

Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences




Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information		
Name	Lucca Maria Fischer	
Student number	5349699	
Studio		
Name / Theme	Heritage and Architecture – Vacant Heritage	
First mentor	Lidy Meijers	Heritage and Design - Design
Second mentor	Frank Koopman	Heritage and Technology - Building Technology
Third mentor	Hielkje Zijlstra	Heritage and Design - Research
Argumentation of choice of the studio	<p>The decision to do this project was driven by the idea of sustainability. In my MSc1 at Heritage and Architecture I learned about the importance of adaptive reuse in the field of sustainable building. Thereby, it is important to deal with the preservation of each building in order not to destroy heritage characteristics.</p> <p>The buildings of the 70s and 80s are still too young and numerous to be officially protected as monuments. Because of their often outdated technical design and energy deficiencies, they are rarely associated with sustainability. Yet some features, such as the stability and durability of reinforced concrete in already constructed buildings, can also be used for sustainability purposes.</p> <p>The studio deals in particular with police real estate that is to be divested due to the restructuring of the Dutch police. These are mainly buildings that no longer meet current spatial requirements, but also those that are not economically viable, often because of their old technologies and low energy efficiency.</p> <p>Mainly consisting of an administrative office typology the buildings are also spatially affected by changes in work life due to - among others - the pandemic, digitalization and new ways of working. As space is a constant to be distinguished from the function of a building, its investigation is particularly important</p>	

	<p>in adaptive reuse and heritage preservation as initial functions for which buildings are designed might change or cease to exist over time.</p> <p>Both the balance between heritage protection and sustainability as well as social changes and the related reuse of office architecture will continue to play a major role after my studies. That's why I chose this studio.</p>
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Graduation project	
Title of the graduation project	The Architectural Youngtimer (/Architectural Young Classics) – adaptive re-use of the police department in the Mathildelaan in Eindhoven.
Goal	
Location:	<p>Eindhoven</p>  <p>Figure 01: Own image of the Police Station Eindhoven, Mathildelaan.</p>
The posed problem, research questions and	<p>See below</p> <p><i>How can the spatial characteristics of Dutch administrative office buildings from the late 1970s and 1980s be implemented into a sustainable adaptive reuse strategy, on the example of the Mathildelaan Police department in Eindhoven.</i></p> <p>Subquestion 1: <i>What are characteristic design identifiers of the late 1970s and 1980s office buildings?</i></p> <p>Subquestion 2: <i>Which characteristic elements could be relevant according to the results from SBT research?</i></p> <p>Subquestion 3: <i>Which identified characteristics are relevant to be preserved under the consideration of a Value Assessment?</i></p> <p>Subquestion 4: <i>How can the characteristics found be implemented into a sustainability strategy by way of adaptive reuse?</i></p>

design assignment in which these result.	See below
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The reorganization of the Dutch police in 2013 led to the urgency of revising its current real estate. This is expected to cause the divestment of around 700,000 sqm of the respective real estate, but also renewal and adaptation of use. (Weessies, 2017, n.p.)

Trough the buildings and portfolio transformation the aim is „to achieve a good relationship between functional, technical, spatial, aesthetic and financial requirements“ according to Weessies (2017 n.p.). An estimated 30% of the police real estate is affected by these redevelopment measures.

In an individual in depth research the focus will be placed on 70s and 80s office buildings, represented by the police station in Eindhoven (completed in 1981) as a decisive part of the police departments also contains office space. In the Netherlands, buildings from 1971-1990 currently make up 29% of the total office stock in the Netherlands. In comparison, the total amount of pre-1971 buildings is more than 10% less (see Figure I) (Bak, 2021, p. 22). The office architecture from the 1980s is rarely protected through monument conservation. Currently, many buildings from this period are still in use, but they are in urgent need of renovation, not exclusively for aesthetic reasons. Outdated technology and insufficient insulation makes them inefficient in their energy use and therefore unsustainable.

If we nevertheless need other uses today and the buildings do not meet today's requirements, the question arises if building new wouldn't be more sustainable and efficient.

