REFLECTION REPORT

P3 – P4 – P5
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Introduction

This paper is the reflection on my research and design of the graduation project for the track Heritage & Architecture of the Master of Science Architecture, Urbanism & Building Science at the TU Delft. By choosing the project of the Nemavo-Airey dwellings within the studio Housing Heritage in Amsterdam which is part of the Heritage & Architecture department, I am able to explore my fascinations and interests in the field of architecture, heritage and sustainability.

Subject & Theme of graduation lab

I started the graduation studio with a fascination for mass customization in renovation processes and with the interest in how to increase the energy efficiency of existing dwellings to energy neutral. Linking this fascination and interest with the theme of the graduation lab Heritage and Architecture resulted in the subject for my research on how mass customization as a tool could be used in the design phase for a renovation of the Nemavo-Airey dwellings in Amsterdam West. The Nemavo-Airey dwellings in Amsterdam West are part of a conservation area of the municipality of Amsterdam. The dwellings are all social houses of housing association Eigen Haard.

Wider social context

In the coming years, a lot of houses in the Netherlands have to be renovated to meet the national and international agreements based on concerns about our environment and climate. The most important national agreements in the Netherlands might be the 2013 Energy Agreement, which has the aim that for example in 2050 the built environment must be energy neutral and in 2020 the rented social houses must have a B-label on average. Because a lot of existing buildings in the Netherlands do not yet meet these requirements of 2030, the challenge is to renovate these building in the coming years in order to be able to still use these buildings in the near future. Besides an increasing amount of renovation projects in the Netherlands, some techniques and information technologies are nowadays developed to a stage it can be used to organize more advanced production processes by the digitalization, automatization and mass customization. In this case, suppliers and contractors develop renovation products like complete energy boxes or energy saving extensions which can be added or placed as one product. However, these renovation products might not be suitable for houses with cultural historical and architectural values, a status as monument or located in a conservation area.

According to ICOMOS, cultural heritage is “an expression of the ways of living developed by a community and passed on from generation to generation, including customs, practices, places, objects, artistic expressions and values”. This explanation shows that cultural heritage is more than historical monuments or historic sites. It actually refers to a total evidence of human creativity and expression. In this way, looking at the renovation of a building with a lot of cultural values is not only limited to the material object itself but also consists of intangible values and immaterial elements. According to UNESCO the content meaning of the term cultural heritage has changed considerably

during last decades because the term also includes traditions and living expressions inherited from our ancestors and passed on to our descendants. Moreover, cultural heritage is also the result of a selection process of memory and oblivion which characterizes human society that for both different reasons choose what is worth to be preserved for future generations and what not. This question and choice is also related to my graduation project because the Nemavo-Airey dwellings at the Burgemeester de Vlugtlaan in Amsterdam New West are located in a conservation area of the Amsterdam municipality. The Amsterdam municipality describes that conservation areas have a general importance because of beauty, mutual cohesion or their scientific or cultural historical values. So, it is not only about the dwellings as material objects, but more about the mutual coherence, the related structure and the history behind it. However, it is hard to protect these dwellings because of the difficult relationship between the interest of individuals and companies, the different interpretations of the values from an expert and resident perspective and the balance between private and public. In the case of the Nemavo-Airey dwellings at the Burgemeester de Vlugtlaan, most of the residents do not like the architecture of this type of buildings but many experts do like the architecture because the dwellings have a lot of cultural historic values referring to the situation after the Second World War. In this period there was a huge demand for housing in the Netherlands, not only because a lot of buildings were destroyed and damaged, but also because an increasing population of 8.8 million people in 1940 to 12.9 million in 1970. Because of the housing shortage and a lack of building materials and qualified building construction workers, alternative building methods were used to build faster and cheaper in order to fulfill the demand for new houses. One of these new building methods was the English Airey system, developed by Sir Edward Airey, which was introduced by the government to increase the industrialization of the housing production in the Netherlands. In order to deal with the housing shortage problems, Van Saane, director of the ‘Nederlandse Maatschappij voor Volkshuisvesting’ (NeMaVo), J. F. Berghoef and H.T. Zwiers developed the Airey system to the Nemavo-Airey system which was a more rationalized system and had some advantages in comparison with the existing Airey-system.

