The centrifuge
revising spaces of enclosure

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THE CENTRIFUGE
REVISING SPACES OF ENCLOSURE
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The centrifuge

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Preface

This thesis, The Centrifuge, marks the end of a one-year research/design master project at the Architecture building and planning department at the Eindhoven University of Technology (TU/e). The thesis is a result of the graduation studio: Revising spaces of enclosure, which has been established by Juliette Bekkering, Sjef van Hoof and Jochem Groenland.

The first six months various reference projects, panopticon prisons and urban situation are analysed. After that, one location of the panopticon prison was chosen to design a new plan. This research focused on the panopticon prison in Arnhem. The aim is not to redesign the former panopticon prison, but to design a new plan, which fits best on the location. On this way, the panopticon and the surrounding area will have profit.

I want thank my graduation supervisors Juliette Bekkering, Sjef van Hoof and Jochem Groenland for setting up this graduation studio, educational meetings and the freedom they gave to formulate our design research. Also, I want to thank my family and friends for the support and confidence they have given me.
Summary

In this project I do research on the possibilities of the dome prison in Arnhem. This dome prison is part of the city and the dome has become true landmark. The prison complex has an area of approximately 3 hectares and a part of the buildings, the walls, the gateways and the panopticon are listed as monuments.

The aim is to look at the interaction between the city and the building that characterize it. Especially, with special focus on the changes and possibilities that result from the loss of functional value. The main question of this research project is to what extent it is possible or desirable that a building that was originally fenced off from the city now becomes a crucial part of it.

The research does not focus on the building and the city in isolation, but the correlation between them.

For the location, I made an urban plan. This foundation relates and responds to the surrounding city. After having set up the plan, I design a building located within the peripheral zone surrounding the dome prison - the area between the city and the panopticon. Redesignation is not the main focus of the project. Rather, it’s the architectural relation between the original buildings and the new design.

The area of the panopticon is isolated from the surroundings, and therefore hidden. The different layers (identities) and qualities are ignored. This is partly by the partition of the city. The activities of some parts of the city are taken part into an isolated way. Especially, this part of the city has lack connection with the surroundings. Both Lombok and KEMA is connected in one way. Utrechtseweg is the only opportunity to access both neighbourhoods.

In addition, this part of the city has a very strong horizontal direction. The movement of the west part is mostly going from the Utrechtseweg. Also the rail track and the river contribute to this horizontal movement. However, the vertical connection is considerable lack. There is no connection with the other upper and lower part of the city.

However, the panopticon is located in a very strategic area. It intersects different layers (identities). First of all, the panopticon is bordered to KEMA terrain and the dynamic neighbourhood Lombok. Also Sonsbeek Park and Mariendaal Park are not far located. Secondly, the railway zone has an architectural value on the area, because of the beautiful high differences. Thirdly, it is near located to the river Nederrijn. And finally, the mast on KEMA terrain and the high apartment has a visible connection with the panopticon, which can work for a larger scale.

Indirectly, the concept of the panopticon, all-seeing eye, is visible on the whole district. The panopticon can work as a linking point or engine for different areas.

I can also say that the quality of the prison is dependent on the different elements (typologies, identities, functions) of the surroundings. The prison is a resultant from these various elements. The significance of the panopticon is be derived from the different qualities of the surrounding areas.
The urban fabric of the city Arnhem has centralization around the city centre. The important movements are going from the city centre. This principle is especially working for the public transport. At this moment the area has a traditional town planning. The districts from the left side of the city centre are only accessible from the Utrechtseweg.

By creating a new intensity, by using the panopticon, a new centralization will arise around that place. The centralization will influence the current urban fabric of the area. It will provide new activities around that place, and could help to connect the separate districts. A small new centre could possible, because the panopticon and the surrounding area have the potential qualities. On that way, people can use the area in an optimal way.

The panopticon will provide a new identity to the area, and will be the entrance of the districts. The new identity could stimulate the development of the surrounding area. Also the hidden districts, like KEMA, will be more visible.

To achieve a new centre, the function of the panopticon should change into a more public function.

A food hall can stimulate the new intensity. The panopticon will have a public function and will be accessible for a larger scale. The existing green will still be part of the panopticon. It could function as kind of buffer for the new intensity. Furthermore, the wall will be broken in some places to attract people to the area and to create more a public feeling.

In addition, the KEMA terrain should change into an open area.

The terrain is currently closed and private area. By making it more accessible for a larger population the district will change in a positive way. The business park can attract more employees. However, if the KEMA terrain closes, for a reason, the terrain can turn into a residence place, with a park identity. Also on this way, the surrounding districts can fit into this new identity.

The new building blocks, I designed for the area, will fit in the new masterplan. It will provide a new intensity to the area. All these new elements will also stimulate to develop the area and to fit in the exiting urban fabric of the city Arnhem.

