Resource strategies - discussions on remodelling modernistic housing and related social impacts

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Abstract. A growing tendency to remodel social housing areas can actually be recognized in the Nordic countries. The paper analyses a case where a vulnerable modernistic housing area is remodelled based on social arguments. Through findings it is discussed how more responsible circular strategies can save the inhabitants and the environment from ‘wasting’ already valuable welfare and already existing spatial structures and materials. The starting point is taken in the actual transformation of Gellerup, a New Town area built from 1968 to 1972 in Aarhus. A dramatic demolition has already taken place to avoid social disorder. This was done to provide room for rethinking, for changes in demography and for mixed ownership, and thereby solve several social problems. The process is under development, but already before this remodelling has finished and will perhaps fulfil its purpose, the government and the city council have predicted further demolishment. The tenants are increasingly reacting to this development, which erases their homes and the history of Gellerup. The loss of the areas memories and the fact that they feel they are not involved in decisions regarding their area worry them.

1. Background
The UN Sustainable Goals for 2030 serves in this paper as a basic understanding to discuss sustainable cities and communities, sustainable consumption and good wellbeing which are formulated within the seventeen main goals [1]. The paper deals especially with the coherence between the themes of a clean planet and happy people in shared prosperity [2]. The possibilities for emerging concepts for a Sustainable Built Environment are here displayed at a scale of a neighbourhood in the case of a local transformation of a modernistic city. However, the intention is to draw some general recommendations regarding future transformation projects.

1.1 Intentional architectural influence on the Danish welfare suburb
During the years after WWII the development of the welfare society accelerated a special humane interpretation that was developed in the Nordic countries. The political and economic foundations for this development were initiated by the Social Democrat’ politicians in Denmark [3]. At the time there was an urgent needs for housing for the mid and low income population. This development was organized and handled by non-profit and public/private housing associations. The planning and development was carried out in cooperation with municipalities and was developed all over Denmark within a set of governmental restrictions.
A large increase in the number of homes was designed based on the ideas of New Towns [4], where inspiration from Europe such as the CIAM [5], especially the architect le Corbusier [6] was predominant. A large increase in new and modern housing blocks in relatively large settlements was seen in Denmark. This development was influenced by the Garden City Movement [7], ideas of separating different traffic elements followed the Radburn traffic system [8] - and the planning and building ideas of le Corb’s ‘Towards a new Architecture’ [9]. In Danish Architecture the setup of modern ideas met local humble design attitudes and tradition, and the influence was moderated [10].

From 1965 until 1973 building construction developed from craftsmanship into industrial concrete panel production, which, combined with montage on site, were the most common ways of constructing a large number of housing estates in the surroundings of the existing cities.

1.2 Translation of international ideas to The Gellerup Park
West of Aarhus City, in the suburb of Brabrand an outstanding and modernistic housing estate was designed at the office of the architect Knud Blach Petersen [11] and was named The Gellerup Park [12]. The planning of this New Town [4] stipulated 7,000 inhabitants, and both the planning and the architecture were heavily influenced by the modernist’s ideas. Part of the planning principles of that time was the segregation of working places and living places. The public spirit was characterised by social ideas, collective thinking and strong beliefs in development, trust and welfare.

The plan offered a huge park surrounded by housing for all kinds of families, to provide spaces and flats designed according to Danish ideas and culture and to add more functionality. A physical framework for living a whole lifespan in the estate was established: it should be possible for the elderly to live within the community, children should have easy access to kindergartens and public school, and everybody had easy access to theatres, a church and even a glass-covered swimming pool - together with modern conference facilities and library. All these programmes were built in the park. The traffic was divided according to the differentiated system to secure safe movement between the recreational areas, institutions and housing blocks without crossing car lanes [12].

The realization of the plan went well; the sizes of the flats were diverse, ranging from one room flats to five room flats. All flats had the modern transition to green recreational areas around the blocks, as large windows draw the inside to the outside and the daylight and the view to the inside. All flats were designed based on thorough functional studies: the organisation of the spaces was outstanding for the time. The housing blocks were built at a high rate of industrial speed, and the flats could easily be rented by working and middleclass people. The tenants were people from the surroundings, both people from Brabrand and from the inner, dense city structure.

1.3 The Welfare City’s development
Another new movement of the Welfare City became popular at this time: detached houses in larger settlements in the suburb. These houses were partly economically subsidised by State loans. The detached houses were affordable for the middle class and even for some working class families; at the same period the wealth of families increased, as many women joined the labour market.

