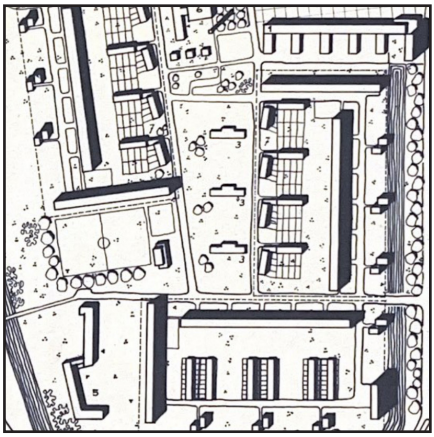

The transience of society:

Through the lens of a post-war neighbourhood in The Netherlands

Amrita Sen

28 June 2024

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Research Report
Advance Housing Design AR3AD100
Delft University of Technology

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Introduction

"1 million homes by 2030!"

This is a phrase all too familiar with anybody living in the Netherlands. The origin of this statement comes as a response to the ongoing housing crisis that the country is facing for several years now. The Ministry of the Interior and Kingdom Relations of Netherlands states that in 2023, there was a shortage of 437,000 homes, and by predicting population growth and demand for houses, they estimated the need for 900,000 new homes by 2030. How do they plan to tackle this?

In the next fifteen years, almost 1.3 million homes are expected to be added through new construction, the division of existing homes into multiple units and the transformation of, for example, old office buildings and vacant shops into new homes. At the same time, an estimated 189,000 homes will disappear due to demolition and mergers. This results in a net growth in the housing stock of approximately 1.1 million homes byl 2038 (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2024).

These statistics raise some pertinent questions; Where is the land to build all these hundreds of thousands of homes? What resources will be used for this massive construction process? Why are 189,000 homes being demolished?

Many of the homes that are currently being demolished or have been demolished are noted to be those constructed during the post-war reconstruction period in the Netherlands (1945-1968). These homes were built as a response to an immense housing shortage that the

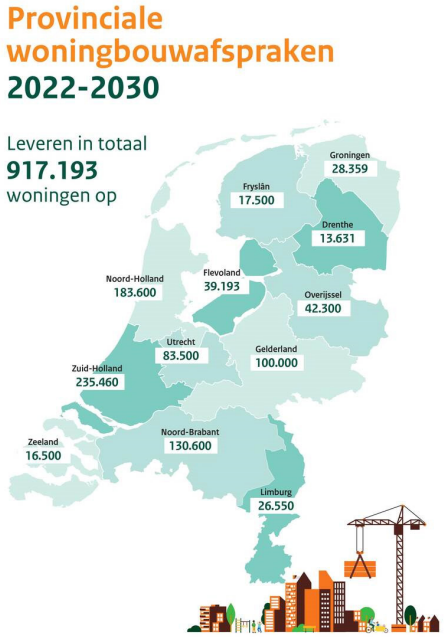


Fig 1. Distribution of homes to be built per province (2023-2030)
(Ministry of the Interior and Kingdom Relations of Netherlands, 2022)

country was facing due to war destruction. Why did they have to be demolished? What makes the construction of new homes better than its predecessors? How many years before the new homes are demolished also?

Simply constructing new homes is not the answer to the housing crisis. "1M Homes: 'More living space' doesn't just mean 'more building'" (2021) is an interdisciplinary initiative by TU Delft, where professors Marja Elsinga and Thijs Asselbergs emphasise the need for systemic changes and socially responsible innovation. "The cubic metres actually already exist". The transformation of existing neighbourhoods, repurposing vacant buildings, flexible housing forms and the responsible use of raw materials are some of

the principles that need to guide the housing challenge (Elsinga & Asselbergs, 2021).
So how can new homes be created so that they do not face the same fate as the post-war housing stock of the country? How can existing neighbourhoods be densified without putting pressure on agricultural or natural landscapes? The answers to these questions are rather complex. However, to try and make a resilient future, it can be beneficial to study the past- its successes and its failures.

This study examines the post-war housing typology of the Netherlands, specifically in the district of Westwijk, Vlaardingen which was an important site that housed several thousand people after the bombings in the neighbouring populous city of Rotterdam. With the goal of designing more future resilient neighbourhoods, a parallel is drawn between the post-war housing typology and the traditional housing typologies of the Netherlands; highlighting similarities and contrasts.
Drawing such comparisons offers insights into the shortcomings of current planning practices and identifies necessary changes to ensure that new constructions do not face the same fate as the hundreds of thousands of homes before them.

A walk through Westwijk

Westwijk, Netherlands
December 2023

Situated not very far from the bustling metro city of Rotterdam, one can find the neighbourhood of Westwijk, at first sight, underwhelming to say the least. Stepping out of the metro stop 'Vlaadingen west', the first sight a visitor is greeted by: A 14-storey high concrete tower, with several broken windows, peeling paint and rain damage. A sense of dismay is bound to encapsulate your visit to this typical 'post-war' neighbourhood of the netherlands, with striking similarities to countless others, built within the same decade - the 1950s.

Fig 2. Westwijk in 2023 (by the author)

1. *Houses, houses and more houses!*
The Post-War Reconstruction period

The period after the war gave rise to an unprecedented situation, where war destruction along with the baby-boom, resulted in a severe housing crisis. The government of the Netherlands, like many other European countries, needed to focus on economic reconstruction. Rebuilding infrastructure, and housing development became a crucial aspect of this reconstruction process. Expansive residential neighbourhoods and suburbs were commissioned to be built, using new construction techniques, in a fast, cheap and efficient way.
The design of the post-war neighbourhoods often followed the CIAM design principles of a functional city, based on efficient use of space and resources, and the application of modular technologies. With the development of industrialised methods of construction, it became fairly economical to construct high-rise buildings using steel and concrete that optimised ground space by vertically stacking housing units. To enable the easy multiplication of housing units in these buildings, the concept of the 'minimum unit' was introduced, where architects would be guided by scientific solutions to create compact, low cost dwellings (Mumford, 2019)

This became the guiding principle for many urban planners and architects during the reconstruction period in the Netherlands and the response to addressing spatial constraints. CIAM member Willem Van Tijen was one of the first to build high-rise apartment blocks in Rotterdam. One such example is the renowned 'Bergpolderflat', a high-rise apartment block built in 1933, commonly acknowledged as the first 'gallery flat typology' in the world. Prefabricated out of steel and concrete, it gained popularity by boasting radical and 'modern' dwelling units with with flexible open-plan floors and large windows, something which was previously unaffordable for the

working class (Rijksdienst voor het Cultureel Erfgoed & Nationaal Restauratiefonds, n.d.). The high degree of standardisation enabled low rental prices and the project soon became an experiment and example in industrialised public housing.

Fig 3. Cover of Hoe zal Rotterdam bouwen (How will Rotterdam build)? by architect Herman Kraaijvanger, 1946
(Paul Groenendijk Collection, n.d.)

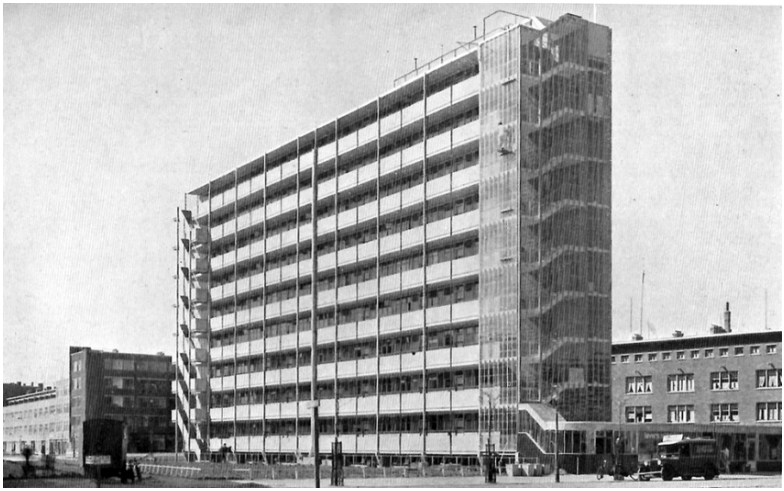


Fig 4. Bergpolderflat, Rotterdam 1933 (Schuitema, n.d.)

