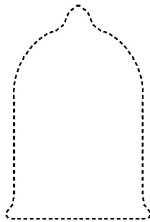




THE MISSING MIDDLE

Nascent Potential in South Africa's Commercial Environment

Alexander Coetzee 2015



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THE MISSING MIDDLE

Nascent Potential in South Africa's Commercial Environment

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This dissertation is presented as part fulfillment of the degree of
Master of Architecture (Professional) in the School of Architecture,
Planning and Geomatics, University of Cape Town

October 2015

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I would like to thank and acknowledge the assistance of:

Kevin Fellingham, for pushing me to try new things.

Heinrich Wolff, for having lead me to this enquiry.

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INTRODUCTION

My interest this year was around the commercial development potential of low-income areas in South Africa. The dissertation title, “The Missing Middle” refers to three aspects of the commercial environment in South Africa which I believe to be missing, ones relating to economics, architecture and built-environment professional practice.

Economics

I was interested in the gap between two disparate economies in South Africa, those that in oversimplified terms are referred to as the formal and informal economies.

Architecture

I was interested in the fact that this disparity was reflected in the types of retail buildings seen in South Africa - the fact that there are a large number of big-box type shopping centres and a large number of small-scale micro-enterprises but very few retail buildings that are at a scale between these two.

Practice

I was interested in the gap in the market for the provision of built-environment professional services in low-income areas.

These three aspects informed the design for a retail centre in the low-income suburb of Du Noon. The design project, entitled Waxberry Market, is aimed at filling the gap between small-scale informal trade and large-scale retail centres (shopping malls) in the context of South Africa’s low-income suburbs.

This report documents my dissertation in four parts. The first three relate to my initial enquiries around economics, architecture and practice with the last part covering the design project.

PART 1

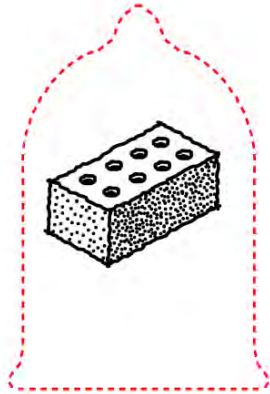
ECONOMICS

Breaking the Bell Jar

“The key problem is to find out why that sector of society of the past, which I would not hesitate to call capitalist, should have lived as if in a bell jar, cut off from the rest; why was it not able to expand and conquer the whole of society? ...

[Why was it that] a significant rate of capital formation was possible only in certain sectors and not in the whole market economy of the time?

Fernand Braudel, The Wheels of Commerce



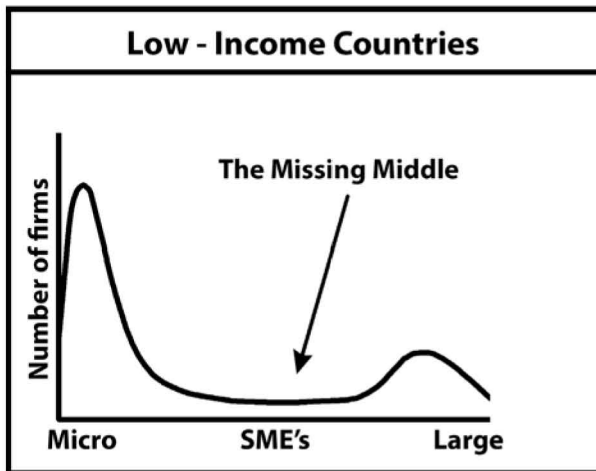
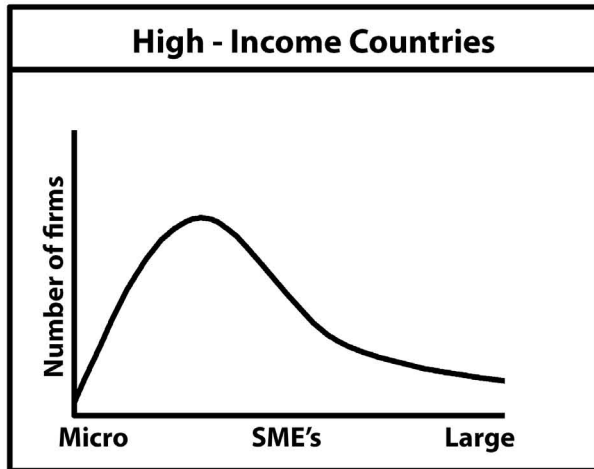
This part covers the economic underpinnings of the dissertation. The above quote by Fernand Braudel, which I first came across in Hernando de Soto's book "The Mystery of Capital" encapsulates the key question that I had in the beginning of the year- why was it that there seemed to be two disparate economies in South Africa, those commonly referred to as the formal and informal economies, which exist as if cut-off by a bell-jar from one another? Upon doing further research into this relation between formal and informal economies, three main economic ideas revealed themselves and became informants throughout the year, these are *The Missing Middle*, *Lowering Thresholds*, *Shifting Perceptions*.

THE MISSING MIDDLE

The Missing Middle refers to an economic condition, common to many developing countries, characterised by a high number of micro-enterprises and macro-enterprises but very few small to medium enterprises (SME's) (Beck&Demirguc-Kunt, 2006).

In high-income countries SME's are responsible for over 50% of employment and over 60% of GDP. In developing countries most employment is from either micro-enterprises or large enterprises with SME's being responsible for less than 30% of employment and GDP (Beck&Demirguc-Kunt, 2006).

The importance of having a strong middle strata is that that is considered crucial for developing and sustaining healthy institutions, particularly state institutions (Chen,2012). South Africa, being a country with a large number of social grants and a small tax base, provides an example of how difficult it can be to sustain healthy institutions without a large middle-income group.



1. Diagrams of firm-size distribution in low and high-income countries. Unknown author, taken from Beck&Demircu-Kunt, 2006.

LOWERING THRESHOLDS

A book that I read in the beginning of the year, entitled “The Mystery of Capital” by Hernando de Soto was hugely informative in developing the economic underpinnings of the project. In his book, *The Mystery of Capital*, Hernando de Soto describes how the failure of capitalism in developing countries can be attributed not to a lack of assets but to the inability to turn those assets into capital (De Soto, 2000,p.6). He argues for lower thresholds of entry into the formal capitalist system and stronger property rights for the poor as a means to turn their assets into capital (De Soto, 2000).

De Soto argues that restrictive legal barriers are often what prevent entry into the formalised capitalist system and hence prevent a country from using its resources efficiently. As part of De Soto’s research, members of his research team posed as street vendors in order to test the ease with which they could obtain legal recognition for their assets e.g. registering themselves as a business, obtaining necessary licenses such as those restricting the sale of alcohol etc. His research concluded that in many developing countries, this proved to be a very difficult process for most people on the lower end of the economic spectrum.

De Soto also holds the view that the assets of the poor in developing countries is far greater than is often estimated and can play a significant role in their economies (De Soto, 2000).

SHIFTING PERCEPTIONS

The view that the informal sector could offer value to the economy of a country, has not always been the case, however, this more optimistic view of the role of informal economies is starting to gain weight (Chen,2012). During the 1950's and 60's there was a common perception that informal economic activities could be absorbed by the formal capitalist economy under the right set of economic policies and thereby, disappear. (Chen, 2012). An essay by W.Arthur Lewis which received a Nobel Prize for Economics in 1954, reflected this view. Lewis's prediction was that economic development in developing countries could create enough formal jobs to absorb all of jobs in the informal sector (Chen, 2012). Lewis refers to a tipping point, where wages would be higher than the subsistence level and there would be no need for operating outside of the formal economy (Chen, 2012).

The view that informal economies will eventually disappear or be absorbed by formal economies is one that is waning. In fact, on the contrary, the informal sector seems to be rapidly expanding in recent years, particularly during the recent economic recession. Recent theory on informal economies has stressed the need for a "Hybrid Economy" that sees informal enterprise as a key component of a countries economy and allows for linkages between it and the formalised economic sector (Chen,2012).

PART 2

ARCHITECTURE

Towards a New Retail Typology

INTRODUCTION

Based on the economic ideas that I was interested in, I decided to investigate how these manifested themselves in a local architectural condition. The retail sector provided such an example and is one that I decided to investigate in more depth. The “Missing Middle” economic condition seemed to manifest itself in the retail sector in South Africa where there are many large-scale shopping centres, many small scale-micro enterprises but few retail centres of a scale in-between these two. I was particularly interested in investigating retail in South Africa’s low-income suburbs after becoming aware of the drastic increase in the number of large-scale retail centres that have been developed in these areas in recent years.

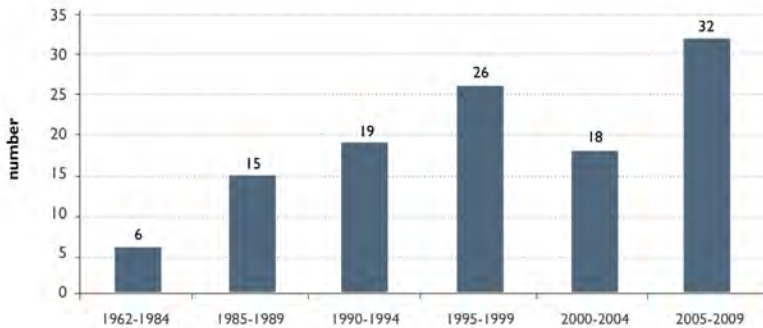
I was interested in something that could fill the “Missing Middle” between small-scale micro-enterprises and large-scale retail centres. Whilst realising that South Africa’s “Missing Middle” condition is in some ways a result of rather specific circumstances - such as its history of Apartheid- it is also a world-wide phenomenon shared by many other developing countries. I decided, therefore, to broaden my perspective on places of trade by looking at case studies of retail centres from across the world ranging from small-scale micro-enterprises to large-scale retail centres. I have grouped these retail types loosely under the terms Big Boxes, Medium Boxes and Small Boxes. Big Boxes refers to large-scale retail centres (shopping malls). Small Boxes refers to small-scale micro enterprises. Medium Boxes refer to retail centres at a scale in-between these two, they are the missing middle typology in South Africa.

BIG BOXES

Big Boxes is a term that I have used to describe large-scale retail centres. Most commonly, these take the form of inward-looking shopping malls . This type of retail centre has been developed extensively in South Africa and across the world. Considering its popularity and prevalence, I felt that there was a need to challenge its appropriateness in all contexts. Certain aspects of the shopping mall type made me question whether it is a model appropriate for the context of South Africa's low-income suburbs - it is a model that caters specifically to the motor car user, has potentially detrimental urban effects and has a tenant mix of predominantly large-scale enterprises. I decided to investigate the history of this type, as well as its detrimental and beneficial aspects.

RETAIL IN SOUTH AFRICA'S LOW-INCOME SUBURBS

Since the end of Apartheid, there has been a significant increase in the number of large-scale formal retail centres being developed in South Africa's low income suburbs. A study undertaken by DEMACON, revealed that 160 retail centres are currently existing low-income suburbs in South Africa. Out of the 116 which had been developed since 1962, 66 were developed in the 37 years between 1962 and 1999 and 50 in the 10 years between 2000 and 2009. There has also been an increase in the average size of retail centre being developed with an increase from 6 500m² gross leasable area (GLA) before 1994, to almost 20 000m² GLA post 1994 (Napier et al, 2013).



2. The number of retail centres developed in 'emerging economy' areas in SA between 1962 and 2009. (Napier et al., 2013)



3. The total retail floor space developed in 'emerging economy' areas in SA between 1962 and 2009. (Napier et al., 2013)

A HISTORY OF THE SHOPPING MALL

The modern shopping mall is a typology that emerged in the United States in the early 20th century and is inextricably linked to the invention of the automobile and the growth of suburbia (Gruen, 1960).

A massive demand for housing, a desire to escape the intolerable living conditions in dense industrial cities and the emergence of the automobile as a predominant mode of transport allowed for housing developers to roll-out low density mass housing developments in early and mid 20th century USA (Gruen, 1960). These neighbourhoods, being almost entirely residential at first, lacked all of the social and institutional amenities of cities. It was out of this gap in the market that the typology of the modern shopping mall was born. Victor Gruen, an architect that is often considered to be the pioneer of the modern shopping mall, envisioned them as centres of community in neighbourhoods that were highly private (WTTW, 2013).

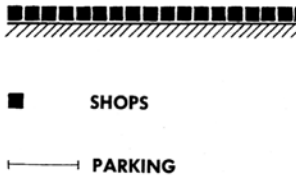
Before Gruen's the invention of the fully enclosed shopping mall, commercial developers attempting to enter into the suburban environment, did so by developing shops with frontages onto major highways (Gruen, 1960). These stores provided single row parking at the sidewalk and allowed for customers to quickly stop to enter a store. This model quickly faced problems of insufficient parking space, a lack of constant pedestrian flow on sidewalks (Gruen, 1960). Gruen's invention of the fully enclosed shopping mall responded to these problems by surrounding the mall with ample rows of off-street parking and creating anchor tenants shops - large regional stores- that would ensure a predicable flow of pedestrians past all other stores in the mall (Gruen, 1960).

This model became a great commercial success but its outcome on the urban environment differed greatly from that which Gruen had intended (WTTW, 2013). Gruen saw malls as an alternative to the monotony of suburban sprawl, they were intended as centres for communal living that would serve not only commercial purposes but civic, recreational and even educational functions as well (WTTW, 2013). They were to act as planned nodes in suburbs that would stimulate

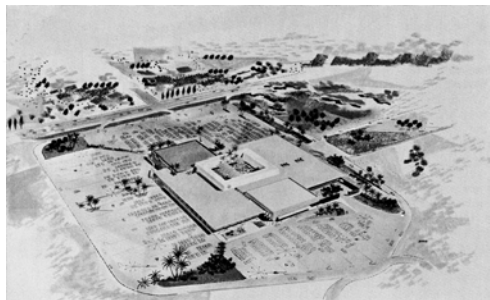
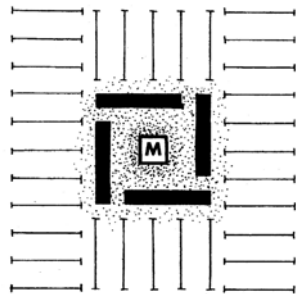
growth around themselves (Gruen, 1960). The subsequent replication of the mall across the USA, however, lacked these two aspects of Gruen's vision, they didn't generally serve other civic and educational purposes and were not generally planned as part of a greater urban strategy (WTTW, 2013). Gruen himself grew highly sceptical of the mall and is noted as being highly critical of contemporary shopping malls (WTTW, 2013).



4. Suburban sprawl in the early 1950's USA. Gruen, 1960.



5. Stores along suburban highways with only single row parking. Gruen, 1960.



6. The fully enclosed shopping mall with ample parking. Gruen, 1960.

MAGIC BOXES

Margaret Crawford, author of the paper 'The World in a Shopping Mall' offers an explanation for why Gruen's model further perpetuates suburban sprawl. Crawford describes the strategy of mall development as "strangely inverted version of central-place theory" (Crawford, 2004). This is to say that, as opposed to the historical model of highly dense and developed environments as ideal locations of trade, contemporary shopping mall developers deliberately seek out underdeveloped commercial voids where the consumer demand is not being met. This trend of shopping mall development is responsible for its perpetuation of suburban sprawl since it continuously drives development away from city centres (Crawford, 2004).

Another aspect of the shopping mall model of which Crawford is highly critical is its highly inward facing nature (Crawford, 2004). Contradictory to this view, Gruen saw the inward facing nature as a highly desirable aspect of his model. The excessive signage on early commercial strip developments that faced out onto suburban highways, represented to Gruen an expression of cluttered, uncontrolled sprawl (WTTW, 2013). His model, which he termed "the introverted-type" aimed to hide all of this clutter behind a neat, blank facade (WTTW, 2013). Crawford argues that this aspect destroys the contribution of the mall to its surrounding urban realm and is also used as a kind of "trick" by mall developers to entice both impulsive buying and longer spending time in mall-goers. Crawford describes the contemporary mall as a kind of magic box, an inward looking fantasy world that uses a strategy of "indirect commodification" (Crawford, 2004). This refers to the placement of non-salable objects in the world of the mall in order to give intrigue to the saleable commodities within its stores (Crawford, 2004). She gives an example of a simple pot placed in the context of a Moroccan harem within a shop window in order to suspend the utilitarian value of the object and give it a sense of intrigue (Crawford, 2004). She argues that the mall model is entirely reliant on this strategy and is the cause of their highly inward looking nature.

A case study which Crawford uses to illustrate this point is the West Edmonton Mall in Alberta, Canada, the largest mall in North America. The West Edmonton Mall is essentially an oversized version of Gruen's "introverted-type" shopping mall- a large box surrounded by large stretches of parking lots. The mall markets itself as containing the diversity of the world all under one roof (Crawford, 2004). Crawford reveals this as a tactic to add intrigue to what is essentially a collection of the same generic stores that could be found in any other shopping centre in the United States. The mall offers multiple recreation activities, an ice-skating rink, a non-denominational chapel, several nightclubs, an indoor water-park and an indoor amusement park (Crawford, 2004). These facilities, apart from generating money of their own accord, entice shoppers to spend more time in the mall in which they can shop at other stores and the combination of leisurely activity into the shopping experience is conducive for more impulsive buying (Crawford, 2004).

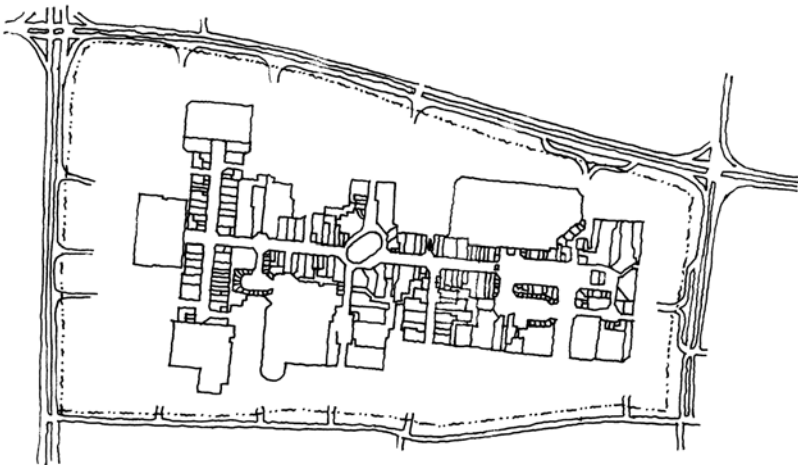
Whilst the oversized "magic-box" is still an incredibly prevalent typology in the United States, Crawford does point to some trends in recent years that have led to the development of new models. Particularly, she identifies a saturation of the market, greater disparity in income distribution and the development of more accurate market research that have resulted in a break away from the one-size-fits-all approach of the conventional big-box mall to smaller and more specialised retail centres (Crawford, 2004).



7. The exterior of the West Edmonton Mall, a fairly banal experience.



8. The interior of the West Edmonton Mall; a fantasy world that entices longer shopping hours and more impulsive buying



9. Plan of the West Edmonton Mall.

ALTERNATIVE BIG BOX MODELS

Brazil offers an interesting alternative to the “introverted-type” developed in the United States. The differences in Brazil’s shopping centre typology is likely due to the considerable time difference between its emergence in Brazil and its initial development in the United States; allowing it to incorporate several innovations by a newer generation of American and European architects (del Rio et al., 2009). Another likely cause for this difference is the culture of inner-city as opposed to suburban living which, in Brazil is still highly desirable. (del Rio et al., 2009) The trend towards suburban living which sprung up in the early and mid twentieth century in the United States is only quite recently being developed in Brazil in the form of gated-community developments (del Rio et al., 2009). Generally, however, middle and high-income groups in Brazil prefer to reside in city centres (del Rio et al., 2009).

Brazilian shopping centres can therefore, generally, be considered to be particularly different to those developed in the United States with regard to their insertion in the city context. Fully enclosed malls are often located within city centres and have acted as catalysts for growth around them as opposed to perpetuating suburban sprawl (del Rio et al., 2009). Bruna and Vargas refer to two such examples in the city of Sao Paulo, namely the Iguatemi shopping center and Patio Higienopolis. Whilst they claim the urban quality of the Iguatemi shopping centre to have been slightly undermined by recent additions, Patio Higienopolis has been identified as a mall with a particularly sensitive response to its surrounding context (Bruna&Vargas, 2009). The mall’s development in a dense urban area, caused a great deal of opposition from local neighbourhood associations in its planning stage, forcing the developers into a strong dialogue with community members before the design was approved (Bruna&Vargas, 2009). As a result, the Patio Higienopolis, whilst still being a fully enclosed big-box type, contributes positively to its surrounding urban environment with several landscaped areas and restaurants along the perimeter of its ground floor (Bruna&Vargas, 2009). This added amenity to the surrounding public realm has reportedly increased pedestrian flow

in the surrounding streets, allowing other businesses in the area to flourish (Bruna&Vargas, 2009). These two Sao Paulo examples, give a slightly different picture of the fully-enclosed big-box type mall. Other Brazilian cities with more favourable weather conditions, such as Rio de Janeiro and Salvador, the development of open-air malls has been more prevalent (Bruna&Vargas, 2009).

The Downtown shopping centre in Rio Janeiro and the Aeroclub shopping centre in Salvador are examples of this open-air type. These two examples, focus on the creation of pleasant outdoor areas instead of fantastical interior spaces to create a more leisurely shopping experience. Whilst this is not too dissimilar to the tactic used by the magic-box type mall as a means to entice longer shopping time and more impulsive buying, the focus on outdoor space means that the added amenity of these spaces is revealed to the surrounding neighbourhood instead of being confined to the walls of the malls as is the case in examples such as West Edmonton Mall. Existing natural amenities such as beautiful views and beaches are often integrated into the mall and exploited as an amenity (Bruna&Vargas, 2009). Another interesting use of existing amenities in the development of retail centres in Brazil is the re-use of historic buildings in its city centre.

The re-use of historic buildings as retail centres is a tactic used by the state in city revitalisation programmes in Brazil. In Sao Paulo, the Shopping Light centre, developed in 1999 is an attempt by such revitalisation programmes to give new life to an under-utilised historic building (Bruna&Vargas, 2009). The Shopping Light centre is located in a renovated 1929 historic building and houses two hundred department stores, one hundred shops, and two hundred parking spaces (Bruna&Vargas, 2009). The Shopping Light centre, is an interesting case study in the use of commercial development to drive state objectives of urban development (Bruna&Vargas, 2009). Public-private partnerships such as these can utilise the impact of shopping centres positively in areas in need of development.

10. High-rise apartment buildings are a highly desirable form of living. (del Rio et al. 2009)



11. Patio Higienopolis - Large retail centres are often located within city centres. (del Rio et al. 2009)



12. The Downtown shopping center in Rio de Janeiro- an example of the open-air type (del Rio et al. 2009)



13. The Shopping Light center in Sao Paulo - commercial development is often used to give new life to historic buildings in the inner city (del Rio et al. 2009).



SMALL BOXES

The following paragraphs will focus on micro-enterprises - what I have referred to as “small-boxes”.

A research studio that I was involved in during my Honours year which was focused on studying the urban conditions of Du Noon - a low income suburb in Cape Town- will serve as the primary resource for this section. The studio produced in-depth empirical research of small-scale micro-enterprises within a South African context. The findings of this research will be presented along with international examples of small-scale micro-enterprises that showcase similar principles.

AN INTRODUCTION TO DU NOON

Du Noon is a low-income suburb in Milnerton, Cape Town. The suburb was developed as an RDP roll-out that had its first phase complete in 1996. Almost 20 years old now, Du Noon has rapidly grown since the initial roll-out of RDP houses- to the extent that it is hardly recognisable as the low-rise, low-density suburb it once was. What makes Du Noon particularly interesting is that it is a break away from South Africa’s usual urban settlement trajectory. Whilst in both high and low-income residential areas in South Africa, there is a deeply entrenched culture of low-rise living with the “Suburban dream” as the ultimate ideal, Du Noon is beginning to expand vertically. It is a suburb that is quickly becoming urban.

1996



14. Du Noon's Original RDP layout

2014



15. Figure ground drawing of Du Noon in 2014

BUSINESS AND DOMESTICITY

The close ties between business and domesticity is something which is missing from many contemporary shopping mall developments but is often an integral part of small-scale enterprise. This can work on a number of levels; one is in the Live/Work scenario where a business premises doubles up as the home of its owner (a common way of keeping overheads low), domesticity can also be the commodity which is traded (in the case of rentable apartments) another is when the business takes on a domestic function besides lodging that is commonly associated with the home but which for some reason cannot be accommodated in peoples current living conditions. All three of these scenario's were found in Du Noon.

Live Work

The live/work scenario is very prevalent in Du Noon. Most businesses have grown out of the basic RDP house and continue to function as homes even in cases when the RDP home is completely demolished with expansion. The benefits of having one's business premises double up as living quarters are obvious from an economic point of view but there are other plenty of other benefits that influence the surrounding public realm – a form of passive surveillance and a sense of ownership are exercised over the surrounding area at all times of the day.

Rentable Apartments

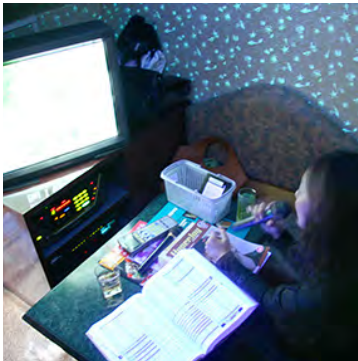
One of the most profitable enterprises in Du Noon has been the development of rentable apartments. This business type has also been the predominant cause of Du Noon's vertical expansion. The living conditions of these apartments differ from those typically developed in the rest of Cape Town and are more comparable to those seen in student housing developments. They typically only consist of only one room that is an average of 8m² in size. Ablution facilities are communal, with 5-10 apartments typically sharing one WC and one shower/bath. Cooking, washing and socialisation usually occurs in the individual rooms.



16. Manga Kissa, Tokyo, Almazan 2008



16. Hair Salon, Du Noon



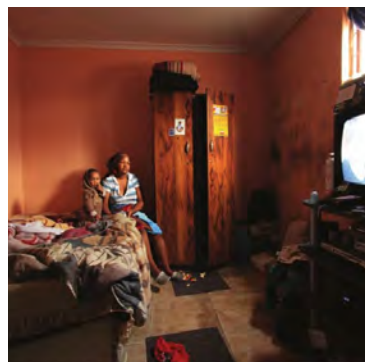
17. Karaoke Booth, Tokyo, Almazan 2008



18. Hardware store, Du Noon



19. Sleeping Booths, Tokyo, Almazan 2008



20. Rentable Apartment, Du Noon, Wolff 2010

Business as an extension of the home

Under circumstances of very tight living conditions, many of the social functions typically associated with the home are lost. The rentable apartments in Du Noon are an example of this – a single room typically occupied by more than one person means that there is no privacy gradient that distinguishes a social space from a studying or sleeping space, for instance.

Living conditions in Tokyo are often similar to those seen in the rentable apartments in Du Noon with regard to their size and level of privacy. As a result, many of the functions typically associated with the home, apart from lodging, are often filled by businesses with the home becoming merely a place for sleeping and storage. Enterprises such as Manga Kissa, Relax Rooms and Love Hotels provide intimate domestic functions that are missing from the very tight living conditions in most Tokyo apartments (Almazan, 2008)

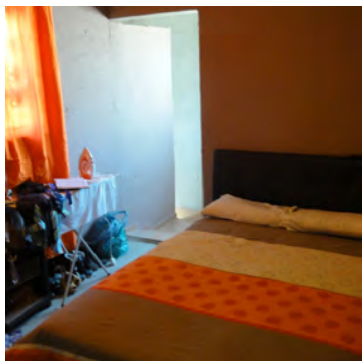
SMALL SPACES - HIGH RATES

Du Noon has shown the ability of small scale enterprises in a low-income area to be highly profitable, particularly in property development. Being in a low-income area, one would not expect to be able to charge high rental rates. If, however, the space to be rented is small enough such that a high R/M² rate can still be earned whilst making it affordable to the market, the profit margins can be very high. One of the most profitable enterprises in Du Noon has been the development of rentable apartments. Wolff (2010) has done extensive research of this typology from both an economic and an architectural perspective. A table produced by Wolff (2010) indicating the average profits made by such a business reveal it to be a highly successful enterprise. The living conditions of these apartments differ greatly to those typically developed in the rest of Cape Town. They offer a far more collective form of living- comparable to that of student housing. The typical plan of such a unit would have between 4 to 6 apartments on both its ground and first floors which make use of shared ablution facilities. Other business which have utilised the small spaces/high rates strategy include the emerging type of co-work office spaces.

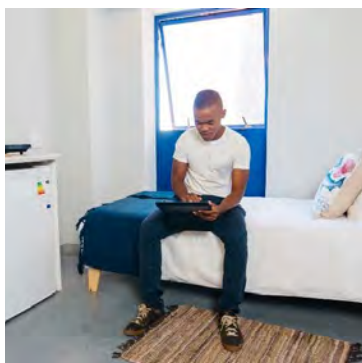
Average unit size:	8m ²		
Typical rental:	R 700 / month		
	R 50 - R100 / m ²		
	R 45 - R 80 / m ²		(including ablutions)
Comparative rentals:	R 700 ÷ 8m ²	= R 88 / m ²	DU NOON
	R 3500 ÷ 40m ²	= R 88 / m ²	CAPE TOWN CITY
	R 3000 ÷ 40m ²	= R 75 / m ²	BANTRYBAY
	R 3500 ÷ 40m ²	= R 88 / m ²	BANTRY BAY (upmarket)
	R 2850 ÷ 40m ²	= R 71 / m ²	BLOUBERG
	R 2650 ÷ 40m ²	= R 66 / m ²	DURBANVILLE



21. Co-Work office space in Cape Town: 1M² for R2000/month



22. Du Noon Apartment: 8M² for R700/month



23. Student Apartment in Cape Town: 8M² for R4000/month

FIXITY AND TEMPORARINESS

The state provided RDP housing, services and roads of Du Noon have provided a sort of structural spine that has supported the growth of more temporary elements around it. This relation between fixed and temporary elements was particularly evident in small-scale businesses. Some notable examples included Container stores which paid a monthly fee to owners of RDP houses for the use of water and electricity, sidewalks used as rent-free trading places, backyard shacks which make use of abutment facilities in RDP homes etc. The growth of these more temporary elements around the structural spine of the original RDP layout has occurred to such an extent that it has become the predominant experience of the area.



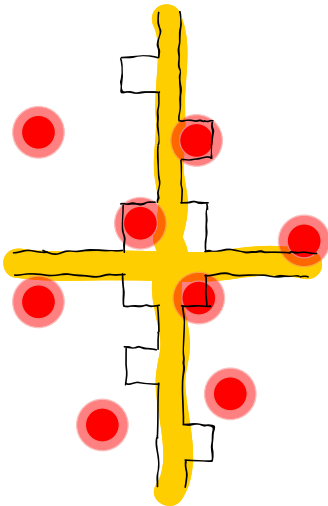
24. Street vendor, Du Noon



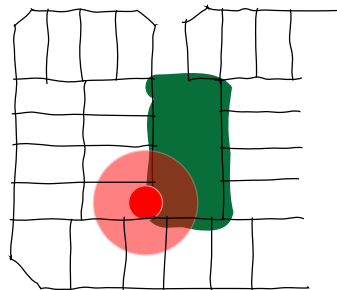
25. Container Store, Du Noon

PUBLIC AND PRIVATE REALMS

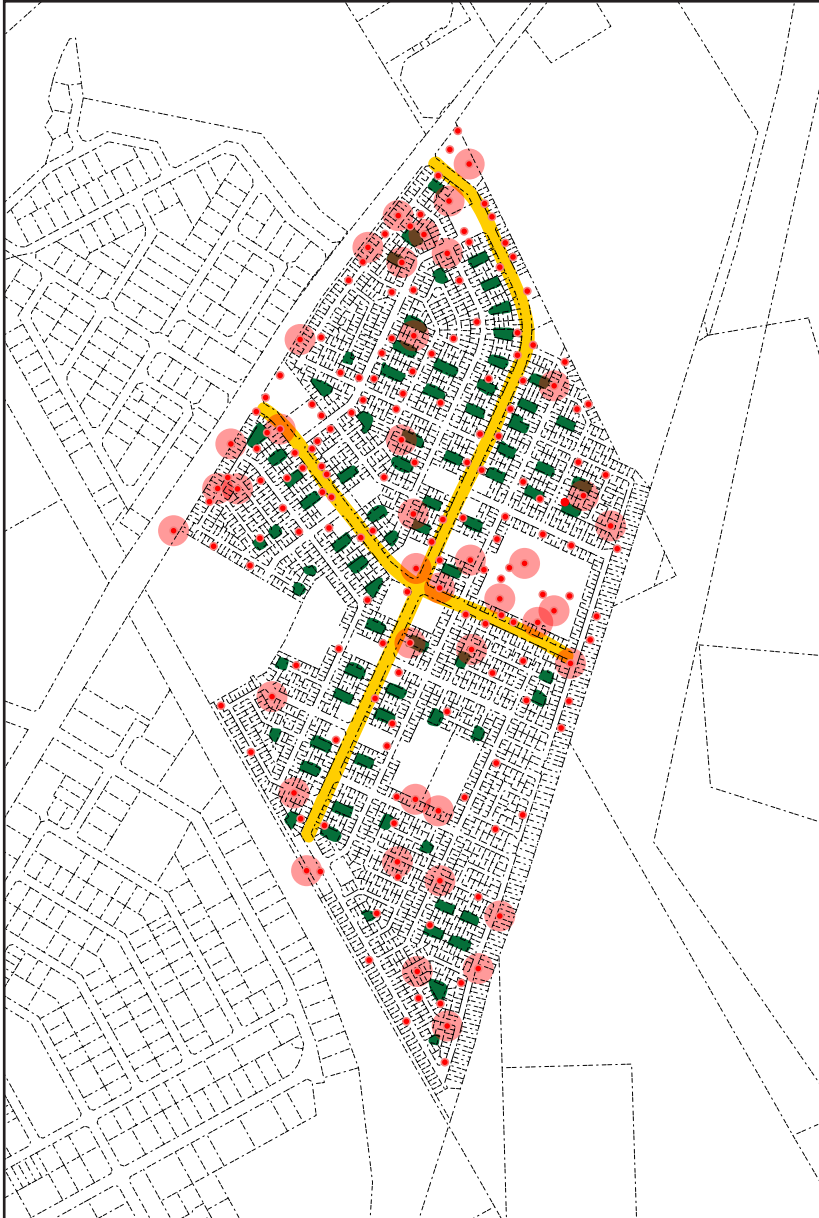
Du Noon has a clear urban layout - two main roads off of which lead a series of secondary roads and cul-de-sacs. One would expect this layout to dictate to an extent, where higher concentrations of businesses are found. However, despite the clarity of this layout, businesses in Du Noon are scattered in a fairly homogenous concentration throughout the entire neighborhood that does not seem to adhere to any pattern. This is likely due to the fact that business owners in Du Noon usually run their business out of their home which would be located in whichever RDP home they happen to be assigned. As a result, businesses of all types can be located in all corners of Du Noon - from main roads to the most intimate of cul-de-sacs. Whilst this homogenous spread of businesses throughout the neighborhood is impressive, there are possible conflicts that can arise when businesses of an overtly public nature overlap with the private realm in uncomfortable ways. A notable example is the location of taverns in quiet cul-de-sacs in close proximity to private homes and creches.