A first argument against this approach is to save resources. New construction consumes new building materials that have high embodied energy through their processing, transport and assembly. With adaptive reuse, many materials could be saved. Thus, energy efficiency must be considered not only in the finished building but also in the construction process. In addition, less material and a shorter construction process, as well as lower disposal costs, can also save money (Trabucco & Fava, 2013, p. 43). Furthermore, critical points can be improved in a selective manner, because even with a new building there is no guarantee of perfection and it will probably be confronted with the same problem in the future. Finally, an important point is the identity and heritage of the building and possible elements relevant to monument preservation that need to be investigated and preserved.

Lastly, buildings of this period meet some criteria that might have a positive effect on a reuse strategy and further use: The 1970s and 80s architecture started to break with the idea of functionalism (Zey, n.d., n.p.). Due to the use of grids in design and the manner in which interior walls are built, they can easily adapted to other functions. Furthermore, their construction of glass, concrete and steel on the one hand makes demolition and disposal even harder more costly and also problematic under sustainability aspects (Trabucco & Fava, 2013, p. 38). On the other hand it ensures a stable structure in further re-use.

In Eindhoven, there will be a shortage of 4000 apartments by 2030 (van der Smitte, 2019, n.p.). As new construction is rather slow, the conversion of existing buildings and

gradual expansion in parallel with the growth of the urban population could make a major contribution and already achieve sustainable results quickly. This is where the first design concepts would come in.

The preservation of buildings from the late 70s and 80s has just started. Although there are already numerous collections of buildings which are probably worth preserving from the so-called "Post '65" era, there is not much research on separate characteristic spatial elements of the 70s and 80s that are relevant to the preservation of historical monuments in a transformation and reuse context. This research is therefore intended to look for these identifiers and shall focus on how to preserve them in a sustainable reuse or conversion project. This way it shall provide a starting point as a basis for further research.

The research for the graduation project in Heritage and Architecture is twofold. There is an overarching group research on Spatial Building Typology and an individual research topic. Both researches are entangled, complement each other and are guiding design decisions in the redesign of the Mathildelaan Police Department in Eindhoven. The individual research also includes the design in which results and ideas are tested and additionally integrated into the local conditions.

The SBT research question is formulated as follows:

How and why do specific series of spatial characteristics on all scale levels influence the design possibilities regarding the redesign of a specific group of buildings realized for a specific function? (Derived from the preliminary introduction to the second volume in the SBT series)

For Phase 3, the police station in the Mathildelaan in Eindhoven has been chosen as the focus object for this graduation project. As mentioned before I would like to particularly examine the characteristics relevant to the temporal context and how to use these specifically for a sustainable approach. Therefore I formulate my research question as follows:

How can the spatial characteristics of Dutch administrative office buildings from the late 1970s and 1980s be implemented into a sustainable adaptive reuse strategy, on the example of the Mathildelaan Police department in Eindhoven.

The question contains several sub-questions, each of which builds on the others and ultimately lead to answering the main question.

Subquestion 1: *What are characteristic design identifiers of the late 1970s and 1980s office buildings?*

Subquestion 2: *Which characteristic elements could be relevant according to the results from SBT research?*

Subquestion 3: *Which identified characteristics are relevant to be preserved under the consideration of a Value Assessment?*

Subquestion 4: *How can the characteristics found be implemented into a sustainability strategy by way of adaptive reuse?*

Design assignment:

The design is intended to test the principles identified in the research part for the investigation and evaluation of 1970s and 1980s buildings in practical application using the example of the Eindhoven police department. In addition, the topic of sustainability in the three categories of economy, ecology and social issues is to be given particular consideration.

A first design concept takes into account the social and economic aspect by aiming at the transformation into a self-sustaining co-living block through a conversion of the existing building and an extension or addition. The ecologic aspect shall amongst others implemented through greenery and an improvement of energy efficiency in the construction and maintenance.

Due to the housing shortage that affects Eindhoven as well as other cities across Europe, the design will focus on inclusive residential development. The aim is to model a block of homes as a meeting and interaction place for a cross-section of society and an addition to the city's green infrastructure.

