Transformed Spaces

Strategies for Transforming Schools into Housing and Study Typological Evolution

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Table of Contents

Chapter 1: Introduction

The topic surrounding the heritage of buildings is starting to become more acknowledged, with the heritage of buildings being a crucial topic since these buildings denote and show glimpses of the past and its time layers (Mısırlısoy & Günce, 2016). More and more of the constructed heritage is being demolished to make way for example high-rise structures (Ragheb, 2021). The decision to reuse a heritage property necessitates a number of factors, including location, heritage value, architectural qualities, environmental treatments, and market trends. Building preservation has recently evolved from being just protective to becoming an important component of a holistic plan for urban regeneration and sustainability. Adaptive reuse is thus a strengthening strategy for dealing with this shift (Ragheb, 2021).

1.1 Adaptive reuse

The internationally recognized reference, the Burra Charter by ICOMOS Australia, defines 'adaptive reuse' as a sub-concept of 'adaptation,' which has been defined as: "Adaptation of a place for a new use... (is called) 'adaptive reuse'", rooted in the Latin terms "ad" (to) and "aptare" (fit). Dr. Johnson's Dictionary (1755) defines adaptation as "the act of fitting one thing to another." In the book 'Building Adaptation' by Douglas (2006), 'adaptive reuse' is further expounded as the conversion of buildings into more effective and efficient uses. "More effective" pertains to satisfying client needs and prolonging a building's usable life, while "more efficient" focuses on improving spatial and technological aspects to align with user requirements. Such conversions often necessitate structural changes to accommodate varying spatial and functional demands (Douglas, 2006).

Repurposing existing buildings for new functions is a common practice, and throughout history, structurally sound buildings have readily accommodated various uses and needs without significant challenges (Plevoets & Van Cleempoel, 2019). However, these adaptations were often driven by pragmatism rather than heritage preservation, emphasizing the practical and financial motivations behind reuse (Pérez de Arce, 1978; Powell, 1999). Meaning that there is always a reason to reuse.

1.2 Problem statement

The built environment is one of the most pressing issues for sustainable development since the building industry contributes the most to natural resource depletion, the greenhouse effect, and climate change. More than any other sector, the building industry contributes 40% of CO2 emissions (Le et al, 2021; Zimmermann et al, 2020). Therefore, sustainable construction is necessary for future sustainable development. Buildings, in reality, are long-lasting objects, often meant to last 60 years (Le et al, 2021). A study done on the improvement of outdated attempts of modernist post-war planning mentions that due to the age of post-war buildings these modern structures are entering a phase where fundamental questions are being asked about the future viability of these structures (Altrock, 2023). These questions regard energy, building services, and infrastructural requirements, in combination with changing demands for housing,

office work, and retail. Therefore, nowadays, the fate of built heritage of modern structures constructed after 1945 is particularly troublesome, with the risk of these structures being demolished and being replaced for example with high-rise buildings (Hartmann, 2022; Ragheb, 2021).

Among existing buildings, school buildings in general are in need of renovation due to their age and evolving teaching and learning methods (Le et al, 2021). Besides renovation, existing school buildings facing potential vacancy hold promise for adaptive reuse, especially due to the high-quality interior and exterior layout (Macmillen & Pinch, 2017). However, the challenge regarding school buildings is the building's possesion of old technology with regard to ventilation, thermal fittings, lighting, and acoustic (Le et al, 202; Farsäter & Olander, 2019).

When it comes to demolition and rebuilding a new structure, studies show that retrofitting, refurbishing or repurposing a building has less environmental impact and is mostly the economical choice (Bahadır et al, 2022; Sánchez et al, 2023; Zimmermann et al, 2020)

1.2.1 Demolition of school buildings

Hans Korbee, an advisor of the RVO and an expert in circular construction economy mentions that thousands of schools in the Netherlands need to be sustainably demolished to build a new building in their place (Korbee, 2016). Therefore, Post-war schools are becoming scarcer due to them rapidly disappearing by being demolished. Furthermore, In the 'Sectoriale routekaart' for making school buildings more sustainable published by the RVO (Rijksdienst voor Ondernemend Nederland) it is visibly that the schools in the Netherlands have an average of 40 years. This means that post-war schools are the category that is in danger of being demolished now (Rijksdienst voor Ondernemend Nederland, 2021). Just like the post-war churches and other building types, these schools also need protection. Not only because of their architectural-historical significance and financial value but especially because of the inseparable collective memory they hold in many post-war generations (Keminga & Wessel, 2013). The research firm that strives to improve school architecture 'Stichting Mevrouw Meijer'(2019) sees these post-war schools as a great cultural significance and thus worth saving, with great potential to adapt to future use (Keminga, 2020).

1.2.2 Number of students declining and vacancy

Another problem surrounding schools is the decline in the number of students in both primary and secondary schools in the Netherlands. Since 2008 there has been a decline of 170.000 in primary schools and between 2016 and 2031 130.000 in secondary school (Rijksoverheid, 2023).

Even cities like Amsterdam predict a shrinkage in the number of students in primary and secondary schools. In the upcoming 5 years, the number of students in primary school will decrease from 60.945 to 58.109 students, and in secondary schools there will be a total decrease of 5.8%. This decrease is mainly caused by the expected departure of families with children from the city (Gemeente Amsterdam, 2023).

When zooming in to a district, it is noticeable for instance that Amsterdam Nieuw-West (figures 1 and 2), the district this Master studio is focused on, also experiences a decrease in the number of students (Gemeente Amsterdam, 2023). Additionally, Rijksoverheid (2023) suggests that merging 2 or more schools can be a way of solving problems caused by student decrease. When doing so one or more schools will be empty and can house a new function, making it possible for an adaptive reuse project. Currently the Netherlands have a few vacant educational buildings with around 50 in North Holland (figures 3 and 4) (CBS, 2022). In the last known data from 2016 regarding school buildings in Amsterdam Nieuw-West shown in figure 5, it is visible that 14 schools are closed or have moved making it possible that the building is now vacant or has a temporary use (Nio et al, 2016).

