TRANSFORMATION
OF PRISONS

a new function for the
panopticon prison of Breda

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This graduation project at the Technical University of Delft is part of the studio Explore Lab. In this studio, the graduation consist of a research and a related architectural design. The topic of this research document is the transformation of existing prisons in The Netherlands. A design will be made for the Koepelgevangenis in Breda.

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When I heard that, due to budget cuts, a lot of prisons in the Netherlands were closing in the next few years, I was immediately interested. Some of these prisons are listed as a monument, and cannot be demolished. Successfully transform these prisons into incorporating a new function, seemed like a difficult task. The association I had with prisons, was an atmosphere that doesn’t easily suit other functions. Prisons have a very specific building structure and architectural appearance. They are a whole society, designed for the sole purpose to keep people inside, lock them up. Philosophers, writers, artists and ordinary citizens are intrigued by those micro-worlds, closed of the regular life. These worlds form simultaneously an integral part of our society. A prison actually has a public function, but is not accessible.

When I started reading more about prisons in the Netherlands, I became more and more fascinated. In The Netherlands the first prisons were built in the mid-19th century. Because this was a newly required building type, architects could think from the start about how this buildings should function and look like. A prison is a reflection of the time in which it was build. It expresses the way that was though about good and evil and crime and punishment. That makes the philosophy behind these buildings very visible and intriguing.

The fact that there are actually prisons closing in the Netherlands, in combination with the specific building characteristics, makes the conversion of prisons a very topical and interesting subject for my graduation project.
In this chapter the problem definition is described. In addition, the political, social and economic relevance are explained. After that, the scientific relevance will be clarified.

2.1 POLITICAL, SOCIAL AND ECONOMIC RELEVANCE
State secretary of Security and Justice, Frederik Teeven, has decided that in the next few years 19 detention centers in the Netherlands will be closed. That is a quarter of all that appear in the Netherlands. New prisons will be built in Zaanstad and Veenhuizen. The detention centers that will close are: (Benschop, 2013)

2014
* Amsterdam, Havenstraat
Roermond, Te Roer
Scheveningen, ZBBI
Middelburg, Nederhof
Almelo, Niendure
Maastricht, Overmaze
Hoogeveen
Grave, De Marstal

2015
*Utrecht, Wolvenplein
Doetinchem, de Kruisberg
Alkmaar, Westerlinge
Tilburg

2016
*Haarlem, Koepelgevangenis
*Arnhem, Koepelgevangenis de Berg
*Breda, Koepelgevangenis
Amsterdam, Over-Amstel
Amsterdam, Tafelbergweg
Veenhuizen, Esserheem
Veenhuizen, Norgerhaven

* indicates a prison that is listed as a monument

The government needs to find buyers in order to economize the anticipated and required 340 million euros. (Benschop, 2013)

Vacancy is not an option for several reasons. First of all, the maintenance costs are too high. (Dongen, 2012, p. 6) Besides that, a vacant complex as big as a prison creates an unpleasant atmosphere in the surrounding neighborhood and city. These complexes are often important for the outline and structure of a city. (Nelissen, 1999, p. 27) The hermetic nature ensures that the, often huge, complexes are meaningful in their urban context. Many penitentiary complexes are of cultural-historical, architectural and urban value. (Dongen, 2012, p. 6) Vacant buildings are also a waste of precious space in The Netherlands. (Nelissen, 1999, p. 26)

Two prisons in The Netherlands are already vacant since 2008. It turns out to be very hard to find a new function for a former prison complex. (Dongen, 2012) These buildings were originally built for a very specific function and as a consequence they are not easy to use for other purposes. (Nelissen, 1999, p. 9) Especially the conversion of cell wings, with a monotonous repetition of massive constructed cells, has limitations. (Dongen, 2012, p. 23)

The loss of the original function of prisons, has a prominent place in public debate in the last decades. As mentioned: vacancy, demolition or conversion may indeed have a major impact on the complexes themselves, but also on the immediate environment, both physically, emotionally, socially and economically. (Dongen, 2012, p. 6) For example, the fact that a Facebook page has been made to discuss the future of the panopticon prison in Haarlem, shows the involvement of civilians. The increasing vacancy rate is high on the political agenda in the Netherlands.

In conclusion, 19 prisons are coming onto the market. Because vacancy or demolition is not an option for these complexes, it is inevitable that for some of these buildings a new function must be found. Prisons are such specific buildings that they are difficult to use for other purposes. Research on possible other purposes is therefore essential.
2.2 Scientific Relevance

In this chapter will be explained what has been written about transformation in general. After that, there will be a focus on what is written about the approach of transformation and especially the transformation of prisons.

A well-known book about transformation is *discovering the assignment* by Job Roos. His book is about the architecture of redevelopment and is intended to be instructive rather than exemplary. (Roos, 2007, p. 7) Job Roos describes redevelopment as ‘an architectonic intervention in the existing heritage, varying from restoration tot the adaption of the existing to new uses.’ (Roos, 2007, p. 13) But redevelopment is not only restricted to architecture. Through the centuries, cultural goods are reused, first for economic and pragmatic reasons. It has inspired writers, composers and artists to elaborate on the existing. No longer guideless for material needs, but intended and substantive. In architecture, there are many examples of intentional use of the existing. (Roos, 2007, pp. 22-25)

There are different general theories and views on the approach of transformation. Paul Meurs says in the foreword of *discovering the assignment* that there is no ready-made recipe for interventions in historic buildings. The respect for existing buildings has resulted in some very generally applicable rules for transformation. ‘An old, but still topical slogan is: conservation takes precedence over renewal.’ (Roos, 2007, p. 7) As a reaction on that slogan he states that redevelopment encompasses much more than conservation alone. Jo Coenen shows in *Noties* different ways to approach a redevelopment assignment. He thinks that the highest that can be reached for is ‘fusion’ between the existing and the new. (Coenen, 2010, pp. 52-56) But his theories stay very general. According to Job Roos, existing literature about redevelopment and transformation consist mainly of views of architects. Inspiring, but not a support in the written and oral communication on the subject. Many parties have said that a clear and unequivocal terminology of the discipline of redevelopment, is missing. (Roos, 2007, pp. 192-193)

In the next years, redevelopment will cover an increasing part of the building projects. In a time when resource and pollution issues are intensifying, working with the existing built environment has become the order of the day. Conversions and upgrades will continue to gain in importance in the near future, accounting for a steadily increasing percentage of the total building volume. (Schittich, p. 1) Not only due to economic necessity (demolition is usually more expensive) but also because of a changing programmatic demand. The assignments focus more and more on ‘totals’ such as urban areas, industrial complexes, dockyards, barracks, etc. (Roos, 2007, pp. 14-15) (Coenen, 2006, p. 27) The prison complexes may also be viewed in this list. Because of the change of scale, the design requires consistency. The assignment cannot be accessed anymore from just intuition or from prevailing doctrines. (Roos, 2007, p. 15)

Research has been done on specific cases such as converting offices or churches. About transformation of office building, a lot of literature is available. *Transformatie van kantoorgebouwen* from Hulsman is written in 1998. The last years, the subject becomes more and more popular. C. Oudijk did a masterthesis on the subject in 2007, just as C. van Veen in 2008. Other books are *Transformatie van kantoorgebouwen: sturingsmiddelen om herbestemming van kantoorpanden te bevorderen* and *Transformatie van kantoorgebouwen* van T. van der Voordt in 2007. More recently, in 2013 A. Eeuwijk graduated with the masterthesis *het herbestemen van een kantoorgebouw tot ouderenbouw*. About converting churches in 1995 the first book was released, written by Pollman: *Herbestemming van kerken*. After that, several articles and books were published: *herbestemming van kerken; behoud beter dan sloop, slopen of herdopen, aanbevelingen herbestemming kerken en kerklocaties, onderzoek herbestemming kerken en kerklocaties, etc.*

Available articles about transformation of prisons are limited to specific examples. After certain constructed conversations, articles have appeared giving an evaluation of the design.

As been written above, there are theories about the general approach
of redevelopment. Also, research has been done on specific cases such as converting offices or churches. What is striking, is that a rezoning study about converting prisons is lacking. (Dongen, 2012, p. 6) This lack of information is a problem, especially now that so many prisons are coming onto the market. As been shown, transformation has become the order of the day, and will continue to gain importance in the next years. Research about converting this prisons is therefore necessary.
In this chapter the structure of the research and the relation with the design will be explained.

3.1 Research Structure

Potentials and possibilities of the transformation depend to a large extent on the new function that has to be incorporated. Therefore, the research question is:

Which function is suitable for the transformation of a panopticon prison type in The Netherlands?

This research question will be answered from three different angles: the typology of a panopticon prison, the requirements of certain functions and case studies (what has already been done).

The research starts with a description of the context. In order to understand prison buildings, it is necessary to give a short explanation of the evolution of the prison type in the Netherlands. Besides that, the different kinds of detention in the Netherlands will be described very shortly. This information is needed to explain the focus of the research on Huizen van Bewaring (detention on remand) and prisons within the prison system.

After the description of the context, the research will concentrate on the prisons that are closing in the Netherlands. These are put in a broader perspective by looking into the different types of prisons that are found in the Netherlands. In order to focus the research, one prison type will be explored further. This will be the panopticon prison (of Breda). The decision for this prison will be explained.

Before continuing the research, some background information about the panopticon prison of Breda will be given. This consists of information about the location, architect and the complex itself. Drawings of the building complex are added in the appendix.

The first approach focusses on the relation between function and type. The typology of a panopticon prison will be described and compared with the typology of certain possible new functions. A literature study will clarify the definitions ‘type’ and ‘typology’. There will also be described what other kind of functions are situated in a spatial comparable building type as the panopticon prison.

The second approach focusses on testing possible new functions on certain criteria for suitability. These criteria will be explained. The requirements of the functions on the criteria will be exemplified. In the next chapter the panopticon prison of Breda will be analysed on these criteria. Thereby, in the conclusion, a comparison can be made between the characteristics of the panopticon prison and the requirements of new possible functions.

The last approach consist of case studies: examples of already converted prisons. Those give more information about the suitability of certain functions. There are several examples of converted prisons: The Huis van Bewaring in Almelo is converted into a hotel, just as the Arresthuis in Roermond. Besides that, there is a museum in Veenhuizen and offices in a former prison in Amsterdam. The Blokhuispoort in Leeuwarden has a temporary function. These five former prisons will be analysed, on which more is explained in the chapter ‘Case studies’.

In the last chapter the conclusions of the research will be described, subdivided into the typology, function requirements and case study approach. At the end, the research question will be answered by combining these conclusions. In a broader perspective, there will be reviewed whether the research is also applicable for the other panopticon prisons or even other prison types.
3.2 RELATION WITH DESIGN
A design will be made from the transformation of the panopticon prison in Breda. The location is thus determined by the research. The new function is stated by the result of the research. The results of my research will therefore be elaborated in the design.

POSSIBLE FUNCTIONS WITH THEIR REQUIREMENTS
What is a function?
Which functions are there?
What are the requirements of these functions?

CASE STUDIES
What is transformation?
What is important with transformation?
What are examples of transformed prisons?

Which function is suitable for the transformation of a panopticon prison type in The Netherlands?

What is suitability?
What are criteria for testing suitability of different functions?

What is a type or typology?
Which type of prisons occur in The Netherlands?
Which type of prison is the most important to research and has the best potentials for transformation?

OBJECT OF FOCUS OF THE RESEARCH:
PANOPTICON PRISON OF BREDA
To define the field of the research, first the context is determined. For specializing in redevelopment, the architect should understand the historical context of the building and place the architecture in the time in which it was formed. (Roos, 2007, p. 187) Therefore, a short summary of the evolving of prisons in the Netherlands is given. After that, the detention system nowadays is described and related to the delimitation of the research on Huizen van Bewaring (detention on remand) and prisons.

4.1 History of prisons in The Netherlands

Before the 18th century punishment was physical: banishment, corporal punishments and the death penalty. A real prison did not exist. Criminals were only imprisoned while awaiting their punishment. (Verstegen, 2001, p. 9) So essentially any enclosed place could function as prison: city gates, towers, caves, monasteries etc. (Traa, 1987, p. 5) (Verstegen, 2001, p. 10) People often stayed there in appalling conditions. The dominant ideas about crime at that time were those of the Catholic Church. The physical punishments were to literally 'drive out the devil'. (Verstegen, 2001, pp. 10-11) With the rise of the Enlightenment at the end of the 18th century the correctional system got attention of reformers and jurists. (Verstegen, 2001, p. 9) The physical punishments were seen as cruel and inhumane. According to Enlightenment thinkers, punishments had to be determined by law. (Magis, 1999, p. 21)

In the mid-16th century the first workhouse in The Netherlands arose: the Rasphuis in Amsterdam. Poor people were imprisoned there and forced to work. (Verstegen, 2001, p. 10) This disciplinary houses consisted of large rooms were the prisoners ate and slept. There were no cells. It was simply converting life time into working time. (Magis, 1999, p. 21) The success of these disciplinary houses was the profitability. (Verstegen, 2001, p. 10) People were held under appalling conditions. (Magis, 1999) ‘Jail fever’ emerged by poor hygiene. This resulted into an important insight: people thought if a building could cause disease, it could also be used to cure criminality and evil (which were then seen as moral diseases). (Verstegen, 2001, p. 11)

With the rise of the Industrial Revolution in the mid-19th century these workhouses could no longer compete with the emerging industries. In addition, they got into disrepute because of the unhealthy living conditions. (Verstegen, 2001, p. 10)

All these factors together caused a profound change in the penal system. (Physical punishments were seen as inhumane, locking people up together creates miserable living conditions, imprisonment can be used as a cure for moral diseases and disciplinary houses could no longer compete with the industry). (Magis, 1999, p. 21)

As a result, the cellular system was introduced in The Netherlands in 1851. The focus shifts completely from external to internal punishment, which involved the question whether psychological punishment had to be preferred over physical punishment. Solitary confinement was introduced. Criminals should awake their conscience by themselves. The prison was considered as an instrument for improving people: it is expected that people come to repentance. (Magis, 1999, p. 25) (Verstegen, 2001, p. 9)

The required contrast between life in freedom and captivity is based on the principle of retribution. The function of retribution had to be reflected in the appearance of the building. (Magis, 1999, p. 26) The prison was therefore visible in the city and dissuasive. The impressive and monumental architecture of the prison from the 19th century had a hermetic appearance. For most people, these buildings are still the archetype of a prison. Also its interior with galleries and steel fences is part of that. (Verstegen, 2001, pp. 22, 25)

The maximum prison sentences became higher and higher. In 1851 the maximum was a sentence up to 6 months solitary confinement. In 1854 this became 12 months. In 1871, 24 months. In 1886 the first Be-ginselenwet on Justice had been approved. The sentences were raised up to 20 years and livelong, with the first 5 years in solitary confinement. (Magis, 1999, p. 23)
In 1951, solitary confinement was abolished. Studies showed that solitary confinement had great influence on the development of serious mental disorders. They became convinced that it was contrary to human nature and made people egocentric and antisocial. Corporal punishment and confinement in a dark cell were also abolished. In the new Beginselenwet of 1953, the experts were under the spell of a new ideal: rehabilitation. (Magis, 1999, pp. 28-29) This post-war idea was so strong that it even caused a denial of prison as an institution. With the construction of the Bijlmerbajes, (1972-1978) barred windows were taboo. This tower model prison was supposed to look like student homes. The complex is unique because of the underlying ideas. Over time, the tower model revealed to be too expensive because the number of guards in the elevator should always be one higher than the number of inmates. (Magis, 1999, pp. 13-14) (Verstegen, 2001, pp. 26, 31)

In the 70’s it was increasingly assumed that in a modern democratic society, in the future prisons were no longer necessary. (Magis, 1999, p. 15) The realization of the great psychological pressure on a detainees by deprivation of liberty was important. People realized that the prison building played an important role in this. PI Nieuw Vosselveld in Vucht was constructed as a courtyard model. More informal contract in the courtyard between prisoners and guards created a more relaxed atmosphere. This suited the policy of rehabilitation. Five new prisons were build according to the courtyard model. (Magis, 1999)

From 1980, the number of prison sentences increases explosively. The idea of rehabilitation was over. The new guidance was preventing and reducing the harmful effects of detention. (Verstegen, 2001, p. 54) Around 1985, the Ministry of Justice commissioned the construction of new prisons that would eventually result in a fivefold increase in the number of cells in The Netherlands. (Verstegen, 2001, p. 53) Although the detention of prisoners had changed radically since the late 18th, the acute shortage of cells was resolved by applying the tried and tested nineteenth-century wing-model for new prisons. (Magis, 1999, pp. 9, 41) The PI Grave was successful and creates a preference of the governments for cross type prisons. Of the eleven newly built prisons in that time, ten are based on the cross model. The new prisons have a more friendly appearance. That is in contrast with the deterrent facades of the older prisons. But the structure is strikingly similar with the older designs. (Magis, 1999, pp. 14-15)

The most recent Beginselenwet dates from 1995. (Magis, 1999, p. 43)

With the economic crisis, state secretary Teeven is closing 19 prisons in order to economize 340 million euros. Criminals with a short sentence, can serve their sentence at home with an ankle cuff. (Benschop, 2013)
### Timeline of the History of Prisons in the Netherlands from 1770 till 2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>&lt;1770</td>
<td>Physical</td>
</tr>
<tr>
<td>1770</td>
<td>Imprisonment</td>
</tr>
<tr>
<td>1851</td>
<td>Solitary confinement</td>
</tr>
<tr>
<td>1951</td>
<td>Abolition of solitary confinement</td>
</tr>
<tr>
<td>1980</td>
<td>Imprisonment</td>
</tr>
<tr>
<td>2013</td>
<td>Ankle cuff?</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
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<tbody>
<tr>
<td>1770</td>
<td>Houses of correction</td>
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<tr>
<td>1851</td>
<td>Alcove prisons</td>
</tr>
<tr>
<td>1951</td>
<td>Denial of prison as institute</td>
</tr>
<tr>
<td>1980</td>
<td>Reduce harmful effects of detention</td>
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<tr>
<td>2013</td>
<td>Retribution and deterrence</td>
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*Denotes the closure of 19 prisons.*

**Timeline:**
- **1770:** First prisons with cells were built to deter and reeducate.
- **1851:** Solitary confinement became the standard, leading to severe mental disorders.
- **1951:** The abolition of solitary confinement aimed to reduce harmful effects of detention.
- **1980:** Imprisonment was considered an economic crisis.
- **2013:** Ankle cuffs were introduced to monitor detainees.

