

Re-structured.
A position on the transformation
of
structuralism-influenced,
mass housing blocks.

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Figure 1 Research topics. A Satisfying answer for the design of mass-customized dwellings can be found only by looking at the bigger picture - diverse, overlapping backgrounds of: mass-housing history, current society housing needs, advances in building technology, etc. The Architects' role in this process is similarly complex: based on an understanding of the existing structures and a vision for the new housing system of transformation. Graphic by author.



Scope of Research

The omnipresence of the aging mass-housing estates in Europe has created a new frontier for innovative approaches in architecture, particularly in the architecture of renovation. This new movement has the capacity to address two major aspects of contemporary architecture: the role of architects in catering for sustainable development (ecological, economic, and social development) and, more importantly, addressing the needs of changing society (e.g. from monologue to digital). A close look at mass-housing projects in the Netherlands reveals the enduring impact of the doctrines in practice at the time of their construction. These principles, predominantly influenced by structuralism, present compelling opportunities for the transformation of selected buildings. Accordingly, a main goal of this graduation project is to study the housing demand of current, multi-cultural, Dutch (in a larger scope: European) society and

therefore to explore possibilities for sustainable development, and for improving the living condition in the existing, post-war, mass-housing complexes. To do this, this research examines the impact of mass-customization by means of a new, adaptable to the dweller housing structures, introduced in the existing urban fabric with the aim of supporting the development of sustainable communities. From the field survey and publications discussing social problems in the mass-housing neighbourhoods, it can be observed that the existing post-war mass housing model no longer caters to the needs of current and new users. The potential of structures to deal with this shift will be studied through the thorough analysis of relevant and successful mass housing renovation precedents. Through this, research conclusions will be drawn as to the extent and type of design intervention in 3 scales: individual dwelling unit, housing block and local urban settlement (i.e. within 3-4 adjacent blocks).

Research Question

To what extent/how through mass-customization of dwellings, mass-housing blocks in the Netherlands can be transformed to address the needs of new users and changing society?

1.
What are the architectural characteristics and potential of existing, mass-housing buildings?
2.
What are the design interventions used in the selected housing renovation projects? What is the role of architects and inhabitants in the process? (case study)
3.
What are the new needs of changing society? Which present needs and expectations towards housing were not considered by the original architects in the creation of post-war mass-housing?

Literature Overview

In the process of designing a transformation for an existing building, the very first step is to understand the background of the building in question. ¹ Studies on the Ommoord housing complex in Rotterdam are predominantly published in Dutch. However, for the purpose of this research English results have also been beneficial. ² When discovering the genesis of the project's site, sketches and ideas related to the discussions held in CIAM X, and later followed by TEAM 10 members, points out the influence of what later become known as structuralist doctrine on the urban plan, spatial organisation of the dwellings in residential blocks and finally at the building system used in its construction. ³ The building system developed for the construction of residential buildings, was of considerable influence in defining the form of the blocks, a process which was precisely documented

by H. Priemus. ⁴ Because of the importance of the structural system in the generation of this architecture, the idea of structuralism as a way of (re)using the appropriate buildings has recently been linked to the architecture of renovation. In a recent publication by Herman Herzberger, he advocates the application of structuralist principles in buildings' transformation. ⁵

This might be a useful point of departure for further investigation of the Ommoord project. Recently, in field of residential and public buildings' architecture, innovative realisations have redefined the phrase "renovation interventions" into "buildings transformation." In these examples, after investigation and evaluation of existing building's quality, research-based design is made, with goal to re-define quality and identity of the initial, outdated building. Such an approach opens new field for research, where practices like i.e. Lacaton & Vassal goes further, creating a manifest to "never demolish." At the same time, interest of, again, Lacaton & Vassal office in housing architecture is peculiar: creation of open-ended spaces, leaving room for users to apply function to them and high role of participation in the transformation project resembles pioneer participatory architecture of 1970s, featuring works of Lucien Kroll and influence of "Freedom to build" movement, where J. Turner propose to involve residents in creation of the built environment. ⁶

¹ H. Hertzberger refers to buildings that are able to be transformed or its design prevent such an intervention, this distinction can be made after a careful analysis.

² Just to name some: Lidwine Spoormans Studio I.S, Het Geheim Van Ommoord, Stadsontwikkeling

Bureau Monumenten En Cultuurhistorie (Gemeente Rotterdam, 2014).; Erik Dral, "The Era of Sustainable Housing Transformation" (TU Delft, 2014).; B. van Velsen B. Jansen, J. Ruitenbeek & P. and Veenstra, Ommoord: Cultuurhistorische

Analyse En Beschrijving (dS+V Rotterdam, 2005). And J. Ruitenbeek Bureau ArEA, P. Veenstra, Ommoord – Cultuurhistorische Analyse En Beschrijving [1957 -1965].

³ Dirk van den Heuvel Guus Beumer, Jaap Bakema Study Centre, "CIAM Grid Rotterdam Alexanderpolder 1955," Het Nieuwe Instituut, <http://open.jaapbakemastudycentre.nl/content/ciam-grid-rotterdam-alexanderpolder-1955>.

⁴ R.S.F.J. van Elk, H. Priemus, and Research-Instituut voor de Woningbouw, Niet-Traditionele Woningbouwmethoden in Nederland (Samsom, 1971). And H. Priemus, Wonen in Een Era-Flat (Research-Instituut voor de Woningbouw, Delft, 1970).

⁵ Herman Hertzberger, Els Brinkman, and John Kirkpatrick, Architecture and Structuralism : The Ordering of Space (Rotterdam :: Nai010 Publishers, 2015).

⁶ Turner, J. F. C. and R. Fichter (1972). Freedom to Build: Dweller Control of the Housing Process, Macmillan.

7 Frédéric Druot and Anne Lacaton & Jean-Philippe Vassal, Plus. Large-Scale Housing Developments an Exceptional Case, ed. Susana Landrove (Barcelona: GG Gustavo Gili, 2007).

8 Harald Mooij Bernard Leupen, Housing Design a Manual (NAi Publishers, 2011).; Neufert and P. Neufert, Architects' Data (Wiley, 2000). Studies about current housing demands needed can be also found OTB chair publications from TU Delft.

9 Official Journal of the European Union, "Directive 2010/31/Eu of the European Parliament and of the Council of 19 May 2010 on the Energy Performance of Buildings," (2010).

Influence of these ideas underpin a new, leading position on the re-use of existing mass-housing stock.⁷

For this reason, this research aims not only to define the current (and expected future) housing needs from the study of existing design manuals, but also to go beyond these manuals to conduct primary research on housing preferences and trends, based on the analysis of recent housing transformation projects.⁸ Considering feasibility of housing projects for ecologically, economically and socially sustainable growth, as a first step to achieve the objectives of this research, the new design and fabrication techniques are investigated alongside with new building technology requirements.⁹

Construction of this paper

Part 1: Character and Potential of Existing Mass Housing.

Overview of origins behind creation of mass-housing blocks, introducing relevance of Ommoord housing complex as “area of national importance”.¹⁰ Deconstructive analysis of “layers of building” on the example of Ommoord are presented – evaluating contemporary quality of the neighbourhood and the context behind the construction system (ERA), which defines the quality of the housing blocks. Information in this chapter is based on field excursions (presentation by ERA company on site, showing the housing unit under renovation and concluded later survey among the inhabitants) and literature study. This part was initially developed with the TU Delft Heritage & Architecture Studio under the topic of “Re-housing”, as a group work

with Simone Schade, Dimitrios Papatheodorou and Eva Führer. Groupwork was consulted with L. Spoormans, B. Gremmen, N. Clarke and during visiting sessions with A. Lacaton.

Part 2. Case Studies. Overview of contemporary positions towards housing renovation.

Case studies are selected housing transformation projects which improved radically after research-based architectural intervention, targeting violent problems, threatening demolition of the building, which emerged from lack of architectural quality prior to the new architects’ design. Selection of the case studies is based on influence on the housing trends in western countries of European Union evaluated by: international awards and presence in architectural publications. Primarily, interventions are analysed in the comparable way, describing change in the “layers of building”.

In this case, to understand the motivation and theme of the architectural intervention, initial study of the original, existing building is concluded. Analytical tool of demontage of various buildings layers (used as an analytical tool for the Architectural Heritage), based on the lifespan of the elements (structure, skin, services, space plan, stuff) helps to evaluate the quality of the building’s elements and target places where architectural intervention is needed and feasible at the same time. I.e., newly introduced staircase can be implemented

easier in the existing structure of Wallisblok than in monolithic, concrete structure of Kleiburg block.

To investigate how the building under transformation improves, the step-by-step analysis of the following by each other interventions in case of each case study building is done, highlighting the problem statement – architectural solution mechanism.

To summarize the unique, context-related problems and following architectural solutions, comparisons to figures (commonly understood as model solutions) from C. Alexander’s Pattern Language are made.¹¹

10 Erfgoed, R. v. h. C. (2016). “Rotterdam Ommoord; een wederopbouwgebied van nationaal belang, nr. 17.” Brochurereeks 30 wederopbouwgebieden 17.

11 Alexander, C., et al. (1977). A Pattern Language: Towns, Buildings, Construction, OUP USA.

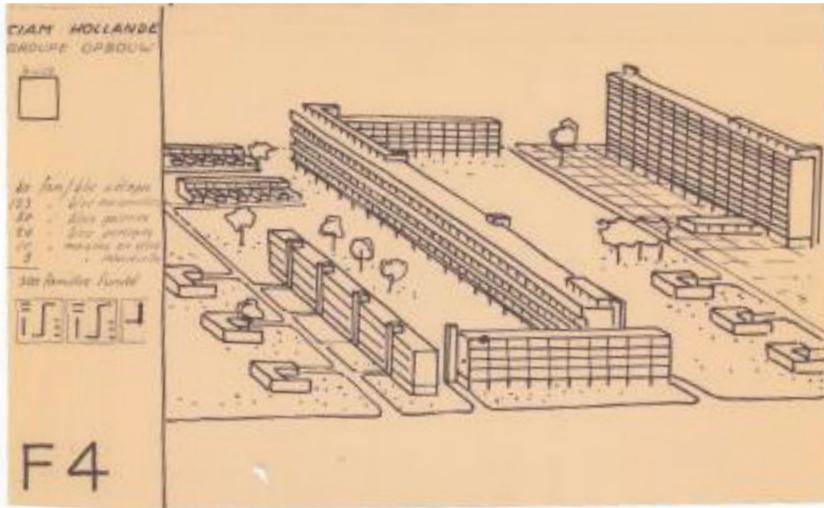
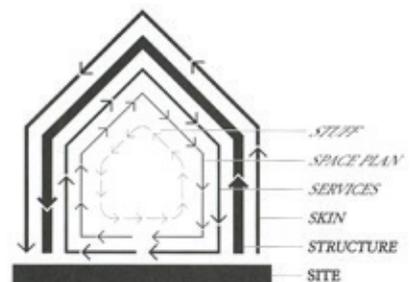


Figure 2 Jaap Bakema's "grid of elements" as a new extension of Rotterdam, new "habitat".
 "A positivist, problem-solving approach in architecture is met with an elementary aesthetic of optimism and progress"

Figure 3 Steward Brand "How Buildings Learn": Layers of change. Separation of Site, Structure, Skin, Services, Space Plan and Stuff (inhabitants' personal objects) is clearly visible in the example of Ommoord. Therefore, problems and values of the buildings can be easily categorized, preparing for the building's transformation.



Character and Potential of Existing Mass Housing

The problem of housing shortage was a crucial challenge for European architecture after the Second World War. Multiple proposals which had arisen after the first CIAM conference in 1928 were given fresh attention after WWII as a form of mass-housing production. Expanding and rebuilding from damage caused in cities (some which needed whole new housing districts) provided vast opportunities for architects to design new, highly functional environments. In the Netherlands, the process of building these high-density built environment through multi-story apartment buildings for social housing (rental system) was supported by the government by providing subsidies for the housing associations.¹² Under this policy, housing associations (contractors)¹³ developed large numbers of housing units, mainly for low-income urban residents, under the banner of “affordable rental housing”. Building systems developed by

the contractors aimed at bringing innovation in labour-savings and cost-efficiency, as was demand by the governmental policy.¹⁴ This situation led to industrially-produced buildings which met high-standards in terms of building technology. However, there are many questions regarding architectural and/or urban qualities created by those projects. What was seen at the time of the buildings’ construction as a pinnacle of technological progress and the exhibition of a modern, uniform and equal society, is now seen by the general public in a negative light; frequently referred to as “uniform” and “monotonous” in appearance.¹⁵

As the design site of this graduation project, the Ommoord housing complex in Rotterdam, Netherlands was chosen. Its significance is marked, inter alia, in the programme for the district proposed by Jaap Bakema in 1955 at CIAM meeting in La Sarraz [Figure 2], the unique urban design by Lotte Stam-Beese and the highly advanced ERA (van Eesteren Rationele Aanpak) construction system.^{12, 16} Separation between the development branches was a significant factor in the development of the estate. Stam-Beese was responsible for urban plan and landscape design but the design of buildings under ERA-system was under the jurisdiction of the company’s architect R. H. Fledderus.¹² In line with this distinction and the staged process of the buildings’ construction, the analysis of the housing estate will be conducted step by step, accordingly to Stewart Brand’s scheme. [Figure 3]

12 van Elk, Priemus, and Woningbouw. And G. van Daalen A. Ouwehand, J. Kullberg, Onderzoeksinstituut OTB (Delft), Dutch Housing Associations : A Model for Social Housing, Tu Delft (Delft : DUP Satellite, 2002).

13 These Housing associations were directly called “contractors” because of their executive role in housing construction.

14 In the 1954, 40% of labour-savings (comparing to traditional methods) was required for the governmental subsidy (van Elk, Priemus, and Woningbouw.)

15]. Gehl, *Life between Buildings: Using Public Space* (Island Press, 2011).

16 Guus Beumer.

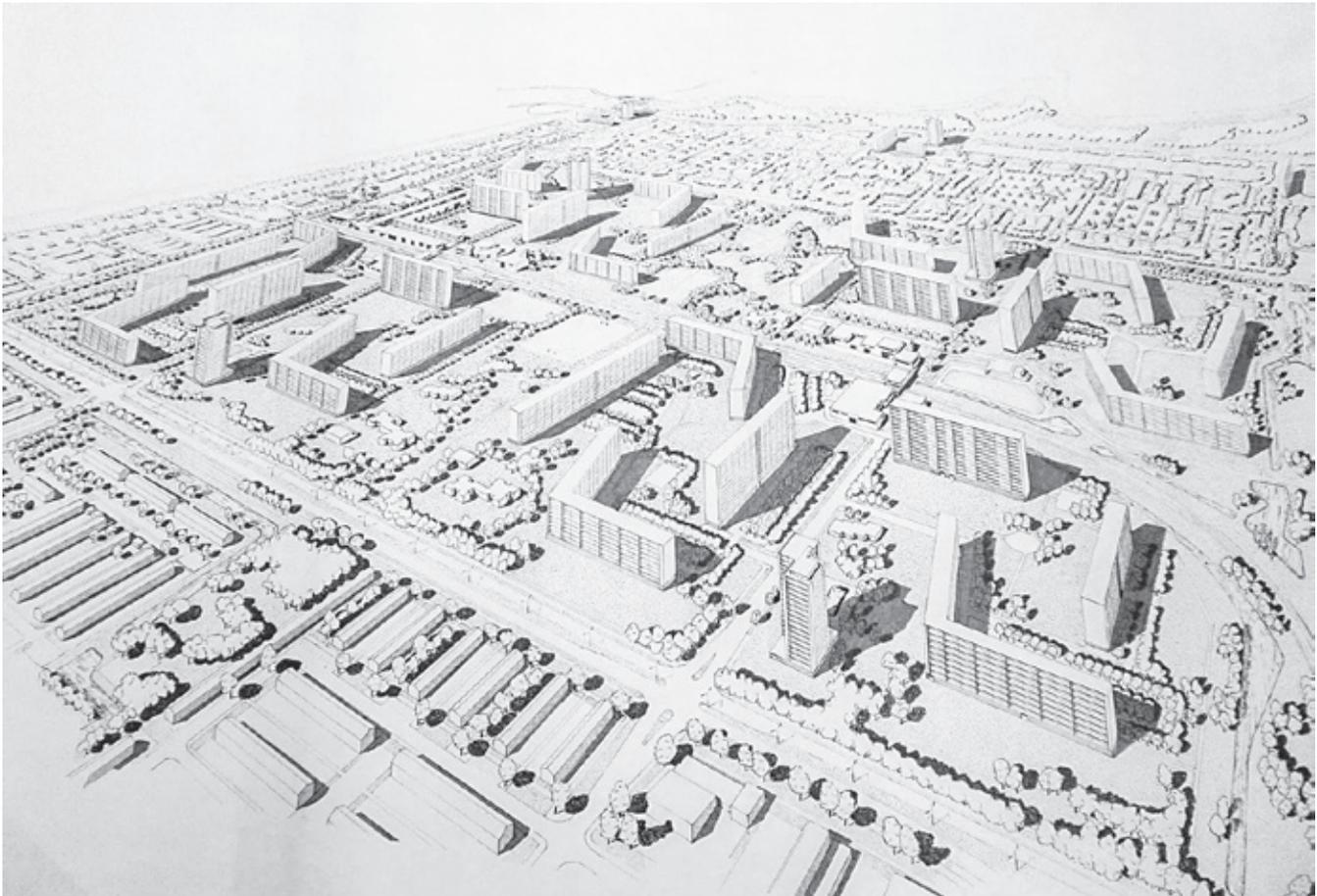


Figure 4 Perspective drawing of Ommoord in 1965 by Lotte Stam-Beese. Collectie Het Nieuwe Instituut, Rotterdam. The drawing presents the “divine version” of the estate, without later additions of low-rise buildings. Clear distinction of “The Square”

Site. Genesis of the housing project and its urban design

Ommoord is situated in the North-East of Rotterdam, South to the public parks called “Hoge Bergse Bos” and “Lage Bergse Bos” and North to the A20 motorway and “Rotterdam Alexander” train station. Ommoord housing complex is limited by a busy, rectangle-shaped arterial road which functionally and visually separates the complex from its surroundings. The urban design of Ommoord is based on a collection of high-rise residential buildings organized in a rectangular shaped plot. Developed as a satellite housing district for Rotterdam, the original “Square” (originally: De Ruit) is easily recognizable from the surrounding, low-rise residential buildings.¹⁷ There are four typological variants of high rise flats: the knikflat (9-stories, gallery flat), a linear, block flat (14-stories, gallery flat), the tower flats (21-stories, core access buildings) and a linear building consisting of three parts (9-stories, gallery flat). [Figure 10]

Ommoord originated from the spatial plans for the expansion of Rotterdam after the Second World War. The initial plan was designed by J. Bakema and presented in 1955, and can be described as a “catalogue of habitation typologies” and a theoretical showcase of a modern city. From 1951, architect Lotus Stam-Beese was also working with the municipality of Rotterdam on the North expansion of the city. He focussed on more practical, locally-based approaches, which resulted in a design featuring a high-density satellite housing complex.¹⁸ The increasing number of estimated dwellers in the district (from 7,500 in 1963 to 10,000 in 1965) affected the urban design and promoted these high-rise buildings supporting higher population density.¹⁹ In addition to providing housing, the governmental subsidies at that time also required the building companies to work on innovative projects and methods in the production of new housing. For this reason Ommoord was programmed as an experimental site for implementing new building techniques such as the industrially developed ERA building system. This system facilitated the efficient construction of high-rise buildings and thus the housing of a large number of people that the plans had envisaged.²⁰ However, the regular plan of aligned and multiplied same-looking blocks from 1963 also had a history of modifications, due to, running across the estate, metro line (which was elevated above ground in the early plans). As a result, the

17 Studio LS.

18 B. Jansen and Veenstra.

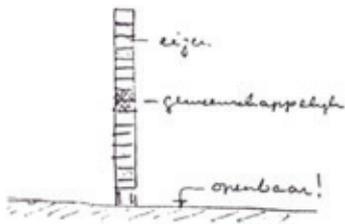
19 Koos Hage and Kim Zweerink, Van Pendrecht Tot Ommoord : Geschiedenis En Toekomst Van De Naoorlogse Wijken in Rotterdam (Bussum: Thoth, 2005).