26. Main Road with businesses adhering to no strict pattern.



27. Overlap of public and private realms in quiet cul-de-sac.



28. Business density map of Du Noon showing random distribution of businesses throughout the area.

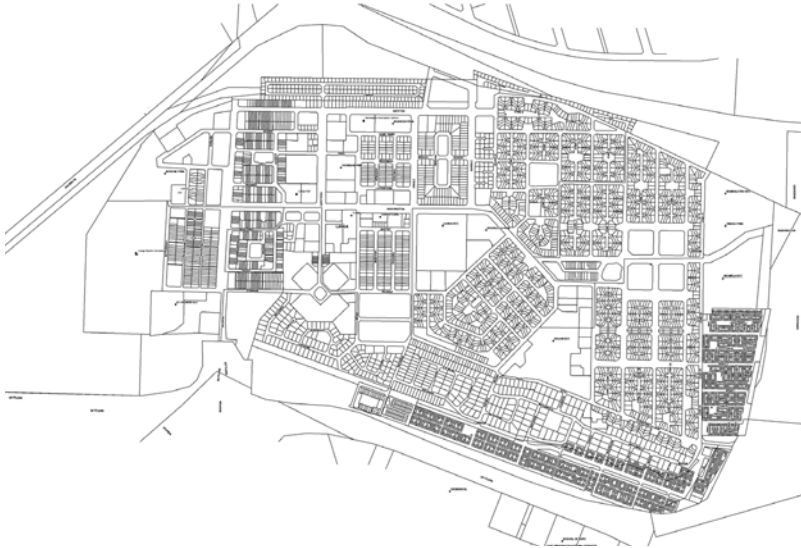
LOCATION

One of the factors that has driven Du Noon's rapid development is its location. As opposed to many other RDP developments which are located on the peripheries of cities and far away from work opportunities, Du Noon's location is fairly desirable. It is approximately 24km away from Cape Town's city centre, is well served by public transport and is close to many other job opportunities in nearby Industrial, Residential and Agricultural areas (Wolff, H. 2010)

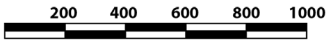
URBAN LAYOUT

Location is not the only driving factor behind Du Noon's rapid urbanisation. The relatively small size and density of its urban layout is something that differs from many other low-income suburbs in South Africa, particularly those designed during apartheid many of which were based on the Neighbourhood Unit Model. The Neighbourhood Unit Model developed by Clarence Perry is based on the creation of self-contained low-density suburbs (Banerjee & Baer, 1984) In the context of Cape Town many such Neighbourhoods were developed along the N2 Highway during apartheid, namely Langa, Bonteheuwel and Athlone.

A scaled comparison between the plot diagrams of Du Noon and Langa reveal the considerable difference in size of plots, density of plots, and size of the neighbourhood as a whole. Du Noon has a compact urban layout - small plots at a high density in a small neighbourhood that is bound by hard edges on its periphery making it a pressure cooker for vertical expansion. Langa is a neighbourhood with a loose-fit urban layout - larger plots at a lower density with large open spaces .



29. Plot diagram of Langa.



30. Plot diagram of Du Noon.

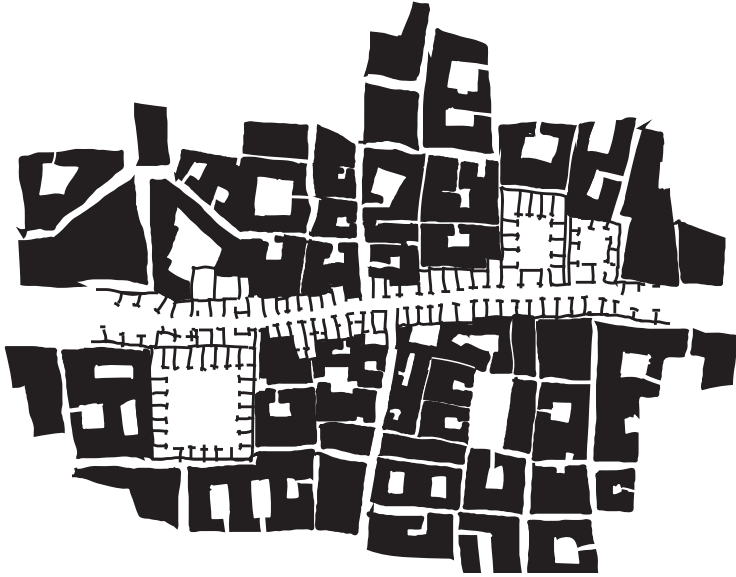
MEDIUM BOXES

Medium Boxes refers to retail typologies that lie between the scale small-scale micro-enterprises and large-scale retail centres. They are the condition which I believe to be missing in South Africa's retail environment. An existing typology which I felt to represent this medium scaled retail centre was that of the Bazaar. A class research tour to Iran and Turkey during the middle of the year, provided a useful opportunity to visit many Bazaar's first hand and to extract valuable principles from them for the design project.

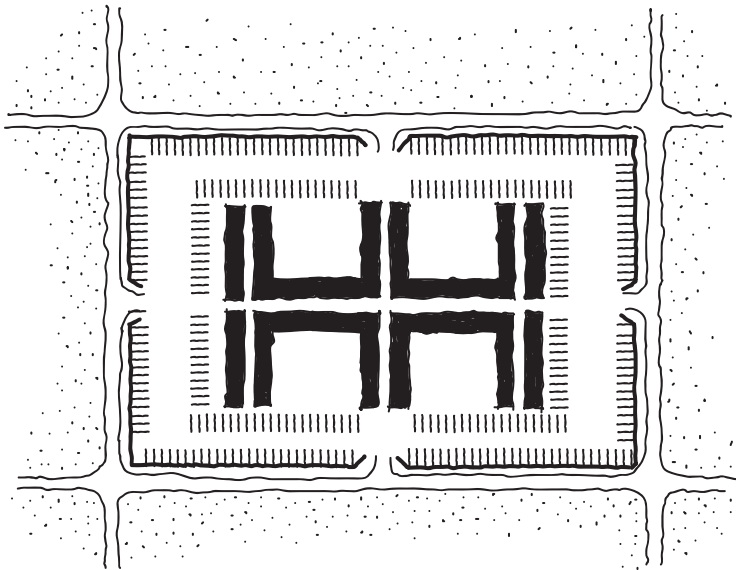
A CONTINUATION OF THE CITY

Whilst the interior layout of the Bazaar and Mall may seem quite similar - a celebrated circulation route, perfected for shopping with shops on either side - their impact on the surrounding urban realm is in stark contrast. Whereas the mall is a kind of introverted box, surrounded by a sea of tarmac, the bazaar is a continuation of the existing city that is slightly adapted to provide ideal environments for trade. The Bazaar has multiple entry points off of the ordinary streets of the city making the transition from one to the other fairly seamless. The Mall has fewer entry points, which one usually approaches from a parking lot. The Mall is entered with the clear intention of purchasing.

The seamless transition between city and Bazaar makes it far more accessible as an urban amenity. The internal route of the Bazaar also usually connects many important civic functions e.g. Mosques, Gardens, Bath-houses - and hence one is likely to enter it as a convenient thoroughfare without the intention of shopping. The stores in the Bazaar of course also benefit from this situation by having a great deal of foot-traffic passing by.



31. Diagram of the typical bazaar



32. Diagram of the typical mall

THE CIVIC ROLE OF COMMERCE

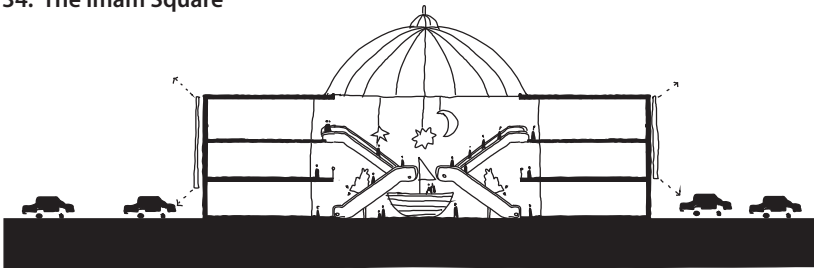
The notion of retail spaces as places concerned purely with generating profit is a preconception that I found to be contested by many Iranian bazaars. The grand bazaar in Isfahan shows a retail space that, apart from serving commercial functions, also acts as an epicentre for many civic, religious and institutional functions. Isfahan's bazaar follows the typical pattern of a series of small stores along a covered route but is made rather exceptional through its enclosure of the Naqsh-e Jahan Square - a generous public space around which many non-commercial functions are located. The grandeur of this public space represents a contrast to the mall typology. Whereas the mall typically creates grandiose interior spaces where spending occurs and offers little to the public realm, the bazaar has an interior which is rather banal and is clearly more concerned with its exterior impression on public space. A small architectural example of this difference in attitude is the double story wall which encloses the Naqsh-e Jahan Square. Whilst the bazaar is only a single story building, it is given a double story wall on its facade facing the Naqsh-e Jahan Square which serves no clear function other than to create a greater sense of grandeur and enclosure in the square. The surrounding civic and religious buildings facing onto the square display a similar concern for their public appearance. The Shah Mosque, for instance, which sits at a diagonal to the walls of the square in order to face Mecca, has its entrance angled to meet the walls of the square perpendicularly. The combined effort of all of the buildings facing the Naqsh-e Jahan Square turns it into a grandiose public room with an impact far greater than that of its individual parts.



33. Section through the Isfahan Bazaar



34. The Imam Square



35. Section through the typical mall.



36. Interior of the West Edmonton Mall.

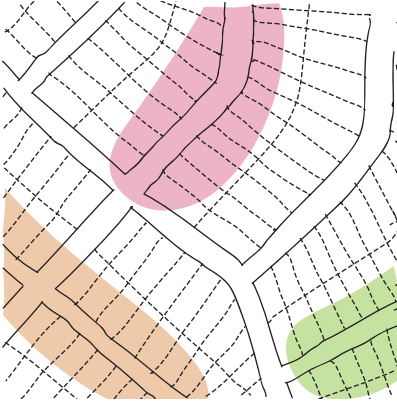
INDUSTRY CLUSTERING

A study by M.W.Wolfe on the Grand Bazaar in Istanbul discusses the tactics that the Bazaar uses to attract customers that differ to those used by contemporary malls. The absence of the anchor tenant in the Bazaar means that all shops are of a more equal hierarchy - there are no large supermarket chains that can create a predictable pedestrian flow past secondary stores. Stores in the Bazaar operate by clustering together in groups of similar trade. This clustering together of stores makes the Bazaar a more easily navigable place and also creates a competitiveness amongst traders (Wolfe, 1962).

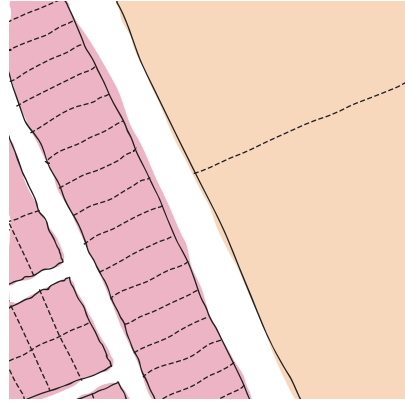
The strategy of clustering of similar trades within the typical bazaar is something that is seen in the structure of the city as well. During my brief stay in Tehran, this pattern became very noticeable. Our accommodation in Tehran was located in a district known for having a high number of businesses specializing in automotive parts.

The relationship between businesses in an industry cluster is one of both support and rivalry. The rivalry amongst businesses in the cluster drives competitive advantage and innovation. Conversely, the informal knowledge transfer, and social networks between businesses in the cluster can make it a highly supportive system. Clustering can also make it feasible for businesses of a small scale to operate successfully amongst larger businesses in the same industry. One of the reasons for this is that the business is not necessarily dependent on its physical size to be easily identifiable by a customer. Another reason, is the relationship of subcontracting between large and small scale businesses in the same industry.

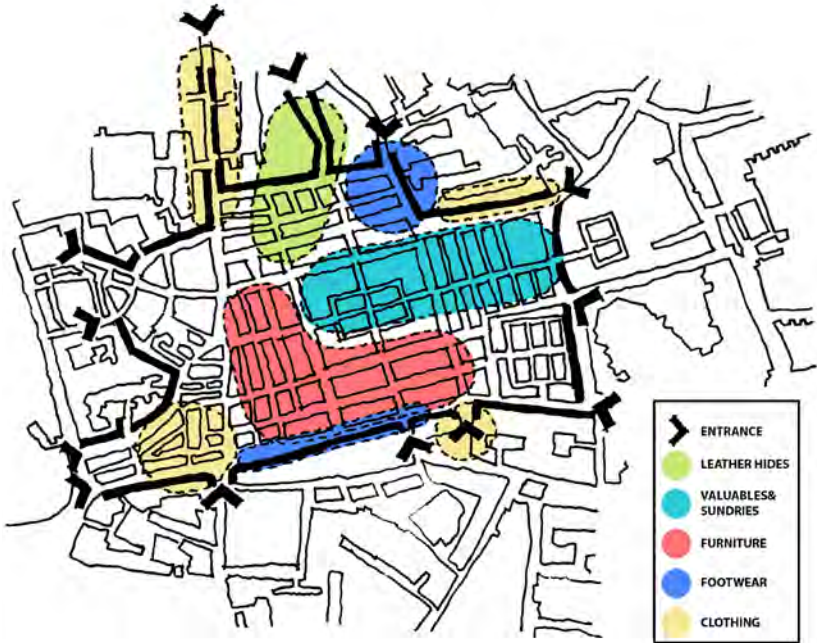
Whilst commercial activity may be somewhat segregated into industrial clusters, it is interesting to note that in terms of urban form, the clusters are rather indistinguishable from one another. The consistency in urban form with variation in function is a contrast to the notion of zoning where urban form is greatly dictated by function. The flexibility in this urban form means that industry clusters, although being dominated by a particular kind of business - e.g. those specializing in auto parts - also easily accommodate many other



37. Different industrial clusters within a homogeneous urban grid, emulating clustering of trades and products within the bazaar



38. Notion of zoning, seen in South Africa, which tends to produce architecture and urban form dictated by function



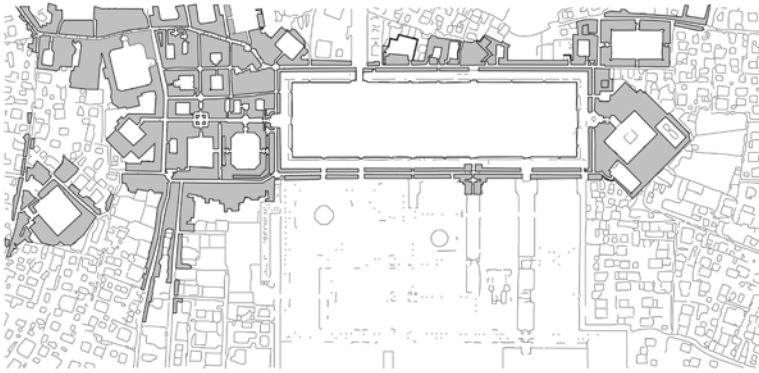
39. Plan of the Grand Bazaar showing the clustering of similar trades

functions such as housing. The strategy of clustering can be useful for us to consider from a South African perspective since it provides clues as to how small businesses can survive in a competitive environment. Furthermore, the ability of different industry clusters to exist within neighborhoods of similar urban form, contests the notion of zoning which has been incredibly prevalent in the planning of South African cities.

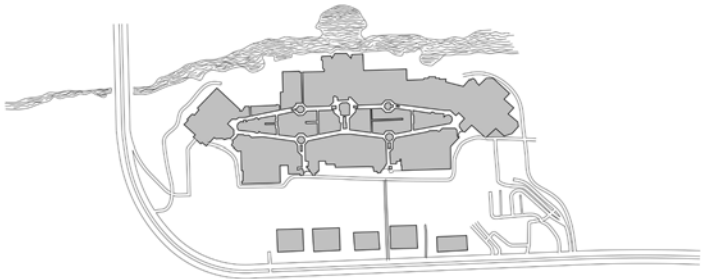
A SENSE OF SCALE

Whilst the Bazaar typically accommodates small to medium scaled enterprises, it can take on quite a strong presence in the city. The Bazaar of Isfahan is an example of this. Stores in the Bazaar, no more than 5m in width line one of the largest public squares in the world, the Naqsh-e Jahan Square, measuring approximately 160 metres wide by 560 metres long. In experience, this space had an epic quality without feeling uncomfortably vast or overpowering.

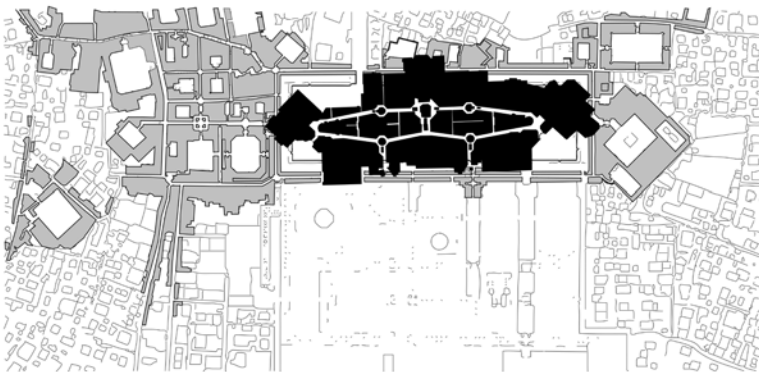
In order to gain perspective of just how large this is, I conducted a scale study between a the grand bazaar of Isfahan and the Canal Walk Shopping centre - a local commercial space which I felt to be very large. When overlaying the plans of these two retail centres it can be seen that the Canal Walk Shopping centre is approximately the same size as the Naqsh-e Jahan Square. Another interesting observation that was made from this study was how the Bazaar was quite directly the inverse figure-ground relationship to the of the mall - the mall being as introverted box surrounded by a sea of tarmac and set back from the city and the Bazaar being tightly woven into rest of the city fabric and opening up at its centre to provide public space.



40. Plan of the Grand Bazaar of Isfahan



41. Plan of the Canal Walk shopping mall



42. Overlay of Canal Walk and Isfahan Grand Bazaar

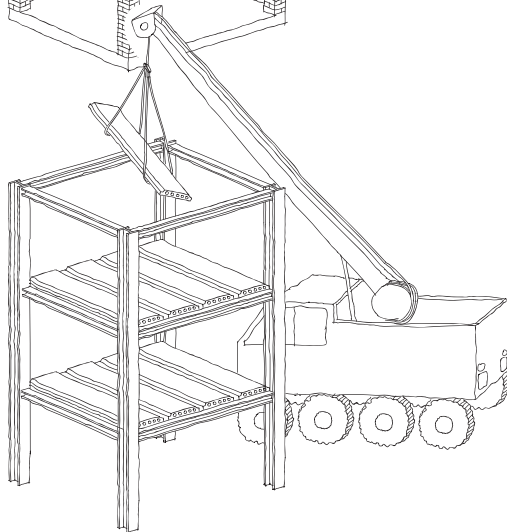
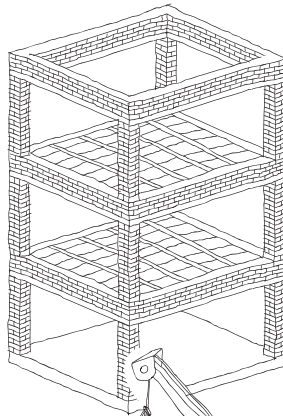
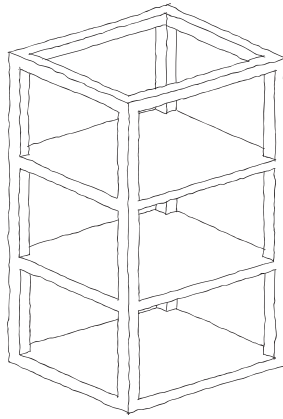
THE ROLE OF THE STATE

The Bazaar shows a relationship between state and private enterprise that differs to that of the mall. As an organised government-supported body, the Bazaar can ensure that the interest of the public is upheld and not overridden by the interests of private enterprise. This relationship holds clues for South Africa where public funds are often used to support commercial development but where management and regulation of retail centres is left to the private sector. South Africa's Public Investment Corporation, which is responsible for managing the pension funds of all state employees is a considerably large role-player in commercial development in South Africa and is in fact the largest owner of commercial property in the country. A more active involvement of the state in the development of retail centres, as seen in the case of the Bazaar, could allow for commercial development to act as catalysts for state-driven agenda's.

PART 3

PRACTICE

A Hybrid Construction Industry



INTRODUCTION

Apart from exploring the retail centre as a typology, I was interested in the process of its development. It occurred to me that just as just as in the retail sector in South Africa, a Missing Middle condition also existed in the field of built-environment professional services.

I became aware of this gap in the market after attempting to undertake private work in the area of Du Noon this year. The private work that I engaged in this year included additions to local taverns and shebeens as well as signage design for a local Chisa Nyama. Engaging in this work revealed some invaluable lessons for working as an architect in low-income areas in South Africa. These lessons are both in field of practice and construction.

Practice

In terms of practice, the gap in the market for the provision of built- environment professional services in low-income areas was the key lesson that revealed itself from the work undertaken in Du Noon. Built environment professionals, particularly architects, are only able to serve a small portion of the population that can afford their fee's. If the overheads associated with architects fee's could somehow be lowered so as to be able to cater to a lower income group, there could be a great deal of potential work for architects in serving this potion of the population.

Construction

In terms of construction the key lesson that revealed itself was the wide range of role-players in the South African construction industry - ranging from small-scale contractors to large-scale construction companies and prefabricated suppliers- that, just as in the case of the retail sector, often do not speak to one another. I became interested in the possibilities co-ordinating these different industries in on construction projects in new and interesting ways.

OVERVIEW OF PRIVATE WORK

Throughout the year, I attempted to undertake private architectural work in Du Noon. The first opportunities that I came accros were for the additions to a shebeen and a signage design for a cafe and butchery. These projects, however, ended early in the design stage due to the client's lack of funds. Eventually a more substantial opportunity to design an addition to highly succesful tavern in Du Noon came about.

The tavern is currently located on two standard RDP sites, one of which has already been vertically consolidated to accommodate an upstairs living area. The owner expressed her desire to build an upstairs extension on the site that had not yet been vertically consolidated that would include a bar, dancing area and a small bedroom for one of her employees.

The deliverables for the commission would include: a set of plans used to obtain a liquor license for the upstairs extension, gathering quotes from suppliers to establish a rough budget for the project, a set of construction drawings and supervision of the project during construction phase.

Apart from design work, my role was to also correspond with a local builder, an engineer, precast slab suppliers, a lawyer regarding liquor license approval and a town-planner regarding the consolidation of the sites.

PRACTICE

MITIGATING RISK

To understand why the access to professional services has such a high threshold it is important to think about what the meaning of the term professional holds and how it differs from that of occupation. Being a professional implies having gone through some kind of formal training and examination in order to be admitted to a professional body that has the power to regulate its members and to provide some degree of monopoly rights (Bullock, A & Trombley, S. 1999) The admittance to a professional body can often be a highly lengthy and difficult process involving several years of study and apprenticeship – often making it accessible to only a very small portion of the population. Reasons for the strict regulation of admittance to a professional body are that the work carried out by such individuals is considered to be of high societal value and often has great social impact (Bullock, A & Trombley, S. 1999). Implicit in this is a great deal of risk.

Taking on this risk is one of the reasons why professional fees can be so high and one of the factors that could prevent architects from serving a lower income bracket.

Going through the process of trying to appoint an engineer on the tavern addition revealed the hesitance of professionals to undertake work in low-income areas. After several attempts, however, an engineer was found who was willing to undertake the work.



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INVOICE / FAKTUUR

CLEINT: [REDACTED]

Architect: ALEX

Job order no: Eng Design : col, beam, deck over

Date: 2015/May/07

Invoice No: 001 /deposit

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GO AHEAD				
2 Structural Engineers Certificates				
1	50 % DEPOSIT	R 7 500.00	now	R 7 500.00
	1 SANS F2 - Appointment of Struct Engineer	incl		
	2 commence on engineering modelling	incl		
2	50 % BALANCE	R 7 500.00	follow	
	1 Base engineering + sched	incl		
	2 RC Beam Engineering + schedule	incl		
	3 Deck : deflection analysis, topfloor type design	incl		
	4 Issue : Structural Engineers set	incl		
	5 Final Structural Engineers Cert act103	incl		
Principal	W.N. ESTERHUIZEN Pr(Tech)Eng NHD.Eng (Struct,Civil) MSAISC Prof Engineer's ECSA No 200370102 Engineer's Act 46 of 2000			
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Totale eise / Total Claims				R 7 500.00
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PRINCIPAL: Consulting Structural Engineer
WN Esterhuizen Pr (Tech) Eng MSAISC MNHBRC

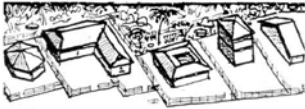
[REDACTED SIGNATURE]

Client Signature
Payment Terms: Direct from invoice date
Interest will be charged on overdue accounts at the rate for overdraft facilities as charged by our bankers, plus 2 % p.a., calculated monthly.

51. Engineer's appointment form, names covered to protect anonymity.

LURIE BAKER

Laurie Baker, a British-born architect who worked for most of his professional life in India, is an exemplary case of an architect who was able to effectively serve a lower-income group by adjusting his mode of practice (Bhatia, 2000). Baker worked in India for over 60 years, completing hundreds of buildings that were predominantly concerned with reducing construction cost and adapting to India's particular climate. Baker produced buildings of predominantly institutional, religious and residential use, mostly in a rural context (Bhatia, 2000). Baker's frugal lifestyle and his commitment to producing cost-effective buildings can be seen as the means by which he was able to work for a lower-income client. Baker worked predominantly on his own as an architect, preferring to have a greater on-site involvement with builders as opposed to working off-site with other architects in an office - as is the case with conventional practice. His strong on-site involvement meant that he was less reliant on accurately drafted construction drawings to communicate his ideas. Baker's drawings were usually drafted fairly crudely by hand but with a comic-like clarity that communicates overall principles very quickly- as opposed to the conventional construction drawing which communicates minute details upon close inspection. These drawings were often collated in booklets which were published by a research centre co-founded by Baker named COSTFORD (The Centre of Science and Technology for Rural Development) (Bhatia, 2000). These booklets were made freely available in digital and print format, extending Baker's influence beyond the projects that he was directly involved with. Baker's involvement with research institutes and NGO's is something that has helped sustain his particular mode of practice which sees the architect both as a designer and a teacher (Bhatia, 2000).

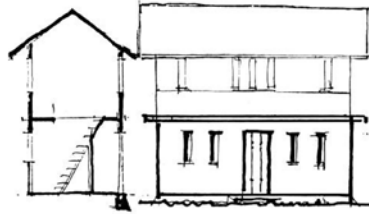


Laurie Baker

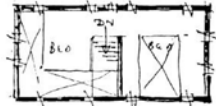
**A MANUAL
OF COST CUTS
FOR STRONG
ACCEPTABLE
HOUSING**

COSTFORD

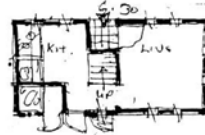
**FUTURE VERTICAL
EXPANSION**



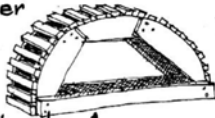
**FUTURE
FIRST
FLOOR**



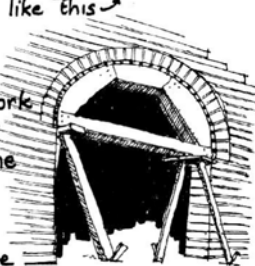
**GROUND
FLOOR.**



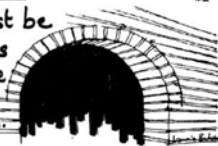
It is easier
to build
an arch
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frame like this →



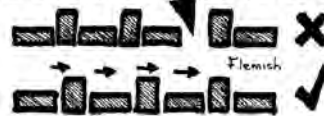
The
brickwork
is built
over the
frame



but the
frame must be
removed as
soon as the
arch is
completed.



Don't cut ✗ **insert**



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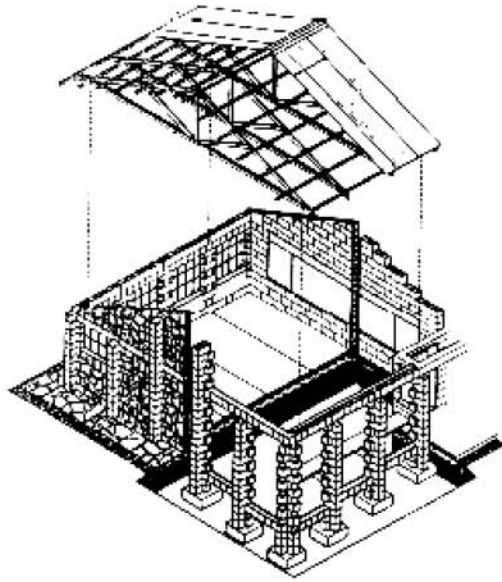


Get the first course right

52 -55. Images from Laurie Baker's construction manuals, COSTFORD, 2000

IAIN LOW

Iain Low, a South African architect who worked in Lesotho for several years during the 1980's, is an architect who can also be said to have been involved with a bottom-up way of working. Whilst Low's work in Lesotho was carried out for a low-income population, it differs from much of Baker's work in that it was funded by a large company, specifically: The World Bank (Wolff, I. 2013). Low's work in Lesotho was carried out as part of the Training for Self Reliance Project (TSRP), a programme designed and co-ordinated by Low, aimed at upgrading educational facilities in Lesotho (Wolff, I. 2013). This programme oversaw design interventions being implemented at over 200 schools, a body of work often referred to broadly as "The Lesotho Schools". The Lesotho Schools display a particularly interesting system of construction that articulates the role of different trades in a way that becomes didactic - by looking at the buildings the system reveals itself to the viewer. A particularly dominant expression in this system, that has relevance for overcoming vertical consolidation, is the expression of the frame and infill (Judin&Vladislavić, 1998). The Lesotho Schools showcase a unique method of frame construction that makes use of standard concrete blocks which are stacked and filled with reinforced concrete in order to create columns and beams (Judin&Vladislavić, 1998). The system involves creating a series of pad foundations on which columns made of concrete blocks stacked in alternating perpendicular/parallel pattern are built. These columns are tied together at ground level with a ring beam made of concrete blocks stacked horizontally and filled with reinforced concrete (Judin&Vladislavić, 1998). This ring beam establishes the ground floor datum, whilst a secondary ring beam at door height establishes a datum for openings- removing the need for lintels. The frame allows for easy infill which can be carried out with a less sophisticated construction system and by a less experienced contractor (Judin&Vladislavić, 1998). Low's work in it's clear articulation of trades establishes more of a hybrid system of both high-end and low-end construction.



56 - 60: Images of Iain Low's Lesotho Schools, Low, Date Unknown

CONSTRUCTION

A HYBRID SYSTEM

Ranging from low-end aritsans and “bakkie builders” to large scale contracting firms and pre-fabricated suppliers, there is a broad spectrum of construction industries in South Africa who are each able to offer particular advantages. Prefabricated suppliers can offer speed and reliability, large contracting firms have access to and expertise in working with large expensive equipment, small-scale contractors can provide labour intensive work, artisans can offer their craftsmanship. By co-ordinating these different industries on a project in an innovative way, one can not only spread the economic benefit of construction amongst a greater number of hands but also achieve new and intersting tectonic expressions.

In meetings with the builder to discuss the construction of the tavern addition a system combining masonry collumns with concrete-infill and pre-cast concrete floor slabs was developed. This system makes use of the speed, reliability and neat-finish of precast concrete with the affordable and accesible practice of masonry construction.

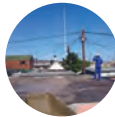
PREFABRICATED

assembly
neat
cost-efficient
monotonous
quick
systematic
clinical



SMALL SCALE CONTRATOR

messy
labour
stereotomic (SA)
empirical
unpredicatble
raw



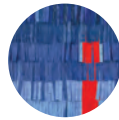
LARGE SCALE CONTRACTOR

reliable
expertise
tectonic (SA)
professional
technology



ARTISAN

decorative
unique
expressive
non-utilitarian
craft



MASONRY CONSTRUCTION

With the addition being on an upper level, the challenge of creating a reliable support structure that would support the heavy loads of a packed dance-floor was the main challenge that had to be overcome.

The builder had some experience in building frames in a simple but effective way . This system consists of first creating steel frame, made from standard I-beams and columns and then surrounding the steel columns with a layer of brickwork in order to create a cavity in which concrete can be poured. The system makes use of the reliable strength of the steel I-sections as its primary means of supporting the floor slab with the concrete being used to stabilise the columns against lateral loads.

The builder expressed the desire to use a similar construction method that would avoid the use of timber shuttering for the construction of the frame but recommended that a prefabricated system be used for the construction of the floor slab- due to the high live loads that the building will be experiencing. A system of hollowcore precast decking, which could be delivered on site by truck in one day was chosen as the ideal method for the construction of the floor slab. The use of a prefabricated system would remove the need to consult an engineer for its design and would spare the builder a great deal of work.



61-62. Builders previous experience with framed construction



63-64. Builders previous experience in-situ floor construction

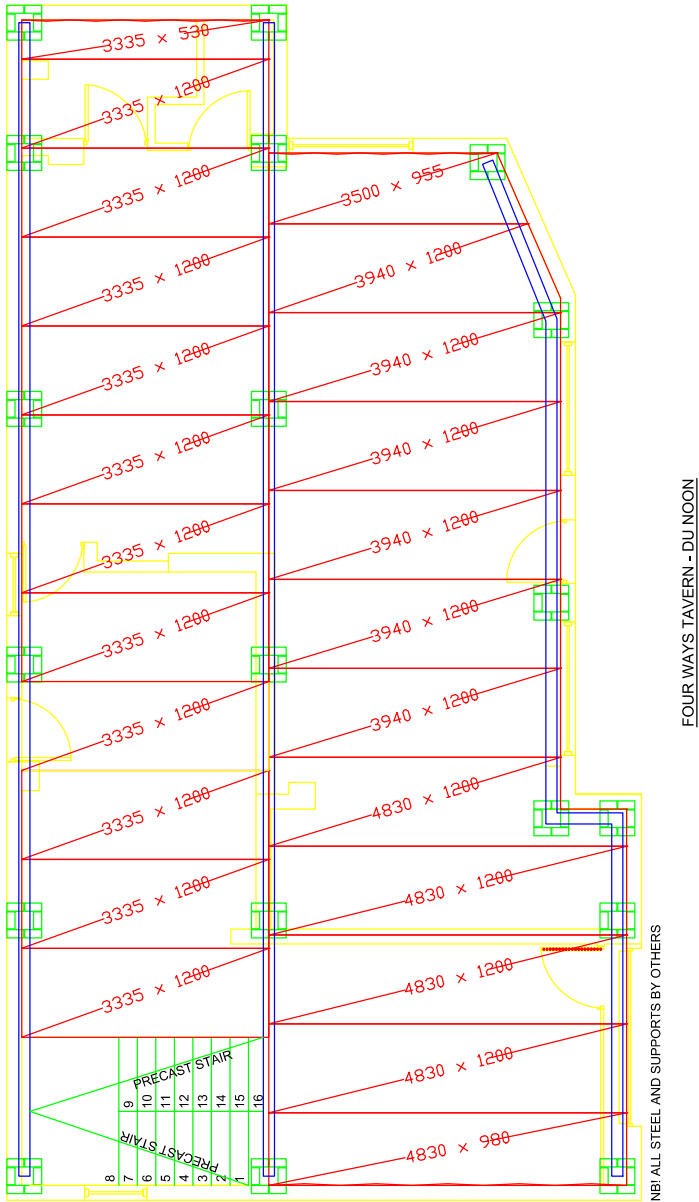


65-66. Builders previous experience pre-cast floor construction. Photographs by the author, 2015

PREFABRICATED FLOOR SLABS

One of the clear benefits of a large-scale company being able to supply a construction system is that it can reduce the amount of risk placed on the contractor. Since the systems developed by large-scale companies are “tried-and-tested” they can potentially also remove the need for engineering consulting services.

