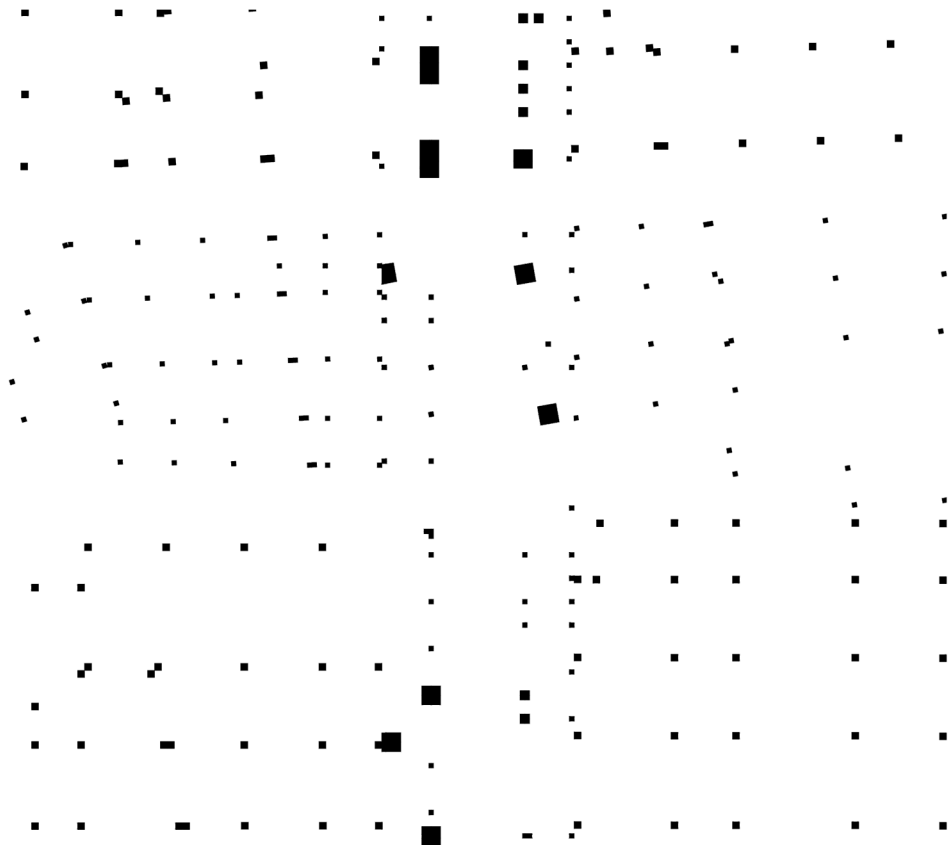
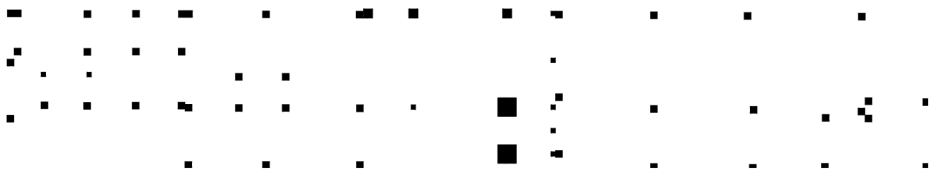




MESS IS MORE

Iterating Dwelling Design Processes For The Urban Poor In New Delhi, India



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PROLOGUE

Young David Vs Goliath

This is a most classic underdog myth from the book of Samuel where a weaker opponent (Young David) is able to defeat the much stronger and bigger adversary (Giant Goliath) with a simple technique. Is there a simple technique for the urban poor of Delhi ?

ACKNOWLEDGEMENTS

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Thank you all and as they say, Aaila Mandaoli.

Aaila Mandoli is a phrase that is used to initiate a festive event in my hometown in India.

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PREFACE . MOTIVATION

Shifting Status Quo

The informal settlements in Delhi are witnessing a resurgence of interest from the bureaucrats, planners and academicians alike. Quite understandably so, as the Indian government is driving high on a development desire of making Delhi, a world-class city and the widespread presence of informal settlements in its built environment is seen as the biggest hurdle. Further, in an attempt to make Delhi 'beautiful' and 'slum-free', the government has adopted a peculiar propaganda of evicting poor from their houses within the city and resettling them on the peripheries in newly designed 'resettlement colonies'. There have been multiple efforts for ideating resettlement colonies, which in effect is a process of formalizing the informal, calling on architecture as a discipline for an active participation.

One such case is of 'Savda Ghevra', Delhi's largest resettlement colony developed 24 miles outside the city core to re-house slum dwellers evicted from inner city areas. Envisioned as a resettlement camp, it is home to more than 20,000 inhabitants for a ten year period within which they are either expected to rise the economical ladder until they are deemed fit to claim a position in the city or are expected to learn a way to stay out of the city infrastructure. The design of the 'camp' invited disciplinarian aid in 2003, which was exceedingly limited in the understanding and translational of the emergent qualities of a user-generated informal dwelling. With rigid dwelling typologies, unregulated open/shared space structure and an incoherent application of 'incrementality', Savda Ghevra was rendered as an architectural mess.

In 2017-18, for phase two, a group of musicians and puppeteers living in a traditional informal quarter in the city called Kathputli, are being resettled to neighbourhoods in Narela, outside the peripheries of Delhi. At the moment, hundreds are being displaced and put in pre-transit camps for an interim period, ranging from one to five years until the resettlement schemes are been constructed. These camps are analysed as strategically placed inside the city limits to reduce resistance and are viewed as an opportunity to intervene, radically challenging the existing stance and processes.

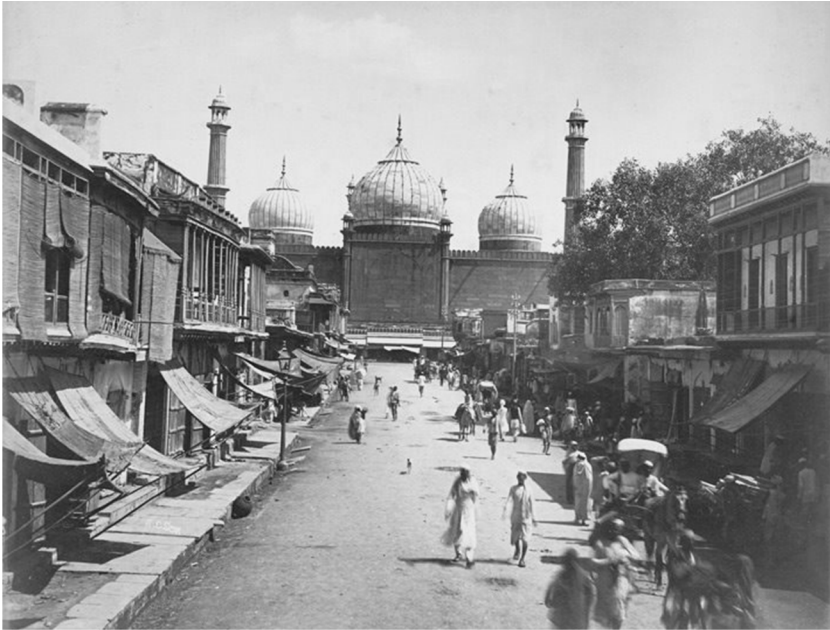


Figure 2 . Top : Visuals for a street in Walled city,1870 Bottom : The same street in 2012; Photographs from Alamy

Placed at this junction, the thesis explores the implications of the formalization processes unfolding in Delhi by re-imagining the process and the design of one such Transit camp, Anand Parbat. Although the scope of intervention for the final design thesis is limited to resettlement colonies or a component of the resettling process, the research phase first strives to explore informality in the context of Indian cities. This is expected to give a firm prelude to the processes and forces behind the organizational structure within an informal setup, that are possibly very different from the formal design processes. Using the theories of Holland and Page for complex adaptive systems, the paper would argue for seeking the intelligence behind the organisation of seemingly chaotic informal settlements of Delhi. Further on, it will use Ostrom's common property regime to bring out the tangible logics constructing the said intelligence. The final intention would be to instrumentalise them for an effective design translation that resonates with the inhabitants and elevates the responsibility of empowering them socially, culturally and economically.

The paper is divided in four sections - the first section introduces the context of New Delhi and elaborates the scientific and societal relevance of the problem. It also clearly lays out the position and stance of the author, representing the discipline as the spatial agency. The second section is aimed at analysing the play of spontaneous forces in the structuration of the open space or shared realm through observation studies and plan analysis of three existing informal settlements. The intention is to theorize on how various parameters such as economics, religion, caste, defence against evicting bodies, family size and gender manifests spatially. The third section would look at ways of reading and tabulating informal settlements so as to understand the emergent spatial qualities of the produced space. The last section would translate these idiosyncrasies into tangible outcomes that can be integrated into a dwelling proposal that gives an alternative to the pre-transit camp as a way forward for the designers and the bureaucrats for engaging with the urban poor.

~ **97 %** URBAN POPULATION
OF DELHI (CENSUS 2011)

~ **78000** MIGRANTS ANNUALLY

~ **76%** LIVING IN INFORMAL
HOUSING

7 DIFFERENT FORMS OF
INFORMAL TYPOLOGIES

~ **73%** OF WHICH IS
SUB-STANDARD

~ **52%** EARNING LESS THAN
15000 INR / 200 E PER YEAR

**informality is pervasive.
informality is relevant.
informality is urgent.**

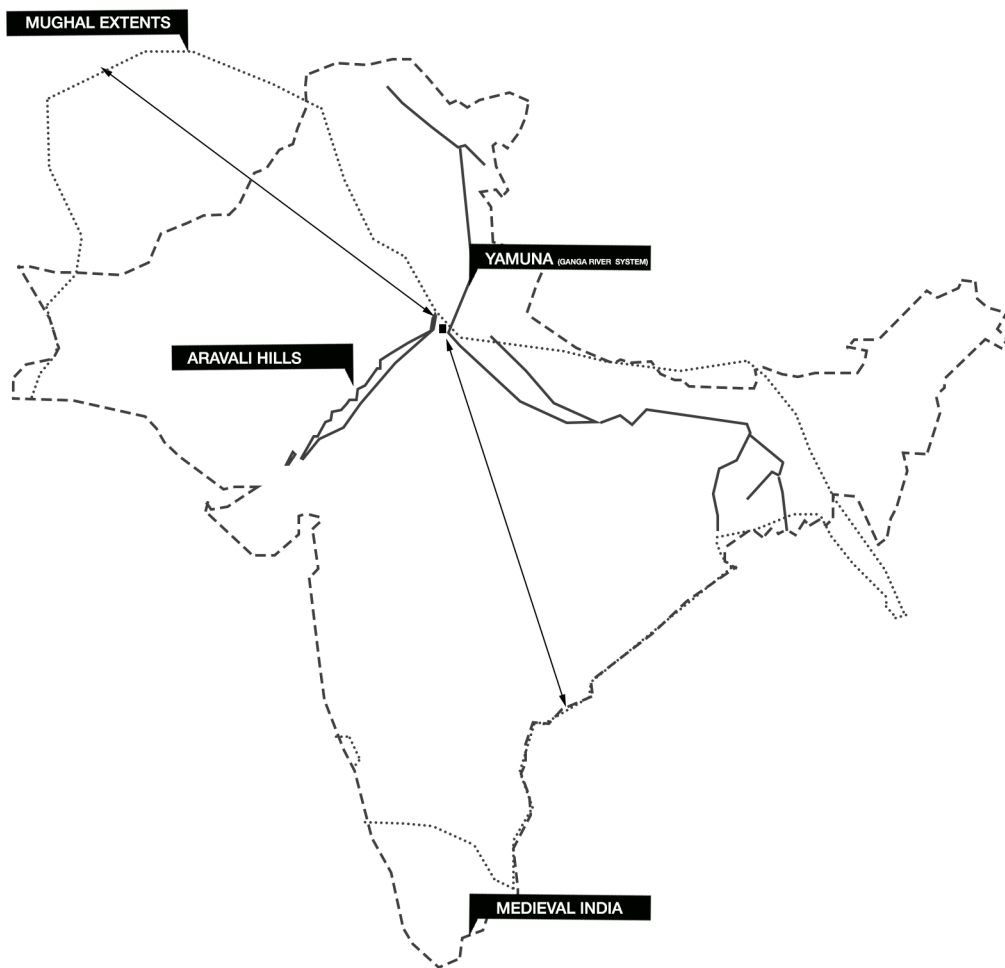


Figure 1. India before Independence, Mughal Extents, Aravalli Hills and Yamuna River - Delhi as the seat of Power

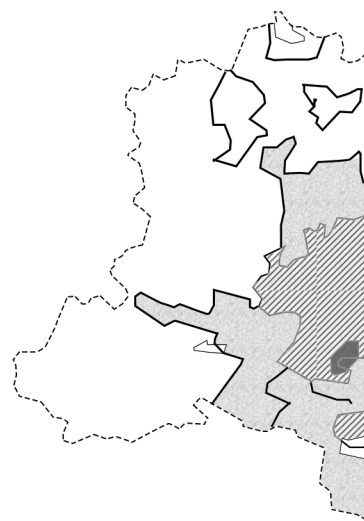
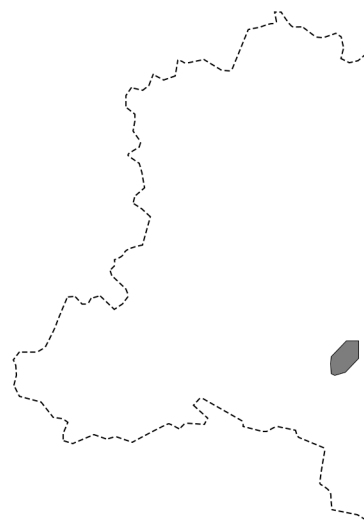
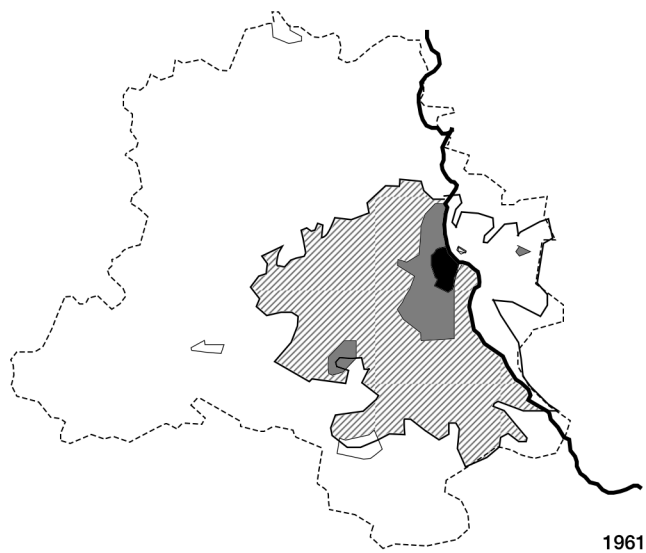
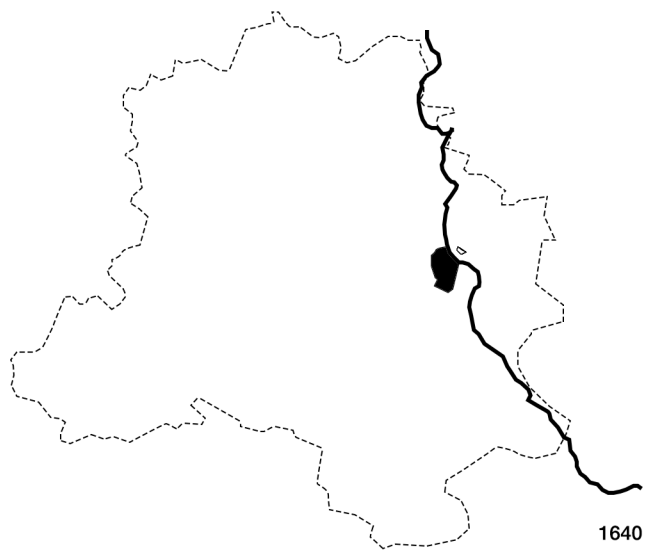
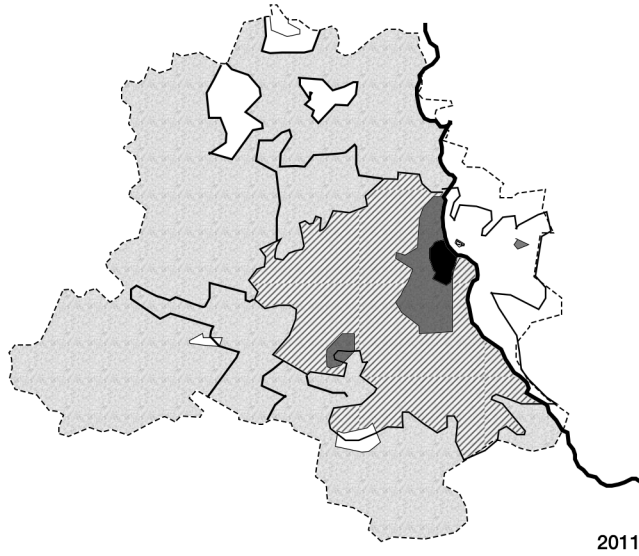
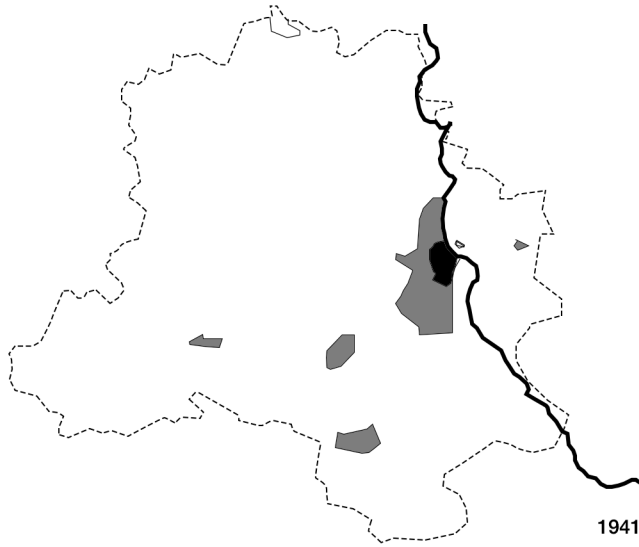
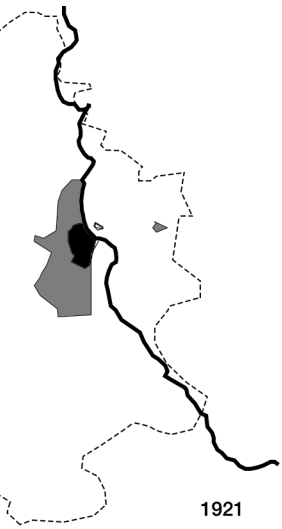


Figure 3b. Expansion of Delhi (Base informa



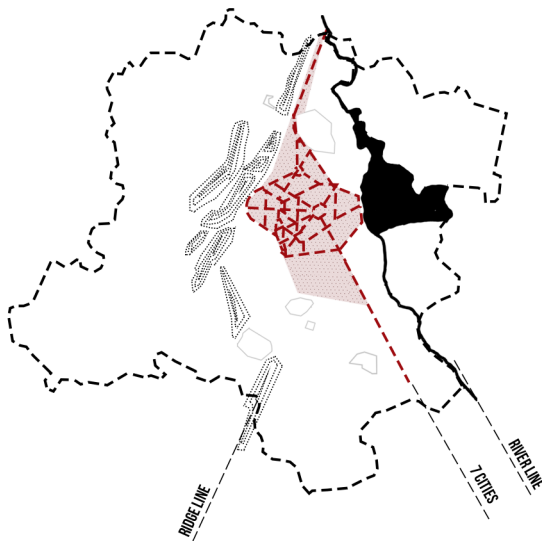
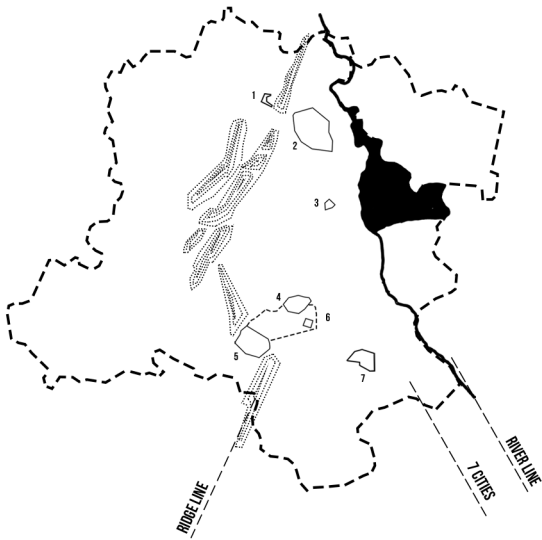


Figure 3b. Top Left : Traditional quarters in Delhi, Illustration by Author, N ^
Bottom Left : The british assembly in Delhi, 1936, Illustration by Author, N ^

Top Right : Photograph from Delhi Memoir, Dharampur
Bottom Right : Photograph from Delhi Memoir, Viceroy Palace

A : DELHI DRAMA

Outlining Relevance and Context

Delhi, the national capital to one of the world's fastest growing economies, India is a vortex of Indian administrative, political and judicial forces at play. For a city that was originally conceived as a geographic combination of seven smaller historic pockets, the turning point came in 1911, when Delhi was declared the new imperial capital of British India. The historic parts of city were deemed as cluttered and unsanitary for habitation. (Figure 3) As a symbol of new imperialist ideas and limitless colonial power, the British section of Delhi designed by Edward Lutyens was carefully placed, segregated from the clutter. This phenomenon resulted into three very significant events. Firstly, while the colonial and the elite simultaneously inhabited the new city, which stood as a symbol of luxury and power, the historic city was starved of resources, suffering a complete neglect and decay. Secondly, neither the people who were called in to construct the new utopian city of Delhi nor the people who gave up their land for this construction were given a place in the new city. By forcing the native Indians as well as non-elite to live in the old city, the spatial patterns within the traditional quarters were permanently disrupted. Lastly, the traditional quarters witnessed a surge in small and large-scale markets and industries, inviting a widespread migration of people, increasing the density exponentially. Interestingly, on plotting a building density plan (figure 4), one can observe that the densest parcels are in and around the seven pockets proving that the informal settlements are agglomerated around these traditional cores of the city. (Figure 4,5)

Post-Independence, India has been constantly struggling to find inclusive and cohesive socio-economic frameworks to cater to wide-ranging and diverse communities equally. Town planning and development visions are a fairly new concept to Delhi, which at present has been battling its associations to certain negative motifs – crime against women, increasing pollution levels and violent religious confrontations. However, what renders this mega-city central to this discourse are the complexities shaping the dwelling typologies for the urban poor. The urban population in Delhi touched the benchmark of 97% in 2011 and with about 78,000 people migrating to Delhi annually,¹ the dearth of affordable dwelling and housing schemes have become a pressing issue. There are two important aspects to delve into - the demographic profiles of the users composing the urban poor and the settlement typologies accommodating them in the city.

