

ARCHITECTURAL YOUNG CLASSICS

A sustainable redesign strategy for the
Police Building in the Mathildelaan in Eindhoven

Reflection Paper
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Introduction to the topic of investigation

The office architecture of the 1970s and 1980s makes up the largest part of Dutch office building stock at about 30% (Bak, 2021, p. 22). Most buildings are now in need of major renovation and often no longer correspond to today's aesthetic perception. In addition, the function of the buildings must be adapted to today's needs and technological standards. This is not least due to the rapidly changing world of work, especially after the climax of the Corona pandemic.

The studio deals with the study of spatial building typologies. After retail architecture in the form of V&D department stores, this year's second series of the research project focuses on office buildings in the form of police buildings from the portfolio of the Dutch police. (see Zijlstra et al., 2021)

The buildings are analysed on four different scale levels: 1. city centre, 2. urban block, 3. building object, 4. building envelope, with three aspects linked to each scale level. This makes the sites comparable at all scales in order to obtain spatially typological characteristics as a basis for redesign options.

The study is divided into five parts. In part 1, the buildings are analysed in form of texts and drawings and the results are compared in part 2. The individual research is described by each student in part 3 and the respective designs are documented in part 4. Part 5 then examines the spatial typology for design patterns.

Information about the sites is gathered through archival research, literature research and other sources. The method used is the Hausmann method, which involves tracing and mapping plans to compare buildings and find spatial typological characteristics. Results are subsequently explained in graphics and texts (Jallon et al., 2017).

The individual research makes use of the results of the SBT and additionally examines the buildings in Groningen from 1971, Eindhoven from 1981 and The Hague from 1985 for spatial typological characteristics. This serves as a basis for the further research.

Objectives

In this project the following research question was addressed: 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 Police department in the Mathildelaan in Eindhoven?

The aim of the individual project is to examine the office buildings from the 1970s and 1980s within the framework of the SBT research in order to collect their typological characteristics, as described above.

The findings are applied to the redesign of the police building in the Mathildelaan. Few of the architectures from these years are already listed as monuments, which is why it is often difficult to assess which parts of the building are worthy of heritage preservation.

A catalogue of various characteristics serves as a basis for further research on this period. For it is certain that after the late post-war period - referred to here as "Post 65" - has already moved into the focus of the authorities (Ministerie van Binnenlandse Zaken, 2021), the 1970s and 80s will soon be debated in this context. Until then, a good overview of characteristics should make it easier to assess what might be worth preserving in order to prevent relevant monuments from being lost beforehand.

The research process was planned in a diagram, which shows a circle as one part of a spiral, as this research process is considered part of a continuing research field. The SBT research, the individual research and the design each form a shell as they are interconnected at all times. This research concept has proven itself in that at every point in time, even during the design process, characteristics could be identified. Conversely, each time a design decision was made, the research was used again as a basis for decision-making. However, the research does not remain conclusive, but must be continued through further projects, which is why the open end of the diagram is justified.

Abstract of Outcomes

The study of three buildings from the SBT portfolio and complementary case studies, as well as literature review research-by-design led to the results discussed below. As in the SBT I divided the results into the characterization of the Urban Scale and the Building itself.

Urban Context

In the urban context, it is noticeable that, in accordance with the original purpose, the administrative offices were planned in direct proximity to the city centre. Due to this location, the buildings are perfectly connected to the infrastructure and utilities.

Compared to newer buildings in the area, they are significantly lower and the plots are less densely built. Nevertheless, a large part of the area is often sealed and used as parking space.

The building

The most common building materials used in office buildings of this period are glass, steel and, above all, concrete. The latter is frequently used in the form of reinforced concrete in the supporting structure and thus leads to a high and long-lasting load-bearing capacity. On the other hand, the material greatly increases the cost of disposal in case of demolition.

The era marks a move away from pure functionalism towards more flexibility. This is also reflected in the floor plans, which are determined by a strict grid of columns. Load-bearing walls are often only load-bearing in the cores and play less of a role in the load-bearing capacity of the other sections.