Stadsdeel	2020/'21	2021/'22	prognose 2022/'23	telling 2022/'23	verschil
Centrum	3.765	3.650	3.682	3.550	-132
Nieuw-West	12.463	12.275	12.214	12.193	-21
Noord	8.687	8.880	8.800	8.918	118
Oost	10.303	9.767	9.685	9.540	-145
Weesp	1.738	1.822		1.953	
West	8.513	8.390	8.149	8.180	31
Zuid	10.534	10.220	9.989	10.045	56
Zuidoost	6.867	6.665	6.567	6.566	-1
Amsterdam	62.870	61.669	59.086	60.945	-94

Figure 1 - number of students in primary schools in Amsterdam (Gemeente Amsterdam, 2023)

Stadsdeel	2020/'21	2021/'22	prognose 2022/'23	telling 2022/'23	verschil
Centrum	1.109	1.148	1.165	1.174	9
Nieuw-West	7.391	7.760	7.783	8.073	290
Noord	4.709	4.740	4.820	4.800	-20
Oost	7.492	7.632	7.781	7.544	-237
Weesp	1.676	1.677		1.739	
West	2.810	2.731	2.687	2.732	45
Zuid	16.535	16.459	16.531	17.236	705
Zuidoost	2.802	3.173	3.174	3.228	54
Amsterdam	44.524	45.320	43.941	46.526	846

Figure 2 - number of students in secondary schools in Amsterdam (Gemeente Amsterdam, 2023)

1.2.3 Housing shortage

Finally, the last problem is that the Netherlands is dealing with a shortage on housing with almost 400.000 dwellings short. 'The Programma Woningbouw' describes the approach to increase the construction of dwelling with the aim to realize 900.000 homes by 2030 whereby 52.500 are expected to be built in Amsterdam by 2025 (Rijksoverheid, 2022, p.5; Gemeente Amsterdam, 2018).

Therefore, the current housing crisis asks for more typologies and room for these houses. By combining the preservation of (post-war) school buildings with the housing crisis problem, a new typology can be created by applying adaptive reuse strategies to transform heritage school buildings into housing.

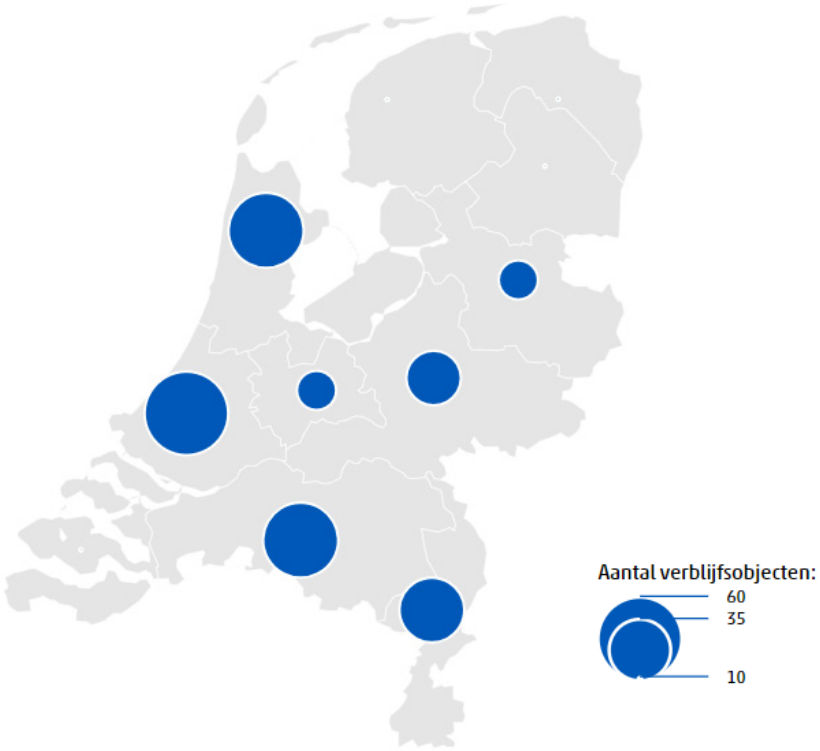


Figure 3 - CBS vacancy of educational building per Provence (CBS, 2022)

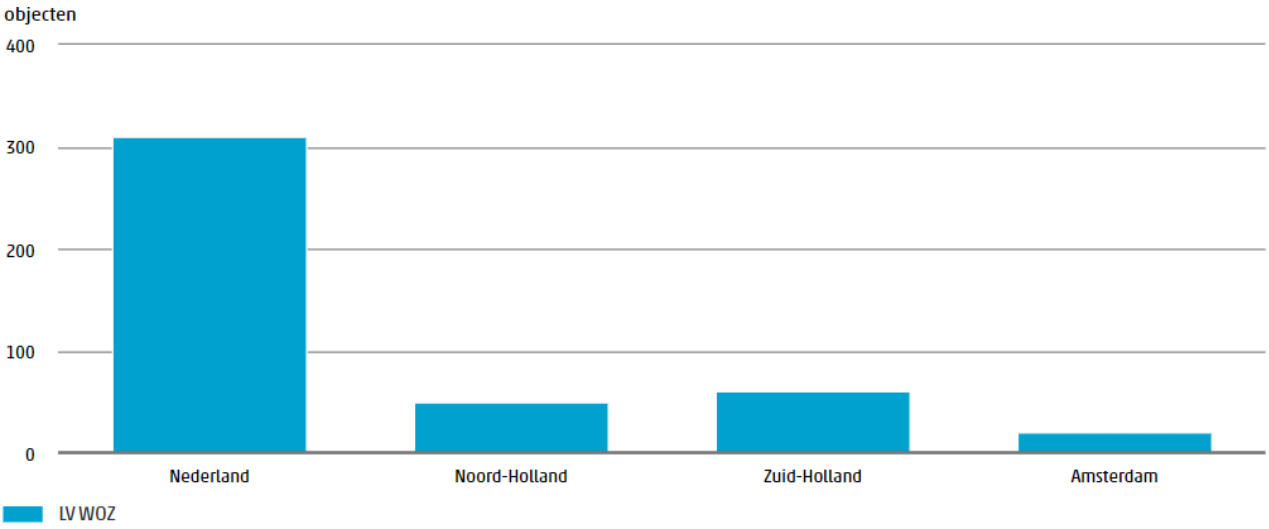


Figure 4 - Vacancy educational buildings in the Netherlands in 2022 (CBS, 2022)