In the lay-out of the plan several welfare issues are recognised: new living possibilities, growing economy, internal competition between renting a flat and owning a detached house, and not least, that the activities in the overall society were so optimistic that the Danish production facilities invited people from abroad to work in production. This conjuncture of circumstances led to a situation where the Gellerup housing blocks were not as attractive as expected. And the municipality decided to use its rights to assign flats to the new working class, which in this case were people from abroad. A Turkish migration to Gellerup followed at the end of 70s. Later came the Vietnamese refugees, and in the 80s the Palestinians [13]. Besides this migration flats were also attractive to many Danish students, who found the large five room flats affordable for collective living. In the 90s new migrants from Somalia arrived [13]. At this time the first migrants to have arrived were slowly moving out of Gellerup, as their relation to the Danish society and their financial situation improved; they also wanted to live in detached houses in the sprawl.
1.4 **Gellerup today**
The population in Gellerup is diverse, 80% are of other ethnic origins than Danish, and majorities are well integrated in the Danish society. However, Gellerup is a multi-ethnic settlement where many cultures live together. This mix of people have sometimes created internal problems in Gellerup, but in a united effort the housing association, people living there, the police and public associations have created an optimistic atmosphere for working together to shape a calm and welcoming humane climate in all of the area. Nielsen describes Gellerup as a stepping stone to Danish society [13]; the recognition that everybody is migrants in the Arrival City [14]. In Gellerup one can meet people who cannot use a smartphone because of illiteracy, you can meet educated people, and migrants who have lived there their whole lives and have children. The majority seems to be loyal to the area. 38% of the population is children under 18 years old; others have not worked since they came to Denmark thirty years ago and do not speak proper Danish. Others have only just arrived and have not frequented schools for education yet. 20% of the population in Gellerup is of Danish origin [15], and many of them leave during daytime for work and studies.

Gellerup is described by the government as a socially disadvantaged housing estate and is included in the governments list of hard ghettoes [16]. After many efforts to normalise these problems, it was decided to remodel the area in order to change the demography and the composition of the inhabitants. The housing organisation and Aarhus Municipality have worked together on this remodeling, and they have chosen to embrace the theories for eliminating social disorder and provide better living conditions described in the Helhedsplanen [17]. The plan comprises in two sets of plans: the housing social plan, which involves strong interaction in order to raise the level of education, employment and integration of women into the working marked. The physical plan aims to eliminate social disorder by using the instruments of tearing down and rebuilding new structures.

1.5 **The state of the transformation**
The actual transformation is in a midway stage: five blocks have been demolished, new buildings containing the municipality’s technical department, the housing association; an entrepreneurial hub, a parking house etc. are under construction. An ambitious landscape transformation has been established in the middle of the estate, and two housing blocks are under renovation in order to meet the requirements for energy efficiency, building technical demands and architectural quality. A housing social plan is being implemented parallel to this physical change; new offices take care of the education of grownup migrants in order to promote language skills and cultural understanding, and unemployed tenants are educated to be interns for later employment, etc..

Furthermore, the municipality and the housing association are developing new plans for a further transformation and for reducing the share of rented flats to 40% of the total inhabitants [18]. Seemingly this looks like it will result in further demolitions, new housing forms and new ownerships.

1.6 **The research questions**
The focus of the research is: what is the outcome of tearing down and adding new structures to Gellerup in relation to the social impacts? It is to look for circularity in the actual transformation process and to be aware of the tenants’ feelings and meanings. As the process is at a halfway stage, it is possible to draw attention to the ambivalent wonderings of the tenants. It will be investigated whether there are aspects of the transformation that have been forgotten and could be taken into consideration in the future.

2 **Methodologies**
The methodologies used intend to draw overall attention to the different developments through the Gellerup’s life span, to pick up some interesting mid-term investigations and develop a humanistic discussion.

Retrospective studies of architectural history are recalled and inspiration is found in the architecture of the early modernistic movement. Material from the early modernism is examined;
Danish architectural history and thoughts on influences from this period combined with the remodelling of the actual buildings are noticed.

Literature of modern technology from the industrial period, especially relating to the case of Gellerup, is retrieved. The methodologies which are used are literature studies and interviews with people who were involved in the original design and construction of Gellerup.

An investigation of the local housing association Brabrand Boligforening’s intentional material for Helhedsplanen is carried out. Material from newspapers and the internet media is followed during the planning and remodelling period.

