The Plug-in Community

James Soeno and Callum Cherry

Contents

Berlin

30/09/2018 - 09/10/2018

Personal Reflections

Callum Cherry

During the intensive week, I worked as part of a group of five along with James in which we covered a range of ideas and concepts. Due to a differing opinion, difficulties did arise when narrowing down a design and developing it further, however I believe the massing produced and options we explored really helped the development of the scheme.

I spent the remainder of the project working with James after having mutual interested and simialar ideas throughout the Berlin intensive week. Continuing this parasitical idea once back in Manchester deemed to be diffuclt initially, when researching and solidifying a concept and design, however I feel James and I have really grasped the idea of a parasitic architecture.

I am really pleased with our final design. I believe the journey from massing; to experimental models; to the final outcome sits well within the ethos of USE.

Timeline of Berlin Workshop

30/09 01/10 02/10 03/10 04/10 05/10 06/10 07/10 08/10 09/10

AEDES

Tempelhof Visit

City Model Museum

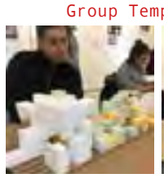
Teaming up with TU Brauschweig and Universidad Diego Portales students we explored the concept of organic, parasitical architecture.

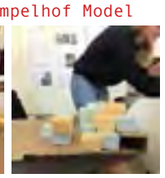
Firstly producing a range of conceptual massing models, which reacted to the sloping roof of the existing site and capturing importants vistas.

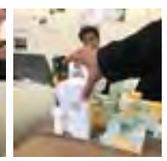
Developing the massing, an important aspect was the concept of parasitical architecture and with it, the investigation of alternative urban densifying strategies for Berlin and beyond.

Semi-public space and the idea of commonalities were also explored as well as integrating common spaces like gardens, bars/restaurants, kitchens and living areas into the master plan.

Group Tempelhof Model



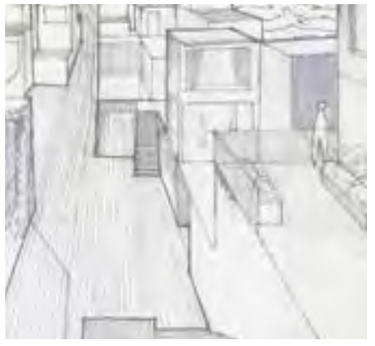




Intensifying scale

Exploring Form

Circulation



Initial Sketches

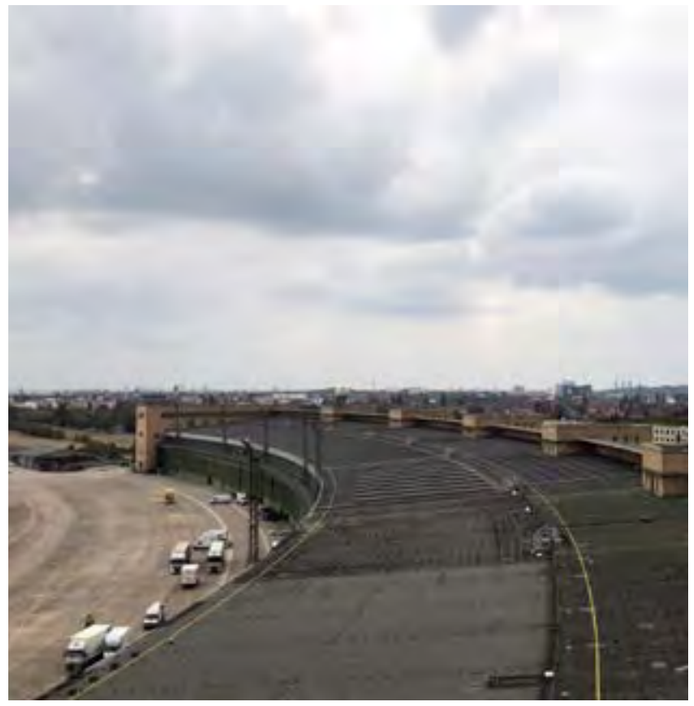
Tempelhof Visit & Analysis

Berlin is a city full of abandoned buildings with long and troublesome histories. But one building has been through more political turmoil than most: Tempelhof Airport.

Tempelhof has been used to test some of the world's first aircrafts, house World War II prisoners, and give the people of West Berlin a vital lifeline to the outside world during the Cold War.

In recent years, Tempelhof has become home to Germany's largest refugee shelter. There were 3,000 refugees from countries such as Iraq and Syria living in the hangars at one point, but that number has fallen to about 600 as German authorities have relocated many of them, while others have returned home.

The intentional design of the roof was to provide a viewing platform in which spectators could watch military parades and other events taking place in the field.



The heavy concrete structure protrudes several storeys high, decorated with ordered floor to ceiling windows. Inside, a variety of ceiling heights and thresholds continue to state dominance and power.

Views of the airfield can be seen from the top of the roof, as well as spectacular views looking into the city on the opposing side.

The angle of the arc allows for maximum direct sunlight whilst also deflecting prevailing southwest winds.

The proposed site is the roof of the former airport building. The construction is sound in terms of structural integrity to take the load of a new building on top due to its intended purpose.

Site Analysis

The colossal airport straddles Neukölln and Tempelhof neighbourhoods approximately 4 kilometres south of the city's centre. North of the site, main roads leading into the city centre can be accessed. U-Bahn and S-Bahn stations are situated South-West of the field.

Site

U-bahn

Oncoming winds

Sun path

Purpose

Berlin today has become a hotspot for foreign investors with former residential buildings being converted into luxuary accommodation and holiday rentals. This social upgrading is increasing rent prices in neighbourhoods such as Friedrichschian, Prenzlauer Berg and Kreuzberg. As a result, locals who make up the fabric of the city are being forced to relocate.

Intertwined with these negative effects, Berlin is thriving from such investments which is helping the city's economy. Over the past decade, Berlin's GDP has seen an average growth rate of 3.4%.

The gentrimap depicts the uneven growth throughout the city and identifies key areas being targeted for investment.

Can architecture act as a balancing tool for gentrification in Berlin by encouraging alternative methods of development?

The project aims to identify current latent spaces (Tempelhof) and activate the sites building potential for investors. These proposed spaces of concentrated investment attempt to dilute the impact on already thriving neighbourhoods.

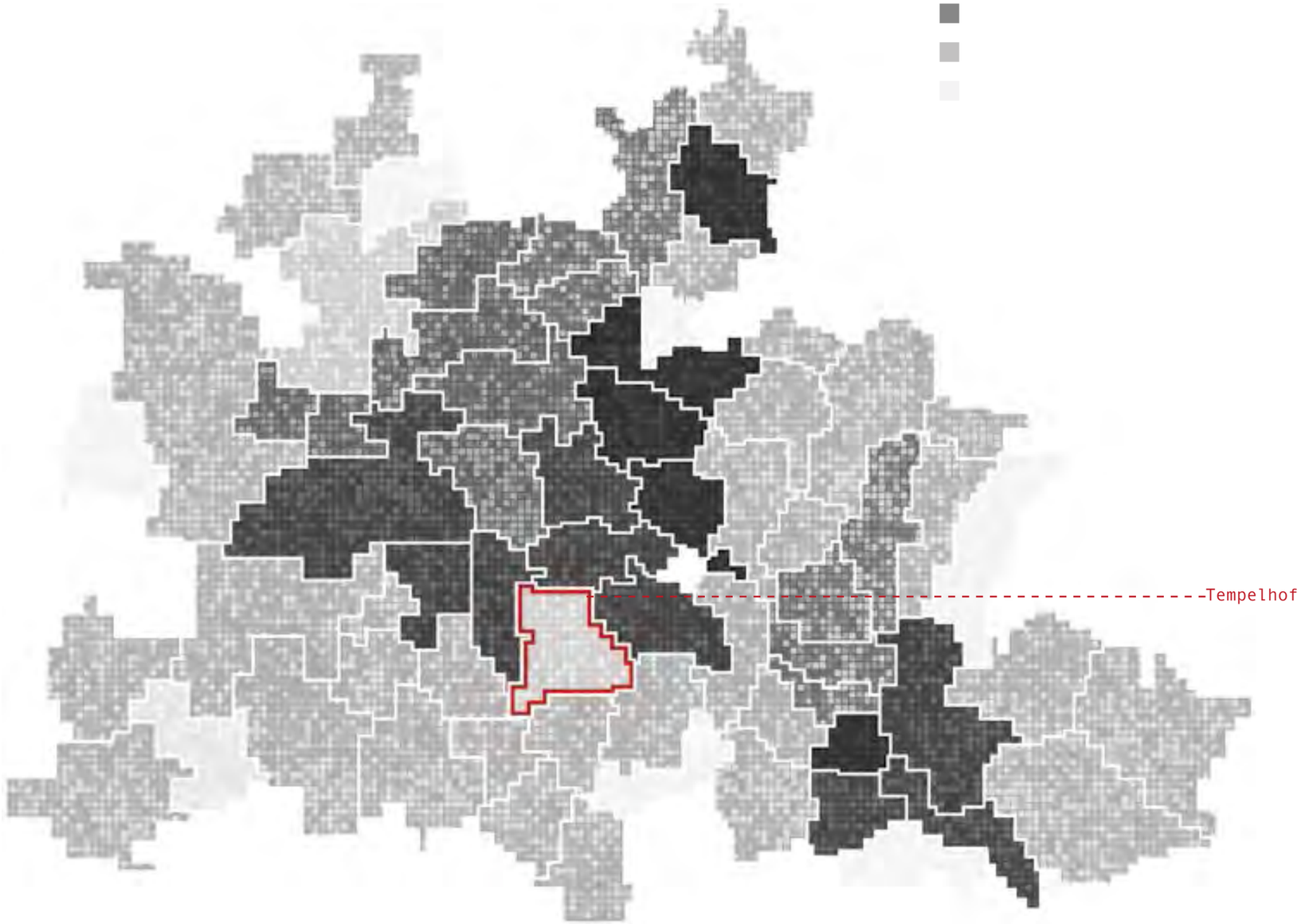
Idea

To create a customisable housing scheme, in which investors are encouraged to introduce new rental properties within our ongrowing framework.

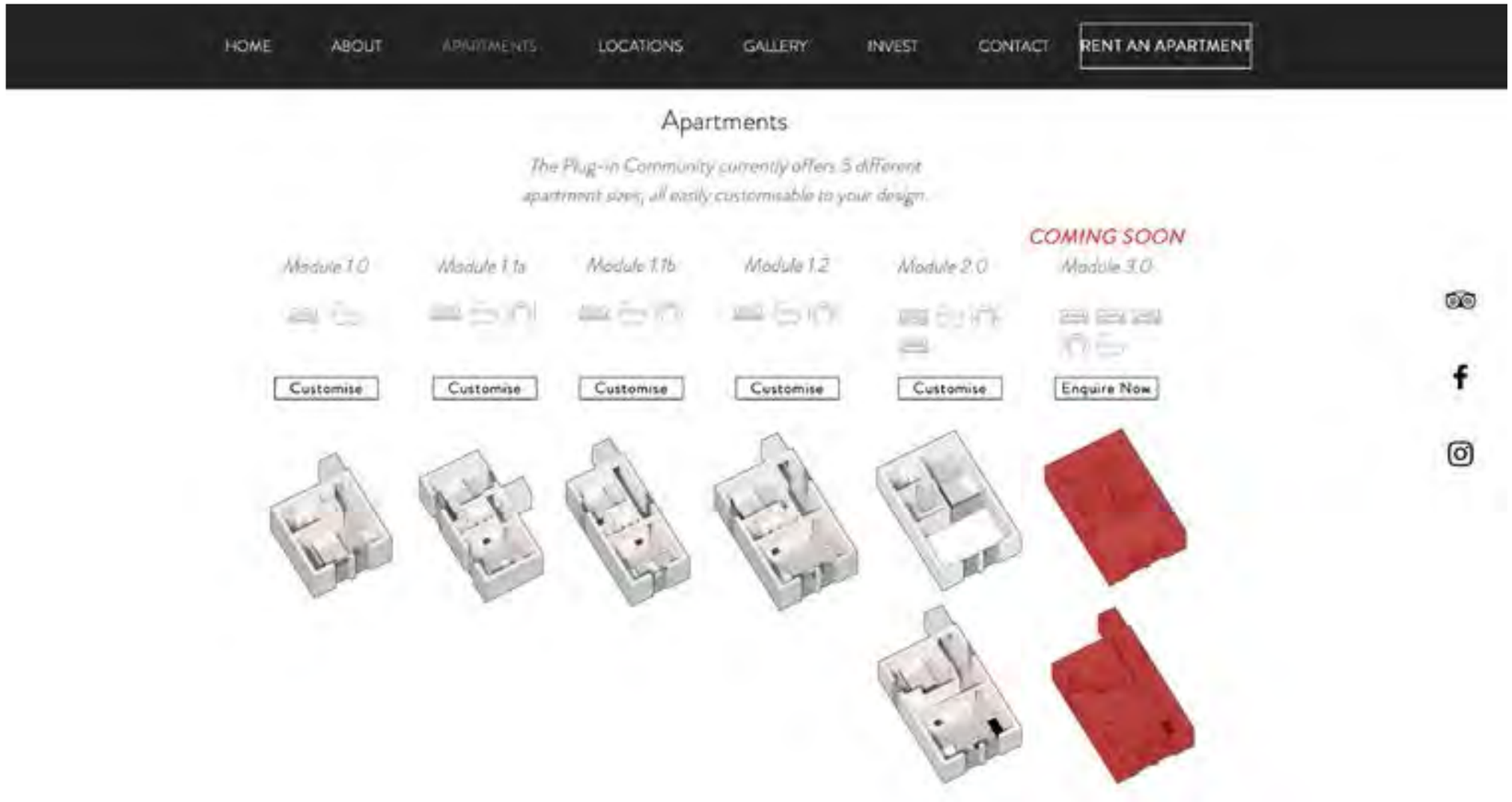
These unique, prefabricated dwellings will be a product of collaborative design between architect and the investor.

Gentrimap

Gentrification and uneven development in Berlin: the darker areas are characterised by social upgrading and increasing rent prices.



Page of website aimed at the investor: Apartments



Website/App Concept

Our website and app offer services to both investors and renters.

The investor interface allows them to design and order their property using an online platform with suggested spatial configuration.

The pages aimed at the renter allows them to browse all available apartments in their specified location.

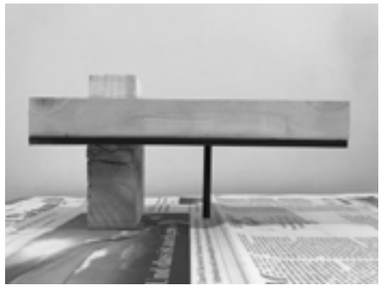
Screen of app aimed at renter: Booking browser

Exploration of Movement

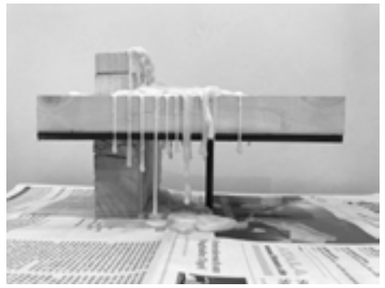
parasite
/ˈparəsʌɪt/

noun
noun: **parasite**; plural noun: **parasites**

1. an organism which lives in or on another organism (its host) and benefits by deriving nutrients at the other's expense.