The design will create a new identity to the city Arnhem, and will have a value that works for a larger scale. Also because of the location, it would be an entrance zone to the city. The quality of the city Arnhem will increase.
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Introduction

This thesis is divided in four chapters. The first chapter is about the panopticon in general and the panopticon prison in Arnhem. Also, I made a research why the urban context and appearance of the prison changed in time.
The second chapter is a research about the chosen location. The city Arnhem, where the panopticon prison is located, is analysed. The analysis will help to design a new masterplan for the area.
The third chapter wills focus on the masterplan and the motivation of the chosen design area. Also the concept of the new design is included on this chapter. The last chapter contains all the drawings of the new design.
Panopticon

A panopticon is a type of building whose architecture facilitates effortless central control. It was first designed in the 18th century by Jeremy Bentham, originally for prisons and asylums.\(^1\) Panopticon means seeing. It is the model for an ideal prison, school, hospital, factory, and also any other place where a small number of people want or need to keep a lot of other people under control. In the nineteenth century the panopticon became attractive in the form of a prison with cellular system (solitary confinement in single cells).

The principle was simple when individuals have to be controlled; they should not, as in the dungeons of the middle ages, stowed away in the depths. They should not be invisible, uncontrollable and useless. They should just be totally visible. An object or subject that’s visible makes himself known and therefore manageable.

Bentham introduced the principle of the visibility through the architectural design of a panopticon. The persons, which have to keep under control, are placed in individual cells in a double-walled circular building, with windows both to the outside and to the inside of the circle. In the centre of the circle stands a tower with windows on all sides. The overseer is located in the tower, who only has to turn on its axis to keep many individuals under control.

The main idea of this construction is the visibility of the isolated individuals and the invisibility of the overseer; the overseer can see without being seen, and therefore, these individuals never know with certainty in which direction the overseer is watching.

Jeremy Bentham called his model ‘a new way to gain power of mind over mind, in an unprecedented scale’. The benefits of the panopticon are dependent on three major principles: separate visibility of each individual, recognisability of each individual, and clarity of the mass or group.\(^2\)

The principle of the panopticon is used in the Netherlands in the dome prisons in Breda, Arnhem and Haarlem.

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1. Panopticumberlin
Prison Arnhem

The dome prison in Arnhem was built between 1882 and 1886 by J. F. Metzelaar. It is located in the neighbourhood Lombok. The prison was designed like a panopticon according to the theory of Jeremy Bentham. The complex consisted of three buildings. The centre building, the dome, was used to capture prisoners. The front building which is connected to the wall was used for administration and storage. A kitchen, boiler room, hospital and offices were located in the rear building. Originally the dome contained a pulpit to provide room for religion, but because of the bad acoustics a free standing smaller church was added on the south side of the prison in 1888. This church was designed by W. C. Metzelaar. The prison was restored between 1981 and 1982 and isolation was added to the dome to minimize the loss of heat. Between 1994 and 1998 the prison cells were also restored. New buildings were added to the south side between 1999 and 2001. These buildings provided space for prisoner related services and functions such as sport facilities and work spaces. The main entrance from the prison was also moved from the centre to the side of the complex. The latest building was added between 2002 and 2003 on the north side of the prison. This building contains special rooms for mentally ill prisoners. The former entrance, entrance building, courtyard and rear building were also restored during this period. All restorations including the former gate were finished in 2005. Currently the dome, entrance building, wall and the rear building are marked as national monument by the Dutch government.

The panopticon prison in Arnhem will close in 2016, like many other prisons in the Netherlands. The Ministry of Security and Justice must save millions on prisons. The cost to hold a prisoner a day in one of the three dome prisons in the Netherlands (Arnhem, Breda and Haarlem) is much higher than for other prisons. Therefore, the Ministry has decided to close the monument. The owner of the panopticons, The Empire Realty Company in The Hague, will put the prisons up for sale. Also, they are looking for a new function that ensures the survival of the system of monuments and generate a positive return.
Theoretical research  The transformation of the prison

A lot of prisons, particularly prisons near by the city of society, closes. Also the current prisons are not visible and recognizable. At this moment we cannot find a prison in the neighborhood. I made a research about the transformation of the prison in the Netherlands. Particularly, why the urban context and the expression of the prisons changed in time.
Introduction

Current prisons are not visible anymore. People perceived many messages from the media, but they do not have any idea where the prisons are and how they look. In the past, they were much more visible and recognizable. At this moment we cannot find a prison in the neighborhood. Did we forget it? Actually we did not forget the prison. The media remember us daily how people get judge. However, it seems to like that people do not know or do not want to know, where the prisoners stay. Then I am wondering why people do not want a prison on their area? This question can be compared with the current values and norms. The current prisons are not recognizable as prisons. They look like offices or hospitals, but then for prisoners. The entrance is mostly hidden or look like an information desk for visitors. Furthermore, the prisons are hidden and are extruded from the cities; they are actually invisible for the society. Façade architecture plays a main role to change the expression of the prisons. Also, the current prisons do not communicate with the citizens, there is no possibility for that. And if there is a possibility, the building does not show the real function.

Why it is not necessary to see or recognize the result of commit a crime? Is it not necessary anymore? Do not we need a physical element to recognize the result of committing a crime? Or became the media the physical element?