20 van Elk, Priemus, and Woningbouw.

complex has 3 distinctive centres, arose from the metro stops and equipped with the commercial facilities for inhabitants (such as supermarkets, hairdressers, cafes, etc.). Clustered in groups of low-rise buildings, they stand in contrast to apartment blocks, encouraging pedestrian traffic and public life in the central areas. Schools are situated in the vast, open, park-like setting, grass and trees areas that spans between the high-rise ensembles.

As the chief architect of this housing complex, L. Stam-Beese also focused on designing spaces for the community created by the inhabitants of the massive “vertical neighbourhood”. In her sketches, she presents the idea of a public “core” as a place of neighbours’ interaction [Figure 5]. Unfortunately, the rigidity in execution of the blocks (following strictly the unified ERA design) did not allow this idea to come to fruition, instead creating closed, blind ground floor. Uniform appearance, along with the tightly optimised circulation spaces of the blocks, greatly diminished the idea of ground floor as a place of social interaction. It is worth mentioning here the research of Lidwine Spoormans, who investigated this project and in her study analysed the ground floor spaces in Ommoord. She suggested that despite the great majority of closed storage doors, some local initiatives managed to thrive in this space, such as small shops, cafes, kindergartens or gyms [Figure 6]. Following the idea of a core, but limited by the design of the

standardised buildings, Stam-Beese focused on the direct surroundings of the residential blocks. Vast and open grass fields with trees are the dominant view from the living room of the apartments. On the opposite, gallery side, space is more multi-functional, with the balance between car-parking spaces and more organized landscape design of “courtyards” in between buildings. [Figure 7] Outside of the entrance zones, a highly developed network of pedestrian and biking paths is separated from the car traffic, which role is strictly limited in the urban design. This highly functional planning is strengthened by architects’ vision to create an environment dominated by long viewing axes. [Figure 11]



Hoogbouw van dege rebbaal
 "beerydt" de bodem van het
 eigen en het gemeenschappelijk eigen
 (ontneemt de bewoners dus ook deze
 qualiteiten); geeft daarvoor terug
 het openbare:

Figure 5 Lotus Stam-Beese's sketch on "vertical neighbourhood" which she also called "mammoth". As an opposite to unified gallery-flat design architect envisioned open and public ground floor as a community zone.

Figure 6 Lidwine Spoormans' study of the core presence, from initial idea (incorporated in the building) into the only the question mark marking the designer's intention after construction.

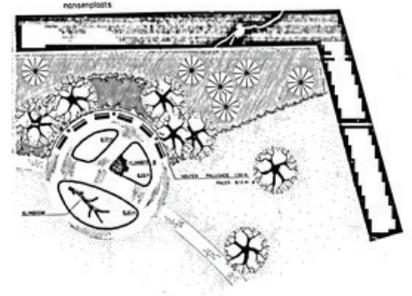
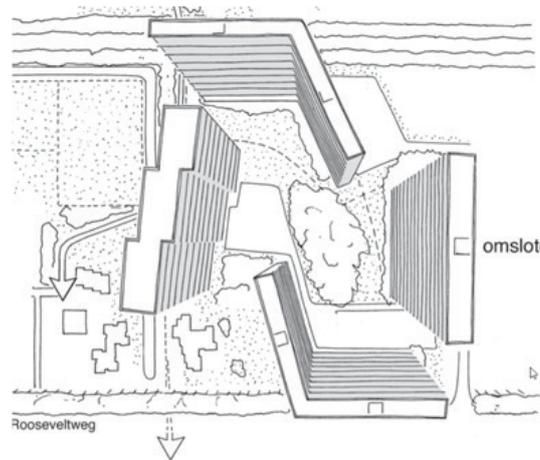
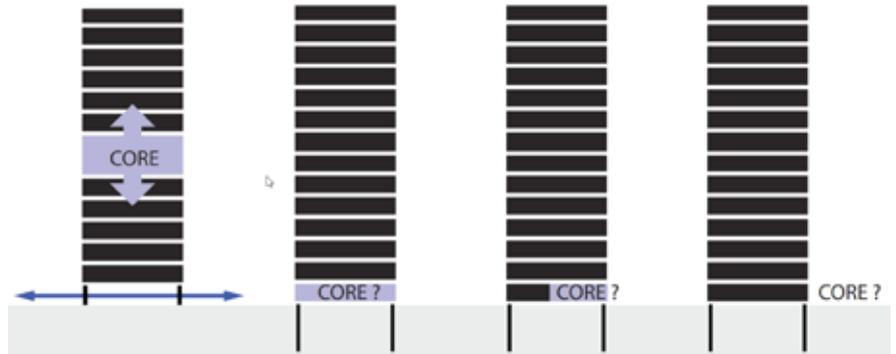


Figure 7 Local community scale. Public space, without the secluded private gardens was a key idea for Ommoord. Stam-Beese designed those spaces with special care: starting from the angled buildings (knikflats) to the details about public gardens.

Structure & Skin. Separation of the supports and infills as a result of used building system.

ERA Building technique was developed by J. P. van Eesteren in 1960's and used by contractors of the ERA company for the development of high-rise, residential buildings. The ERA system started as a small-scale experimental construction in Zandaam, where the first generation of flats were built as a portiek-flat (single staircase housing block) of three or four floors. Ommoord, Rotterdam was the first large-scale project, creating 2016 gallery-apartments. Positioned by tower crane, a set of 3-12 steel tunnels was used as a casting form, facilitating a 7.8m span between the construction walls [Figure 18]. In this method, reinforcing bars are placed and concrete is poured into the formworks in-situ, generating a monolithic, concrete structure.²¹ A basic principle of the system was to separate the load-bearing structure from the other elements of the building, generating a free plan within each

unit and creating opportunities for various internal configurations. However, the rigidity of the structural module is also limiting – it is considered problematic to penetrate the structural walls. Flexibility in terms of spatial layout of such a construction had a clear goal to sustain the continually changing needs of the inhabitants, a feature that recalls the theory of the frame and generic space developed by Bernard Leupen. These characteristics show the influence of the structuralist doctrine on the building system [Figure 13]. However, considering the whole building, the repetition of the structure limits the variation in apartment type. The resulting dwelling units were unified by its accessibility (main staircase core connected to an open gallery) and unified by size across the entire building. Moreover, the whole Ommoord complex follows the same principle, creating standardized estate of overwhelming sameness. Programmed for just one target group (standard 2+3 family model), nowadays the apartments despite its spatial qualities are considered outdated.

The structure was carried out by in-situ casting process with use of gravel-concrete, reinforced by steel bars. The other buildings elements also came as part of the ERA system in prefabricated sets and included:

- Inner partition walls, manufactured by ERA own factories. The separating walls

21 van Elk, Priemus, and Woningbouw.

Figure 8 Streets and parking lots.



Figure 9 Streets and parking lots.

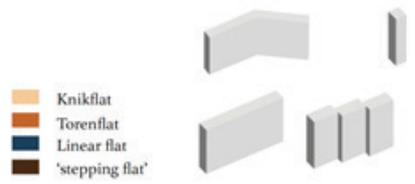


Figure 10 Building types.



Figure 12 Visual axes. Drawing by Lotus Stam-Beese.



Figure 11 Functions.

of the bedrooms and living room used sandwich panels made from gypsum and insulating foam. The walls in the bathroom and toilet used fenolspaanplaat (chipboard panel) instead of gypsum.

- The inner doors, painted in factory. Wooden façade: windows and doors, produced in ERA factories.²⁴

Those elements were packaged in sets and transported to the construction site as an easy to assemble system. Parts for services, such as pipes for central heating and sanitary elements were also made in the factory lines. All concrete components which are exposed to the exterior, such as the cantilevered gallery and balconies, were prefabricated and transported to the site. Those elements were placed on the cantilevering beams fixed to the load bearing structure, with a layer of felt in between [Figure 15]. From today's perspective this poses a few problems: cold bridges on exposed concrete elements can cause high heat loss during the winter season while concrete floors provide minimal acoustic insulation between apartments.

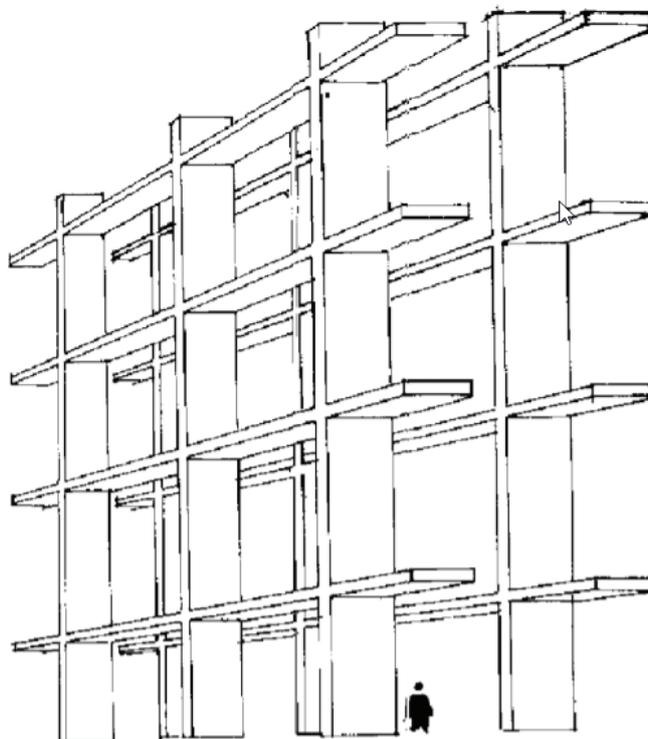


Figure 13 Separation of supports and infills, John Habraken. Drawing present the same principle as the ERA construction.

Technical and aesthetic characteristics of glazed façade, railing and brick cladding.

The ERA system was designed for efficiency in construction, where the role of the architects was very limited. That is why H. Priemus mentioned that this system is often called contractor's architecture.²⁷ Consequently, the aesthetics did not play a significant role in the building design. Despite the lack of thoughtful aesthetics consideration, massive blocks are strong, dominant elements in the composition of Ommoord complex. Appearance of the blocks consist of long, linear elements, such as the balconies and exposed floor slabs on the end facades, visually creating uniform, horizontal composition. [Figure 20] The glazed façade elements infill the gaps between the structure rectangular pattern, enhancing transparency and good daylight conditions inside. Elements such as windows and handrails that form the skin of the building, are repeatedly used in every dwelling unit. [Figure 21] Visual unification, "sameness"

of the façade and therefore the units, creates a sense of anonymity and equality. This followed the idea at the time to fight old-fashioned interior design and redefine the "Dutch taste" (i.e. influence of Stichting Goed Wonen foundation). However, the anonymity has outlived this initiative and now makes it hard for the residents to relate to the building. Occasionally, this leads to small, shy, personalized additions around the entrance to the apartment or at the balcony, which are at odds with the surrounding unity of forms. [Figure 24, 25]

At the time when the ERA blocks were constructed, energy performance of the buildings was not a major concern. As a result, the buildings are considered obsolete in current standards, receiving energy label E, according to Energy Performance Certificate.²⁸ Due to ineffective thermal insulation and many thermal bridges caused by the monolithic concrete structure, maintaining sufficient indoor climate and temperature is problematic. To address such issues, action would have to be taken, including addition of insulation layers and design intervention which could resolve the problematic connection details (mainly the exposition of the concrete structural walls both to the interior and exterior of the building). So far limited work has been done to ameliorate these problems in order to minimise alterations to the external appearance of the building and the legibility of the building's design. [Figure 17]

27 H. Priemus lecture at TU Delft, 13.09.2016

28 Measuring the energy efficiency was done during the thermal renovation of particular buildings in Ommoord, increasing the label from E do B-, according to presentation "ERA flats TU 16.09.2016"; Energy Performance Certificates based on: Union.

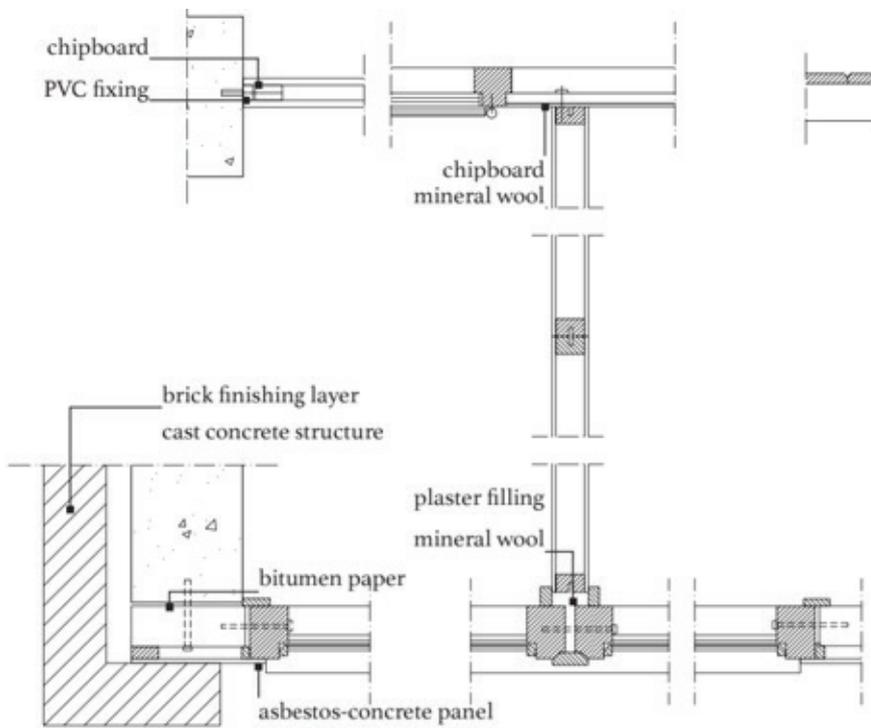


Figure 14 Details of construction, facade and interior walls connection. Here, in detail, the separation of the load-bearing structure and skin-elements such as façade or brick finishing layer is visible.

Figure 15 System's elements connection. The principal role of load-bearing structure, with balconies and galleries attached to it.

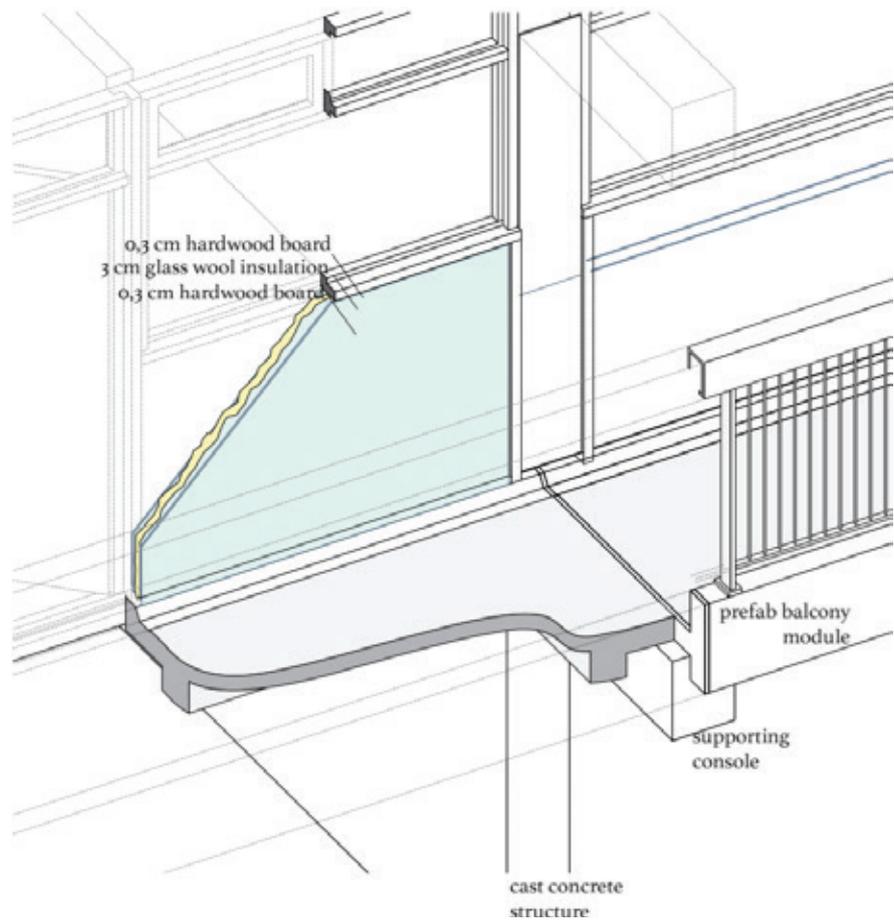




Figure 16 Wooden facade under thermal renovation (2016). Additional layers of mineral wool inserted for insulation.



Figure 17 ERA system under construction. Steel casting module lifted by tower crane.

Figure 18 Apartment without partition walls under renovation. Glazed facade allows to fill the spacious interior (7,8m distance in between walls) with natural light and enjoy the view.



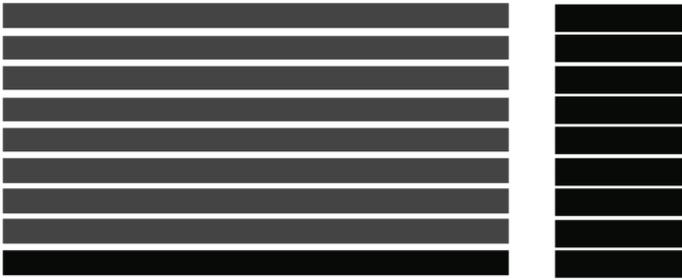


Figure 19 *Appearance in buildings' scale*

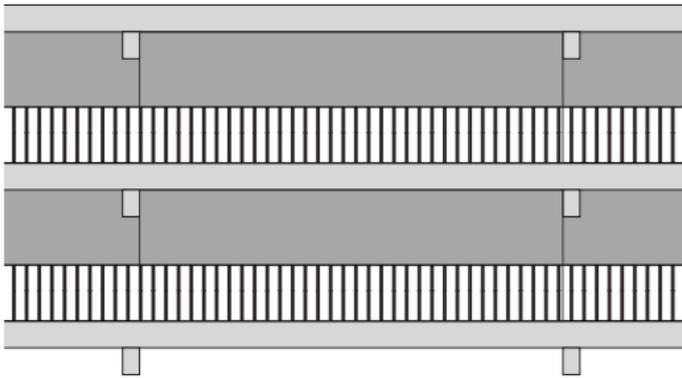


Figure 20 *Appearance in units' scale*

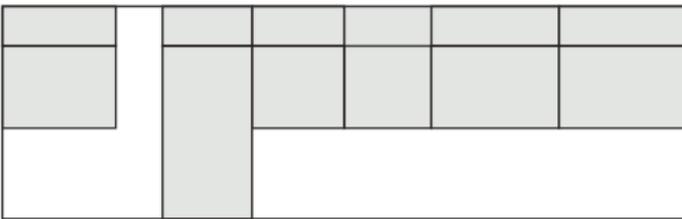


Figure 21 *Appearance in personal unit scale: gallery side*

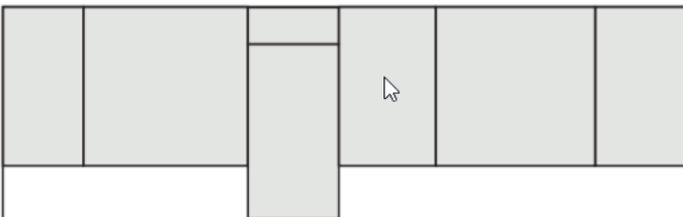


Figure 22 *Appearance in personal unit scale: balcony side*

Figure 23 Balcony customization
Figure 24 Entrance customization



and size are not fixed and unified.³⁰
Additionally, much of the piping and cabling is exposed, affecting with the aesthetics of interior space.