In South Africa, several prefabricated products exist for floor slab construction. These products typically consist of light-weight concrete panels/decking that are delivered to a site by truck or a system of lightweight beams/lintels and blocks/tiles that can generally be moved by hand on-site. They are generally more expensive per squared meter than in-situ slab construction but can remove the need to consult an engineer - potentially making them more cost effective. These products also generally work very well in conjunction with traditional construction methods such as masonry construction, their dimensions are often worked out to fit in with standard brick courses and several construction details which specify how they can be used with traditional systems can be downloaded online. The hybrid system of traditional and prefabricated construction methods that these products allow for, can be greatly beneficial for overcoming the challenges of vertical consolidation - prefabricated systems can be used only where necessary in order to reduce the need for professional consulting fees and can still allow for the remaining work to be done by low-end contractor's using traditional construction systems.



67. Plan of precast floor-slab layout for the tavern addition

PART 4

DESIGN

Waxberry Market

INTRODUCTION

Based on the enquiries that I had in the beginning of the year around the commercial environment in South Africa, three “Missing Middle” conditions revealed themselves.

One was an economic condition – the missing middle between small-scale microenterprises and large scale corporations. Second was an architectural condition – the fact that retail typologies existed mostly on two opposing scales - either very large or very small - and that a typology in between these two scales was lacking. The third condition was in the provision of professional services – the fact that there exists a gap in the market for providing professional fees to a lower income base. With these enquiries being related to both the product of architecture- the retail centre typology- as well as its process – who is built by? whom does it benefit? – it became clear that the design project would have to consider product and process as equally important.

The product of the design project is a proposal for a retail centre in the low-income suburb of Du Noon, Cape Town. It aims to fill the missing middle between large-scale retail centres (shopping malls) and small-scale microenterprises in the context of South Africa.

The process of the design project considers who this development would be done by, whom it would benefit and whom it would be built by. The process aims to fill the missing gap for the provision of professional services to a lower income base and explores the relationship between different scales of contractors in the construction industry.

In tying the product and process of the project together, a narrative was constructed that would allow these two to seamlessly co-exist. The narrative follows the development of the design project from conception to completion. This narrative was considered throughout the design process and was useful means of making design decisions.

BRIEF

NARRATIVE

The project is envisioned as being carried out by a group of young recent graduates, one soon to be architect, one soon to be property developer and one soon to be engineer who decide form an enterprise. The team has found a gap in the market for providing professional services in the low-income suburb of Du Noon. They become aware of a site in the area that has underutilised development potential - that of the existing Taxi Rank. The site is owned by the City of Cape Town and the team discovers that there are plans to upgrade the taxi-rank facilities in the near future. They decide to pitch a proposal to the City of Cape Town to develop a new retail centre on the site as part of the upgrade. The proposal, named after the road onto which the taxi-rank fronts, is called Waxberry Market.

Waxberry Market is pitched as a new retail typology that is better suited to South Africa's low-income suburbs than that of the "big-Box" shopping mall. It is a public/private partnership between the City of Cape Town and local developers in the area of Du Noon. It will upgrade the existing taxi-rank facilities, make better use of the underutilised commercial potential of the site and provide civic-scaled public space to the area.

In its construction, the project will aim to co-ordinate a variety of different role-players in the construction industry - ranging from small-scale contractors and artisans to large-scale construction companies and prefabricated suppliers. This is done with the aim of spreading the economic benefit of the construction process to the greatest number of hands and will hopefully result in a material expression that is much richer than that of the typical mall. The teams multi-disciplinary set of skills will allow them to act as co-ordinators in this process.

PROGRAMME

The project consists of a combination of state and private developer-run functions. The state-run functions include, the taxi-rank, a large market space, public ablution facilities, centre management offices, a caretakers flat and parking facilities.

The private developer functions were based on observations of already flourishing business types in Du Noon. These include Rentable Apartments, Taverns, Shisa Nyama outlets, container stores, crèches and spaza shops. The design and area requirements of these was based loosely on studies done of existing conditions but were adapted where it was felt that existing conditions were problematic e.g. The size of rentable apartments was based on those that currently exist in Du Noon however their design was altered slightly in order to deal with issues of inadequate cross-ventilation, fire-escapes and privacy that exist in the current typical apartment conditions. Two new businesses types that are currently not present in Du Noon were also introduced, namely office space and a gym.

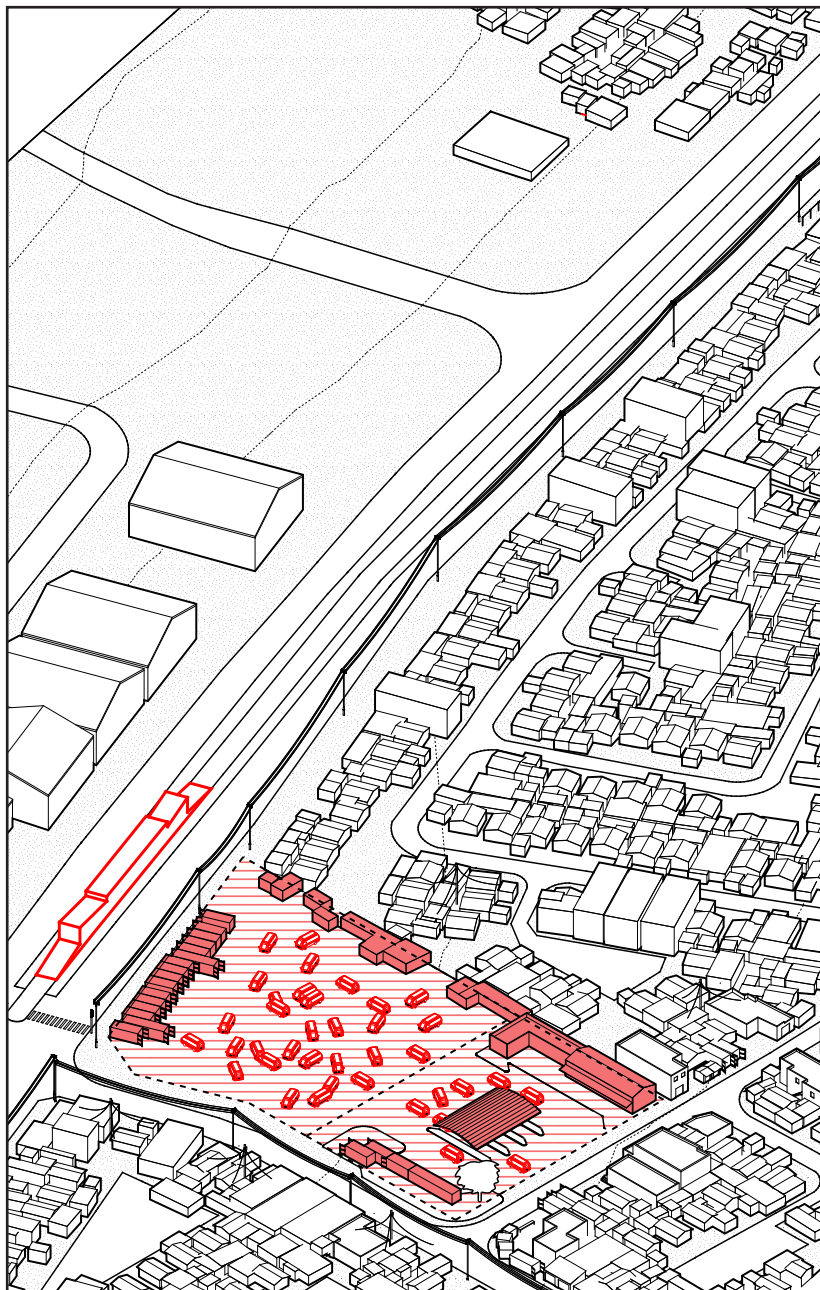
SITE

The site is an existing Taxi-Rank in Du-noon which currently has some informal trade at it's periphery but is highly underexploited due to the disorganised traffic flow of taxi's which dominates the ground plane. The existing taxi rank occupies two properties on Du Noon's western periphery. One of these properties is currently zoned as GB3 - a general business zoning- and the other is zoned as SR2 -a residential zoning.

These two properties are some of the largest in the area, they receive a great amount of foot traffic and are some of the only large properties that have not been occupied by squatters. There is serious potential for them to be developed into a commercial hub but, strangely they are still very underexploited.



68. Figure-ground drawing of Du Noon. The site, shown in pink, is one of the only large open properties available for development.



69. Axonometric drawing of existing site conditions



70. Zoning diagram of Du Noon showing the site as one of the few GB3 (General Business) properties in the area.



71. Photographs of existing site conditions

URBAN CONSIDERATIONS

CREATING HIERARCHY

A lesson learnt from the case studies of shopping malls in Brazil is their ability to be used as catalysts for larger state driven agenda's e.g. shopping centre developments were sometimes used to revive run-down parts of the city.

In the case of Waxberry Market, the larger agenda was the ability for the development to act as a catalyst for turning the existing taxi-transport route into a commercial strip in Du Noon.

The spread of businesses in Du Noon is currently a fairly homogenous spread. Whilst the ability of businesses to flourish even in the most quiet of cul-de-sacs, there are conflicts that arise with this scenario. Businesses such as Taverns located in close proximity to crèches create conflicts between public and private spheres of life.

It is important that a sense of hierarchy be given to the urban fabric of Du Noon – that certain areas be defined as being more public than others. Waxberry Street is an opportunity to create such an area.

Waxberry Street is currently one of the busiest streets in Du Noon as a result of its connection to the Taxi Rank. Taxis currently circulate along this road in both a clock-wise and anti-clockwise direction making pick-ups and drop-offs along the way. Despite its heavy vehicular and pedestrian flow, there is little that distinguishes Waxberry Street from any other street in Du Noon. Articulating Waxberry street as a public space aims to turn it into a commercial strip. Raised pavements at each intersection will create nodes that facilitate taxi drop-off and pick-ups as well as turning the intersection into a public space. The decision to turn a traffic intersection into a public space was influenced by observing the way in which these spaces are currently being used. The footprint of built-fabric is so dense that traffic intersections are some of the only spaces where outdoor activities such as soccer games can take place.

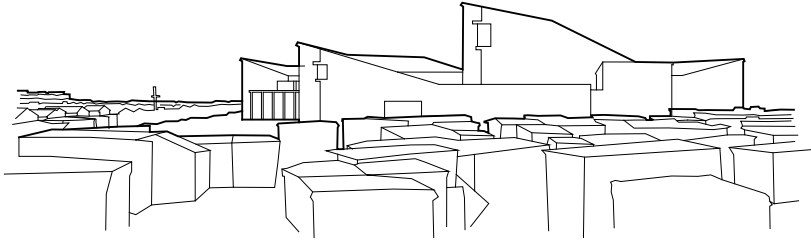
A PRIMARY URBAN ELEMENT

Two conflicting views have consistently presented themselves in this regard. One view is that a development in a low-rise, low-income suburb such as Du Noon should respond to its surrounding urban context by being recessive in to that which is around it. The other view is that, in an area such as Du Noon with very little hierarchy in its urban fabric – almost every building is of the same small low-rise nature as the next- certain significant buildings can be more dominant in order to give a sense of hierarchy and variation in the urban fabric.

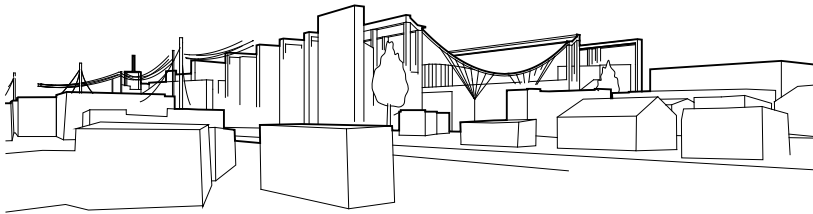
Theory by Aldo Rossi on urban scale was highly influential in developing an argument around Waxberry Market as a dominant element in the urban fabric. Rossi speaks of the importance of certain elements in the structure of the city which are of a more dominant nature than others. He refers to these dominant elements as primary elements – they are usually those that are associated with collective functions whilst the more recessive elements are those which are associated with the private realm (Rossi, 1982).

Primary elements, he argues, should convey a sense of permanence. They are the elements through which we orientate ourselves in the city, through which we read the passage of time. They need not assert themselves as dominant through scale alone – formal clarity, a sense of permanence and intent and individuality are all means by which Primary elements assert themselves (Rossi, 1982). The mall differs from the monumentality which Rossi speaks of in that it allows for very little of the interchange between public and private spheres of life.

The urban aggregate of Du Noon is one in which very few Primary elements currently exist apart from the Inkwenkweni Secondary school by Noero Wolff architects. The site chosen for Waxberry Market is one of the only large city-owned site in which such an element could be developed without having to demolish any of the existing settlement.



73. Inkwenkwezi Secondary School, Du Noon, Noero Wolff Architects



74. Waxberry Market, a primary urban element



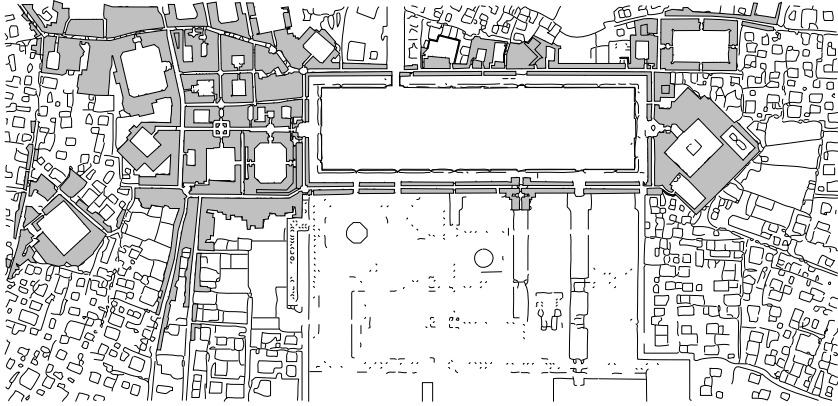
75. Amphitheatre, Arles, France, a primary urban element, Rossi 1982

A SENSE OF SCALE

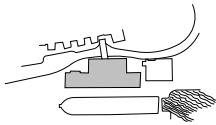
Given the desire for Waxberry Market to be of a primary element in a landscape of small low-rise buildings, the question of scale was always a key consideration. Any building beyond two stories height and exceeding the footprint of an average RDP house can easily seem extrardonarily large in the context of Du Noon. I decided, therefore, that it was necessary to be able to compare the scale of Waxberry Market to something outside of its immediate context. A series of scale studies were done to gain perspective of the scale of Waxberry Market relative to other buildings of significant commercial and civic nature.

The scale studies revealed Waxberry Market to be of a scale comparable to Green Market Square, the Watershed, the Uffizi Gallery and the Agora of Assos. These places are all of a scale that is not extrodinarily large but have a strong civic pressence in the city.

Apart from gaining an understanding of scale, interesting observations were made with regard to the figure-ground relationships of these buildings. Two very large retail centres, the Grand Bazaar of Isfahan and the Canal Wals Shopping centre revealed two contrasting figure-ground relationships - one with its bulk in the centre of the site and the other at its periphery- that corresponded to different effects on the public realm. Canal Walk, with its bulk in the centre of the site is an inward-looking box surrounded by parking and The Grand Bazaar of Isfahan acts as a wall defining a large public space.



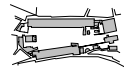
Grand Bazaar of Isfahan



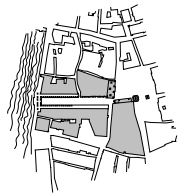
Watershed



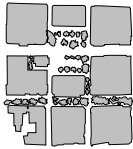
Waxberry Market



Agora of Assos



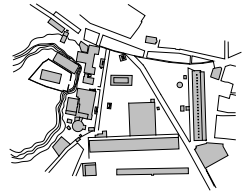
Uffizi Gallery



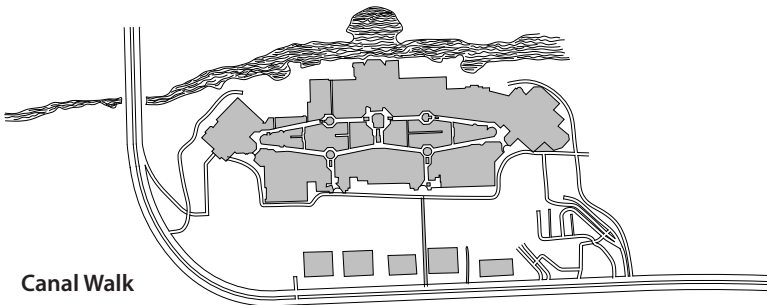
Green Market Square



Grand Bazaar of Istanbul



Agora of Athens



Canal Walk

76. Scale studies of commercial and civic places

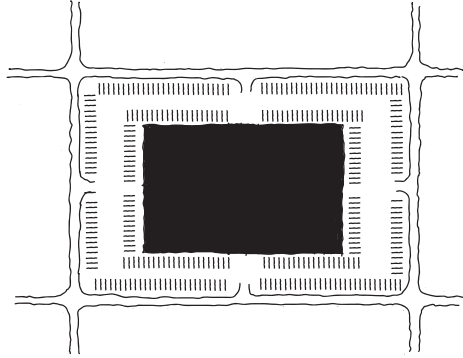
ARCHITECTURAL CONSIDERATIONS

AN EXTROVERTED BOX

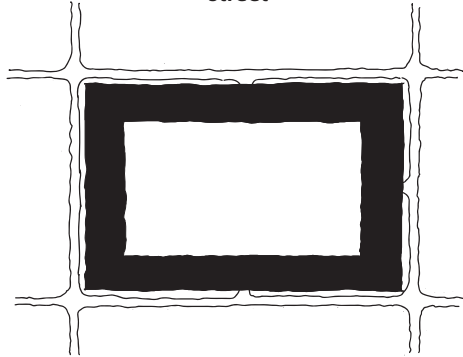
Victor Gruen's invention of the fully enclosed shopping mall was described by himself as "the introverted type". To Gruen, the appeal of the fully enclosed mall was its ability to conceal all of the messiness of the shopping experience behind a neat blank façade. This, together with the fact that the mall was set back from the street edge by a sea of parking, results in a building type that offers very little to its surrounding public realm.

A key design decision from the start was to quite literally invert the figure-ground relationship of this model – converting its solids into voids and visa versa.

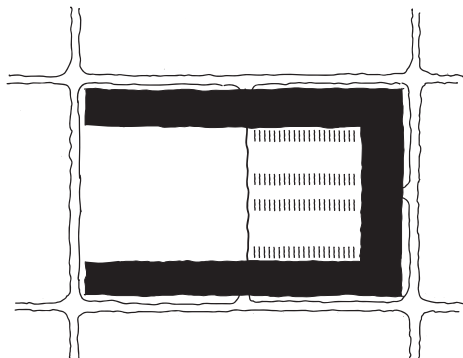
The mall's sea of parking around its periphery is replaced by hard edges and the inward-looking box is replaced by open space. Half of this open space is used for the taxi-rank facilities whilst the other half becomes a market.



77. The typical big-box shopping mall inward looking and set back from the street



78. Inverting this model gives a perimeter building with hard edges and a large open space in the middle



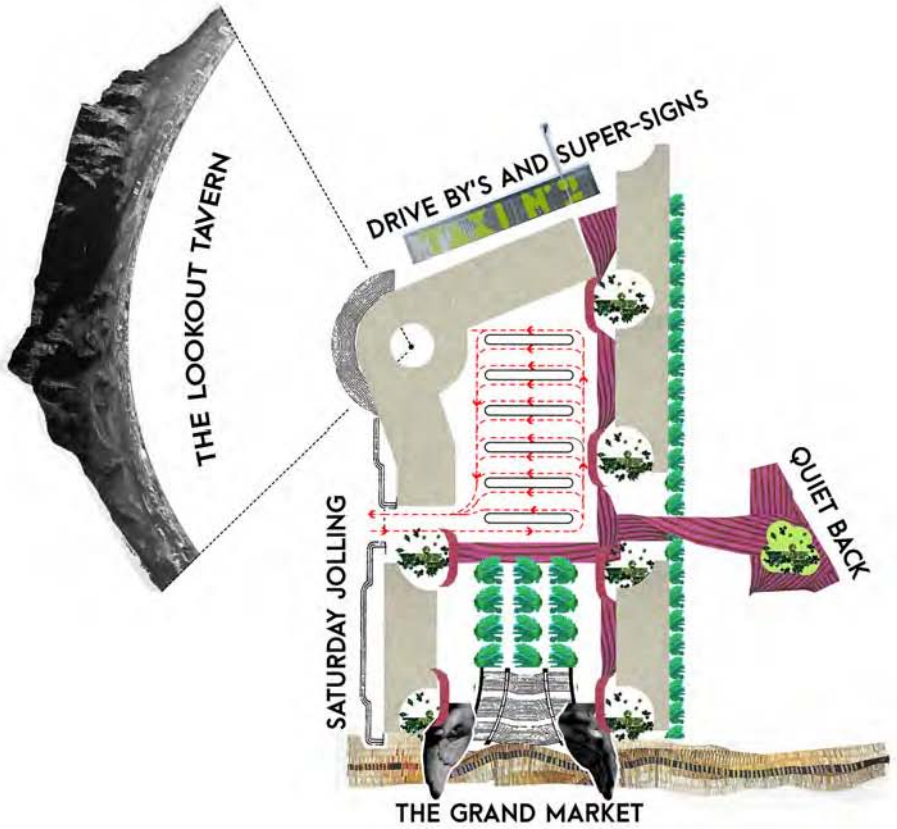
79. Half of this open space is used as a taxi-rank and the other half as a market

EDGES WITH CHARACTER

In the mall, large anchor tenant stores often serve as navigation points and create predictable pedestrian flow past smaller stores. With the absence of large anchor tenant stores, other strategies of making a retail centre navigable have to be used. A strategy commonly used by the Bazaar and other small-scale trading centres is that of clustering. As was discussed in the examples of the Grand Bazaars of Istanbul and Isfahan, stores of a similar trade will often be located in close proximity in order to form industry clusters. One can easily navigate the Bazaar by knowing, for example, where the gold, leather, or spice clusters are. Besides, navigability, the clusters provide other benefits such as driving competition between stores and the ability to buy stock in bulk.

Lessons from the strategy of clustering were taken and slightly adapted to suit the design of Waxberry Market. Waxberry Market, being less of a convoluted maze than the Bazaar and more of a perimeter building with strong edges, the strategy became about the creation of edges that had a particular character and were responsive to their surrounding context. The South Western edge facing the many taverns and take-away joints on Dumani Street was termed “Saturday Jolling” – Two taverns and three take-away restaurants are located on this edge which feed off of the “vibe” of the existing enterprises and add to its character as an edge associated with night-life. This edge, drastically contrasts the North-Eastern edge – one which I have termed a “quite back” – which is concerned with providing a peaceful edge onto the residential cul-de-sacs which it faces. Blocks of rentable apartments, crèches, a caretakers-flat and a gym are located on the quite-back.

The North Western edge, termed “Drive-by’s and super-signs” faces onto the dual-carriage way of Potsdam road and is concerned with advertising the market to the many cars driving past. The edge with the most special treatment is the one which faces onto Waxberry Street –termed “The Grand Market”. This edge aims to create a grand “outdoor-room” facing onto the very busy Waxberry Street.



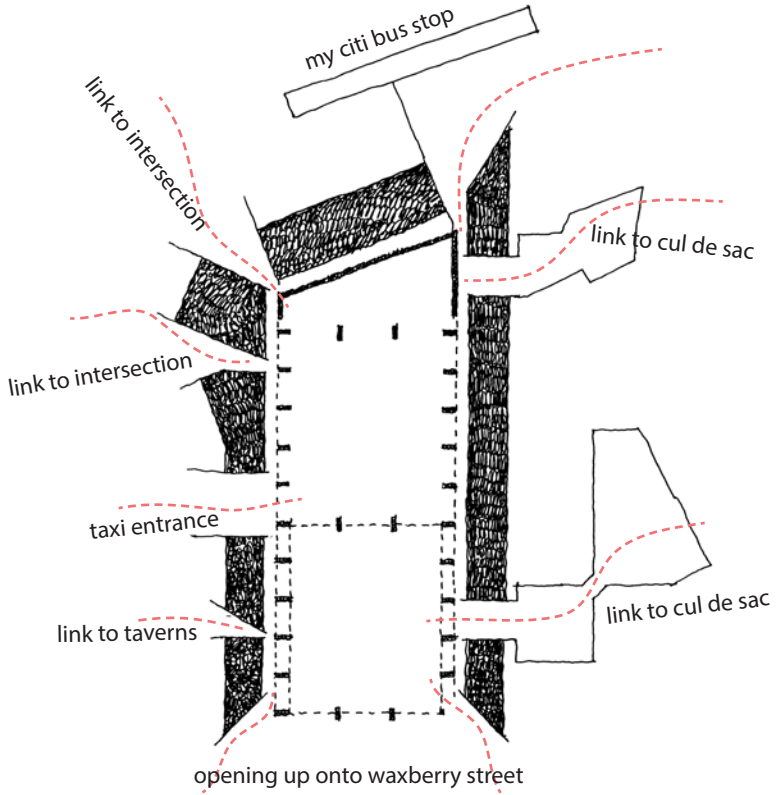
80. Collage of different edge conditions

A PERMEABLE WALL

After having visited many of the Bazaar's in Iran and Turkey, a notable difference in experience compared to that of the mall is the ease with which one can access the centre from multiple entry points. The transition from walking down the street to entering the Bazaar is a seamless transition. The internal routes of the bazaar are in fact extensions of ordinary streets. This continuation is in stark contrast to the experience of the mall which has far fewer entry points and ones that do not necessarily relate to existing movement routes.

The Mall is a destination that one enters with an intent, the Bazaar's seamless connection to existing pedestrian routes, however, means that one is likely to enter it even without the intention of buying anything.

Linkages to existing pedestrian movement patterns was a key concern in the design of Waxberry Market. These linkages ensure a predictable flow of pedestrians past storefronts. They are articulated as punctures in the edges of the building. Wherever a linkage intersected with the edge of the building it was cut at a diagonal so as to accentuate its depth.

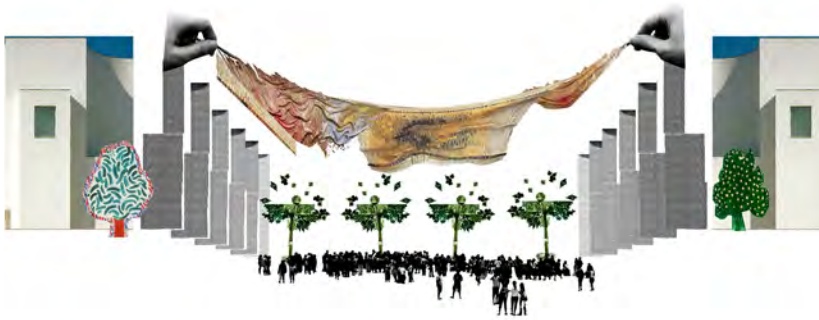


81-82. Punctured edges

A GRAND PUBLIC ROOM

The aspect of the design which received the most special attention was that of the Market space fronting onto Waxberry Street. This space was envisioned as a grand public room. It functions as a market space during the day, drawing customers from the commuters passing to and from the adjacent Taxi Rank. The space is defined by a series of 2.5m wide brick piers which support a large hanging roof above. The piers create sub-spaces onto the large open court in the middle in which container stores can be slotted. Staircases on either side of the central space provide access to the parking lot, flats and other businesses on the upper floors.

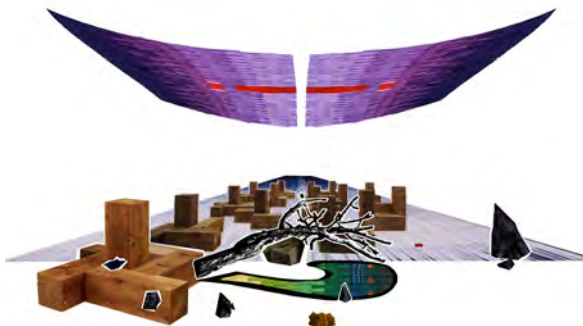
Apart from the function of this space as a market, its scale also gives it the potential to act as a venue for civic functions such as concerts, church services, public gatherings etc. It was therefore a key concern that this space be expressed as something spectacular and not merely utilitarian. The large-hanging roof above the Market is the element which gives this space its spectacular quality. The fact that the space is entirely open on its sides meant that the roof needed to only provide a degree of shading and waterproofing and to be able to span the 30M distance between the piers on either side of the market. The hanging form was chosen for its sculptural quality and the economy with which it could span the 30M distance.



83. A Grand Market



84. A Civic Space



85. Under A Hanging Roof

BUSINESS AND DOMESTICITY

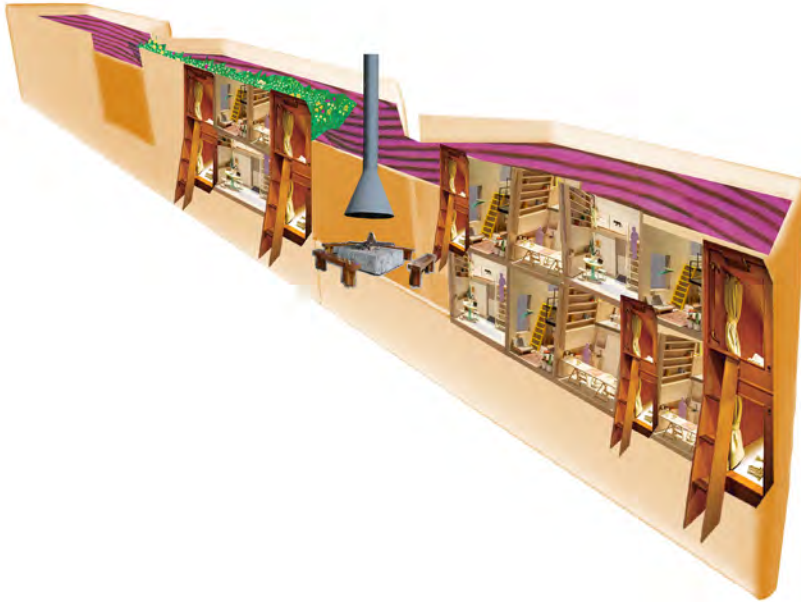
Learning from the close ties between businesss and domesticity in Du Noon, several businesses were incorporated into the design of Waxberry Market that take on a domestic function both directly - in the form of rentable apartments- and indirectly - in the form of businesses which perform a domestic social role. Two main objectives with regard to the design of these domestic spaces was to give a greater privacy gradient to the tight living conditions of the typical Du Noon apartments and to incorporate businesses that would act as communal living rooms - performing a social role- on the upper floors of the centre.

Living in Tight Spaces

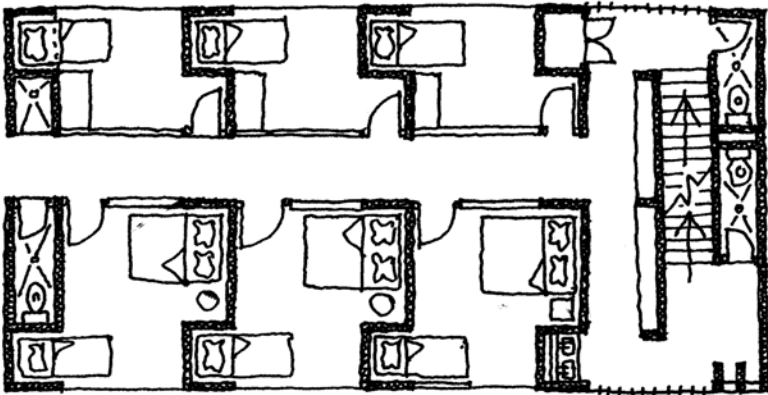
The current Du Noon apartment conditions typically consist of a small single open space which is often shared by several people. The size of these apartments was kept but a greater degree of privacy was given by incorporating nooks and crannies this layout. The nooks and crannies not only provide a greater degree of privacy but also relate to the structural system developed for the building.

Collective living rooms

These are businesses which provide a social role, they consist of crèches, an internet cafe and a gym located on the first floor of the development – space that would anyway be undesirable for retail - which allows them to target the many people living in the tight rentable apartments on the first and second floors of the development as customers.



86. Tight spaces with communal living rooms



87. Apartment layout showing nooks and crannies

A NEW RELATIONSHIP WITH THE STATE

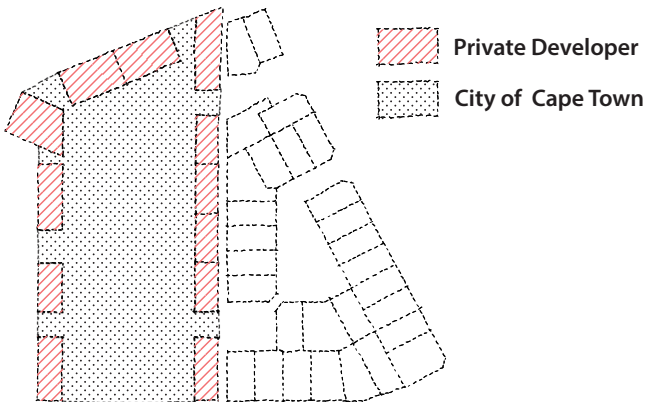
Learning from the relationships between the state and private developers in the Bazaar and the shopping mall case studies in Brazil, Waxberry Market is to be developed as a public/private partnership. This informed the design of the centre as an infrastructural core wrapped by a skin of private businesses. An altered ground plane with stoeps, paving and landscaping ties these two entities together.

Infrastructural core

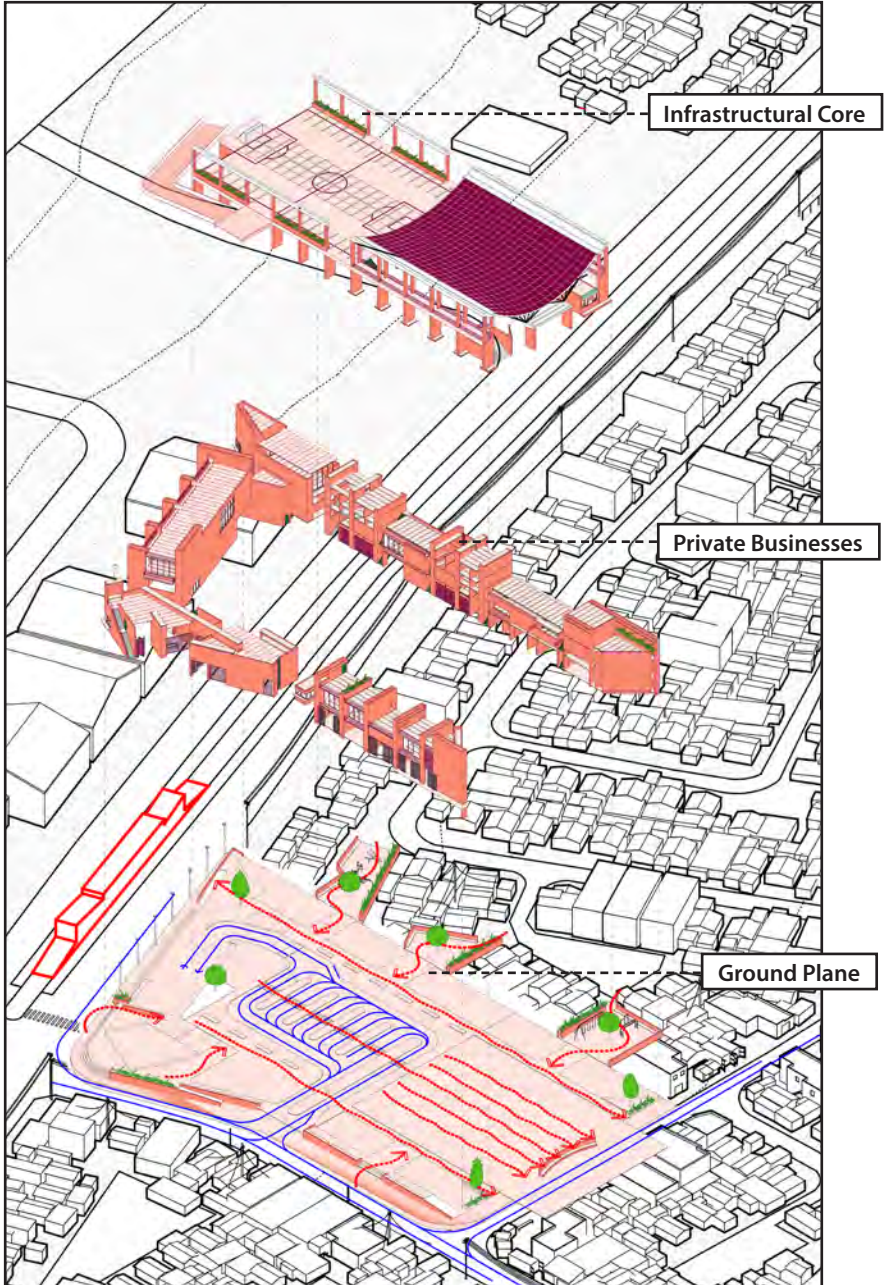
This consists of a large-scale frame of brick piers that support a pre-cast concrete slab on one half of the site and a large hanging roof on the other half of the site. The pre-cast concrete slab creates an upper level parking lot with a soccer pitch and the large hanging roof covers a market space below. Containers slot in between the spacing of the brick piers from which the receive electricity.