**Key Points:**
- **1770:** Cruel and inhumane.
- **1851:** 'The devil' imprisons.
- **1951:** Detention gives mental stress.
- **2013:** Friendly appearance.

*Own Image*
4.2 Detention nowadays

The Dienst Justitieele Inrichtingen (DJI) ensures on behalf of the Department of Security and Justice the execution of sentences and custodial measures, after the verdict of a judge. Annually the DJI provides cells for 70,000 prisoners. The containment takes place in different types of institutions. There are detention centers for adults (PI) but also special facilities for young people (JIJ). For psychiatric patients, there are Forensic Psychiatric Centers (FPC). (Dongen, 2012, p. 14) (Verstegen, 2001, p. 36)

The process is as follows. When a prisoner has not yet been convicted, he stays at a Huis van Bewaring (HvB) (house of remand). When he is sentenced to imprisonment, he goes to in a prison. DJI is, in addition to the inclusion of prisoners, responsible for their daily care. Part of that is preparing the inmate for his return to society. Therefore, at the end of his sentence, a prisoner is placed in a Beperkt Beveiligde Inrichting (BBI). After that is the Zeer Beperkt Beveiligde Inrichting (ZBBI) and freedom. (Dongen, 2012, p. 14) (Magis, 1999, p. 45)

To define the research, only the prisons and HvB will be examined. Because the other detention centers prevail a higher level of freedom, the buildings are completely different and therefore not relevant for the research. Nineteen detention centers are closing, of which fifteen are Huizen van Bewaring and prisons. The research will focus on these fifteen. In the rest of the report this buildings will be referred to as ‘prisons’.
After the description of the context, the research will concentrate on the prisons that are closing in the Netherlands. These are put in a broader perspective by looking into the different types of prisons that are found in the Netherlands. In order to focus the research, one prison will be explored further. This will be the Koepelgevangenis of Breda. This decision for this prison will be explained.

5.1 TYPE & TYPOLGY

Type is not the same as typology, although they are regularly confused. In ABDC research methods Hielkje Zijlstra distinguishes type as a ‘group of objects marked by common characteristics and qualities. Concerned with function.’ Typology is described as a ‘system of a number of types whose buildings have some common characteristics.’ So, buildings that share a number of common characteristics form a typology. A categorization of buildings is developed by combining several type characteristics. This classification is not solely determined by function and is relevant when a building still exists, but its function has been changed. In this way we can recognize aspects which relate to possibilities for converting the building. (blz 67 ABCD)

In Typologie van gebouwen Pennick confirms that type and typology are related concepts. He says that in science in general, the term ‘type’ is a basic understanding. The need for system is the underlying concept. If we translate the general term to architecture, according to Pennick the architectural type can be defined as a class of buildings which contain certain characteristics that are similar. This definition has two consequences. Firstly, the characteristics that the buildings do not have in common, are excluded. Secondly, in this definition, nothing is said about the nature of the characteristics. This nature can vary. (Pennink, 1981, p. 5)

In the textbooks about typologies three major categories are usually distinguished: total building, large structural systems and decorative elements. The aim is to provide architects with a typological guide for the whole design process. (Duin, 1991, p. 13) The distinctions between church, palace, villa, etc. are based on typical spatial forms, which are not maintained for some purpose but are essential to the purpose they serve. (Duin, 1991, p. 14)

The morphological studies of the Italian architects Rossi and Grassi, are primarily focused on urban context and try to formulate rational description, classification and manipulation criteria. These should form the basis logical analysis and design methods. In these studies, the typology concept takes a central place. They are aimed at bridging the gap between form and function. (Duin, 1991, p. 17)

According to Argan in his article het concept van het architectonische typologie within architecture the type can be regarded as a derivative of a historical series of buildings with a clear formal and functional analogy. The type is in his view then to be understood as a schedule, an idea. In the process of comparison for the determination of the type, the specific characteristics of the individual buildings have to be eliminated. Only the elements that are in line with the unity of the series are retained. (Duin, 1991, p. 67) Argan states that a very precise definition of the architectural type is given by Quincy in Dictionnaire historique: ‘the word ‘type’ represents not a copy or perfectly imitated image, but rather the idea of an element that itself should serve as a guide for a model. The model is an object that must be repeated as such. The type is an object that anyone can copy but does not need to look alike. Everything is accurate in the model, everything is vague in the type.’ (Duin, 1991, p. 66)

In this article De derde typologie Anthony Vidler distinguished three ways in which the architectural type is used. According to him, these are also the three ways in which architecture is legitimized since the mid-eighteenth century. The first typology is a construction traced to its origins in nature, which is characterized by an ideal geometric order. With the Industrial Revolution the second typology is created. This links the building forms to the world of machine production. Assuming a building by its nature belongs to the artificial world of tools and machinery, architecture was regarded simply as a matter of technique. Dwellings were converted into living machines, subject to the laws of
functional precision and efficiency. It is remarkable that Vidler thereby mentions Bentham’s Panopticon (the underlying principle of the panopticon prisons) as a paradigm in this view. (Duin, 1991, pp. 71-81)

5.2 PRISON TYPES

The development of a prison type is inextricably linked to the prevailing opinions on the implementation of imprisonment as a punishment. Starting from the simplest “type” of prison, the cell, each subsequent development in the typology is the result of an interplay between the intention of the government to punish and the natural will of the prisoner to avoid punishment. The prison regime and the extent of closure from society are the main aspects which distinguish prison types. (Traa, 1987, p. 12)

A clear sequence of the types of prisons was not possible. Attempted is to indicate the main types and the subtypes derived from that. Two main prison types can be distinguished, the panopticon and the linear type. (Traa, 1987, p. 12)

5.2.1 PANOPTICON

To desire to achieve optimal control resulted in linking the cells in a circle. However, this form did not leave much room for additional functions such as bathrooms, kitchens and workspace. These elements were therefore places outside the round shape. The advantage of small distances inside the cell building were negated by the greater distance to the additional functions. For a regime that wanted optimal control the panopticon type was very suitable. (Traa, 1987, p. 12)

5.2.2 LINEAR

This type was created from the desire to concentrate large numbers of cells within a relatively small, easy monitored area. Simply by concatenating the cells in a line, the linear type emerged. A major disadvantage was that all the movement within the building concentrated in the central corridor. Therefore the walking distances to the other functions were long, which did not benefit the control of the regime. (Traa, 1987, p. 12)
By the wish to have a simple area to guard, the courtyard type was introduced. By placing four blocks around a courtyard such an area was easily obtained. The circular corridor was situated around the courtyard or the concluded outside of the blocks. (Traa, 1987, p. 12)

With the campus type the pavilions became completely independent. Within this type, there was even difference possible between the regimes of the pavilions. The walking distances remained significantly long. (Traa, 1987, p. 13)

The radial type had a partial solution to these disadvantages. There was a central point of control from which the prison could be monitored. By concentrating the additional functions in the central point, these functions were relatively close to each cell. (Traa, 1987, p. 13)

The double cross type is a fusion of the radial and linear type. Several linear parts are connected by a zone in which all additional functions are housed. The central point of control was no longer present. (Traa, 1987, p. 12)

The cross type has only one linear part with cells instead of multiple such as in the double cross type.

The tower type has cells that are linear linked but also vertically linked. That reduces the land use considerably.

5.3 PRISONS THAT WILL CLOSE
In order to focus the research, one type of prison (or even one specific prison) will be chosen to explore. Fifteen prisons will be closed the next few years. The decision which type of prison will be researched depends on how often the type of prison appears, how often the type is closing and the location within The Netherlands and within the city/landscape. The type that is the most common and with the best opportunities for redevelopment will be the most interesting to focus on in the research.
examples plans of prison in the Netherlands
(own image)
5.3.1 BUILDING TYPES

As explained in the previous chapter, different types of prisons occur in the Netherlands.

The plans of some prisons in The Netherlands have been put in a scheme as examples: the cross prison type in Grave, the linear type of Zwolle Zuid 2, the towers of Limburg Zuid and Over-Amstel, the double courtyard type of Hoogeveen and De Schie and the double cross type of Nieuwegein.

In all these types the cells are linked in a linear way. The plans of the tower prison are notable smaller than the others. Here, the cells are also linked vertically instead of only horizontally. Limburg Zuid only has one tower, while Over-Amstel consists of no less than six towers.

The space needed for the actual cells is remarkably small in each type. There are many ancillary spaces such as living quarters, kitchens, exercise area and staff rooms.

There is a big difference in the quantity by which the different prison types occur (as shown in the diagram below). By far, the most common are cross and double cross prisons. There is a clear relation visible between the building types and the closing of prisons. Only 3 cross-prisons are closing and zero double crosses. That is a contrast with the tower and panopticon type. Of these, only 2 and 3 are existing, and there are all closing. The reason for the closure of the towers are the high costs for monitoring. When the inmates need to use the elevator, always one more guard than inmate must be present. This requires
a bigger amount of security guards and therefore higher costs. The problem with the dome type is the division of the inmates in smaller groups. With this building type, that is almost impossible. That makes the dome less practical. For the research, it is interesting to take a closing look at the tower or dome type because these types disappear completely.

5.3.2 LOCATION IN THE NETHERLANDS
When considering the location of the closing prisons in The Netherlands, these are scattered throughout the country. There is no place were more prisons are closing, it remains divided. The inmates may not want to move too far from the original site. The distance for family to visit, will otherwise become too large. So, for the research, no distinction can be made on location in the Netherlands.

5.3.3 LOCATION IN THE CITY
Looking at the location of the prisons that will be closed in the city, there is no clear link visible. The number of prisons that will close does not decrease or increase in relation with the position in the city. It is important to note that the older prisons are located mainly in the city centre, and the newer in the outskirts of the city. This has to do with the change of ideas over detention since the 80’s, just before a lot of new prisons were build. Prisons needed to be less visible in the cityscape and had to have a more neutral and friendly appearance. (Dubbeld, 2001, pp. 80-81) Therefore the older prisons, which often are situated in the city and have a more deterrent appearance, are closing.

However, a clear relation is visible when looking not at the position, but at the type of area in which the prisons are located. A distinction is made between urban (residential, commercial), rural (nature, meadows) and industrial. It is noteworthy that all eight prisons in an urban surrounding are closed while all fifteen prisons in an industrial area, remain open.

For the research, it is interesting to focus on the prisons in an urban
<table>
<thead>
<tr>
<th>Location</th>
<th>City Centre</th>
<th>Edge of City Centre</th>
<th>Outside City Centre</th>
<th>Edge of City</th>
<th>Outside City</th>
<th>Landscape</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haarlem, 1899</td>
<td></td>
<td></td>
<td>Over-Amstel, 1978</td>
<td></td>
<td></td>
<td>Nieuw Vosseveld</td>
</tr>
<tr>
<td>Breda, 1886</td>
<td></td>
<td></td>
<td>Overmaze, 1978</td>
<td></td>
<td></td>
<td>Norgerhaven</td>
</tr>
<tr>
<td>Havenstraat, 1891</td>
<td></td>
<td></td>
<td>De schie, 1989</td>
<td></td>
<td></td>
<td>Essenceheim</td>
</tr>
<tr>
<td>Krimpen a/d IJssel</td>
<td></td>
<td></td>
<td>Krimpen a/d IJssel</td>
<td></td>
<td></td>
<td>Nieuwersluis</td>
</tr>
<tr>
<td>Alphen aan de Rijn</td>
<td></td>
<td></td>
<td>Almere binnen, 1996</td>
<td></td>
<td></td>
<td>Ter Peel</td>
</tr>
<tr>
<td>Toentijd</td>
<td></td>
<td></td>
<td>Oosterhoek, 1997</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>De Geerhost</td>
<td></td>
<td></td>
<td>Oosterhoek, 1988</td>
<td></td>
<td></td>
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<tr>
<td>De Marweiz</td>
<td></td>
<td></td>
<td>De Berg, 1886</td>
<td></td>
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</tr>
<tr>
<td>Nieuwegein, 1999</td>
<td></td>
<td></td>
<td>Hoogeveen Lelystad ,</td>
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</tr>
<tr>
<td>Zwolle Zuid 1,</td>
<td></td>
<td></td>
<td>1995</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1994</td>
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<td>Amerswiel, 2000</td>
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<td></td>
<td></td>
<td></td>
<td>Zuyder Bos, 1994</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Roermond, 2000</td>
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<td></td>
<td>Kruisberg, 1866</td>
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<td></td>
<td></td>
<td></td>
<td>Tafelbergweg</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>4</td>
<td>16</td>
<td>14</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>CLOSING</td>
<td>Haarlem, 1899</td>
<td>Over-Amstel, 1978</td>
<td>De Berg, 1886</td>
<td></td>
<td></td>
<td>Nieuwerluis</td>
</tr>
<tr>
<td>Breda, 1886</td>
<td></td>
<td>Overmaze, 1978</td>
<td>Hoogeveen Lelystad,</td>
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<td>Ter Peel</td>
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<tr>
<td>Havenstraat, 1891</td>
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<td>1995</td>
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<td></td>
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<tr>
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<td>4</td>
<td>2</td>
<td>7</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>PERCENTAGE</td>
<td>100 %</td>
<td>12,5 %</td>
<td>50 %</td>
<td>0%</td>
<td>40%</td>
<td></td>
</tr>
</tbody>
</table>

**Location of prisons in the Netherlands within the city** (own image)
context. This area is the most common and gives more opportunities for redevelopment.

5.4 CONCLUSION
The research will concentrate on the panopticon prison type because:
- All three existing panopticon prisons in the Netherlands are going to close. These have similar characteristics and a common building structure. Therefore it might be possible to find a generic solution.
- All three prisons are situated in an urban context, which is the most common and gives more opportunities for redevelopment.
- The drawings of these prison are available because the buildings are older than 50 years.

The focus will be on the Koepelgevangenis of Breda because:
- The contact with this prison ran smoothly and they gave permission to visit the building.
- This prison has the best location: directly next to the city centre, even within the city canals. This gives many opportunities for redevelopment.
Before continuing the research, some background information about the panopticon prison of Breda is necessary. This is just an introduction. The important aspects/characteristics for the research will be explained and illustrated later on in the research. This chapter consist of information about the context (site and architect) and the building itself. The aim is to get an impression of the building and the location. Drawings of the building complex are added in the appendix.

6.1 CONTEXT
6.1.1 Site
Breda acquired, as one of the first in northern Brabant, city rights in 1252. In order to defend the city it was walled at the beginning of the 14th century. Canals were dug around the city. In the 16th century, at the harbor the defenses were strengthened with two heavy pentagonal towers connected by a wall. In the second half of the 19th century Breda had a flowering period of trade and industry. The connection to the rail system opens up new industries for Breda.
Breda, 1824, the location of the prison projected on the former fortifications (Floor, 2009, p. 260, own editing)

Breda, 1877, the vacant land around Breda with the location of the prison (Floor, 2009, p. 260, own editing)

Breda, 2013 (own image)
part of the former fortress. (Traa, 1987, p. 73)

In 1942 Breda was extended with two new districts: Ginniken and Princenhage. Also after the second world war, the city continues to grow. In the districts Heusdenhout, De Hoge Vucht en IJpelaar arise. 10 years later, the construction of the Haagse Beemden starts, which is nowadays Breda’s largest district. Also Nieuw Wolfslaar on the southeast part of the city and in the northeast, is being built. In the historic city rises a completely new area: the Chassé Park. (“Gemeente Breda,”)

Breda is, with more than 174,000 inhabitants, currently the ninth city in the Netherlands. Breda is the third city in Brabant. Eindhoven and Tilburg already passed the 200,000 inhabitants. (“Gemeente Breda,”)

6.1.2 Architect
The panopticon prisons in The Netherlands were designed by two architects: father Johan Frederik Metzelaar (1818-1897) and his son Willem Cornelis Metzelaar (1848-1918). Both worked a significant part of their career as an engineer-architect for the Ministry of Justice. For several years they worked simultaneously at that department, where W.C. Metzelaar was assistant to his father. (Floor, 2009, p. 7)

J.F. Metzelaar was born in 1818 in a protestant family in Rotterdam. In

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1818</td>
<td>Born in Rotterdam</td>
</tr>
<tr>
<td>1833</td>
<td>Carpenter apprentice</td>
</tr>
<tr>
<td>1847</td>
<td>Own architectural firm</td>
</tr>
<tr>
<td>1870</td>
<td>Architect of Justice Department</td>
</tr>
<tr>
<td>1883</td>
<td>Koepelgevangenis</td>
</tr>
<tr>
<td>1885</td>
<td>Retirement</td>
</tr>
<tr>
<td>1887</td>
<td>Died</td>
</tr>
</tbody>
</table>

overview of influences in the work of J.F. Metzelaar (own image)
1833 he started as an apprentice carpenter at R. Kempe Valk, a Rotterdam carpenter who also worked at the drawing school. Besides his education for carpenter, Metzelaar also followed lessons at this art school, which became later the Academie van Beeldende Kunsten en Technische Wetenschappen. After a five-year apprenticeship, he established himself in 1838 as an independent carpenter in Rotterdam. In 1839 he finished his studies at the Academy. He was immediately appointed professor in architecture at the Academy. This position he held until 1850. Meanwhile he educated students at his carpentry. A well-known student of Metzelaar was J.H. Leliman, later a prominent architect within the eclectic movement. Other students were J. Maris (later on architect in Groningen), G.J. Morre (later on a teacher at the Polytechnische School in Delft) en H.W. Veth (later on architect in Dordrecht). (Floor, 2009, pp. 15-16)

In 1847 Metzelaar founded his own architectural office. In the early years he built steam plants, the building of the Dutch Central Bank, the Officers-Society in the Park, the store house of Bunne Camp and Mahler and the Leeskabinet, all in Rotterdam. He also designed villas, farmhouses, carriage houses, a post office, a reading museum and a commercial building. (Floor, 2009, p. 17)

In 1860, he was appointed as a teacher in history of architecture at the Rotterdamse Academie van Beeldende Kunsten en Technische Wetenschappen. This position he held until 1868. (Floor, 2009, p. 19)

In 1867 Metzelaar was in Paris to coordinate the preparation of the Dutch branch of the World Fair. (Floor, 2009, p. 19)

In 1868 he gave up his architectural firm and teaching position and moved to Delft. His son William started studying Engineering at the Polytechnische School there in 1867. Metzelaar designed in 1868 a student association building in Delft. From his Delft period are some other activities known arising from his interest in education. He was worried about the neglect of it. (Floor, 2009, p. 21)
In 1870 he was appointed engineer-architect for prisons and courthouses at the Department of Justice. When he joined the Department, there had been for some years the ‘question of style’. (Floor, 2009, p. 23) Important in the 19th century, is the architectural debate that prevailed. In the traditional architecture there were no clear solutions how new building types (such as prisons, train stations, etc.) should look like. Initially the 19th century architecture often referred to the past, styles like neoclassicism, eclecticism, neo-Gothic and neo-Renaissance. Although many architects did not want to lose tradition, they were forced by new developments to other solutions. Also, the idea was that architecture should give expression to contemporary society. Other important themes in the architectural ideas of that time were the visibility of the structure and an understandable expression of the function in the design of the building. (Floor, 2009, p. 9)

Government buildings take a special place in the image of the Dutch architecture at the end of the 19th and early 20th century and reflects the growing role of the state in society. Subsequent activities of the arising influence of the government led to specific requirements and a need for robust and prominent architecture to present themselves.