However, after more than fifty years, these Nemavo-Airey dwellings have been used by many residents. Because of this, a renovation of these dwellings is a project about homes instead of houses. Houses are initially designed with the function to provide shelter. However, after a certain time, users have added more meaning and depth that will exceeds the original function as a shelter. In this way, the term houses gains deeper purpose and are named homes, which already are customized by their residents with all involved memories and cultural values.

So, cultural heritage might help us remember and understand our cultural diversity in relation to its time and to develop respect and renew dialogue by discourse. From a sociological perspective, discourse includes all that a particular category of agents say or write in a definable thematic area. However, the fact that houses are sometimes the domain of fashion, suggests the general validity of

4 Gemeente Amsterdam, 'Welstandscriteria Erfgoed', (2014).
8 M.S. Larson, Behind the Postmodern Facade: Architectural Change in Late Twentieth Century America, (Berkeley: University of California Press, 1993), p. 5.
the concept of criticality and the primacy of socio-cultural factors. In this way, the academic consensus, expressed in charters for architectural conservation, differs from the everyday practice of renovation of monuments or historic buildings. The charters do not provide a blueprint for planning and assessment of renovation proposals because every project requires a specific consideration and customized solutions. In addition, besides all different kind of buildings from different kind of periods and ideals, almost every renovation can be justified or criticized because there are so many different charters on heritage conservation which are a product of the time they were published and a reflection of the professionals who wrote them. For this reason, determining in an early stage what is essential to a monument or a project might be an option to legitimate and assess renovations. This can be done by making a specific cultural historic analysis and a value assessment as tools to discuss and examine cultural values and the impact of a renovation or intervention.

Research & Design

I started my research with an analysis of the cultural history, the urban context, the architectural appearance, the building technology and the energy consumption. Within the building technology part I analyzed the construction for example (see figure 1) but I also explored the possibilities of mass customization as a tool for a renovation concept. Moreover, for the energy consumption chapter I calculated the existing energy consumption and studied several case studies of examples of projects with high energy ambitions in order to learn from these examples.

![Fig. 1 One of the analysis drawings of the construction of the Nemavo-Airey dwellings](image)

During the research and design phase I used different methods to do research. First of all, I did different literature studies in the beginning to read and know more about the period of time the urban area was designed and the buildings were erected. In combination with different visits of the location and guided tours I analyzed the area and the building from different perspectives in order to know the values and to decide which values are important for the new design. An example of this is the research based on the original drawings of the part of building with a retail function (see figure 2). Another example of the analysis is the comparison of the existing square meters and the required square meters of the Bouwbesluit (see figure 3). By making this comparison, I gained more insight in which rooms need more square meters than the existing situation of today.

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For the energy efficiency I looked to different case studies of projects and buildings which are similar to the Nemavo-Airey building. By analyzing these examples and comparing the hard criteria like energy savings, investment cost and energy labels with the soft criteria like architectural image and the impact for the area I have gained more insight in the possibilities and consequences of renovation methods to reduce the energy consumption which I have used for my design for the renovation of the Nemavo-Airey building blocks. Figure 4 shows the comparison of hard criteria and soft criteria.

