KAN-CHANE
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GARDEN INN IN THE SKY

AR40107 Design Studio
DS 6.1 Interim Report

Preface

The prologue to this design thesis is a dissertation submitted at the conclusion of the Michaelmas Term, entitled as *The Instance of a Dwelling* (Gunawardena, 2009). This dissertation explored the concept of 'dwelling' as a fundamental endeavour integral to our comprehension of being-in-the-world. It delved into the intrinsic human aspiration for a 'rooted dwelling', representing a universal essence of habitation sought by all beings since the awareness of their existence.

The last century has witnessed profound advancements and shifting paradigms in modes of habitation. Consequently, our understanding of the world and attitudes towards dwelling have undergone substantial transformation and redefinition. For the contemporary dweller, the world has become far more accessible, with cities replacing traditional notions of locality and rootedness, which have become transient experiences. A lifelong rooted dwelling is increasingly perceived as superfluous, with permanence in habitation regarded as an unnecessary luxury. Modern dwellers now find themselves navigating a reality where significant periods of their lives are spent detached from such rootedness.

This design thesis aims to examine this emerging paradigm of habitation; one characterised by the transient nature of dwelling that predominates among urbanites. It serves as a continuation and progressive development of the dissertation, seeking to address the modern challenges of dwelling and their implications for contemporary urban residents.

DS 6.1 is an interim design thesis report submitted by Kan-chane Gunawardena towards the degree of M.Arch, Master of Architecture at the University of Bath, Department of Architecture and Civil Engineering. Lent term, February 2009.

Contents

[01]

[1.0] DESIGN HYPOTHESIS

COULD THE DESIRE FOR A SUSTAINABLE LIFE BE SATISFIED IN A DENSE URBAN SETTING?

[1.1] W. W. W. W.

A project begins with the principal four 'W's of What, Who, Why, and Where…

What is it?

An inn for gardening and cultivation

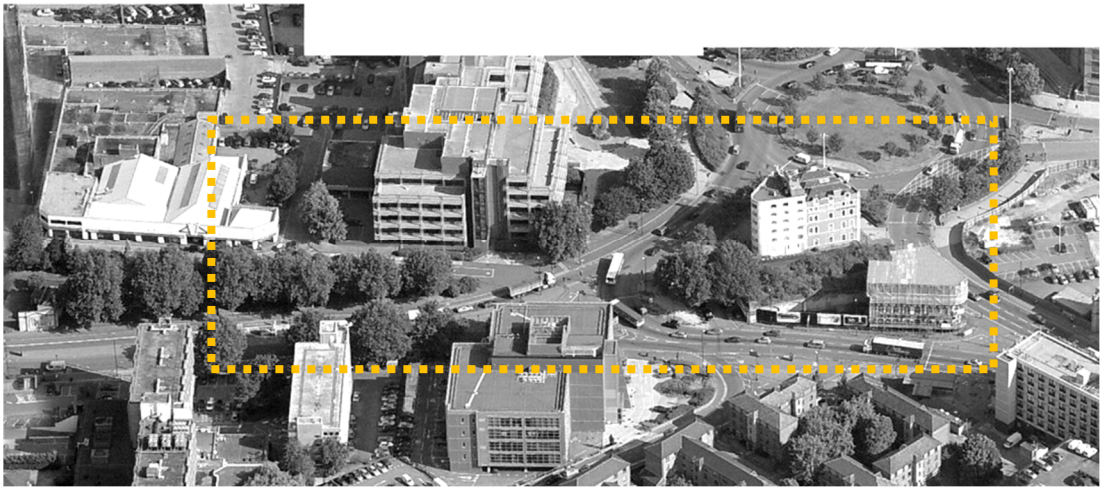
Who is it for?

For the transient urban dweller who aspires to gain locally sourced nutrition

Why?

At present, this growing demand is not met by any market interest

Where?

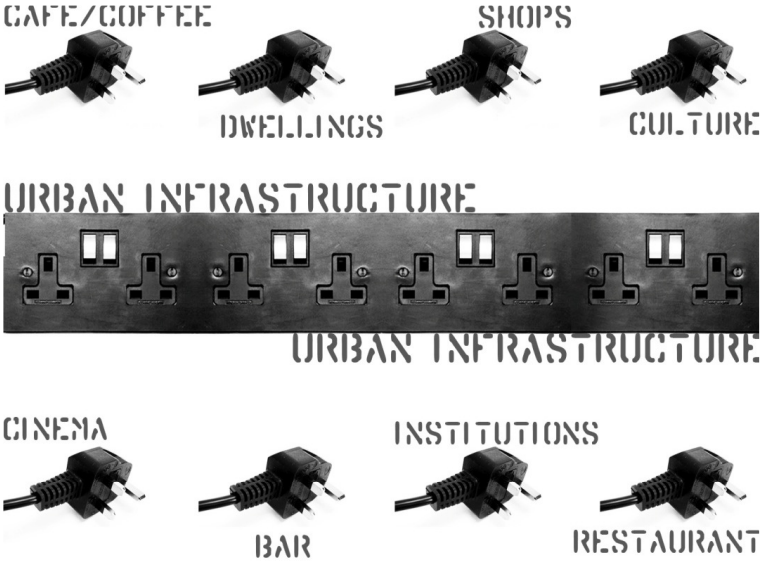


As a gateway trigger project to a regenerated Redcliffe, in Bristol

programmatic metaphor

‘sockets’ and diverse ‘plugs’

The programmatic application of this metaphor is demonstrative of adaptability and scalability in architecture. Much like physical sockets and plugs ensure seamless electrical or mechanical connectivity, built environment counterparts address interoperability challenges by adhering to defined standards and protocols. They serve as conduits for resource exchange and operational synchronisation, underscoring the importance of modularity in advancing technological innovation and maintaining system coherence.



Focal ‘plug’: the Garden Inn
a colony for the transient gardener and farmer

The 'thread' that unites this project pertains to the dynamic interplay between:

universal ⇌ ***specific***

Within this structural context, certain subsets (binary oppositions) are in operation. Examples:

urban (macro) ⇌ ***detail (micro)***

collective ⇌ ***individual***

permanent ⇌ ***transient***

As the project advances, this list of subsets will expand. However, each subset will remain relatable to the structural dynamic interplay between:

universal ⇌ ***specific***

THIS PROJECT IS INTENDED AS A MANIFESTATION OF SUCH ARCHETYPAL DYNAMICS...

[1.2] Q&A, a thought process

This Q&A explores the thought process behind defining the intentions and objectives for the urban project. It highlights key considerations, guiding principles, and strategic goals that shape the project's direction, aiming to ensure its success in addressing urban needs while aligning with broader social, environmental, and economic aspirations.

Who is a transient dweller?

A transient occupant refers to an individual who resides within a specific spatial condition for a finite duration of lived time. The concept or intention of a permanent dwelling is therefore, absent.

Who belongs to such a group of dwellers?

Age, gender, race, religion, occupation, and other such characteristics hold no relevance; rather, it is solely the state of transiency that is of importance. Accordingly, transient dwellers may encompass individuals such as:

- Students visiting a city for a short course;
- Tourists visiting a city for a short holiday:
- A businessman visiting a city for a few meetings;
- An employee who has a regular arrangement to work in a city for 2 to 3 days a week (or secondment);
- Someone visiting the city for an appointment ...etc.

The user-group is thus very diverse.

What activities do individuals engage in

during their transient occupations?

- listen to music;
- read something;
- watch a movie;
- eat, and/or drink;
- window shop, shop;
- gaze at, people and/or things;
- walk, or pace...

The range of activities under consideration are thus notably diverse.

Is it possible for a single architectural intervention to accommodate a transient dwelling?

Given the diversity of user groups and activities, a single intervention poses implementation challenges. A modular or adaptable system may better address various needs, offering flexibility to accommodate diverse requirements without the constraints of a singular solution.

What kind of intervention would address all their diverse needs?

An intervention designed to 'facilitate' a multitude of other interventions would serve as the foundational infrastructure, enabling adaptability to address the diverse and evolving needs of transient dwellers. By providing this core framework, such an intervention ensures the flexibility required to accommodate a wide range of functionalities, programmes, and habitation necessities.

What form might this infrastructure take, and are there any historical precedents?

An infrastructure facilitates and acts as a catalyst for various events and experiments, setting the stage for numerous everyday struggles. Examples include:

- **Bridges (e.g., *Ponte Vecchio* in Florence, Italy, or Poultney Bridge in Bath, England);**
- **Railway lines and stations (e.g., King's Cross St. Pancras in London, England, or Euralille in Lille, France, the latter considered later in this report);**
- **Airport hubs (e.g., Schiphol in Amsterdam, O'Hare in Chicago, CDG in Paris, Singapore, etc.);**
- **Redundant structures (e.g., Slab City, discussed later).**

Does Redcliffe need infrastructural investment?

At present, there is no such infrastructure in Redcliffe. Transient occupants perceive it as a 'no-man's land', traversed enroute from Temple Meads Station to the centre of Bristol. The 'island of Redcliffe,' as its residents refer to it, remains an isolated enclave, suffering neglect and having no significant relevance to the rest of the city.

Within such a context, a solitary architectural intervention would be inadequate to instigate a shift towards urban integration and prosperity. A more substantial initiative is therefore necessary; one that would foster the generation of numerous enterprises and extensions.

Inserting a solitary 'polished' object into a deprived environment will merely result in a self-sustaining existence at best, contributing minimally to Redcliffe and its wider standing. Therefore, an infrastructural intervention seems essential to redefine Redcliffe's relevance to the wider city.

What infrastructural intervention would be relevant for Redcliffe?

The recent proposal to implement a light rail transit (LRT) system along the route known as the 'Brunel Mile', which connects Temple Meads Station to central Bristol, offers the opportunity to introduce a significant infrastructural asset.

The necessity for an infrastructural intervention in Redcliffe has already been acknowledged by the relevant authorities. The primary objective now must be to maximise its contribution.

Would such an intervention alone be adequate for an urban project?

Unlikely… Infrastructure itself is neutral. Redcliffe requires a clear direction, a standpoint, and a compelling reason for transient occupants and the broader city to engage. Accordingly, the project must aim to deliver an agenda through an additional parasitic program (i.e., a 'plug-in'), that can integrate with this infrastructure (i.e., receiving 'sockets').

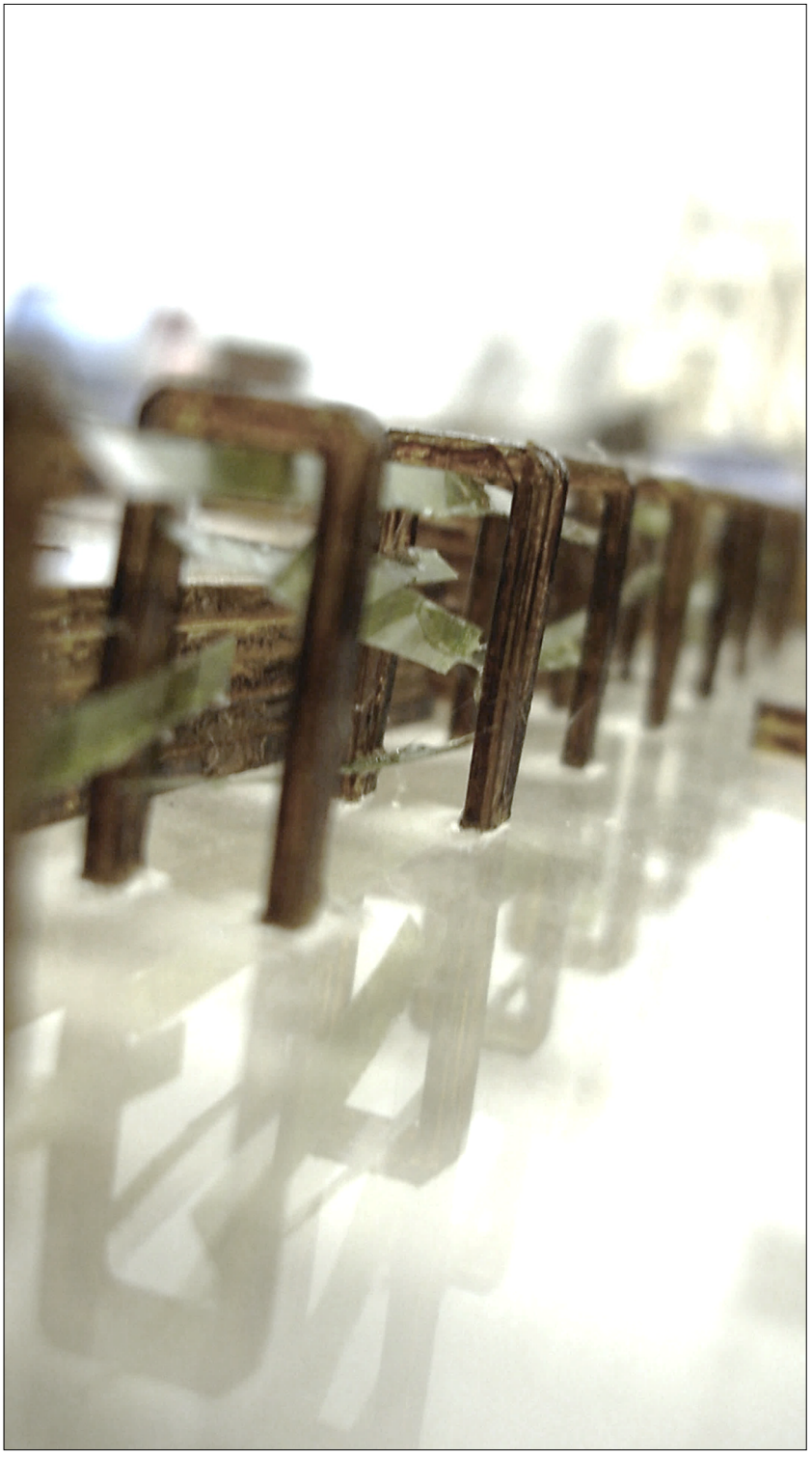


Plate 1. Proposing a strategic purpose for Redcliffe.

What agenda could such a program present?

The recent past has seen an increasing awareness and active advancement of what has been collectively described as a 'greener way of living'. We are encouraged by the wider collective to pursue a low impact existence by reducing resource consumption. As part of this lifestyle shift, consuming organic produce that has had little impact on the environment in its making, is supported. In such light, growing one's own food has become a significant interest to the British public, and is reinforced by a longstanding passion for gardening and cultivation. Self-sufficiency is now celebrated and is emerging as a significant shift in modern attitudes to living.

This desire for a self-sufficient lifestyle is however constrained by the urban setting. Land is either scarce or contaminated by decades of industrial activity, rendering cultivation an arduous task. Besides this, cities are also gripped by another global trend towards transient occupancy (addressed in the short essay titled 'transient occupancy'). The 'greener way of living' thus has a contradictory relationship with the transient engagements of the modern urbanite.

This design thesis project attempts to present an agenda, a program that aims to reconcile these conflicting attitudes, and define a sustainable approach to living that also appeals to the transient and itinerate life of the modern urban dweller.

This project therefore seeks to answer the following central research question:

Is it feasible to integrate a commitment to sustainable living within the context of an ever-evolving dense urban environment?

[02]

[2.0] CITY-SCALE

[2.1] Transport infrastructure

[2.1.1] Findings from an urban charrette

The implemented urban charrette sought to identify broad strategic infrastructural decisions that would influence future development within Redcliffe. Particular attention was given to decisions and strategic initiatives concerning transport infrastructure in the region. The investigation revealed that both the Regional Spatial Strategy (RSS) and the Local Development Framework (LDF) had established policies advocating for the introduction of light rapid transit (LRT) systems in Bristol within a 25-year timeframe. Over the past 15 years, Bristol City Council has therefore examined the feasibility of reintroducing a tram network, informed by an analysis of several northern metropolitan case studies, such as Nottingham, where tram systems have proven to be highly successful.

[2.1.2] History of tramways in Redcliffe

Plate 2. Redcliffe Street; during the golden age of Bristol trams, 1940.

Photographic records:

Taken around 1872, a view from the top of the tower (or spire) of St. Mary Redcliffe extended above Pipe Lane (now Redcliffe Way) towards Temple Meads. In the bottom left corner, an unfamiliar chapel, and hovels, marked for demolition to accommodate future railway sidings (redundant by 1964), were visible, alongside the railway viaduct, which was removed in 1965. The more distant pottery cones were dismantled in the 1890s, while a nearer cone had developed a crack in the 1930s, leaving only its first storey intact. To the right, Somerset Street descended towards the New Cut, which by the 1960s was accompanied by tall flats. The railway line passed beneath Redcliffe Churchyard and Redcliffe Hill.

Taken around 1872, a view from the top of the tower (or spire) of St. Mary Redcliffe extended across Welsh Back and Redcliffe Street towards Bristol Bridge. St. Stephen's tower dominated the skyline above Cooper's Hall and Ponton & Gough's newly constructed granary. Historic landmarks such as St. Werburgh's Church and the Franklin Mansion had been removed, with the site cleared for the development of the first Robinson Building, located to the left of St. Thomas' Church. In the foreground, Redcliffe Street awaited road widening, as shown between 1874-1879. The Edward Ringer & Bigt tobacco factory was established in the bottom-right area, in the following years.

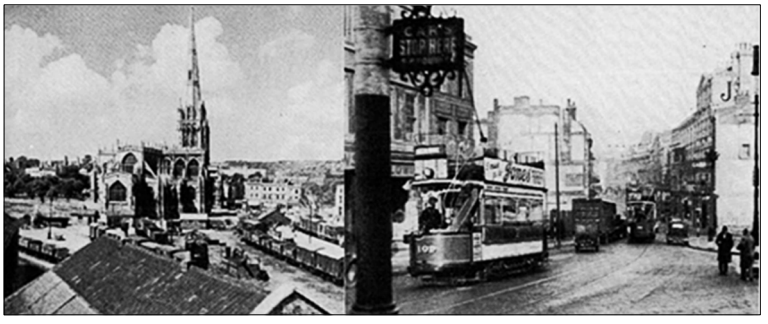
Taken in 1911, Redcliffe Hill, as viewed from Bedminster Bridge, showcased buildings on both sides that were earmarked for demolition to make way for the well-known faggot shop. At the time, this area thrived as a bustling shopping centre, and was conveniently served by the Ashton and Bedminster Down trams.

Taken on 6 April 1938, the Redcliffe Street terminus, extended towards the corner of Bristol Bridge and Bath Street, visible in the distance. The area, including properties numbered 104 in Ashton, and 111 in Bedminster Down, was later entirely blitzed or demolished. It is noted that no reversers were present for the overhead arms.

Taken between 1938 and 1939, the area of Redcliffe Street faced extensive destruction, with all buildings either blitzed or demolished in the following years.

Taken in 1973, the site of the former faggot shop had been transformed into a bus stop. The surrounding flats, constructed as part of post-war redevelopment, were considered among the more successful architectural additions to the area.

Taken on 28 October 1939, Redcliffe Way under construction. A gap had been created within the distant buildings to accommodate the new dual carriageway designed to cross the water. To the left, the railway sidings were positioned above a row of workshops, while one side of the newly constructed road had already been opened to traffic.



Taken on 9 June 1938, St. Mary Redcliffe Church was observed from a high window in Mardon's Building in Redcliff. To the left, the harbour railway line extended beneath Redcliffe Hill, while on the right, the sidings were situated above the workshops.

Taken on 24 November 1938, a view of Redcliffe Street from the North Porch of the Church, shows tram 100 awaiting clearance to proceed, with the signal provided by a points boy positioned at the corner of Portwall Lane. Meanwhile, tram 70, enroute to Bedminster Down, emerges from the single line section. Demolition works had commenced for the construction of the new inner circuit road, with the future Redcliffe Bridge located to the left and Redcliffe Way to the right. Prior to the closure of the tram system, Redcliffe Street was recognised as the most congested street in Bristol.

The three stages of track lifting on Redland Hill during 1982, as documented by S. Miles Davey.

Cartographic records:

Plate 3. 1820, prior to the introduction of the tram network.

1820: Victoria Street and Redcliffe Bridge had not yet been constructed. However, Redcliffe Street exhibited considerable development density, principally driven by trade-related activities.

Plate 4. 1880, Redcliffe Way.

1880: Redcliffe Way and Redcliffe Bridge were still non-existent, yet the high-density development along Redcliffe Street persisted, maintaining its strong association with trade.

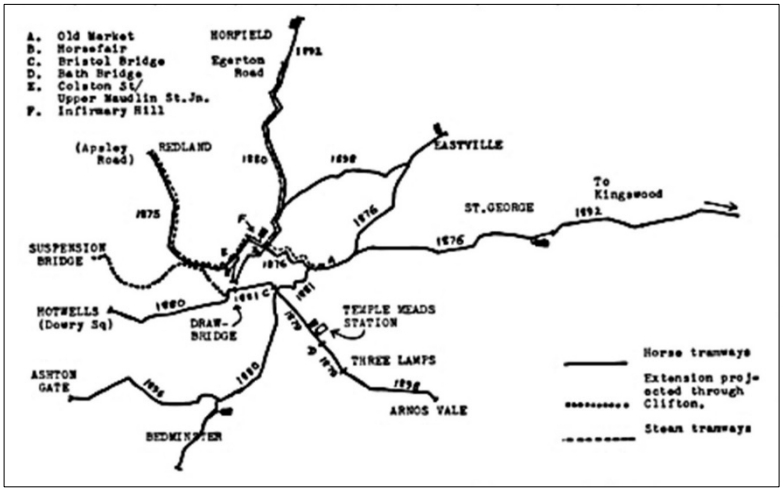


Plate 5. Early Tramways, horse and steam powered (1875-1900).

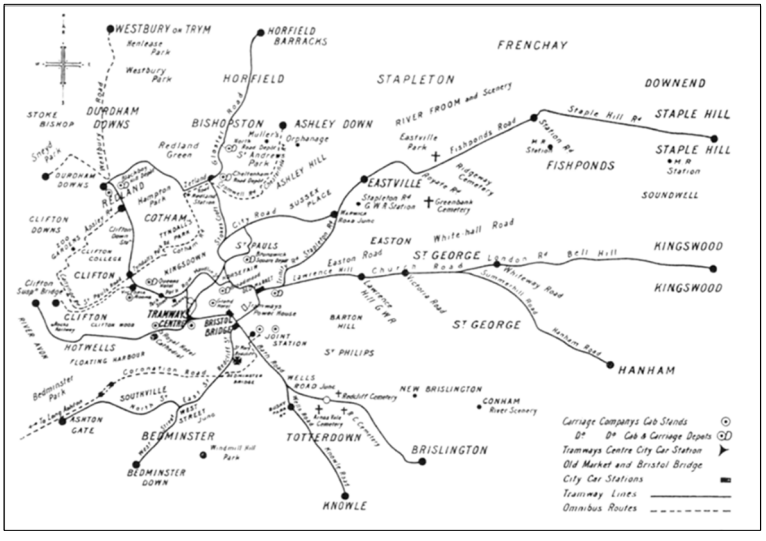


Plate 6. Electrified Tramway Network (1900-1941).

