RESEARCH & ANALYSIS REPORT
Manutenção Militar Complex - Lisbon, Portugal
THE BUILDING AS MACHINE
The Manutenção Militar Complex (MMC) located in the city of Lisbon, the capital of Portugal. The MMC was an industrial facility that produced food, uniforms and other goods for the Portuguese Army. Especially the southern part of the complex had an industrial function, whereas the northern part had a rather social function. In this Research and Analysis Report we will focus mainly on the southern part of the complex due to the industrial heritage present in this area.

The MMC was accommodated in a former Convent, Convento das Grilas, by the end of the 19th Century. During the 20th Century, due to the needs during the First World War and the Portuguese Colonial War in the 1960s, the complex was expanded multiple times. The industrial capacity became superfluous due to reduction of the army, the production stopped in 2010. The MMC was finally substituted by a public enterprise MM-Gestão Partilhada in 2015.

In the heart of the (southern) complex an ensemble of two objects is highlighted: The Milling Factory and The Bakery. Our group of students was chosen to analyse these objects in the built environment.
CHAPTER I: THE CITY OF LISBON

Location
topography
Geomorphology
History
Urban Development
Waterfront Development

CHAPTER II: THE PARISH BEATO

History
Urban Context
Morphology
Buildings
Green
Public/Private
Public/Private vs. Green
Transport
Accessibility
Parking
Amenities
Facilities
Sports and Leisure
Vacancy
Demographics
Housing
Welfare
Social
Economical
Buildings

CHAPTER III: THE MILLING & THE BAKERY

History
Historic Development

INTRODUCTION

The Architectural Research and Analysis Report is composed of three chapters. These chapters are different scales on which the research and analysis are done. On all scales

This report begins on an analysis on city scale. The goal is to gain as much understanding as possible about the city. This is done through reading previous research on Lisbon in order to understand the context in which military structures have been built. This research is translated into a map that is presented in combination with retrieved information from earlier research in literature and analysis on retrieved maps and drawings.

It will then go on to the direct environment of the buildings: the MMC and the parish Beato. The goal as this scale is to understand the context on more local scale. This is done through reading previous research in literature and analysis on retrieved maps and drawings.

The third section assess the scale of the buildings: the milling and the bakery. The goal on this scale is to understand the present spaces and the relation to their environment. The information that is presented is a combination of retrieved information from earlier research in literature and analysis on retrieved maps and drawings.

The report has been organised in the following way. At the start of each sub-chapter a research question is posed. During the sub-chapter that same question is answered by conclusions. The conclusions are underlined in text. Images are sourced when their not our own. Literature is stated per page per subject.
RESEARCH QUESTION

What is the influence of topography, geomorphology and climate on the location of the Manutenção Militar Complex?

Introduction

The research of the entire city is done to understand the findings on the scale of Beato in a larger context. The findings on smaller scale are often part of a larger system or have the same cause. Assessed should be if the findings can be used/solved on local scale or if they belong to a different assignment.
The Manutenção Militar Complex (MMC) is located in the metropolitan area of Lisbon, Portugal. The metropolitan area of Lisbon is divided by the Rio Tajo (river) into two sub-regions: Grande Lisboa and Península de Setúbal. The Grande Lisboa is the most populous and densest region in Portugal, including the capital city of Lisbon. The city of Lisbon is divided into 24 freguesias, each controlled by its own municipality. The MMC is located in the freguesia Beato.
Lisbon and the south part of Portugal contain a subtropical-Mediterranean climate. This means that the city deals with long warm summers and short very mild winters. The winters are paired with heavy ‘monsoon’ type rainfall that can reach 124 mm rain in one month.

Comparing Lisbon’s climate with a more familiar climate, like the Dutch one, it provides more understanding of the situation and will help with facing the future design task. This means that during the design process the climate needs to be taken into consideration while approaching the buildings physics. For example, the heavy rainfall in the winter will need to be questioned when detailing the roof and façades of the building. Also for indoor climate it needs to be taken into consideration that it needs to have a pleasant during the hot summers.


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<th>Transport</th>
<th>Demographics</th>
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<tr>
<td>Lisbon</td>
<td>- Climate - Geomorphology</td>
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Average temperature Lisbon

Average precipitation Lisbon

Research and Analysis
The maps on city scale show the altitude and the slopes throughout the city. The city of Lisbon is nicknamed: A Cidade das Sete Colinas (The City of Seven Hills).

On the scale of Beato a sloping terrain could be important. A sloping terrain can create natural barriers, could be used in for passive transportation (gravity) and can provide view points. These themes topics will be assessed in chapter 2: Beato.

Over time Lisbon has been hit several times by serious flooding. The last flood dating back to 2014 even flooded parts of the downtown city centre due to heavy periods of rain.

The MMC is located in an area that could be vulnerable to flooding when a period of heavy rain occurs.

Retrieved from:
1 - https://en.wikipedia.org/wiki/Lisbon/
3 - http://portugalresident.com/flood-misery-returns-to-lisbon

Topography - Climate - Geomorphology

LEGEND

Altitude (m)

Average risk
High risk
Very high risk

FLOODING

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1 - https://en.wikipedia.org/wiki/Lisbon/
3 - http://portugalresident.com/flood-misery-returns-to-lisbon
How has Lisbon developed in the 20th century, and how does the parish of Beato relate to this development?
The analysis of the three maps of Lisbon suggests the identification of four morphological periods over the last two centuries:

(1) A monarchic period, from 1812 to 1879;
(2) A republican period, from 1899 to 1911;
(3) A dictatorial period, from 1940 to 1978;
(4) A democratic period, from 1987 to 2011.

The monarchic period is characterized by a slow urban development, supported by the coexistence of new spatial uses and organizational proposals, such as urban gardens and cultural facilities, with structural urban elements from the 18th century. These elements included large squares and roads, some of which branching out of town through an organic network, with important urban projects that better express the Marques de Pombal’s powers.

The late-monarchic and republican period, represented by the 1899 town map, is characterized by the emergence of new urban forms: the avenues, the roundabouts and new private residential developments, on a small scale, in parallel with housing for the working class, the villas. The combined effect of these urban elements with the emergence of a new transportation mode, the electric tramway, was able to structure the northern expansion of the city.

The third period, the dictatorial period, represented by the 1948 town map. This period was characterized by the opening of a large urban park on the western side of the city, the construction of a large university campus, the construction of the Lisbon metro system as well as various social housing estates made of single family houses, followed by multifamily building estates.

The democratic period – starts with the 1987 town map. This period is characterized by the construction of a complex system of urban motorways expressing a mobility concept centered entirely on the private car. A new look at the waterfronts justified a number of interventions on public spaces along the Tagus river, that accompanied the construction of new urban projects associated with the 1998 Universal Exhibition. The port industry that had occupied most of the southern industrial area, the EXPO site, finally, the dictatorial period characterized an even more radical and the construction of important cultural facilities such as the Centro Cultural de Belém, a large multi-purpose and flexible venue located on the western Tejo river front.

Conclusion

The historic development of Lisbon can be divided in four periods. Each period is characterized by the urban interventions and political drive. The maps also show the presence of Beato on the earliest maps. When analyzing the parish of Beato these facts should be taken into consideration.

The posed question (assessed in chapter II):

Which buildings and structures characterize the four morphological periods in the parish of Beato?
The present situation of Lisbon can be simplified with a morphology map. The different typologies indicate (or reveal) the four morphological periods. The MMC is located in Beato, an area with both industry and historical housing. Beato is located between the linear/individual blocks of Marvila and the "city centre." However, the valley of Chelas is an interruption in the urban tissue. This valley can be seen as green connection to Beato/MMC and is used for greenfields, brownfields, urban agriculture and leisure.

Images:
1 - 6: Retrieved from Google Maps

1. Baixa
2. New Avenues
3. Benfica
4. Beato
5. Valley of Chelas
6. Marvila
Lisbon can be defined as an historic city. During the era of industrialization (1900-1970) most of the waterfront was transformed into industrial territory.

The morphology map shows the three different centres of Lisbon: Belem, Baixa and Expo ‘98. Between the centre some developments have improved the recreational access to the river Tejo.