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<table>
<thead>
<tr>
<th>LOCATION</th>
<th>TYPOLOGY</th>
<th>LEVELS</th>
<th>YEAR OF RENOVATION</th>
<th>NUMBER OF HOUSES</th>
<th>ENERGY INDEX BEFOR</th>
<th>ENERGY LABEL BEFORE</th>
<th>ENERGY INDEX AFTER</th>
<th>ENERGY LABEL AFTER</th>
<th>SURFACE AREA OF DWELLING</th>
<th>INVESTMENT PER DWELLING</th>
<th>INCREASE IN COSTS PER MONTH</th>
<th>ARCHITECTURAL CHANGE **</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lutterboekstraat Bocholde</td>
<td>Drive-in dwellings</td>
<td>3</td>
<td>2012-2013</td>
<td>28</td>
<td>2.35</td>
<td>E</td>
<td>0.68</td>
<td>A++</td>
<td>126 m²</td>
<td>unknown</td>
<td>unknown</td>
<td>+</td>
</tr>
<tr>
<td>Saterloofstraat Nangolo</td>
<td>Portiek</td>
<td>3</td>
<td>2014</td>
<td>76</td>
<td>1.70</td>
<td>A</td>
<td>1.14</td>
<td>B</td>
<td>45 - 70 m²</td>
<td>€56,400,00</td>
<td>€40,000</td>
<td>-</td>
</tr>
<tr>
<td>Jan Vermanstraat Amsterdam</td>
<td>Portiek</td>
<td>4</td>
<td>2013-2014</td>
<td>362</td>
<td>2.35</td>
<td>E</td>
<td>1.31</td>
<td>B-C</td>
<td>52 m²</td>
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<td>€40,000</td>
<td>-</td>
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<td>Luisterstraat Amsterdam</td>
<td>Portiek</td>
<td>4</td>
<td>2013-2014</td>
<td>175</td>
<td>1.47</td>
<td>A</td>
<td>1.04</td>
<td>B</td>
<td>45 - 58 m²</td>
<td>€45,000,00</td>
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<td>Beethovenlaan Utrecht</td>
<td>Gallery apartments</td>
<td>4</td>
<td>2015-2015</td>
<td>128</td>
<td>1.97</td>
<td>D</td>
<td>1.04</td>
<td>A</td>
<td>31 - 66 m²</td>
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<td>€20,000</td>
<td>-/+</td>
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<td>Acacia/Magnolia Nieuwkoop</td>
<td>Apartments</td>
<td>2</td>
<td>2010-2011</td>
<td>16</td>
<td>1.90</td>
<td>B</td>
<td>0.58</td>
<td>A++</td>
<td>66 m²</td>
<td>€100,000,00</td>
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<td>+</td>
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<td>unobtained</td>
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<td>A (MOB)</td>
<td>unknown</td>
<td>&gt; €65,000,00</td>
<td>€0.00</td>
<td>-/+</td>
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</tbody>
</table>

* calculated by: (Increase of rent - savings of energy bill) / month
** architectural image changed a lot: + / architectural image did not change a lot: -

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During the research I divided my findings into three categories, the analysis (as objective as possible), the value assessment (personal interpretations of a certain value) and recommendations (for the design and the design process). This division made clear how to interpret the results of the analysis and gave me tools for the design phase. Moreover, the total graduation period was an iterative process in which research by analyzing and assessing the values and design continually followed each other. An example of this is the analysis of specific trees and plants in the areas between the Nemavo-Airey building blocks. During my research I analyzed the greenery from a broad perspective in order to relate it to the ideas of the Modern Movement which were dominant in the period the urban plan and the buildings were erected. However, when I decided to explore the possibilities of an extension of the building and to redesign the space between the buildings I had to deal with the existing elements like some trees which are there for many years. Therefore I analyzed the type of trees, the age, the ecological value (determined by the amount of different type of insects which eat the leaves of trees) and the possibilities to replace these trees (see figure 5). After this analysis I looked to the values of the results of the analysis and developed my design to a design more based on the existing elements. After this redesign I discovered also more and more interesting reference projects and sustainable solutions which I studied in order to look which aspects were interesting to develop and use for my own design. In this way the research of reference projects during my graduation project continually influenced my design.

Fig. 5 Analysis of existing trees in the area between the Nemavo-Airey building blocks

Besides analyzing results of case studies and literature I also spoke to different tenants who live in the Nemavo-Airey building blocks. Because I have chosen to focus on the existing tenants as target group for after the renovation I think it is really important to speak with these people. I have chosen for this target group because the houses are now social houses of housing association Eigen Haard. This means that in real it would be difficult for Eigen Haard to rent these houses in the free sector because they are not allowed to rent these houses for high prices because the subsidies Eigen Haard
receives from the government. Because my ambition is to make these dwellings energy neutral, the savings in energy costs after the renovation can be invested in the renovation itself by an ESCo (Energy Service Company) in order to prevent an increase in rent and to keep the social houses affordable for the existing tenants. Besides the tenants obviously don’t want or are even not able to pay more rent, I have learned a lot more of the conversations with these existing tenants. However, the most interesting talks were in the second part of my graduation project. I would recommend for others to try to have interesting talks with the residents in an earlier stage of the project because you will discover more problems and the information you get, can help you by making design decisions and to give your research a more realistic approach. I discovered for example not only the problems the tenants were facing now (see figure 6) and in the past, but I learned also a lot about their desires for their homes in the future.