Architectural Concepts and Issues

This departure is also reflected in the design, which on the one hand is determined by prefabrication but also reinvents ornamentation in the form of emphasised concrete elements (Brutalism), geometric patterns in the building concept (Structuralism) and historical exaggerated allusions in form and colour (Post-Modernism). Due to the scarcity of raw materials at this time, however, there was also a growing concern for the protection of historical monuments and the preservation of building fabric, and social criticism led to the first consideration of accessibility, especially in public buildings.

Typical problems in the renovation of buildings are significantly less insulation than today's standards with regard to temperatures and noise in walls and windows. But also the installed technology is outdated and less efficient than modern equipment. Escape routes and fire resistance urgently need to be checked and the building fabric checked for harmful substances such as asbestos.

Evaluation of the Influence on the Design

I was aware from the beginning that the field chosen would be very extensive and that the study could only be a start for further research. The research influenced in many respects several design decisions. This is not least due to the fact that the design was part of the research.

What I found particularly remarkable, however, was how similar the period from 1970 onwards was to the present day. In part, the parallels only developed during the project.

For example, the war in Ukraine currently reduces the European supply of gas and oil, even though there is already a shortage of raw materials due to the Corona crisis.

This is reminiscent of the oil crisis in the 1970s, which was caused by the Yom Kippur War (Eklkofer, 2018 n.p.). At that time, too, an epidemic, the Hong Kong flu, had just been overcome, but it had very little economic impact. Even in those days, the demand for solutions that were as durable as possible and, in the first stages, also sustainable, increased.

After the historical causes had previously only played a secondary role, the focus in the design process also increasingly shifted to historical origins. Due to a necessary densification of built spaces on the plot in Eindhoven, I also tried to transfer the results of my research in this field to the learning process for new buildings and additions.

The research thus influenced the decision-making process for the re-use of the police building as well as for the extensions. In each case, the goal of sustainability was taken into account.

The Context

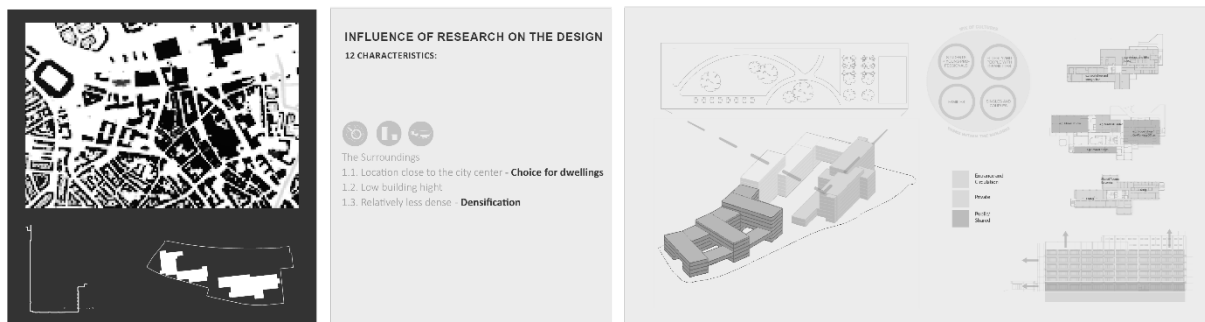


Image 1: Overview of the results in regard to the context and incorporation into the re-design (own work).

With regard to the surroundings, I have noticed that administrative office buildings are usually located in the immediate vicinity of the city centre. This location has encouraged me to seek a redevelopment as a residential building. Of course, zoning plans also play a role here, which is why no general recommendation can be made within the research.

Because of the current low building height, different extensions on top have been considered. However, there is also the possibility of increasing the height of the supplementary building and thus creating a balance. A particular influence, however, was the finding of low density on the building site. A density of 26% GSI, as in the case of Eindhoven, is economically inappropriate in this location. However, the large undeveloped area means that there are many possibilities for redevelopment. I have decided not only to aim for a higher density of buildings but also to break up the sealing and to create more green spaces.

The Building



Image 1: Overview of the results in regard to the building and incorporation into the re-design (own work).

One of the most commonly used building materials was concrete. Although sustainability of concrete is not self-explanatory here, sustainability considerations also played a role as concrete is very strong and durable. A first finding is that the sustainability aspect of the longevity of concrete only achieves its goal if it stands for a long time. In this respect, this aspect already speaks in favour of a conversion of the building, which, according to a rough calculation, can save a huge amount of CO₂.