In 1940 the World Exhibition was held in Portugal. Belem was presented as the historical centre of Lisbon. The redevelopment of the waterfront made the river accessible to recreation.

Also the area around the city centre is being developed since 2008 under the name: “Devolver o Tejo as pessoas (Returning the Tejo to the people).” This project includes a terminal for large cruise-ships aiming to improve tourism.

The MMC could be one of many developments to improve the access to the river Tejo. However the location of the MMC is in the middle of the still active industrial territory.

Images:
2 to 6 - Retrieved from: Lisbon: a new relationship with the river, © AIVP - The worldwide network of Port Cities

Legend:
- Airport
- Financial district
- Industrial activity
- The MMC
- Green Areas

What is the influence of the transportation network on global, national and city scale on the MMC location?
The map on the left (1) shows the current harbour activity in Lisbon. Visible is that the waterfront of Beato is used for cargo-shipping. A photo from the silo to the waterfront confirms this finding.

More important is the strategy from the Port of Lisbon (a private company), shown in the map on the right (2):

“The aim is to use the estuary and river as a means of linking the port’s operational areas, and these areas with logistics hubs, thus reducing traffic using city roads and its resulting environmental impact. This means that conditions must be established that will enable the current level of river-borne traffic to grow, and container traffic to be introduced and boosted.”

The waterfront of Beato (near the MMC) is used for cargo-shipping. The strategy is to grow traffic over water, it is thus unlikely for the waterfront to become available. If the future strategy is to change the waterfront of Beato to a Logistics Hub, harbour activity may increase.

Data:
Port of Lisbon Strategic Development Plan - Porto de Lisboa

Images:
1 and 2 - Porto de Lisboa Strategic Development Plan - Porto de Lisboa
3 - Photo by Hielkje Zijlstra
The New Lisbon Airport (NAL) is the name of the project for the new airport that will serve Portugal, especially the area of Grand Lisboa and all of its center/south. Opening in 2017, it will replace the Portela Airport as the main international airport in Lisbon, the closure of the current airport is not certain.

The Third Crossing of the Tajo (TTT) in Chelas-Barreiro alignment contribute to the development of “Grande Lisboa” as a city of two banks. In addition, it may help reduce the traffic on the 25. de Abril Bridge and V. da Gama Bridge, balancing traffic entries in Lisbon and creating spare capacity for the traffic generated by the new Lisbon airport.

Data (2009 retrieved from):
(1) - Relatório do Estado do Ordenamento do Território - CML LISBON

Images:
(1) - Retrieved from http://www.esacademic.com/dic.nsf/eswiki/771688

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(1) - Relatório do Estado do Ordenamento do Território - CML LISBON

Images:
(1) - Retrieved from http://www.esacademic.com/dic.nsf/eswiki/771688
The public transport in Lisbon is made up of the train and the metro. The train has national character. The train stations Marvila and Chelas are connected to the rest of Portugal. Trains to Coimbra and Porto stop in Marvila. The train is also connected to the city centre and the expo '98:

- Time to city centre is 45 min, every 30 min. (14 min walk + 30 min train)
- Time to the expo '98 is 33 min, every 30 min. (14 min walk + 19 min train)

The metro station Olaias is on the Red line, connecting for example the airport, the expo and the technical university.

- Time to city centre is 57 min, every 6 min. (36 min walk + 21 min metro)
- Time to the expo '98 is 48 min, every 6 min. (36 min walk + 12 min metro)

To compare:
- MMC to city centre by bike 50 min.
- MMC to the expo '98 by foot 50 min.

The train and metro network are not a suitable connection to the city network. Where it could be faster to walk, and much faster to use a bicycle.

Source: Google Maps

Images:
(1) - http://www.metrolisboa.pt/eng/custom-er-info/diagrams-and-maps/
(2) - Google Maps
RESEARCH QUESTION
What is the influence of the housing and demographic developments in Lisbon and the context of the Manutenção Militar Complex?
WHY IS THERE A SUDDEN INCREASE IN THE POPULATION IN LISBON IN THE LAST 5 YEARS?

1. - Until 2011 rental control laws prohibit any maximum increase of the rent.
2. - Rental incomes were tied to keeping up maintenance costs.
4. - Rent increased since 2012.
5. - Tenants began to fail.

STRATEGY OF THE MUNICIPALITY

INVESTMENTS IN PUBLIC SPACE EX: CITY CENTRE

INVESTMENTS IN RENOVATION "RENOVATE FIRST, PAY LATER"

PROPERTY

Until 2007, the population of the city of Lisbon has shrunk dramatically. In the last 30 years, 300,000 people have moved out of the city. Curious to see is that the population in the Province of Lisbon is growing but in the city it is declining. This shows that the people are moving from the city to its surrounding areas.

Other data show that due to this process, buildings become vacant. In Lisbon (15%) In Beato (17%). However, in the last few years there's a small increase in population in the city of Lisbon by 4,000 people. This is expected to increase.

Data: Lisbon Demographics 2011 - Instituto Nacional de Estatistica Censos


VACANCY RATE (2011)
Lisbon, which can be used for the design task, because of its relation to the building environment, will be mentioned as follows.

The consequences of the crisis are still visible and they are discussed within the metropolitan areas of Porto and Lisbon, because of the large amount of population settlement (Marques et al. 2014).

The social class is facing the most difficulties economically since the crisis to get back on track. Although in the second half of the 2010s the unemployment rates are decreasing, the country has been struggling mainly with the housing sector, which is a result of the fact that more younger people are leaving the cities (and country) due to the high unemployment rates within this group leaving the country or moving towards the suburbs (Marques et al. 2014). The suburbs are facing the highest unemployment rates causes growth in indebtedness of lower income families is increasing much more than younger urban population (15,8% - 16,6%) in 2013. The cost of living and increases social inequalities (Marques et al. 2014).

For the design task it is interesting to take into account the social imbalance within the area into consideration together with the vision of the municipality, while looking at the future possibility of redeveloping public projects to attract young people back to the city that is why the municipality working on projects to attract young people back to the city and increases social inequalities (Marques et al. 2014).

Looking at the GDP rates and unemployment rates causes growth in indebtedness of lower income families is increasing much more than younger urban population (15,8% - 16,6%) in 2013. The cost of living and increases social inequalities (Marques et al. 2014). The suburbs are facing the highest unemployment rates causes growth in indebtedness of lower income families is increasing much more than younger urban population (15,8% - 16,6%) in 2013. The cost of living and increases social inequalities (Marques et al. 2014).

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CHAPTER II

THE PARISH OF BEATO
How did the urban context of the MMC develop over time, and what traces can be found of the historic development?
Palácio dos Duques de Lafões
First railway of Portugal
Convento das Grilas
Convento das Agostinhas Descalças

TIMELINE

The map 1856-58 made by Filepe Folque shows the site before the transformation to the Manutenção Militar Complex (MMC), in the Monarchic period. This map shows traces of the Origin of Beato. This period is characterized by the power of royal and religious institutions. The land is used by these institutions as leisure garden or agricultural land. An assumption can be made that the convents also had a productive function.

The direct connection to the waterfront and structures along the water indicate some kind of harbour activity.

Dates of significance
1722 - Origin of the Military Service
1755 - After the big earthquake the Palace and the Convent were (partly) reconstructed.
1856 - Opening of Portugal’s first railway line (between Lisbon and Carregado).

Soucres
1- http://restosdecoleccao.blogspot.nl/2013/10/manutencao-militar.html
2- http://aps-ruasdelisboacomhistoria.blogspot.nl/2014_02_01_archive.html

Images
1 and 3 - 2- http://aps-ruasdelisboacomhistoria.blogspot.nl/2014_02_01_archive.html
2 - Own edition - Photo: Google Maps

Legend

Convent
Factory
Tramway
Private garden
Cultivated land

MORPHOLOGY

TRANSPORT

CHARACTER

People
Transport

Urban Context

1 1922
2 1860
3 1911
4 1940
5 1950
6 1974
7 Present

HISTORY

MONARCHIC PERIOD

FUNCTIONAL

HISTORY - MORPHOLOGY - TRANSPORT - AMENITIES - DEMOGRAPHICS - CHARACTER - PROCESS
The map 1911 made by Silva Pinto shows the first structures of the MMC in the Republican period. This map shows the Settlement of Industry.