Memories of Redcliffe trams

The following is a personal account of life in Redcliff, detailing family roles, schooling, tram work, and notable events, including the 1942 bus strikes and historical landmarks:

> *"My grandparents lived in Jones Lane, two houses from the Friends' Burial Ground. My grandfather assisted in casting the largest bell in St. Mary Redcliff. My uncle, Arthur Smith, worked as a stoker on the steam barge JOHN, which knocked down Bath Bridge. My father drove Blue Taus from Blackboy Hill garage, earning 106d per week. Our entire family attended Redchiff Infant School on Ship Lane, after which my father and we boys moved on to Redcliffe Endowed Boys' School on Redcliff Parade. Dad worked under J. T. Francombe and later Mr. Clibbens (John Clibbens was the author's mother's cousin's brother-in-law). I myself was a conductor on the trams until the transition to buses. I had just passed through Broad Weir when three buses were struck in 1942."*
>
> A. A. E. Cook (Harrow)

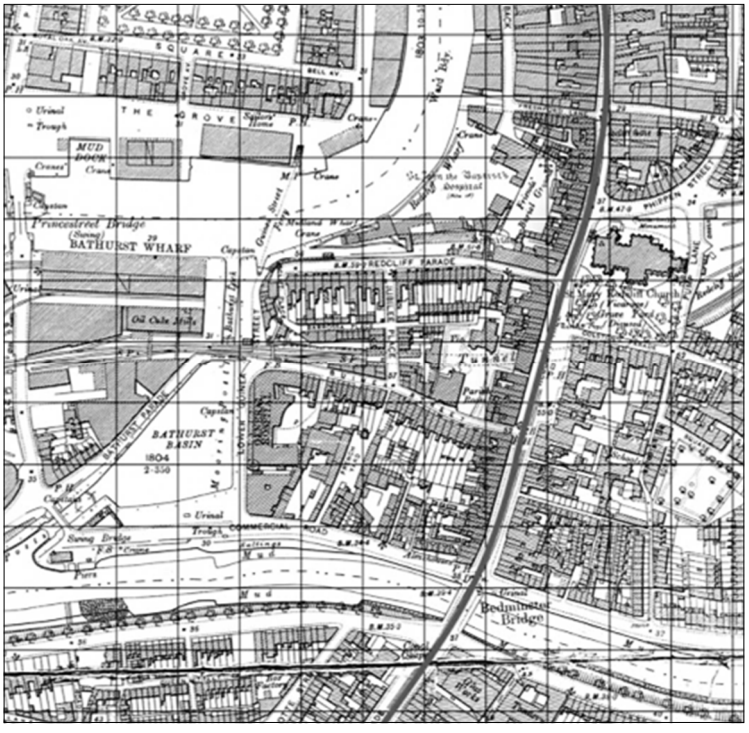


Plate 7. 1903, Electric Tram Network (at its peak).

1903: The urban landscape experienced minimal transformation and retained much of its character as it had existed in 1890.

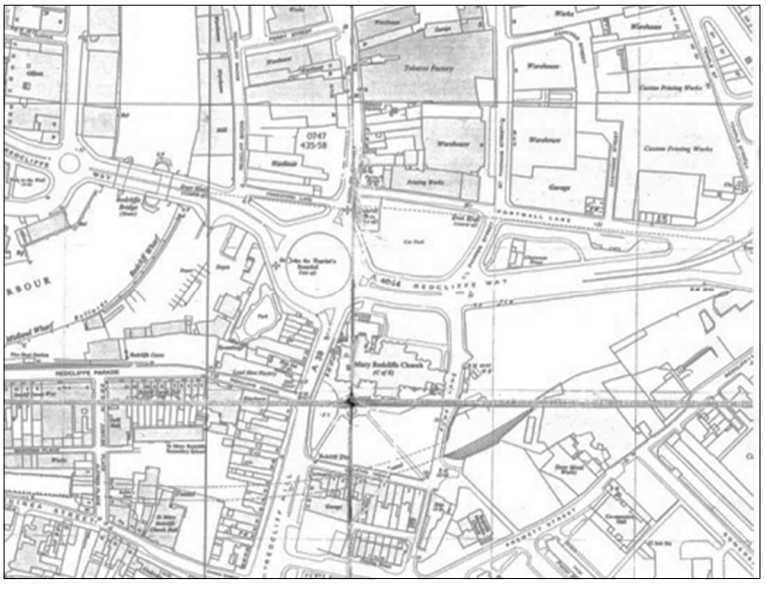


Plate 8. 1969, tram networks removed from Bristol.

1969: Redcliffe Way and Redcliffe Bridge were constructed; however, the density of activity along Redcliffe Street experienced significant decline. The establishment of Redcliffe Bridge effectively marked the decline and eventual obsolescence of Redcliffe Street.

Sixty-seven years later, the remnants of the tramway through Redcliffe are limited to scattered fragments of the tram tracks on parts of Redcliffe Island. Although track-lifting operations commenced in 1938, the removal of tracks along Redcliffe Street was delayed due to the impracticality of accommodating the wide turning circles of the newly introduced motor buses at the narrow Redcliffe Street-Bristol Bridge junction. The tracks were ultimately removed in April 1941. However, a high explosive bomb, which struck the tramline prior to its full removal, displaced a section of the track, and flung it into the churchyard, where it remains embedded to this day as a significant and visible testament to the tramway's history in Redcliffe. Additionally, fragments of embedded tracks, potentially linked to the tunnel railway, can still be observed on the outskirts of Redcliffe. (Joyce, 1980).

Plate 9. Remnants of the Redcliffe tramways.

[2.1.3] Plans for a strategic infrastructural intervention

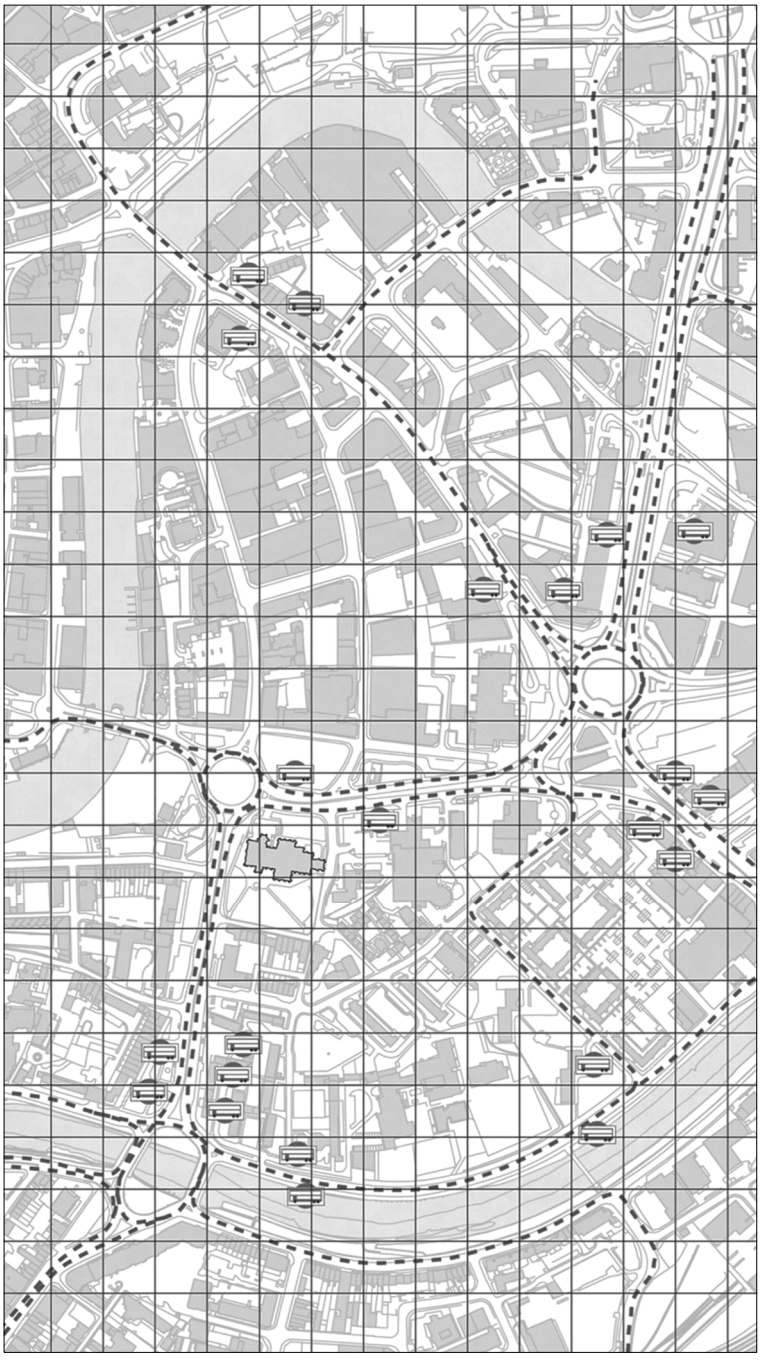


Plate 10. 2008, existing public transport infrastructure (i.e., bus routes) through Redcliffe.

The 2003 Local Development Plan has safeguarded a corridor through Redcliffe Way for the establishment of a light rail public transport (LRT) system. This proposed line aims to connect central Bristol with Parkway Station in the north, passing through Redcliffe Way and Temple Meads Station. The rationale behind this route aligns with a broader strategic objective to reassert central Bristol's position as a competitive economic hub, particularly in contrast to Cribbs Causeway, which has emerged as a prominent out-of-town commercial centre. The successful implementation of this strategic transport link is deemed essential for the economic vitality of Bristol city centre, especially considering the newly initiated development programme for Cabot Circus.

To date, three independent studies, largely the Atkins Report, have endorsed the strategic measures under consideration and identified the proposed route via Redcliffe Way as both feasible and appropriate. Thus, the inclusion of a rapid transit line along Redcliffe Way within planning policy is regarded less as a question of 'if', and more as a matter of 'when'. The impetus for adopting an LRT system has been significantly shaped by the success of comparable European examples, as highlighted in the Atkins Report (e.g., Barcelona).

Plate 11. Barcelona's tram network together with the city's Metro service delivers an efficient public transport service.

Light Rail Transit (LRT) systems are widely recognised as a more sustainable alternative to other forms of systemised transport. They offer low operational costs, resulting in more affordable passenger fares. Moreover, LRT tracks can be seamlessly integrated into urban environments without causing any significant visual disruption. However, a notable drawback of such systems is their substantial capital cost. The proposed line in question is projected to require an investment of £150 million, presenting a considerable financial challenge for Bristol City Council. The project has been suspended as a result of prevailing funding difficulties, following a recommendation from the Department for Transport (DfT).

[2.1.4] Opportunity for Redcliffe

The Redcliffe Futures Masterplan has recognised the critical importance of the designated Light Rail Transit (LRT) line and its proposed route as a cornerstone for the regeneration of Redcliffe. In response, the Masterplan outlines two potential pathways for the LRT: the original preserved route and an alternative route, both of which are considered integral to the area's regeneration efforts. (Bristol City Council, 2002).

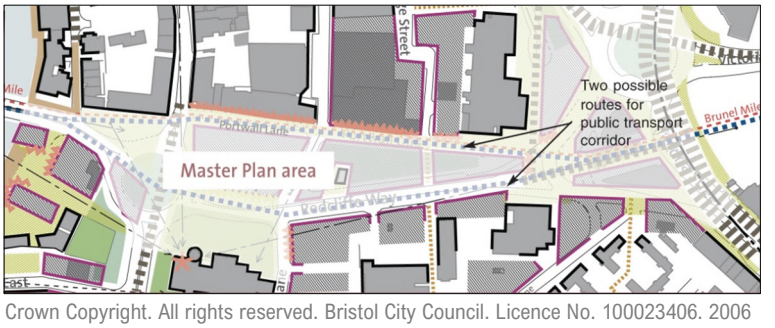


Plate 12. Extents of the Redcliffe Futures Masterplan for Redcliffe Way.

The strategic policy underpinning the Light Rail Transit (LRT) proposal renders it an inevitable challenge for Redcliffe to address. This presents an opportunity for Redcliffe to

leverage the LRT line as a crucial infrastructural asset. The project outlined in subsequent chapters adopts a similar perspective, envisioning the LRT as a foundational component for Redcliffe's future development.

As part of the reassessment of the LRT route's importance for Redcliffe, an urban charrette exercise led to alternative route proposals designed to further support the regeneration of Redcliffe and its surrounding urban areas:

1. The first proposed route adheres to the preserved LRT alignment via Redcliffe Way.

2. The second route suggests an additional connection via Redcliffe Street, aimed at linking central Bristol with Bedminster and Ashton. This route would unite the northern and southern parts of Redcliffe while encouraging development along Redcliffe Street, which currently remains underutilised.

3. The third route advocates for reopening Redcliffe Tunnel to establish a connection with the SS Great Britain and the Industrial Museum at Wapping Wharf. This route is intended to strengthen Bristol's growing tourist economy.

These proposals are visually represented on the following page (Plate 13), and were collaboratively developed by the author and Nathan Bloomfield as part of a group exercise.

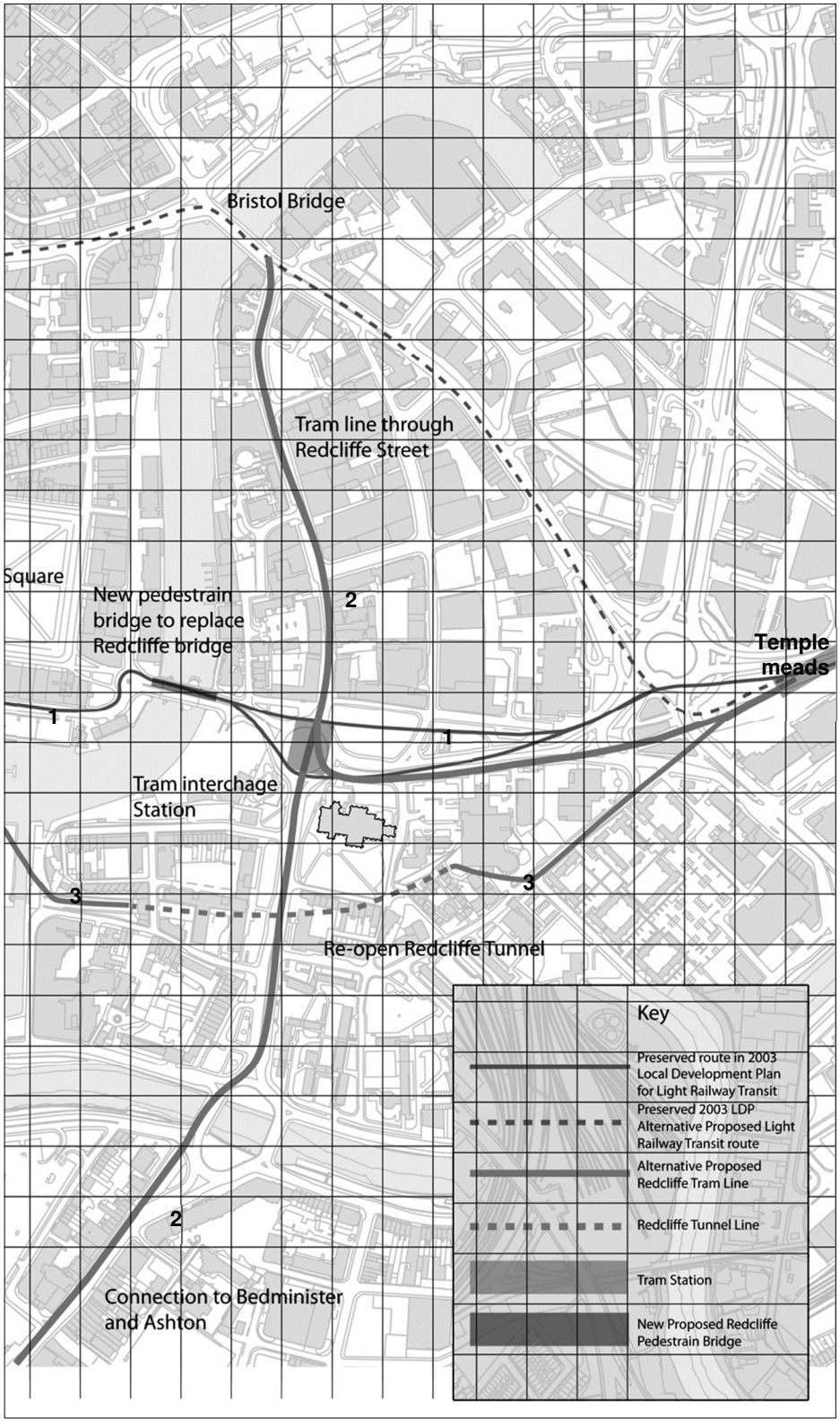


Plate 13. Proposals map with proposed (with alternative) tram routes.

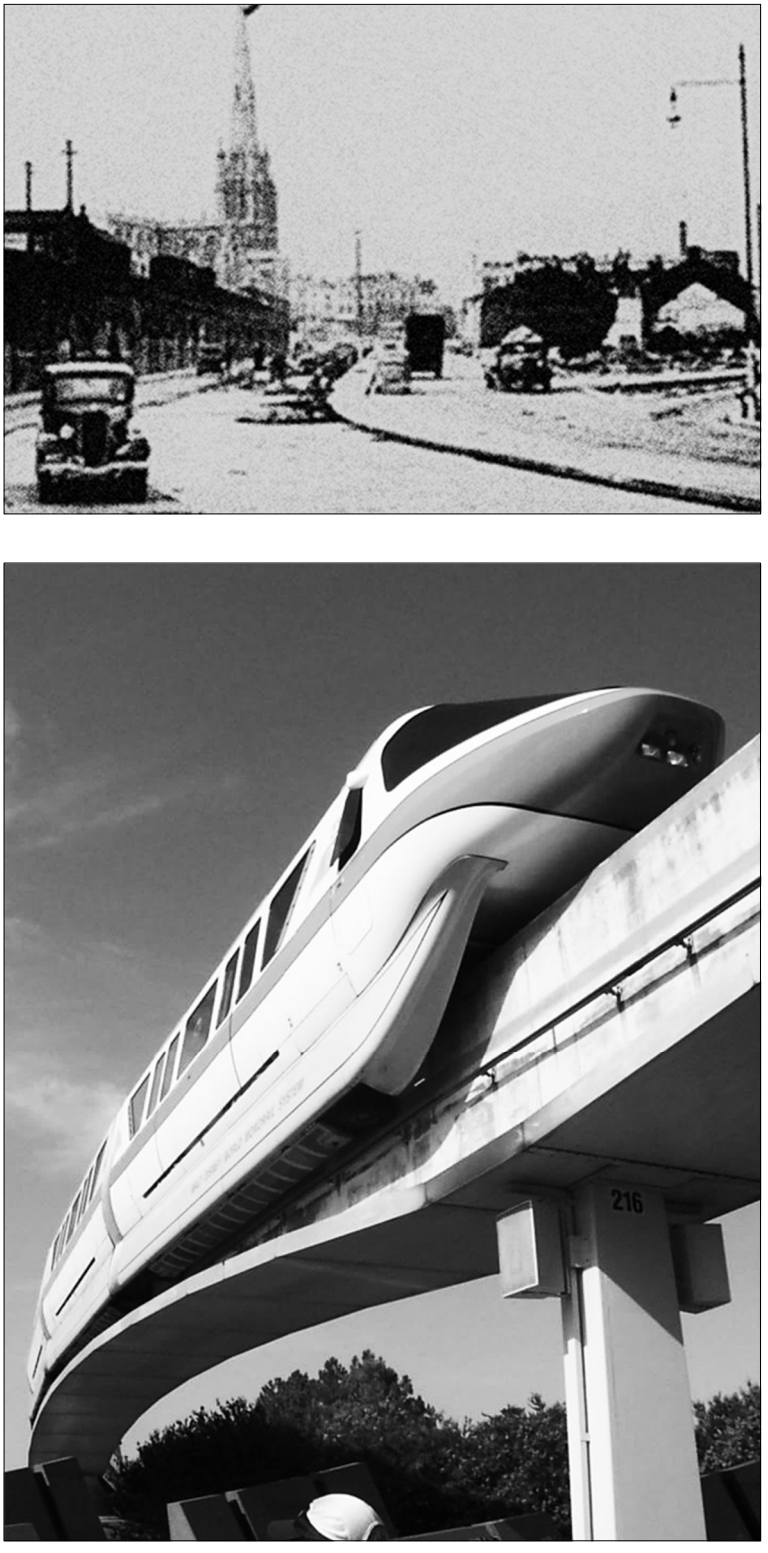


Plate 14. A new transport infrastructure for Redcliffe via Redcliffe Way; past (tramway)… and possible future (e.g., monorail)?

[2.2] Infrastructural trigger: case study of Euralille

The Euralille project serves as a compelling case study of an infrastructural trigger for urban regeneration. Initiated following the Franco-British Channel Tunnel agreement and *Train à Grande Vitesse* (TGV) network expansion, the project saw the rail line redirected through central Lille, transforming the city's economic prospects. Spearheaded by the Mayor and architect Rem Koolhaas' practice the OMA, it aimed to rejuvenate a declining city by creating a new mixed-use hub, incorporating offices, residential areas, and cultural facilities. Koolhaas' masterplan, influenced by his 'Generic City' manifesto, sought to disrupt traditional urban forms by focusing on movement and global connectivity. Despite initial criticism for its stark contrast to Lille's historic centre, Euralille has successfully revitalised the city, and triggered wider redevelopment to attract global interest. As a case study, it exemplifies how transport infrastructure can act as a catalyst for broader urban transformation (Gunawardena, 2006), making it an ideal reference for the regeneration of Redcliffe.

[2.2.1] Context

The Euralille project was initiated following the signing of the 1986 Franco-British agreement for the construction of the Channel Tunnel (Eurotunnel), as well as the 1987 agreement with Northern European countries to develop the TGV network. The initial proposal for the Paris-Brussels line aimed to bypass Lille; however, following vigorous lobbying by local stakeholders, it was decided in 1987 that the TGV line would instead pass through central Lille. Lille's geographical siting is exceptional, lying between London, Paris, and Brussels, and thus within reach of some of Europe's most densely populated and economically prosperous regions. At the time, the economic context of Lille was also remarkable, with the

gradual waning of industry in the region pushing the city towards a state of economic decline. The new proposal was conceived to revitalise Lille and position it as a new hub for European activity. Accordingly, the project's underlying hypothesis posited that the TGV line and its associated station would trigger a period of renewed prosperity, alleviating the city's otherwise bleak economic situation.

[2.2.2] Brief

The key figure behind this vision was Pierre Mauroy, Lille's longstanding Mayor and former Prime Minister of France. Under his guidance, a public-private study partnership was setup in 1988 that conducted feasibility studies and produced a brief for an urban project. The site was next to the existing Flandres Station, which had remained vacant due to military ownership, and thus was a greenfield site in public control. The first objective of the brief was to build the new TGV station, and then between the old and the new, to build an international business centre. To avoid any competitive conflicts, a diverse program was suggested, incorporating offices, services, shops, housing, open spaces, cultural and public facilities. As the OMA described the program (Koolhaas & Mau, 1995), it was intended to be a new city named *Euralille*, not an extension to Lille, but a city 'planted' walking distance from old Lille. With this brief in mind and to prove the hypothesis of the project, a master architect was needed to direct the development. After oral presentations from a short list of eight European architects that included renowned names such as Norman Foster and Claude Vasconi, Koolhaas' OMA was appointed as master-planner in 1989. It is claimed that the OMA was selected because Koolhaas had presented a vision for the city, not just a project (Bertolini & Spit, 1998). The masterplan was developed with constant consultation with Mayor Mauroy and mediated by the Executive Director of Lille (*Baïetto*). In 1990, a public-private development partnership was created to implement this new city (Gunawardena, 2006).

[2.2.3] Proposal

Koolhaas' OMA were from the onset excited by the ambition of the scheme: "*Working within the existing context our task is to make a quantum leap towards a radical future as exotic as imminent"* (Koolhaas cited in: Bertolini & Spit, 1998). Fuelled by unprecedented political and client backing, the OMA masterplan became more and more adventurous throughout its progression, although the simplification of initial proposals was inevitable in the light of cost restraints.