1.1 *The post-war Reconstruction of Vlaardingen*

After the bombing of Rotterdam in 1940, the pressure on the housing market intensified in the neighbourhoods surrounding the city. The city of Vlaardingen, which was located in close proximity to Rotterdam, did not suffer much material loss in the war and thus saw a large increase in the number of inhabitants and demand for houses. At the end of the war, Vlaardingen had more than 41,000 inhabitants and approximately eight thousand homes (Wederopbouw 1946, n.d.), a major imbalance in the demand and supply chain. The municipality thus commissioned Willem Van Tijen and Huig Maaskant in 1947 to develop a residential urban plan for Vlaardingen, including a detailed housing quarters for Westwijk and Babberspolder.

The planning of Westwijk followed the CIAM planning principles for a functional city. In such a planning, the built environment was split into four distinct functions; that is, of dwelling, work, recreation and circulation. This can be observed in the original masterplan for Westwijk, where the district was divided into 4 neighbourhoods with 5700 houses, with a central zone for shops and parks (Wederopbouw 1946, n.d.). 4 corridors of recreation emerged from the town centre, including sports fields, shopping centres, churches and community halls and a new railway station.

However, when looking at the plan of Westwijk today, the original structure of planning no longer exists. Several new housing developments have cropped up within the 'recreation corridors', several schools and churches converted into other functions and most concerning of all, the demolition of a number of high-rise buildings. These demolitions were not restricted to the district of Westwijk. Just a few decades after their construction, the massive high-rise housing constructions across the Netherlands were being torn down only to be replaced with newer high-rise constructions.

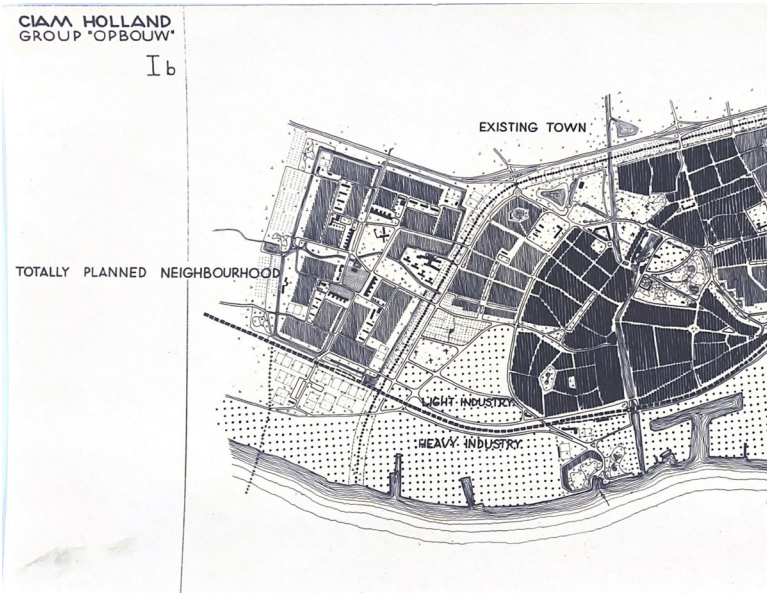


Fig 5. Urban plan for expansion of Vlaardingen
(archives Het Nieuwe Instituut)

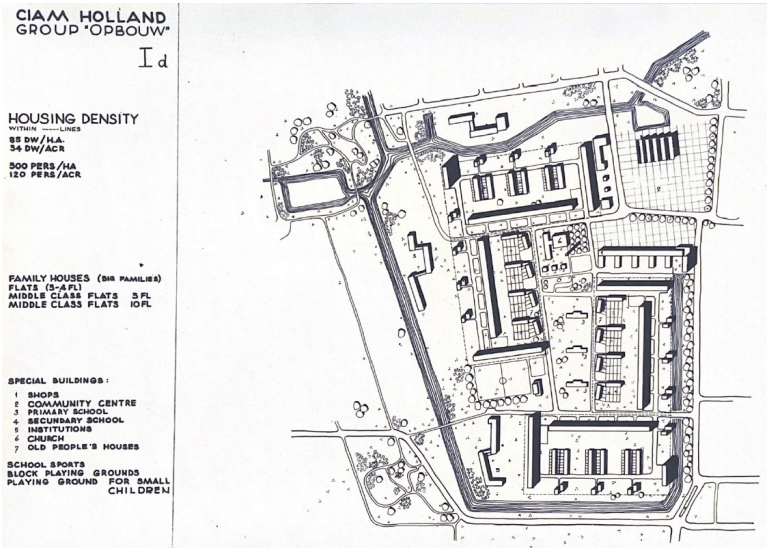


Fig 6. Planning for residental neighbourhood of Westwijk , Van Tijen 1949
(archives Het Nieuwe Instituut)

—— *Case study; Dura Coignet building*

Within these post war neighbourhoods, it is intriguing to note that a large number residential buildings, especially the high-rise typology, across multiple neighbourhoods and even cities, look identical. The design of the facade, floorplan of individual houses, even the design of cills are standard across the various locations and the buildings are indistinguishable from each other. The reason behind this peculiar similarity is the widely used 'Systeembouw' (system-construction, or pre-fabrication), which was the most common method of construction for houses in the post war period. This industrialised, standardised way of building was the solution to the need for cheap and fast construction, providing good quality, while requiring much less manpower.

Muvi, Panagro-Larsen and Nielsen, Airey, Pronto are a few of the several techniques of construction being used across the country. One such system of prefabrication is the 'Dura-Coignet' construction typology which was introduced by Job Dura alongside French company Coignet, in the Netherlands (Liebregts, 2012). The numerous imposing structures, stretching 100-130 m long, and 5 storeys high, that are dotted across Westwijk, are the products of this method of construction which yielded a total of 31,000 homes in the Netherlands in the period between 1959 to 1975.

The Dura-Coignet factory was located in Heiplaat, Rotterdam, where every element that is required to construct a building, including structural walls, staircases, facade panels and interior walls were prefabricated to a high degree of precision in the factory and then transported to the construction site and assembled using cranes to lift the elements to the right heights (Dura B.V., n.d.). Once placed at the right location, liquid concrete was poured into pre-made joints, thus securing the various elements in place. Architect Ernest Groosman

Fig 7. Dura Coignet factory, Heiplaat, Rotterdam (Dura B.V., n.d.)

Fig 8. Cranes transporting prefabricated panels at the building site (Dura B.V., n.d.)

was appointed by Dura-Coignet to realise the planning of these buildings. The process of construction became the guiding force for the basis of the design of the buildings as well as the internal floor plans. For instance, all wall elements were manufactured on the same machine, giving very little possibility for variation. Similarly only 4-5 versions were available for the facade panels (Dura B.V., n.d.). These constraints demanded the floor plans to be designed in a way so as to need the least number of elements to finish a home.

The methods of prefabrication that were developed in the post-war period were a revolutionary new way of building, which delivered thousands of homes in a period of severe housing crisis. High precision detailing and manufacturing ensured minimum assembly time and reduced the need for skilled labour in a project from the average 50% to 16% (Dura B.V., n.d.).

2. *Re-Reconstruction?*
Problems in post-war neighbourhoods

While the industrialised construction process helped solve the immediate housing crisis after the war, these homes eventually became unsatisfactory places to live for residents. Data from the congress 'Post-war public housing in Trouble' (Prak & Priemus, 1985) in 1984 announced a very concerning statistic. At the time, almost 3.5 million homes out of a total of 5 million were constructed after 1945, however only 20-30 years after their construction a lot of buildings began to be demolished. The post-war neighbourhoods did not function as intended by the city planners, and the lived experience of residents was far from what was envisioned. These neighbourhoods were plagued by high crime rates and vandalism, as well as physical defects resulting in a loss of safe and satisfactory residential atmosphere. Despite a huge housing shortage, high vacancy rates were observed in several such neighbourhoods, eventually necessitating their demolition (Prak & Priemus, 1985).