Private Businesses

The periphery of the site is subdivided into a series of smaller sites - all more or less at the size of a typical RDP site- which can be sold off and developed by separate developers.



88. A public/private partnership



89. Infrastructural Core, Private Businesses and Ground Plane

CONSTRUCTION CONSIDERATIONS

A HYBRID CONSTRUCTION INDUSTRY

With the project consisting of a combination of state and private developer delivered buildings, construction would be done as a phased development. The first phase would consist of the infrastructural core which would be delivered by the state. The second phase would consist of the incremental construction of the private developer buildings on the periphery of the site.

Two construction systems were innovated for the project, one for the construction of the large-hanging roof of the infrastructural core and the other for the construction of the private developer buildings on the periphery. Both of these systems make use of a variety of different role-players in the construction industry.

The system which I have developed for the buildings on the periphery, which I have called “A Habitable Poche”, is a variation on the system used for the tavern addition that I undertook. It makes use of a combination of small-scale contractors and pre-cast concrete suppliers.

The system developed for the large hanging roof, which I have called “Gold out of Gum-wrappers” utilises a combination of simple assembly methods and sophisticated engineering.

A HABITABLE POCHE'

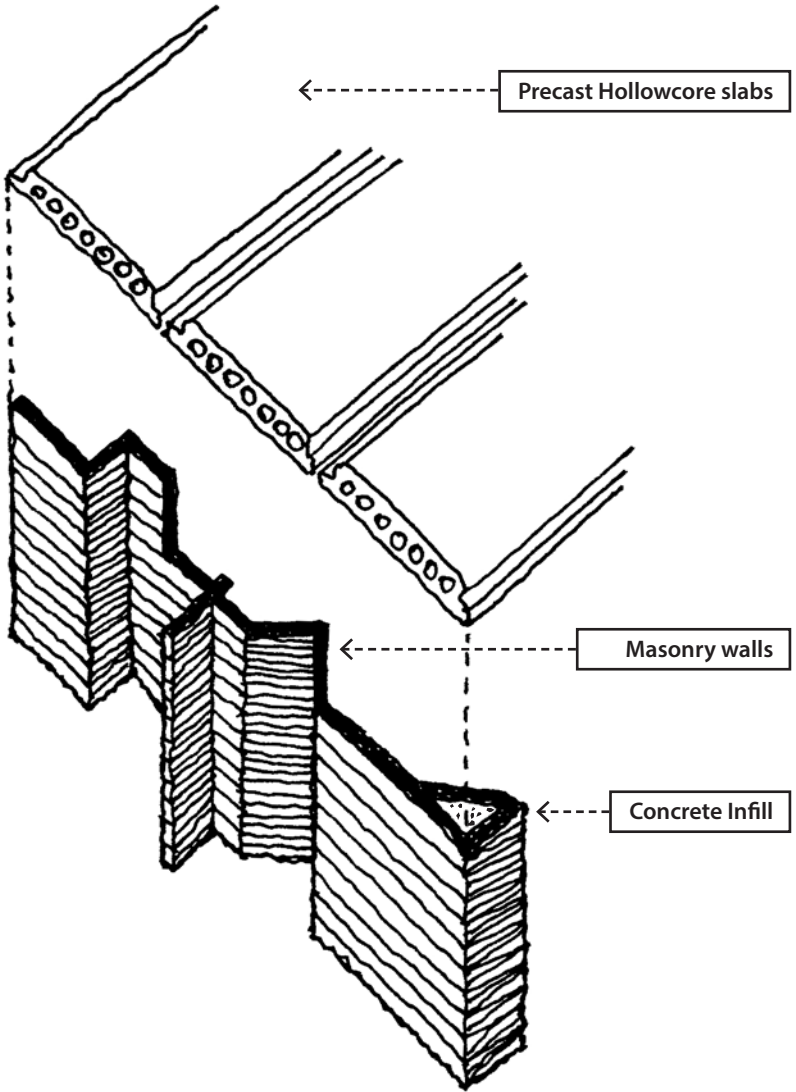
The system developed for the construction of the private developer buildings is a variation on the system used for the tavern addition which is a combination of masonry columns with concrete in-fill and pre-cast concrete decking.

For the design project, I was interested in exploring how this system could result in spatial configurations that were different to those of the in-situ concrete frame. Particularly, I was interested in the ability of the masonry supports to create a sub-spaces - nooks and crannies. These sub-spaces become a kind of “habitable poche’ ” that results in spatial configurations similar to those in the hull of a boat. These spaces also address the desire to create a greater privacy gradient in the apartment buildings.

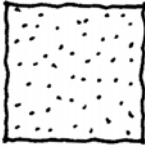
Variations of this system and its spatial configurations were explored through a series of hand-drawn plans, sections, details and diagrams.



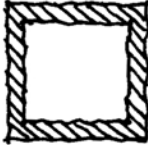
90. Habitable Poche' collage



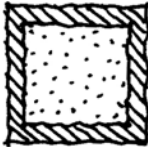
91. Structural Diagram



Here we have an off-shutter concrete column. A simple looking thing but fairly difficult for a small-scale contractor to construct because of shuttering, reinforcing

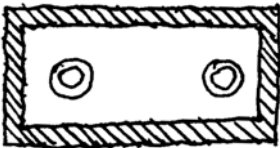


Brickwork, however, is something that most small-scale contractors in South Africa are very familiar with.

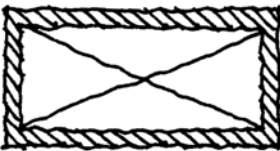


One can make a concrete in-fill column by pouring concrete inside a brick "box".

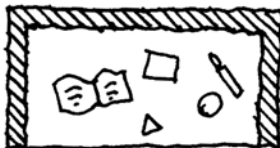
Brick boxes can also become all kinds of other things..



They can house services.



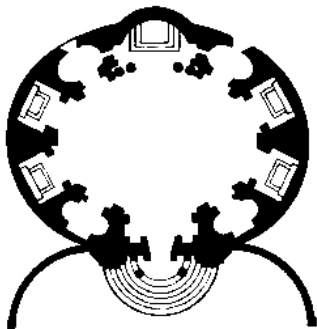
They can become ventilation shafts



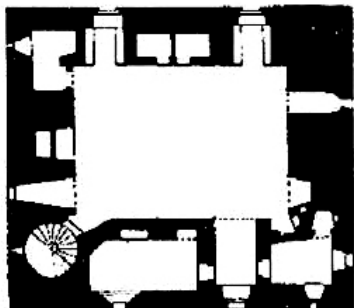
They can create nooks and crannies that provide intimacy in large spaces.

92. Column Diagrams

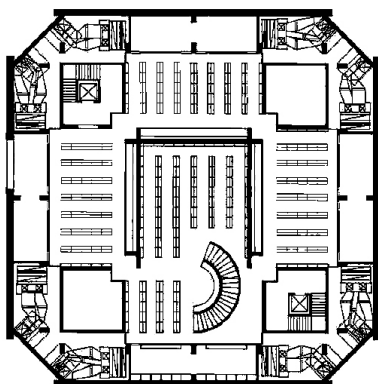
If we view a building as a steak then the poche' would be considered to be the fat and space, the meat.



Poche' hasn't always been considered to be so fatty though. In Baroque buildings it takes on a figural presence that makes it just as important as the space which it defines.



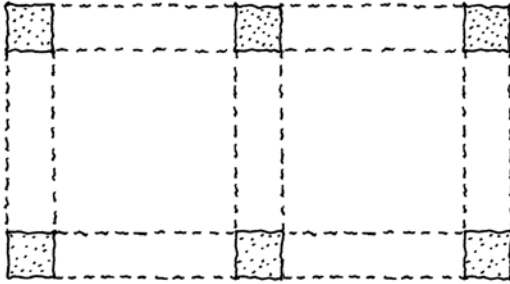
In Scottish castles, entire rooms are found in the poche'.



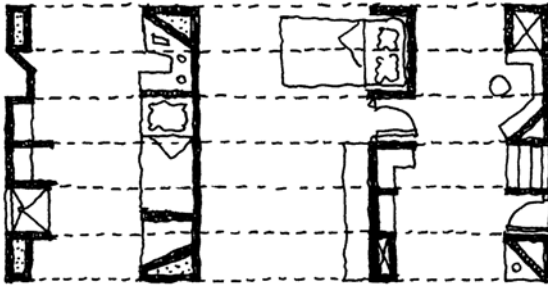
In the work of Louis Kahn, poche is used to create a distinction between service and served space.

93 - 95 Poche Diagrams

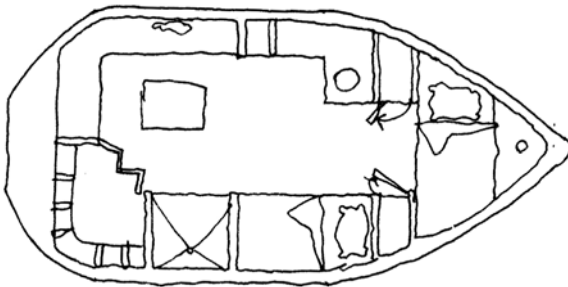
In concrete framed buildings, there is usually limited opportunity for manipulation of the poche



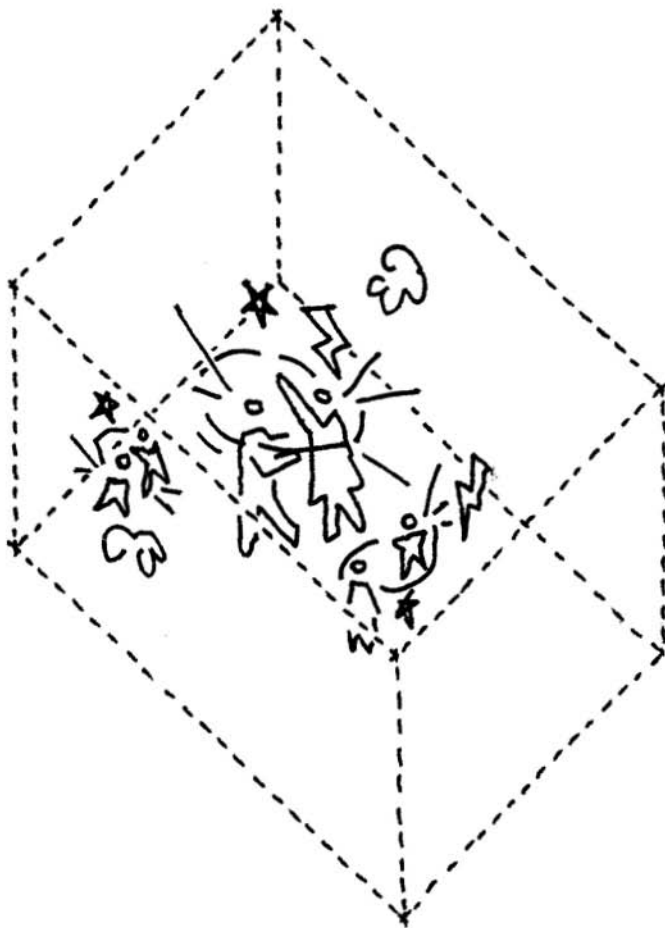
In brick buildings, there is a lot more opportunity for poche' play. This can allow for all kinds of interesting spatial configurations.



Spaces become configured like the hull of a boat - a configuration that can make living in tight spaces, much easier.

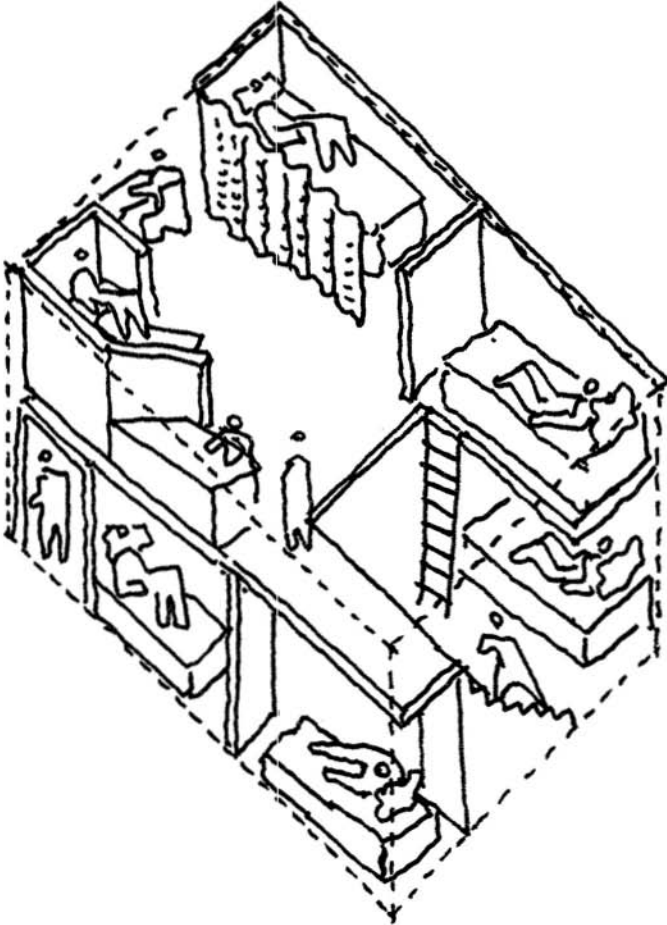


When living in a tight single space, it is hard for people to not constantly be in each other's hair and at each other's throats.



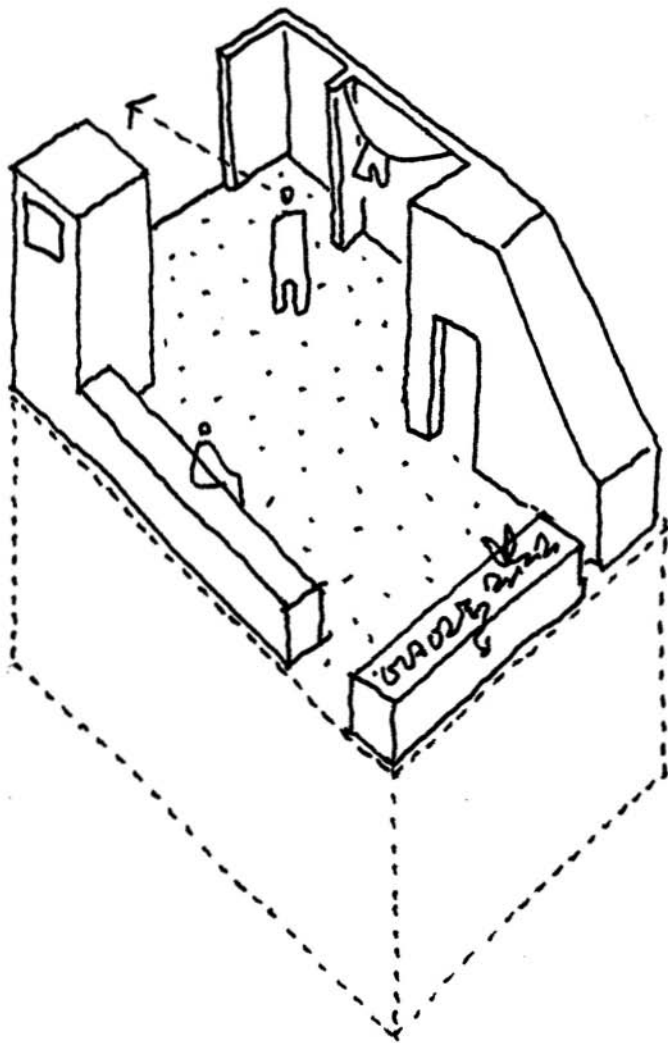
99. Privacy Gradient

Giving that same space a finer grain of nooks and crannies, allows for a greater degree of privacy.



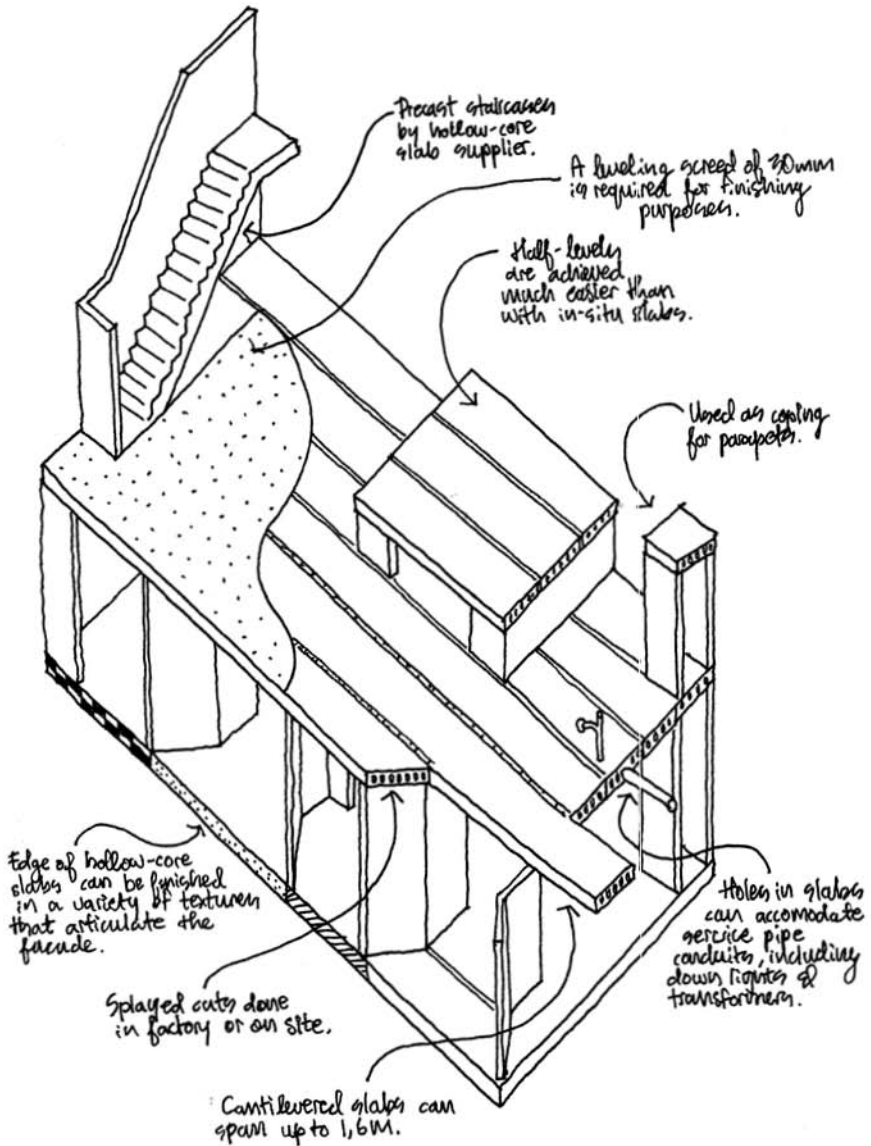
100. Privacy Gradient

The roof becomes a place to escape the intimate spaces of the house and can be used for activities such as cooking, washing and socialising.



101. Privacy Gradient

Explore these spatial configurations using this construction system



102. Construction system

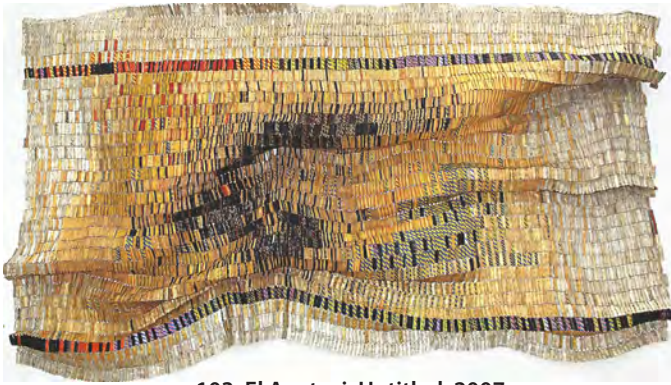
GOLD OUT OF GUMWRAPPERS

Whilst the design predominantly makes use of conventional construction methods, the construction of the large hanging roof over the Market space provided an opportunity to explore something more innovative.

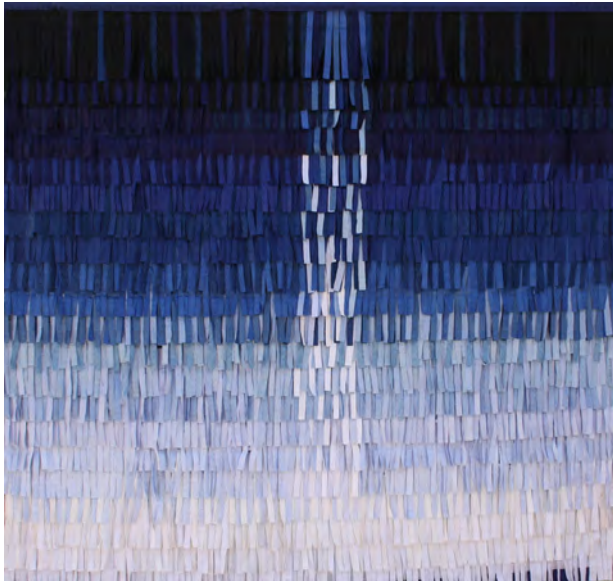
Here I was interested in the potential of using very ordinary materials in innovative ways in order to change the perception associated with them. This was inspired by the high number of recycled waste craftsmen in South Africa who transform ordinary waste items- bottle caps, shopping bags etc. into works of art.

The potential of co-ordinating a team of such craft-people on a construction project was a challenge which I was interested in pursuing. The work of the African artists El Anatsui and Abdoulaye Konate were highly influential in this regard. Their work consists of large scale assemblages and tapestries which are done by a team of craft-people with the artist acting more as a co-ordinator in the process. Their work is characterised by a dense agglomeration of textures, colours and patterns that is striking for its display of the meticulous labour with which it is put together. I was interested in giving the roof this quality of a dense agglomeration of small parts – like that of a tapestry or carpet.

Throughout the year, I pursued several material choices and assembly methods for the construction of the large hanging roof. Initially I aimed to make use of small recycled plastic parts – milk bottles, plastic bags, polycarbonate off-cuts etc. – but eventually became aware of the issues of weathering and durability that could occur with such materials. A compromise that needed to be made was between the use of poor quality recycled materials which would be cheap but require a large amount of effort to become weather-resistant waterproof or the use of a higher quality material which would be more expensive to purchase but could fulfil the waterproofing and weathering requirements more easily. The



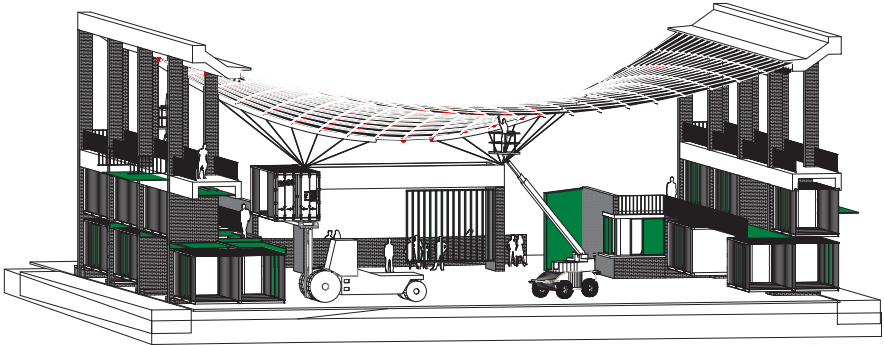
103. El Anatsui, *Untitled*, 2007



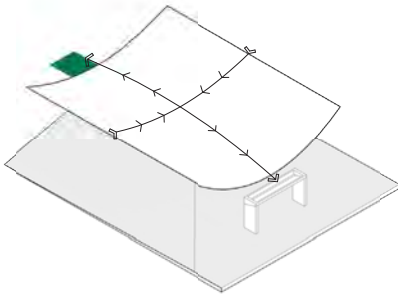
104. Abdoulaye Konate, *Symphonie Bleue*, 2011.

material that was eventually chosen is a highly weather resistant and waterproof rubber called EPDM which would be laid as panels onto top of series of supporting cables.

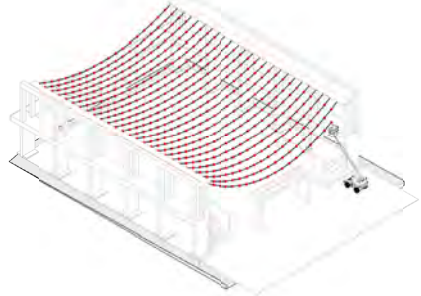
The system makes use of a combination of a simple assembly process and sophisticated engineering. In order to deal with the issue of wind-uplift the form of the roof has a double-curvature which places it under constant tension. A series of cables first are hung from the brick piers using a cherry picker - a hydraulic lifting system that can be easily hired by a small-scale contractor. A series of tension cables running in the perpendicular direction are then threaded through the hanging cables tying them in place. EPDM sheets are then laid on top of these cables.



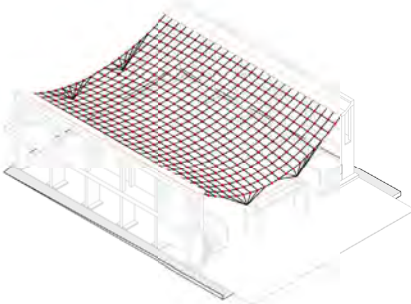
105. Axonometric section through market space showing roof construction.



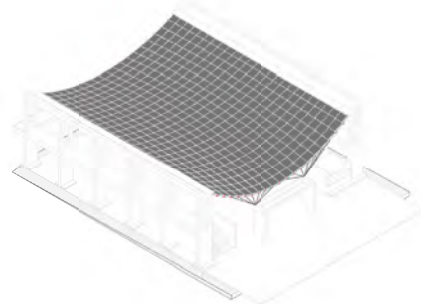
106. Double Curvature



107. Hanging Cables



108. Tension Cables



109. EPDM Sheets.

CONCLUDING THOUGHTS

My interests this year were broad and ranged from fields of economics, architecture and professional practice. Attempting to synthesise these interests through the design project has been the primary focus of this year.

The design project has, I believe, arrived at such a synthesis . It proposes a new retail typology aimed at filling the missing middle between small-scale trade and large-scale retail centres in the context of South Africa's low-income suburbs.

It inverts the figure ground relationship of the typical big-box shopping mall - a big box surrounded by a sea of tarmac- into a civic scaled space enveloped by a skin of city fabric.

In it's construction it aims to spread the economic gain of it's development to the greatest number of hands.

Its character is dominant whilst being responsive to it urban surrounds. It is not tall and shiny, but has all the charm that most commercial buildings lack.

The project emerged in dealing with my primary interests as well as all-kinds of unexpected additions. I would describe the process as being an accretive rather than reductive one. New ideas were welcomed and worked into the narrative of the project, which if not always making it clearer, certainly made it richer. This process is also, I believe, a unique opportunity afforded by design research and is something that distinguishes it from other research methods.

The narrative of the project, being based slightly on my own personal experience, is something that I hope to continue after this year.

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- 52 -55. Images from Laurie Baker's construction manuals, COSTFORD, 2000

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70. Zoning diagram of Du Noon showing the site as one of the few GB3 (General Business) properties in the area, Cape Town City Zoning viewer, accessed: 10/04/2015

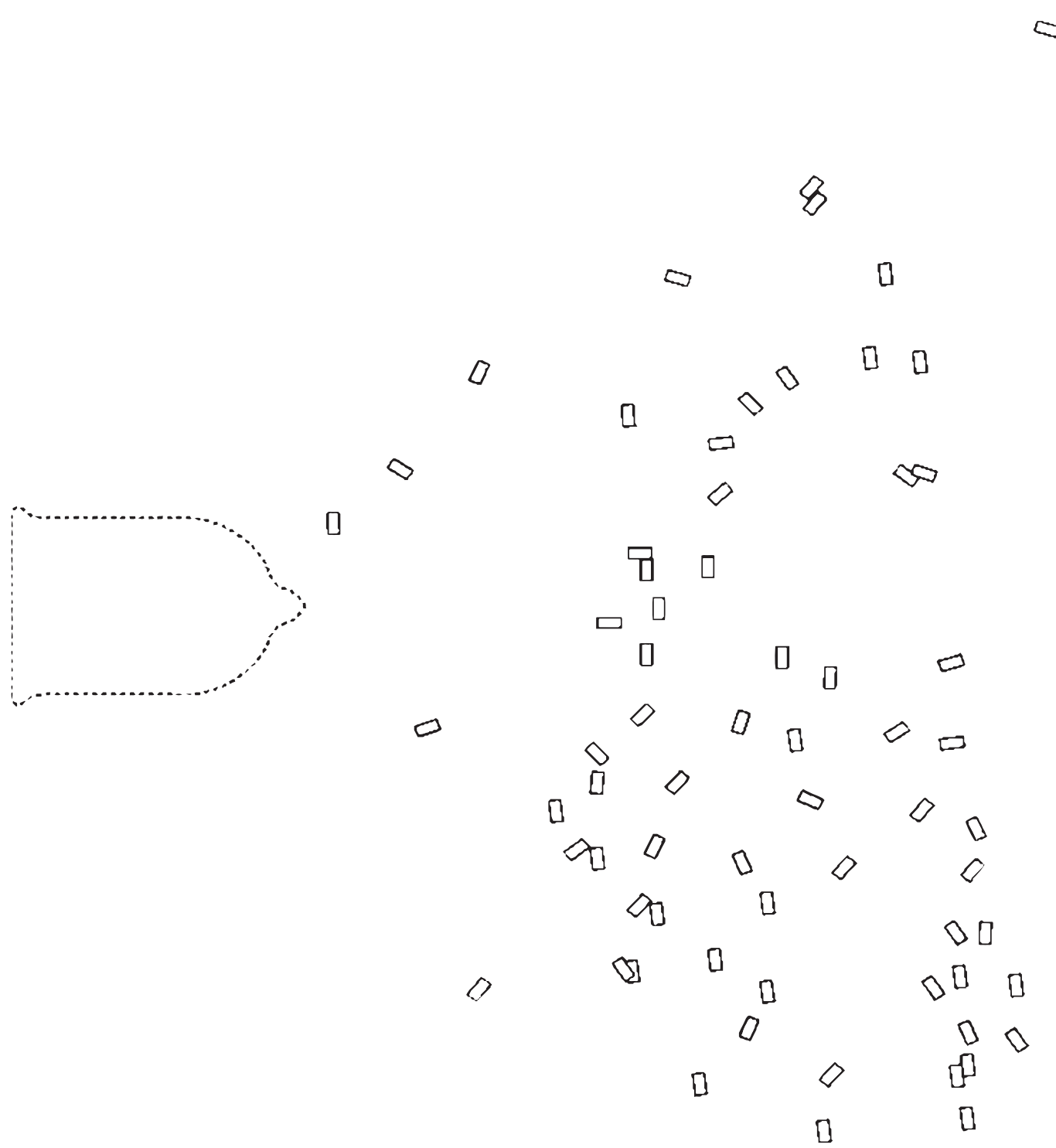
103. El Anatsui, Untitled, 2007, taken from: https://www.google.co.za/search?q=el+anatsui&newwindow=1&es_sm=93&source=lnms&tbm=isch&sa=X&ved=0CAcQ_AUoAWoVChMlxvLupq7RyAIVQcAUCh10WAV_&biw=1920&bih=979#imgrc=fOHivPBkRpYprM%3A, accessed: 20/10/2015

104. Work of Abdoulaye Konate, taken from: <http://africanah.org/wp-content/uploads/2014/09/KonateSymphonieBleue2011.jpg>, accessed: 20/10/2015

THE MISSING MIDDLE

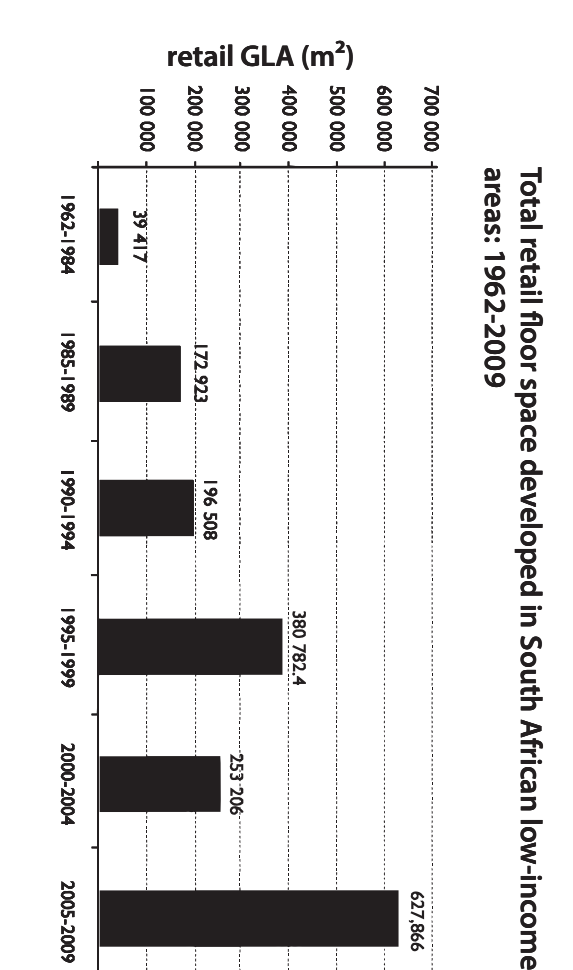
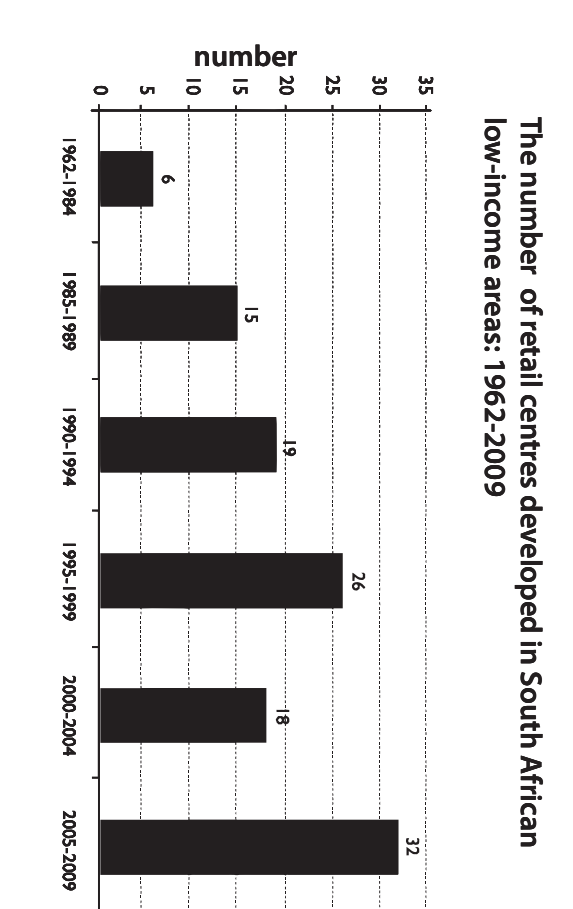
Nascent Potential in South Africa's Commercial Environment

Alexander Coetzee 2015

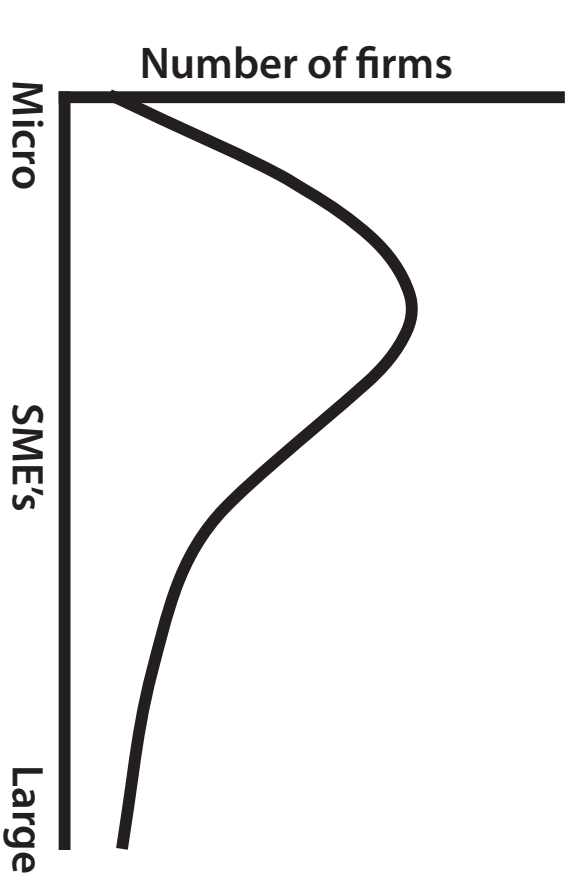


Introduction

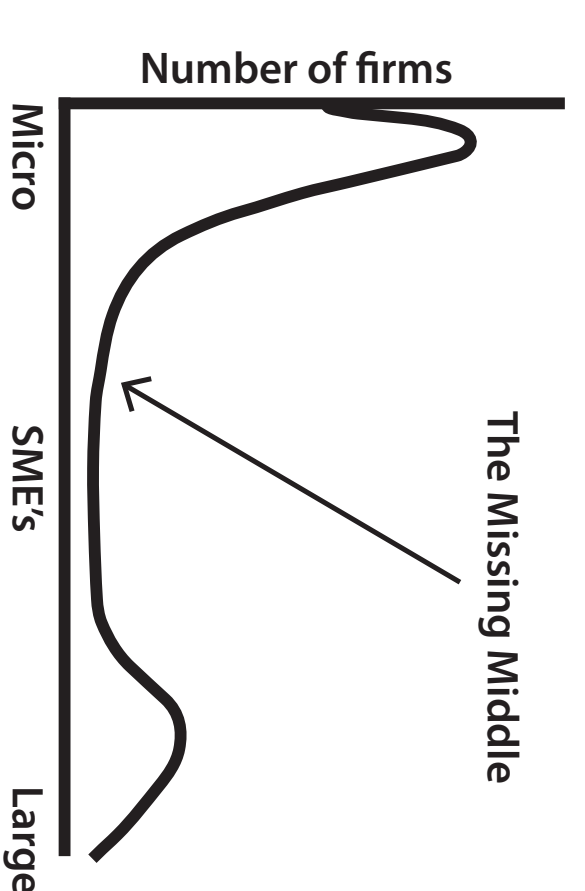
My interest this year was around the commercial development potential of low-income areas in South Africa. The Missing Middle refers to three aspects of the commercial environment in South Africa which I believe to be missing: ones relating to economics, architecture and built-environment professional practice. These three aspects informed the design for a retail centre in the low-income suburb of Du Noon. The design project, entitled Waxberry Market, is aimed at filling the gap between small-scale informal trade and large-scale retail centres (shopping malls) in the context of South Africa's low-income suburbs.