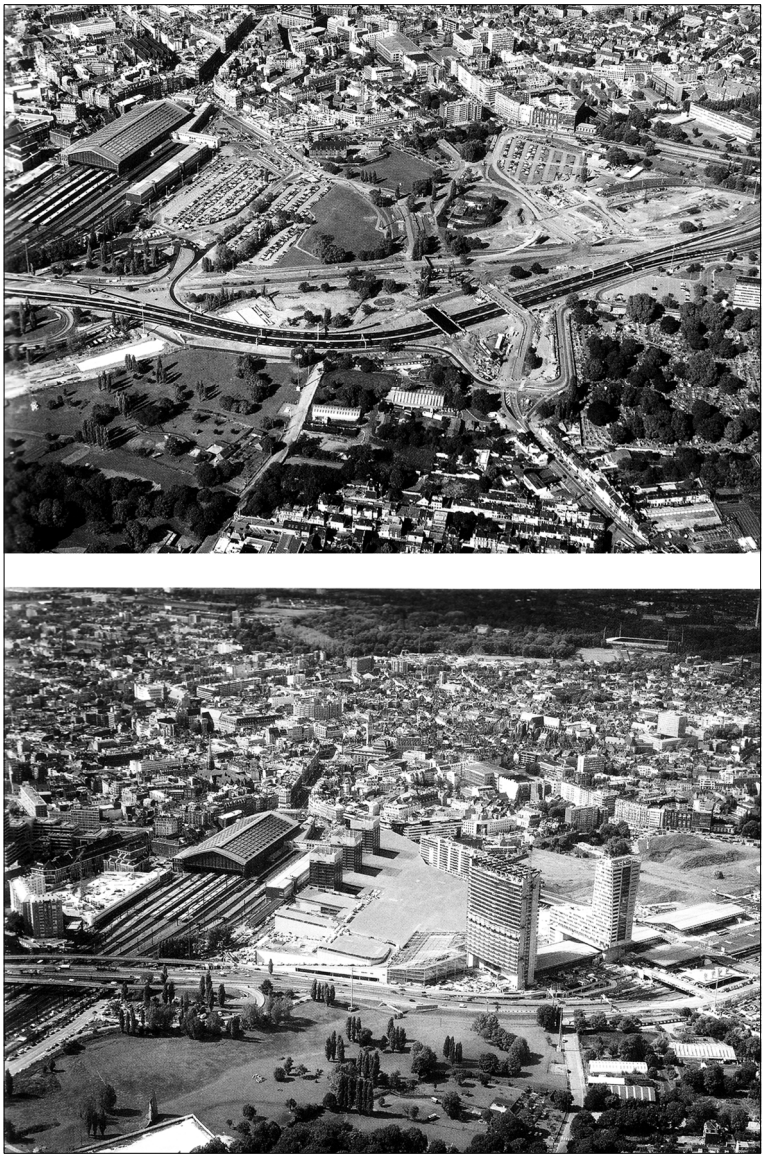
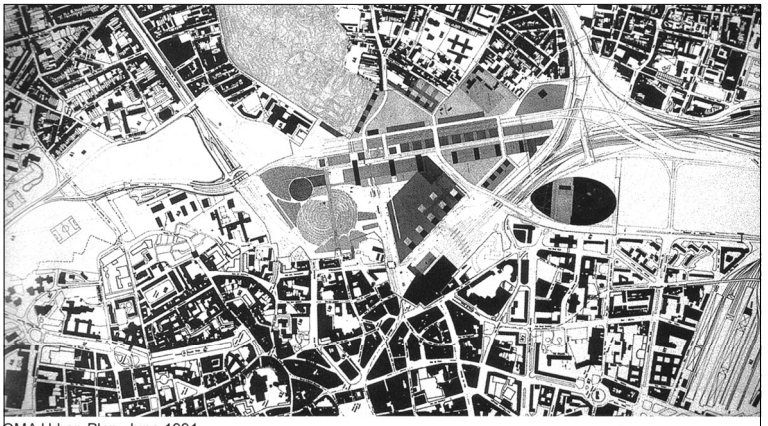


Plate 15. Euralille being constructed (below); and Euralille site (above).



OMA Urban Plan, June 1991

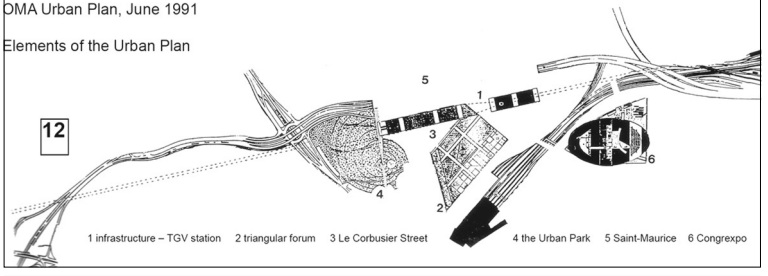
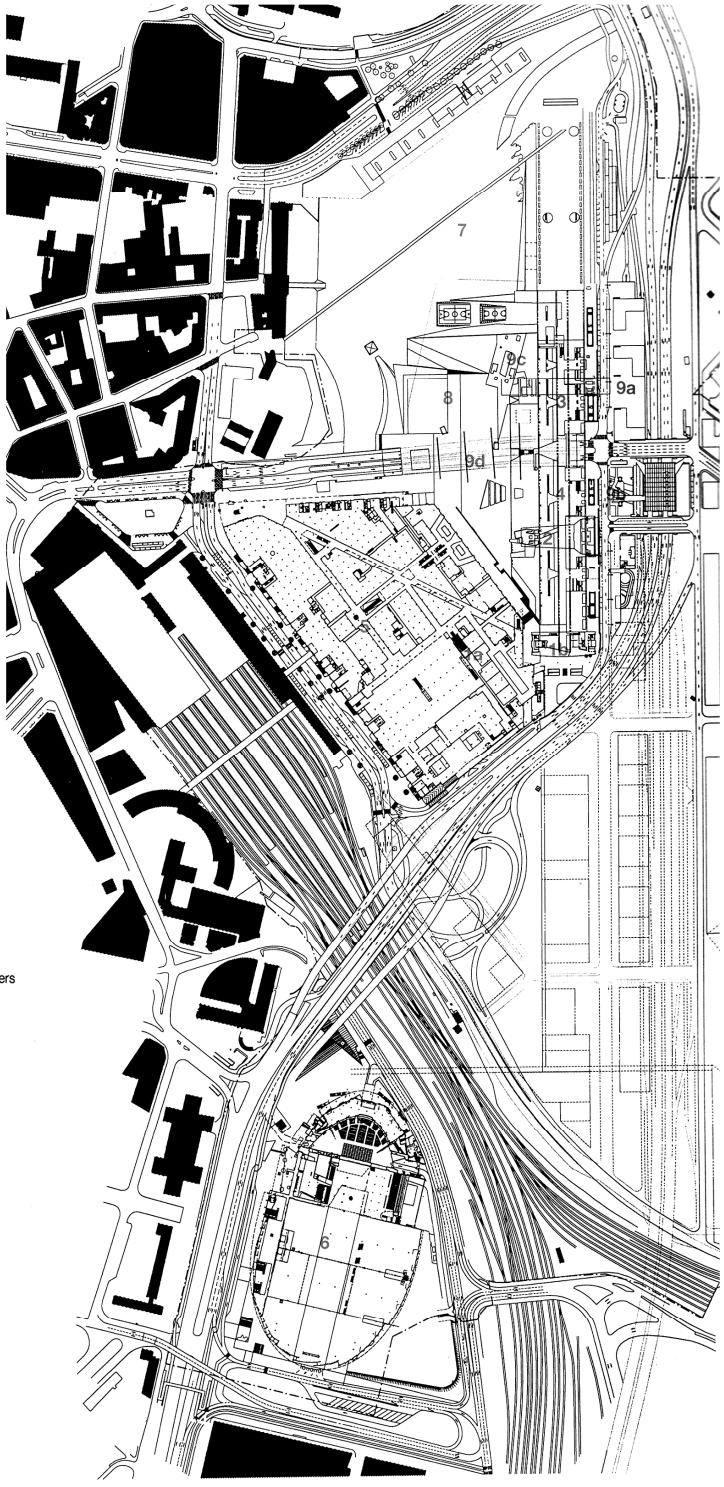


Plate 16. View of implemented Euralille from Lille (below), and Congrexpo, 1990-4, by OMA / Rem Koolhaas (above). (Levene, 1998).

Euralille
Overall site plan

13



CITE DES AFFAIRES

1 WORLD TRADE CENTER
Program:
1a L'Atrium: offices, restaurant, commercial services, expo, club WTC; 15. 449 m²
1b Tower: offices; 25.124 m²
Architect: Claude Vasconi

2 CREDIT LYONNAIS TOWER
Program: offices; 14.600 m²
Architect: Christian de Portzamparc

3 4 STAR HOTEL
Program: 204 rooms; 11.000 m²
Architects: François et Marie Delhay

4 TGV STATION LILLE-EUROPE
Program: Station for the TGV's with destination London, Brussels, France
Architect: Jean-Marie Duthilleul

5 EURALILLE CENTER
Program:
commercial activities; 92.000 m²
recreation; 5.900 m²
aéronef; 2.200 m²
restaurant; 5.250 m²
education; 18.570 m²
public services (post office, crèche, playing ground, lockers for joggers, etc); 4.000 m²
Architects: Agence Jean Nouvel ACRA

6 LILLE GRAND PALAIS
Program:
congres; 18.000 m²
expo; 20.000 m²
rockhall "Zenith"; 5.500 places
parking; 1.230 places
Architect: Rem Koolhaas

7 PARC
Surface: 10 h²
Architects: Gilles Clément, Empreinte

8 FEVA
Program: in progress

9 COMPLEMENTARY INFRASTRUCTURE:
9a Parking; 1.370 places
Architects: Antoine Béal and Ludovic Blanckaert
9b Metro station Lille-Europe
Architects: Martine et Jean Pattou
9c Tramway Lille-Europe
Architects: Thierry Grislain and Martine Proy
9d Viaduct Le Corbusier; 172 m long
Architects: François Deslaugiers, Antoine Béal and Ludovic Blanckaert

Plate 17. The Euralille master plan by Rem Koolhaas and the OMA, (Levene, 1998; Koolhaas & Mau, 1995).

[2.2.4] Euralille and the 'Generic City'

Euralille as an urban program was unusual; it was not considered to be an urban extension nor entirely a new town. Many critics describe it as an 'instant city' set down like an alien spaceship, dominated by volumes of greyness that differ in style (Meade, 1994). For some, it is a disturbing contrast. In comparison to Lille's old town, many consider it to be the very manifestation of 'cheap modern junk' (Menu, 1996). These descriptions voice a state of astonishment that illustrates its programmatic uniqueness, in terms of its location and the morphologies it has generated. Euralille thus has managed to induce intense and contrasting reactions that in turn attracts interest. It is therefore a success in terms of addressing the project's objective of generating interest and drawing new populations to Lille. Today, it is a transitional city where people work, eat, and buy, while the old city Lille, agitated by its presence, is energised, renovated, and is once again booming with life (Balmond, 2003). Buruma (in Betsky, 2003) sees Euralille's success as a bold urban experiment, that has managed to 'shock the old to revitalise a fading city'.

This concept of 'shocking the old to revitalise it', is one that Koolhaas expressed in his manifesto for 'The Generic City' (Koolhaas & Mau, 1995). In this manifesto, he described the need for cities to be rejuvenated by shocking its existing urban fabric to address modern needs, without being restricted by nostalgic attachments. Euralille therefore is an example of such a city that has regained a sense of vitality, by addressing modern needs without being restricted by historical attachments to Lille's scale, style, form, and organisation.

Fundamental to Euralille's program is the concept that sees it as a city of movement and location. The present-day world is an age of information, cyberspace, and virtual environments that are gradually causing all sense of 'identity' to disintegrate. As Dovey (1998) emphasised, Koolhaas sees this

as a form of liberation from the traditional constraints of 'place', 'region' and 'character'. His representation of Euralille is therefore anti-contextual and encourages people to vacate real space in favour of 'virtual space'. Public space thus becomes mostly a realm of transition and movement, as opposed to facilitating any sense of permanence (Dovey, 1998).

The hypothesis for this project was based on the precondition of strategic location; an hour from Paris, two from London. Thus, it clearly acknowledged the global significance of the site as a European hub of movement. Koolhass identified this acknowledgment as an opportunity to 'redefine the idea of address' (Koolhaas & Mau, 1995). Address, movement, and global connectivity were all concepts that he had analysed in the 'Generic City'. In paragraph four, he notably highlighted the importance of the 'airport' in defining such concepts. He claimed that they are like "quarters of the Generic City, sometimes its reason for being (its centre?)" (Koolhaas & Mau, 1995). Although Euralille is not a city centred on an airport but on a train station, its status as a city for movement is not by any means any lesser. For this new city, the TGV station is its *raison d'être*, the founding from which everything else has spawned (Gunawardena, 2006).

Taking into consideration the highlighted, Euralille as an urban regeneration programme had:

- **Disrupted the old urban fabric to generate new reactions and interests;**
- **Distanced itself from nostalgic attachments to 'identity'; and**
- **Capitalised on its location and global significance.**

The above therefore presents key lessons from which an infrastructure for movement could be structured, which in turn would facilitate the redefinition of the address of Redcliffe.

[2.3] Urban seams of Barcelona

The following section examines the concept of 'urban seams' as explored within the urban fabric of Barcelona, serving as a case study. An urban seam arises where two distinct urban fabrics converge. This juncture may be naturally formed, such as by a river, or artificially introduced through infrastructure like a highway or railway line. If the two adjacent urban fabrics fail to embrace the seam, it risks becoming a divisive barrier that exacerbates separation between the districts, often to the detriment of one, and in certain instances, both. Conversely, when such a seam is acknowledged and celebrated, it can develop a distinctive character and enrich the urban landscape.

In this context, the analysis considers two specific seams within the Spanish city of Barcelona: the Lesseps crossing, which includes the Biblioteca Jaume Fuster (2005), and La Rambla with its transient trade huts (dating back to the fourteenth century). These examples illustrate how urban seams can be both a challenge and an opportunity within the broader framework of urban design and any agenda for regeneration.

[2.3.1] Lesseps crossing

Plate 18. Lesseps crossing, prior to implementing the regeneration landscaping strategy.

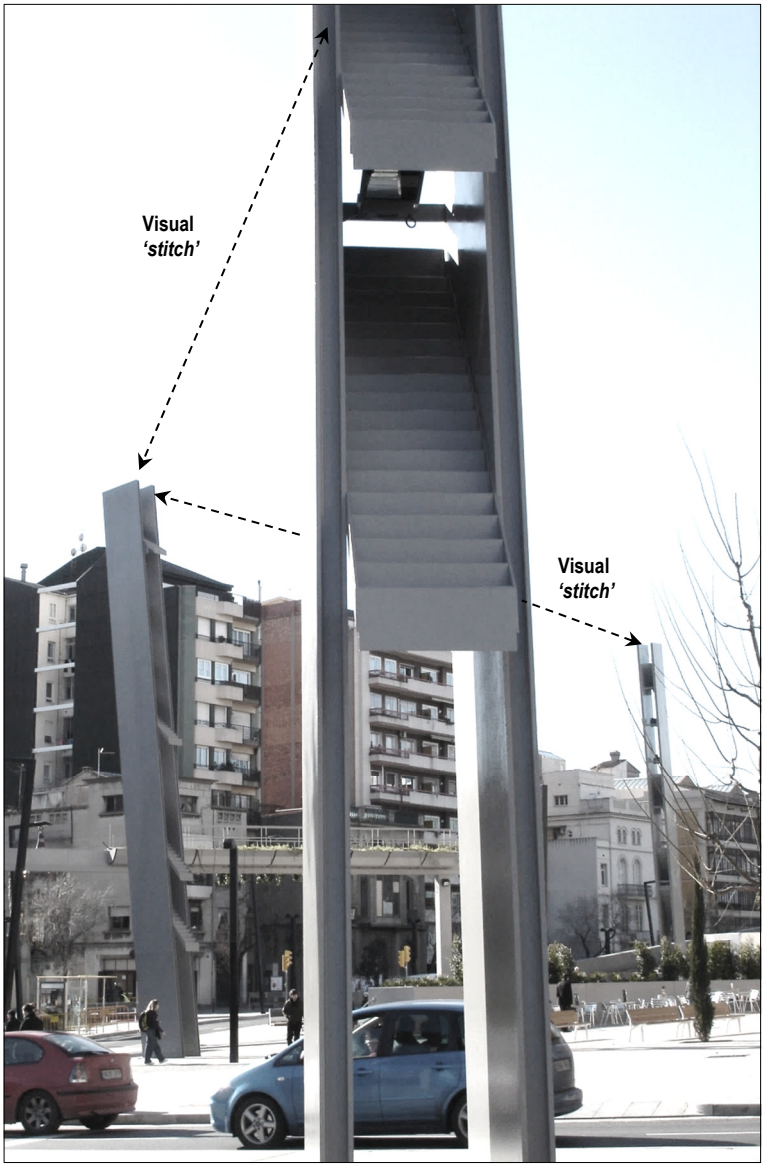


Plate 19. Lesseps crossing with sculptural stair cores, placed to generate visual associations of the stitching of two urban fabrics.

Prior to the implementation of the new urban scheme, the Lesseps crossing functioned as a divisive boundary between two districts of Barcelona. This six-lane road had constituted a formidable barrier for pedestrians seeking to traverse from one side to the other. The recently implemented landscaping strategy addressed this by redirecting most of the traffic through an underpass and by incorporating a series of sculptural features designed to symbolically 'stitch' and visually integrate the two adjoining districts (Plate 19 and Plate 20).

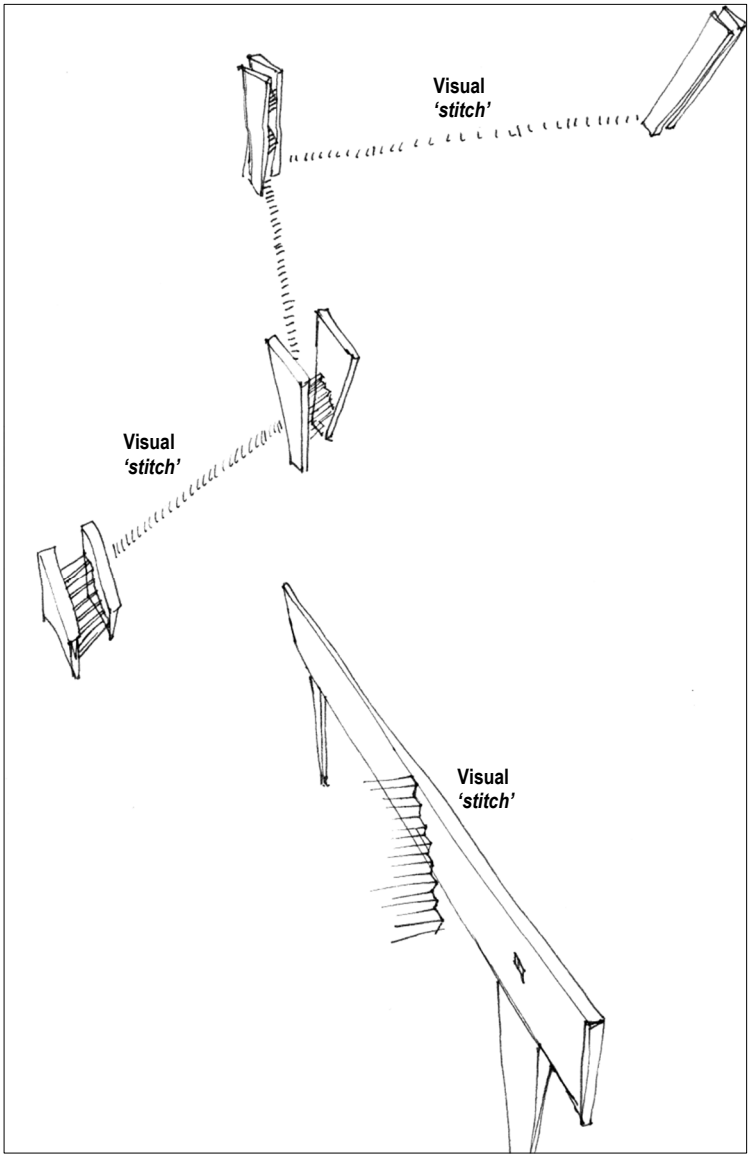


Plate 20. Visual associations, a strategy for stitching together two disengaged districts.

At the heart of this scheme is the Jaume Fuster Library (2005), designed by architect, Josep Llinás Carmona. In the Spanish cultural context, libraries transcend their traditional role as repositories for books, functioning also as vital community centres that foster social cohesion and integration. In the context of the Lesseps crossing, this library assumes the role of a singular 'nodal trigger', serving as both a unifying node that connects diverse interests, and a catalyst for further development and activity (University of Navarra, 2005).

Plate 21. Biblioteca Jaume Fuster by architect Josep Llinás Carmona.

Plate 22. An outdoor room? A play on visual associations.

The most abstract aspect of the landscaping strategy are the sculptural 'stitching' gestures, which necessitate a considerable level of discernment to grasp their intended role as visual associative devices (Plate 22). The fact that many of these sculptural elements lack clear practical purpose, particularly the pseudo stair cores, could render them perplexing and regarded as an unnecessary extravagance. Consequently, their non-functionality risks diminishing their relatability.

[2.3.2] La Rambla

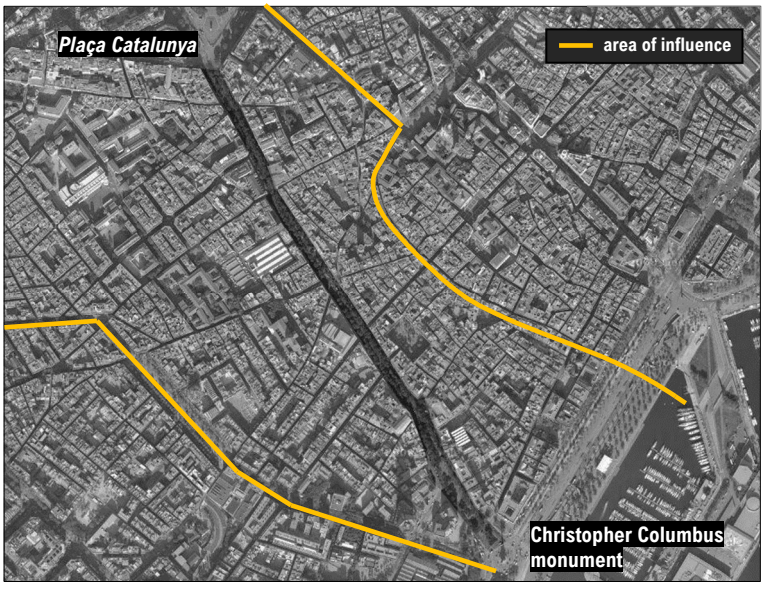


Plate 23. La Rambla and context.

La Rambla, is a picturesque tree-lined pedestrian avenue in central Barcelona, dating back to the fourteenth century. It stretches for three-quarters of a mile, linking *Plaça Catalunya* at the city's heart with the Christopher Columbus monument at Port Vell. Typically bustling with street performers, cafés, and market stalls, it embodies a distinctive character often celebrated as the essence of Barcelona (Agar, 2002).

Plate 24. La Rambla, aerial views, day, and night.

Plate 25. La Rambla, material distinctions (inset) street furniture.

Plate 26 La Rambla comprises a series of interconnected streets, collectively forming the renowned and distinctive urban avenue.

Plate 27. La Rambla, transient traders and their huts that expand and contract their area of influence during certain times of the day; (left) contracted and closed, (right) expanded and trading.

La Rambla serves as an urban seam that has developed a unique identity and prominence. It operates as a marketplace, a theatre, and a hub of cultural exchange. The dispersed trader infrastructure provided by the council, while unremarkable when closed, transforms into vibrant forms and colours during trading hours. Each hut thereby gains its own individuality and defines a dynamic zone of influence. The dispersed addition of street theatre performers further enriches the diversity and vibrancy of the streetscape, which remains in a continuous state of flux throughout day and night.

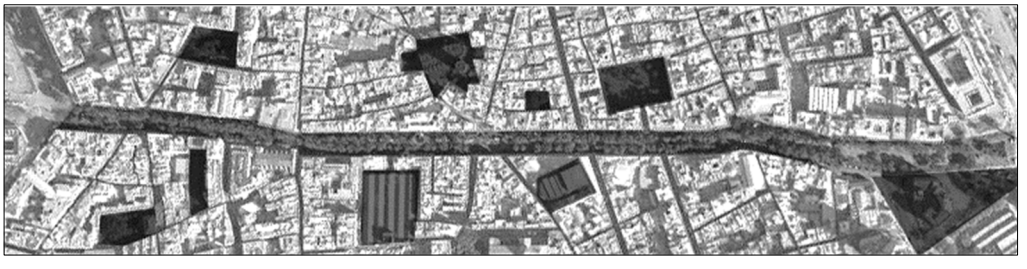


Plate 28. Interdependent spaces and functions that contribute to the vitality of La Rambla.

The neighbouring urban fabrics derive significant advantage from the allure of this urban seam, with traders on both sides prospering. The seam as a result has established its position as the central attraction, serving as a focal point from which the surrounding areas draws interest and commerce.