In addition, should not a prison located in the center of the city to communicate with the citizens and also to emphasize the punishment? The old prisons were located in the center of the city and communicate daily with the citizens. It was one of the main elements in the urban fabric. The sober walls and the porch were one of the important elements for the communication with the citizens. The porch was the entrance between the prison and the city; A kind of zone, which separate the two worlds from each other. A current example, which is built in the center of the city, is the Federal Jail in Chicago. It is built next to a library and is recognizable as a prison. Another example is the prison Kleine Gartman. First it was built on the edge of the city and was later incorporated into the city. Also this prison communicated on a particularly way with the citizens.

I want to research why the urban context and the expressions of the prisons changed. Currently, the prison is denied and is not present in the urban fabric. Therefore my research question in this essay is:

Why changed the urban context of the prison, and has the transformation effect on the expression of the building?

For this essay, I analyzed three prisons which show the changing urban context and appearance of the prisons in time. The three references are: Kleine Gartman, Over-Amstel and De Schie.

Then, I will explain with the book ‘The architecture of the city’ and ‘Het gebouw als denkbeeld: De gevangenis.’ why the urban context and the expression of the prisons changed in time.
In this chapter I analyzed three prisons. The prisons differ from location and expression. I want to find why the urban context changed in time and what kind of result the transposition has on the expression of the prisons.

**Edge of the city (Kleine Gartman, Amsterdam)**
The House of Detention in Amsterdam (between Leidsekade and Leidseplein), was built in 1850. On that time it was located on the edge of the city, and was therefore the cheapest location to build prisons, hospitals, cemeteries, houses, parks and gardens. However, the city developed rapidly and the former urban edge becomes embedded in the urban fabric. After this development the prison belongs to the center of the city. On this subchapter I will focus on the period, when the city did not developed yet. The prison was built on a former fortification zone. As a building the Kleine Gartman was simply built. The building was sober and has a simple and rational structure. Efficiency was important on the design of the building and that was characteristic for all prison constructions on that time. The prison has the shape of a cross, and is surrounded by a round wall and a strict front façade. For this approach the architect got probably inspiration from the military engineering. The former function of that area was a stronghold. It was part of the fortification and was strongly defended by the military group. However, in that time it did not used anymore. The result is a strong utilitarian character. As the former function of the area the prison represented the power of the government and the safety of the citizens. The prison communicated the power and safety in three ways. First, the round shaped wall. This architectural element is a touchable element, which was seen clearly on the environment. It was the separation between the prison and the neighborhood. Besides, it recognized the form of a stronghold. The second element is the canal. Also this element was used for the defense of the city and provides a double separation of the prison and the neighborhood. It is emphasizing the separation and the safety. The last element is the front façade. The expression was strict and also the only opportunity to go in and out the prison. The entrance of the prison is a small version to access to the city.

**Center of the city (Kleine Gartman, Amsterdam)**
After 1870 the prison was surrounded by buildings. It was on that time located in the center of the city. The three architectural elements were still recognizable. On that state the architectural elements got one extra function; they show the result of commit a crime. The wall got a deterrent function for the citizens. On that time the government beliefs in healing the prisoner. Corporal punishment changed into mental punishment. The impressive, somber walls of the building fear the people for the consequences of crime. The confrontation between the citizen and the prison was a major aspect on the urban area and an important factor to succeed the penal policy. The prison was one of the most important buildings of the city. The prison changed into an institute to heal people. The wall and the porch building emphasized the formation
of the institute. The institute is a small community in the city. It is actually a gated community, which is not accessible for everybody. Also it excludes a certain group. Only prisoners and authorized people can go in. The wall and the canal blocked the accessibility for the normal citizens and formed a barrier for the urban grid.

Furthermore, the shape of the wall emphasized the healing believe of the institute. The round wall embraced the prison building and established the institute. The porch building plays a major role in the neighborhood. It is the connection between the institute and the city, but also an entrance to a different community, which is not a public domain. The gated community has his own laws and rules, which was not apply for the normal citizens. The porch building keeps this community behind it.
A part of the city (Overamstel prison, Amsterdam)
The prison Over-Amstel, near the Amsterdam Amstel railway station, was built in 1978. The prison is denied as institute. Prisoners were people who have to prepare to join the society. The best way to preparing is creating a normal life; a fake family in Penal Institute. The Dutch Welfare State beliefs in makeable society. It was possible to change the prisoners. The design of the prison Over-Amstel is the result of this point of view. It looks like student apartments or more like a hospital. It could be seen as rehabilitation for the prisoners. Also the design looks like a hospital because of the color and the minimalist architecture. The color white can associate with hospitals and therefore the prison has a healing appearance; it is an institute to heal people. The architecture looks like the Soviet architecture, constructivist, from the 1920’s. Also the constructivist wants to change people with their design; Stripped of all superfluity and colored in white. We can call this modern architecture. In the beginning it was designed without bars over the windows. However, the glass of the windows was not unbreakable, and therefore they put bars on the windows, however, they called lamellas.
The prison is a part of the neighborhood. It is a social condenser of the city. It can be seen as a gated community, because of the tall walls. But from a view the wall is not visible and not recognizable as a prison and therefore it belongs to the city.

