Support Structures as an approach to Informality

Design Research Project APG50585
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Master of Architecture (Professional)

by

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COVER SHEET

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Thesis: No matter the purpose of the essay, you must have a thesis and build your paper so to explicate that thesis.
Outline: Your essay must have a clear and organized structure. Start by developing an outline. Break the essay down into the following categories:

Introduction: At least one paragraph which introduces the essay topic. It includes the thesis statement, usually as the last sentence in the first paragraph.
Body: Develop the themes and points that explicate your thesis in the body of the essay.
Conclusion: A final paragraph(s) that re-states your thesis and contextualizes or summarizes the body of the essay. Never add a new topic or point of explication in your conclusion.

Paragraphs: It is very important that you develop well-structured paragraphs. The rule-of-thumb is that each topic or theme is developed in a single paragraph. However, that rule may be modified if a paragraph becomes too long (which can be tiresome to read) or you have too many brief paragraphs (which are also tiresome). Include transitions at the end and beginning of paragraphs so that they flow together well.
Writing style: Your essay must be clear, concise, and flow smoothly. Academic essays require a certain degree of formality, but do not complicate the writing style or word choice unnecessarily. Utilize punctuation correctly! Check your grammar (pay particular attention that subject and verbs, pronouns and antecedent nouns agree)! Read your essay out loud to yourself to check for flow and clarity! **Proof-read and spell check!**
For further reading or assistance, see:
http://startup.curtin.edu.au/study_skills/writing.html, or http://www.lib.uct.ac.za/infolit/report.htm, or The Humanities Library at UCT has a large collection of writing skills reference books, or visit The UCT Writing Centre (http://www.ched.uct.ac.za/adp/writing/), which offers writing assistance to all students.

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Contents

1 Introduction

Conceptual model of a support structure emerging between the formal structures at Wynberg station site

The point of departure for this project was an interest in informality within the urban environment. This initiated a search for an appropriate approach to intervening within this context. The project aims to establish a physical armature which facilitates, yet does not suppress the autonomous, emerging nature of informality. This entails an investigation which defines the role of the architect in realising and developing this enabling armature. A "support structure" is investigated as the physical intervention which locates itself between the dialogue of "informal" and "formal". The anatomy and form of the support structure is not universal and is strongly influenced by the site. This project ultimately establishes a new mass housing typology, rooted in its site, which allows for informal practice to emerge.

The design process extracts ideas from two previous research papers; a theory paper and a technology paper. The idea of a "support structure" derives from the theory paper referencing the theory of John Habraken and further complemented by the ideologies of the Metabolists and Structralists. The chosen precast concrete structural system derives from research conducted in the technology paper. These theories and investigations prove influential in the thought process and idea generation.

This report aims to provide insight into the multivalent design process undertaken in order to explore and develop a response to the initial interest. From the outset, the nature of the proposed project led to a systematic design approach. However, this was purposefully complemented by a parallel conceptual exploration which endorsed creative freedom.

2 Theoretical Position

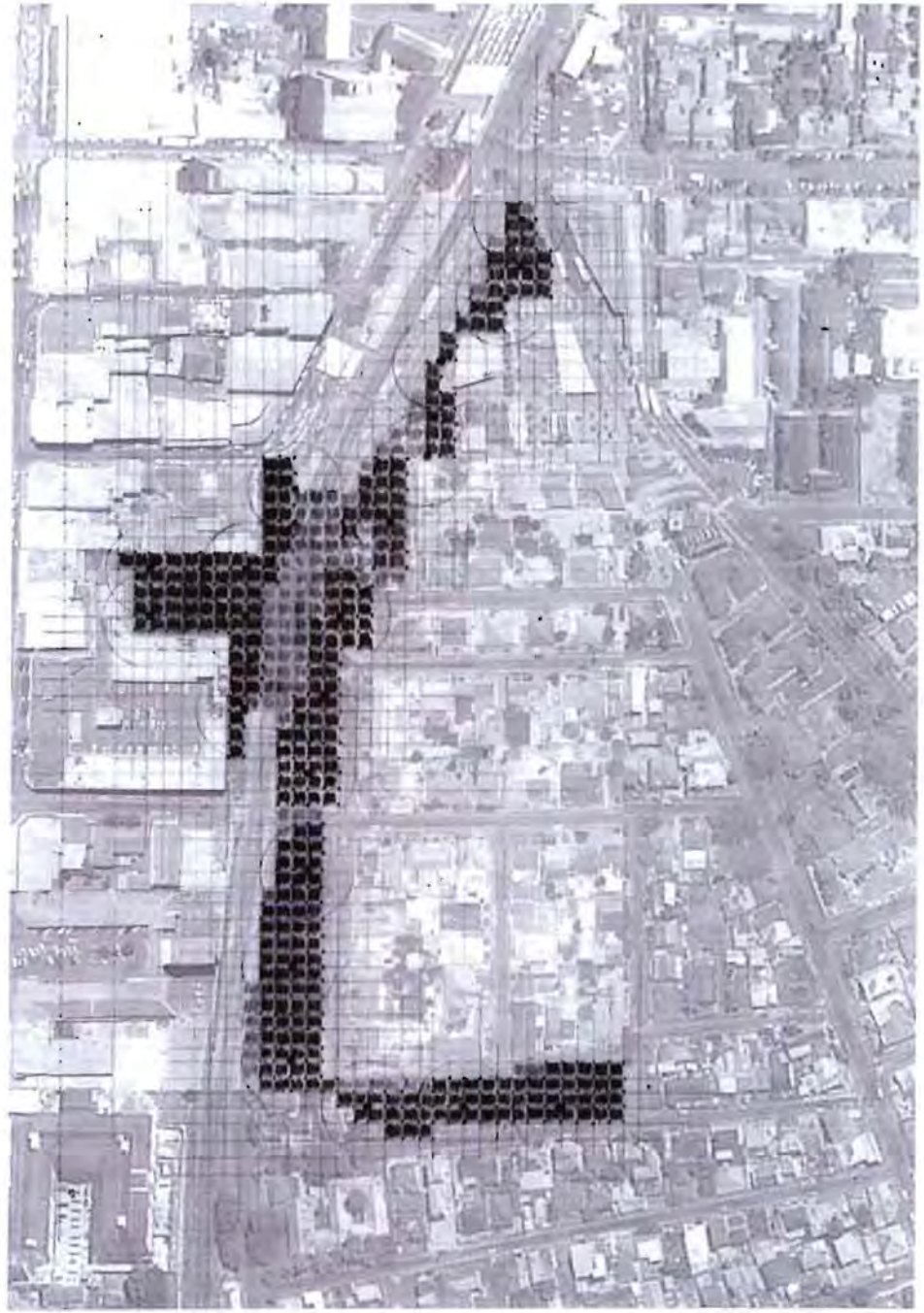
Exploring Informality

Enabling Support Structures

Learning from Torre David

The Role of the Architect

Right:
Conceptual illustration of the emergence of informality between the formal structures of the transport interchange and retail edges at the Wynberg Station site.



Exploring Informality

"Formality and informality are in true connected" (Cheizanoglou. 2008. 14). Thus, understanding informality necessitates understanding its antithesis, formality. This is because they are in constant dialogue and therefore have a symbiotic relationship, which counters the perception that informality is the absence of formality. The dialogue, in everyday life, illustrates dichotomies of power related to class and access. Where informality allows for freedom, formality strives to place sanctions.

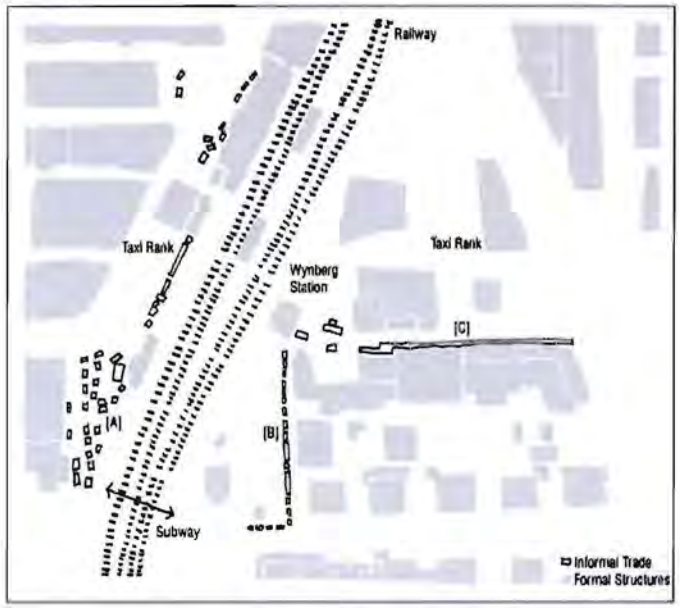
Natural Emergence

Informality is defined as a natural emergence between formal elements. Informality thrives where there is a lack of formality or where formal structures fail to impose authority. Informality emerges where the boundaries of formality are not apparent. People exploit this condition and tend to occupy space where there is no planning or legislation which commands a specific structure or occupation. This is a natural condition governed by self-creation; an autonomous act which locates itself between the formal.

Market [A] *is located between a retail edge and the railway line. It is made up of ephemeral lightweight structures which are erected and taken down each day. The fact that the stalls are re-erected on the same spot means that there is a general order and thus some level of authority.*

Market [B] *Is located along a walkway between a fence and the boundary wall of residential plots. This consists of a row of ephemeral stalls defined by draped material from the fence to the boundary wall which is erected each day. The stalls therefore develop incrementally along the fence using the fence as display space, thus making the walkway narrower, yet people still make use of the walkway in order to get to the taxi rank. The stalls are dependent on the existing walkway for economic viability as well as the formal structures of the fence and wall for stability.*

Market [C] *is located near a taxi rank and a mosque. Here an armature is constructed to facilitate trade. This was in form of a permanent threshold which lines a series of retail stores. The threshold enhanced trade along the existing retail stores and facilitates the dialogue between the informal trade and the formal retail stores.*



Degrees of Informality

Informality's search for autonomy is continuous. In everyday life certain spaces are perceived to be informal, however, there often exists some level of formality. Therefore, one argues that there are degrees of informality which are influenced by context and time. This will be explained using Wynberg Station as a narrative (the Wynberg Station site became the chosen site for the proposal). The formal structures within this context are the railway line, the station, the taxi rank, residential edge and a number of retail stores. The informal, being informal traders' markets, locates itself between and on the edges of the formal structures.

The informal markets all feed off the formal structures in terms of pedestrian activity and movement. It is evident that the permanence of structures and the actions in space determines the degree of formality. Form is the precondition for the formal because it hints at permanence. The absence of form is the catalyst for informality. The space is left empty apart from the permanent formal structures when the informal stalls are de-stalled at the end of each day. Therefore the quality of the space changes depending on the actions in space, which is related to the time of day.

Left:
Diagrams illustrating degrees of informality related to time (day/ night)

Right:
Conceptual photomontage of temporal and emerging qualities of informality at Wynberg Station

Context Time Scale

Context further identifies that which is formal and informal. "The phenomenon of formality and informality are always interdependent and context specific, depending on the given time and space (situation), therefore should be treated as spatiotemporal variable". (Cheizanoglou. 2008. 21). Spatiotemporal variables are related to actions in a specific space (context) in relation to time. Actions in space are governed by the temporal changes of seasons, day and night, week to week and even across years. Peoples' actions in space change over time due to the increased presence of formal structures or the infiltration of formality. Informality becomes marginalized and therefore seeks a new context in which to autonomously emerge between the formal. As informality grows over time within a specific context, the formal often becomes invisible, yet no less important.

The perception of formality and informality differs between contexts and similarly between scales. Scale is also related to actions in space. Certain actions are deemed to be informal on a micro scale however on a macro scale it forms part of a larger formal structure. Perception becomes an important theme in informality discourse. Due to the multivalent nature of informality, different perceptions are formulated. These perceptions, we find, are influenced or altered by social structures, class and power; physicality, and permanence and economy.

Top left:
The Imizamo Yethu Township, where the formal element of a concrete platform and seating installed around a wash point, enhanced the existing infrastructure, and turned it into a public meeting space

Bottom left:
VPUU Programme in Khayelitsha adopted the approach of integration. This was an attempt at negotiating an economic based model with the local community in terms of community members receiving compensation, in the form of vouchers, for the upkeep of the constructed community facilities. "The intention is not to eliminate informal economic sectors, but rather to integrate them into a formalized system". (Joaneily and Casper 2011: 35).

Intervening in the Informal

Intervening in the informal is a delicate process. Firstly, one must establish whether it is necessary to intervene in the informal, and secondly, whether intervening in the informal adds value to the existing conditions and addresses broader economic and social issues. Since informality is by nature an autonomous condition, one must be mindful not to disrupt or hamper existing practices by introducing formal structures. Thus the challenge when attempting to intervene in the informal, is to avoid formalising the informal. The approach should be sensitive and explore ideas of integration and symbiotic relationships that enhance the existing conditions on a micro and macro scale. Intervention therefore calls for engagement with all structures and parties active in the specific context.

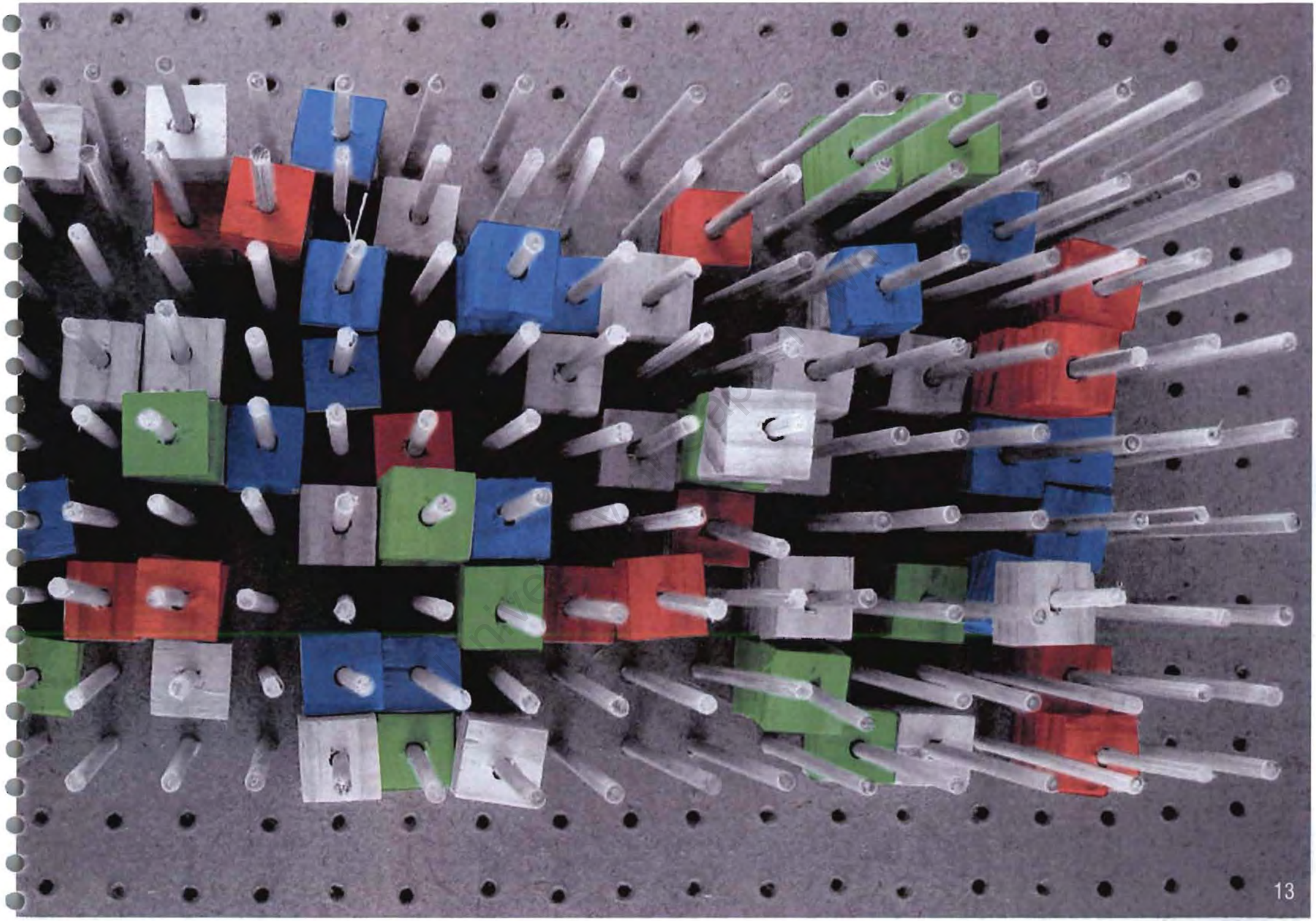
Right:
Conceptual model of a support structure. The vertical elements represent the armature and the coloured blocks represent the infill of different programmes emergeing between the formal vertical elements

Enabling Support Structures

Unpacking informality leads to the notion of "support structures" described in theory of John Habraken, as an appropriate means of responding to informality. A support structure is defined as "a construction which allows the provision of dwellings which can be built, altered and taken down, independently of the others" (Habraken 1972:59-60)

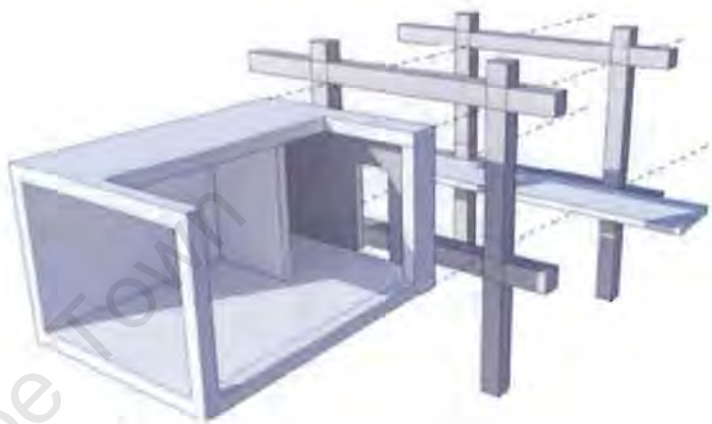
Support structures are constructed without a final form in mind; the more variety offered in occupation, the better. The structure is incrementally completed as it is appropriated overtime. Therefore it is not in itself a building or a dwelling, but rather an armature which facilitates occupation. It is a democratic system which promotes habitation and does not solely lend itself to housing as a programme. The way in which the structure is inhabited determines its programme.

The support structure is that which the architect has control over. Because the final form cannot be prescribed, the approach should initially be functional. The architect develops a set of rules which then determine the anatomy of the support structure. The architect has a degree of control initially, but over time, the control becomes more indirect and implicit. Once the structure is built, the product becomes an open system. The users take ownership of portions of the support structure facilitating informal activity. It should allow for endless ways of appropriating space liberated from the architects' control. It is a natural process which is governed by the user based on the everyday practice of habitation. The user has the power to alter and shape space within the support structure



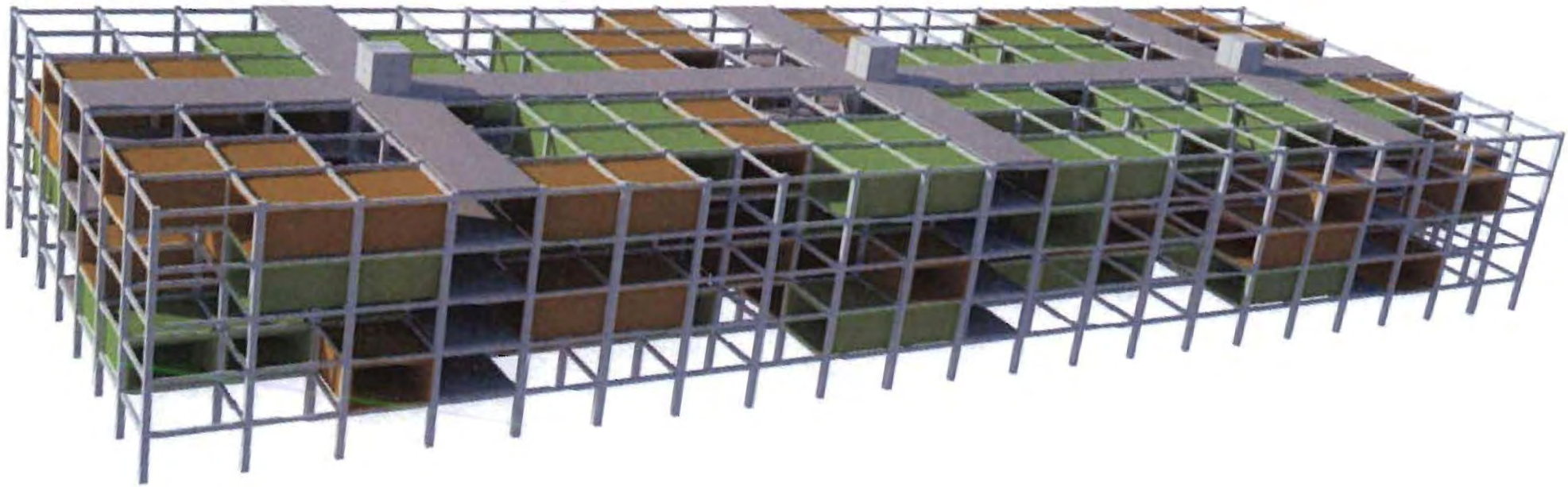
Top Right:
Diagram showing prefabricated capsule system which attaches to a support structure frame. The capsule is fully furnished and clips into structure with the possibility of being removed.

Bottom Right:
Diagram showing a kit of parts system. Prefabricated panels of different materials and configurations clip into a robust support structure.



A key principle of support structures is their ability to absorb the unforeseen (Habraken 1972: 74). This links directly to the notion of flexibility; flexibility in assemblage and in facilitating the appropriation of space. Therefore it is critical that the appropriate construction system and material for the support structure be determined, informed by the context. It should be a legible, robust structure comprising of floors, beams, columns and service cores. This lends itself to prefabricated, mass produced elements and components which are assembled into an efficient system. The structure is completed by implementing one of two infill techniques- both of which are products of prefabrication and mass production. The one infill technique consists of preassemlbed units (capsules) whereas the other consists of a kit of prefabricated parts. There is a third option which facilitates a more informal approach, eliminates mass production and allows the inhabitants to complete the structure using accessible and affordable materials. This speaks of a hybrid infill approach whereby a combination of materials are used resulting in a variegated appearance.

Support structures can also form part of a larger structuring device on a city and town planning level. "A support structure is not the skeleton of a building, but all the dwellings together form the skeleton of a town; a framework for a living and complex organism" (Habraken 1972: 69). This describes an architecture which has no definite end; it experiences constant change and growth.



Above:
Rendered support structure exploration consisting of a framework into which units are inserted. There is a sense of circulatory ordering principles with vertical circulation cores and horizontal passages. This system was generated independent of a site as evidenced by the homogeneity of the structure.

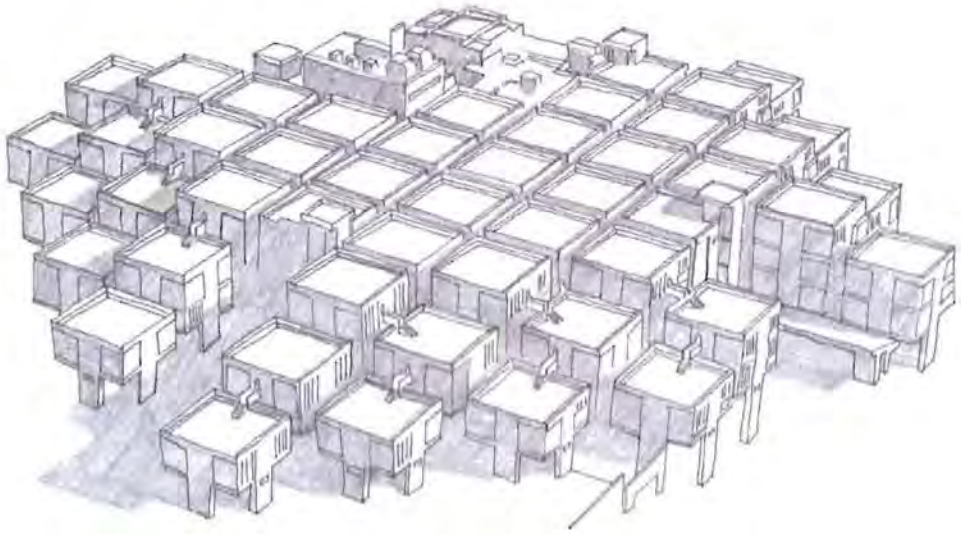
Top Right:
Prefabricated capsule connection to support structure (Kurokawa 1977: 108-109)

Right:
Illustration of the Nakagin Capsule Tower, Kurokawa, which consists of two concrete service cores acting as the support structure. Onto this, 140 prefabricated steel framed living capsules are attached. In its entire life span, not one of the capsules have been removed or replaced. (Illustration by author)

Metabolist Reincarnation and Transformation

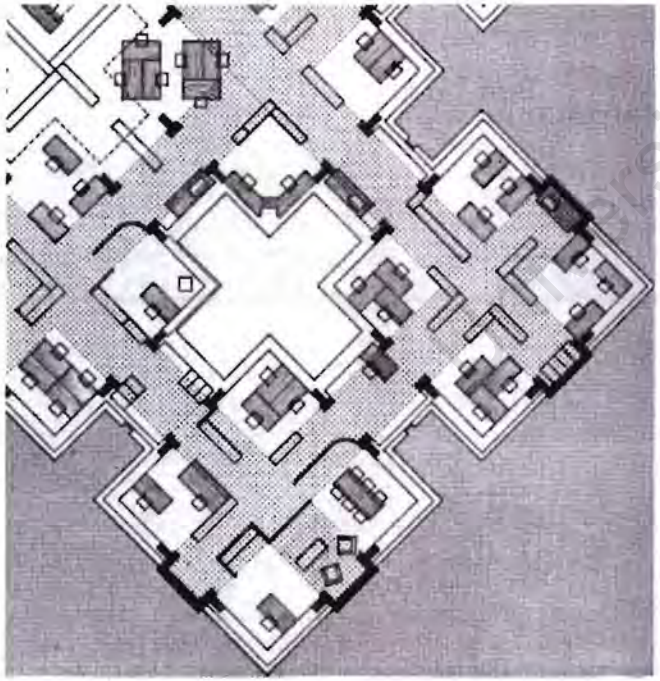
The Metabolism movement envisioned an 'age of life' whereby emphasis was placed on the dynamics of life; change, renewal and destruction. The most notable themes of Metabolist works were 'infinite transformation' and 'reincarnation'. Infinite transformation refers to the modifications of form dependent of the way space is used. Reincarnation refers to architecture which changes and regenerates in response to stimuli. They believed in designing a city so flexible in its connections that "its parts could grow, transform themselves and die while the whole animal went on living." (Jencks 1977: 9). This emphasises the idea of a city or building as a living organism capable of regenerating its parts. This is enforced in Habraken's statement equating a building to a bookcase whereby the support structure harbours "individual dwellings as a bookcase contain(ing) books, which can be removed and replaced separately." (Habraken 1972: 59). Through grouping parts of a building or city with similar rates of change, it enables certain structures to live whilst others deteriorate.