The original waterline has been moved to create space for the MMC. A large square within the MMC could have been used as dock or outdoor storage. Most of the labour is still done by hand in this period.

Date of significance
1862 - Experiment to manufacture and supply bread to the army. A Military Bakery is created on the site now known as Rocha do Conde de Obidos named “Padaria Militar”.

1896 - Ministerio da Guerra takes possession of the site.


Sources:
1- http://restosdecoleccao.blogspot.nl/2013/10/manutencao-militar.html

Images: 1 - Facebook MMC 2 - Facebook MMC
The map 1950 (unknown) shows the introduction of social facilities in the northern part of MMC as well as the increase of the harbour activities.

The period between 1920 and 1935 can be indicated as a period of industrialization. A lot of industrial (infra)structures have been developed or built.

A new railway (private) has been constructed and forms a border between MMC and the water. The solution is the construction of two mechanical air bridges, one from the water to the MMC and one from MMC south to the MMC train station (1951). The new logistics are complemented by rail within the MMC.

**TRANSPORT FUNCTION**

**Legend**

- Convent
- Palace
- Harbour industry/activity
- Private garden
- Cultivated land

**Timeline**

The map 1950 (unknown) shows the introduction of social facilities in the northern part of MMC as well as the increase of the harbour activities.

**Transport**

- People
- New tram connection
- New railway
- New industries
- New communications

**New warehouses**

**Cal-Bridge**

**New construction**

**Buildings demolished/collapsed**
The map 1950-1974 made by ART 91 - PDM shows a further expansion of harbour activities. From 1950 the construction of social facilities for the employees began. The Social block included opening of primary school, healthcare, vocational school, daycare, cafeteria, supermarket and an auditorium. Also a tram connection was made to connect the southern parts of Lisbon and Beato. This connection made it easier for employees to commute between the MMC and the city centre.

During the Ultramar War, the MMC is very active in the provision of food for the troops and in the support of the families of the soldiers. In this period the MMC reached its maximum level of productive development and of employees. Large scale buildings like the silos and the Pasta/Biscuit are added, to optimize and maximize the production.

Timeline
- 1951 - Aerial bridge between rail and factories
- 1968 - Opening Supermarkets
- 1974 - Opening big Silo’s
- 1974 - End to five decades of dictatorship.

Sources:
5 - Texts exhibited at Manutenção Militar Complex by Lisbon Municipality

Images:
1 - Retrieved from DOCOMOMO TRANSPORT
The map 2011-2016 (present) from LXI shows the MMC in its current ensemble. The first large intervention is the completion of the road to the east of the MMC, resulting in the loss of two MMC buildings.

Further development of the harbour, especially container shipping. More sea has been turned into land. On the southwest of the MMC, a lot of small buildings (houses?) have become vacant.

Date of significance

1975 - Independence of the former colonies: Angola, Mozambique, Cape Verde, Guinea Bissau, São Tomé.

Manutenção Militar has to adapt to a pacific period and reduce the production and activities. The “military supermarkets” closed.

2004 - The last year of compulsory military service - The Army is now of 32,992 troops while in the sixties it was of 200,000. Private companies provide a great part of the goods for the armed forces. The complex starts to lose its reason of being.

2011 - Manutenção Militar officially closed most of the factories in the complex, though there are still a few services.

Images:
1 - Photo by Hielkje Zijlstra

TRANSPORT

FUNCTIONAL

DEMOCRATIC PERIOD
Character

Plan do Grilo to Waterline
Transport
People

1722
1860
1911
1940
1950
1974
Present

Monarchic period
Republican period
Dictatorial period
Democratic period

Legend

HISTORY
MORPHOLOGY
TRANSPORT
AMENITIES
DEMOGRAPHICS
CHARACTER
PROCESS

Urban Context

CONCENTRATED
HARBOUR

11 CONTAINER HARBOUR

SUMMARY

The MMC is the result of the progressive urbanization of the north of Lisbon from the 1720s onwards. It was also the result of the need to have a port and a shipyard to support the Portuguese Navy. It was the place where the important shipbuilding company of Manuel da Nóbrega was located. After the independence of the former colonies, the MMC started to lose its importance and became the residence of some of the most important Portuguese families. In the 1980s, the MMC was transformed into a residential area, and in the 1990s, it became an industrial zone. Today, the MMC is a mix of residential, industrial, and tourist uses, with a strong presence of the military. The complex is surrounded by a waterline, and it is connected to the city by the Rua do Grilo. The MMC is an important element of the heritage of Lisbon, and it is a key example of the urban planning and architecture of the 18th and 19th centuries.
Urban Context

The name Beato reminds of a better time: A history of wealth: convents and palace are still existing entities.

Green areas with agriculture, private gardens and an close connection with the river.

The MMC is a physical memory of time of power. It reminds of a time where Portugal was powerful, and the MMC provided a lot of work and positive activity in the area of Beato. The same area is a representation of an era of dictatorship under Franco, and the colonies (suppression and violence).

The religious character has (partly) been replaced by the industry. First only land was taken, later a convent was taken for military use. The addition of a social block in 50s improved the social character of MMC. In the 70s the industry had the largest impact on Beato. The decline of MMC caused a void in Beato. The social functions, the area’s prosperity and social setting disappeared.

The Rua do Grilo is the original waterline, the point at which the addition of land from sea took place.

The connection to the water has always had an important role. Until the 70s most goods were transported by water and rail, from the 70s the road became more important. The expansion of the private harbour made the water less accessible to the MMC.

A growth in population (and buildings) due to employment until the 70s. The decline of the employment and the technical state of some buildings (probably) made people leave Beato. Leaving buildings and the MMC vacant.

CONCLUSIONS

100

The MMC is a physical memory of time of power. It was not only used by the industry. The only land taken without a direct gain was taken by military use. The addition of a social block in 50s and the social character of MMC in the 70s is still noticeable. The decline of MMC caused the social functions, the area’s prosperity and social setting disappeared.

TRANSPORT

The connection to the water has almost lost its importance. Until the 70s most goods were transported by water and rail. The N10 is today the main road. The expansion of the private harbour made the water less accessible to the MMC.

PEOPLE

If people were in population and buildings live in employment the N10 is the decisive point of the environment and the social makeup of the area is changing. The rules of DOCOMOMO and the MMC are still active in the area.

Images:
1 - Photo by Hielkje Zijlstra
2 - Photo by DOCOMOMO
3 - Photo by Killian T€l€a

MORPHOLOGY TRANSPORT AMENITIES DEMOGRAPHICS CHARACTER PROCESS

Urban Context

The MMC is a physical memory of time of power. It is symbols of two eras Portugal was powerful of, and the MMC provided a lot of work and positive activity in the area of Beato. The same area is a representation of an era of dictatorship under Franco. The social functions, the area’s prosperity and social setting disappeared.

Images:
1 - Photo by Hielkje Zijlstra
2 - Photo by DOCOMOMO
3 - Photo by Killian T€l€a

Research and Analysis

57
MONARCHIC PERIOD

The oldest part of Beato. The character is embedded in Convents, Palaces and the connected outdoor space that was mainly used for agriculture. Some traces are still left in the surroundings and on the site itself.

REPUBLICAN PERIOD

The first industrialization of Beato. The character is embedded in relativly small volumes and detailing of the buildings (cast-iron). Most of these buildings have been reconstructed over time to keep up with the production process.

DICTATORIAL PERIOD

The optimization of the production process and the introduction of social facilities. The character is embedded in the grand scale and use of modern building techniques. The scale and way of buildings is in contrast with buildings from the republican period.

DEMOCRATIC PERIOD

In Beato hardly any buildings date from the democratic period. The largest intervention is the expansion of the harbour for container ships.
MORPHOLOGY

How does the morphological profile of the parish of Beato relate to the MMC?
The waterfront is dominated by harbour activity.
The area is low density.
A mixture of different typologies, the MMC is mainly surrounded by the historical fabric.
West of the train track, no continuity can be found in the urban tissue. The result: Palimpsest urbanism.