As of 1857 A.C. Pierson was engineer for prisons. When Pierson died in 1870, the Minister of Justice (van Lilaar) wanted to connect a permanent engineer to his Department. (Traa, 1987, p. 11) He established his own construction bureau, with J.F. Metzelaar as chief.

In 1874 the College of Government Advisors was founded with Victor de Stuers as secretary. Along with Alberdingk Thijm and P.J.H. Cuypers he had great influence. They were followers of Viollet-le-Duc and the neo-gothic style. (Floor, 2009, p. 10)

Against this background, it is important to note that J.F. Metzelaar and his office followed an independent line relative to the College of Government Advisors. Metzelaar thereby differs from three other, later, government architects: C.H. Peters, Cuypers and J. van Lokhorst. These were designing according to the style that De Stuers propagated. This style was not pure neo-gothic, but a neo-renaissance variant. (Floor, 2009, p. 23)

In June 1870, Metzelaar gives a speech about his views on the beau-
ty of buildings. According to him, the architect should not hang the building with ornaments without meaning or reason, or decorate with marble or other precious materials. ‘A building is only truly beautiful when it speaks through simplicity of layout, clarity of structure, representation of truth, and harmony and nobility in form an understandable language. (Floor, 2009, p. 24)

In 1875, he argues that a structure with the least possible materials provided the best stability, and that the construction should be displayed as clear and beautiful as possible. He believed that not decorations or coverings made an architectural style, but the construction. This vision is also visible in the panopticon prison of Breda. (Floor, 2009, p. 24)

Metzelaars position is interesting in the discussion on the rational principles in architecture. In addition, his view shows a clear resemblance to twentieth-century ideas about the construction as core of architecture in which functionality and rationality are defining elements of beauty. (Floor, 2009, p. 25)

During the first half of the 80s a number of buildings was completed, which resemble the highlights in the career of Metzelaar at the department of Justice. In 1883, the cellular jail in Groningen was completed. In the following years, other cellular prisons, including the famous panopticon prisons in Arnhem and Breda, were completed. (Floor, 2009, p. 26)

In 1882, Metzelaar gave a presentation in which he made a comparison between the design of a panopticon prison and a wing prison. (Floor, 2009, p. 27)

In 1883, W.C. Metzelaar was appointed as assistant engineer-architect of his father. (Floor, 2009, p. 32) The office of J.F. Metzelaar was reinforced with more assistant architects in 1899, including Metzelaars later successors Simon Wijn and Willem Hendrik Kam. At the age of 67, Metzelaar retired and his son replaced him as architect for the De-
Department of Justice. In 1914, Simon Wijn took over. (Traa, 1987, p. 11)
Metzelaar died at the age of 78 in 1897. (Floor, 2009, p. 32)

6.1.3 Design Process

It is not entirely clear why Metzelaar sr. had decided to apply the panopticon principle on prisons of Arnhem and Breda. In the Netherlands, but also in other countries, the wing model was standard, and the panopticon model an exception. (Floor, 2009, p. 43) The Panopticon principle was actually applied on a limited scale in Europe. The advantages of this underused prison model listed by Metzelaar are probably not the only reason. He named the better mutual isolation of the detainees, the better clarity and the lower construction costs, partly because a separate church would be unnecessary. (Traa, 1987, p. 11) There was much criticism on the principle. The relatively low construction costs shall have been important to the Dutch Department of Justice. It is also quite possible that Metzelaar wanted to expand his reputation as an architect. His work attracted attention, even beyond the borders. An image of the prison of Arnhem was published in 1888 in the ‘Handbuch des Gefangnissewesens’. (Floor, 2009, pp. 45-47)

As regards the construction of the prison in Haarlem, Metzelaar jr was instructed by the Department of Justice, from the viewpoint of cost reduction, to apply his father’s creation. The fact that he had already designed a wing prison proves that his preference was different. (Traa, 1987, p. 11)

The specifications of the design of Arnhem’s panopticon prison was adapted to the situation in Breda. Except the two managers’ residences, both prisons were almost identical.

The cost of the construction in Breda were estimated at f. 575.187,00. The tender was held for f. 538.489,00. The prison was put into use on August 15, 1886. (Traa, 1987, p. 72)
6.2 BUILDING

6.2.1 SPACE

The prison complex that was built in 1883 formed a rectangle. The only access was on the east side, formed by a gate building. The gate building gave access to a courtyard which was bordered by two warehouses. The courtyard formed the entrance to the administration building, which gives via a corridor entrance to the panopticon cell building. (Traa, 1987, p. 74)

The cell building has a circular plan with a diameter of 63 meters. It has four floors and an attic. The building is covered with a dome structure and has a total height of 37.9 meters. The 'vlak' has a diameter of 53 meters which gives a surface of about 22 hundred square meters. Each floor has 52 cells. That gives a total of 208 cells. The cells are about 12 square meters with a height of 3 meters. In the four cardinal points of the building, towers are located which contain the stairs. The towers reach to the starting point of the dome. Between two towers are thirteen cells and windows. (Traa, 1987, p. 25) The towers are for one-third portion positioned inside the cell building. Except the front façade, all facades are blind. (Traa, 1987, p. 26)

Each floor has 52 cells and window openings. In this openings wrought iron windows are placed on a cast iron sill, with cast iron bars. (Traa, 1987, p. 26) Under each cell window are two small openings equipped with a grid. The original color scheme did probably consist of light gray window frames. The bars were painted the same color. The vents were ochre yellow. (Traa, 1987, p. 78)

Pavement was laid out on the whole court, in a meter-wide strip around the various buildings and at the courtyard in the service building. Furthermore, paths were laid out from the cell building to the cellular air spaces. The rest of the plot was seeded with grass. (Traa, 1987, p. 74)

The entire complex was surrounded by a boundary wall, only interrupted by the administration building. The wall is 0.625 meters thick and has an average height of 3.5 meters. It is made in masonry and has Portland cement stone covering pieces. On either side of the administration building is the wall, unlike in Arnhem, double constructed. In this way, 'Sluices' were created on both sides by including a gate in the east and west wall. (Traa, 1987, p. 75)

The entrance, located on the Singel, consisted of a gate with a double wooden doors adjoined by two towers. The original color was probably dark varnished doors in dark grey frames and dark gray windows and frames. The iron bars were painted dark grey and the hinges bronze green. (Traa, 1987, p. 76)

Outside the boundary wall, houses were built for staff of the prison. All service houses all identical, except two bigger ones closer to the gate. Those were intended for the managers of the prison. The T-shaped houses have two floors and an attic. (Traa, 1987, p. 80)

After completion of the two prisons (Arnhem and Breda) it turned out that church services within the dome were hardly possible because of the poor acoustics. The construction of separate churches were inevi-
1883
the original site

1889
a church was built outside the panopticon

1893
demand prison and Court of Justice were built

1948
Cellular air spaces were demolished workbuildings built inside the walls

1968
Remand prison was extended to the south

2013
The complex remains the same, the city has grown around the complex

History of the prison complex in Breda
(own drawings)
In 1889 a church was built inside the boundary walls. In 1893 a Court of Justice and a remand prison were added to the complex. The Court of Justice was designed by W.C. Metzelaar in Neo-Renaissance style. It was built at the corner of the complex, the main entrance was also at this corner. The Court of Justice is connected to the adjacent remand prison.

As explained in chapter 4 (the history of prisons in The Netherlands), the ideas about punishment and confinement change over time. In 1948, the cellular air spaces were demolished to make place for working buildings. There were two large cellular air spaces situated in the northwest and southwest of the original site. A small one for women was situated in between. (Traa, 1987, p. 78)

In 1968 the remand prison was extended with five grids to the south.
After that, the complex remained the same. The city around it has grown toward the site. Nowadays, the city is completely surrounded by buildings, except on the eastside, where the singel is still present.

6.2.2 BUILDING STRUCTURE
The foundation of the Koepel consists of 1168 stakes of 7 meters in length. (Traa, 1987, p. 78)

The foundations of the boundary wall are constructed with a total of 400 stakes with a length of 5 meters and a diameter of 0.2 meters. The wall is constructed as a cavity wall with a cross bond in brick. (Traa, 1987, p. 75)

6.2.3 MATERIALS
The masonry of the cell building, built in Waal format bricks laid in cross bond, has a lower strip of clinkers. Above are hard gray bricks used on the walls of the four floors. On top of the wall a natural stone gutter is cantilevered on consoles. On this gutter a wrought iron fence is attached.

The roof of the attic is covered with zinc between upstanding roof cappings. The dome is covered with zinc sheets in diamond shape (“en losanges”) between 28 semicircular roof cappings. All roof cappings are covered with zinc as well. A total of twenty-eight flat roof windows are placed. On top of the dome is a fourteen-sided lantern of which the vertical and angled parts are made of glass. The roof of this is covered with lead and topped with a copper finial. (Traa, 1987, p. 25)

6.2.4 SERVICES
In both the panopticons of Arnhem and Breda, electric lighting was already installed during the construction.

On the plot, three brick bins were built for collecting the rainwater. These bins are situated below the pavement of the court, the floor in the central hall and the terrain north of the boiler room.
managers house with on the background the panopticon, 2013
(own picture)
guards house, 2013
(own picture)
side of the entrance gate, 2013
(own picture)
front of the entrance gate, 2013
(own picture)
In this chapter, two approached are exemplified. The first approach focusses on the relation between function and type. The typology of a panopticon prison will be described. A literature study will clarify the definitions ‘type’ and ‘typology’. There will also be described what other kind of functions are situated in a spatial comparable building type as the panopticon prison.

The second approach focusses on testing possible new functions on certain criteria for suitability. These criteria will be explained. This will be followed by an analysis of the panopticon prison on basis of these criteria.

The aim is to connect a certain function to this type of building. Therefore, different types of functions will shortly be described. Per function, first the typology will be described on the basis of recently built examples and literature. After that, the requirements with reference to the criteria will be described.

7.1 TYPOLOGY OF THE PANOPTICON PRISON

In the previous chapter, the terms typology and types are explained. A study based on the ABCD method includes several ways of considering a building as a type, in which function is only the first layer. The typological approach may be different for each particular building, to provide the most useful information for the study as a whole. Hence, it may be possible to include a building in several typologies. (Zijlstra, 2009, p. 67) For the redevelopment of buildings, a typology that includes spatial characteristics besides a functional type, is more useful. (Zijlstra, 2009, p. 69)

The first aspect on the subject typology is the panopticon principle. The prison of Breda is based on the panopticon principle of Jeremy Bentham (1748-1832), a philosopher and legal scholar. Bentham gives in The Panopticon Writings, a series of letters that he wrote in 1787, a characterization of the panopticon, ‘a penitentiary inspection house’. The structure can be applied to a prison, but is also applicable for workplaces, factories, poorhouses, hospitals, mental institutions and schools. (Floor, 2009, p. 12)

The panopticon is a round building in which the cells are located along the circumference. Originally, communication between the inmates was impossible. The cells were separated by thick walls that stick out to the hall, so that there was no visual contact between the inmates. The cells were, except for bars, completely open towards the hall. Each cell had an outside window. In the middle of the construction an inspection tower was situated. Between this tower and the cells there was an empty space. The inspection tower had big windows which corresponded to the internal windows of the cells. The light penetrates from the outside window throughout the cell and thus, the inmates are visible because of the created glow and shadow. In this space, there is only need of a single observer. His power is visible but uncontrollable. One could not say if the observer was there or not: blinds along the windows and partitioning walls in its interior made the betrayal of his presence impossible. That is the essence of the panopticon: ‘seeing without being seen’. (Floor, 2009, p. 12)

Internationally, the panopticon was mainly seen as a theoretical ideal to observe. Worldwide, only a dozen panopticon were established and only a handful has been preserved in its old function and is technically and architecturally still in such good conditions as those in the Netherlands. Especially the presence of three panopticons in one relatively small country is particular. With all panopticon prison, extensions quickly arose in the form of prison churches, making whole penitentiary settlements behind the stern walls. With their pantheon-like structure the prisons of especially Breda and Haarlem, dominate the city skyline. In Arnhem and Breda, the entrance gates have become icons of the execution of sentences. (Dongen, 2012, p. 80)

In all panopticon prisons they have attempted to accommodate additional facilities, needed for functioning in the 21th century, within the dome. Not all interventions are successful from the perspective of architecture and heritage. Around 1980, Rem Koolhaas made an intriguing plan for the Arnhem panopticon prison, commissioned by
the Rijksgebouwendienst. Due to lack of money and internal resistance the plan has not been realized. (Dongen, 2012, p. 80) It is interesting to mention that Rem Koolhaas did, before designing, a study on the usefulness of the panopticon prison in Arnhem. He said that it is striking that, in the hundred years of the existence, there have been different views on the functioning of a prison, but the architecture has not changed. The main points on which the panopticon prison is based (central observation and solitary confinement) are changed radically, but the building responded without major architectural changes. The panopticon principle has been transformed in a remarkable way: the central observation post in the middle has been converted to staff canteen, prisoners can now see the guards drinking there coffee. The conclusion of Koolhaas was that the monumental and seemingly space-consuming building, was in practice actually reasonably flexible. According to Koolhaas, this is because the dome has a large margin. It is this margin that new buildings lack. In new designs, the exact coincidence of program and form are so completely that any change of mind means an irrevocable change of program and shape. (Dubbeld, 2001, p. 65) With this in the mind, according to Koolhaas, it should be possible to find a suitable new function.

The spacial typology of the Koepelgevangenis in Breda can be defined as a rotunda (a circular ground plan) building. Its architectural form is the result of the synthesis of an annular building with a tower in the middle. The circumferential part is divided in cells which each one has the depth of the whole building. It counts in total four layers of 52 cells each and it was considered a luxurious “resort at the expense of state” at the time of its completion.

The rotunda type of building has been applied to religious, entertainment and culture/learning buildings. Between the 9th and 11th century a lot of circular church buildings have been built in central Europe. This have an average diameter of 6 to 9 meters, which is a lot smaller than the 63 (55 without cells) meters of the prison of Breda. Comparable buildings, also in terms of size, are the Michael Maddox Petrovsky Theater in Moscow, the Roundhouse Theater in London and the read-
ing rooms in the Stockholm Library and the British museum.

The emptiness of the dome is important in the typology. Usually, such a big space is used, as seen in the examples, for functions were people gather, such as theatres or library reading rooms.

The most important spacial aspect of building type of the panopticon prison in Breda is the contrast between a immense dome and the 208 cells surrounding it. These cells are small and with a tiny window, leaving few light to enter.

The structure of the panopticon prison is also interesting. All cells are linked to the main dome in the centre. So in essence, there is one very big space, connected to 208 small spaces.

The functional typology of the panopticon prison is, of course, a prison. The complex is therefore cut off from the rest of the city by the boundary wall. In some new functions, this seclusion would perhaps have more potential than with other functions. It is important to take into account the boundary wall that encloses the entire complex. Also in terms of buiding type, it is typologically clearly a prison. This manifests itself in small barred windows and a massive appearance. Also a lot of repetition in both the interior and exterior is an important characteristic of the typology of the prison. This is mainly due to the large number of cells. These form and endless row of cell doors, seen from the inside, and of barred cell windows, seen from the outside. This often creates somewhat monotonous apprearance.

7.2 CRITERIA

In order to evaluate the suitability of a possible new function, criteria for judging these functions must be set. Suitability is described as ‘the quality of having the properties that are right for a specific purpose’. That means that in the best case scenario, the perfect suitability, the properties of the building are exactly right for the new function. In that case, the building can retain its qualities and the new function would work optimally. The suitability can thus be measured on the extent to
which the building can retain its original qualities in combination with the functionality of the new function.