J.M. Nelissen (1985) analysed some key factors that result in a condition of decay, broadly categorising them as 'Spatial Decay' and 'socio-cultural decay'. Spatial decay relates to the problems arising due to poor urban planning, quality of construction and planning of internal spaces. Socio-cultural decay occurs when there is a lack of social interaction and unrest amongst residents, unfavourable social atmosphere and safety hazards.

Owing to the industrialised method of construction, all dwellings had identical floor plans. There was no diversity in the spatial planning of the apartments and people from various cultures, family types and economic backgrounds were forced to live in standardised dwelling typologies. Individual needs of residents were not satisfied resulting in

unrest amongst neighbours and general dissatisfaction. Additionally, there was an absence of collective spaces for residents within the buildings with no scope for interaction except in elevator cores or staircase blocks, used only as a means of accessing higher floors.
Research by Van Naelten & De Pessemier (De Jonge, 1985), found that personalization was at the core of people's comfort and satisfaction. People demand flexibility and freedom when it comes to choosing their living habitats. From interviews they concluded that it is important to have clearly defined open spaces around the built form of the house. Common spaces of the high-rise developments are neither public, nor private and the residents do not have control over it, hence they remain unattached to it, resulting in neglect of these areas (Wassenberg, 2021). Due to lack of social interactions, covered corridors and common galleries became an unsafe zone attracting litter, vandalism, homeless squatters, drug abuse and truancy. What was designed as privacy in the post-war neighbourhoods resulted in anonymity amongst the neighbours.

Looking particularly at residences of Westwijk, a pattern of disconnect can be observed. Rows of lowrise dwellings seem to be placed within a plot of land, with absolutely no correlation to the neighbouring row of units. Narrow streets are created in between the rows in order to access the front door of the house. Backyards exist as a collection of narrow fenced spaces, often reduced by the construction of garden sheds by the residents. A back door in the fence may allow residents to exit into a path, generally narrower than 1m, flanked by the neighbour's fences on either side. For the highrise typology, even though open space is planned around it, these spaces exist as decorative lawns with no social character or function. This anonymity, lack of communal interaction, and institutional nature of urban spaces in the neighbourhood is typical of many such post-war neighbourhoods in the country.

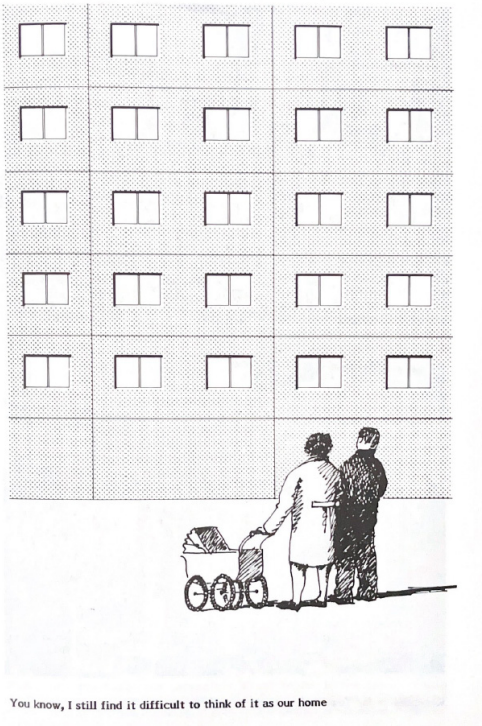


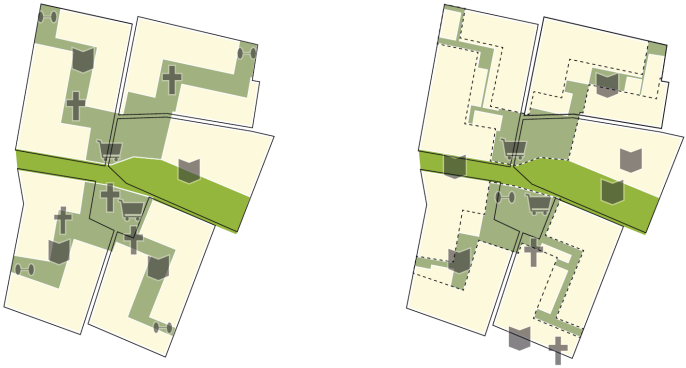
Fig 9. Anonymity in a post-war high-rise buildng
(Prak & Priemus, 1985)

Fig 10. Indische buurt, Vlaardingen in the 1960s
(Historische Vereniging Vlaardingen)

When comparing the planning of Westwijk today, to the original master plan, it is evident that the originally envisioned structure for the neighbourhood failed, as functions started overlapping. The planned 'recreation corridors' were not integrated with the living blocks, resulting in new haphazard residential developments in the expansive open spaces, while sports facilities and schools were demolished. The deserted streets, absence of community spaces or social activities in the neighbourhood points to a similar decay as seen in other parts of the country.

It was however interesting to note that decay did not occur in all parts of the neighbourhood. Areas with large foot traffic due to communal facilities such as shopping centres possess the ability to self-regenerate as and when required (J.M. Nelissen, 1985). Similar is the case in Westwijk, where the central shopping complexes are the only area where one can see residents during the day, doing their weekly grocery shopping. When a sense of belonging is evoked in a certain area and all residents benefit from the same, there is an effort by the community as a whole to upkeep and maintain their surrounding.

Why did these decays then occur in certain parts of the neighbourhoods and how can it be prevented? To gain a better understanding of what causes the success or failure of post-war planning, it can be beneficial to learn from the centuries old housing estates of the Netherlands that stand the test of time even today.



a. Original structure of planning *b. Present day*

Fig 11. Planning of recreation and open space in Westwijk, Vlaardingen
(Loop, Sen & Smit, 2024)

Fig 12. Bustling shopping centre in Het Liesveld, Vlaardingen in the 1960s
(Historische Vereniging Vlaardingen)

3. *Learning from the past*

Traditional housing structures of the Netherlands

Traditionally, there seemed to be a variety of open space typologies, clearly defined around the built form. These can be seen in one of the oldest housing blocks typologies, the Dutch 'Hoftjes' of 'Hof', where the dwelling units are built in a U shape or a continuous loop around an inner courtyard. Houses can be accessed from this shared communal space encompassing gardens, play areas and other shared spaces. This courtyard formed a 'parochial space' where even though public access is permitted, a sense of territory is established, belonging to the residents who live along the perimeter (Theunissen, 2009). In such a planning, the interior becomes a form of transient space, flowing from the public street to the private dwelling, a space for potentially both, a visit and a resident.

Subsequently, looking at the more 'modern' perimeter block or the street-side house, it was one of the most widely used planning strategies in 19th and 20th century European residential architecture. At first sight these may resemble the traditional hof typology with dwellings surrounding an inner courtyard, however their planning differs greatly from the former, and can almost be interpreted as reversal of the hof typology. Inclusion and exclusion constituted the basic principles of the European block where the exterior of the block becomes the 'public' side where the entry to the houses are situated, and the interior courtyard becomes the 'private' zone with backyards. Most often residents are allotted a certain area for their private perusal, which is fenced off from its surroundings, accessed only through the house. One enters directly from the street into the living space, often lacking a collective domain for residents or the passerby.