**MORPHOLOGY**

**LEGEND**
- Industrial Zone
- Residential: Family Housing
- Residential: Collective Housing
- Cultivated Land/Urban Agriculture
- Residential: Historical/Mixed Use
- Private Green
- Recreational Green - Public
- Reclaimed land - Self constructed housing
- Brown Fields

**BUILDINGS**
- Public/Private - Green
- Public/Private vs. Green

**BEATO**
**HISTORY** - **MORPHOLOGY** - **TRANSPORT** - **AMENITIES** - **DEMOGRAPHICS** - **CHARACTER** - **PROCESS**

Buildings - Public/Private - Green - Public/Private vs. Green

Source: Google Maps

Urban Resilience  Linear blocks  Historical fabric  Suburban fabric  Global harbour

Research and Analysis 63
Some greenspaces have been designed for the newer areas of Beato. The area of Madre de Deus (1) has a sloping park with some sports facilities. In the historic tissue, no greenspaces for leisure are found.

Private greenspaces have been designed for the newer areas of Beato. Some private greenspaces are present. Owned by (former) religious and royal institutions. Other private greenspaces are used by a company that sells wood.

A substantial part of the space is used for agriculture. It is impossible to identify if these plots are used by one or multiple owners (4-8). Looking at the structures, it can be assumed that a piece of land is reclaimed (6), used by individuals for agriculture (and maybe living).

Brownfields
A substantial part of Beato is brownfield. Some used for nothing (7 and 12), and others for parking (10).

LEGEN
1 - Green area Madre de Deus
2 - Urban Agriculture
3 - Green area Social housing
4 - Urban Agriculture
5 - Jardins da Quinta das Pintoras
6 - Urban Agriculture/Bottom-up dwelling
7 - Brown Fields/No use
8 - Urban Agriculture
9 - Jardins do Convento dos Grilos
10 - Brown Fields/Parking
11 - Jardins do Palácio do Duque de Lafões
12 - Brown Fields/No use

Source: GOOGLE MAPS
The public-private map shows that most of the public space is used for circulation. Sometimes with walls on both sides of the road (3). Some places are wide enough to park a car, and the public space is mainly used for circulation and parking (1 and 4). Within the linear block structure (2) all space is public, mainly used for parking.

In conclusion:
Insufficient public space to stay or meet, dominated by space for circulation or parking.

The overlay of green space and private space shows how the private space is used. The areas around the MMC are very open (unbuilt) but private and protected by walls. Could this space not become public?

LEGEND
- Private
- Green
- Brownfield
- Urban Agriculture

Source: GOOGLE MAPS

Research and Analysis 67
RESEARCH QUESTION
How is transportation arranged at the MMC estate?
The only public transport that is directly accessible from the MMC Complex is the bus. In the direct surrounding there are 4 bus stations. When looking at the accessibility of these bus stations it is noticeable that the route towards the bus stations on the car road is way more complicated and long than it should be. This is because the whole strip where the South MMC belongs two is one closed long line. That is why it would be a better option to open up the MMC towards the car road, so not only the MMC would be better connected to the city centre of Lisbon, but the whole area around the complex would also have better connection.

Also the two visual in the Pasta building have high potential to manage direct public transport accessibility towards the city.
The site has a good connection to the city centre and the Expo '98 due to the Av. Infante Henrique. Also the Rua do Grilo is an historical route connecting the entire waterfront of Lisbon.

The parking in Beato is solved by using every possible space to park. The rules seem to be unwritten: "as long as other cars can pass, it's fine." The result of this attitude is that some potential qualitative public spaces are taken by cars (pictures 1-4).

The large office building has its own parking garage, and also the MMC has its own parking garage (now unused).

**Legend**

- Main distribution
- Secondary distribution
- Local distribution
- Parking outdoor
- Parking indoor
- Train

**Legend**

- Main distribution
- Secondary distribution
- Local distribution
- Parking outdoor
- Parking indoor
- Train

Pedestrian space used by cars

Source: GOOGLE MAPS

Research and Analysis
RESEARCH QUESTION

What amenities are in the surroundings of the MMC and how are they spread in Beato?
Facilities - Sports and Leisure - Vacancy

Retail shops are focused on a small local scale (Google street-view 2015). Schools as well (Google street-view 2015). Small scale amenities form the street-view (Google street-view 2015).

The map with amenities provokes the assumption that the surrounding neighborhood of the MMC (especially Rua de Xabregas and Rua do Grilo) contains a lot of amenities. But looking at the graphic overview on business activity in Lisbon and Beato it can be noticed that approximately 13% of the business activity in Beato is focused on the local scale. Also from a street view, these amenities operate on a really small local scale and, for example, do not have a connection with the rest of the city. Decline in amenities

The amenities on local scale create a very intimate atmosphere while strolling through the neighborhoods. Because they are so reliable on a small scale, they are really vulnerable. Meaning that they can shut down very easily and create a very closed and vacant street-view. For the design task this could play a role during the formation of the program of demands that will be implemented in the complex. The question that could be asked regarding this topic is: What local scale amenities could work for the neighborhood? Is it possible to implement large scale amenities? What would be the consequences for the neighborhood?

Sources used:

Decline in amenities

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Sources used:
What are the social, economical and building statistics of Beato and how do they relate to the rest of Lisbon?

Who are the people living in Beato and how are they live?
Family composition

The composition of the families show that the number of families living in Beato is lower than the number of families living in the rest of Lisbon.

Lisbon Demographics 2011
Instituto Nacional de Estatística Centro 2011

Number of children per family

Data derived from:
Education and unemployment

The level of highly educated people in Beato is significantly lower than in the whole of Lisbon. Besides that only half of the population in Beato has a basic education level. The unemployment rate in Beato is 16% which is higher than the unemployment rate in Lisbon. If this is in part due to the lack of working opportunities in Beato itself is yet to be researched further. While the basic education level in Beato and Lisbon is not very high a lot of exchange students are present in the city centre. Each year more than 3000 students study in Lisbon with the Erasmus Exchange program. (VoxEurop, 2010)


Figures


Research and Analysis
Working sector

The people in Beato mostly move to work by bus which is quite different from the whole of Lisbon. Usually the car is the most used form of transportation. In Beato the car is a close second to the bus.

While looking at all the different working sectors in Beato it can be seen that the people that work in Beato have a small self-owned business.

Most buildings in Beato are relatively young but the number of old buildings are mostly large old convents or palaces referring to the blessed past of Beato.

While looking at the number of floors and square meter floorspace we can conclude that most buildings are relatively low and small, especially the dwellings.

**Figures**

Data derived from:
The dwellings in Beato are mostly occupied by multiple families in one building even though the number of single family dwellings is also higher than the average for Lisbon's fraguesias.

Figures

Facilities besides dwellings

Vacancy and facilities

There are a lot of vacant buildings in Beato, which is probably due to the migration of people and lack of use of the facilities no longer used as these are moving as well.

When the MMC was still active it dominated the facilities within Beato. We can conclude that there is a lack of (diverse) facilities in Beato.

Lisbon Demographics 2011
Instituto Nacional de Estatística Censos 2011

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Lisbon Demographics 2011
Instituto Nacional de Estatística Censos 2011

Facilities besides dwellings
Conclusions of the demographic figures in Beato

- Young families move to the suburbs of Grande Lisboa and people get fewer children creating the aging city of Lisbon

- Beato has large population of:
  - elderly
  - people with basic education
  - unemployed people

- The buildings in Beato:
  - are relatively small
  - have a high vacancy rate
  - house multiple families
  - house hardly any facilities other than dwellings
  - are not very old with a few exceptions
What are the characteristics of the spaces and the façades of the MMC?
The character of the space

The MMC shows a clear division of spaces which can be categorized as streets and squares. These spaces need to be researched to be able to define the different characters of these spaces.
Spreading the façades over one drawing provides an overview of the differences in exterior of the buildings. At first sight there is the common use of colours is noticeable. Another thing that is noticeable is the transition of different styles. The Pasta factory in the bottom of the drawing contains this repetitive concrete industrial character, while the convent in the top has a more monumental character. In between these two there are the Milling and Bakery that both contain this mixture of the industrial and monumental character. The reduced streets bread is the role of the ancillary buildings and the more wooden in the other parts.

