L’Usine Électrique, a factory for knowledge

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Introduction

In this graduation report I collected the work of a year long graduation project in the master of architecture at the TU Delft. The project consists of the transformation of an old electricity factory into a library. The former factory is located at the Canal Saint Martin in the North East of Paris. A former industrial area that has become more and more residential.

This graduation report contains a position paper, analysis, research and gives an overview of the design process, the methods I have used and the design itself. In a reflection I will look back upon my graduation project. The process had many different phases and aspects starting with an analysis and ending in an architectural design.

In the first phase of the graduation project a position paper and graduation paper were two written ways of defining what I was working on and in what direction I would go. It is now, in the endphase, interesting to look back and see if my results live up to the proposed research and process.

This report will start with the position paper as it summarizes the goal of the studio and the issues that were to be dealt with. The position paper was a separate assignment that was written in the beginning of the studio. It also addresses the phenomenon of typology as I decided to research this more for my position paper.

This report continues with the analysis on the area and building, based on the analysis report that I made before. As I decided to design a library, I formulated another research on what the library of the future is. As society is changing and digitilazing the library as a palace of books may not be tenable.

In the chapter on the process a series of sketches show how the project developed, and I analyse and describe the design methods I have used. After this the actual design for the building and its context will be explained through text and drawings. The last chapter is the reflection upon the whole project and the stated goals and research questions. At the end of the report in the appendices, an overview of all drawings explaining the project can be found.
INTRODUCTION: For my graduation project I participate in the RMIT studio Canal Saint Martin. This studio concerns the north east of Paris, a former industrial area that is currently in transition. Within the Faculty of Architecture of the TU Delft, RMIT is the chair that focuses on re-use of existing buildings through Modification, Intervention and Transformation with the goal to preserve and re-activate built heritage. This position paper will address the problem of vacant heritage and its relevance. The content and issues of the RMIT Canal Saint Martin studio will be discussed. Based on these issues I will position myself in the field of architecture and formulate a research question that is connected to the theoretical field of typology and its relation to the studio.

PROBLEM: In the current field of the architectural discipline, a shift in the design assignment has taken place. In former times, cities where expanding and construction would often take place on empty plots on the edges of the city, where new typologies were developed as cities grew larger. Nowadays numerous cities in metropolitan areas have reached their limits, and municipalities search for intensification and densification within the city. Design assignments are very multiform, and address more and more construction within enclosed plots or working in existing buildings. A tabula rasa does not exist, as architecture is always liable to its context. But in RMIT this context gets a more tangible character because the assignment concerns existing buildings. Understanding the history and identifying the characteristics of these buildings are important to design solutions that respect both the existing and make way for a new function.

RELEVANCE: Under the influence of economics, politics and cultural factors, society changes. Transitions take place in cities, and areas and buildings within them no longer live up to the demands of society. Upon these changing demands, many buildings lose their function and are abandoned. The
result is a large amount of vacant heritage. At the Venice Architecture Biennale 2010 RAAAF (Rietveld Architecture-Art-Affordances) portrayed the amount of unoccupied buildings in the Netherlands through the exhibition Vacant NL. In a pavilion, models of all vacant buildings of different types in the Netherlands are shown, churches, offices, factories, warehouses, etc. This model illustrates the amount of Dutch vacant heritage, but it can represent the vacant heritage of many countries in the world. The issue of how to deal with this heritage is very relevant nowadays. Society increasingly started appreciating these buildings. In the field of preservation more sites are being protected and appointed monuments, like the UNESCO world heritage. While RAAAF showed the scale of the vacant heritage problem, at the same Biennale Koolhaas criticizes the current policy of preservation through the exhibition Chronocaos. He blames preservationists for being over controlling and selective on what part of the past is worth saving and what can be demolished, as they “rage to eliminate the evidence of the postwar period of architecture as a social project.” Koolhaas warns us, if we restore back to an ideal and leave out the more difficult chapters in history, those will be lost and preservation will become simultaneous, “destroying any sense of a linear evolution in time.”

CHALLENGE: In this discussion lies a challenge for the architect, to shape the new future of a building and intervene in the so called evolutionary timeline of this building. A danger lies in an abundance of rules and bureaucracy, protecting the heritage but simultaneously impeding the possibilities. The challenge I find in dealing with built heritage is how adaptations can make buildings usable again while at the same time maintain their character and values. By identifying the elements that give a building its authenticity and by placing it in a broader perspective, the specific character can be revealed. Our cities are constantly changing and transforming, influenced by the people that occupy them. Old buildings play a role in the history of an area and refer to a past. Their reference to the past, to our past, is why they should be kept. But how should we deal with them in terms of forms of preservation?