HIGH-INCOME COUNTRIES



LOW-INCOME COUNTRIES



SITE CONDITIONS



Du Noon - original RDP layout 1996

Du Noon - 2015

Site - Existing Taxi Rank

Economics

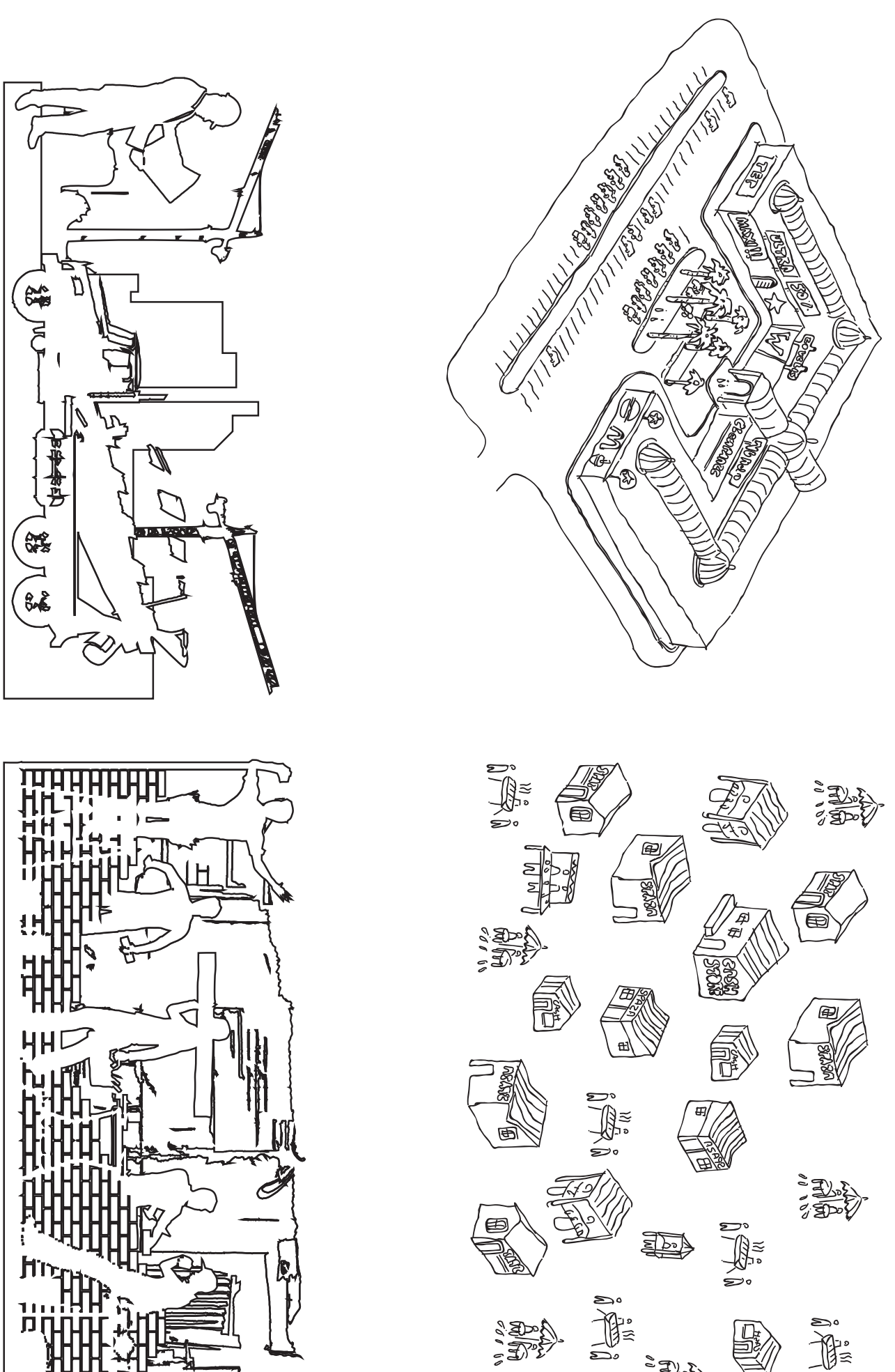
I was interested in the gap between two disparate economies in South Africa, those that in oversimplified terms are referred to as the formal and informal economies.

Architecture

I was interested in the fact that this disparity was reflected in the types of retail buildings seen in South Africa - the fact that there are a large number of big-box type shopping centres and a large number of small-scale micro-enterprises but very few retail buildings that are at a scale between these two.

Practice

I was interested in the gap in the market for the provision of built-environment professional services in low-income areas and the gap between large and small-scale contractors.



THE NARRATIVE

3 RECENT GRADUATES WHO DECIDE TO START AN ENTERPRISE

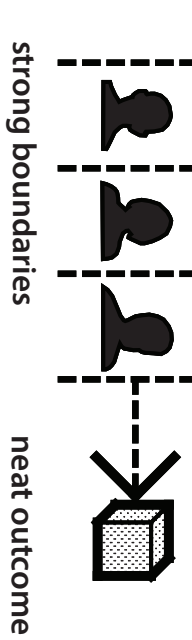
1 ARCHITECT 1 PROPERTY DEVELOPER 1 ENGINEER



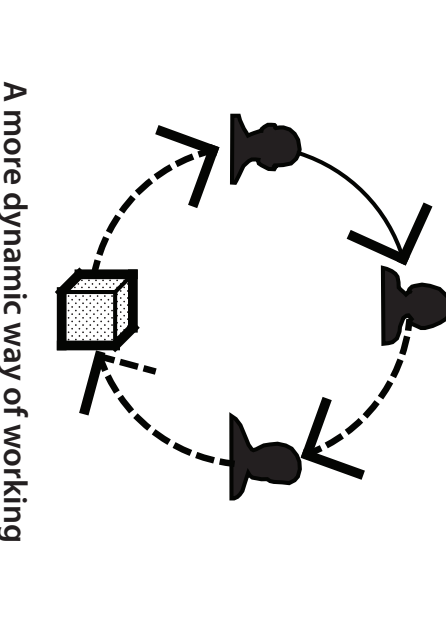
OUR STORY STARTS WITH ...

They form a multidisciplinary development company.

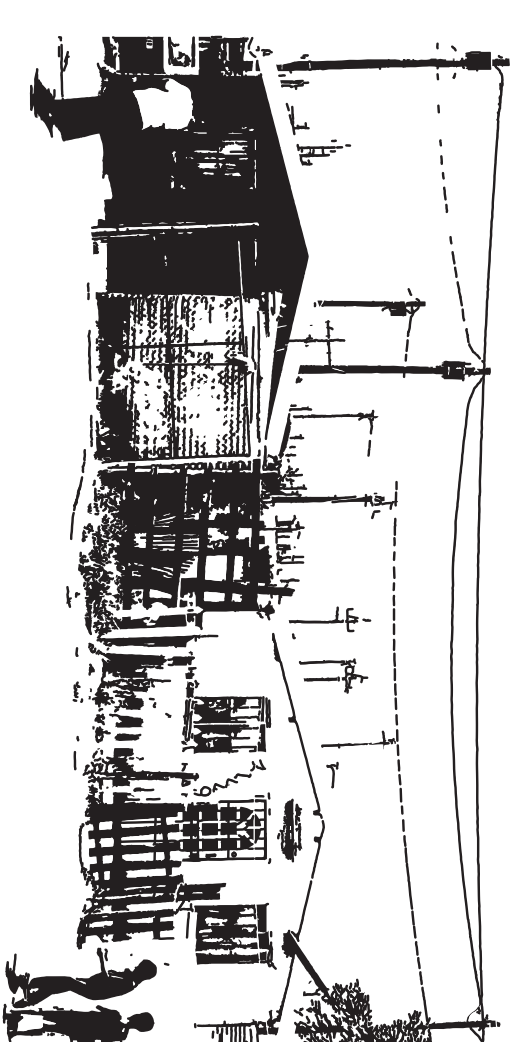
CONVENTIONAL PRACTICE



MULTIDISCIPLINARY PRACTICE



They find a gap in the market for providing professional services in Du Noon.

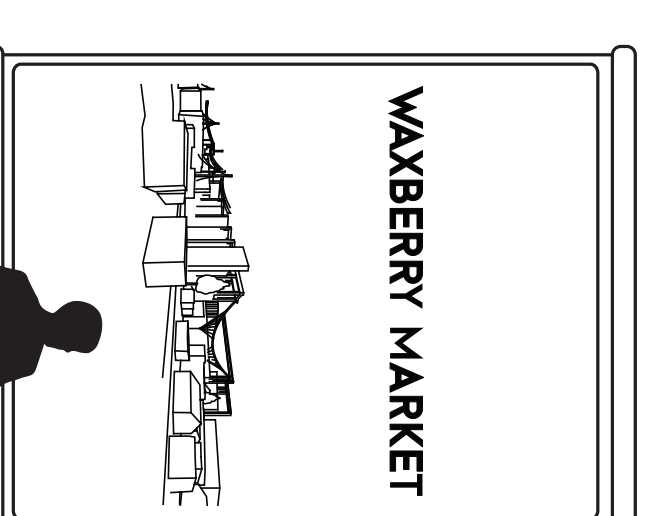


And come across a site with real development potential!

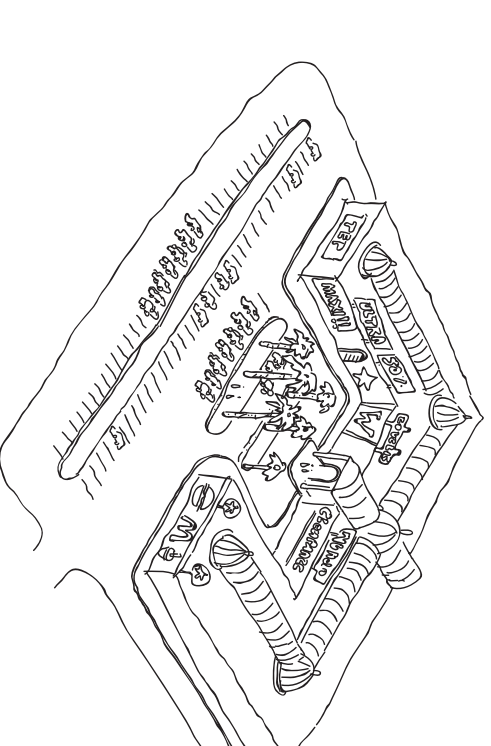


The existing TAXI-RANK Owned by THE CITY OF CAPE TOWN

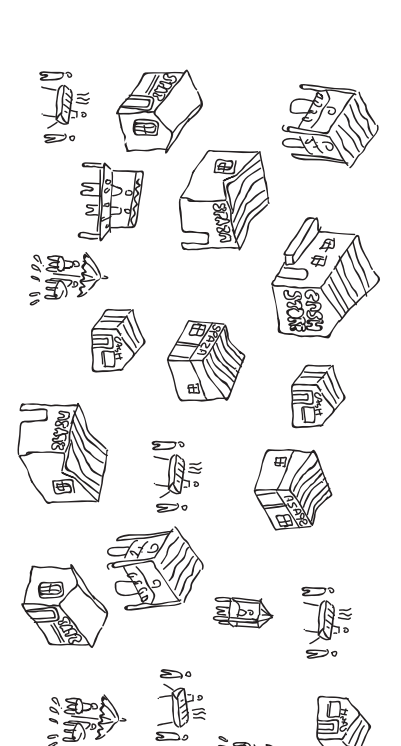
They pitch a proposal to the City of Cape Town to develop a new retail centre on the site.



One that fills the gap between large-scale retail centres and small-scale micro-enterprises



THE MISSING MIDDLE ?

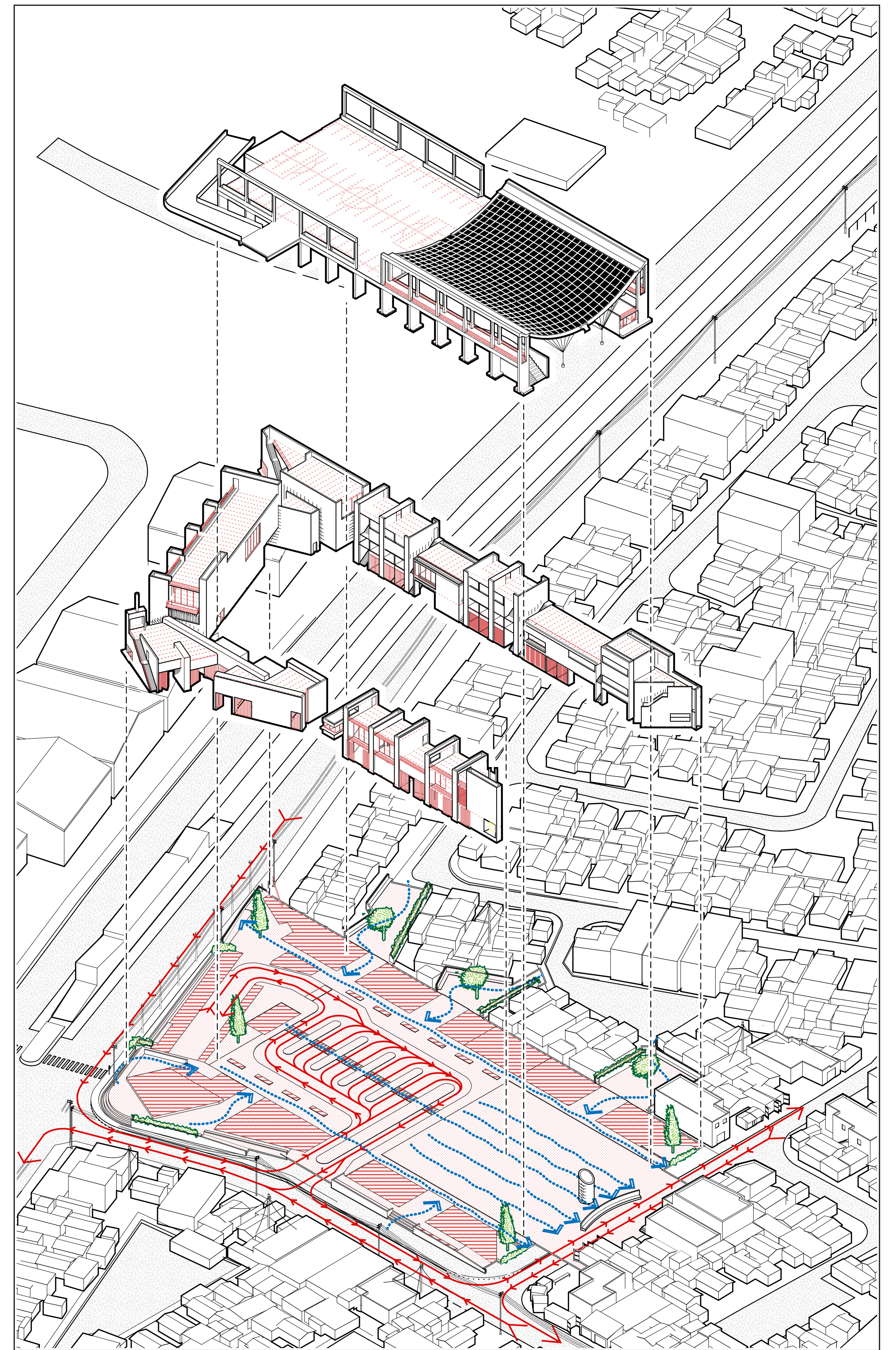


And spreads economic benefit to the greatest number people in the construction industry