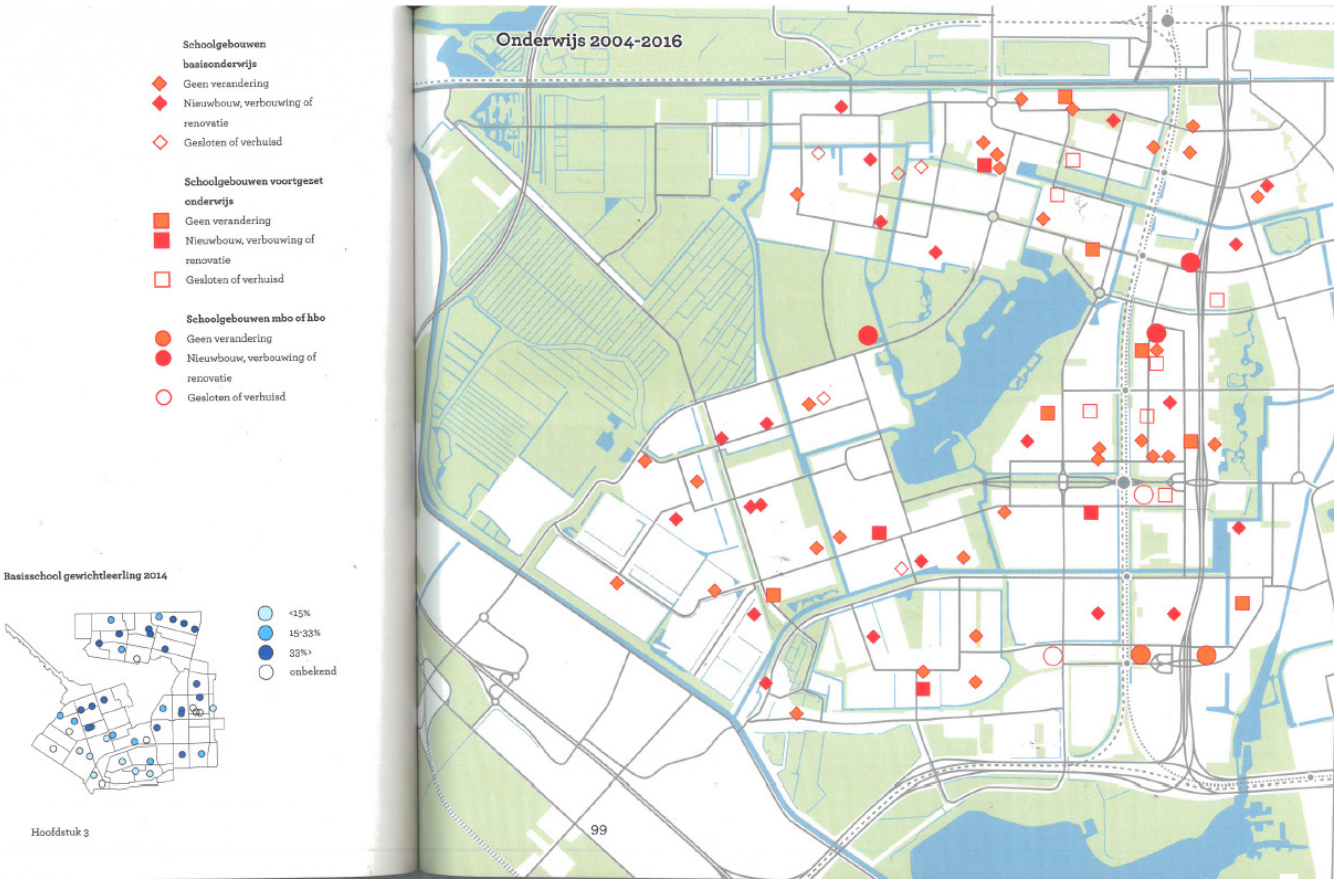


Figure 5 - Education 2004-2016 Amsterdam Nieuw-West (Nio et al., 2016)

1.3 State-of-the-art

So far research surrounding the combination of these problems and the transformation of school buildings is limited. The state-of-the-art will be split into two fields of study: literature on the transformation of (school) buildings and literature on the cultural value of buildings.

1.3.1 Existing literature on transformation of old (school) buildings

A paper written by two scholars Plevoets and Van Cleempoel (2011) gives an overview of the academic literature on adaptive reuse. This paper compares and classifies theories based on how they handle adaptive reuse. There are three main approaches that can be identified: typological, technical, and strategic (Plevoets & Van Cleempoel, 2011). The first publication on adaptive reuse mentioned by Plevoets and Van Cleempoel (2011) was a book called 'New uses for old buildings' written by Cantacuzino (1975). This book covers various cases but does not go in depth in the transformation of these cases. Douglas (2006) also covers the adaptation of buildings, but the range of building types discussed is limited. There are no school buildings mentioned and from the building types mentioned, there are only a few new uses discussed for each type, but no supporting case studies are included.

Furthermore, other sources with emphasis on the typological approach have tackled the reuse of one specific building type, e.g. religious buildings (Alavedra & Marin, 2007; Morisset et al, 2006) and industrial buildings (Bordage, 2002; Stratton, 2000). However, schools are researched in a more limited extend. So far there are no guidelines or strategies in transforming a school building into dwellings. One book titled 'De transformatie van het schoolgebouw' by Dam, Komossa, and Spoormans (2011), created in collaboration with Delft University of Technology, documents and classifies twenty school buildings into transformation groups. However, the book is outdated, and it provides only one case study on the transformation of a school into housing. Brooker and Stone (2004), Jäger (2010), and Robert (1989) also looked at similar terms regarding design strategies (figure 6).

Moreover, a study published in 2023 focused on a decision-making framework to prioritize existing school buildings in Iran for adaptive reuse. For this research an Adaptive Reuse Potential (ARP) model, developed by Langston et al. (2007, 2008), was applied in 29 school buildings where enough information was available. However, this study is quite broad and requires a big time-frame (Pourebrahimi et al, 2023).

<table>
<tr><th colspan="6">Design strategies (interventions)</th></tr>
<tr><th>Robert 1989</th><th>Brooker & Stone 2004</th><th>Jäger 2010</th><th colspan="3">Dam, Komossa, Spoormans 2011</th></tr>
<tr><td>Building within</td><td>Insertion</td><td>Transformation</td><td>Absorption</td><td rowspan="4">Repetition</td><td rowspan="4">Diversity</td></tr>
<tr><td>Building over</td><td></td><td rowspan="3">Addition</td><td rowspan="3">Addition</td></tr>
<tr><td>Building around</td><td rowspan="3">Intervention</td></tr>
<tr><td>Building alongside</td></tr>
<tr><td rowspan="2">Adapting to a new function</td><td>Conversion</td><td rowspan="4"></td><td rowspan="4"></td><td rowspan="4"></td></tr>
<tr><td>Installation</td><td rowspan="3"></td></tr>
<tr><td>Building in the style of</td></tr>
<tr><td>Recycling material of vestiges</td></tr>
</table>

Figure 6 - Analogy between described strategies towards adaptive reuse (own work).

