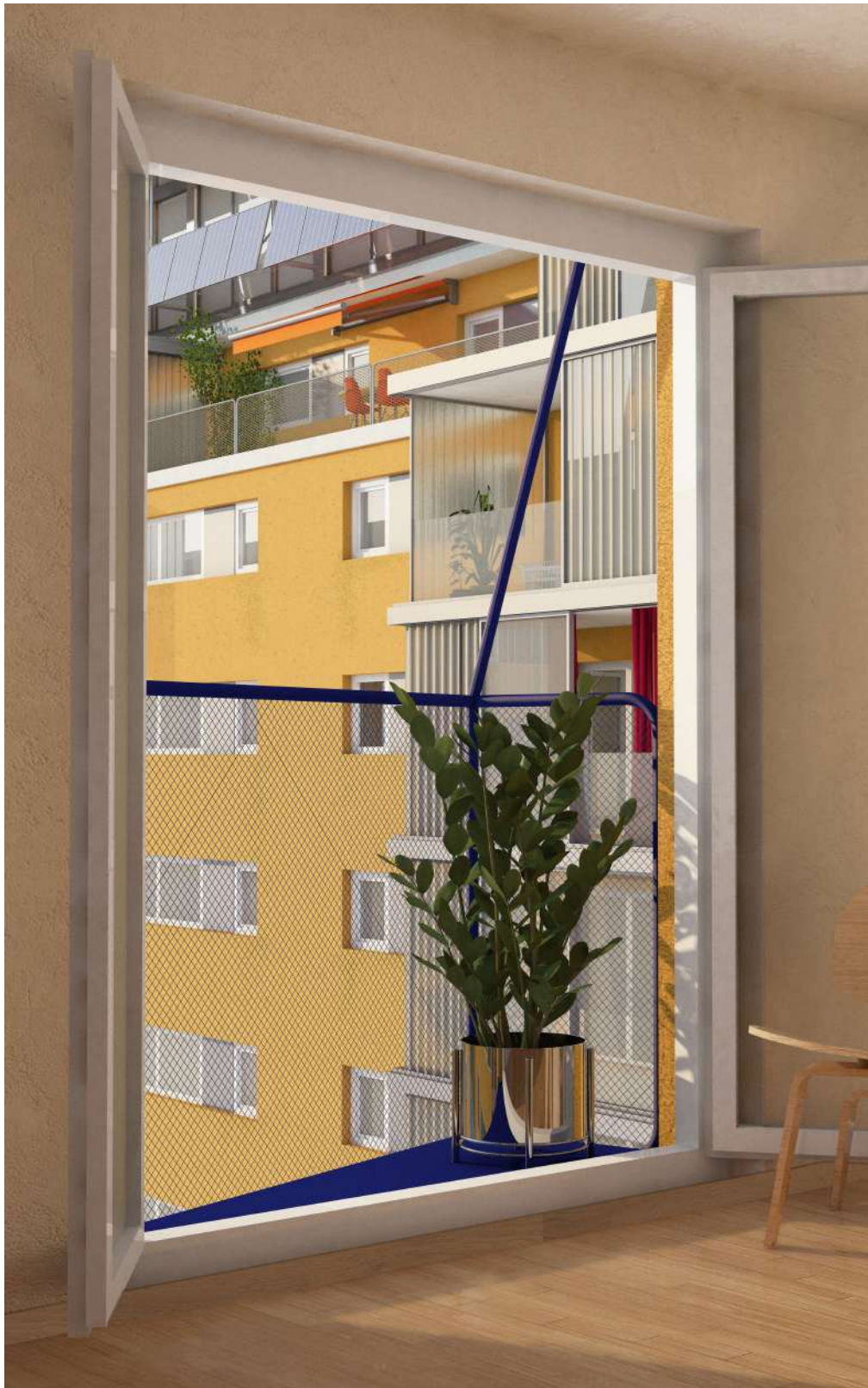
Added Winter Garden Layer

Love your Neighbours

As the train run North of the site the facade was almost hermetically closed off and blocking the residents from experiencing their surroundings. By extending the windows solely in the kitchen and adding a small juliet balcony, which is held up at only three points and needs no additional foundations, all apartments are gaining an additional and different outdoor space. On the northern facade the small bathroom windows are substituted with round windows, that have the same diagonal as the square ones, but allow a considerable bigger amount of light in, giving another secondary room a valuable