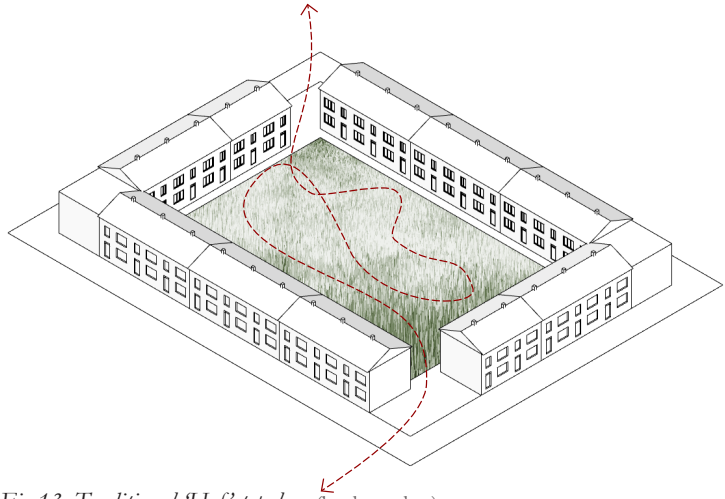


Fig 13. Traditional 'Hof' typology (by the author)

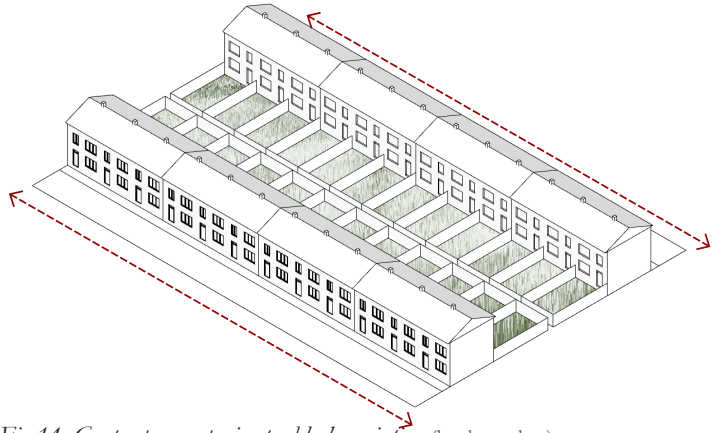


Fig 14. Contemporary perimeter block variation (by the author)

This typology of living arrangement, especially in the Netherlands is thought to have a predecessor in the centuries old 'Merchant's House' or 'Canal House' (Theunissen, 2009). Merchant's houses generally consist of 2 to 3 storeys with the entrance to the home opening directly onto a public street. However, a key difference between the two typologies is that traditionally, the room adjacent to the street, where the main door of the house was located was made into a 'street room', used for business by the merchants, while the interior rooms and the 'backside' of the houses remained strictly private (Theunissen, 2009). So even though these houses created an absolute division of the interior and exterior, a spatial buffer allowed the urban fabric of the street to trickle into the home. This spatial transition was however absent in the perimeter block typology, which formed the backbone of several low-rise post-war developments. While in the perimeter block, some common gathering spaces may have existed in the interior courtyard, these were entirely missing in the new developments where fences and walls stood bounding every open space.

As seen in many low rise developments across Westwijk and Vlaardingen, the front door opens directly from the living space onto a public street, or into a driveway for vehicles. The open space at the back of the house consists of backyards that are cut-off from the neighbour's and surrounding open spaces by means of tall fences. People exit the privacy of their home, headed straight towards their next destination. The urban plan does not allow for any kind of lingering, socialising or even observation of one's immediate surroundings.There exists an absolute division of the public domain from the private realm, resulting in an complete anonymity and solitude for both the residents as well as passersby.

This kind of absolute division became even more pronounced as the post-war highrise typology started taking form. Communal spaces existed only in the form of elevator cores or staircase blocks, used as

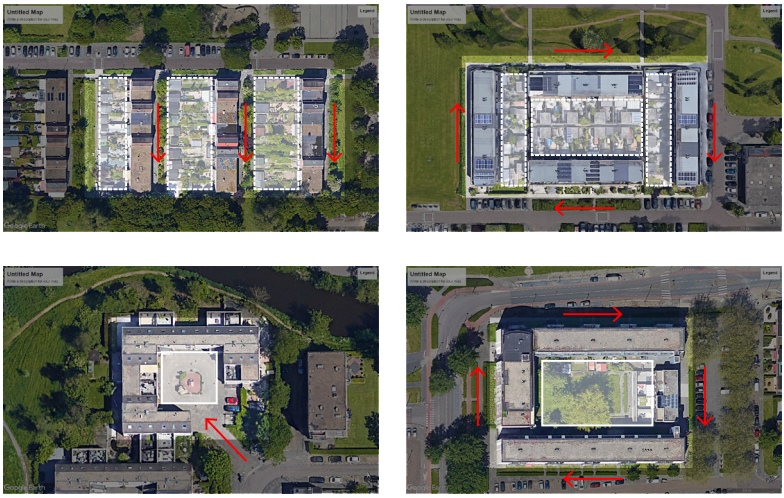


Fig 15. Buildings of Vlaardingen- Satelite View (Google Earth, 2021)
Clockwise from top left: Type 1 (row houses), type 2 (row houses), type 3 (semi-detached houses), type 4 (highrises)

The 4 types of clusters seen above form a majority of the housing types in Westwijk. The access to these houses (red arrow) in most cases is segregated from the other units, and usually through the vehicular road. The row houses (type 1& 2) have fenced off private backyards (white dotted line), with no visual or physical connection with other residents. Type 3, even though designed to have a common access, has a driveway in the common courtyard (white line). Type 4 is a cluster of highrises that are oriented along the vehicular access roads, with half of the flats overlooking an unused courtyard.

a means of accessing higher floors. Private backyards or open spaces were also eliminated from dwelling units, only to be replaced by rows of identical balconies stacked one on top of another, resulting in the present day decay of such living conditions.

Fig 16 & 17. Westwijk- 2024 (by the author)

4. *Somewhere in-between*

Open-space planning & the un-built

In western Europe, some young members of CIAM including Dutch architects Jaap Baakema and Aldo Van Eyck, vocally opposed the dogmatic approach of CIAM towards rational urbanism in response to post-war Dutch town planning (Strauven, 1992). They believed the analytical and functional approach to architecture dissociates people from their surroundings. They saw the importance of creating a strong relation between individuality and collectivity in the post war architecture era, concentrating on developing a more human scale (Strauven, 2007).

Van Eyck's research in art and anthropology led him to the conclusion that relativity plays a crucial role in understanding the complexities of contemporary life can only be understood by mutual interaction of past and present design principles (Strauven, 2007).The 'inside' cannot exist without the 'outside', 'private' cannot exist without the 'public', and 'community' cannot be conceived without 'individuality'. This led him to a place often neglected in modern architecture, the 'in-between', a place where different objects and scales can meet, unite and co-exist. The philosopher, Martin Buber, who Van Eyck mentions in several texts, defines the ín-between' as a sphere that exists between 2 humans, which is common to both and which transcends the individual spheres of both (Farhady & Nam, 2009). Van Eyck defined architecture in context to this in-between; "Its job is to provide this in-between realm by means of construction, i.e., to provide, from house to city scale, a bunch of real places for real people and real things" (Van Eyck, 1962 as cited in Ligtelijn & Strauven, 2008). Thus the 2 spheres that can be seen to dominate as well as divide residential architecture is that of the expanding private sphere, and the increasing need for the urban collective (Wietzorrek, 2014). The built environment, nature and society meet in a zone of

Fig 18. Amsterdam Municipal Orphanage, Aldo Van Eyck 1955-1960
(Aldo van Eyck Archive, n.d.)

Fig 19. Design of an in-between' space by Aldo Van Eyck
(Aldo van Eyck Archive, n.d.)

ambiguity that allows for appropriation, the unbuilt. Van Eyck paid close attention to the design of such interstitial voids to define space and place, aimed at creating dialogue in the community, for both adults and children. This can be seen translated into the numerous play grounds that he designed for Amsterdam's Department of Public Works. The inbetween can thus be seen to exist at multiple scales of architecture, from the small courtyard of a house to large urban squares of the city, available to society and nature alike, permitting multiple uses and interpretations by the actors passing through it.