Services.
Building's installations:
energy supply, heating,
ventilation, plumbing.

Considering the age of the building and the technological advancements at the time it was built, the building's installations (heating, ventilation) are not efficient when compared to current, more complex climate systems which use mechanical ventilation with energy recuperation.²⁹ This limits the efficiency of the buildings services and results in higher running costs in addition to broader environmental concerns. Analysing the distribution of the piping and electricity cables in the space plan of the standard apartment there is a visible inconsistency comparing to the logic applied to structure design, a goal which was to provide space without structural elements within the dwelling unit. Position of the main electrical cupboards (containing controls and fuses) in the middle of the flat, greatly compromises the envisioned flexibility of the space plan, where according to catalogues of interior layouts, rooms' positions

29 Thermal renovation of particular buildings in Ommoord, increasing the label from E do B-, according to presentation "ERA flats TU 16.09.2016"
30 Priemus.

Space plan. Characteristics of the housing unit and building as a multiplication of units

The space plan of the individual unit presents immense potential for users' customization in spatial layout configurations, limited only by the few design and buildings' execution flaws created by the execution of the structure and services. The standardised internal layout is functional, but was designed for the family model 2+3, dominant in the 1970's, which does not necessarily align with contemporary living standards. Its considerably large size (82 m² plus 11 m² of balcony space) is divided into 10 separate spaces (3 bedrooms, living room, kitchen, entrance corridor, storage, central hall, toilet, bathroom). Separation of living room and kitchen (two opposite corners of the dwelling) can be considered problematic for current users. Open and shared gallery as well as adjacent balconies are problematic to the neighbours (in terms of privacy, acoustics and use of gallery as playing space by children).³² Elderly dwellers (55+,

who are majority of Ommoord: 45-63%) are finding their apartments problematic due to its size (more than needed and generating additional cleaning) and certain design features such as narrow corridors and high doorsteps. New dwellers (accommodated in social housing apartments), who represent 0-48% of population face problems because of the fixed, outdated layout of the dwellings (in particular immigrants from Islamic countries, having different housing needs than Dutch family model of 2+3 from the 1970's).³³ As mentioned in prof. H. Priemus publications regarding building systems, in the beginning, catalogue of different arrangements of the size, position and number of rooms (within the same structural boundary of 7.8x11.3 m) was envisioned.³⁴ Unfortunately, due to the way the buildings were constructed, in the industrialized process of massive-multiplication, variations were not implemented and most of the flats share the same floor plan, with small variations in the size of the living room (2 sleeping rooms or 3, with smaller living room). From a contemporary perspective, key issues which make the space plan obsolete are the disproportionate and compartmentalized rooms and the imposed division of the space. Also, despite the existence of outdoor space, its proportions do not allow to be used to its full potential.

Another unfortunate use of space occurs at the ground floor, where storage rooms are located,

32 Following the survey conducted by author among 5 residents in Ommoord in September 2016.

33 Statistics by: Dral.

34 Thermal renovation of particular buildings in Ommoord, increasing the label from E to B-, according to presentation "ERA flats TU 16.09.2016"

creating an enclosed, blind plinth. This problem was touched on (but not realized) in the design phase of the Ommoord complex by Stam-Beese through the idea of a social “core”. In its place, local businesses like cafes and hairdressers have organically developed where space can be made.³⁵ This suggests that communal, shared space would be utilised if provided and should be carefully designed to fulfil the needs of the local community, which is often at ends with the physical representation of the building blocks (i.e. mentioned by L. Spoormans communities of elderly people in clusters of 2-3 blocks). In opposition to a social activation approach, recent renovation of similar structures in Ommoord (variation of ERA’s knikflat with smaller span between structural walls) have privatized the space in the ground floor and redesigned part of the plinth to accommodate additional dwellings.³⁶ In the original design, main entrance to the building is situated on the “front” side, mainly oriented towards north or east, where also galleries, granting access to apartments, are located. The “back” side of the building, (mainly southern or western) is defined at the ground floor by the blind wall of the building’s plinth, which creates an impassable barrier upon which multiple rows of balconies sit. Because of this plinth, both potentially communal space of galleries and recreational space of balconies are separated from the lively area of main entrance

and open, grass fields on the balconies’ side. Long, blind facades of the buildings are proven to be associated with negative feelings of people passing by.³⁷ However, this problematic zone also has potential to become the “base” for the redefinition of the mass-housing estates negative image. In some proposals aiming to change the reception of mass-housing buildings “it is the surface of the ground on which ambitions and impossibilities are (to be) played out.”³⁸



Figure 26 Back, balconies' side of the ground floor

Figure 25 Front, entrance side of the plinth, with storage access



35 Studio LS.

36 See chapter: case studies - Knikfats Ommoord

37 Gehl.

38 Rem Koolhaas OMA, “Bijlmermeer Redevelopment,” <http://oma.eu/projects/bijlmermeer-redevelopment>.

III. Case Studies. Overview of contemporary positions towards housing renovation.

Ongoing trends in the residential architecture and necessity of change.

Current renovation cases in Western Europe (France, UK, Netherlands) shows that a holistic approach to the problem of mass-housing - where research-based transformation strategies are envisioned by architects - can lead to innovative solutions, which redefine the value of the mass-housing estates. Proper use of the potential of existing structures, combined with user-targeted renovation can deliver a quality surpassing the newly built housing stock.³⁹

In these terms, it is worth researching the successful case studies in western Europe. Abductive research on these projects will show

the similarities and differences both to the existing blocks in Ommoord. The selection of buildings is based on significance in terms of architectural quality of renovation, innovative design methods and tools used by the architects and developers, similarity in terms of mass-housing as a renovated object, heritage value of renovated buildings and the user groups addressed by the renovation. Focus is put on: commission type, method of financing the operation (profitability of renovation), analysis of design interventions proposed by architects, performance of the building before and after and role of inhabitants in the design process and construction. Renovation or so-called transformation of existing buildings highlight those issues and updating the buildings to meet current standards is a chance to analyse building performance in bigger picture. Moreover, in certain cases the design intervention is provoked by one problem (i.e. need to meet energy-saving requirements) and architects, by their extensive design, provide solutions not only to address this initial problem, but also to multiple others, observed issues. “Change” as a leading topic and “upgrade” of existing shows vividly which qualities were lacking by juxtaposition. The effect before/after is a domain of transformation and a powerful concept, understandable for everybody.

In the current realm, after dynamic post-war housing develop-

³⁹ Bernard Leupen, H. M. (2011). Housing Design A Manual, NAI Publishers.

ment, we inherit or rent our dwellings, with all its limitations. As architect A. Lacaton observes “sometimes the position of electrical plug dictates the layout of the bedroom” and, in this way, we find multiple obstacles on the way to customization of dwellings into our needs – needs which are vastly different than they were in the previous century, when the housing estates were built. Our definition of privacy has evolved and even with our curtains closed we can stay in constant, wireless connection to the world. Measured data about our personal activities provide highly targeted products promoted to particular groups of users.

Advertising and commerce come right into the home to tell people what they should buy or how they should live. In this context, in fact, it has been said that the private sphere has been colonized.³⁹

Some other trends, after intensive rise in the late 20th century seems to be meeting counter-trends. Common activity of going to work every day in the morning is becoming replaced by working-from-home idea, where with the use of a connected, personal computer we can do our job as we would be in the office.

Previous trends in aged care which saw the expansion of organized nursing homes is now meeting some criticism and problems due to

increasing number of people who need assistance in living. In opposition to this, organized, but far more socially-oriented therapy from home is becoming popular, making the nursing assistance less visible. These concerns are particularly worth mentioning when assessing mass-housing units where elderly people are in a majority.

It cannot be forgotten that capitalist-oriented society also express its individualism (both as single lifestyle and as freedom of personal choices) in the housing realm:

the dwelling has gradually ceased to be the place where we come home to a family setting: in it we find at most one person, or no one at all. The dwelling has become less a ‘home’ and more a place of transit, like the other places we pass through over the course of a day. The ‘multi-purpose trip’ has become the norm: people no longer go home first after each activity. This has served to undermine the connection with our own place of residence: people have become less oriented towards social cohesion in and around the home. The more educated we are, the more time we spend with colleagues and friends in other parts of the city rather than with our immediate neighbours, in regard to whom we most jealously cherish our privacy. [...] When dwelling is spread across many places outside the home, it is impossible to find dwelling unified as a whole in any single place. ‘Home-

39 Bernard Leupen, H. M. (2011). Housing Design A Manual, NAI Publishers.

less' dwelling also implies a certain restlessness, a vagabond search that seems most prevalent among young two-income couples.³⁹

Even if mentioned trends are contradictory in many ways, they exist and develop in parallel to each other and can have a significant impact on the transformation of post-war mass-housing units. This, existing layout of a dwelling plan represent uniformed snapshot of society needs of the previous century, which means in short: 2+3 standard family setup. Current data shows, that this situation is less and less present.

Selection of the case studies.

Overview of current transformation examples shows new trends in the residential architecture, emerging from 3 factors of sustainability:

Ecology: transformations aim to improve energy efficiency

Sociology: interventions lead to positive change within the community of dwellers

Economy: new development models are more resilient, de-centralized and buyer-oriented.

Narration through the study cases show compelling story of transformation, the emergence of new methodology (Dutch: “klushuis”, meaning “DIY house”), which is present in small interventions in early 2010’s like Wallisblok in Rotterdam or Klusflat Klarenstraat in Am-

sterdam. Importance of the method used in the transformation of Wallisblok was described in the publication by the architect and building became recognizable to the point where it was a part of Rotterdam’s open day of architecture, where author had an opportunity to be guided through the renovated apartments by their dwellers.⁴⁰

Proven successful, in all of the sustainable goals mentioned before, Klushuis methodology can be seen applied on a larger scale, visible in transformation of Kleiburg, massive urban block in Bijlmermeer, Amsterdam. Being still an experimental project among Dutch housing design, transformation design by NL Architects became internationally recognizable, winning 2017 Mies van de Rohe Award. At the same time, omnipresence of the aging mass-housing estates in western Europe has created a new opportunity for innovative renovation: architecture of transformation. Sharing the same mass-housing origin as Bijlmermeer estate, transformation example from U.K. (namely valuable for history of brutalist architecture Park Hill estate in Sheffield) add to the story, defining contemporary state-of-the-art in architecture of housing transformation.

In a logical order of continuation of Ommoord’s studies, presented first Amsterdam’s Kleiburg project shows a transformation realized on the block with similar qualities to those built under ERA-system. Next

40 Klushuis as a process is discussed further in chapter “Wallisblok” and “DeFlatKleiburg”.

41 Frédéric Druot, A. L. J.-P. V. (2007). "Plus" Large-scale housing developments An exceptional case. Barcelona, Gustavo Gili.

42 Concept of "villa-quality" is explained further in chapter "Bois-Le-Prêtre Tower Block"

43 Wikipedia contributors (2017). "Park Hill, Sheffield." 2017, from https://en.wikipedia.org/w/index.php?title=Park_Hill,_Sheffield&oldid=815719936.

44 <http://www.archdaily.com/174968/park-hill-hawkins-brown-with-studio-egret-west> Hawkins Brown with Studio Egret West (2011). "Park Hill / Hawkins Brown with Studio Egret West." from <https://www.archdaily.com/174968/park-hill-hawkins-brown-with-studio-egret-west>.

45 <https://www.hawkinsbrown.com/projects/park-hill-sheffield> Hawkins Brown (2011). "Park Hill \ Bringing love life and pride to a Sheffield icon." from <https://www.hawkinsbrown.com/projects/park-hill-sheffield>.

transformation project studied in this paper, due to its influence and presence among recent publications, is Lacaton & Vassal's innovative approach "never demolish", illustrated by Bois-Le-Prêtre Tower Block renovation, finished in 2011. Architects by proving that demolition and creation of new housing structure would be more expensive than design-driven transformation of the existing building started the ongoing process of changing perception how public and officials perceive aging housing blocks, massively produced in France after Second World War.⁴¹ Starting with theoretical notion of massively accessible "luxurious space", each flat during the transformation process can be upgraded to so called "villa quality".⁴²

Here as well as in the Dutch examples, addition of customizable space to the outdated dwelling is a recurring pattern, therefore chapter describing Bois-Le-Prêtre Tower Block is followed by analysis of Wallisblok and Klarenstraat. Lastly, transformation of iconic British Park Hill Estate led by Hawkins/Brown architects, cooperating with Urban Splash developers is presented to showcase a project realised on the building with national importance (which was one of the six short-listed projects for the 2013 RIBA Stirling Prize).⁴³

After costly renovation, developers aim to sell Park Hill as a premium location, understanding trend of art-inspired, loft-like quality. In this case, designers already equip reno-

vated public space and new apartments with "DIY-style" accessories. Slogan previously sprayed on a wall becomes an art neon installation, rough and aged concrete balustrades are replaced "with a more slender design cast with a higher quality finish" and finally the show flat boasts with "celebration of designers who have recycled, re-appropriated, re-fashioned, re-modeled or re-valued old pieces of furniture, a theme inspired by our own rejuvenation of Park Hill."^{44, 45}

In this case re-valuation of the estate became a well branded product, a result that can be criticized, although it is intriguing to see such a large-scale and successful operation taking place on the previously abandoned, neglected building which is still a Grade II European Heritage.

1. DeFlatKleiburg

Location: Bijlmermeer housing complex, Amsterdam, the Netherlands

Designer: NL Architects, XVW Architectuur

Project Year: 2016

Client: Consortium De Flat: Kondorwessels Vastgoed, Hendriks Cpo, Vireo Vastgoed, Hollands Licht / Martijn Blom

Data: 11-storey building is 400-metres long, bend gallery-access slab with 500 apartments which formed part of a vast estate laid out in hexagonal plan, which is home to 100,000 people. It is the only remaining block in the area maintaining its original qualities, one of the biggest apartment buildings in the Netherlands.

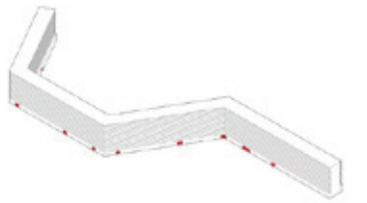
Strategy:

Dutch studios NL Architects and XVW Architectuur restored the repetitive, grid-like pattern of the 1960s block and left the interiors empty for the dwellers to customize. Name of the project, Klusflat – “do-it-yourself” in Dutch – reveals the concept, where inhabitants buy space and are obligated to finish it by themselves or with contracted by the developer company.

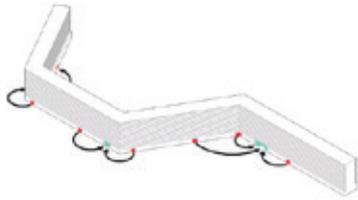
History:

The Bijlmermeer housing complex was developed in the 1960s as a part of highly-functional, CIAM-inspired development for southern housing district for Amsterdam designed by Siegfried Nassuth of the city planning department. It was meant to be a green, spacious alternative to traditional housing, with separated routes for pedestrians and traffic. Now the area houses about 100,000 people of over 150 nationalities. Despite displaying high quality of life at start, Bijlmermeer area soon faced problems typical for modernist housing complexes, designed from ground up, with not much relation to the context. This new environment, hardly familiar to the dwellers, became an object of bad publicity, where radical, experimental quality of the design was misunderstood. According to the architects:

“Fed by heavily economized execution, bad publicity, lack of understanding, poor maintenance and the sudden emergence of a new residential dream type -the suburban home-



many small underpasses limited in height by the interior street of +3 level

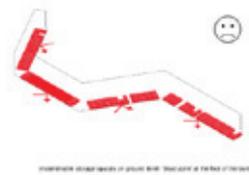


interior street (2nd level): regrouping of underpasses to create larger openings

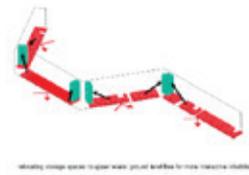
Figure 27 Architects' intervention to "impassable barrier" of the ground floor, by making large openings for pedestrians.
source: <https://www.archdaily.com/806243/deflat-nl-architects-plus-xmv-architectuur>



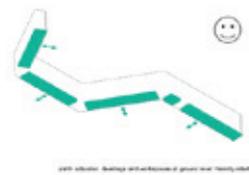
Figure 28 Large openings at the ground floor level merges previously separated public space next to the building.
source: <https://www.archdaily.com/806243/deflat-nl-architects-plus-xmv-architectuur>



interior street (2nd level): regrouping of underpasses to create larger openings



interior street (2nd level): regrouping of underpasses to create larger openings



interior street (2nd level): regrouping of underpasses to create larger openings

Figure 29 Activation of the ground floor: by relocating storage units next to the staircases, ground floor can become an accessible commercial zone.
source: <https://www.archdaily.com/806243/deflat-nl-architects-plus-xmv-architectuur>

the Bijlmer turned into a slowly dis-integrating parallel universe.”⁴⁶

Therefore, a renewal operation took place since the mid-nineties. Following the idea to diversify the neighbourhood, most of the original blocks were torn down and replaced by dense, but vastly different in terms of typology, sub-urban housing.

*“Kleiburg was the last building in the area still in its original state; in a way it is the last man standing in the war on modernism”*⁴⁷

In the past years building's state started to decline. Implementation of additional staircases with elevators did not solve social and building-related problems and again, in 2010s Kleiburg's future was threatened by demolition. Process of transformation started when Rochdale (real-estate company) launched a campaign to rescue the building, after realising that complete, standard renovation would cost up to 70M E. Kleiburg was offered for sale for 1€ to attract as many ideas as possible and open a discussion about the future of the block. Consortium De FLAT was selected in the second stage of the competition, where the first stage attracted over 50 proposals, ranging from student or elderly housing to live and work-units, or homes for the homeless.⁴⁸

Site:

Enclosed ground floor, where originally storage rooms were situated, was one of the main factors responsible for „overwhelming” and “impassable” impression of the block. Ranging almost 500m long, ground floor wall had too few, too small passages to be perceived as a piece of good public space surrounding the building. By distributing the storage rooms on the dedicated, small spaces on each floor, ground floor was freed to house workspaces and day-care facilities accessed directly from the carpark within which it sits. To connect public, park space on the both sides of the block, first two stories were punctured by double-high, spacious openings, allowing pedestrians to pass through the block.

Structure:

Massive, exposed concrete structure is the leading characteristic of the Kleiburg block, allowing the building to reach its monumental dimensions. Constructed in the 1960's in highly industrialised, tunnel-casting technology, system of load-bearing walls and slabs represent the pinnacle of the development of post-war housing systems. In the Klusflat transformation, architects focused on highlighting original composition of the structure by removing the additional elevators, placed in the 80's. By doing so, the intervention is a manifestation of re-use and cautious approach towards the existing struc-

46 NL Architects XVW architectuur (2016). “deFlat.” 2017, from <https://www.archdaily.com/806243/deflat-nl-architects-plus-xvw-architectuur>.

47 afasiaarchzine (2017). “nl . xvw.” 2017, from <http://afasiaarchzine.com/2017/02/nl-xvw/>.

48 Divisare (2017). “NL ARCHITECTS, XVW ARCHITECTUUR DEFLAT.” 2017, from <https://divisare.com/projects/336585-nl-architects-xvw-architectuur-stijn-poelstra-marcel-vander-burg-deflat>.