The question is how to measure and compare this. There are different methods developed to judge the architectural quality and functionality of a building. The views on how to measure architectural quality vary. Judgments differ depending on the position, experience and knowledge of the assessor. (VROM, 1991, p. 15) *Ruimte voor Architectuur* mentions some elements to evaluate quality. They describe the functionality, the cultural value and the future value. Functionality indicates to what extent the requirements of practical use are complied. The intended function sets requirements for the building and the relationship of the building with the environment. (VROM, 1991, p. 16) An important requirement is the ergonomics that has to do with the size of rooms, the interrelations, the layout and internal and external accessibility. Another requirement is a good indoor climate. This is related to the presence and quality of amenities such as heating, ventilation, lightning and thermal and acoustic insulation. (VROM, 1991, p. 16) In the case of cultural value they refer to the expression of the building. This is related with function in the sense that a public building gives a different expression to a building than, for example, a residential function. (VROM, 1991, pp. 16-17) The future value is the third element that is described. This concept refers to the time factor. For economic reason, quality preservation is required. This is mainly described as eligibility for other use. (VROM, 1991, p. 17) In the purpose of this research that quality is irrelevant. The research is already about finding a new function.

That the extent to which a space is appropriate for the intended use, determines the architectural quality, is also stated by Rijksbouwmeester Dijkstra in *Architectonische kwaliteit*. He also said that architectural quality is hard to define. (Dijkstra, 1985, pp. 1-3)

In *voldoet dit gebouw?* a method is described to measure the functional quality of a building. (Benes, 1990, p. 1) Quality of a function is defined as the relation between the requested performance and the provided performance. (Benes, 1990, p. 3) Functions have certain usage requirements. By formulating these requirements can be investigated if these fit with the building. They mention four groups of requirements: functionality, design, comfort and safety. (Benes, 1990, p. 9) Not every component can be measured objectively. But even if the aspect is subjectively interpreted, the aspect becomes negotiable and controllable, once it is documented. (Benes, 1990, p. 6) Each group is divided into subgroups:
- Functionality (Space, flexibility, services, layout, location, accessibility, vertical transport)
- Design (exterior, interior, material and color use)
- Comfort (temperature, sound, ventilation, heating)
- Safety (fire, burglary)

The method that has been developed to test the suitability in this research, is to review on certain criteria the ‘extent to which the building can retain its qualities and the functionality of the new function’. The criteria have been adjusted into the following subgroup:
- Functionality - Space
  - Structure
- Design - Exterior
  - Interior
- Comfort - Light
  - Climate

But a function not only has requirements for the building itself, but also for the location. The location aspects that are important, depend on the function. Therefore, the functions will only be judged on the criteria that are important. The aspects that are irrelevant will be left out. The location aspects are:
- distance to city centre
- distance to shops for daily needs
- distance to park or green
- accessibility by car and
- accessibility by public transport
- distance to Hogeschool or University
At last, a function have to be relevant for Breda or within the country. There must be a demand for a certain functions, otherwise it will not work.

To apply this method, first the panopticon prison of Breda and some possible functions, have to be analysed on these criteria in order to evaluate on the suitability. This will be described in the next chapter.

Each of the criteria will be given a value between 1 and 10, with 10 as best. The average valuation of the building, location and relevance will be given. The average of these numbers will be the final valuation of the function. This will be discussed in the conclusion of the report.
7.3 ANALYSIS OF PANOPTICON ON BASIS OF THE CRITERIA

7.3.1 SPACE
The dome in the middle of the panopticon has a diameter of about 53 meters. This makes a total floor area of 2200 square meters. The dome has a height of approximately 38 meters. The cells have a floor area of approximately 12 square meters. The height is 3020 mm and the depth is 4020 mm.
space inside a cell
(own image)
7.3.2 STRUCTURE
In the panopticon cell building, all cells are linked to the main space. In the four cardinal points, towers are located which contain the stairs. In the middle between the towers are also spiral stairs. The dome has very small entrances on two sides, which connect to the administration building at the front and the kitchen at the back. These are only two story high, stone buildings.
7.3.3 DESIGN/EXTERIOR
The building is constructed in brick. The roof of the attic is covered with zinc sheets. Especially the perfect round shape of the cell building is extraordinary and is both architectural as historical very important. The building has a regular and monotonous exterior because of the repetition of the cell windows. The exterior of the building is monumental, stately and remarkable. It is clearly visible as prison architecture and quite an impressive building.

7.3.4 DESIGN/INTERIOR
The interior can be described as ‘kil’ but stately. The interior has a nice detailing with several kinds of brick. Without a doubt directly recognizable as a prison interior because of the steel galleries en the endless rows of steel cell doors.
7.3.5 COMFORT/LIGHT
Each cell has a window opening. The opening starts at about 1.8 meters above the floor, so it is impossible to look outside. The window only has a surface area of about half a meter, so it is quite dark inside. The dome has 28 windows in the roof, divided over two layers. On top of the dome is a fourteen-sided lantern of which the vertical and angled parts are made of glass.

natural light inside a cell and the dome (own image)
7.3.6 COMFORT/CLIMATE

The acoustics in the dome is strange. When you stand in the centre, you can hardly hear anything, but when you stand on the side, you can hear someone speak on the other side of the dome. It echoes terribly. There is no mechanical ventilation. In each cell are two small ventilation openings. But in the dome are no operable windows or ventilation openings.

acoustics in the dome
(own image)
The location is situated closely to the historic city centre, only 500 meters away, which is a 5 minute walk away.
7.3.8 LOCATION/DISTANCE TO SHOPS FOR DAILY NEEDS

The closest supermarket for daily needs is 600 meters away, about 8 minute walking.
7.3.9 LOCATION/DISTANCE TO GREEN

The complex is situated directly next to the canal that surrounds the city. From the complex it is a 4 minute walk to the Valkenburg Park, to the west. The Wilhelmina Park is located to the south, a 10 minute walk.
7.3.10 LOCATION/ACCESSIBILITY BY CAR

Breda is situated between the A27 to Utrecht and the A16 to Antwerp and Rotterdam. From the location the A27 is 7 minutes by car, the A16, 9 minutes. There is a big parking lot with 848 places at 200 meters distance. But these are meant for the theatre, cinema and city centre.
The site is situated 700 meters from the train station of Breda, from which trains depart to Tilburg (13 minutes), Rotterdam (30 minutes) and Roosendaal and Antwerp. The bus stop nearby is only 150 meters.
7.3.12 LOCATION/DISTANCE TO HIGHER EDUCATION INSTITUTIONS

There are three higher education institutions in Breda, the ROC, NHTV and Avans Hogeschool. They are situated at approximately 700 meters and 1300 meters.
7.4 FUNCTION ANALYSIS

7.4.1 RESIDENTIAL
A residential area has a certain target audience. Because the space per cell is only 12 m² a large house such as a family home is not suitable for the building because too many cells have to be linked to make an appropriate home. The opportunities will therefore be researched for two types of residential functions: elderly people's homes and student homes.

Because the requirements for the amount of daylight for a residential function did not suit the panopticon prison, the conclusion was that residential function was not the most suitable function. Therefore, the typology description was not relevant and is left out of the research.

7.4.1.1 ELDERLY PEOPLE
Functionality
Within the housing of elderly people, there a three degrees in the care that is offered.

Old people’s housing consist of self-contained flats or apartments which are adapted for the needs of the elderly. Such housing is usually scattered around residential areas. Flats for one person are around 25 to 35 square meters. For two people this is up to 45 till 55 square meters. The balconies have to be sheltered and larger than 3 square meters. (Neufert, p. 302)

The second category is sheltered housing. This consist of a group of flats in one building, with common rooms. The groups usually consist of 8-10 people, with a shared lounge and kitchen. (Neufert, p. 303) This facilities are usually build close to a nursing home for the elderly who can provide meals, leisure, recreation and therapies. Per 5-8 residents, 1 car parking space is needed. (Neufert, p. 302)

Old people homes offer also care facilities. The most economic size is about 120 places. Meals, entertainment and therapy are provided intern. There is also an integrated nursing section for short-term care. These homes are mostly situated close to the infrastructure of a town and public transport. A daycare centre can be included and is needed per approximately 1600 elderly people. According to Neufert, central facilities are best grouped together on the ground floor. The central facilities include space for administration, consultation, therapy, physiotherapy, chiropody, entertainment, cafeteria and hairdressing. (Neufert, p. 302)

In order to reduce the risk of cross-infection between elderly people circulation distances should be kept to a minimum. Corridors must be wide enough to allow two people in a wheelchair pass each other. (Neufert, p. 302)

The stairs have to be 16/30 cm and without an open riser. (Neufert, p. 302)

Only 6% of the elderly indicates that they want a home with only one bedroom. Most of the seniors wanted to move to a two-bedroom appartment. The senior of today wants a spacious house. Furthermore, irrespective of the type of home, they think the outside and storage space is very important. The largest group wanted to move to a single-storey house. (Vastgoedactueel)

When choosing an appartment, elderly people prefer to live on the ground floor or top floor. They prefer a home with two bedrooms. They wish for a single-storey house with plenty of natural light inside and all electronic facilities available. Furthermore, it is valued to have a large balcony, extra large bathroom and a balcony or garden facing south. (Vestia, 2011, p.10)

Design
The key to living environment is that it is a pleasant place where one feels at home. The difficulty is the diversity of older people and thus the diversity of housing needs. A pleasant atmosphere is described as very important. (Gemeente Breda, 2010, p.6)
Comfort
Consistent temperatures are required and contingency plans for providing heating in the event of power failures should be considered. The ability to control temperature and sunlight penetration, particularly in bedrooms and sitting rooms, is important. (Neufert, p. 303)

Location
The homes should be sited close to the infrastructure of a town or village. The accessibility with public transport needs to be very close. (Neufert, p. 302)

The location desires are also described in the *woonwensenonderzoek* by Vestia. Elderly prefer a location close to a shop for groceries and daily needs and within walking distance to the city centre. Other preferences are a calm and green environment, close to public transport and a sufficient amount of parking places nearby. (Vestia, 2011, p.10)

### 7.4.1.2 STUDENTS

**Functionality**
There are different types of student accommodation, each with its own characteristics. (KENCES, 2013, p. 4) There are two main types that can be distinguished: independent living or non-independent living. (KENCES, 2013, p. 10) In this research the focus is non-independent living (also referred to as ‘room’), in which functions such as kitchen and bathroom are shared.

A total student home (so the student room and common rooms together) must have a minimum area of 18 square meters. (KENCES, 2013, p. 19) The shared space at least has to be 11 square meters. The bathroom has to be at least 2,2 meters by 0,9 meters. (KENCES, 2013, p. 20) An outside space of at least 4 square meters is required per student home (with multiple rooms). (KENCES, 2013, p. 22)

In Breda, 39 % of the students wants a room with shared functions, 27% want their own studio, and 34 % a normal house. Half of the students who want a room with shared functions, wants a room bigger than 16m2. (blz 21 wonenalsstudent) A room between 12 and 14 square meters is desired by 30 % of the students. The majority is willing to share the facilities with 3 to 5 other students. (Wonen als student, 2013, p.22) 90% would rather not share facilities with more than 5 people.

Usually, the rooms are connected with an intern corridor to reach the shared functions such as kitchen and bathroom. (Wonen als student, 2013, p.30)

**Design**
The atmosphere of a student residential building is important. Among students is a great mutual involvement and social control. (Wonen als student, 2013, p.31) Students like to change their living spaces into something personal.

**Comfort**
For living areas there is a minumum of 0,5 m2 window and 10% of the floor space. (Wonen als student, 2013, p.25)

Rooms should have a ventilation system with a feeding device for fresh air and exhaust of indoor air. A ventilation grid is sufficient. In the kitchen, toilet and bathroom mechanical ventilation is required. (Wonen als student, 2013, p.25)

**Location**
For students, accessibility with public transport is very important, since they travel for free. Accessibility with a car is not important, because most students do not own a car or travel by car. The distance to the university or higher education should not be to far. Also the distance to the city centre and recreation such as cinema, shops and bars is important.

### 7.4.2 PUBLIC BUILDINGS

#### 7.4.2.1 LIBRARY
The history of the public library is relatively short, about 160 years. The

Library of Birmingham, 2013 (Prizeman, 2011)

Seattle central library, 2004 (Prizeman, 2011)

Biblioteca España, 2008 (Voshart, 2008)

Bibliothèque Multimédia à Vocation Réégionale, 2015 (Prizeman, 2011)

Panopticon prison, Breda (own drawing)
The design of libraries has radically changed in the past 20 years by technological progress. Two key aspects that dominated the library design were the physical scales of containment and the ability to maintain environmental control. The digitalisation of books changed the library. Therefore, to define the typology of libraries, new build libraries from the last 20 years have been examined. (Prizeman, 2011)

The requirement to enable visual surveillance was the driving force behind the spacial arrangement of library design. Thousands of library have a radial plan, enabling librarians to monitor readers with optimum efficiency. Examples are the British Library, build in 1857 according to the design of Robert Smirke, and Alvar Aalto's Seinäjoki Library, built in 1965. (Prizeman, 2011)

In his essay about the typology of libraries, Oriel Prizeman states that today's public library brief is more than simply functional. At all scales, the public library is being framed as an emblem of hope and a symbol of cultural establishment. He notes that is is clearly the symbolic value of enabling the physical browsing of books that is celebrated today. The accidental meeting of alphabetical order and social interaction is the future of the public library. ‘Since the infinite space of the internet may be accessed from the private realm of the home computer, the library provides containment, and the characterisation of its identity through scale and form has become critical’. (Prizeman, 2011)

While the new technology is certainly having a major impact on the way we think about libraries, the building of a new library involves many other issues, such as sense of place, partnering, flexibility, mission, and others, some of them quite specific to a certain library or site. (Webb, 2000, p. 254)

To describe the spatial typology of a library, the plans of five different, recently built libraries are compared: the national library of China (2008), the Library of Birmingham (2013), Seattle Central Library (2004), Biblioteca Españ Dallas and Bibliothèque Multimédia à Vocation Régionale (2015). The plan of the panopticon prison is indicated at the same scale.

The sizes of the libraries differ. The National Library of China and the Library of Birmingham are the largest and almost twice the size of the Seattle Central Library. The Biblioteca Españ Dallas and Bibliothèque Multimédia à Vocation Régionale are the smallest, but these have many floor levels. The panopticon prison appears thus small for a library.

In all libraries are large, open spaces present. These are indicated in light brown on the drawings. This also determines the spacial typology of these libraries. There are large spaces with directly connected small rooms. However, these small rooms are not as small as the cells in the Koepelgevangenis.

**REQUIREMENTS**

**Functionality**

The floor area depends on the size of the collection. There should be 300m² of usable floor area for every 10,000 units of media in the collection. The objective is to have a minimum of two media units per occupant. Ideally, the design should include a large, open, multipurpose area and an inviting entrance. The room height should be higher than 3 meters.

The number of book shelves depends on the type of organization, accessibility for users, type of shelving but also the structural grid of the building. The aisle between an open-access book shelf is about 75-80 cm. The book transport is with trolleys with an average width of 500 mm. (Neufert, p. 327)

Facilities inside the library should include reading rooms, online catalogue terminals, copying equipment, open-access book shelves, music listening facilities and work spaces. (Neufert, p. 328)

Facilities outside the controlled area are cloakrooms, lockers, toilets, a cafeteria, a newspaper reading area, an exhibition room, lecture and conference rooms, an information desk, on-line catalogue terminals,
Bord Gáis Energy Theatre Dublin, 2010
(Wilkinson, 2013)

Royal Danish Theatre Copenhagen, 2008
(Wilkinson, 2013)

Snøhetta Oslo, 2007
(Wilkinson, 2013)

Panopticon prison, Breda
(own drawing)
book return, recreation, meeting rooms and a collection area for ordered/reserved books. It may also include a music library and an art lending library. (Neufert, p. 328)

The area required for a simple reading/work place is 2.5 square meters. For a PC or individual work place, about 4 square meters is needed. (Neufert, p. 328)

According to Neufert, reading room areas, with space for reading and working, should be easily accessible. That also aids book transport. Circulation routes should be wider than 1.2 meter. (Neufert, p. 327)

Access to different floors should be by staircases, but lifts must also be provided for the use of disabled people and for book transport. (Neufert, p. 327)

Design
Public libraries are used by children, adults and elderly people. The room design should encourage people to spend time in separate open-plan spaces where activities take place. The entrance should be inviting. (Neufert, p. 327)

The building has an important public function within the city, and should therefore be stately, notable and unique.

Comfort
In the user areas the temperature should be around 20 degrees. The relative air humidity should be around 50%. The fresh replacement air should be higher than 3 m³/h/m. Air filtration is necessary to eliminate any harmful substances in the atmosphere. By using wall materials with good moisture and heat-retaining properties, it is possible to reduce the necessity for air conditioning.

Direct sunlight needs to be avoided, since UV and heat radiation destroy paper and bindings. Lightning should have separate switches in each area and be individually adjustable at each work station. (Neufert, p. 328) According to Jo Coenen the day light in the reading room is essential. (Coenen, 2010, p. 80)

Lighting should be appropriate to the use to which the area is put. Bookshelves should be protected from daylight. Sensitive materials should not be exposed to a level over 50 lx. Artificial light is preferable in an exhibition area since it is easier to control. The best luminance distribution ratio at workstations is 10:3:1 (book: surface: background). Non-work rooms need 100-300 lx, stacks need 150-300 lx, office and administration blocks need 250-500 lx. And reading rooms without individual lights and catalogue rooms need 300-850 lx. (Neufert, p. 329)

Location
libraries perform a range of functions in society. The functions of academic and public libraries are often combined in a single library in larger towns. (Neufert, p. 327) The location therefore have to be central in the city and close to the city centre. A excellent accessibility with both the car and public transport is important.

7.4.2.2 Theatre
The essence of a theatre is the space for an audience combined with a stage. In addition to these acting space, there are also offstage spaces containing dressing rooms, rehearsal rooms, space for constructing sets, props and costumes, as well as storage. (Wilkinson, 2013)

To describe the spatial typology of a theatre, the plans of three different, recently built theatres are compared: the Bord Gáis Energy Theatre in Dublin (2010), the Royal Danish Theatre in Copenhagen (2008) and the Snohetta in Oslo (2007).