'In-between' spaces have existed for many centuries in dwelling design, and were traditionally greatly valued in architecture in the form of 'patios' in European culture, 'aangans' of India, 'siheyuan' of China or 'sahns' in the Middle-east, to name a few. The traditionally 'indoor' spaces are mostly fixed in its composition with 4 walls, a roof and a floor; however the 'outdoors' or semi-outdoor spaces are more fluid in nature. It allows for hybrid uses based on time of day. For example a canopied space may be used for morning yoga, kids' playground by the day, and a gathering for friends to chat in the evening. These spaces accommodate not only humans, but animals and nature are allowed to co-exist. Fischer-Kowalski and Weisz (1999), in their model of the socio-ecological system, placed humans, animals and the built environment in an overlapping zone between culture and nature, where each impacts the other like a chain reaction. Thus, the complexities of the relationships that the in-between space fosters, warrants a careful consideration in the design of the 'un-built'.

Defining the architecture of the in-between, leads us to the inevitable 'line of control' for such spaces. Where does the built form end and the unbuilt begin? A wall, a door, a window create a singular plane of separation. A corridor, a canopy, or even a hedge, extend the traversing of this boundary. Van Eyck's contemporary, Herman Hertzberger (1991), defined the boundaries that one traverses in daily life, whether spatial or social, using the term 'threshold'. He

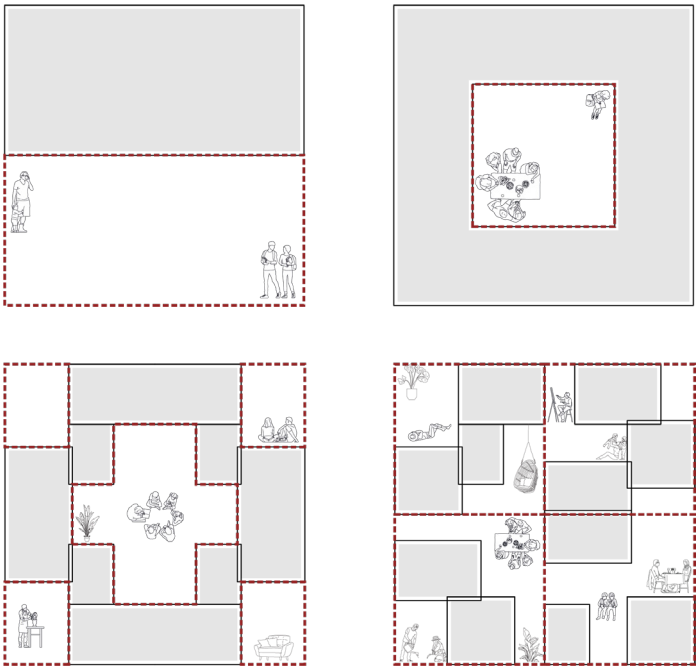


Fig 20. Designing the 'un-built' (by the author)

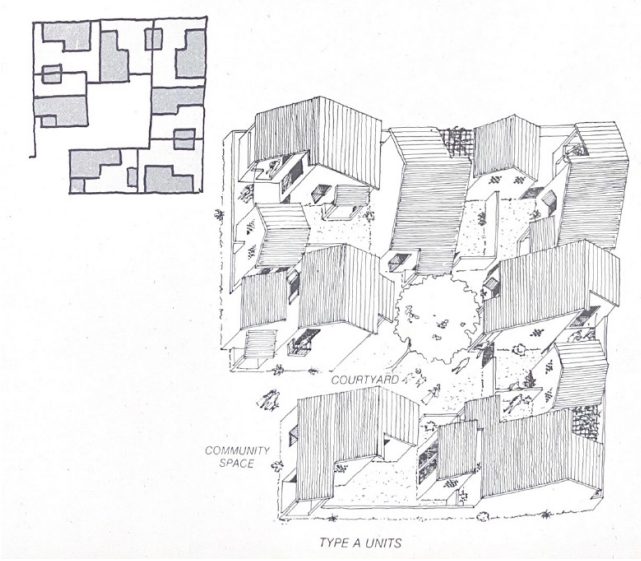
defines it as- "A zone of transition and connection between areas with divergent territorial claims and, as a place in its own right, it constitutes, essentially, the spatial conditions for the meeting and dialogue between areas of different orders." The threshold can thus be interpreted as a spatial concept where boundaries can either be established or stepped over. We determine our boundaries everyday, by closing doors for example, or by opening windows, drawing our curtains or putting up fences. The way that boundaries are designed between the public and private sphere may lead to various trajectories of social developments (Wietzorrek, 2014). Nuanced thresholds may be established to convey social and spatial boundaries, and define the territories of public, private or parochial spaces.

The celebrated Indian architect Charles Correa in one of his early publications 'The New Landscape' (1985) discusses the meaning of "space as a virtue" in context of the rapid growth and urbanisation in the towns and cities of developing countries of the time. Urban living is not restricted to the 4 walls of a room. It exists as a collection of hierarchical spaces that extend from the private interiors of a home, followed by zones of intimate social contact, ie. the threshold; extending next to neighbourhood meeting spaces of collective gatherings and lastly zooming out to principal urban areas used by the entire city. Even though these spaces differ in type and number, it forms the basis of all human settlements across the globe and through time. What can be observed in this hierarchy is that the shift from private to public spaces is almost always accompanied by a shift from covered spaces to open to sky spaces. Correa in his works, examines a multitude of spaces that lie between these 2 extremes, such as verandahs, pergola-covered terraces or even the shade of a tree. He believes their functionality can be adapted to either end of the intimacy spectrum, provided that layers of privacy are tailored to their specific uses. He notes certain 'cardinal principles' that he believes are the key to the success of mass housing in third world countries, these are;

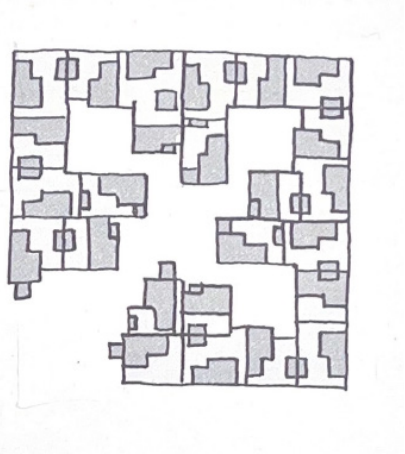
Incrementality;
Pluralism;
Participation;
Income Generation;
Equity;
Open-to-sky space; and
Disaggregation.

These principles may be viewed objectively as a way to densify residential neighbourhoods, to house the growing population of city centres. What Charles Correa envisioned for 'third world countries' in fact is seen as key considerations for affordable housing in countries across the world. What built typology do these principles then

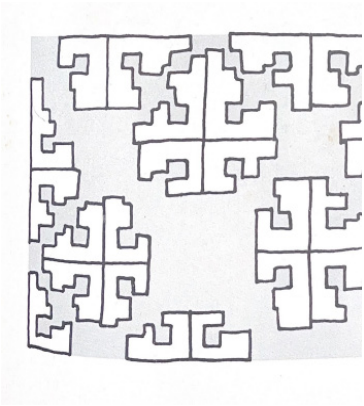
7 units are grouped around an intamate courtyard (8m x 8m)



3 of these clusters combine to form a bigger module of 21 houses, surrounding an open space of 12m x 12m



These modules repeat to form the next scale of community spaaces 20m x 20m



this spatial heirarchy continues until one reaches the largest neighbourhood scale of schools, facilities and a seasonl stream