new perspective. Inside the residence a manifold of new perspective and relations can develop between various apartments, some inside the same building and others over some distance.



Blueprint for a new Perspective

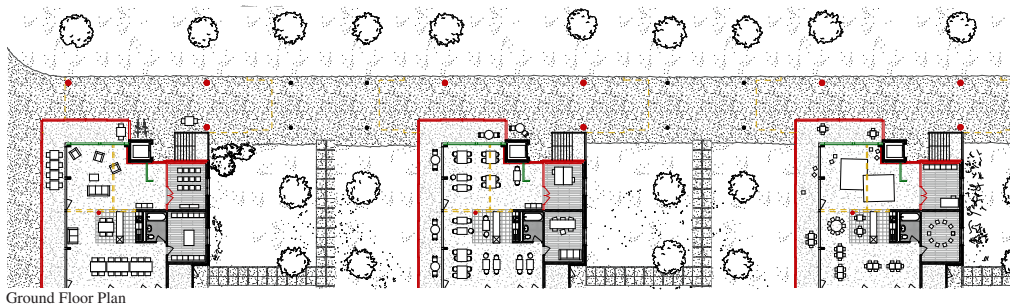


Added Juliet Balcony enabling new Exchanges

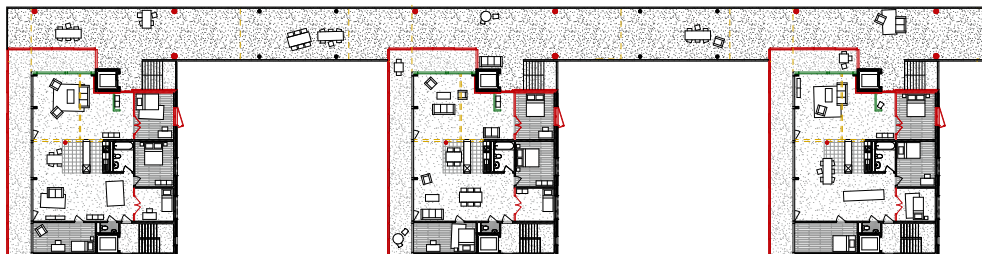
The Colonnade

In place of the former apartments, that were categorised as unsuited for habitation, more public uses find their place on the lower floor. These include the new Gemeinschaftszentrum Hermetschloo, the existing Kindergarden and Kita, as well as spaces to rent out as atelier; office space or commercial uses such as a café.