'Capsule architecture' emerged as a product of Metabolist thinking. It derived from the concept of a 'time community' which refers to a migrant community that is not formed because of their location but in their similarity of actions over time; introducing the idea of a mobile home. (Kurokawa 1977: 7). The capsules are light-weight, prefabricated, autonomous fully furnished units which are dependent on a support structure. Once connected to the support structure, the capsules become part of a larger system - a fixed support structure with plug-in capsules.



Left:
Illustration of The Centraal Beheer, 1972, by Herman Hertzberger. It comprises of a series of towers connected via a network of transitional spaces. (Illustration by author)

Bottom Left:
Plan of one tower showing flexible interior and bridge connections. Each tower is 9x9m and divided into quadrants via an inner street. The separation of the structure into load bearing and space dividing elements facilitate internal flexibility. (Heuvel 1992: 120)



Structuralist Growth and Cohesion

The Structuralist architects intended on creating a new architecture strongly rooted in social encounter and the experience of the individual - a more human approach to Modern architecture.

Growth and cohesion were key guiding principles of the Structuralism movement. These were achieved through repetition and pattern making. The grid becomes a structuring device which enables clarity and order. Grids are based on a simple shape which is then translated into a 3-dimensional form, duplicated and arranged into a pattern (growth). Unity is achieved via the repetition of the simple form and pattern making. The repetition of a simple form at different sizes merges a seemingly diverse multiplicity, into one unified structure (cohesion). A space-structuring system is implemented to create larger volumes yet reduce the scale and maintain structural uniformity. Therefore these structures appear to have no hierarchy; the building reads as one mass even though it is comprised of smaller components. Thresholds and transition spaces are used to link these components and thus become structuring devices which encourage social encounter – both as circulatory and pause spaces.

"Today it is a question of finding large significant structures , which are recognizable to all city dwellers , and continue to be so, and in which every city dweller can recognise himself through what he meaningfully adds, or changes , from place to place and from day to day, freely and accordance with his own real needs." (Aldo van Eyck 1962)

Right:
Photograph of the variegated facade as a result of the infiltration of the squatters. The image illustrates the various methods and materials the inhabitants utilise to define and make the space their own within the concrete framework. (Photograph by Iwan Baan, www.dezeen.com)

Learning from Torre David

Torre David is an unfinished skyscraper in the city of Caracas, Venezuela. Construction came to a halt before services were installed. Squatters began to settle in the structure which is now occupied by over 3000 inhabitants. It has subsequently been labelled a 'vertical slum'. The 45 storey high structure has no elevators resulting in inhabitants having to walk up flights of stairs to access their homes. The inhabitants have created their own infrastructure within the framework. The needs and struggles of everyday life are accounted for through the initiative of the inhabitants which has resulted in the establishment of essential services and amenities. The framework facilitates the possibility for programmes usually associated with ground floor to occur above ground. Shops, hair salons, factories, churches and a gym have been constructed thus establishing a micro economy. This illustrates Habrakens' idea of "plots in the sky".

People personalise and demarcate their space by placing partitions of various materials depending on what is accessible and affordable, some more permanent than others. Space allocation is decided by the individual and negotiation with the neighbours. The facade becomes animated by the different use of materials and approaches in creating enclosure, resulting in a variegated appearance contrasting the initial planned facade of the skyscraper. The rigid and robust nature of the structure has allowed for inhabitants to act with freedom internally, shaping spaces between the formal structural members. This occupation and informal practice speaks of"architecture without architects" (Iwan Baan, 2012) and triggers alternative ideas in reimagining mass housing typologies in urban environments.

It is evident that people cannot survive without basic essential services. Water, sewage disposal and electricity are connected in their own capacity to the nearest and most accessible sources even if this means the neighbouring building. In a multi-storey structure, it is critical that the elevators are in operation and maintained. Large groups of people need to be moved up and down the structure along with their belongings which include furniture - stairs alone are not sufficient. People also need opportunities to generate an income as wells as recreational spaces. The above mentioned is essential to everyday life. After examining the conditions of Torre David, it becomes apparent that the inhabitants seek these basic services and opportunities and take it upon themselves to realise them. When people are left to create their own infrastructure network, the results often lead to ingenuous solutions. However, such solutions are often not in the best interest of the larger population, since they lack longevity.

Top:
Photograph of a larger space within the Torre David which is being used as public space where inhabitants can take part in recreational activities and socialise. (Photograph by Iwan Baan, www.dezeen.com)

Middle:
Photograph showing how inhabitants have defined their dwelling boundaries by constructing a low brick wall. People and furniture reach the various levels via a taxi service which operates in the neighbouring 50 storey building. (Photograph by Iwan Baan, www.dezeen.com)

Bottom:
Photograph showing the occupation of space with in the concrete frame, draping clothe to define a dwelling boundary and using the existing steel girder as hanging space. (Photograph by Iwan Baan, www.dezeen.com)

The Role of the Architect

The overarching question then, is how architects learn from precedents like Torre David and past support structures to imagine and construct new typologies which facilitate the complex practices of everyday life with informality as a contextually emerging condition?

Learning from the two Modern movements previously discussed, it becomes noticeable that the role of the architect becomes less conventional. The Metabolists believed in the idea that once the building was built, it would change and grow over time. The architect has an obligation to facilitate this process, thus creating "a kind of architecture that would regenerate itself by stimulating the people living in it to participate." (Kurokawa 1977: 11). Herman Hertzberger, a Structuralist, believed that the role of the architect was not to design and build a complete solution, but to provide a structural framework which is then completed by the user.

In today's society of migration, with people moving frequently in and out of cities, there is a constant search for freedom. The challenge becomes to find new ways of creating armatures which facilitate this migration and the need for inhabitants to move – 'modern nomads'. The armatures need to support undetermined periods of occupation and the possible need for expansion. These armatures therefore should not be static; they should be flexible and adaptable. They should promote "free combinations", whereby minimal prescribed decisions are made with regards to positioning and sequence of spaces; "constant renewal", in terms of an environment which changes spontaneously and allow for relationships to form over time, rather than being forced. (Habraken 1972: 38).

The role of the architect becomes that of a facilitator which establishes guidelines that are proscriptive rather than prescriptive around which the inhabitants act. The guidelines inform the anatomy of the support structure and embody a set of scenarios which hint at habitation. The architect becomes less in control of the completion of the structure. The inhabitants take control of this process and the aesthetic development; they take ownership and create spaces with a level of freedom, thus becoming collective developers. The role of the architect, ultimately, is then to design a system which provides comfortable living conditions, yet still allows a level of freedom and flexibility for everyday life to flourish.

"I make the rules of the game, but don't tell them what moves to make. If the rules are clear, it's very likely that the moves are going to be good. I limit myself to establish neat and flexible enough set of rules. But the game will be played by the (inhabitants). And the game finishes and has winners when they make their own moves", Alejandro Aravena commenting on the Quinta Monroy Housing Project (Aravena 2005: 50)

Above:
Plan of the Quinta Monroy Housing Project illustrating the grouping of units around a collective public space. This condition introduces the idea of a social support structure through an ordering of shared public space (Lotus International 2011: 104)

Top Left:
Quinta Monroy Housing Project as a support structure as provided by Elemental Chile and Aravena. Built according to the half a House concept (Aravena 2001, http://alejandroaravena.com)

Left:
Quinta Monroy Housing Project after inhabitants have expanded through self built practice (Aravena 2001, http://alejandroaravena.com)

Right:
Illustration imagining an architects intervention in the Torre David skyscraper. The illustration shows a gradation for the skyscraper as it is today, into an imagined condition whereby an architect has established the fixes.

3 Process

Conceptual Exploration

Siting and Analysis

Programme

Design development

Model 1

Skeleton framed structure with prefabricated units which slot between structural members

Conceptual Exploration

The conceptual exploration of support structures is based on an analysis of precedents and the process of model making. This intentionally explores support structures independent of a site in order not to supress imagination and creativity. The focus for the exploration was space and form-making with some idea of an ordering system, in a variety of support structure types.

Further analysis and testing on Model 3 meant imagining the model as a built support structure with the individual blocks as prefabricated units with a real dimension (width, length and height). It was observed that during the model making, intuitively, the floors each had more or less the same number of units except for the ground floor which had more. This suggests a ground floor as a base which facilitates a wider variety of activities; a public base with private activities above.

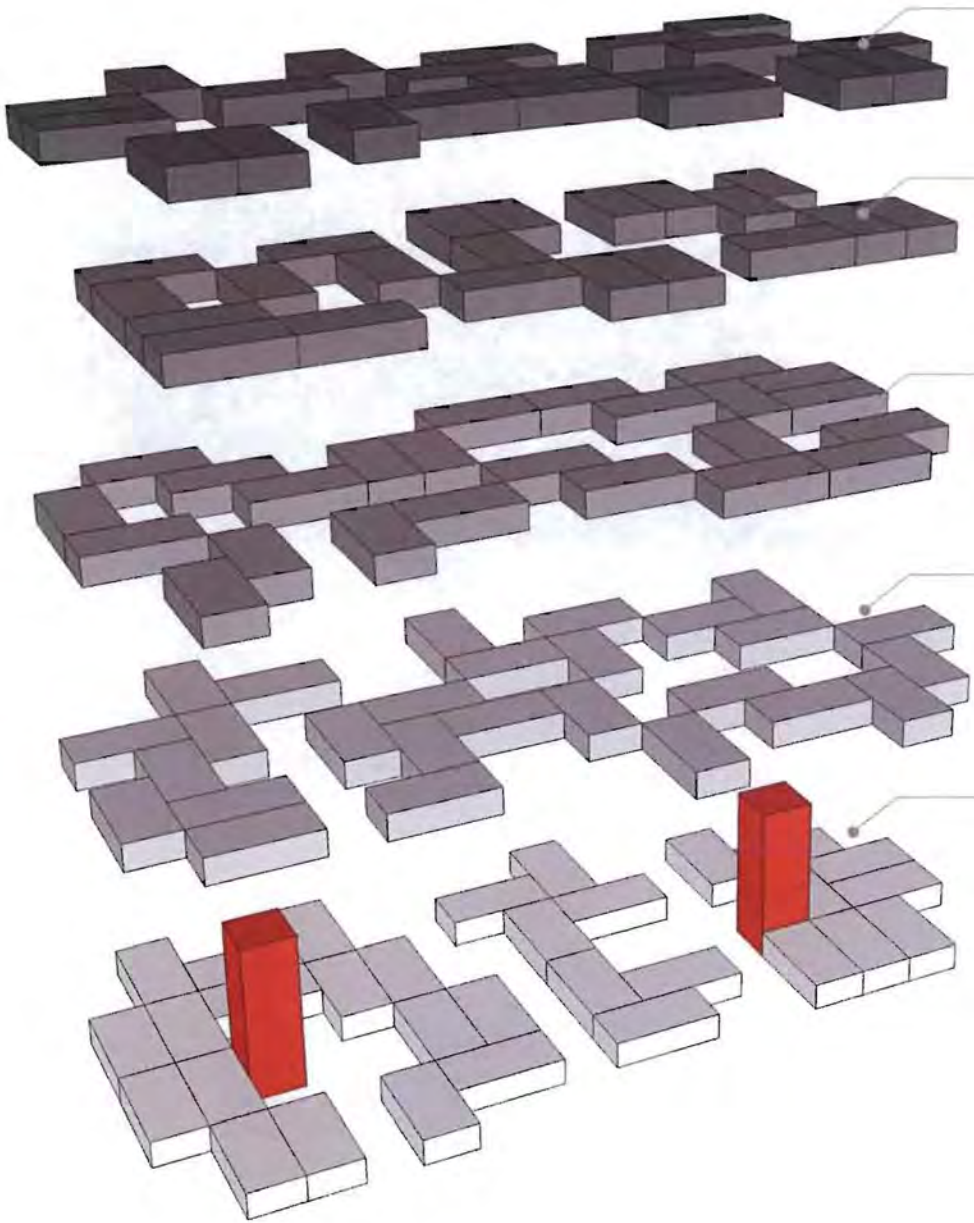
Model 2

One central vertical core with components attached. The components are prefabricated and can be removed or added independently

Model 3

Prefabricated units stacked. Units are shifted and rotated in order to create a terraced effect and allow the roof of the neighbouring unit to be utilised

** further analysis on next page*



LEVEL 4
- 21 UNITS

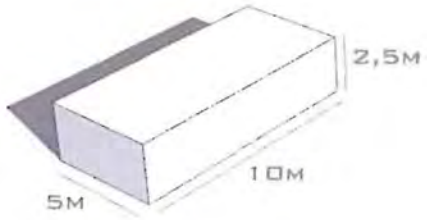
LEVEL 3
- 21 UNITS

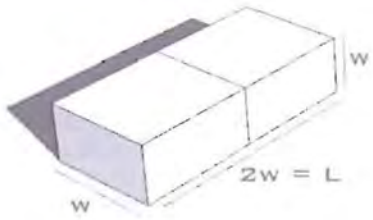
LEVEL 2
- 25 UNITS

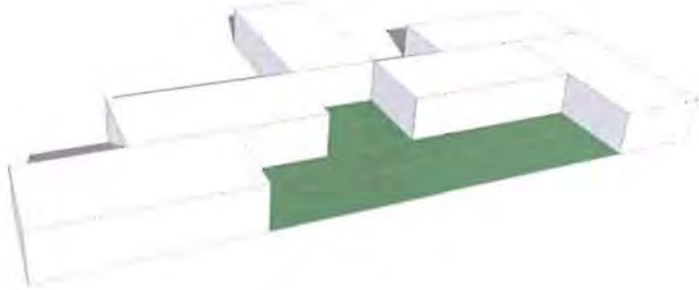
LEVEL 1
- 27 UNITS

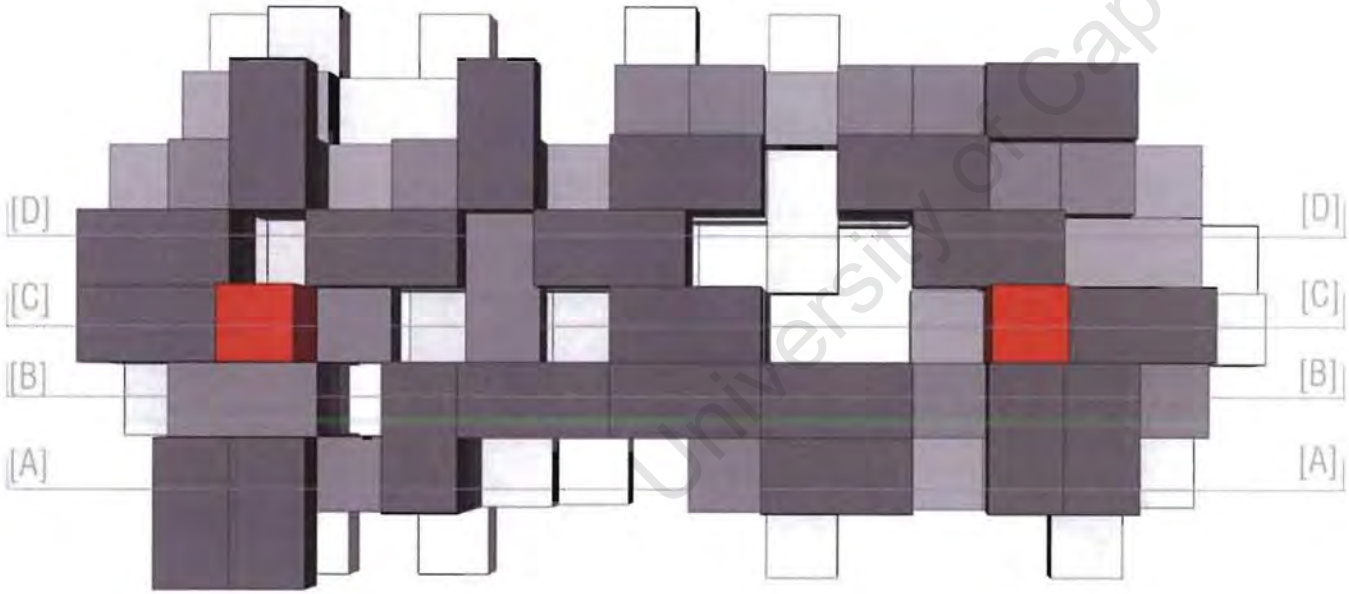
GROUND FLOOR
- SERVICE CORES
- 31 UNITS

Above:
Model 3 Exploration
Exploded 3D of prefabricated units congregated around a vertical service core. Units are stacked in various configurations on different floors









Top:
Prefabricated unit dimensions

Above left:
Plan view

Above:
Sections taken through the structure

Siting and Analysis

Initially two sites with contrasting characteristics were investigated: a site in the Khayelitsha informal settlement which is large, vast and highly trafficked, and Wynberg which is a long, narrow fenced in site. Both sites are left over spaces located between formal structures (railway line, residential edges etc) of their respective communities. Each site was tested against a basic set of rules (site morphology, existing movement routes, access, entry and vertical circulation) to determine an elemental ordering system and structure most suitable for their respective sites.

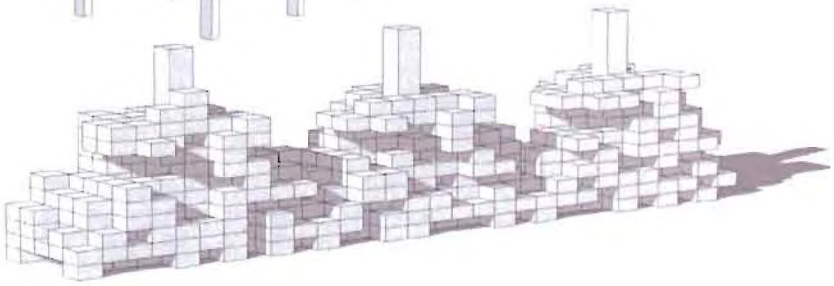
The Wynberg site was then chosen as the site for the basis of this design project, and the process of developing a system for a support structure to be implemented on the site began. The site underwent a more rigorous mapping and analysis process in terms of access, edge conditions, land use and connections.

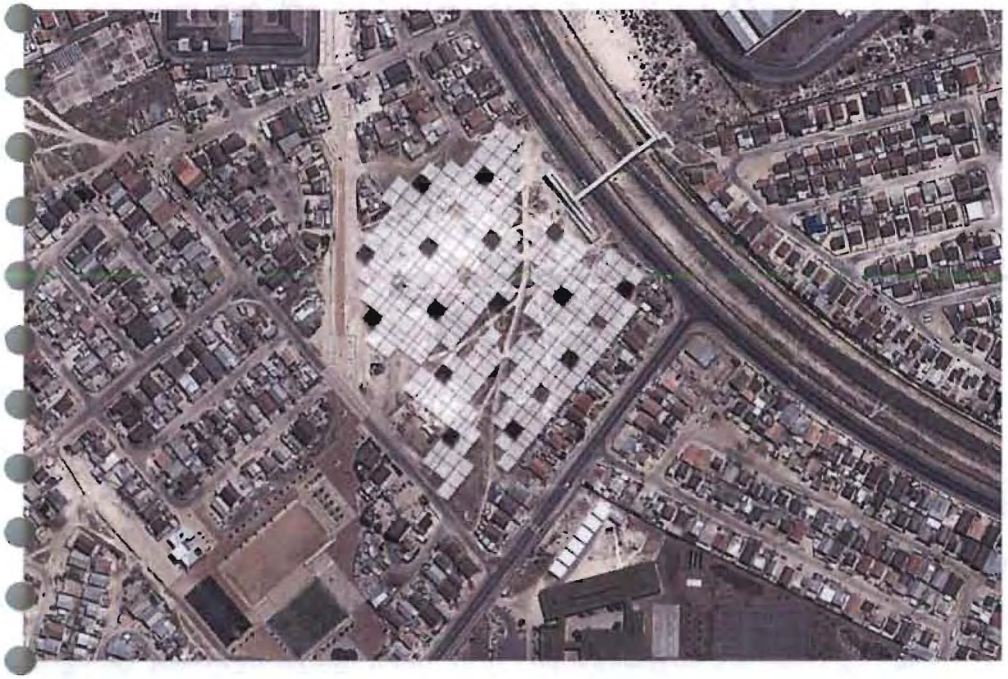
Wynberg - narrow site

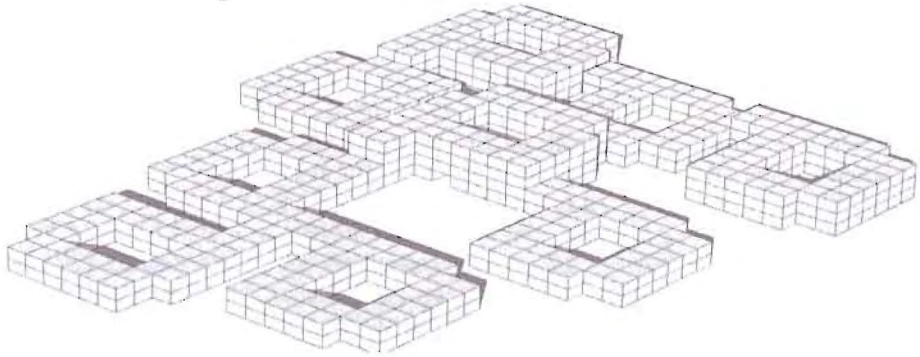
The Wynberg site is located along the railway line which links Cape Town to Muizenberg. The site, if developed, would be the edge between Main Road and the residential suburb. The support structure would consist of vertical service cores in a linear arrangement. The structure has the opportunity to be tall and exceed the 3 storeys to increase density. These structures should contain lift shafts as well as emergency stairs. It should minimise vertical supports and implement a system which facilitates large uninterrupted floor spans

Khayelitsha - expansive site

The Khayelitsha site is located along the VPUU framework which would act as another node which will further strengthen the movement route if developed. The support structure which would most suite the particular site is an arrangement of vertical circulation cores in a pattern system. The general layout of the vertical supports should allow for repetition in order to facilitate expansion and horizontal growth, resulting in a mat-like form. The structure does not necessarily need to be tall and could consist of three storey walk-up typologies. If the structure exceeds 3 storeys, lifts should be considered







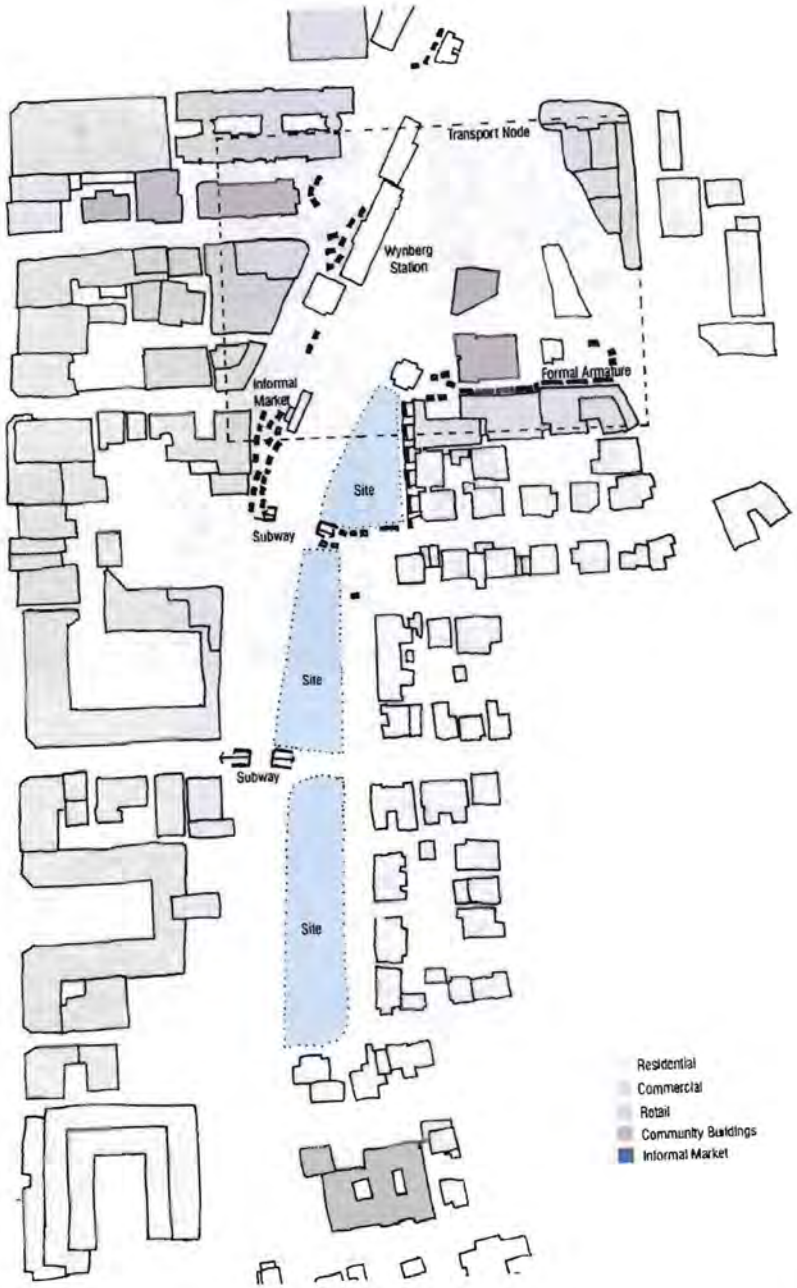
Wynberg Site

The suburb of Wynberg is located in the Southern Suburbs on the Cape Flats, Cape Town. It is the main transport hub for the Southern Suburbs, collecting people from the outlying Cape flats suburbs en route to the CBD. It is predominantly a middle class suburb providing commercial and retail opportunities, and is home to government institutions such as the Wynberg Magistrate's Court and Home Affairs.