Industrial vs. Monumental

Looking into the façades from a human scale perspective, there can be a relation drawn between the buildings and their façades. This relation can be seen in the way elements in the façades are reacting to each other. For example, in the street with the Pasta factory and Bakery both façades contain these vertical elements, but in a different style. This vertical repetitiveness contributes to this industrial character. At sight, it is to be mentioned that the one side of Pasta factory and the other side of the street also has the industrial character, the silo is the dominant for the character formation of this street. Another example is the street of the Milling and Convent, where the use of similar windows on the upper two floors contributes to the same character.
The street between the Pasta factory and the Bakery is very long (200 m) and feels even longer with the vertical lines in the rhythmic façades on both sides. The end of the street is clearly defined by the large and high silo’s redirecting your vision upwards. This landmark structure emphasizes the industrial atmosphere of the whole site but definitely also the character of this street.

Besides the length the width of the street, with 11m is rather small compared to the other streets leaving only a small pavement to walk on suggesting a fast moving atmosphere.

The facade of the Pasta factory is most prominent as it is higher, longer and more closed to the street. It is mostly this building and the silo which highlight the industrial character of the street. Both buildings are rather closed making them look more solid and tough. The whole atmosphere with the grey coloured façades and small windows and rigid vertical division feels raw, cold and strict.

Overall the character of this street can be defined as industrial.

Next to this obvious passage the street has two more canopy like structures giving the street a more secure enclosed and protected feeling. It helps to introduce the human scale within the street.

The middle street is also the smallest of the three and the windows of both façades are mostly orientated on the street creating a visible connection from both buildings as well. All these features enhance the secure character in which the buildings are oriented towards each other.

Overall the character of this street can be defined as intimate.
The streets between the Milling and the Convent measure a width of 16m and is thus the widest street in the MMC. This width creates a more quiet, relaxed and slower atmosphere.

The division of the Milling façade separates the lower and upper part which contributes to a human scale feeling of the space. On the other side the first floor of the old convent is situated above street level separating the interior from the street as there is no immediate connection, it is impossible to look inside the building.

Lower buildings are situated at both ends of the street which contribute to the tranquil atmosphere of the whole street.

Overall the character of this street can be defined as rustic.
Diverse vs... Intimate

Looking at the facades spread over the square it can be noticed that there is a mixture of industrial and monumental elements. But what is more noticeable is the difference in building scale. Most of the buildings around the square contain a scale of maximal 2 floor levels and this monumental style, creating an intimate neighborhood atmosphere. But then there is the tall Milling silo that contains 9 closed floors, which, due to its large scale, holds a dominating position in this intimate space. It is almost like the silo is the landmark of this square and contains an important function, because it is the first thing you notice when you come from the street of the Workshop and Cookie factory.
Diverse vs. Intimate

The square drawn on the left page shows the mixture of the industrial and monumental elements in the façades. The most noticeable elements in this façade spread are the entrance of the Bakery and the Silo. The entrance of the Bakery contains the most detailed facade and can almost be said to have a monumental character relating to the Milling, Supermarket and Convent and on the other side, the Silo and Pasta factory.

The Silo, due to its large size, contains a dominating position in this square. Due to the variation of different building scales and style elements this square has a more diverse and less intimate open character.
The MMC area has a closed-off character because of its border. The border is made of either a height difference in the landscape, the façades of the buildings, a wall around the complex or gates. Some examples of these borders are given on the previous page.

This map shows where which kind of border is situated.

**Types of border**

- Height difference as border
- Buildings as border
- Walls as border
- Gates as border

**Photo**

Google maps - interview
ENTRANCES

The entrances are divided into two groups: the width of the gate indicated whether the entrance was used by vehicles or people, since big trucks were used for transportation.

The gates can also be categorized as monumental or non-monumental. The use of ornaments can indicate importance of the entrance.

Only one gate for vehicles can be seen on this side (west) of Rua do Grilo was the social block and the office of the military chief. This entrance was probably the main gate for visitors.

Most entrances for people face Rua do Grilo. This could be explained by the prestige and status of the military or by the representation to the neighbourhood.
The skin of the MMC is formed by walls, gates, fences and buildings. The buildings of the industrial part of the MMC face on one side the old waterline route Rua do Grilo and on the other side the wide Avenue Infante Dom Henrique. The skin has a significant difference in character and building. The buildings on the Rua do Grilo are smaller in scale and have some ornamentation. The reason could be that they were built in an earlier period (monarchic and republican) or because the buildings were meant to have a monumental presentation to the streetside. The buildings on the Rua do Grilo are representative of the MMC, used to show the prestige of the military. The huge length of pasta and biscuit factory (200 meters) dictate a very strong repetitive concrete structure ended with the height of the big silo's (40 meters). These buildings are built in a more efficient way. The way of building had changed since the republican period. The buildings facing Rua do Grilo were the representative side of the MMC, used to show the prestige of the military. The buildings facing the Av. Infante Dom Henrique are result of pragmatism, built in the most efficient way.
Production Process
CONNECTIONS
Global/National - Water
Up the river to and from Portugal/Spain.
Down the river to and from rest of the world.
Example: import and export to colonies.

National - Rail
Train connection from and to the rest of Portugal (other military bases).

Urban/Local - Road
Connection by road for the distribution of local produce from and to Lisbon/Portugal.

Urban/Local - Tram
Tram connection by (slow) rail to connect the City to the Beato. Transport of labour?

Local - Foot
Distribution of products through the supermarket to local families and military.

LOGISTICS
D: Distribution, import
1: Warehouse, storage of ingredients
2: Milling, the process of changing wheat into flour.
3: Production, the flour and other ingredients are combined to create food.

1: Warehouse, storage of products
D: Distribution, export
S: Supermarket, local

The distribution of products inside the MMC has changed in the 70s after the last stage of modernisation in the dictatorial period.

The construction of the big silos replaced the function of the warehouses. The aerial bridge was closed and all traffic was done by trucks.

Inside the MMC, the production process didn't change. However, the distribution of products was modernised. The internal rail was replaced by pipes pumping products from one building to another.

The tram connection was also lost. The decline in production meant a decline in employees, making the tram connection a expensive luxury for a small group of people.

LOGISTICS - MAP 1950-1970

LEGEND
Production process
Aerial connection (mechanic)
Connection by Road

LOGISTICS - MAP 1970-2011

LEGEND
Production process
Aerial connection (mechanic)
Connection by Road

BEATÒ
HISTORY, MORPHOLOGY, TRANSPORT, AMENITIES, DEMOGRAPHICS, CHARACTER, PROCESS
RESEARCH QUESTION

How did the Milling and the Bakery develop over time?

The reasons for the development over time of the ensemble will be explained in six stages. Each stage is illustrated with a historical map of the complex, which shows the buildings that have been added in that particular stage, and historical photos and drawings. For a more technical analysis of the historic development of the ensemble, see the Technical Analysis.
Ministerio da Guerra takes possession of the site. The former convent is converted to Manutençao Militar to provide the Portuguese army with all kinds of products. In this stage no building of our ensemble was built yet.

34 years earlier, in 1862, an experiment was carried out to manufacture and supply bread to the army. A military bakery was created on a site now known as Rocha do Conde de Obidos named “Padaria Militar”.

Between 1898 and 1910 construction of several factories, including the mill building and bakery, took place. The mill building was expanded in 1920 by adding a new silo.

The bakery is a volume with two roofs, in which a clear exception is visible: the middle part of the left roof is flat and lower. The milling is one elongated volume, as can be seen in a drawing that was made for its extension with a silo. The military bakery was expanded in 1920 by adding a new silo.


Images:
1. Map of 1911 by Silva Pinto (own editing)
2. Drawing ‘Remodeling of the mill building’ (provided by Docomomo)
3. Ground floor bakery (photo Hielkje Zijlstra, 04-09-2016)
4. Bakery 1917 (photo Facebook MMC)
The period between 1920 and 1935 can be indicated as a period of industrialization. A lot of industrial (infra) structures have been developed and built in this period, like the baker system. In image 3, the wooden factory has been built and it is visible that the building was divided over three floors. It is connected with both the bakery and mills building (image 4).