A book called “Make it anew” by Hans Ibelings and Diederendirrix architects looks at four approaches to transform a building: Restore, Repurpose, Restructure, and Regenerate. These four approaches are put into two regions created by two axes (figure 7) (Ibelings & Diederendirrix, 2018). In this book 17 cases are analyzed and for each case the following is mentioned: Client, Transformation Year, Size, Original Architect, Original function, and Construction Year. The method used in this book is definitely a method that can be used in this thesis to categorize the selected case studies.

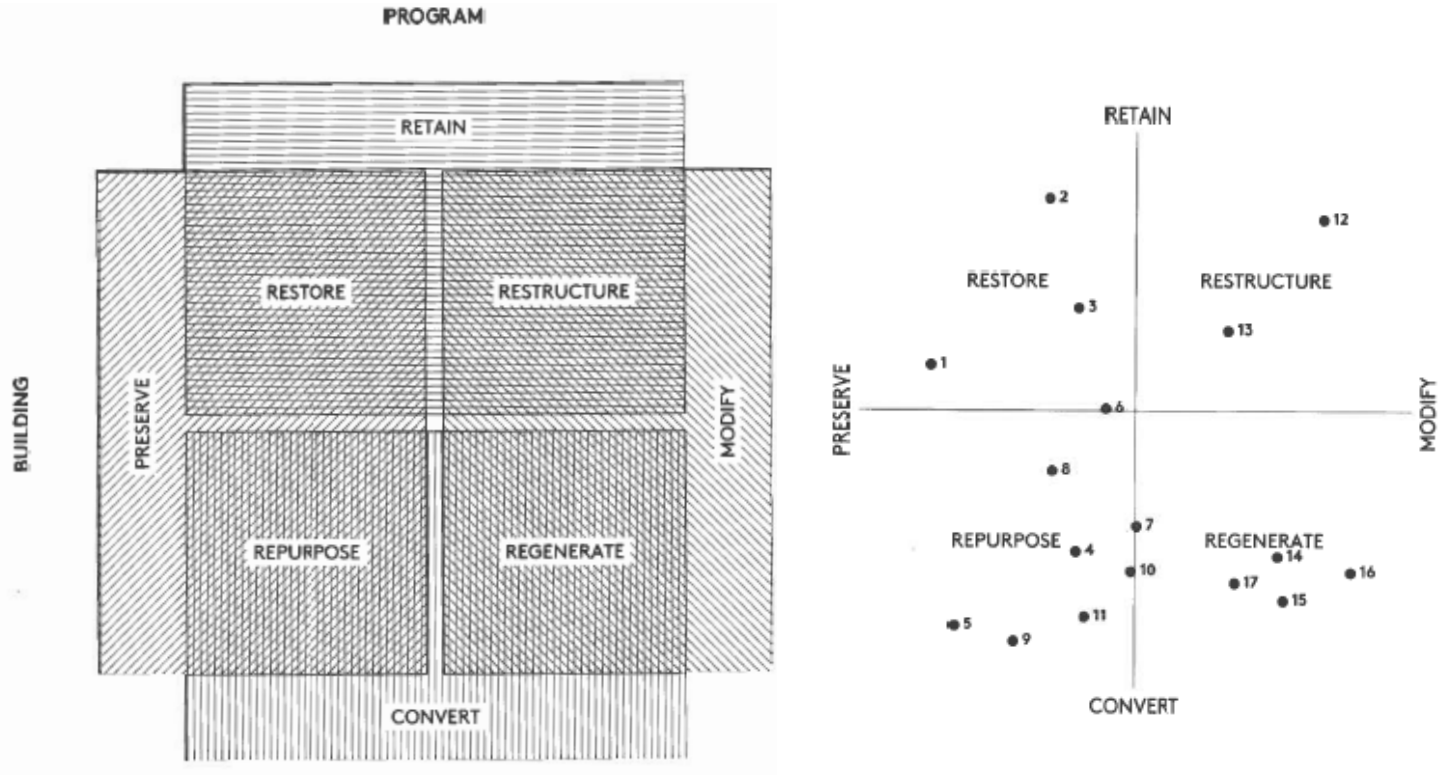


Figure 7 - four approaches to transform a building (Ibelings & Diederendirrix, 2018)

1.3.2 Cultural value of buildings

A recent study by Spoormans & Pereira Roders (2020) on the methods for assessing values of architecture in residential neighborhoods looked at the state-of-the-art and concluded that aesthetical, ecological, and age values were underrepresented. According to this literature review, different disciplines evaluate diverse values in their research. A value framework mentioned by Spoormans & Pereira Roders (2020), is the values framework (figure 8) by Pereira Roders (2007). This framework is seen as a broad and simple classification of most values.
The definitions of the values shown in this framework are added in figure 9, which acts as a guidance to identify primary values of cultural heritage assets (Tarrafa Silva & Pereira Roders, 2012).

Figure 8 - Values framework (Pereira Roders, 2007)