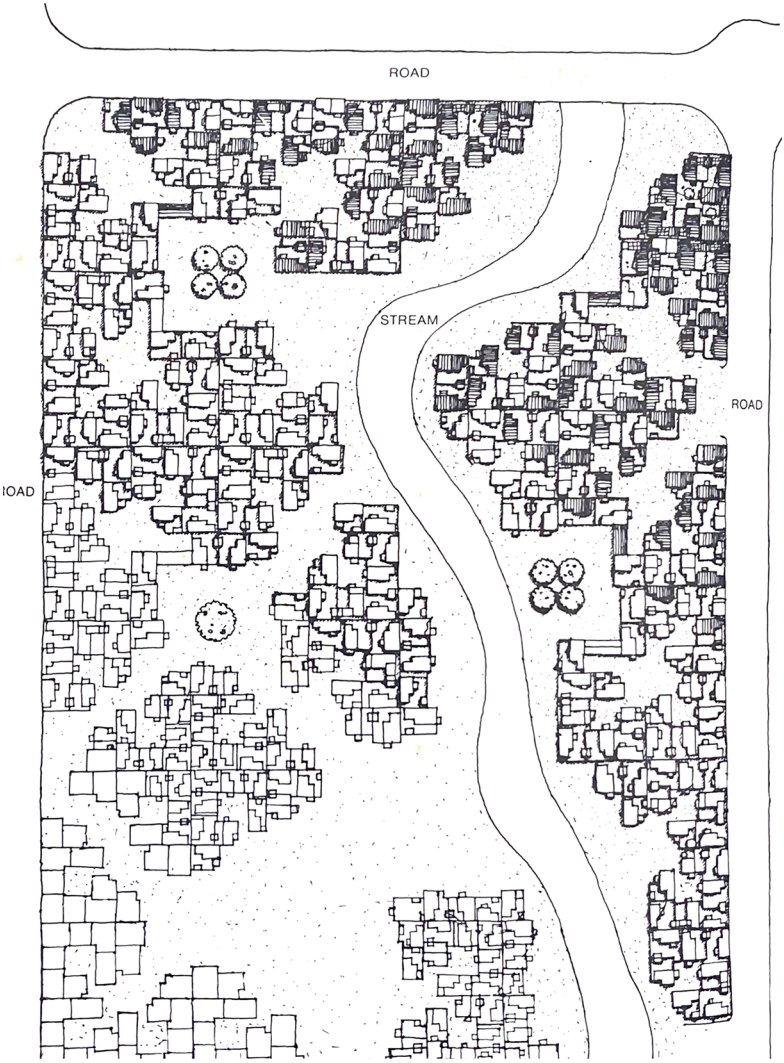


Fig 21. Sketches of the master plan for Belapur Housing, Charles Correa
(Correa, 1985)

translate into, and how do they differ from the developments that we looked at in the post-war Netherlands?

Correa in the design of 'Belapur Housing' (1983) in Navi Mumbai, India, cleverly makes use of low-rise, high-density housing typology on 5.5 hectares of land, to house 500 people per hectare (20 sqm per person). The main planning principle is guided by the open/enclosed space distribution as discussed above with each family receiving private open space to augment their living space. Instead of the typical row-house typology of low-rise developments, Correa arranges the individual plots (consisting of built and unbuilt spaces) in clusters of 7 units surrounding an intimate courtyard. These clusters are then multiplied several times to form larger inner courtyards, leading to the urban scale of parks and public schools. Within each individual plot, the house can grow incrementally to include additional bedrooms as the family's income grows. The simplicity of form and construction gives freedom to the residents to customise their house to their identity.

By maintaining hierarchy of spaces in the neighbourhood, each public courtyard gets assigned a certain function and responsibility of care from the houses surrounding it. The formation of a series of courtyards allows for a variety of activities to take place within them, significantly increasing the usable living areas of the residents, as well as creating various nodes of communal interaction. Being a low-rise development, residents can easily be involved in the decision making and construction process with the possibility of a high degree of personalization of spaces.

Thus we see the fundamental role that the 'in-between' spaces play in residential architecture, giving rise to a sense community that can traverse the concrete nature of the built form. The ability to define one's own thresholds and degrees of privacy is also a small yet powerful way to create a healthy relationship with one's immediate

surroundings and neighbourhood. The absence of the transient in-between in the post-war typology points to one of the key planning flaws that led to failure of the living environment in such buildings.

5. *Transience*
of an ever evolving society

Transience exists not only between the public and private realm but also within one's private life. The Belapur housing project also caters to this very important aspect of residential architecture- growth. By enabling the residents to expand their house as and when they need to or can afford to, grants them the freedom to build their life at their own pace with a living environment that supports that life.

The need for transience in our living environments exists alongside a stark permanence often seen in architecture. For many centuries, including in theories as recent as of modern architecture, structures were considered an expression of permanence through solidity and mass. However this permanence can be seen as one of the reasons for decay occurring in post-war neighbourhoods. Stewart Brand (1995) strongly opposed the idea of permanence in our built environment, highlighting the gap between the real world scenario and our interpretation of what must be permanent. "Between the world and our idea of the world is a fascinating kink. Architecture, we imagine, is permanent. And so our buildings thwart us. Because they discount time, they misuse time." The permanence of our built environment resists change. How can our homes support healthy living conditions when it cannot accommodate the changing needs across generations of the users that they are meant to serve? "Almost no buildings adapt well. They're designed not to adapt" (Brand, 1995).

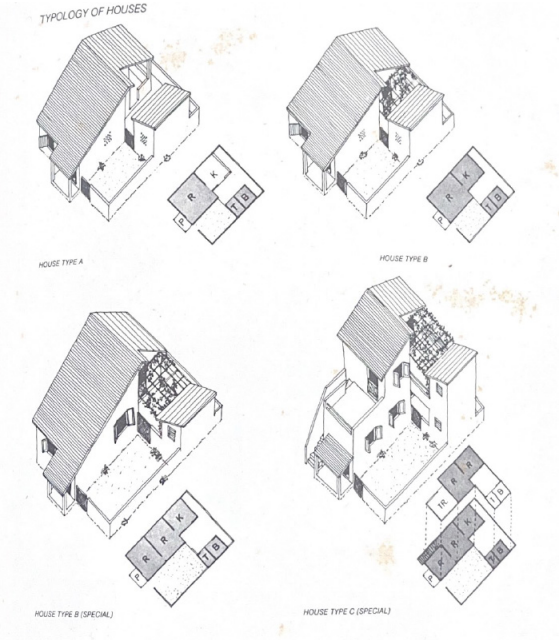


Fig 22. Incremental nature of the Belapur housing units
(Correa, 1985)

It is interesting to note that the Bergpolder gallery flat as discussed in section 1 of this paper, provided movable internal partitions for day-time and night-time use as well as foldable beds to maximise the small floor area. However, somewhere through the period of reconstruction, these concepts of flexible living were lost to the ease of creating cheaper, very permanent concrete walls.

It is the role of an architect to perceive and design a space, but it is ultimately the role of the users to live the space. This distinction between perceived experience and lived experience is what often results in the failure of a built space. Buildings are not always used in the way the architect intended it to be. Once a house is designed and handed over to the residents, it becomes a setting for their daily

lives, and is most often modified to suit their changing needs over time (Handa, 2015). These changes may be small, for example the position of a piece of furniture, but also major changes in floor plans, extension of rooms or elimination of walls are common. Isn't it arrogant for us as designers to then believe that the users stay true to our vision of how a space is meant to be used? Especially in dwellings? A study conducted on the actual conditions of the houses 30 years after completion shows that in most cases the inhabitants went much further than the architect's wildest imagination (García-Huidobro et al., 2008, as cited in Mota, 2021). It is hence important to integrate fluidity and temporality in living environments to be able to facilitate these inevitable changes that accompany its users. As Handa (2015) puts it, "Afterlife" is the very "life" of the building".

Over the last several decades, there has been a great shift in the way people live. Bauman (2000) defines this fluid and constantly changing nature of contemporary society as 'liquid modernity'. He argues that the traditional 'structures' of the past have become increasingly uncertain, with individuals, states, technology, relationships becoming porous and subject to change. Architecture has to deal with this 'constant and constantly changing' human reality, i.e. not only with what is different from the past, but also with what has remained the same (Strauven, 2007).

A successful example of a project that promoted flexibility in planning and residents' participation, is the Siedlung Hellmutstrasse designed by ADP Architektur und Planung in 1985. Built through a community led approach, the project split the floor plan into 2 distinct strips of living spaces and 1 strip of service areas. The apartments were accessed externally through shared balconies. The astute placement of load bearing with respect to partition walls allowed multiple neighbouring units to be combined into a single apartment. In the course of the building's 30-years of existence, no one has ever had to move because as families have grown or shrunk, their homes have also been adapted for the same (Till & Schneider, 2016).