The sweets factory had a connection with both the bakery and mill building (image 1 and 2).

Text:

Images:
2. Connection sweets factory and mill building (screenshot video of 1927 from www.cinemateca.pt)
3. Baker system bakery (photo 1930s, provided by Docomomo)
4. First floor mill building with 22 mills (photo 1930s, provided by Docomomo)

In the bakery the baker system has been replaced in 1955 by two automatic ovens. Because of the need for a column-free space and the addition of a floor, which 'completes' the volume, they chose for a monolithic concrete structure. For this reason the old ovens in the middle part have been demolished.

Text:
1. Texts exhibited at Manutenção Militar Complex by Lisbon Municipality

Images:
1. Map of 1950 by unknown (own editing)
2. Automatic ovens bakery (photo provided by Docomomo)
During the Ultramar War, Manutenção Militar (MM) was very active in the provision of food for the troops. In this period the MM reached its maximum level of production: silos were built and the production process was modernized, especially in the mill building. The new machines asked for a specific concrete structure, for that reason most of the original floors were removed.

In 1975, independence of the former colonies, MM had to reduce the production. However, in the 1980s a warehouse has been added to the ensemble. This is probably done because the products were not shipped directly anymore, but stored and supplied inland. In 2011 the complex officially closed most of the factories, of which the bakery was the last.
Modernization of the production process played a significant role in how the buildings became as they are right now. The production process is hereby strongly related to the military history, the spatial character of the buildings and site and it reflects the pragmatic attitude. The spatial character will not be discussed in this report, but will be explicitly addressed in the Architectural Analysis.
RESEARCH QUESTION
Where is the Milling situated within the MMC and how does its interior and exterior look like?
The Milling is one of the buildings situated in the middle of the MMC and consists of multiple building parts.
THE MILLING
OVERVIEW - CIRCULATION - CHARACTER

Overview interior
These are some images of the interior of the Milling. Notable are the many machines and the large spaces in which they stand. In the different building parts the interior through-out the building is very different, showing different construction techniques, materials and techniques.

1, 3, and 7: Machines and spaces in build-
ing part 18
2: Smaller Silo's in building part 18
4, 5, and 6: Machines and spaces in building part 20
8: Larger Silo's in building part 20

Photos
1 - 2 - 3 Hielkje Zijlstra
4 - 5 - 6 - 8 - 9 Noelle Dooper
7 Daan Masmeijer

Overview exterior
These are some images of the exterior of the Milling. From the outside the different building parts are visible in the facade ending with a high concrete construction on one side and a lower closed construction on the other side.

1, 3 and 5: Building part 18
2, 6 and 7: Building part 19
4: Aerial photo of the whole Milling

Photos
1 - 3 - 5 Hielkje Zijlstra
2 - 4 - 6 - 7 Noelle Dooper
In addition to these drawings, there are also cross sections available in DWG of each building part.

<table>
<thead>
<tr>
<th>Building</th>
<th>Total Surface Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>BK-City</td>
<td>36,400 m²</td>
</tr>
<tr>
<td>Library TU Delft</td>
<td>15,000 m²</td>
</tr>
</tbody>
</table>

1. From: http://www.braaksma-roos.nl/projecten/herbestemming/bkcity/
2. From: http://www.mecanoo.nl/Projects/project/27/Library-Delft-University-of-Technology/delft

**Notes:**
- Total Surface Area: 50,368 m²
- Total Surface Area Ensemble: 104,110 m²

**Dimensions:**
- 9.65 x 13.15
- 5.40 x 13.15
- 13.15 x 13.15
- 29.20
- 33.95 x 11.90
- 3.85 x 11.90
- 16.70 x 11.90
- 16.30 x 11.90

**Areas:**
- Library TU Delft: 15,000 m²
- BK-City: 36,400 m²
Production oriented functions.

The functions within both buildings are production oriented, which means that the functions are placed following the production process of the flowers and bread discussed earlier. For the Milling, the two main functions are production and storage.
How is the circulation throughout the building arranged?
The Milling has several entrances which are needed for all its different building parts. The main entrance in the middle is much wider and marked by a small canopy roof (photo 1). Some of the entrances are followed by stairs indicating that these were used by people and not for transporting the products. The products left the building via slides (photo 2) or large elevators ending immediately at street level.
The circulation of the people through the Milling is determined by the machinery within the space. People have to move around the machinery to operate the machinery, so taking away the machinery would influence the circulation.

The circulation within the Milling is destined for specific building parts. This means that people enter the building knowing in which part they have to be in as it is mostly impossible to move from one part to the other. Therefore, walking through the Milling, people can experience different dead ends. This is probably mainly due to the later added building parts and the different functions in the production process in each part.

People

Legend

- Internal corridor
- Vertical circulation
- Machinery
- Building part 1 separated by circulation
- Building part 2 separated by circulation
- Building part 3 separated by circulation
- Ground Floor - 1:500
- Second Floor +7.00 - 1:500
- Section - 1:500

Research and Analysis
1. Slide on which the flour bags exit the Milling.
2, 7 and 8. Milling machines on each floor producing a finer flour transporting it through tubes to the next milling process. 
3 and 4. Slide within the warehouse part of the building where the flour was bagged and stored. The slide transports the flour bags from floor to floor.
5. Chart showing the production process within the Milling.
6. The smaller Silo’s at the beginning of the production process in which the grain was stored.

Photos
1 - 2 - 3 - 4 Noelle Dooper
5 - 6 - 7 - 8 Hielkje Zijlstra

Products
As the Milling is a factory producing flour from grains the product has a specific circulation through the building. Each step in the process moves through the whole building.

Separate processes
Overall process

Production Process in the Milling
RESEARCH QUESTION
How can the character of the Milling be defined?

CHARACTER

Machines within the Milling Building
Photo: Hielke Zijlstra
The facade of the Milling is a mix of a variety of different elements and styles. On one side there are large concrete industrial silo parts and on the other a more monumental cream/red coloured part.

Over time layering of different facade elements. As discussed earlier in the history part, to become the building it is today, the Milling went through a couple of massive changes. That is why the building contains different parts that can not aesthetically relate to each other. Minutes (change took place at the end parts of the building) have left the millhouse in its ‘original’ state.

During the further analysis of the facade the middle part of the building will be an interesting focus point due to its connection with the different facade parts of the building that changed drastically over the years.

While putting the north and south facade next to each other it is noticeable that the south side is more closed than the north side. Another noticeable aspect is that the north side (ground floor) contains large 3,4 m wide open windows, compared to the 1,3 m wide windows of the south side. Windows of the north side have a recurrence of two windows, whereas the south contains only one.

Difference in facade openings due to building climate of the interior. This provokes the assumption that the heat production of the interior requires a more cooled environment, thus that is why there is a difference in amount of daylight (and heat) that comes from the windows. Another argument for this assumption is that the wall contains a thickness of approximately 1,5 m. These thick walls create an ideal cooling environment. But the thickness could also be in combination with the load bearing structure of the facade, which is discussed more in depth in the Technical report.

Research and Analysis
THE MILLING
OVERVIEW - CIRCULATION

Façades

O T HE

Plaster Cream/Dark Red

roof element
Concrete

M - Daylight -
ILL - CIRCULATION -

Space

-CHARACTER-

Corrugated iron framework
Wooden window frames
White plaster
Ceramic tiles
Wooden window frames
Corrugated window glass

Another thing that was noticeable within this study was the use of colour in the facade which shows that the skin follows the functions concludes that the inside interior within materialization, facade openings, structure defines the facade.

The facade of the silo shows a concrete structure to the outside world which creates this industrial vibe.

Looking at the interior materialisation of the mill it can be said that the skin and the interior follows the function because the entrance contains the main entrance to the mill building. The entrance is designed in a way that it stands out in the colour of the building. This again, in combination with the daylight, functions concludes that the inside interior within materialization, facade openings, structure defines the facade.