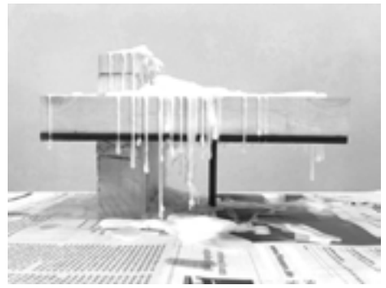
1



2

The idea of parasitic architecture, derived from the concept, emphasises the continuous potential of the project.

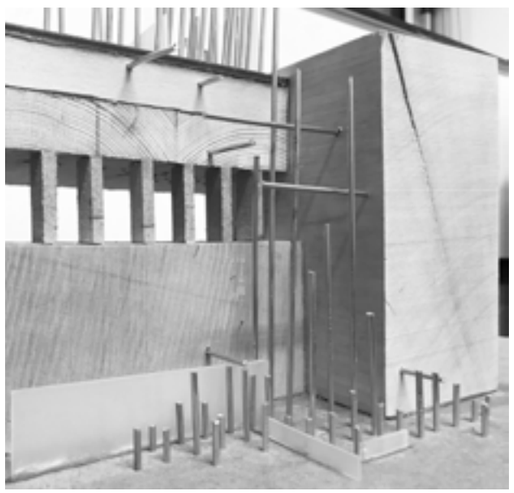
This conceptual model was used to explore movement and spread from a focal point and to accentuate the contrast between the ordered structure and an organic form.

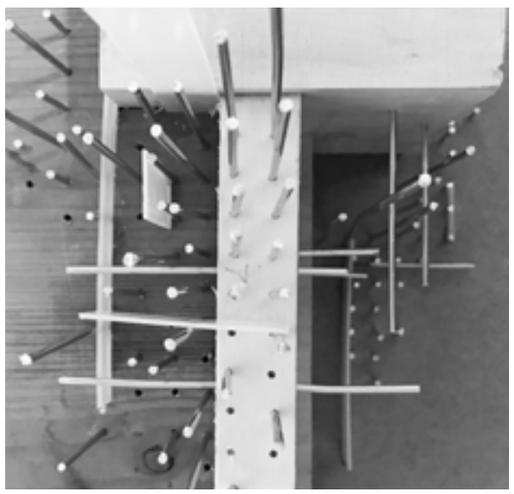


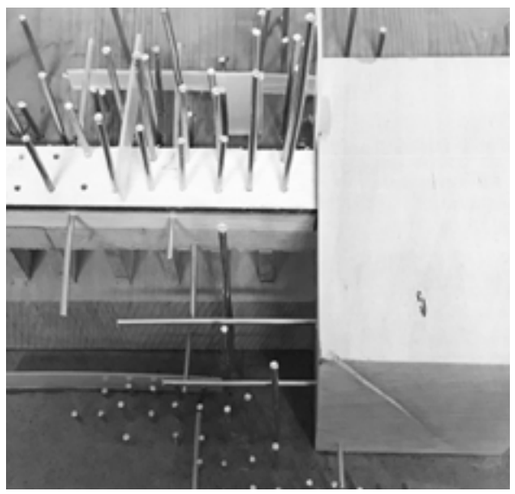
3

Exploration of Form

As a consequence of the initial model, we explored the language of movement with rigid structure.







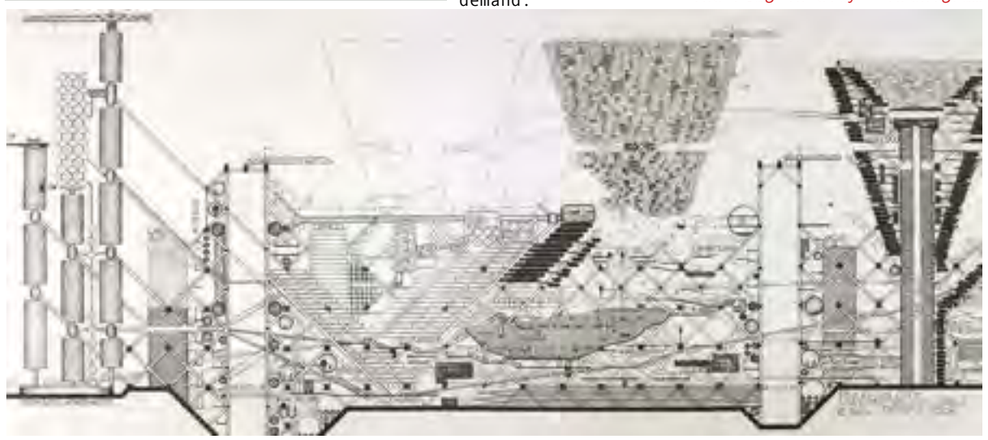
Precedents

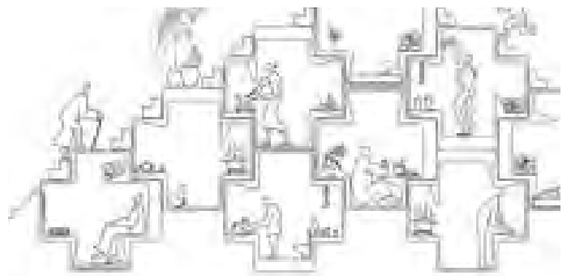
Concept

KODA by Kodasema

The KODA house is a mixed use prefabricated dwelling which is completely constructed in a warehouse off site in advance, transported to any location and then ready to be inhabited without foundations. This method of construction allows our project to follow the concept of a quick installation whilst constantly growing to demand.

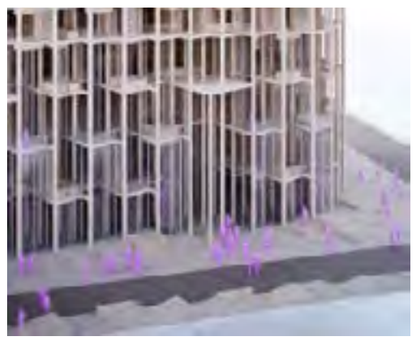
The Plug in City – Archigram





Micro House - Tsinghua by Studio Liu Lubin

Studio Liu Lubin‘s Micro House is an amalgamation of individual living spaces which organically grow on top of one another to create a whole form. This project had influenced our approach to how our scheme can appear to have grown along the existing building in an unpredictable way.



Vijayawada Garden Estate – Penda

Form

Excrescent Utopia explores a parasitic architecture, growing throughout existing structures within the city. This triggered ideas of form and how our project would move around Tempelhof roof. Also, the cube geometries Milo chose are similar to the massings we produced in the intensive week in Berlin.

Excrescent Utopia by Milo Ayden De Luca

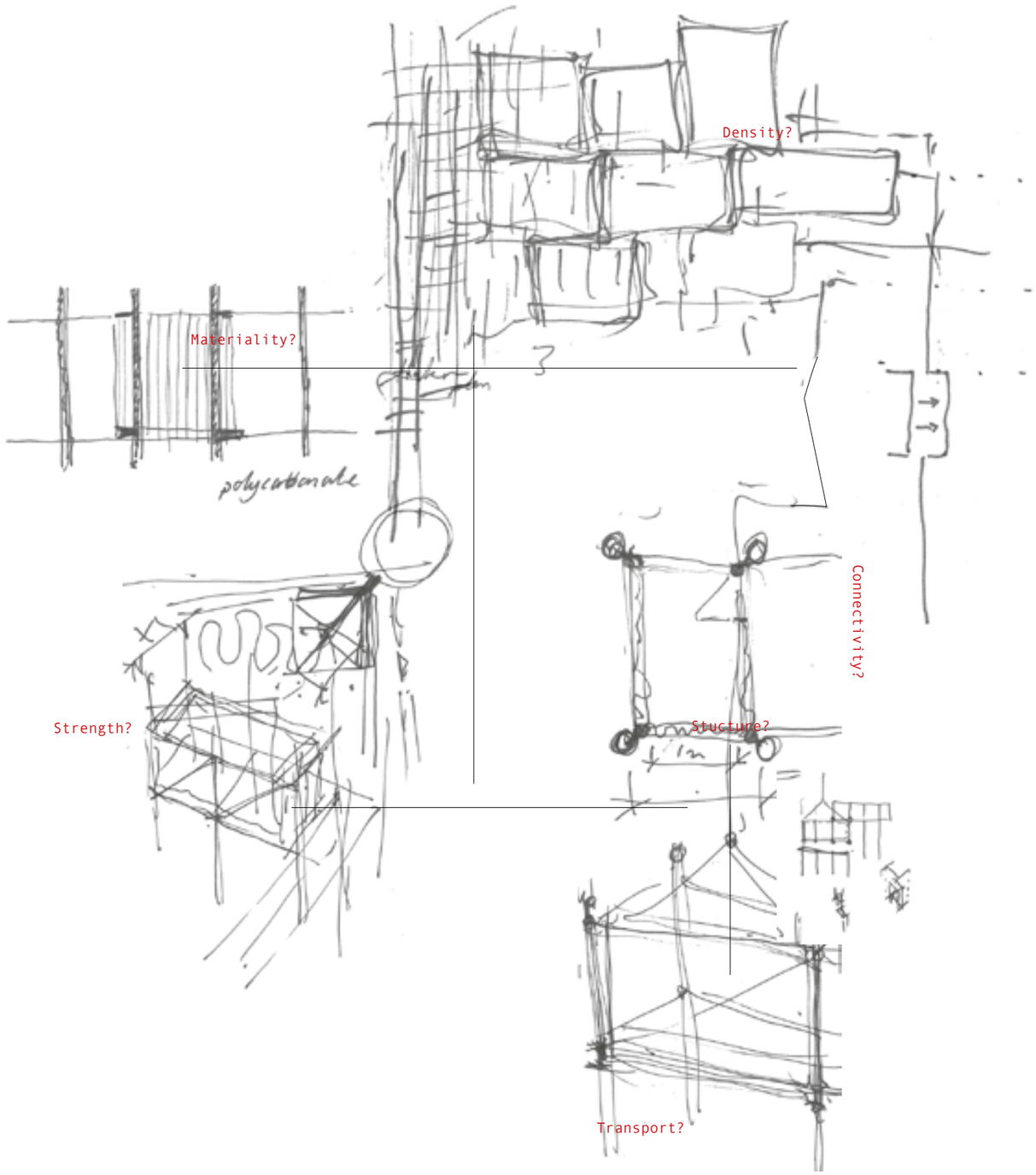
Light House - All(Zone)

Schaustelle - J. Mayer H. Architects

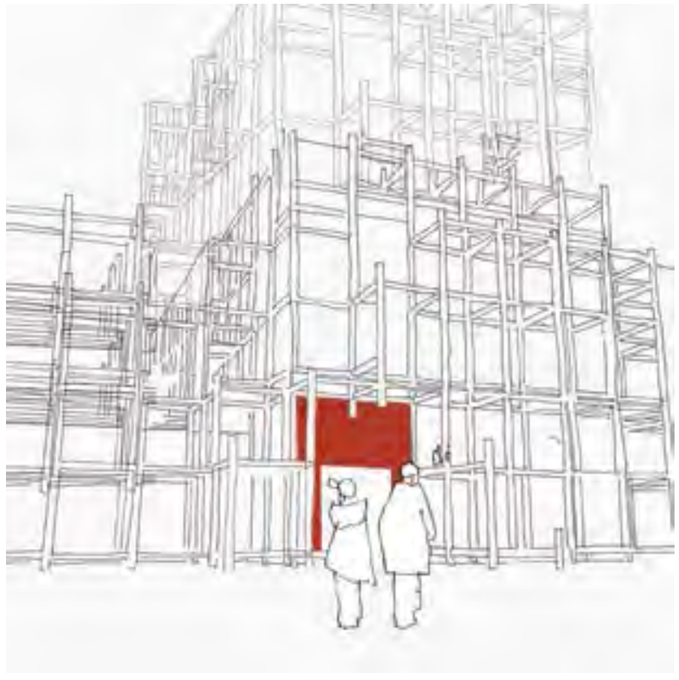
Our greatest precedent of form for our proposal comes from the use of translucent materials and enclosed spaces created by a frame in the Schaustelle to express a feeling of transparency throughout the building. The dense steel frame conveys a notion of incompletion and inevitable extension.

The Proposal

Initial Sketches



Conceptual Sketches of Public Spaces

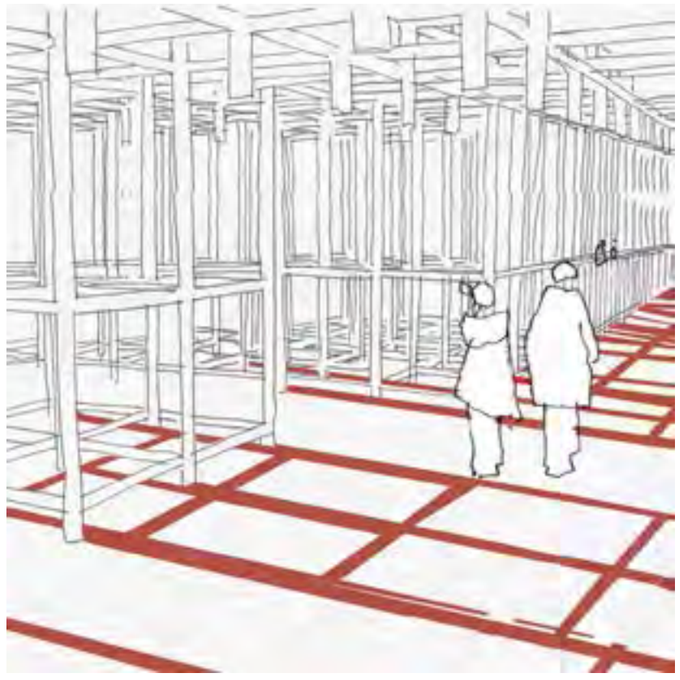


Entrance

The initial point of contact between the framework and the host is the main entrance elevating guests up to the roof.

Exhibition

The ground floor comprises of exclusive exhibition spaces which are available to host an array of events.