¹ Economic Survey of Delhi 2016; [http://www.delhi.gov.in/wps/wcm/connect/923fa5804054d42dbe9bfea1527a7156/Chapter14_\(02-08-17\)](http://www.delhi.gov.in/wps/wcm/connect/923fa5804054d42dbe9bfea1527a7156/Chapter14_(02-08-17))

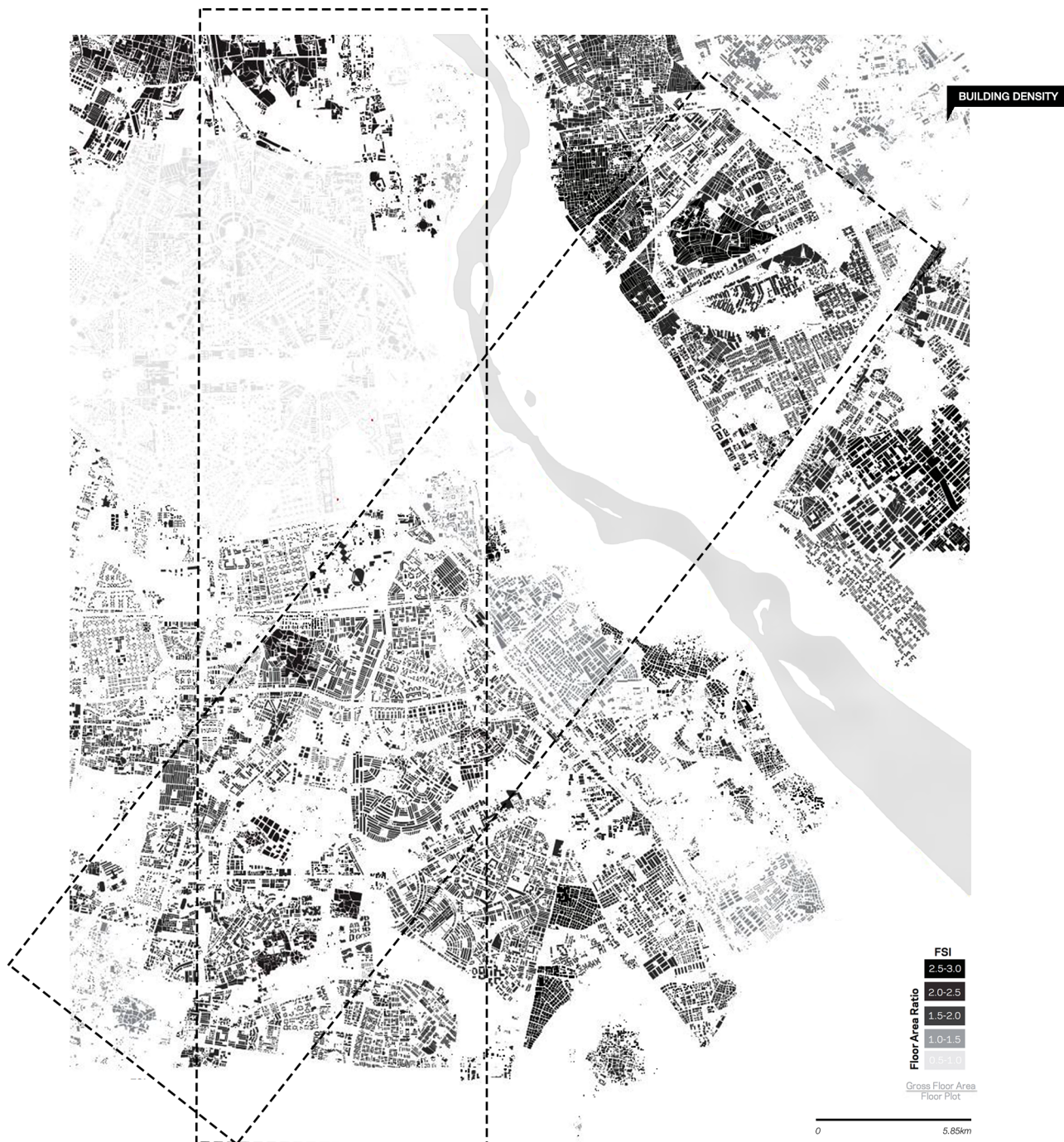


Figure 4. Building density mapping in Delhi, Illustration by Author drawn over plans presented in 'Recentring Delhi', 2015

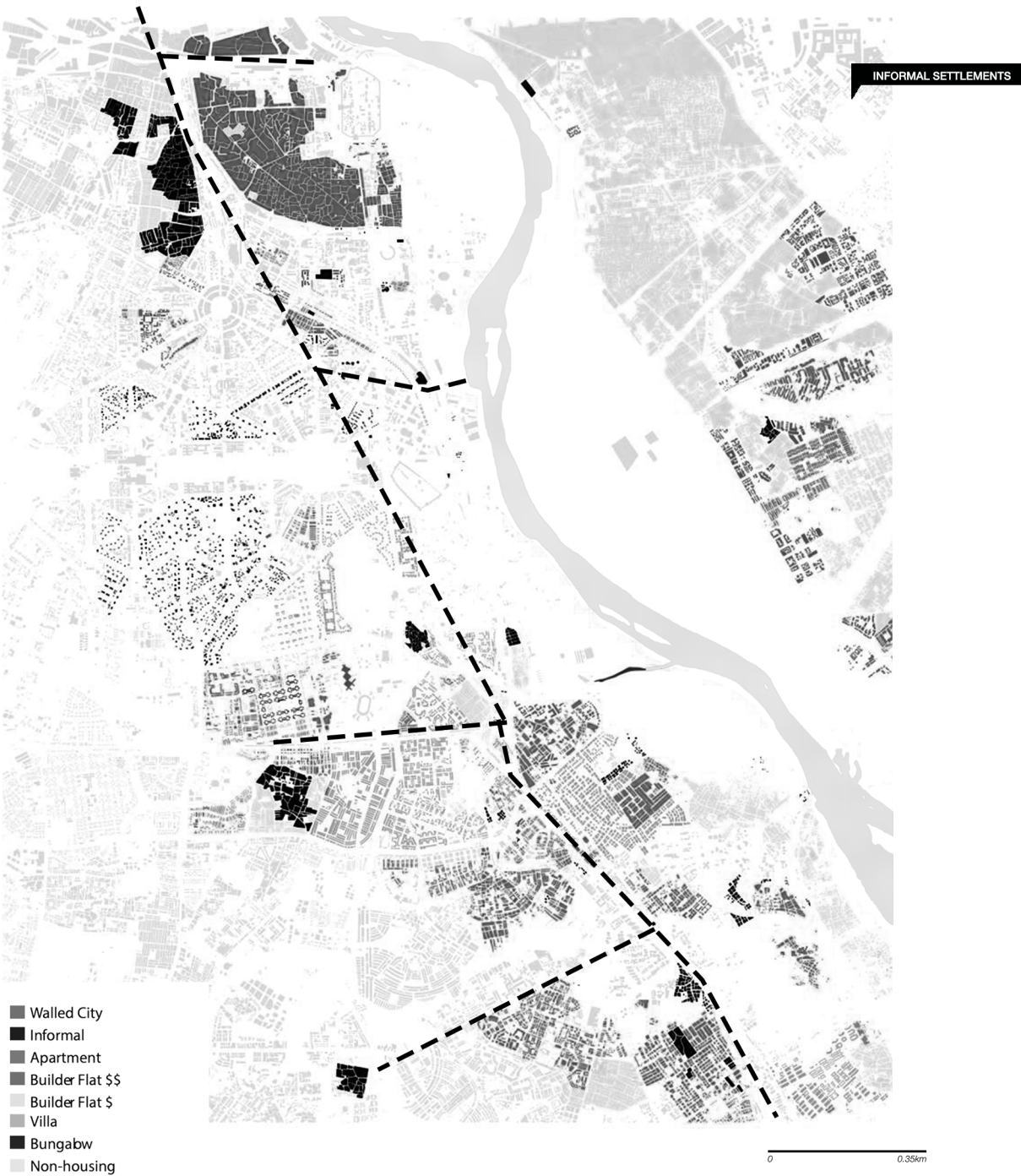


Figure 5. Informal settlements in Delhi, Illustration by author as presented in 'Recentring Delhi', 2015 . N ^

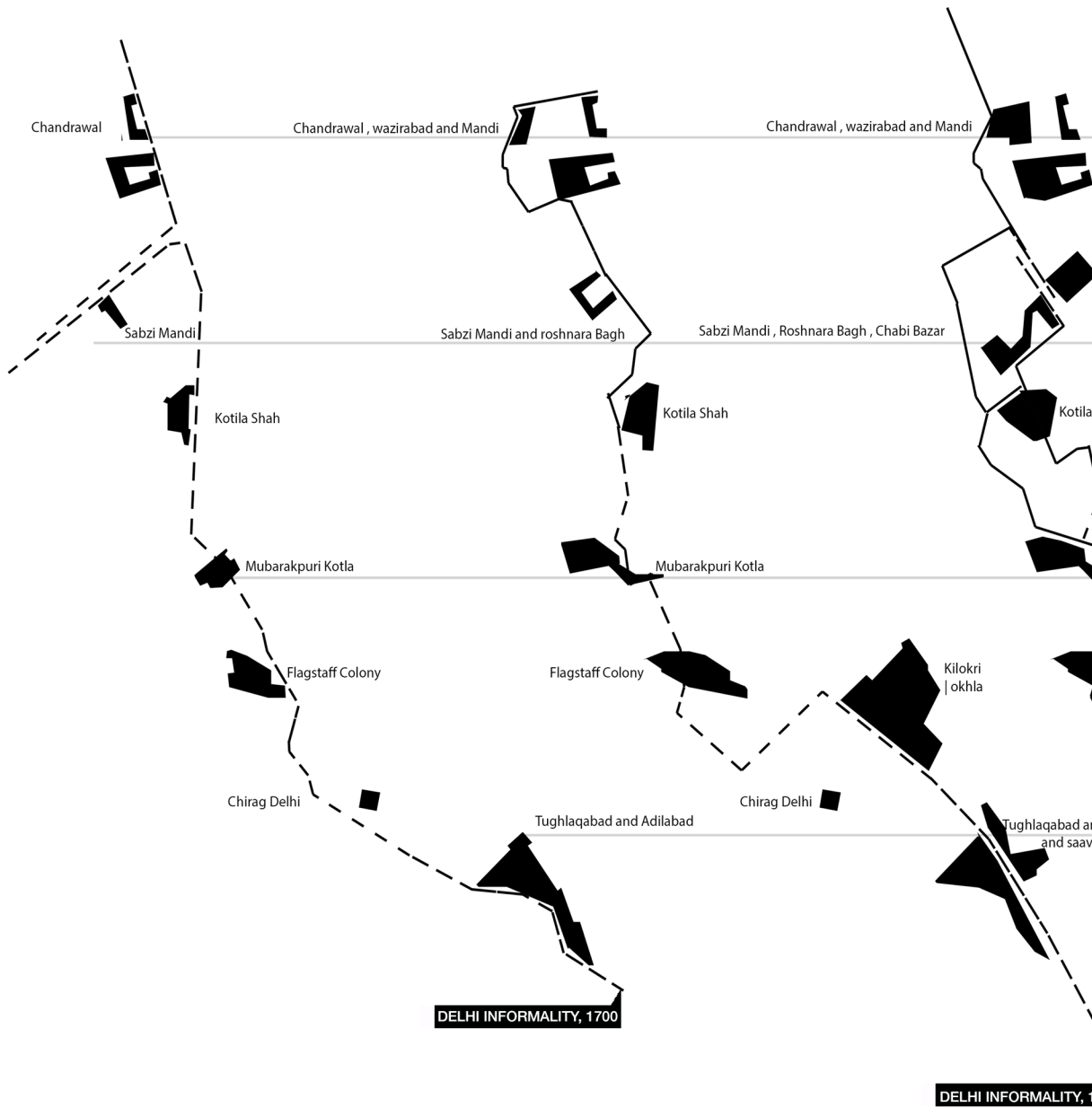
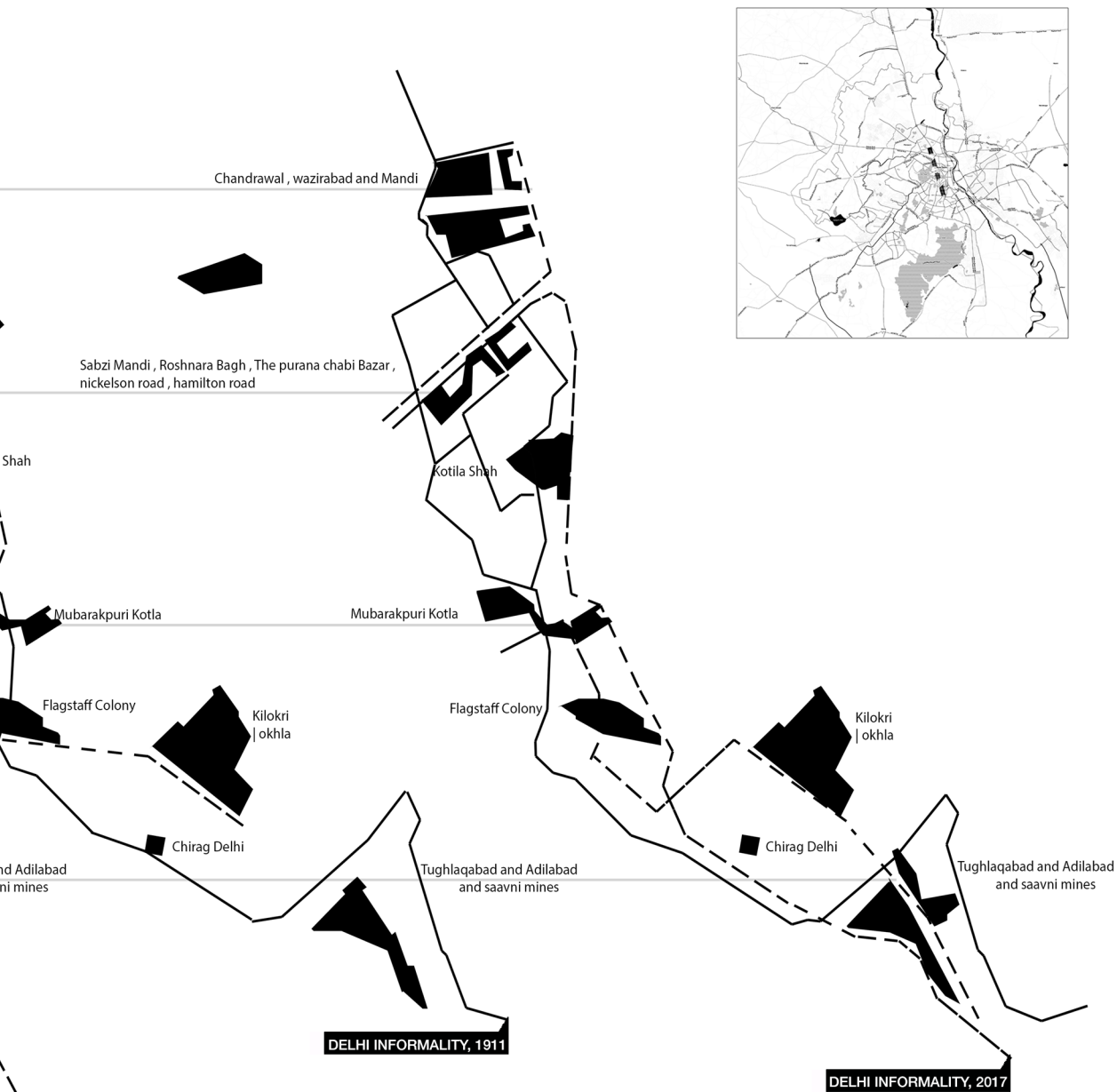


Figure 6. Evolution and morphological iteration of informal settlements in Delhi, demon



Much of the urban growth has been influenced by poverty-induced migration, from different parts of the country, particularly from the neighbouring States, in search of livelihood. The census of India qualifies any person 'migrant' only if he/she is enumerated at a different location than existing at the time of birth. According to an estimate prepared by the Society for Development Studies, the rate of growth of squatter population in Delhi (natural growth of existing squatter population plus the fresh migration) during the period 1971-84 was four and half times larger than the non-squatter population.

The squatter population during the period grew by 13.2 percent per annum as compared to the 2.9 percent growth of the non-squatter population.² Even though there was a radical surge in migrant influx, there was no government body controlling it. The notion of squatting on public space and agricultural land had no guidance or regulation till 1957, when Delhi Development board was formed overseeing the land-use and planning of the capital city. This time frame was extremely essential as geographic boundaries of Delhi were expanded and there was a surge in the building and construction industry. However, assimilation and integration of the migrants was not paid attention to and in the absence of a competent governing authority, much of it happened dynamically through a logic of its own.

Migration and informality are closely tied through a play of social networking in Delhi. Any user trying to migrate first establishes a contact with someone in the city and then looks for an accommodation around this point of contact. Hence, the existing informal settlements keep expanding along familial, regional, linguistic, religious and caste affiliations. Since the planning and management bureaucracy in Delhi does not handle migration effectively, the proliferation strain is truly accommodated by the informal settlements. In ways more than one, the additive and assimilative nature of the settlements in Delhi makes them much required sponges to the inflow of people. The diversity of income and religious groups so formed also render them culturally diverse and cohesive living options.

The second aspect discusses the existing housing typologies comprising the informal sector. The urban housing and development charter claims that about one-third of the city's population is housed in informal dwellings including 695 slum and J.J. Clusters³, 1797 unauthorized colonies, several old dilapidated areas and 362 urban villages, out of which 20 are notified as urban villages. Within the non-formal sector, about 76% of the population is estimated to live in sub-standard housing and within this 73% of the population constructs their own houses.⁴ Deeper analyses of census data revealed the massive class and income differences in the demographic profile of Delhi. Julia King in her work Inclusive city building elaborates that the urban poor neither share a clear or defined access to safe and secure built infrastructure nor can afford formal shelter.

By slowly excluding them from formal dwelling processes, the poor are forced to adopt non-formal ways to acquire shelter, giving rise to an informal housing sector. The most pertinent to this research is the resettlement clusters. The first

² Chakrabarti, 2001; 07-11

³ Locally defined as insanitary and poorly constructed squatter settlements

⁴ Economic Survey of Delhi 2016; <http://www.delhi.gov.in/wps/wcm/connect/923fa5804054d42dbe9bfea1527a7156/Chapter+14.pdf> (02-08-17)

wave of resettlement happened in 1970's, citing better living conditions, 44 inner city settlements were displaced to the periphery. These peripheral zones subsequently became part of the city when the boundaries were extended in 1981-84. The next wave of resettlement was carried out from 2003-2005 where about 66175 people from various slums were displaced to be rehabilitated into resettlement colonies outside the new periphery with plot allotments of 25 sq., 18 sq. and 12.5 sq.⁵ The last phase of displacement is going to unfold in 2018 becoming the trigger point of this study.

A1: Confrontations

Problem statement: Rich to Poor Factory

What has come to terms through personal observations and engagements with the city is that two clear contesting poles shape the landscape of informality. First, the Indian political and bureaucratic classes are driving a capitalist developmental desire to make Delhi a 'world class city'. With the likes of Shanghai and Hong Kong as precedents, Delhi is set to undergo a radical transformation to achieve an ideological image of the 'global city', invariably translating to slum-free. Chakrabarti notes that it has become very evident that there has been a concerted attempt to clean up the Indian cities, to rid streets and public lands of squatters and to reclaim public spaces for the use of proper citizens.⁶ Over time, various instruments such as master plans, environmental legislations, slum clearance/rehabilitation projects etc. have been deployed by the state to effectively achieve the same.

Today, the capital city, has succeeded, although partially, in diverting population growth to geographic or socio-economic periphery of the metropolis. Large sections of poor migrants have been absorbed either in the hinterland or in the marginal areas within the agglomeration like the sides of railway tracks, industrial landscapes, swamps etc. wherein the quality of life is low. However, it is interesting to note that the space so reclaimed by displacing the poor is used to create segregated public realms for elitist consumption and culture.

Resisting this idea, is the other pole, composed of people inhabiting these settlements, arguing for a right to live and avail the facilities of the city. They are joined by an academic position that urges India to recognize the potentials of a user-generated dwelling form that in effect offers affordable living solutions to the majority of the urban poor population in Delhi. It may seem that the right to housing with a sufficient benchmarking in terms of standard of living would be universally accepted as fundamental; however, in urban India this is a very expensive proposition. Regressively, the poor in India are expected to stay as 'citizens without the city' assuming that a mere position in the city is a high enough courtesy, above which everything would have to be a 'buy in' through personal assets gained in the time.⁷ There are various groups encouraging agencies to look at dwellings as not just commodities but fundamental assets that are not reserved for a selective few only.

⁵ Census Report, Housing , 2016; Volume Housing

⁶ Roy 2009; 5-11.