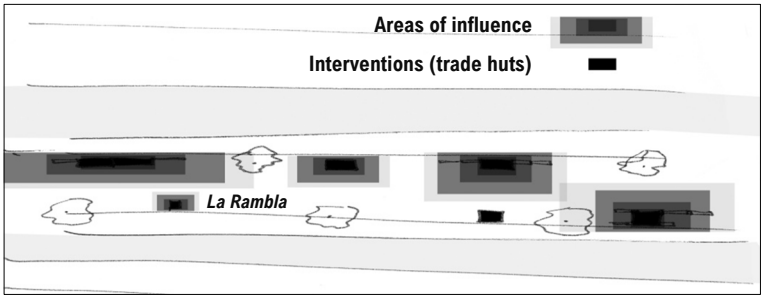


Plate 29. La Rambla trade huts, and their changing zones of influence.

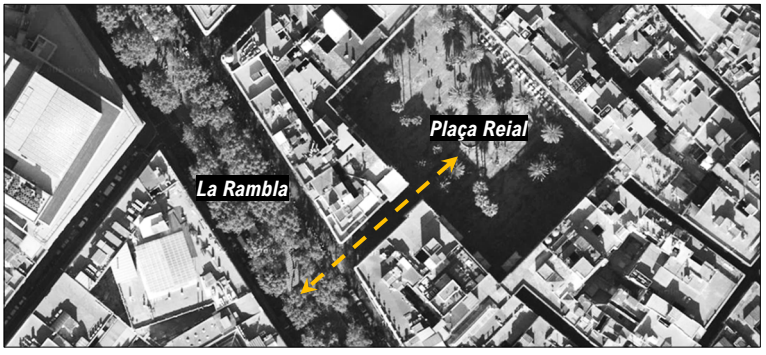


Plate 30. The Plaça Reial, closely connected to La Rambla, thrives as a lively square where its restaurants and clubs' benefit from the continuous influx of visitors drawn to its intimate atmosphere.

Plate 31. Plaça Reial, with an arcaded connection to the La Rambla.

[2.3.3] Drawing parallels

Comparison of urban seams: Redcliffe | Lesseps | La Rambla

Plate 32. Redcliffe Way in Redcliffe, Bristol.

Plate 33. Lesseps crossing, Barcelona.

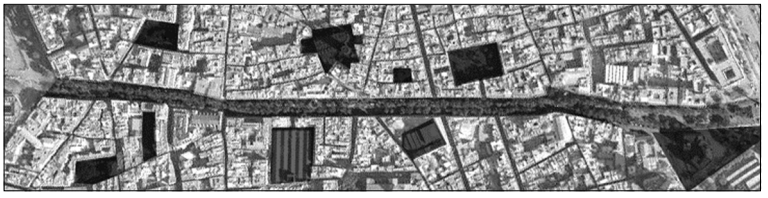


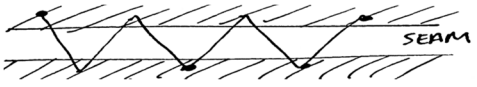
Plate 34. La Rambla, Barcelona.

Redcliffe Way, like La Rambla and Lesseps crossing, serves as an intersection or seam where two distinct districts converge. However, at present, it functions merely as a thoroughfare for commuters travelling between central Bristol and Temple Meads Station. It is perceived as a transitional, uninviting space, with residents turning away from this vast area due to its lack of appeal. Over time, this detachment has exacerbated the division between the northern and southern parts of the Redcliffe quarter.

In contrast, La Rambla has embraced its seam-like qualities by integrating infrastructure and fostering multiple and dispersed trade and cultural activities within its seam zone. This approach has transformed it into a vibrant urban entity and attraction, benefitting all surrounding districts (Agar, 2002).

Similarly, the Lesseps crossing previously represented a fragmented urban fabric, with adjoining areas disengaging from the seam. The new scheme had implemented several strategies to address this issue. Traffic flow had been reduced through the introduction of an underpass, while a single 'nodal trigger' represented by the Biblioteca Jaume

Fuster, had been introduced to function as both a library and community centre. Furthermore, associative strategies, including sculptural elements, had been employed to connect the two distinct urban fabrics visually and symbolically. While the latter measures mark progress, the long-term impact of these stitching strategies remains uncertain.



It is widely acknowledged that Redcliffe Way must establish stronger connections with the adjacent urban fabrics to the north and south. Similar to La Rambla, Redcliffe Way possesses the potential to evolve into a prominent urban entity within the city. Achieving this vision requires both districts to actively engage with the area and collaboratively work to 'stitch' the divide between north and south.

To fulfil this 'stitching' function, specific strategies must be implemented. These might include the introduction of multiple dispersed uses akin to those found at La Rambla, or the more abstract approaches observed at Lesseps crossing. Furthermore, the establishment of a nodal trigger, such as the Biblioteca Jaume Fuster, would be instrumental in stimulating broader development and fostering urban integration.

Within the masterplan for this project, significant infrastructural investment is proposed, incorporating the planned Light Rail Transit (LRT) route that will traverse Redcliffe Way. This infrastructure would serve as the backbone, enabling functions from both the northern and southern areas of Redcliffe, alongside other stakeholders, to reconsider the importance of Redcliffe Way as an urban seam with appeal. As seen with the Biblioteca Jaume Fuster at Lesseps crossing, a dominant nodal trigger is also envisioned for Redcliffe Way in the form of the Garden Inn and its associated programmes.

[2.4] Urban superstructures

Historically, cities have emerged around significant geographical features such as rivers, lakes, or valleys. These assets offered conditions conducive to sustaining life, ensuring protection from external threats, and providing a sense of identity and orientation, essential for establishing rooted communities. These early cities as a result, maintained a self-sufficient and independent presence.

The advent of rail networks and mechanised flight revolutionised the dynamics of urban development, diminishing the necessity for cities to operate as self-contained entities. Cities accordingly became integrated into national networks, heralding the rise of strategic city and regional planning. With the normalisation and popularisation of air travel, the airport emerged as an essential infrastructural asset, facilitating global connectivity, and driving exponential urban growth. Consequently, modern cities could now be envisioned and established independently of natural assets, championing the concept of the airport city. Humanity had thus leveraged 'manmade infrastructure' to create cities wherever they desired, placing infrastructure as the fundamental catalyst for urban development and expansion.

The concept of the 'urban superstructure' encapsulates this advancement in manmade infrastructure and its critical role in shaping contemporary and future cities. The urban superstructure is envisioned as a monumental human endeavour to establish a new foundation for cities undergoing continuous reinvention. By providing essential infrastructural elements, it functions as the 'trigger' for the growth and prosperity of revitalised urban environments.

the infrastructural superstructure, **Brooklyn Bridge**, one of the oldest suspension bridges in the US, stretches 1825m over the East River, connecting the New York City boroughs of Manhattan and Brooklyn.

[2.4.1] Urban strategy

The following analysis examines the concept of the 'urban superstructure', within the context of a potential siting in Redcliffe, Bristol. The superstructure is interpreted as the realisation of a 'strategic intervention', with its primary objective being the promotion of choice, freedom, and equality. Over time, it is anticipated that the superstructure will evolve in accordance with the shifting dynamics of authority within the city. Furthermore, this discussion incorporates fictional narratives that envision a past, present, and plausible future, wherein the superstructure is perceived as a constant presence in urban development and regeneration.

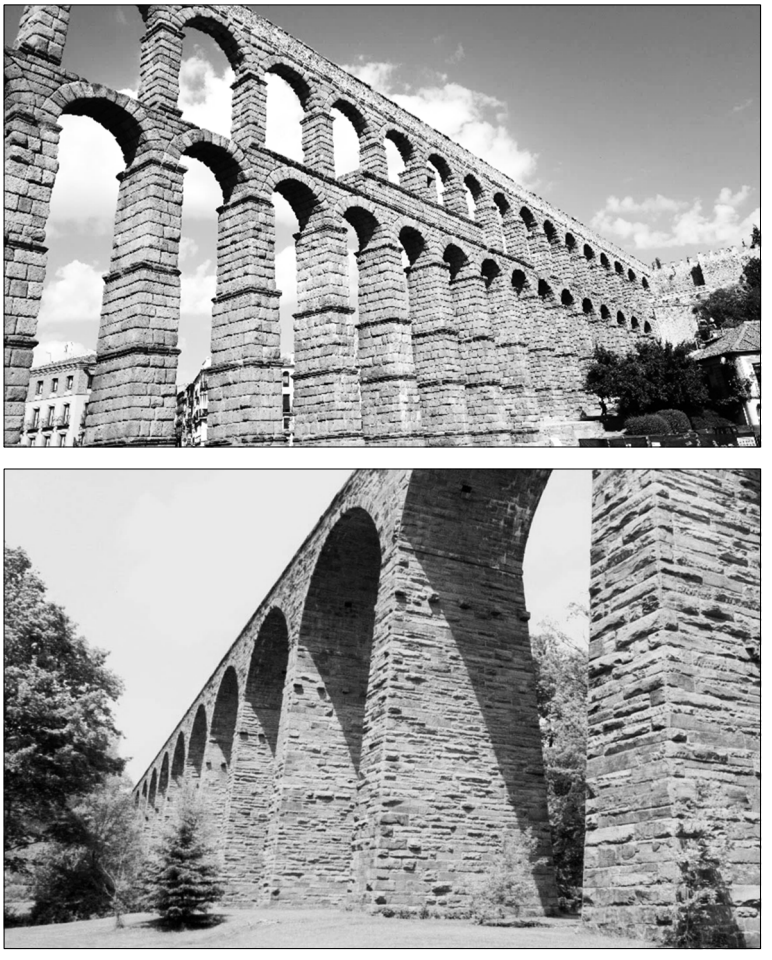
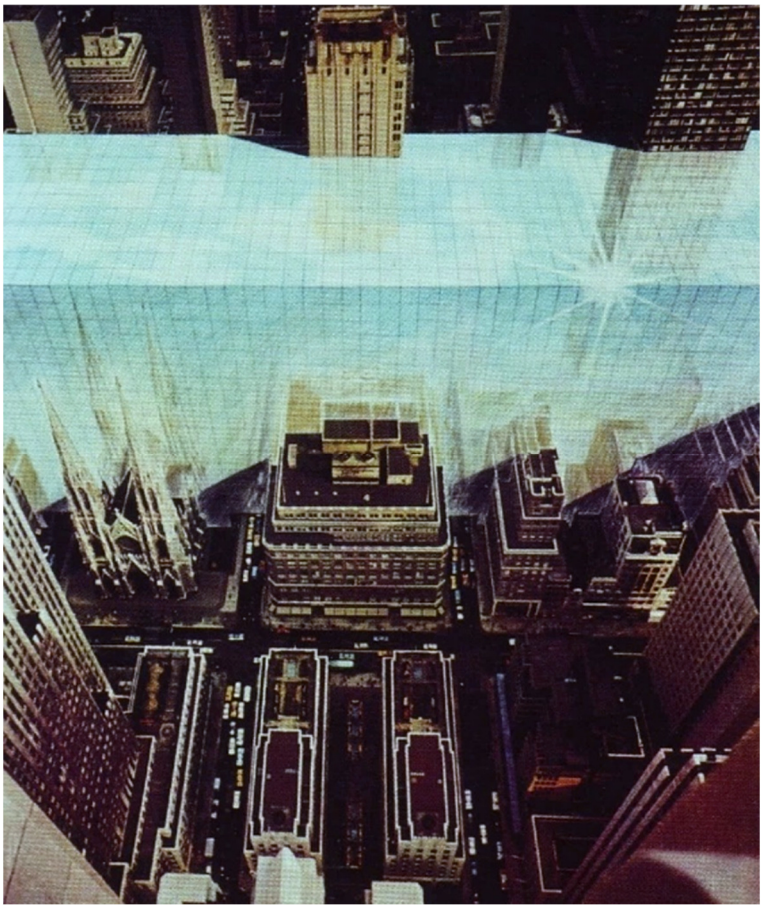


Plate 35. Historical precedents: Above, Aqueduct of Segovia, Spain (1st century AD); and below, Starrucca Viaduct in Pennsylvania, USA (1848).

[2.4.2] Infrastructure case studies

The following presents two case studies: the theoretical vision for a megastructure proposed by Superstudio, and the real-world settlement of Slab City, an informal community that has repurposed and utilised redundant infrastructure.

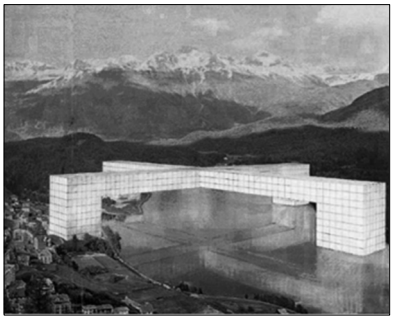
2.4.2.1 Theoretical: CONTINUOUS MONUMENT

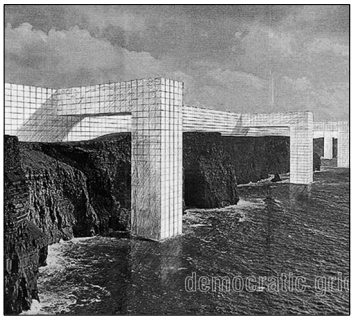


***The Continuous Monument*, conceptualised in 1969 by Superstudio, was described as "An Architectural Model for Total Urbanisation". They envisioned the grid as a 'single continuous environment', characterised by the homogenisation of the world through technology, culture, and the unavoidable mechanisms of imperialism. This uniformity was seen to**

create a truly democratic human experience, where equality would prevail, with each point on the grid being identical, leaving no place superior to another (Lang & Menking, 2003). Key principles embedded in this vision included:

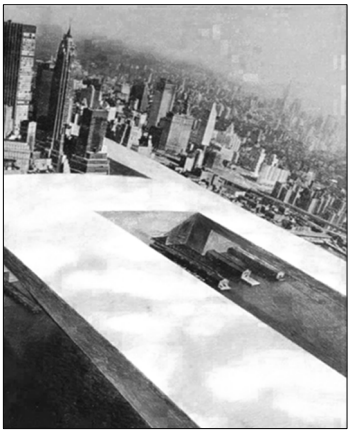
- **Freedom and the liberation of choice;**
- **Democracy as a fundamental ideal; and**
- **Anti-consumerist stance, exploring the potential for a life unbound by material objects.**





Superstudio was an architecture collective established in 1966 in Florence, Italy, and was founded by Adolfo Natalini and Cristiano Toraldo di Francia. In 1967, Natalini identified three major trajectories of future exploration:

- **Architecture of the Monument: Examining monumental forms and structures.**
- **Architecture of the Image: Focusing on visual and representational elements.**
- **Technomorphic Architecture: Emphasising forms inspired by technological advancements.**



Superstudio's radical projects and critiques have since influenced discussions surrounding urbanism, design, and the sociopolitical dimensions of architecture (Lang & Menking, 2003). This project is particularly inspired by the boldness and ambition of their *Continuous Monument* concept.

2.4.2.2 Real-world: SLAB CITY

Slab City, **also referred to as 'The Slabs', is an informal settlement situated in the Colorado Desert of south-eastern California. The area serves as a haven for recreational vehicle owners and individuals seeking an unconventional transient lifestyle, including squatters from across North America. Its designation originates from the concrete slabs and pylons that remain as remnants of the decommissioned World War II military facility, Marine Barracks Camp Dunlap. Since the closure of the base, the site has experienced continuous informal habitation, although the number of residents has declined markedly since the mid-1980s.**

During the winter months, the settlement accommodates several thousand seasonal visitors, many of whom are retirees. Additionally, there is a permanent population of approximately 150 residents, informally known as ‘slabbers’. These individuals often rely on government benefits for their sustenance, having been drawn to the area due to economic disadvantage. For some, the allure of living beyond the oversight of governmental structures is a significant motivator.

The site operates without regulation and is entirely decommissioned, offering free parking to its inhabitants and visitors. However, it lacks basic infrastructure, including electricity, running water, and other essential services. Residents and visitors typically procure necessary supplies from Niland, California, a nearby town located approximately three miles to the southwest of Slab City.

Slab City exemplifies how infrastructure can extend beyond its intended purpose and even surpass its design lifespan. When infrastructure is made available, it will inevitably be utilised, adapted, and repurposed to meet the evolving needs of its inhabitants, including transient dwellers.

[2.4.3] Current site situation

Plate 36. The Redcliffe Way site.

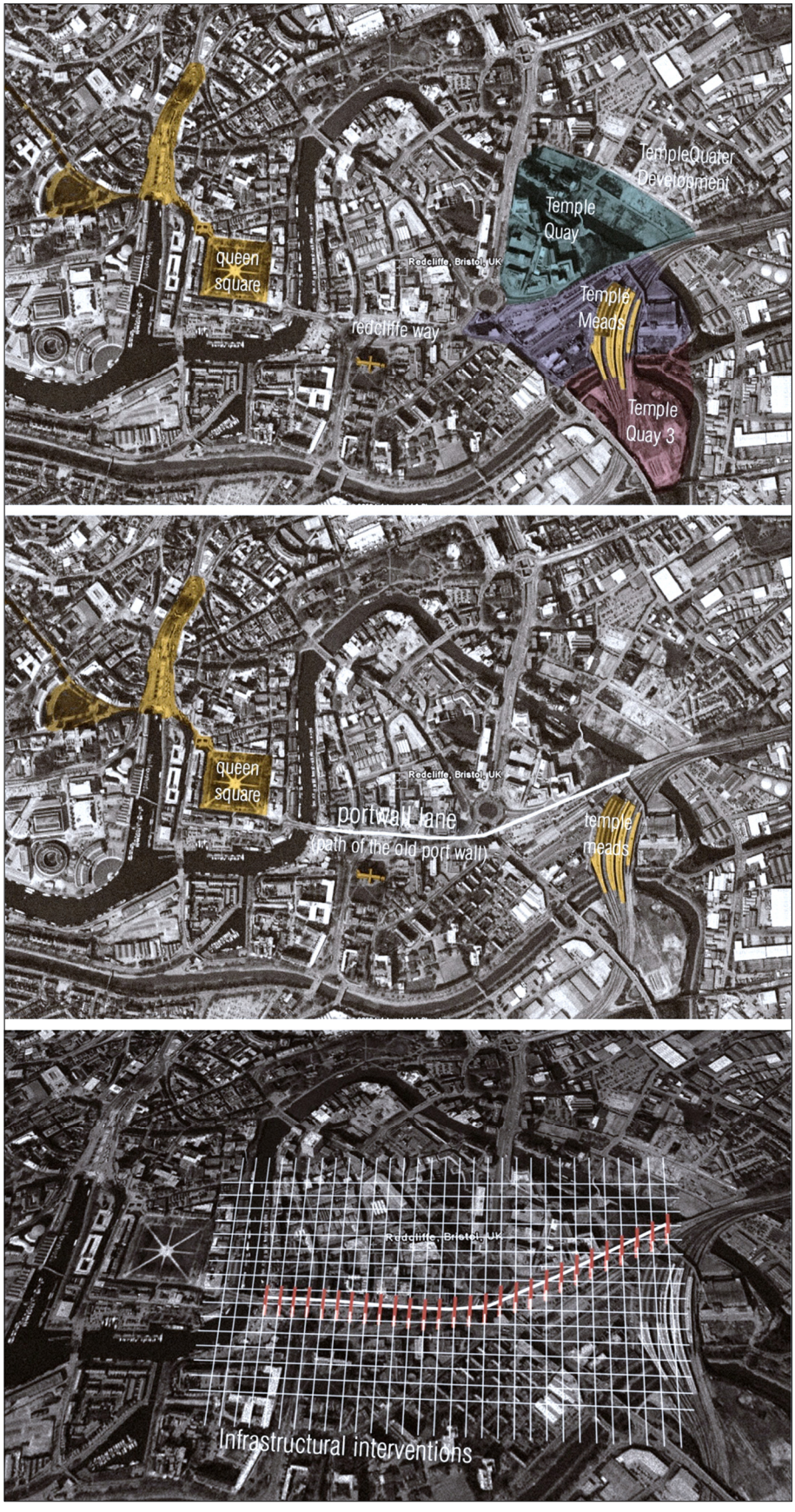
The site presents a valuable opportunity to establish a nodal point, serving as a key element for identity, connectivity, and fostering community engagement within the area.

The urban strategy focuses on Redcliffe Way, a significant thoroughfare linking Temple Meads Station with Bristol city centre via Queen Square. According to the Redcliffe Futures Masterplan (Bristol City Council, 2002), the entirety of Redcliffe Way has been identified as an underutilised asset, with over £400 million of prime land dedicated to an underused road. To address this, the Masterplan proposes the development of a dense urban block to occupy most of the site, while the remaining portion of Redcliffe Way would be reduced in size to align with the current volume of vehicular traffic.

Although this project recognises the importance of minimising and regulating vehicular traffic along Redcliffe Way, it envisions the surplus land from the downgraded road as optimally serving Redcliffe and Bristol as an urban park. This park is intended not only to catalyse future development in Redcliffe, but also to become a prominent destination for city residents and visitors arriving via Temple Meads.

The proposed urban park would adopt the suggested Light Rail Transit (LRT) connection, outlined in section [2.1], as its central axis. The envisaged superstructures are designed to provide essential infrastructure for the LRT connection, anticipated to traverse Redcliffe Way, along with accommodating supplementary programmes that could benefit from establishing their presence either as parasitic entities, or as complementary components of this urban superstructure.

Plate 37. Redcliffe Way aerial view, 2008.


queen square
redcliffe way
Redcliffe, Bristol, UK
Temple Quay
TempleQuater Development
Temple Meads
Temple Quay 3
queen square
Redcliffe, Bristol, UK
portwall lane
(path of the old port wall)
temple meads
Redcliffe, Bristol, UK
Infrastructural interventions

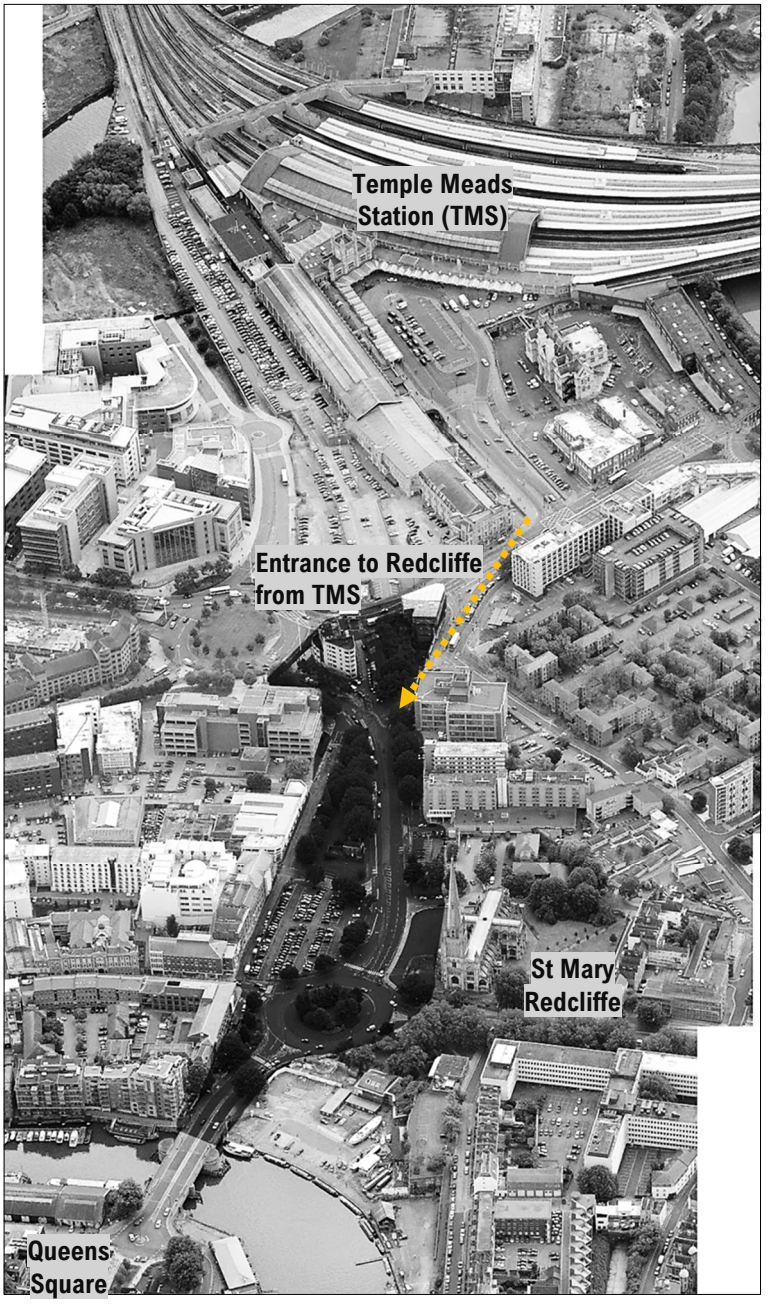


Plate 38. Redcliffe Way, and the proposed urban parkland extents.