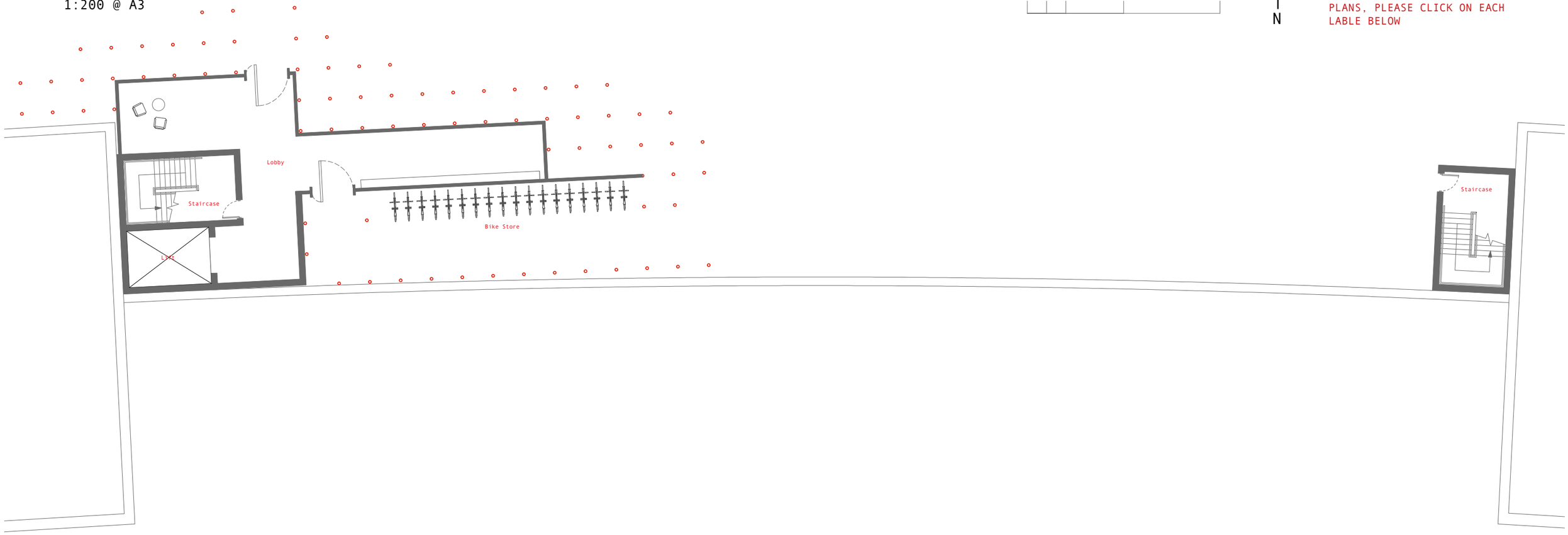


Steel Garden

The external garden floor visually divides the building into two. This space differentiates the public from the private whilst allowing users to inhabit and admire views of Tempelhof field and the city.

Proposed GA Plans

1:200 @ A3



PLEASE NOTE THIS IS AN INTERACTIVE PDF. TO VIEW PLANS, PLEASE CLICK ON EACH LABLE BELOW

Street Floor Plan Ground Floor Plan Garden Floor Plan First Floor Plan Second Floor Plan Third Floor Plan Fourth Floor Plan Fifth Floor Plan

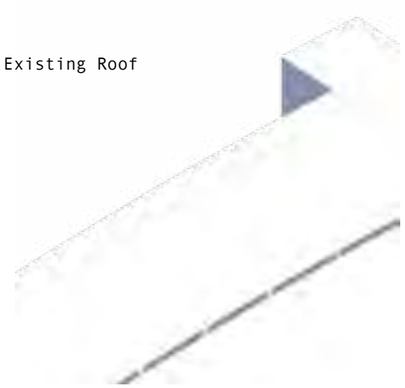
Progression Elevations/ Construction Sequence

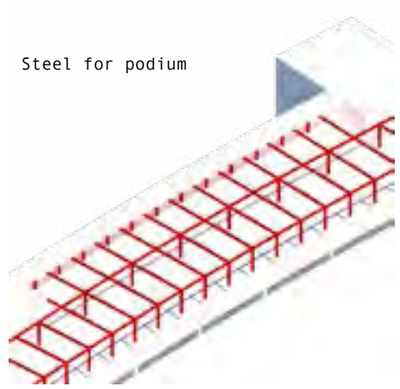
Once an investment has been made for a new property, the prefabricated structure will have been already completed with just the internal layout to be constructed to meet the requirements of the customer.

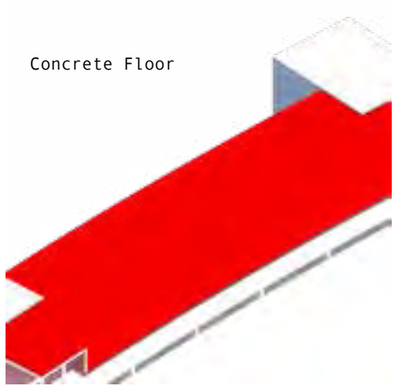
The property is transported from one of our local warehouses to the site and is lifted into allocated location by crane. Once fixed into our framework, the module can be fixed onto the circulation walkways and all services are plugged into the system. This whole process takes 24 hours maximum.

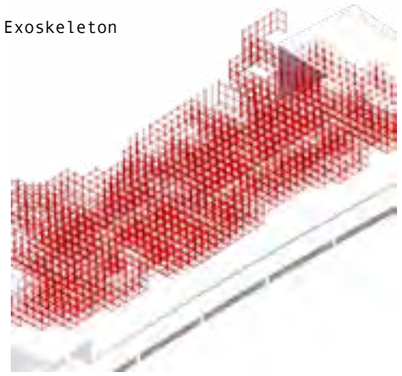
Site Construction Sequence:

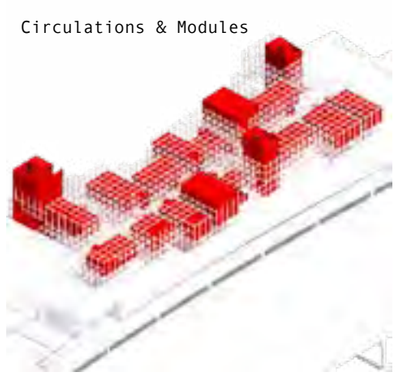
1.The location is defined
2.The steels for the podium structure are fixed into place.
3.The concrete slab floor is fitted to the podium structure and the ground floor façade is fixed.
4.The initial steels for the exoskeleton are fixed into the concrete floor.
5.Circulation and dwelling modules are introduced to the frame.
6.The framework continues to grow

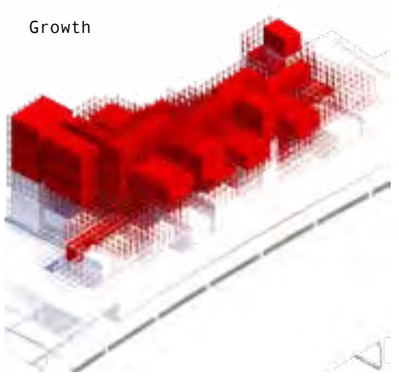

Existing Roof

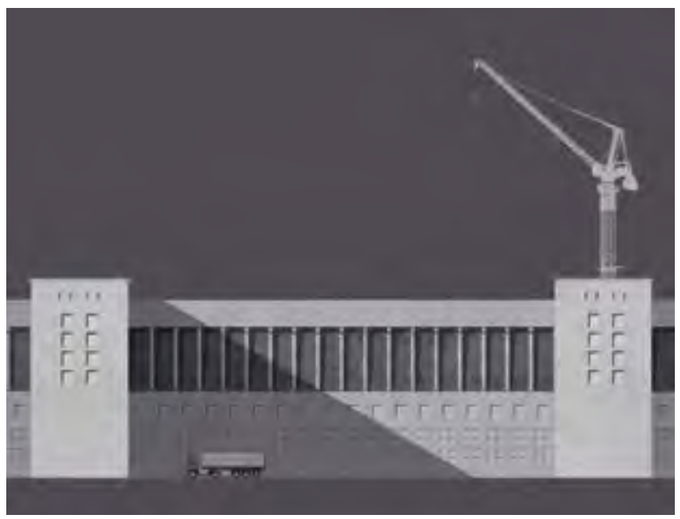

Steel for podium


Concrete Floor

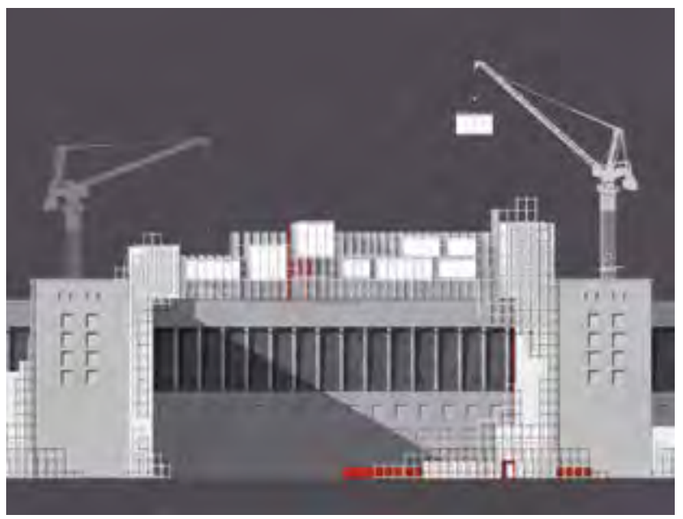

Exoskeleton


Circulations & Modules

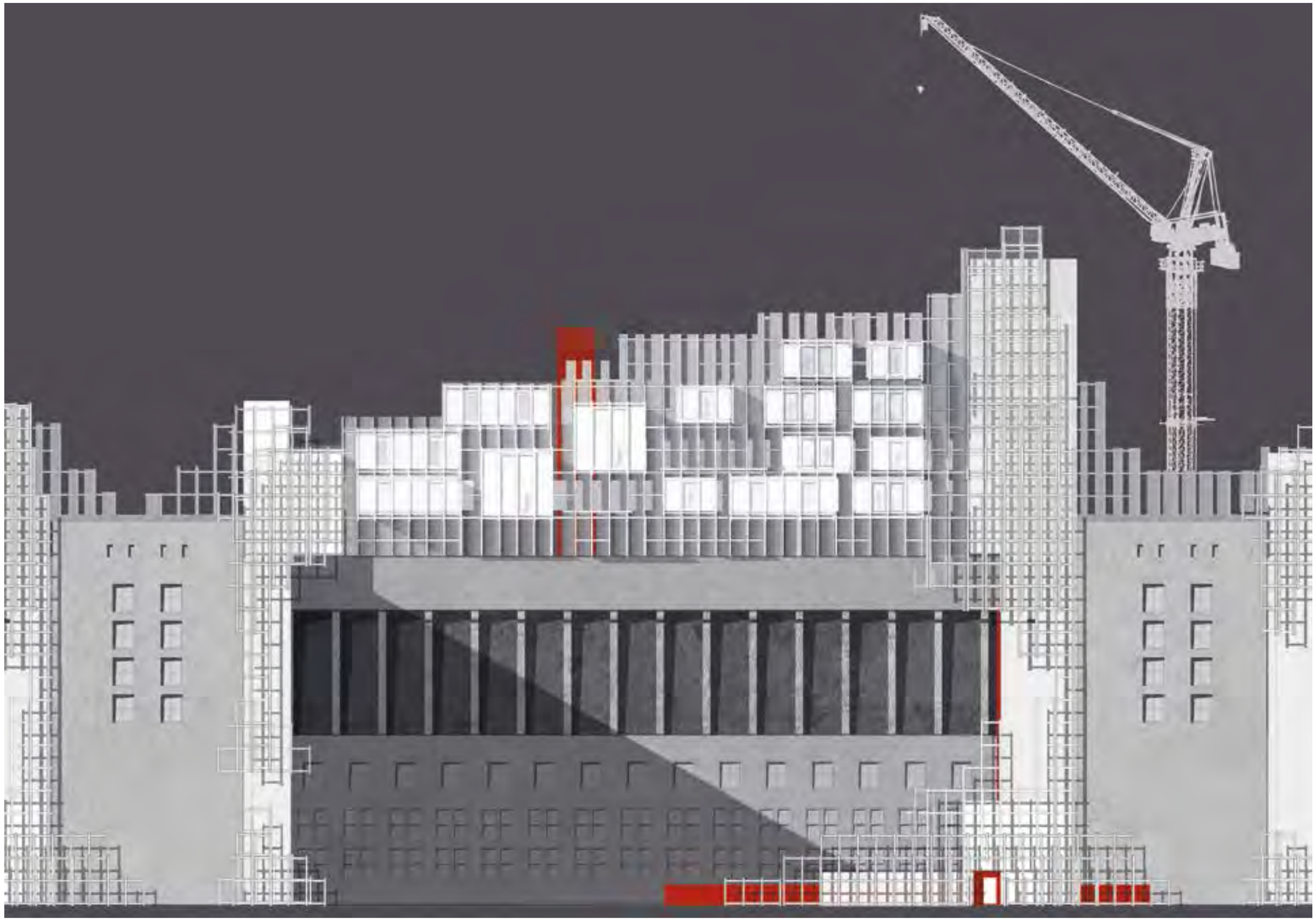

Growth

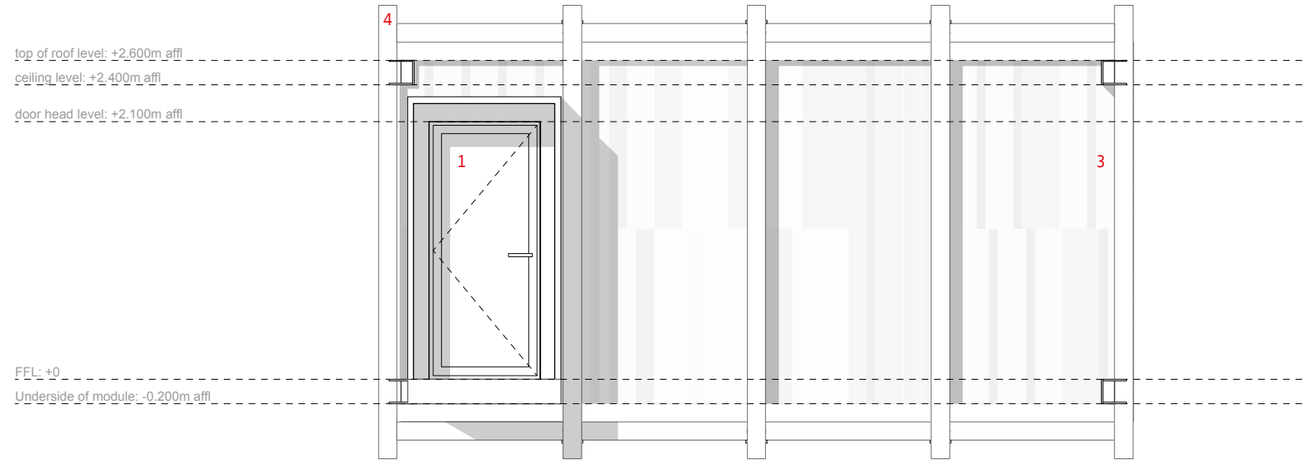

Arrival

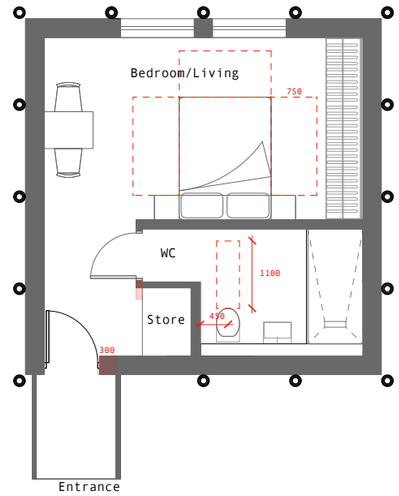

Latch


Grow

Intermediate Elevation







Building Regulations:

(Please see red annotations for measurements for building regs)

Part M(2) - Accessible and adaptable dwellings

2.20
A) Level external landing - 1200x1200mm
B) Landing is fully covered which exceeds min 900x600mm
D) Door has clear opening width of 850mm
I) Door swings in external extrance corridor are 1500mm apart

2.22
A) Minimum width of corridor - 900mm - corridor proposed width - 1400mm
D) 300 nibs (highlighted on plan)

2.25
A) Clear access route a minimum 750mm wide from the doorway to the window.
B) clear access zone a minimum 750mm wide to both sides and the foot of the bed.