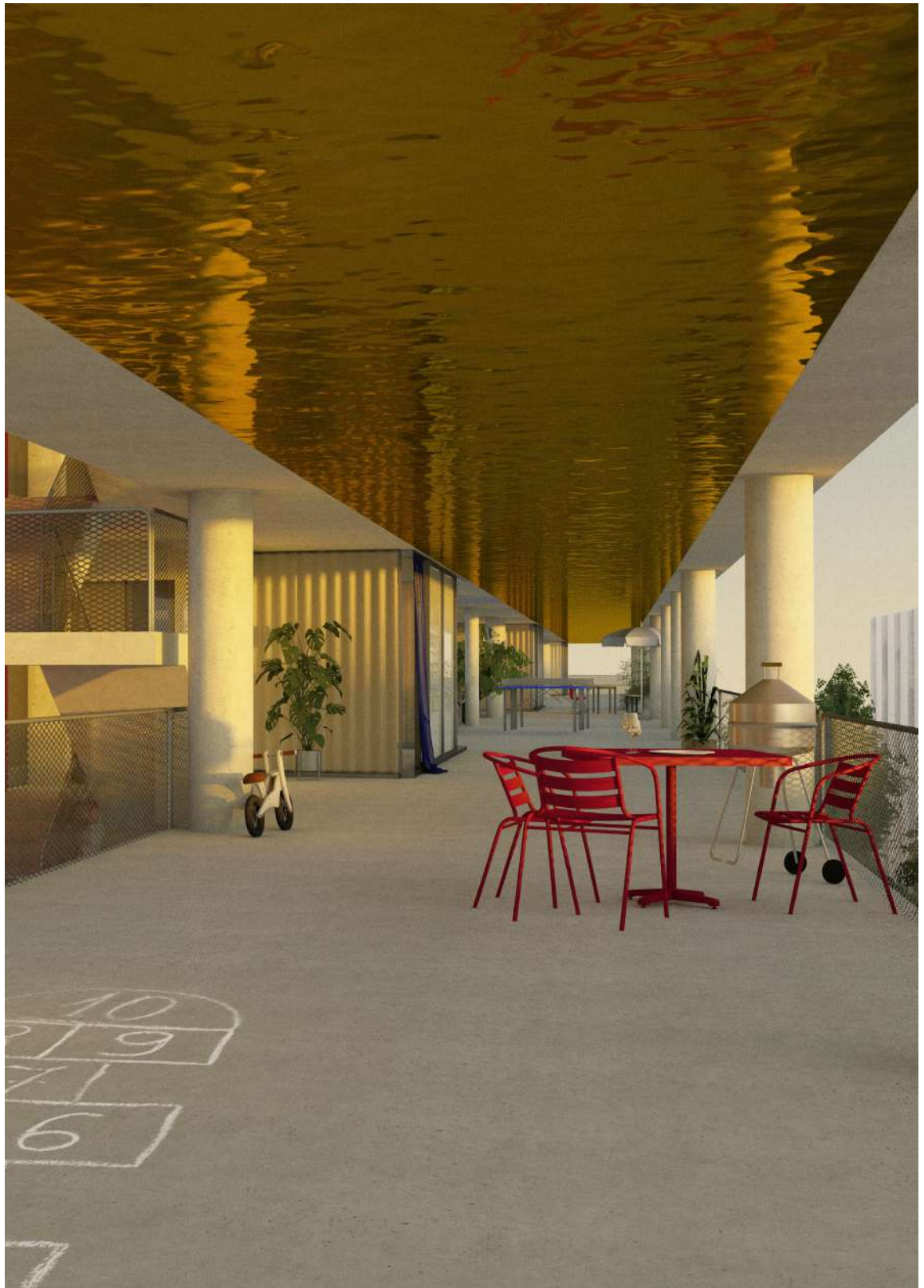
On the higher floors 6-room apartments with direct access to the colonnade enable less strict forms of co-habitation more suited for the current time and age while also providing a valuable space for the city.