Another thing that was noticeable within this study was the use of colour in the facade which shows that the skin follows the functions concludes that the inside interior within materialization, facade openings, structure defines the facade.

This again, in combination with the daylight, functions concludes that the inside interior within materialization, facade openings, structure defines the facade.

The way these façades are framed by looking at the exterior materialisation, facade openings, structure defines the facade. The roof of the building contains a concrete roof frame with a light corrugated plate structure.

Taking a look at the exterior materialisation, facade openings, structure defines the facade.

When day plays a part in reconstraining the interior of the building it is the materialisation of the interior that gives lustre to the exterior and vice versa. For the two large silos that can be situated in the external material of a factory, with vision and frameless sliding curtains consisting of glass and PVC window frames.

The exterior and interior of the other part of the milling contains a more diverse material palette as in the interior any plastic, special edition frames are used that is in combination with the ground floor windows. These windows and doors are made for the most part of glass and a plastic plate structure.

The roof element consists of a concrete roof frame with a light iron open plate structure.

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The roof of the building contains a concrete roof frame with a light iron open plate structure.

The roof contains a concrete roof frame with a light iron open plate structure.

When day plays a part in reconstraining the interior of the building it is the materialisation of the interior that gives lustre to the exterior and vice versa. For the two large silos that can be situated in the external material of a factory, with vision and frameless sliding curtains consisting of glass and PVC window frames.

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What also plays a part in explaining the character of the building is the materialisation of the exterior and interior.

Another thing that was noticeable within this study was the use of colour in the facade which shows that the skin follows the functions concludes that the inside interior within materialization, facade openings, structure defines the facade.

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Daylight function oriented

The left page shows the daylight study of the facade view from the outside. As they remain mostly closed, causing a fully isolated facade view, the outside.

Daylight here is not necessary and wanted so they remain mostly closed, causing a fully isolated facade view, the outside.

Studying the amount of daylight that comes into the interior strengthens the assumptions made earlier regarding the Milling function oriented façades. These schemes also show that the amount of daylight that goes through the façade is related to the function that is behind the centre of the floorplan which contains the small silo. Here it is noticeable that the machines are placed in the middle part and the small silo. Here it is completely shut down from daylight due to the fact that the function does not require the centre of the floorplan which contains the small silo. Here it is completely shut down from daylight due to the fact that the function does not require.

The amount of daylight that comes into the interior has a strong influence on the way people experience a space. That is why a thorough understanding of the amount of daylight that enters the interior is important. We have to consider, if it can be taken into account while changing the interior for a future

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Research and Analysis

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The atmosphere the amount of daylight creates in the middle part of the Milling, is a mixture of two types of atmospheres. Within the floorplan it can be divided in three strokes. Two strokes contain this bright open atmosphere and are the ones next to the windows. The other atmosphere is this closed, dark, more intimate atmosphere that can be found in the middle stroke where the machines are. This division comes back in all the three levels of the middle part.

But if you would take away the machines, the space will be one whole with just light and dark spots.

Layering of atmospheres within one space.

The two large silos contain a dominating closed and dark atmosphere. Which is straightforward in the storage silo part due to its function. But the silo (facing the square with the weird corner) contains a more lighter atmosphere due to the function mix of storage and production. Also this silo contains more potential for opening up the facade due to its construction (more detailed information about facades can be found in the technical report).
The milling room is the last stage in the milling process before packing. The space can be divided into two functional zones: the circulation space (see previous page) and the production space.

Machines: The production space is defined by the machines and their infrastructure. Especially the pipes/tubes create a chaotic atmosphere where machines are moving in a chaotic manner.

Light: High windows provide enough light, but not a visual relation with outside.

Space (without machines): The space is linear and dynamic defined by the rhythm of the construction.

Layers: The walls date from the original structure. The newer concrete beams are supported by the original structure as separate entity.

Colours: Monotone
**THE MILLING**
**OVERVIEW - CIRCULATION - CHARACTER**

**Space concept with machines**

**Conclusion:** In this space machines dust collectors are one of the first steps in the milling process. The machines are suspended from a separate steel construction.

**Machines:** The machines are dominant, and create a strong linear space.

**Light:** The windows create a light interior.

**Space (without machines):** The space is linear in one direction. Without the machines the height of the room gets a structural expression due to the steel trusses.

**Layers:** The walls and construction date from the original structure. Assumed is that the floor is added later on.

**Colours:** The wood and painted steel give this space a warmer character.

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**Space concept without machines**

**Measurements:** space

**Conclusion:** This space is part of the (re)construction in the 70s. The machines are engines to power the mills.

**Machines:** The machines have a dominant impact on the ceiling, but not on the spatial concept.

**Light:** The windows are positioned high, just above street-level, and only on one side of the space. The space is thus only luminous on one side.

**Space (without machines):** The space is linear in one dominant direction, defined by the column construction.

**Layers:** The walls and construction date from the original structure. Assumed to be fixed the floor is from the construction.

**Colours:** Monotone
The tower next to the silo’s was used for packing and added in the 70s. The machines were used for packaging in the mill’s operation.

Machines:
The still present machines seem to be placed at random, and do not have a relation with the construction. Some machines are placed in front of the windows and are highlighted by the illumination from behind.

Light:
The windows on both façades create a bright and comfortable space.

Space (without machines):
The construction creates no dominant direction, but due to the windows.

Layers:
All visible structures are from the same era.

Colours:
Monotone

The room above the silo’s is used as distribution space for the silos.

Machines:
The pipes have no relation to the concrete construction.

Light:
The little windows provide light, but there is no strong visual connection with outside.

Space (without machines):
The space has no dominant direction.

Layers:
All visible structures are from the same era.

Colours:
Monotone
THE MILLING
OVERVIEW - CIRCULATION
CHARACTER

Space with machines

Space concept with machines

Space without machines

Measurements space

Conclusion:
The space is part of the original construction, and was reconstructed in the 70s. Assumed to be the original silos.

Machines:
The space is static and has no dominant direction. The space is defined by the solidity of the silos, low dynamic ceiling, creating a cramped atmosphere.

Layers:
The concrete silos date from the 70s and are connected to the original structure and original distribution system.

Colours:
There is a contrast between the cold white stucco on the silos, walls, bare concrete floors and the older wooden windows, steel distribution belts.
OVERVIEW

RESEARCH QUESTION

Where is the Bakery situated within the MMC and how does its interior and exterior look like?
THE BAKERY  
OVERVIEW  |  CIRCULATION  |  CHARACTER

Situation  |  Interior  |  Exterior  |  Drawings  |  Function

The Bakery is one of the buildings located in the middle of the MMC and consists of multiple building parts.
Overview Interior

These are some images of the interior of the Bakery. Within the Bakery each building part shows a different way to store and process the dough. Mostly large machines or large open spaces.

1. Building part 16.
2. The old ovens.
3. Staircase to offices.
4 and 5. The kneading and weighing department.
6. First floor.
7. Cookie factory in building part 17.

Photos
1 - 2 - 4 - 6: Hielkje Zijlstra
3: Noelle Dooper
5 - 7 - 8 - 9: Alessandro Scalisi

Overview Exterior

These are some images of the exterior of the Bakery. From the outside the different building parts are visible in the facade. Building 17 is a cookie factory. Buildings 16 and 17 are joined to each other by a passage on the ground floor.

1. Entrance of building part 17.
2. Building 16.
4. Aerial photo of the Bakery.
6. Facade of building part 17.
7. The passage between building 16 and 17.

Photos
1: Hielkje Zijlstra
2 - 3 - 4 - 6: Noelle Dooper
5: Hielkje Zijlstra
7 - 8 - 9: Alessandro Scalisi
In addition to these drawings, there are also cross sections available in DWG of each building part.
Production oriented functions.

The functions within the Bakery and Cookie factory are program oriented. This means that the functions and places following the production process are all the spaces used for the various production processes. In the case of the Bakery the production process is the production of bread and pastries. Therefore the most functions are production and design. And are placed following the production process. The functions can be divided into production and storage areas.