2.27
A)Entrance storey provides WC and Basin
B)Basin does not impede access to the WC/1100x750mm clear zone infront of WC
D)Door opens outwards

National Space Standards

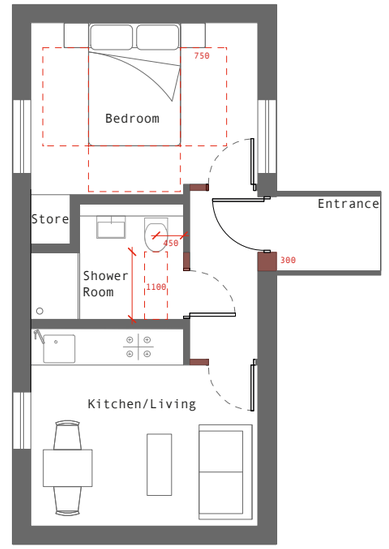
Providing one bedspace - bedroom exceeds a floor area of at least 7.5m2 and exceeds 2.15m wid minimum

1.5m2 of storage is met

1. Entrance
2. Windows
3. Polycarbonate Cladding
4. Steel Framework

Module 1.0 - Plan/Elevations
1:100/1:50 @ A3

1. Entrance
2. Windows
3. Polycarbonate Cladding
4. Steel Framework



Building Regulations:

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Part M(2) - Accessible and adaptable dwellings

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A) Level external landing - 1200x1200mm
B) Landing is fully covered which exceeds min 900x600mm
D) Door has clear opening width of 850mm
I) Door swings in external extrance corridor are 1500mm apart

2.22
A) Minimum width of corridor - 900mm - corridor proposed width - 1400mm
D) 300 nibs (highlighted on plan)

2.24
B) 1200mm clear zone provided in front of kitchen units

2.25
A) Clear access route a minimum 750mm wide from the doorway to the window.
B) clear access zone a minimum 750mm wide to both sides and the foot of the bed.

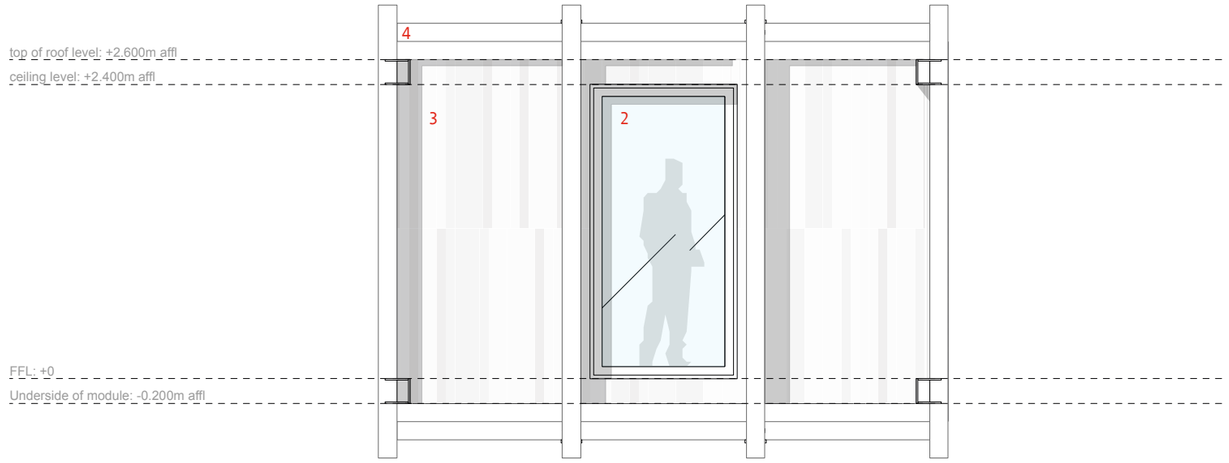
2.27
A)Entrance storey provides WC and Basin
B)Basin does not impede access to the WC/1100x750mm clear zone infront of WC
D)Door opens outwards

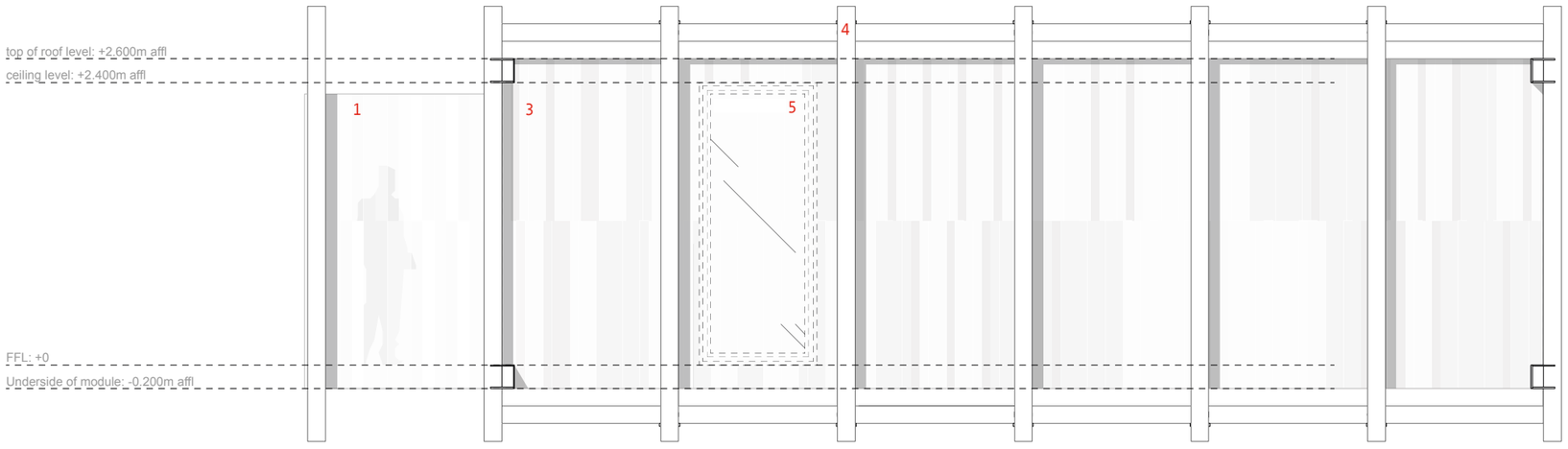
National Space Standards

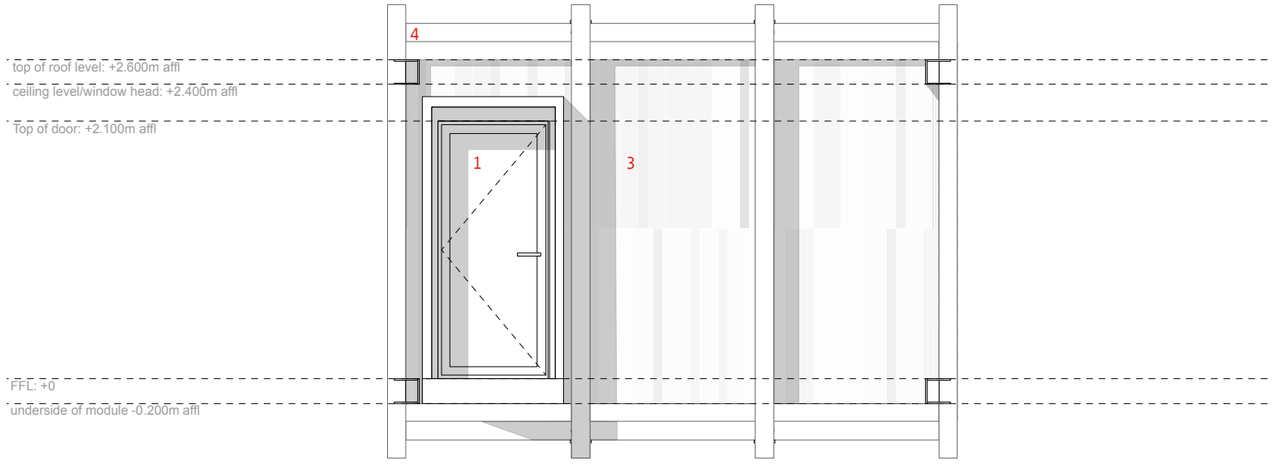
Providing one bedspace - bedroom exceeds a floor area of at least 7.5m2 and exceeds 2.15m wid minimum

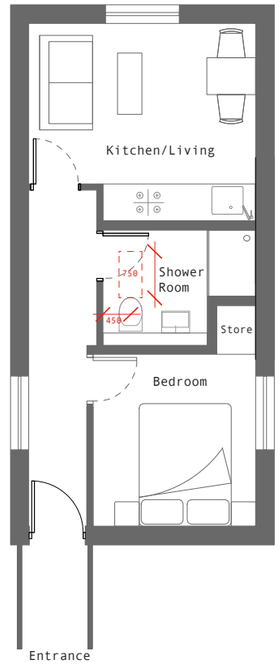
1.5m2 of storage is met

Module 1.1a - Plan/Elevations
1:100/1:50 @ A3









1. Entrance
2. Windows
3. Polycarbonate Cladding
4. Steel Framework
5. Window behind clouded polycarbonate cladding for privacy.

Building Regulations:

(Please see red annotations for measurements for building regs)

Part M4(1) - Visitable dwellings

1.14
A) Exceeds minimum clear opening width of 775mm

1.15
A) Every door to a habitable room has clear opening and proposed corridor is 950mm wide which exceeds minimum.

1.17
B) 750mm clear space in front of WC and 450mm from centre of WC to wall.

National Space Standards

Providing one bedspace - bedroom exceeds a floor area of at least 7.5m2 and exceeds 2.15m wid minimum

1.5m2 of storage is met

Module 1.1b - Plan/Elevations
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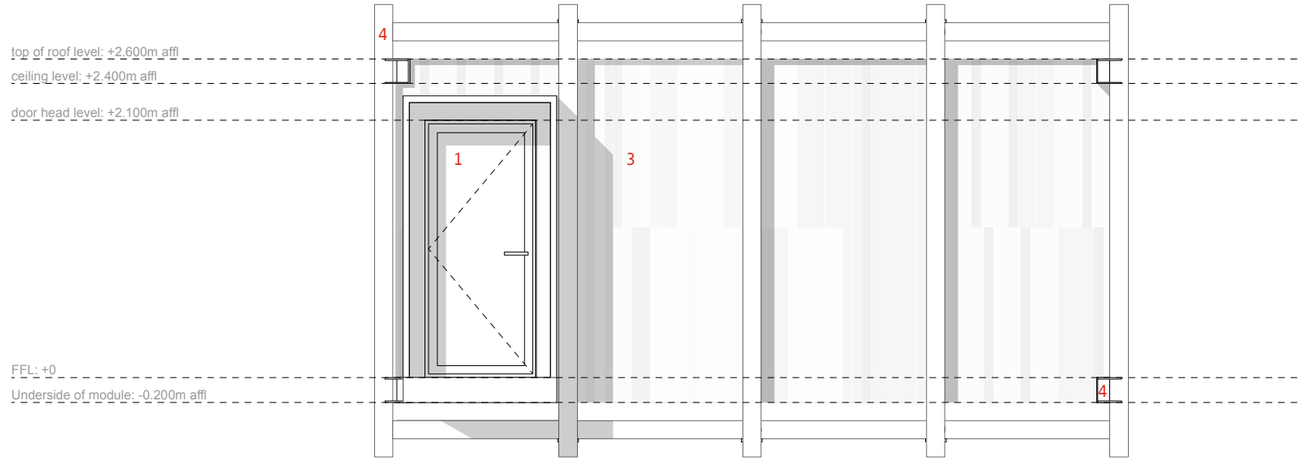