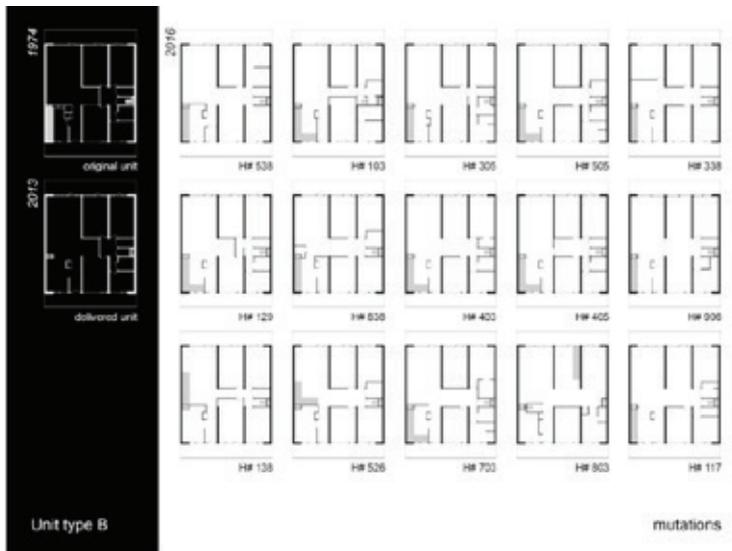


Figure 30 Taking advantage of large span between load-bearing walls, layout of the dwelling can be customized in various ways. Architects' proposed some "mutations" but ideally flats are sold empty, allowing users to define them up to themselves. source: <https://www.archdaily.com/806243/deflat-nl-architects-plus-xvw-architectuur>

tures, where after the initial evaluation, in the process of transformation useful elements are maintained and outdated ones are replaced.

Skin:

Following the preservation of the concrete appearance of the structure, balustrades were sandblasted to reveal the beauty of the concrete. Interesting intervention was applied to the gallery lighting, where simple addition of movement sensors changed the appearance of the block in the night. Now, instead of dominant static gallery illumination, after the sunset, diverse glow of particular flats' lights can be visible, with additional, animated by the passing-by dwellers lights at the galleries.

As a starting point for the customization, architects created catalogue of various frameworks which offers residents the option to pre-define the use of the flat and at the same time choose the appearance, presented to all the neighbours. In this way, "personal façade" reflects the interior layout: openable parts, sliding doors, double doors, a set-back that creates space for plants or people. Despite the different variations about the frameworks, the general appearance of the housing block is unified by renovation, with exposed existing concrete structural elements and uni-

form composition of refreshed galleries and balconies. Where previous Bijlmer renovation interventions had focused on differentiation, architects of Kleiburg block reject this strategy.

"After two decades of individualisation, fragmentation, atomisation it seemed an attractive idea to actually strengthen unity: Revamp the whole!" they continue. "It became time to embrace what is already there: to reveal and emphasise the intrinsic beauty, to sublimise!"²³

Space plan:

With attention to renovate the main structure -elevators, galleries, installations- the apartments are left unfinished and unfurnished: no kitchen, no shower, no heating, no rooms. This new business model for housing in the Netherlands leads to minimized initial investments. As a starting point, architects proposed the catalogue of pre-defined interior layouts, even with options to combine two or more flats vertically or horizontally. The vast block now hosts 500 customisable apartments. Relatively small differentiation between the glazed facades, shows nevertheless the personal preference of dwellers, which is a significant change in comparison to the previous state, even when inhabitants protect their privacy behind the closed curtains.

Critique:

From Press release of MvDR award:

"Kleiburg helps us imagine a new kind of architectural project, which responds to changing household patterns and lifestyles in the twenty-first century. A revitalization of typologies of the past is as relevant as experimenting with new, untested models in this quest, just as radically transforming existing buildings is."

49 NL Architects, X. a. (2016). "de-Flat." 2017, from <https://www.archdaily.com/806243/deflat-nl-architects-plus-xvw-architectuur>.

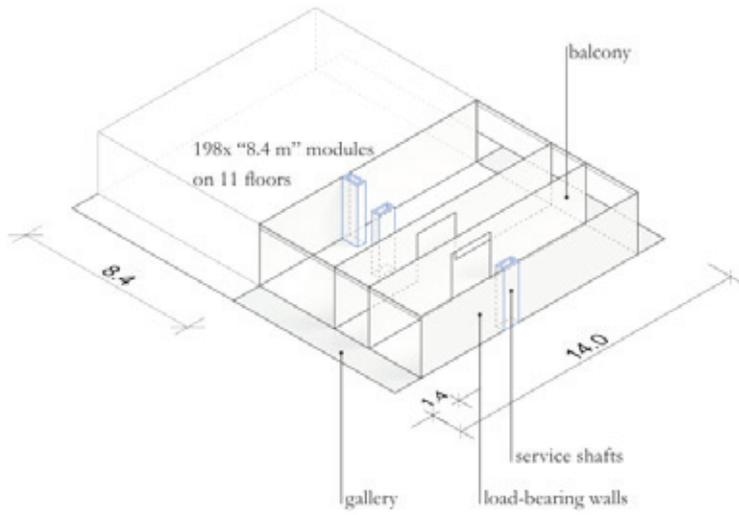
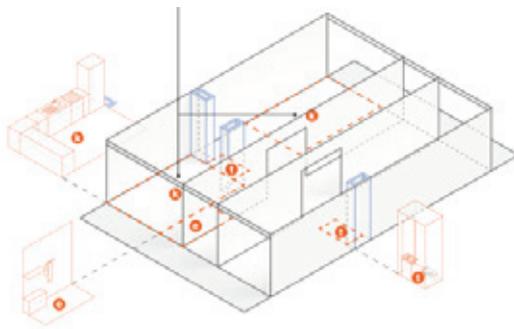
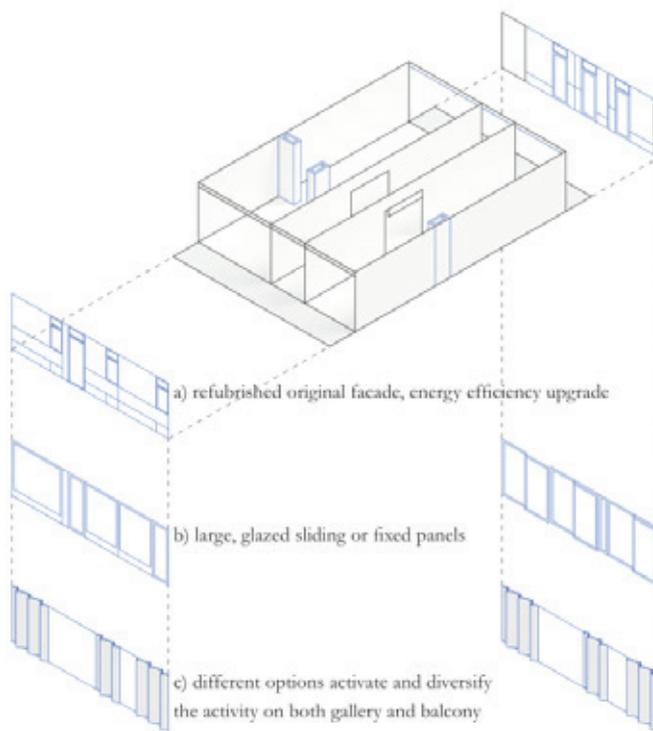


Figure 31 1. Deconstruction.
 Dwelling units cleared out of partition walls.



2. Catalogue of floor plans. Various options for kitchen, entrance and toilet spatial configuration.



3. Catalogue of facades. Various options for the balcony and gallery facade, following interior design.

sources, recouping of energy coming from ventilation).

Data: 16-storey Tour Bois-le-Prêtre, originally designed by French architect Raymond Lopez in 1962, develops on 50m height, 16 levels serving each one 4 or 8 residences in total contains 96 apartments. 6,288 existing usable m² + 5,400 m² enlargement (including surface areas of the balconies), total: 11,688 m² .

Strategy: Built in the northern outskirts of the city, after 60 years of ageing and being neglected, the building needed an extensive transformation to bring the accommodation to meet the modern standards. Renovation included extending the floorplates outwards to increase the size of rooms plus create new conservatories and balconies. Moreover, circulation at the entrance of the building has been re-programmed, creating open, collective space. Additional elevators were introduced.

“Completed at half the cost of demolition and new build, this is an exemplary lesson in harnessing clever thinking and ingenuity to transform neglected parts of our cities.”⁴⁹

Need to improve living conditions of the inhabitants’ merges in this project with architects’ ambition to “never demolish” and utilize existing building as a base for architectural transformation. The project proposes to enlarge the flats by forming new floor slabs on the outside of the

49 Amanda Levete, on the Dezeen Designs of the Year judging panel. Frearson, A. (2013). “Tour Bois-le-Prêtre by Frédéric Druot, Anne Lacaton and Jean-Philippe Vassal.” from <https://www.dezeen.com/2013/04/16/tour-bois-le-pretre-by-frederic-druot-anne-lacaton-and-jean-philippe-vassal/>.

2. Bois-Le-Prêtre Tower Block

Location: Boulevard Bois-le-Prêtre, Paris.

Designer: Druot, Lacaton&Vassal

Project Year: 2011

Client: Offices Publics de l’Aménagement et de la Construction (OPAC), Paris.

Budget: 11,25 M€

Key-values: massive-transformation, each apartment equipped with a winter garden and a balcony, new types of apartments (from the studio to the six-bedroom flat), participatory design with relocation within the building, reduction of energy consumption by more than 50%(optimisation of the passive energy input of the facades, installation of low-energy lighting, renewable energy

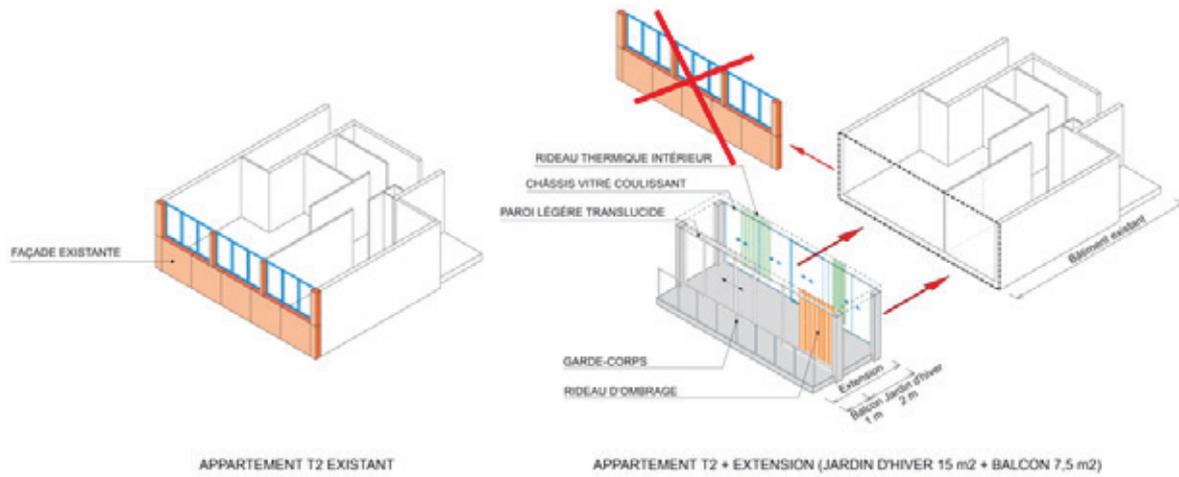


Figure 32 1. Transformation goes beyond replacing the facade – dwellings are extended by balcony and winter garden, built with its own foundation.
 source: (Frédéric Druot 2007)



Figure 33 Process of new facade construction. Using this method, inhabitants did not have to leave their flats for the construction time.
 source: (Frédéric Druot 2007)

high-rise, which would enable the living room to be enlarged, winter gardens and continuous balconies to be created, and the comfort, views and insulation of the flats to be improved. At the same time, inhabitants of the high-rise block will retain their flats or be able to move to a bigger or smaller flat in the same building, following participatory design introducing new configuration of apartments. It will not be necessary to vacate the flats during the building work.

Site:

Numerous interventions were taken after analysis of problems occurring on the ground floor, especially the entrance zone of the block. To improve the security, exterior entrance ramp was replaced by more transparent homogenisation of the indoor and outdoor height level, inter-crossing hallway over the garden was added and glass walls were installed around the main stairway (please refer to diagrams). Enclosed storage rooms were transformed into communal premises on the ground floor and the mezzanine.

Structure:

Steel structure, supporting addition of new “plus” space was created on the outside of the building, with its own foundation, but also rigid connection to existing concrete structure of the block. Transformation process continue therefore the original

load-bearing structure, providing dimensions and guidelines for the addition. Important quality of the initial design, panel-like original structure of the façade element allows to replace outdated façade with the extension. Once built, original structure preserves such a value that process of demolition and development of new housing becomes economically not viable comparing to Lacaton&Vassal’s proposal.

Skin:

To prove the advantage of transformation rather than demolition and creation of new housing, architect’s design for the facade aims to create a new identity for the block while meeting requirements for the thermal performance of the building. Introduction of additional, empty space at the exterior of each apartment serves not only as a new, energy efficient façade. In their publication dedicated to “Large-scale housing developments”, Frédéric Druot, Anne Lacaton & Jean-Philippe Vassal brings up topics like “Luxury and Ease” or “Ecoculture”, while in the introduction referring to essay published in in *Architecture d’Aujourd’hui* 239, June 1985 by Jacques Hondelatte and Épinard Bleu:

“The different spaces would be strongly characterised, not only by precise functions, but by extremely

50 Frédéric Druot, A. L. J.-P. V. (2007). “Plus” Large-scale housing developments An exceptional case. Barcelona, Gustavo Gili.

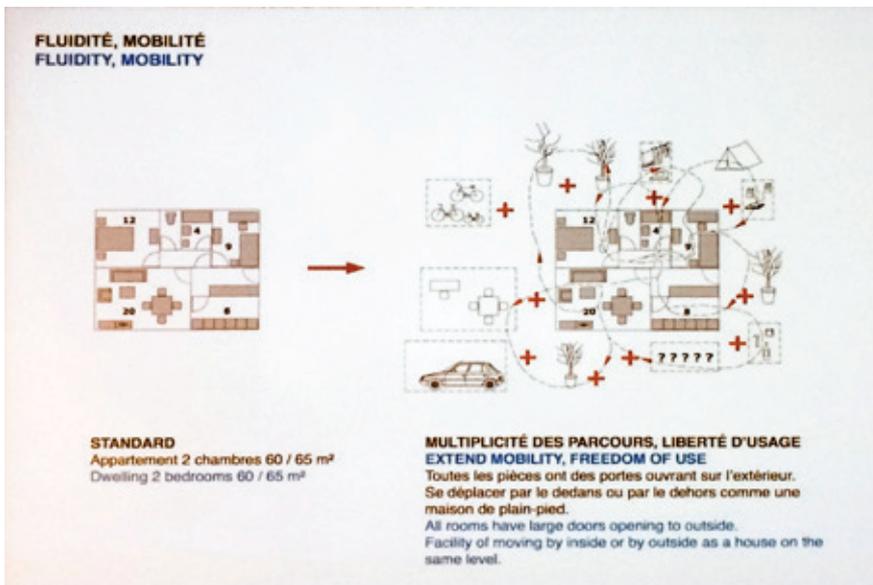


Figure 34 Villa Quality concept, slide from public lecture at TU Delft, 11-10-2016

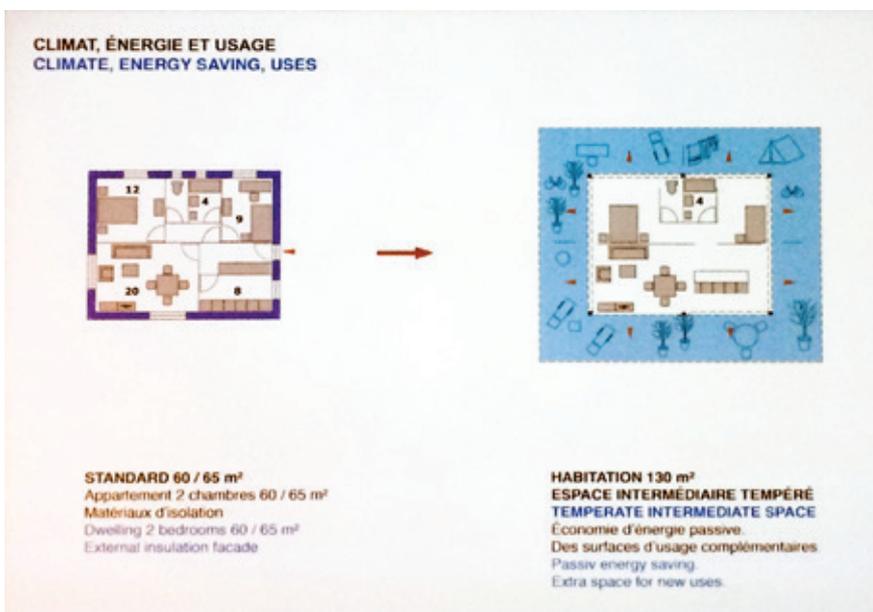


Figure 35 Villa Quality in practice, slide from public lecture at TU Delft, 11-10-2016

strong qualitative particularities. *A priori, no bedrooms, living rooms or bathrooms, or premeditation when it comes to conceiving the places for relaxing, working or eating in. Rather, a catalogue of spaces with contemporary and contrasting qualities.*"⁵⁰

In spite of this idea, an empty, sunny room as an expansion of dwelling is a luxurious, undefined space, ready to be filled with contemporary qualities, up to the user's preference.

A facade of corrugated aluminium clads the new exterior of the tower, interspersed with large windows and glazed balconies. Floor-to-ceiling glass separates the apartments from the new terraces to let more natural light into each residence. By creating the terraces, role of the previous façade is changed: now it serves as a separator between the apartment and winter garden, which is equipped with its own façade.

Space plan:

By addition of heated extensions, winter-gardens and balconies, the overall surface of origin of 8900m² is increased to 12460m². This new organisation of space has its origins in idea of "villa quality", explained by Philippe Vassal:

"Each flat has to become a villa, it means that each flat has no more to stay behind a window but in front of each window it has to be now a new door, opening to a very large balcony-wintergarden. And at this

51 0300tv (2009). Lacaton & Vassal Architectes / Jean Philippe Vassal / Interview II.

moment the relation between inside, outside totally changes and you are no more in a flat, you are in a villa.”⁵¹

Additional space and the precise interventions in existing dwelling layout (i.e. re-arranging partition walls), provide more than just luxury, making it possible to adapt the rental offer while meeting by the creation of new typologies, therefore to satisfy the housing needs of various target groups. Passive heating reduces the consumption of energy of more than 50%, mainly by the addition of the winter-gardens. Large openings provide a lot of sunlight, even with shadow casted from the added terrace. Followed by participatory design, layout of the apartments was reconfigured, allowing even to exchange the location (and size) of the apartment with other inhabitants of the building.

Design process analysis – transformation of circulation and ground floor.

Figure 36 A. Entrance and circulation before the transformation.