Extruded from the city (Prison De Schie, Rotterdam)
The prison De Schie was built in 1989 in Rotterdam. The building is situated on the Schie, on the opposite of the Van Nelle factory. This building is in contrast with the previous prisons. It has bright, cheerful colors, which make the prison unique. The building is colored in shiny orange color and the front of the building has horizontal yellow, orange and blue lines. The expression of the building is very cheerful and is in contrast with the old gloomy prisons. Also the building is not recognizable as a prison. The entrance is hidden and lost the traditional deterrent function. The entrance is on the back of the building and is just a gate with a red awning. The idea of hidden doors is also applied on the rest of the building. The doors for goods supply and arrest cars are almost invisible. The doors are made of the same material as the façade. The prison is located on an industrial area. It is extruded from the city and did not have connection with the surrounding. Also the prison is not recognizable as a prison. It is in his urban context and appearance hidden in the urban environment. The prison is not a healing building but only storage to store criminals or dangerous elements in an invisible building. The prison as an institute does not exist on the urban environment. The cheerful and bright colors of the façade are hidden or faking the real function. It could be anything expects a prison.

5 Het gebouw als denkbeeld. De gevangenis, 2001, p.31
6 Het gebouw als denkbeeld. De gevangenis, 2001, p.44
7 Het gebouw als denkbeeld. De gevangenis, 2001, p.45
The transformation of the urban context and the appearance

I analyzed three different prisons. They show the changing urban context and appearance of the prisons in time. On this chapter I will explain with the architectural terms of Aldo Rossi and the study of Lynsey Dubbeld why the prison does not fit in the urban fabric anymore. I only focused on the urban context, the expression of the prison and the relation with the city.

Aldo Rossi

Aldo Rossi explained in ‘The architecture of the city’ residential districts. The city can see as a spatial system formed of parts, each with its own characteristics.

‘The residential district is thus a moment, a piece of the city’s form. It is intimately bound up with the city’s evolution and nature, and is itself constituted of parts, which in turn summarize the city’s image. We actually experience these parts. In social terms, it is a morphological and structural unit characterized by a certain urban landscape, a certain social content, and its function; thus a change in any one of these elements is enough to define its limits. We should also bear in mind that an analysis of the residential district as a social artifact based on the division of social or economic classes as well as on economic functions corresponds in an essential way to the process of formation of the modern metropolis.’

So I can say that there is no any reason to not build a prison in a city. When I read this explanation, a prison could perfectly fit in the urban fabric. A prison has his area and could be a piece of the city.

8 The architecture of the city, 1999, p.71
Also it has a certain social content. Furthermore, a city cannot exist without a living area. A prison can considering as a small living community for a certain group. Again it could nowadays fit in the urban area. However, another explanation of Aldo Rossi rejected this idea. A district or a city can be functional when it has enough public and communal facilities. Unfortunately, a prison is, in terms of Nolli, a private domain and therefore it could not be used as a public domain. Also the prisoners has a strict separation between the surrounding, therefore there is no relation with the urban area. But this explanation of Rossi did not convince me much. Because how can a prison does not fit in the urban area when we currently speaking about transparency and openness, and combining different functions and domains. Why cannot we still accept a prison in the urban fabric? And why are we hidden it in far locations and changed the expressions of the prison buildings?

Lynsey Dubbeld gave a physiological explanation for this question.

Lynsey Dubbeld

The modern urban structure isn’t only based on factors as income, land price, social class and race, but also on crucial element on our current social life: fear. Aldo Rossi, did not appoint this point in his book. Citizens are feared on the public domains. Also their private domains are protected from the outside by different elements like security cameras. The dwellings are defending by fences and security systems. Therefore, the public domains can be protecting by storing the dangerous elements. Besides the appearance of architecture of the prisons are also playing a role to protect the public domain. The (façade) architecture can nuance the circumstances and look like a safe, harmless, risk-free places. The citizen did not experience the prison, and feel a safe area. First, the prisons are located in deserted places. There is no contact with the citizen. Second, if there is contact with the citizen, the building does not look dangerously, strange or threatening. The architect of the prison De Schie Carel Weeber said: ‘The safety of the society could be successful when the outward expression does not look dangerously.’ By covering the function of the building, disappear the prison as a building out of sight. That means out of city, daily life, vision and even out of the imagination of the citizen. Therefore, nowadays, a prison cannot fit in the urban fabric. But how, as I mentioned before, is it possible that in Chicago a prison can built in the center of the city, next to a library? The answer is the internal regulations of the Department of Justice in Netherlands.

Department of Justice

It is almost impossible to build a prison in the center of the city. It has two practical reasons. The first reason is the expensive land in the cities. And the second reason is the increasing and the changing requirements of the security and safety of the prisons. It is almost impossible for architects to solve these major problems and also to find optimistic clients, who want to build it. The requirements influenced the design of the prison drastically. Therefore, it is
very difficult to design a new system for the prisons. Architects are forced to design current prison models. This resulted in big prisons, which needed large plots. Also the Department of Justice wants some elements that have to be build. To illustrate one of the requirements is the closeness of the prison. It should be surrounded by a railing and that railing should be surrounded by a tall wall. Therefore, it is very difficult in Netherlands to build a prison in the center of the city like in Chicago.
Conclusion