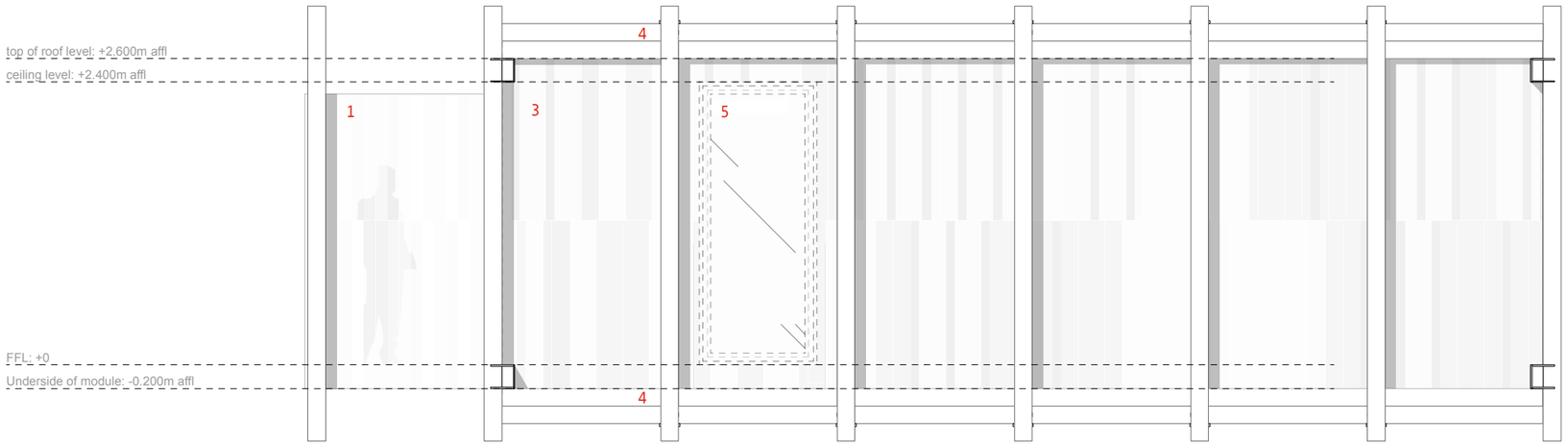

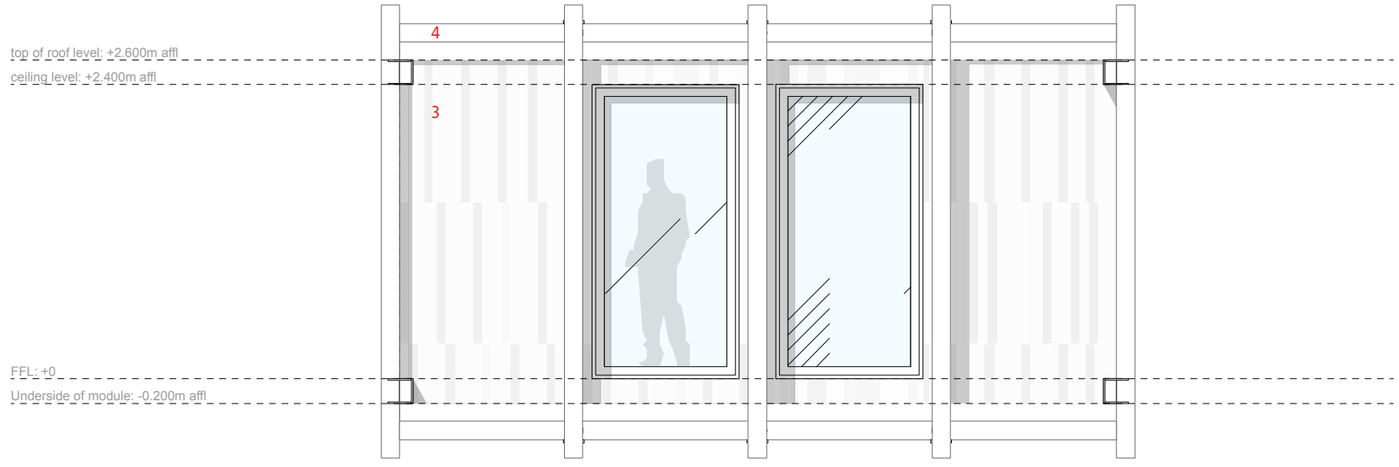

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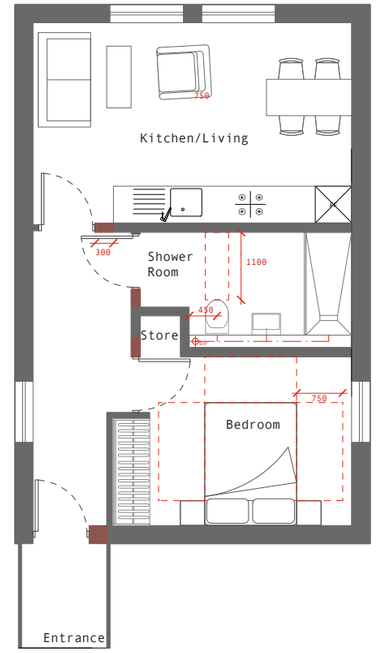
4. Steel Framework
5. Window behind clouded polycarbonate cladding for privacy.



Building Regulations:

(Please see red annotations for measurements for building regs)

Part M(2) - Accessible and adaptable dwellings

2.20
A) Level external landing - 1200x1200mm
B) Landing is fully covered which exceeds min 900x600mm
D) Door has clear opening width of 850mm
I) Door swings in external extrance corridor are 1500mm apart

2.22
A) Minimum width of corridor - 900mm - corridor proposed width - 1400mm
D) 300 nibs (highlighted on plan)

2.24
B) 1200mm clear zone provided in front of kitchen units

2.25
A) Clear access route a minimum 750mm wide from the doorway to the window.
B) clear access zone a minimum 750mm wide to both sides and the foot of the bed.

2.27
A)Entrance storey provides WC and Basin
B)Basin does not impede access to the WC/1100x750mm clear zone infront of WC
D)Door opens outwards

National Space Standards

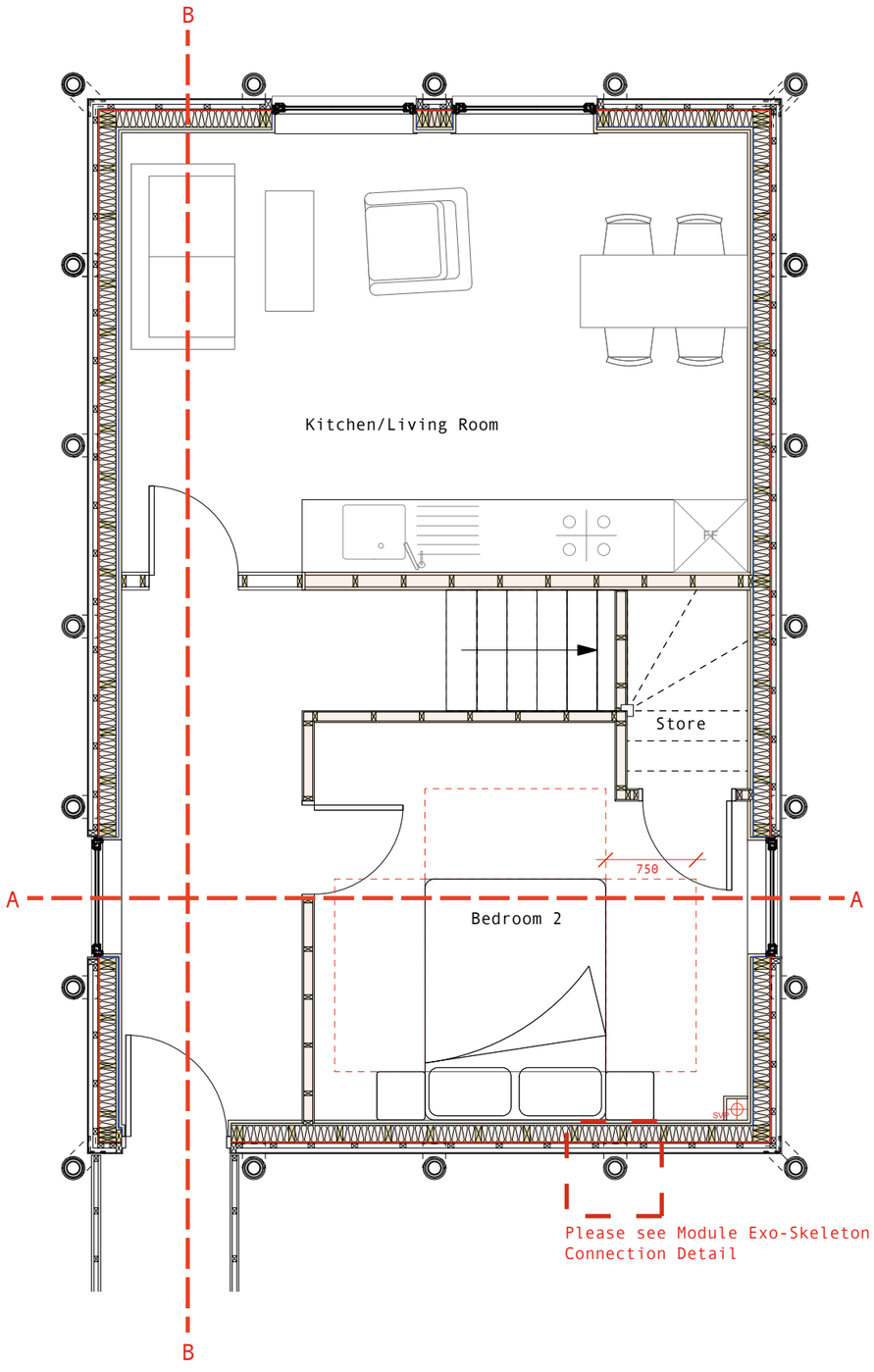
Providing one bedspace - bedroom exceeds a floor area of at least 7.5m2 and exceeds 2.15m wid minimum

Module 1.2 - Plan/Elevations
1:100/1:50 @ A3

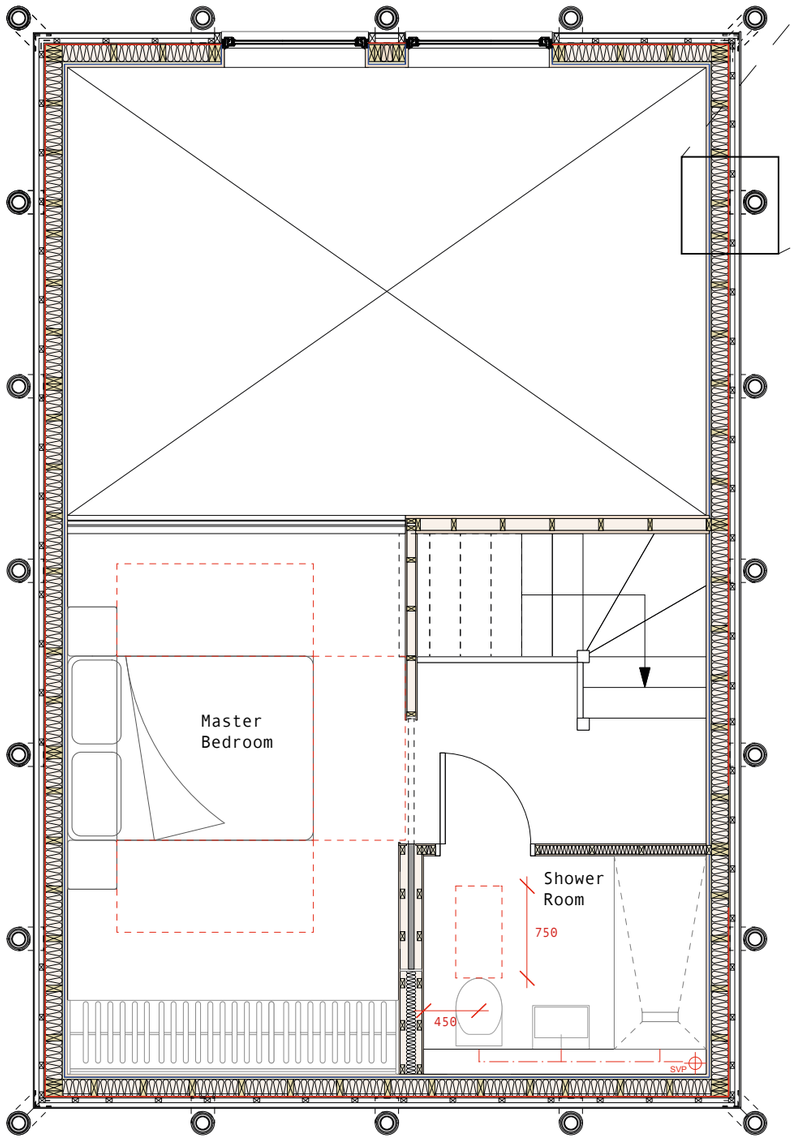
Module 2.0 Construction Plans

1:50/1:100 @ A3

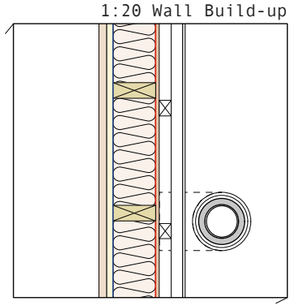
Ground Floor Plan



First Floor Plan



1:20 Wall Build-up



Wall Build-up

15mm Polycarbonate cladding
38mm horizontal battens
38mm vertical battens
breather membrane
sheathing board
140mm insulated timber frame
20mm insulation
Vapour Control layer
25mm timber finish

Building Regulations:

(Please see red annotations for measurements for building regs)

Part M4(1) - Visitable dwellings:

1.14
A) Exceeds minimum clear opening width of 775mm

1.15
A) Every door to a habitable room has clear opening and proposed corridor is 950mm wide which exceeds minimum.

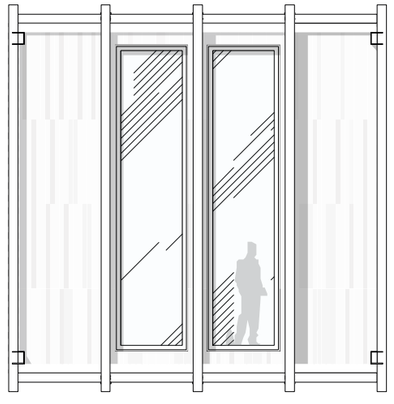
1.17
B) 750mm clear space in front of WC and 450mm from centre of WC to wall.

Part K:
1.3
Stair risers are 200mm and goings are 250mm
1.11
2 meters headroom

National Space Standards

Providing two bedspaces, a double exceeds a floor area of at least 11.5m2 and is 3.75m wide and the other double bedroom is 3.5m wide

2.5m2 of storage is available

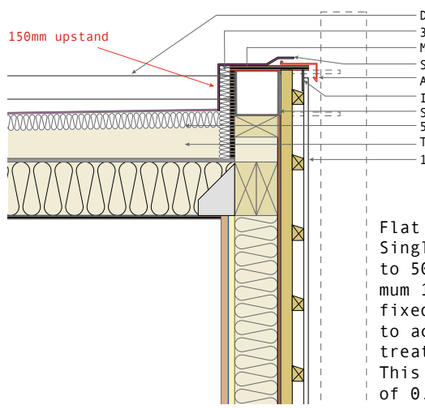


Front Elevation

Module 2.0 Construction Sections/Details

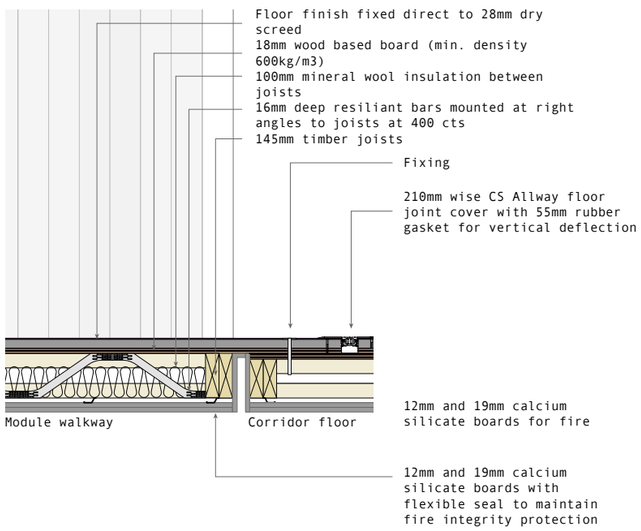
1:50/1:20 @ A3

1:20 Flat Roof/Parapet Detail:

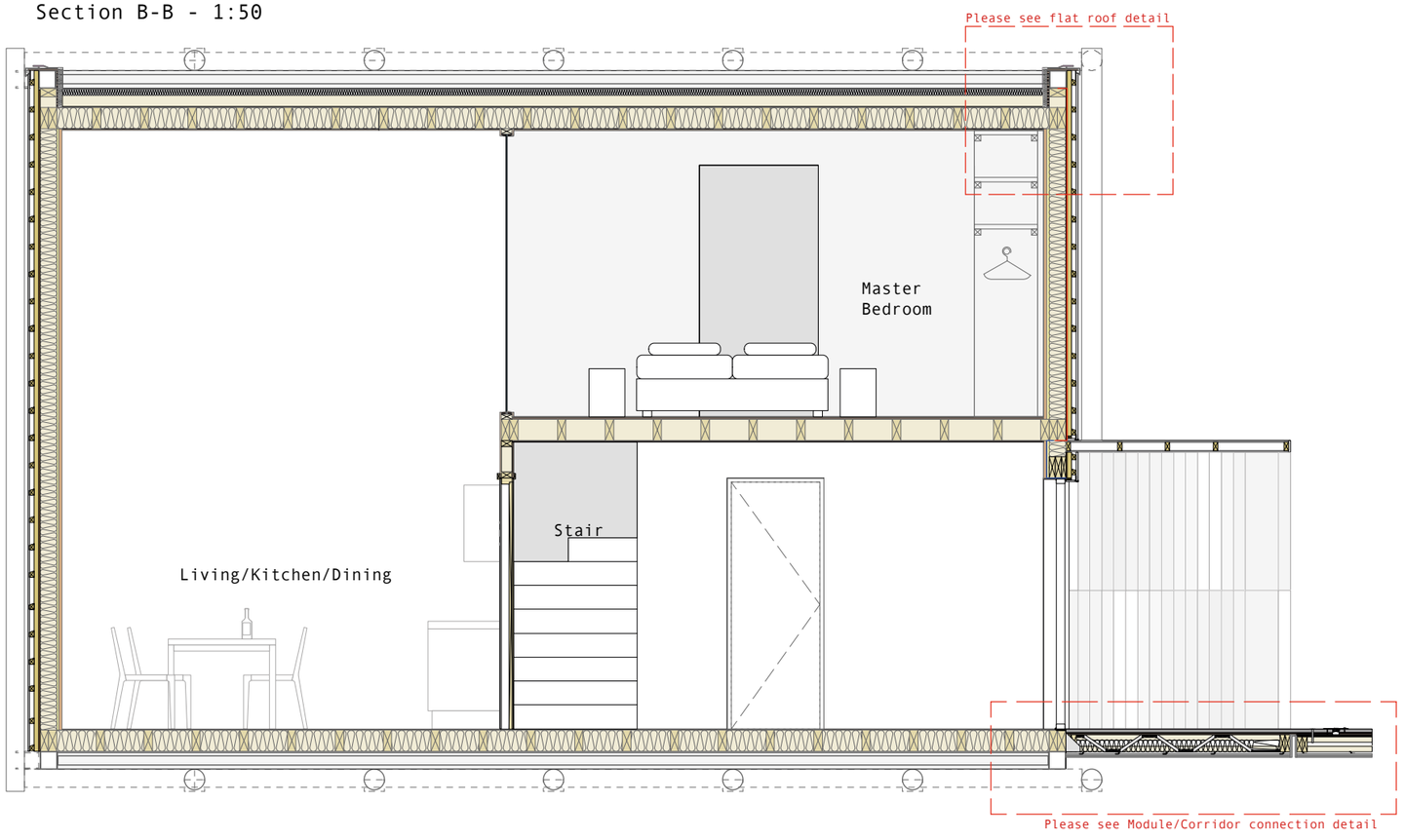


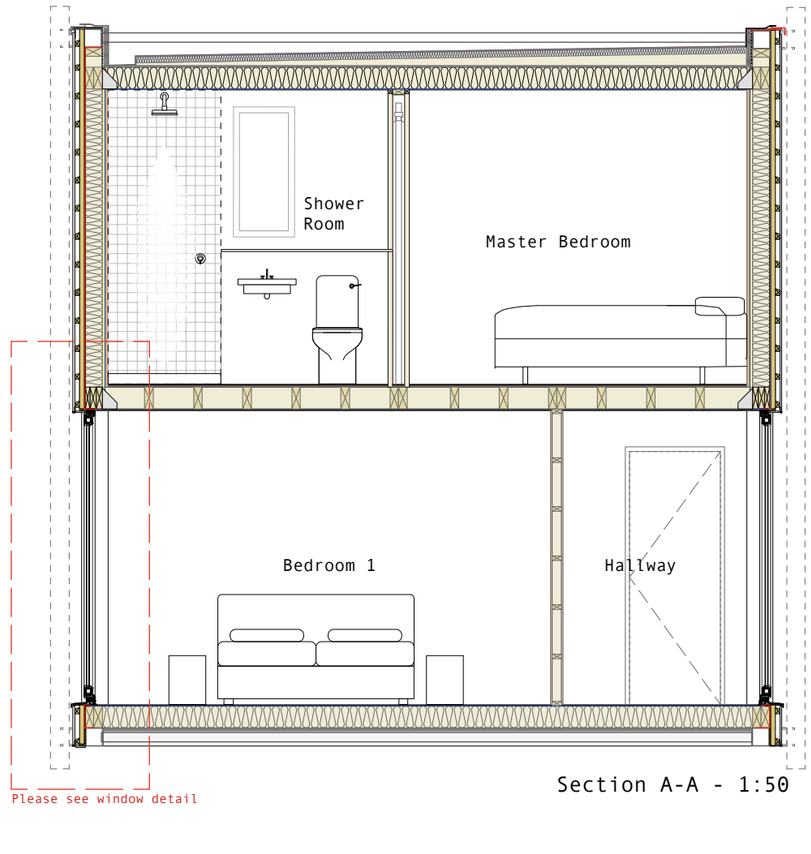
Flat Roof Construction:
Single ply membrane bonded to 50mm insulation on minimum 18mm marine ply deck, fixed into timber firrings to achive 1:80 fall on treated SW joists.
This will provide a U-Value of 0.18 W/M2K

1:20 Flexible Juction -
Module/Corridor Connection



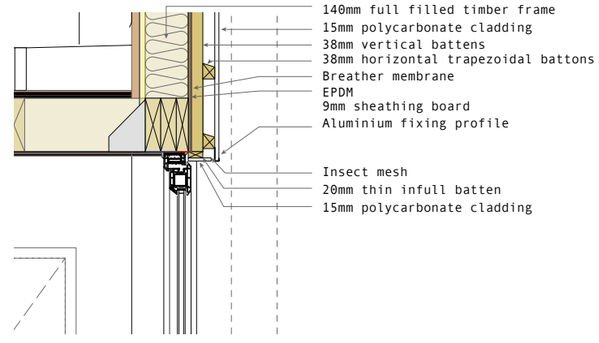
Section B-B - 1:50

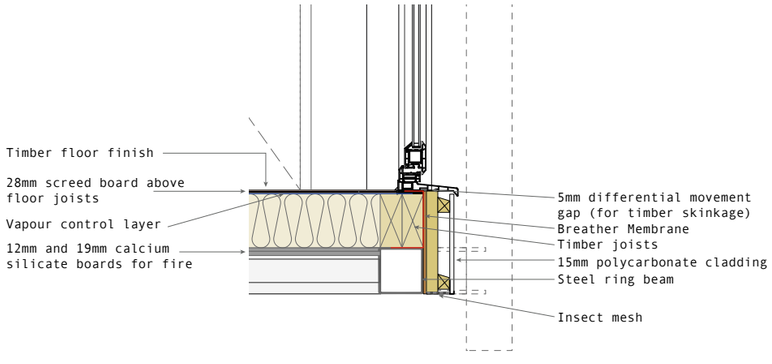




Section A-A - 1:50

1:20 Window Detail





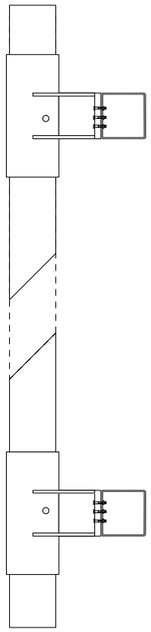
Module 2.0 Construction
Exploded Module Build up

1. 15mm Polycarbonate cladding
2. 38mm horizontal battens
3. 38mm vertical battens
4. breather membrane
5. sheathing board
6. 140mm insulated timber frame
7. 20mm insulation
8. Vapour Control layer
9. 25mm timber finish

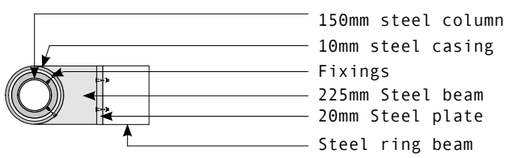
10. Timber floor finish and 28mm screed board
11. Full fill timber joists
12. 12mm and 19mm calcium silicate boards
13. Steel ring beam
14. Module steel fixing frame
15. Module steel columns