The difference in size of the theatre buildings is remarkable. The Snohetta in Oslo is more than twice as big as the Bord Gáis Energy Theatre in Dublin and the Royal Danish Theatre in Copenhagen. This difference is determined by the additional space next to the actual auditoriums. The auditoriums have about the same size. All theatres have small rooms used as dressing rooms and storage. Some bigger rooms are used as rehearsal rooms. The position of the auditoriums are in all cas-
MaXXI Rome, 2009
(Marotta, 2012)

Milwaukee Art Museum, 2001
(Marotta, 2012)

Institute for Contemporary Art (ICA), 2015
(Marotta, 2012)

Lois & Richard Rosenthal Center for Contemporary Art, 2003
(Marotta, 2012)

Panopticon prison, Breda
(own drawing)
es central for the design of the theatre. The auditoriums are marked with light brown in the drawings. These determine the spacial typology of the theatres. The basis of a theatre is the auditorium. In all cases, this auditorium connects to a foyer or hallway which can be used to reach the small additional rooms.

The sizes of the auditoriums are comparable with the size of the dome of the Koepelgevangenis. The needed additional spaces are much bigger than the cells, both in total and in size.

All examples of theatres are extraordinary buildings. This ‘eye-catching’ is also a part of the typology of a theatre. It is a public function, with great importance to the city. The theatre building has to stand out in the city.

REQUIREMENTS
Functionality
The theatre is structurally in the tradition of the German reform theatres of the 19th century. It is characterized by the stalls arrangement (i.e. the audience sit in a large ascending curved area) and by a distinctive, front acting stage (an acting area in front of the proscenium in the auditorium) (Neufert, p. 477)

The size of the auditorium has to have an area of at least 0,5m² per spectator. The maximum chairs in a row is 16 seats per aisle. The escape routes has to be 1 meter wide per 150 people. The volume of the room is obtained on the basis of acoustic requirements and has to be approximately 4-5m³/spectator. (Neufert, p. 478)

The proportions of the auditorium are obtained from the spectator’s psychological perception and viewing angle. A good view with slight head movement and slight eye movement is approximately 60°. (Neufert, p. 478)

The maximum distance of the last row from the start of the stage is 24 meter for a playhouse, which is the maximum distance from which it is still possible to recognize facial expressions. A room proportion of 1:1.6 is the best option for multiple use. (Neufert, p. 479)

Design
The building has an important public function within the city or even within the country, and should therefore be stately, notable and unique. Also the interior should be special and impressive.

Comfort
The stage should be ventilated for smoke and hot gases resulting form fire on the stage. The temperature should be constant.

Practical
During the design of a theatre, pragmatic considerations play a major role and are even somethings decisive. Fire safety has lately become one of the hardest issues in contemporary designs of theatres. A room with five hundred people must be cleared instantly. (Coenen, 2010, p. 107)

Location
There are three important things for the location of a theatre. Because a theatre has also a regional function, especially the accessibility with both car and public transport has to be excellent. Also the distance to the city centre is important.

7.4.2.3 MUSEUM
In the article Typology: museum the development of the typology of museums is discussed. The first type was a gallery within a residence of a wealthy family. This was the first archectural work, specifically designed for the exhibition of artwork. During the Enlightenment, people wanted the collections to be accessible for the public for educational purposes. There was great importance attached to the systematic and chronological presentation of the artworks. The museum was designed as an encyclopedia. (Paalvast, 2011)

From the 19th century on, the museum was part of any self-respecting
modern city. By the end of that century a new type of museum arose. This new type had irregularly plans to accommodate a wide variety of exhibitions. (Paalvast, 2011)

Museums today are mainly a product of the creativity of the architect and technical innovation. The imagination is hardly constrained by functional requirements. Lately, more museums are built in a short period of time and never in such a large variety. (Paalvast, 2011)

To continue with the description of the typology of modern time museums, the plans of four museums have been explored. These museums are: MaXXI in Rome (2009), Lois & Richard Rosenthal Center for Contemporary Art in Cincinnati (2003), Institute for Contemporary Art (ICA) in Richmond (2015) and Milwaukee Art Museum (2001). The first thing to notice is the difference in size between the buildings. The MaXXI in Rome and the Milwaukee Art Museum are about four times as big as the Lois & Richard Rosenthal Center for Contemporary Art and the ICA.

In colors, different open spaces in the museum are indicated. Most times, this contain the exhibition space, entrance hal or auditorium.

The ICA and the Lois & Richard Rosenthal Center for Contemporary Art have about the same size as the Koepelgevangeniss.

REQUIREMENTS
Functionality
Broadly speaking, a museum has two functions. The first is displaying the artworks as favorable as possible. The second is to protect the artworks from damage, theft, fire, humidity, weather and dust. (Paalvast, 2011) Display the collection in the best way is difficult, because the collection will change and therefore requires a flexible building.

Each group of pictures in an art gallery should have a separate room and each picture a wall to itself, which means small rooms. It is necessary to allow 3-5m2 hanging surface per picture, 6-10 m2 ground surface per sculpture and 1 m2 cabinet space per 400 coins. (Neufert, p. 336)

In addition to the exhibition spaces, most museums have a private museum library, foyer, catering facilities and a museum shop. Particularly the larger museums have educational offerings such as workshops, tours, educational programs an an audio tour. (Neufert, p. 336)

Side rooms are neede for packing, dispatch, administration, a slide section and maybe even lecture theatres. (Neufert, p. 336)

Comfort
Because the artwork has to be protected, the structural and insulation requirements of a museum must be of a very high level. A leakage, for example could have irreparable consequences, a poorly functioning air conditioning system also. Exhibits should be displayed in a way which allows the public to view them without effort, and show the works in the best light. The light is therefore very important.

Design
The building has an important public function within the city or even within the country, and should therefore be stately, notable and unique. Also the interior should be special and impressive.

Location
There are three important things for the location of a museum. Because a museum has also a regional function, especially the accessibility with both car and public transport has to be excellent. Also the distance to the city centre is important.

7.4.2.4 PUBLIC: HOTEL
To describe the typology of a hotel, three examples of recently built hotels will be analysed. These are the Fletcher Hotel (2013) in Amsterdam, the Dream Downtown (2011) in New York and the Mövenpick Hotel (2005) in Amsterdam.
The Fletcher Hotel in Amsterdam, designed by Benthem Crouwel, has a height of 60 meters and a compact floor plan with a diameter of only 24 meters. The limited space is used as efficiently as possible. The lobby and coffee corner are on the ground floor. There are 120 rooms. On the top floor (18th) is a sky lounge and on the floor below a restaurant.

The Dream Downtown Hotel, designed by Handel Architects, is situated in New York. The 12-story building includes 316 guestrooms, two restaurants, rooftop and VIP lounges, outdoor pool and poolbar, a gym, event space and ground floor retail.

The Mövenpick hotel has a height of 70 meters. In the plinth on the ground floor the reception, bar and lounge are situated. On the first floor the gym and sauna. Above are the conference rooms with facilities and the staff offices. All other floors contain a total of 408 guestrooms of 26m².

The basic principle of a hotel is that people can stay overnight. For that purpose guest rooms are essential. In the three examples the surface area of these rooms are quite similar. These are double rooms with en-suite bathroom.

To fit as much as possible rooms on a small ground surface, towers arise. These have a corridor structure: a hallway with guest rooms on both sides.

While designing the Mövenpick hotel, the architects have studied possible variants to this stereotyped pattern. But it turned out to be very hard. The corridor type is by far the most efficient typology for a hotel. (Architectenweb, 2002)

This can also been seen in the three examples. All floors with guest rooms have the same plan. In the middle is a circulation space connected with an elevator and stairs. From this circulation space, all guest rooms can be reached.
The cells of the panopticon prison are smaller than the guest rooms in the examples. In the panopticon prison, the circulation space is the dome, which is substantially bigger than the corridors in the examples.

**REQUIREMENTS**

**Functionality**

The quality and facilities that are offered in a hotel vary. Accommodation facilities (rooms, toilets, bathrooms, showers and hallways) should occupy 50-60% of the floor area. Public guest rooms, a reception area, hall and lounges require 4-7%. Hospitality areas, restaurants and bars 4-8%. Meeting and conference rooms 4-12%. Kitchens, personnel rooms and stores 9-14%. Administration, management and secretarial 1-2%. Maintenance and repair 4-7%. Leisure, sports, shops 2-10%. (Neufert, p. 464-467)

The size and number of beds largely dictates the minimum dimensions and layout for the rooms. Rooms can include a sitting area with chairs or a desk. Corridor space should be about 6 square meters per room, and normally at least 1,50-1,80 meters wide. A double bedroom in an economy hotel is around 3,80 by 7 meters, including bathroom. (Neufert, p. 464-467)

Hotels usually have a restaurant and/or breakfast area and one or more bars. Hotels with a conference facility may include a multifunctional central hall, meeting rooms, exhibition areas and buffet facilities. Storage for extra furniture and additional parking space may be necessary. Hotels should provide facilities for the handicapped and disabled in at least 1-2% of the rooms, preferably on the ground floor. (Neufert, p. 464-467)

The area required in the hotel per room (without parking facilities and restaurant) is about 52 square meters in central location. (Neufert, p. 464-467)

**Design**

An extraordinary design can be a selling point for a hotel. The decor is very important to be impressive and stately. The image of a hotel is very essential. The entrance needs to be eye-catching and attractive, because it has to get people inside.

**Comfort**

The climate inside needs to be comfortable. The amount of light in the rooms is not as important as with a residential function. There need to be mechanical ventilation in the bathrooms. Openable windows are a positive point.

**Location**

For the location, especially the distance to the historic city centre is important. Also the accessibility with both the car and the public transport is important. There need to be enough parking lots.

**7.4.3 OFFICES**

*Because the requirements of the amount of daylight of offices did not suit the panopticon prison, it was concluded that offices were not the most suitable function. Therefore, the typology description was not relevant and is left out of the research.*

**REQUIREMENTS**

**Functionality**

The way in which office work is organised and roles are defined affects the requirements for office space. A detailed description of the company and its organisational structure, including company specific functions, will give a better list of requirements. The description given by Neufert for the requirements of offices, is a bit outdated. Neufert speaks of record areas for microfilm, central computer rooms, post room, etc., which are maybe no longer needed. Office work continues to change from the introduction of new technologies. What always remains is the space allocated to a person to execute a task, a workstation. This can be a private office with full-height partitions, or an individual desk in an undivided space. (Neufert, p. 339)

A large office building will consist, besides the workstations, of sever-
Developments in information and communication technologies have contributed greatly to the changing working conditions in offices. The floor area needed for an office is approximately 15-18 square meters. The average floor area is about 22 square meters. A standard desk is 0,78 by 1,56 meters. Behind the desk an empty space of 0,85 meters is necessary. The space requirement per employee clearly depends on a number of factors: type of work, use of equipment, degree of privacy, level of visits made by outsiders and storage needs. A minimum floor area requirement for office workstation has not been defined. There are some guidelines: separate offices minimum 8-10 square meters and open-plan offices 12-15 square meters. A floor-to-ceiling height of minimum 2,5 meters is recommended. (Neufert, p. 339)

The width of corridors depends on the occupation of the space and the area required to move equipment. Generally speaking, it should be possible for two people to pass each other. (Neufert, p. 339)

Rising levels of physical and psychological stress have resulted in greater attention being paid to the work environment. Office workers need sufficient space, the freedom to arrange their own furniture, good ventilation and lighting, and protection against external or unnecessary disruptions. (Neufert, p. 339)

Design
For a company it is important to be noticed and have a remarkable building. The interior should be light and attractive, also to stay in throughout the day.

Comfort
Daylight can usually be used up to a distance of 7 meters from the window. Some systems convey and change the direction of the light (prisms and reflectors) and make more efficient use of daylight. The basic rule for the depth of daylight entry is 1,5 times the window height. (Neufert, p. 339)

Location
For an office it is important to be easily accessible by car. There need to be enough parking spaces. The accessibility with public transport is also significant. (Neufert, p. 339)

7.4.4 WELLNESS COMPLEX
The key elements for making a day spa successful are an attractive and competitive range of spa services, high-quality service offered by well-trained staff, an intriguing spa architecture and a clever marketing strategy. (Brouwer, 2013, p. 65)

The graduation report of A. Brouwer from 2013 is about the architecture of wellness complexes and sauna’s. The typology of a wellness-complex that is described in this report is shortly summarized. The outdoor space is playing an important role within a wellness complex. Often the complex exists of seperate buildings. The catering always has a view on this indoor courtyard. The buildings consist of one or two floors. Generally, the catering has the same size as the sauna area. The massages and treatments are located in a different building or seperate area of the building. (Brouwer, 2013, p. 65) These conclusions are also visible in the examples: the Elysium wellness complex and Sauna Soesterberg.

In a wellness complex, there are only a few large spaces. Mainly these are the restaurant and the area where the main pool is situated with surrounding facilities.

Elysium is a national wellness centre, which can been seen in the size of the complex. Sauna Soesterberg has a more regional function. This size is about the same as the Koepelgevangenis.
REQUIREMENTS
Because the conclusion from the comparison between the typology of the panopticon prison and a wellness complex, is that there are no similarities, the requirements of the wellness complex were not relevant anymore. In any case, this function was not the most suitable.
In this chapter five case studies will be analyzed. First the method for analyzing will be explained combined with the choosing of the case studies.

### 8.1 Method for Analyzing the Case Studies

There are several prisons already converted into another function:

<table>
<thead>
<tr>
<th>name</th>
<th>construction year</th>
<th>place</th>
<th>new function</th>
<th>temp/perm</th>
<th>year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blokhuispoort</td>
<td>1870</td>
<td>Leeuwarden</td>
<td>creative entrepreneur</td>
<td>temporary</td>
<td>2007</td>
</tr>
<tr>
<td>Spinhuiswal</td>
<td>1912</td>
<td>Den Bosch</td>
<td>rented 'anti-kraak'</td>
<td>temporary</td>
<td>not started</td>
</tr>
<tr>
<td>Huis van bewaring</td>
<td>1928</td>
<td>Almelo</td>
<td>hotel</td>
<td>permanent</td>
<td>2004</td>
</tr>
<tr>
<td>Noordsingel</td>
<td>1854</td>
<td>Rotterdam</td>
<td>mixed functions</td>
<td>permanent</td>
<td>2014</td>
</tr>
<tr>
<td>Spinhuis</td>
<td>1739</td>
<td>Zwolle</td>
<td>hotel-restaurant</td>
<td>permanent</td>
<td>2008</td>
</tr>
<tr>
<td>Het Arresthuis</td>
<td>1666</td>
<td>Roermond</td>
<td>working, living, recreation</td>
<td>permanent</td>
<td>2011</td>
</tr>
<tr>
<td>Oostereiland</td>
<td>1662</td>
<td>Hoorn</td>
<td>museum</td>
<td>permanent</td>
<td>2007</td>
</tr>
<tr>
<td>Het 2de gesticht</td>
<td>1823</td>
<td>Veenhuizen</td>
<td>horeca, offices</td>
<td>permanent</td>
<td>2005</td>
</tr>
<tr>
<td>Kleine Gartmanplantsoen</td>
<td>1850</td>
<td>Amsterdam</td>
<td></td>
<td>permanent</td>
<td>1991</td>
</tr>
</tbody>
</table>

Besides these objects, there are also examples outside The Netherlands: In Palencia, Spain, a 19th century prison has been converted into a civic and cultural center in 2011. The prison Katajanokka, build in 1837 in Helsinki, was in 2007 transformed into a hotel. The Celica hostel in Ljubljana was a former prison from 1882 and has been converted in 2003. Because it is not possible to visit these examples, they will not be the main part of my research.

The conversions of Spinhuiswal in Den Bosch and Noordsingel in Rotterdam are not finished yet. Therefore, these examples will be left out of the research. The Spinhuis is Zwolle and the Oostereiland in Hoorn refused to cooperate with the research. So five former prisons continue will be analyzed for the research.

These five prisons are not the same spacial prison type as the pantopicon prison. But the functional type is the same: that of a prison. The combination of many small cells and larger meeting areas remains. Also the closed nature of the buildings is similar.
The structure of the research on these case studies will be the following. First, a short summary of the context and history will be given. After that, the main part of the analysis will focus on the new function.
- What is the new function?
- What adjustments have been made to fit in this new function?
- How is been dealt with the prison characteristics and atmosphere in the new function?

At the end of every case study, a short conclusion about the transformation will be given.

The total conclusion about the case studies will be described with the conclusions in chapter 9.
Munsterkerk was restored by the famous Dutch architect Pierre Cuypers, who was born in Roermond.

The Arresthuis is located in the middle of the city centre, only 100 meters from the Munsterplein. The NS station and the Markt are about 500 meters away, also within walking distance. It is situated in a historic and quiet place in the inner city. Citypark De Karthuis, with monastrery gardens, is located just across the street.

The Arresthuis was built in 1863 by, at that time the Chief Government Architect, Allard C. Pierson. For over 100 years it functioned as a remand prison. The prison was built on the site of a former bishop’s palace, which has been used as court. Several times it has been extended, the last time was in 1916. On the Dionisiusstraat, an extra prison wing was realized and between the Bishop’s Palace and the prison, an archive building was placed. (Het arresthuis, 2013)

The complex also contains a stable building on the corner of the Dionisiusstraat and the Geeststraat. The ring wall was built partly in 1860 and partly in 1915. (Het arresthuis, 2013)
After years of vacancy, the building reopened in 2002 as an emergency facility for drug offenders. The vacancy was caused by the construction of a new prison. Mid 2007, the prison closed for good. (Kennis- en projectenbank herbestemming, 2012)

In the spring of 2007, a selection procedure followed, in which visions could be submitted by market parties. These visions were evaluated by a committee and tested against predetermined principles. ‘Quartier Damianus’ of Engelman Architects was the winning plan. In 2010, the construction started. (Kennis- en projectenbank herbestemming, 2012)
8.2.2 ANALYSIS
The complex consisted of cellblocks, courthouses and a court.