The prison transformed in an interesting way. First it was, one of the main elements in the urban fabric. It was clearly visible and recognizable for the citizens. Besides, the shape and some architectural elements communicate with the citizens about the result of commit a crime. Second, the idea of prison changed into a healing institute. The prison as institute was denied. The main goal was to prepare the prisoners into the society. This idea changed the expression of the building. It looks like a student apartment but more a hospital. The building heals the prisoners, and therefore the prison is a part of the urban fabric. Third, and also the current consideration, the prison building does not exist in the urban fabric. It is extruded from the city and does not like a prison. Façade architecture plays a main role. Many prisons, which are built in the center of the city, are closed or moved to new prison buildings out of the city. The Kleine Gartman prison closed in 1979 and transformed into a cultural area. The Over-Amstel Prison will move in 2016 to a new prison building in Zaanstad. This is because of the high value and the demand for the location. Many prisons are located out of the city, out of view of the citizens. Similarly, the appearance of the building changed in the same way. The current buildings are not recognizable as prisons anymore.

The transformation can explain by the architectural terms by Aldo Rossi and the study of Lynsey Dubbeld about prisons. The architectural terms of Aldo Rossi, do not allow a prison in the urban fabric. The prison does not have enough public and communal facilities in relation with the city. And is in terms of Nolli a private domain, and therefore, has not it enough relation with the surrounding area. Similarly, the study of Lynsey Dubbeld declines the prison in the urban fabric. This is about the crucial element in our social life: fear. People can overcome fear, by storing the dangerous elements. Also Carel Weeber said: ‘The safety of the society could be successful when the outward expression does not look dangerously.’ By covering the function of the building, disappear the prison as a building out of sight. That means out of city, daily life, vision and even out of the imagination of the citizen. Therefore, nowadays, the prisons do not like prisons. They have a friendly expression. In addition, the Dutch Department of Justice plays a main role. They have a large program of requirements. Therefore it is almost impossible to build a prison in the city. These three factors changed the urban context and the appearance of the prison.

However, the Federal Jail in Chicago shows the possibility to build a prison in the center of the city. The Dutch Department of Justice should be more flexible and open for new ideas and opportunities. Also the problem with the public space and communal facilities could be solved. In this time of recession, people are more open for new ideas. The crucial element of our social life, fear, is on my own opinion for a temporary time valid. This psychology element could change in time, and is also changeable by government and other main institutions. The prison should be, in my opinion, a part of the urban fabric and it should be recognizable as prison.

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11 Het gebouw als denkbeeld. De gevangenis, 2001, p.63
Arnhem

The city Arnhem is the capital of the province of Gelderland. It is part of the plus region Arnhem Nijmegen. The city is located on the Nederrijn and the Sint-Jansbeek river, which have been the base of the establishment and development of the city Arnhem. Also, the city is known for its location near the river Nederrijn. The city is located both north and south of the Rhine. Especially the southern part of the city has developed expeditiously after the Second World War.

The location of Arnhem on routes between West, East, North and South Netherlands and close to Germany has been lead to a commercial city. Currently, the city is primarily a service and officials city. Besides, the Rhine River is going from Germany through Arnhem to Rotterdam. The location, near the border of Germany, leads Arnhem to a major trading port.

Furthermore, Arnhem Central train station is an important railway junction in all directions and also it is the main Dutch station which has the link with Germany.

Moreover, there are several important national roads through and around Arnhem. For instance, the A12 is connected to the German border, and turns into ‘Autobahn 3’. The A12 is one of the most important Dutch east-west connections with Germany. In the city the main roads connect different districts. Main roads are the avenues in the inner city; Eusebiusbinnen- and buitensingel and Jansbinnen- and buitensingel, Boulevard Heuvelink, Johan de Wittlaan, IJssellaan, Velperweg, Amsterdamseweg, Apeldoornseweg, Batavierenweg, Huissensestraat, Hollandweg, Groningensingel, Metamorfosenallee and the Burgemeester Matsersingel.

Therefore, because of the central location in eastern Netherlands, Arnhem has been for centuries important for national and international transport by water, rail and road.

In addition, Arnhem has five industrial plots: Kleefse Waard, Het Broek, IJsseloord I and II and Overmaat. Then, there is the business park Arnhems Buiten; the former KEMA terrain. This terrain accommodates an office of DNV and the headquarters of the administrators of power grid TenneT. All these lead Arnhem to a major employment centre in the eastern Netherlands.
Arnhem - West

The panopticon is located in the west part of the city Arnhem. The west part of the city has one of the most diverse neighborhoods in Arnhem. It consists of several unconnected neighborhoods between the river Rhine, the Amsterdamseweg, the Frombergstraat and the Boompjesstraatje. Also, the residential community Het Dorp and Business Park Arnhem belongs to the west part of the city. One of the most famous neighborhoods is Heijenoord, a typical thirties neighborhood with mostly single family houses.

On the south side of the trail is district Lombok the largest neighborhood. It is a friendly residential area with small working-class houses and involved residents. The urban plan of the district is very dynamic; it was built in five different urban periods. Various housing typologies are recognizable. Also the panopticon is located in this district. Moreover, the railway Arnhem-Nijmegen, Arnhem-Utrecht and an adjacent railway yard cuts the district in half. All these particular spatial influences provide an interesting experience for the district Lombok.