Primary values		Secondary Values	References
	Social	Spiritual	beliefs, myths, religions (organized or not), legends, stories, testimonial of past generations;
		Emotional, individual	memory and personal life experiences;
		Emotional, collective	notions related with cultural identity, motivation and pride, sense of "place attachment" and communal value.
		Allegorical	objects/places representative of some social hierarchy/status;
	Economic	Use	the function and utility of the asset, original or attributed;
		Non-use	the asset's expired function, which has it value on the past, and should be remained by its existence (of materials), option (to make some use of it or not) and bequest value (for future generations);
		Entertainment	the role that might be have for contemporaneous market, mainly for tourism industry;
		Allegorical	oriented to publicizing financially property;
	Political	Educational	the education role that heritage assets may play, using it for political targets (e. g. birth-nations myths, glorification of political leaders, etc.);
		Management	made part of strategies and policies (past or present);
		Entertainment	it is part of strategies for dissemination of cultural awareness, explored for political targets;
		Symbolic	emblematic, power, authority and prosperous perceptions stem from the heritage asset;
	Historic	Educational	heritage asset as a potential to gain knowledge about the past in the future through;
		Historic-artistic	quality of an object to be part of a few or unique testimonial of historic stylistic or artistic movements, which are now part of the history;
		Historic-conceptual	quality of an object to be part of a few or unique testimonial that retains conceptual signs (architectural, urban planning, etc.), which are now part of history;
		Symbolic	fact that the object has been part/related with an important event in the past;
		Archaeological	connected with Ancient civilizations;
	Aesthetical	Artistic	original product of creativity and imagination;
		Notable	product of a creator, holding his signature;
		Conceptual	integral materialization of conceptual intentions (imply a conceptual background);
		Evidential	authentic exemplar of a decade, part of the History of Art or Architecture;
	Scientific	Workmanship	original result of human labour, craftsmanship;
		Technological	skillfulness on techniques and materials, representing an outstanding quality of work;
		Conceptual	integral materialization of conceptual intentions (imply a conceptual background);
	Age	Workmanship	craftsmanship value oriented towards the production period;
		Maturity	piece of memory, reflecting the passage/lives of past generations;
		Existential	marks of the time passage (patine) presents on the forms, components and materials;
	Ecological	Spiritual	harmony between the building and its environment (natural and artificial);
		Essential	identification of ecological ideologies on its design and construction;
		Existential	manufactured resources which can either be reused, reprocessed or recycled;

Figure 9 - The definitions of the cultural values framework of Pereira Roders (Tarrafa Silva & Pereira Roders, 2012)

1.4 Aims and Objectives

This research aims to gain more understanding of adaptive reuse approaches of various case studies and to then add to the research gap regarding the transformation of school buildings into housing. It is therefore important to obtain knowledge of adaptive reuse projects to fill in this gap. The research question is: 'What strategies can be used to transform schools into housing while preserving their cultural value, and how does the typology transition between these two functions evolve?' The following sub-questions must be regarded in order to answer this research question:

- How have previous adaptive reuse projects tackled the transformation of a school building into housing and what strategies can be concluded?
- What design protocols should be followed in creating a new housing typology?
- Which adaptive reuse strategy is more suitable for Rendorpschool?
- Which cultural values are important for Rendorpschool?

Chapter 2: Methodology

This research applies a mixed-method approach. For question one a general comparative case study will be done using the four approaches to transform a building by Hans Ibelings & Diederendirrix (2018). This framework will be used to classify and analyze the research data. The following criteria will be used to make the decision: 19 school buildings in the Netherlands are selected by using websites like: gebouwdin.amsterdam.nl, herbestemming.nl and architecture firm websites. To ensure that the strategies discovered are not confined to a single region, cases from various parts of the nation are chosen (Appendix 1). The cases need to be post-war adaptive reuse projects with a new dwelling function. The chosen projects are of varied sizes. The data collected will be the following: Picture, Name, Construction Year, Transformation Year, Size, Location, Original Floorplan, and New Floorplan.

The strategies used in the redesigns will be identified using primary sources about the interventions, by looking at the difference between the original and new floor plans. Additionally, cases with no data on either the original or the new floorplans are filtered out. The cases will be grouped based on their strategies and interventions. An overview is built for each instance, based on the interventions in each case study and the before and after these transformations. This enables the creation of a general overview of all interventions

The number of groups established will dictate the extent of the analysis. Within each group, one case will be deliberately chosen, and a more comprehensive analysis will be conducted, with a specific focus on the smaller scale of the building, including spaces, room dimensions, interior circulation, sustainability, and ceiling heights. Simultaneously, on a larger scale, considerations such as the site, accessibility, outdoor pathways, and potential additions are taken into account. Consequently, a more detailed transformation overview is generated, and the effects across all scales become visible.

Furthermore, to be able to answer the second question a literature study will be done on the existing design protocols in the Netherlands. Finally, a unique and new matrix will be created based out of the combination of the design protocols, and the detailed and general overview.

The objective of using this matrix is to determine whether it can serve as a new research and documentation tool for architects and researchers in the field of heritage and architecture, in addition to providing answers to the research questions mentioned above. It might be a useful addition to the heritage as vector approach and the current biographical research methodologies, especially for those engaged in the design process.

Most disciplines are more text orientated while architects are more visually orientated. The school building intervention matrix may be useful for obtaining a concise, visual overview of all interventions and may serve as a starting point for evaluating the comparative qualities of the various interventions. It makes it simpler for designers to quickly understand what they are dealing with and may be a more effective way of communicating research. Additionally, it forces the compiler to at the very least confirm that data for all scales is available. This new matrix will be tested out on the design case, Rendorpschool located in Amsterdam Nieuw-West.

Prior research will be done on the Rendorpschool. Fieldwork and research with (architectural) drawings from the archives will be done. For the selected design case the cultural value will be assessed using the values framework by Pereira Roders (2007). Due to this framework being broad, in this thesis the focus will be set on the historic, age and aesthetical values. The choice for age and aesthetical values is due to the research gap on these fields.

Together with the cultural value assessment by Pereira Roders (2007), the matrix will shape and help answer the last question regarding the forming of an adaptive reuse strategy for the creation of a housing typology in a school building.