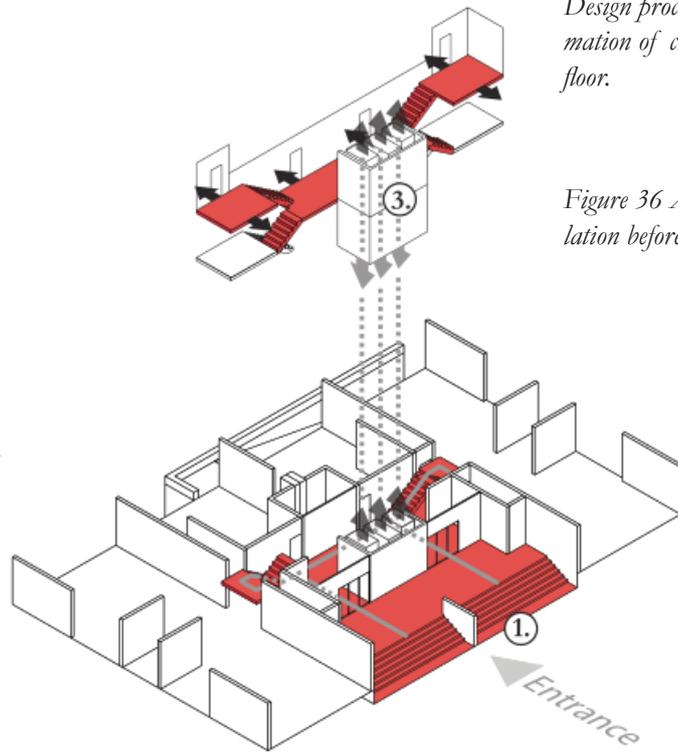


Figure 37 B. Entrance and circulation after transformation. Series of interventions transforming communal space:

1. Adjusting the outdoor terrain to match height of the entrance.
2. Creating intercrossing hallway, connecting garden to the main entrance.
3. Replacement of three lifts by two larger ones.
4. Installation of two new lifts in the north and south wings.
5. Introduction of communal space on the ground floor and the mezzanine.

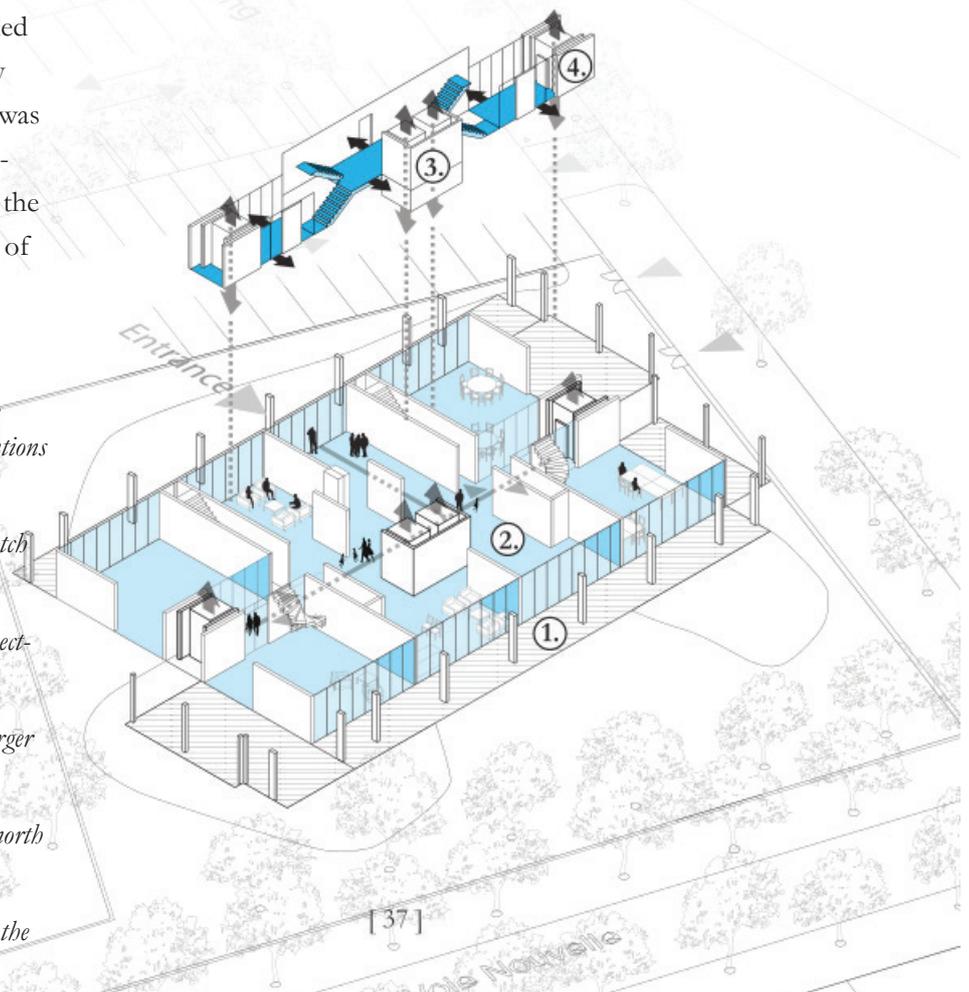




Figure 38 Shared garden
source: (Hulsbof 2008)

3. Wallisblok

Location: Spangen district, Rotterdam, the Netherlands.

Designer: Hulshof Architects

Project Year: 2003

Client: Kopersvereniging De Dichtertelijke Vrijheid

Value: from 70,000 € for 50 m² apartment to 200,000 € for 4-story house. Additionally, municipality invested approx. 35,000 € per apartment.

Key-values: radical-transformation, innovative business model,

Data: 30 houses, 39 apartments with one common courtyard garden (700 m²). One-storey apartments (50 m²), duplex apartments and rooftop homes (up to 125 m²), four-storey houses (266 m²)

Context:

Wallisblok residential building, located in Spangen district in Rotterdam and consists of courtyard-typology, pre-war houses. Wallisblok neigh-

bourhood's area stands out on Rotterdam's map: its population of around 600 people, of which almost 60% are younger than 30 years and only 5% are over 55 years old inhabit around 300 dwellings in the area, from which a quarter are vacant.

Degradation of the district, leading to negative migration of the dwellers, was caused by multiple factors: years of unclear decision-making on conservation, demolition or renovation of the buildings and its surroundings. Due to raising costs of maintenance and relatively outdated living standards presented by the buildings, they failed to attract new residents. Used as a social housing and owned by municipality (in 80%) and local housing corporation, buildings such as Wallisblok were considered problematic also because of the social problems, among which were highly reported issues of drug use.

Strategy:

The idea of renovating the housing block within the model of collective private investment (CPO) came from Hulshof Architects and the Rotterdamse Steunpunt.^{52, 53}

The block on Wallisweg was worth it: attractive architecture was still in technical condition allowing the renovation. Architects discovered the building block on a search trip with students for future academic projects in Delfshaven district. Municipality was initially not convinced to the idea of radical renovation, reasonably doubting that there will not be

52 Wonen, W. e. I. (2007). "Het Wallisblok, Rotterdam." Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer.

53 Hulshof, I. (2008). "Poetic Freedom."

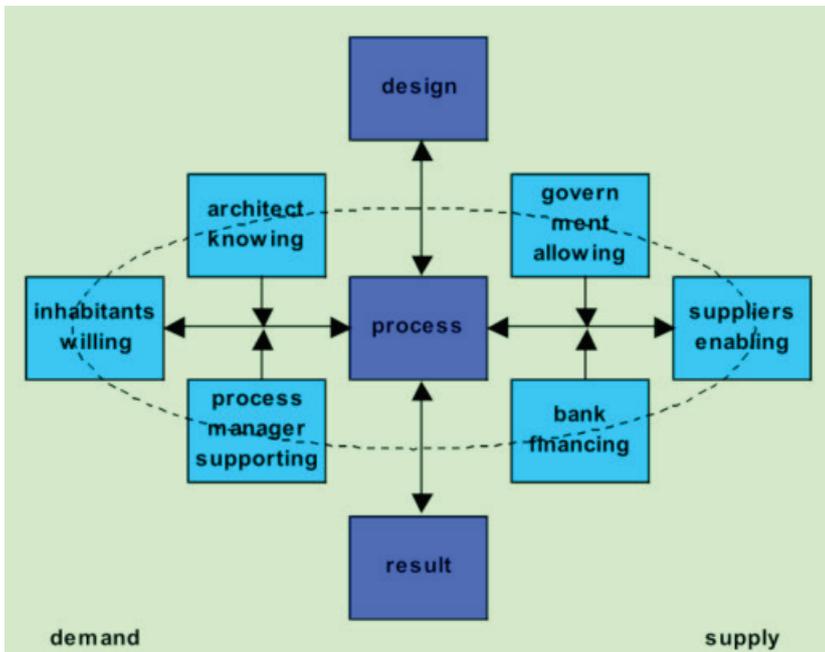


Figure 39 "Collective private assignment" process, explained by Ineke Hulshof. Role of the municipality is mixed, providing both financing support and supporting bottom-up initiative of inhabitants in improving the neighbourhood.
source: (Hulshof 2008)

Figure 0 Preservation of street-oriented facade: Building as a part of local context.
source: architect's website:
<https://www.bulshof-architecten.nl/portfolio/wallisblok>



Figure 41 With the new façade living space opens towards community garden
source: architect's website:
<https://www.bulshof-architecten.nl/portfolio/wallisblok>



enough interest in the renovated building, with lots of similar vacant ones nearby. However, strong initiative of architects and Steunpunt, backed with the housing corporation willing to invest was enough to stop municipality's plans of the demolition. Whole operation become viable because of shared system of expenses: money reserved in the city's budget for demolition covered the renovation of foundations, disassembly of the old, courtyard side of the façade and asbestos removal. Other main works costs were shared through the future buyers. In general municipality invested 1.3 million euros (€ 35,000 per apartment), where future dwellers paid between € 70,000 for one-story houses (50 m²) to € 200 000 for the four-story houses.

Site: Due to neglected state of the building, inner courtyard was filled with freely growing trees and bushes. Mature trees, preserved during the transformation process, create unique atmosphere in the courtyard, where no fence or other obstructions marking the privacy of the dwellers are needed: thick vegetation serves the function of the buffer zone, creating blurred boundary between private terraces and collective squares, which resemble forest clearings.

Structure: Original brick structure and foundations were preserved. Photographs from the deconstruc-

tion (of courtyard's façade) shows load-bearing walls and beams supporting slabs. This original structure provides some flexibility in creating openings in floors, therefore making multi-level, urban-villa-style dwellings possible.

Skin: Application of new, minimalist, partially glazed façade on the courtyard side is a distinctive element of the transformation. Building's appearance, preserved from the outside, with only slightly refreshed original brick façade stay in the contrast to the modern walls enclosing the inner, collective courtyard. Executed by the contractor, this energy efficient façade applies uniform appearance to the dwellings, which interior vary from one to another.

Space Plan:

Decision of stripping down the courtyard's façade, besides benefits from replacing it by better performing new one, resulted in radical opening of the building for the transformation of its interior layout.

Therefore, new typologies were introduced, ranging from small ground floor apartments for single living dwellers, up to villa-like 4-story high family row-houses. During the site visits in 2016, owners explained that it was up to their preference to buy a flat finished by the contractor or decide to take over the interior works once the contractor company enclosed the building with the court-

yard's side façade, equipped with stairs and new services' installations.

54

54 Wallisblok housing was one of the places of „Dag van de Architectuur” in Rotterdam, with some dwellings open for visitors.

55 Wonen, W. e. I. (2007). “Het Wallisblok, Rotterdam.” Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer.

Figure 42 Deconstruction of the original courtyard-oriented facade.
source: architect's website: <https://www.bulshof-architecten.nl/portfolio/wallisblok>



Figure 43 New facade reflects the configuration of dwellings introduced to the transformed structure. At the same time, it improves thermal insulation.
source: architect's website: <https://www.bulshof-architecten.nl/portfolio/wallisblok>



Figure 44 Custom dwelling - size and type of space adjusted to the particular housing needs, not applied from top to down.
source: architect's website: <https://www.bulshof-architecten.nl/portfolio/wallisblok>

Critique: Result of the transformation was a new type of an urban residential block, with its mixed typology attracting various groups of dwellers. Pushing the boundaries of renovation, this project proves that this type of renovation can lead to creation of new quality, far more attractive than demolition of the existing building and creation of a new one, in already defined by surrounding buildings' context.

However, Wallisblok is a typical example of gentrification, realized by several housing corporations and de SEV. Gentrification stands for the new interest in old and centrally located neighbourhood that were abandoned in the 19th and 20th century by the upper-class and in general, leads to not positive process of pushing out current, less wealthy tenants outside the inner city. Defending the architect's vision, in this case it can be called "gentri-puncture", a combination of gentrification and acupuncture.

"By pointing the needles on a good target, in this case the neglected neighbourhood, this limited intervention should lead to social and commercial activation, without drastically changing the identity of the district." New inhabitants, who had the courage to buy a house in that area are "spekkoper" (Dutch) – they believe in the positive process of activation of the district and therefore rise of value of their estate. Dutch publication from Dutch Ministry of Housing, Spatial Planning and the

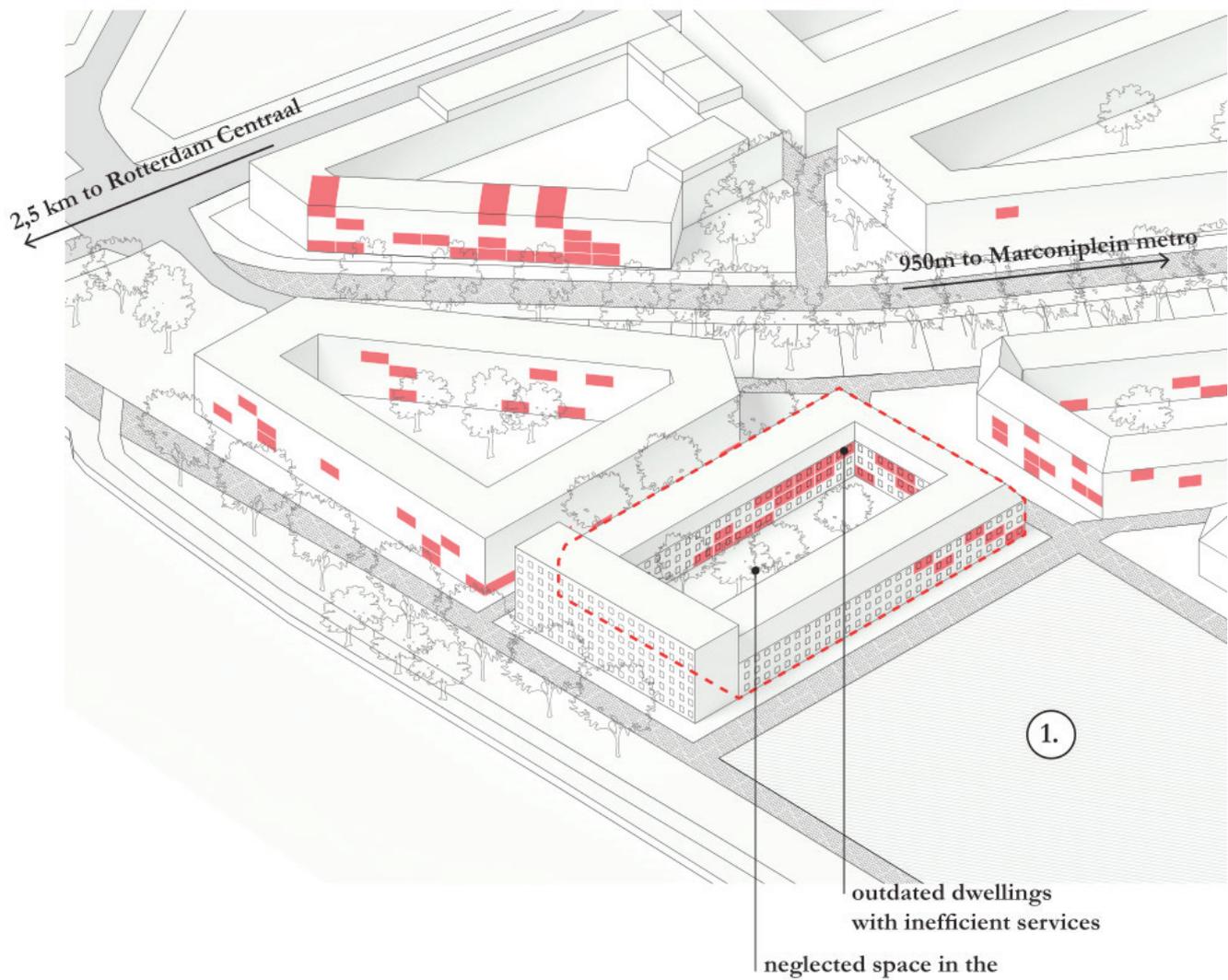
Environment (VROM) points out as example the developments of "Lombok in Utrecht and older, like Pijp in Amsterdam or other similar in US" stating that this development model can lead to positive change.⁵⁵ Renovating in "collective private commissioning" offers various options and a great level of flexibility in terms of transformation, allowing users to highly customize their dwelling (from small apartments to a complete urban villa). Moreover, client is positioned in more decisive role than just an apartment buyer, being able to choose between finishing the interior works on his own or use the services of provided construction company.

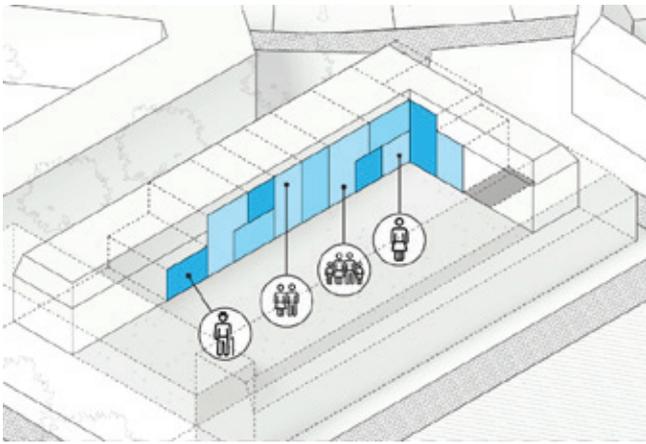
Figure 45 Design process analysis. Graphic by author

1. Wallisblok in the local urban context. Part of a bigger problem - neglected buildings with vacant dwellings.

1. first strategy of Rotterdam's municipality - demolishing the housing blocks.
(Wallisblok site was planned as next one to be demolished)

 high presence of vacant dwellings in the area.

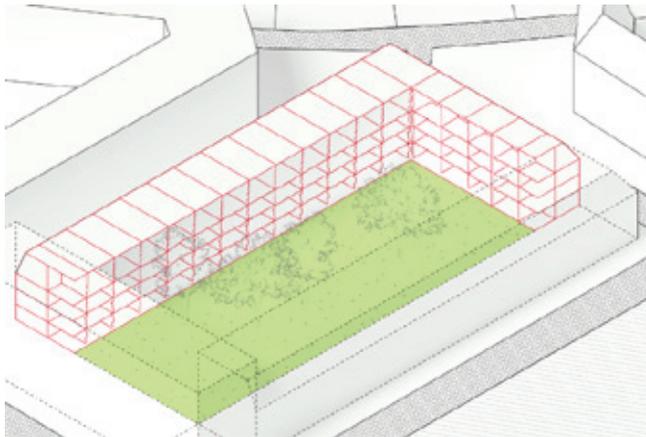




2. *Bottom-up local architect's initiative to save the building by renovation strategy: collective private investment of new users.*

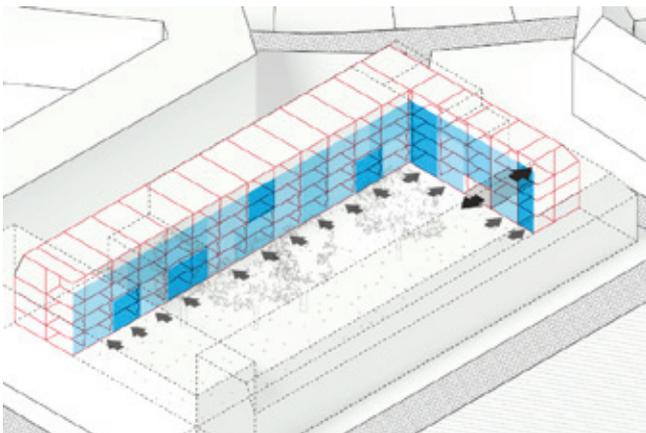
New program for the building include various type of new dwellings for diverse target groups: elderly dwellers, young couples, larger families and young professionals.