A calculation of the embodied CO₂ of the police building showed an emission equivalent to more than 750 cars driving 12,000km. This is comparable to an average driving distance for one year.

As a result, I wanted to preserve as much as possible of the very characteristic material and consider and weigh its longevity in relation to the poor carbon footprint, even for the extensions.

Not only the material but also the design changed. The new prosperity, as well as the necessary flexibility of long standing buildings, led to a turn away from the functionalism of the post-war period. Instead of building a prototype for a function, and also because of the above-mentioned prefabrication, gridded floor plans were used for later adaptability. Especially in office buildings, the rapidly changing new technology, such as the first computers, also played a role here. This led me to use the offered flexibility for a new design and a continuation in the additions.

Some of the striking columns are additionally staged in the new design.

Issues

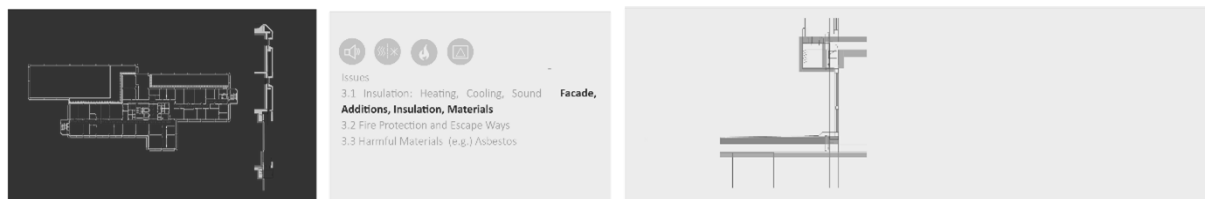


Image 1: Overview of the results in regard to the building issues and incorporation into the re-design (own work).

Some of the features found here, such as the harmful materials used, are of a more practical nature. In particular, however, the insulation has an influence on the design. In weighing up the changes to the façade, I decided to replace the old façade. While the balconies are an important part of the façade design, the curtain wall behind them has changed considerably due to fading caused by the weather, and its introverted dark colour of the windows themselves no longer corresponds to the new purpose of use or the technological requirements. In this case, the lack of insulation due to the temperature control as well as the building's impact from the railway and the road was more significant.

Architectural Concepts

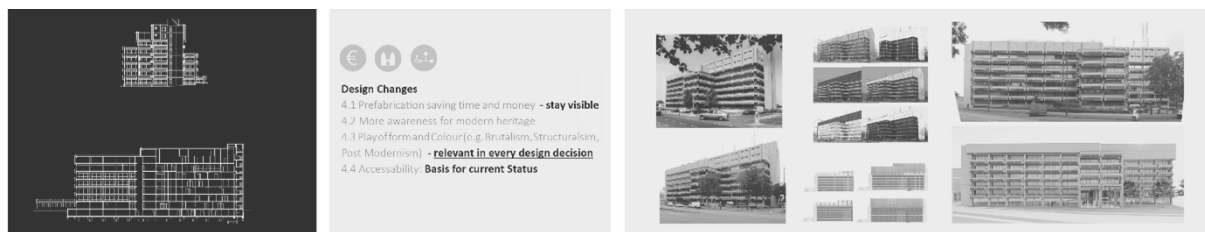


Image 1: Overview of the results in regard to the typical Design and Aesthetics and incorporation into the re-design (own work).

The identified architectural models of the 1970s and 1980s were particularly relevant for the design decisions. As mentioned above, the prefabricated concrete elements are not only very distinctive but also particularly characteristic. Despite conflicting aesthetic aspects, a decision was made in favour of preserving these elements.

Not only the material itself but also the current styles are relevant here. Post-modernism and brutalism as important architectural styles of the 1970s and 80s also represent a departure from pure functionalism. With their richness of colour and form, however, the buildings of these styles are not perceived in a positive way by everyone.

This formal language can be seen in the Eindhoven police in its rotationally symmetrical main body as well as the brutalist-looking top floors, the staircases and the sunshade balconies. Even though the police building did not really follow any of these architectural styles consistently.

Unfortunately, the balconies are not decoupled from the floors and therefore create a thermal bridge. They are also not usable as balconies in their current design. Because of the strong identity-forming effect, however, I decided to preserve the balconies and make them usable through the smallest possible interventions.