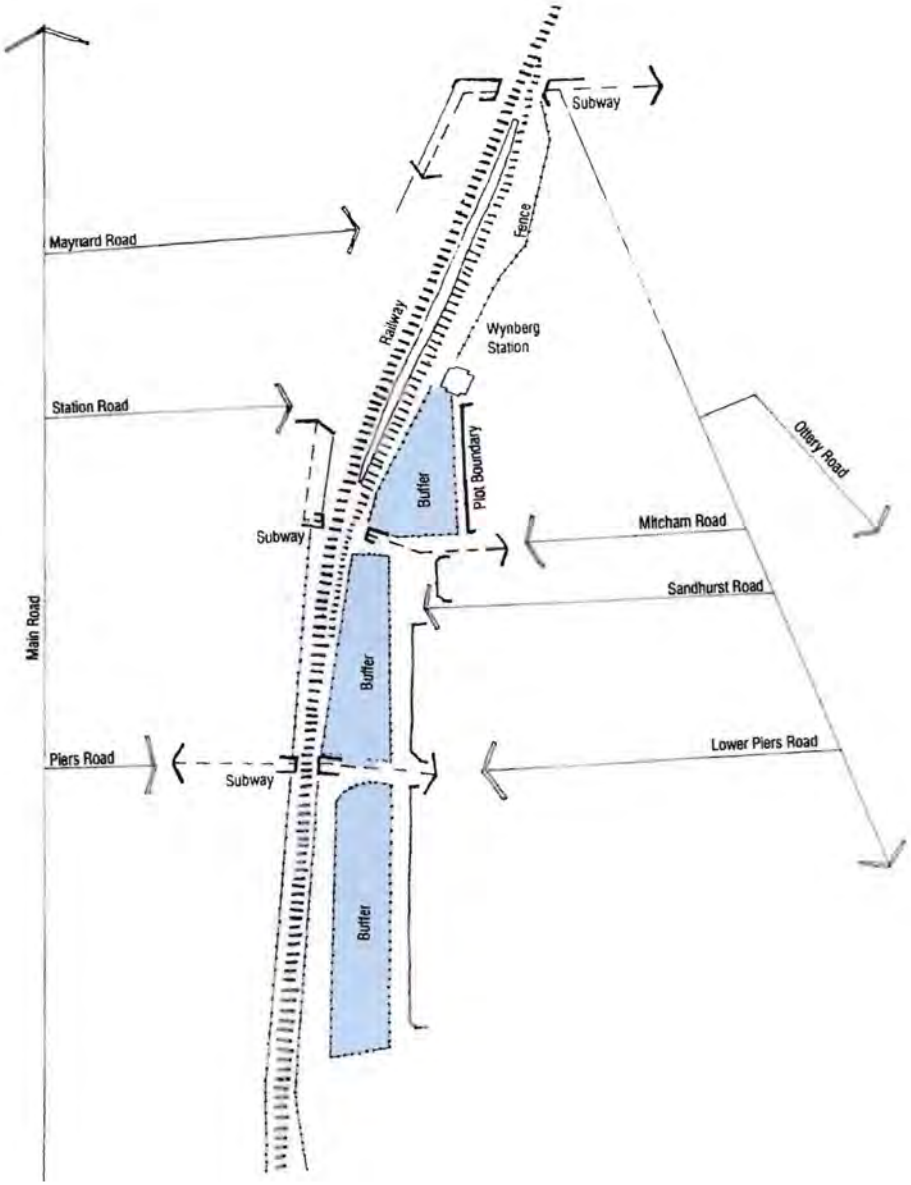
The chosen site locates itself next to the Wynberg Train station on the main line from Cape Town to Simons Town. It forms part of an important transport hub which also includes a taxi and bus terminus. The morphology of the site reveals a long narrow strip of land parallel to the railway line, which stretches from the train station to the edge of the residential fabric. It is flanked by the back yards of the buildings which front Main road and the single storey residential homes on the other side of the railway line. The only connection to main road is via two subways. The railway line essentially acts as a barrier.

The site, in its present state, is an unoccupied fenced in piece of land currently zoned as General residential 3. The site is fenced off from the residents, and in parts, show signs of dumping. There is an existing informal market network which traverses a portion of the site. This begins at the train station and extends below the railway line, emerging on the other side of the subway. It further runs along a narrow walkway between residential boundary walls and a fence and culminates at the taxi rank. This portion of the site is the busiest, and sees activity throughout the day from members of the public who make use of public transport and the informal trade.

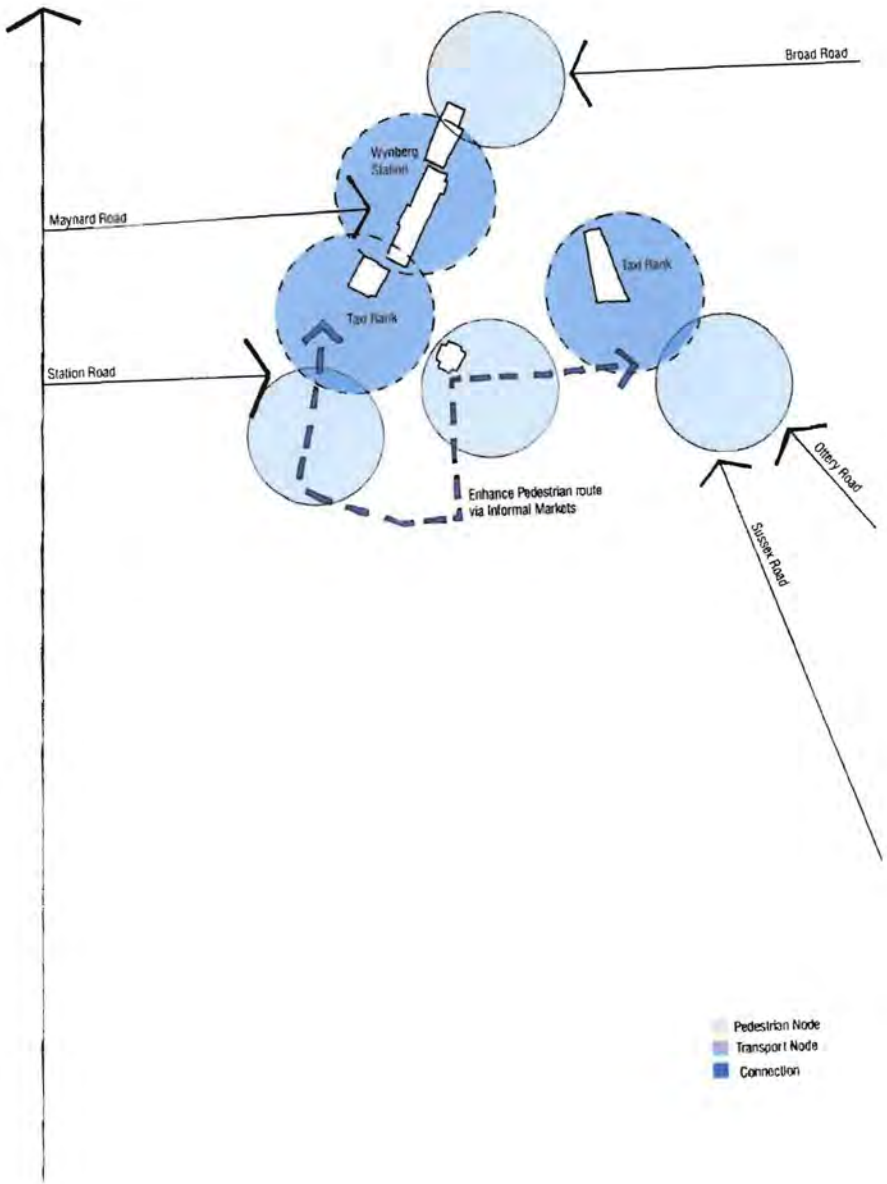
Above:
Photographic journey
A collection of photographs that depict the various conditions and character of the site. The photographs capture points of interest including the various stages along the informal market route, the subways, the transport nodes and the park.



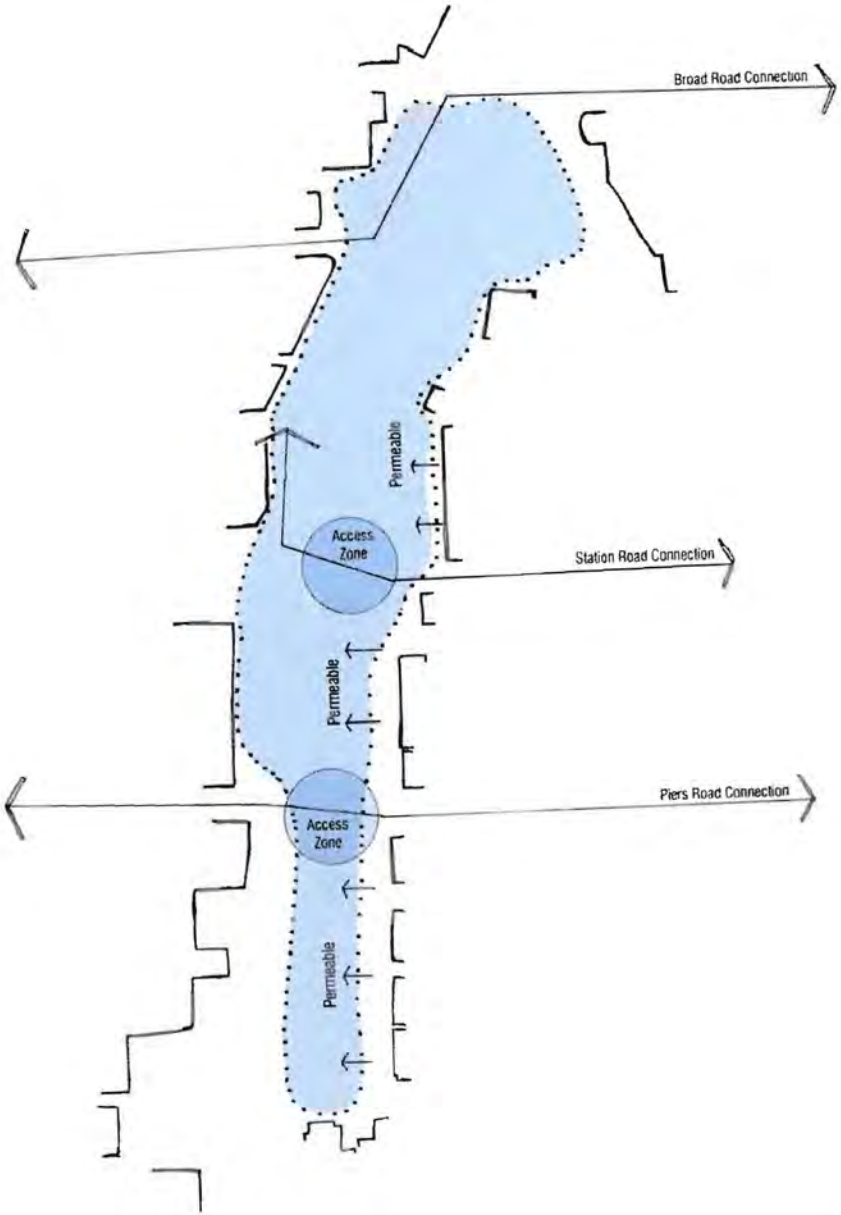
Land use



Barrier



Nodes



Permeability and Natural Emergence

Programme

The development of the programme derives from an investigation into the existing land uses of the immediate Wynberg area. This identifies retail, residential, transport and informal trade to be the dominant programmes. This observation becomes a catalyst in the idea of creating a sustainable human settlement. The proposed building, a support structure, would be able to accommodate retail stores, at least one community facility, space for informal trade, communal public space and a large social housing component. But this should not be predetermined as support structures are armatures within in which the inhabitants can act. The nature of the support structure allows for a variety of programmes to play out. It is important that specific zones be left open to allow programmes such as hair salons and shops to establish themselves in amongst the residential units. The option of residential units converting to shops or other functions is also possible. Therefore the support structure should not be too prescriptive programmatically.

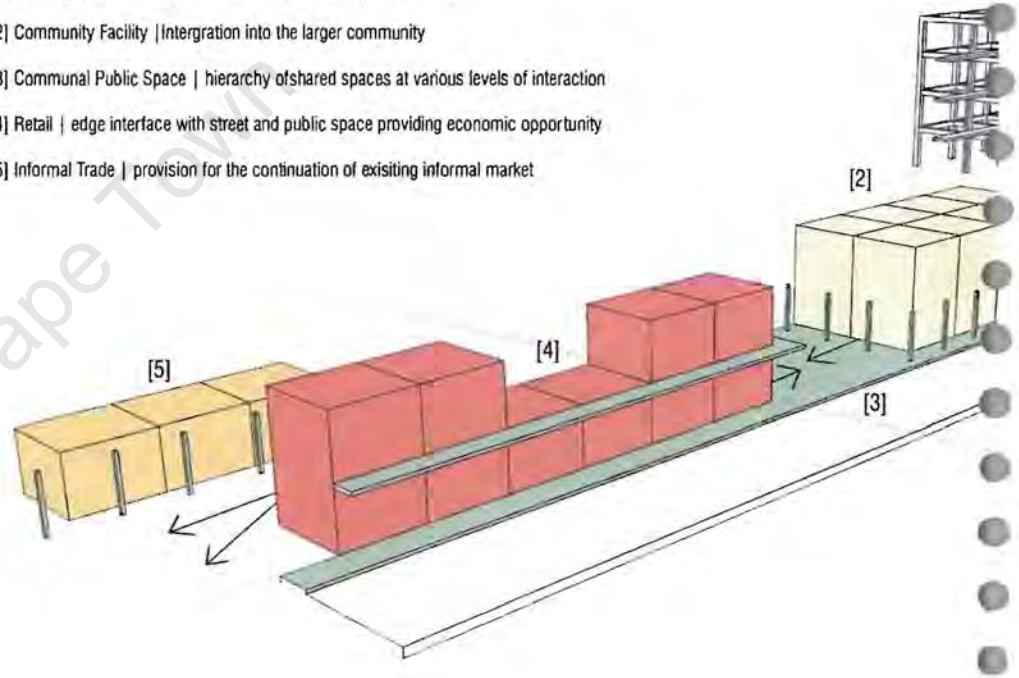
[1] Housing | infill housing with smaller communal spaces in the sky

[2] Community Facility |Intergration into the larger community

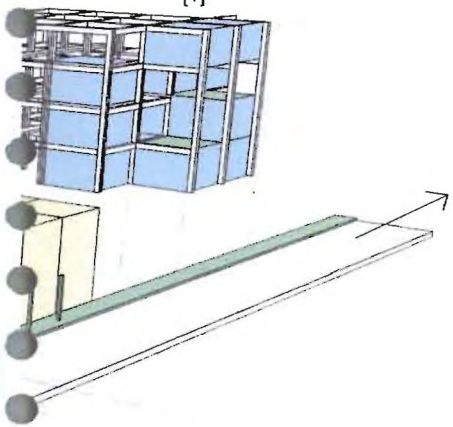
[3] Communal Public Space | hierarchy ofshared spaces at various levels of interaction

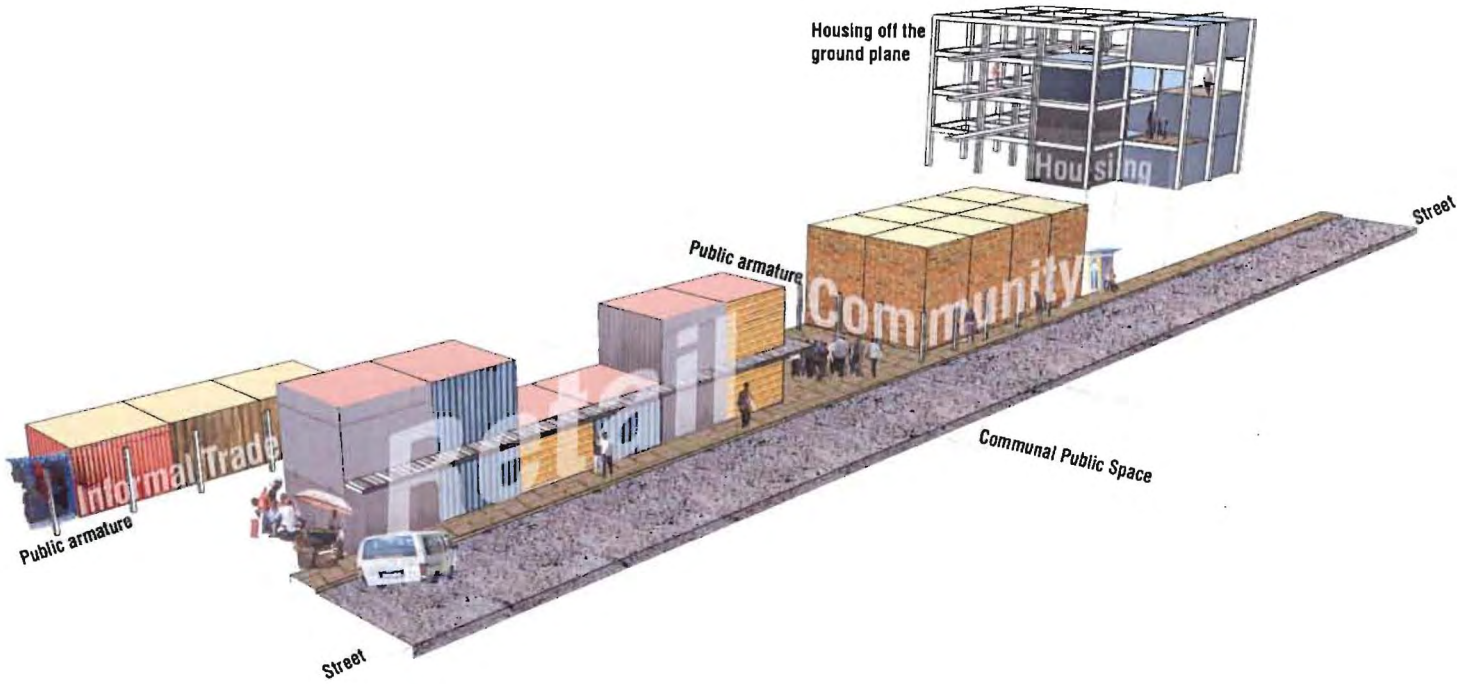
[4] Retail | edge interface with street and public space providing economic opportunity

[5] Informal Trade | provision for the continuation of exisiting informal market



[1]




Housing off the ground plane
Housing
Public armature
Community
Street
Informal Trade
Public armature
Communal Public Space
Street

Design development

The design development stage illustrates the initial proposal for a support structure on the Wynberg site and then demonstrates the process of refinement of the initial design. This process saw a few crucial stages which proved influential in the development of the project and will be discussed as themes. Design developmrent will essentially present the thought process followed in order to realise a support structure that is able to develop incrementally over time by allowing users to become collective developers.

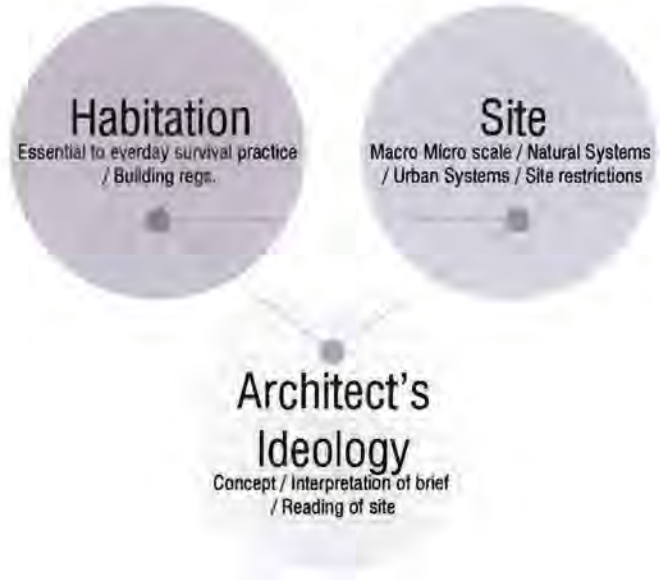
Setting up rules

In order to start designing the support structure, one needs to develop a set of rules which would serve as fixes in the support structure. These fixes hint at degree of control, but it is an informed control governed by three themes namely; Site, Habitation and Architects' Ideology. The fixes influence the anatomy of the support structure, and assist in setting up a order system. This can be seen to be a systematic and rigid approach, but it achieves an efficiency which the project requires.

In Habrakens' discussion on 'support structures', emphasis is placed on setting up 'game-rules' as the key informants which influences the composition of the structure. The rules should be proscriptive to promote infinite ways of acting with freedom, creativity and self-organization. The process aims to establish rules of engagement that ensure the creation of an efficient and comfortable environment across scales from the macro; (the site and the surrounding context), to the micro; (the individual dwelling unit). It therefore reflects the architect's ideology and strategy for ordering the site, bearing in mind site conditions and habitability, issues of massing, the location of entrances, relationship s between units (neighbourhoods), shared communal space and desired connections.

The process of setting up rules might lead to the stimulation of the permutations of the existing building restrictions in order to allow more freedom. The relaxation of these restrictions will free up possibilities for support structures and liberate the process of setting up fixes.

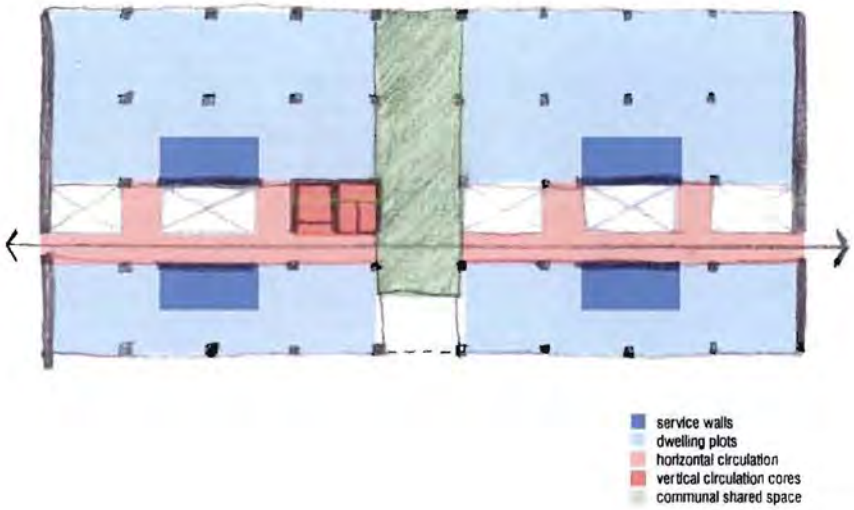
The setting up rules process continues throughout the project and is modified and revised as the project develops.



"... by setting up game-rules for the user and subdivision of support structures, [we shall] take part in a powerful movement towards new social relations, new dwelling forms, new cities" (John Habraken 1961)

Large order Rules - site

The larger order rules inform the integration of the support structure into the site and existing context. This uses the existing nodes on the site as catalyst for development, and influences the location of entrance cores and a servicing logic. It also informs the proposal of a programmatic intention for the support structure.



Neighbourhood Rules - dwellings

The neighbourhood idea, on a micro level, refers to a collection of dwelling units which share a particular space on a micro level. This highlights ideas of access, starter service walls, the layout of plots, the shared communal space and connection to other neighbourhoods.

Developing the Grid

The grid is an enabling device which sets up the framework for the entire support structure. It informs the structural layout, but also acts as a catalyst for growth. The grid pattern presented itself as the most efficient system for a support structure on the site. It provides the formal fixes which allows the inhabitants to act with freedom between structural elements. The layout of the vertical circulation cores, services and structural members should be with the grid. Therefore, the grid along with the vertical circulation cores and structural members make up the formal elements of the support structure. The initial grid was 5m x 5m. This was influenced by a number of factors including:

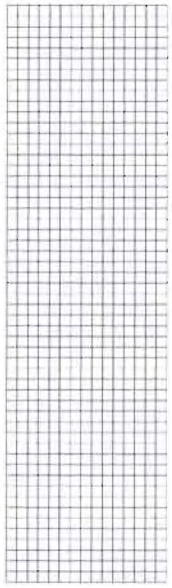
- Comfortable module for the dwelling units and also suitable for other programmes
- One structural bay is able to accommodate two habitable rooms
- Two structural bays bigger than an RDP house
- Suitable dimension for an efficient layout for the morphology of the site
- One vertical circulation core (elevator and stair) fits within in one structural bay
- The creation of a comfortable size neighbourhoods within larger structure
- Orientation according to the sun

The thought process entailed finding a grid system which works for the housing component of the project and then testing it to determine if it is flexible enough and suitable to serve other programmes. After an interrogation of the grid and further investigation into the structure, the grid was adapted to a 5,5m x 5,5m.

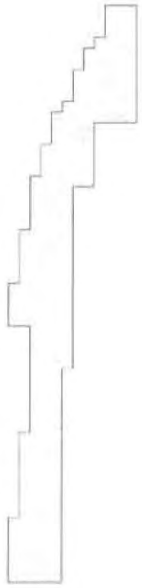
(see next page for initial proposed support structure grid)

Right:
Initial proposed support structure system. The system includes a grid overlaid onto the site with a circulatory network (vertical cores and passages) in a linear arrangement and possible dwellings clustered around the centralised circulation route.