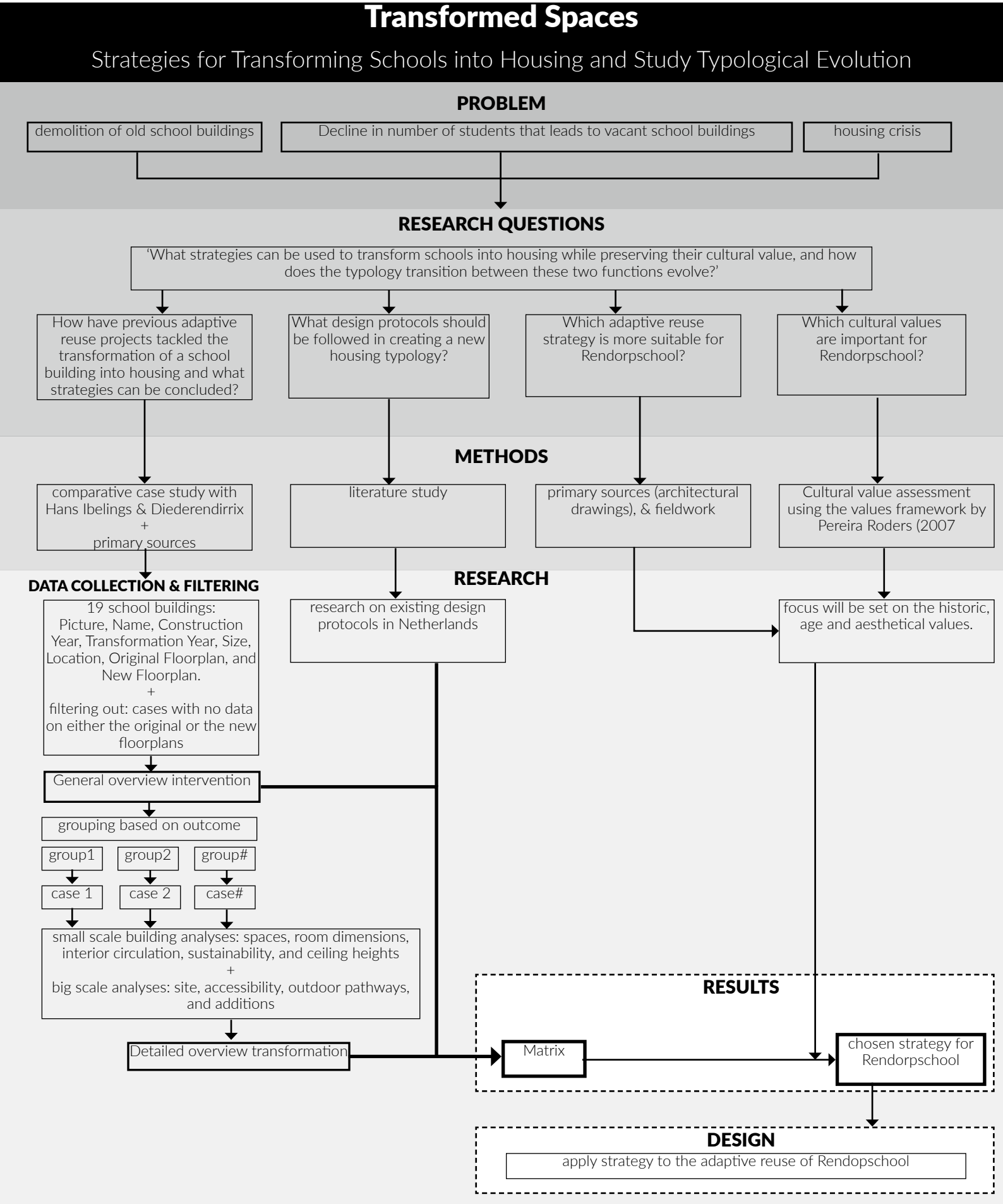
2.1 Risks and Mitigation

A general analyses will be done on the school transformations of 19 case studies. If it takes to long to find data on all 19 cases, e.g. original or new floor plans, then the number of cases will be narrowed down. Furthermore, if not enough cases around the Netherlands are found the scope will be narrowed to only buildings in Amsterdam. Finally, if not enough adaptive reuse cases on post-war school buildings are found, school buildings of other periods will be analyzed.

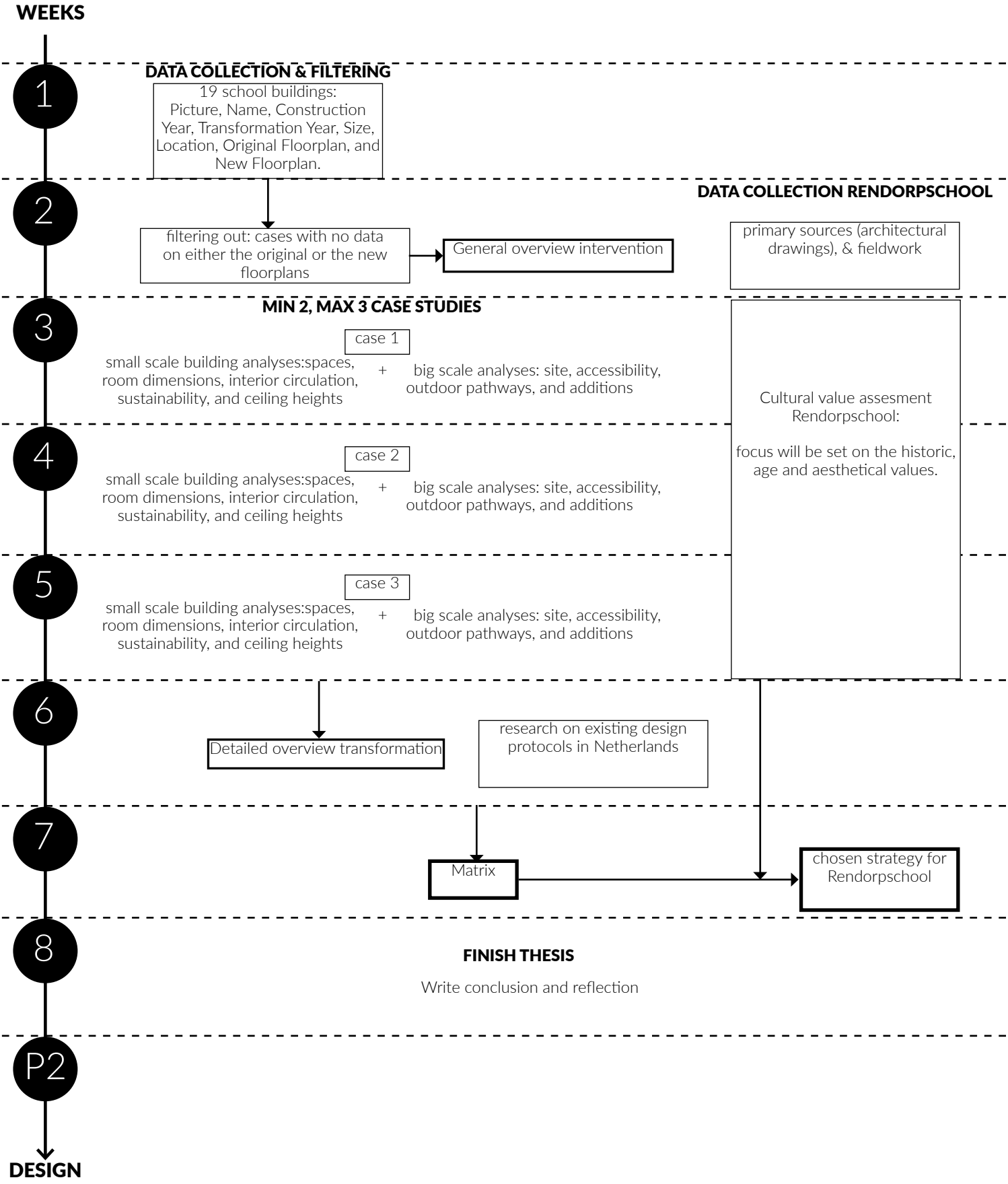
In order to prevent the research from remaining superficial, an in-depth study will be conducted on one case from each group that has been established in the context of the general analyses. Due to the 8-week time constraint, a minimum of two cases will be subjected to analysis, depending upon the number of groups formed. Furthermore, if time permits, an additional case will be subjected to a more thorough research process.