In the plan ‘Quartier Damianus’ of Engelman Architects, they went back to the situation in 1850, which led to the restoration of the Bishop’s Palace, the Arresthuis and the oldest cellblock. (Kennis- en projectenbank herbestemming, 2012)

The rest of the complex was built later on. These temporary buildings and a newer prison wing have been demolished to make room for two new apartment buildings. (Kennis- en projectenbank herbestemming, 2012)

The Bishop’s palace has been converted into four luxurious apartments.

The Arresthuis and former cellblock were transformed into a hotel with 43 chambers. On the ground floor of the Arresthuis, a restaurant with terrace on the inner square has been created. The inner square

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**plans Arresthuis**
(Het arresthuis, 2013) (own editing)
was the former yard of the prisoners. For business guests, the hotel has two conference facilities. The Galerij, located in the former cell block, is suitable for parties up to 250 people. (Het arresthuis, 2013)

The new apartment buildings contain 34 senior apartments with a floor space ranging from 67 till 83 square meters. There is an opportunity to rent a parking place beneath the complex. They build a parking garage with 73 parking spaces. In April 2011, the first apartments are completed, in July the follows the second stage.

The former stable building has been sold to a third party and will be converted into a dwelling. (Kennis- en projectenbank herbestemming, 2012)

The interventions and additions to the former prison wing, have been minimal. Three cells have been converted into one hotel room by connecting them internally with small passages. You enter in the sitting room, the middle one is the sleeping cell and the last cell the bathroom. Only one of the three cell doors (the one of the sitting room) is }

plans Arresthuis
(Het arresthuis, 2013) (own editing)
The former recreation areas of the prison have been transformed into deluxe ‘cells’. The suites of the hotel are located in the former director room and the exercise spaces of the former prison. As already mentioned, the gallery can be used for parties and banquets. (Kennis- en projectenbank herbestemming, 2012)

The architect, Hans Boots, says: ‘a hotel does justice to such a building. It was a residence buildings and it still is.’ (Kennis- en projectenbank herbestemming, 2012)

The prison wall around the property has been closed. Thereby, the seclusion of the walled complex is strengthened. The inner courtyards have been made semi-public. The new building blends smoothly into the historic city pattern. (Kennis- en projectenbank herbestemming, 2012)

The new buildings have a reluctant design and have the same simple

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classification

- entrance
- sitting room
- sleeping cel
- bathroom
- closets

plan interior
(own drawing)
entrance. All the elements inside (the cell doors and cast iron stairs) have been painted anthracite. That creates a high contrast with the white walls.

The tangle of installation pipes on the walls have been removed so the cast iron stairs and landings are made visible again.

The prison elements have all been preserved and sometimes even given extra emphasis in the design by adding color. The former white-gray front façade is painted anthracite and therefore more threatening and expressive appearance. The bars on the windows are painted white so they stand out more and are more noticeable on the facades.

Part of the prison atmosphere has been preserved and even given extra emphasis. A small amount of soberness is acceptable and even desirable because it is a hotel with a certain selling point.
They did change a few things to make the gallery a better place to stay. Mainly, color has been added in the furniture and lights. On the ground floor, five sets of two light grey benches have been placed around a wooden table. Bright colored pillows lie on these benches.

In order to make the atmosphere more ‘light’ and arty, elements have been placed to remind people at the former function. For example, as art they used old keys and photos of prisons. The cheerful, modern chandeliers on the ceiling make a sharp contrast with the past.
The appearance of the gallery is gentler due to the carpet on the floor. Also opening up the cell doors is playing a role in that.

The light is very important. Spotlights are incorporated in the ground floor. In the first and second floor are spotlights that shine upwards and downwards. These lights determine for a main part the atmosphere in the gallery. The colors change from blue in the day to purple at night. The purple color creates a mysterious atmosphere at night. The blue daylight is more friendly and cheerful.

8.2.3 CONCLUSIONS
The transformation of an abandoned monumental prison to a hotel is a small step. Typological a prison is an accommodation building. By meticulously connecting three cells together a luxury accommodation building for voluntary stays arises. Converting to a hotel function is also relatively easy for another reason: the prison characteristics and atmosphere can be the image and selling point of the hotel. Therefore it does not matter to preserve a lot of the characteristics and atmosphere. The prison characteristics rather have an inspiring than a detrimental effect on the success of the hotel. The extraordinary history of the location is instead the image and selling point of the hotel. The atmosphere is good enough and interesting for a hotel, but not for a real residential function. Particularly through color schemes, lighting effects and adding elements like chandeliers, the soberness largely disappeared. A small amount of soberness is acceptable and even desirable because it is a hotel with a certain selling point.
8.3 SECOND COLONY, VEEKHUIZEN
8.3.1 CONTEXT
The Justice-village Veenhuizen started in 1823 as a colony with three asylums for orphans and beggars. Later, the colony gradually changed in character and from 1886 it was part of the prisons system in The Netherlands. (Floor, 2009, p. 44)

Veenhuizen was in former times also called ‘Hollands Siberia’. Around 1825, thousands of beggars, vagrants, widows and orphans were banished from the big cities to ‘Hollands Siberia’. The name ‘Hollands Siberia’ reflects on the remote location. Around Veenhuizen is still a vast landscape. Veenhuizen is in clear contrast with its surroundings. Veenhuizen has a so-called orthogonal structure: the lanes, canals and neighborhoods are perpendicular lines. The colony was spacious, with a main canal and perpendicular to that six smaller canals. Three square asylums were surrounded by land plots. Veenhuizen is situated amid of raised bog landscape and meandering stream valleys. (Heuvel, 2013)

Due to the bad economic situation in the first half on the nineteenth century, there was a high rate of unemployment and poverty. General Johannes van den Bosch, tried to find solution for this problem. People who wanted to work but could not find work, were given the opportunity to build up a new life in agriculture, subjected to certain conditions. They were put with their family in a working colony. Not long after the establishment of these colonies, the objective was broadened and also beggars and vagrants were employed there. The consequence was a
more stringent regime. This led to a big difference between the so-called free colonies and the compulsive colonies. (Floor, 2009, p. 45)

In 1823 and 1824, the asylums Veenhuizen I, II and III were build. The three had an almost identical design with a courtyard of approximately 100 by 100 meters. The courtyard served as walking place. Around it were halls that served as a residence at daytime and as dormitories overnight. The asylums were surrounded by moats and only had a front and back gate. (Heuvel, 2013)

In 1859, the government took over the control. Orphans and foundlings were replaced by people who were sentenced to imprisonment. The prisoners lived side by side with the ‘nursed’: vagrants and beggars. The difference was only visible in the clothes they wore. Eventually all asylums became prisons. An entire village was built around the prisons for the prison staff. The official hierarchy was reflected in the grandeur of the homes. On the facades of most homes still adorned edifying spells. (Adler)

Since 1970 the ‘nursed’ people are gone. However, the village still has three prisons, with a total of over 1000 prisoners. Veenhuizen is freely accessible since 1984. Before that, only prison staff and their families were allowed inside the village. Who retired or found another job outside Veenhuizen, had to move. (Heuvel, 2013)

Nowadays, Veenhuizen is part of the municipality of Noordenveld. Veenhuizen has more than one hundred national monuments and three prisons that are still in use. (Adler) The second institution, is the only building that has passed the ravages of time and retained its original character. The original plan shows four components of each 145 meters long and 10 meters wide which lie in a square around a large courtyard. This type of building is widely used in the eighteenth and nineteenth century for barracks, working buildings and monastries. Small windows and doors dominate the facades. The courtyard covers a surface area of one and a half hectare (125 to 125 meters). Floor, 2009, p. 46)

In 1928, the eastern wing was demolished. Some garages were placed on the terrain, but the characteristic square shape of the asylum changed. The original moat around the building has largely been preserved. (Adler)

In style and typology, the three asylums are identical. It involved simple, one storey buildings with an attic. (Adler)
8.3.2 ANALYSIS

In 2000, the second asylum was appointed as the location for the Prison Museum. The design has been made by Mayke Schijve, an architect from the Rijksgebouwendienst. She is especially impressed by the length of the building. She wanted to show the public this characteristic. So all boxes, offices and chambers which were created over time, were demolished. The new partitions are made of glass. Therefore, the visitor can see until the end of the building and get an idea of the length of the building. (Poll, 2008)

Another important characteristic, according to the architect, is the rough, simple construction. They thick wooden support beams were kept in sight and concrete has been put on the floors. All other additions of the architect are from steel and glass, which does not interfere with the original appearance of the building. (Poll, 2008)

The most notable new element is behind the entrance to the museum. The visitor enters through the narrow original gateway, behind which a glass extension is installed. It is a modern extension, only visible from the courtyard. This extension serves as a reception area. From this new part, to the left the visitor finds the cloakroom and toilets. To the left the visitor center, the museum shop and the exhibition space. (Poll, 2008)

In the restaurant, in memory of the original timber structure, a triangular light box has been placed. (Poll, 2008)

The last addition by the architect are a number of large glass walls in the facade on the side of the courtyard. At these locations the Department of Justice had placed rolling shutters. (Poll, 2008)

The museum also includes a visit to the actual prison ‘de rode pannen’, which is situated next to the museum. The 42 rooms in the large cell building were built in 1939/1940. At first, it was used for disciplinary punishment. In the 60s and 70s, weekend punishments were sentenced here. Since 2003, detainees with a maximum stay of 90 days were held there. ‘De rode pannen’ closed on 31 March, 2008. (Adler)

The museum has grown into a professional organization with 24 employees and about 90 volunteers. In 2007 it has been named the best historical museum in The Netherlands. In 2011, the museum received as many as 112,500 visitors. (Adler)

In 2011 Veenhuizen won the EDEN Award. The Award is an initiative of the European Commission to encourage the sustainable development of tourism destination. In 2011 the theme was redevelopment of local heritage. (Poll, 2009)

8.3.3 CONCLUSIONS

The original form of this prison was an ‘alcove’ prison. This means that there were no small cells but larger sleeping rooms for multiple prisoners. The windows are quite big and not barred everywhere, so the interior was very light for a prison building. The architect has placed a few extra windows on the place of the former shutters.

Because of the organization of the alcoves around a courtyard, it was easy to make a museum routing through the length of the building. The structure could therefore largely be preserved, only the partitions had to be demolished and the museum could use the length of the building. The museum is quite small, it is only extended with a new entrance hall.

In conclusion, the transformation to museum was quite easy when considering the building typology of the original prison. Some small interventions were needed, but the building has kept its monumental appearance and works perfectly as museum. This easy transformation had to do with the alcove structure around a courtyard and the ‘normal’ windows which allows a lot of daylight to enter.
sketch of former second colony
(Poll, 2008)

sketch of new plan for museum
(Poll, 2008)

picture of the new entrance hall, new windows, interior of the exhibition space and the restaurant (own pictures)
8.4 Kleine Gartmanplantsoen, Amsterdam

8.4.1 Context

The wing-type prison of Kleine Gartmanplantsoen was built in 1849 according to the design of I. Warnsinck and J.G. van Gendt. It was the first cellulaire prison in The Netherlands. Next to the remand prison, a Court of Justice was built. (Cappelen, 2012, p. 9)

During World War II, the prison complex was used by the German Sicherheitsdienst to imprison and interrogate many prisoners immediately after their arrest. Then they were transported to prisons, camps or executed in the dunes near Overveen. Anne Frank and her family have spent two days in this prison. (Cappelen, 2012, p. 9)

The prison was closed in 1979 and replaced by the Bijlmerbajes. (Cappelen, 2012, p. 9)
8.4.2 ANALYSIS

The complex was redeveloped around 1990. The Court of Justice was, unlike the remand prison, listed as a monument. This building was therefore almost completely preserved and is currently in use as ‘De Balie’, a center for various cultural events, especially debates. (Cappelen, 2012, p. 9)

The remand prison was almost completely rebuilt, only the structure of the building has remained intact: the central hall and four cell wings. The cells wings have been transformed into offices. During the transformation, only the outer walls have remained. In the central hall, the original windows and stairs have been preserved. On the ground floor, a passage has been made to give the space a public character. The central hall gives access to the offices, but also forms a connection between the Garmanplantsoen and the Max Euweplein (designed on the terrain of the complex). (Cappelen, 2012, p. 10)
With the transformation in 1990, on one hand (from the population and municipality) they were trying to preserve the memory of the building, on the other hand, it seems the architect wanted to erase all traces that recall the original function. This has let to a strange result: a sombre building with small windows and thick walls, but painted in a cheerful pastel shade. It is an office complex in a building from 1849, but without any monumentality or atmosphere. (Cappelen, 2012, p. 10-11)

What has remained intact of this first cellular prison in The Netherlands, is the original structure of a cross shape, the central hall with staircases and windows and the walls of the cell wings. The bars of the windows have been removed everywhere except the two windows in the storage room. The characteristic high chimneys of the central hall have been removed. Between the external walls of the cell wings, everything was demolished, so nowhere the original cells have been preserved. The atmosphere of a prison has totally disappeared. Only in the central hall this ambience can slightly be seen. (Cappelen, 2012, p. 11)

The fresh-air places, staff housing, chapel and surrounding wall have been demolished. In particular the characteristic seclusion has disappeared. The architect wanted to complex to have a public character. In this context, also the original gatehouse has been demolished. Instead, Greek pillars have been placed which is rather strange surrounded by (of origin) 19th century buildings. (Cappelen, 2012, p. 11)

8.4.3 CONCLUSIONS
Because the original building was not listed as a monument, they demolished almost the whole building. Only the original structure and some elements like the central hall with stairs remained. The new function in the cell wings is offices. There were no plans available to see if any of the former prison structure could be recognized. But from the literature, the conclusion must be that the offices are actually new. They only used the original outside borders. The longshaped buildings are close to the corridor-typology of offices, which usually have
a diameter of about 13 meters. This corridor structure was probably easy to fit in the original borders, when the original cell structure was removed. Also the former cell windows have been enlarged and the window bars removed.

It is hard to recognize the former prison in the building nowadays. When looking from above, the structure with cell wings is clearly visible, but when standing on the street, people do not recognize that. With the construction of the passage and public square, the originally closed building complex got such another character that the atmosphere of a prison is completely gone.

In conclusion, the building nowadays houses offices, but about the transformation from a prison structure to offices can not be said much, because the original building is almost completely demolished. What can be concluded is the the size of a cell wing fits with the typology of an office building.
8.5 Blokhuispoort, Leeuwarden

8.5.1 Context
The Blokhuispoort is a building complex that served as a detention center in Leeuwarden until December 2007. The history of the complex dates back to around 1500. It located in the southeast corner of the city centre of Leeuwarden. Throughout the centuries the complex has had many modifications and extensions. Since 1580 it has been used as a prison. Around 1875, large parts were demolished to make room for a new remand prison, designed by Chief Government architect J.F. Metzelaar. Later, various alterations and modifications were carried out under the direction of his son and successor: W.C. Metzelaar. The complex contains 180 cells and is listed as a monument. (Kerkvliet, 2008)

8.5.2 Analysis
The complex was closed in December 2007, because it could no longer meet today’s fire safety requirements. The establishment is owned by the government. After the closure, it has had a temporary function as a cultural centre. About 130 creative businesses have been placed there. One of these companies is Podium Asteriks that has taken up residence in the former recreation hall of the prison. Former staff, founded ‘Blokhuispoort’, a foundation that promotes Blokhuispoort as cultural heritage. Other businesses are café/restaurant, ateliers, workshops and offices for small businesses. (Kerkvliet, 2008)

There were no plans available from the complex, only an axonometry with the different buildings inside the complex.
8.5.3 CONCLUSION

In the current situation of temporary use, the buildings can be utilized in an almost unchanged state. To maintain and experience the original prison atmosphere that is an optimal situation. The monumental value is in the present situation to full advantage.

Since the current use is only temporary, the government has prepared a document with ambitions for the establishment. The key point is to preserve the special historic value and integrity of the complex with the incorporation of a new function. Equally important is a function and redevelopment that adds value to the city.
The temporary use with creative companies is working excellent for the building. Each small company can rent one or multiple cells to work in. The surface area of a single cell is approximately 12 square meters. This is the same size as the cells in the panopticon prison. This size is apparently convenient to use as creative business space. It must be said that these cells are now rented for 90 euros a month. Because it is so inexpensive, there is even a waiting list for renting these cells. This would maybe not be the same with a ‘normal’ price for the rent.

In conclusion, because it is a temporary function, there has not been changed anything in the building. Still, the cell wings are used for creative businesses. If the building can be used for this function, without any changes, the function seems to fit well in the prison structure.
8.6 HUIS VAN BEWARING, ALMELO

8.6.1 CONTEXT
The former Huis van Bewaring on the Marktstraat in Almelo was opened in 1928. The architect was J.G. Robbers. The building contained a high front building with on the ground floor the entrance and some service areas. At the first floor was the prison chapel. Behind this front building the cell block was situated.

In 1995 the prison closed and the prisoners and staff were moved to a new location. Shortly afterwards, in 1997, the building was appointed as a national monument. The monumental prison has experienced a period of vacancy after the departure of the prisoners. (Huis van bewaring, 2013)

8.6.2 ANALYSIS
In 2004, the prison was bought by the present owners. They went to live there themselves and created a bed and breakfast in the other spaces. Since 2006, guests can stay in the hotel/bed and breakfast. (Huis van bewaring, 2013)

In the front building, the prison chapel is converted into the dining/breakfast room. The stained-glass window with faith, hope and love, recalls the former function. The glass extends to the main floor of the family on the top floor of the front building. (Huis van bewaring, 2013)

The cells in the former cell block were transformed into guest rooms.
The block consists of two layers of cells with a gallery and a third layer of cells with a side corridor. (Huis van bewaring, 2013)

The original cells are combined into comfortable bedrooms (2 cells combined) and spacious suites (3 cells combined). There were no plans available. But when visiting this case study, the hotel rooms seem to fit in very natural. The original internal cell walls have been removed, making the rooms look spacious. In the guest rooms the prison architecture is not as recognizable as with the Arresthuis in Roermond, where they remained the internal walls, and only made breakthroughs to connect the cells.