One-story apartments (50 m²), duplex apartments and roof-top homes (up to 125 m²), four-story houses (266 m²).

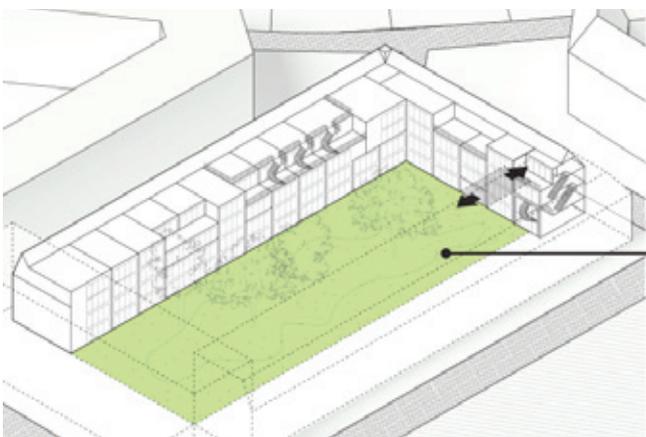


3. *First step of renovation - disassembly of courtyard's facade.*

At the same time, outside, street-oriented facade has been refurbished, seamlessly matching the other buildings in the neighbourhood.



4. *Transformation of dwelling units - individual entrances both from the courtyard and street side, installation of more efficient services.*



5. *Application of new, energy-efficient facade, following the preference of new users.*

6. *Renewal of courtyard's garden.*

Blurred boundary (created mainly by vegetation) between private gardens and collective courtyard's space.

viding private gardens at the ground floor, attaching balconies to the units above and creating a roof terrace for the top floor apartments, with optional in the future build-up addition. Ambitious goals were achieved because of bold initiative of collective private investment (CPO in Dutch), making it the first post-war portiekflat renovated under this system.^{56, 57}

56 NRP Gulden Feniks (2015). “Klussen op de Klarenstraat.” 2017, from <http://www.nrpguldenfeniks.nl/hall-of-fame/jaargangen/2015/renovatie/klussen-op-de-klarenstraat-1/>.

Comparing to standard “portiekflat” renovations like “Jacob Catsstraat” reference from <http://www.renovatie-kompas.nl/>, project from Klarenstraat shows benefits of collective approach driven by strong design idea.⁵⁸

57 Dutch Design Daily (2015). “Renovations at the Klarenstraat.” from <http://dutchdesigndaily.com/architecture/renovations-at-the-klarenstraat/>.

58 renovatie-kompas.nl (2016). “Een greep uit de gerealiseerde projecten.” 2017.

4. Klusflat Klarenstraat

Location: Klarenstraat, Amsterdam

Designer: VanSchagen Architects

Project Year: 2013

Client: DO VVO Klussen aan de Klarenstraat

Key-values: A-label energy efficient, CPO funding model, modularity, local collective, different target groups.

Data: 30 houses ranging from 40-190 m²

Strategy:

The residential building, originally built in 1956, in typical for its time “portiekflat” (common staircase) typology, went through a substantial renovation, developing 30 apartments, each with unique layout. Key idea of the renovation was to customize through expansion: pro-

By taking opportunity of introducing new dwellers (and therefore having a full flexibility in changing apartment’s layout and other building’s elements like facades) project fulfils both inhabitants needs and requirements for sustainable development in terms of energy efficiency.

Structure: Original load bearing walls and slabs were preserved, creating the base upon which the customized apartments were built. In certain cases, the slabs and walls were punctured, providing openings which connect various “blocks” in bigger apartments.

Skin: By replacing façade with more energy-efficient one, intervention provided more daylight to the dwellings and option to introduce private balconies.

59 Hulten, F. v. (2014). “Klussen op de Klarenstraat.” 2017, from <http://www.urbannerdam.nl/werkvelden/klushuizen-bijzonder-vastgoed/klussen-op-de-klarenstraat/>.

60 <http://www.urbannerdam.nl/werkvelden/klushuizen-bijzonder-vastgoed/klussen-op-de-klarenstraat/>



Figure 46 DIY dwelling in progress: new staircase connects apartment to the roof terrace.

source: <http://dutchdesigndaily.com/nl/nieuw/klus-sen-aan-de-klarenstraat/>



Figure 47 Facade before upgrade

source: <http://dutchdesigndaily.com/nl/nieuw/klus-sen-aan-de-klarenstraat/>



Figure 48 Facade after transformation: using similar materials, variation in form of balconies and roof terrace is introduced, breaking monotony of the previous design.

source: <http://dutchdesigndaily.com/nl/nieuw/klus-sen-aan-de-klarenstraat/>

Services: Another goal of the project was to innovate in terms of energy efficiency, at the same time preserving the original structure. Installation of 250m² of PV panels and new, well insulated façade and more efficient, low-energy heating installed in the floor made possible to score A energy label (from previously D/E).

59

Space plan: By diversification of the apartments' space plans, new target groups were attracted, at the same time achieving high-quality of living in the new apartments. After the renovation, the inhabitants vary "from twenties to fifties, from family to single, and opera singer to engineer to curator"⁶⁰. Process of integrating new residents is controlled by the collective, which can form a strong community. Project presents both strong bond between inhabitants and the space (units labelled by names in the design phase, desire to "own a piece of land/space", personal identity expressed in the apartment layout) and ambitious goals in terms of sustainability (energy efficiency, social-space efficiency in high-density housing, de-centralized funding model).

Comparing to the original design, it can be pointed out that after the transformation the housing block was deprived of some not-working public and shared spaces. I.e. the

buildings' plinth, previously occupied with garages and store rooms was redeveloped into housing units with gardens on the back side.

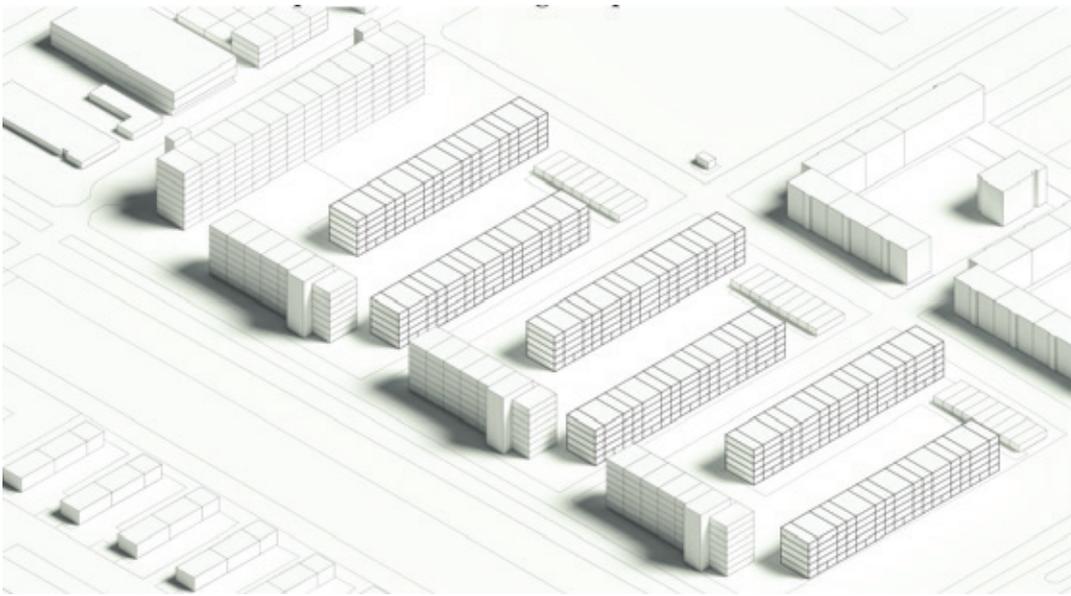
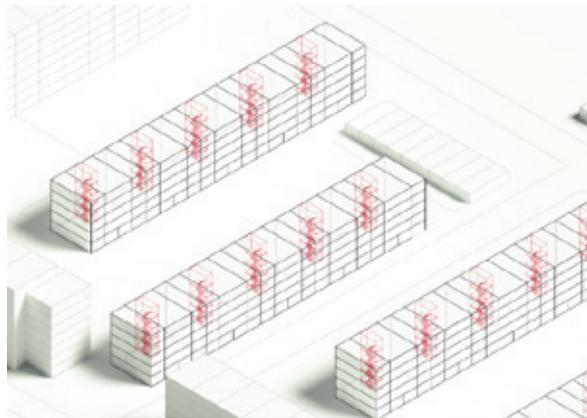
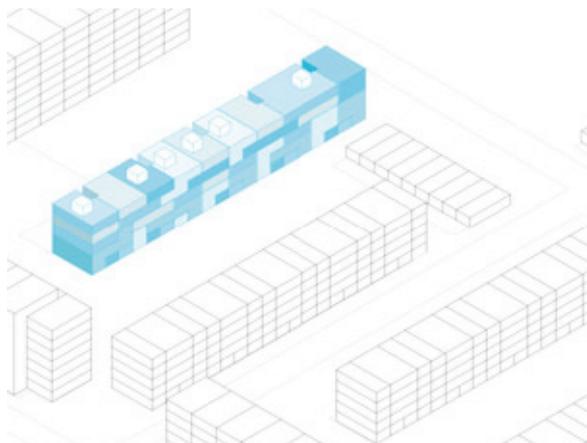


Figure 49 Design process analysis

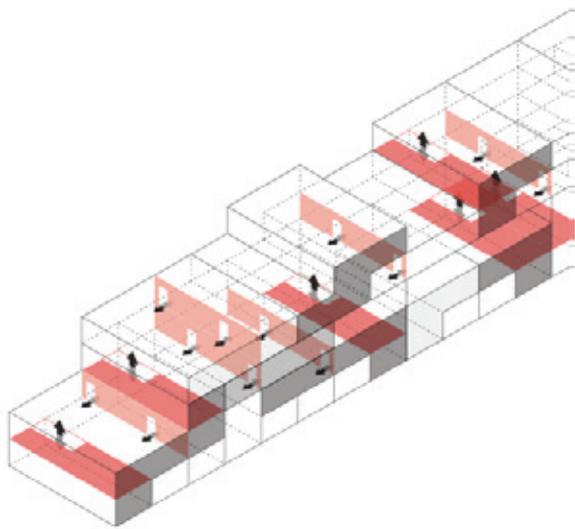
1. Sameness of 1952's "portiek flat" housing complex in Amsterdam's post-war urban planning.



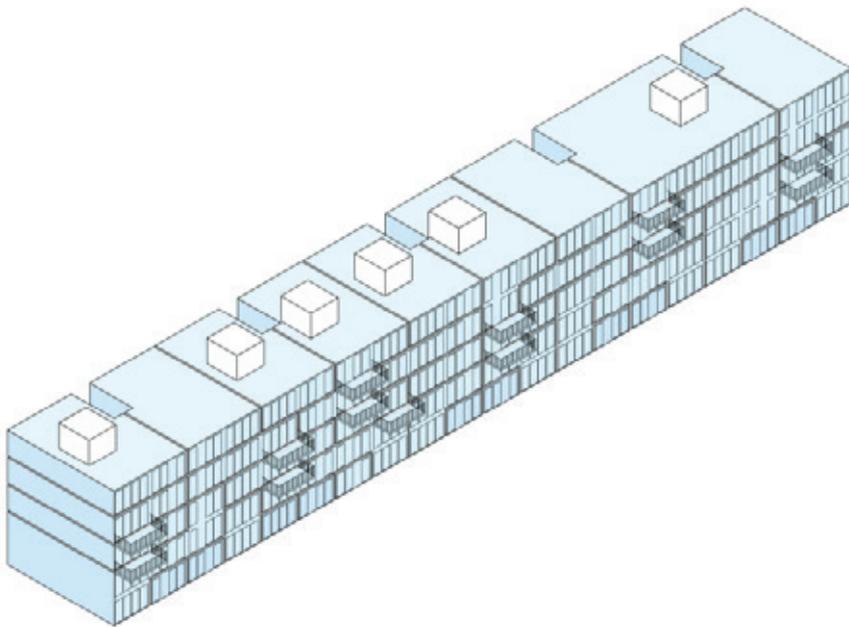
2. Circulation in "portiek flat" typology - shared staircase for 12 units



3. New program - creation of dwellings from "blocks" with close cooperation with the future dwellers.



4. Execution of "blocks" - transformation of former apartments into new modules by punctures



5. Application of new, energy-efficient façade.



*Figure 50 Main image at the internet site of the developer, promoting and selling refurbished dwellings comes from theatre show by National Youth Theatre. Transformation of Park Hill housing complex aims to change its identity, not only architecture.
source: <http://www.bbc.com/news/entertainment-arts-14748066>*

5. Park Hill, Sheffield

Location: Sheffield, United Kingdom.

Designer: Hawkins Brown with Studio Egret West.

Project Year: 2011

Client: Urban Splash Build Ltd (North)

Value: £120m (140M €)

Data: 130000.0 sqm, The refurbished 1st phase block houses 75 residential flats and commercial units at the plinth of the building. Built on a steeply sloping site to the East of the city centre, Park Hill commands panoramic views of the city. The building profile harnesses the topography of the site keeping a constant roof level. The height of the blocks ranges from four to thirteen stories. 874 flats in total.

History:

The original scheme, comprising 995 flats on a 32-acre estate, was designed by Jack Lynn and Ivor Smith working with J. L. Womersley of Sheffield Corporation City Architects Department. Designed from 1957-61, complex officially opened 16 June 1961. ⁶¹ The building is historically important as one of Britain's first completed schemes of post-war slum clearance and the most ambitious inner-city development of its time. Innovative in its modern building techniques, spacious interiors and an integrated district heating system project aimed to establish new standard for mass-housing development. Its characteristics galleries, so called "streets in the sky" aimed to recreate the community spirit of traditional streets within a high-rise development.

STRATEGY: When 1998 Park Hill was granted Grade II heritage status, making it the largest listed structure in Europe, its future was preserved. ⁶² However, iconic for the Sheffield city building needed a major renovation to reach the standard of contemporary housing and overcome bad public opinion about the estate. To successfully bring Park Hill back to the housing market, developer launched a competition, seeking for design which could be feasible financially and at the same time can bring new identity to the housing complex.

Original structure was preserved, with duplex (maisonette apartment

⁶¹ Wikipedia contributors (2017). "Park Hill, Sheffield." 2017, from https://en.wikipedia.org/w/index.php?title=Park_Hill,_Sheffield&oldid=815719936.

⁶² Sayer, J. (2016). "Brutalist housing project, Europe's largest protected building, to be renovated within five years." 2017, from <https://archpaper.com/2016/10/sheffield-brutalist-park-hill-renovation/#gallery-0-slide-0>.

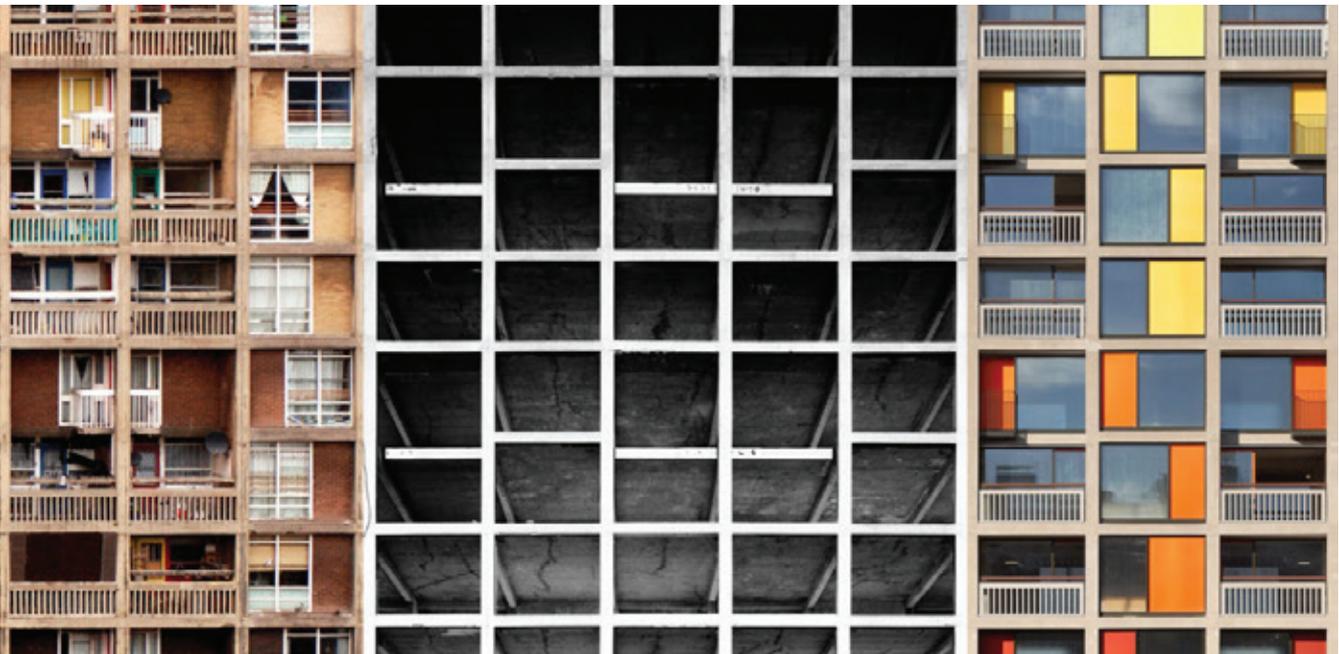


Figure 51 Brutalist's quality of Park Hill architecture comes (among others) from the exposed concrete structure. Collage shows transformation of the facade from old (left) to new (right).
 source: <https://www.hawkinsbrown.com/projects/park-hill-sheffield>



Figure 52 Interior of developer's model flat. Bare concrete is exposed both in the outside and inside of the building.
 source: <https://www.hawkinsbrown.com/projects/park-hill-sheffield>

spread on 2 floors on top of each other) and single level apartments arranged within a rigid grid with access decks on every third floor serving duplexes on and above the deck and single-story flats set below. Taking advantage of the original generous layout, dwellings are redesigned to provide spacious rooms as well as built in storage space. The impermeability of the original estate and lack of vision for the activation of the public spaces is one of the fundamental reasons why Park Hill did not work. The original building placed in the landscape, was an excluded estate, left on its own. Powered by the heritage value of the estate, project aimed to transform the space around Park Hill, making it a prominent location.

Site:

Facing the original problem of residential units at ground level, which stand in conflict with transparency and accessibility to the communal space outside, architects decided to introduce a commercial zone. New plinth (which rises from 1.5 to three stories) bring on retail, bars and restaurants. With the creation of “the Cut”, new large entrance to the complex, visually independent plinth stays in contrast to the residential function above. In general, transformation of the building relies on interventions in specific places, where valuable parts of the building are refurbished, preserving the original appearance of the mass-housing

block.

Structure:

Raw appearance of concrete grid-like structure is one of the key features of the brutalist’s nature of the building.

„Through ongoing dialogue and collaboration with English Heritage and Sheffield City Councils Planning Department, the following architectural interventions have been made:

the concrete balustrades have been replaced with a more slender design cast with a higher quality finish

The footprint of the flats have increased to incorporate new storage space at the threshold to the Streets in the Sky

a new 4-story Cut through the Northwest block creates a welcoming and civic scaled new entrance to the estate

an external mirror-finished stainless steel helical stair and glazed external lift core on the West façade of the Northwest block provides dramatic vertical circulation affording panoramic views of the City whilst marking the new civic entrance.”⁶³

Important qualities of the original structure were preserved, keeping the design of a private balcony for each flat, the orientation of the flats, with living spaces facing South and West to maximize natural sunlight and heat, and bedrooms facing North or East as well as external access “streets in the sky” which

63 West, H. B. w. S. E. (2011). “Park Hill / Hawkins Brown with Studio Egret West.” from <https://www.archdaily.com/174968/park-hill-hawkins-brown-with-studio-egret-west>.

utilise the topography of the site by connecting elevated walkways to ground level.