Bottom right:
3D view of initial proposed system illustrating the linear nature of the support structure



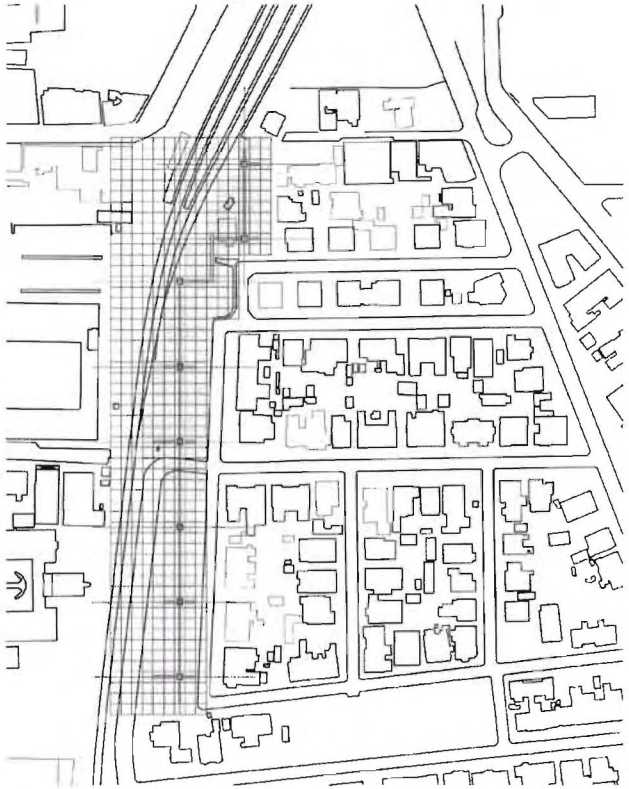
Grid



Footprint

Vertical cores

Circulation



1 Structural Grid

5 x 5m Structural grid for vertical supports
Grid is applied to the site to establish the extent of the footprint
Footprint is essentially the same for each floor although variations occur when exposed to site informants
Footprint establishes the boundaries of infill

2 Vertical Cores

Vertical Cores are located in a linear arrangement approx. 30m apart in accordance with the maximum distance from a unit entrance to emergency stairs
Vertical Cores consist of stair as well as a lift
The lobby areas link vertical cores with a circulation system (horizontal)

3 Circulatory System

Circulation system is a connecting device which links the vertical cores
Circulation system also acts as a ventilating device which allows air and sunlight to penetrate down into the building

4 Primary Bathroom Service Cores

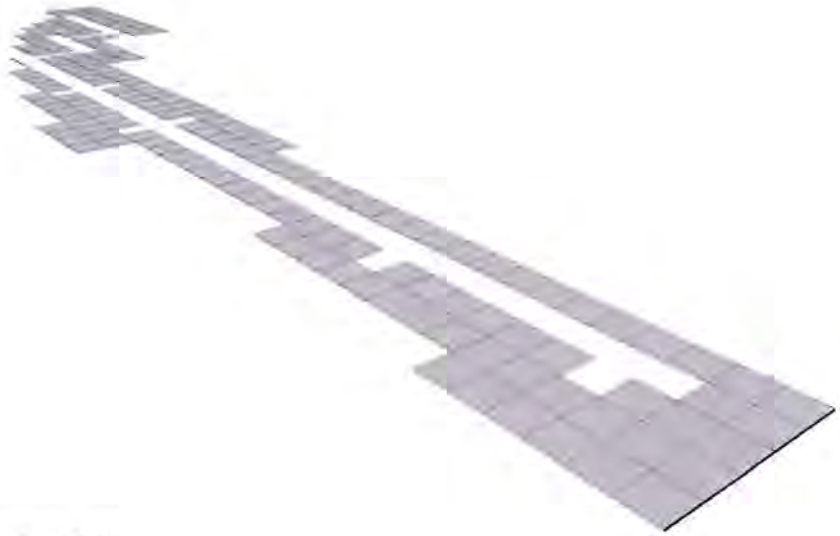
Bathrooms are stacked vertically
2 bathrooms fit within a structural bay sharing service ducts
The ganged bathrooms each serve one unit
Bathrooms contain a toilet, hand basin and bath
Each is naturally ventilated

5 Secondary service ducts

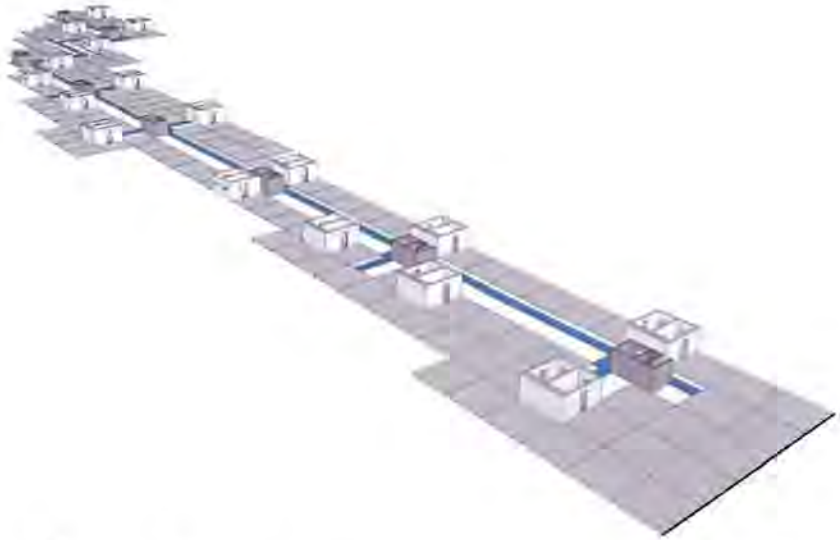
These ducts provide the necessary pipes for the kitchen
These are independent of the bathroom cores in order to ensure flexibility in unit layout
Services are integrated into the vertical structural elements and located around the central circulation spine

6 Structural Columns

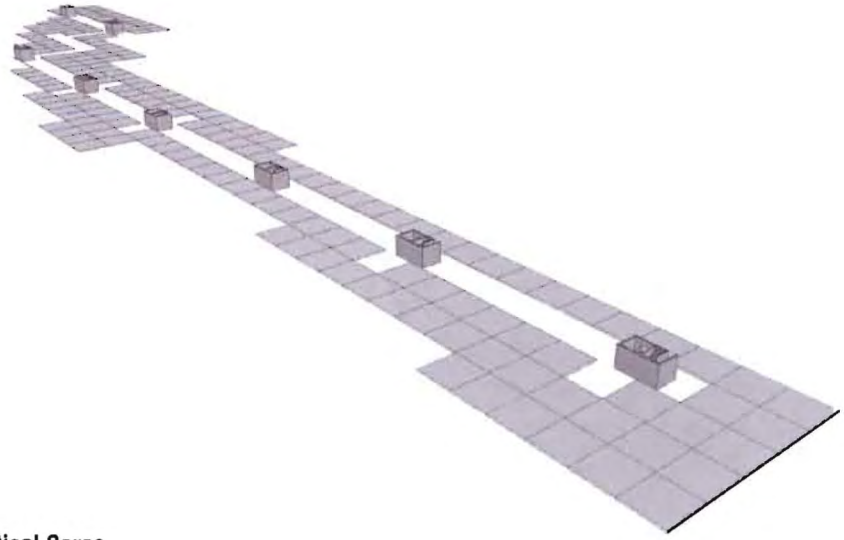
Vertical supports are arranged on the 5 x 5m grid
These are load bearing concrete columns onto which the infill panels are attached



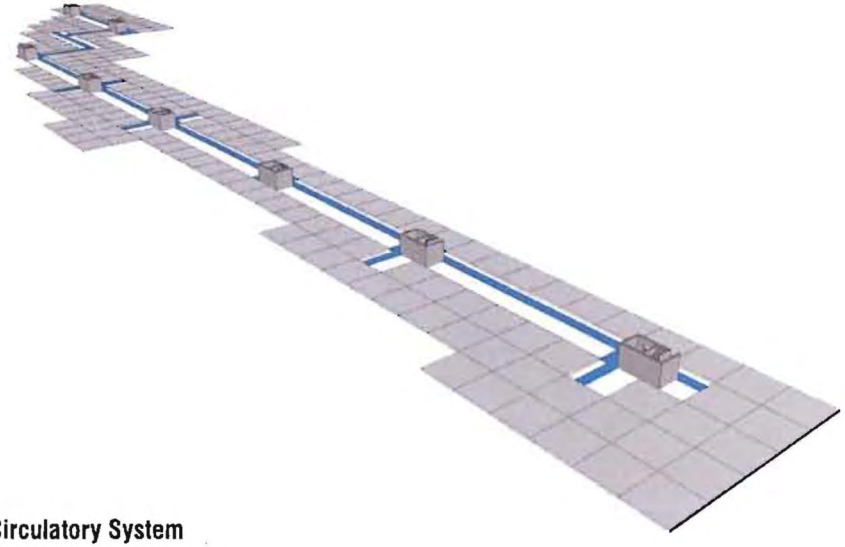
1. Structural Grid



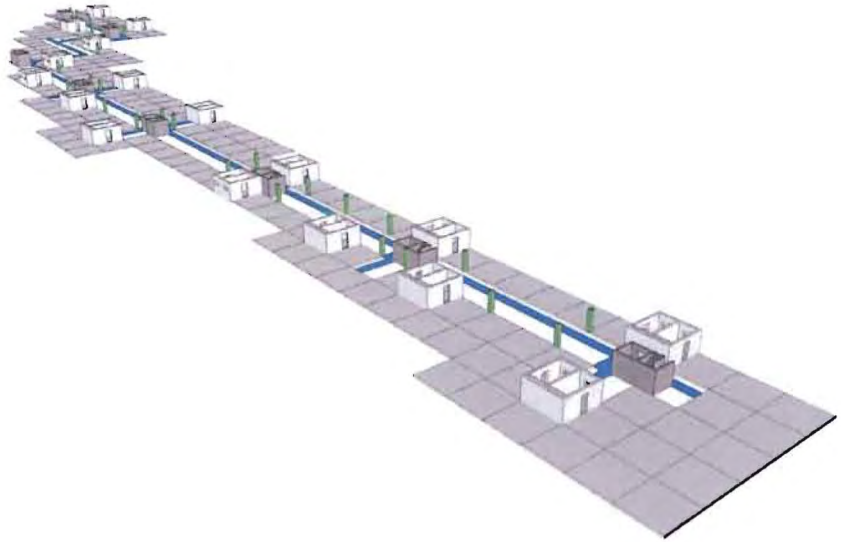
4. Primary Bathroom Service Cores



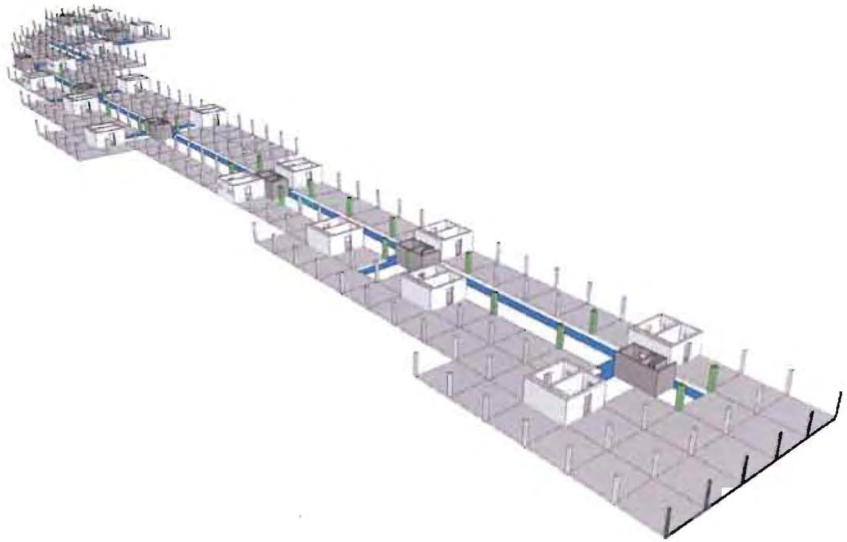
2. Vertical Cores



3. Circulatory System

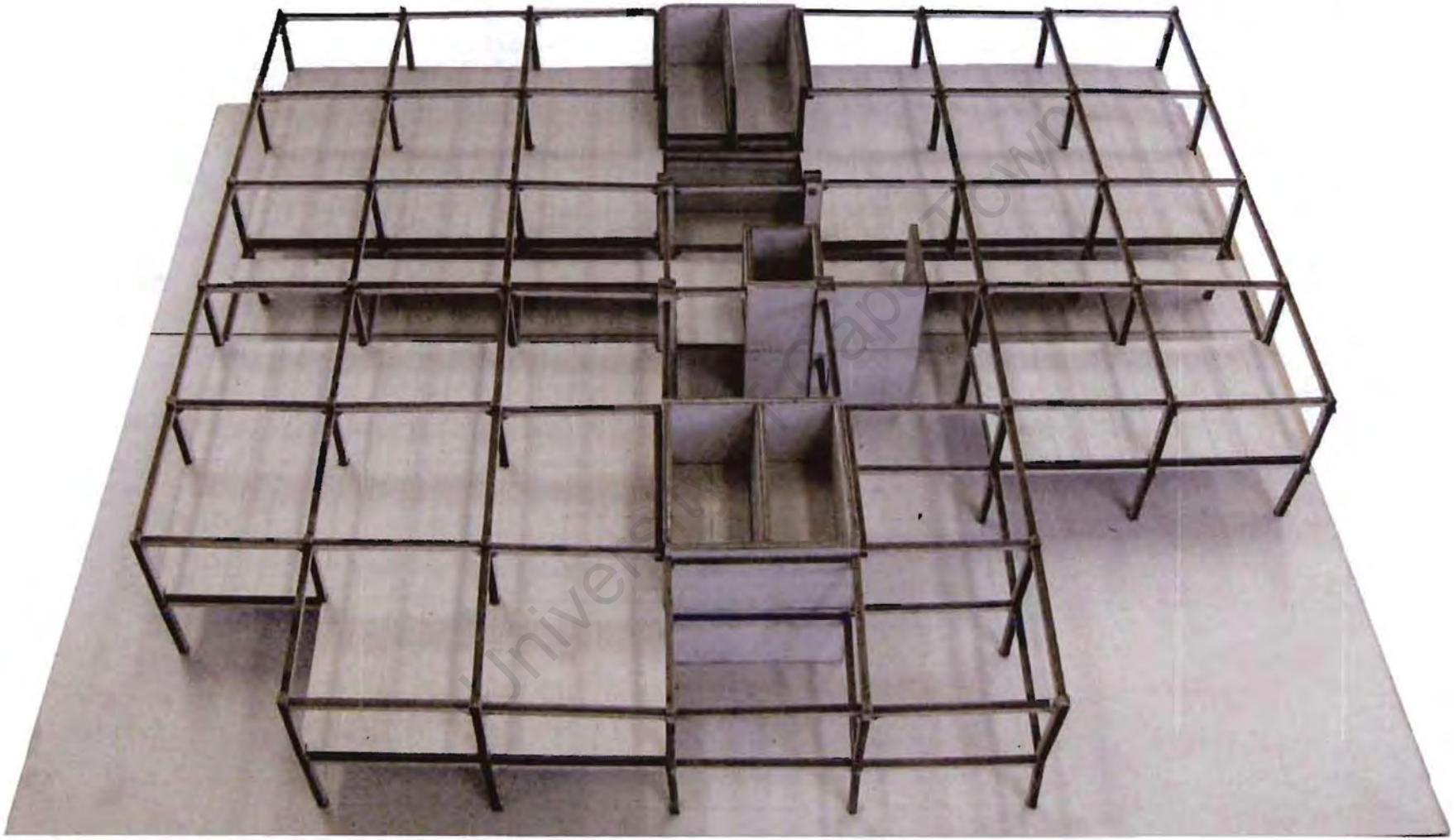


5. Secondary service ducts



- 6 Structural Columns

Below:
1:50 model of a portion of the structure showing the circulation and servicing fixes. The model was an attempt at working out an ordering system integrated with a structural idea



Below:
3d model of the context, showing the relationship of the support structure to the railway line and the existing urban fabric. The building introduces a new edge condition

Vertical circulation

Anatomy of the support structure

The anatomy of the support structure was introduced in the previous section dealing with the development of the grid. This is because the anatomy of the support structure is informed by the grid. Three key elements determined the anatomy of the structure: Vertical Circulation, Service Cores and Structure.

The vertical circulation consists of elevators and stairs which are ganged together to make vertical cores. One core should fit between one structural bay. These are located in a linear arrangement along the site and are always located one bay from the street edge. The distance between the cores takes into account the proximity of dwellings to the fire escapes. The base of the cores comprises of a secure lobby area which contains letter boxes and an attached service room.

Service cores

The driving factor behind the location of the services is to find a balance between design intent and efficiency. The services referred to include water and plumbing fittings as well as electrical conduits. The intention is to locate the service walls around the central circulatory zone for accessibility in terms of maintenance, ventilation and to clear the building frontage of pipes and conduits

The service walls run the height of the building and maximum efficiency is achieved by ganging the services. The service fixings act as the starter block for the dwelling units or other programmes which require services. The bathrooms ventilate to the central circulatory zone. On ground floor the service walls could serve the toilets for the retail stores and community facilities. They also serve as connections for any water points required by informal traders.

The service fittings can also have aesthetic advantages in terms of the construction of double storey dwelling units due to the omission of fittings at a given level. This also plays a role in creating variance on the façade.

Structure

The structure of the building is influenced by the guidelines stipulated by John Habraken Summary of Guidelines for the form of support structures:

- Parallel planes running above the other carried on columns - most primitive form.
- A construction system whereby the production apparatus moves but the product is stationary
- The structure must have, as a far as possible, the same section at any given point
- vertical circulation on the outside of the structure, as stairs and lifts are deemed to be obstacles in the structure
- To build plots in the air
- The structural elements must be as long as possible – produce ribbon like forms
- Long floor spans for easier portioning into plots
- Modern construction technique of prefabrication

The structure must be robust and legible. It should allow for fast erection and easy expansion over time.

Construction Strategy

The construction of the support structure influences the growth of the infill. The construction technique can happen in a number of ways, each having an effect on the occupation pattern of the inhabitants. Certain construction techniques allow construction and appropriation to occur simultaneously, whereas others need the structure to be built completely before occupation by inhabitants. The construction strategy has to be the most logical for the site.

Strategy type 1A : Entire structure is built including services and vertical circulation. Inhabitants construct dwelling in a top down pattern over time

Strategy type 1B : Entire structure is built including services and vertical circulation. Inhabitants construct dwelling in a bottom up pattern over time

Strategy type 2A : Phase growth of the structure. Phase one will include the construction of the support structure at subway one and extend to subway two. Inhabitants move in and the system is tested.

Strategy type 2B : Phase growth of the structure. Phase two can be built making adaptations to the structure based on lessons learnt in phase one.

Strategy type 3 : Sectional growth of structure. Starter towers adjacent to prominent movement routes. The system will be tested and evaluated for future development of the left over space. This growth allows for public space for the broader community and allows the community to access and interact with the building. Future development could see an adjustment in building height, introduction of new programmes, and spatial adjustments made based on observations of starter towers

Strategy type 1A

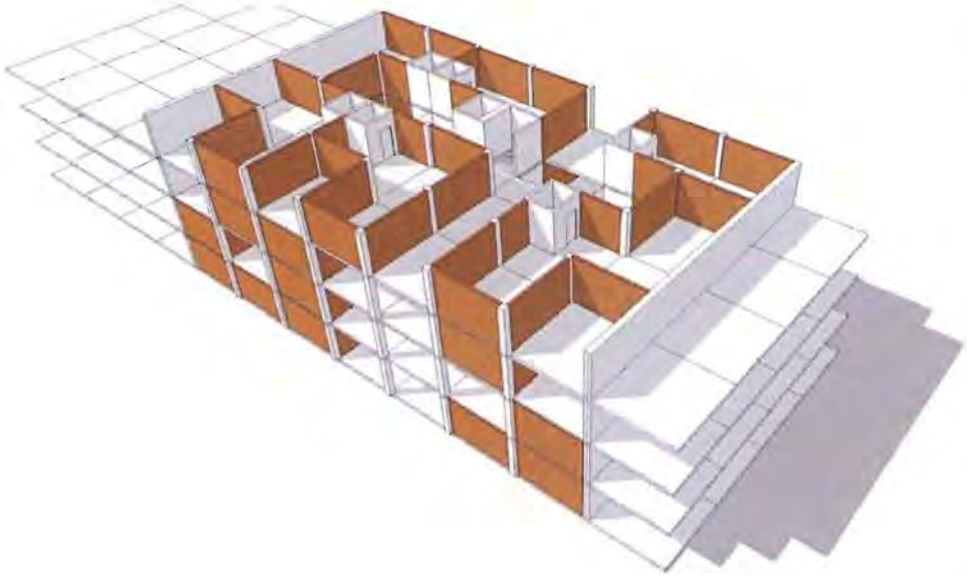
Strategy type 1B

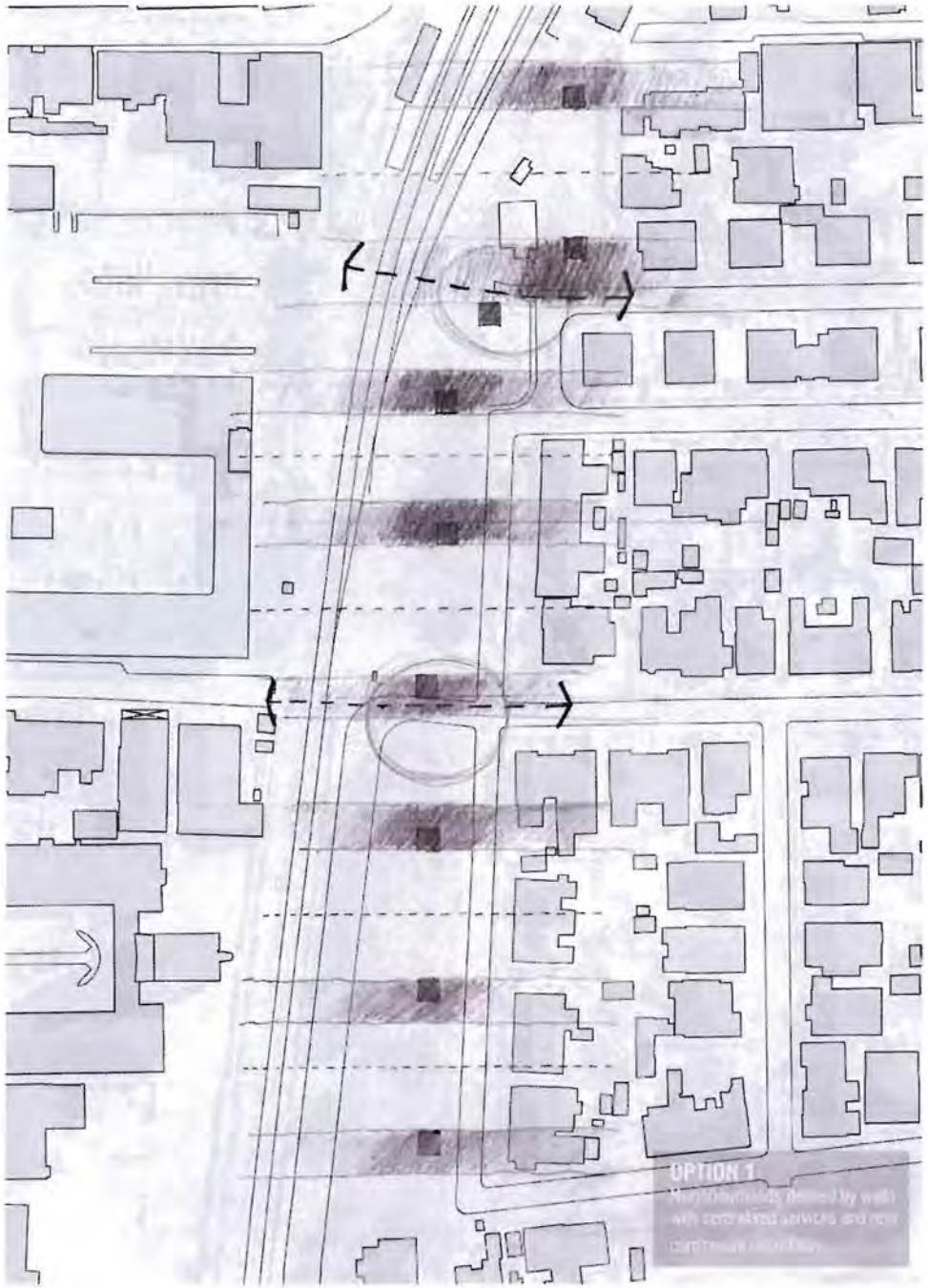
Strategy type 2A

Strategy type 3A

Strategy type 2B

Strategy type 3B



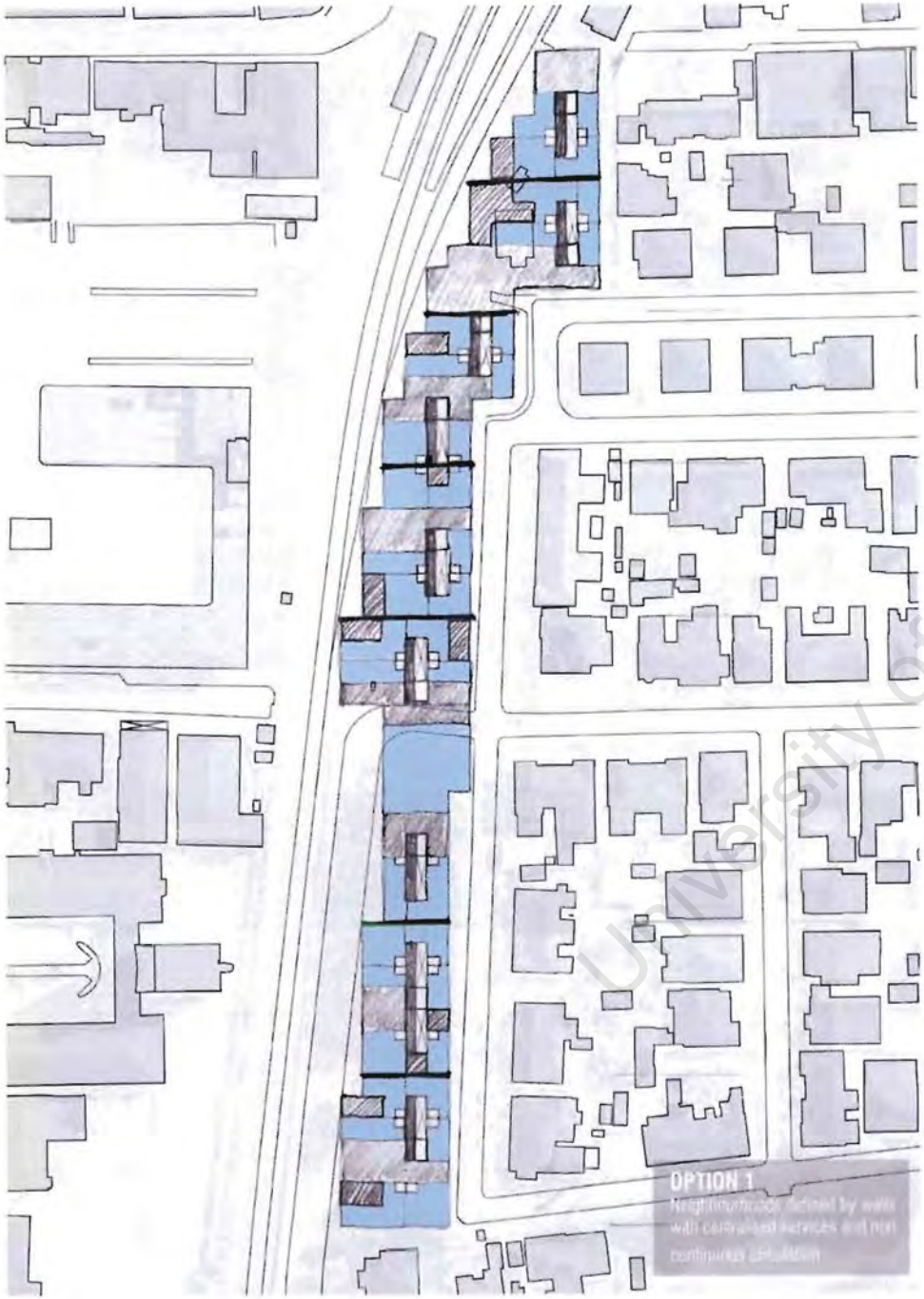


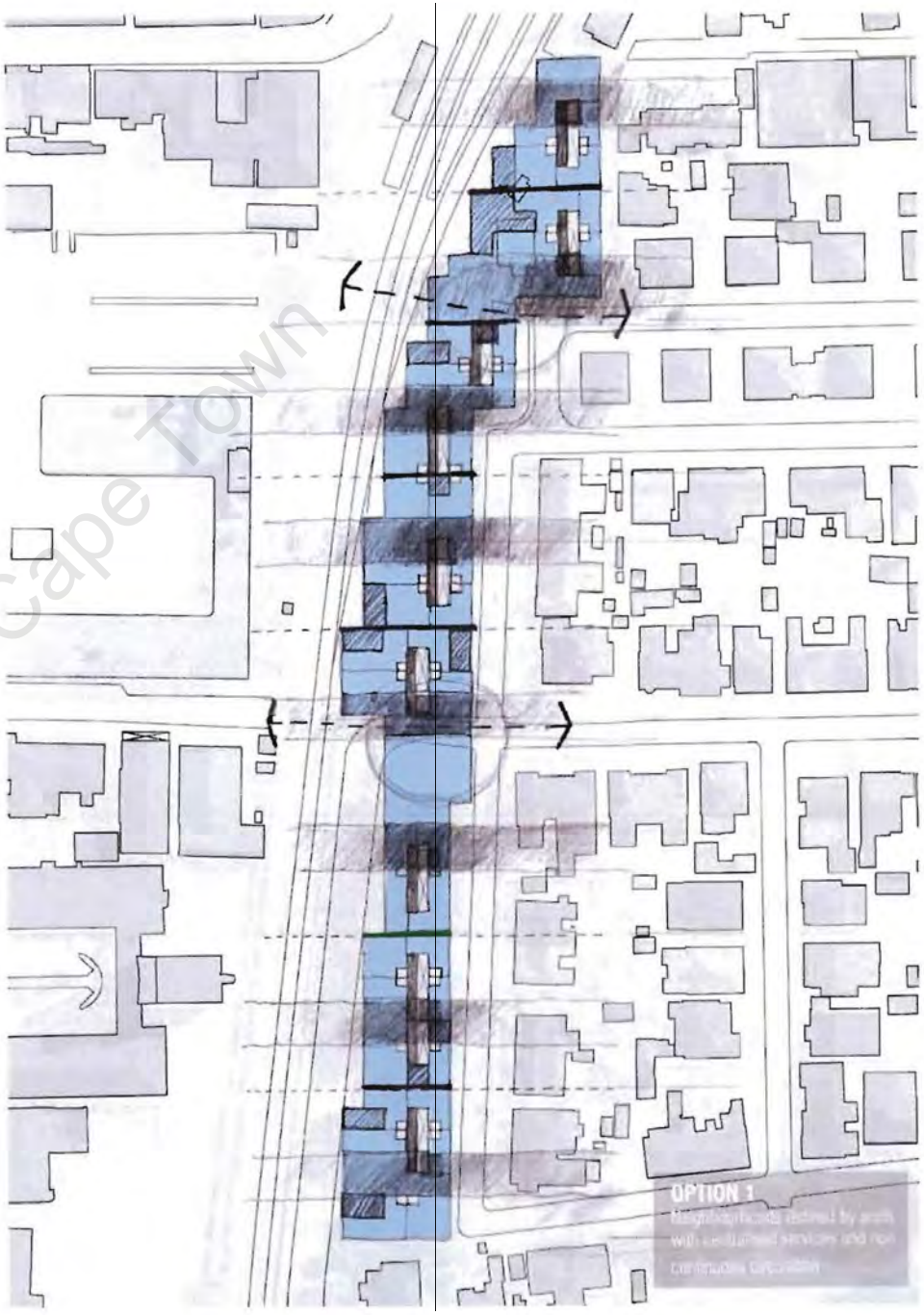
Neighbourhoods

The neighbourhood idea stemmed from an attempt at creating a smaller system within the larger support structure system. The primary goal is to create a sense of community within this larger system and to promote micro management of space. This also aids security and ownership. Each neighbourhood contains a limited number of dwelling units which share a communal space and circulation core (access). A neighbourhood is no more than 8 dwellings units. Neighbourhoods are defined by colour coded solid walls and service cores separated from one another via fire doors. This system also helps orientate the inhabitant.