Ultimately, if time allows the analysis of the Rendorpschool will be integrated into the thesis, or alternatively, it will be applied in the design process after the 8-week time-frame.

2.2 Research plan overview

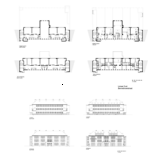
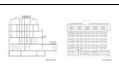


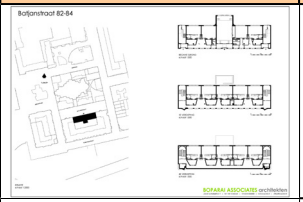
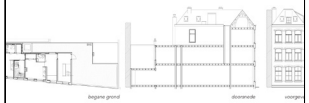
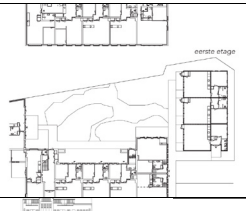
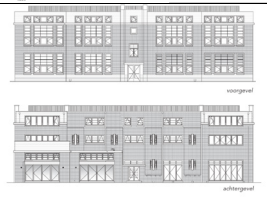
2.3 Research timeline

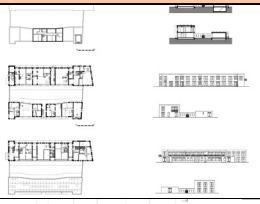
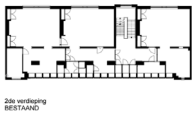
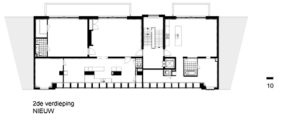
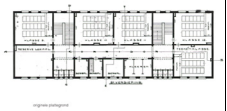
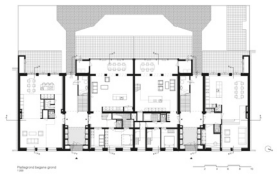
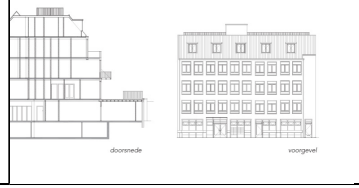


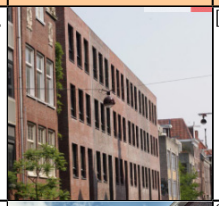
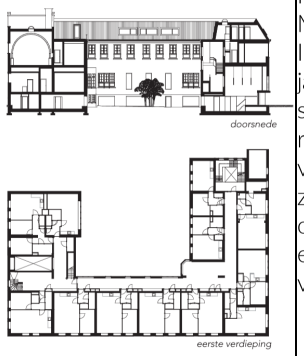
Chapter 3: Appendices

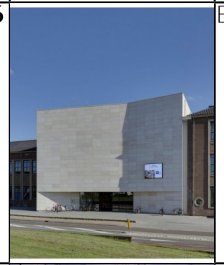
Appendix 1 - Overview refrence cases (so far). Detailed on next pages

NUMBER	Picture	REFERENCE CASES	CONSTRUCTION YEAR	TRANSFORMATION YEAR	LOCATION	LINK	FLOORPLAN OLD	FLOORPLAN NEW	CATEGORY	MONUMENT STATUS
1		Batjanstraat 56-84 13 homes	1998?	2014/2015	Batjanstraat 56-84 , Amsterdan Oost	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=1157&selected_balkitem_id=531&UserQuery=transformatie				?
2		Stek Zuid 12 homes and collective space	1910	2018/2019	Henrick de Keijserstraat 14-16, Amsterdam Zuid	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=3317&selected_balkitem_id=531&UserQuery=transformatie				?
3		Jan Ligthartschool 19 homes	1933	2015/2016	Kraaipanstraat 54-56, Amsterdan Oost	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=1293&selected_balkitem_id=531&UserQuery=herbestemming				?
4		Lokaal Zuid FV 10 7 homes	1931	2013/2014	Floris Versterstraat 10-12, Amsterdam Zuid	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=1034&selected_balkitem_id=531&UserQuery=herbestemming,				?
5		Kalkoenstraat 11 Christian primairy school now 9 homes	1923s	2018/2019	Kalkoenstraat 11, Amsterdam Noord	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=3364&selected_balkitem_id=531&UserQuery=herbestemming,			Christian Primairy School	?
6		Amundsenhofje homes: 15	1964	2014/2015	Amundsenweg 1, Amsterdam West	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=1127&selected_balkitem_id=531&UserQuery=herbestemming				?
7		Lokaal Zuid BB homes:10	1930	2013/2014	Bennebroekstraat 11-13, Amsterdam Zuid	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=1033&selected_balkitem_id=531&UserQuery=herbestemming				?
8		Lokaal Zuid FV 11 homes: 7	1931	2013/2014	Floris Versterstraat 11, Amsterdam Zuid	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=1035&selected_balkitem_id=531&UserQuery=herbestemming				?
9		Ons Dorp Amsterdam homes: 10 with comercial area	1910	2014/2015	Elisabeth Wolffstraat 50. Amsterdam West	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=1123&selected_balkitem_id=531&UserQuery=school				?
10		De Rapenburger homes:28	1998?	2017/2018	Rapenburgerstraat 76, Amsterdam Centrum	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=1633&selected_balkitem_id=531&UserQuery=school			old university	?
11		De Roos homes:23	2007 infront of 1005 building?	2007/2008	Rozenstraat 198-208, Amsterdam centrum	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=267&selected_balkitem_id=531&UserQuery=school			extension with nieuwbouw	?
12		Stek Noord homes:34	1914-1916	2018/2019	Havikslaan 20 en 22, Amsterdam Noord	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=3365&selected_balkitem_id=531&UserQuery=school			2 of 3 old schoolbuildings	?
13		CPO Zaaiersweg homes:8	1931	2016/2017	Zaaiersweg 11-15, Amsterdam Oost	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=1461&selected_balkitem_id=531&UserQuery=school				?
14		De Baak Zuid homes:35 + Huis van Wijk+ Collective space (The old chapel)	1926	2019/2020	Vechtstraat 90-94, Rijnstraat 115, Amsterdam Zuid	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=1&item_id=3470&selected_balkitem_id=531&UserQuery=school			Klooster and Meisjesschool: In de loop der jaren is het schoolgebouw regelmatig verbouwd en zijn er veel oorspronkelijke elementen verdwenen.	?
15		Adaptive reuse school building to housing homes:3	1890	2016	Waranda 150, Schiedam	https://normaalkracht.nl/portfolio/herbestemming-school/				?
16		Brewinc Cultuurcluster	1952-1964	2011	Usselkade 13 7001 AN Doetinchem	https://www.herbestemming.nl/projecten/brewinc-cultuurcluster-doetinchem				Gemeentelijke monument
17		Vermeerschool apartments:16	1921	2007	Vermeerlaan 13 1213 EA Hilversum	https://www.herbestemming.nl/projecten/transformatie-vermeerschool-hilversum				Gemeentelijke monument
18		De Oude School apartments: 9 and 1 company space	1917	2012	M.P. lindostraat 4 3532XE Utrecht	https://www.herbestemming.nl/projecten/de-oude-school-utrecht			Public Primairy school	-
19		Ambachtsschool Ateliers + Homes	1934	2010	Mimosastraat 1 8013 SB Zwolle	https://www.herbestemming.nl/projecten/ambachtsschool-zwolle				Rijksmonument