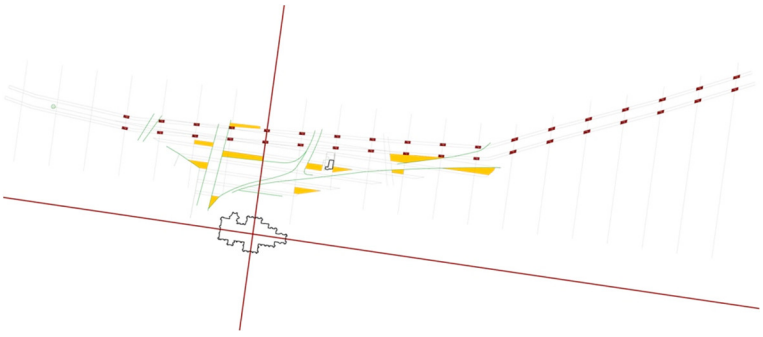
Immediate cultivation of the proposed Redcliffe Way urban parkland is unfeasible due to site conditions. Developing this requires a phased approach. Initially, planting phytoremediation species is essential to decontaminate the site and prepare the soil. Once decontamination is achieved, broader cultivation opportunities can be explored, ensuring ecological balance and long-term sustainability.

Plate 39. Present-day Redcliffe Way, showing asphalt road and modest fragments of greenspace (above); and asphalt surface car park (below).

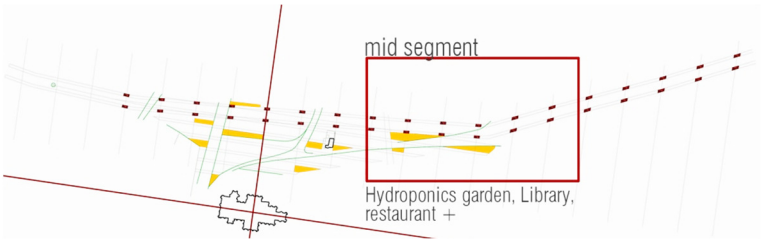
Plate 40. The 'mid-segment site' and surroundings (described later).

Plate 41. View from the 'mid-segment site' towards St. Mary Redcliffe.

[2.4.4] Massing and masterplan



The urban masterplan proposes a linear network of superstructures along the 'Brunel Mile', which establishes a connection between Redcliffe Bridge and Temple Meads Station. These structures are arranged on a 40-metre grid, offset from the axis of St. Mary Redcliffe. This grid also serves as the organising framework for the urban park, onto which existing pathways are superimposed. At intersections between these pathways and the organising grid, programmatic interventions have been strategically positioned. The vision for this urban park includes a considered balance of hard and soft landscaping, punctuated by programmatic elements.



For this project, both the superstructure elements and the proposed specific plug-in programme will focus entirely on the 'mid-segment' of the superstructural network. This mid-segment is identified as the 'site' for the specific plug-in programme, selected intentionally due to its placement as a 'gateway' to the reimagined Redcliffe for those arriving from Temple Meads Station. The plug-in programme, envisioned as a Garden Inn in both form and function, will serve as the 'gateway project', aiming to cultivate a new urban ecology.

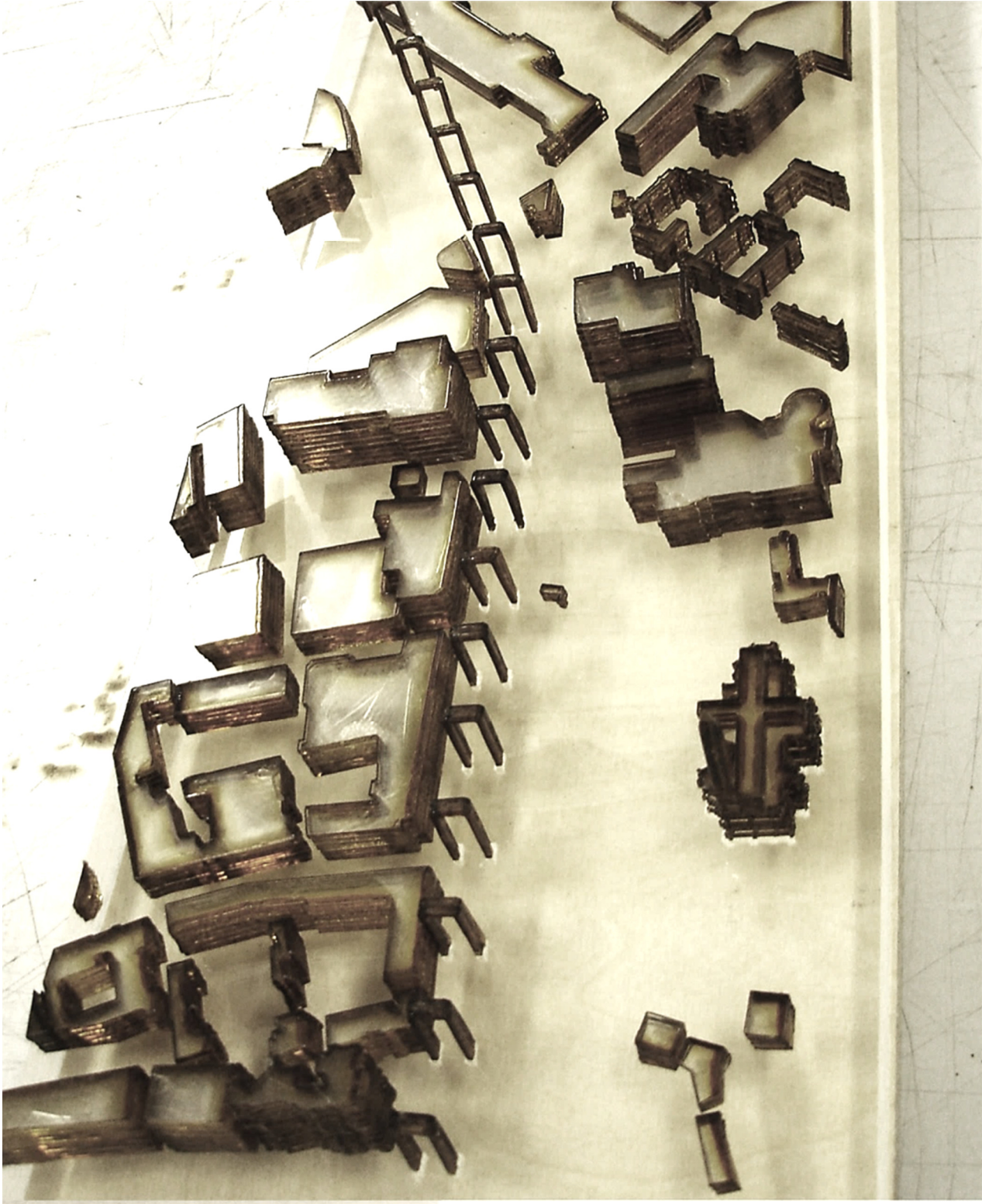
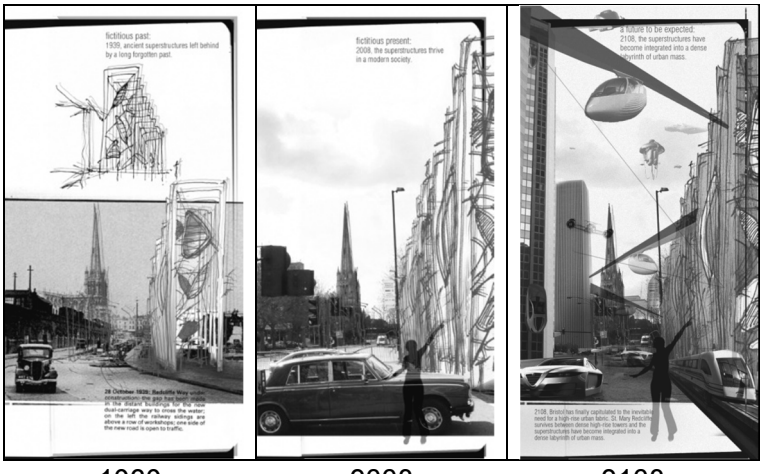


Plate 42. Massing model including the proposed superstructural network (made from Perspex).

2.4.4.1 Timeline [past : present : future]

Examining the timeline of an urban project elucidates the interplay of tangible scenarios and speculative trajectories.



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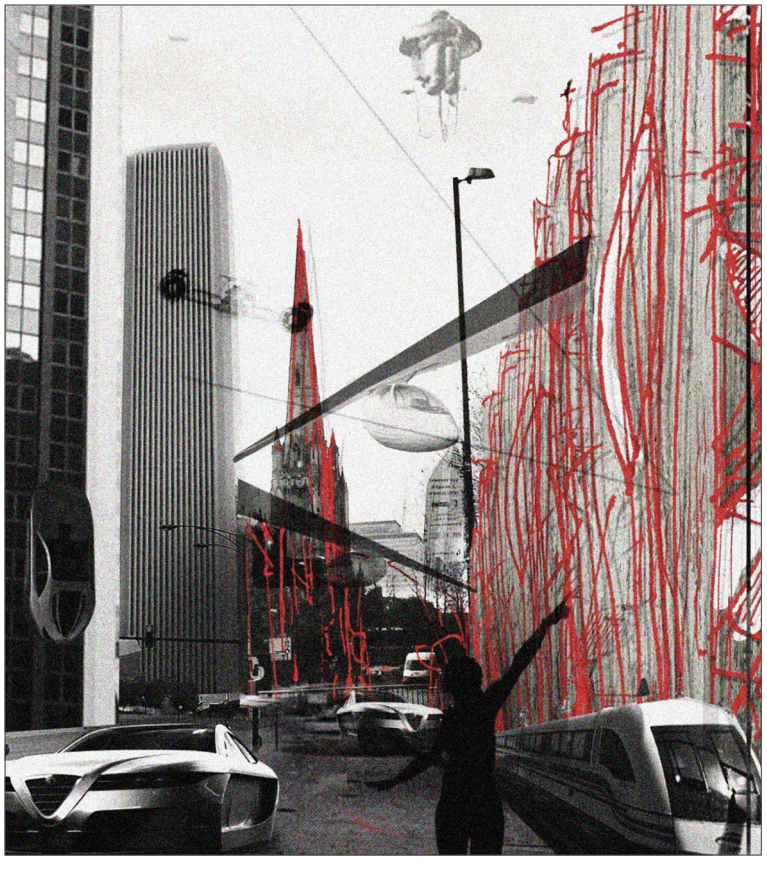


Plate 43. The twenty-second century will witness Bristol and Redcliffe's transformation into a compact vertical city, with the superstructures as an ever-present and integrated component of the urban fabric.

2.4.4.2 Superstructure elements in detail

Every structure that is conceived and constructed inherently possesses a programme. Even the absence of a specific programme implies the presence of a programme defined by the absence itself. What then might be the programme of an urban superstructural element?

An urban superstructure can be understood as a stem framework lacking a defined specialisation, yet serving as a foundational entity capable of accommodating any supplementary or parasitic programme. Such a superstructure must therefore fulfil three fundamental requirements:

- → ***STABILITY*: The structural system must be designed to ensure self-support while accommodating anticipated additional static and dynamic loads. Achieving this will necessitate substantial engineering expertise and considerable investment.**
- → ***SERVICING*: Provision of essential services and systems is critical to support habitation. These include water supply, sewerage, drainage, energy infrastructure, and communications technology, among others.**
- → ***ACCESS*: The design must facilitate convenient ingress and egress as dictated by the programme. It must also prioritise safe and efficient evacuation in response to threats such as fire.**

Most infrastructural projects, including bridges, viaducts, and railway lines, are typically designed with lifespans exceeding a century. Given the substantial resource costs associated with the procurement of such structures, they are engineered to maximise service longevity, thereby justifying the investment, and ensuring sustainable utility. Consequently, the envisioned lifespan of the superstructures at Redcliffe is set to target a 200-year service life. This lifespan will depend on the implementation of robust maintenance, replacement, and repair regimes. Such an extended service life is a crucial consideration influencing the construction and assembly strategy of the proposed urban system.

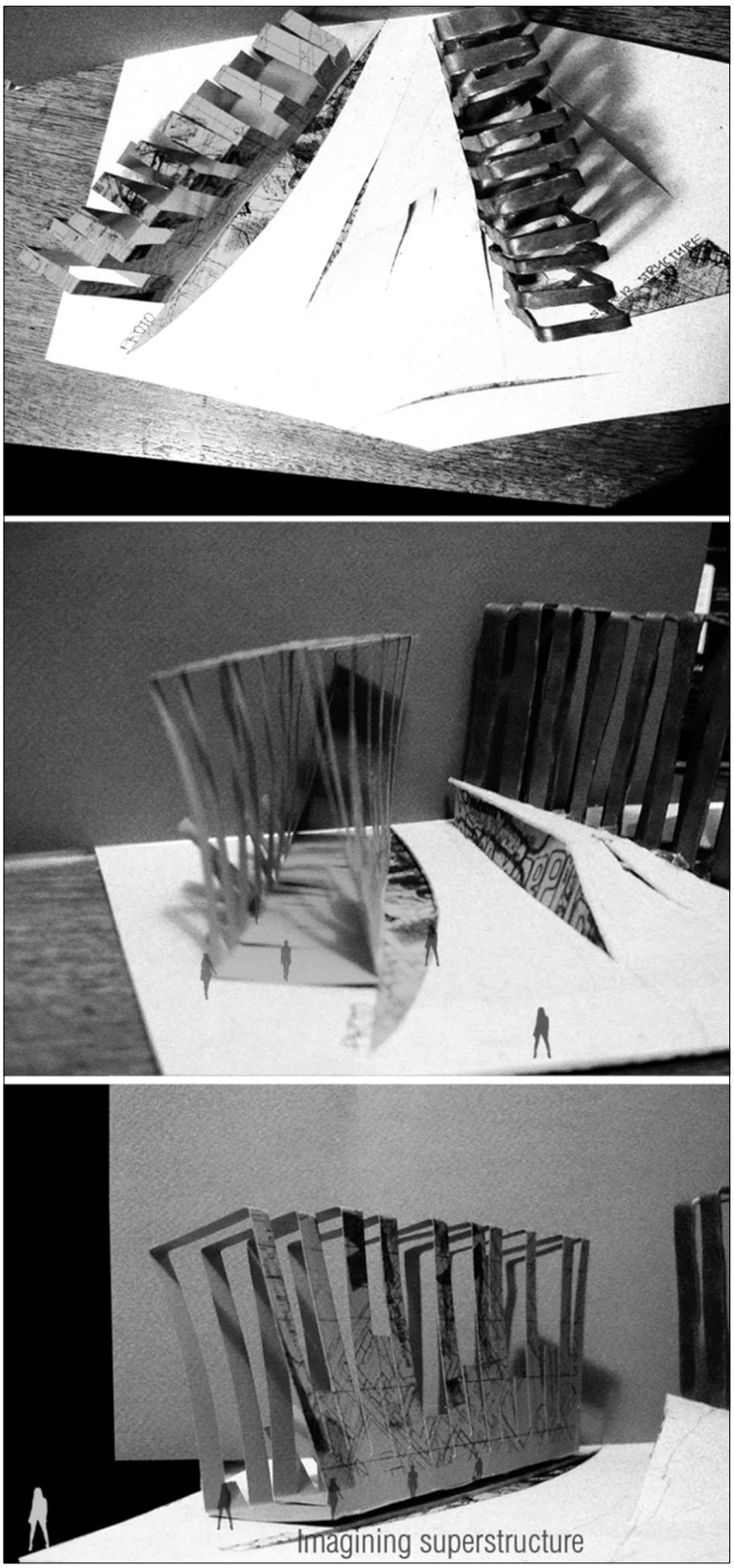


Plate 44. Proto-superstructural systems #1 and #2.

Developing arrangements and compositions necessitates the iterative process of prototyping to explore and refine possible scenarios effectively and comprehensively.

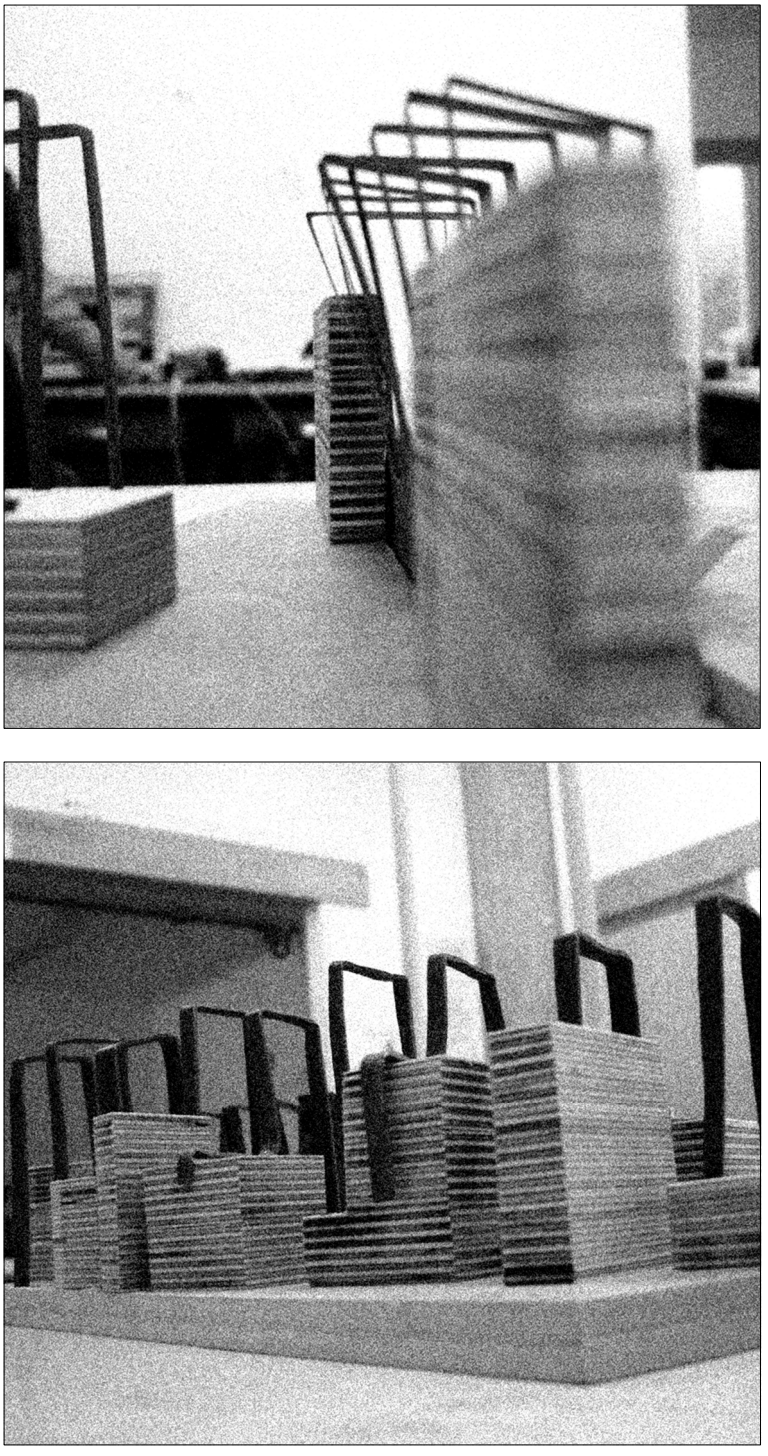


Plate 45. Proto-superstructural systems #3 (above) and, #4 (below).

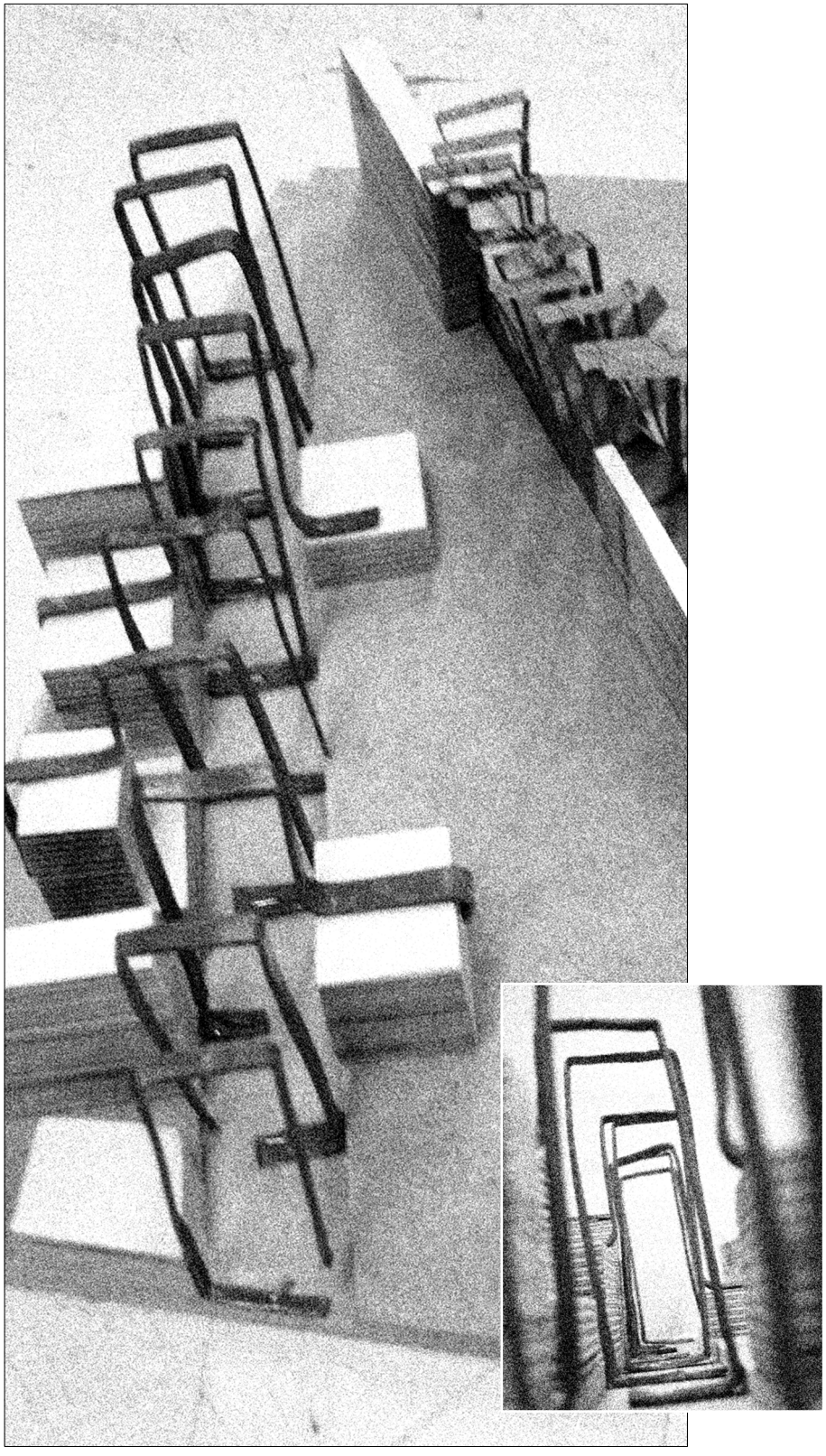


Plate 46. Proto-superstructural systems #3 and #4, inset #4.

2.4.4.3 Form and materiality

Plate 47. Steel superstructures as vertical 'urban cores'.

The steel superstructures function as critical engineering elements, creating a sequence of vertical 'urban cores' within the landscape. These cores effectively integrate structural engineering with spatial planning, fostering interconnected urban zones. By addressing verticality, they contribute to optimised land utilisation and enhanced urban density.