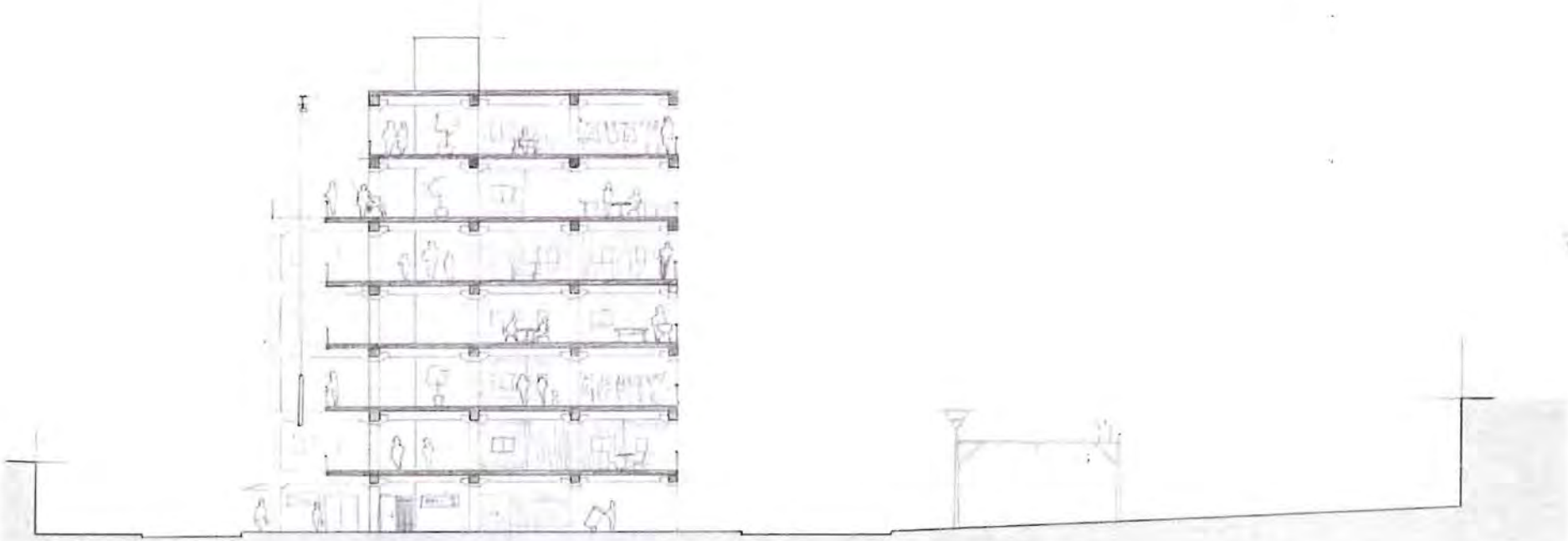
Each neighbourhood has a set of rules to which the inhabitants need to conform. There is a centralised communal space that cannot be occupied by private dwellings unless negotiated with the other inhabitants. This space is also used as the zone in which materials can be hoisted up and distributed. The service fittings and walls serve as the starter blocks for dwellings.

On a macro level, the neighbourhood system attempts to create a system of communal spaces, which act as breaks in the residential levels of the support structure but also acts as a fixed public space for the inhabitants.



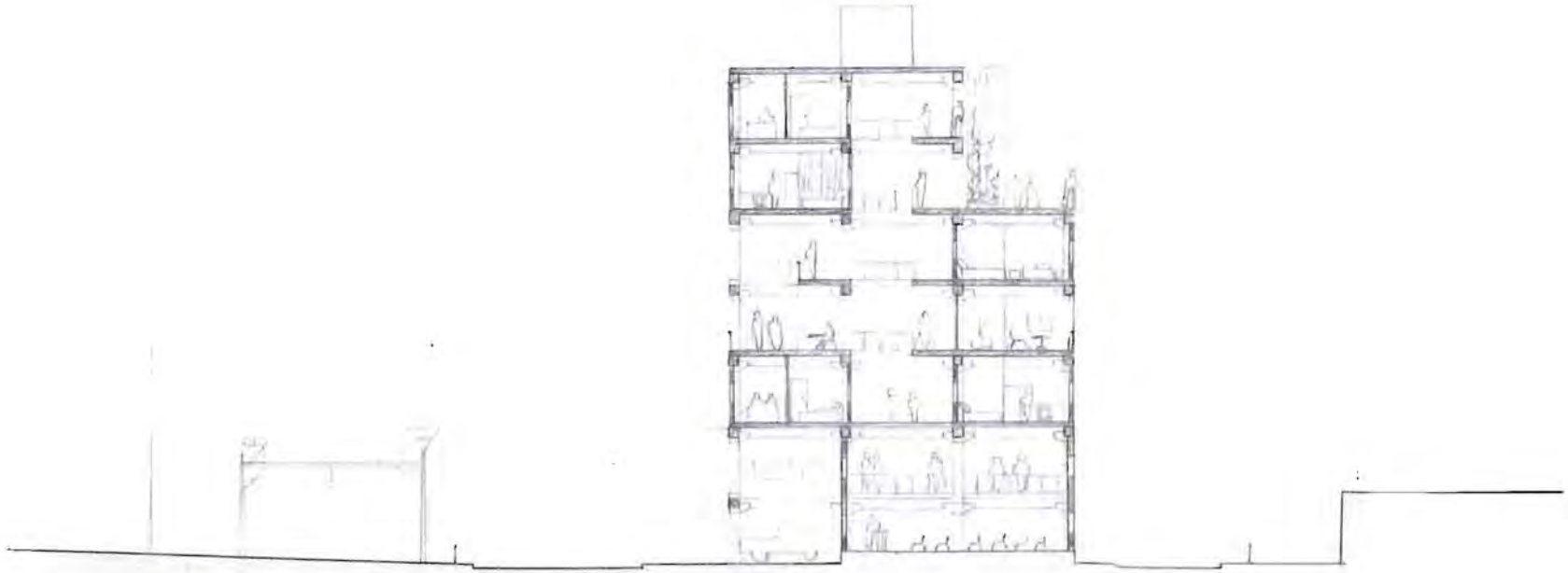


Below:
Section through the shared communal spaces of the various stacked neighbourhoods. The section illustrates the ground floor condition of entrance as a permeable space. The section also illustrates the recess in the structure which serves as the cavity in which the panels are lifted from ground floor to the various levels.



Section A-A

Below:
Section through the narrowest section of the structure, 3 structural bays. It illustrates the terrace shared space on the 5th floor, the circulatory network and the taller volume on ground floor for the possibility of a community facility.



Section B-B

Social Support Structure

This refers to the provision of public space at various scales within the support structure. This forms a crucial part in the experience of the support structure by the inhabitant whether it is the owner of a plot or a member of the public interacting with the building. The inhabitants' engage with these spaces which promote interaction. These larger social spaces foster a sense of community and cohesion as they are not dedicated to one specific group. The smaller social spaces allow for private space which could either be sheltered from the public or maintain some connection

Social Support Structure (synthesis)
This is a combination of private balconies, neighbourhood shared space, intermediate communal space and the ground floor plane.

Private balconies

The outdoor space within the plot is not utilised as part of the enclosed dwelling unit. Two neighbouring units could combine balcony spaces to create one long shared private balcony. The balconies can also be in the form of light weight clip on structures.

Neighbourhood Shared Space

This is a centralised space shared between the units within the neighbourhood. It branches off the central circulation route and can be used for recreation purposes or an area to hang washing. The space relies very much on the negotiation between the various dwelling units.

Intermediate Communal Space

This is a larger shared space shared between a numbers of neighbourhoods. The programme for this space is undetermined. It could be used for recreational purpose or could see the emergence of small convenience stalls or other service stalls.

Ground floor

The ground floor aims to offer freedom to support a variety of uses overtime. The double volume space frames a public base for the support structure. The structural grid is altered to allow less vertical supports and ensures larger uninterrupted spaces. This can support informal trade, retail stores, storage, community facilities and public space. The nature of the ground floor changes over time incorporating these programmes.

Form Development

As the design developed, the structure was captured in 3d sketches illustrating the entire support structure and its possible occupation. The development shows the testing of ideas in terms of ordering principles, hierarchy and zones of public space. The following illustrations are exploratory and present an imagined future for the structure.

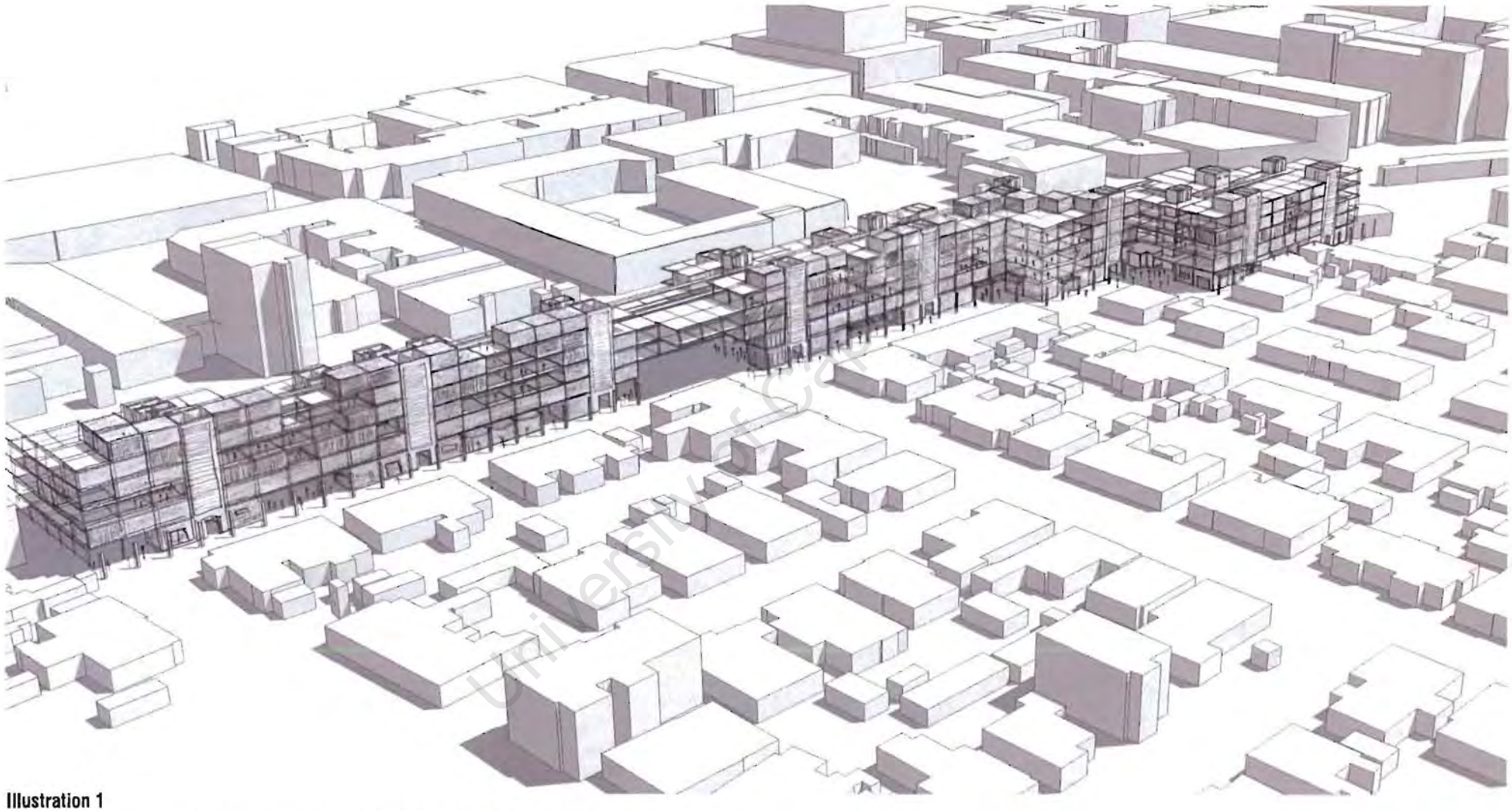


Illustration 1
First conceptual representation of the entire structure. It introduces the idea of a loosely programmed ground floor. The vertical circulation cores act as bands which bring order to the facade due to their location at the edge of the building envelope

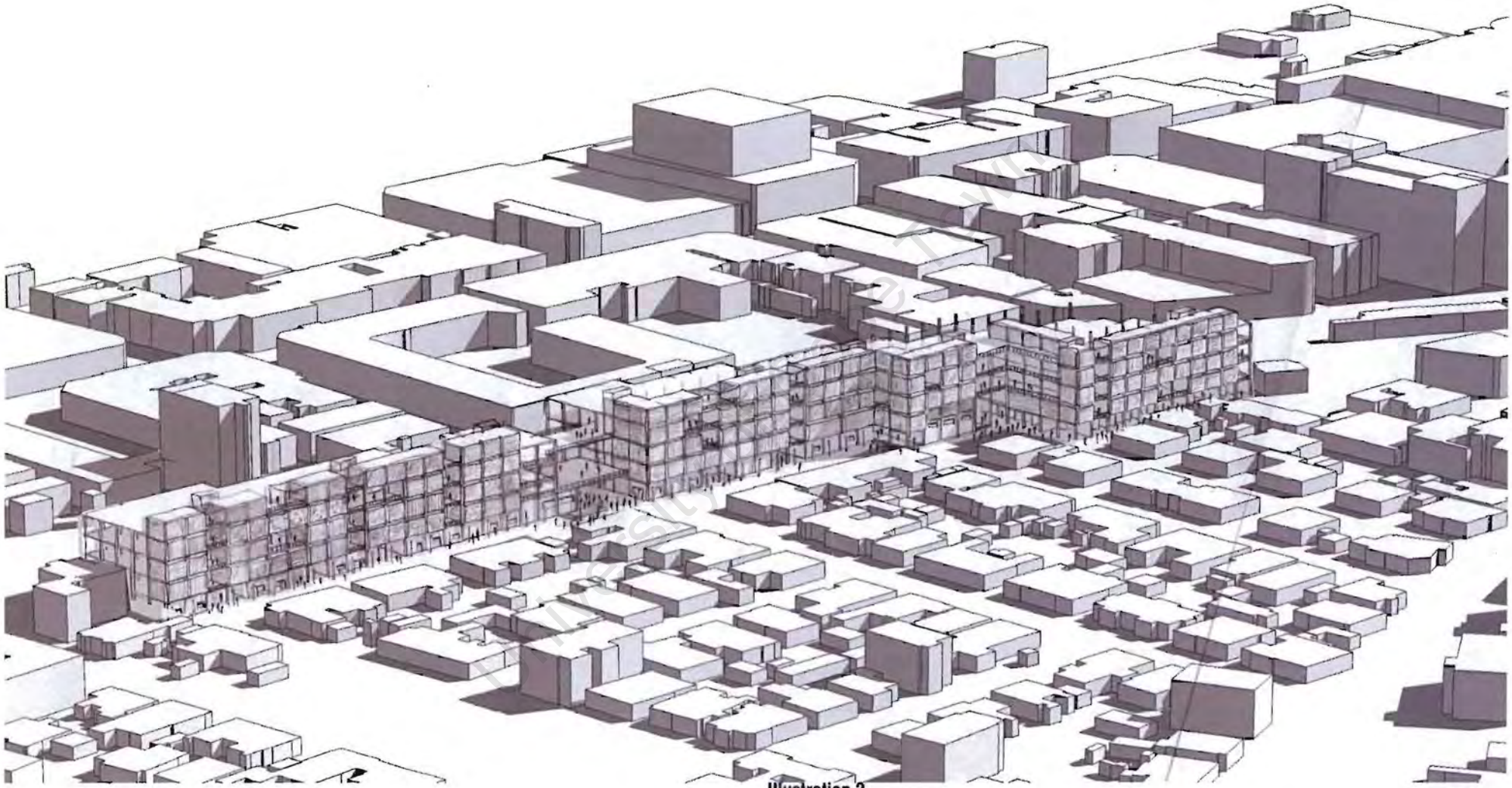


Illustration 2

Second conceptual representation of the entire support structure. The hierarchy displayed in the previous illustration is eliminated through off setting the vertical circulation to the interior of the site. The infill panels animate the facade. Bands of open space in the sky create breaks in the facade with a bridge spanning the road.

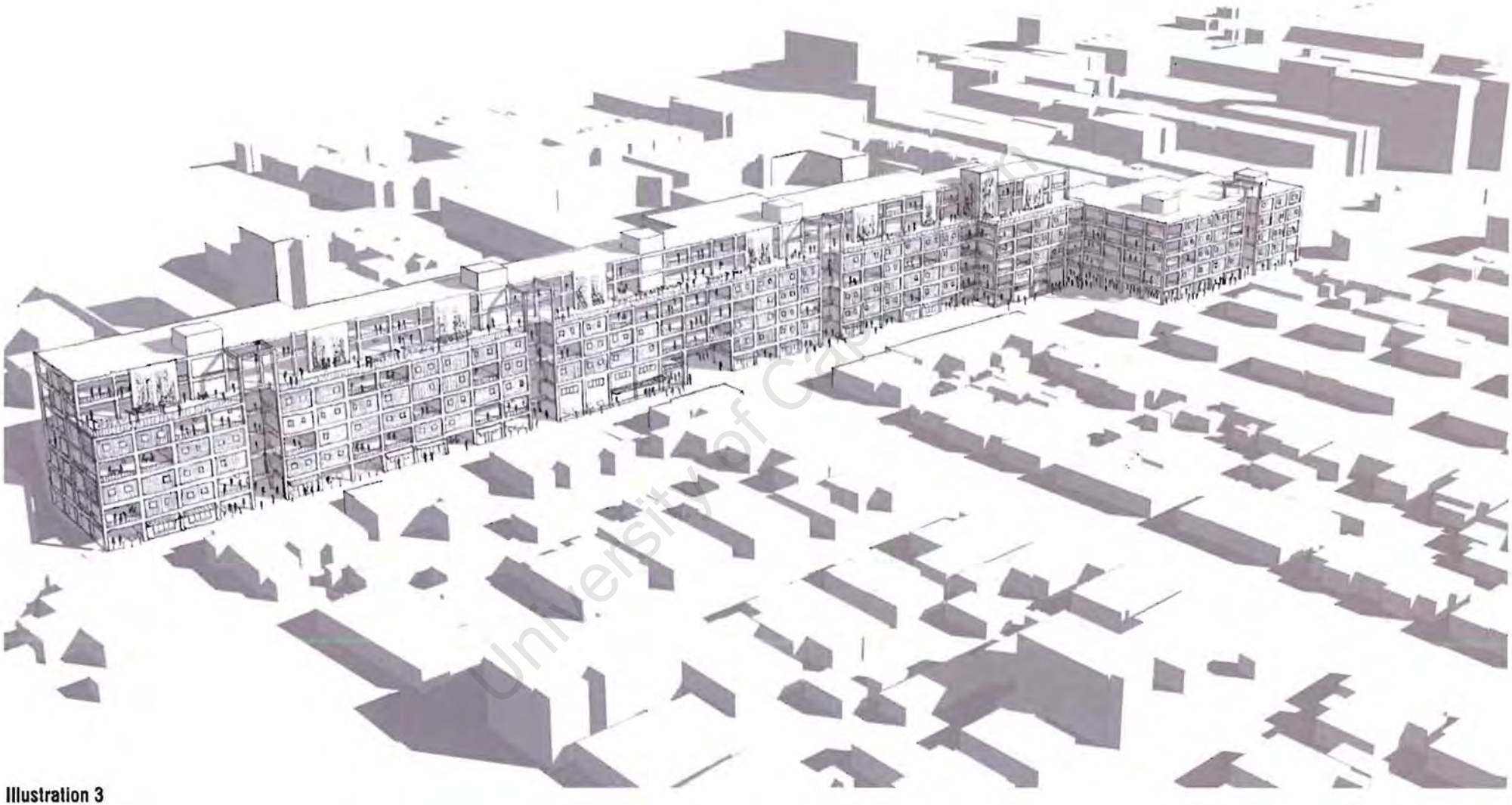


Illustration 3

Third conceptual representation of the entire support structure. The roof terrace becomes a communal outdoor space for all the residents. The shared neighbourhood space becomes the cavity in which the panels are lifted to the various levels but also provides breaks in the facade structure. The ground floor is double volume along main movement routes to allow for larger programmes.

4 Technical Studies

Material Choice and Structural System

Services

Infill Panels

Clip-on components

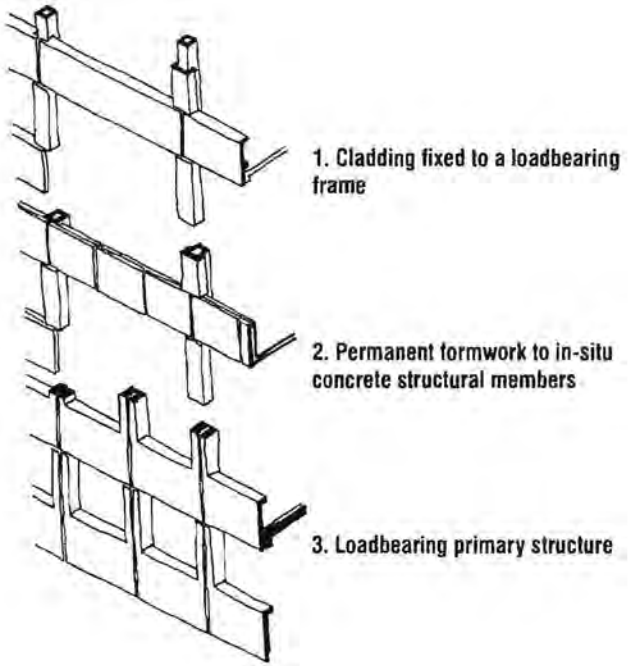
Below Right:
Drawing illustrating the use of precast concrete elements in construction

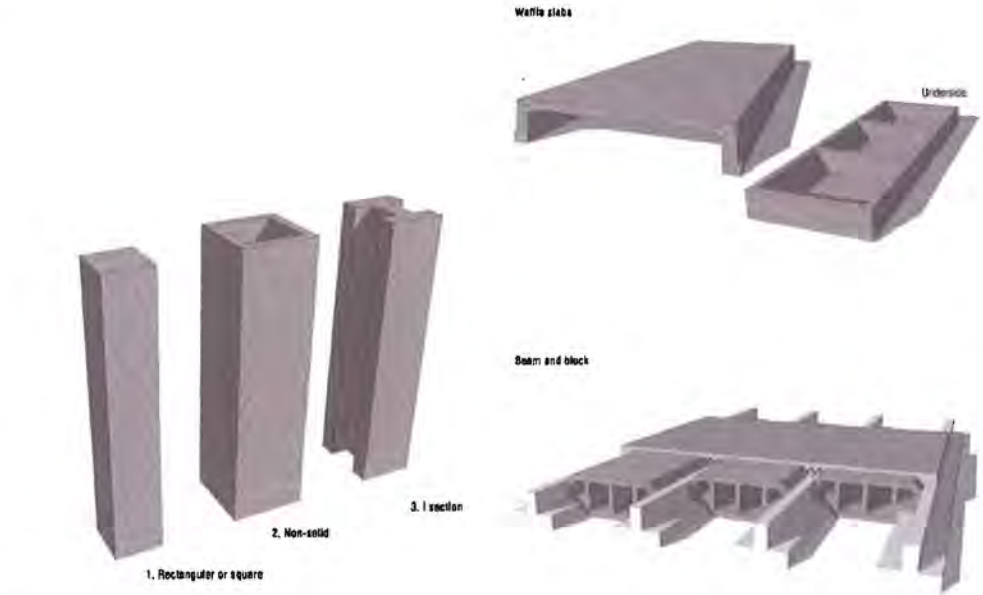
Material Choice and Structural System

Concrete is chosen as the primary material for the support structure. The decision is based on the theoretical and technology investigation addressing the need for the structure to be robust, rapidly built with the possibility of growth (expand), better fire performance and to reduce on-site labour. Therefore a precast concrete system reveals itself to be the most appropriate material choice for this support structure. The choice to implement precast techniques is influenced "by means of the factors which serve to speed construction and to reduce total costs while satisfying the quality stipulations of the specification governing the structure" (Richardson 1973: 1). Precast components are prefabricated and mass produced and then erected on-site. Some components require less heavy duty equipment than others. This is also dependent on the height of the building and erection technique. The erection process is rapid and less intensive as in-situ concrete works which leads to a reduction in on-site time. Therefore precast concrete as a construction method allows for precast elements to be produce and assembled into a sound structural economic design at a relatively rapid speed, reducing construction time.