In the gallery the prison architecture is more recognizable. Original elements such as the heavy stell cell doors and the iron stairs in the cell block remained intact. The difference with the Arresthuis in Roermond, is that there are only cells (guest rooms) on one side of the
gallery. The other side has windows. This makes the gallery very light and spacious.

8.6.3 CONCLUSION
The hotel function fits very well with this former prison building because of the corridor-structure. The cells have been connected by removing some of the former cell walls. 2 or 3 former cells nowadays form one guest room.
Guest room in Huis van Bewaring (own picture)

cell door in Huis van Bewaring (own picture)

Guest room in Huis van Bewaring (own pictures)
In this chapter, the conclusions of the research will be described, subdivided into the typology, function requirements and case study approach. At the end, the research question will be answered by combining these conclusions. In a broader perspective, there will be reviewed whether the research is also applicable for the other panopticon prisons or even other prison types. At the end, there will also be looked if the methods that have been used to answer the research question can possibly be used for finding a function for other transformations.

9.1 FUNCTION & TYPE
In this conclusion, a comparison have been made between the typology of the panopticon prison and the typologies of several functions.

The residential function have not been research according to the building type because the requirements for the amount of daylight did not suit the building. The same applies to the office function.

9.1.1 LIBRARY
When comparing the typology of the panopticon prison with that of a library, there are several similarities. The most important aspect of the typology of a library is the large, open space with bookshelves connected to small rooms with practical functions such as reading rooms, workshop rooms and work spaces. This typology suits with the typology of the panopticon prison. That also contains a big space connected to small rooms. The rooms in the libraries are however not as small as the cells in the panopticon prison. Besides that, the panopticon prison seems small comparing to a library.

With a library, there is clearly a symbolic value besides the practical function of borrowing books. The public library is also an important point of social interaction for a city. The extraordinary panopticon prison could easily fulfill this public function.

In conclusion, the typology of a library suits well with the typology of the panopticon prison.

9.1.2 THEATRE
With the comparison between the typology of the panopticon prison and the typology of a theatre, there were several similarities. The essence of a theatre is the auditorium. This has about the same size and form as the dome in the panopticon prison. The dome is also the essence of the panopticon prison. So that corresponds well, a theatre auditorium could be placed inside the dome.

Another important aspect of a theatre is an ‘eye-catching’ building that stands out in the city. This also suits the panopticon prison very well. In conclusion, the typology of a theatre suits well with the typology of the panopticon prison.

9.1.3 MUSEUM
The typology of the panopticon prison and that of a museum, are hard to compare. The organisation of a museum is largely dependent on the kind of exhibition. The exhibition space is the essence. The artworks have to be displayed as favorable as possible. That can be arranged in several ways. Most museum contain open spaces, in which the exhibition is very flexible. But also small rooms can be used for an exhibition. Also for a museum it is important to differentiate themselves and stand out in order to attract visitors. Therefore, the building is important.

The typology of the panopticon prison, should in principle be suitable with the typology of a museum. The building is extraordinary and that can be used as selling point for the museum. The exhibition can be organized in the dome but also in the former cells.

9.1.4 HOTEL
When comparing the typology of a hotel with the typology of the panopticon prison, there are several similarities. A hotel typically has a corridor structure: a circulation space with elevators and stairs, connected to several guest rooms. This is comparable with the typology of the panopticon prison. A prison is in essence also a ‘hotel’, only the guests are held against there will. The cells of the panopticon prison are a lot smaller that the guest rooms in a standard hotel. In the panopticon prison, the circulation space is the dome, which is substantially bigger than a standard hotel corridor.
In conclusion: the typology of the hotel is comparable to the typology of the panopticon prison.

9.1.5 WELLNESS COMPLEX
The typology of the panopticon prison and that of a wellness complex, are completely different. In a wellness complex, the outdoor space is playing an important role. The complexes usually have a inner courtyard, surrounded by several buildings. The structure is entirely different from the panopticon prison. Within the wellness complex, the structure is more like a maze, instead of having a central area.

9.1.6 CONCLUSION
In this conclusion, a comparison have been made between the typology of the panopticon prison and the typologies of several functions. This reveals that the typology of several functions have similarities with the typology of the panopticon prison. The only function that can be excluded is the wellness complex, which is a totally different structure.

Typological the prison is the closest to the typology of a hotel. Which is logical because a prison is in essence also a ‘hotel’, only the guests are held against their will. But the large dome in the middle gives a margin which allows more functions to be suitable. The large space can be used as library, theatre or museum. A theatre would be impossible in other types of prisons.

Also, the appearance and uniqueness of the building is important for certain functions. Public functions often want a noticeable building within the city. Therefore, public functions seem to be more suitable.
9.2 FUNCTION REQUIREMENTS
First, the functions are tested on the criteria given in chapter 7. At the end of the paragraph, the conclusion about this method is described.

9.2.1 RESIDENTIAL: ELDERLY
Functionality/Space
The floor space of one cell is approximately 12 square meters, and can be used as bedroom. Most elderly people desire a spacious kitchen, one or two bedrooms and a spacious bathroom. This would require two cells to function as kitchen and living room, one as bathroom and the number of bedrooms can vary. Some cell walls have to be broken down, but the size of the cells fit well with a spacious bathroom or bedroom. The functionality of the space is rated with a 7.

Functionality/Structure
The structure of a large space surrounded by small cells, suits the organization of housing for elderly. The small cells can transformed into apartments. The large dome could be a bar/restaurant with a small supermarket for daily needs. The suitability of the structure is rated with an 8.

Design
Elderly people state that the most important feature of their apartment, is that they feel at home and feel comfortable in a good atmosphere. The sober, stately and hermetic nature of the prison does not fit well with the bright, spacious environment that elderly people desire. This applies both for the interior and exterior. The interior can be changed easier that the exterior. Therefore the interior is rated with a 5 and the exterior with a 4.

Comfort/Light
Natural light is one of the most important aspects in a living area. In the former cells the light is not enough to use the area as living space. Therefore, the windows have to be enlarged. That is a major intervention. Therefore, the light is evaluated with a 1.

Comfort/Climate
In addition to the natural light, elderly people are attached to a controlled indoor temperature. This can be applied with a central heating system per apartment. In addition, mechanical ventilation should be placed in the bathroom, toilet and kitchen. Furthermore, the noise disturbance in the building from other cells and the central hall is extreme. Something would have to be done about that. Because the indoor climate needs a lot of adjustments, it is rated with a 5.

Practical objections
The corridors are too small for two wheelchairs to pass each other. Besides that, elderly people attach great importance to having personal outdoor space in the form of a balcony. Balconies could be added to the building, but it would be a major adjustment. In conclusion, there are a number of important practical objections for transforming the building into a residential complex for elderly, making the practical objections being rated with a 1.

The total rating for the suitability of a residential complex for elderly in this building, leads to a 4,4.

Location
The main points that elderly mention in relation with the location are compared to the situation in Breda. The shops for daily needs are close, but not right around the corner. A daily shop could possibly be incorporated into the building, however, the question is whether the order quantity is therefore sufficient. The distance is therefore assessed with a 6.

The location would ideally be located in the city centre. The centre is a 10 minute walk. This has been rated with a 7.

The distance to public transport scores an 8. The bus stop is very close and the train station is only a 10 minute walk.

The location is easily accessible by car. There is a large parking place
about 200 meters away. This is for elderly people not close enough, they rather park their car right before the apartment. Therefore, the accessibility by car is rated with a 5.

The nearest park is only a few minutes walking, and is rated with a 7.

_**In total, the suitability of the location for a residential building for elderly is rated with a 6.6.**_

_The total rating for the suitability of a residential complex for elderly in this building and on this location, scores a 5.5._

Relevance
The overall shortage of housing for elderly in The Netherlands is 84,000. There is also a shortage in Noord-Brabant. (ABF Research, 2013, p.27)

_The relevance of this functions therefore scores a 8._

_The total score, including the relevance, is a 6.3._

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**Total building**

| 4.4 |

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**Total location**

| 6.6 |

**Total building & location**

| 5.5 |

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<th>Relevance</th>
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**Total**

| 6.3 |
9.2.2 Residential: Students

Functionality/Space
The small spaces around the dome are the ideal size for a student room. The large space can be used as meeting place with a student bar or other activities. The usability of the space is rated with a 9.

Functionality/Structure
The structure of small rooms around a large hall, is applicable to student rooms. The large space in the middle can be used as a meeting place. The disadvantage is that it is hard to make a separation between different student houses because all doors open onto the same space. Usually, student houses are divided into smaller, manageable formats. The suitability of the structure is rated with a 7.

Design/Exterior
The sober, stately and hermetic nature of the exterior of the prison does not match the bright, cheerful home that students desire. Nevertheless, it is likely that students can appreciate living in a former prison. It is a special environment. Therefore the suitability of the exterior is rated with a 6.

Design/Interior
The disadvantage of living in a monument is that few personal modifications are possible in the interior. This is probably experienced as a disadvantage by the students. In addition the interior is sober and stately. The atmosphere does not suit student residences. The rating is a 3.

Comfort/Light
The minimum required window surface area is 10 % of the square meters of the floor. The window in the cells are only 0,5 square meters. For the rooms of 12 square meters these need to be enlarge to at least 1,2 square meters. This is a major intervention. Therefore the light is rated with a 1.

Comfort/Climate
The former cells contain natural ventilation with a ventilation grid. In the shared kitchen, bathrooms and toilets, mechanical ventilation should be placed. This is only in a part of the cells. In addition, adjustments should be made to limit the noise disturbance from other cells and the central dome. Therefore, the suitability of the indoor climate is rated with a 5.

Practical objections
Every student home (with multiple student rooms) must have an outside space. So some balconies have to be added to the building. Therefore, the practical objections score a 5.

The average suitability of the building to house students is a 5,1.

Location
For students are three things important to the location. The distance to the public transport is accessed with a 9 because the railway station of Breda is only a short bike ride away and there are also good bus connections. The distance to the university or higher education depends on the institution but is at a maximum distance of 1300 meters. That is only a 6 minute bike ride. This part scores an 8. The last one is the distance to the city centre. The historic centre of Breda, with bars and restaurants, is only a 5 minute bike ride. Because the ideal location would be in the middle of the centre, the rating is an 8.

The total grade for student homes on this location is a 8,3.

The total rating for the suitability of a student complex in this building and on this location, scores a 6,7.

Relevance
Breda has a shortage of students’ rooms with shared facilities in the category above 300 euros a month. Students are particularly looking for spacious rooms. There is a shortage of about 600 rooms. Cheap
rooms with shared facilities and independent studios are sufficiently available. In Breda is a shortage of about 100 spacious student rooms with shared facilities. The number of students in Breda will increase in 2021 by 1390. The number of students living in the city will increase by 400. (Wonen als student, 2013, p. 9) There is also an increase in students who want an independent unit. For the type of student rooms which would be built in this building, there is not a shortage.

*Therefore the relevance for transforming the building in student homes is rated with a 5.*

*The total score, including the relevance, is a 6.2.*

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| Location          | distance to city centre | 8 |
|                   | distance to Hogeschool/University | 8 |
|                   | accessibility with public transport | 9 |

| Total location    | 8.3 |

| Total building & location | 6.7 |

| Relevance          | 5 |

| Total              | 6.2 |
9.2.3 PUBLIC: LIBRARY

Functionality/Space
The size of the dome can be used as library itself. The small cells can be used for additional functions such as study areas, workshops rooms, reading rooms, exhibition space, cloakrooms, etc. For a study room the 12 square meters of a former cell would be ideal. The usable space has therefore been assessed with a 9.

Functionality/Structure
The structure of a big dome with small rooms surrounding it is ideal for a library. The dome can be used to place actual books. From all other rooms the library would be accessible. The structure is rated with a 9.

Design/Exterior
The particular and striking appearance of the building would suit a public function such as a library. A library needs to stand out in the city, and that is absolutely possible with this building. Moreover, it provides a stately character and atmosphere. The suitability of the exterior is rated with a 9.

Design/Interior
The height of the dome comes to good use when used as a library. The stately and serious character of the interior suits well with the library function. The space almost invites to silence. The beautiful design and detailing suit a public building, so everyone can enjoy the design. The sealed cells are ideal as working place, because there is little view on the outside and therefore few distractions. The suitability of the interior is rated with a 9.

Comfort/Light
The natural light on the books themselves should be minimal. That is perfect in this relatively dark building. A basement for the archive and storage of books is already present. The natural light in the cells should be backed up by artificial lightning at workplaces. The requirements for natural light in a living space are a lot higher than, for example, temporary working places, exhibitions or reading rooms. The light is being rated with a 7.

Comfort/Climate
The climate in a library has high demands. The temperature and humidity should be constant. Also the noise disturbance and echoing should be solved. Therefore, the indoor climate is rated with a 2.

The total suitability of this building to be transformed in a library is a 7,5.

Location
For a library, three location aspects are the most important. The connection to public transport is rated with a 9. There are several bus stations only a few hundred meters away. Especially the regional transport will be important. Of course there are people who travel by car to the library. The accessibility by car is excellent. There is a large parking place at 200 meters distance. But there also have to be parking places added to the site itself. Therefore, the access by car is rated with a 6. The distance to the city centre is rated with an 8. Other important public functions such as the cinema and the theater are only 500 meters away. The location is just outside the city centre, but still within the city canals.

The total score for the suitability of the location for a library is a 7,6.

The total rating for the suitability of a library in this building and on this location, is rated by a 7,6.

Relevance
The library is still the largest public function in the Netherlands with 4 million members, 130 million loans and 100 million visitors per year. It is still the most popular and successful public institution. Almost 100% of the primary school pupils are member of a library. However, this is changing. In the last ten years 300 library branches in The Netherlands have been closed. (Volkskrant.nl, 2014) When the new function for
the building will be a library, it will have to be an innovative library that provides more features than borrowing books. Education is another key task (debates, languages course, literature courses, etc). The function can be combined with a café, lecture and conference rooms and an art library. It has to be a new, innovative concept. Breda already has several libraries, scattered over the city. The relevance is rated with a 4.

*The total score, including the relevance, is a 7.4*
9.2.4 PUBLIC: THEATRE

Functionality/Space
The large dome in the middle can be used as theater itself. The small cells of 12 square meters can serve as changing rooms, toilets, cloak rooms and other additional functions. However, that will not fill the 208 cells with a functions. Not all space can be optimally used. Therefore, the space is rated with a 8.

Functionality/Structure
The most important space in a theatre is a large, high-ceilinged room. The dome can be effectively used for that. The problem within the structure is the connection the small cells directly to the main hall. Within a theater one often comes inside through a foyer. Small rooms can be used as dressing rooms, cloak rooms and other additional functions, but they are all connected to the theater itself. The structure is therefore rated with a 7.

Design/Exterior
A theater has to have a striking and impressive appearance. This building is absolutely a landmark in the city, which is definitely an advantage for a theatre. The exterior is rated with a 9.

Design/Interior
The atmosphere inside the building fits a theater. The interior is impressive and has beautiful detailing. The interior is rated with a 9.

Comfort/Light
The building has a relatively low amount of natural light. For a theatre this is favorable. The small windows in the former cells give few problems. In the additional functions not much daylight is needed. The light is rated with a 8.

Comfort/Climate
Especially the acoustics are a huge problem. The shape of the dome is not suitable as a theater. There are also issues such as ventilation when there are more than hundred people at the same time. The climate is rated with a 3.

Practical objections
Especially the fire safety is a problem. The dome must be cleared out in a few minutes. Additional emergency exist are needed. The existing corridors are too small to serve as emergency exists. The practical objections are rated with a 4.

The total suitability of this building to function as a theater is a 6,9.

Location
There are three things significant for the location of a theater. Because a theater has a more regional function especially the accessibility by public transport and by car is essential. The location is close to the train station and bus stops. Therefore the public transport is rated with a 9. Because people are willing to walk a little further from their car with an initial visit to the theatre, the accessibility by car scores an 8. A large parking place is only 200 meters away. At last, the distance to the city centre is important. This is rated with a 7. Many theatre visitors do not come by bike and are therefore forced to walk to the centre. It is a 10 minute walk.

The total score for the suitability of the location for a theatre is an 8.

The total rating for the suitability of a theatre in this building and on this location, is rated by a 7,5.

Relevance
Breda has a rich history of theatre and culture. In 1995, the Chassé theatre, designed by Herman Hertzberger, was opened. At that time, it was the largest theatre in the Netherlands. The Chassé theatre presents 500 theatre performances and 3400 film screenings a year. The Chassé theatre is about 500 meters from the location. (Chassé theater, 2013) Building a new theater would be useless.

The relevance is rated with a 1.
The total score, including the relevance, is a 5.3.

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</table>
9.2.5 Public: Museum

Functionality/Space
The large dome can be used as a meeting place/restaurant or even as exhibition space. The small cells can be used as exhibition space and may be interconnected in some places. All areas can be useful within a museum. The functionality of the space is rated with a 9.

Functionality/Structure
The circular structure of the building can be used to create a route through an exhibition. It is easy to make different themes within the museum. From the large space in the middle, all areas of the exhibition would be accessible. That should be a good structure for a museum. The structure is rated with a 9.

Design/Exterior
A striking and impressive appearance is an advantage for a museum. The building is a landmark in the city. The exterior is rated with a 9.

Design/Interior
The special atmosphere can be used as an asset within the museum. A disadvantage is that the interior of the building contains masonry walls and an iron construction. The masonry walls may not be the ideal background for all artworks. Therefore, the interior is evaluated with a 7.

Comfort/Light
Light is one of the most important aspects in a museum. The incidence of natural light has to be dispensed and preferably falls inwards from above. The light in the cells is difficult to adjust to the special demands of a museum or a specific work of art. Therefore, the light is rated with a 2.

Comfort/Climate
The indoor climate of a museum has very high demands. A broken ventilation system or leakage can have major consequences and cause the loss of special pieces of art. A constant indoor climate is important to ensure that artworks remain well preserved. The indoor climate will need to be adjusted and seriously improved. Therefore, the indoor climate has been rated with a 1.