Skin:

The brick work in the elevation has been replaced with colourful, anodized aluminium panels, a material which is more radiant and reflective, providing greater contrast in the banding of the streets throughout the development than the original tonal brickwork. North and East facing elevations have been opened up by inverting the solid to void ratio to 2/3 glazing, 1/3 solid. This gives previously dark bedroom spaces much more daylight. Hallway and landing windows looking onto the gallery have been introduced into the apartments as a means of improving the passive surveillance of the Streets in the Sky (which the original architect Ivor Smith described as one of the most regrettable failures of the original design).

Space plan:

Giving residents a sense of ownership was an important part of the project, so patterned floor tiles and stained plywood details were added around the entrances to each home to provide a more domestic appearance. These details also vary between different clusters of homes, helping

residents to orientate themselves. Show flat, proposed by architects, summarize the “branding” part of the renovation. Following the new identity to the housing complex, show flat design is equipped with either re-valuated old furniture or one made from recycled materials – a theme which is reoccurring along the whole renovation project on multiple scales.



*Figure 53 Slogan previously sprayed on a wall of a social housing estate becomes an art piece in form of a neon sign. Eye-catching contrast between roughness of brutalist architecture and humane response to it becomes a part of the new Park Hill identity (or „brand” from developers perspective).
source: <https://www.hawkinsbrown.com/projects/park-hill-sheffield>*

Criticism:

“New identity” for the housing complex provoked critical publications. In certain sense, originally built in 1960s, this massive housing estate was a statement of “welfare state” politics, aiming to improve life of its working-class inhabitants. First phase of renovation, finished in 2013, consists of 40% “affordable” apartments, in line with government regulations. However, plans for second phase, submitted in 2017, does not suggest any dwellings designed for social housing.⁶⁴ From architectural

point of view, renovation of this significant building is truly valuable, nevertheless it produces new social problem: gentrification in a scale of whole housing complex, visible in “Sheffield Tent City” protest.⁶⁵ Renovation of this architectural heritage monument, partially funded from public money, shows in this case rather a renewal of public interest in brutalist (perceived as “authentic”, “raw” or “industrial”) architecture, rather than general interest in social equality or utopian nature of the project. Or on the contrary, maybe it illustrates contemporary, commercialized version of housing utopia?

64 Block, I. (2017). “Mikhail Riches unveils plans for phase two of Park Hill estate regeneration.” from <https://www.dezeen.com/2017/09/27/park-hill-estate-sheffield-phase-2-renovation-urban-splash-mikhail-riches-uk/>.

65 Elmer, S. (2017). “Sheffield Tent City and the Social Cleansing of Park Hill Estate.” Case Studies in Estate Regeneration. 2017, from <https://architectsfor-social-housing.wordpress.com/2017/01/30/sheffield-tent-city-and-the-social-cleansing-of-park-hill-estate/>.

Discussion.

Transformation process and resilience of housing estates.

Studying contemporary examples of housing transformation, selected by the author because of its significance and impact on general perception of outdated and problematic housing structures, it can be observed that relation between clearly defined problem and specific, related solution becomes the driving force of the projects. To give an example, an economic calculation comparing costs of demolishing and rebuilding to the cost of major transformation of the existing housing building can be observed as a repetitive, major factor starting the discussion and later, driving the successful housing transformation

project. Lacaton&Vassal office's "PLUS" strategy" takes mentioned calculation as a starting point for the project, justifying included in the transformation design, exceptionally extensive change in the building's appearance, organisation of circulation and quality of the dwellings. In other selected case studies, namely Dutch examples of Wallisblok and Kleiburg, the low quality of living in the buildings combined with high scale of the local problems prior to the transformation led to the situation where some of the surrounding buildings in the projects' areas have been already demolished. Since this paper (followed by the academic project) seeks to define benefits gained from successful operation of re-using large-scale housing estates (rather than demolition), example of Park Hill estate's renovation stands out in the comparison to the demolition of similar, massive residential estate built in the 1960s in UK: Robin Hood Gardens, designed by Alison and Peter Smithsons.⁶⁶

Demolition as a tool for designers and urban planners have without doubt power of "starting from scratch", where previous building is crossed out and new one can arise, breaking link to the previous perception of the site. Demolition as a symbolic condemnation of built architecture was famously commented by architecture critic Charles Jencks: "Modern architecture died in St. Louis, Missouri on July 15, 1972, at 3.32 pm.", where at this date, just

⁶⁶ Mairs, J. (2017). "Bulldozers move in on Robin Hood Gardens." *dezeen*.

67 Fiederer, L. (2017). "AD Classics: Pruitt-Igoe Housing Project / Minoru Yamasaki." 2018, from <https://www.archdaily.com/870685/ad-classics-pruitt-igoe-housing-project-minoru-yamasaki-st-louis-usa-modernism>.

two decades after completion, housing complex of Pruitt-Igoe by Minoru Yamasaki was demolished.⁶⁷ This practice, of demolition as condemnation of problematic architecture is continued up to this day.

Mechanism of threat prompting urgently needed change is hard to observe in the analysed housing complex of Ommoord, Rotterdam. On the contrary, slow and gradual improvement over the years, built upon open and consistent urban plan by Lotte Stam-Beese, represents qualities of a resilient neighbourhood. In the recent years neighbourhood has been densified around the central nodes of communication (metro stops), growing in size to cater small open-air shopping centres, other local amenities and recently built residential towers. Data about Ommoord, from municipality of Rotterdam shows a slow decline of population, related to the fact of elderly society living in the area (majority of early owners from the time of creation of the estate), but at the same time shows that dwellers are satisfied with their apartments. Process of integration of the new inhabitants in gradual and problems noted from the interviews with the dwellers, related to this issue are rare. In the recent years, the population rose by 3.2% (between 1 January 2011 and 1 January 2017). For Prince Alexander and the whole city of Rotterdam, these percentages respectively a growth of 2.4% and a growth of 3.9%. Comparing to Prins Alexander

(district where Ommoord housing complex is situated), Ommoord is a more popular place to live, but behind districts like Centrum (+12,4%) or another northern housing district, Overschie (+10,5%). Accordingly to the *wijkprofiel*, Ommoord has several active residents' groups, such as the Heidebes, the Opzoomerme-groups and residents' groups of the Residents' Association Ommoord (BOO), which represents interests of the communities in the district.

Description of the current status of the estate, obtained from *wijkprofiel* (portal with urban data of Rotterdam) characterizing "quiet residential area with lots of greenery" stays in contrast to presented case studies, therefore highlights lack of demand for major housing-transformation project.



Other ERA Buildings in Europe.

Ommoord, with its experimental housing structure system, built a way for van Estereen company to realize more, industrial-scale housing projects. Ommoord was the first, and the biggest, large scale implementation of the ERA system, which later was used to develop 11.000 dwellings in 7 cities in the Netherlands (Rotterdam, Zaandam, Delft, Capelle a.d. IJssel, Zoetermeer, Velsen, Zwijndrecht) and in one international project in Emden, Germany [Figure 42].^{68, 69} Multiple use of the same casting set of elements was profitable to the ERA company, therefore justifying amount of resources spent for the innovation and creation of the building system. ERA company used the system mainly to build housing structures for social renting purposes (it guaranteed governmental subsidies for the projects) but an excep-

Figure 54 ERA-system realisations in the Netherlands up to 1968 where publication by H. Priemus was published. Black dots represent 100 dwellings.

tional case in Poelenburg shows that structure can be used also in another business model (private initiative of the Zaandam non-governmental business). High-rise estates appeared in Zaandam in the late sixties with the fourteen-storey gallery flats in districts such as Peldersveld, Brandaris, Pharus, Perim, North Wachter and IJdoorn. In recent years, these apartment blocks have been renovated in a variety of ways.

In Delft, at the remote part of the district, Buitenhof-Noord, next to the open area of Kerkpolder, four ERA structures were built as parallel blocks in 1969. After successful, carefully planned realization of ERA blocks in Ommoord, massive, 15-story high blocks built in the nearby city of Delft represented at its creation rather high structural performance of the building system and efficiency of the building's company than values achieved in the "area of national importance" of Ommoord. In general, high-rise estate of Buitenhof can be called "textbook example of sweeping modernist urban planning", which development was stopped around 1970s.⁷⁰

Accordingly to the 2017 population data from municipality of Delft, Buitenhof has the highest number of inhabitants, 13.775 (13,5% of

68 R.S.F.J. van Elk and H. Priemus and R.-I. v. d. Woningbouw (1971). *Niet-traditionele woningbouwmethoden in Nederland*, Samsom.

69 Presentation on ERA housing system by ERA-contour company on 15.09.2016

70 Reinout Rutte, H. o. A. a. U. P. (2016). *History of Delft. 17th IPHS Conference, Delft 2016.*

71 Gemeentelijke Monitor Sociaal Domein. "Wijkprofiel Delft." 2018, from https://www.waarstaatjegemeente.nl/Jive/JiveReportContents.ashx?report=gmsd_wijkprofiel&input_geo=gemeente_503.

72 Wijkzaken, V. (2010). "Wijkbarometer 2009 Buitenhof." Gemeente Delft.

total population), with high percentage of western and non-western immigrants (11% and 33%). Social problems within the district can be observed through the data showing high amount of people with social assistance benefits (27% of total Delft's number) and youth under child protection (20% of total Delft's number).⁷¹ More problems are highlighted in the municipality studies.⁷²

Transformation of this initially middle-class neighborhood into problematic in terms of socio-economic conflict zone with bad publicity can be linked to lack of urban and architectural quality of the built environment. Zooming into the ERA-blocks, it can be noted that urban composition of 4 blocks in a row stays in contrast to varied urban pattern of Ommoord, or even bended block of Kleiburg. Alienated at the end of the district, with distinctive borders around (large hospital complex to the north, sport centre on the polder to the west and canals bordering from the suburban low-density housing on the south), these blocks, lacking quality in the urban (site) layer are in need for intervention, which should aim to re-connect them back to the city.

Figure 55 Buitenhof (nr 25) and the other districts of Delft
source: https://www.waarstaatjegemeente.nl/Jive/JiveReportContents.aspx?report=gmsd_wijkprofiel&input_geo=gemeente_503

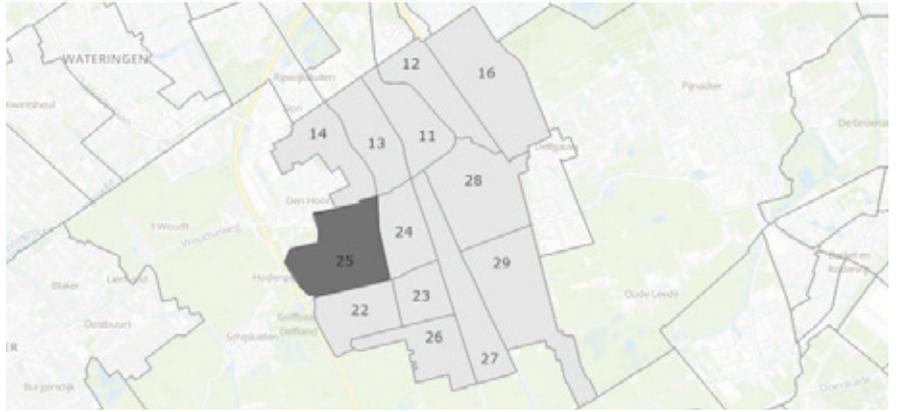


Figure 56 Site of ERA housing in Delft, Buitenhof-Noord with its borders.



bourhood, centres with shopping streets, public squares, cultural, educational and sport facilities arouse. Densification around the nodes brought also more housing units like recently built residential towers.

59. Quiet backs. Quality of urban plan composed from „clusters”, enclosing more private, accessible green park-like areas has been preserved. Presence of canals adds up to the quality of this space.

60. Accessible green. Emerging from the urban plan, most of the blocks overlook park-like areas from their balconies. Network of bike and pedestrian paths provides additional connectivity for the rest of the dwellers.

2A: Kleiburg – intervention in urban scale. “Empowering the whole” strategy aims to make the building connected to the nearby areas, while retaining its original qualities. Pattern observed:

53. Main gateways. By enlarging passages and changing function in the ground floor (introduction of two level-high commercial plinth), perception of the block is changed. It is no longer a massive, impassable barrier, but rather a gate connecting neighbourhood.

3A: Bois-Le-Prêtre Tower Block. Complete re-development of the entrance, unifying level of entrance lobby with the parking lot and backyard garden connects back the building to the neighbourhood. Shaded space under added façade creates terrace in front of the building. Quality described in the pattern is observed:

112. Entrance transition. Instead of contrasting border between the main street and entrance stairs (previous position of the entrance was on the other side of the building), after the transformation entrance is reached after transition between series of communal spaces.

4A: Wallisblok. Despite change in the courtyard’s façade, quality of inner garden is preserved and strengthened by new architecture. Patterns observed:

111. Half-hidden garden. Connected to the quality of “House clusters (37)”, this pattern describes balance

between privacy and connection to the other dwellers, which ideally describes courtyard in the Wallisblok with its soft boundaries created by vegetation. Pattern is connected to “General process of “Site repair (104)”, which is also the case in Wallisblok.⁷³

115. Courtyards which live. Accessible only to the dwellers, courtyard in Wallisblok is place for communal activity like picnic or urban farming. Ease of access from the ground floor of dwellings and visual connection from roof terraces makes it a balanced, healthy space.

5A: Klarenstraat. Quiet, courtyard-oriented gardens are extension of apartments in the Amsterdam’s project. Same pattern of “111. Half-hidden garden” is observed, with its accessibility restricted from the main street.

B. Communal space and circulation within the building.

1B: Ommoord/Buitenhof. Quality of circulation space: entrance and gallery, defined by ERA-system in both locations is questionable. In 9-story high “klikflats” (bended gallery blocks) in Ommoord, due to the smaller scale of the building and therefore lower number of inhabitants per entrance, problem of dehumanized, repetitive row of entrances is somehow “softened” by the dwellers who tend to equip their entrances with flowers and other decorations. However, in bigger, 196-apartment blocks in Buitenhof, this practice practically does not occur.

2B: Kleiburg. “Catalogue of facades”

Conclusions

Comparison of qualities emerged from transformation of the case studies.

Comparison chart, naming qualities gained after transformation (or in case of Ommoord – obtained from gradual improvement). Comparison to “Pattern Language” is made – highlighting connection to human-scale design, which in general stays in contrast to original spirit behind industrially developed housing.⁷³

A. Public space: accessible to all dwellers.

1A: Ommoord in urban scale: gradual development over the years managed to steadily improve quality of life in the neighbourhood. 3 patterns can be distinguished:

30. Activity nodes. Around metro stops, in the 2 points of the neigh-

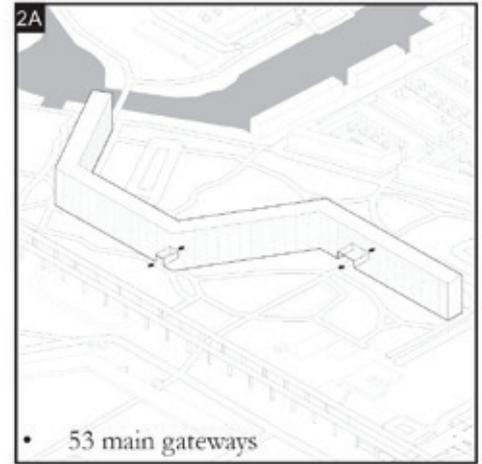
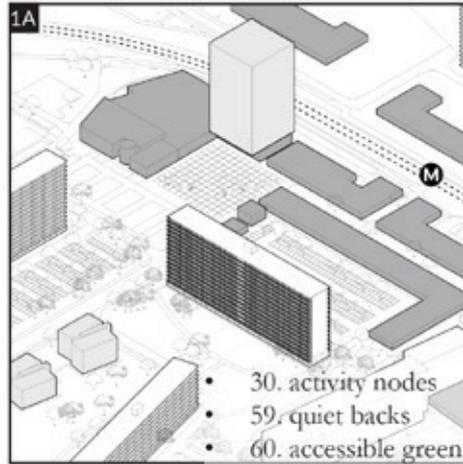
⁷³ Alexander, C., et al. (1977). A Pattern Language: Towns, Buildings, Construction, OUP USA.

Comparison of qualities after housing transformation.

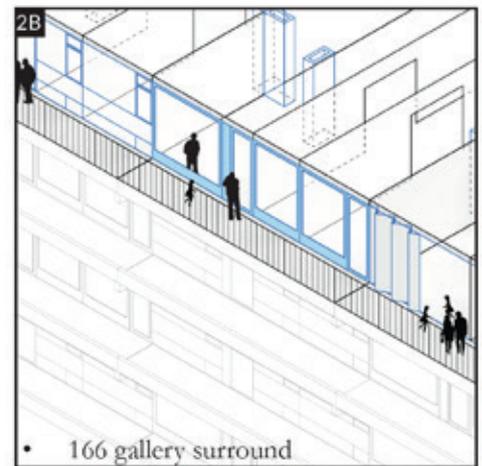
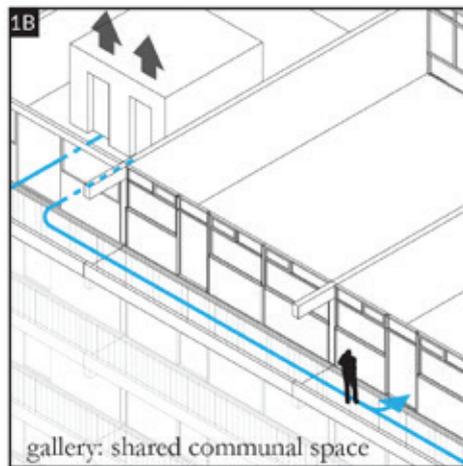
Ommoord, Rotterdam
& Buitenhof, Delft

Kleiburg, Amsterdam

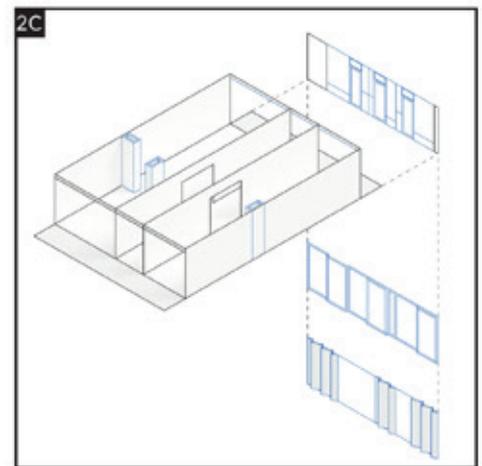
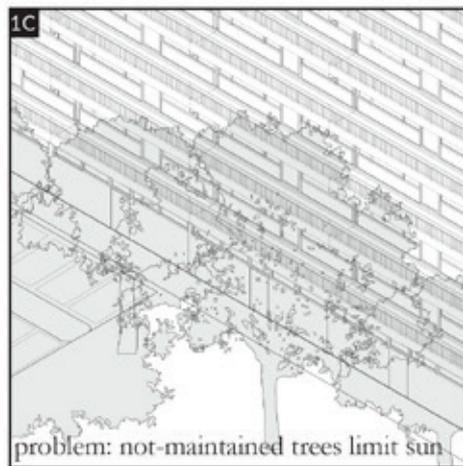
Public, accessible to all dwellers