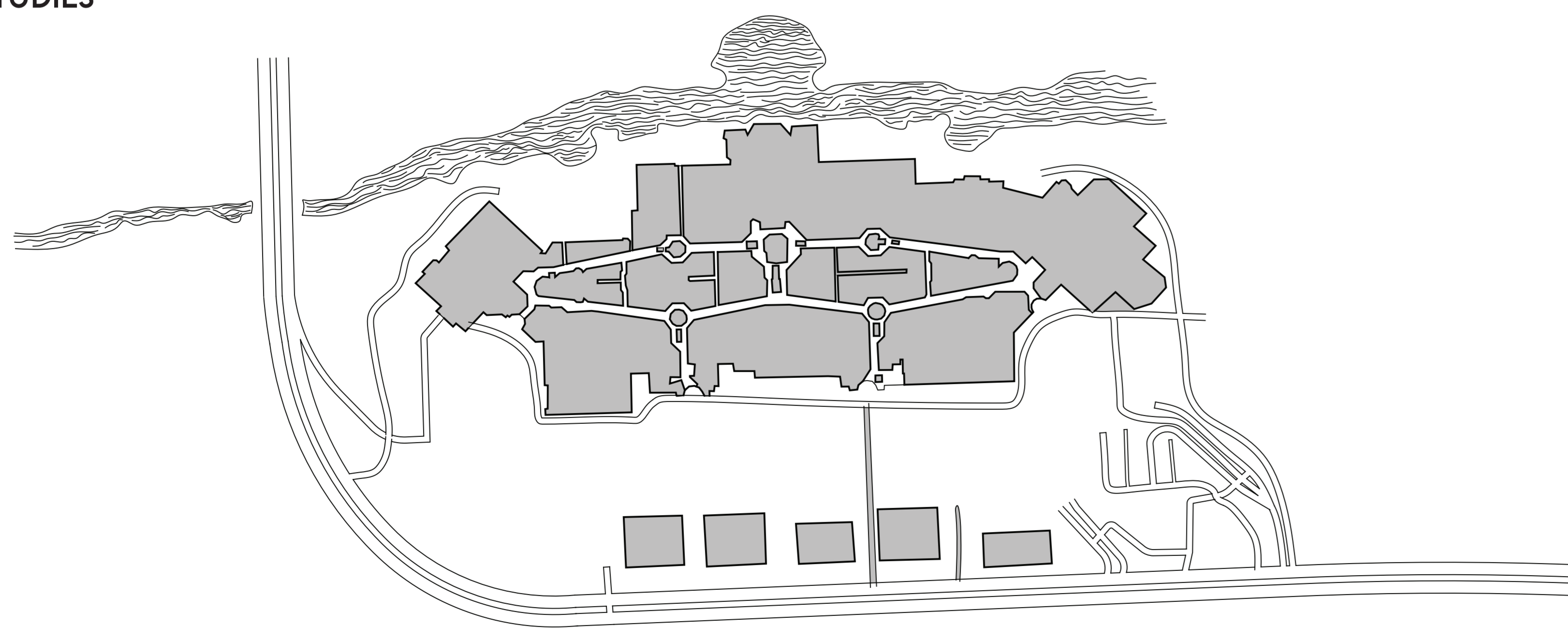


URBAN AXONOMETRIC

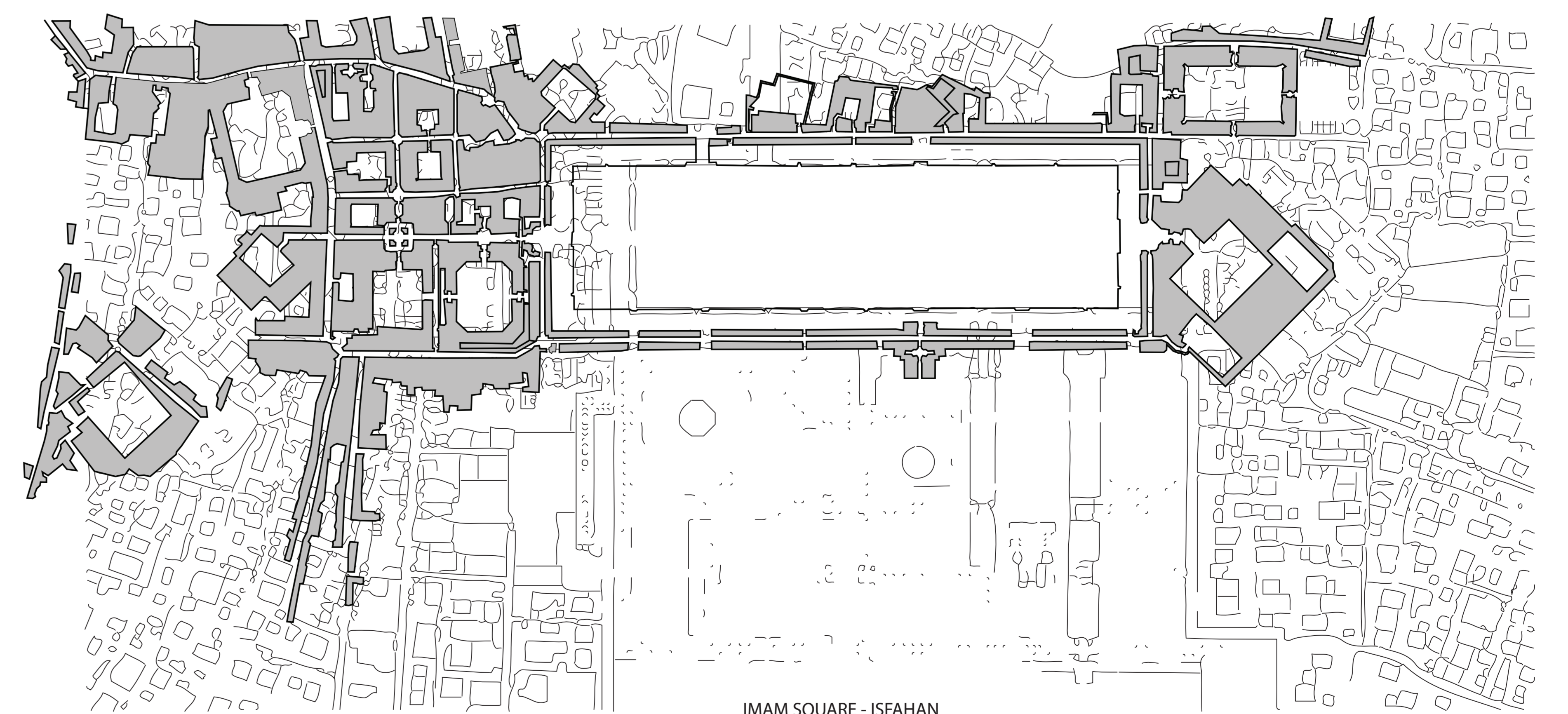


EXPLODED AXONOMETRIC

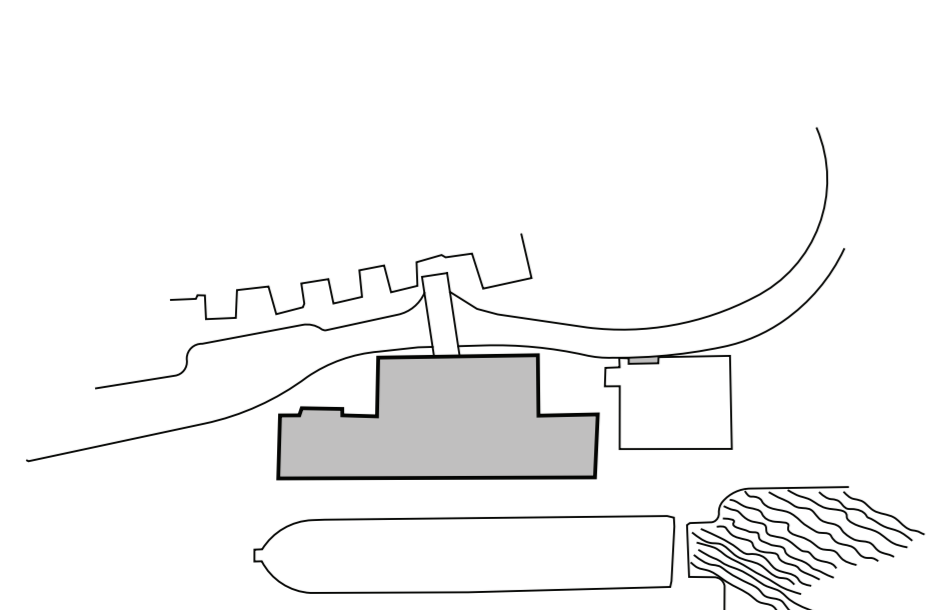
SCALE STUDIES



CANAL WALK SHOPPING CENTRE - CAPE TOWN



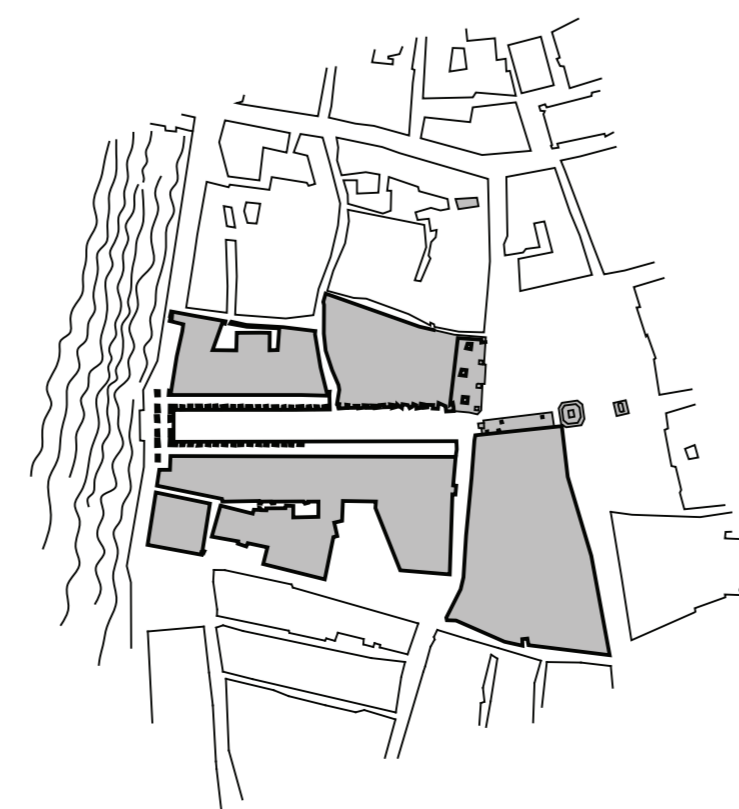
IMAM SQUARE - ISFAHAN



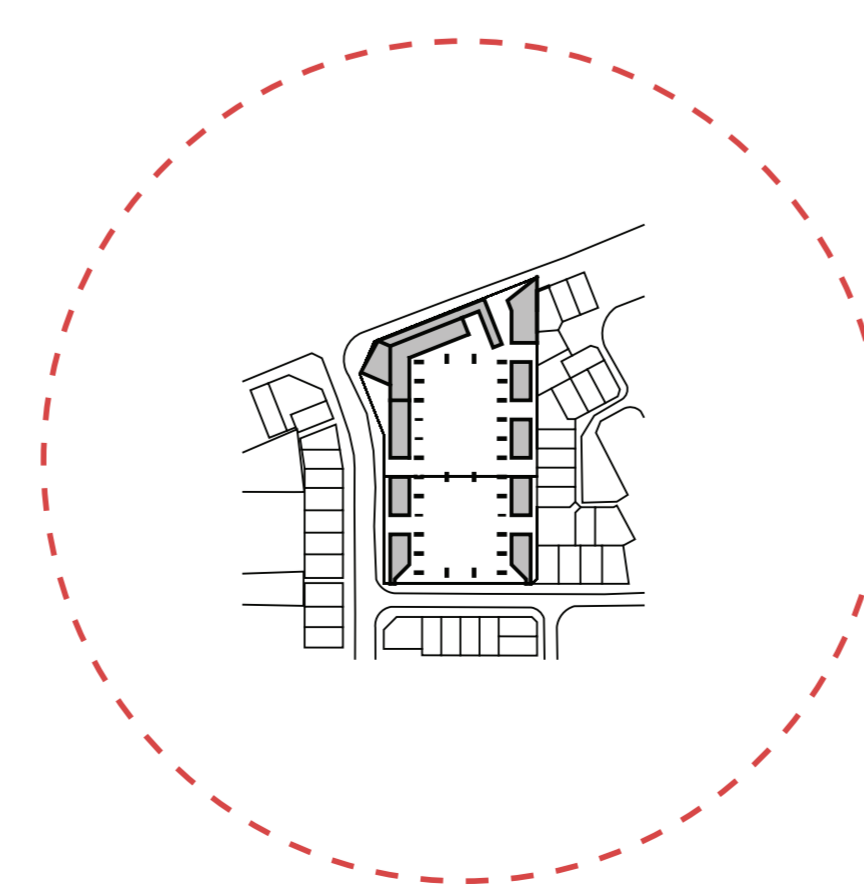
WATERSHED - CAPE TOWN



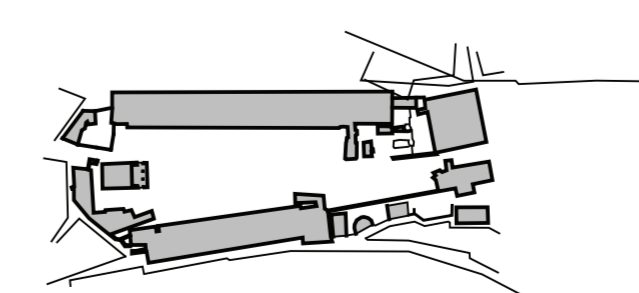
THE GRAND BAZAAR - ISTANBUL



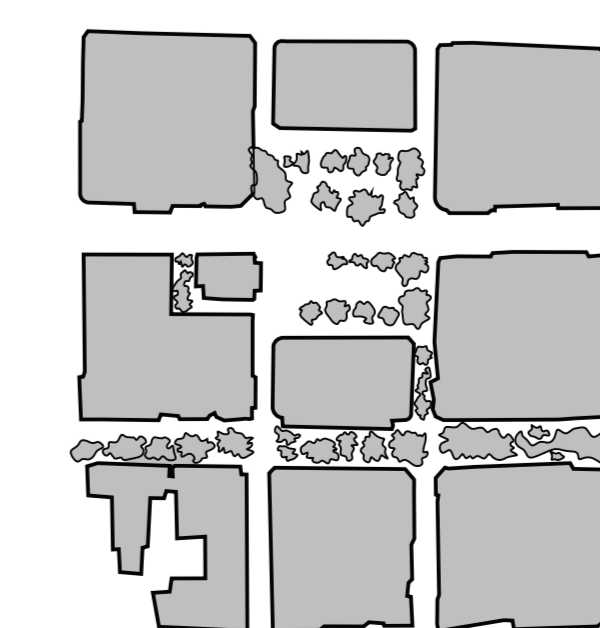
THE UFFIZI - FLORENCE



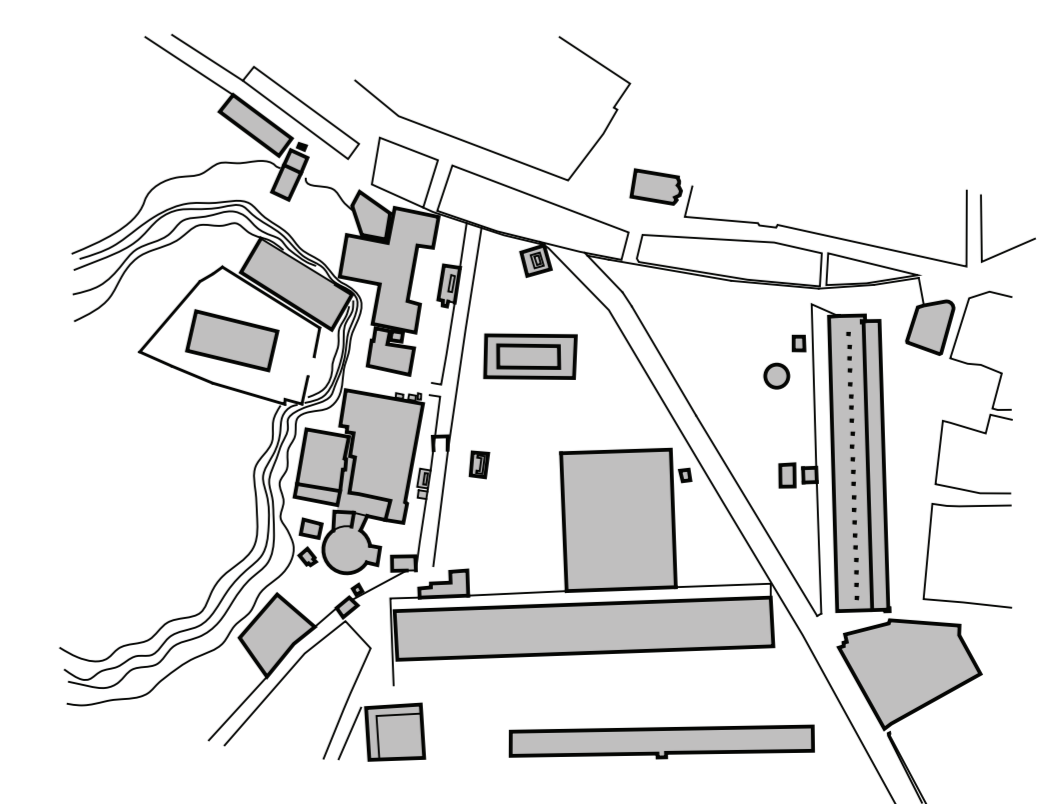
WAXBERRY MARKET - DU NOON



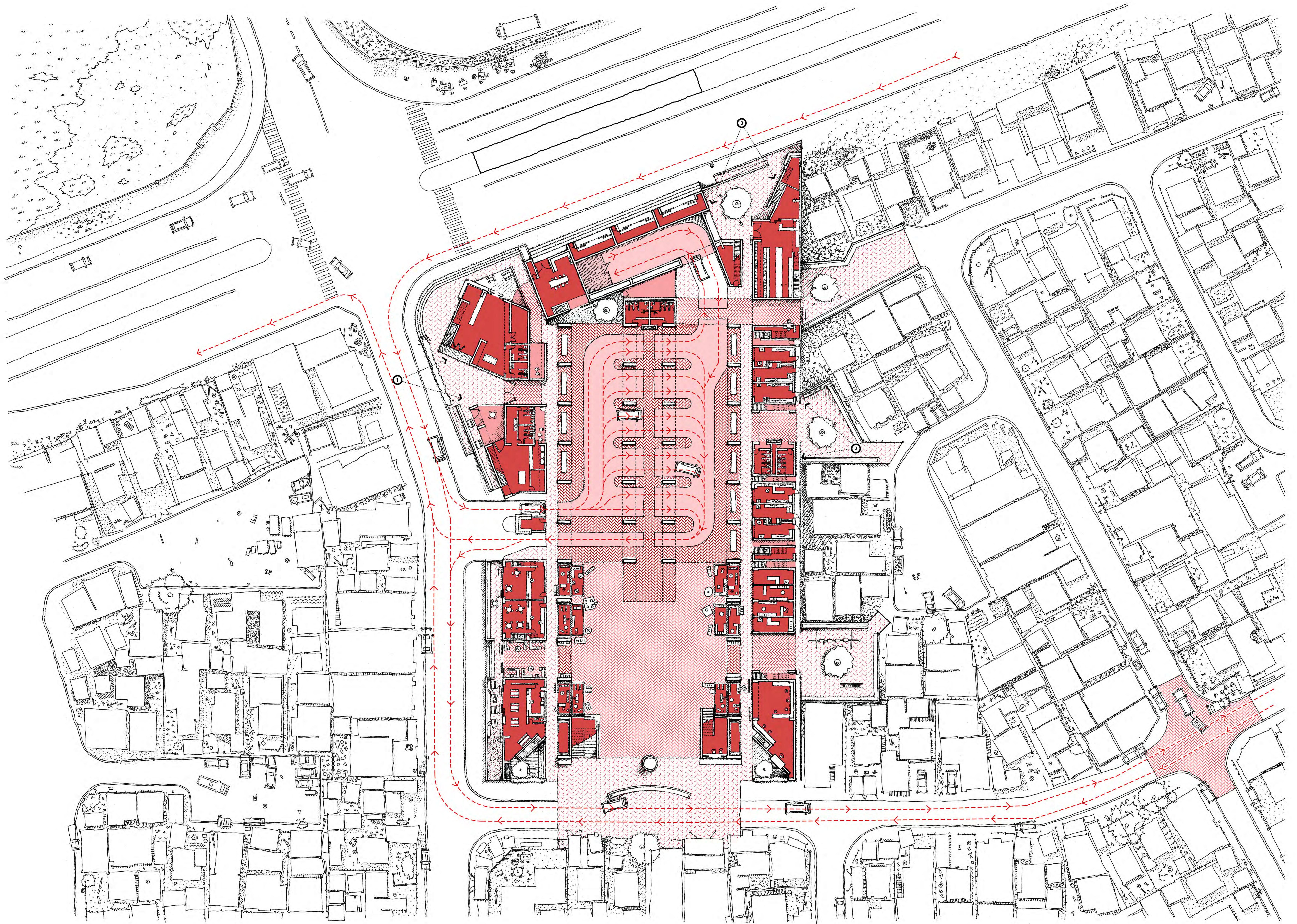
THE AGORA OF ASSO



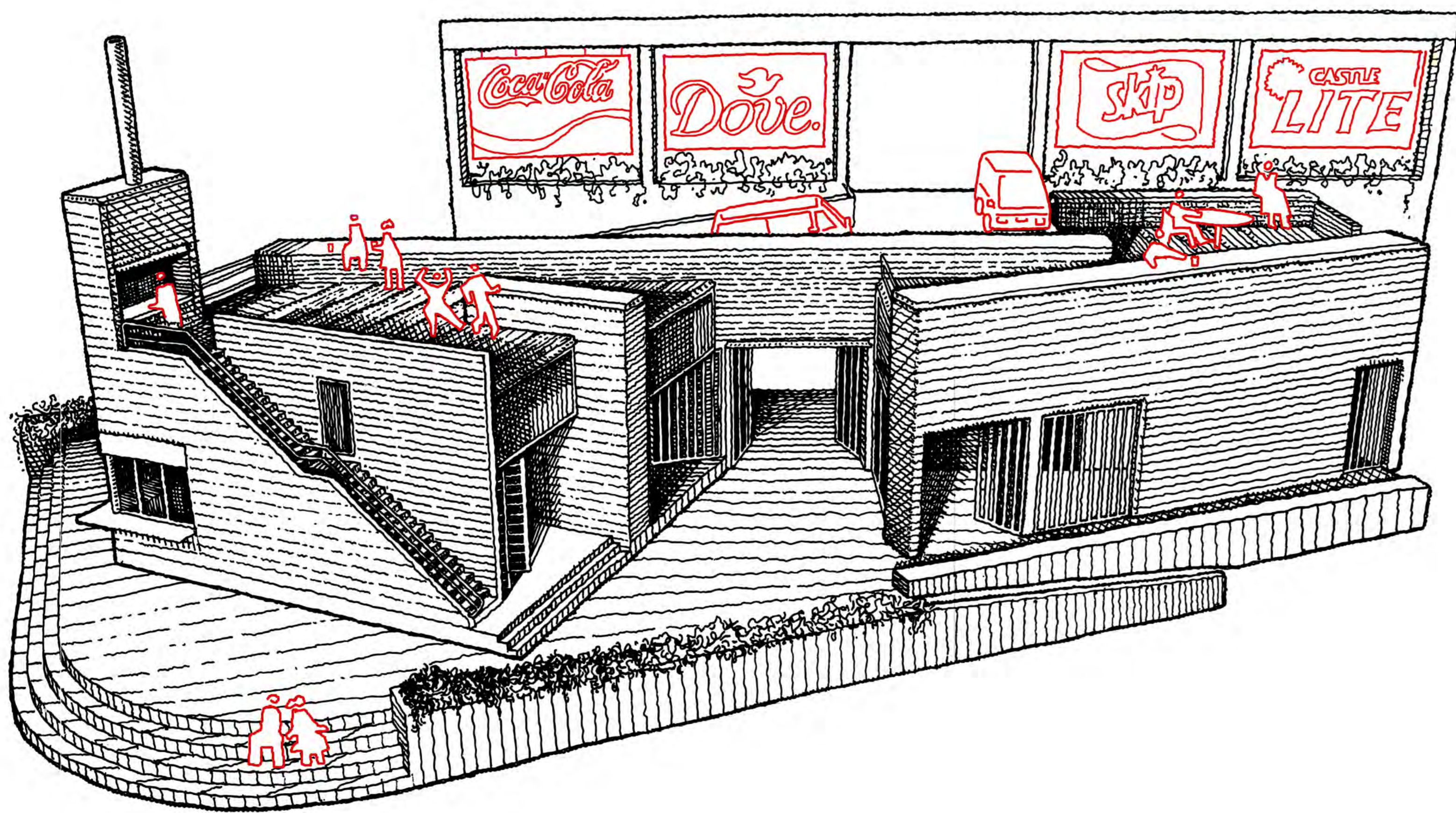
GREEN MARKET SQUARE - CAPE TOWN



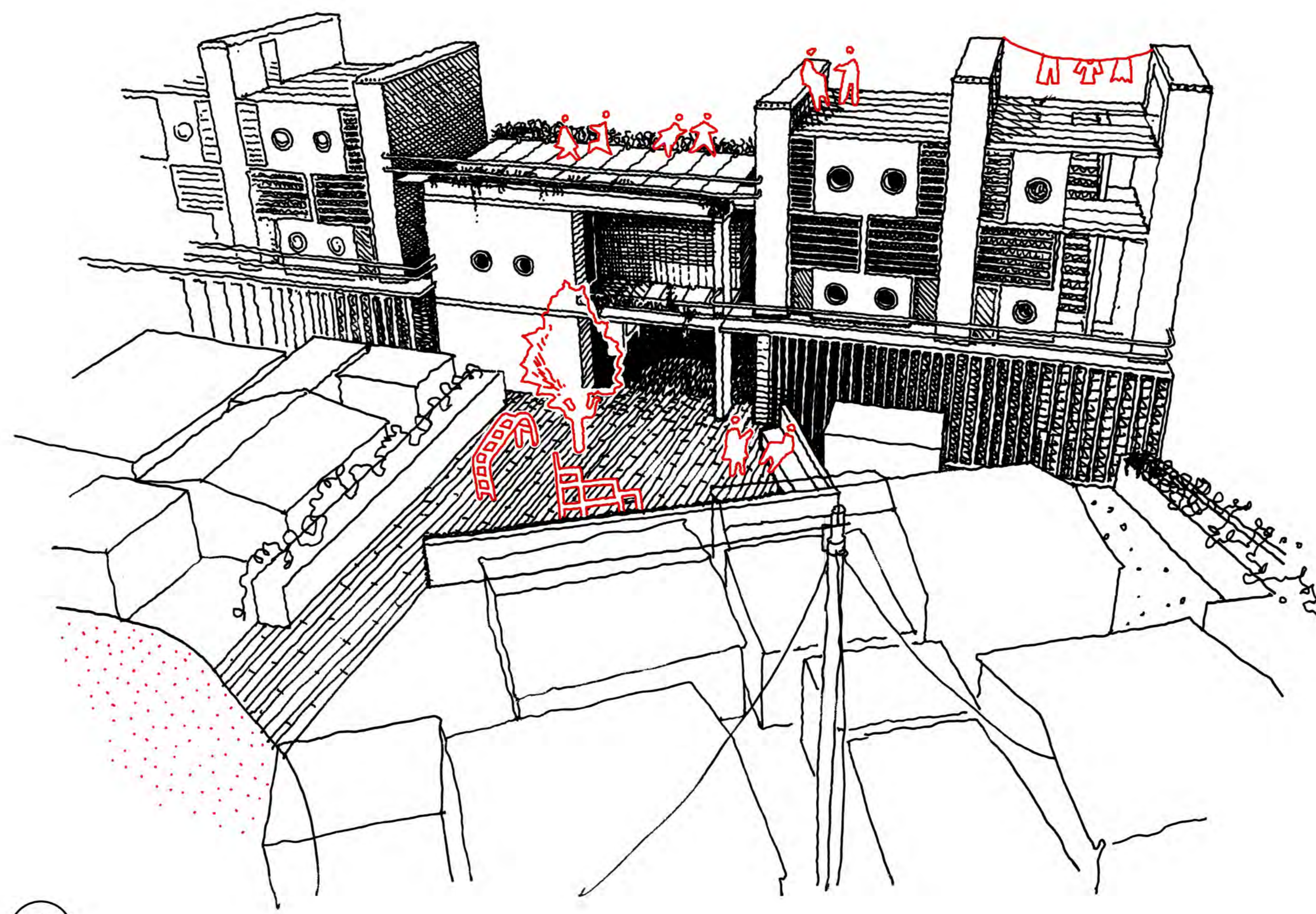
THE AGORA OF ATHENS



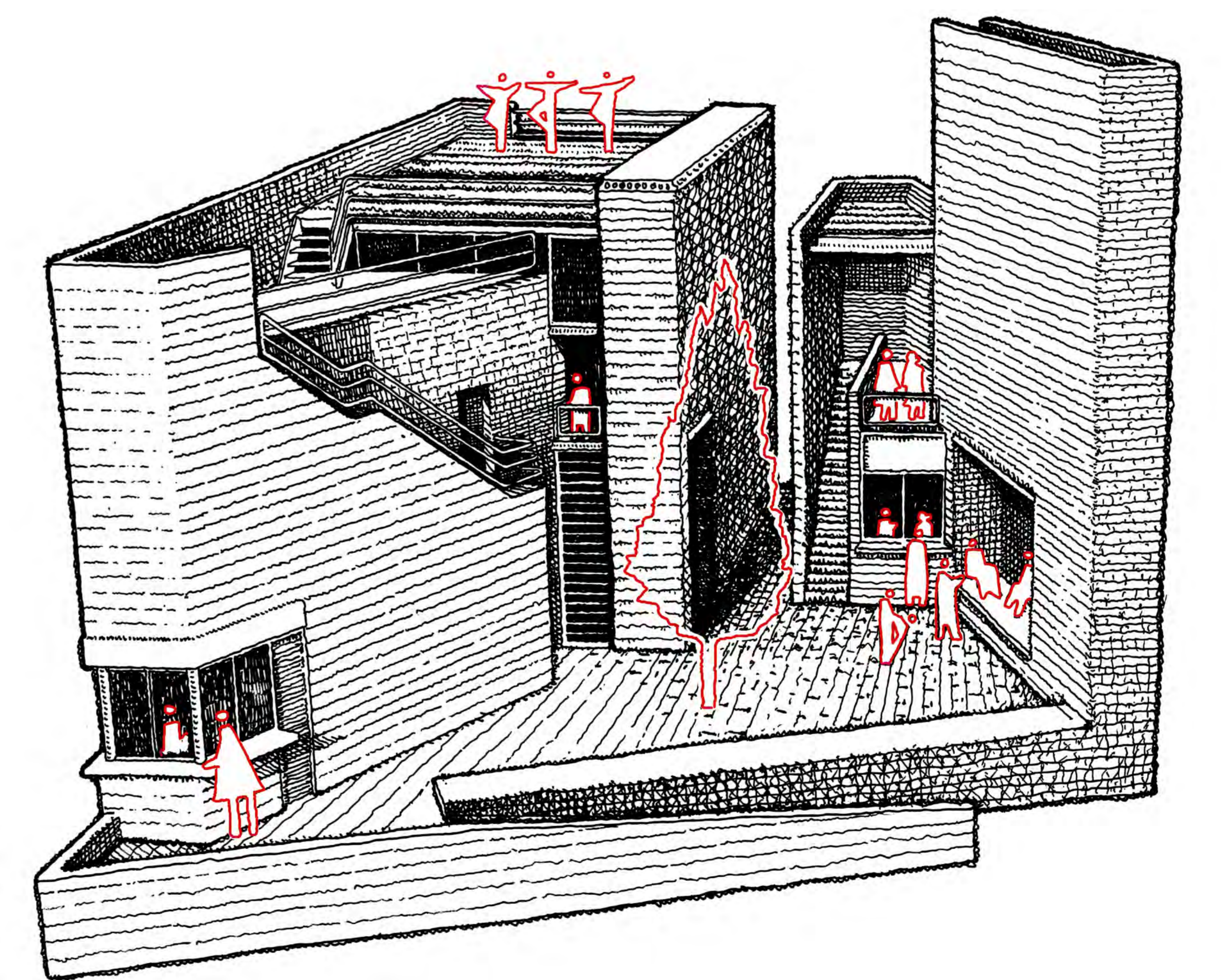
GROUND FLOOR PLAN
1/200



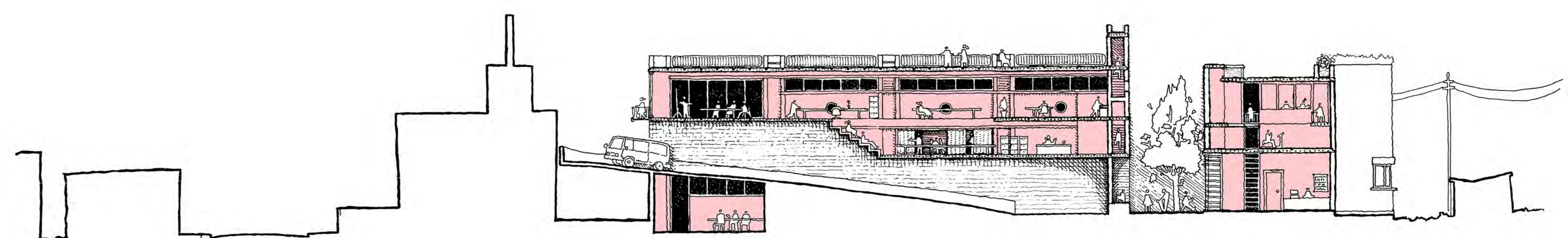
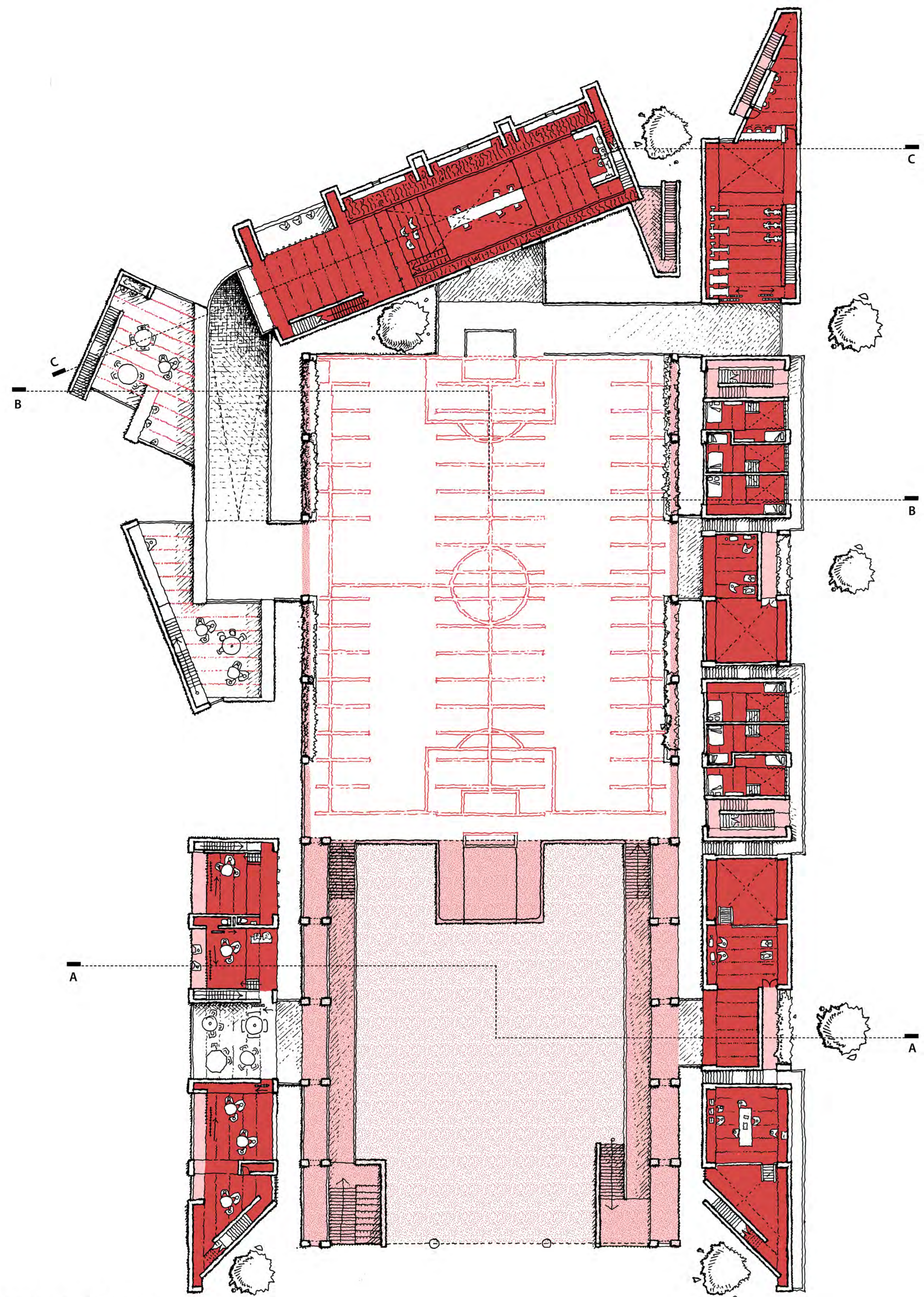
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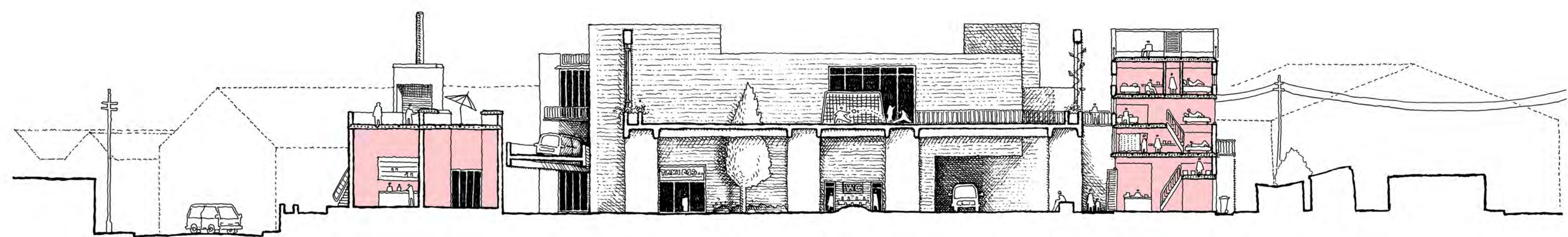
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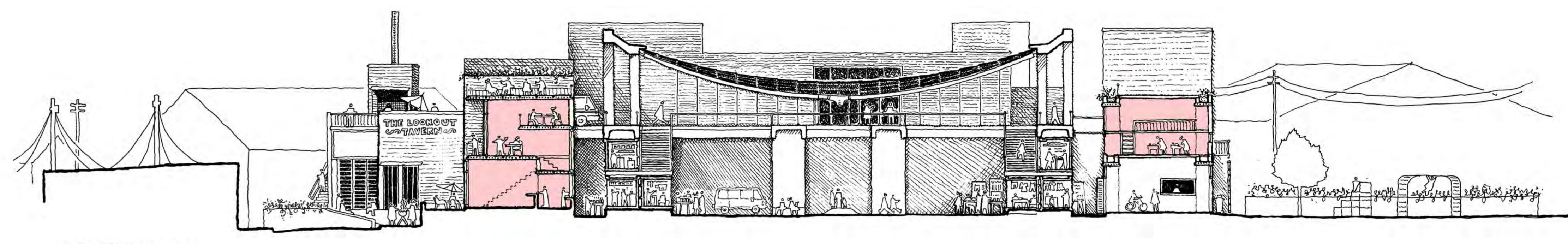
3



SECTION GC
1/200

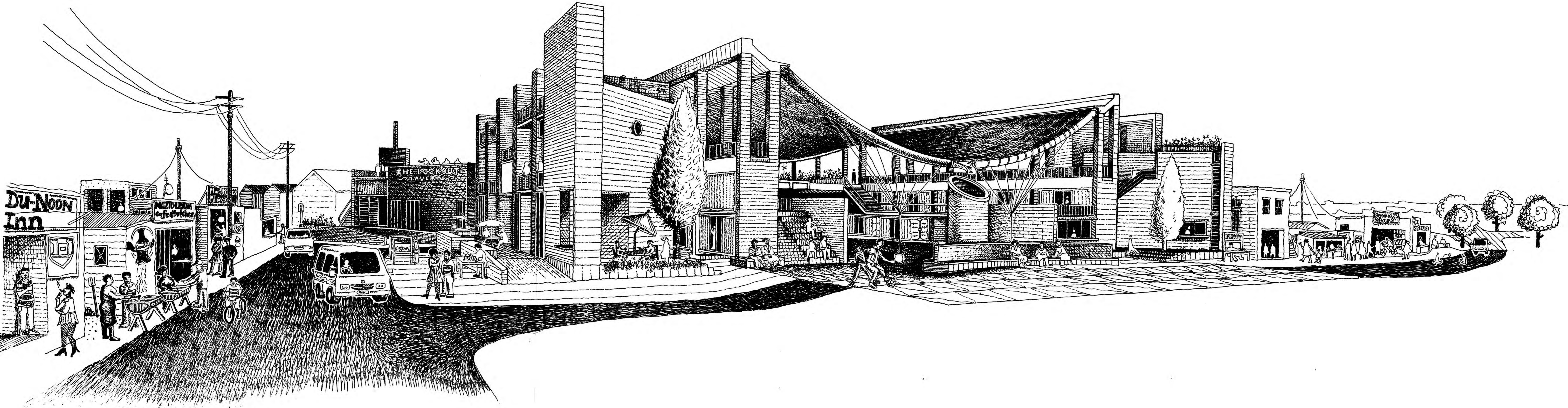
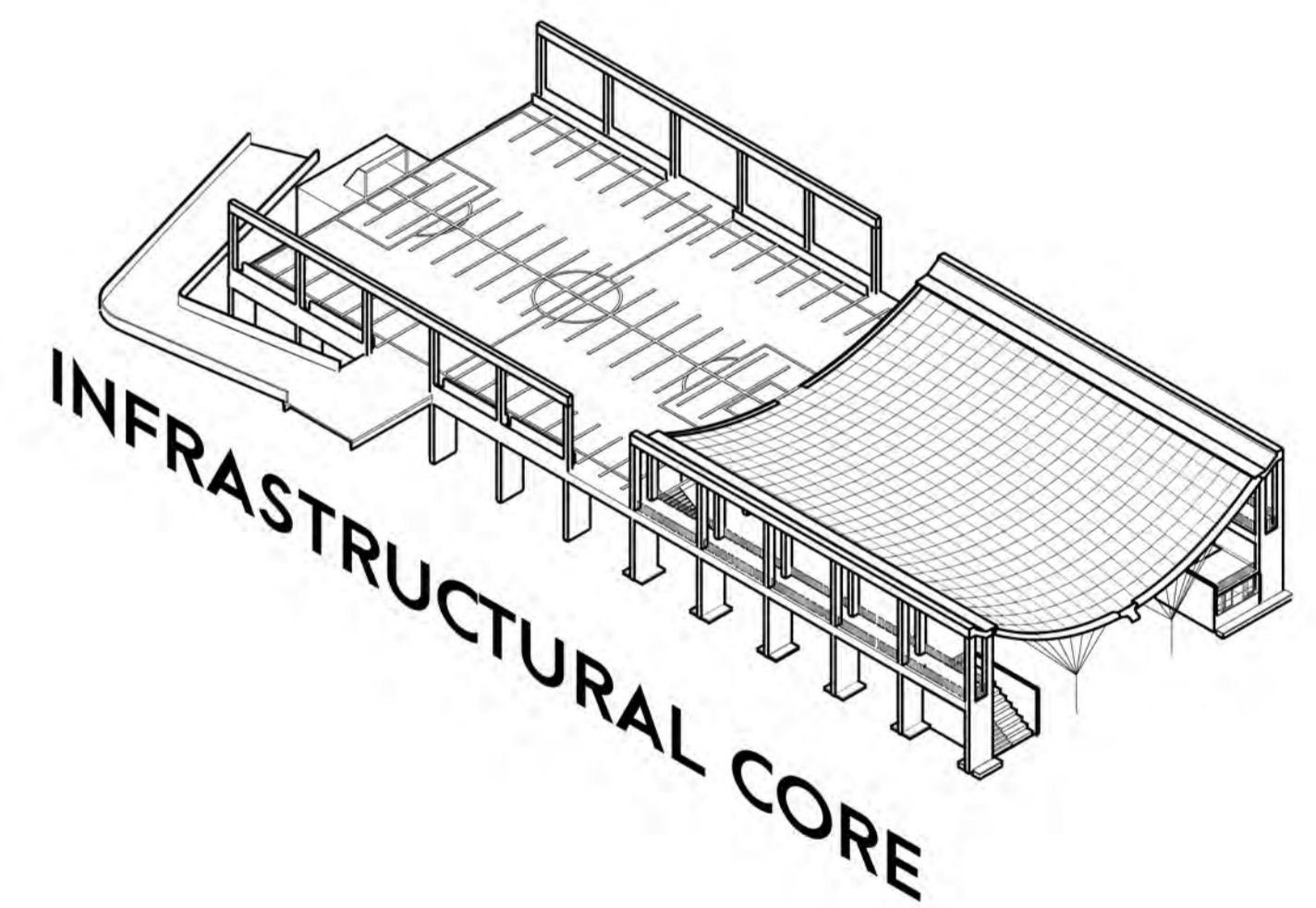
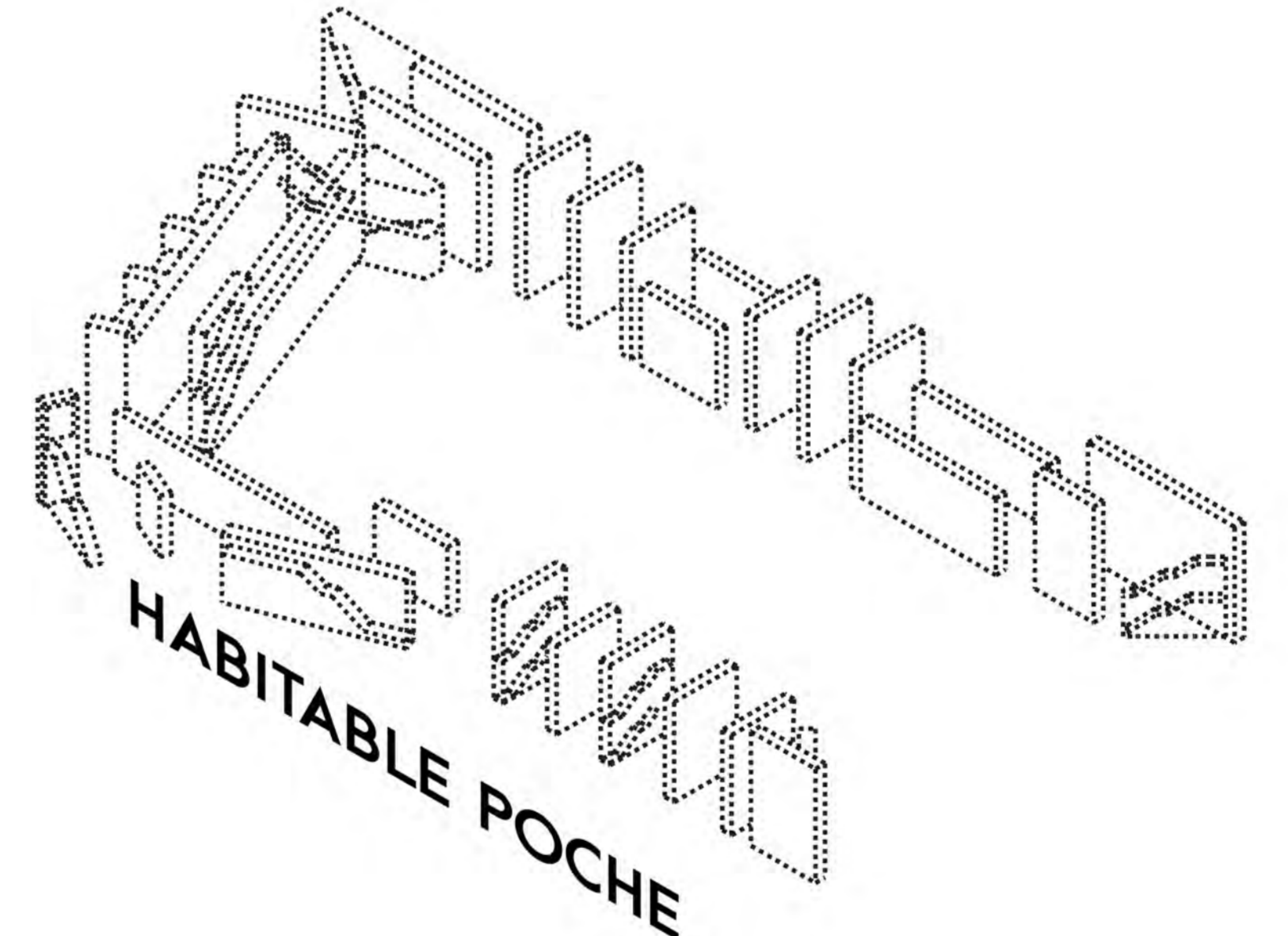
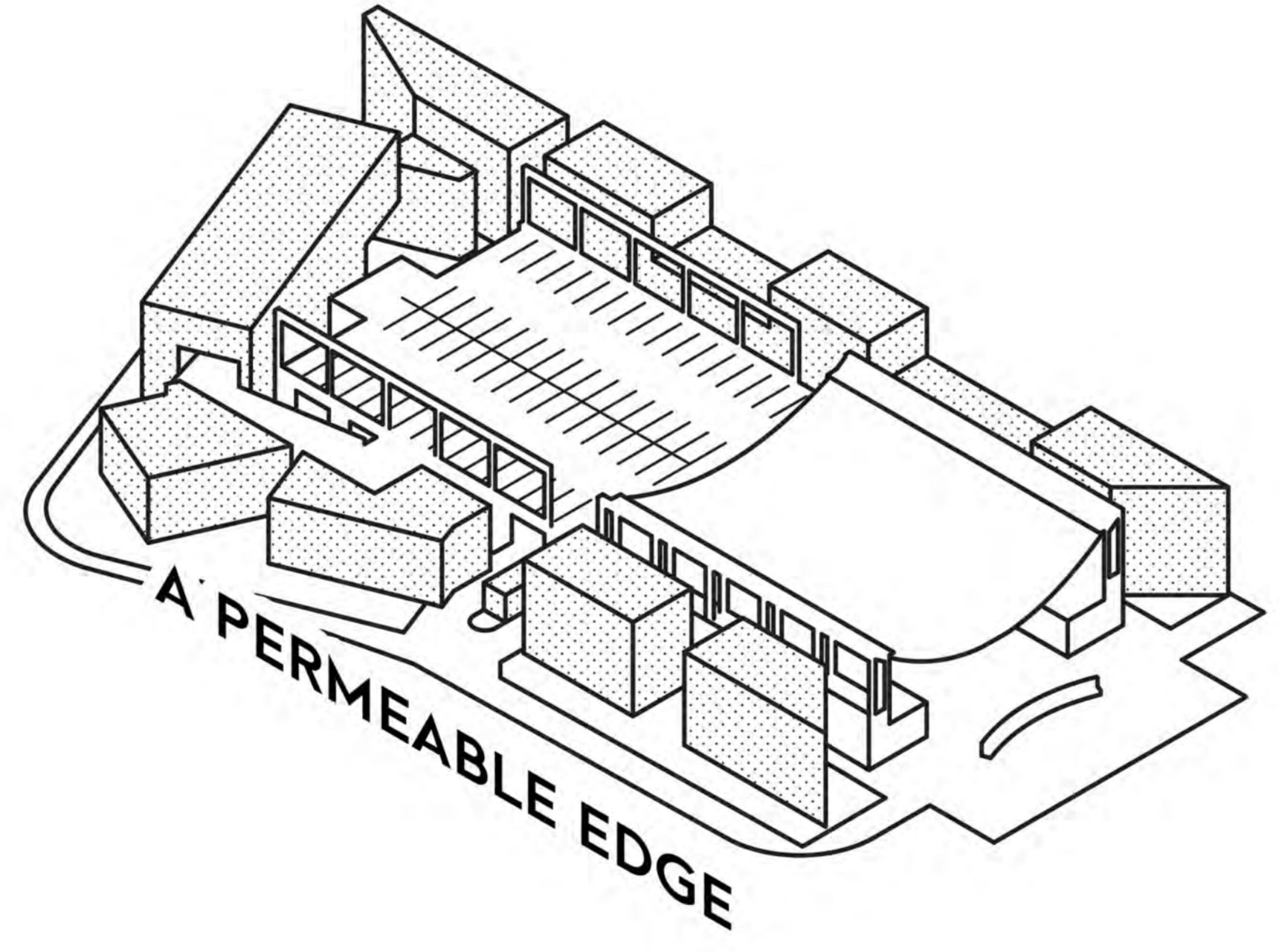
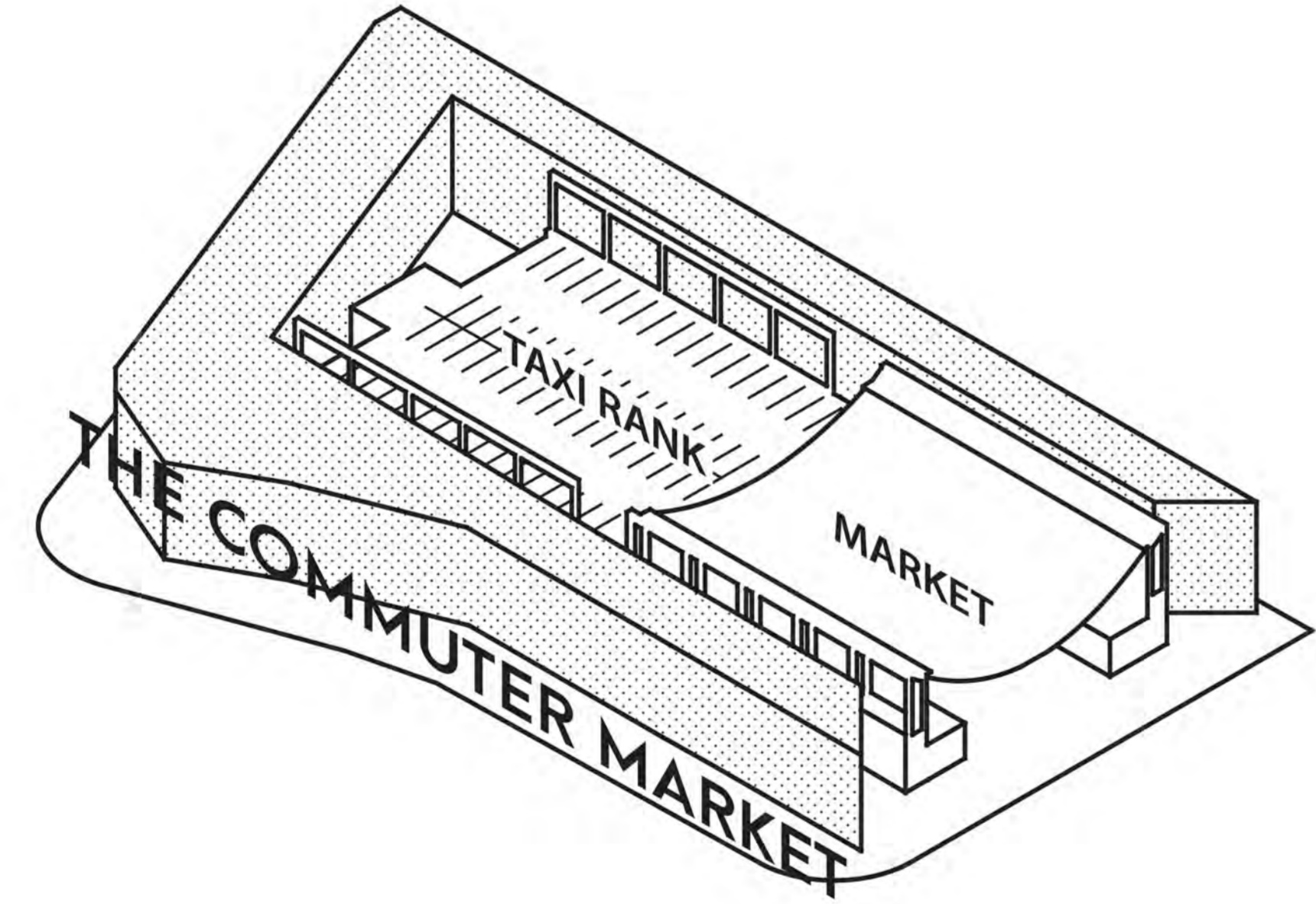
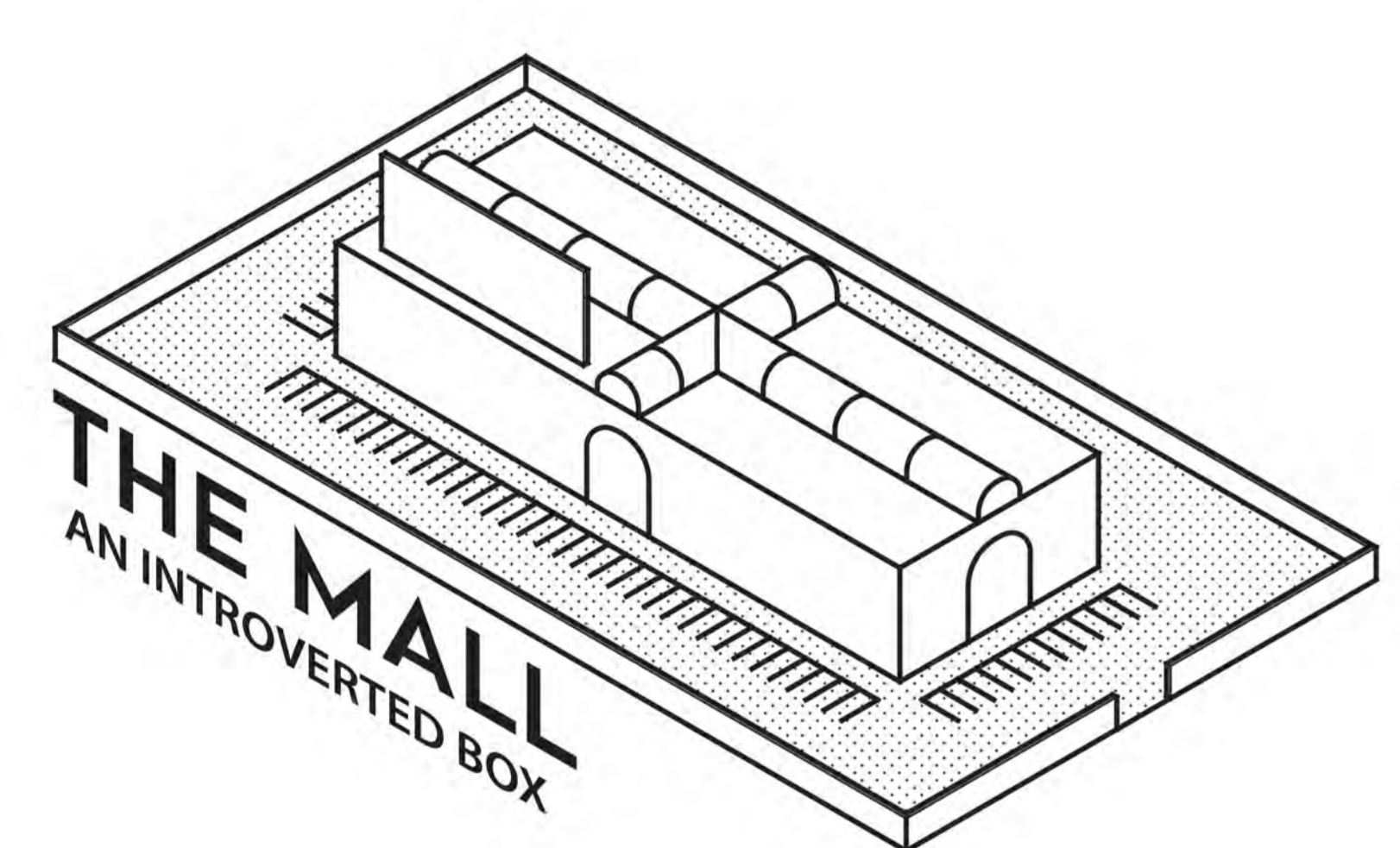