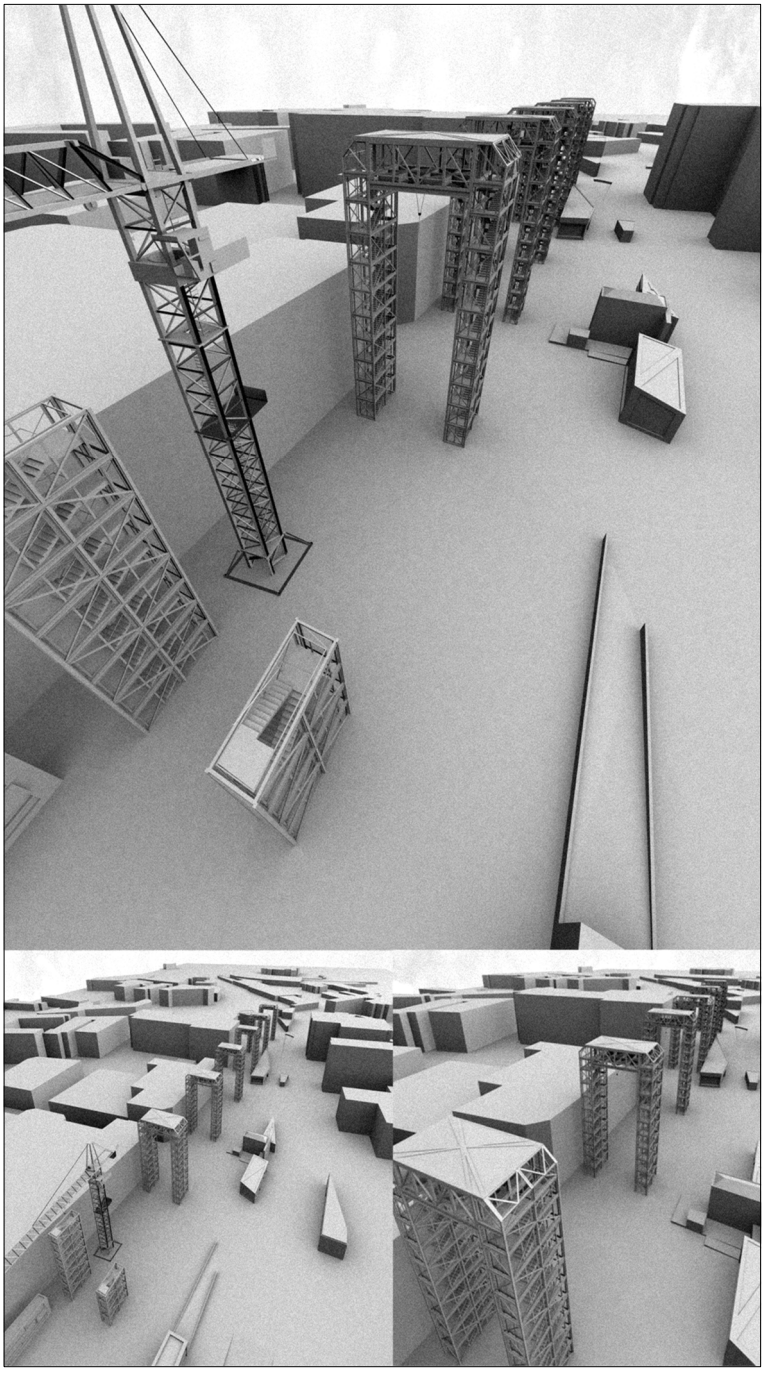


Plate 48. In their bare form they are engineered urban structures.

For superstructures to achieve practical functionality, they must demonstrate adaptability in both construction and assembly processes. Steel construction excels in offering such flexibility, facilitating the modification or replacement of structural components as necessary. This modularity

ensures responsiveness to dynamic requirements, supports sustainability, and enhances the long-term usability of this framework in an evolving urban environment.

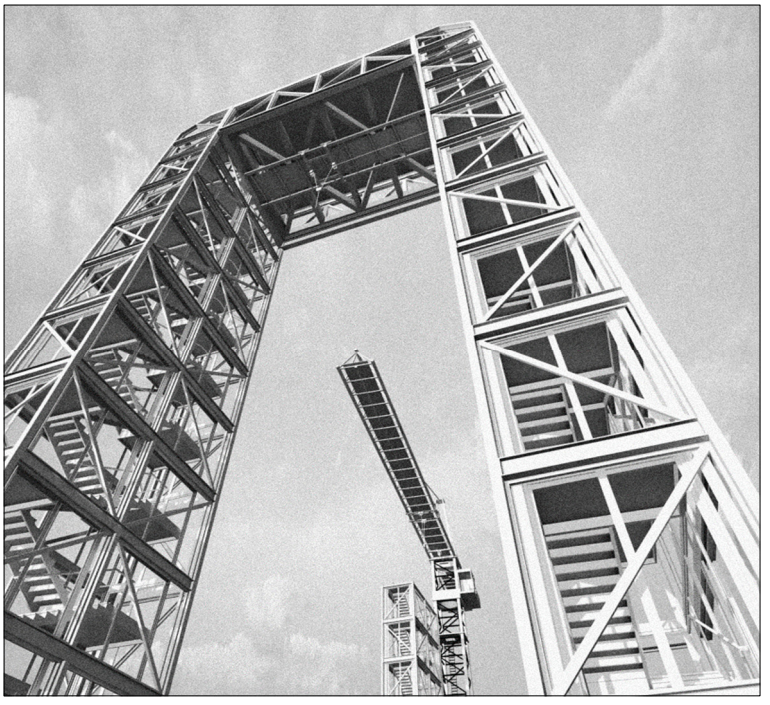


Plate 49. Steel construction offers adaptability, allowing for the addition and removal of segments and elements as needed.

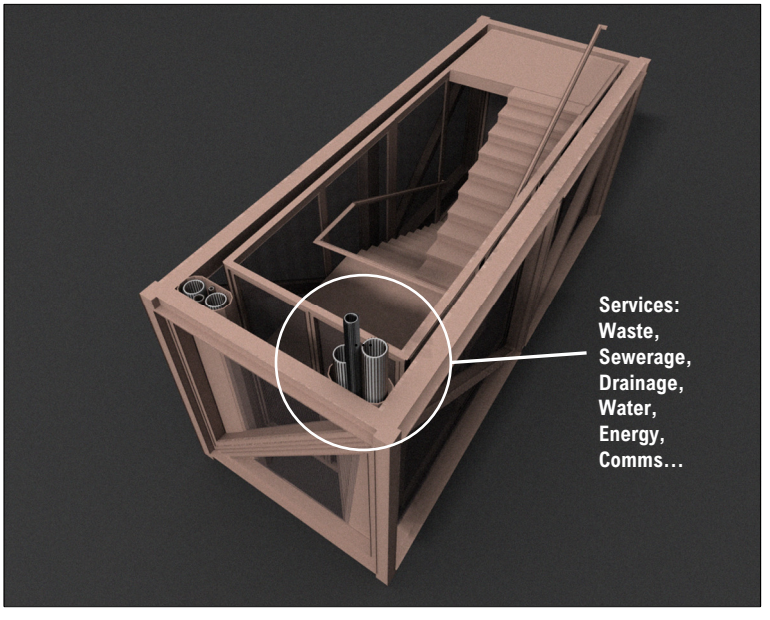


Plate 50. Further layers of flexibility are added using standardised construction components and units.

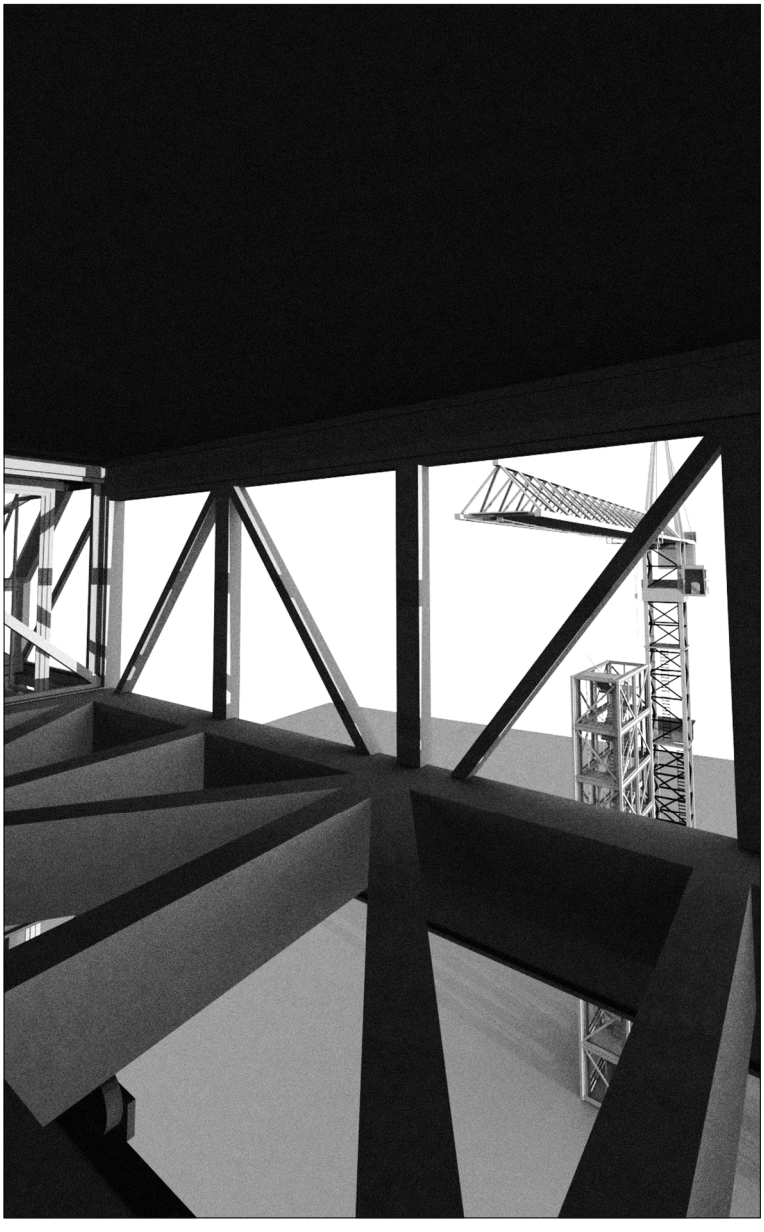


Plate 51. Upper bridging deck (an elective construction).

The upper bridging decks connecting the vertical cores will be constructed if or when necessitated by future developments, modifications, or expansions, thereby embodying a speculative scenario. This approach optimises resource allocation and reduces initial material expenditure, aligning with sustainable construction principles. It allows the urban superstructure to remain adaptable, addressing potential future demands without imposing unnecessary structural burdens.

2.4.4.4 Superstructures adopting a specific agenda

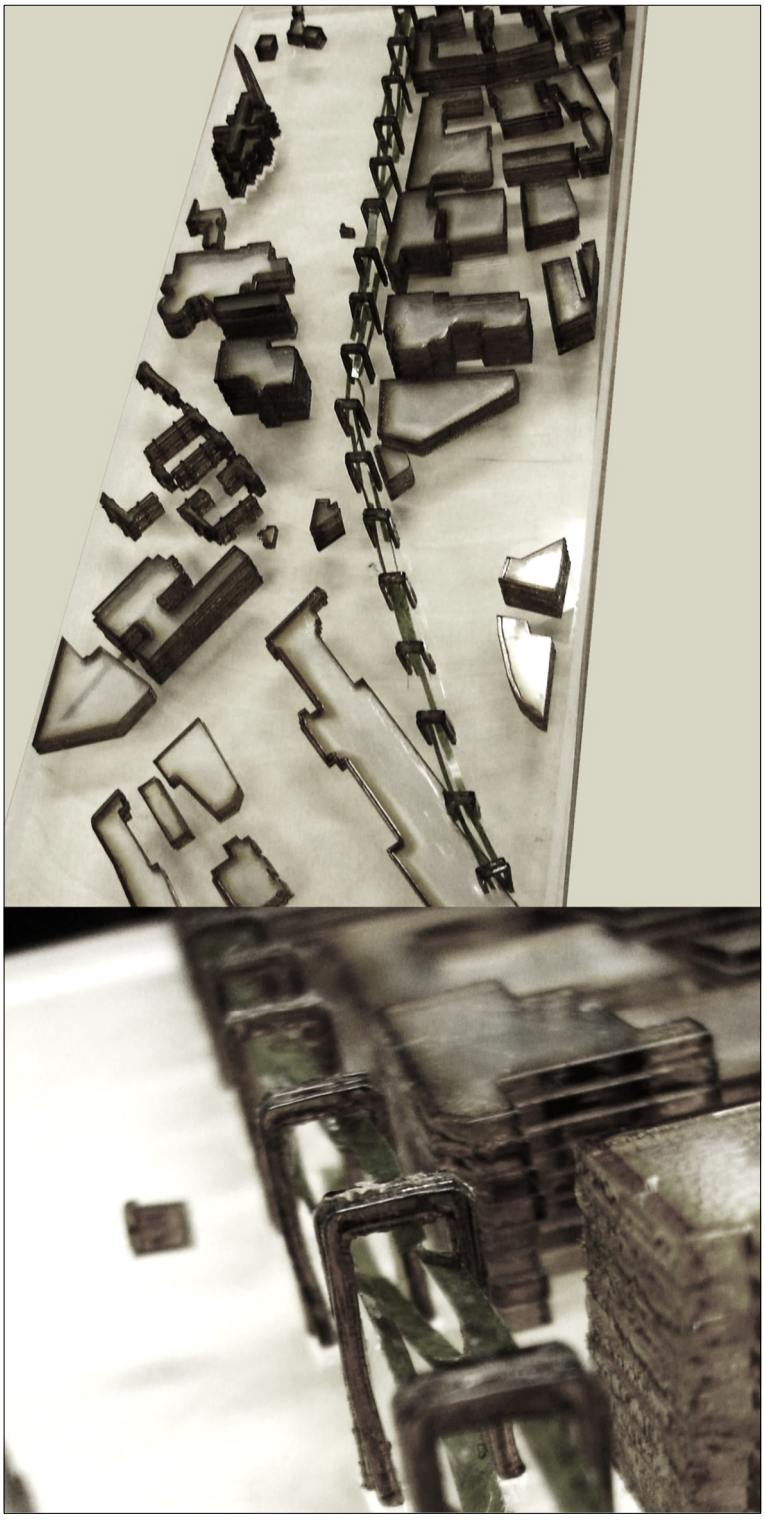


Plate 52. Superstructures populated by hydroponic vegetation systems will create a new urban ecology.

[03]

[3.0] BUILDING-SCALE

[3.1] Transient dwelling in an urban garden

Transient occupancy in the city of Bristol is accommodated by a range of average to luxury inns, budget hostels, and bed and breakfast establishments. The approach and service offered by these institutions remain conformist and do not attempt to address anything beyond what is conventionally expected by a transient occupant of the city.

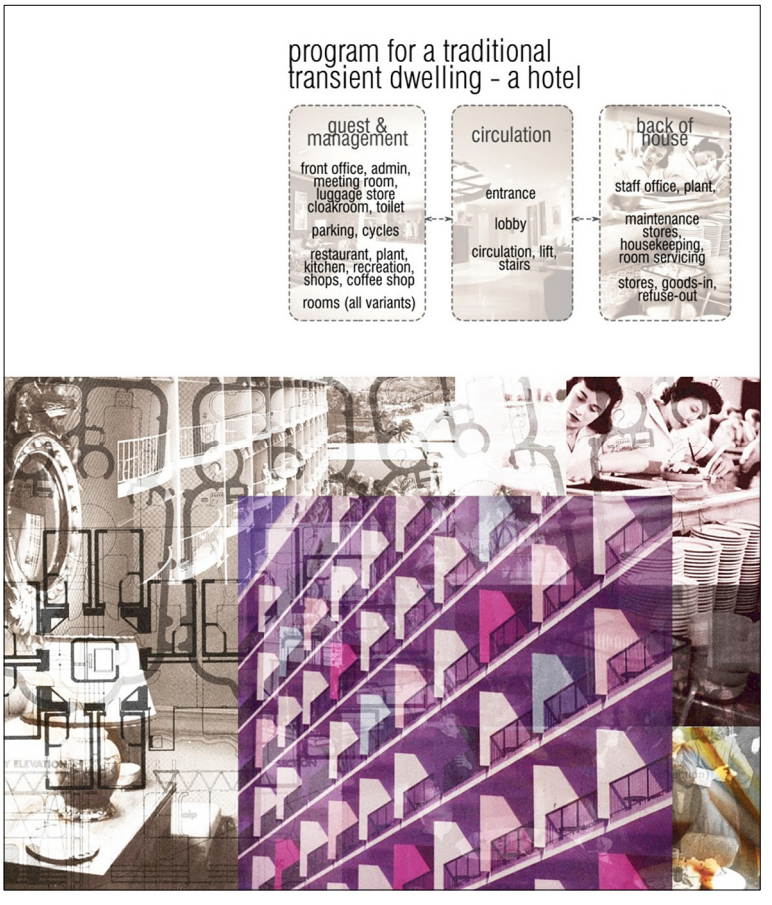


Plate 53. The traditional model of inns and hostels in Bristol.

[3.2] Hydroponic cultivation

In recent years, there has been a growing awareness and promotion of what is collectively referred to as a 'greener way of living'. The general population is increasingly encouraged to adopt a low-carbon lifestyle by reducing resource consumption, and where feasible by sourcing products from environmentally sustainable origins. Within this framework, the practice of growing one's own food has gained substantial popularity amongst the British public, an interest that is strongly rooted in the country's longstanding cultural affinity for gardening and cultivation. Consequently, self-sufficiency has become a central tenet of contemporary attitudes towards living, emerging as a significant movement that advocates for greater autonomy in food production (Viljoen, 2005).

However, the pursuit of a self-sufficient lifestyle is often constrained by the urban environment. In many cities, land is either scarce or contaminated due to decades of industrial activity, making cultivation a challenging endeavour. Moreover, urban areas are characterised by rapidly changing attitudes and patterns that influence their organisation, distribution, and form. As a result, conducting studies to identify optimal growing conditions in urban settings is rendered difficult, as future urban changes are inherently unpredictable. Any identified optimal conditions would therefore only be valid for a limited time, as constantly changing urban morphologies could easily negate these conditions. For instance, a sunny patch in a central urban area such as Redcliffe could easily be overshadowed by new construction projects. Thus, the dynamic nature of cities, coupled with the specific requirements of cultivation, creates a fundamental tension. If cultivation is to be pursued as a sustained activity, it must be governed by a process of control. The most viable approach is therefore to embrace the fundamental characteristic that defines urban environments: the persistent desire to manage and control surroundings (Resh, 1981; Viljoen, 2005).

Controlled cultivation is by no means a novel concept and has longstanding use across various cultures. Historically, such methods were employed to enhance yields in conditions where traditional farming practices were ineffective. In recent years the 'hydroponic method' has attracted significant attention, particularly for its potential use in densely arranged urban environments (Resh, 1981). It is a soilless cultivation method that has been explored extensively, including space-related research. NASA for instance, has conducted numerous studies on the application of hydroponics for future space stations and potential planetary colonisation missions (Morrow, 2001; Jones & Rugh, 2004). This development signifies the growing recognition of hydroponics not only as a practical solution for urban agriculture on this planet, but also as an essential technology for space colonisation.

Plate 54. Hydroponic living wall at the Quai Branly in Paris.

The architectural community has also shown increasing interest in hydroponic cultivation in recent years, although as some critics might argue, this interest is often driven more by the perceived 'green aesthetic' rather than a genuine commitment to sustainable practices. Green roofs or walls, for example, have become characteristic of the 'green' architectural discourse that certain urban-theorists and architects are championing. This raises an important question: are such hydroponic systems genuinely functional and purposeful, or are they primarily employed for superficial aesthetic purposes? The central aim of this thesis is to advocate for the use of hydroponic systems as building integrated solutions, designed not merely as decorative features but as meaningful contributions that encourage urban cultivation practices and foster a sustainable urban environment.

[3.2.1] Benefits of hydroponic cultivation

Hydroponic cultivation offers many benefits, making it an appealing method for modern agriculture. Hydroponic systems:

- **Can be utilised in environments where traditional agronomy is simply impractical (e.g., harsh environments).**
- **Offer significantly higher crop yields: for instance, a family of four using conventional agronomy would require 235 m² of land to produce enough vegetables. In contrast, the same amount of produce grown hydroponically requires only 12 m² of space (Dickerman, 1975).**
- **Facilitate faster growth rates: for example, tomatoes ripen in 8 to 10 weeks, cucumbers can mature in as little as 5 days, and bib lettuce reaches harvest-ready status in 40 days from seedling see Table 1 (Dickerman, 1975).**
- **Easy to maintain; cultivating a 235 m² plot with traditional methods requires constant attention, whereas a 12 m² hydroponic unit needs only a couple of hours of maintenance per week. Furthermore, the maintenance process can be easily automated (Morrow, 2001).**
- **The controlled environment ensures freedom from diseases, consistent crop production, and the possibility of cultivating plants out of season (Jones & Rugh, 2004).**

- Hydroponically grown plants are not inferior in flavour to conventionally grown ones, with analyses showing no significant deficiencies in vitamin or nutritional content (Jones, 2005).
- The process is also highly water-efficient, as most of the water used is recycled (Morrow, 2001).

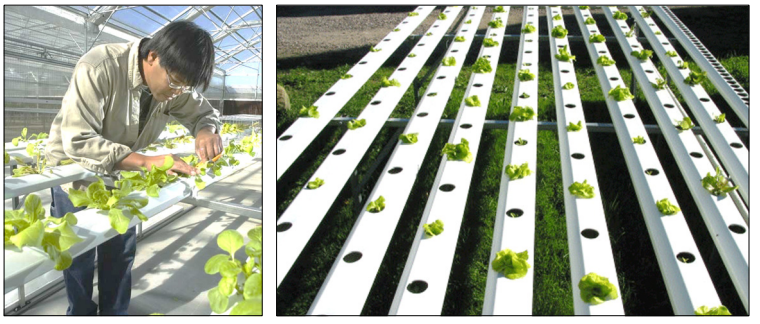


Plate 55. Hydroponic units with automated mineral nutrient tracks.

[3.2.2] Hydroponic yields

The following table reflects the general trends reported by Dickerman (1975) considering hydroponic versus traditional soil-based cultivation, demonstrating the former's benefits in terms of space efficiency, faster growth rates, and yields.

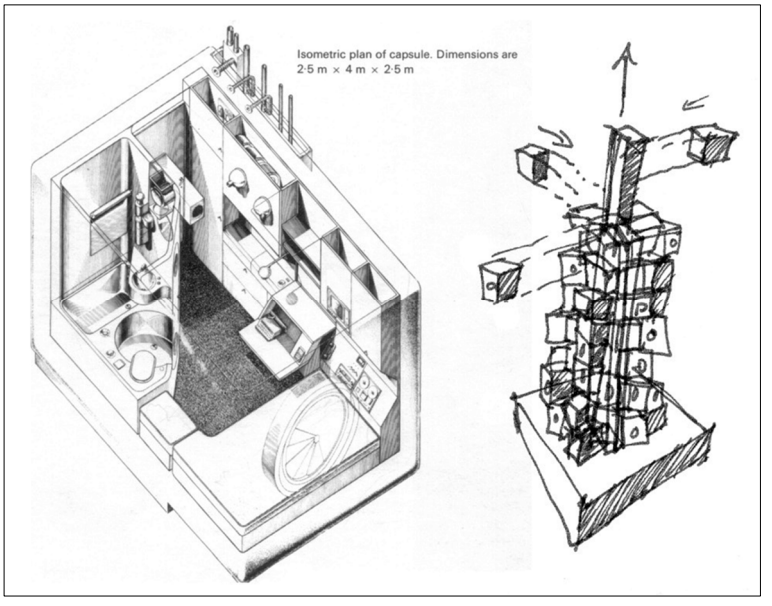
Table 1. Hydroponic vs ordinary soil yields.