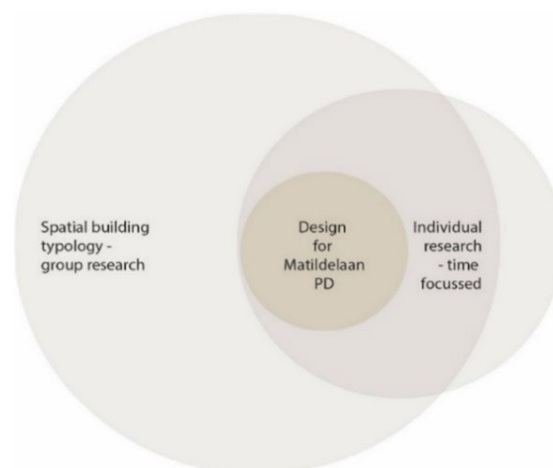


Figure 02: Entanglements of SBT, Individual Research and Design, Source: own image.

Process

Method description

Overarching research:

The SBT research methodology is aligned with the first volume of the SBT series on department stores. (Zijlstra et al. 2021). It is subdivided into 4 phases (here phase 1a-4a) : In Phase 1a, 8 selected Dutch police buildings are examined on four scale levels:

1. city centre
2. urban block
3. building object
4. facades and roof

On the respective scale, three further sub-aspects will be examined in more detail. In this way, each object is first studied independently of the others.

Each object is examined on the basis of planning material provided by the police, supplemented by archival material and databases such as Q-Gis. The data and aspects relevant for the investigation are reproduced by drawing, tracing and mapping in the sense of the „Hausmann method“ (Jallon & Neapolitano, 2017). The analysis is additionally completed and evaluated in written form for each aspect. In phase 2a, the aspects are compared and striking commonalities are identified as typological characteristics. In phase 3a, individual research and redesign options are presented in diagrams for the students at the selected location. Finally, in phase 4a, the detailed individual re-design results are compiled and evaluated diagrammatically to identify typological reuse options.

The SBT research serves as a basis for the individual research. In particular, the investigation of the police station in Mathildelaan is included in the individual part, but the development of the typology in phase 2a also allows for conclusions about temporal characteristics.

Individual research:

Like the SBT part, the individual part is divided into four sections (here called 1b-4b) by answering the four sub-questions.

In phase 1b, which refers to the first research question, literature research is conducted to find characteristics of the late 1970s and -80s. Secondary literature and databases of 70s and 80s monuments are used where available (see Theoretical Framework), but also primary literature on design approaches is analysed. In addition, several buildings will be examined quantitatively for certain characteristics as case studies. Referring to the “built artifacts” of Steward Brand’s framework of building layers (site, skin, structure, space, plan, services and stuff) added by surroundings, surfaces and spirit of place as proposed in the HA method by Kuipers et al. (2017). A pre-selection of possible case studies include e.g. the Amsterdam Medical Center , „Regionale Omroep Zuid” building in Maastricht and the Rijkswaterstraat Office building in Schubertsingel, Den Bosch (see Figures 04-13). The selection will consist of buildings that were built in the late 70s and 80s as administrative office buildings and which in the best case have already undergone an adaptive re-use and renovation. These buildings will be analysed by analytical re-drawing and mapping from pictures and on site and literature research.

For phase 2b, it will be evaluated and compared to what extent the characteristics found are reflected in the Mathildelaan police station. The analytical drawings from SBT phase 1a will be used for this purpose.

In phase 3b the results from phase 1b and 2b are evaluated in a value assessment using the HA method from Kuipers et al. (2017 p.87) (See Figure 14) .

In this way, the characteristics initially identified from the quantitative case study research are qualitatively evaluated for the building in Eindhoven.

In phase 4b, the possibilities of using the typology's characteristics (SBT) from the corresponding time period (individual research) in a sustainable conversion strategy are investigated. Firstly, this is done using the case studies from SBT and individual research as references.

Research-by-design:

Additionally, in phase 4b, a strategy for the selected building in the Mathildelaan is developed in the form of drawings, model building and evaluations of technical methods and data. This fourth phase analyses the research results based on the design. Through this research by design, a concept should emerge that represents a practical application example for the research part.