#	PICTURE	CASES	CONST.YEAR	TRANSF.YEAR	LOCATION	FLOORPLAN OLD	FLOORPLAN NEW	NOTES		LINK
1		Batjanstraat 56-84 13 homes	1998?	2014/2015	Batjanstraat 56-84 , Amsterdan Oost				?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=1157&selected_balkitem_
2		Stek Zuid 12 homes and collective space	1910	2018/2019	Henrick de Keijserstraat 14-16, Amsterdam Zuid				?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=3317&selected_balkitem_
3		Jan Ligthartschool 19 homes	1933	2015/2016	Kraaipanstraat 54-56, Amsterdan Oost				?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=1293&selected_balkitem_
4		Lokaal Zuid FV 10 7 homes	1931	2013/2014	Floris Versterstraat 10-12, Amsterdam Zuid				?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=1034&selected_balkitem_
5		Kalkoenstraat 11 Christian primairy school now 9 homes	1923s	2018/2019	Kalkoenstraat 11, Amsterdam Noord			Christian Primairy School	?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=3364&selected_balkitem_

#	PICTURE	CASES	CONST.YEAR	TRANSF.YEAR	LOCATION	FLOORPLAN OLD	FLOORPLAN NEW	NOTES		LINK
6		Amundsenhofje homes: 15	1964	2014/2015	Amundsenweg 1, Amsterdam West				?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=1127&selected_balkitem_
7		Lokaal Zuid BB homes:10	1930	2013/2014	Bennebroekstraat 11-13, Amsterdam Zuid				?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=1033&selected_balkitem_
8		Lokaal Zuid FV 11 homes: 7	1931	2013/2014	Floris Versterstraat 11, Amsterdam Zuid				?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=1035&selected_balkitem_
9		Ons Dorp Amsterdam homes: 10 with comercial area	1910	2014/2015	Elisabeth Wolffstraat 50. Amsterdam West				?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=1123&selected_balkitem_
10		De Rapenburger homes:28	1998?	2017/2018	Rapenburgerstraat 76, Amsterdam Centrum			old university	?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=1633&selected_balkitem_

#	PICTURE	CASES	CONST. YEAR	TRANSF.YEAR	LOCATION	FLOORPLAN OLD	FLOORPLAN NEW	NOTES	MONUMENT STATUS	LINK
11		De Roos homes:23	2007 infront of 1005 building?	2007/2008	Rozenstraat 198-208, Amsterdam centrum			extension with nieuwbouw	?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=267&selected_balkitem_
12		Stek Noord homes:34	1914-1916	2018/2019	Havikslaan 20 en 22, Amsterdam Noord			2 of 3 old schoolbuildings	?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=3365&selected_balkitem_
13		CPO Zaaiersweg homes:8	1931	2016/2017	Zaaiersweg 11-15, Amsterdam Oost				?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=1461&selected_balkitem_
14		De Baak Zuid homes:35 + Huis van Wijk+ Collective space (The old chapel)	1926	2019/2020	Vechtstraat 90-94, Rijnstraat 115, Amsterdam Zuid			Klooster and Meisjesschool: In de loop der jaren is het schoolgebouw regelmatig verbouwd en zijn er veel oorspronkelijke elementen verdwenen.	?	https://www.gebouwdin.amsterdam.nl/main.asp?action=display_html_pagina&name=detailpagina&booMarge=-1&item_id=3470&selected_balkitem_

#	PICTURE	CASES	CONST. YEAR	TRANSF.YEAR	LOCATION	FLOORPLAN OLD	FLOORPLAN NEW	NOTES	MONUMENT STATUS	LINK
15		Adaptive reuse school building to housing homes:3	1890	2016	Waranda 150, Schiedam				?	https://normaalkracht.nl/portfolio/herbestemming-school/
16		Brewinc Cultuurcluster	1952-1964	2011	IJsselkade 13 7001 AN Doetinchem				Gemeentelijke monument	https://www.herbestemming.nl/projecten/brewinc-cultuurcluster-doetinchem
17		Vermeerschool apartments:16	1921	2007	Vermeerlaan 13 1213 EA Hilversum				Gemeentelijke monument	https://www.herbestemming.nl/projecten/transformatie-vermeerschool-hilversum
18		De Oude School apartments: 9 and 1 company space	1917	2012	M.P. lindostraat 4 3532XE Utrecht			Public Primairy school	-	https://www.herbestemming.nl/projecten/de-oude-school-utrecht
19		Ambachtsschool Alteliers + Homes	1934	2010	Mimosastraat 1 8013 SB Zwolle				Rijksmonument	https://www.herbestemming.nl/projecten/ambachtsschool-zwolle

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Chapter 5: Figures list