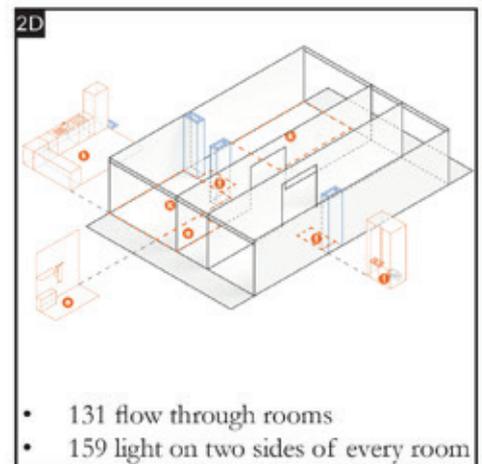
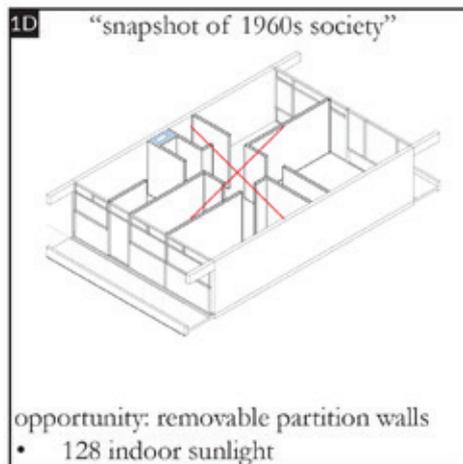
Community space & circulation

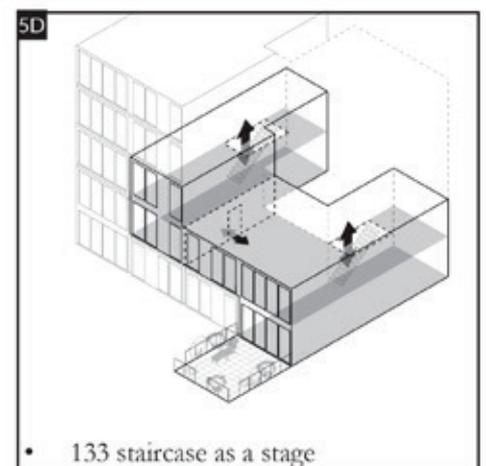
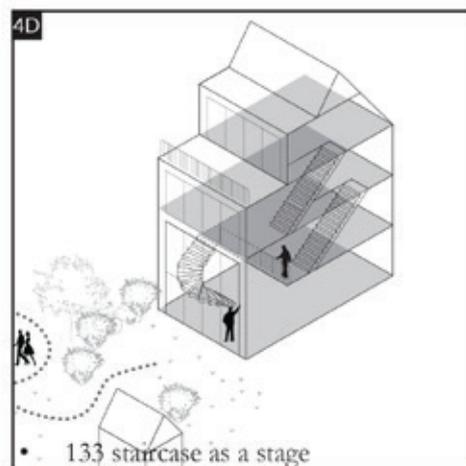
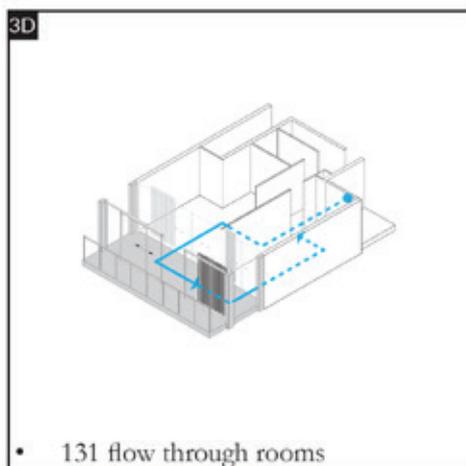
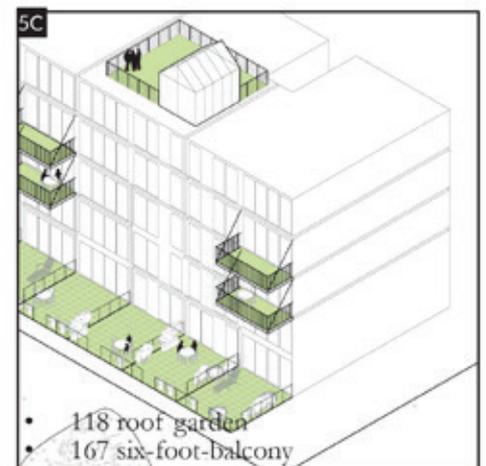
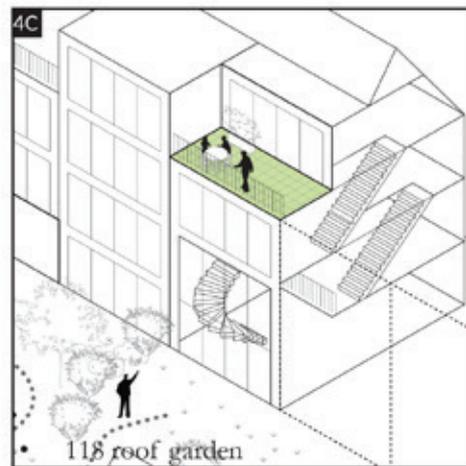
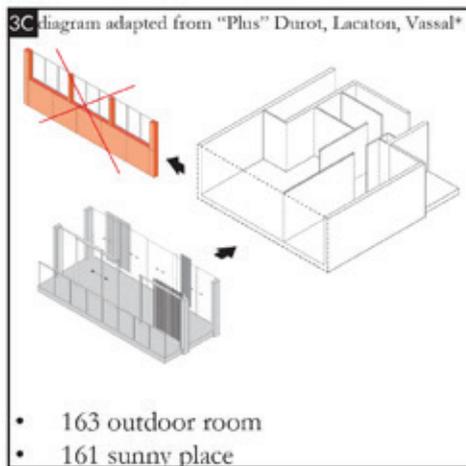
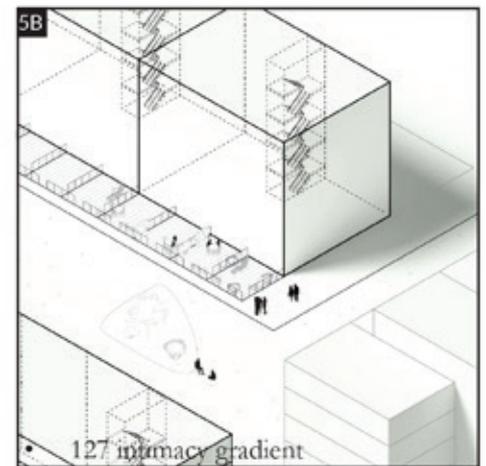
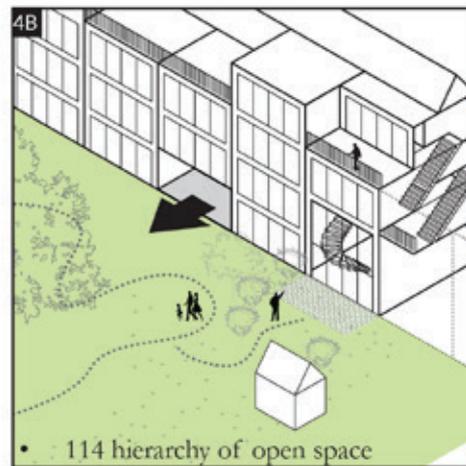
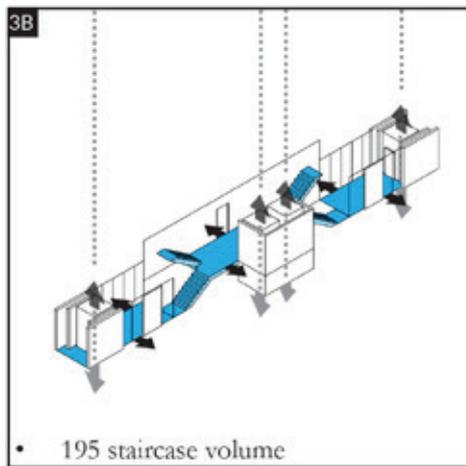
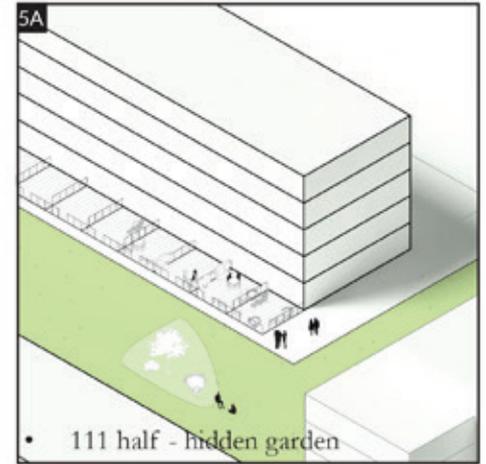
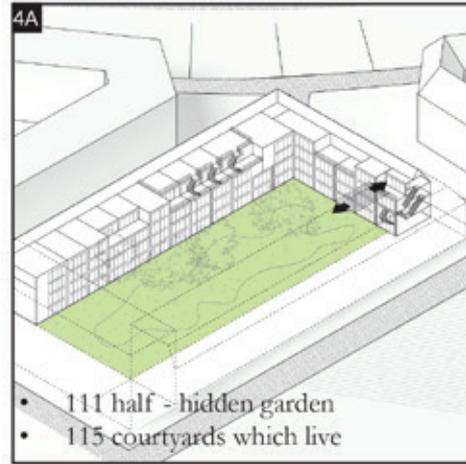
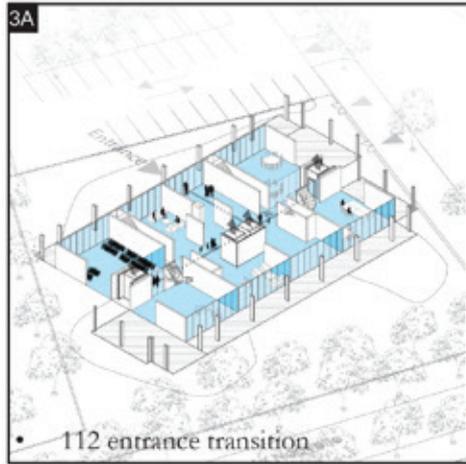


Semi-private balcony space



Custom dwelling - private domain





proposed by architects, combined with interactive, proximity activated gallery lighting breaks the monotony and help dwellers to identify with their building.

166 gallery surrounding. Alexander describing “space which people who are outside the building can use to help them intimately connected with the building” refers to more traditional galleries or arcades, but in case of Kleiburg transformation dwellers are encouraged to express their housing needs also on the exterior of the apartments in a similar matter – connecting them to the building.

3B: Bois-Le-Prêtre Tower Block. Introducing two additional elevators, architects improved circulation within the block. Described in the pattern volume needed for additional circulation is in this case consequence of transformation strategy:

195 staircase volume. Volume needed to add elevators and additional landing space is gained following the “plus” strategy, expanding the dwellings with new façade.

4B: Wallisblok. Enclosed and refurbished courtyard is connected to the street outside by multi-level dwelling. Interesting pattern of chained open spaces can be observed:

114 hierarchy of open space. Courtyard’s open space and its relation to smaller terrace space, then connected to open space of multi-level dwelling, connected by main entrance to the street is a good example of chain of spaces in different hierarchy.

5B: Klarenstraat. Preserving original circulation which defines the dwelling typology of “portiekflat”, a small, accessible from the street staircase groups after transformation 5-7 dwellings. This proportion, combined with multi-level dwelling provides good gradient of intimacy described in the pattern:

127 intimacy gradient. “people need a gradient of settings, which have different degrees of intimacy”.⁷³

C. Semi-private balcony space

1C: Ommoord/Buitenhof. Quality of “garden to look at” from balcony vary between two projects. In Buitenhof, on the lower levels, approximately from 1st to 5th floor, daylight is restricted by unmaintained vegetation.

2C: Kleiburg. Catalogue of facades continue to improve identity within the block. It can be loosely connected to the pattern 161 – sunny place.

3C: Bois-Le-Prêtre Tower Block. Addition of external, separated from load-bearing structure of the existing building, not defined room is a guiding theme of “plus” strategy. It equips dwelling with new quality, matching two patterns:

161 sunny place – “special sunny place – (...) important outdoor room, a place to work in the sun, or a place for a swing and some special plants, a place to sunbathe”.⁵¹ All of these scenarios are envisioned in the “villa quality” approach to provide not-defined, openable and transparent outdoor room.

163 outdoor room. This pattern is a part of the one described above.

4C: Wallisblok. Spacious roof garden as a part of façade applied in the transformation process is connected only to the larger dwellings, as an extension of the top floor. This approach is described in the flowing pattern:

118 roof garden. Alexander, referring to “sheltering roof (117)”, which is also visible in Wallisblok, describes roof garden as a consequence of “roof system”, which in certain points

is flat to provide roof garden.

5C: Klarenstraat. Designing customizable apartments, which size vary depending on number of connected “blocks”, architects envision outdoor spaces connected to them. Described previously hidden garden is accompanied with two spaces described in patterns:

118 roof garden. In Klarenstraat accessible via built into the apartment internal staircase.

167 six-foot-balcony. Large balcony which is attached to the façade, allowing removal/addition in the future. Alexander refers to large balcony as those narrower than approx. 180 cm “are hardly ever used”.

D. Custom dwelling - private domain

1D: Ommoord/Buitenhof. ERA-system, providing gallery slab blocks makes all apartments equally facing opposite directions, which is most visible in Buitenhof, where all dwellings face east-to the gallery side and west-to the balcony. Potentially removable partition walls allow dwellings to create rooms with windows facing both sides, however this opportunity has not been observed in visited apartments.

128 indoor sunlight. In both cases, right orientation, allowing living room and balcony to face south or west adds to the quality of living in the ERA-flats.

2D: Kleiburg. Architect’s decision to clear out the flats from pre-defined layouts of partition walls from the time of building creation open new possibilities for creation of the custom dwelling. Two patterns emerge from this decision:

131 flow through rooms. Described by Alexander advise to “use public rooms and common rooms as rooms for movement and for gathering” is further

described by B. Leupen as “polyvalent dwelling”.⁷⁴ This important notion, where rooms are accessible from the space which use limited not only to the function of “corridor” opens new possibilities, which match current, not-standard and changing trends in housing architecture.

159 light on two sides of every room. In Kleiburg example, by removing partition walls, space next to the service shaft spans from one façade to the other, making it possible to introduce an open space for cooking-gathering and relaxation, with light passing from both sides. Strategy can be implemented for various other activities.

3D: Bois-Le-Prêtre Tower Block. Addition of empty room to each dwelling creates a new space for social interaction: polyvalent space, which can be used as alternative route for accessing the other rooms. Introduced for a small T2 dwelling it almost double the initial space where for bigger layouts its quality as a transition space rises higher. It matches described above:

131 flow through rooms

4D: Wallisblok. In multi-level dwelling transition between levels create not only gradient of privacy but also unique space next to the open staircase. With open double-height space, it provides new level of interaction.

133 staircase as a stage. “Place the main stair in a key position, central and visible. Treat the whole staircase as a room”.⁵³

5D: Klarenstraat. Custom multi-level dwelling, composed in the participatory design with the future dweller, uses internal staircases as a part of the apartment, duplicating therefore the collective staircase. In this case, staircases are individual, highlighting the custom idea behind each dwelling.

133 staircase as a stage.

73 Alexander, C., et al. (1977). *A Pattern Language: Towns, Buildings, Construction*, OUP USA.

74 Bernard Leupen, H. M. (2011). *Housing Design A Manual*, NAI Publishers.

Housing transformation as research-based practise.

Thorough investigation in the buildings in question (like presented buildings, threatened by demolition) reveal misunderstood qualities and opportunities originating from the original design. Accordingly to C. Alexander, patterns (global, referring to community) “can never be “de-designed” or built” in one fell swoop”, therefore process of transformation, as based on the existing, justify the “never demolish” doctrine.⁷⁵ Principles behind ambitious works and experiments of architects who were trying to bring back the balance of power between the architect and the user in form of participatory driven design (i.e Lucien Kroll’s La Maison Médicale and more recently Alexandro Aravena’s Half a house projects) can be now applied in a different field: not only for creation of the built environment but rather in

process of housing transformation, where users, led by an architect can re-adjust the building to themselves. To justify this statement, parallel connection between Kroll’s “student-designed spaces and furniture” and empty Kleiburg’s apartment can be made. Aravena’s bare, unfinished “half of a social housing unit” in Chile shares the same principle as light and transparent “plus” space of Lacaton&Vassal’s housing tower – provides extending above required minimum, non-defined space for dwellers needs. Transformation architect, understanding all layers of the building as well as social context of the neighbourhood can lead a process of subtraction (of outdated elements of the design) and addition of new qualities. Housing transformation is therefore a process of addition of new, missing and desired qualities to the housing complex.

Under these circumstances, presence of the outdated and problematic building (and its dwellers) is not an obstacle but rather an opportunity, point of departure, setting foundation for the future design. In this context, research-based design can reveal surprising opportunities. “Snapshot” of the society from a half century ago, with its sameness, embracing efficient industrial multiplication of “standard modules” for standard family units, casted in brutal form of a massive, concrete block of Kleiburg can arouse the aversion of architects, but after closer look its transformation might

75 Alexander, C., et al. (1977). *A Pattern Language: Towns, Buildings, Construction*, OUP USA.

bring unexceptional quality. End result of Kleiburg's project: customizable, empty apartments ready for the future dwellers, placed in unique housing block display radical change in the perception of the block, while its preserved appearance still carries heritage value of the original design. Rediscovery of the initial qualities (in this case polyvalent plan, cleaned from the last century's clutter of gypsum walls and enriched by optional openings in the load-bearing walls and slabs), highlighted in the final design and sold as an exceptional quality for the contemporary, not defined needs of the new coming dwellers shows understanding of both influence of structuralism doctrine in the initial design of the structure as well as conclusions from not limited, freeform experiments of participatory design. Separation of "supports and infills", distinguished by J. Habraken and SAR, which influence can be observed in the open plans of industrially developed housing structures like those built under tunnel-construction system can be positively evaluated for future use and potential for transformation. Changing perception of the housing blocks, with projects like Kleiburg recognized by Mies van de Rohe award in 2017, shows emerging trend, offering alternatives to the ongoing housing crisis in the European cities.

Transformation, even targeted for low-income users like social housing Tour Bois-le-Prêtre, surpasses

in terms of spatial quality newly formed housing. Notion of polyvalence in dwelling, can be found in each of the projects, in various forms. However, example of Tour Bois-le-Prêtre with its equally added "framework" for new qualities can be a prime example of change from pre-defined layout of dwelling into open and polyvalent space plan. Described by B. Leupen as "number of possible arrangements or combinations of activities it permits" and possibility to "accommodate different living patterns", "plus" space added in this project present innovative approach to the existing housing structures.⁷⁶ Quality of not-defined, multipurpose space, changing the meaning depending on the circumstances and unique to each dweller's needs is juxtaposed with the physical presence of original structure, reminding of the former, now reinterpreted function. Contrast between new and old seems to strengthen the individuality and defines the identity pursued by the dwellers and set them apart from the original quality represented by the building prior to the transformation.

This principle extends beyond the boundary of private zone of a dwelling unit. In Kleiburg, user-driven design of façade can be observed from the communal space of the gallery. Therefore, monotonous rigidity is broken. Custom, adjusted layout of the dwelling, composed from modules reflects on the Klarenstraat and Wallisblok projects' façade and

roof. Positive evaluation connected with satisfaction of the dwellers of existing or transformed housing structure affects further decisions in the urban scale and long-term planning for municipality strategies: realised early can point housing estate such as Ommoord into direction of long-term resilient district, or like in case of Wallisblok, catalyse changes within the district without drastic change proposed by demolition. Transformation can be perceived as a statement, with strength comparable to the act of demolition. However, in contrary to erasing the past structure, transformed building incorporates evaluated in the design process parts of the initial design, saving environmental (energy embodied in the existing structure) and economical costs.

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Re-structured.

A position on the transformation of
structuralism-influenced,
mass housing blocks.

Jan Ksiazek.

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