Ground Floor Plan



Standard Floor Plan



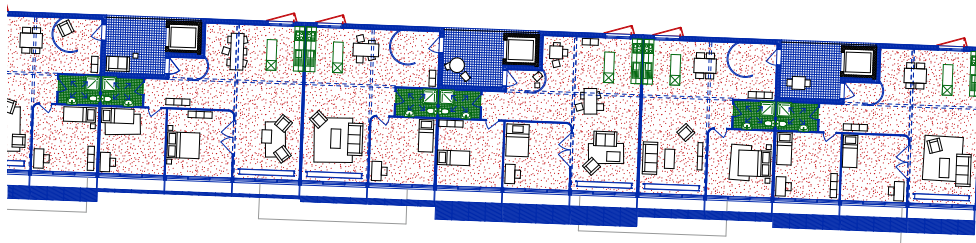
View down the Colonnade

The Extension

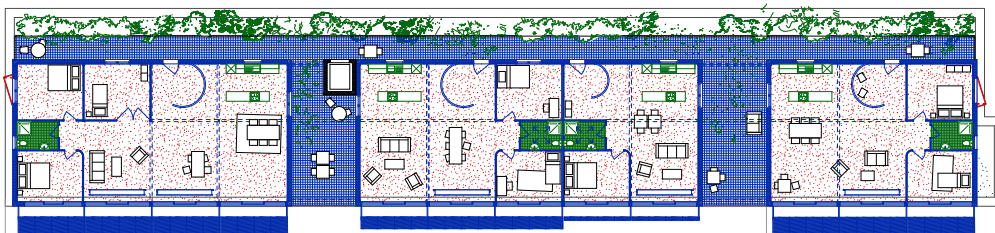
To compensate for lost living spaces the idea of a vertical extension, was formulated early in the design process. Even though the possibility two additional floors was statically plausible, I opted to build the structure by only a single floor. Thus to prevent making living conditions for lower apartments worse while still providing the best possible housing experience.

The apartments are all connected with an exterior passage way and share outdoor spaces instead of having isolated balconies like the existing floors. In case of the north these spaces are oriented towards the train tracks providing a valuable connection to the context.

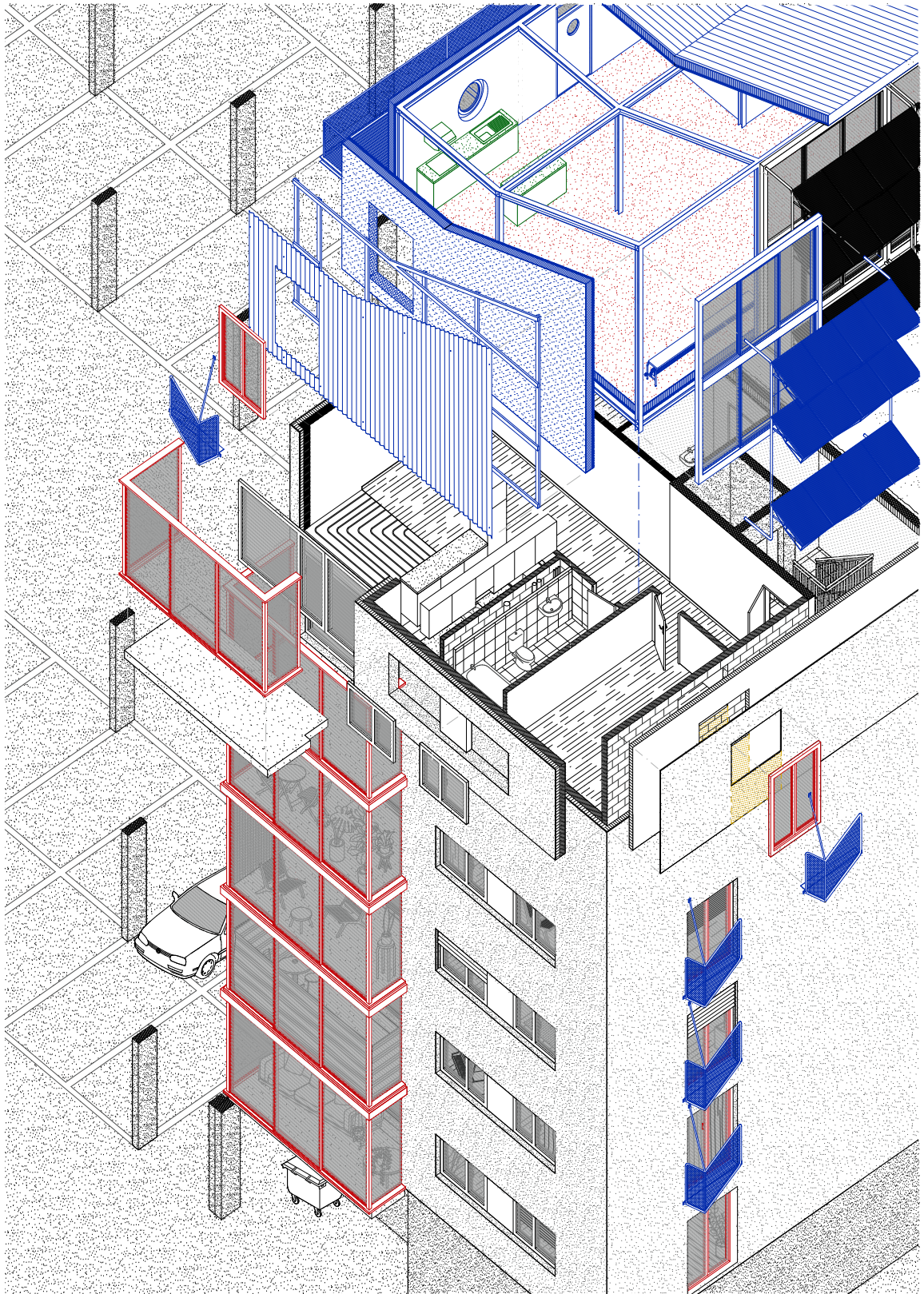
The chosen volume reflects the geometry to maximise solar potential and lighting while not casting any additional shadow to the existing apartment units. The triple glazed windows provide plenty of sunshine and are equipped with movable solar shaders, to prevent overheating while harvesting solar energy to minimise the energy consumption of the whole complex by 62% over the course of a year.