Furthermore, Klingelbeek is located in the southern part of the Utrechtseweg, which has a village appearance. Directly along the Rhine, particularly bigger houses are located.

The age structure in the western part of the city is average. However, among different neighbourhoods people can detect differences. Klingelbeek has a larger proportion of elderly because of the nursing home. Lombok has a large number of single households and fewer families with children.

Furthermore, in terms of income the residents of the western part are slightly above the average of the city Arnhem. Particularly, many residents are active in their neighbourhood. Therefore, there is a strong social involvement in the neighbourhoods.

Arnhem-West has good facilities but are scattered throughout the various neighbourhoods. Residents from Heijenoord used their stores mainly along Amsterdamseweg and Brouwerijweg. The major facilities in Lombok are concentrates along the Oranjestraat. Only Klingelbeek has no shops for daily groceries. Moreover, it has only one primary school, but plenty of play opportunities for children. In addition, the city, the station, roads and nature reserves like Mariëndaal are near located.

Particularly in Arnhem-West, Het Dorp, where all amenities focused on disabled residents.

Arnhem-West is a residential area with a past, but also with a future. In the near future a number of developments are planned for the districts.

From 2008 more than a hundred new homes will added. Especially in Hoogstede and Klingelbeek will senior apartments and houses built. Also, on Business Park Arnhem is housing planned. This is including at the junction of the two railway directions. Twenty percent of these houses are remarked for social rent. There are also serious plans for the district Het Dorp. The future plan is to create a place where people with and without disabilities live together.

Furthermore, to improve the accessibility, more tracks will be built to increase the train traffic.
**Geography**

The prison was built on top of the hill in the neighbourhood Lombok. The hill is relatively steep and points towards the river Nederrijn and the city centre. The water and parts from the city around the river the Nederrijn can be spotted from upon the area around the prison. Besides the difference in height between the area around the Nederrijn and the area around the railway network, there is also a big difference in the plot of the prison complex. Because of this the wall around the prison is built in sections instead of one straight line. The rooftop of the prison can be seen from upon the valley on the south part of the Nederrijn.
Neighbourhoods

Lombok
The neighbourhood Lombok contains 1.705 inhabitants (2012). The density of Lombok (5.138 inhabitants/km²) is lower than the average of Arnhem (5.650 inhabitants/km²) (2012). The edges of the neighbourhood are mainly resale homes, while the dwellings at the centre are primarily rental. Many of the dwellings in Lombok are relatively small; the neighbourhood can be regarded as an urban village.

At the end of the 19th century the railway network created an intersection in the landscape. In the former situation the neighbourhood was dominated by villas, but after the railway network smaller dwellings had to be developed as well to house the railway employees. The prison was built in 1886 and had a huge impact on the neighbourhood. The value of the plots around the prison declined dramatically. After this event villas were not built anymore in the neighbourhood and only smaller dwellings were developed.

The neighbourhood was originally designed like one plan, but developed at the end in five stages. Because of this the neighbourhood can be seen as a dynamic and natural shaped neighbourhood instead of a static and planned neighbourhood. It can even be seen as one of the most dynamic and natural shaped neighbourhoods of the city of Arnhem.

The typologies of the dwellings are different. Almost all Dutch dwelling typologies are clearly visible. The neighbourhood Lombok do not work as a whole. The differences in typology, which define the use of the space, divide the neighbourhood in different parts. Each different typology forms with its own block or different building a unity. However, the sequence of the various typologies is in good order and reacts only with the surrounding neighbour. For example, the biggest closed building block reacts indirectly with the prison. The outside buildings forms a kind of thick wall, as like the prison wall, for the inside building block. Also, the large buildings, which differ in size, have a connection with each other. The prison has indirectly connection with the high apartment block, the church and the Elisabeths Gasthuis.
Various typologies

Connection building block and the wall

Connection buildings
KEMA

KEMA was a global consulting firm in the field of energy. KEMA was established in 1927 in Arnhem for Inspection of Electrical Materials. In 2011, KEMA has been taken over by the Norwegian agency Det Norske Veritas (DNV).

From an economic point of view the municipality of Arnhem looks at the complex as a complex with economic potential. Not only because of the attraction for companies inside the Netherlands but also on an international scale. Because of the green surrounding, it is a good environment for the wellbeing of employees and entrepreneurs.

The complex has a campus identity with scattered buildings. Because it is one of the first business complexes with this typology, the area is a Rijksmonument. They designed the complex in a certain way that the buildings are not standing in each other’s view. This gives the idea that every building stands alone. The view towards the buildings and the notions of height are also part of the identity. Currently the image of the business park is changing. The homogeneous identity is slowly starting to disappear on certain areas of the complex. A mixture of different activities and housing is slowly entering the area. Investors see new possibilities and city plans create new opportunities which can be used to re-use some of the empty test facilities or to develop new buildings.

The KEMA terrain has a campus typology. The buildings are objects on field. They are not shaped by the surrounding streets or buildings. Each building has its own identity and connection with surrounding. However, the different buildings have indirectly connection with the prison building. The size of the building and the surrounding greenery area are in common. Only the prison wall rejects the connection with the KEMA terrain.