Interviews of tenants are performed. The interaction between the housing association, the municipality, the consultants and users are referred in refereed publications; especially the view points on tenant’s homes are supplemented with references to interviews done by another researcher in anthropology.

Reviews of scientific sources are visited in regard to the environmental impact of transformation sites, reuse of space and energy consumption when buildings are demolished. The material has added scientific knowledge to the subject.

3 Learnings from Gellerup

Three aspects related to the remodelling of Gellerup are highlighted and their implications on social impact and memory of space are noticed: environmental learnings from demolition, architectural inheritance learning and the importance of smooth communication.

3.1 Environmental learnings

The transformation’s design tools create possibilities of erasing physical structures in the form of buildings and landscapes, and in combination with new buildings, of adding changes to the overall impression of The Gellerup Park. The learnings will illustrate circularity from a position partly through the actual ongoing process. These learnings are supplemented by some tenant’s comments and feelings, which are translated to social impacts.

The physical transformation started by relocating the tenants to other flats in either Gellerup or in other social housing associations nearby.

In 2014 the five blocks were vacated and the demolishers started a cleaning process: facades, cabinets and toxic substances were removed (Fig. 1); the concrete structures were torn down and crushed into gravel (Fig. 2) to be recycled as material for use under new roads. After cleaning the site a new architecture with other programs replaced the old housing blocks (Fig. 3) and a new park was established with many thorough ideas imbedded in the design.

The two transformation strategies lead to huge investments; the environmental account is not figured out here, but it is obvious that both investments and the consumed efforts, economy and energy by demolition are enormous, not to forget environmental investments in new programs for the rebuilt compound of private owned housing, rentiers housing and office and business offices. The strategies create a mixed functionality in the city. At the same time some existing building structures are lost, well-functioning flats are erased and enormous amount of materials are lost, resulting in a great waste of energy, in order to prepare new building sites at the area. Not to mention noise and dust. In Denmark two million tons of concrete waste is produced every year on average, which corresponds to 25 % of the total waste from building sites [19]. From a circular viewpoint a great deal of this waste could have been turned into resources in new buildings, if wisely reflected.

It is a key instrument in Helhedsplanen that social dysfunctionality can be changed by physical interventions [20], which are illustrated by relocating tenants in other parts of the city. But the social problems will then naturally also be relocated at the risk of introducing the dysfunctionalities to other areas. The State Building Institute has recently reported that evidence shows that large scale demolition and forced rehousing aboard just move the problems [21]. This fact is off course not circular, and cannot be a solution to follow.
Figure 1: From demolition starting phase  
Photo: Ryolf

Figure 2: Concrete turned to gravel  
Photo: Ryolf

Figure 3: Blocks under remodelling. Photo: Vestergaard
The overall impressions from inhabitants living in Gellerup, some of them even working here, are expressed by Bach and are supplemented through interviews taken for this paper. Bach refers the tenants’ feelings for the transformation [22]; these feelings are also described in recent interviews taken by authors. Some of the tenants express that they can no longer recognize their settlement; they cannot find the qualities which were connected to their earlier period of living in Gellerup. One tenant cannot find the places as he knew before, which means that he is not walking outside any more, he cannot recognize his Gellerup now. It is a common feeling that places are gone and nobody cares about cleaning around the blocks and the area as such.

A huge amount of tenants have very strong family relations. These tenants are complaining about the risk being relocated, which threatens the family pattern.

Another example of environmental loss is that Gellerup for almost 50 years had trees and thickets which had growth power. These were erased as a starting point of the transformation; this was done to provide good views and proper lines of sight in all parts of the landscape. The trees created wind barriers and spatial qualities as a path across the park. The row of trees was telling a specific story of how to cross through the landscape from one end of Gellerup to the other. Nobody thought of the importance these plants had for the narrative of Gellerup.

Also self-grown gardens between the blocks are either erased or in danger of being erased. This worries the tenants and destroys initiatives and ownerships to something of great value, although these initiatives are unplanned activities.

As a concluding learning, it is of great importance in order to create ownership of the transformation to pay attention to memory in architecture, retaining the local narratives and places to create identity and emotional feelings and a sense of belonging to the area.

3.2 The inheritance of modernistic architecture

Gellerup is originally one of the most ambitious projects from the birth of the Danish Welfare Society. The period represents the largest building epoch in Danish history. This period deserves to be treated as architectural heritage, and, at least, the most important neighbourhood deserve to be handled as such. It is of great architectural value, that one can retrieve this narrative in the city environment, and in all terms imagine how the society was enlarged after the two wars in the 20th century.