Extension Floor Plan Northern Volume



Extension Floor Plan Free Volume



Interventions and Additions





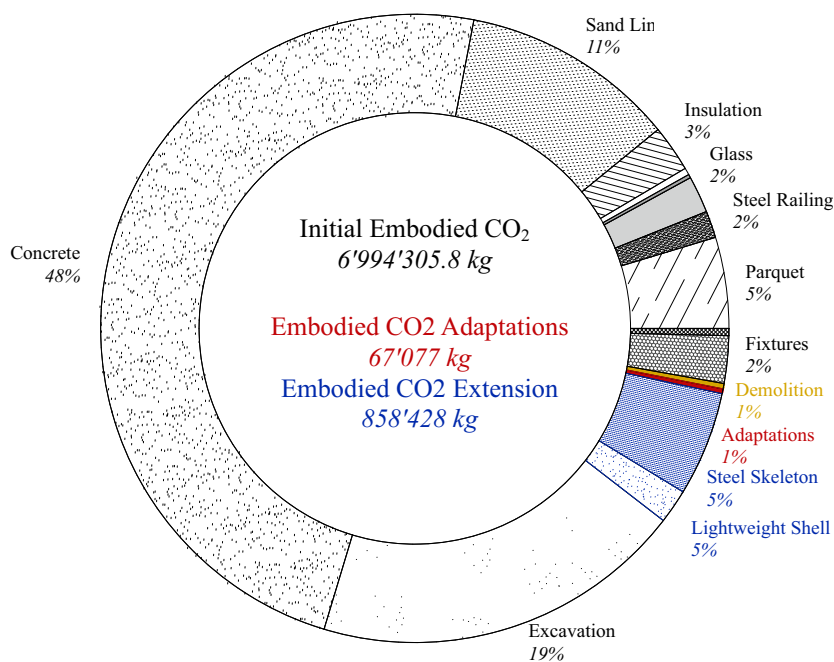
Interior View inside the new Apartment

Embodied Emissions & Energy Potential

Embodied emissions tend to be elevated in cost-effective building standards as in the case of the «Micafil Areal». Low-cost materials exhibit lower quality characteristics, which can lead to increased energy consumption during the buildings operational phase, thus offsetting the initial cost savings and contributing to heightened embodied emissions. The manufacturing processes associated with these materials often rely on older, less energy-efficient technologies, further amplifying the carbon footprint.