Module Exo-Skeleton Connection Detail
1:20 @ A3

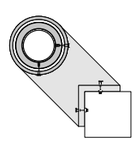
Elevation



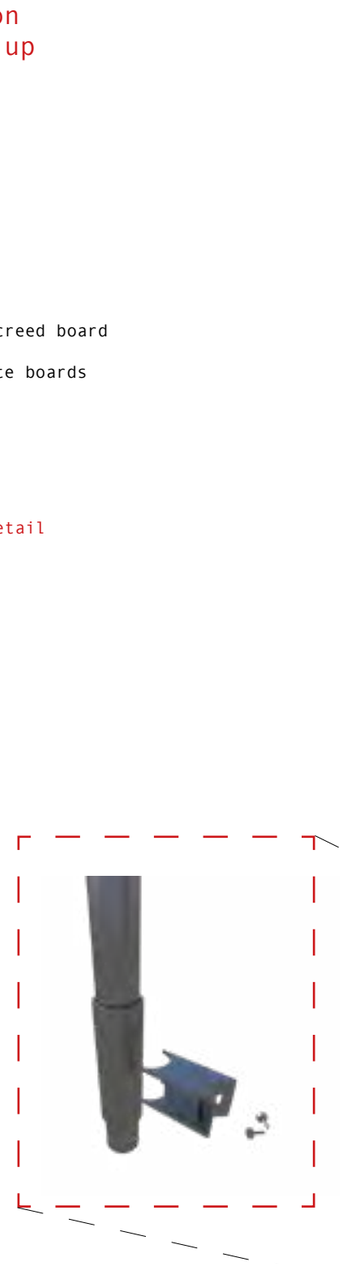
Plan

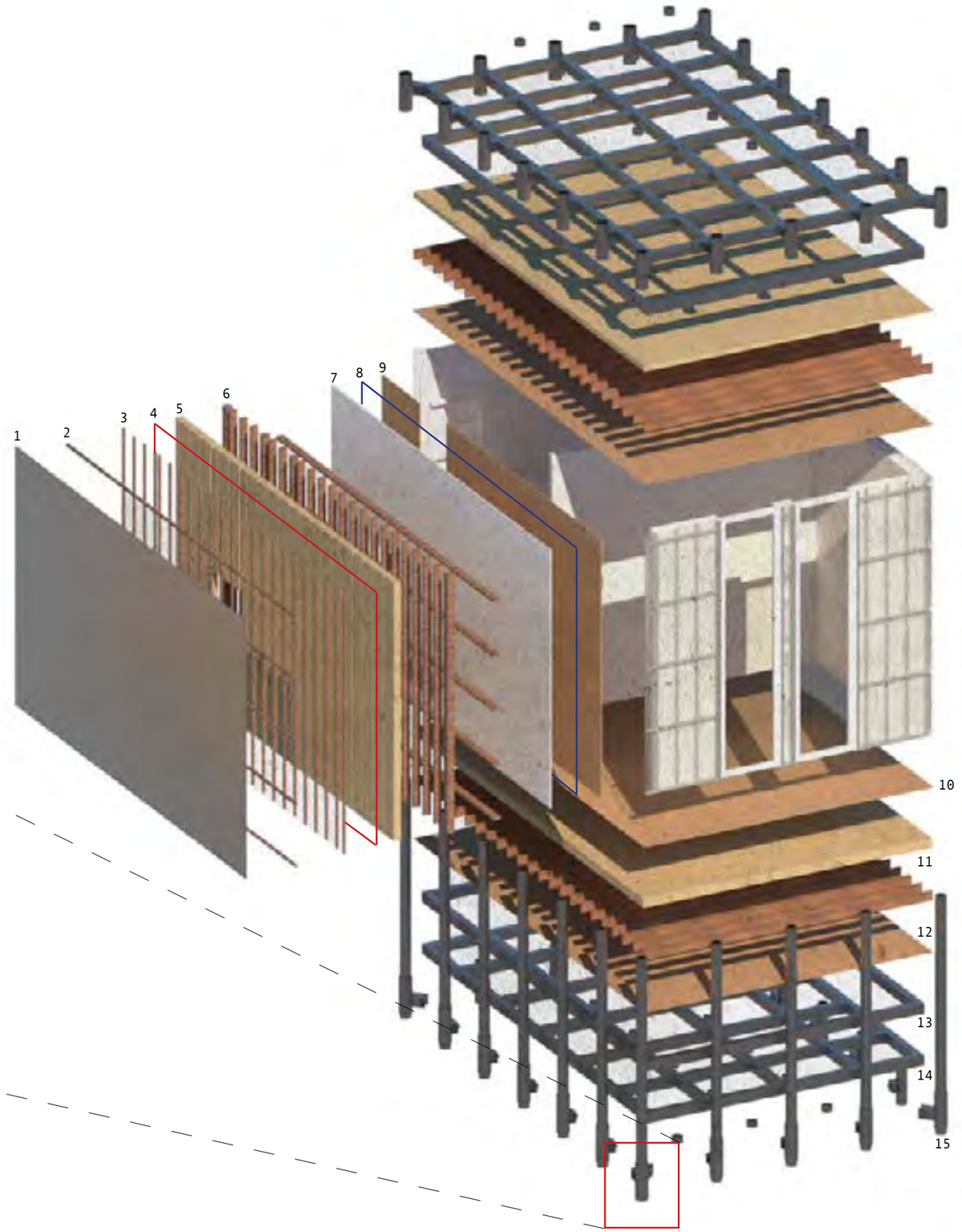


Straight part

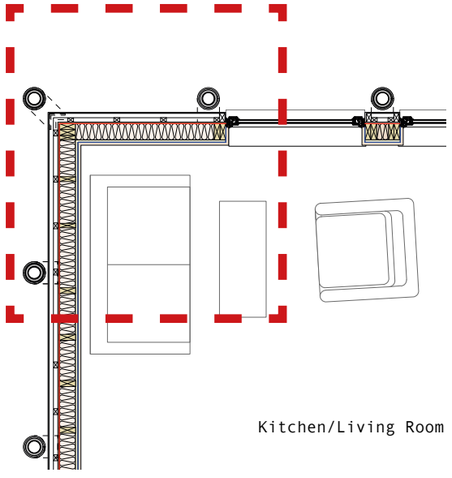


Corner Part

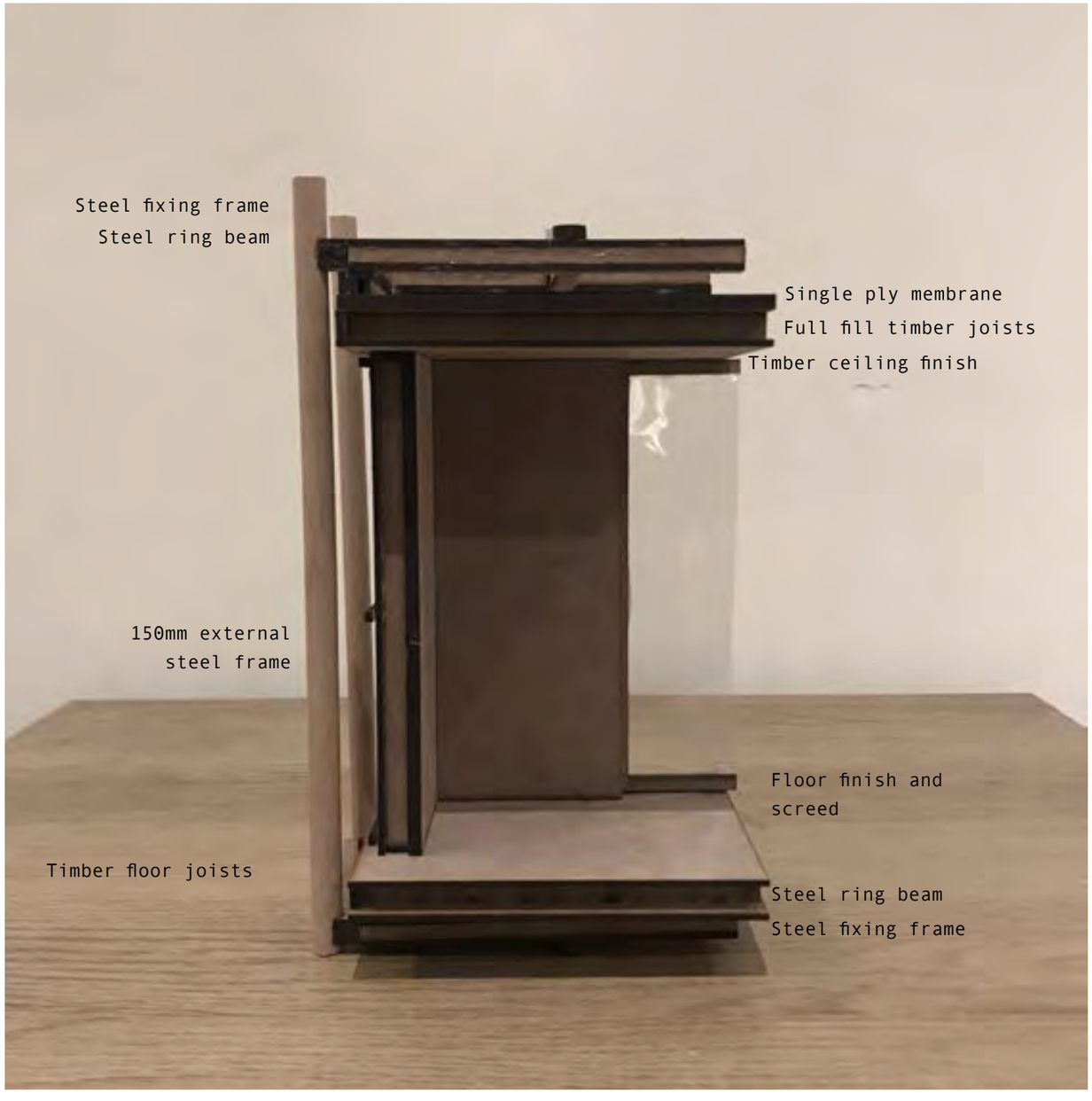




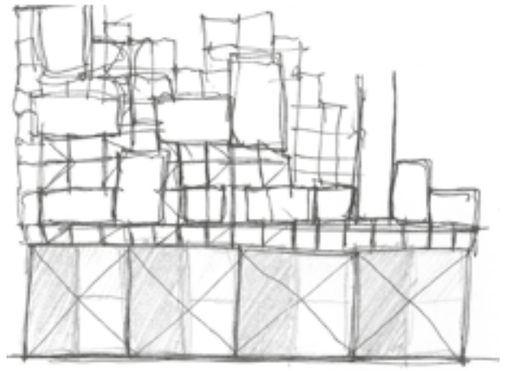
1:20 Detail ModeL



Kitchen/Living Room

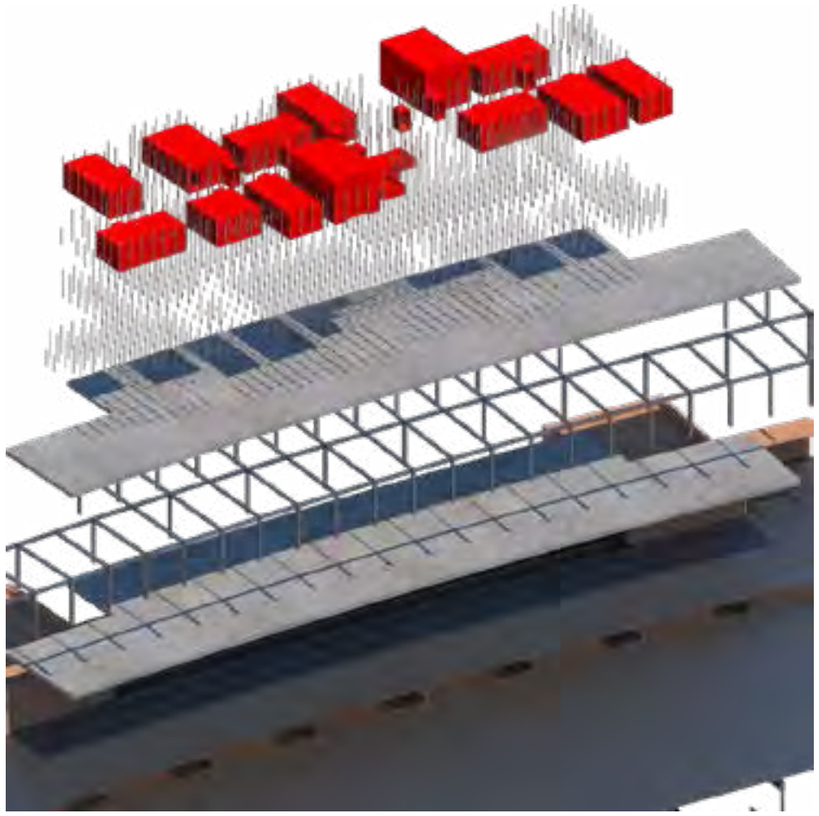


Construction Method



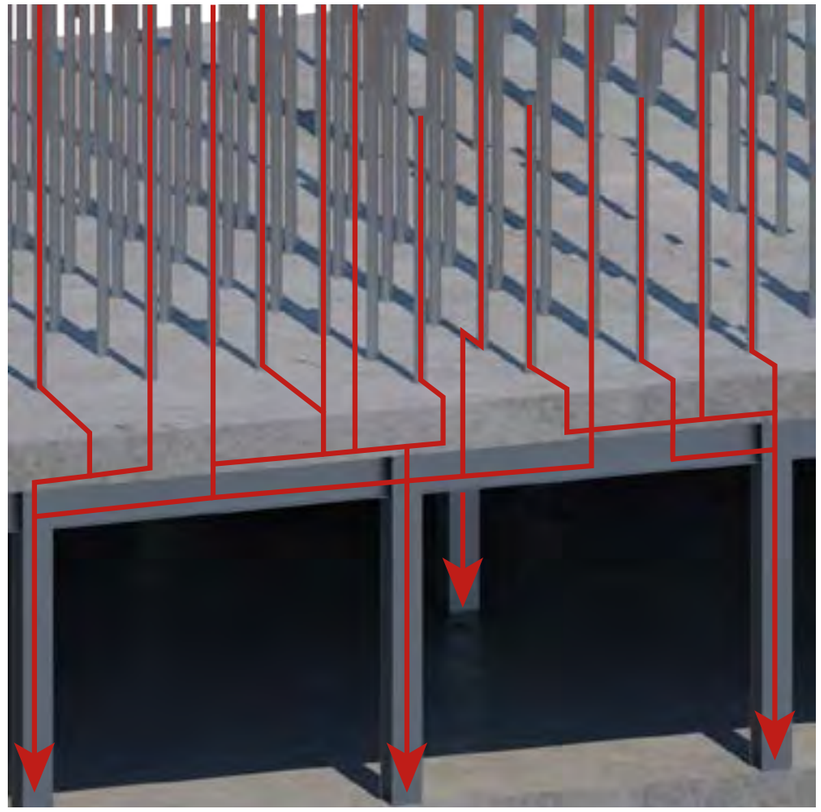
Initial structure concept sketch

The residential floors of the building are built up of a dense grid of 150mm diameter steel columns, each connected horizontally by 100mm diameter beams and cross braced throughout the core of the framework surround the walkways. Modules inherit their own columns which are then placed within the grid and the columns are fixed to the existing.



Exploded Structural Diagram

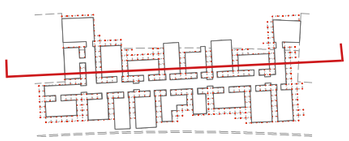
To allow for the dense steel frame whilst also showcasing large open spaces for the ground floor, we have decided to implement a steel podium structure. The podium is erected by 400x400mm steel columns fixed to 530x210mm steel beams spanning up to 9500mm with a 500mm thick prestressed hollow-core concrete slab fitted.
As shown in the diagram, this method of construction allows the load from the modules to be carried down the steel grid and then transferred across the concrete floor to the podium columns and into the existing structure.



Transfer of load

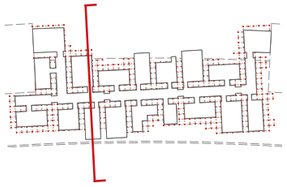
Proposed Site Section

1:200 @ A3

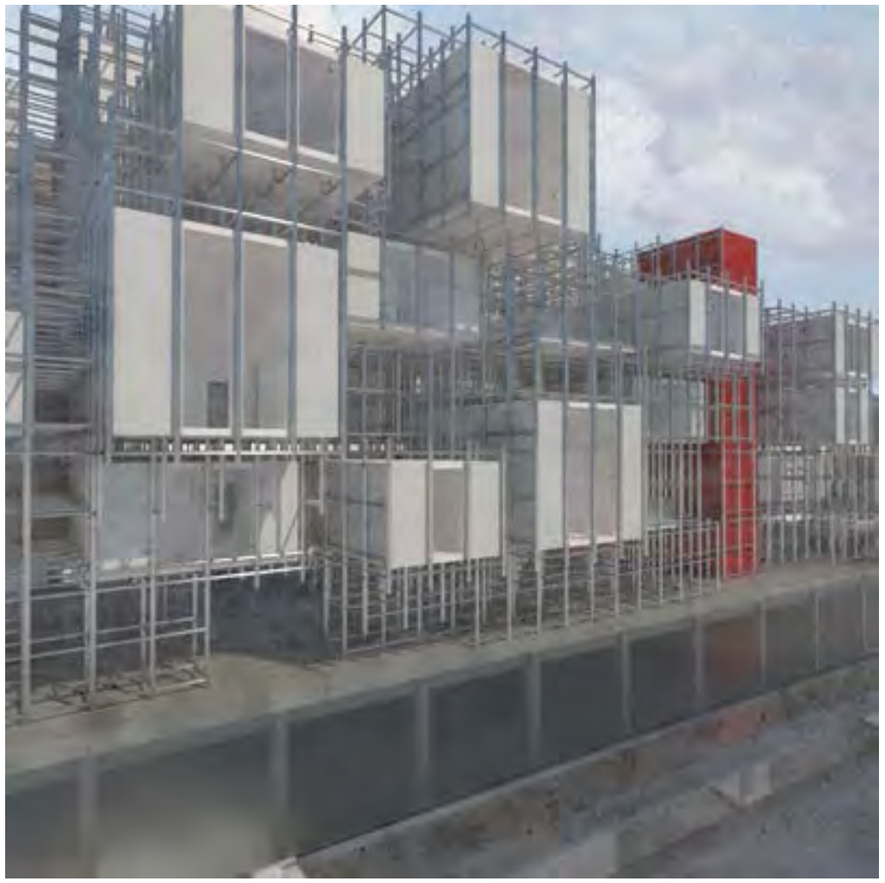


Proposed Cross Section

1:200 @ A3



Exterior Visuals



Modules

Entrance

Exterior Visual

Evening overlooking Tempelhof Park

Interior Visuals

Steel Garden Space

Gallery Space

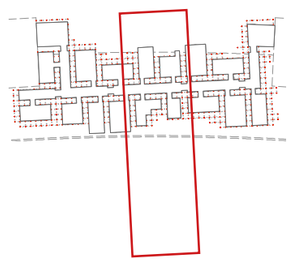
Taking over the Tempelhof Roof

1:100 Section Model

Rear View

Front View

Side View



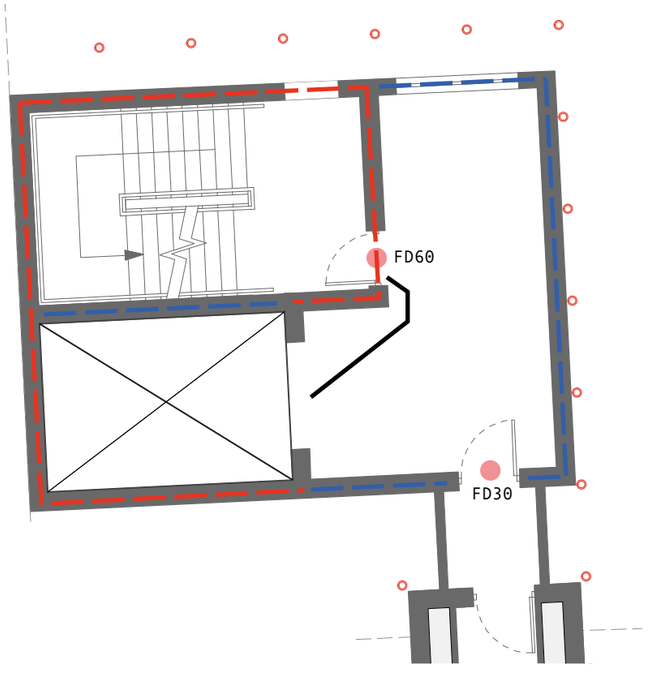
Building Regulations

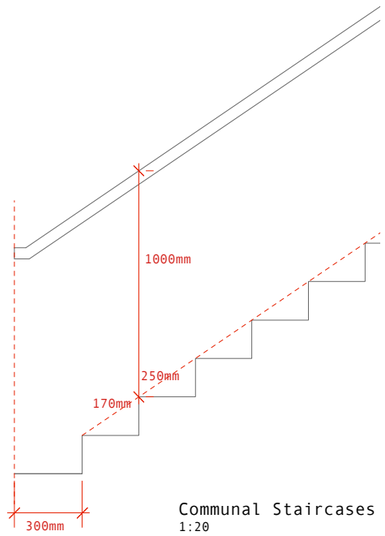
Due to the buildings height, the internal staircase is required to be within a fire-fighting shaft (Part B - p114, diagram 52, b. shaft serving flats)

Staircase to be vented naturally.