⁷Appudurai 2001; King 2010



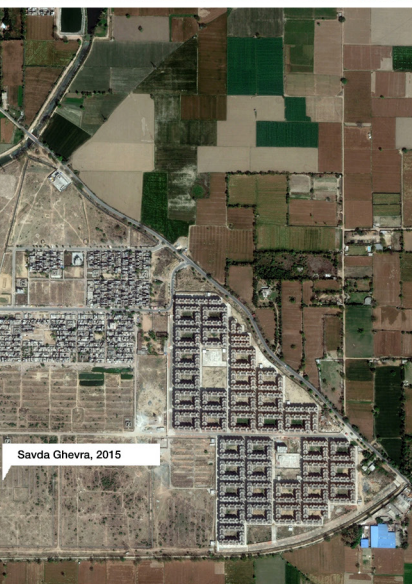
Figure 7. LEFT : Yamuna Pushta Eviction, MIDDLE : Savda Ghevra R



Savda Ghevra, 2007



Kathputli, 2007



Savda Ghevra, 2015



Kathputli, 2015

These two poles are often seen confronting ferociously. One such scenario was the eviction of 2003, where about 3,00,000 people were forcefully displaced far away from Yamuna Pushta, a 50-year-old informal settlement in the city centre, citing illegality of the land, poor health conditions and flood risk. They were placed in something like 'dormitory' camps, which were leased to them for 10 year, 40 km west from the city centre, in a barren plot of land called Savda Ghevra (SG). The proposal was enforced by linking affordable housing with security of land as a justification for resettlement.⁸ The process invited architecture as a discipline to felicitate the first ever formalization process of informality in the form of designing a resettlement colony, bringing together the bureaucrats, designers and inhabitants together on one plane. The repercussions of this process as well as the repeated recurrence of the same are discussed in the next section. (Figure 7)

A2: Mythical land of Opportunity

Savda Ghevra Resettlement

Within the disciplinary scope, Savda Ghevra was designed as a residential zone for various urban poor groups that were evicted from their respective squatter settlements in the city. (Figure 8) Some of these settlements were as old as 200 years qualifying them as historical relic and the others as new as 50 years, long enough to make a dent in the city's built environment. Carried out in two phases I and II, Savda Ghevra is the epitome of regressive thinking where in the name of civic amenities; hundreds of people were allocated unbuilt plots outside the periphery of urban Delhi without any site and services planning, on a lease of ten years. The inhabitants who were uprooted without any proper monetary compensation, not only were expected to pay for a basic structure on the plot (subsidized than the market rate) but also to pay for the construction of the house as per the affordability.⁹

This process was presented as an 'incremental scheme' where the residents were free to develop the house as per requirements depending on the capital at hand and availability of materials. This application of incremental strategies, however, was fairly limited and short-sighted. Julia King notes that more than 50% of the houses did not partake any investment on the dwellings, which meant that most of the households lacked basic facilities of sewage and sanitation. Her studies conducted in the area attest to the fact that most of the houses did not upgrade and remained in their original forms even after 7 years of secure land tenure. ¹⁰ There were be two prominent reasons for the same. (Figure 9,10,11) Firstly, since the neighbourhood was far away from any source of livelihood or income, social and economical networks and city infrastructure, most households frantically started saving as much money to avail another accommodation within the city limits. Secondly, even if there were any investments made in the physical infrastructure in Savda Ghevra, it would be diverted to commercial setups building up an informal micro-economy.

8 King 2010; <https://incrementalcity.wordpress.com/2013/03/26/affordable-housing/> (16-11-17)

9 King 2010; <https://incrementalcity.wordpress.com/2013/03/26/affordable-housing/> (16-11-17)

10 King 2010; <https://incrementalcity.wordpress.com/2013/03/26/affordable-housing/> (16-11-17)



Figure 8. Top : Government Proposal retrieved from Julia King's study of Savda Ghevra
Bottom : Montage of a Typical Block obtained from LSE and CURE

Apart from a loosely framed planning framework, Savda Ghevra had to be planned rigidly so as to restrict illegal resale and remodelling of the houses. The planning agencies used a strict grid division and a rigid dwelling slab system as the strategies to achieve the same. The housing parcels were distributed in two predominant dwelling slabs – 18 sq. And 12.5 sq. and they were allocated through a peculiar cut-off system. (Figure 9) The inhabitants who had enrolled in the cut-off of 1990 resettlement scheme were allocated the 18 sq. plot slab and those who qualified for the 1998 cut-off were allotted 12.5 sq. plots.¹¹ It is important to note that the plot sizes were considerably shrunk and laid out as highly restrictive, without responding to family-sizes, income and religion profiles. Even further, the strict grid placed to achieve the high density, rendered a plot-to-plot housing settlement with complete disregard to ventilation and daylight requirements. Lastly, the agencies provided planning schemes for one-story houses but did not educate the inhabitants in terms of the quality of workmanship and material quality essential for the house, resulting in a poor and low standard of life in the neighbourhoods. Each parcel was allocated a community toilet, most of which are sealed even today,¹² forcing the residents to either resort to open defecation or installation of toilet blocks through private companies, increasing the incurred cost.

The second phase involved construction of a G+5 apartment scheme intending to stack people vertically to leave as much free ground space for other projects to make the scheme lucrative for developers. Most of these apartment blocks are either empty¹³ or rented out illegally. The inhabitants sitting far away from any source of livelihood rented out their houses for a steady rent income and made new informal settlements in the adjacent empty plots. So in reality people who were pushed out from their traditional homes citing informality, ended up with no choice but to make new informal inhabitation forms outside the city (Figure 10). A simple glance, at the scale and proportions of the open spaces and dwellings makes the design intent explicit, which was more like a propaganda aimed at uprooting people from their homes in the city and placing them in neighbourhoods designed to bring about a radical transformation in the social and everyday practices. In fact, Savda Ghevra can be appropriately compared to a rich to poor factory, where the residents were left with no choice but to either grow up the economic ladder and gain a superior position in the city or learn to live on the peripheries of the city infrastructure.

The other and most important aspect that is critically missing from the resettlement strategy is the unregulated open space. Since most of the households could not resonate with the proposed dwelling structure, they started encroaching the open spaces, which were very loosely demarcated and lacked any jurisdiction. (Figure 12,13) This misplaced appropriation of ground realm on combining with other processes such as lack of jobs, short-term leases and high costs of construction, resulted in an inconsistent growth and urban form in Savda Ghevra.

¹¹ Tiwari, Qazi; 2016, commodification of housing - II

¹² Tiwari, Qazi 2016, commodification of housing - II

¹³ Tiwari, Qazi 2016, commodification of housing- II



UNIT TYPE - 12.5 sqm. (Built & Plot)

UNIT TYPE - 18 sqm. (Built & Plot)

Type c

BUILDING COST : 48 Euros

Type d

BUILDING COST : 53 Euros

Type e

BUILDING COST : 60 Euros

Type b

BUILDING COST : 20 Euros

Type f

BUILDING COST : 0 to 6 Eu.

Type g

BUILDING COST : 30 Euros

Type a

BUILDING COST : 9-10 Eu.



Figure 9. Top : Unit size and Bottom : Building costs - obtained from LSE and CURE

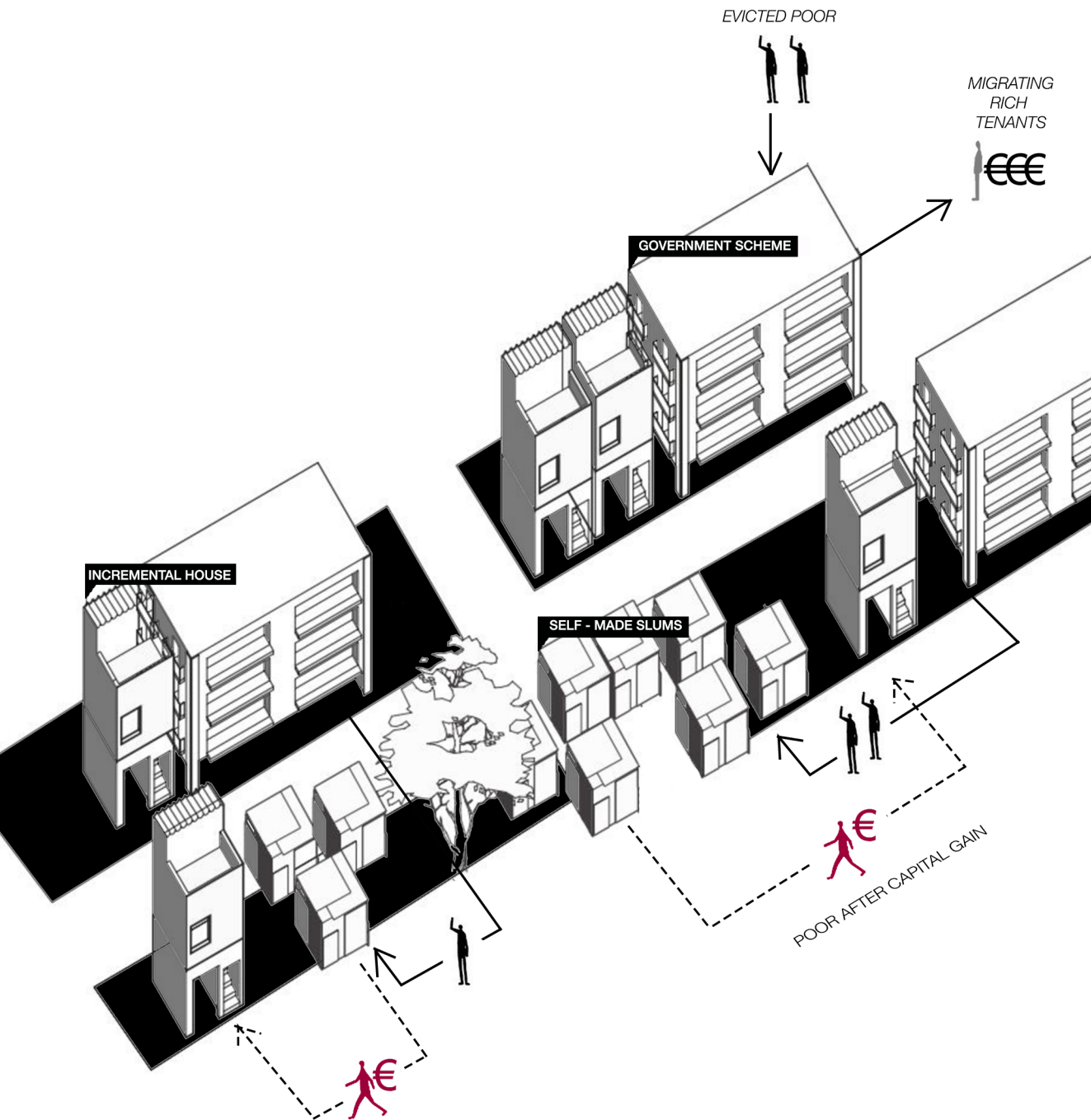


Figure 10. Dwelling trends in Savda Ghevra, Illustrations by Author

A3: Fault Lines

Understanding the gaps

There are a series of gaps in the conception, implementation and execution of this relocation model. First and foremost, the incremental strategies deployed on site are taken from precedents where such schemes have bloomed into cohesive living environments. However, in the case of Savda Ghevra, they could not take off. The poor were dislocated from the zones of opportunity inside the city and placed at peri-urban blocks with poor connectivity to infrastructure, socio-economic networks and possible sources of livelihoods. Thus, the lack of a steady source of income makes it highly improbable for the already vulnerable groups to invest in construction of their own houses. Usually, in a generic informal settlement there is a very strong linking between the informal loan markets and micro-finance systems facilitating the construction process. However, in the case of Savda Ghevra, the security of tenure is not a strong enough reason for the micro-finances to get involved. Furthermore, the plot sizes of the houses are relatively smaller (18 and 12.5 sq.) to be presented as collateral in the formal finance avenues to get a loan to facilitate construction. Thus, in the absence of steady income and restricted formal and informal finance markets, there is next to nothing in terms of resources to carry out the incremental process.

The finance and economic systems are owed acknowledgement, however, very little can be achieved through spatial planning to counter these processes. In purely architectural terms, there are two very clear gaps visible through the analysis of the process that could definitely be altered using the tools of space, form and program. First, is the regressive dwelling slab approach, which enforces a one-shirt-fit-all approach disregarding various form determinants that are at play. It has to be clearly put forth that affordable living options for the poor is not a number problem, it is in fact a people problem and would a range of paradigms operating simultaneously to resolve it.

The second bigger gap is the dismissal of open space or ground realm and the value it holds for these informal settlements. In the case of Savda Ghevra, the disciplinary reflection is only limited to land that has a monetary value. The open space in the case of a generic informal settlement is enriched in social value and not as mere a by-product of dwelling figure ground. This order of the open space makes an informal settlement adaptive to changing economies and housing markets. As a spatial component, it adds onto the domestic space and makes it highly flexible and responsive to varying family structures, aesthetic values, social dynamics, class systems, and 'tastes'. Thus, understanding the structuration of an open space network in a non-designed environment should have been the key to design Savda Ghevra but the design approach seemed completely oblivious of it.

In 2017-18, a similar process is set to unfold, where a traditional informal settlement of musicians and puppeteers living in Kathputli, an informal pocket in the city are being evicted to neighbourhoods in Savda Ghevra and Narela, outside the peripheries of Delhi. Incidentally, an interim stage has been introduced in the entire process where the displaced

populations are first placed in transit camps until the developers are preparing the designated schemes. While analysing the dynamics of this process, it was observed that these interim camps could be experimented with to iterate the existing process of eviction and resettlement.

There are three primary propositions that make pre-transit camps an exciting terrain. Firstly, the geographic location of a pre-transit camp is such that it is met with least resistance during the eviction. On mapping the existing pre-transit camp locations, it was realised that most of them were inside the city boundaries close to commercial and residential cores of the city. Furthermore, it was realised that the placement of the camps coincided with the industrial landscapes of Delhi, which were also pushed outside the city core two decades ago, pollution and environmental degradation. Post expansion of Delhi, they have become part of the peri-urban and urban premises, increasing the viability of the placement of the camp.

Secondly, the interim period was initially aimed for 9 to 12 months, however is seen as stretching to up to five years. The period is long enough for giving a fighting chance to the poor to assimilate within the city fabric before the final displacement. Owing to the geographic location, it could possibly expose them to the idea of production and empowerment through capacity building. Thirdly, the existing transit camps are developed under public-private partnership schemes under a duress levied by resisting inhabitant. Thus, it is possible to urge the agencies to readily invest in developing a safer and cohesive dwelling zone to accommodate the displaced residents. Thereby, tackling the entire regressive approach implicitly. The thesis attempts to re-imagine one such pre-transit camp, Anand Parbat, as a typology to bring forth the merits of positioning the poor in the city symbiotically.

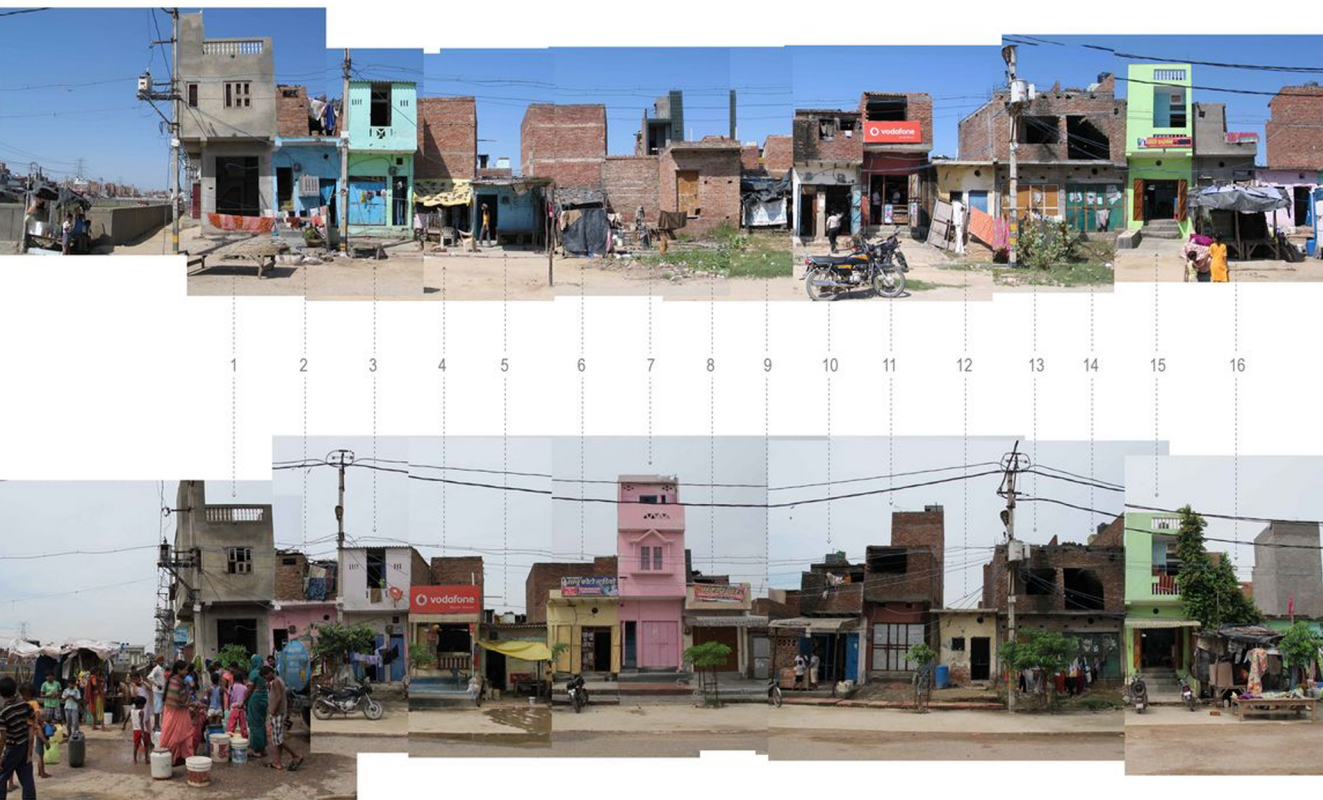
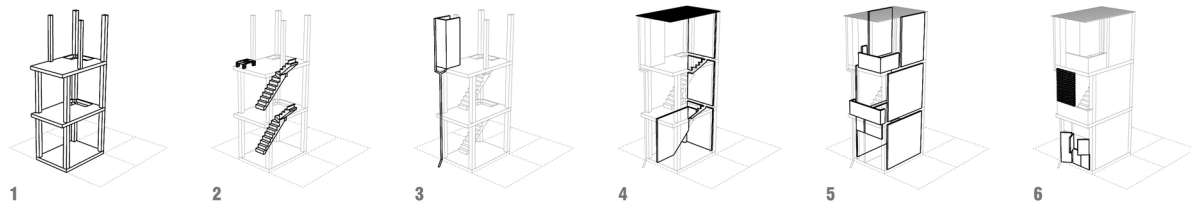
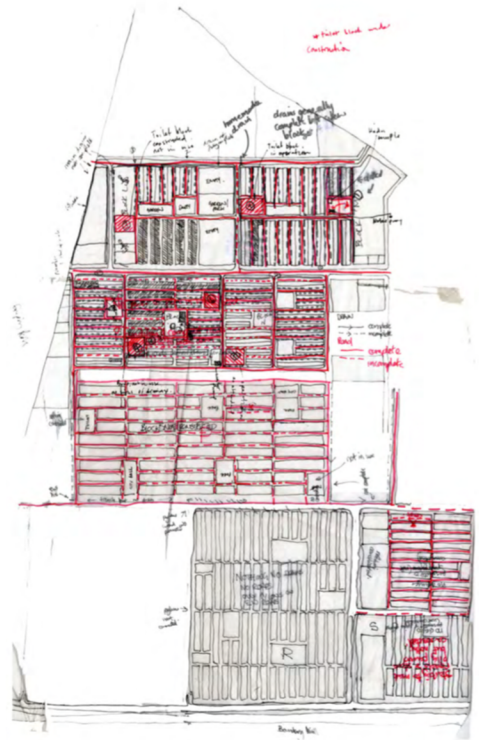


Figure 11. Illustration by Julia King, the Potty Project for Savda Ghevra- 2012



Figure 12. Photograph from Changing Landscapes at Savda Ghevra, LSE and Cure



A typical half constructed road in block A



Poorly made street surfaces collapse



Collapsed road due to heavy trucks

A4: Propositions

Blind men of the myth

Why and what exactly went amiss? An Indian parable is used to answer this more assertively. Three blind men were asked to describe an object, an elephant in this case by touching it. Each blind man creates his own version of reality from that limited experience and perspective – a rope, a wall, a tree but not an elephant. Are we the blind men of the myth?

The answer tends to yes, as designers or 'experts' there has been a relative opaqueness when it comes to understanding the dynamics between people constructing their built environment. In the course of daily life, people make sense of the world around them; they give it meaning and they interact on the basis of these meanings.¹⁴ In the case of informal settlements, the local interactions between the inhabitants are translated to local knowledge and manifested spatially. Resultantly, a complex and layered organizational structure logically exists underneath the settlement but it is not immediately visible to the observer that has been relatively outside the system. The understanding of these critical underlying organizational complexities is imperative to attempt any sort of formalization processes.

The study of resettlement processes occurring in Savda Ghevra brings out three significant observations. Firstly, the rigid dwelling slab system is an easier way out, however, is counterproductive to the process of relocation. Like Amos Rapoport states in *House, form and culture* (1969) that various communities around the world have operationalize various form determinants, especially in terms of Dwelling. There are physical form determinants such as climate, need for shelter materials and technology and site conditions. More importantly, there are intangible form determinants such as Economics, defence and religion coming from the social framework.¹⁵ These subtle idiosyncrasies need attention, research and translation when it comes to dwelling typologies.

The other important aspect is the ability of these settlements to organize and structure their open spaces in the absence of a governing agency and ambiguous ownership regulations. The sheer volume and the robustness of these settlements, especially in the case of Delhi, is a proof that there is a latent genius in the processes at play in terms of open spaces. The engagement of the profession has been fairly limited to the dwelling design when it comes to informality, however, it is important to note that the flip side or the negative – open space also defines the physical form of the settlements. It can be argued that the inherent local knowledge used by the communities to create an ordered living environment, separates them from a mainstream settlement produced through a disciplinary process. The next section would try to establish this said intelligence and the robustness of the process and make a case for its identification and integration in the design processes while designing a resettlement typology.

¹⁴ Schutz, 1967; Blumer, 1969; Denzin, 1978

¹⁵ Rapoport 1969; 24-43



Figure 14. Photograph from Changing Landscapes at Savda Ghevra, LSE and Cure



Figure 14a. Forceful and planned Kathputli Demolition. Photographs by Sanjukta Nair, Independent Research by the Telegraph, 2015



Figure 14b. Anand Parbat Resettlement neighbourhood, Photographs by Sanjukta Nair, Independent Research by the Telegraph, 2015

What are the **processes and forces** organizing **open spaces** in an informal settlement of Delhi and can they be instrumentalised into **fundamental guidelines** for a design process for an inclusive and sustainable **resettlement project** ?