In addition, the mast located on the KEMA terrain has also a kind of connection with the prison. The mast is a very visible element on the location. It is the first large object, which people see, in the location. The tall size gives the benefit to see the mast from far. Especially, from the train it is clearly visible.
Routing

Road
The infrastructure in Arnhem shows one clear main route for the access of the area. The neighbourhoods Lombok and KEMA find all its access from Utrechtseweg. This road connects the neighbourhoods with each other and is the only connection with the city centre. The neighbourhood is located two kilometres from the city centre. However, it is a bit isolated from the city centre and the surroundings, because of the lack connection.

Urban transport
The urban transport on this part of the city is minimal. The area is only accessible by bus. The area border on the train track Arnhem - Nijmegen, but can only use via central station. The area is bad connected despite the fact that it is the border of a Business Park and city centre.
Rail

The railroad, in the direction of Nijmegen, passes along the north side of the district. The nearest train station is at the central station. Besides, the north side of the district is one of the entrances of the city, by rail. On that location has the valley, where the rail track was built, the best high differences. The green valley is beautiful in its own way. Besides, the hilly landscape of city Arnhem is clearly visible in this area. It has an urbanistic value, and it is one of the characteristic elements of the district.

However, the valley divides Lombok and Heijenoord from each other. The high difference does not allow any connection with these two neighbourhoods. Despite the near location of many other neighbourhoods, like Het Dorp, Mariendaal, Sonsbeek Park and the main road Amsterdamseweg, it is isolated and bad connected.
Separation zones

The prison is bad visible on different scales. On neighbourhood scale the prison is mainly visible at the surrounding streets. Unfortunately the prison is not visible in the other parts of the neighbourhood Lombok. This is due to the high trees, the surrounding buildings and the difference in geographical height. Also the wall blocks the visibility of the prison. Consequently, the prison is clamped on the neighbourhood Lombok and does not allow any connection with the city.

Moreover, on neighbourhood level, particularly street level has the wall major impression on the surrounding. Due the tall height of the wall it has great impact on street level. The wall rejects every communication of the prison with the surrounding area. Actually it is hidden the prison from the neighbourhood. On this level the prison is almost invisible.

In addition, the neighbourhood is also clamped by the railway network. The big valley separates the neighbourhood with the upper part of the city. There is one bridge, which connects the lower part of the neighbourhood Lombok to Heijenoord. This architectural element creates a physical connection. However, this connection is too small to fully connect the neighbourhood. The connection with the north part of the district is lack. The impact of the railway network is simply too big. Also on the left side, the prison is clamped by the KEMA terrain. This terrain is currently a private and semi-private area. Besides it is surrounded by fences, which has a closed impression. Because of this, the neighbourhood has no connection with the KEMA terrain and the surroundings.

On city scale the dome of the prison is mainly visible from the (lower) south side of the city. The dome is also occasionally visible because of the geographical height differences.

Because of the surrounding neighbourhoods, Lombok is almost physically cut off from the city centre of Arnhem, the prison is isolated.

On city and regional scale the dome is, regarding visibility, working together with the tower and the apartment. The tower could connect with the upper part of the city and railway zone and the apartment with the river Nederrijn.
KEMA

The wall

Lombok

The railway zone

Main separation zones
Motivation
Master plan
The concept

CHAPTER 03
Panopticon resultant from the area
Motivation

Problem field
The area of the panopticon is isolated from the surroundings, and therefore hidden. The different layers (identities) and qualities are ignored. This is partly by the partition of the city. The activities of some parts of the city are taken part into an isolated way. Especially, this part of the city has lack connection with the surroundings. Both Lombok and KEMA is connected in one way. Utrechtseweg is the only opportunity to access both neighbourhoods. In addition, this part of the city has a very strong horizontal direction. The movement of the west part is mostly going from the Utrechtseweg. Also the rail track and the river contribute to this horizontal movement. However, the vertical connection is considerable lack. There is no connection with the other upper and lower part of the city.

Interesting area
The panopticon is located in a very strategic area. It intersects different layers (identities). First of all, the panopticon is bordered to KEMA terrain and the dynamic neighbourhood Lombok. Also Sonsbeek Park and Mariendaal Park are not far located. Secondly, the railway zone has an architectural value on the area, because of the beautiful high differences. Thirdly, it is near located to the river Nederrijn. And finally, the mast on KEMA terrain and the high apartment has a visible connection with the panopticon, which can work for a larger scale. Indirectly, the concept of the panopticon, all-seeing eye, is visible on the whole district. The panopticon can work as a linking point or engine for different areas.
I can also say that the quality of the prison is dependent on the different elements (typologies, identities, functions) of the surroundings. The prison is a resultant from these various elements. The significance of the panopticon is be derived from the different qualities of the surrounding areas. So, the prison is interesting because of the quality of the surrounding areas.
Masterplan

Arnhem has various districts with their own potentials and qualities. However, the districts are not used in an optimal way, because of the lack of connection of the districts. This leads to a district where the qualities are not visible for the city and the surroundings. These problems are also visible in the district Lombok, where the prison is located. The neighbourhood is much closed and has an introvert character. The only connection with the city centre is the Utrechtseweg, which is used by pedestrians, cyclists, cars, and public transport. Furthermore, the KEMA complex, next to the prison, shows the same introvert character. It is totally closed form the neighbourhood Lombok and the rest of the city. This is a result of the large amount of trees and the fence on the edge of the complex. The KEMA complex is also not connected to the city centre. Furthermore, the green areas, Mariëndaal and Sonsbeek Park, do not have a good connection to the surroundings. Mariëndaal is actually located near the neighbourhood Lombok, but does not have a connection with it. Also the river Nederrijn is an important identity on the location, but does not have any relation with neighbourhood or the prison. In addition, the railway area also separates the location from the surroundings. The large talus, the green zone, has a great impact on the separation of the neighbourhood from the surroundings. All these dividing elements lead to a neighbourhood that is not used properly; the location works only on neighbourhood scale.