![Figure 4: The repetitive façade in the park - before demolition](Photo: Vestergaard)
The values of Gellerup are multiple and also have a history which is expressed from 1972 until today; here is a whole city of housing with all common facilities represented in the surroundings of a great park. The parks values where great, now a huge and planned park has replaced the old park but there could still be remains from the original park, which should be retained; an example that is mentioned is the responsibility taken by the tenants to rearrange an area of urban gardening between two blocks. The places of memory referring to the tenants and are at risk of disappearing; it is important to keep this value for the future. Another case was a row of 50-year-old trees. Other areas of great value could be retained wild and untouched.

Huge potentials and values are imbedded in keeping and restoring the buildings; they all have excellent aesthetic and physical qualities, they have spatial qualities and are made of good materials (Fig. 4). Furthermore, they are based in the Danish tradition of concrete as developed in the 60s. But an argument of this kind is not intended to turn settlements such as Gellerup into museums by conservation; on the contrary, it aims to bring the settlement and housing into a future, where respect for the modern ideas is handled in an architectural treatment. This aims to bring the architectural blocks up to a modern and environmental level which corresponds to the building standard.

Add to this architectural history that the buildings and spaces have stories to narrate that are related to the tenants; they have all their stories and places, where good and bad things happened. It is of great importance for people to keep important places to connect to narratives.

3.3 Communication shortcomings

Through tenants interviews it is clear, that communication about the transformation is lacking. Several tenants point out that there are shortcomings in the communication; some of the vulnerable tenants believe that the housing association makes a profit from their rent, although the organization is a non-profit organization. Others cannot comprehend a written message; even the highly educated Danish people have difficulties understanding and to getting in touch with the service and building workers, when some installations are not functioning in their new flat. Even to understand that a transformed flat has less square meters after the transformation and that you have to pay more in rent can be difficult for a well-educated Danish tenant.

During the building period tenants are also annoyed because of noise, dust and difficult access to cars and to buildings where they have their homes. These things are to be expected, when you live at a building site, but are referred to as more annoying than expected.

The shortage of consideration given to the tenants leads to negative thoughts regarding the remodelling. The lack of information and communication leads to negative feelings: insecurity and unconsents. The missing understanding of decisions leads to apathy on several levels. It seems as if communication in the area demands a specific insight and care in order to be smooth.

One of the tenants pointed out that this lack of good communication also had the advantage, that the tenants in the newly renovated block had become more closely connected than before, because they had to communicate and guess at the staircase about what had happened and what was going to happen, now that they had received no information. Off course this was a positive point, but she could also see that such experiences did not put the housing organisation in a good light.

4 Discussion

The transformation strategies for hard ghettoes used in Gellerup are the most radical restructuring of Danish neighbourhoods from the 60s. Environmental, cultural, social and humane impacts are at risk of being forgotten when such a harsh demolition instrument is used with the intention of erase social problems by physical interventions. To qualify the research, three circular aspects are addressed through the themes of clean planet, happy people and shared prosperity.

4.1 Clean planet

To strive for a clean planet in recent initiatives regarding circularity in European Union [23] as well as in Denmark, the government has predicted new initiatives for turning waste into resources for
development. Circularity is defined by a value hierarchy [24] in the form of a staircase. The upper steps relate to the city, the landscape, the infrastructure and the city’s spaces or the nearby building places. All buildings relate to the higher steps. Lower steps are components and materials, and at the ground floor step we find demolished materials, just before the lowest point of the staircase: toxin fragments and leftovers for land fill. Transferred to circularity in an architectural understanding of the staircase it is apparently predicted to keep the values of an architectural object as close to the top-level as possible.

Looking at the Gellerup block we see a housing machine carefully shaped with a relatively high differentiation of flats. From an environmental viewpoint there is no reason to demolish; the concrete material serves its purpose as load bearing structure, as spatial organisation of the flats and their interrelations. The images of the blocks are all well-proportioned and functional, although the blocks are criticised for the repetitive expression they have: they fulfil their purpose for living comfort, but should be renewed to present a more attractive expression and to meet modern standards.

The Collective City of Gellerup [25] represents an exemplary way of reusing a building: this building is located close to the centre and the local square and was originally designed as a collective building with hotel, collective housing for the elderly and a library for the whole city. The architect Exner has recently drawn a prospective for the building, where all physical structures are reorganized, spatial qualities are both kept and transformed, and modernistic colours are added to the facades [25]. The content of the building is reorganized based on a collective idea that entrepreneurs and small business initiatives form a community as a collective hub [25]. Such initiatives should be respected and transformed into other projects for the new Gellerup.