Fig. 6 Existing tenant shows problems with the existing window frames

An example of one of the desires of the existing tenants is the relation between the living room and the kitchen. For families from Turkey, Morocco and other countries it is desirable to have a separate kitchen without an open connection with the living room. This is because of two reasons. First reason is that these families cook with a lot of herbs which you can smell clearly. The second reason is that within these families the women will do the cooking and that it is not desirable if the man has some friends over the floor in the living room and these friends are able to see his wife. Almost all tenants of the Nemavo-Airey dwellings are from countries like Turkey and Morocco. This lead to the discussion to what extent the designer has to take into account the desires of to the existing tenants and to what extent the existing tenants have to adapt themselves to the new design. This has also to do with mass customization and how much choice you will give to the tenants. By making different impressions of situation in which I simulate the tenants have a choice between certain facade elements for example, I tried to look what kind of results and image this will have as consequence. Figure 7 shows an illustration of how the Nemavo-Airey blocks might look if I add a new layer of which the materialization can be chosen by the tenants based on some pre-defined options. In my opinion, this results in a messy image without unity and respects to the old existing building and its cultural values. However, if you give four different options for facade elements, it is hard to expect how the facade will look like, because if almost all tenants will choice for the same option, less variety in the facade is the result. For me it was hard to decide how to involve the residents in the
The tension between choices within the design process is also reflected during the design process of Van Hooijschuur for the renovation of the Nemavo-Airey dwellings of housing association Eigen Haard. Because 8 tenants do not agree with the floorplans Van Hooijschuur designed, these 8 tenants decided to go to the judge. This is now a process between the lawyer of the 8 tenants and the housing association Eigen Haard.

In the beginning of the process I focused on my ambition to make these social houses energy neutral by improving the energy efficiency, because according to the requirements of the Energy Agreement, the built environment must be energy neutral in 2050 and in 2020 the rented social houses must have a B-label on average. However, by taking into account all restrictions and requirements of the practice for this building in the conservation area of Amsterdam-West, it is almost impossible to make an interesting design from an architectural perspective. Realizing this, I had some difficulties to leave these requirements and restrictions and to think in an architectural way and design from a more architectural approach. The retake I had for my P2 with the aim to mainly focus on an architectural vision, forced me to approach the design of the renovation more from an architectural point of view. This has resulted in more architectural quality and a stronger concept for my design.

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Design Process

One of my research ambitions was to explore mass customization as a tool to be used in the design process to improve the comfort and energy efficiency. Moreover, I wanted to use a mass customization tool as a way to create architecture which would increase identification and participation. By involving the residents in the design process, the chance will be bigger that the housing association convinces more than 70% of the residents to agree the renovation because without convincing 70% agreement among the tenants, the housing association cannot start with the renovation\(^\text{12}\). In addition, I also wanted to raise the livability for the tenants by increase the value of the existing qualities of the urban area and the building blocks itself. However, during the design process I started to experience that by using mass customization, the architectural outcome was most of the time in contrast with my starting points and value assessment based on my research and analysis. So, in order to create more identity and to strengthen the modernistic image of the building blocks, I decided to leave the idea of mass customization for the exterior of the buildings. However, I wanted to involve the tenants in the design process of the floorplans in which they were able to translate their desires into some design options.

To explore the architectural parameters in order to accomplish my ambition to improve the comfort and energy efficiency and to increase the quality of the area between the Nemavo-Airey building blocks, I looked back to my starting points based on the value assessment and analysis of my research. With this information I reflected the design variants I made of several aspects of the area and the building. Figure 8 shows an example of drawings of different variants in the first stage of the design process. However, in a later stage of the graduation project I started again making different kind of sketches in order to express the ideas and ambition for the project. By doing this, I gained more insight in the consequences of design choices and for me it was also a good way to communicate my ideas to others.

Fig. 8 Sketches of different situations and design options

During the design process I took into account the restrictions of the Bouwbesluit. Looking at the parking situation, I designed different options and assessed them by different criteria. Figure 9 gives the example of the design study of different parking places and their measurements.