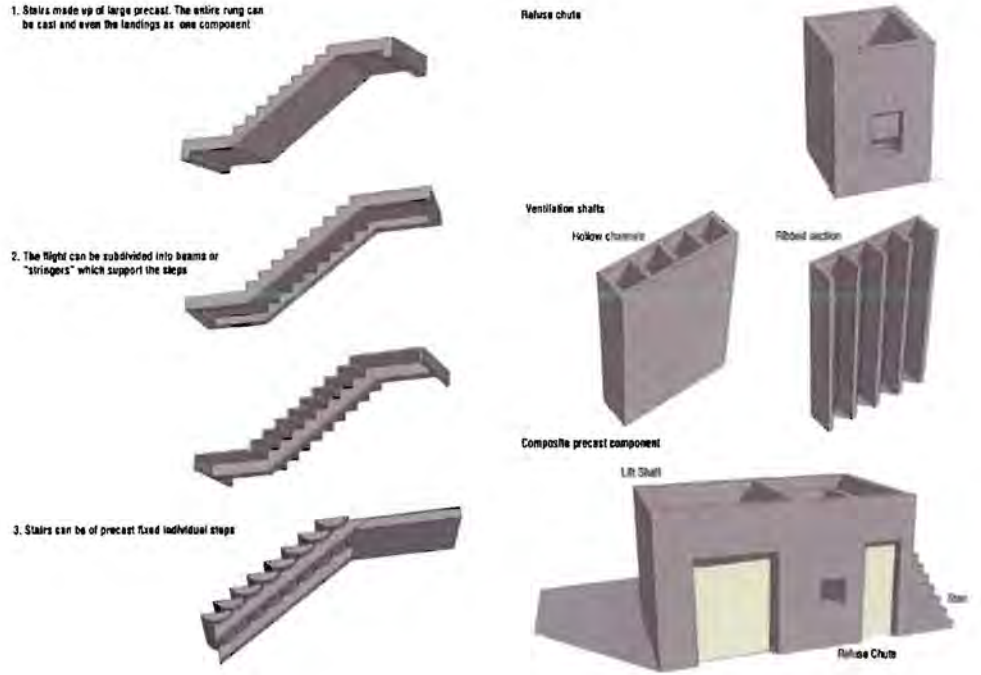
There are three basic ways of using precast concrete in architecture:
1. Cladding fixed to a load-bearing frame
2. Permanent formwork to in-situ concrete structural members
3. Load-bearing primary structure

Precast concrete components are primarily implemented in this proposal as a load bearing primary structure





Left:
Diagrams of a variety of precast concrete elements available



Precast concrete elements

The system of support structures comprises of a structural framework and services. The framework is made up of horizontal (beams) supports, vertical (columns) supports and floor slabs. The services provided are in the form of a horizontal (passages) and vertical (stairs or lifts) circulation system and a ducting system. These components are available in precast concrete elements. The nature of precast concrete architecture allows for variations in shape and size, and the mass production of these components.

Structural System

The choice of multistorey structural systems using precast elements is informed by the following:

- The height and number of storeys of a building
- The capacity of cranes and erection equipment
- The proximity of the precast factory to site
- The span and spacing of the frames in relation to storey height
- The loads transmitted to the floor

The primary structural systems are:

- Framed structures with continuous columns
- Framed structures with spliced columns
- Framed structures comprising of portal framed units
- Mushroom-type structures
- Structures composed of slab or plate-type components

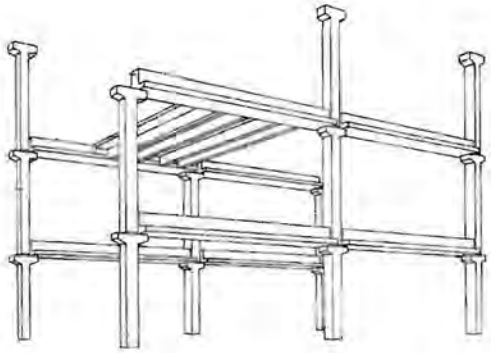
(Koncz 1970: 4-15)

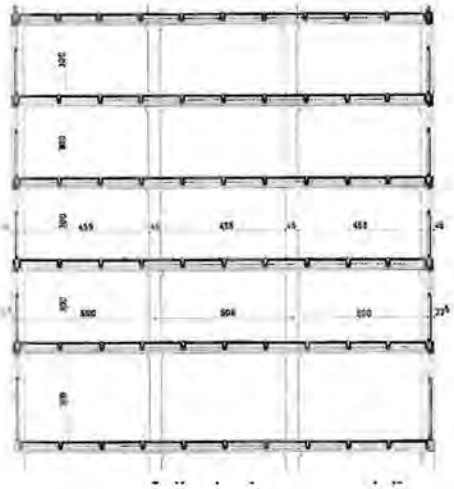
This support structure proposal implements the framed structures with spliced columns. This system is suitable for buildings 10 to 60m tall. The components are manufactured and precast in a factory off site. The components are erected via a tower or goliath cane. There are two variations of this system:

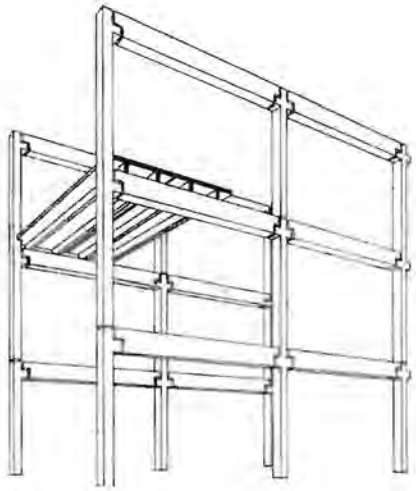
1.The system can comprise of spliced columns at each floor. The floor units rest on the beam which is propped up by the column head. Rigid joints can be achieved by in-situ concrete of prestressing. The components in the system are of equal weight however the columns need to be braced or stiffened. The components can be standardized and mass produced.

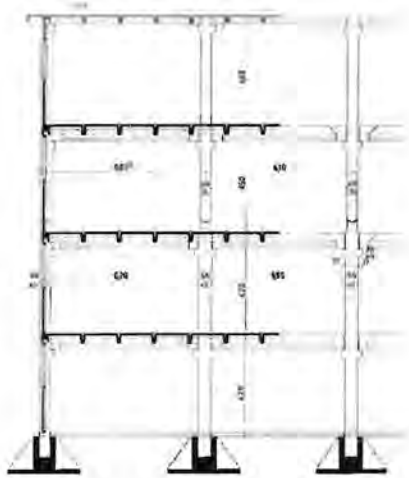
2.The system can comprise of staggered joints whereby the columns may be continuous over two storeys. This means that the number of structural components is reduced.

These are structures where the lifting and handling capacity of the crane does not allow for the use of units larger than an individual column or beam. This is governed by the greater height and longer spans which can be achieved by these structures. This method requires rigid connections unless stability is gained via shear walls. In-situ or prestressing is the preferred connection.





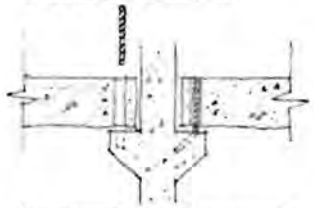




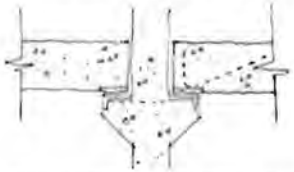
Top Right:
Diagram showing spliced cloumns at each floor
Koncz 1970: 6, 33)

Right:
Diagram showing staggered joint whereby the columns may be continuous over two storeys
(Koncz 1970: 6, 33)

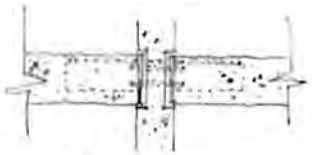
Column and beam connections



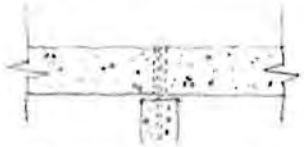
Nibs or haunches cast onto the column and bolted or dowel connected and then grouted



Welded connections with steel plates cast onto beam and stiel plates of nibs

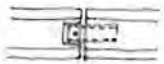


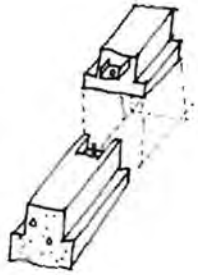
Recesses formed in column with bolted or welded plate connections



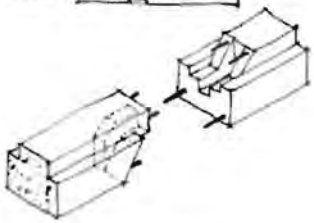
Continuou beam span over columns and dowel connected

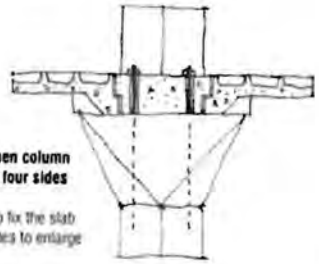
Pin-joint in portal beam





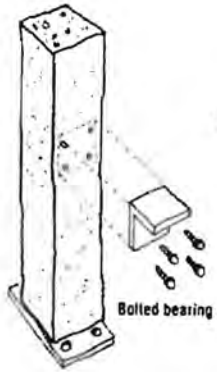
Rigid connection beam at point of minimum bending moment



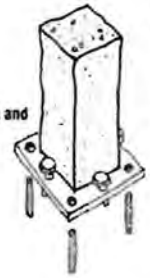


Bolted connection between column and slab cantilevering on four sides

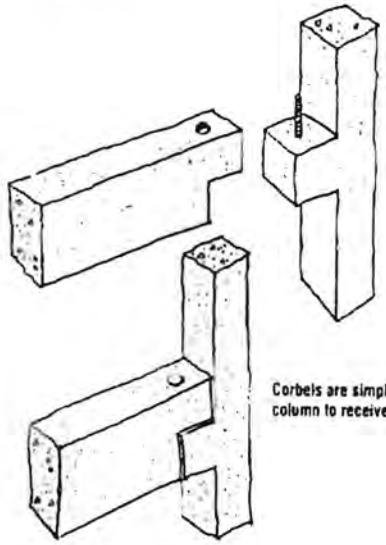
The column base serves to fix the slab cantilevering on all four sides to enlarge column head



Bolted bearing cleats



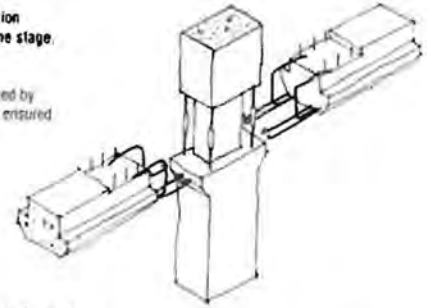
Combined levelling and base plate



Corbels are simply cast with the column to receive beam

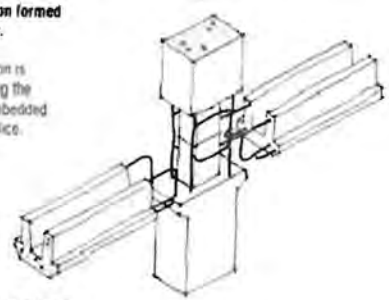
Column splice and beam connection formed with in-situ concrete in one stage.

Some of the vertical bars are spliced by welding. Continuity of the beam is ensured by top reinforcing bars.



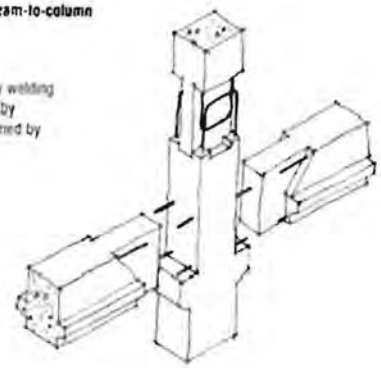
Column splice and beam connection formed with in-situ concrete in two stages.

Stage one, only the beam connection is poured leaving a socket for receiving the upper column. Overlapping bars embedded in the concrete form the column splice.



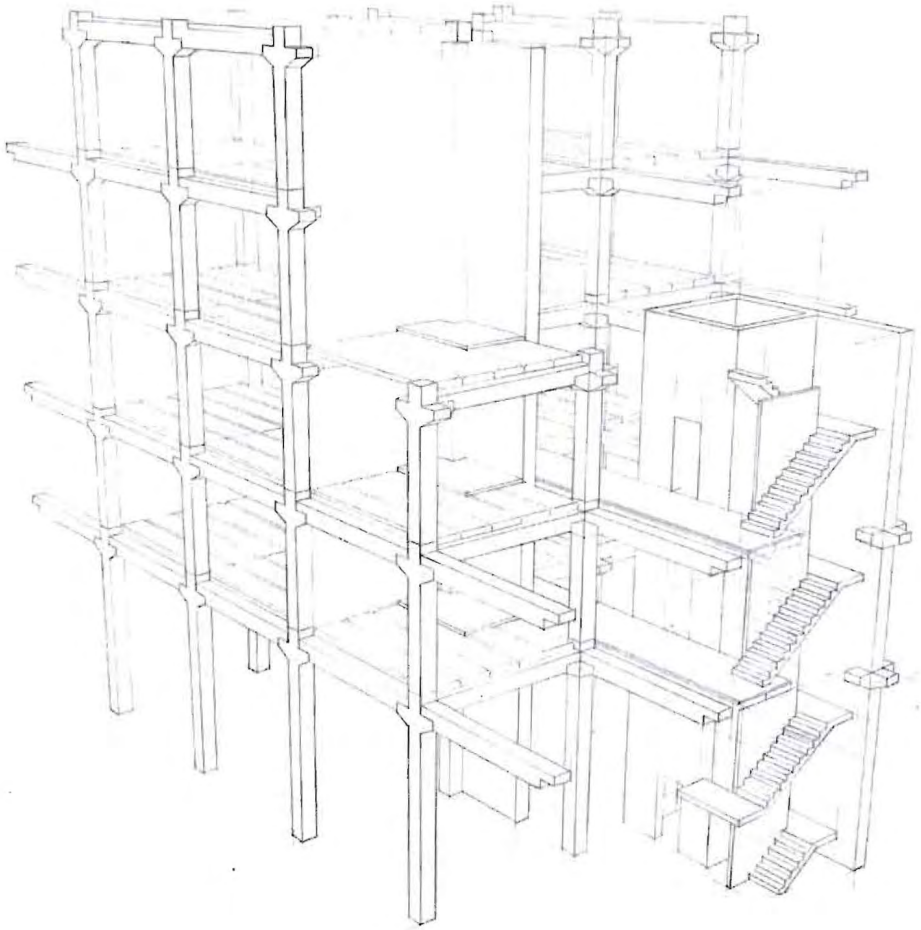
Column splice separate from beam-to-column connections

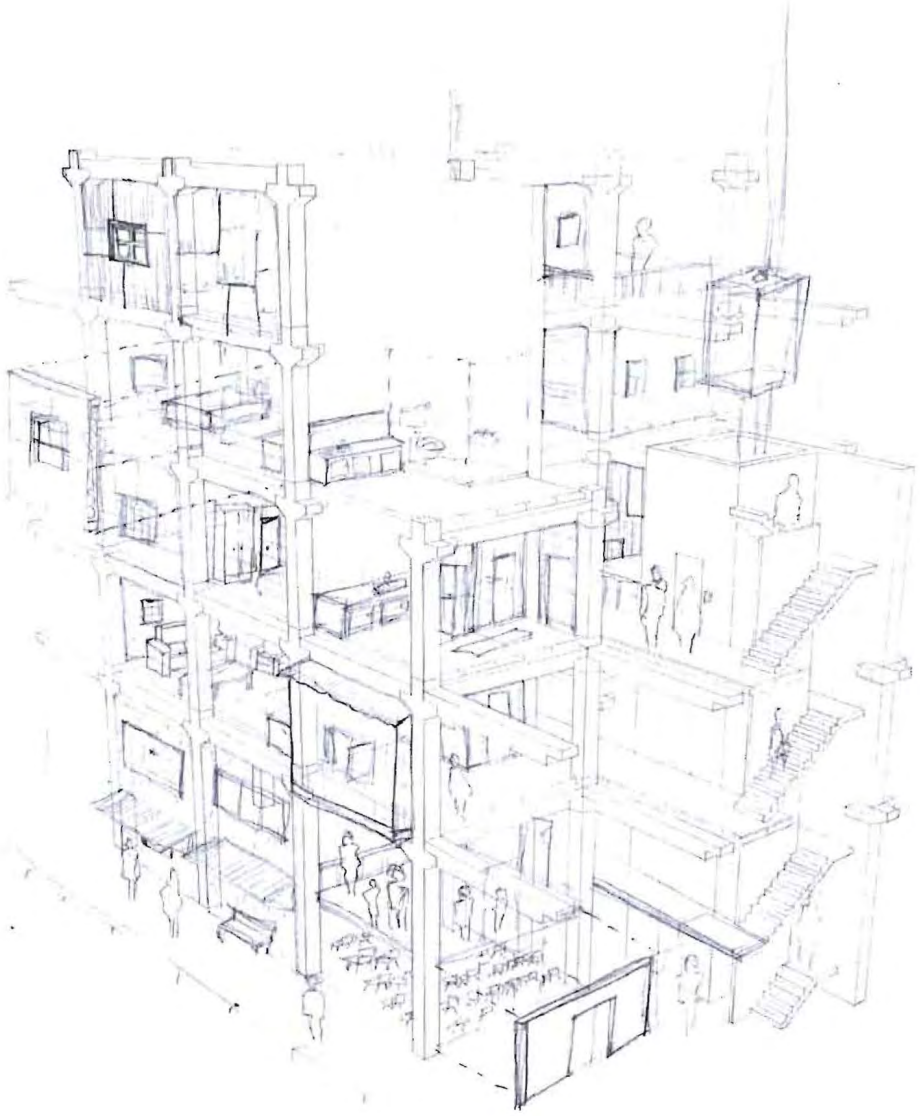
Beam reinforcement is spliced by welding. Column reinforcement is formed by overlapping loops. Joints are formed by in-situ concrete



Above:
Drawings illustrating welded and bolted connections

Top Right:
Drawings illustrating Insitu connections





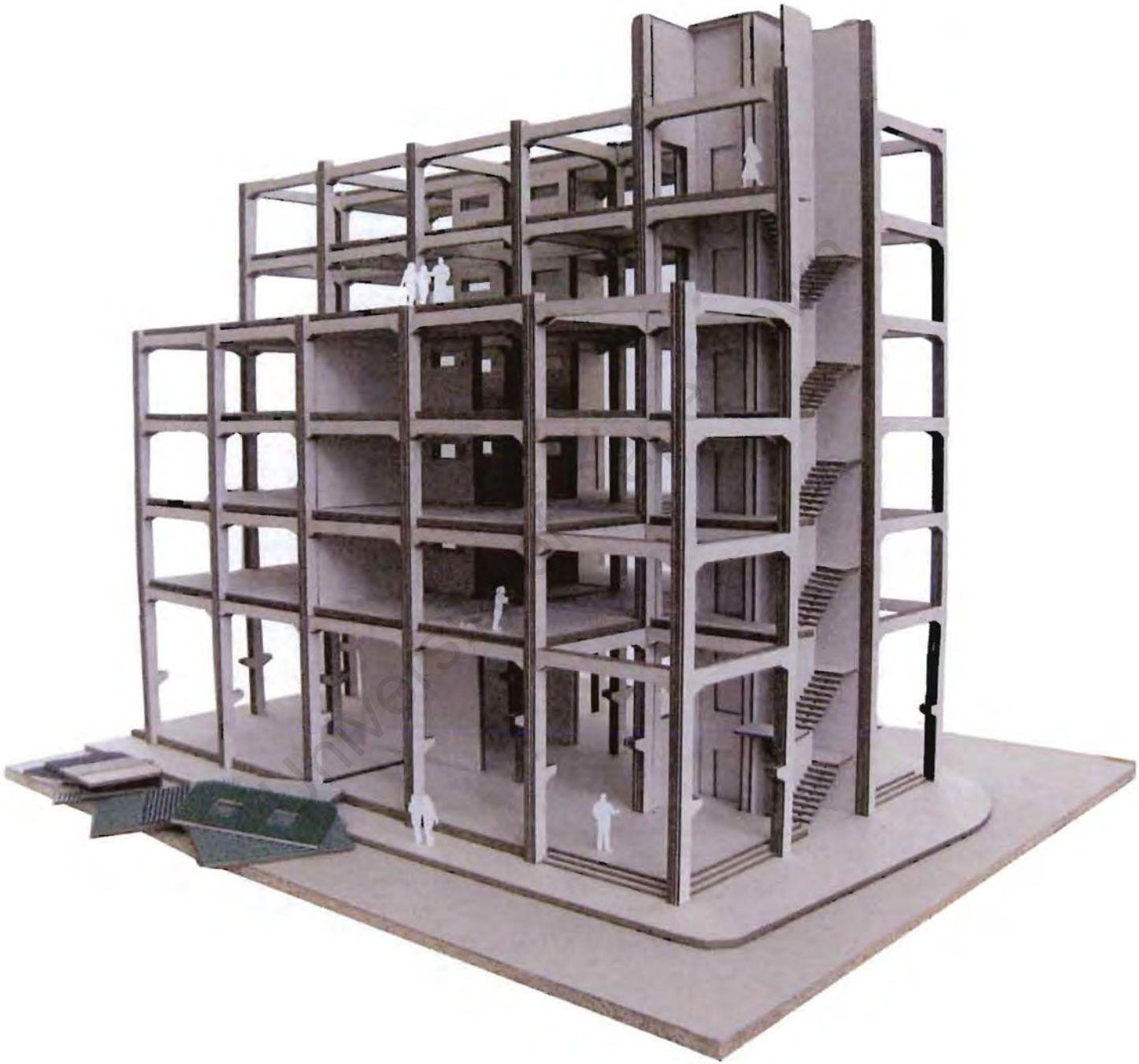
Far Left:
3d drawing of a portion of the structure showing the ordering system of vertical circulation, passages, service walls and ducts and precast structural members

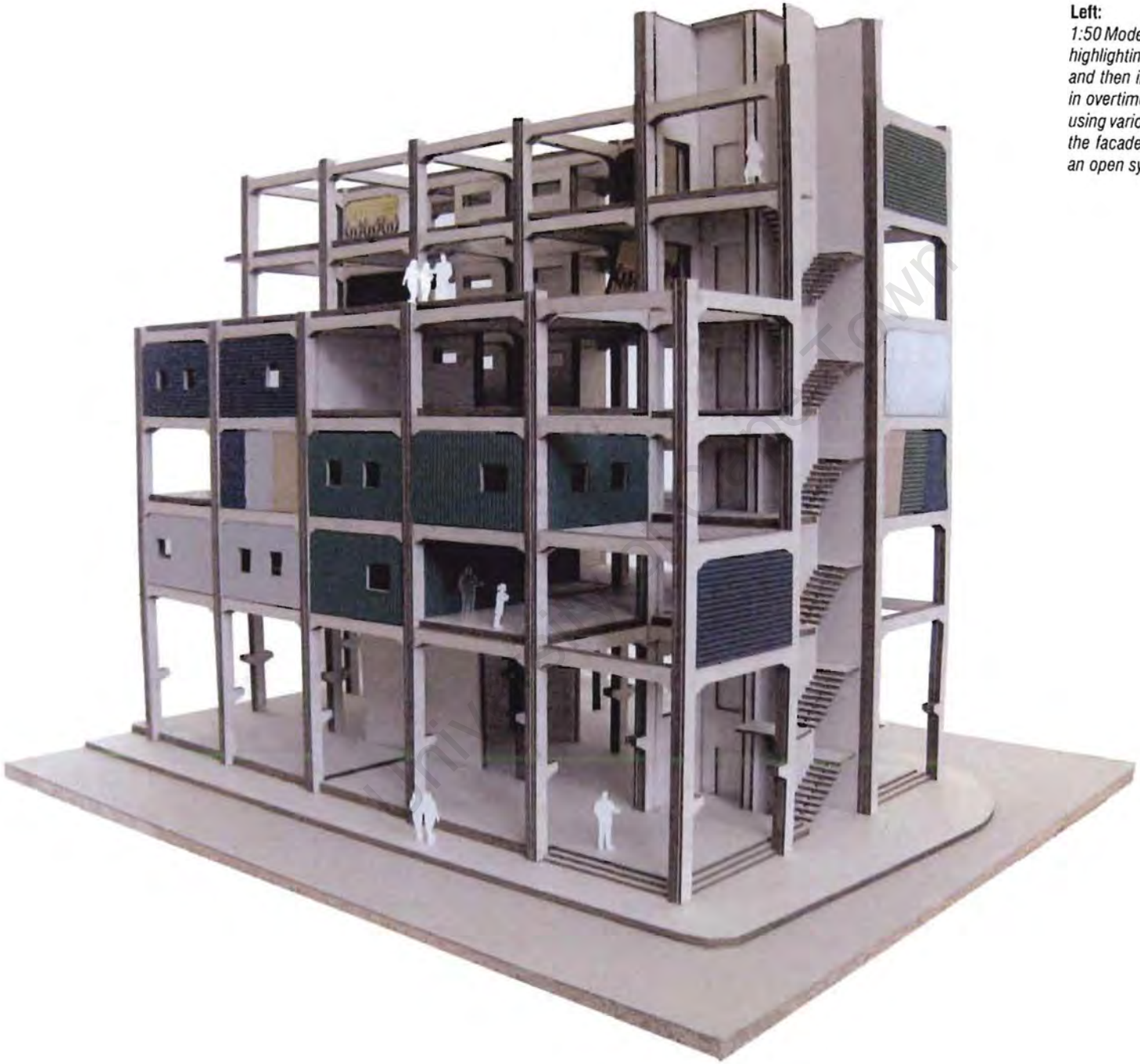
Left:
An imagined illustration of how the support structure could be appropriated by the inhabitants. The inhabitants act within the formal structure of columns, beams and floor slabs. The structure grows overtime as it gets added on.