Source images:
- Cookie factory production
  Docomomo, Lisbon 2016
- Bakery storage
  Hielkje Zijlstra, Lisbon September 2016
CIRCULATION

RESEARCH QUESTION

How is the circulation throughout the building arranged?
The Bakery has several entrances which are important for all the different parts of the building. The main entrance (photo 5) is located on the South-West facade which is the most representative facade of the Bakery. The North-East facade on the other hand is the main entrance for the Cookie factory (photo 4) and mostly marked by the large canopy roofs. As this entrance is used for products the canopy roofs are to ensure that the products stay dry when loading trucks. Some of the entrances are followed by stairs (e.g. photo 7) indicating that these were used by people and not for transporting the products. The products left the building via slides (photo 2) or via an entrance at street level.
The circulation of people through the Bakery is determined by the machinery within the space. People have to move around the machinery, so taking away the machinery would influence the circulation.

The circulation within the Bakery is destined for specific building parts. This means that people enter the building knowing in which part they have to be as it is mostly impossible to move from one building part to the other. Only building part 16a and 17 are connected on the first floor. Therefore, walking through the building people can experience multiple dead ends, which is mostly due to later added building parts and the different functions in each part.
The building named the Bakery produces bread and cookies. These two production processes are separated into two buildings: building part 16 and 17. Within these buildings the production process is logically arranged in a chain of actions and spaces. Starting with the Silos in the middle building part 16a where the flour is stored. So the production in the whole building starts from within and from there spreads out into two chains of production: bread and cookies.
How can the character of the Bakery be defined?
The Bakery consists of four different façades, the four main are the bakery and the cookie factory which can be separated through the two facades in between the Bakeries and the cookie factory. The two facades represent the Bakery itself and the cookie factory. Just like the Milling the Bakery contains a mixture of different elements, such as the two different coloured facades and the vertical concrete element in the middle which is a silo. Besides that the building contains a bridge that is attached to the Milling but does not contain a internal connection with the building.

Over time layering of different facade elements.

Referring back to the History part of this report, the Bakery went, just like the Milling, through a series of changes which are visible on the outside of the building. For example, the facade elements have been changed over time as well as the windows and the bridge. What is noticeable is that the two facades contain the same repeating elements, such as the window frames and the vertical concrete elements.
The Bakery, just like the Milling, went through a lot of changes since the time it was build. The changes have been significant to the building's function, and it is interesting to see how these changes have affected the facade of the bakery. What is interesting to see these changes also play a role in the facade today. Selecting the facade is not restricted to the functions of the facade, but also based on the aesthetics. In this case, the facade is constructed this way for aesthetic reasons and to point out the main functions that are unique for the building. The facade here contains much more details and shows window elements that are not found in any other building.

Looking at the functions behind the west facade, it becomes clear that the facade is constructed for aesthetic reasons and to point out the main functions that are unique for the building. The facade here contains much more details and shows window elements that are not found in any other building.

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What is interesting about the Bakery and Cookie factory is their repetitive facade that is made up of similar elements. In the case of the Bakery and Cookie factory, these elements are small repetitive windows that all have a width of 1.40 m and these concrete columns that stick out of the facade. Because this is a repetitive element, only one facade element is drawn for the whole building.

Repetitiveness in the facade.
The use of materialisation, colour and decorative elements in the facade is quite related to the one of the Milling. The main three materials within the exterior are plaster, wooden window frames and glass. Although the roof contains roof tiles.

The repetitive facade element and the constant use of the same material assumes, from a human perspective, that the building is one whole, despite the different use of colour and the silo in between. It can be said that this aspect contributes to defining the character of this building.

Looking at the interior materialisation it contains the same three materials as the exterior but with the addition of tiles. The use of tiles is common in the interior of old industrial buildings. Which again proves the pragmatic character of the building. The colours that are used here are white plaster and cream/white tiles.

Source images:
Safety matches factory, Zilina Slovakia (1915)

St. Petersburg Russia (1937)

Textile factory Russia

Factory Moscow

Just like in the Milling, studying the exterior in relation to the interior while focussing on materialisation, facade openings, daylight and structure helps to understand the character of the facade.
That falls into an interior can have a strong influence on the way people experience the factory, and the amount of daylight present in the area is surrounding, as can be taken into account while choosing the location for a space surrounding.

### Daylight function oriented

The Bakery has a width of approximately 22 m which means that roughly half of the area is well-lit by daylight. The less XY oriented walls of the Bakery, are X-oriented on the edges that do not require daylight. Besides this, functions such as offices, managers, and bathrooms are located to provide the best light. The rest of the illumination is provided by artificial lighting, in the X-oriented walls of the Bakery to ensure proper lighting at all times.

It is important to note the tasks that require a significant amount of daylight on the west side.
The atmosphere within the Bakery can be characterised by bright and open spaces with large machines in the space, as well as bright daylight in the areas. This is particularly noticeable in the middle of the Bakery, where the facade instead of in the middle or in the large machines in the Bakery are put next to large machines and an intimate space, which is different from the Cookie factory. This also happened in the Cookie factory, and contains lots of daylight in the areas where the large machines in the space it still feels less like an intimate space, which is different from the Cookie factory. What is interesting to mention here is that the facade where the bread production happened.

The bread production happened.

The atmosphere in the Milling was characterised as bright and open. Even with the machines in the space, a bright daylight in the areas where the large machines in the space made it feel less like an intimate space, which is different from the Cookie factory. This also happened in the Cookie factory, and contains lots of daylight in the areas where the large machines in the space it still feels less like an intimate space, which is different from the Cookie factory. What is interesting to mention here is that the facade where the bread production happened.
Space with machines

Space concept with machines

Space concept without machines

Measurements space

Conclusion
The character of the room is determined by the slim construction, the painted tiles, ovens, and wooden baking tools. This gives the room a representative character.

Machines: The only machines in this room are the old ovens with the painted tiles which tells the story of the Bakery and are a real reminiscence of the past activity. Giving this space a sort of grandeur.

Light: The space has large windows to give the room its daylight and also some curtains making this part of the Bakery seem more representative and formal.

Space (without machines): The only machines to take out would be the old ovens but this might be a challenge as they have a structural purpose in the Bakery. The ovens also do not interrupt the spatial character of the space which is linear as the columns guide the visitor from the entrance to the next space.

Layers: The whole space really emphasize the past importance of the Bakery creating this rustic atmosphere.

Colours: This space is very colourful with its painted tiles, shiny reddish flooring, and red curtains. Giving the space a warm atmosphere.

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Layers: The whole space really emphasize the past importance of the Bakery creating this rustic atmosphere.

Colours: The colours of the space are defined by yellowish tiles on the wall and a rather dark roof with its construction showing.
Space with machines

Space without machines

The large area used to be filled with two large ovens. Now only one oven is left and you can still see the connection with the second floor. When taking away the last oven the space would be more defined by the new concrete construction giving the room a rigid and heavy character.

Machines:
The oven which is still there brings dynamics to the space especially with the connection to the upper floor. It also emphasizes the horizontal character and the length of the space.

Light:
There are windows on one side of the space. The concrete structure is preventing a clear view outside, still enough daylight enters the space.

Space (without machines):
The rhythm of the concrete columns define the space which now has a less defined direction.

Layers:
The walls date from the original structure. The newer concrete structure is placed within the original space as separate entity.

Colours:
Monotone

Measurements:
2.9, 6.85, 1.5, 8, 1.9, 1.2

THE BAKERY
OVERVIEW - CIRCULATION - CHARACTER
Facades - Daylight - Space - Conclusion

Research and Analysis 202
Space concept with machines

Space concept without machines

Space with machines

Measurements space

Catalogue: Monotone

16,4 m

12,4 m

Conclusions:
The space is defined by a slim construction and some loose objects placed randomly on the floor. The tiled flooring and obvious purpose for baking activities give the space a dynamic and hygienic character.

Machines:
Most of the machines are loose objects which can be easily moved giving the space a more dynamic and working character.

Light:
Windows bring in light from one side of the space while the other side ends in the passage in the middle of the building.

Space (without machines):
Taking away the machines the slim construction will define the direction in the space.

Layers:
The structure is original showing the detailed columns while the flooring is a newer addition which shows the layers within the space.

Catalogue:
Monotone