Distance from lift shaft to staircase is under 7.5m

Main Circulation
1:100





Communal Staircases
1:20

Building Regs - Part K:

Handrail 1000mm above stair pitch

Distance from wall - 50mm

All handrails feature a 300mm extension at the top and bottom of the stair.

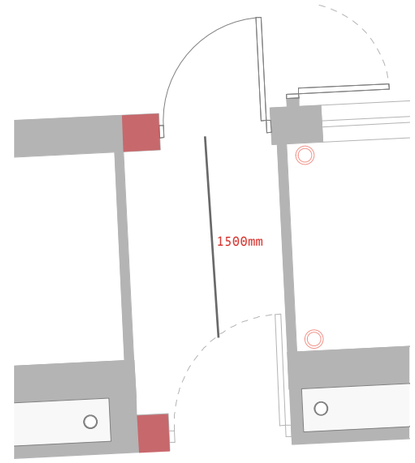
All stairs wider than 1000mm feature a handrail on both sides.

Module Entrance Corridor
1:20

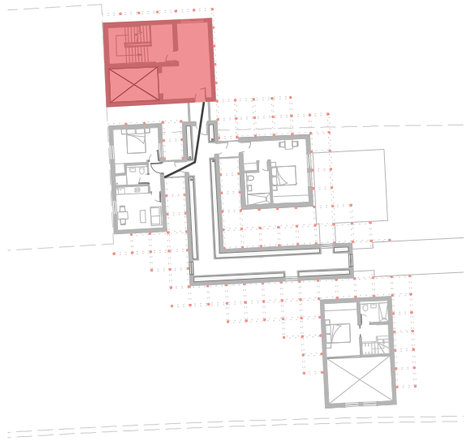
All doors in communal spaces and apartment entrances has a 300mm nib (clear of any obstructions) on the leading edge of the door.

2.20
I) Where there is a lobby or porch, the doors are a mini mum of 1500mm apart and there is at
least 1500mm between door swings.
- 1500mm between door swings

All doors and windows are designed to meet the security requirements of PAS 24:2012 (Part Q - 1.2) with frames mechanically fixed to the structure at module entrance (Part Q - 1.5)



Fifth Floor GA Plan
1:500



First Floor GA Plan
1:500

Part B: Fire Safety (Volume 2 - Buildings other than dwellinghouses)

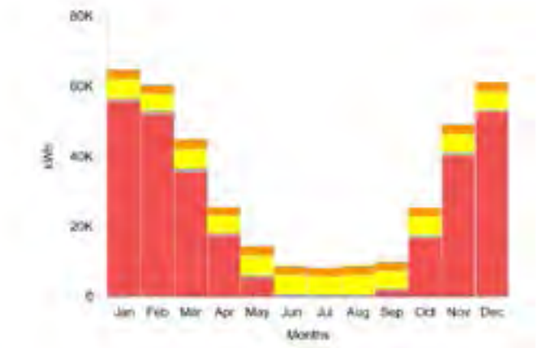
2.20(b) and 2.28
Due to every flat on first, second, third and fourth floor having 2 means of escape, a maximum distance from flat door to escape stair is 30m. Maximum proposed - 17m

On fifth floor, only one means of escape is present, therefore a max of 7.5m. Maximum proposed - 7.5m

B3 Section 8: Compartmentation
In order to satisfy the appropriate means of escape, ALL protected cores are to be 60 minute fire rated compartments.

Environmental Study

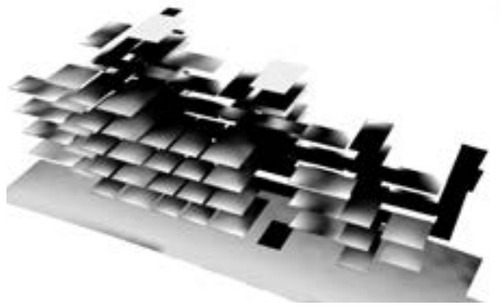
Sefaira



Energy Usage

As seen from the chart, our model had an annual energy usage of 350,230kWh. At the time of this study, the building was accommodating 80 people therefore producing an annual energy usage of 4,378 per person. This is greatly below the German average of 6,602kWh and the UK of 4,795kWh.
By looking at the charts, the majority of the energy usage is consumed by the heating of the building. As this analysis was created from a very simple model of the building, there are many factors which are not included.

Initial stacked layout



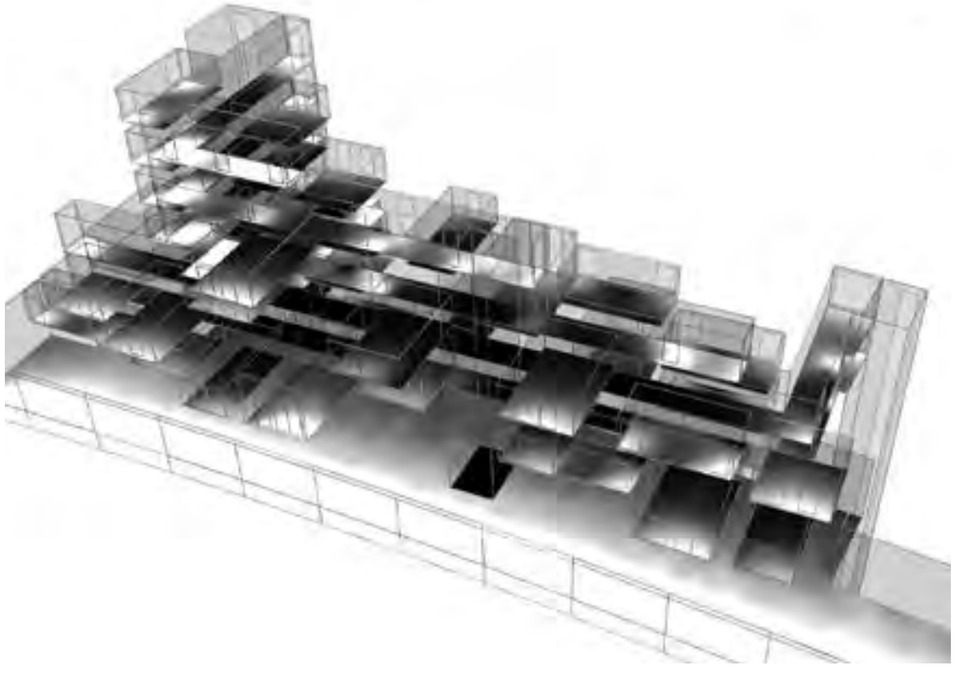
Light Study

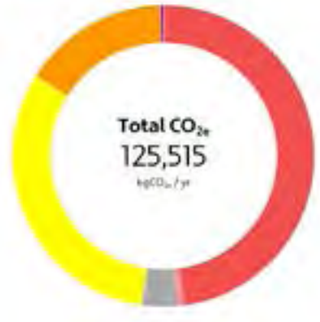
Given the large scale of the site, allowing natural light and direct sunlight into the building were great concerns during the planning of the layouts.
As you can see from our initial concept of the modules plugging into the walkway ordered and frequently, the walkways were deprived of any direct sunlight. From this study we implemented breaks in the elevation and windows on the walkways to brighten up the walkways.
After the analysing the daylight visualisation, we decided to introduce a staggered layout of the modules in elevation to not only take advantages of the horizontal breaks but also introducing vertical ones.

Increase in spaces between modules

Staggered

Final Layout

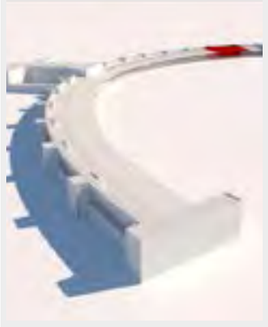
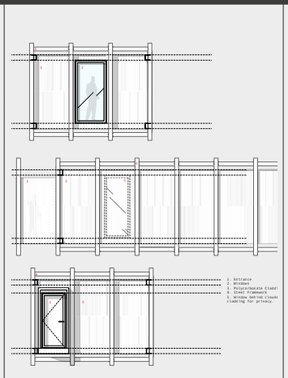
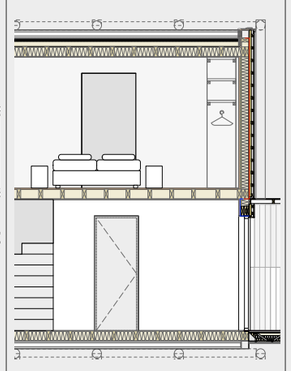
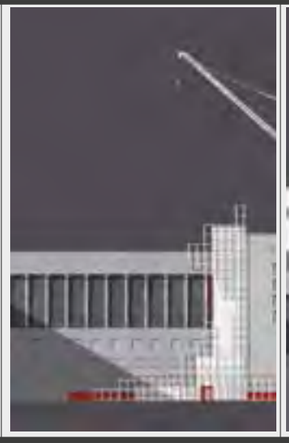




RIBA Plan of Work 2013

The RIBA Plan of Work 2013 organises the process of briefing, designing, constructing, maintaining, operating and using building projects into a number of key stages. The content of stages may vary or overlap to suit specific project requirements. The RIBA Plan of Work 2013 should be used solely as guidance for the preparation of detailed professional services contracts and building contracts.

www.ribaplanofwork.com

Stages	0 Strategic Definition	1 Preparation and Brief	2 Concept Design	3 Developed Design	4 Technical Design	5 Construction	6 Handover and Close Out	7 In Use
Tasks								
Core Objectives	Identify client's **Business Case** and **Strategic Brief** and other core project requirements.	Develop **Project Objectives**, including **Quality Objectives** and **Project Outcomes**, **Sustainability Aspirations**, **Project Budget**, other parameters or constraints and develop **Initial Project Brief**. Undertake **Feasibility Studies** and review of **Site Information**.	Prepare **Concept Design**, including outline proposals for structural design, building services systems, outline specifications and preliminary **Cost Information** along with relevant **Project Strategies** in accordance with **Design Programme**. Agree alterations to brief and issue **Final Project Brief**.	Prepare **Developed Design**, including coordinated and updated proposals for structural design, building services systems, outline specifications, **Cost Information** and **Project Strategies** in accordance with **Design Programme**.	Prepare **Technical Design** in accordance with **Design Responsibility Matrix** and **Project Strategies** to include all architectural, structural and building services information, specialist subcontractor design and specifications, in accordance with **Design Programme**.	Offsite manufacturing and onsite **Construction** in accordance with **Construction Programme** and resolution of **Design Queries** from site as they arise.	Handover of building and conclusion of **Building Contract**.	Undertake **In Use** services in accordance with **Schedule of Services**.
Procurement *Variable task bar	Initial considerations for assembling the project team.	Prepare **Project Roles Table** and **Contractual Tree** and continue assembling the project team.	The procurement strategy does not fundamentally alter the progression of the design or the level of detail prepared at a given stage. However, **Information Exchanges** will vary depending on the selected procurement route and **Building Contract**. A bespoke **RIBA Plan of Work 2013** will set out the specific tendering and procurement activities that will occur at each stage in relation to the chosen procurement route.			Administration of **Building Contract**, including regular site inspections and review of progress.	Conclude administration of **Building Contract**.	
Programme *Variable task bar	Establish **Project Programme**.	Review **Project Programme**.	Review **Project Programme**.	The procurement route may dictate the **Project Programme** and may result in certain stages overlapping or being undertaken concurrently. A bespoke **RIBA Plan of Work 2013** will clarify the stage overlaps. The **Project Programme** will set out the specific stage dates and detailed programme durations.				
(Town) Planning *Variable task bar	Pre-application discussions.	Pre-application discussions.	Planning applications are typically made using the Stage 3 output. A bespoke **RIBA Plan of Work 2013** will identify when the planning application is to be made.					
Key	Preapplication discussions with the clients and investors regarding their required modules. Formulate a programme of works and assign team.	Analyse the site to determine constraints of the location and undertake feasibility studies to incorporate with project brief to later influence the design concept.	Finalise and agree the project brief, propose structural methods and design to be used and produce initial cost estimations.	Present and agree fully developed design package including drawings, refined costing and a in -depth schedule of works.	Collate completed package of technical design drawings including those of the architect, structural engineer, contractor and all sub-contractors to a degree of detail to initiate works.	Structural works to commence on site in accordance to construction details provided alongside prefabricated modules to begin construction off-site in provided warehouse.	Completion of initial project construction, handover to client, documentation and inspections carried out.	Continuation of module implementation in response to increase of clients. Updating as constructed information due to client feedback .
								
UK Government Information Exchanges	Not required.	Required.	Required.	Required.	Not required.	Not required.	Required.	As required.

***Variable task bar** – in creating a bespoke project or practice specific RIBA Plan of Work 2013 via www.ribaplanofwork.com a specific bar is selected from a number of options.

Bibliogrpahy

Copley, C. (2017) ‘Curating Tempelhof: negotiating the multiple histories of Berlin’s “symbol of freedom.”’ Urban History, 44(04) pp. 698–717.

DDC20, Plank, R., Blanc, A. and McEvoy, M. (1993) Architecture and construction in steel. London: Spon.

Levy, J. and Stott, G. (2015) ‘Modular Housing.’

Minguet, J. M. (2015) Container & prefab houses. Barcelona, Spain: Monsa.

Nasereddin, M., Mullens, M. A. and Cope, D. (2007) ‘Automated simulator development: A strategy for modeling modular housing production.’ Automation in Construction, 16(2) pp. 212–223.

‘Revolution pavilions’ (2017) l’Arca International, (134) January, pp. 94–99.

Robb, I. (1972) Steel frame design examples. 3rd ed. (SI)., Basingstoke: Macmillan.

Stakeholder Representations of Gentrification in Amsterdam and Berlin: A Marginal Process?: Housing Studies: Vol 30, No 6 (n.d.). [Online] [Accessed on 15th October 2018] https://www-tandfonline-com.ezproxy.mmu.ac.uk/doi/abs/10.1080/02673037.2014.979770.

Stors, N. and Baltes, S. (2018) ‘Constructing Urban Tourism Space Digitally: A Study of Airbnb Listings in Two Berlin Neighborhoods.’ Proceedings of the ACM on Human-Computer Interaction, 2(CSCW) pp. 1–29.

Wachsmuth, D. and Weisler, A. (2018) ‘Airbnb and the rent gap: Gentrification through the sharing economy.’ Environment and Planning A: Economy and Space, 50(6) pp. 1147–1170.

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