Exploded view of a portion of the structure highlighting the range of precast elements which when assembled make up the anatomy of the support structure

The support structure as an assemblage of formal precast concrete elements

The support structure filled in with an infill panel construction. The structure is filled in by the inhabitants over time latching onto the formal concrete elements.





Left:
1:50 Models showing the support structure unoccupied highlighting the services walls and structural system and then imagining the way the structure will be filled in overtime. The structure is filled in by the inhabitants using various lightweight panels which begin to animate the facade. The structure initially is incomplete and is an open system which invites autonomous occupation

Right:
Sequence of 3d drawings showing the various elements which make up the anatomy of the support structure.

- Structure
- Vertical circulation
- Service cores

Services

This includes the water connections, plumbing and electrical connections to the various units. These will be housed in ducts which run the length of the building and shall be shared between two units. The pipes and conduits run along the built up walls to their fittings, bath, wash basin and toilet for the bathroom, sink for the kitchen and electrical wall mounted point for the unit. The ducts are located in an efficient pattern, ganged around the central circulatory zone for easy access and maintenance.

Right:
Initial structural and service principal diagrams

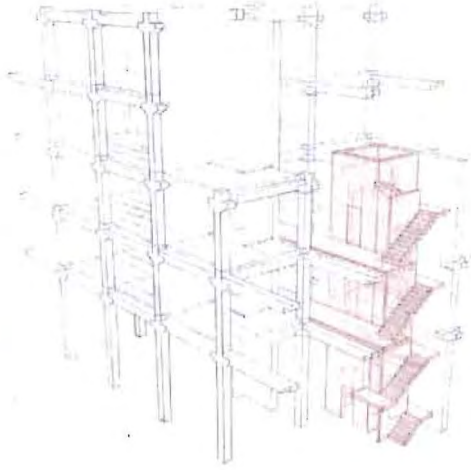
Centralised Services
Service ducts are ganged around primary structural cores and act as single unit

Decentralised Services
Primary structural core is separate from service ducts. Service ducts can be ganged around secondary structural members

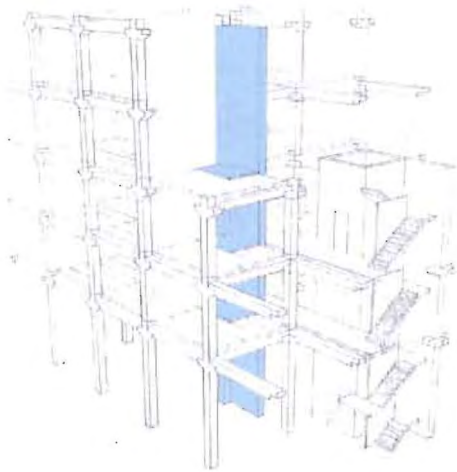
Integrated Services and Structure
Service pipes are located within the hollow structural member. Small voids must be cast into the members to allow access to the pipes

Service Walls
The cavity of load-bearing walls are thickened which allows for the service pipes to be located within the wall. The wall can be used to service adjacent units

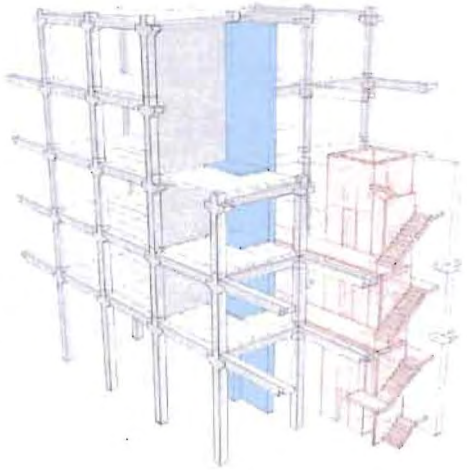
Structure



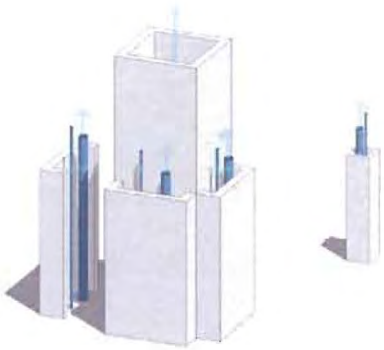
Vertical Circulation



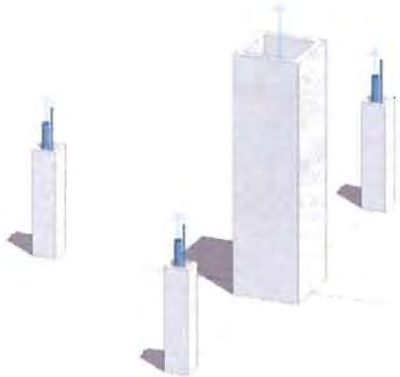
Service cores



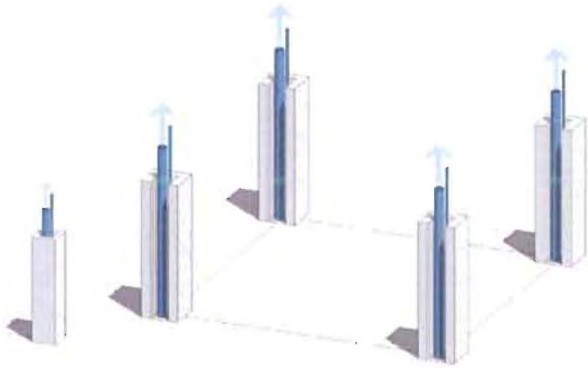
Synthesis



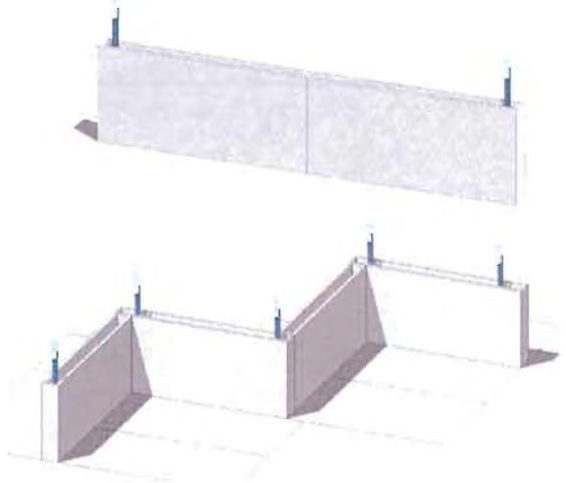
Centralised services



Decentralised services



Integrated services and structure

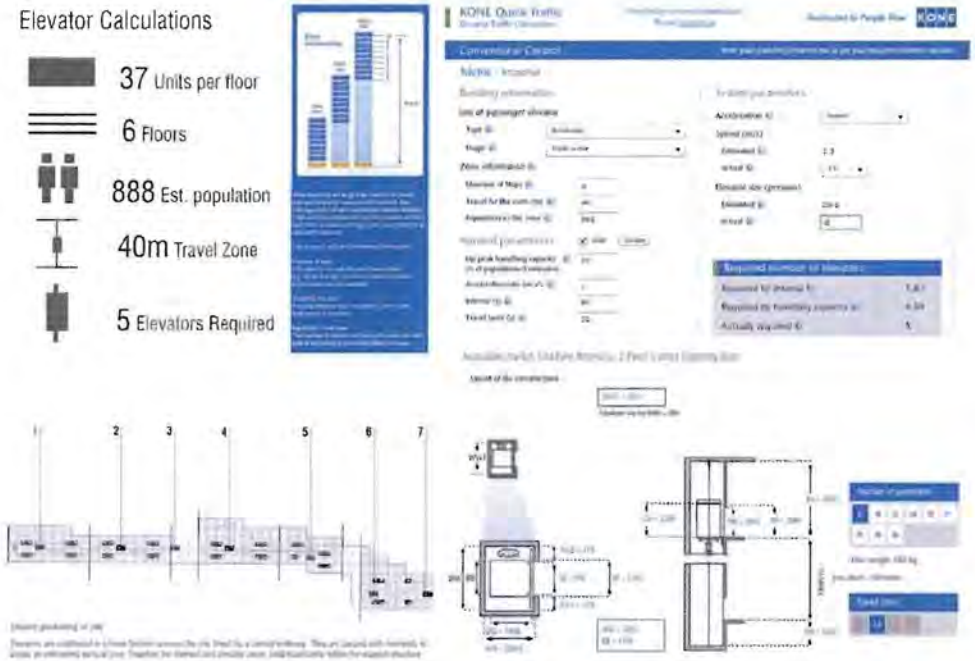


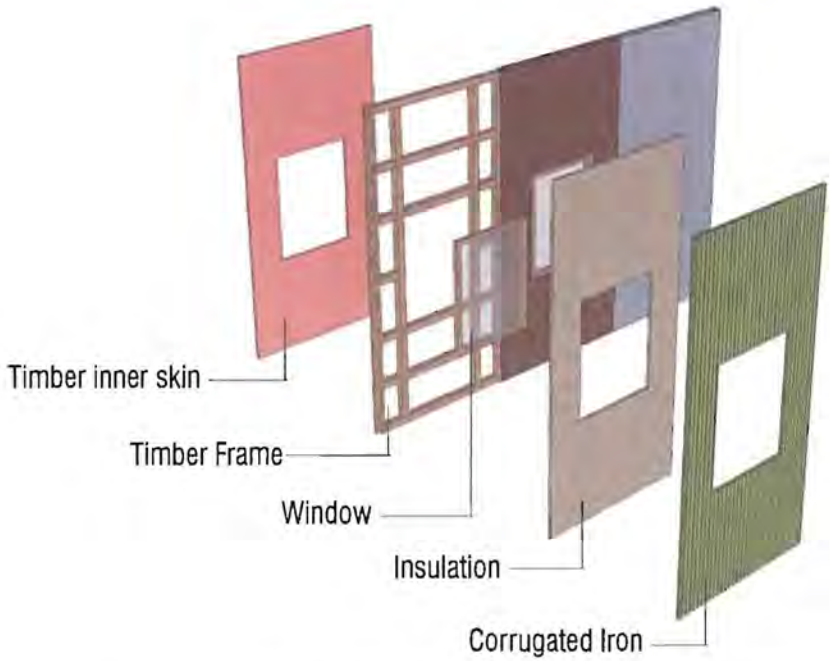
Service walls

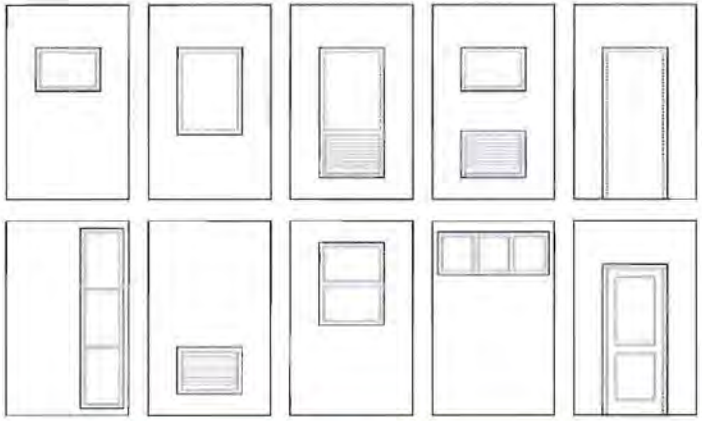
Below:
Initial calculations generated to determine required amount of elevators and handling capacity using KONE Quick Traffic (http://www.kone.com/countries/en_ZA/lifts-elevators/Pages/default.aspx)

Elevators and Stairs

Stairs and elevators form the vertical circulation cores. The building exceeds three storeys and it is therefore necessary to install elevators. The entire circulation core is located within one structural bay and assists the building in dealing with shear forces. The stairs, including the landings, are of precast concrete. The calculations for the elevators handling capacity and minimum numbers were developed using the KONE for a population of approximately 888 people.







Top Left:
Exploded view of typical panel showing the various layers of construction. Three panels making up the infill between a structural bay

Bottom Left:
Panel configurations and material swatches, recycled treated ship lap timber, recycled plastic, corrugated iron and strawboard (from left to right)

Infill Panels

The framework of the support structure is filled in with light weight infill panels of myriad materials. These panels are designed by the architect in various configurations and of various materials - timber recycled plastic and corrugated iron. The panels should be insulated and water proof. They should be light enough to be by carried and installed by the inhabitants and the fixings need to be simple requiring no specialist skills. Panels can be lifted to the various floors via an industrial pulley system.

The panels are available in a number of configurations; solid panels, window panel, door panel. The structural bay distance between columns is 5100mm. Therefore the infill panels are divided into 3 panels 1700mm wide. The panels assist in creating a sense of identity defined by facade variation and the division of the plot. The panels attach to the support structure via steel angles which are bolted. Inhabitants create variations on the facade by combining panels of different configurations and materials.

These will be provided as a working system for the inhabitants to purchase once they have purchased their plot and are ready to move in. If the inhabitants wish to use their own materials and construction technique they should conform to the neighbourhood guidelines. Therefore, it is possible for other patented materials to be used WINBLOK, WINVENT etc.

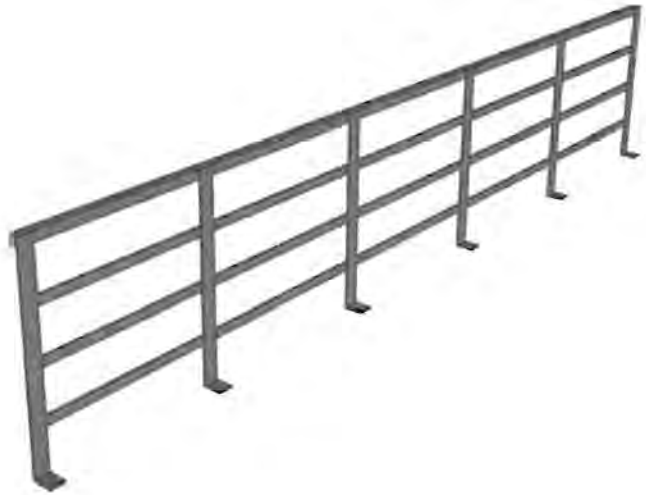
Right:
Railings to create a less permanent division. Based on previous studies, it was revealed that internal spaces have minimal wall dividers, and rather opt for material dividers. These railings cane be attached between beams.

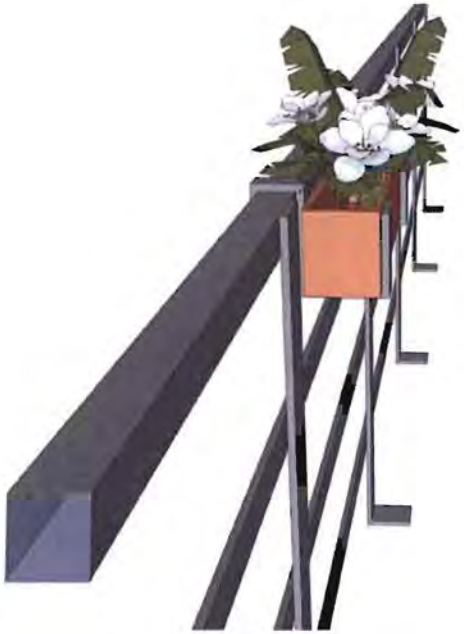
Bottom Right:
Simple steel balustrades for private balconies and public areas located at the edge of the building envelope. These will need to meet the requirements stated in the building regulations, and are made from standard steel extrusions

Clip-on components

Clip-on components are of light weight material which is then fixed to the main support structure. This increases the freedom on the inhabitants to transform their space and add to the architectural language of the structure. The components should support a variety of uses both internal and external use.

- Railing (interior) to divided spaces using textile fabric for a less permanent barrier
- Balustrades for walkways and outdoor spaces
- Balconies for private outdoor space which extends beyond the building envelope
- Planter box frames





Left:
Steel planter box clipped onto balustrade for balconies and public areas

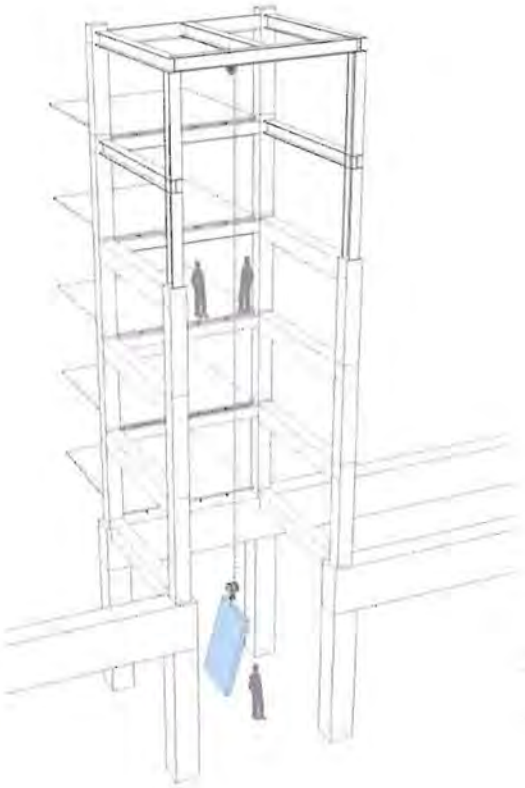
Bottom Left:
Light weight steel balcony attaches to beam below and tied back to the concrete column. The balcony is assembled from steel angles and mesh

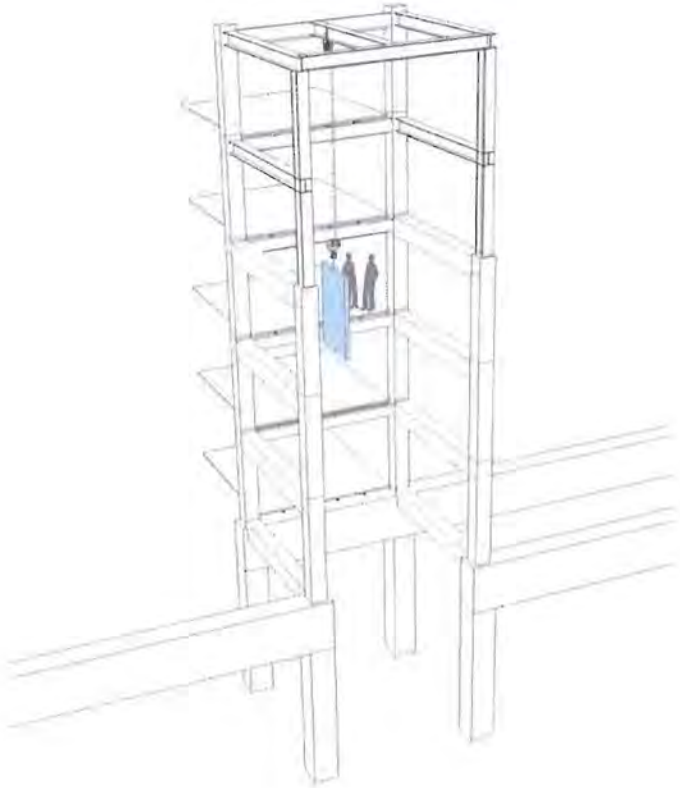
Bottom Right:
3d of one structural bay showing infill panels and clip on balcony

5 Building a Home

The support structure is under construction and part of the building is ready for occupation. Members of the public are able to purchase plots within the structure and begin to construct their homes

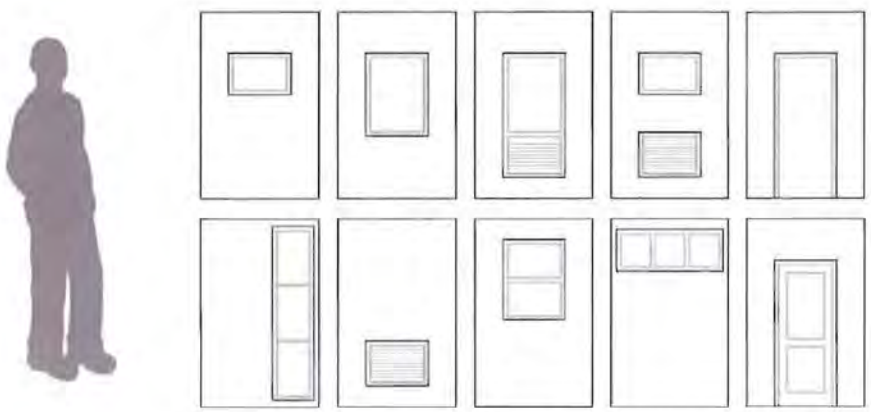
1. A prospective tenant approaches the land owner to purchases a plot within the structure (maximum of 4 structural bays, minimum of 2 structural bays)





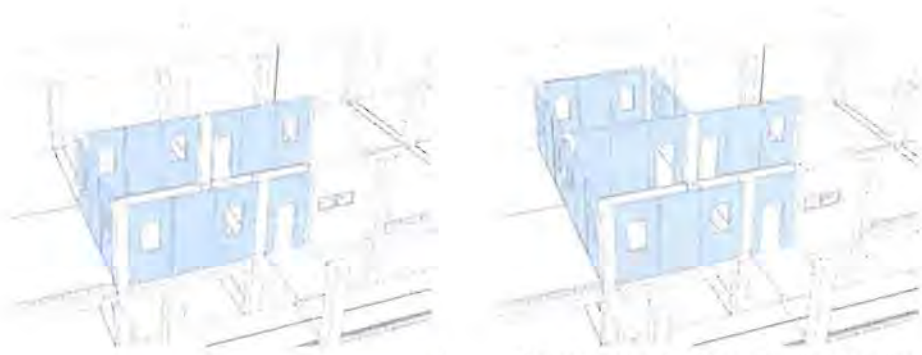
4. The panels are then hoisted up using an industrial pulley to the desired floor and distributed to the purchased plot.

2. The individual receives a brochure which is a set of proscriptive guidelines as to how to construct a home and the rules of engagement on the neighbourhood level.



3. The individual is presented with the option of a variety of panels with different configurations. The person makes the selection and purchases the panels.

5. The dwelling is then constructed by the individual and family, facilitated by trained members of the support centre and the current tenants. The construction has to adhere to the guidelines stipulated in the brochure. Construction on their own home begins with the brochure as an aid, the purchaser receiving further help from other plot owners.



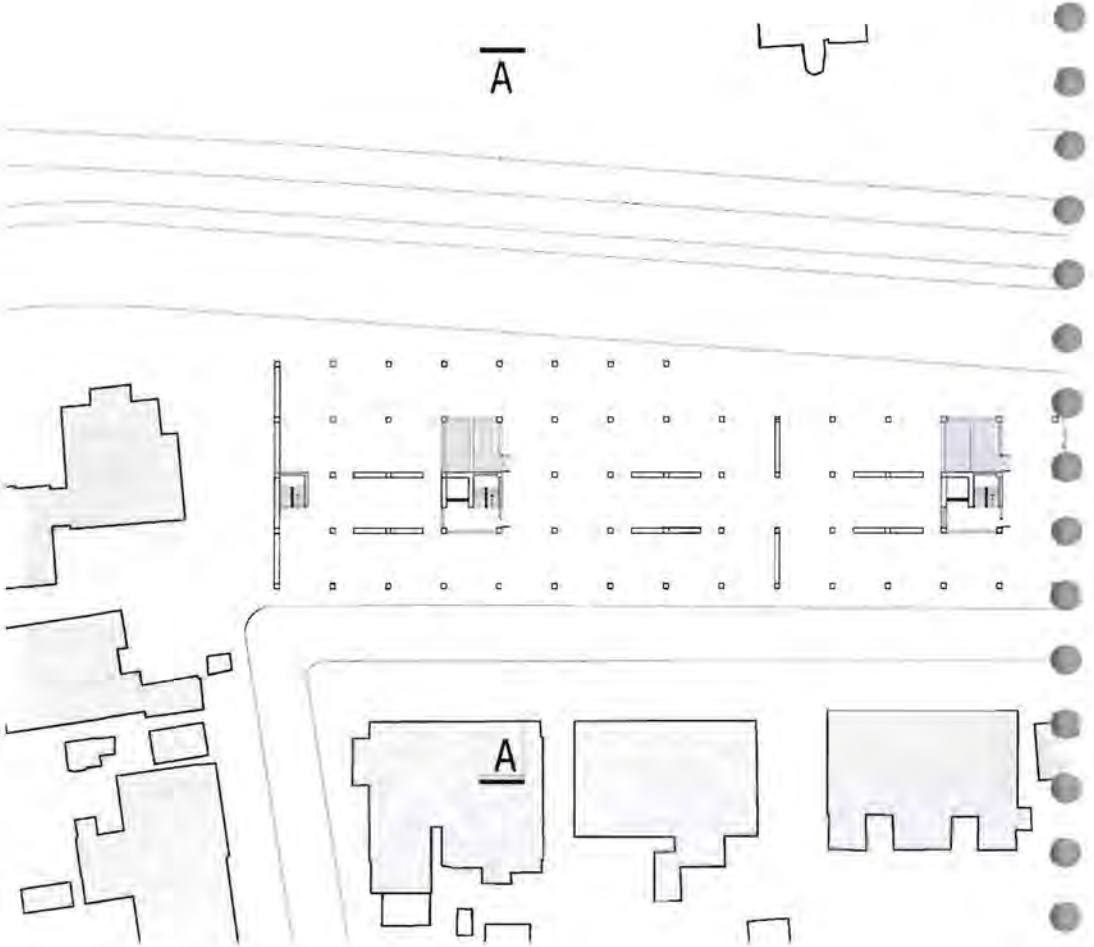
6. Over time the dwellings envelop can alter providing it stays within the plot. More panels as well as other light weight clip-on components can be purchased.

6 Scenarios

Larger Order

Neighbourhood level

Due to the nature of the proposal whereby the inhabitants become collective developers, one cannot predict a final form or appearance of the building. The only fixes are the vertical circulation, service cores and the primary structure. Thus one has to imagine how people would inhabit the building and transform spaces based on the 'set up' rules as discussed previously in the document. A series of scenarios have been developed which hint at how the support structure might be appropriated under different conditions. These scenarios are to be explored at two scales; at neighbourhood level, and overall structure.