The research thus had a strong influence on the design because it enabled the values to be weighed up. Especially with regard to the topic of sustainability, however, it can be said that the period under study and thus also the building are pursuing initial approaches. However, the idea and also research around the topic of sustainability has developed strongly since the 2010s. During this time, a real trend developed. Thus, there are new building materials and technologies available today. Furthermore, the Corona crisis has led to a greater demand than ever for outdoor spaces close to the city. The research, though, made it possible to compare the findings of today with those of the past in terms of design. The results played an important role in the transformation of the building, but also in the complementary new construction, as the approach here was to create harmony through transferable design aspects of the 1970s and 80s and at the same time to contrast outdated ideas for example by reducing the use of concrete and instead using sustainable and regrowing resources such as wood or green façades.

Entanglement of project and the studio, the Architecture Master Track and the Master programme

The Master Track Architecture deals with the design as well as with historical and architectural theoretical backgrounds. Insights from research are used for architectural design. The transformed design of the police in Eindhoven is based, as described above, on design decisions qualified by research and thus corresponds to the working method of the track. In the Master of Architecture, however, not only purely artistic but also technical design is required. Technical feasibility and consideration in design decisions was taken into account at all times and influenced both in the research and in the transformation. On the other hand, the technical investigation has also led to some further insights for the research. In addition, the branch of architecture deals comprehensively with the building to be planned and its conditions. In the case of the police building in the Mathildelaan, the lighting conditions and noise were additional issues. These are solved in terms of urban planning by forming a courtyard and the interior design of the extension building. On an intangible level, this location also plays an important role for Eindhoven, as it is the starting point for the Eindhoven Marathon and a landmark as being a police building. This is also taken into account in the redesign.

The studio was the deciding factor for the research idea. I chose the studio because heritage conservation makes an important contribution to sustainability in architecture.

This relevance for sustainability aspects increases with the amount of possible application examples, which is very high for more modern buildings (see above). The SBT has provided me with a differentiated method for searching for characteristics as well as three possible case studies.

Relevance and possibility of application

The project aims to cover three major current problem areas with a recommended approach:

- heritage protection
- housing shortage
- Sustainability

In the first instance, the aim is to prevent the demolition of important buildings by making it possible to better evaluate properties that are not yet protected. To this end, it offers a key point paper of characteristics of the building period of the 1970s and 80s describes 3 straight lines of redesign on the basis of case studies (purely energetic renovation, slight alteration of the façade and preservation of the building core alone) and demonstrates a consideration and redesign on the basis of the police in Eindhoven as an example.

The amount of existing building fabric and its location offers good conditions for transformation into residential buildings to contribute to the housing shortage. On the other hand, a way must be found to represent the new character in the design. This is being investigated in the police design project. According to the calculations immanent to the study, the preservation alone can show that a lot of CO2 can be saved. Through lower disposal and material costs, however, money can also be saved. The design aims to either examine all identified characteristics for their suitability for sustainability. For example, urban green spaces can also be expanded here.

However, given the framework as a master's thesis, only a first approach can be given here, which should be understood as a basis for further research. The transferability of the police redesign to other administrative buildings depends on the respective legal and structural situation of other building objects. The case studies offer an overview of possible design stages. Instead of a 1:1 transfer, the project only demonstrates one possible solution, even if alternatives are dealt with at some points in the research by design. Unfortunately, it was not possible to present other ideas, as I was the only one choosing this building for intervention.

Summary

Finally, it can be said that my planning from the Research Plan was to a large extent realizable. The results represent a first list of characteristics of the time period studied that can be used for sustainability aspects or where an update to today's status might be necessary. I sincerely hope that these initial results can support further research in this area.

Personally, I have gained a lot from this project. During the research I became aware of how much the past and the present are similar. In terms of sustainability, it becomes particularly relevant to learn from the buildings of that time. We face similar questions and problems in architecture. Do we answer them in the same way? In some - yes, in some - to a certain amount, in others not at all: We have learned more in terms of technology and building materials. We have more old building material available than after the Second World War, which is worth evaluating whether it can be used in a new way. Finally, we also have the opportunity to draw on the knowledge of the previous period, and we should do so. This project makes a contribution to this.

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