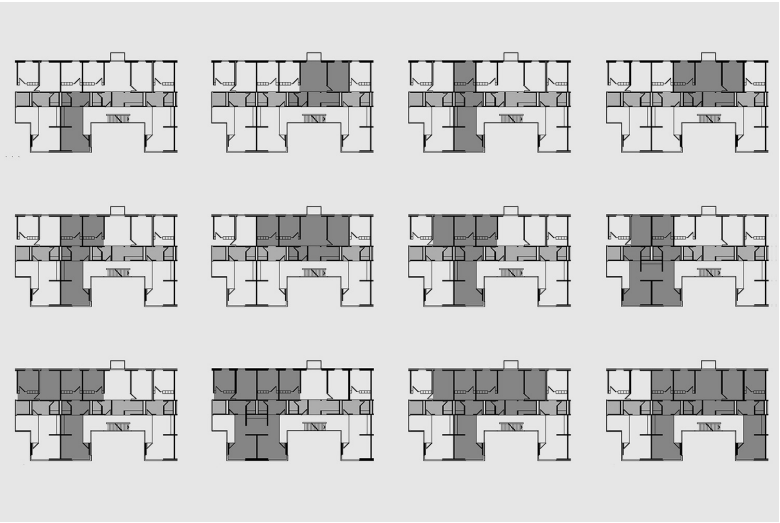
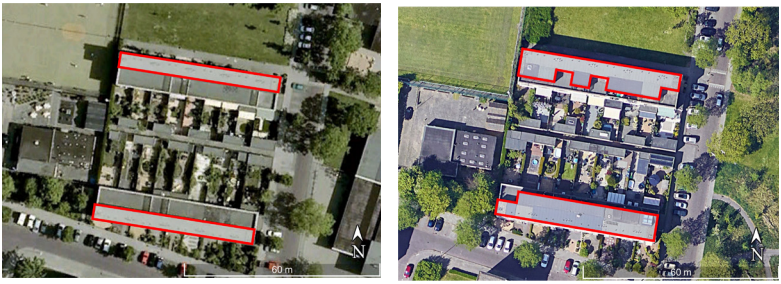


Fig 23. Combinations of adjoining units to create multiple dwelling typologies, Siedlung Hellmutstrasse, Switzerland (A.D.P. Architektur und Planung, 1985)

Fig 24. A courtyard in PREVI Lima in 2012 (Mateo, 2017)

Pelsmakers and Warwick (2022) through their research on adaptability and flexibility of spaces found that such housing designs are important for supporting ageing in place, allowing families to grow or shrink, and facilitating multicultural living requirements. Early ideas of 'a growing house' can be found in Leberecht Migge's 'Die wachsende Siedlung nach biologischen Gesetzen' (The growing settlement according to biological laws) published in 1932. Migge introduced this concept for the farming community at a time where resources with people as well as governments was very limited. The initial stages of the project would be realised with limited material and skills. Eventually, as time and financial situations permitted, the house could grow like an organism from a small shed into a 100 sqm house (Mota, 2021).

The PREVI Lima housing competition was one such experimental case of the growing house, which formed the basis for many affordable housing projects of the future (Mota, 2021).
In 1965, the Peruvian Government and the United Nations invited British architect Peter Land to design mass housing project strategy as an alternative solution to the rapidly growing informal settlements of Lima during that period (Mateo et al., 2016). The project was opened to architects around the world with the brief of creating a high-density housing scheme for 1500 family units, each holding the potential of future growth. The built project became an experimental pilot project of 500 units where designs from 6 winning architects were chosen to be built together. Even though PREVI was designed to accommodate change and growth of a family's needs over time, its evolution and subsequent changes made by inhabitants, as seen 40 years after its construction, have radically transformed the dwellings in programmatic and formal terms (Mateo et al., 2016). As the original architecture disappeared under the extension of upper floors, terraces, balconies and a variety of external claddings, what remains are the in-between spaces and voids as conceptualised by Peter Land in the original masterplan. This network of intimate public spaces, or parochial spaces, survived the test of time, maintained and



2005 *2021*

Fig 25. Unorganized extions done by residents in Westwijk (Google Earth 2021)

Fig 26. Transience in society

used collectively by the inhabitants till date. The clear demarcation of private and collective spaces ensures each resident's privacy is maintained while encouraging regeneration of the community spaces through social interaction.

These ideas may have sowed the seeds for what we today refer to as 'incrementality' in architecture, which can not only accommodate growth and change, but enables participation of residents in the design of their homes and allows personalization at every step.

Extensions are a common form of unorganised growth observed in housing settlement in almost all parts of the world. As ownership changes, or the family grows, it is only natural for people to need additional space. The opposite of this is also observed, where as children grow older and move out of their family homes, parents are often left with spaces that are too large for their needs and are often very time consuming and expensive to maintain. In these cases residents are forced to move to smaller homes.
The residents of Westwijk are no different from others. Extensions of living spaces in the form of dormer windows in attics or even the construction of an additional upper storey, are common throughout the neighbourhood. However, because the planning of the houses did not account for the need for this change, these newer extensions often feel out of place and haphazard, built in entirely different architecture styles and materials. In the case of highrise blocks, it is impossible to make any changes to the houses thus in the long run creating a high number of vacancies in many of these buildings.

Thus we see that transience is an inevitable part of residential life. If the architecture does not support this transience, people, for lack of better options, are stuck in homes that do not suit their lifestyle, eventually forcing them to move, or worse remain unsatisfied and unhappy in their living environment.

Concluding discussion

The post-war reconstruction period in the Netherlands marked a significant time for the housing industry, where demand and necessity resulted in ground-breaking innovations, and construction technologies advanced by leaps and bounds. The high-rise typology proved essential in tackling the housing shortage owing to the fast and affordable system-construction using abundantly available concrete. While these innovations enabled the creation of a large number of houses, solving the housing crisis temporarily, it was soon observed that the living conditions of these neighbourhoods were far from ideal. The creation of standardised units and floor plans afforded developers the ease of vertically stacking units to create a large number of dwellings. However the principal flaw in this planning strategy was the lack of consideration of how households function in reality.

As the government of the Netherlands plans to build upto a million new homes by 2030, it becomes pertinent to ask the question, will they be suitable homes? The large-scale construction and demolition that is required to achieve this promise will require an immensely large stock of raw material and natural resources. So how can these homes be made different from the ones that already exist? How will they mitigate the problems that plague the widespread post-war neighbourhoods of the country?

There is a lot that can be learnt from the rich traditional forms of housing in the Netherlands. A key part of these housing estates was the importance given to the role of communal spaces that formed a lively society through citizens participation. However, the new developments in the mid 20th century were based on a model of self containment and isolation. Such environments harboured unpleasantries in the neighbourhood stemming from isolation and

an absolute divide between the private life and the urban collective. For a residential neighbourhood to function successfully, there needs to be a synergy between the various domains that exist within it; the private and the public, the enclosed and the open, the present and the foreseeable future. Acting on one of these, without consideration of the other, creates an imbalance in the intricate connected spheres of architecture, nature and society.

Looking at the works of Aldo Van Eyck, Herman Hertzberger, Charles Correa and several other projects discussed, transience emerges as a key aspect in their success. It exists not only in an absolute form such as the 'in-between' spaces, but also as a concept of growth. When houses are designed to accommodate change, to encourage communal interaction, while allowing the freedom to draw one's own boundaries, it leads to *the creation of a society*. The formation of such a society is what is crucial to the upkeep of a neighbourhood, camaraderie amongst neighbours and the possibility of multiple generations being able to benefit from their *family home*.