When modern architecture is taken care of and being kept in relation to experience and functions, this strategy will obviously save a lot of economy, energy and primary materials, which a clean planet can benefit from.

4.2 Happy people
The key reason for demolition is argued based on in beliefs that social disorder can be solved by physical interventions. The segregation and social disorder will obviously be moved to other places [26]. Apart from this, an enormous amount of money is spent to do this exercise. It seems as if this strategy can be an ongoing machine in Denmark, if the society has money enough. This fact makes it extremely important to look closer at the subject of happy people.

This research shows that the different aspects of demolition transfer unsafety and lack of trust into the neighbourhood. It is well known that migrants form a homogeneous occupant crowd, where strong family ties are characteristic. These ties have embossed strong social bonds, and the families have a high rate of social capital [27]. Obviously, people are worried about their relations or about whether they themselves are the next to be relocated by force. In this research is learned that trust between the people who decide the physical project and the tenants living in Gellerup is suffering.

International research has not identified whether forced displacement ensures a social mix in a neighbourhood in form of interaction between different groups of populations [26]. What Bachs research shows is that the inhabitants have a sense of belongings for their valuable spaces, and are annoyed if the spaces are lost [22]. It is of great importance to secure the tenants’ ownership of the area and thereby secure a positive future for the neighbourhood.

4.3 Shared prosperity
Despite the stories told in the city of Aarhus that Gellerup is a socially disordered city within the city, the tenants who have informed this research seem on the contrary to love their neighbourhood. They strongly want to secure that they have lots of memories of the settlement as it was thirty years ago. A high rate of earlier migrants feels they are Danish citizens and have adopted Danish attitudes, such as education, attended the labour marked and trying to solve problems in common, as a friendly way to manage everyday relations. One of them underlined that he wanted to literally fight for Gellerup as this place was his place since he came to Denmark from a war-filled area in the Middle East.
These inhabitants carry very strong narratives of Gellerup of both the bad times with gangs and the good times now, where they have also been involved together with the local police in pushing the bad gangs away. Their pride of these stories was obvious. For people outside Gellerup these stories are maybe not known, and one can doubt that the municipality or even the government are aware of them. At least these narratives give hopes for other and more respect full ways of interacting in such neighbourhoods. Related to these narratives and to the lost places this research describes that there is a strong recognition, that Gellerup shared memories of welfare.

For any given person, places are infused with memory. When a personal memory or place-association is shared with others, we see signs of a collective memory. This is a way of understanding architecture...

Embedded in the architecture and the physical environment are memories that can be read, understood, discussed and transformed...

Collective memory, together with physical traces of history and culture is the foundation underpinning identity and a sense of belonging...[28]

The modernistic architecture in Gellerup tells an extraordinary story, which is in danger of disappearing due to the demolition. But it is also the authors’ aim to speak up about the modern period’s birth in the Danish suburbs and suggest a more moderate intervention. The architecture should be recognized as a row of values and the actual interventions should be related to these values.

The memories of the period must not be forgotten, and the Collective City [25]; shows a building-scale reference to a collective memory. At the same time as the inheritance is kept, there is a visual and sensitive possibility to narrate the stories of the past. No doubt the shared memory of the Gellerup of the past is remembered in the population of today. One can only hope that the future stories have not suffered too much through this radical demolition period.

5 Conclusions
The findings show that there exist several values and remains of the original Gellerup, which are of great importance for the new version of Gellerup. These remains can be of physical nature such as a building character or city character; and they can be stories and good memories of how neighbours’ handled difficult situations during the big transformation. These narratives are of great value for the collective feelings and belonging. Such experiences will lead to pride and ownership and contribute to the future living quality.

Through the discussion it is argued, that a wealthy society such as the Danish is behaving in a contra dictionary way when handling the so called ghetto neighbourhoods with the use of instruments like political force and radical demolition.

Democratic human understanding and involvement of people are preferable: fundamentally society should strive for understanding and democracy; and by thus create ownership through social activities and interactions. These should be the learnings from the welfare society, as well as common sense in handling existing physical and social structures and reusing their qualities.

It seems that the term sustainable is often used for greenwashing when dealing with local issues in isolation and is thereby in conflict with a global balance: it is urgent to think in relations, although decisions are taken at a local level.

Circular acting demands knowledge of larger systems.

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