Terrain *Method*

Toolbox *Intention*

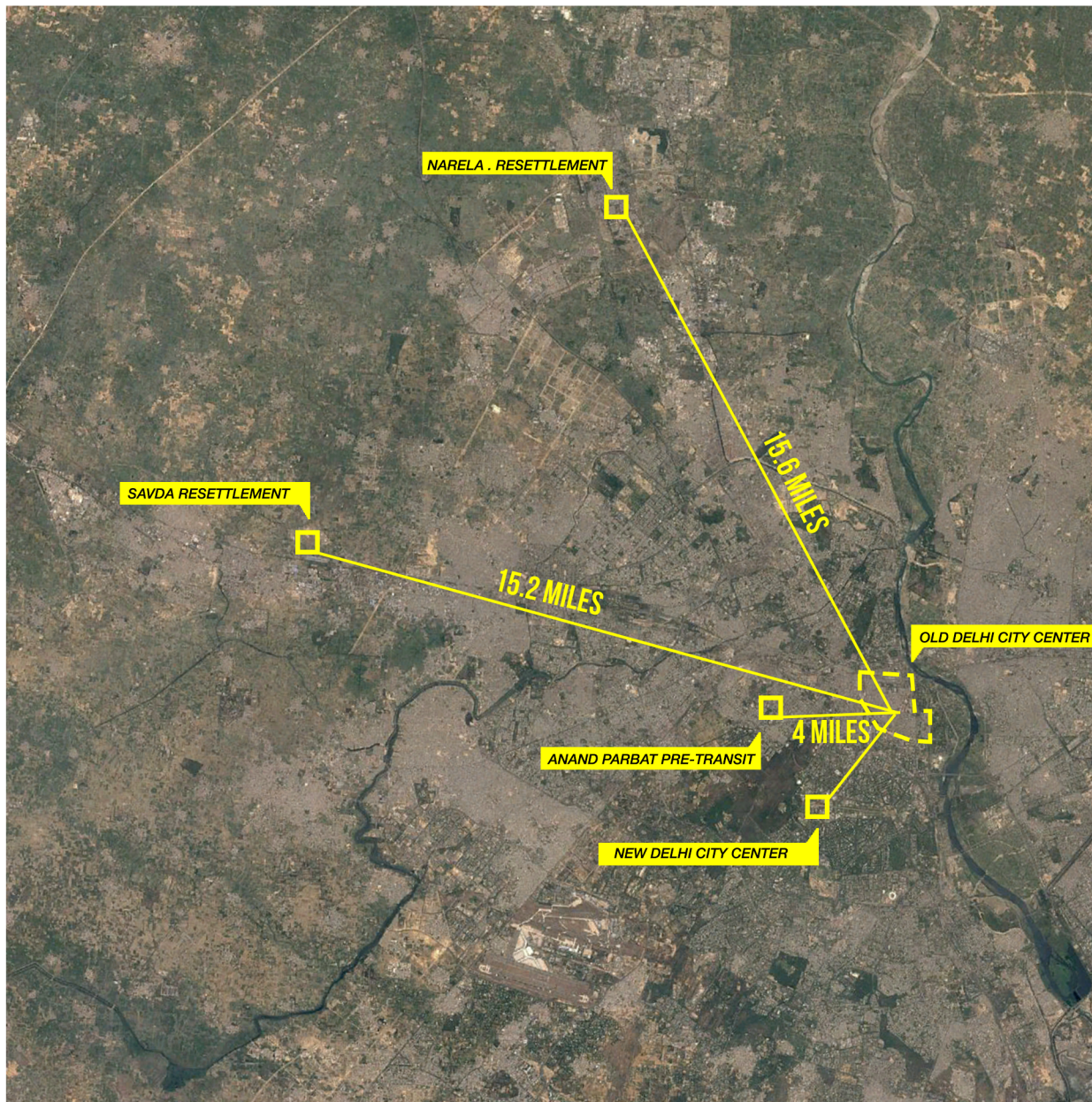
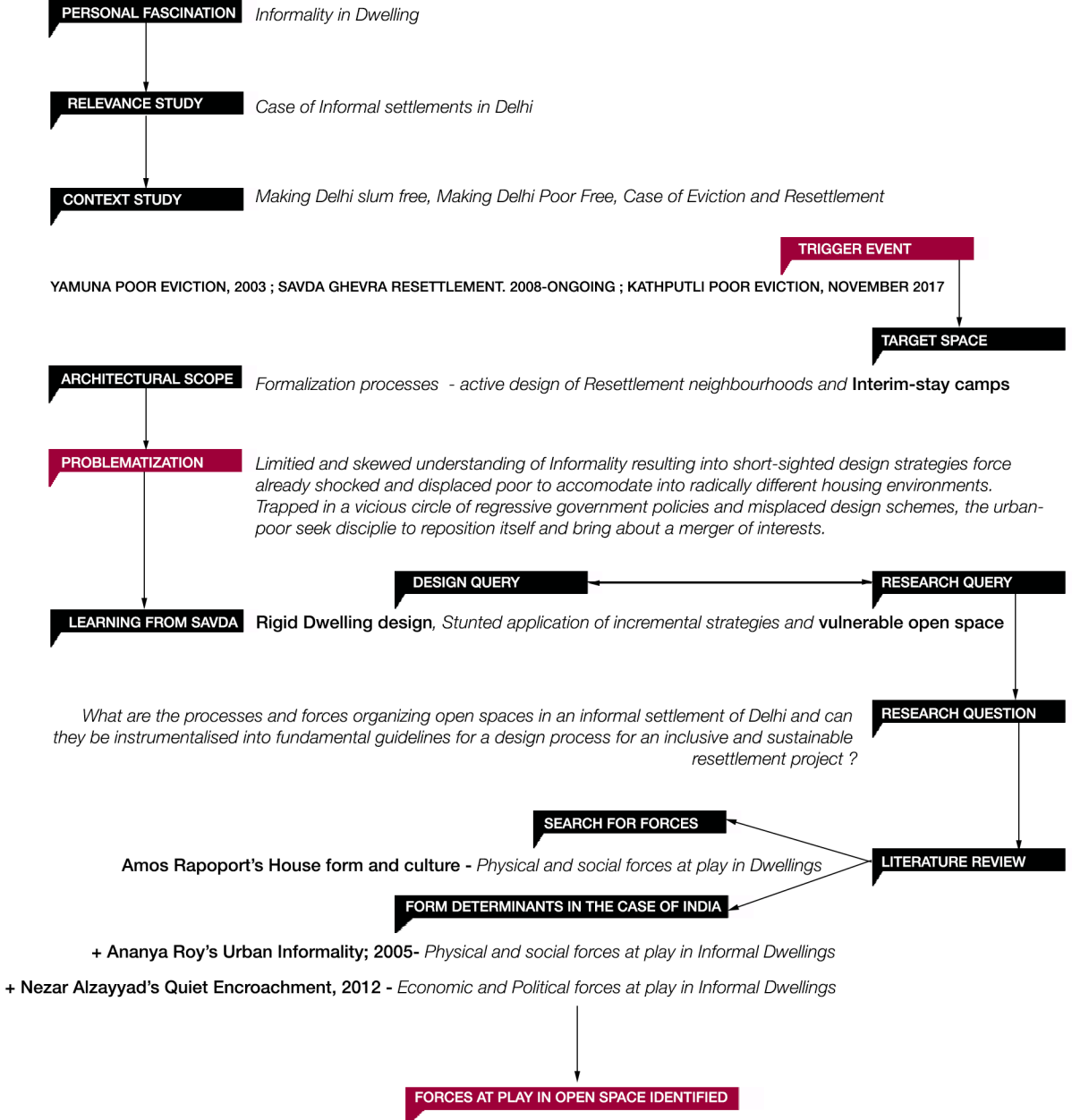


Figure 14c. Location map for City center, Old Delhi, Anand Parbat camp, Savda Resettlement, illustration by Author over Google Earth Imagery



FORCES AT PLAY IN OPEN SPACE IDENTIFIED

FORCES TO ORGANISATION PATTERN

LITERATURE STUDY - II

John Holland and Page's Complex Adaptive systems + Elinor Ostrom's Common Property Regime

Self-organisation is patterned

Common resource pool creates the pattern

THEORETICAL FRAMEWORK

+

An informal or squatter settlement categorically fits the benchmarks of a complex adaptive system, where inhabitants are regularly interacting and adapting to the social, economical and cultural processes occurring in the host environment. Since, people are constructing their own environment, the feedback is not only produced but also visibly adhered to. By virtue of this, certain pattern exists even if it is not legible immediately as the composed whole is larger than the sum of parts.

In a scenario where the scale of resource is too big for harvesting individually, enforces a social arrangement, between participating agents to carry out a balanced exploitation and exploration of a common resource pool. The medium of this sharing belongs to everyone and no-one at the same time.

EMPIRICAL STUDIES

General instances :
School of fish, Popularity by number

General Instances :
Fisheries, irrigation water

Spatial and context instances :
Self-organised Lunch Box Delivery systems in Mumbai, India

Spatial and Contextual Instances :
Cash crop plantation and water system sharing in Garhwal, India

ANALYTICAL FRAMEWORK

Self-organised open spaces is a patterned process structured around a negotiation between common resource pools. Physical factors such as climate and site are constant on a micro scale, however, social factors such as Economics, Religion and Defense are at play in the case of Delhi.

ANALYSIS - SETTLEMENT STUDY

VILLAGE CHIRAG DELHI

WALLED CITY OF SHAHJAHANABAD

VILLAGE SARAI KALE KHAN

OPEN SPACE PATTERNS -DELHI

URBAN PARK X MAIDAN

SQUARE X CHOWK

COURTYARD X CHATTA

DEFINITION AND PROGRAM, USAGE

FORM AND BOUNDARY CONDITIONS

SHAPE AND SIZE

FUNDAMENTALS CREATED FOR DESIGN QUERY

B. FORCES, ORDERS AND SPACES

Empirical studies and Theoretical framework

The process to analyse and substantiate the organizational behaviour of an informal settlement requires theoretical and scientific articulation. Thus, this section would de-construct the emergent and spatial characteristics to look into the various layers of spatial growth and their accumulation within the informal settlements of Delhi. Also, to critically establish relationships between them and the various forces involved in their spatial organization.

The most fundamental observation one can make while engaging with informality is the degree of spontaneity and its visible translation to space. According to Louis Wirth, the socio-economic value attached to the cities underwent a radical transformation at the end of nineteenth century as the discourse moved beyond development to the processes of density, social segregation, heterogeneity and emergence of survival mechanisms among the urban residents. It is at this point when the elements of a user generated physical environment were seen as relevant to the architectural discipline.¹⁶ This led to three primary effects pertinent to this research paper. First, the physical form generated through forms of collective behaviour and social interactions was recognized as a scientific process and not arbitrary appropriation. Second, there was a strong emergence of academia, documenting and analysing the juxtaposition of collective behaviour onto dwelling formation, especially the non-designed physical environments. Thus, the informal settlements were deemed as highly 'systematized' processes that have undergone years of socio-spatial structuring and re-structuring. Third, is that the organization structure was scientifically verified as logical and patterned constantly mutating to align to the inhabitant's needs and choices. The underlying structure was described, as self-organization and its manifestation into spatial structure would be discussed further.

¹⁶ Roy and Alsayyad, 2005 Pg 7-8

The intent behind understanding any organizational process is how an order is achieved. The order can simple or complex, legible or illegible, clearly defined or highly ambiguous. The 'spatial order' dictates the coordination between participating actors. Most orders define how users operate in a vertical plane where there are hierarchical dissimilarities between the social, economic or religious positions and also at the horizontal plane, where the actors are non-hierarchical.¹⁷

B1: Composed whole > Sum of parts

Order and self-organization

There are three elements to be gained in terms of order and self-organization and they would be explained using analogies. The first comes from the advertisement and branding industries - Imagine standing in front of two cafes deciding for lunch, both of them offer same cuisine at similar prices and are empty at the moment. You choose the one on the left and enter it arbitrarily. Sometime later, two people pass through the cafes looking for lunch options. In most probability, they are going to choose the restaurant in which you are seated. William Whyte notes this process in context of public spaces stating that what attracts people most is usually the other people.¹⁸ This explains the human behaviour and congregation patterns in and around the commercial centres, historical objects and communication routes, where number is usually associated with popularity.

The second analogy comes from 'herd behaviour' and is used to understand how does everyday decision-making gets formulated in bringing about self- organization. Quiet understandably, the space enclosed within an informal settlement is a highly contested terrain and typically in Delhi, the case where poor consciously mobilize to organize themselves is highly unlikely. Self-organization claims that in natural processes, sometimes it possible that a global pattern emerges out of localized interactions. For instance, in a fish of school, each fish places itself in accordance to the position and the velocity of the neighbouring fishes, mobilizing without being aware about the global knowledge. The theory argues that composed whole is larger than the sum of parts ¹⁹ and a certain pattern exists even if it is not legible immediately.

For instance, in Mumbai, another megacity in South of India, there is a culture of lunch delivery by a group of people called 'Dabbawalas'. People prepare food out of their homes, which are spread all over the city. Each vendor has his/her clients to cater to. Every morning the 'Dabbawalas' collect the food boxes and use a localized system of stamps to mark which box goes to where in the city. The entire city is coded in zones and represented through stamps and markers that are only legible to all the 'Dabbawalas'. This proves that people are able to self-organize into genius circulation, diffusion and agglomeration patterns even if they are not immediately apparent and or of a positive nature. (Figure 15 and 16)

¹⁷ Page and Miller, 2007

¹⁸ Whyte, 1980; William Hollingsworth 2014

¹⁹ Aggarwal, Sood, Patnakar 2012

LUNCH DELIVERY SYSTEM OF MUMBAI

5000+ MEMBER TEAM

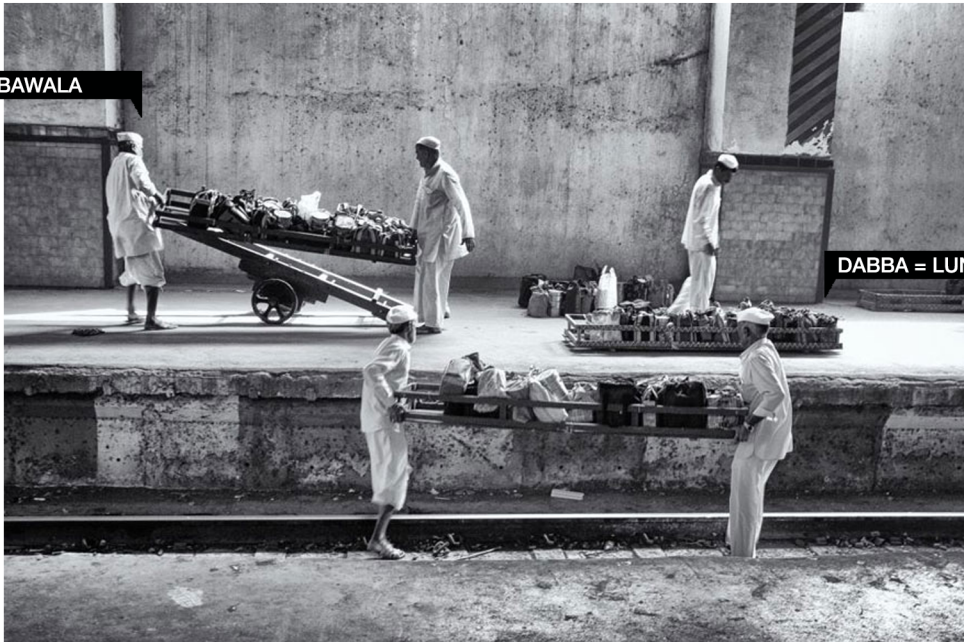
3,50,000+ ORDERS EVERYDAY

REGION WISE DIVISION

COLOR + SYMBOL = ZONE

0.1% ERROR REPORTED*

DABBAWALA



DABBA = LUNCH

Figure 15. Lunch delivery by Dabbawalas, Photograph from a newspaper, Times of India, 02-12-14

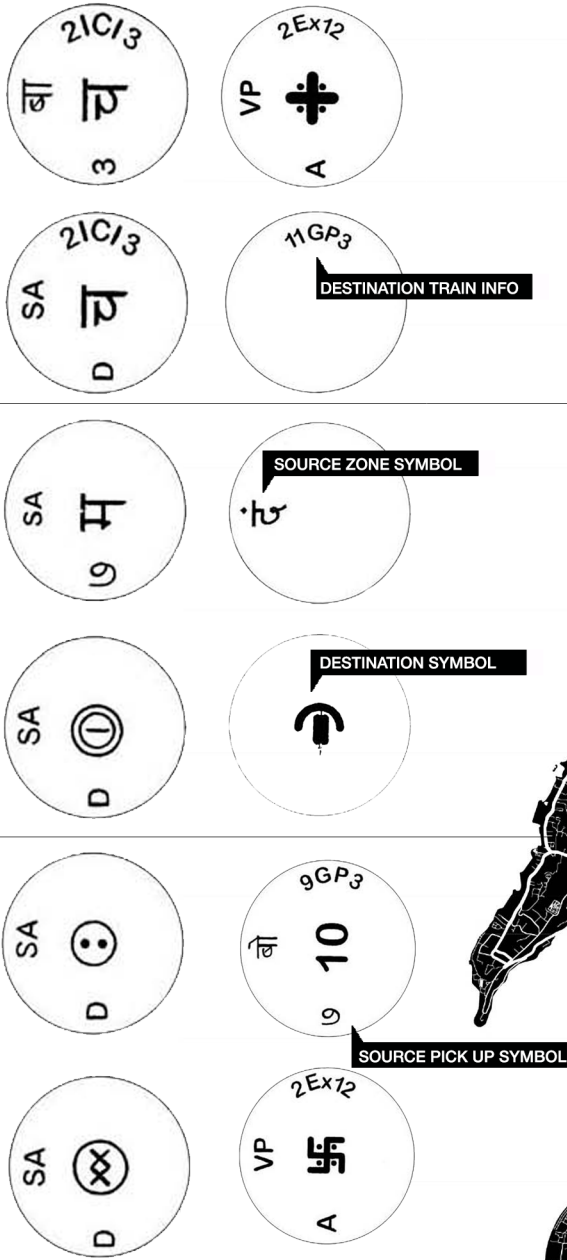


Figure 16..Left : Systems of distribution of lunch boxes, Information from DabbaWala Association chart, Right : Map from STUDIOART, Etsy

Theorists John Holland and Scott Page define this observation theoretically as complex adaptive systems. It states that regularly interacting components of a system are able to locally organize, thereby generating a more globalized organization pattern. There are three parameters that qualify a system into this category.

- A. Complex: There should be numerous components interacting with each other regularly generating multiple interactions, so much so that it is difficult to observe it at once.
- B. Adaptive: The system should be assimilative to global processes, such that it maintains its forms even if the environment is changing dramatically.
- C. Feedback system: The process should be non-linear and dynamic, meaning that the overall process is made responsive to feedbacks, rendering it systematized.²⁰

An informal or squatter settlement categorically fits the brief as the inhabitants are regularly interacting and adapting to the social, economical and cultural processes occurring in the host environment. Since, people are constructing their own environment, the feedback is not only produced but also visibly adhered to.

B2: What makes Mi Casa, Su Casa?

Negotiations through common gain

After establishing existence of patterns and intelligence in their nature, one can dig deeper in how is this operationalized in a non-designed environment. What forces the people to structure themselves in a pattern that corresponds to the composed whole? It is quite hard to imagine that the poor who are striving at an individual scale for basic necessities such as shelter, food, water, occupation, health care and education are able to construct an ordered environment. Elinor Ostrom attempts to break this dilemma with a theory called common property regime. She defines it as a regime or a social arrangement, which enforces a negotiation between participating agents to carry out a balanced exploitation and exploration of a common resource pool. The resource pool is broken down into two parts, one section that has to be preserved perennially (stock variable) and the other section that can be harvested by the community (stock fringe).

The resource chosen can be agricultural, water and irrigation, fisheries etc. that in terms of scale are difficult for harvesting individually and additionally be placed in a context where the user groups are also unable to harvest them individually, enforcing a social arrangement. In terms of informal settlements, for instance, the ground water well can be a good example. Locating and digging the bore-well for ground water is an expensive proposition for a poor household to handle singularly, whereas when decentralised in the community becomes an easier proposition.²¹ It also limits the consumption to members who invested in construction of the bore-well, which in itself is a point of community creation.

²⁰ Aggarwal, Sood, Patnagar 2012

²¹ Aggarwal, Sood, Patnagar 2012

Ostrom through her work 'Governing the commons' effectively ties the theory to eight design strategies for an effective spatial application.²²

1. Clearly defined boundary – the boundary defines members entitled with discretion to either participate or move out of the resource pool
2. Set of simple and mutually decided rules on how would the resource be appropriated – The balance between exploitation and preservation is defined.
3. Forum where each and every member is free to put opinions and participate in the decision-making process
4. Monitoring and regulating mechanisms – effectively handles the flow and span of resource
5. A scale that defines the appropriation of the resource by all actors
6. A body regulating graduated sanctions in the cases of violation of the mutually agreed rules and conflict resolution
7. Expressing and representing the rights that are agreed the members within the community and also outside the community – mutually agreed or social arrangements
8. In a scenario where the resource can be connected to micro-economy of the community, a system that contains flow of capital within the community.

Ostrom's theory presents with it some pertinent questions regarding the ownership of the resources. She acknowledges that in the case of a misplaced ownership, there is a strong chance of the resource being over-used and eventually depleted. Furthermore, one can argue that the local ownership is highly meritorious when it comes to amassing and sieving through knowledge but ineffective in adapting to changing political and economical processes. At the same time, government ownership is effective in handling large scale of resources but ineffective in decentralising the perks of it in all tiers involved.²³ Ostrom suggest a mediatory arrangement between all the poles would be ideal and states that the context and the scale of resource deployed needs a careful examination.

In order to understand the concept better spatially, the author uses the example of community crop productions system called Baranaja by the farmers of Garhwal, a northern zone existing on the foothills of Himalayas. The Baranaja system of crop rotation is a traditional farming method with its roots in the ninth century. Bara-naja literally translates to twelve crops that are planted to maintain the soil health by fixing the nitrogen to the soil. (Figure 17,18). Cultivation period in India is a seasonal process, starting with the sowing period in March and ending with harvesting period in June. The thumb-rule of the cultivation system is to sow baranaja plantations consecutively to the millet and pulses, so that after every cycle of planting cash crops, the baranaja restores the qualities of the soil, preparing it for next season. If this cycle is not followed strictly, the plot of land could be rendered infertile after a period of time.

²² Ostrom 1990

²³ Aggarwal, Sood, Patnakar 2012



Figure 17. Baranaja farming, Photographs from a documentary - Down to Earth, Ritu Guha, 2014

SOCIAL RESILIENCE

FLOW OF RESOURCES

SUSTAINABILITY

ECONOMIC RESILIENCE

ENVIRONMENTAL RESILIENCE

PROBLEM FRAME

CROP FAILURE LOSSES

LOSS OF FERTILE SOIL

PRIMARY CAUSES

DISASTERS, INADEQUATE RAIN

EXCESSIVE CASH CROP CULTIVATION

LOCAL SOLUTION

BARANAJA FARMING

SOCIAL ARRANGEMENT : COMMON GAIN

NEIGHBOUR A

NEIGHBOUR B

COMBINE AND REDISTRIBUTE LAND

CASH CROPS : USE NUTRIENTS

BARANAJA : RESTORES SOIL

FIRST SEASON

COMBINE IRRIGATION WATER

IRRIGATION WATER

UTILITY WATER

UTILITY WATER

A SHARES MONETARY PROFITS WITH B

BARANAJA : RESTORES SOIL

CASH CROPS : USE NUTRIENTS

NEXT SEASON : SUCCESS

UTILITY WATER

IRRIGATION WATER

UTILITY WATER

B SHARES MONETARY PROFITS WITH A

A AND B SHARE LOSSES

NEXT SEASON : FAILURE

Figure 18. Flow of resources in Baranaja system, Illustrations by Author

However, the bara-naja crops are not of a significant commercial value and planting them for six months could take away the expected income for that period. To avoid this situation, people have come up with a system to mitigate the monetary loss as well as maintaining the soil quality.