SECTION B-B
1/200

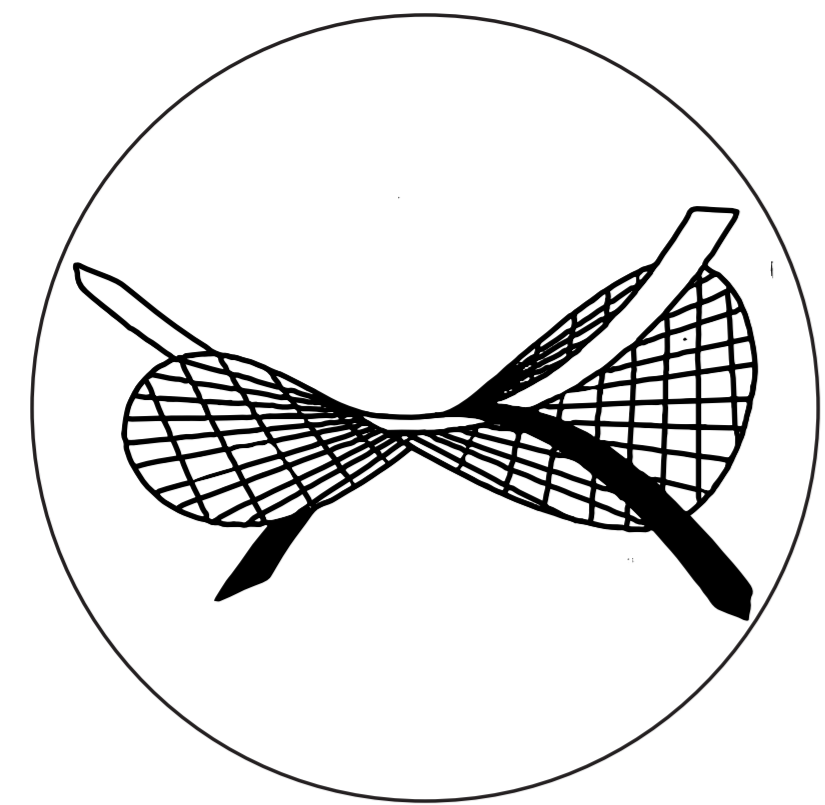


SECTION A-A
1/200

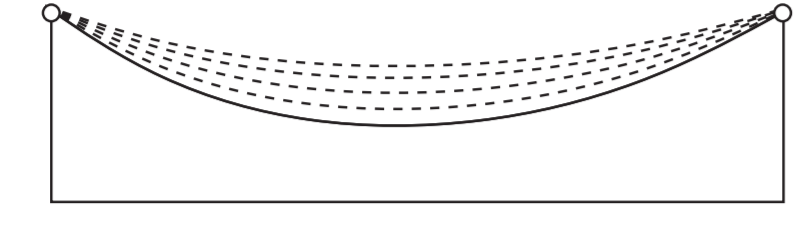
FIRST FLOOR PLAN
1/200



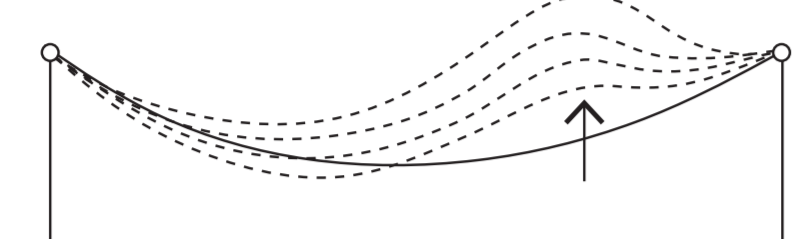
ROOF CONSTRUCTION



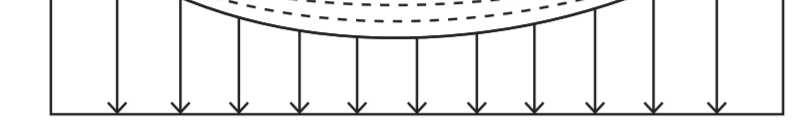
DOUBLE CURVATURE CREATES A SURFACE IN CONSTANT TENSION



CABLES ARE HUNG ACROSS THE WIDTH OF THE SPAN



CABLES HUNG WITH A "CHERRY PICKER"



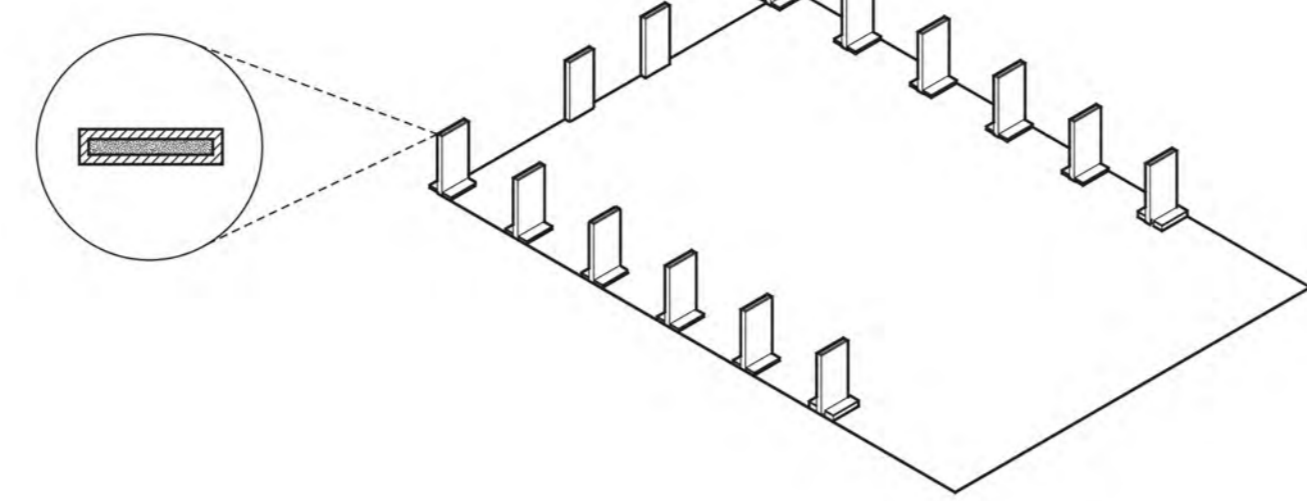
CABLES TIED DOWN IN TRANSVERSE DIRECTION



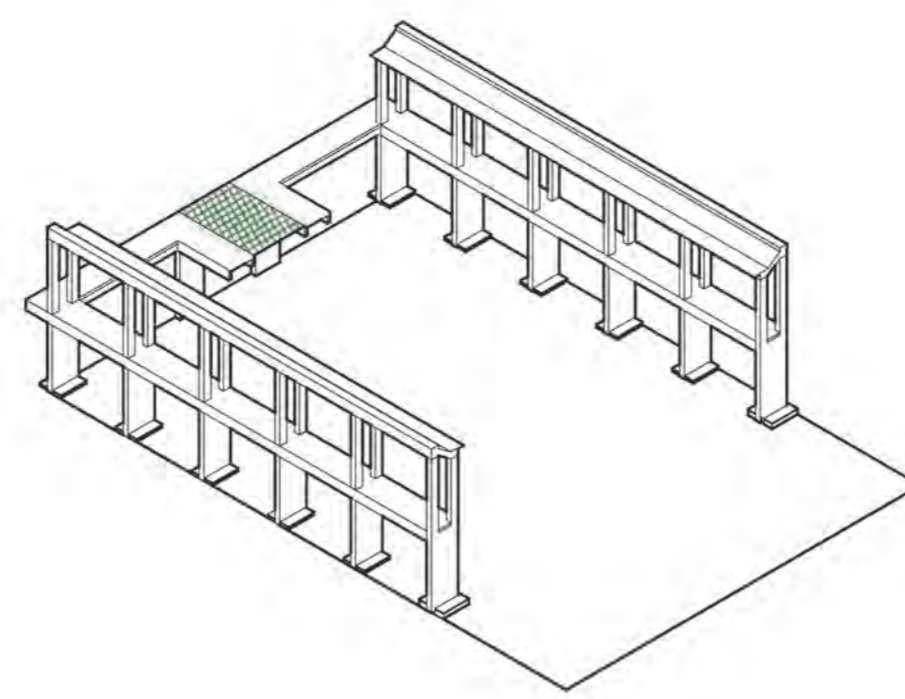
CABLES IN TRANSVERSE DIRECTION TIE THEM DOWN IN ORDER TO PREVENT WIND UPLIFT



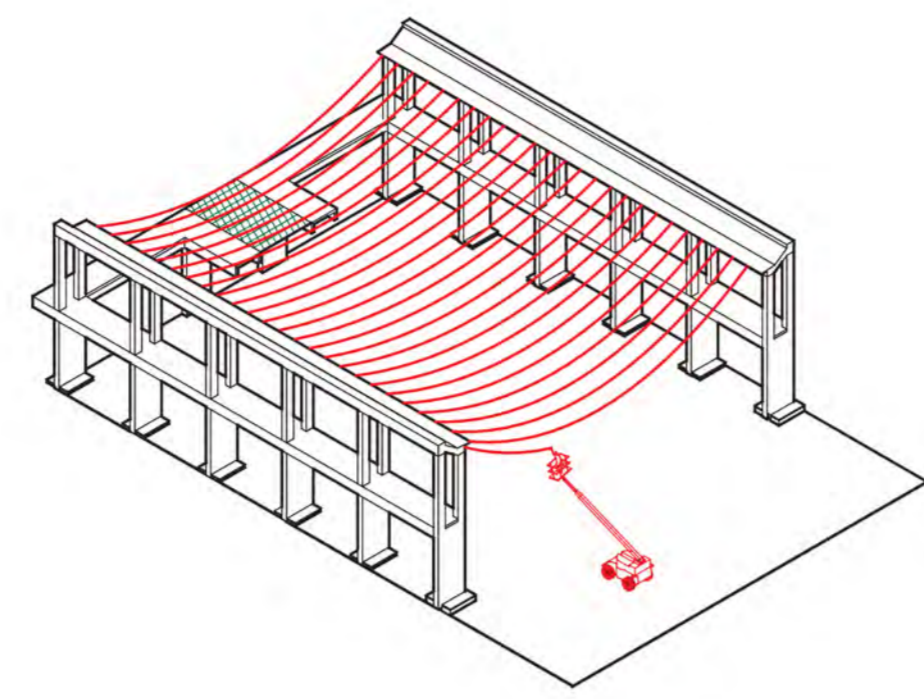
CONCRETE BEAMS PARALLEL TO THE DIRECTION OF THE CABLES ABSORB TENSION



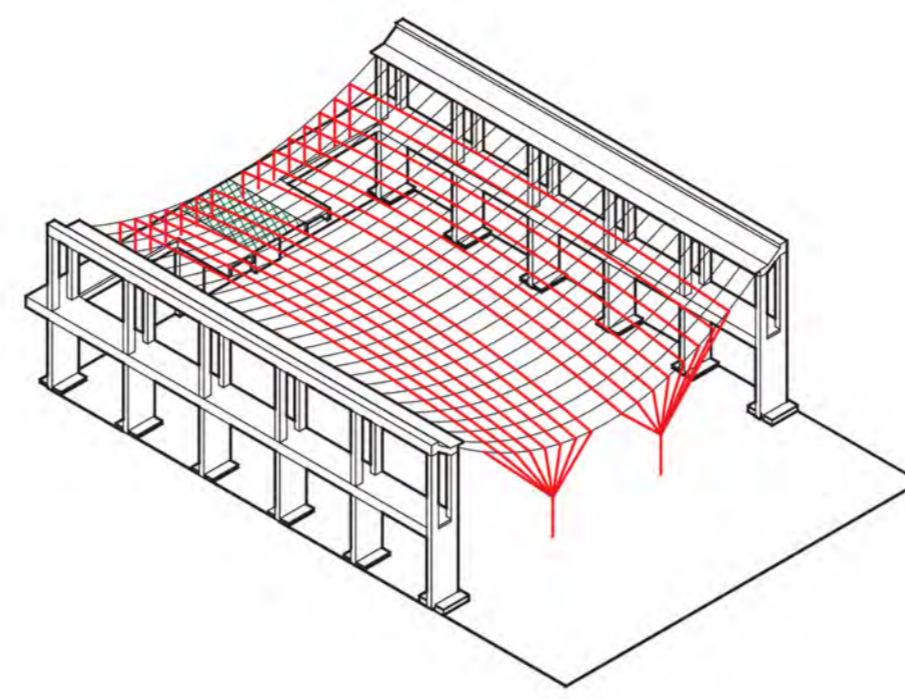
BRICK PIERS WITH CONCRETE INFILL



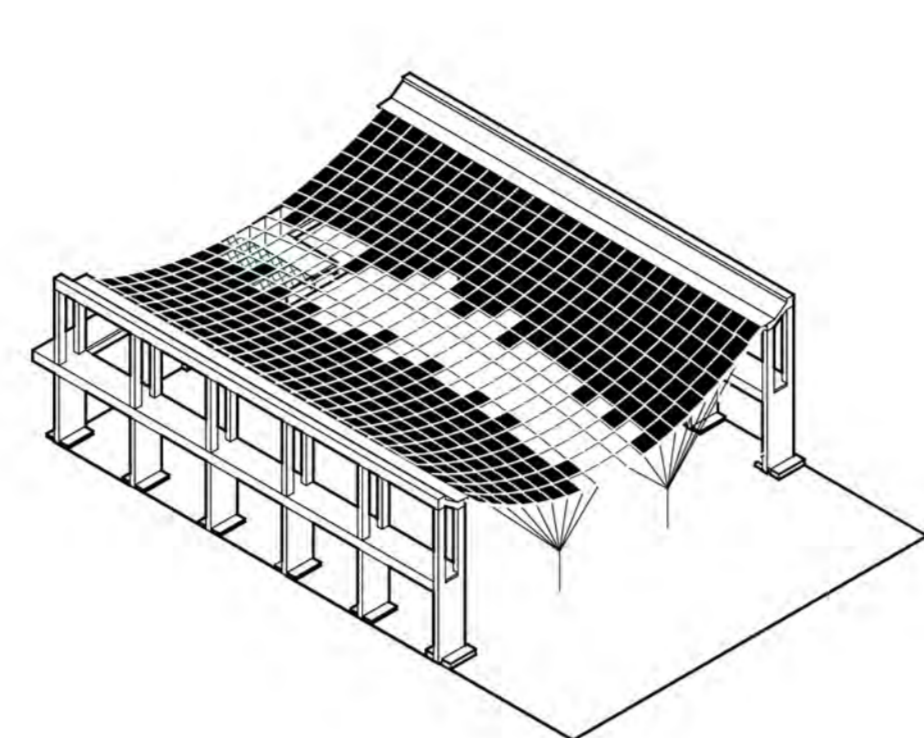
CONCRETE SLABS AND BEAMS



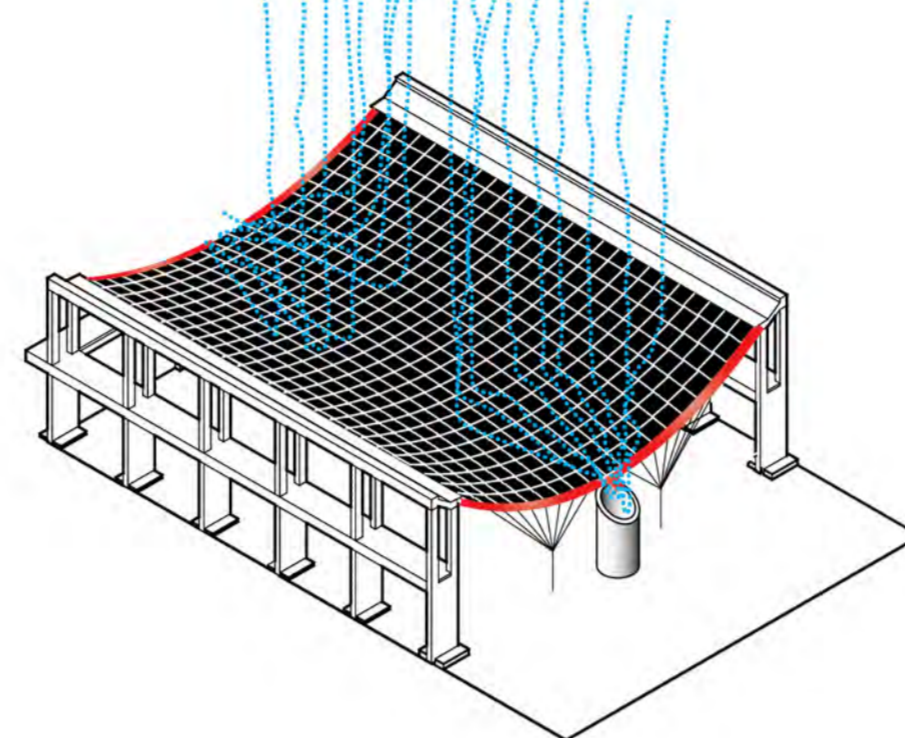
CABLES HUNG WITH A "CHERRY PICKER"



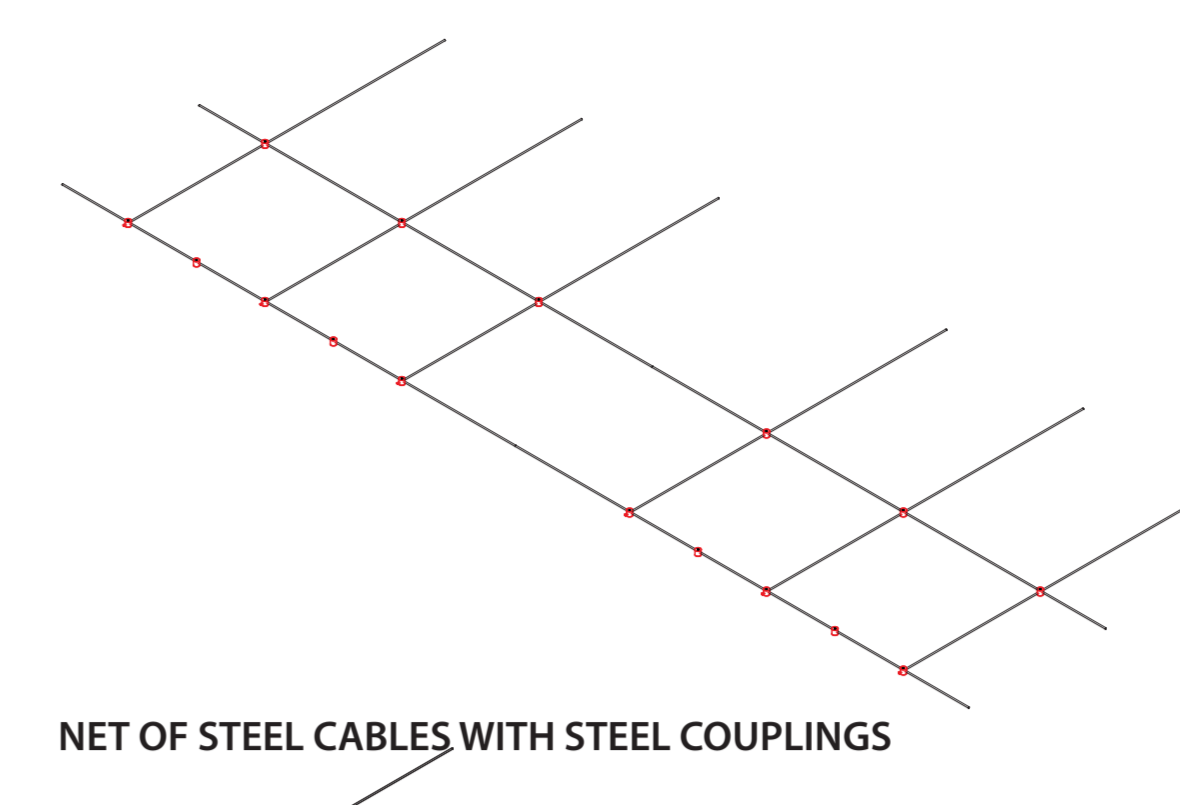
CABLES TIED DOWN IN TRANSVERSE DIRECTION



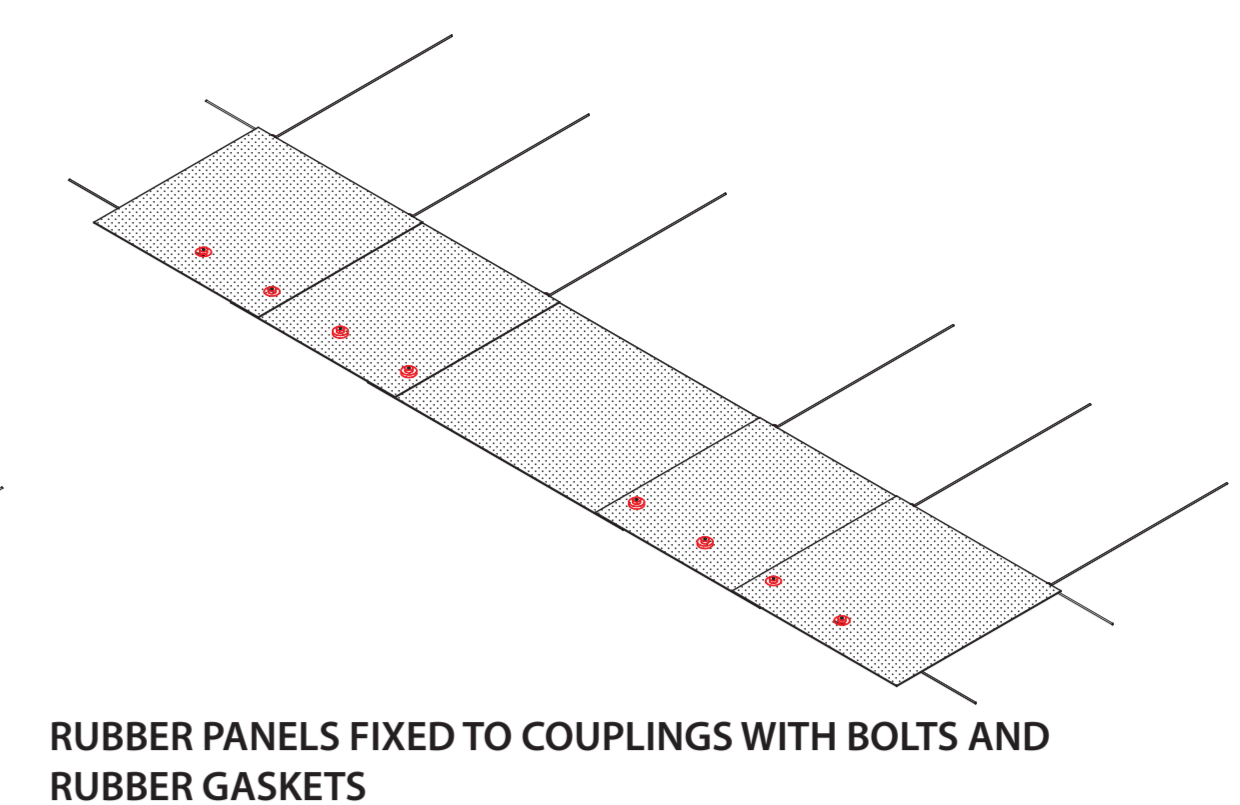
EPDM RUBBER PANELS LAID ON TOP OF THE NET OF CABLES



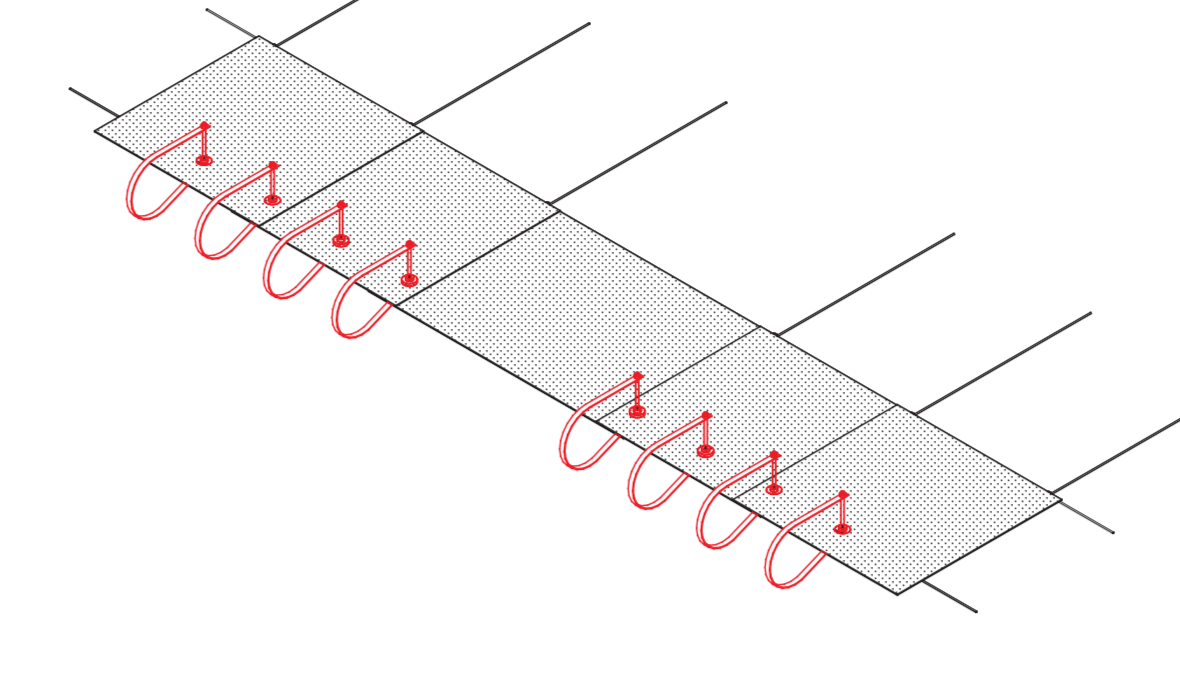
RUBBER GUTTER ON EDGES DIRECTS WATER TO STORAGE TANKS