Fig 26. The society 'in-between' (by the author)

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Appendix A

Motivation

With the '1 million homes by 2030' project underway, aiming to relieve the pressure on the housing market in the Netherlands, it has become increasingly important to discuss the environmental impact of such a large scale construction project. The development plan outlines a complex methodology for achieving the housing targets. Essentially, this boils down to three main approaches: i) Converting larger homes into several smaller units; ii) renovating and transforming buildings used for other purposes into residential spaces and iii) constructing new housing infrastructure (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2024). However, the majority of the responsibility lies with the third approach—building new homes. Building such an enormous stock of infrastructure puts immense pressure on resources, both in terms of construction material and energy use, but also on the land on which they are built.

This research developed from this very basic question- where is the land to build all these new homes? The graduation studio 'Ecologies of Inclusion' presented the case of 'Midden Delfland', a vast open landscape located between the dense city centres of Delft and Rotterdam, which has been gradually decreasing over the last several decades, lost to new infrastructural growth of the surrounding cities. The Netherlands, for many centuries now has been pumping water out of the polder landscapes of the region by creating an intricate network of waterways. This water system has allowed the dutch to reclaim land from the sea, and build cities below the sea level. Midden Delfland is one such landscape with a vast network of boezems and canals, maintaining the water levels for the surrounding urban areas. However, as the cities continued to grow, and the paved areas increase, the water system of Midden Defland has reached its maximum

capacity. (RDD Design Study Exhibited at IABR 'It's About Time' – Redesigning Deltas, n.d.). The Redesigning Dutch Deltas initiative along with the architecture and landscape offices of ZUS, FLUX and SWECO, discuss the need for drastic measures required to continue to live below sea levels. They lay out the master plan of the 'National Productive Park Delfland' which essentially makes Midden Delfland a water storage basin by building dykes and flooding the land. This intervention, while relieving the stress on the water system, also rejuvenates and protects the biodiversity of the region by creation of peat agriculture land, wetlands for birds, and woodlands for wood storage and harvesting.
However, returning to the 1 million homes initiative, 235,460 homes are planned for the province of Zuid Holland. If a significant portion of the area is to be preserved as a green lung for the city, where will the new houses be built? To address this, the master plan proposes densifying the edges of Midden Delfland, the boundary between the green landscape and the city. The analysis of the edge conditions of Midden Delfland revealed a high density of post-war neighbourhoods surrounding this area. These neighbourhoods, therefore, become the focus for densification efforts while also aiming to improve existing living conditions.

Rotterdam, the most populous city in Zuid Holland, faces great vulnerability to the housing crisis, being one of the most sought after cities to live in the Netherlands with over 670,000 residents. Consequently, the districts surrounding Rotterdam play a crucial role in alleviating the housing demand within the city. Vlaardingen, situated centrally between Midden-Delfland and Rotterdam, serves as the base and example for analysing post-war neighbourhoods in the Netherlands.

Appendix B

Reflection & Translation into Design

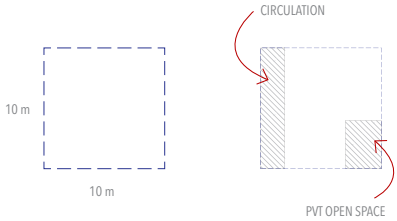
The analysis of Midden delfland, its history, its current challenges and future plans for the landscape by the Redesign Deltas Project, provides a strong understanding of the water systems of the netherlands, and the pressure that it faces due to large scale construction projects. While we recognize the need to preserve the pristine landscapes of the country and reduce the widespread pumping of water from the polders, there is a parallel and paramount challenge that the country faces- that of the housing crisis. What emerged through background and historical research as the most sustainable way to tackle both these challenges was the densification of existing neighbourhoods that flank Midden Delfland,particularly, post-war neighbourhoods. The post-war building stock, reminiscent of one of the most significant periods in the housing sector, have for many decades been the victims of untimely demolitions. How can the new developments that aim to replace these, promise to serve a better purpose than their predecessors?

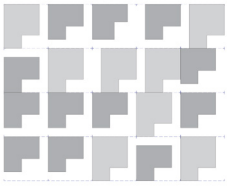
Through literature study, historic case studies and site analysis, it brought forward the need to think of housing developments in a new light, as not just standardised units to tick off on a tender report, but as the crucial nodes of society and a happy community. Low-rise high-density developments in the past have proven to be some of the most successful and long surviving housing developments across the world. Such a planning strategy creates intimacy in the neighbourhood, while allowing for densification, unlike the widespread high-rise typology.

A positive synergy between architecture, nature and society becomes vital to resident's satisfaction as well as to a sustainable way of building. The hierarchical use of spaces, from the private to the urban collective, while defining one's own thresholds, grants residents the

freedom of choice in the way they wish to live. This research forms the backbone of the planning strategy for the design development of my project, which pays very close attention to the developments of a series of 'in-between' spaces with varying degrees of privacy. Individual units are each designed to have a private open space which inturn opens to a parochial neighbourhood courtyard. By virtue of its modular grid construction, individual houses can extend their homes on the upper storeys, combine with multiple units on the ground of upper floors, and even shrink their houses to only ground storey. These configurations cater to the needs of a great diversity of residents- singles,couples, families, the elderly or multigenerational families. The living area starts from 30 sqm units which can grow upto 250 sqm by combining 2 units or even higher areas based on number of units combined. A simple timber frame construction with modular wall components makes it possible for residents to carry out future extensions and changes to their homes without the need for professional assistance. The aim behind such a planning strategy is to create a neighbourhood that fosters relationships amongst the people you live in close proximity to, unlike the stranger living across from you in the sterile corridors of a highrise development. Communal open spaces allow for chance interactions, organised events, safe spaces for children to play and even economic opportunities for residents to hold workshops, monetize their hobbies and much more. The degrees of privacy further ensure that while the general public is allowed to be a part of the neighbourhood, they are restricted to the more 'public' corridor of the development.

This development strategy, not only creates a lively new neighbourhood, but also situates itself within the unutilized land of the existing post-war neighbourhood of Westwijk, Vlaardingen, enriching the lived experience of other residents. By virtue of its repetitive construction grid, the development can be as small as a cluster of 4 homes, or grow to much larger numbers, spreading like an amoebic development, in the crevices of existing neighbourhoods. A proposal to integrate the existing neighbourhood with the new





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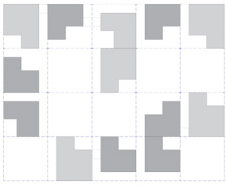
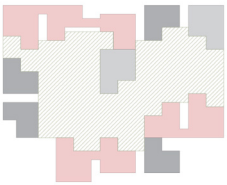


DENSIFY WITH QUALITY



A HOUSE FOR EVERYONE

development, enliven the immediate surrounding of a post-war building while hosting an array of community functions and small studio apartments on its previously unused ground floor space.

The study of post war buildings led not only to find spatial solutions, but also innovation in material sustainability.. The Dura-coignet buildings, which are a large part of Westwijk, hold the potential to provide a large stock of material for new constructions. The modular system construction of these buildings sowed the seed for a possibility of disassembly of the individual components of the building, and be used in a new capacity. Liddewij Tummers, with her office Tussen Ruimtje in 2007 experimented with this possibility to re-use the Dura-Coignet panels and create a folly for an exposition in Heijplaat. As an experiment for architectural application of this possibility, I propose the use of these structurally stable solid concrete panels to form the foundation walls for the project, and allow the new construction to be built entirely free of new concrete. While it was beyond the scope of this project, by scientifically testing the strength of these panels, it may be determined whether or not they can be used to make entire structural components for new constructions. If this possibility is explored, the colossal volume of material that can be recovered from the demolished post-war buildings can significantly reduce the carbon footprint of several decades of building construction.

Through a combination of thorough research-based solutions and some experimental approaches, this low rise, medium density housing proposal in Westwijk, Vlaardingen hopes to tackle some of the shortcomings that the neighbourhood currently faces. This development, while being of a noticeably different design language, blends into the neighbourhood with ease by virtue of its open space planning. It also creates a poetic language of the clash of 'old' and 'new' with its material language, where the harsh concrete of the old post-war building is seen standing in a radically different context.

-end-