For my project I chose to intervene only where needed and reuse elements like kitchens, lightweight walls, doors etc. The further strategy was to avoid any alterations, which would need additional excavation and foundations as these made up roughly 70 percent of the upfront emissions.

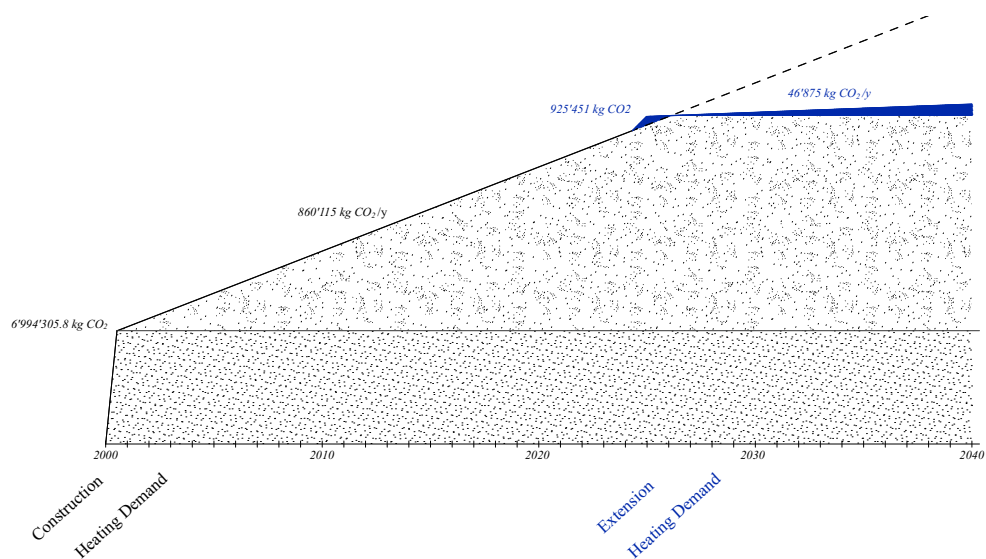
Another key factor for my design process was to increase the ability of the residential complex to generate solar energy on the exposed top floors while providing them with adequate shading. With this method energy consumption could be reduced by 62% while the heating demand for the gas system could be almost eliminated.



Material	Weight	Quantity	Volume	Kg CO ₂ per Unit	Incorporated CO ₂
Excavation	41'935 t	-	29'081 m3	53 kg	1'540'748 kg
Reinforced Concrete	34'147 t	-	14'228 m3	272 kg	3'870'013 kg
Sand Lime Brick	5'958 t	-	4'256 m3	209 kg	887'802 kg
Insulation	45 t	-	1'123 m3	180 kg	202'647 kg
Mortar	216 t	-	140 m3	1 kg	134 kg
Paint	3 t	-	94 m3	1 kg	86 kg
Glass	347 t	-	526 m3	46 kg	24'032 kg
PVC Frames	39 t	1988	263 m3	53 kg	13'935 kg
Doors	83 t	1527	98 m3	62 kg	152'639 kg
Steel Railing	38 t	-	5 m3	22'892 kg	112'246 kg
Parquet	46 t	-	526 m3	-720 kg	-378'957 kg
Sanitary Fixtures	28 t	564	5 m3	49 kg	27'729 kg
Kitchens	24 t	256	-	93 kg	191'026 kg
Demolition	718 t	-	498 m3	45 kg	22'410 kg
Partition Walls	36 t	-	26 m3	102 kg	2'652 kg
Wintergardens	249 t	-	378 m3	52 kg	19'656 kg
Steel Skeleton	86 t	-	19 m3	22'892 kg	433'642 kg
Lightweight Shell	30 t	-	738 m3	177 kg	130'626 kg
Triple Glazing	72 t	-	109 m3	73 kg	7'981 kg

Components and Embodied CO₂

Upfront and Maintenance Emissions



Colloquium
Master Thesis

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