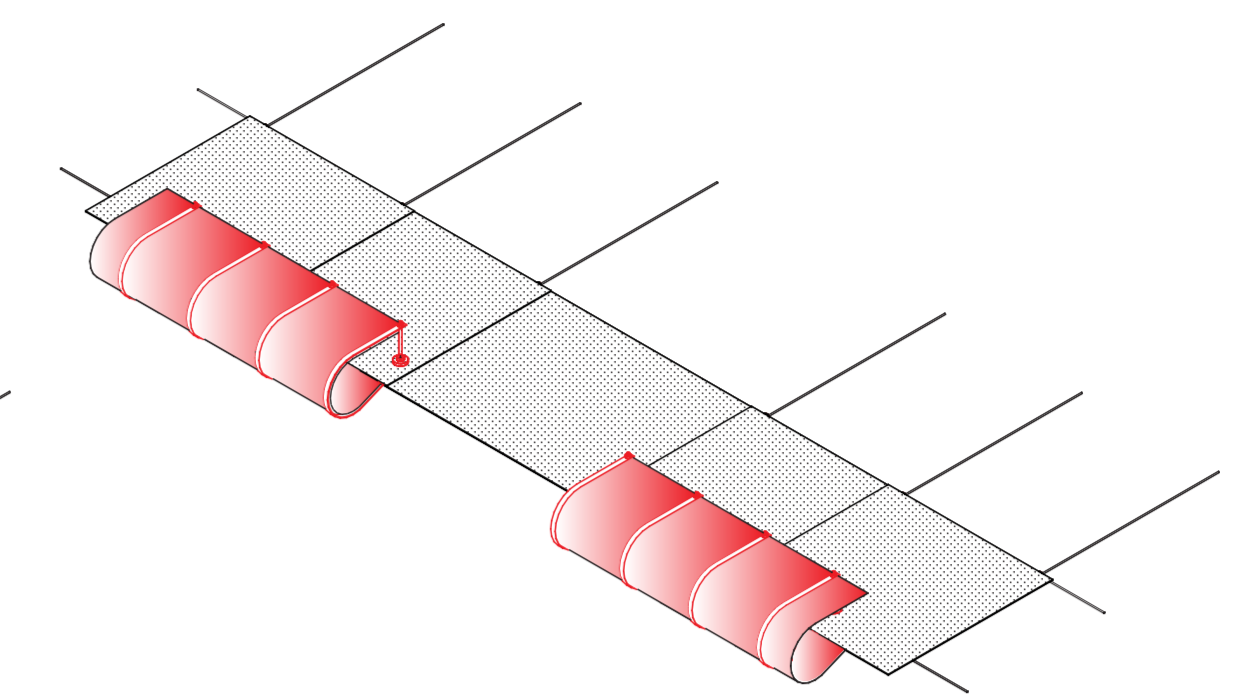
NET OF STEEL CABLES WITH STEEL COUPLINGS



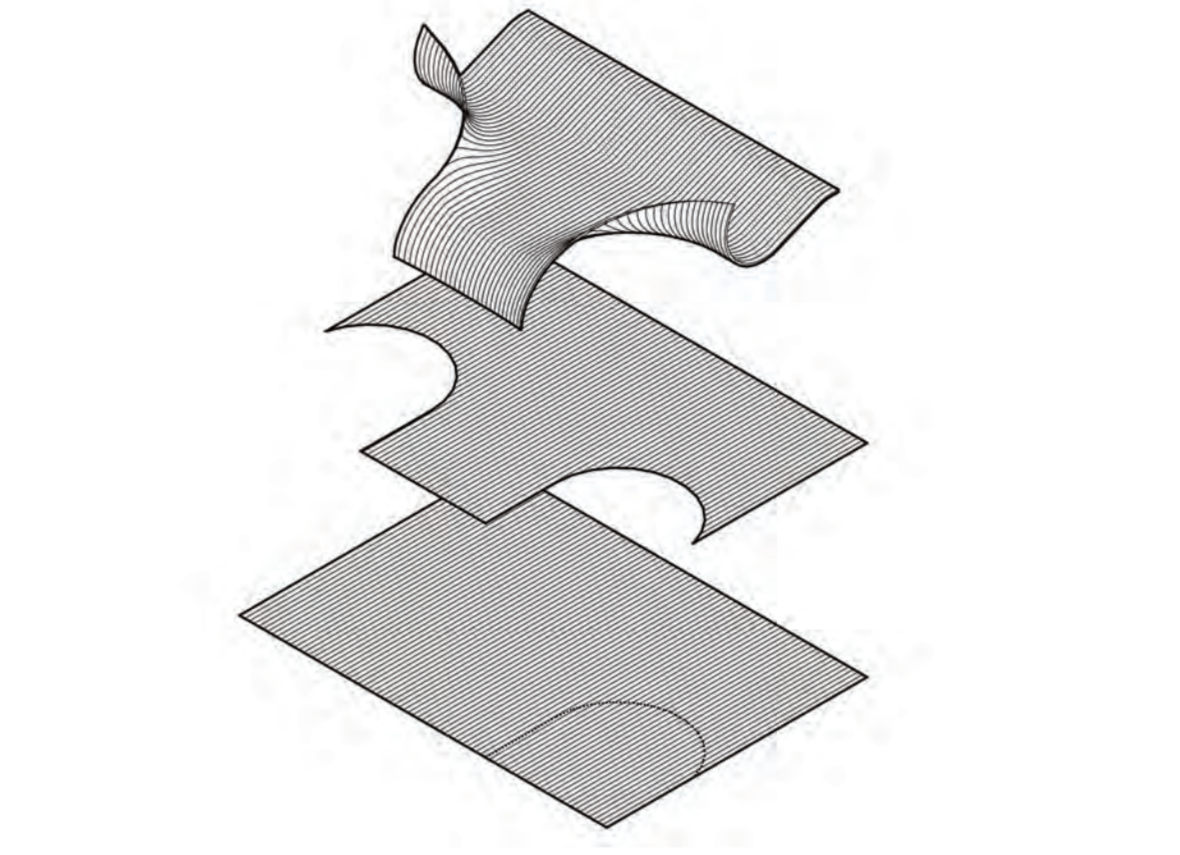
RUBBER PANELS FIXED TO COUPLINGS WITH BOLTS AND RUBBER GASKETS



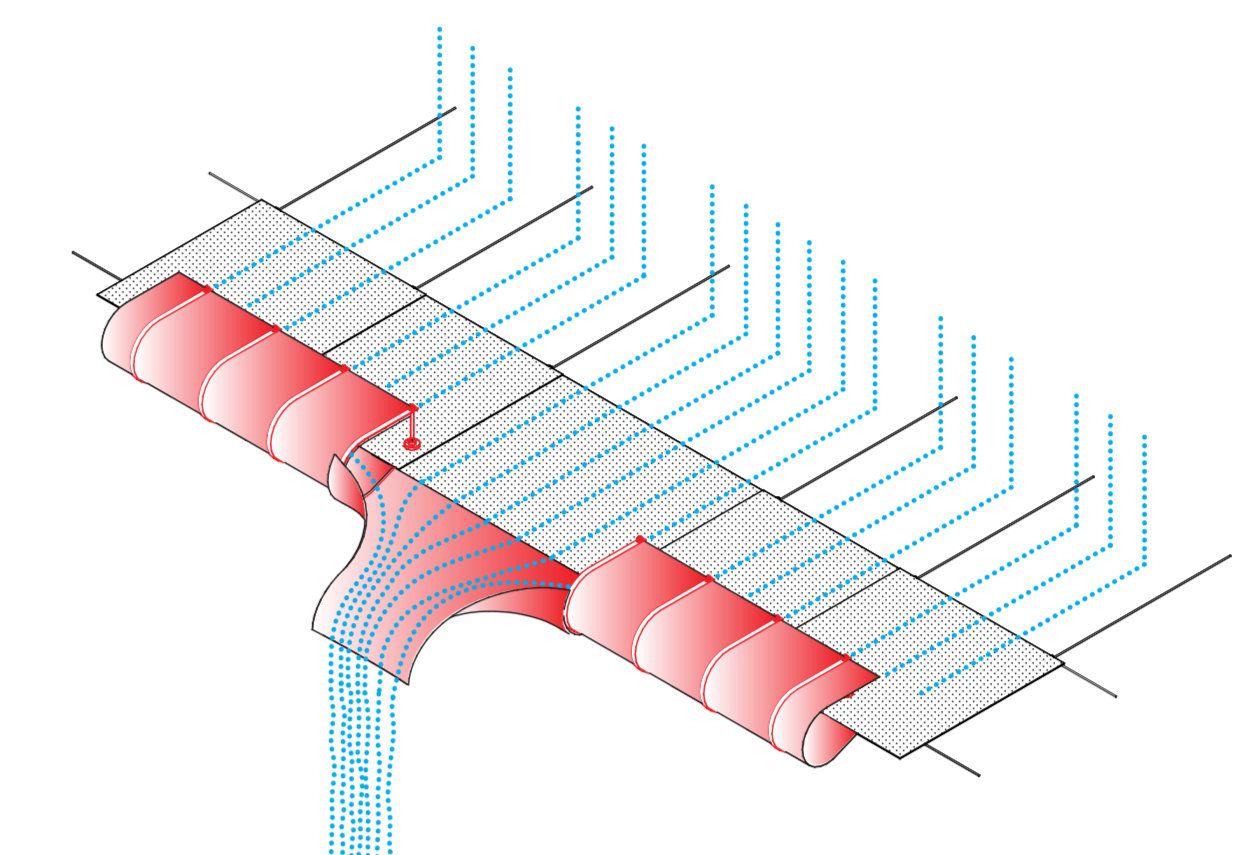
BENT STEEL FLAT BAR PROFILES BOLTED TO COUPLINGS



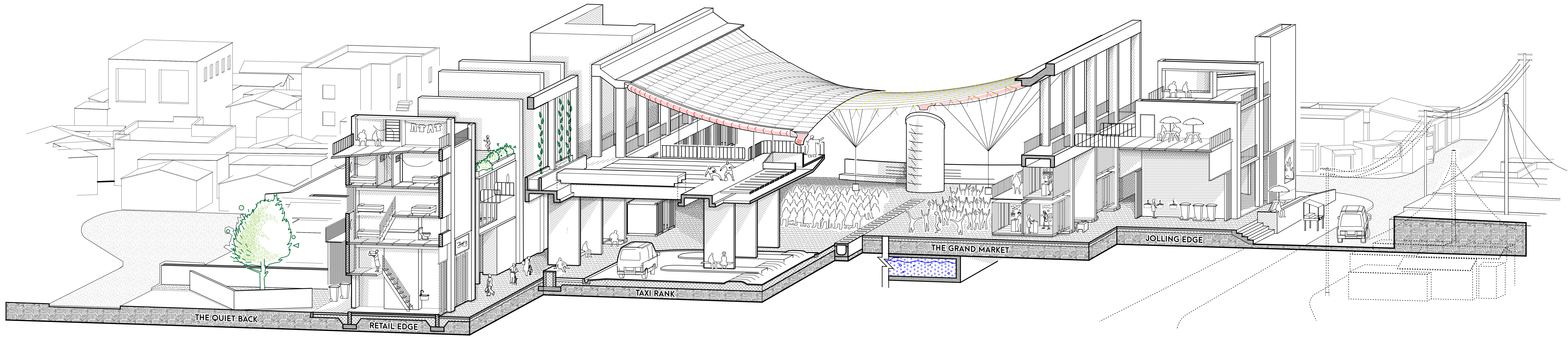
RUBBER TUBING CUT AND FIXED TO PROFILES WITH RUBBER METAL ADHESIVE



RUBBER SHEET CUT TO FORM A SPOUT



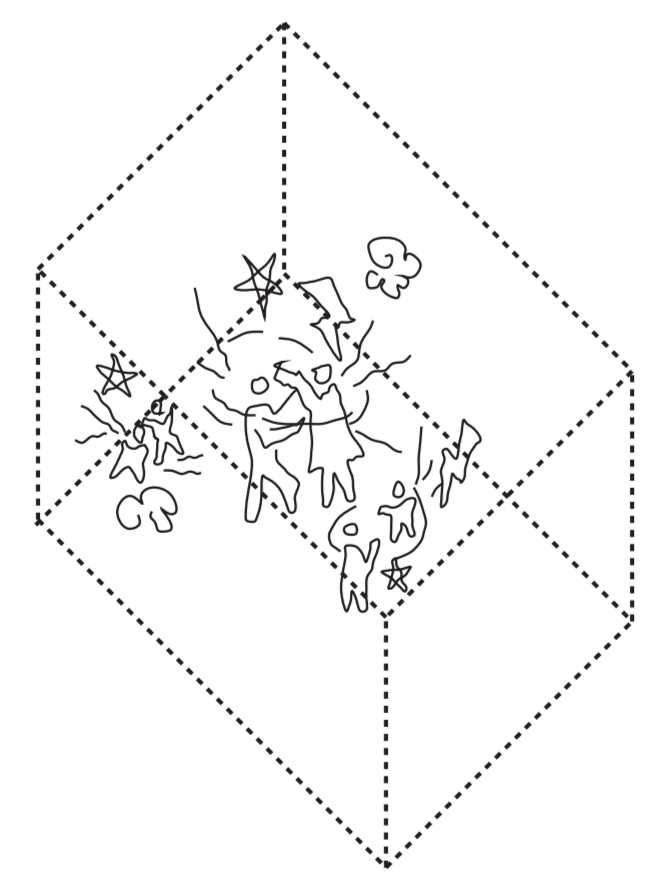
SPOUT CONNECTS TWO ENDS OF THE GUTTER AND DIRECTS WATER TO STORAGE TANKS



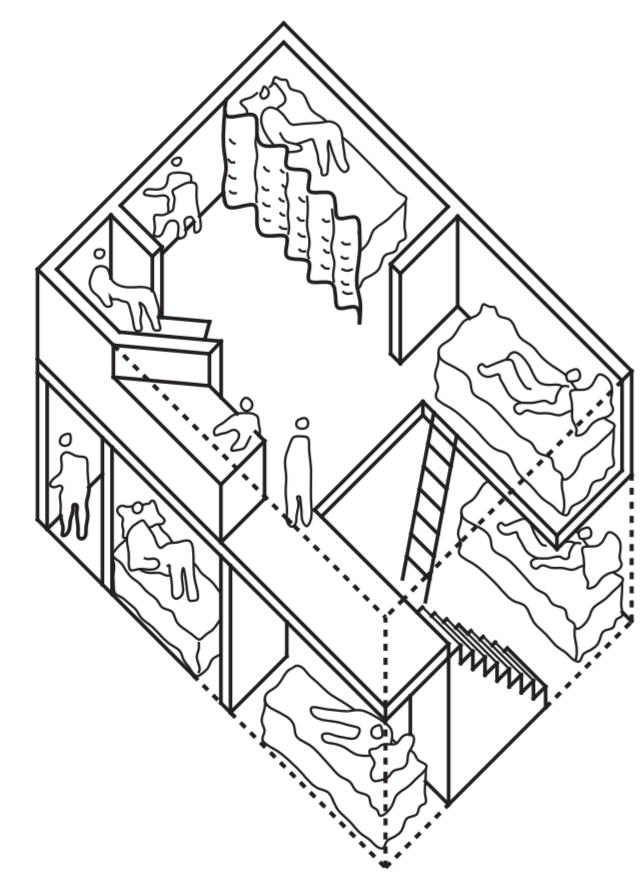
1/100 STEPPED SECTIONAL AXONOMETRIC

HABITABLE POCHE

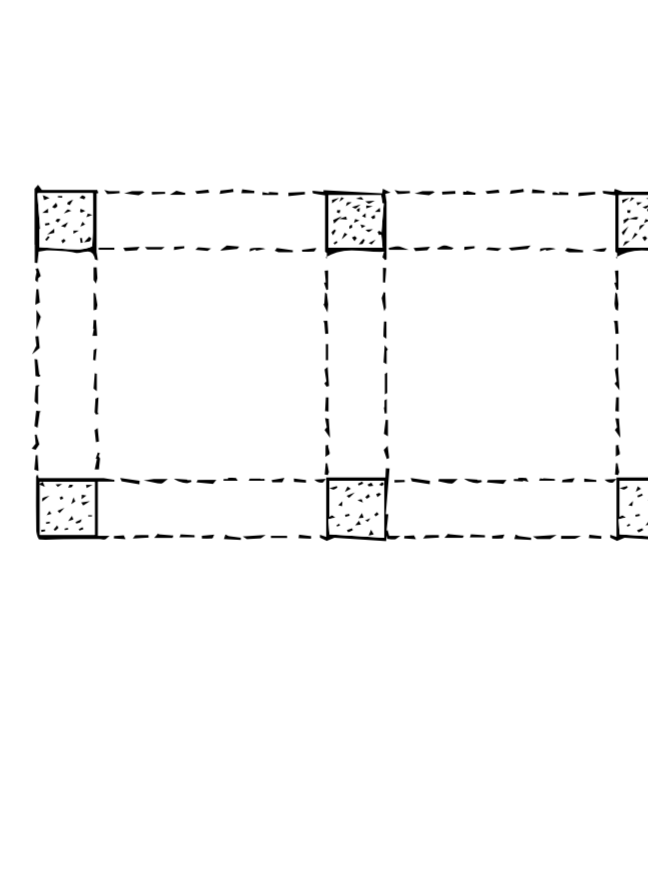
WHEN LIVING IN A TIGHT SINGLE SPACE, IT IS HARD FOR PEOPLE TO NOT CONSTANTLY BE IN EACH OTHER'S HAIR AND AT EACH OTHER'S THROATS.



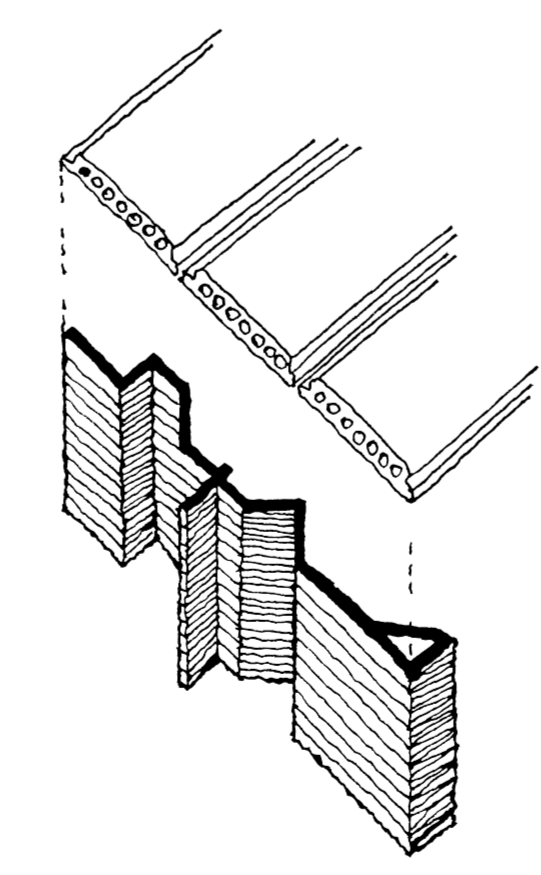
GIVING THAT SAME SPACE A FINER GRAIN OF NOOKS AND CRANNIES, ALLOWS FOR A GREATER DEGREE OF PRIVACY.



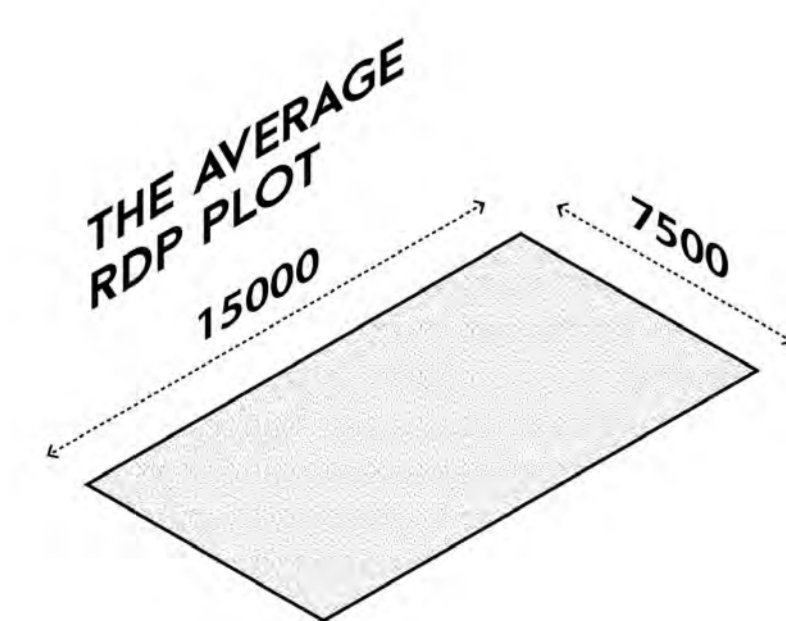
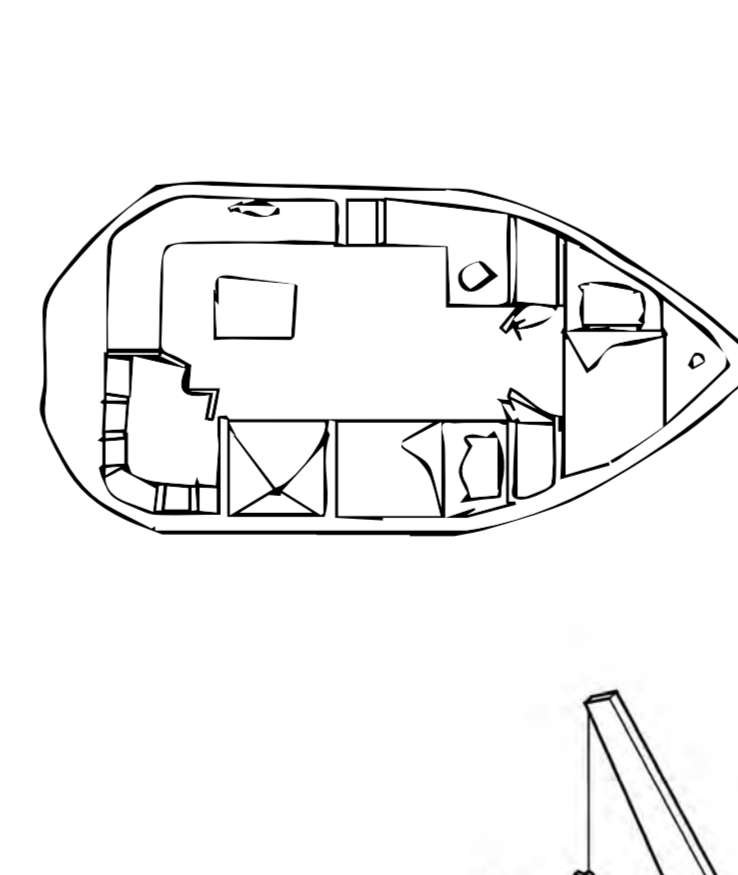
FRAMED BUILDINGS LACK THIS PRIVACY GRADIENT AND ARE ALSO DIFFICULT FOR A SMALL-SCALE CONTRACTOR TO CONSTRUCT.



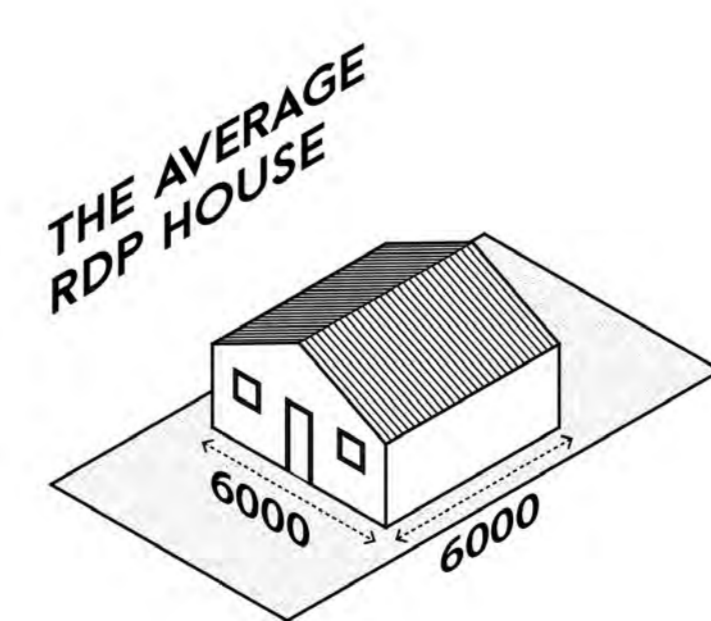
DEVELOPING A SYSTEM OF LOAD-BEARING BRICKWORK AND PRECAST CONCRETE SLABS CAN RESULT IN NEW KINDS OF SPATIAL CONFIGURATIONS



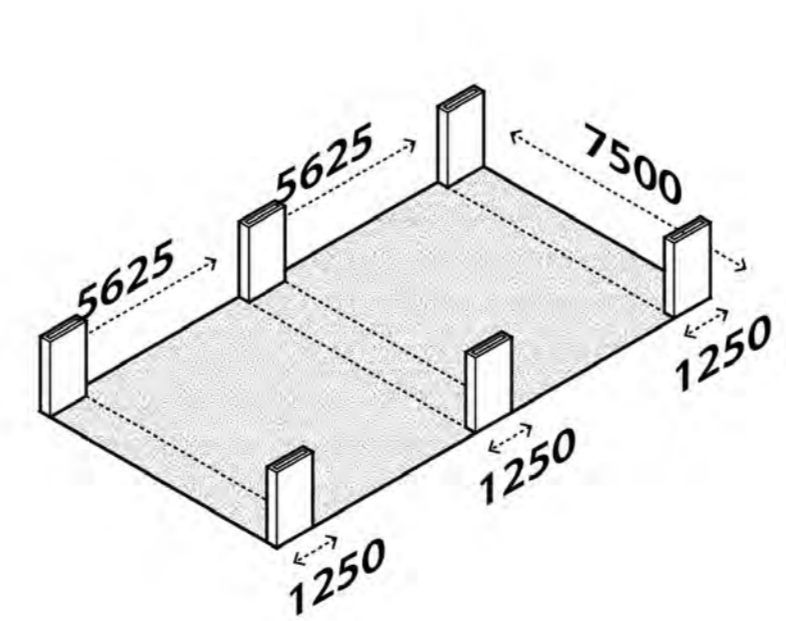
SPACES BECOME CONFIGURED LIKE THE HULL OF A BOAT - A CONFIGURATION THAT CAN MAKE LIVING IN TIGHT SPACES MUCH EASIER.



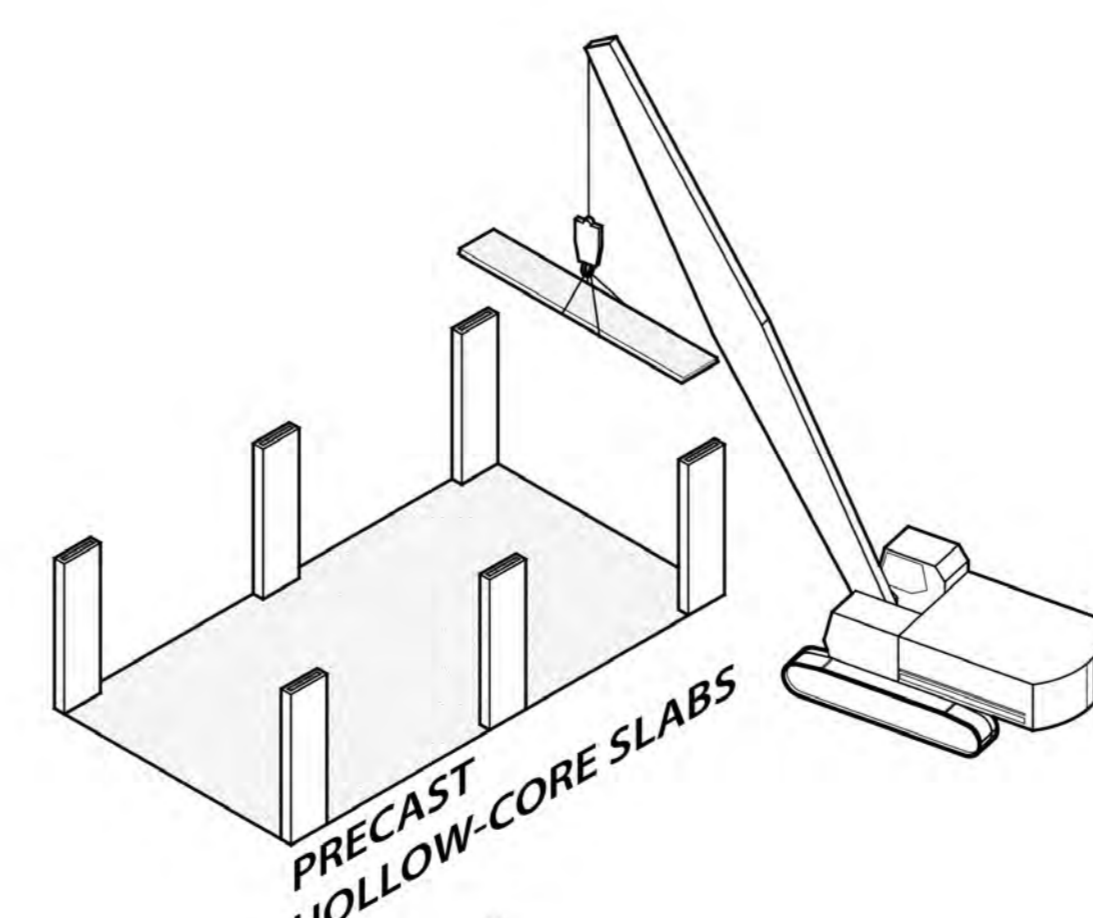
THE AVERAGE RDP PLOT 15000 x 7500



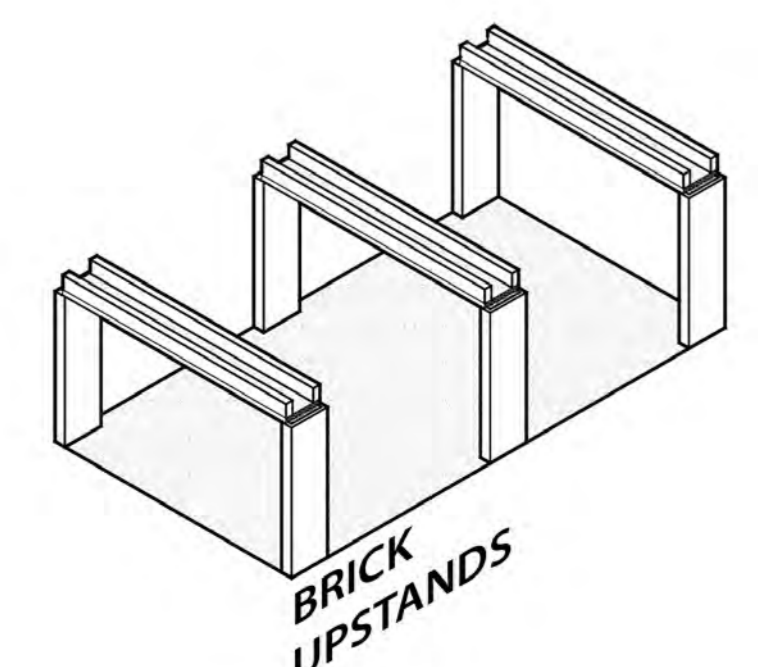
THE AVERAGE RDP HOUSE 6000 x 6000



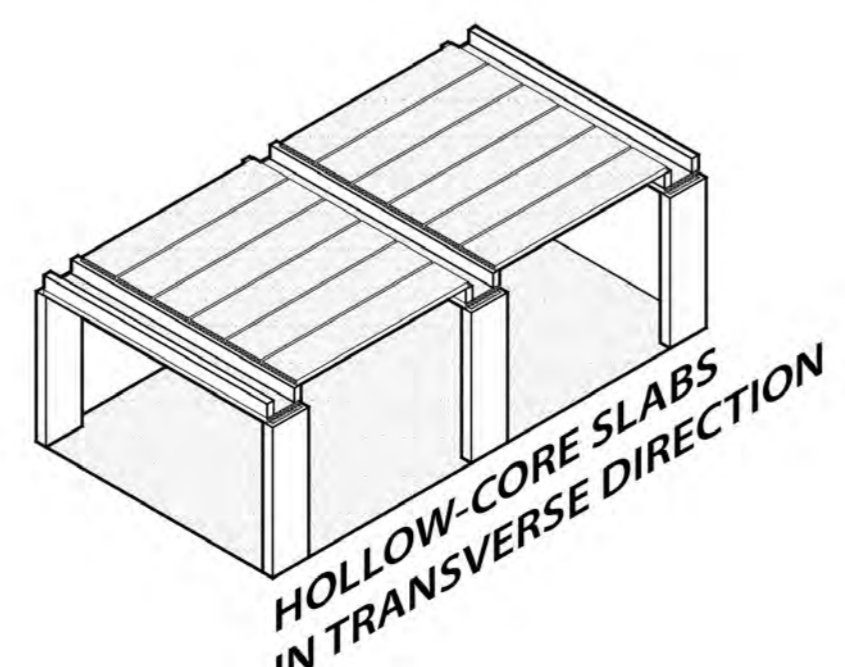
5625 x 7500 x 1250



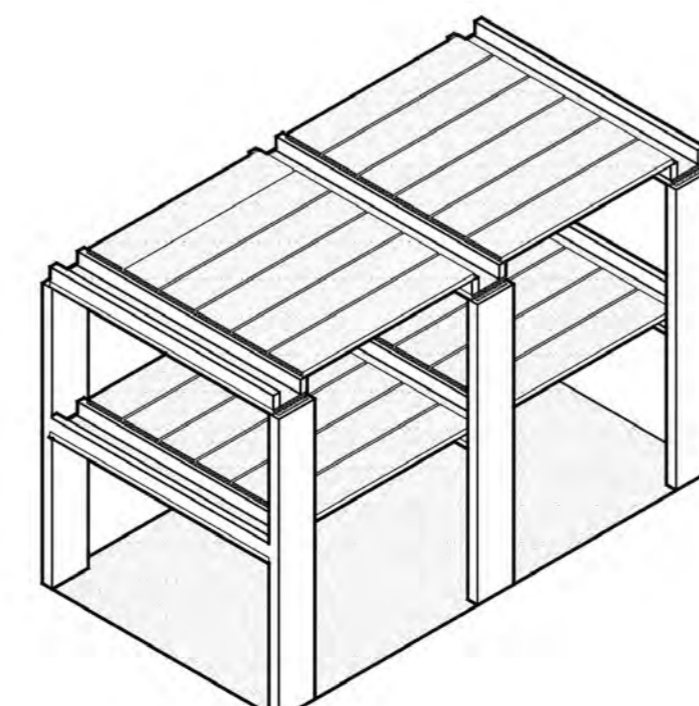
PRECAST HOLLOW-CORE SLABS



BRICK UPSTANDS



HOLLOW-CORE SLABS IN TRANSVERSE DIRECTION



A BASIC TEMPLATE FOR MANY VARIATIONS