The community members within the same geographic boundary come up with a shared arrangement of crop cultivation. The members cultivating millets and pulses in one season are mandated to grow bara-naja in the next one. The monetary and food gained over a season of cultivation of crops is then distributed equally between all the members. In this way, the bara-naja growing members prepare their land for the next season, whereas the cash crop growing farmers sow cash crops sustaining the community.

The arrangement between the communities extends to sharing water and irrigation management systems. As the agricultural lands and irrigation canals are spread over a mountainous terrain, the monsoon water and glacial water running downstream becomes of the prime importance. The households above the terrain share a geographic advantage and since there is no official body governing the utilization of water, there is a chance of an unequal distribution of resources. To counter this, the communities have come up with a social arrangement to share irrigation resources such that all the fields are fallow concurrently. (Figure 17,18)

Looking at the implementation, households at the same topographical level combine and become a community. These communities do not necessarily have to be geographically together, just at the same topographical range all through out. This ideological zone is called Choorna. Representatives from the zone congregate twice during the cultivation period to predict rainfall and cultivation trends and decide upon the water that has to be divided within various zones. Since, its quite difficult to map the amount of water stored, the communities use markers on water barrages to demarcate the water amassed for a zone. The collected water is taken to a central programmatic element, usually the village tank or the temple tank, from where it is distributed amongst the participating households. Even amongst them, since half are growing cash crops and the others growing bara-naja which requires much lesser water, there is a seasonal arrangement of water distribution in place.

This synchronised and coordinated sharing of resources especially water and land is highly ingenious user-generated method to equitably distribute resources as well achieve environmental sustainability. By becoming equal participants to gains and losses, the communities brace themselves in the cases of crop failures, floods, draughts and adverse effects of rodent/pest infestation. The long-sighted arrangement where a negotiation on the pretext of a common gain brings about a social arrangement that is evidently percolates down to space.

B3: From Theory to Practice

Reflections for analytical framework

The theoretical studies conducted so far prove that there is a definite merit in the self-organisational strategies used by the communities. To overcome the economic limitations, urban poor communities show a patterned mobilization making them resilient to changing socio-economic and policy changes. Accepting this through a disciplinarian research does not minimize the role of a designer or a planner, in fact a careful overlapping of local knowledge to disciplinary knowledge could bring about a value addition to these processes.

The theories by Holland and Page, especially the complex adaptive system urges to look at the informal settlements closely, yet from a distance to understand the logical arrangements that could be easily missed. In the case examples so discussed, it became apparent that open spaces can be utilised to observe the patterns of circulation, agglomeration and diffusion of crowds within a settlement. Ostrom's theory of common property regime also points out towards how physical form of the open spaces are organised to maximize its potential. In terms of a spatial component, open spaces are highly contested territories. As a resource in itself, it would be interesting to analyse how are they appropriated over intra-community as well as community-host interactions. Hence, the study of open spaces and the appropriation of the ground realm becomes the centrepiece of the settlement studies carried out in the next section.



VILLAGE CHIRAG DELHI

500m

YAMUNA DISTRIBUTARY

FORTIFIED GRAIN

SETTLEMENT CENTRE



C. GESTALT

Analytical framework

Before going further, it is essential to define 'open space' for this study. There are various ways to define 'open space', however, in the case of informal settlements, Giambattista Nolli's interpretation resonates the most. While surveying the figure ground of Rome, he created a Nolli map interpreting open space as an extension of private space on the public realm. Similarly, for informal settlements there are no categorical ways to define 'open space'. As the priority is to utilise the land in hand efficiently, open space is simply an extension of domestic space on the ground realm. It can be developed or undeveloped, inside the dwelling complex or outside, open to sky or with a roof. As a spatial component, it renders the dwelling highly flexible and responsive to varying family structures, aesthetic values, social dynamics, class systems, and 'tastes' as it plugs into domestic space without any programmatic disposition. Establishing that land is the biggest resource available to the urban poor, Ostrom's common property regime strategies would be sieved through to understand how in a complex adaptive system are people able to articulate public realm.

C1: Settlement studies

Context overview

As previously discussed, Amos Rapoport mentions certain physical and social factors that are highly relevant form determinants. The physical factors like climate, site and terrain do not change drastically as the scope of the study is limited to Delhi. However, social factor – Economics, Religion and Defence, do shift significantly. The scope of the study is thus limited to observations from three informal settlements in Delhi, encompassing the visible play of all these three social forces. Visibility for this section can be understood as synonymous to legibility gained through author's first hand interaction with the settlements. The author substantiates his position only after interacting and participating with a

settlement for a long period of time so as to understand how has the built environment been self-organised to response to a force. The selection of the settlements limits the scope and although is not exhaustive, has specific reasons behind it.

The first settlement is chosen for its strong religious centre and a historic stonewall that has preserved its physical form till date. Chirag Delhi (Figure 19) is one of the oldest and densest urban villages in Delhi. It was built around a shrine of a high order Sufi saint, roughly in the beginning of 13th century. It was quite strategically placed as during the time it was conceived, the city centre of then Delhi and a forest zone called Jahanpanah surrounded it. As the settlement had a religious orientation (Islamic), a visible territory in the form of a wall was built around the shrine, protecting it against the warring rulers. At the advent of British colonialism and Independence period, various religious, social and ethnic user groups took refuge within the settlement boundaries and have continued to inhabit it since. The fortification around the settlement has protected the traditional houses and architecture within.

Catering to the historic value, the government has marked the settlement as a special zone called Red line or Laal Dora and has refrained from interfering with the planning or development of the area within the wall.

The second settlement is chosen for offering a context that is similar to the thesis intervention site, Anand Parbat. (Figure 20) Sarai Kale Khan was a 17th century pastoral village placed along two important landmarks – Humayun's tomb, an Islamic mausoleum, and a traditional settlement next to it called Nizamuddin. The village grew in significance after the inception of the walled city of Shahjahanabad in the north of the mausoleum. The newly formed trade routes coming and going to the walled city became an important transit corridor. Resultantly, the travellers and outcasts started settling down in the settlements along the corridors. Although, it has changed in terms of physical form largely due to the development of a bus stop and the railway line around it, Sarai Kale Khan is probably one of the only settlements in Delhi carrying forward the pastoral character, especially cattle keeping. Hence, the pastoral nature and it's triangulated placement between transportation lines makes it similar to the case of Anand Parbat and a part of this research.

The Walled city of Shahjahanabad, a 400-year-old settlement was built by a Mughal Ruler, Shahjahan in the beginning of 17th century. The walled city was designed as to represent the Mughal might in the world and thus had clearly designed forts, commercial streets, markets and living quarters. (Figure 21) Despite of a formally planned system, the design was limited to the architecture and infrastructure felicitating the royal household. The living quarters were left without an active design for the inhabitants to appropriate. Thus, the physical form was designed and organised by the people since inception. It has survived colonial rule and an influx of refugees post independence. Along with this, it has also survived the changing economic processes unfolding in Delhi. For instance, it was designed for residential and retail of textiles, vegetables and flowers, now holds the Asia's largest Automobile market. Thus, the self-organised living quarters and the resilience towards economic changes qualify it as a relevant case study.



SARAI KALE KHAN - II

500m

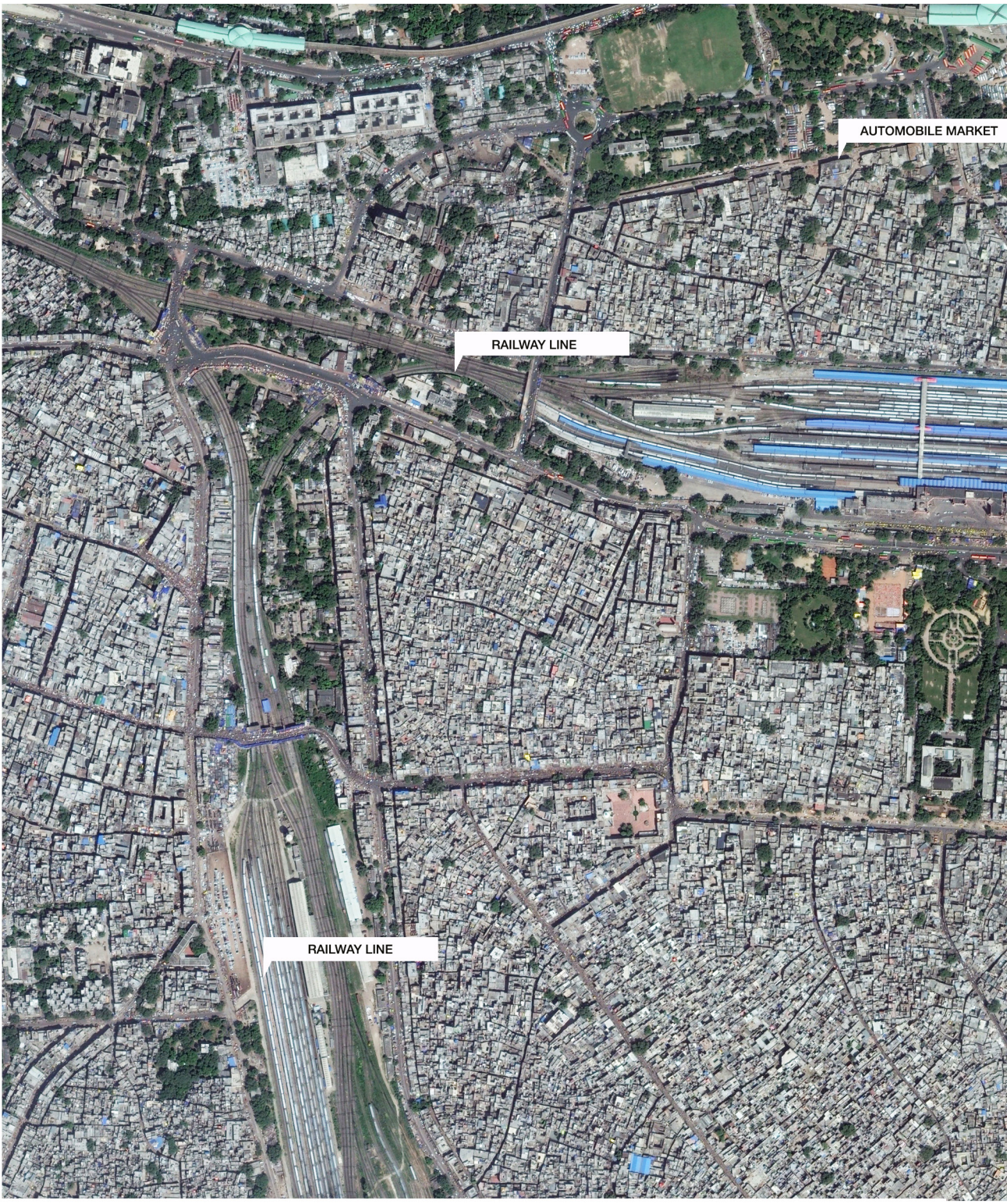
HUMAYUNS TOMB

RIVER YAMUNA

PRIMARY TRANSIT LINE

SETTLEMENT GRAIN





AUTOMOBILE MARKET

RAILWAY LINE

RAILWAY LINE



WALLED CITY OF SHAHJAHANABAD



500m

RIVER YAMUNA

ROYAL FORTIFICATION

MARKET AXIS

200m

C2: Context to Content

Benchmarking towards type and Form

For an effective in-depth study, typology of an open space had to be critically defined. Creation of typology not only makes observation and immersion easier but also ties it effectively to results and design strategies. As mentioned before, the typology creation of open spaces in an informal settlement is a daunting task. As an extension of domestic space, there is no clear spatial boundary to it. The programmatic disposition attached to an open space is also quite flexible. The observations revealed how the same space was being used for agglomerating and washing clothes.

Thus in absence of a clearly defined space or program, author looked at the nature of interactions as the starting point to develop typologies. Closer observations and honest interactions with the inhabitants, however, revealed a latent hierarchy. The open space in all the three settlements had illegible but defined social boundaries. For the purpose of this research, these social boundaries have been defined below, along with their local names as typologies. In a typical informal settlement in Delhi,

Maidan accommodates city-scale interactions and translates to an open space where the settlement and its inhabitants could actively engage with the host city;

Chowk accommodates community-scale interactions and translates to an open space where inhabitants encounter and agglomerate within themselves;

Chatta accommodates neighbourhood-scale interactions and translates to an open space appropriated by user groups of similar familial, religious or occupational affiliations.

In the following section, each of these three typologies would be studied and compared across the three settlements chosen – The walled city of Shahjahanabad, Chirag Delhi and Sarai Kale Khan. The intention is to understand how forces of self-organisation are materialised on site and whether are not are characterised within a common logic or pattern. If yes, then what are the forces structuring the pattern and if there are any tangible observations, can be instrumentalised for a design process of a resettlement colony at Anand Parbat.

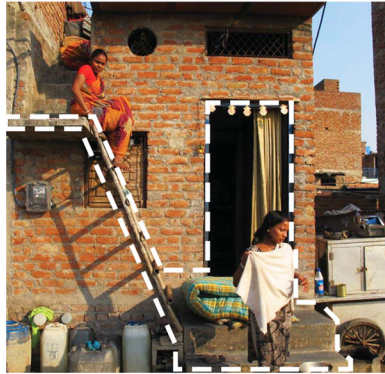


Figure 22. Open space visuals in Informal settlements of Delhi, illustrated over Photographs by Julia King, Potty Project, Julia King, 2012

L

URBAN PARK | MAIDAN



M

SQUARE | CHOWK



S

COURTYARD | CHATTA



Figure 23. Illustrations by Author

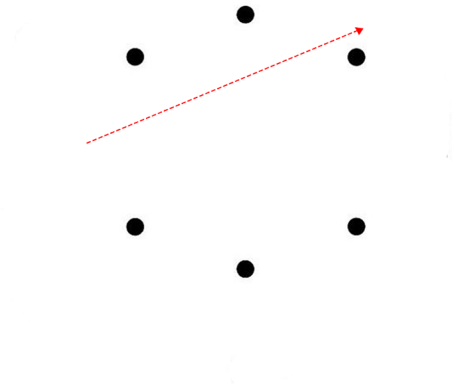
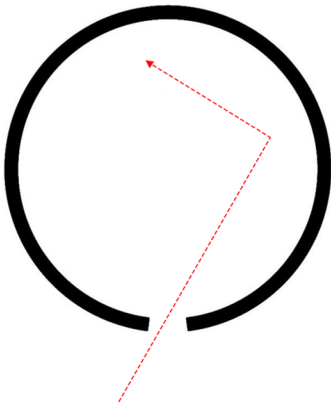


Figure 24. Top Left : Cubbon urban park - an urban park vs Right : Rajendar Maidan flower market, a maidan (Photographs by Dilip De Cunha and Arundhati Mathur, *Maidans of Bangalore*)
Bottom : Typology of Maidan : Left : Definite Boundary of a destination, Right : Maidan as a thoroughfare (Illustrations by Author)

D. SHADES OF GREEN

Observation studies: Looking closely from a distance

To bring out the idiosyncrasies, each category namely Maidan, Chowk and Chatta would be analysed on a few parameters – Definition and Programmatic dispositions, Formal language and Boundary conditions and Shape and Size. The recurrent characteristics and learning would be enumerated as reflections at the end of each section.

D1: Maidan

Size 'L' open space

Definition and Programmatic dispositions

A maidan can be described as an open space where the inhabitants of an informal settlement hold city level interactions. In the case of the selected case studies the primary programs were fairs, games, temporary markets etc. occurring alone or sometimes simultaneously. Along with these, inhabitants of the walled city of Shahjahanabad organise a 'Chor Bazaar', a temporal market selling stolen or illegally acquired products including antiques, electronic goods, shoes and watches every Thursday. Similarly, Chirag Delhi inhabitants hold a pickle and dried fruits markets every Friday. Sarai Kale Khan residents use the Maidan space as a space for cattle grazing and fashion shows for the cattle.

In perception, maidans can be seen as a threshold where the activities organized by the inhabitants can gather attention and active participation from the actors outside the settlement without any hesitation and judgment. For people outside the settlements, such markets and events have become extremely popular and an integral part of the cultural identity of Delhi as they offer unique experiences.



Figure 25. Maidan in Shahjahanabad - Shape and size; Illustrated over Google Earth by Author, Maidan Study for the walled City, N ^

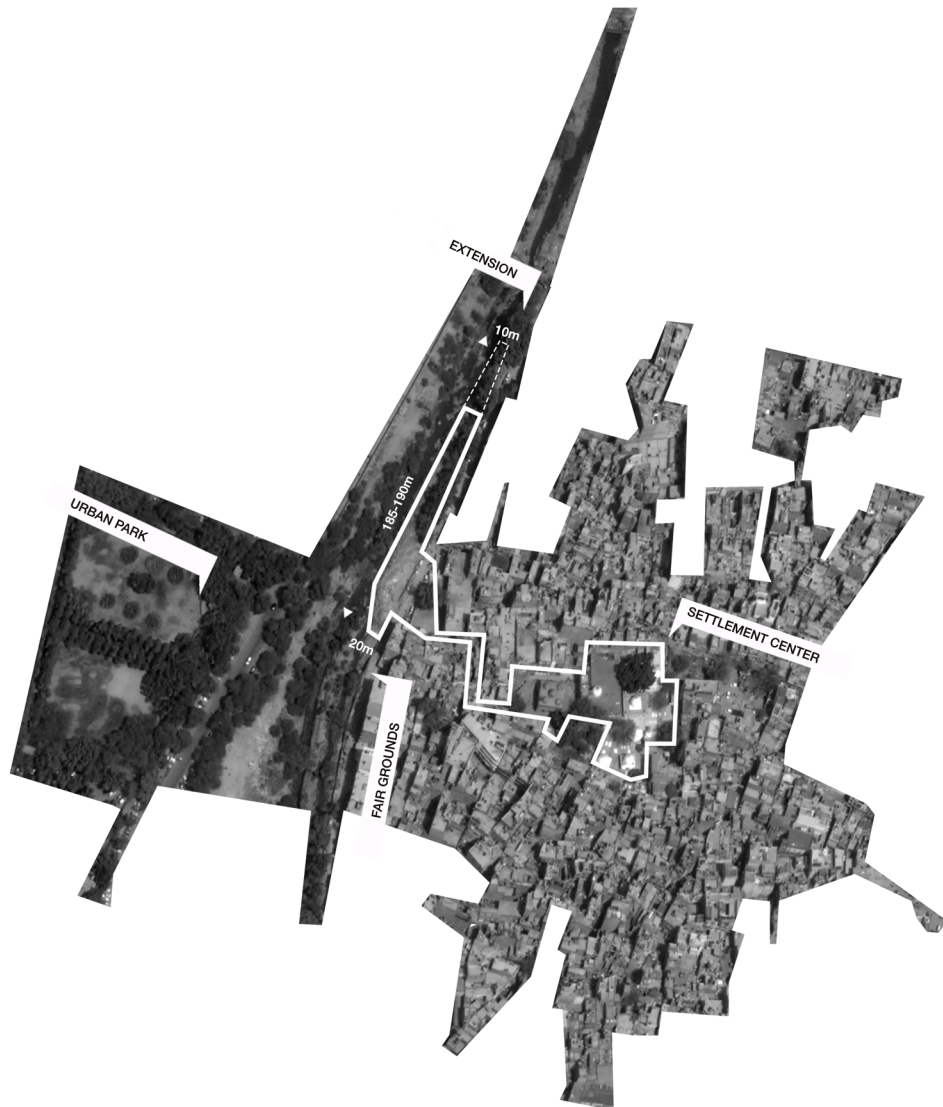


Figure 26 . Maidan in Chirag Delhi : shape and size as illustrated over Google Earth by Author, Maidan Study for Chirag Delhi . N ^

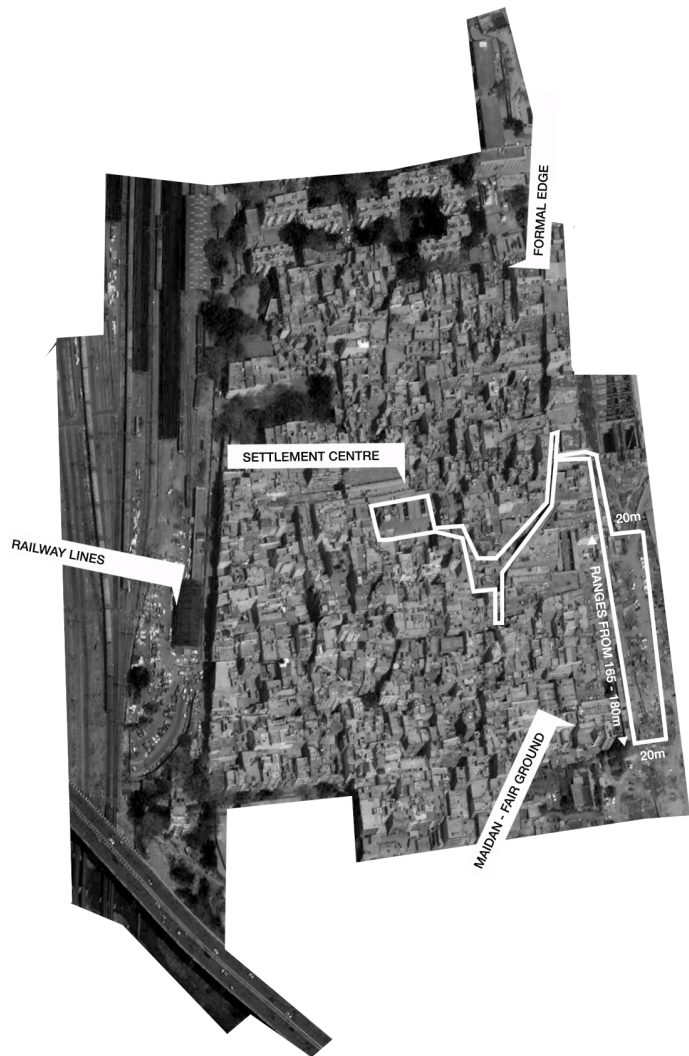


Figure 27. Maidan Study for Sarai Kale Khan: Shape and Size, Illustrated over Google Earth by Author, N ^

Formal language and Boundary conditions

In the chosen case examples, the maidan typology was observed as composed of two elements: a barren ground on the edge of the settlements without a defined boundary and an open-space next to settlement centre. Both the elements are observed as connected through a legible and accessible street. There was hardly anything built or grown on the barren edge, apart from a small exception where a small plot is used for cattle grazing in Sarai Kale Khan. However on one of the visits, it was observed that the weekly market had spread out from the settlement centre out onto the barren space. At this point in time, what seemed like plot of vacant was seen appropriated as an active part of public realm.