A modern design cannot be based on preservation requirements alone. Other aspects also play a role in the development of the concept: the design is used to test the extent to which aspects of monument preservation can be aligned with current demands for sustainability. Different options are tested through design variants. Current urban planning and technological requirements are also to be met.

Visions of urban design are incorporated at the level of the overall concept. Original drawings of the building provide information about necessary energetic, static and technological renewals.

With regard to social sustainability and the desired transformation into a co-living complex, it is also necessary to deal with requirements at all levels for such dwellings. Finally, the conditions of the site determine the execution of the design. In this example, the urban context, natural lighting and various emissions from the surrounding urban traffic have to be taken into account.

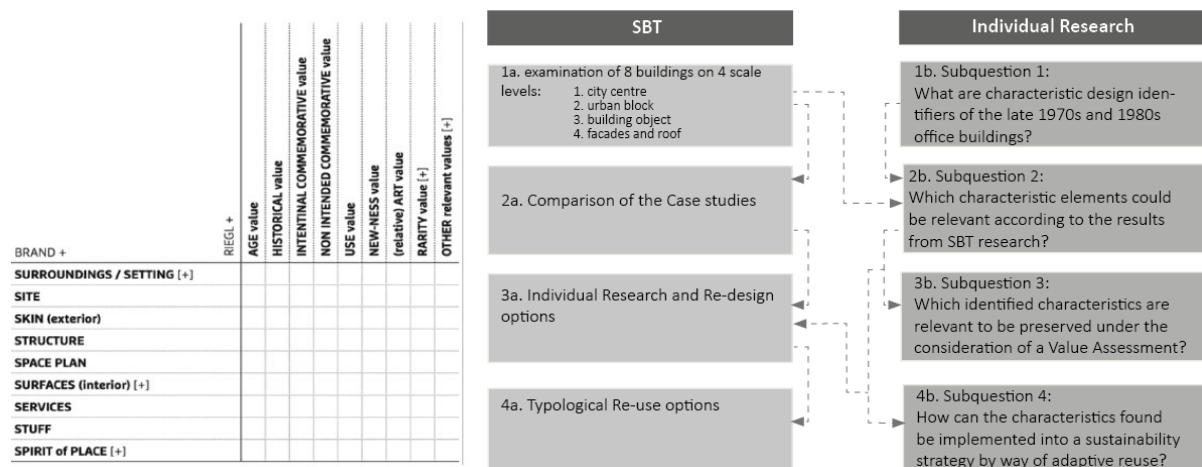


Figure 03: Heritage and Architecture Value Assessment Matrix, Source: Kuipers et al., 2017 p. 87.
 Figure 04: Overview: Entanglement of Research, Source: Own image.

Another graphically oriented method is the one used by Jallon et al. in their analysis of the Interventions of Hausmann in Paris (Jallon et al., 2017). It investigates a building and its surrounding on several scales in black and white analytic drawings. This method was already used in the first edition of the SBT series on department stores. The resulting SBT analysis was collectively discussed and refined for this year's analysis of police real estate.

The individual analysis is based on the existing research on the Post ,65 period. For the individual research the collections of iconic buildings in the Netherlands will be the starting point. Especially relevant are the website "www.love80sarchitecture.nl" run by Lidwine Spoormans and "post65.nl" as well as regional monuments lists such as in Amsterdam and Rotterdam. In addition, the Dutch "Rijksdienst voor het cultureel erfgoed" is also working on the collection on the Post 65 period up to 1990 in its analyses and studies. This research was initiated in response to requests from the Dutch people and has three main objectives: to develop and share knowledge, to deal with this heritage in relation to current spatial planning assignments and to broaden the base of support. (Ministerie van Onderwijs, 2019).