![Design Study of Parking Places](image)

**Figure 9** Research on parking requirements according to Bouwbesluit

This was important to know before I could design the new parking places in the area around the Nemavo-Airey buildings. Figure 10 gives some different options of possible parking solutions in the beginning of the design process. However, these drawings were made before my P2 and are reconsidered after.

![Parking Variants](image)

**Figure 10** Parking variants

Moreover, during the design process I worked on scales from 1:200 to 1:5. However, during the design process I discovered different design problems on a scale of 1:5 and looked for solutions for
these problems which had consequences for also the scale of 1:200. An example of this was the process of designing a new floor for the dwellings on a scale 1:5 which has consequences for the image of the facade in a scale of 1:200. This had to do with the doorvalbeveiligingen of the windows in the facade. After investigating different options for floor systems and by comparing them on the acoustic insulation values, I designed the floor on a scale of 1:5 and 1:20. The type of floor I designed resulted in an extra height of the total new floor and had as consequence that I had to think about how to design the doorvalbeveiligingen. In order to research the consequence of the different options of doorvalbeveiligingen I designed the doorvalbeveiligingen also on a scale of 1:100 and 1:200 to look how this would be integrated in the total facade image. The problem of adding extra floor height for the doorvalbeveiliging is a generic problem which is common in renovation projects. However, the way how you design this doorvalbeveiliging might be project specific. In my case, I designed this doorvalbeveiliging based on the results of my value assessment. I would recommend others also to look at details like this in an early phase of the design because of the influence it might have on the total image of the facade. By knowing the consequences and options in the beginning of the design process, it is possible to integrate these aspects in the total design instead of adding a standard solution for a doorvalbeveiliging after the design phase, which might have negative consequences for the image of the total facade.

Product

The eventually product of the graduation studio is a design for a renovation of the Nemavo-Airey blocks, from a scale of 1:500 to 1:5. In order to design this renovation, I discovered during the process that a clear focus is important and will help you during the research and design phase with structuring all involved aspects and results from research. Not only a focus based on your ambition, but also a focus on the scale of the project. In my case, I focused on the four most original Nemavo-Airey building blocks instead of all building blocks because the other blocks were already renovated which could mean a different approach and design is needed. This is an interesting question to reflect on. If I look to the design for the four original building blocks, some of the original elements are important aspects for my concept, the design and the materialization. Because some of the other building blocks already have a new extra layer on the outside, the original facade panels are for example not visible anymore on these blocks. So if I want to use my design also for the already renovated building blocks, the renovated building blocks first have to change in order to have the same result after applying my design to these building blocks. I also chose to make a redesign for the area between these Nemavo-Airey building blocks because Berghoef, the architect of the Nemavo-Airey building blocks also designed this area between the building blocks and used for example the trees to create a contrast with the modern building blocks which had a low plasticity.

Finally, the results of my calculations on the energy consumption and generation show my designed renovation will make the dwellings energy neutral. In this way my ambition to make these dwellings energy neutral is become reality. However, I did not calculate the expected costs for this renovation exactly, which probably will be too much to be realistic. So the question if it is possible to renovate these dwellings to energy neutral dwellings with less money still remains. I will elaborate and reflect on this more in the reflection for my P5. Within this reflection for my P5 I will also elaborate more on all decisions I made in order to make the dwellings energy neutral.
Conclusion

In order to increase the comfort and energy efficiency by a design for a renovation for the Nemavo-Airey dwellings in the conservation area of Amsterdam West, the architectural and cultural historic values are interpreted and translated to a renovation concept in which architecture and technology is integrated in one design. In order to achieve my ambitions, several preconditions have been formulated in front and the architectural vision for the projects is reflected in the design and the design choices I have made during the process of research and design. During this iterative process of research and design I have learned a lot about the relationship and tension between design, technology and heritage. For my future profession and career, I want to use the things I have learned during this interesting process of research and design.
REFERENCES

5 Larson, M.S., Behind the Postmodern Facade: Architectural Change in Late Twentieth Century America (Berkeley: University of California Press, 1993).
6 Messchaert, Z., Pracht in Prefab (Amsterdam: Amsterdamse Raad voor de Monumentenzorg, 2004).