The value of a space as big as maidans for informal settlements is similar to what urban parks hold for the city. They are used for leisure, recreation, temporal commercial activities and events, witnessing massive participation by the people from outside the settlements. Hence, in terms of formal language, they are organised to be highly accessible, porous and permeable public spaces. In fact, the extents are usually so wide-ranging and dynamic that one tends to enter, participate and exit the space almost unknowingly. Without any formal boundary, the maidan becomes highly flexible almost like a thoroughfare. This in sharp contrast to their counterparts, the urban parks, which are designed as popular destinations.

Carefully observe the dark patches in the illustrations drawn for the maidans. It is actually the same space occurring in various points of time. For an event like festivals which witness's massive participation from the city and the settlements, it enlarges and anchors itself firmly to the settlement centre to accommodate about 1500 people, on an average. However, it becomes quite localized and focussed around the settlement centre for an everyday market, a relatively intimate event of 400-600 people, attended only by the residents from immediate neighbourhoods. Thus, the maidan not only holds a wide range of occupants, it also becomes flexible in terms of area and programming, rendering it much more usable than an urban park formally designed elsewhere in Delhi. (Figure 28, 29)

Shape and Size

As discussed, this 'L' sized open space has to big enough not just to suffice all the inhabitants but also the visitors from outside the settlement and it is not possible for the poor to carve it from the settlement itself. Therefore, it is usually an encroachment on the city's formal boundary and the barren component observed at the edge is the spatial attribute so encroached. If the space is barren and on the edge of the settlement, then how do the inhabitants acquire it without facing any evicting body or municipality disturbance? The answer lies in the shape of it.

On drawing and comparing the barren component of the maidan space in each of the settlements , it was observed that they coincidentally shared comparable dimensions- length varying from 250 to 300 meters and width varying from 15 to 22 meters. Although there is a very diffused and ever-shifting boundary edge of the maidan, it seemed taking a linear spread along one of the primary streets of the settlements in each case. (Figure 25,26,27).



Localised Event eg. Weekly Market
Area : 3670 sqm., Person Count : 600 - 650



City Scale Event eg. Fair Ground
Area : 9000 sqm., Person Count : 1500 - 1600



City Scale Event eg Special markets
Area : 8400 sqm., Person Count : 1000 - 1200

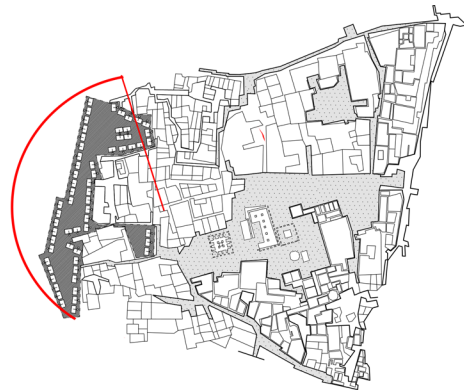


Figure 28. Forms and adaptive extents of a Maidan in Chirag Delhi, Illustration by Author, Data adapted from DUAC Chirag Report, 2016

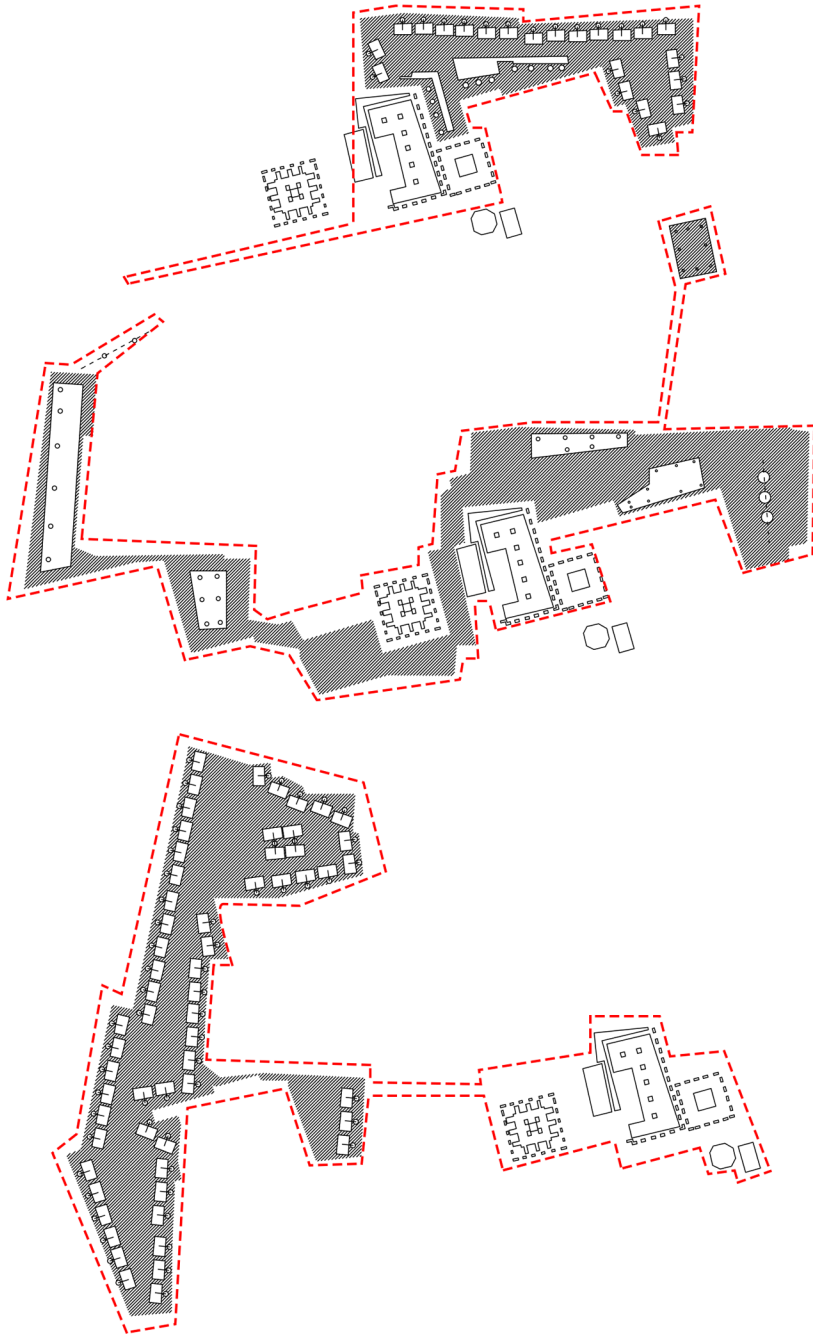


Figure 29. Forms and adaptive extents of a Maidan in Chirag Delhi, Illustration by Author, Data adapted from DUAC Chirag Report, 2016

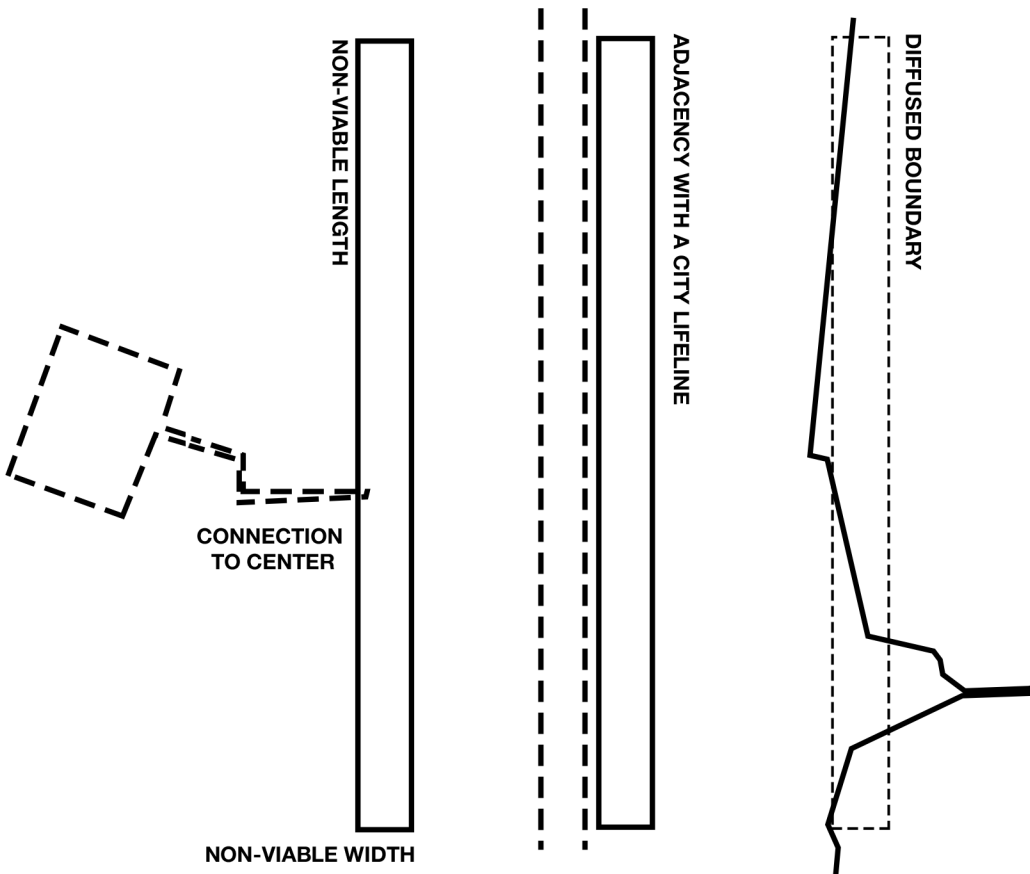


Figure 30. Illustrations by author

As part of the informal structure where no planner or designer is involved, such consistency proves how complex adaptive systems rear patterned results. The observed consistency also compels for identification of the operative force in this instance. One of the merits of conceiving a space linearly is that the dimensions become non-viable for any real estate developer, in turn decreasing the chances of it being absorbed in the formal design processes. Other important observation is the location, as in all the three case studies, this linear space sits next to a primary transit corridor. The master plan of Delhi makes it compulsory to leave the margins next to the roads as un-built or green.²⁴ This also curbs the possibility of the linear space being acquired by the developers. The legible and easy access to the core of the settlement allows make the inhabitants to easily appropriate or abandon the space as per the requirement. All these idiosyncrasies emanate from a negotiation between maximizing on available space as well as defending the empty spaces from formal acquisitions by competent authorities.

²⁴ Master plan of Delhi, 2021

D2: Chowk

Size 'M' open space

Definition and Programmatic dispositions

A chowk can be described as an open space where the inhabitants of an informal settlement hold community level interactions. Programmatically, they hold community-centered retail and everyday markets repeating multiple times within the settlement boundary. However, an interesting observation made from the case studies revealed that each of the chowk had a very strong attachment to some sort of resource pool. In most cases, they are also named after the said resource. For instance, the walled city of Shahjahanabad has a commercial pocket in the northern half called Chaabi Bazaar, with a natural depression storing rainwater. The communities around it have been harnessing this water traditionally for metal industry. Similarly, Chirag Delhi has a chowk where the communities have organized a bore-well for extracting underground water. The chowk is also named aptly as Borey-wala Chowk (chowk with the bore-well). In the case of Sarai Kale Khan, the communities have been keeping cattle traditionally. (Figure 32) The manure so produced was dumped in collective waste disposal lots shared by households together. Eventually, these became fertile zones and were converted into agricultural hot spots. Today, connecting agricultural hot spots largely makes the sequence of chowks in the settlement. (Figure 32)

Formal language and Boundary conditions

Chowks can be compared to squares for understanding and visualization. Unlike, the maidan, which is large and spatially non-defined, the chowks are defined enclosures. In the capacity of enclosures, they divide the settlements into smaller parcels, defining the grain of the settlement. The communities organize the chowks around resources such as water, fertile soil, and underground water reservoir. These enclosures are organized for safeguarding the resource pool on one hand and visibly displaying the end product in the public space on the other. Thus, a gradation of privacy is introduced within the settlement through this typology and one of the ways by which the communities achieve this is by creating a loop. Akhtar in his seminal works on the walled city also enumerates similar findings. He analyses that the communities articulated a system for the chowks and categorizes them into two prominent types – tree like and closed loop.²⁵ (Figure 33) The resource rich chowks are guarded more strongly in an introverted loop whereas the more public chowks are plugged into everyday routes through an extroverted loop.

²⁵ Badshah; 1983

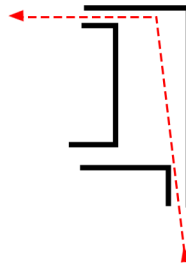
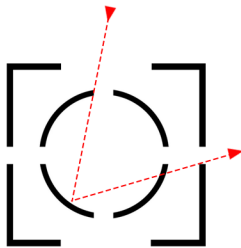


Figure 31 . Top : Photographs by Author; left : Public Plaza near Doumo Milan , Right : Chowk in Chirag Delhi
Bottom : Illustrations by Author; Left : Definite Boundary of a Plaza, Right : Rectangular Chowk



Figure 32. Photographs by author

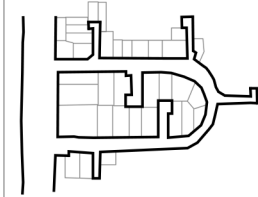
Shape and Size

In terms of physical form, one needs to understand how are these enclosures placed and negotiated within a non-designed environment. The interviews with the local inhabitants revealed that the chowk formation is a result of local knowledge gained over time, sometimes ranging over decades. Users have been observing, identifying and harvesting resources traditionally. Ostrom's common property regime is observed at play since the resources here are gathered in a communal way to optimize the process.

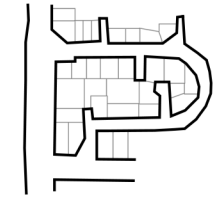
As established before, most of the informal settlements in Delhi are based around historical cores. Thus, the historical core is assumed as the center of any looping exercise. One of the traditional ways to create public avenues was to maximize the convenience in carrying goods in and out of the settlement. In earlier days when there were no compasses or maps, the placement of the exit and entrances to the settlement was done demarcating the direction of the nearby destinations. In each of the settlement, the historical gates were placed on the boundary pointing towards various centers of trade. The historical core was connected legibly to the gates, formulating the structure of the public realm.(Figure 34)

Now, on drawing and comparing the public and resource loop in the settlements studies, it was revealed that the resource rich pools are tied in an offset loop to the public loop, with space for inhabitation in between. Most of the chowks were observed as rectangles or distorted rectangles with a minimum of three points of entry and exit.

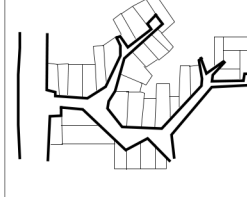
Loop - Like : One street connection



Loop - Like : Two street connection



Tree - Like : One street connection



Tree - Like : Two street connection

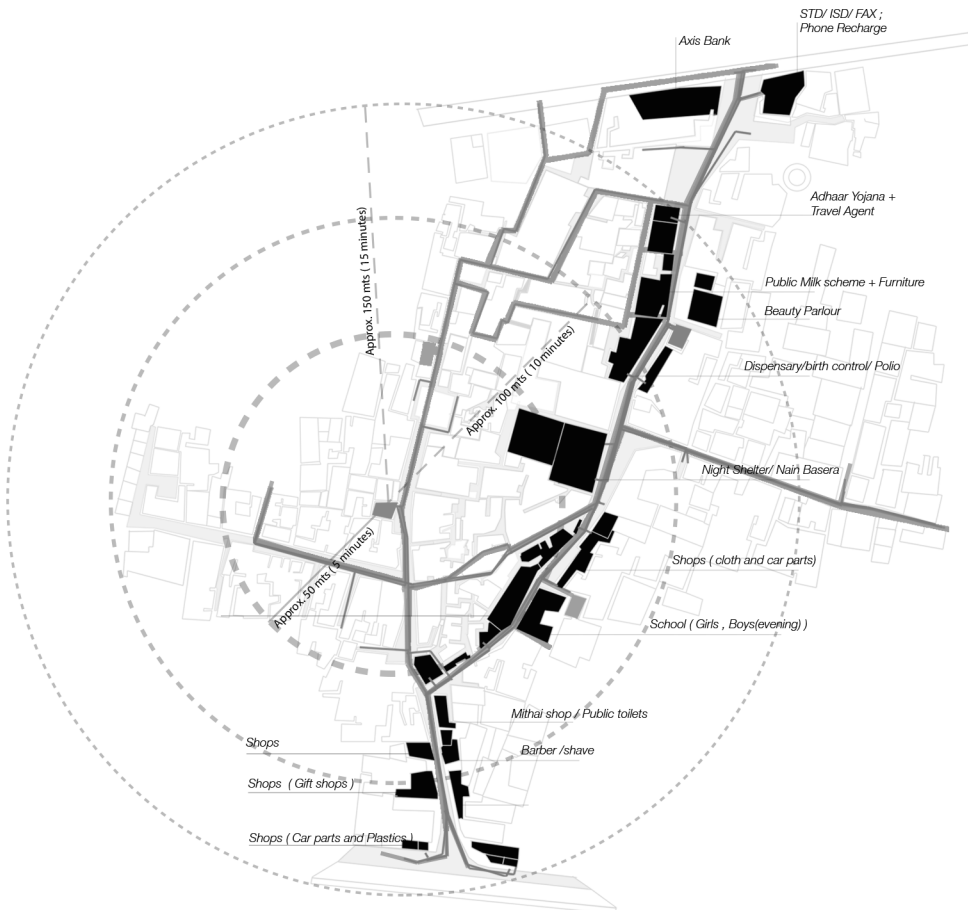
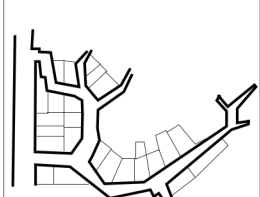
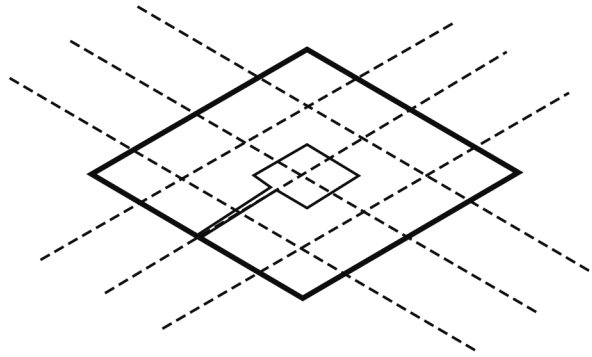
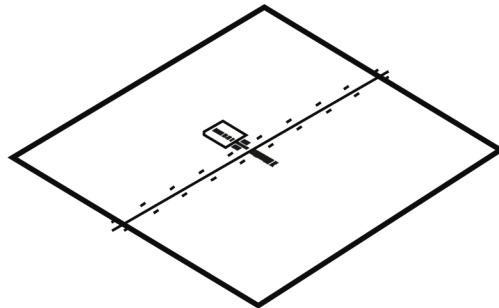


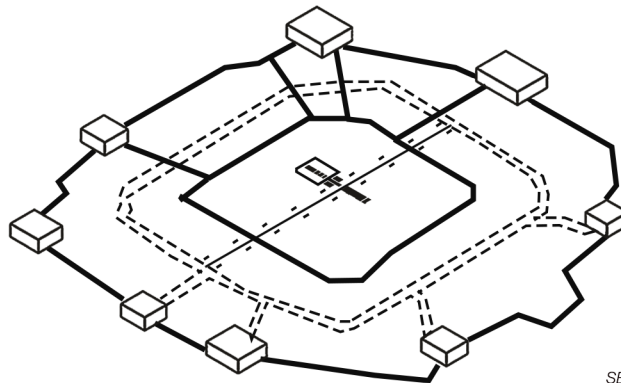
Figure 33. Illustrations by author



BOUNDARY AND CORE



PRIMARY CONNECTIONS



SETTLEMENT GATES

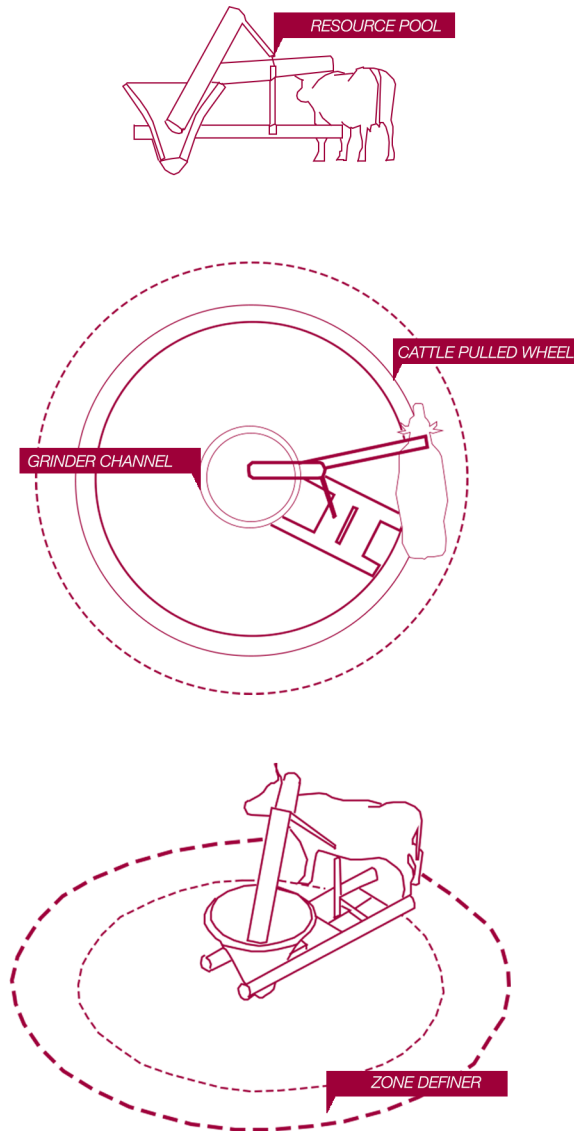


Figure 35. Illustrations by author



Figure 36. Illustrations by author

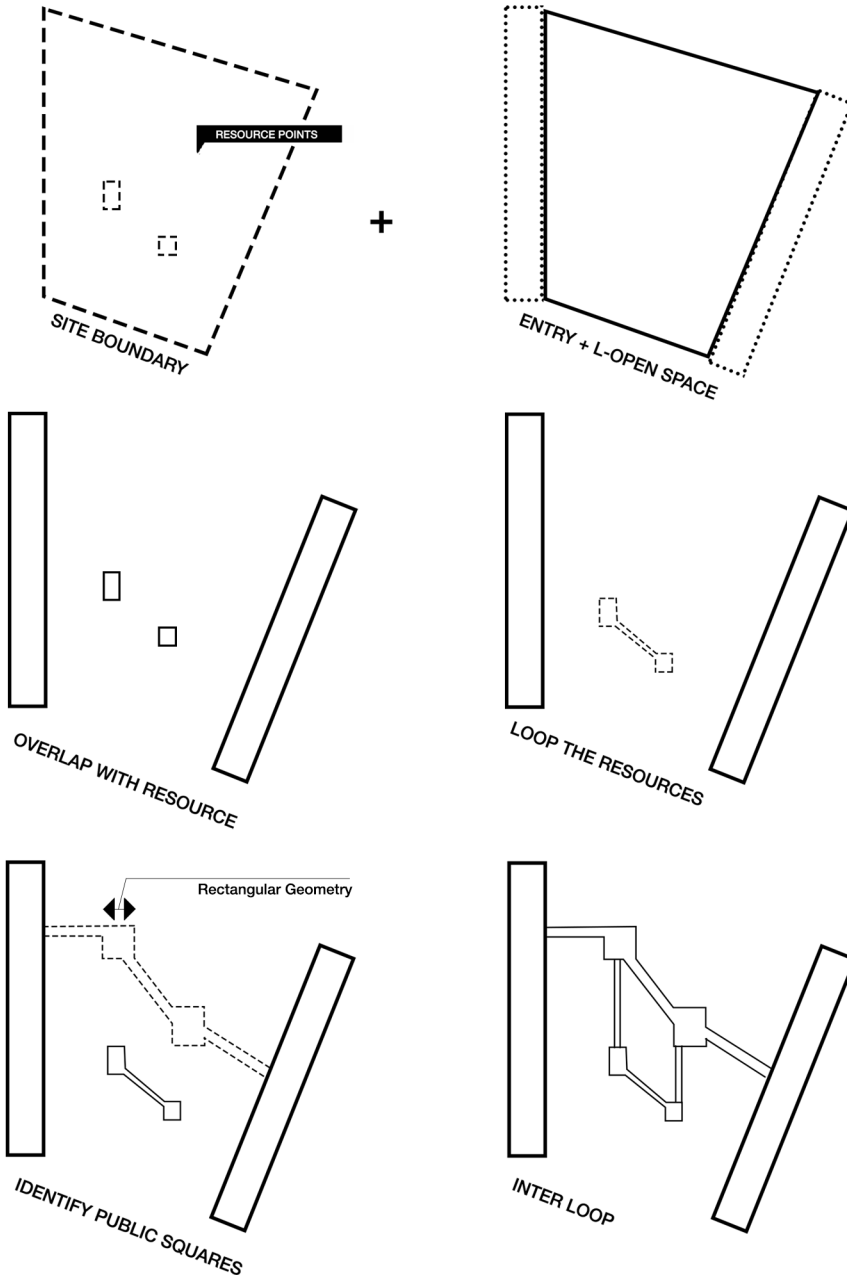


Figure 37. Street looping diagram around the resources, street syntax illustration by author

Reflections and typology creation

As a true example of Ostrom's common property regime, chowks are identified as self-organised, constructed gradually with time and superimposed by local knowledge. In the hindsight, mapping of resources and placing onto them, a community level public space comes across as a promising strategy. To achieve this process, Geographic Information System (GIS) can be used during the zoning phase to identify natural resources.