The total suitability of this building to function as a museum is a 6.2.

Location
There are three things significant for the location of a museum. Because a museum has a more regional or even national function especially the accessibility by public transport and by car is essential. The location is close to the train station and bus stops. Therefore the public transport is rated with a 9. Because people are willing to walk a little further from their car with an initial visit to the museum, the accessibility by car scores an 8. A large parking place is only 200 meters away. At last, the distance to the city centre is important. This is rated with a 7. Many museum visitors do not come by bike and are therefore forced to walk to the centre. It is a 10 minute walk.

The total score for the suitability of the location for a museum is an 8.

The total rating for the suitability of a museum in this building and on this location, is rated by a 7.1.

Relevance
Breda has 14 museums. The largest are the museum of art and history of Breda and surroundings, and the MOTI, the Museum Of The Image, a museum about visual culture. (VVV Breda, 2013) Breda has not a large, well-known museum which attracts tourists (such as the Rijksmuseum in Amsterdam). Maybe this will be an opportunity to promote Breda as city. Research is needed whether there is enough demand for a new museum. Museum and other cultural institutions decline in visitor numbers due to loss of subsidies.

The relevance is rated with a 6.

The total score, including the relevance, is a 6.7.
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<th>Functionality</th>
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**Total building** | 6.2

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<td></td>
<td>accessibility with public transport</td>
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</table>

**Total location** | 8

**Total building & location** | 7.1

| Relevance | 6 |

**Total** | 6.7
9.2.6 PUBLIC: HOTEL

Functionality/Space
The 12 square meters of a cell is too small for a hotel room with en-suite bathroom. As a result, two or even three cells must be merged into a good sized hotel room. This can be designed with doors between the cells or small breakthroughs. Then the space can be put to good use. Therefore the usability of the space is rated with an 8.

Functionality/Structure
The structure of a hotel contains mostly a corridor with attached rooms. In this building, all rooms would be directly accessible from the dome. A hotel can function with this structure. The suitability of the structure is rated with an 8.

Design/Exterior
The image of a former prison works well for a hotel (Arresthuis, Roermond or Gevangenishotel, Almelo). The exterior is striking and stately. It would work as a hotel, and is rated with a 9.

Design/Interior
The interior and the atmosphere inside can be a selling point for the hotel. The decor is stunning for a hotel. The detailing and construction elements of the building are magnificent. The suitability of the interior is graded with a 9.

Comfort/Light
Of course there is little natural light in the former cells. More light would be desirable for a hotel room. But people take it for granted when they stay in a former prison (Arresthuis, Roermond or Gevangenishotel, Almelo). Here, it is not possible to look outside, which is a disadvantage. Because a hotel room is not a living area, the requirements for daylight are less strict. The suitability of the light is rated with a 5.

Comfort/Climate
Adjustments should be made to improve the acoustics, ventilation and heating of the building. Especially the noisy nature of the building would be a serious problem for a transformation to a hotel. The suitability of the indoor climate is rated with a 3.

The total suitability of this building to function as a hotel is a 7.

Location
There are three things significant for the location of a hotel. At first, the distance to the city centre is important. This is rated with an 8. The building is not located directly in the city centre, but only a 10 minute walk away, so not too far either. Because a hotel has a more regional or even national function especially the accessibility by public transport and by car is essential. The location is close to the train station and bus stops. Therefore the public transport is rated with a 9. The accessibility by car is rated with a 6. The hotel needs a lot of parking space on the site, which is missing.

The total score for the suitability of the location for a hotel is an 7,7.

The total rating for the suitability of a hotel in this building and on this location, is rated by a 7,3.

Relevance
There are several hotels in the Netherlands that sell themselves as ‘prison-hotel’. These are situated in Roermond, Hoorn, Almelo and Zwolle. This eliminates the change on a special national function. Whether there is a demand for such a large hotel in the centre of Breda is difficult to estimate. The number of hotels in Breda is similar to, for example, Tilburg, and slightly less than Haarlem. There is nothing that indicates that there is a shortage of hotels in Breda.

The relevance is rated with a neutral 6.

The total score, including the relevance, is a 6,9.
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**Total building**

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<td>accessibility with public transport</td>
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</table>

**Total location** 7.7

**Total building & location** 7.3

Relevance

| Relevance | 6  |

**Total** 6.9
9.2.7 OFFICES

Functionality/Space
The large dome can be used as a meeting place and cafeteria. The cells surrounding the dome can be used as offices. With only 12 square meters these former cells are quite small for an office. Meeting rooms can be placed in the former administration building. The usability of the space is rated with a 7.

Functionality/Structure
In the most companies the offices are connected with an internal corridor. With the connection of all offices with a large dome it is difficult to divide into different companies or departments. The structure is therefore rated with a 6.

Design/Exterior
For a company an office located in a former prison is attractive. It is a stately, striking building. The suitability of the exterior has been rated with an 8.

Design/Interior
The interior has a very gloomy atmosphere to stay in every day. This would have to be significantly improved. The suitability of the interior has been rated with a 7.

Comfort/Light
The amount of natural light in the former cells is far below the minimum. From the workstations, workers cannot look outside. The windows would have to be enlarged. This would be a very radical intervention. Therefore, the suitability of the light is rated with a 1.

Comfort/Climate
The indoor climate needs to be improved. A ventilation and heating system must be incorporated. But the climate requirements are not as strict as for example in a museum. Therefore, the suitability of the indoor climate is rated with a 5.

The total suitability of this building to function as a shopping centre is a 5,7.

Location
For an office, the accessibility by car is essential. Furthermore, it depends on what kind of companies/firms are situated in the building. Another important point is the accessibility by public transport. The accessibility by public transport is sufficient for an office building is rated with a 9. The accessibility by car is good, but the shortage of parking lots forms a serious problem. There is a parking place at 200 meters distance, but the question is whether this is sufficient for the employees of the complex. Perhaps an additional parking area must be constructed near the building. The accessibility by car is rated with a 5.

The total score for the suitability of the location for an office building is an 7.

The total rating for the suitability of a hotel in this building and on this location, is rated by a 6,3.

Relevance
If Breda is in need of more office space, is difficult to predict. Generally there are a lot of vacant office building in the Netherlands. These offices are even being transformed into dwellings or other functions. A new office building is therefore incongruent to the economic climate of the day. But this can change in the next few years.

The relevance is rated with a 4.

The total score, including the relevance, is a 5,6.
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**Total building** 5.7

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**Total location** 7

**Total building & location** 6.3

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**Total** 5.6
9.2.8 CONCLUSIONS ON REQUIREMENTS

In the figure on the right page, the average score per criteria is given. The functionality and design have a high score, which means that the building is easily used for other functions when looking at these elements. The problem lies in the small amount of light in the building and the climate control. Especially for residential functions, the windows are too small. And the lack of outdoor space (like balconies) is a problem. Also for offices the windows are essential. The location was good for every function, so did not really make a difference.

In the figure below, the scores of the function have been summarized. Per function, the conclusions will shortly be described.

Residential: Elderly
The table shows a 4.4 for the suitability of the building. As mentioned, the problem is especially the amount of light in the cells, which is too low for a residential function. There are some other practical concerns, like the absence of balconies and the small corridors. However, the structure with cells, suits the function, although several cells should be connected. In conclusion, the function of residential for elderly is reviewed as not the most suitable.

Residential: Students
For the residential function for students the same applied as for elderly. The light in the cells is simply not sufficient, making a residential function unrealistic. The location is very good for student homes, but the kind of student homes that could be created are not much in demand among students. In conclusion, the function of residential for students is reviewed as not the most suitable.

Public: Library
The library has a high score on the suitability of the building; a 7.5. This is because the large dome can be used to gather and the arranging of books. The small cells can be used for studying, computers, reading rooms etc. The appearance of the building is more suitable for a public building as for a residential function because of the particularity and the unique history. The only problem with the library is the climate control and the relevance of the function. A lot of libraries in the Neth-
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erlands are being closed. The suitability of the function is reviewed as very good, except for the relevance of the function.

**Public: Theatre**
A theatre function suits well with the structure and space of a panopticon prison. Also in terms of interior and exterior design the theatre fits well. The little light that enters the building is actually an advantage. Only because of the relevance the theatre scores very low. When just looking at the total of the building and location, the theatre scores almost the highest. In conclusion, the theatre function is very suitable for a panopticon prison, only not on this location, next to another theatre.

**Public: Museum**
With the function of museum, the main problem is formed with the amount of light and and the climate control. The climate inside a museum must be extremely well organized. The structure can suitable for a museum. The appearance of the building is also very suitable for a museum. In conclusion, the museum scores well on the suitability for the panopticon prison of Breda.

**Public: Hotel**
The requirements for the structure and space needed in a hotel suit very well with the panopticon prison of Breda. The extraordinary design of both the interior and exterior can be used to profile the hotel. The low amount of light is less a problem than for residential functions. The suitability for a hotel in the panopticon prison of Breda is reviewed as very good.

**Offices**
The structure with separate rooms itself is quite suitable for offices. But the main problem is again formed by the amount of light. That is simply not enough for a working environment. Therefore, the function of offices is reviewed as not the best suitable function for the panopticon prison of Breda.

**Conclusion**
When comparing the requirements of certain function with the characteristics of the panopticon prison of Breda, there are a few important conclusions. The first is that all residential and office functions are not suitable because the amount of light that enters the building is not sufficient. Therefore, only public functions remain. The public functions score the highest, also because this functions suit well with the unique appearance of the building. When looking just at the total score for the building and location, all public functions score between a 7.1 and a 7.6. The relevance of some functions, really brings down the total mark.

With this method, at the end, the hotel function scores the highest. That is not so remarkable, because a prison is actually a kind of hotel, only the inmates are held against there will. The museum has the second highest score and than the public library.

### 9.3 Case Studies
In the previous chapter, five case studies have been analyzed. These five transformed prisons were not the same prison type as the panopticon prison. But the former functional type is the same: a prison. The closed nature of the building and the structure with prison cells is similar as the panopticon prison.

It is noteworthy that several prisons have been converted into a hotel. Two hotels were included in the case study research: the Arresthuis in Roermond and the Huis van Bewaring in Almelo. In both case studies the transformation from prison to hotel was relatively easy. A few cells have been linked to create good-sized guest rooms. It is not so remarkable that these hotels fit well in a former prison: typological a prison is an accommodation building. Converting to a hotel function is also relatively easy for another reason: the prison characteristics and atmosphere can be the image and selling point of the hotel. That is the case with both the Arresthuis and the Huis van bewaring in Almelo. The atmosphere is good enough and interesting for a hotel, but not for a real residential function. The panopticon prison in Breda, has about
the same size of cells as the two case studies. So the hotel function should be easily applied to the panopticon prison as well.

It is hard to give a real conclusion about the conversion of a prison to a museum. The Second Colony in Veenhuizen is hard to compare to the panopticon prison. The original form of this prison was an ‘alcove’ prison. This means that there were no small cells but larger sleeping rooms for multiple prisoners. The windows are quite big and not barred everywhere, so the interior was very light compared to the panopticon prison of Breda. The transformation to a museum was quite easy for this type of prison building. The complex has kept its monumental appearance and works perfectly as museum. Because of the ‘alcove’ structure the routing within the museum was easy to create.

For the conversion from a prison into offices, the Kleine Gartmanpaviljoen in Amsterdam is used as case study. It is hard to connect this case study to a real conclusion about transforming prison into offices because with the transformation almost the whole building was demolished and the offices are actually new. Only the structure has remained. What can be concluded is that the cell wings of the prison are close to the corridor typology of offices, which usually has a diameter of about 13 meters. Another notable point is that the former prison now houses a passage and public square. The originally enclosed complex got a totally different character, so the atmosphere of a former prison is completely gone.

The temporary function of creative small businesses in Blokhuispoort, functions very well, taken into account that in the current situation of temporary use, the buildings can be utilized in an almost unchanged state. The surface area of one cell is the same as the panopticon prison, so this case study is comparable. This size is apparently convenient to use as creative business space and should be possible to apply to the panopticon prison. It must be said that these cells are now rented for 90 euros a month. Because it is so inexpensive, there is even a waiting list for renting these cells. This would maybe not be the same with a ‘normal’ price for the rent.

9.4 RESEARCH QUESTION
The research question stated at the beginning of this research was:

*Which function is suitable for the transformation of a panopticon prison type in The Netherlands?*

This research question has been approached from three different angles: the typology of a panopticon prison, the requirements of certain functions and case studies. The conclusions of these methods have been clarified in the previous paragraphs. With the combination of these conclusions, the research question will be answered.

The conclusions of the three different methods have several similarities. The ‘hotel’ function is suitable in terms of both typology, requirements and case studies. This is logical because typologically a prison is in essence also a hotel, only the guest are not meant to leave.

Another important conclusion is that a residential function is not realistic. This is revealed by the research on the requirements of functions.

The typology of several public functions reveal the have similarities with the typology of the panopticon prison. The open space in the middle of the panopticon prison, creates many more opportunities than just a hotel function. The hotel function is definitely suitable for a corridor-structured prison. But the large dome in the middle gives a margin which allows more functions to be suitable. The large, open space can be used as library, theatre or museum. A theatre would be impossible in other types of prisons. Also, the appearance and uniqueness of the building is important for certain functions. Public functions often want a noticeable building within the city. Therefore, public functions seems to be suitable with the expression and appearance of the building complex.

Concluding, the hotel function would be the most suitable in terms of research on typology, requirements and case studies. But also some public functions have their opportunities: a museum, theatre or library
should be possible as well.

9.5 APPLICATION ON OTHER PRISONS
In a broader perspective, there will be reviewed whether the research is also applicable for the other panopticon prisons or even other prison types.

There are two other panopticon prison in the Netherlands: in Arnhem and Haarlem. This research is for a great part also applicable for those prisons. Both are going to close in the next few years. The typology and building structure of these prisons is exactly the same as in Breda. The panopticon prison of Breda is actually a copie of the one in Arnhem. The prison in Haarlem is very similar but a little bit smaller. The conclusions from the research on typology can therefore be used for both Haarlem and Arnhem. The conclusion from that was that a hotel or a public function like a museum, theatre or library, had similarities in the typology. The research on requirements can not so easily be copied, because in this part the location within the city and the relevance has been taken into account. This location should be adjusted to the other cities. The panopticon prison in Haarlem is also situated in the city centre, so the conclusions will not be very different. However, the panopticon prison in Arnhem is situated outside the city centre, therefore a public function such as theatre, museum or library would be less suitable. Other functions would have to be researched (which are mostly situated outside the city centre).

For example, the theatre function scores very high on the suitability with the building, but is not relevant for Breda, because there is a theatre situated directly next to the complex. This function might be more suitable for Haarlem, if the panopticon prison of Haarlem has no theatre nearby.

When looking at other prisons, and prison types, that are going to close in the Netherlands, some conclusions might be useful. In the case studies some examples emerge from prison types with cell wings. Two are successfully converted into hotels, but also the offices from the Kleine Gartmanplantsoen or the creative businesses in Blokhuispoort should not be forgotten. However, the ‘hotel’ function is definitely suitable for a corridor-structured prison type.

Most of the public functions that come forward in the research for the panopticon prison type, would be impossible to accommodate in another prison type. These public functions are only possible because of the spacious dome in the middle of the building.

In conclusion, some elements of the research are applicable for other prisons, especially the other panopticon prisons in Haarlem and Arnhem.


Dubbeld, L. (2001). In de geborgenheid van de gevangenis: de betekenis van de nieuwe Nederlandse gevangenisbouw. Amsterdam: Amsterdam University Press.


KENCES, Ministerie van Binnenlandse Zaken en Koninkrijksrelaties (2013) Studentenhuisvesting en bouwregelgeving


Voorthuijsen, A. v. (2010). De Blokhuispoort is een publiekslieveling. Smaak, 10(49), 24-27


1883-1885 plan of the Koepelgevangenis in Breda 1:1000
(Floor, 2009, p. 262)
2014 situation plan 1:1000
(own drawing)
1883
the original site

1889
a church was built outside the panopticon

1893
adjacent to the complex a new prison and a Court of Justice were built.

history of the complex
(own drawing)
the airplaces were demolished to make room for workbuildings inside the walls of the complex

the prison built in 1893 is extented to the south

the complex remains the same, the city has grown around the complex
functions nowadays
(own drawing)
ground floor plan 1:500
(own drawing)
section over the panopticon 1:250
(Traa, 1987, p. 275)
detail of a cel 1:50
(Traa, 1987, p. 275)
specification drawings of the roof construction
(Traa, 1987, p. 277)
front façade
rear façade
side façade
Section A-B
Section C-D
ground floor plan
first floor plan
administration building and nursing practice 1:500
(Traa, 1987, p. 266)
Gate building 1:500
(Traa, 1987, p. 264-265)
Valuation
(own drawing)

indifferent value
positive value
high value

Valuation
(own drawing)
The gate towers have become an icon for prison architecture from the 19th century.

The boundary wall is essential for the complex. It creates a seclusion from the city and the outside world. Therefore, inside the complex arises a different, enclosed world. The wall itself is not original anymore, but even than is has a high value for the complex.

The former kitchen and administration building are architecturally not very special, but have value for the history of the complex.

These were the former houses for the guards who worked at the prison. These are still in use as dwellings. Important part of the complex, but outside the boundary wall.

19th century Court of Justice, designed by the son of the architect of the panopticon prison. (W.C. Metzelaar) Typical 19th century building with many decorations and references to 'justice'. On the top of the entrance facade a statue of Lady Justice is placed. Below stands the quote: suum cuique tribuere, 'to each what he deserves'. Valuable both for the architecture as for the complex.

The particular panopticon shape is a landmark for the city. Also valuable for the history of ideas about punishment and prison architecture.

Typical 19th century prison architecture with a middle corridor and cells on two sides. Steel galleries and cell doors. Valuable both for the architecture as for the complex.

Working buildings, built in 1948. These have no architectural value.