In addition, a theoretical framework on the design strategies with a focus on Dutch office buildings from the respective two decades is to be examined. Gert Staal deals with the process and influence of the client in his book "Between dictate & design: The architecture of office buildings" (Staal, 1987) and Dick de Gunst deals with the topic of the typology of office buildings in "Planning en ontwerp van kantoorgebouwen: Typologie van gebouwen" (de Gunst, 1989). The framework of the analysis of values is derived from the Heritage and Architecture Value Assessment published in the book "Designing from Heritage". (Kuipers et al. 2017) This examines material and imaterial values on different construction shells in a matrix. The list of values is based on the list of values by Alois Riegl in "Der Moderne Denkmal Kultus" (Riegl, 1903) and the building layers by Steward Brand in "How buildings learn" (Brand, 1995), which were extended by further layers which are marked with a [+] in Figure X.

Some of the still rare writings on the subject of the renewal and adaptive reuse of modern buildings are a.o. writings by the Docomomo association.

Additionally, the book „Welche Denkmale welcher Moderne“ by Frank Eckard, which is based on research results of the TU Dortmund University and the Bauhaus University Weimar, is very relevant in this context. It deals with the situation of the building fabric in Europe and explores approaches to assessing it from a heritage perspective, the role of different actors and strategies for the future. Contributions a.o. by Marieke Kuipers also deal specifically with the situation in the Netherlands (Eckardt, 2017 p.156).

Finally are also numerous approaches to the issue of sustainability. In the writing „Dierbaar is Duurzaam“, Christoph Grafe explains that architecture is sustainable when it is valuable for people's living environment (Grafe & Janssens de Bisthoven, 2011, a.o. p. 27). In this regard, not only ecological aspects play a role, but also social and economic ones, in line with John Elkington's triple bottom line (Elkington, 2018).

With regard to research by design, the case studies mentioned in the Methodology part will be examined as references, since they originate from the same period and, for the most part, have also already been successfully transformed or upgraded.

Reflection

The second volume of the SBT series aims to extend the first with a further typology. Unlike conventional series on the typology of buildings, this series is not oriented towards functions but towards the space itself. This is particularly relevant in the field of heritage conservation, as some functions change over time or no longer exist and therefore other functions need to be found for these spatial typologies. In the case of police buildings, this is already evident from the fact that some were not originally designed as such. A spatial analysis adds another typology to this series, expanding the repertoire of urban spaces with different types of buildings currently used by the police.

The Individual Project is based on the Studio Research. In the process, the elements investigated in the Studio Research are in the foreground. Findings regarding space from the Studio analysis are examined in a time-specific context.

A relation to the Master Program Architecture is the combination of different parts of this field. These are architecture history, design and the basics of technical implementation.

The first aim of this study is to gain initial insights into the typological characteristics of buildings from the late 1970s and 1980s by analysing them. Subsequently, the related possibilities of use within the framework of adaptive reuse are to be investigated and finally the findings will be applied to the example of the Mathildelaan.

Problems I will have to deal with are, that on the one hand, the topic I chose still offers quite an open field of research possibilities but, on the other hand, a lack of information. Although many buildings still exist and are in use, little information on them has been collected. Copyrights can also lead to problems, as can the accessibility of plans, which are often not yet available in archives. Finally, the buildings have not yet been largely evaluated in detail from a monumental heritage perspective, which is why not many qualitative assessments can be derived from professional sources.

The strategy is therefore to quantitatively examine buildings for common characteristics and also to investigate their possible re-use options with regard to or even because of these characteristics. This should provide a basis for further research, which will inevitably become more relevant as the respective buildings age even further. However, it is already important to enable a more conscious approach to the building structure from these decades with regard to monument protection and sustainability, today.

Also with regard to the design implementation, a balance must be established between aspects of monument preservation and the requirements of the current time. These are of a technological and social, but also of an aesthetic nature. Only if these requirements are met people will identify with the building. Only if the design is well received by the population of Eindhoven the third aspect of economy can be fulfilled. Currently, the exact opposite is the case: if the building were economical, it would hardly be up for discussion. Many people describe the building as unattractive and the energy certificate is poor. Therefore, the idea of creating a sustainable design on this basis is a big task.

However, successful designs like some of the case studies show that such a transformation can be successful and that each successful example is a reference object for further development and makes an important contribution to sustainability.

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