Furthermore, the looping of the public space and the resource pool in all the three cases makes it a patterned spatial typology, compelling for identification of the forces at play. In this case, economics is a visible form determinant as for systematizing the loop into public and private in the first place. However, the site visits to Chirag Delhi also revealed an inherent force at play. In the first few visits, the author could only penetrate the public loop of the settlement, completely unaware and unexposed to the resource loop of the chowks. The settlement of Chirag Delhi has four gates as drawn (Figure 34) and no matter which was chosen as the point of entry the author kept circulating within the public loop. Thus, by making sure that only a persona aware of the context can reach the resource pool, the inhabitants have used mazing as a technique to plug in defence.

The roughly rectangular geometry with numerous exit and entry also is an innovative defensive strategy as the visitor is compelled to cross a longer trajectory in a narrow section, knowing that the inhabitants are observing him. The rectangular geometries are usually paired with short sides of the dwellings giving each household a chance at using the front edge for public purpose

D3: Chatta

Size 'S' open space

Definition and Programmatic dispositions

A Chatta can be described as a central open space at neighborhood scale that distinctively is organized by member of similar familial, religious or occupational affiliations. In this case as well, the organisation is usually around the common resource except that it has a clearer spatial boundary. Aggarwal notes that in Kucha Jatmal, a Hindu neighbourhood in the walled city of Shahajahanabad, residents of the same religion came together to formulate a shrine (Temple). The space for the temple was kept central taking away a portion of four households, which in turn got smaller shop areas behind the temple complex. Each of the shop was dedicated to capacity building of the entire neighbourhood as it meant more visitors and capital gain.²⁶ However, the temple complex is a public program, in this case it was extremely private as belonging to the members of the same community.

In certain ways, it behaves much like the chowk but the perception in the settlement renders it as extremely private and exclusive. Moreover, the exclusivity is based on a similar affiliation, in this case religious, and not limited to the geographic affinity. Similarly, In Chirag Delhi, various Islamic communities rear poultry and meat, which is forbidden in the other dominant religions in the settlement. Thus, a localised meat market is organised by the people within the neighbourhood open space. It is designed and placed inwardly, so much so that the odour of the meat does not attract attention. In the case of Sarai Kale Khan, an indigenous community practices arm and mud wrestling traditionally. To practice and participate, a wrestling rink is organised by the community. It is also placed privately within the neighbourhood as the activity is very exclusive to the community.

²⁶ Aggarwal, Sood, Patnagar 2012



SINGLE ENTRY



PRIVATE RESOURCE



CHANGE IN SURFACE



SINGLE ENTRY



ARCHWAY AS LANGUAGE



INTO THE COURT

Figure 38. Different elements of Chatta, Photographs by Author

Formal language and Boundary conditions

A chatta can be compared to a courtyard for better understanding. It contains of a branching street off the loop formed by the chowks, which opens in an open space. While participation within the chatta space is democratic and open to all equally, the extent of ground realm and the resource so created belongs to everyone and no one at the same time.²⁷ It has only one entrance and exit, leading to a very controlled accessibility. Hence, Chatta acts as the end-point definer within the grain of an informal settlement. The boundary enclosing the chatta is usually very clearly defined enclosed with dwelling units sharing their terrace with at least one neighbour.

The site studies revealed that in all the three cases, an architectural element was used to mark out the entry-exit point. In the walled city of Shahjahanabad, Mughal arches were observed as defining the precinct. Similar arches were used to define Islamic quarters in Chirag Delhi, whereas rectangular arches or interconnected balconies defined Hindu quarters. In the case of Sarai Kale Khan, a material difference on the surface is used to determine the territory. Akhtar notes that brickbat patterns define the private quarters of the neighbourhood in some cases of the walled city as well.²⁸

²⁷ Aggarwal, Sood, Patnagar 2012

²⁸ Akhtar, Badshah; 1983

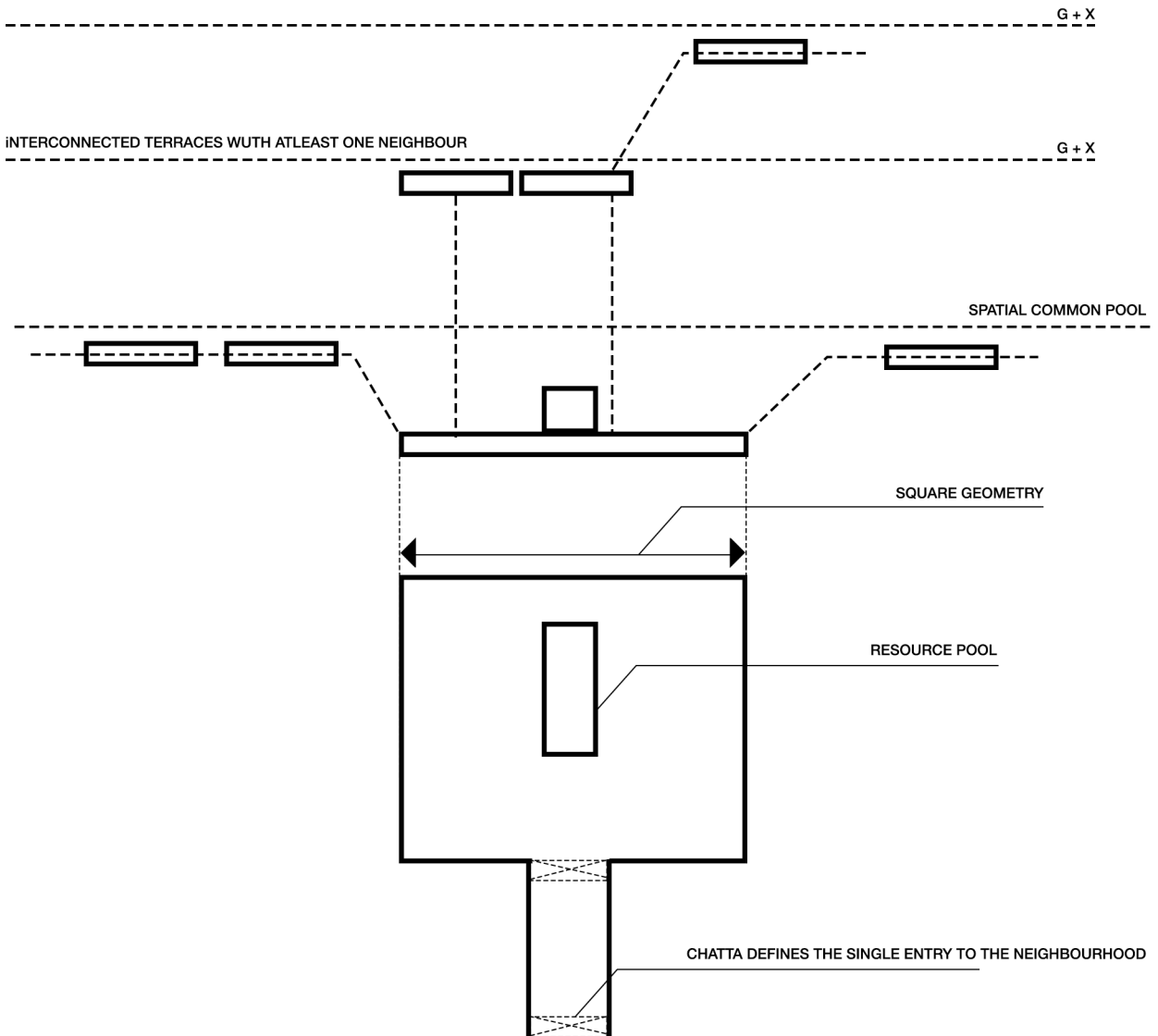


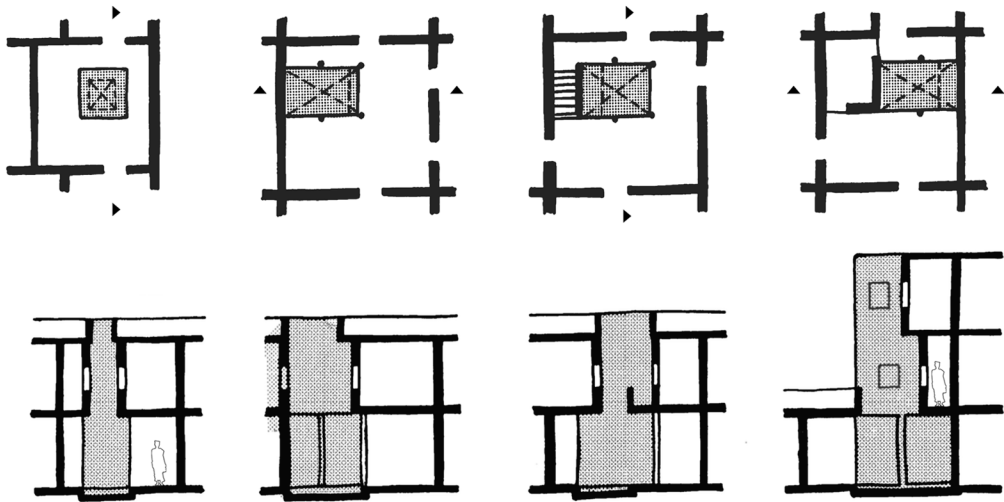
Figure 38. Generic chatta syntax, neighbourhood formations, Illustrations by Author

Shape and Size

The shape and size of the chattas were observed as varying from neighbourhood to neighbourhood in all the three cases. It was difficult to define in terms of a specific type. Moreover, the traditionally designed chattas have undergone tremendous transformations to be classified at present. The placement and usage of courtyards in the observed settlements was found to be quite inventive and unique. The courtyard essentially was designed as a response to the hot climate. However, its present spatial nature effectively links an individual to its family and a particular community. During the site visits and the documentation, the large variety of court spaces were observed. For the purpose of this paper and for the case of Chirag Delhi, courtyards are classified on the basis of where they exist in a household and the associated gradation of privacy.

0 6M

COURTS AS DEFINERS



COURTS AS ARTICULATORS

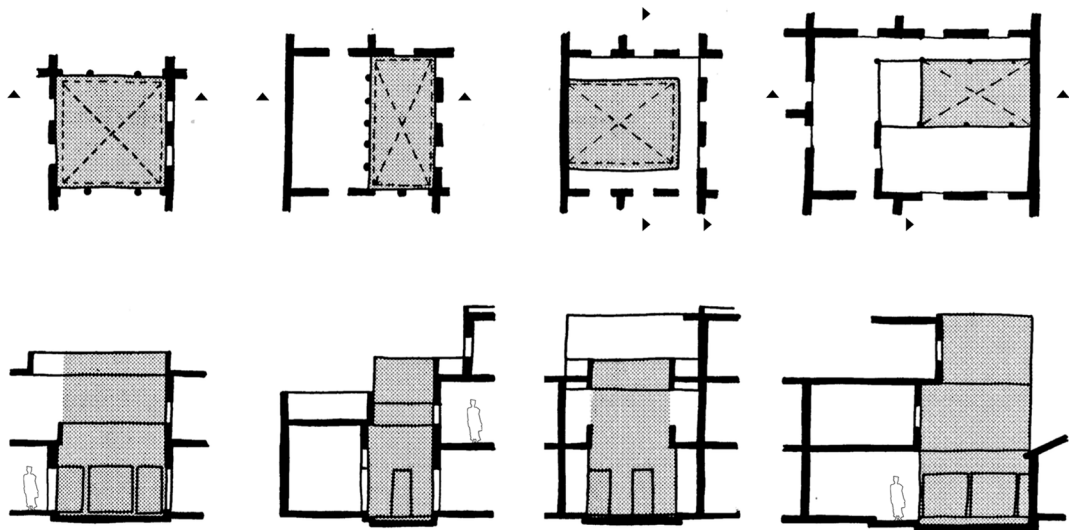


Figure 39. Courtyard diagrams as Definers and Articulators, Sketches by author over Akhtar Badshah's sketches

Akhtar suggests that the chatta could act in three ways as per the location of the same within the neighbourhood.²⁹ It becomes a transitional space if it appears in the beginning of the neighbourhood such that one needs to traverse it to reach to the households. If the chatta is further in but still fairly outside the households, it becomes a space in itself and acts as an articulator of space. In the last case, the chatta is termed as a definer if it is deep within the neighbourhood to become an extension of the room or private space.

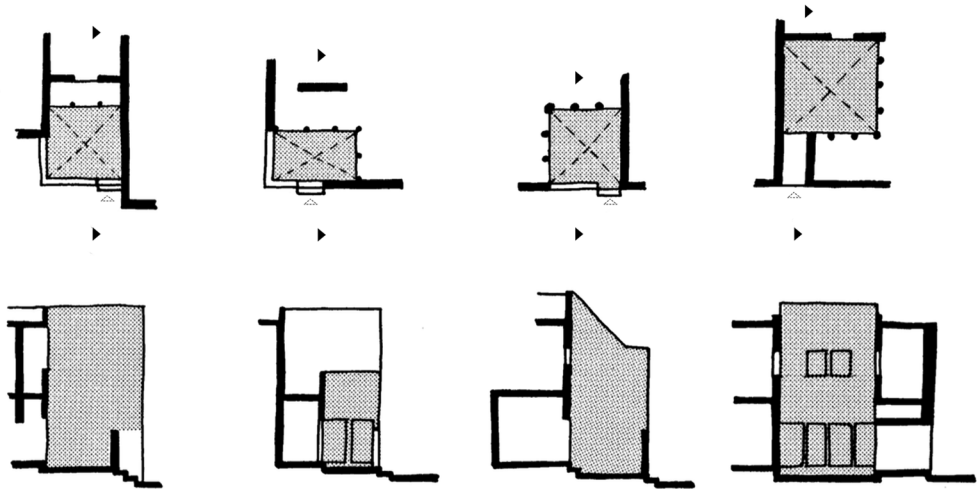
The first classification is that of a **space definer**. A courtyard which is roughly the size of a small living room with a privacy only limited to the immediate family can be categorised as a definer. Functionally it is more of an extension of domestic space combined with a source for light and ventilation.

The second classification is of an **articulator**. When a court for daylight and ventilation, almost becomes a private extension of the domestic space of one family, it can be qualified as an articulator. It has a lockable and a clearly defined threshold, however is much larger in size than the definer type. This more private type of the courtyard is seen most commonly in traditional Muslim homes, as a space where the women collect and gather, away from the eye of public and visitors collecting in the more public living spaces of a dwelling.

During the site visits, some exceptional cases were also observed. In some cases, the courts were the divider of the house itself and in some as a connector of living and cooking spaces. In more tighter grids, they solely existed as light courts. The third classification comes when the court functions as an entry. The **transitional** courts are usually smaller in scale but grander in ornamentation and are more commonly seen in the Hindu households.

²⁹ Akhtar, Badshah; 1983

COURTS AS TRANSITIONAL SPACE



COURTS IN SPECIAL CASES

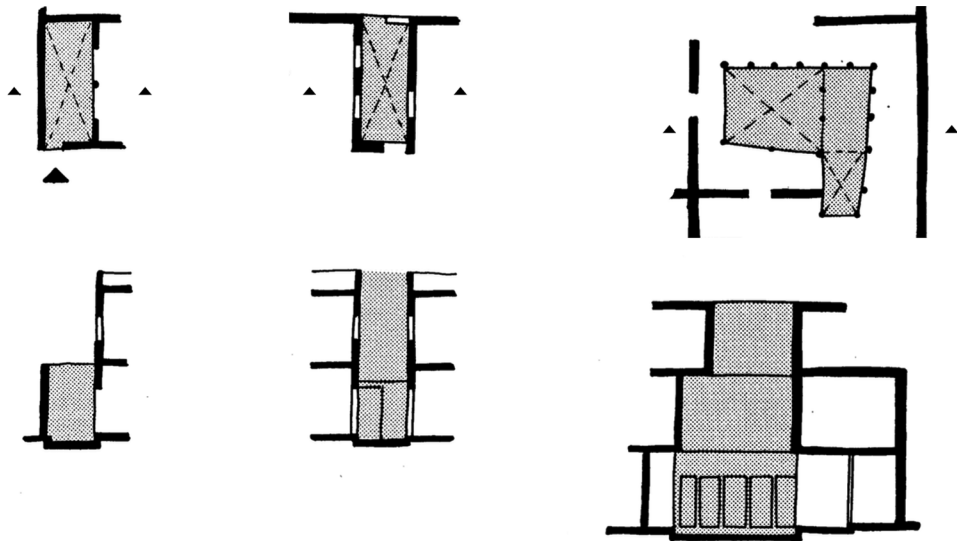


Figure 40. Courtyard diagrams as Transitional spaces and connectors, sketches by Author over Akhtar Badshah's sketches

Reflections and typology creation

There are two intentional processes that explain that chattas had been conceived as a patterned typology marking the territory of the living quarter. Firstly, an easily recognisable architectural articulation of the entry point. Arches or overhead connections change the look and the feel of space, marking territory like a gateway. Furthermore, a single entry point induces interaction between the members of the community, it also makes sure that someone has 'eyes on the street' at all time ensuring the security of the neighbourhood. Defining a territory through a spatial archetype is an intentional act to bring in defence. Secondly, much like the case of chowks, this archetype also utilises the concept of common property to negotiate community participation. Chattas give the opportunities to personalise the open or shared space as per their needs and requirements, attaching the much-needed value to land. The fact that the created resource belongs to one and all and to no one makes it much more resilient and adaptable for community participation.