Ground Floor Plan

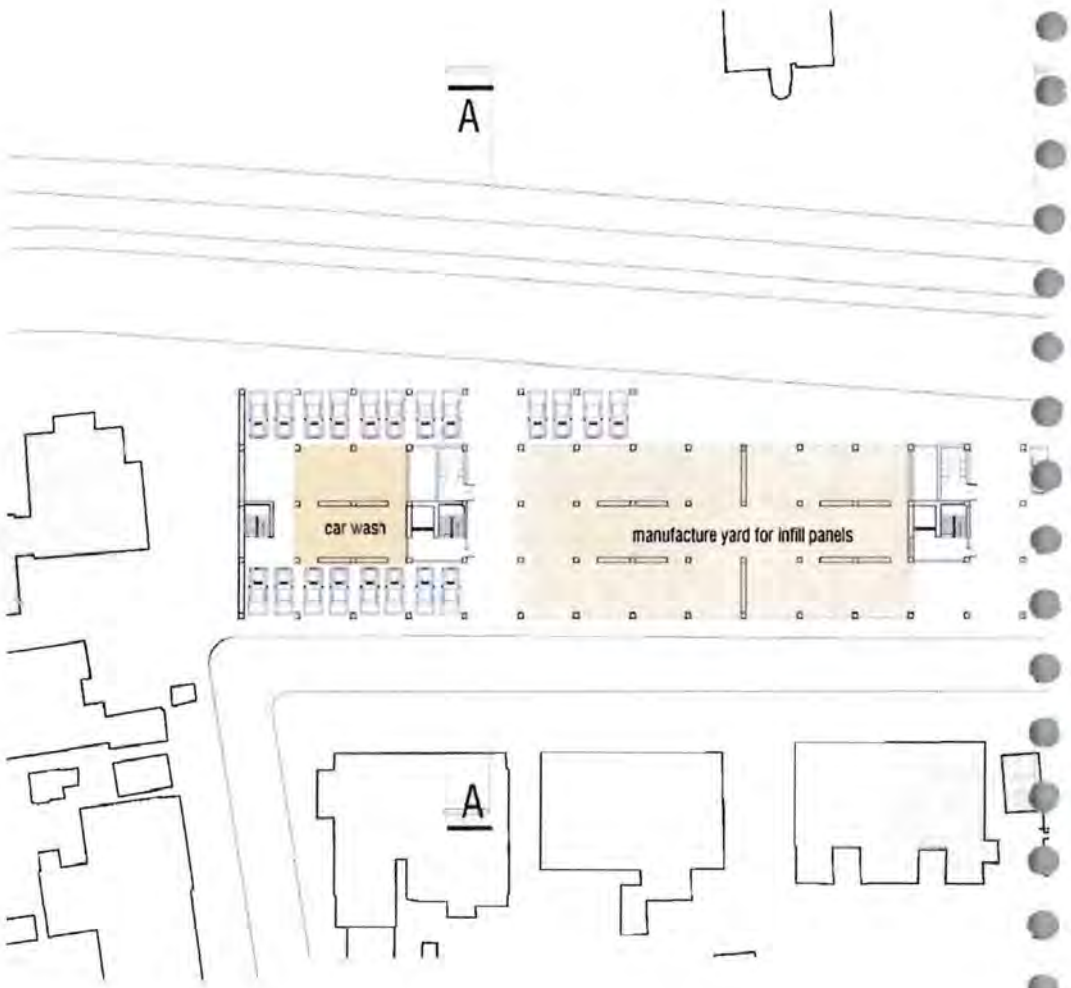
Once the support structure is built, the ground floor is made up of the structural columns, the enhances of the service cores with refuse and maintenance rooms, raised platforms for community facilities, the service walls for plumbing and water, and storage space. This is then open for various scenarios to play out

- creation of a retail edge
- emergence of an informal market


B
C
B
C

Ground Floor Plan - Informal Scenario

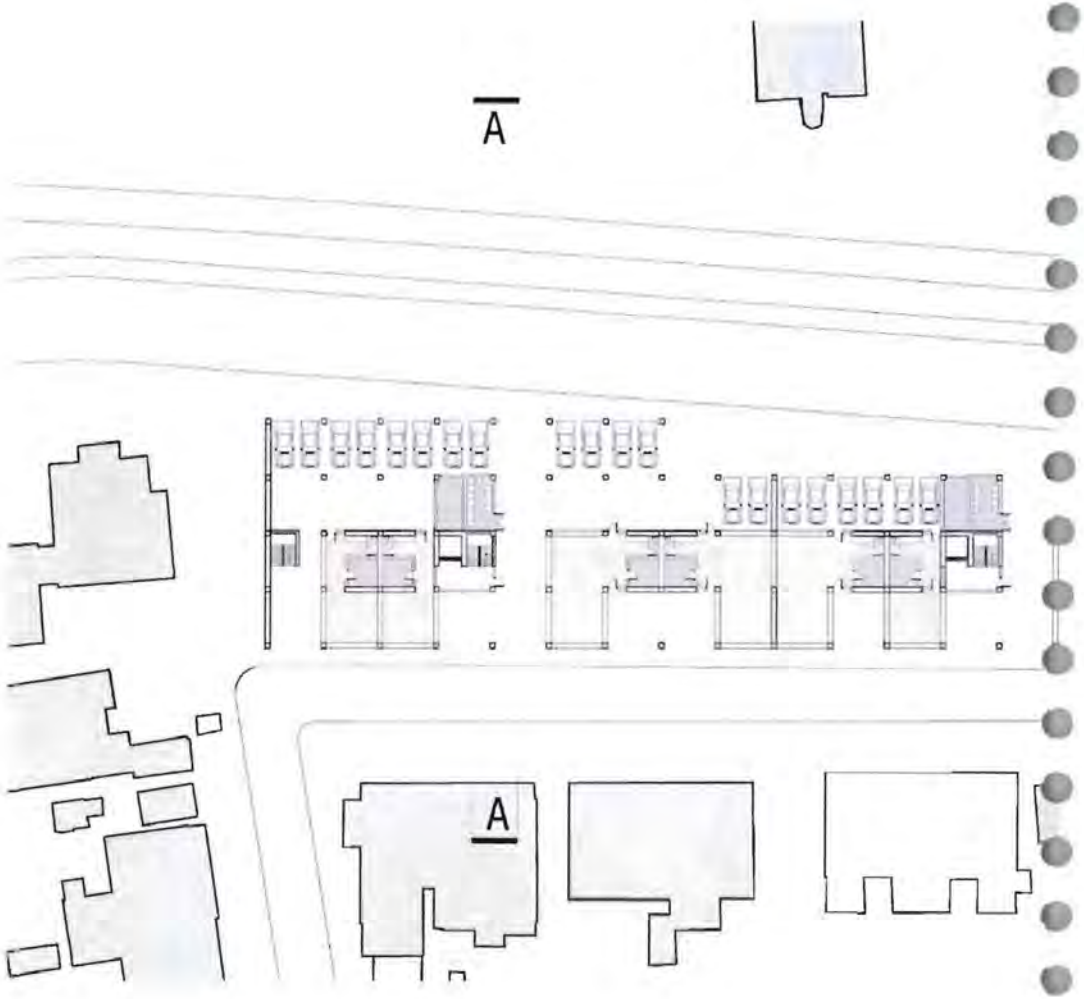
The entire ground floor plan becomes inhabited by informal traders, creating a market. The market would most likely emerge along major pedestrian routes which run from the subways to the transport interchange. Wet platforms will be located around the existing vertical service water points for washing of vegetables and other activities needing water. Wet points can also be used for a car wash. Cold stores will be provided for storage of vegetables overnight. Storage space is provided along the railway line for storage of the market stalls. The ground floor can also be used as space to manufacture the infill panels




B
C
wet platform
C
wet platform
B

Ground Floor Plan - Retail Scenario

The entrances to the service cores are offset one bay from the street and are accessed via a forecourt. A refuse room and maintenance room is also located at this point. Two larger volume community facilities are located along activity nodes announced by a raised forecourt. Retail stores set up a retail edge which undulates and therefore invites the public in. Each outlet contains a store and toilet. Storage units are located along the railway edge for residents to rent and acts as a buffer. The informal market becomes a co-operative hub whereby it picks up on the existing trade route which now filters underneath the support structure. Storage space is provided as well as a cold store.

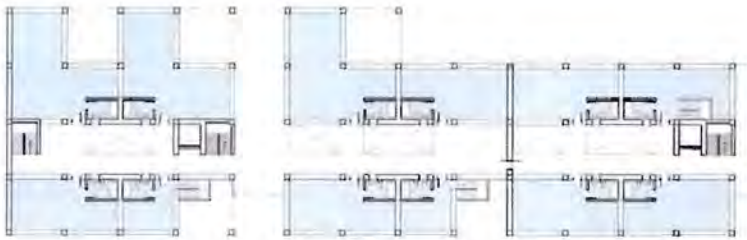



B
C
B
C

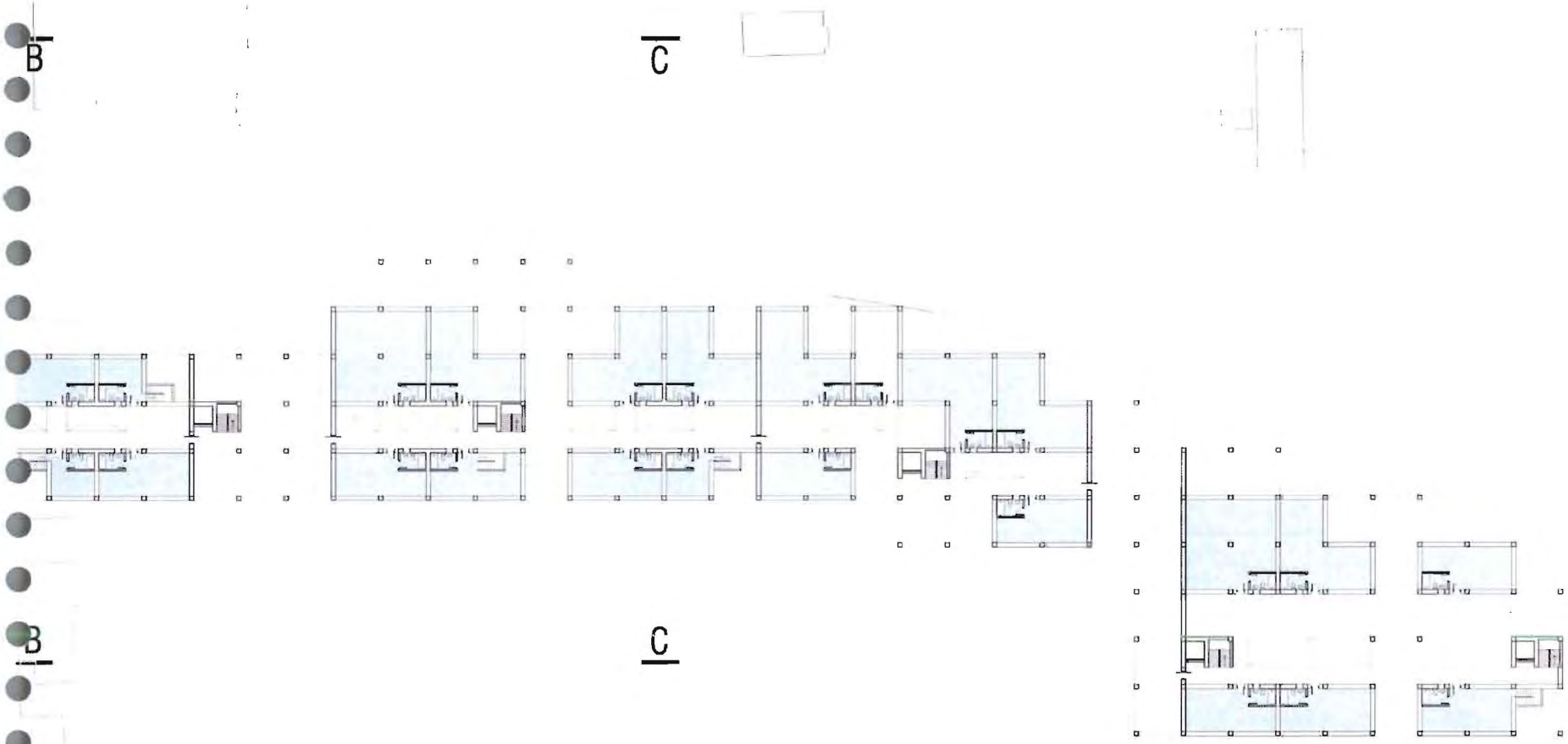
Housing Floor Plan

The structural grid of concrete columns determines the bays in which the residents can act. The service walls are also fixes which determine the starter bay for the unit to grow. The walls are concrete and ganged around the inner circulation street. The omission of service fittings on various levels, dictates a unit which develops over two floors and therefore creates variation on the facade

A

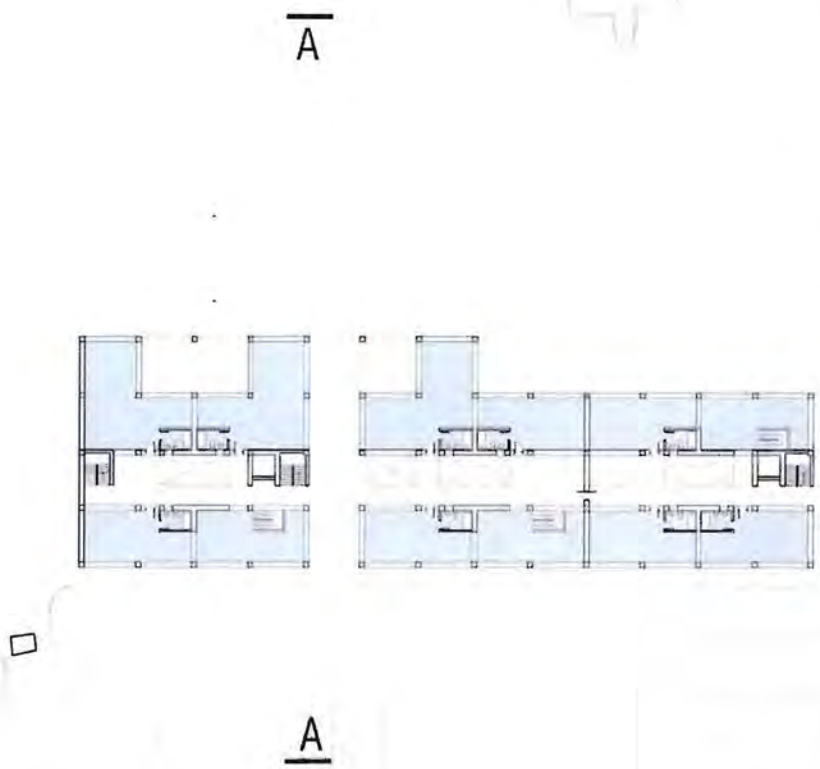


A


B
C
B
C

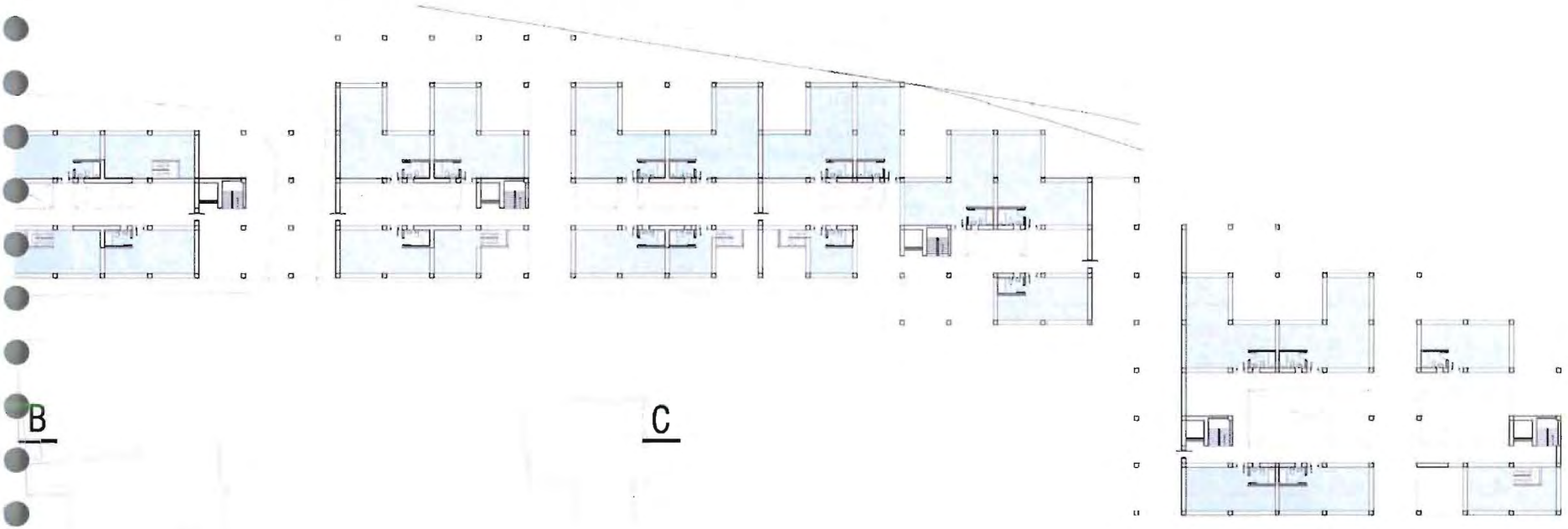
Housing Floor Plan

Dwelling units are clustered into neighbourhoods within the support structure. The neighbourhoods consist of a maximum of 8 units which are served via a service core. Residents buy plots of 2 or four bays as well as prefabricated infill panels used to define the spaces.



B

C



B

C

Dwelling 1
Family of 4
Occupying 4 structural bays

Dwelling 2
Family of 4
Occupying 3 structural bays with private outdoor space adjacent to communal shared space

Dwelling 3
Commune situation, young adults living together
Occupying 4 structural bays option for a secondary entrance

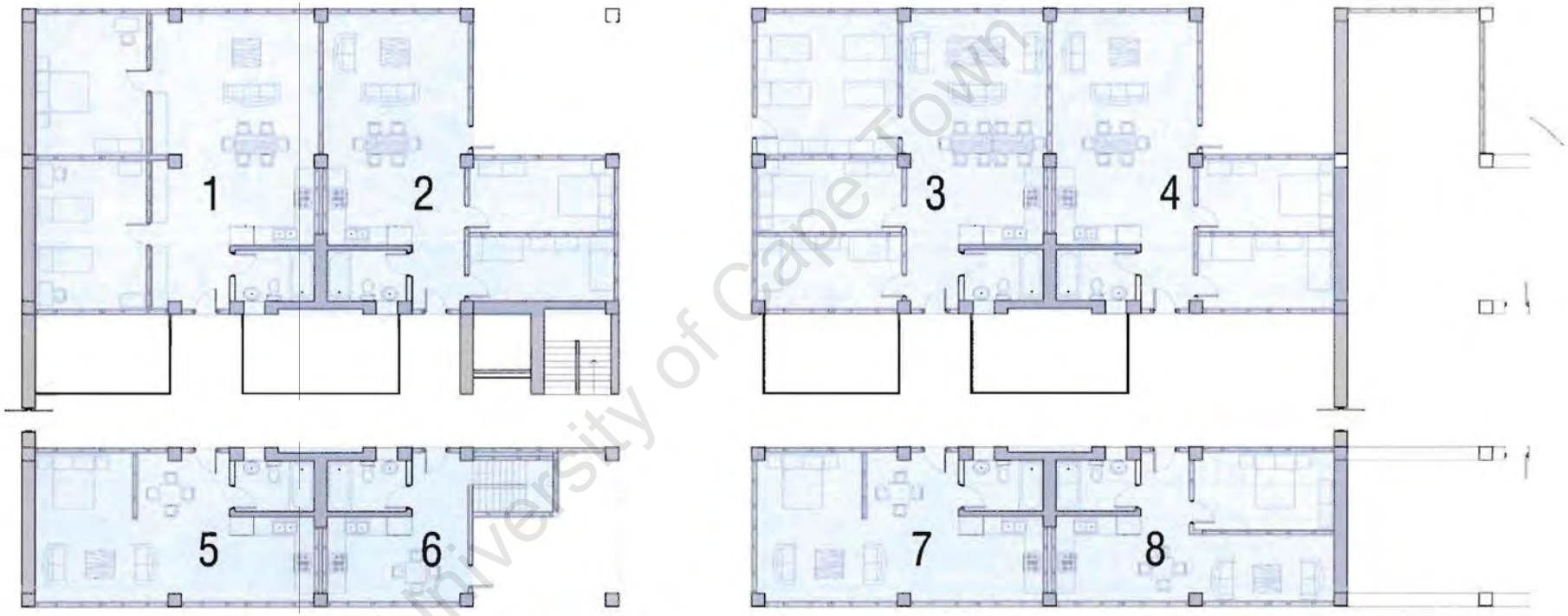
Dwelling 4
Family of 3
Occupying 3 structural bays with secluded private outdoor space

Dwelling 5
Young couple
Occupying 2 structural bays open plan layout

Dwelling 6
Young Family
Occupying 4 structural bays over two storeys, balcony on lower floor with private areas above

Dwelling 7
Young couple
Occupying 2 structural bays

Dwelling 8
Middle aged couple
Occupying 2 structural bays



Typical Neighbourhood Layout

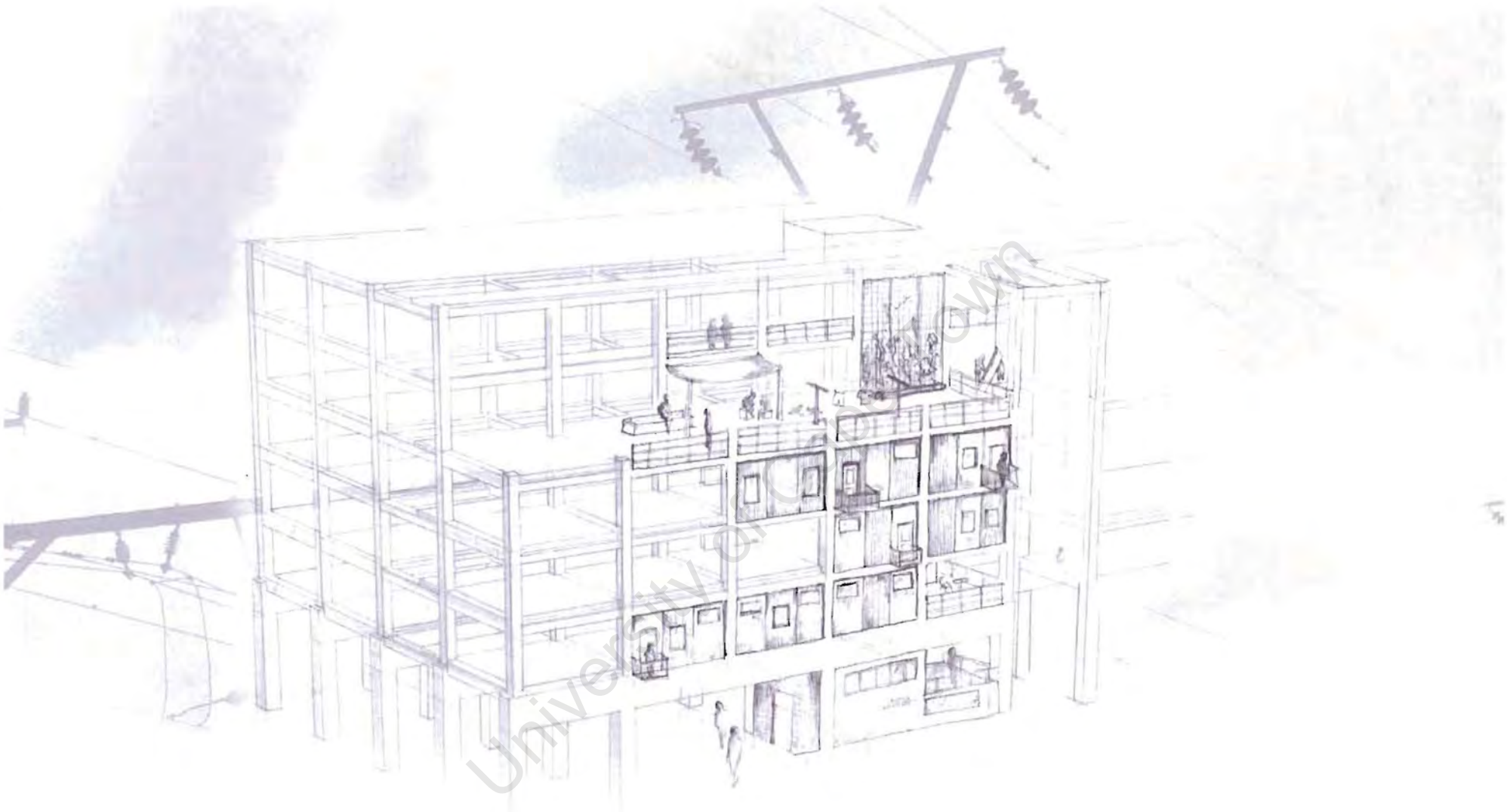
7 Reflection

The current housing crisis in South Africa has left many citizens living in informal settlements without access to essential services. This crisis is further fuelled by slow RDP housing rollout and poor service infrastructural systems. It has therefore become an integral part of contemporary architectural discourse. We need to build at higher densities, at lower costs and in a manner which offers spatial and programmatic variety. We need to be inventing alternative typologies capable of housing the urban masses, which provides essential services, improved living environments and speeds up the provision of houses. Support structures offer these opportunities. The complexity of designing support structures lies in determining that which constitutes the anatomy of the support structure, and at what point the inhabitant assumes the power to define the extent of their living envelop. This act falls within the domain of the architect.

Throughout my architectural studies, I have been educated to think of buildings as complete artefacts – ultimately being judged by the final complete image. This is somewhat misleading as buildings are dynamic and see changes in occupation, programme, spatial configuration and form over time. I approached the concept of support structures through an interest in the notion of informality within urban environments. Difficulties arose in my initial explorations, realising that my architectural response to informality could not present a system that is finite or complete, contrary to my inherent ideology stemming from my education. My response would be the design of an open system. This process entails establishing a physical armature rooted in a particular site, which presents an efficient system of services cores, circulatory network and a robust framework; as the essential elements which constitute a viable support structure. The role of the architect is to develop the spatial preconditions, establish the rules of engagement, and then hand the building over to the inhabitants to adapt, modify and alter the space.

The opportunities that the support structure offers extend far beyond solving the housing crisis; it affects the lives of the individual. Acknowledging that people by nature are rebellious when forced to adhere to legislation, means that by affording the individual the responsibility to shape their own space, one instills a sense of ownership and self-worth. The inhabitants take control of their lives and together become collective developers which negate the reliance on government charity. The freedom offered to act within the elements of the support structure, allows the inhabitants to be proactive about the production of their living environment and everyday practice. This is where the support structure extends beyond merely a mass housing type, and opens up possibilities to accommodate other programmes offering economic and social benefits. Essentially, the support is the creation of a system irresistible for life to take over, ensuring urban vitality.

This project proposal is by no means the first of its kind, but the angle of investigation has led to the establishment of an architecture which directly responds to aspects of contemporary architecture discourse, and raises the issues of the limits of architecture. It presents an argument for open system urban armatures, which affords residents to take ownership of governing their own space, as a response to the housing provision crisis in South Africa. Therefore, this piece is to serve not only as a personal manifesto but as a thought piece which continues a discussion around the ideas of support structures as a typology in dealing with issues of contemporary architectural discourse.



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