Crop	Hydroponic Yield (per m²)	Soil Yield (per m²)	Time to Harvest (Hydroponic)	Time to Harvest (Soil)
Tomatoes	20–40 kg	10–20 kg	8–10 weeks	10–14 weeks
Cucumbers	15–25 kg	5–15 kg	5–7 days	7–14 days
Lettuce (Bib)	10–20 heads	4–8 heads	40–45 days	50–75 days
Spinach	4–6 kg	2–4 kg	30–35 days	40–60 days
Strawberries	3–5 kg	2–4 kg	8–12 weeks	8–12 weeks
Herbs (e.g., Basil)	3–6 kg	1–3 kg	30–35 days	50–60 days
Peppers	15–25 kg	6–15 kg	10–12 weeks	12–16 weeks
Radishes	4–5 kg	2–3 kg	20–30 days	30–45 days
Carrots	8–12 kg	5–10 kg	50–60 days	70–90 days

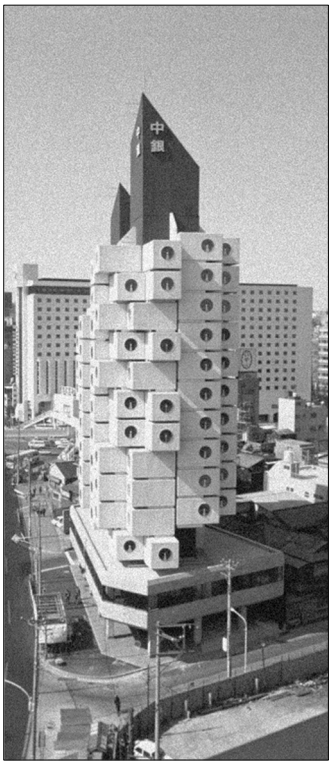
[3.3] Two precedents

This section explores the evolution of compact living and modular construction through two seminal case studies: the Nakagin Capsule Tower and Archigram's Living Pod. The Nakagin Tower, serves as a practical example of compact urban living and modular architecture. Its detachable capsule units embody adaptability and efficient spatial use, highlighting the potential of prefabricated construction for densely populated cities. Archigram's Living Pod offers a visionary counterpoint. As an experimental design rooted in radical 'Futurism', it reimagines individual dwelling spaces, integrating essential living functions into a mobile, self-contained pod. Though unrealised, their design challenged conventional ideas of habitation, emphasising portability, autonomy, and technological integration. By comparing the Nakagin Capsule Tower's tangible contribution with Archigram's speculative innovation, this section examines the interplay between design, functionality, and the future of living in constrained and everchanging environments.

[3.3.1] Nakagin Capsule Tower



Location: Ginza, Tokyo, Japan
Building Type: Residential
Total floor area: 3,091.23 m^2
Capsule dimensions: 2.5 × 4 × 25 m

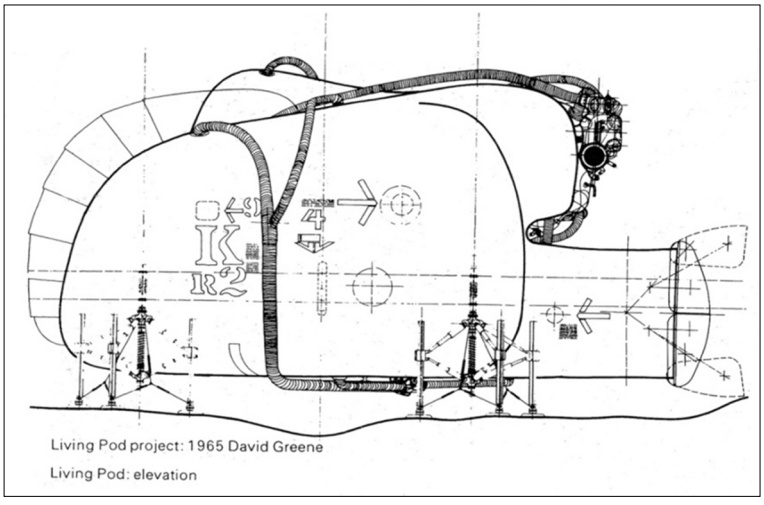


The Nakagin Capsule Tower, designed by Kisho Kurokawa and completed in 1972, is a symbol of Japan's 'Metabolism' movement. The building features prefabricated capsules, offering adaptable, modular living and workspaces. It represents a visionary approach to urban architecture, emphasising flexibility and sustainability in a rapidly changing metropolitan environment (Kurokawa, 2005).

The capsules were factory fabricated and fitted out with utilities, interior fittings, etc., and were attached to the concrete core towers. Each capsule was secured to the shaft by four high-tension bolts and independently cantilevered from the shaft, allowing for the easy removal of any capsule without affecting the others. The capsule design is straightforward, with the primary structure being an all-welded lightweight steel-truss box. The exterior was covered with galvanized, rib-reinforced steel panels. Following fabrication, the panels were coated with rust-preventative paint and finished with a coat of glossy spray (Kurokawa, 2005).

The Nakagin Capsule Tower demonstrates the value of modular, prefabricated architecture in promoting flexibility and sustainability. It underscored the importance of designing adaptable, future-proof structures capable of easy modification and maintenance. The project also highlighted the potential for innovative urban solutions in rapidly evolving cities, championed by the Japanese 'Metabolism' movement.

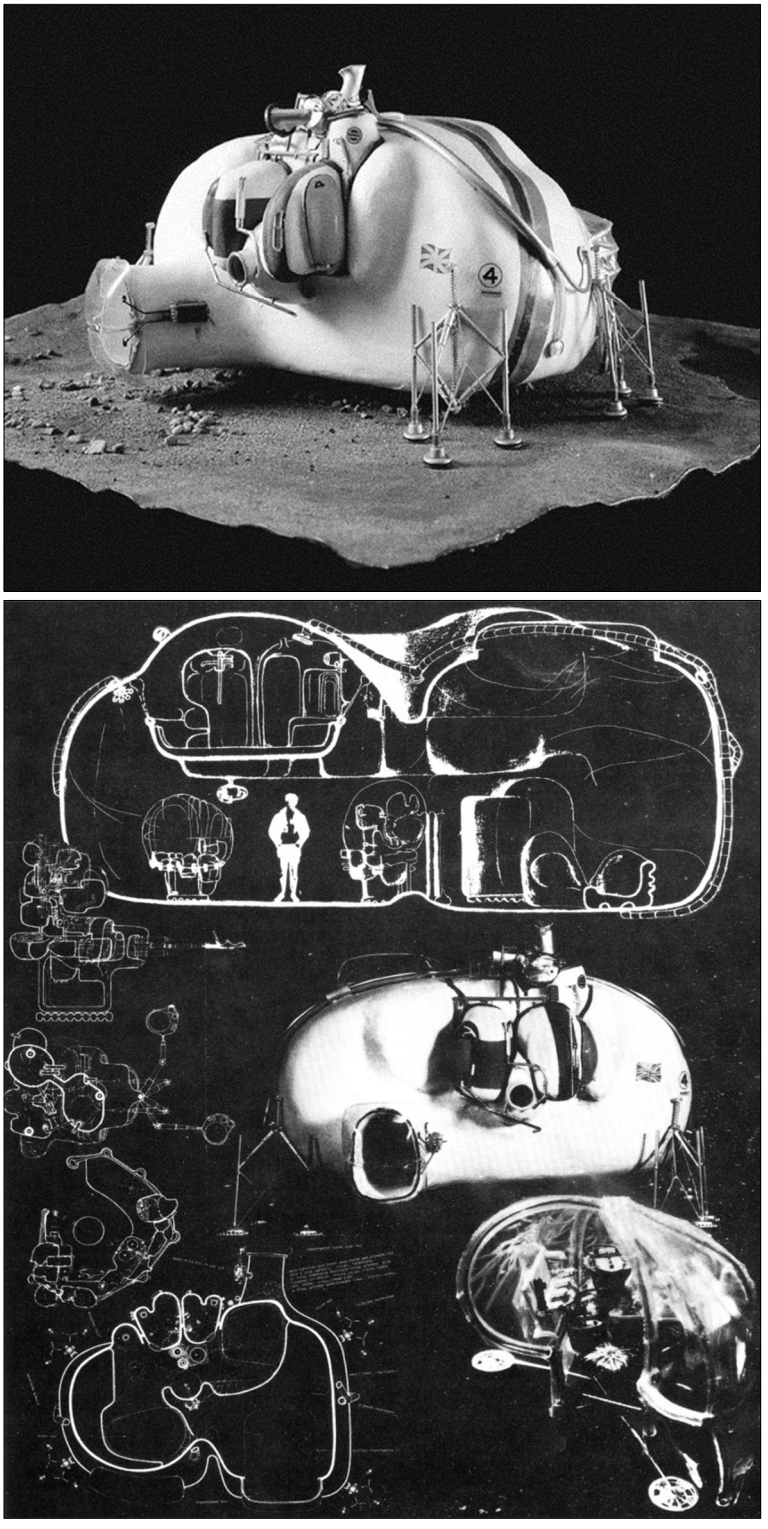
[3.3.2] Archigram's Living Pod



Living Pod project: 1965 David Greene
Living Pod: elevation

The Living Pod, conceived in the 1960s by the avant-garde architectural group Archigram (Sadler, 2005), represented a radical departure from traditional housing concepts, offering a vision of mobile, adaptable, and self-sufficient living. The Living Pod was envisioned as a compact, transportable unit, designed to address the rapidly changing demands of modern life, technological advancement, and the burgeoning consumer society. Drawing inspiration from technological innovations and the growing fascination with pop culture, the Living Pod proposed a modular, flexible environment that could be personalised according to individual needs (Cook, 1991).

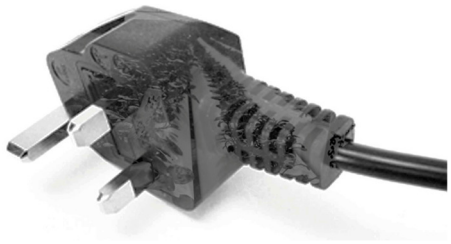
The design, characterised by its futuristic aesthetic and the use of novel materials, envisioned an autonomous lifestyle where inhabitants could live, work, and interact with technology seamlessly. Though never realised, the Living Pod became a symbol of Archigram's broader philosophy, which sought to challenge the status quo of architectural design and push the boundaries of what could be considered a habitable space. Through this conceptual project, they explored ideas of mobility, technology, and the relationship between individuals and their environment, influencing generations of architects and designers in the process (Bayer, 2003).



The Living Pod Project, designed in 1965 by David Greene. The original model (above); and a collage comprising, general section, food machine section, food machine plan; model (by David Greene and Buddy Clarke), teaching machine plan, teaching machine model, and general plan.

Plate 56. Survival mechanics, food machines, and Living Pods.

[3.4] Specifics: brief for the principal building project



the Garden Inn
a colony for the transient gardener and farmer

The proposed plugin is envisioned as a 'nodal trigger,' designed to establish a framework for setting an agenda within the otherwise neutral infrastructural system. This agenda centres on the potential for introducing urban cultivation as a viable and beneficial endeavour for the Redcliffe urban district. By offering an exemplar initiative, manifested as a Garden Inn, the project aims to illustrate that urban cultivation can be a sustainable and worthwhile prospect for the proposed infrastructural framework. Should the exemplar prove successful, it could lay the foundation for advocating the integration of urban cultivation throughout the entire infrastructural system, fostering an urban ecology that benefits not only Redcliffe but the wider city of Bristol.

The 'nodal trigger,' or Garden Inn (as detailed subsequently), incorporates hydroponic technology to investigate the feasibility of urban cultivation. It provides individuals with the opportunity to engage directly with the technology, participating in an ongoing socioeconomic experiment. The initiative seeks to make the ideal of self-sufficiency (i.e., growing one's own food), accessible to people from all backgrounds, irrespective of their permanent or transient status in the city.

Thus, the act of growing one's own food is no longer restricted to the rooted rural inhabitant, but becomes attainable for the transient urban resident as well.

[3.4.1] Expected occupational models

The proposal outlines three distinct models: short-term, mid-term, and long-term lease arrangements, designed to provide flexible and adaptable options to suit varying occupancy needs and durations.

Short-term leases (4 to 8 weeks):

Targeted at portable hydroponic gardening enthusiasts, this group currently is the lowest probability of occupancy.

Mid-term leases (8 to 16 weeks):

Designed for frequent yet transient city visitors, such as exchange students, employees on temporary assignments, or individuals on short-term secondments. This group is currently the most probable user base.

Long-term leases (16 weeks to a year):

Aimed at somewhat established yet transient city occupiers, such as individuals who work in Bristol part-time (e.g., 2 to 5 days a week) and spend the remainder of their time in nearby locations like Bath or London.

[3.4.2] Occupational modes

Lease agreement durations proposed:

- **Minimum period for a garden room is 4 weeks.**
- **Minimum period for a garden research unit is 8 weeks.**
- **Maximum duration of a single lease agreement is 1 year.**
- **Leases may be extended, subject to availability.**

Managed Garden Sponsorships Proposed:

- **Tailored based on crop types.**
- **Sponsorship costs calculated on the basis of average per-person consumption over four-week intervals (e.g., sponsorship for a four-week supply of tomatoes).**

Assistance and Maintenance Packages Proposed:

- ***Maintenance assistance:*** **Packages for garden room units, covering the upkeep of hydroponic systems and the harvesting of crops during occupant absences.**
- ***Advanced hydroponic tutorials and advice:*** **Expert-led tutorials on advanced hydroponic techniques offered through scheduled research seminars, charged on a per-person, per-seminar basis.**
- ***Individual expert advice:*** **Personalised consultation sessions with research unit staff, available by appointment and charged at an hourly rate.**

[3.4.3] Proposed gardener credit scheme

Individual garden room surplus produce may be sold back to the Inn's management in exchange for gardener credit points. These points may then be redeemed for meals at the Garden Inn restaurant, to purchase hydroponic supplies, and/or for sponsorship payments.

[3.4.4] Schedule of accommodation for the proposed Garden Inn

Table 2. The Garden Inn's schedule of accommodation.

SPACES	DESCRIPTION	APPROX. AREA (m^2)	NUMBER OF UNITS
Garden rooms	Single occupant bedded - basic hydroponic infrastructure	15 per unit	40
Garden research units	1-4 occupants, non-bedded advanced hydroponic infrastructure	25 per unit	10
Main managed garden area	Designated plots for crop types and lease types Advanced hydroponic infrastructure	100	1
Garden research laboratory	Non-bedded Advanced hydroponic infrastructure Attached to the University of Bristol	45	1
Research office	One bedded, other non-bedded	25	2
Research library	Specialised in hydroponic literature; Attached to the University of Bristol	40	1
Management office	One bedded unit	10	2
Restaurant + Kitchen	Catering harvested produce along with locally sourced meat produce	70	1
Sales outlet + store	Retailing both produce and hydroponic supplies	35	1
Harvest stores	Chilled storage and packaging	20	1
Goods in and out stores	Supply	25	1
Plant	Rainwater harvester + nutrient solution recycling plant	10	2
General WCs		30	3
Circulation	20%	273	
TOTAL		**1638**	

[3.4.5] Critical adjacencies diagram

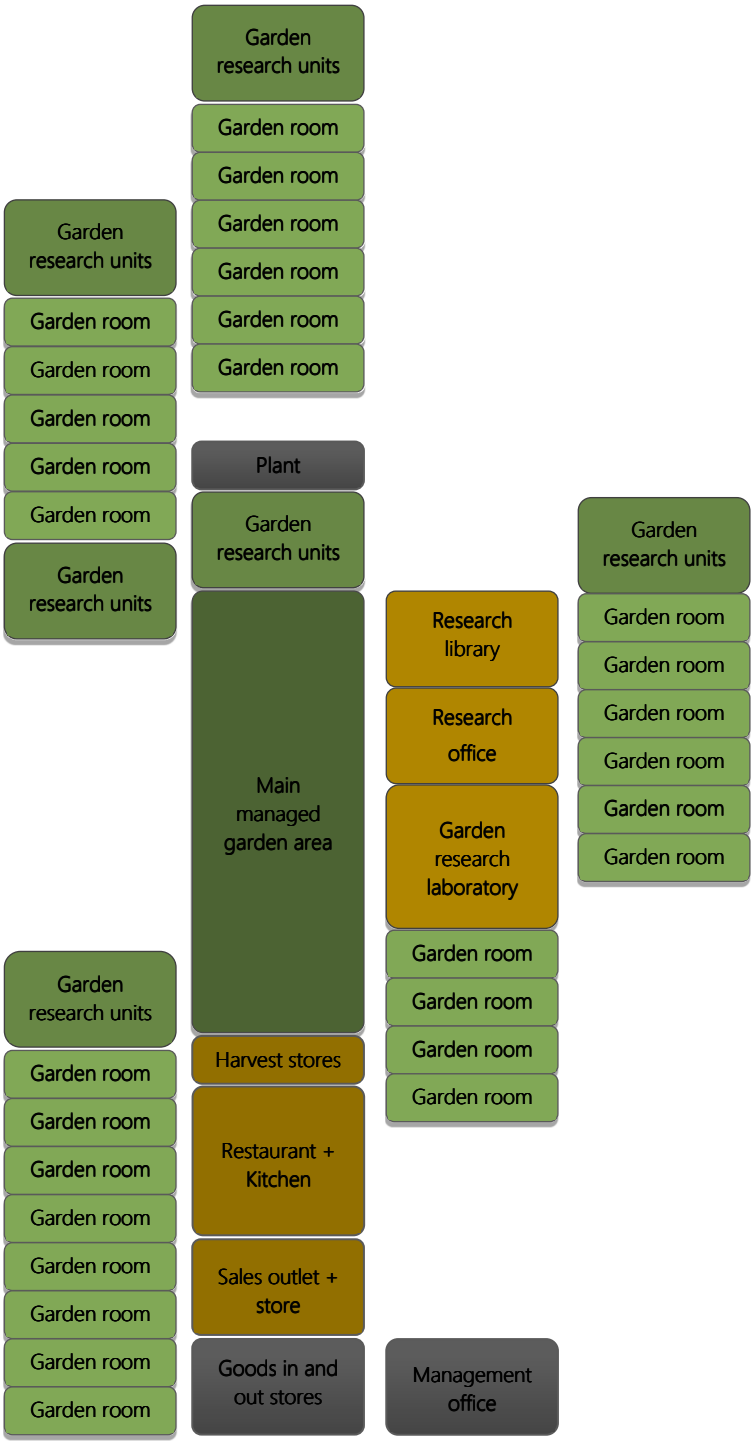


Plate 57. Garden rooms are strategically positioned in close proximity to research units, facilitating a direct integration of individual cultivation with research insights, thereby ensuring professional support and assistance is consistently available.

[3.4.6] Sustainable operation and management

The Garden Inn, by its very initiation places sustainability as a foundational objective. As outlined in the brief, the Inn is conceived as a strategic initiative with ambitious socioeconomic and environmental goals aimed at fostering the development of a novel urban ecology. The project is therefore concerned with all three pillars of sustainability: environmental, economic, and social, which serve as its foundational principles. Section [2.4] has already explored the social and economic objectives, while the present section focuses on the environmental concerns and proposed applications.

Plate 58. Rainwater harvesting and closed loop systems.

The project carries an essential responsibility to align its operational and management processes with the overarching sustainability objectives of the urban masterplan. Water conservation is a prominent focus, addressed by the utilisation of the exceptional water-use efficiency of hydroponic farming, achieved via closed loop systems. Furthermore, the Inn would incorporate greywater recycling systems to supply its water demands, thereby reducing reliance on the city water grid and contributing to overall resource efficiency.

The project strategically implements a staggered arrangement of decks to increase roof area, which accommodates rainwater harvesters, solar panels, and algae tubes. This design facilitates efficient water usage by capturing and reusing rainwater, while the inclusion of solar panels enhances sustainable energy generation. The integration of algae tubes further contributes to the production of bioenergy, promoting an innovative approach to renewable resources. Collectively, these elements not only advance the project's environmental sustainability goals, but also underscore its commitment to addressing energy and water efficiency challenges through building integrated technological solutions.

In the meantime, the urban garden at ground level employs a phased planting approach to facilitate land decontamination, ensuring the restoration of soil quality over time. Located at the bases of superstructure access cores, plant matter recycling centres will convert organic waste into nutrient-rich compost, supporting future cultivation efforts. Additionally, the land area will be optimised through the integration of geothermal and district heating loops, enhancing sustainable energy utilisation. These loops will channel energy upwards into the decks via superstructure service cores, presenting efficient thermal energy distribution. This holistic strategy underscores the project's commitment to environmental remediation and sustainable resource management.

This multifaceted approach exemplifies sustainable and regenerative urban design by combining ecological restoration, energy efficiency, and resource optimisation. It addresses challenges like land decontamination and renewable energy integration, fostering balance between natural and manmade urban systems. The design creates adaptive, self-sustaining spaces while promoting environmental stewardship, reflecting its transformative potential for future urban development and sustainable growth.

[3.5] A day in the life of an itinerate gardener

The following is a fictional account of an itinerant gardener's day in Redcliffe, presented to illustrate how the experience of occupying this distinctive Inn is likely to unfold.

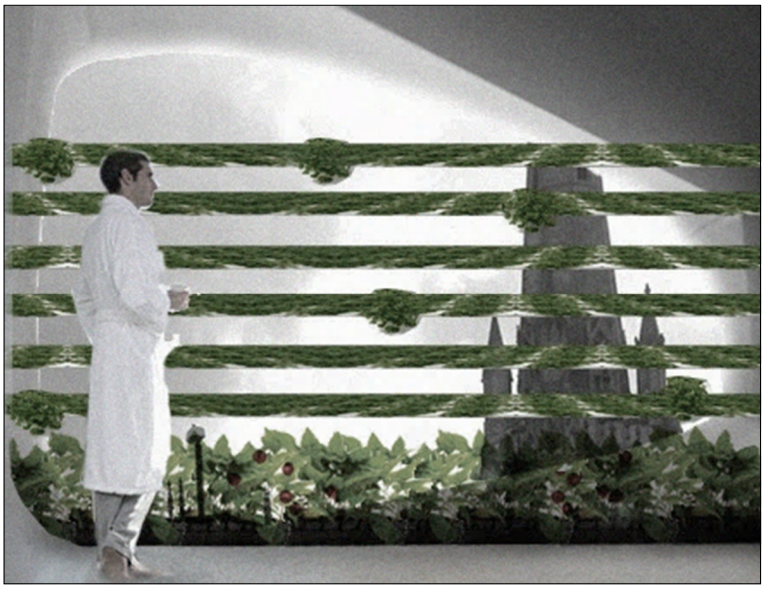


Plate 59. Edward's view from a garden room terrace.

The sunlight filtered through the leafy canopy of Edward's precious garden in the sky, painting the room in amber hues and emerald reflections. His plants seemed to hum a new melody with every dawn, a spectrum of emerald tones interjected by vibrant blossoms. Today, the tomatoes gleamed with scarlet abundance and conceited plumpness, but the strawberries, shy and hesitant, seemed to whisper unease. Edward sighed, wondering if his nutrient-mix that lacked the nourishment they craved. Resolving to consult a technician at the research unit, he tucked the concern away for later.

Vigorous from his rainwater-fed shower, Edward felt a slight thrill as he checked the solution pH levels. All seemed in balance, a promising start to the day. Stepping outside of his room, he marvelled at the 'Vineyard Avenue' of his urban

oasis in the sky. Glistening seedless grapes cascaded from their trellises, inviting passersby to pluck the treats as they wandered through the deck walkways. This privilege, Edward mused, was the reward for his commitment.

Edward is a town planner in his early-forties, and had found himself dividing his life between two cities, bustling London, where his wife Sarah and daughters Gemma and Sonali lived, and the bohemian streets of Bristol, where his work had recently stationed him. The dual-city life had once been a whirlwind of stress and logistical difficulties, but the discovery of this "Garden Inn" had changed everything. Part farm, part restaurant, and part inn, it blended high technology with sustainable cultivation to present its residents with the opportunity to grow their own produce, and thrive in a mutually respectful ecosystem. Edward had been captivated by this fusion of tradition and innovation, ever since a colleague had introduced him to this novel lifestyle.

The inn was not just a place to rest his mind; it revived a passion buried beneath years of the troubles of urban living. It resurfaced memories of his father, and the weekend afternoons spent at their North London allotment, tending to vegetable rows, and him celebrating their homegrown triumphs with a spirited glass of sloe gin. Edward could still hear his father's delighted exclamations, proclaiming the latest harvest as a testament to their industrious green fingers.

For years, such a connection to nature and growing things had been a dream deferred. The relentless pressures of city life and the unyielding competition for green space in London had pushed his gardening aspirations to his life's margins, realisable only after retirement. But now here in Bristol, surrounded by lush greenery and creative gardening, Edward's passion had blossomed anew. That evening he called Sarah and the girls, his voice bursting with pride. "I've finally done it", he told them. "I've created a secret garden in the sky".