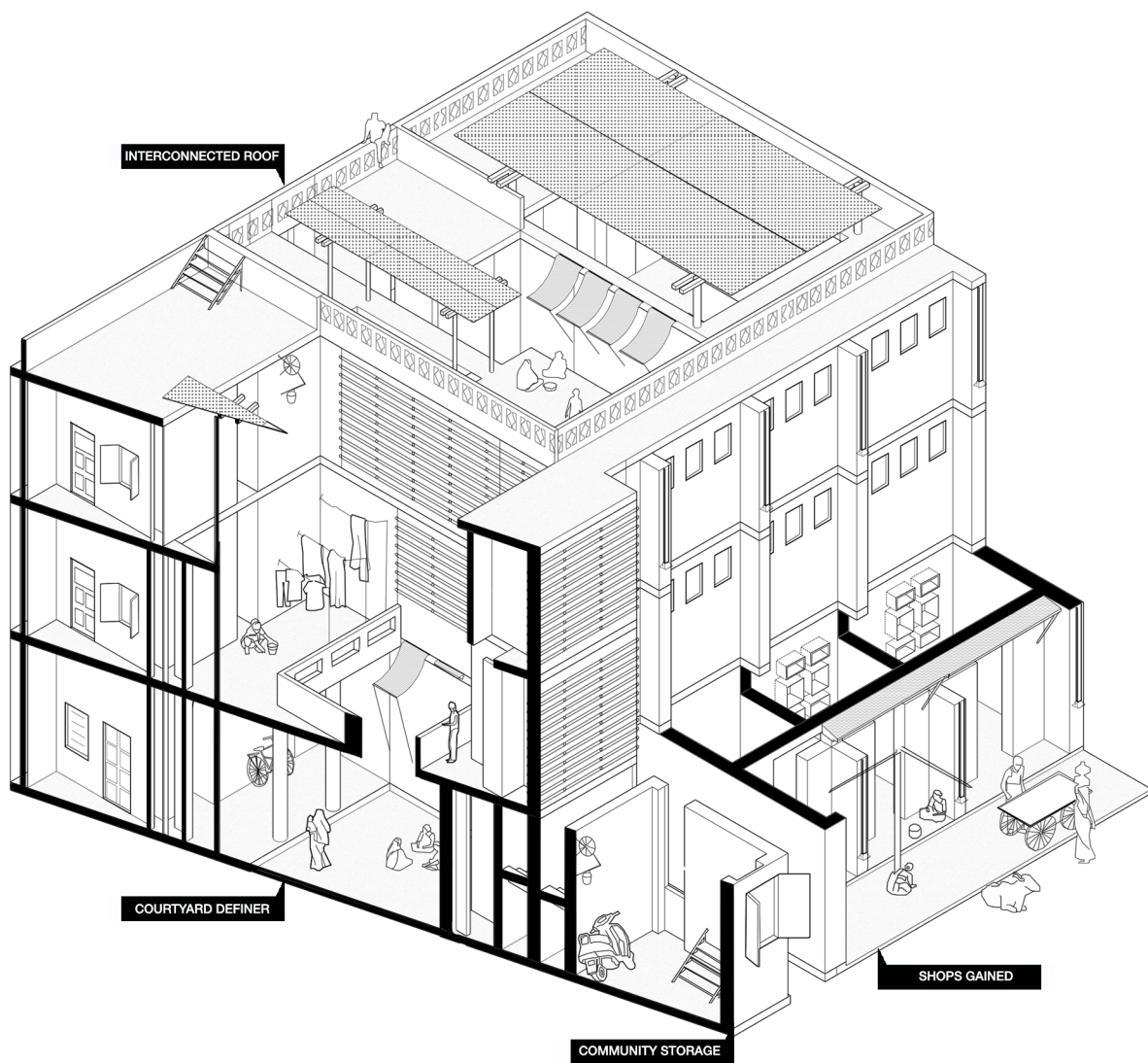


Figure 41. Illustrations by Author

E. TERRA INCOGNITA

Reflections and Way forward

While analysing the river edges of the Sabarmati River, De Cunha and Mathur observe that strict boundaries defining the riverfront and the river edge are slowly blurring. They cite an example of a park in the neighbourhood that had a fence, which now has been taken down to invite active participation. He goes on to say that if the lines and boundary definitions are blurring, then there is an urgent need to re-draw a 'new terrain'.³⁰ He terms it as 'Terra incognita' or a terrain of unmapped and unknown. This research paper is an attempt to engage with a 'terra incognita', that is the realm of open space in the informal settlements of Delhi.

When britishers started mapping the landscape of India, an unfamiliar context they could only map the legible. Through gazetteers, maps and drawings they semantically reduced the Indian landscape to something simple and ordered. However, informal settlements in Delhi, actively resisted this change and survived both in numbers and form. Post-Independence, the governmental agencies made several attempts to organise the settlements and on being not able to successfully do it, marked them into red boundaries called 'laal Doras' or Red threads. The zones inside the red threads were exempted of government policies of ordering and have now been relegated to slums. Just because these settlements do not fit the brief of an order in our disciplinary perception, does not mean they are not ordered. This paper argues that these settlements are ordered, ordered by complexity.

Underneath the seemingly chaotic terrain of open space, there is a latent logic or pattern. To observe and make sense of it the viewing lens had to be changed and in this case it was provided by overlapping Holland and Page's theory of complex adaptive system along with Ostrom's common property regime, over the local knowledge gained by author's continuous engagement with the settlements. Economically arguing, holding gatherings and activities with large crowds becomes imperative for the poor. In a terrain where land is the biggest resource, poor quietly encroach and appropriate city margins that are redundant for the real estate. They spread in unviable length and on unviable widths linearly so as to defend any sort of resistance from the ordering agencies. This linear terrain is identified as Maidan (equivalent to urban parks) – a large space that is always in flux and changing forms, maintaining the historical centre at its core.

Furthermore, inhabitations and settlements have always developed around resources. Informal settlements have either grown the same way or have developed their own so as to stand ground for centuries. In an environment, where the user groups cannot afford to harvest resources individually, they mobilise in communities to share resources for a common gain. The next terrain of 'Chowks' (equivalent to squares) is found to be a spatial articulation of these points of resources. The communities in the sample studies have over the years of socio-spatial restructuring developed loops and connections of these resource points, resulting in a loop of chowks, that in turn redistributes the grain of the settlement. The chowks

³⁰ De Cunha and Mathur 2017

are usually rectangular with a minimum of three entrances. They have a connection to nearest public space so as to sell or showcase the harvest visibly.

It was observed that social network is key in constructing neighbourhoods and communities. The migrants feel secure while placing next to someone known and hence, the communities are observed growing along familial, religious or economic affiliations. The open-space structure of 'Chatta' plugs in at this point becoming the public-private. Communities customise these spaces with spatial definitions and programs key to their values – temples or wrestling rinks. Every member participates in organising it and thus this space belongs to everyone and no one at the same time. The 'chatta' has an architectural threshold and a single entry, which has a seating space where people collect. So by the time a stranger reaches the interiors of the community, people are already aware of his/her presence. It usually has a shape of a square or a distorted square and shows a gradation of privacy as per the placement within the neighbourhood.

Such idiosyncrasies in the non-designed environment add value to the settlement shaping the user interactions. The paper concludes that the open spaces in a non-designed environment are formulated by social forces especially economics, religion and defence. The physical forces would also play a role, however, only over a radically changing terrain. The interplay of physical forces in isolation and along with social forces can be a point of future exploration.

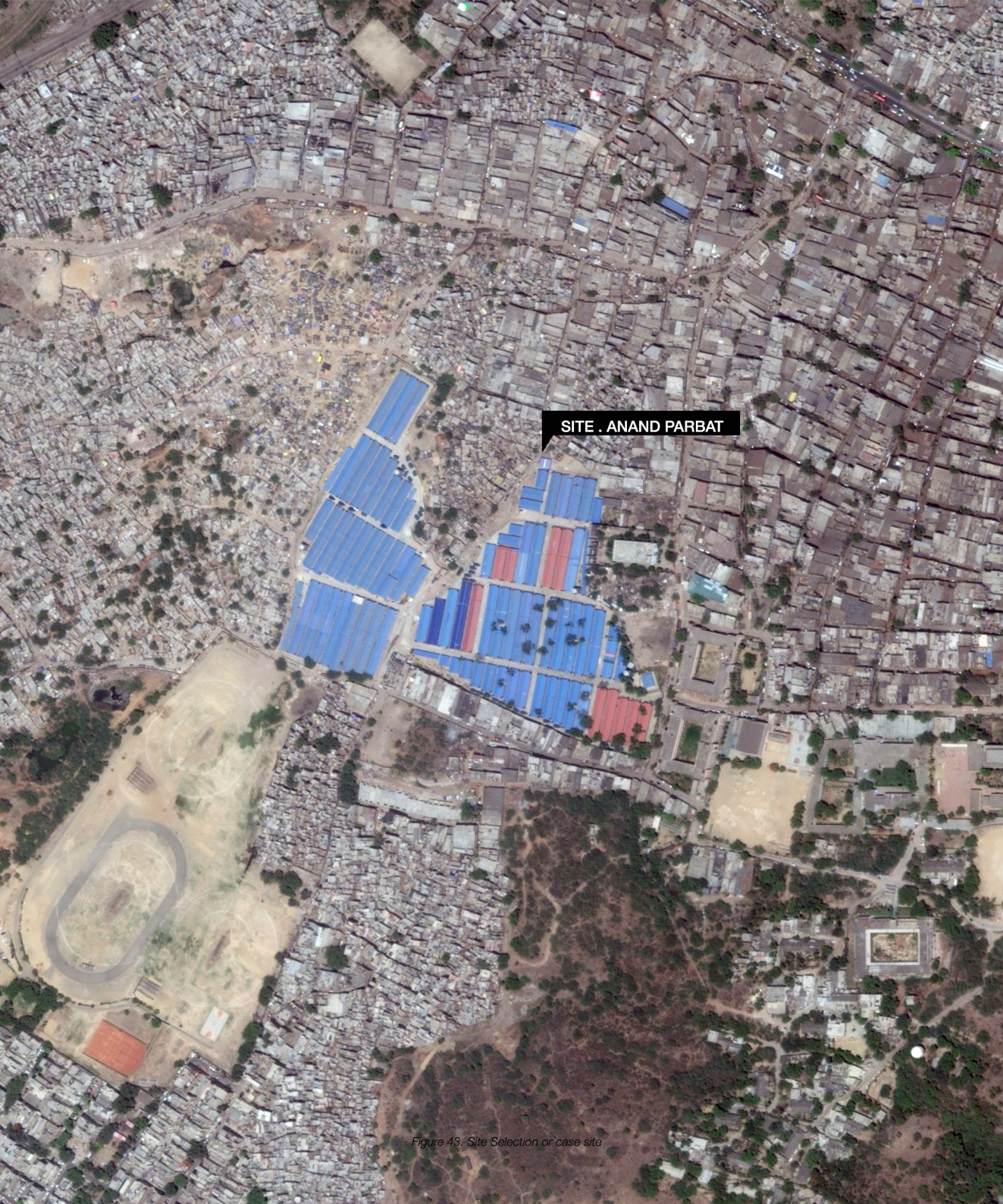
Despite of clear intentions, most design attempts have been unable to gauge the 'ordered complexity in the open spaces, which this paper argues should have been at the core of design processes. Partly by being always outside the system and partly rejecting the intelligence in nature, designers have not been able to effectively use the learnings into formalization processes. The paper attempts to make a case for these forces and spontaneous orders which are not always positive but are arguably genius.

F. TRANSLATION TO DESIGN

Work in Progress

Design

Chosen for their **geographic strength** Pre-Transit camps are reimagined as a **dwelling prototype** challenging the existing in which poor are housed and displaced as cattle. It is envisioned as an **inclusive neighbourhood** exposing the poor to socially and physically **resonant inhabitation forms**, empowering and stabilizing them to either build up **capacity or assimilate** back into the city before the final displacement.



SITE . ANAND PARBAT

Figure 43. Site Selection or case site

Step 1

CONTEXTUALISE

Anchor to the site

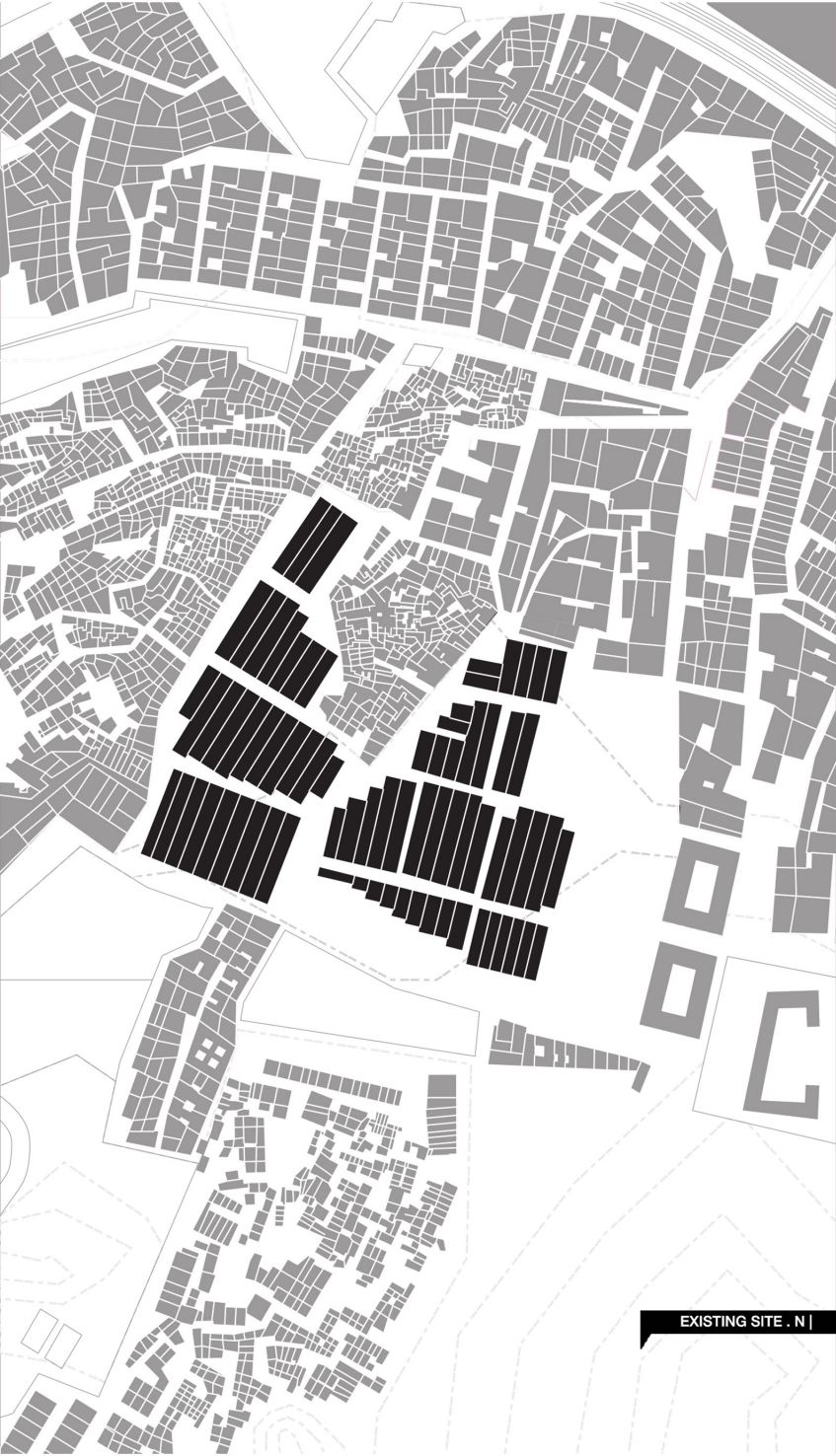


Figure 45 . Site structuration schem



Step 2

RESOURCE-IZE

**Using GIS to identify resources of water and fertile soil
for creating resource pools. Ostrom's resource theory
applied for primary neighbourhood creations**



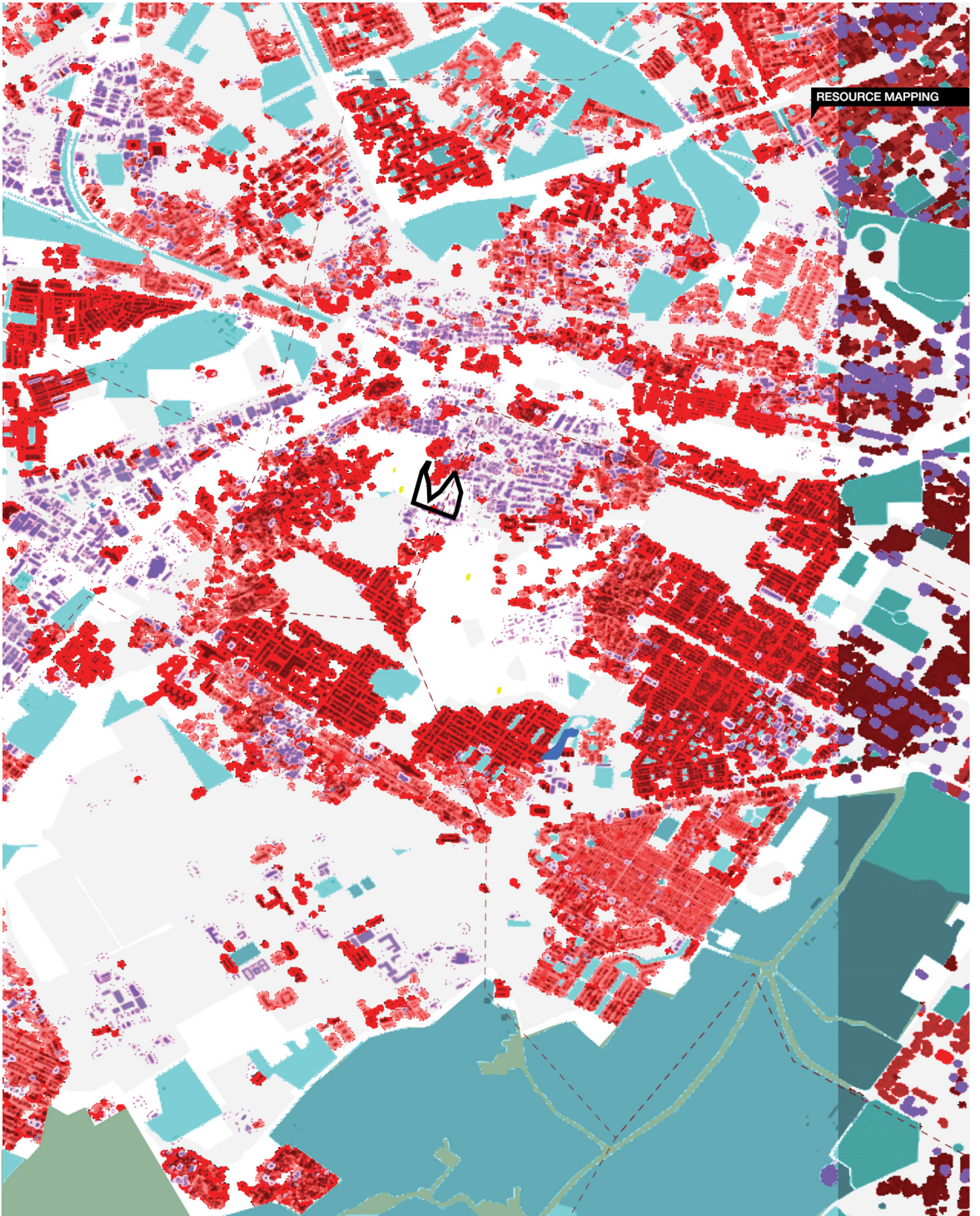




Figure 46 . Site structuration scheme f



CONNECTING POINTS . N |



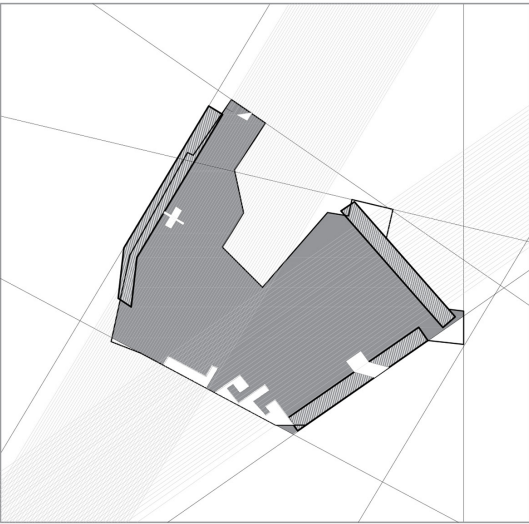
CONCEPTUAL SKETCH. 2

Step 3

TYPLOG-IZE

Making the process non-discursive

CONTEXTUALISE . Scale 7500 . N |



CHOWK LOOP A . Scale 7500 . N |



STREET NETWORK . Scale 7500 . N |



FINAL GRAIN . Scale 7500 . N |



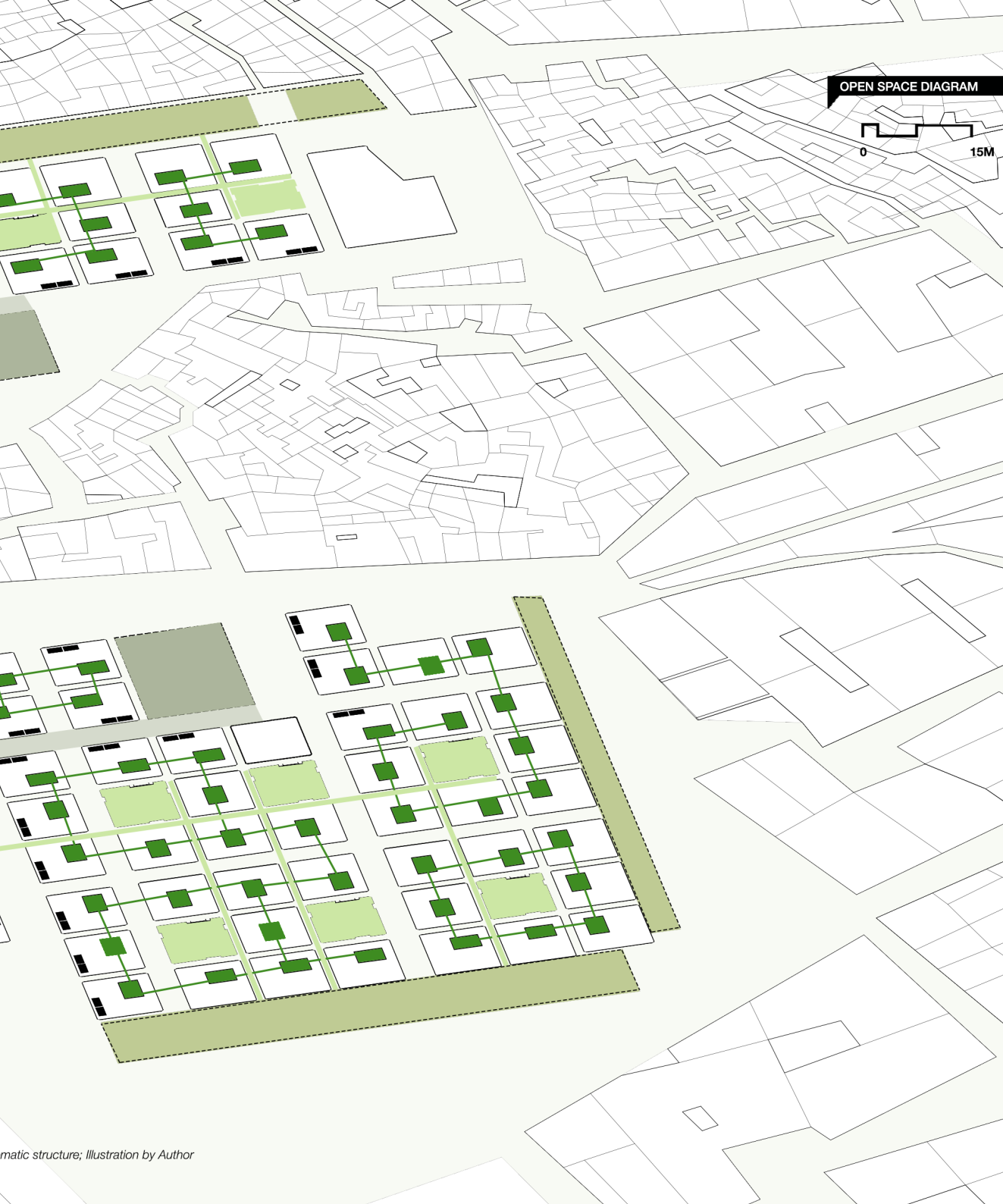
Step 4

RATIONALIZE

Zooming into scales



Figure 48 . Open space diagram from Anand Parbat, Sche



OPEN SPACE DIAGRAM

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