The location has different districts that have various qualities, which are not used properly. Also, because of the lack connection they are not well visible. By making these different identities visible and connecting these locations to each other, the location can function on bigger scale. The prison is located in a very strategic area. It is surrounded by main identities and forms a centre for the location.

North - south connection

The investigation has shown the weakness of the vertical connection of the area. This weakness hampers the development of the area. Also it provides a one-sided connection. The existing bridge on the Oranjestraat is not enough to make a strong vertical connection. Also this bridge is more used by cars than pedestrians.

By making an extra vertical connection, through a bridge, the area of the panoptican can fit to the other districts. On this way the different qualities and identities of the upper and lower part of the city can work with other. The railway zone, which functions now as a separate zone, will turn into a connecting element. This bridge will used by pedestrians.
Horizontal connection

Vertical connection

North - south connection

THE CENTRIFUGE
A new centre

The urban fabric of the city Arnhem has centralization around the city centre. The important movements are going from the city centre. This principle is especially working for the public transport. At this moment the area has a traditional town planning. The districts from the left side of the city centre are only accessible from the Utrechtseweg.

By creating a new intensity, by using the panopticon, a new centralization will arise around that place. The centralization will influence the current urban fabric of the area. It will provide new activities around that place, and could help to connect the separate districts. A small new centre could possible, because the panopticon and the surrounding area have the potential qualities. On that way, people can use the area in an optimal way.

The panopticon will provide a new identity to the area, and will be the entrance of the districts. The new identity could stimulate the development of the surrounding area. Also the hidden districts, like KEMA, will be more visible.

To achieve a new centre, the function of the panopticon should change into a more public function.

A food hall can stimulate the new intensity. The panopticon will have a public function and will be accessible for a larger scale. The existing green will still be part of the panopticon. It could function as kind of buffer for the new intensity. Furthermore, the wall will be broken in some places to attract people to the area and to create more a public feeling.

In addition, the KEMA terrain should change into an open area. The terrain is currently closed and private area. By making it more accessible for a larger population the district will change in a positive way. The business park can attract more employees. However, if the KEMA terrain closes, for a reason, the terrain can turn into a residence place, with a park identity. Also on this way, the surrounding districts can fit into this new identity.

Accessibility

A new station can transform the area into a more accessible place, which can help or speed up the development of the area. Also it will provide additional help for the new intensity around that place. The centralization will influence the current urban fabric of the area, which contributes to the working of the panopticon. Also the new movement will decline the use of the Utrechtseweg and will stimulate the use of the vertical connection of the area.
Centralization around the city centre  

Creating a new center

Closed - private  

Open - public

Isolated  

Train station

Vertical connection

THE CENTRIFUGE  

55
The concept

As showed on the chapter masterplan, the prison is a resultant of the surrounding areas. The neighbours make the area interesting. As a new centre for this area, they will centrifuged by the panopticon. The panopticon will work as a centrifuge, which is rotating in its own axis. This centrifugal movement has a strong effect on the area; it will reinforce the feeling of a new centre.

Also the train station will stimulate this centrifugal rotation, and will provide much strong identity to the area. The food hall, which is located on the panopticon, will provide a movement of people, which also work with the new station. Also, it is clearly visible that the concept of the panopticon, the all-seeing eye, works in this scale.

Program

The different building blocks form a unity with each other. The function of the building blocks will be dwellings and commercial areas, which will be restaurant and cafes. The middle axes will be a commercial area. This area will work for a larger scale. The other spaces between the buildings will work for a smaller scale; local people.
Reacting on each other (creating spaces)
Drawings
South facade 1:200
East facade 1:200
Conclusion

The result of this research led to a design that fits in the current urban fabric of the city Arnhem, and that provides a new intensity to the location of the dome prison. The new design provides a boost to the isolated location of the dome prison, and lead to a location with a high value. On this way, the location will be interesting because of the dome prison and the surrounding neighbourhoods.

The new design and the panopticon work with each other and increase together a higher value to the location and the city of Arnhem.

For this design a further analyse about the different spaces, current and new, should done better. The transition of the different spaces is crucial to a good working design. Also it is important to analyse about the developments of the surrounding area, because all the different districts are working with each other.

Finally, I can say, that I am proud of the result of this project. It was hard-working year, but I am satisfied with the result.
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Pictures
The Panopticon of Jeremy Bentham (online picture). Downloaded on 11 August 2015, from http://www.tformaro.com/thesis/panpic.html

Drawings
All made by Fatma Aslan

Websites