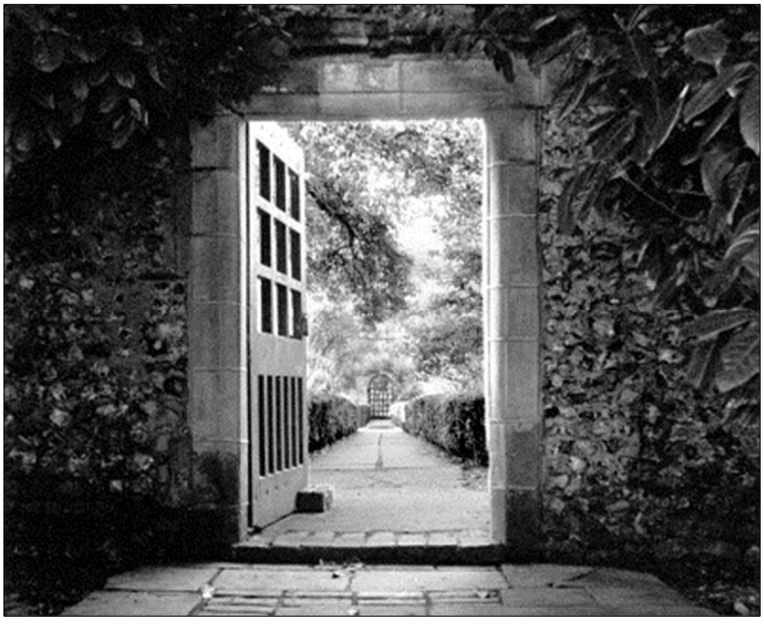


Plate 60. Entrance to a secret garden.

It was the end of his thirty-fourth week in Bristol, and with his tasks complete, the thought of heading home to the capital brought a familiar warmth. Yet, before departing, Edward could not resist one last visit to his cherished garden in the sky. There, he gathered his latest harvest, plump tomatoes and vibrant baby carrots from his own terrace, as well as the week's yield from his sponsored plots. These he wrapped and packed with care, envisioning the delight they would bring to Sarah and his daughters.

The weakening strawberries however, still weighed on his mind. If only he could encourage them back to good health, they too might find their place among the offerings for the next weekend. In his secret garden, Edward dreamed of a future when strawberries flourished year-round, where the seasons themselves surrendered to his nurturing intent.

As much as he longed to reunite with his family, the promise of next week's return already excited him. New growth, fresh blossoms, and the ever-surprising rewards of his garden awaited. Each visit to this urban Eden renewed him, as though the garden gave back more than what it received...

[04]

[4.0] COMPONENT-SCALE

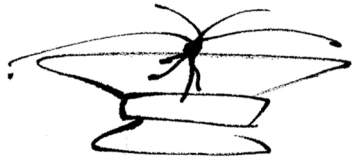


Plate 61. The Blade, a sectional sketch.

While earlier chapters addressed the macro-scale urban agenda and the building-scale concept and programme underpinning the project, this section focuses on its microscale detail. This detail 'component' presented here serves as a precise embodiment of the thesis's overarching objective: to promote cultivation practices within an urban context at a microscale, which can then be aggregated to create a comprehensive urban ecology at the macroscale. This component driver is conceptualised as a modular hydroponic unit, designed to seamlessly integrate into the architectural and structural framework of the proposed Garden Inn.

[4.1] The hydroponic *BLADE*

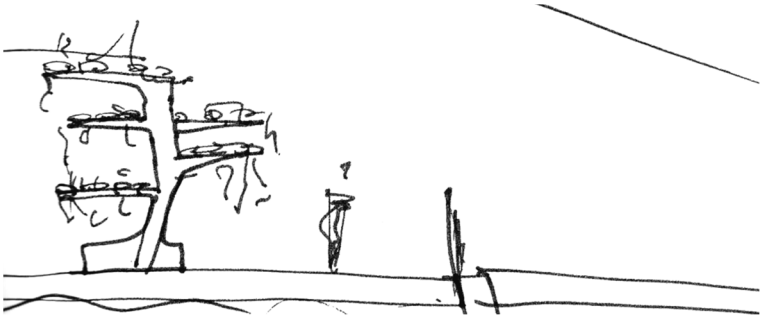
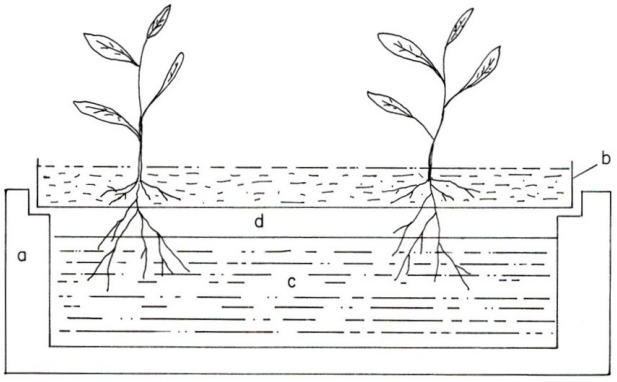


Plate 62. Arrangement, sectional sketch of Blade racks.

The proposed tray unit is not unique in its technical specification, as it retains the standard functionality characteristic of a typical hydroponic tray unit (see Plate 63). The aim of this component exercise was to adapt this proven technological

approach to harmonise more effectively with the tectonic language envisioned for this project. This integration seeks to align the practical functionality of the unit with the conceptual aspirations of the broader design.



a. **Tank:** Constructed from GRC or alternative materials.

b. **Framework:** Wire mesh used to support plants in a 'seed bed' positioned above the nutrient solution. Any galvanised (zinc-coated) surfaces require a non-toxic protective coating.

c. **Nutrient solution:** Serves as the primary medium for root system development.

d. **Air space:** Located between the seed bed's bottom and the nutrient solution's surface. This moisture-saturated air promotes root formation, identified as beneficial for plant growth (Stoughton, 1969, p. 6).

Plate 63. Typical requirements for a hydroponic cultivation unit.

The Garden Inn intends to employ two hydroponic cultivation methods: continuous flow solution cultures and static solution cultures. The static solution culture method, while less productive than the continuous flow solution culture approach, will be promoted for use within individual garden rooms. This method provides greater operational control, which is likely to appeal to individual gardeners.

Conversely, the continuous flow solution culture method is more suited to communal growing environments, as it allows for the use of centralised control systems to optimise efficiency and productivity. The unit designs outlined in the subsequent sections are based on a continuous flow solution culture system intended for communal growing zones. However, the trays can be readily adapted for use with a static solution culture approach (Stoughton, 1969).

[4.1.1] System: Continuous flow culture

In this system, the nutrient solution is allowed to flow continuously past the vegetation root mat. This method offers greater ease of automation compared to static solution culture systems, as temperature and nutrient concentrations can be monitored and adjusted within a central storage tank. This tank has the potential to serve multiple plant arrangements, further enhancing operational efficiency.

4.1.1.1 Nutrient film technique (NFT)

The Nutrient Film Technique (NFT) is a continuous-flow solution culture system characterised by a shallow stream or film of water containing the essential dissolved nutrients required for plant growth. This nutrient solution is recirculated past the bare roots of plants within a watertight channel. The film's shallow depth ensures that the dense root mat formed at the bottom of the channel has an upper area that remains moist but suspended within the channel void. This design effectively facilitates an abundant supply of oxygen to the plant roots, enhancing growth (Jensen & Collins, 1985).

To ensure adequate flow rates, it is recommended that the channels are sloped at a gradient between 1:30 and 1:40. In this project, this required slope will be achieved through the racking system supporting the channels. Additionally, the channels will be maintained at optimal lengths ranging from 10 to 15 metres (Jensen & Collins, 1985).

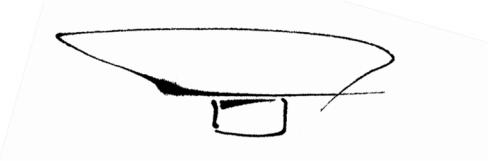
4.1.1.2 Advantages of the NFT system over other forms of hydroponics

Plant roots are provided with sufficient water, oxygen, and macro and micronutrients, thereby simultaneously fulfilling all essential conditions for healthy plant growth. This system enables the production of higher yields of high-quality crops over an extended cropping period (Jensen & Collins, 1985).

4.1.1.3 Disadvantage of NFT

Interruptions in nutrient flow, such as those caused by power outages, can pose significant challenges to system functionality. To mitigate these issues, it is advised to implement backup power solutions, utilise non-grid supply options, or consider onsite power generation methods for enhanced reliability and system resilience (Jensen & Collins, 1985).

[4.1.2] Unit: Hydroponic BLADE



A continuous flow solution culture system, such as the proposed 'BLADE,' comprises three fundamental components:

1. ***Continuous flow channel:*** **Delivers water, oxygen, and nutrients to support plant growth.**
2. ***Racking units:*** **Ensures appropriate flow rates while accommodating the spatial needs for plant development.**
3. ***Automated hydroponic management system:*** **Combines advanced features such as sensors, motors, pumps, and monitors to regulate and optimise system functionality.**

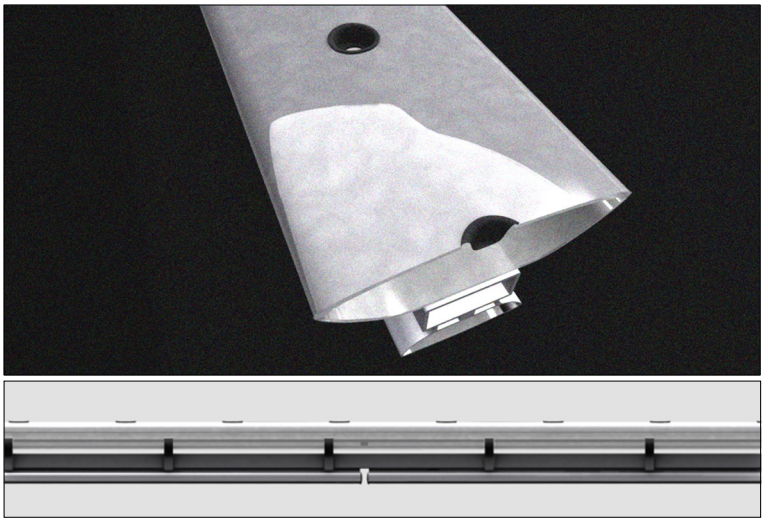


Plate 64. NFT hydroponic BLADE with a nutrient channel made from an extruded-glass base and closure lid.

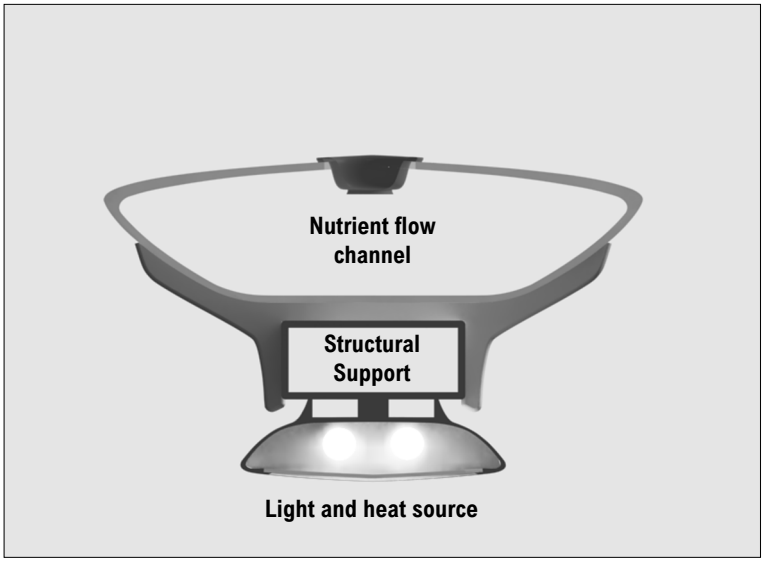


Plate 65. Typical NFT hydroponic unit section.

Plate 66. Component model (Perspex), (inset) proto-component model.

The extruded-glass channel is designed to be gradually populated and uniquely patterned by the root mats of the growing plants. This natural progression allows each BLADE to develop a distinct and individualised character, reflecting the organic interplay between design and cultivation.

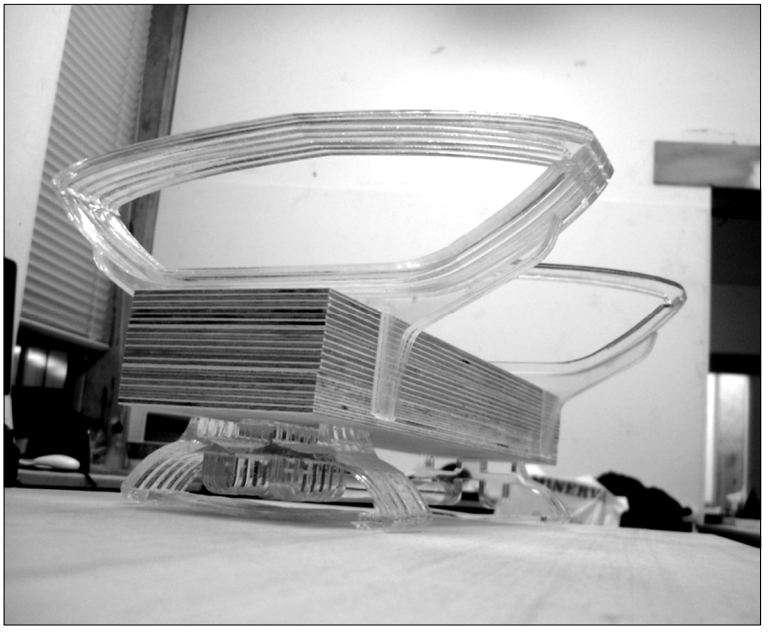


Plate 67. 1:1 The 'H. BLADE' component model.

Plate 68. NFT hydroponic BLADE and its light and heat lamp unit attached to the underside.

[4.1.3] Arrangement: BLADE racks

This section examines the spatial arrangement and integration of the component within the garden passages of the Inn, focusing on how its placement contributes to the overall functionality and design coherence of the proposed scheme.

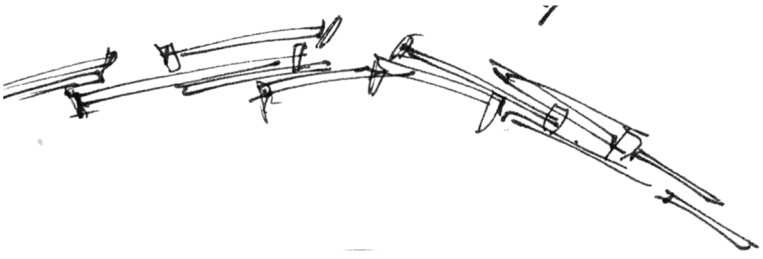


Plate 69. The passage to a garden room could be a garden passage.

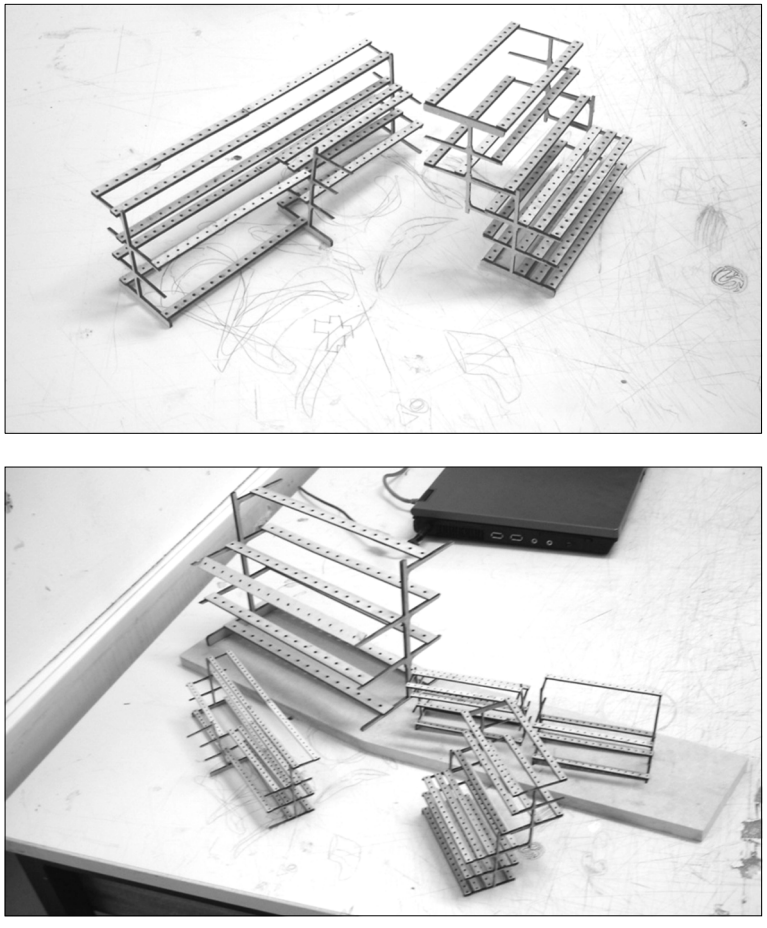
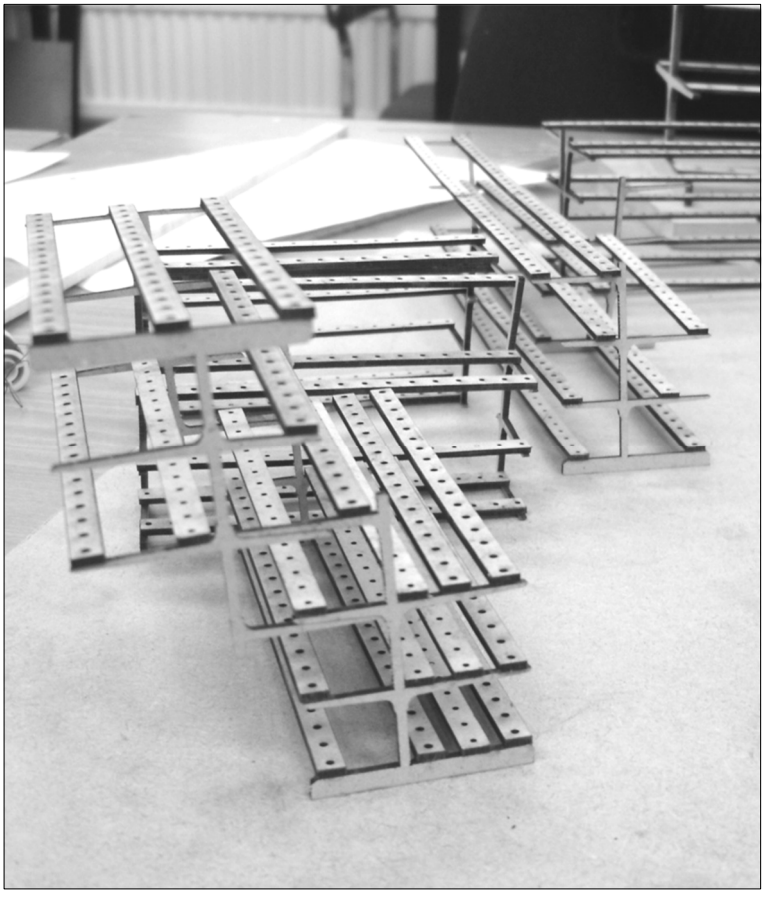


Plate 70. Racking configurations for Garden Inn passages.



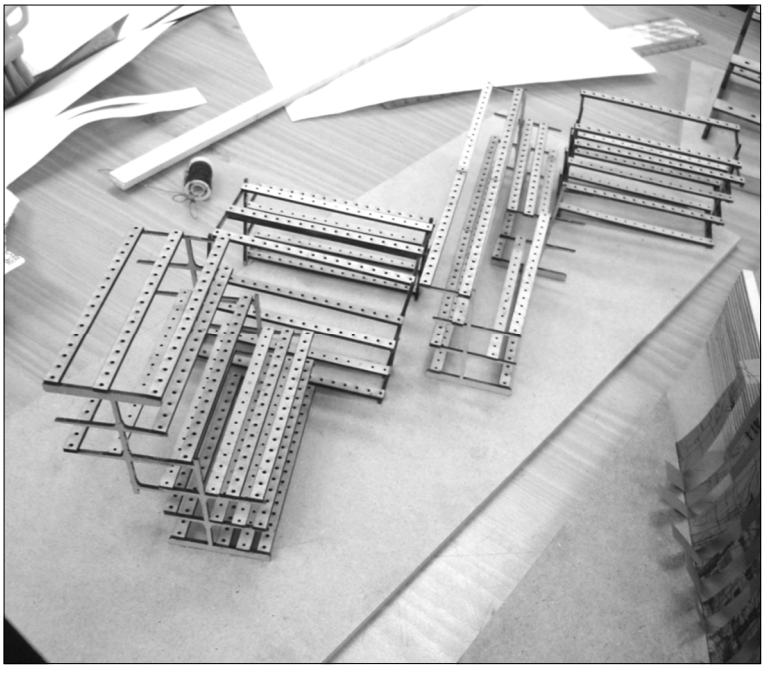
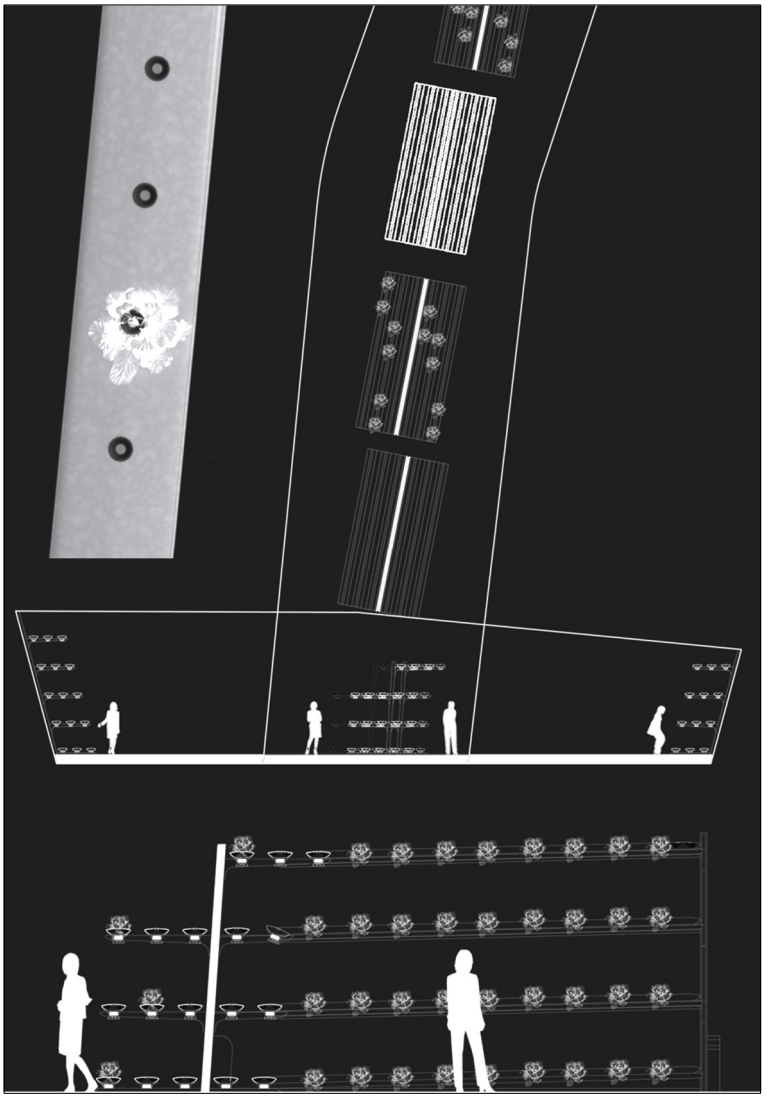


Plate 71. Additional racking configurations for Garden Inn passages.

[5.0] TOWARDS DS 6.2



The hydroponic BLADE component embodies the microscale detail of the project, introducing essential functional variables that will significantly influence the tectonic development of the overall design. This emphasis has catalysed a process of inquiry, fostering the generation of preliminary concepts for sectional and plan arrangements. This detailed component therefore has emerged as a decisive 'generator of arrangements'. Its role will be further examined in the subsequent DS 6.2 report through a series of sectional studies.

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