POSITION: In the diverse field of architecture many positions can be taken, and discourse and exchange of theory among these positions enrich architecture in general. In the discussion on preservation I sympathize with Koolhaas’ statement that we should not neglect a specific episode as all chapters of history are important. We cannot estimate the opinion and possible value of them in the future. But his plea also goes in the direction of less preservation and more tabula rasa, a point on which I disagree. Buildings are as stones, construc
ting the cities or villages in which they lie, together forming its past, current and potentially their future, if we decide to keep them. Maybe it’s a nostalgic perspective, but when preservation is possible I prefer this over cutting in the existing city, as it will erase a part of its history.

Adapting a building for a new use is, in my opinion, shaping a new chapter, forming the future for this building. Different approaches are possible. Some plea for a continuity of the existing, others for a break with the existing. My own approach lies in-between. I think a search for a dialogue between old and new results in architecture that provides new possibilities of use for the future but also preserves the existing. Important is that the new design answers to the context, that it ‘fits’ . Since we add a new chapter to the timeline of evolution, the new and the old should be in balance, and new must be recognizable as new. Depending on the project, we should not be too careful or too modest, old and new are both important as they hopefully have a long lifespan.

STUDIO

The studio Canal Saint Martin is located in Paris. Paris is a diverse and dense city, famous for its monuments, art, culture, fashion, etc. The city was ruled by kings for a long time and an important place for trade, politics, religion and art. In 1789 the French Revolution was the start of a new democratic society. In the 19th century the process of industrialization led to expansion and a huge increase of the population. New infrastructures and building typologies changed the city and life inside it. Haussmann’s renovation opened up the old centre, improving connections and creating monumental axes. The focus of urban planning has been on the centre for long, resulting in neglect of the suburbs (banlieues) that surround Paris.

The RMIT studio concerns the north east of Paris and its suburbs. This area is characterized by its industrial past. An important impulse for the former rural area was the construction of canals and railways in the beginning of the 19th century. This improved transportation possibilities and industries increased while the city expanded. For a century the industries flourished and the area was inhabited by a growing population. A large number of immigrants was part of this poor working class.

In post-war times the canals lost significance as they could not compete with transport over roads. Many of the industries left, abandoning numerous warehouses and factories and leading to high unemployment. Bad housing conditions and social problems attracted attention in the 80ies and some social housing was developed in the areas, but mostly within the Peripherique, Paris’ ringroad. This Peripherique, divided the banlieues from the centre. The infrastructures as canals and the huge surfaces occupied by the railway where a necessary condition for the industrialization of the area, but also form barriers dividing the areas. They were badly connected to public transport and lacked facilities. Issues as high unemployment, low education, criminality, etc. were problems in these neighbourhoods.

Over the past years these problems have drawn the attention of the city of Paris and currently plans for urban renewal in the area are developed. The city is improving public transport connections, and transforming areas into housing and business districts. The numerous industrial heritage present in the area symbolizes its industrial past and among them are special examples of specific typologies or building styles. Their preservation is important for the future as they resemble the industrial past, and future architects can learn from them. As Jo Coenen states in Noties a special building can be kept by placing a new function in it, the challenge is then how this can be done best with respect for the existing qualities. 

The area along the canal Saint Martin in the 10th arrondissement has only little industrial buildings left. The canal runs from the old monumental city towards the Peripherique and its surrounding banlieues. A former electricity factory from 1895 is an eye-catching industrial monument along the canal. The building has a very specific factory typology that already underwent different transformations through the years. The character and use of the canal has become more recreational after an industrial period. The question rises what role this former factory can play for the public space of the canal and the neighborhood as one of the last monuments in this industrial typology. Another question is how this typology can be transformed to house a new use without affecting its industrial character.

RESEARCH QUESTION

Typology is an interesting phenomenon when it comes to transformation, since the typology, as we define it now, changes by transforming the building. Typology in relation to the field of transformation leaves us with a number of question
marks. The different definitions or interpretations of typology seem to be insufficient for transformations, leading to the following research question: Is transformation the occasion on which the definition of typology should be reformulated and how should this be done?  

**THEORY: on typology and transformation**

When I went deeper into the episteme of typology, I found the numerous different definitions given of the concept and their change through time. As Moneo states type can come priori, when addressing a design problem you begin with type and this type develops during a process where at the end a unique architecture is the result. The question then rises what role typology plays when we are transforming an existing building that is already a specific type. The starting point is then the unique architecture, instead of the rough type. Why a theoretical field? If we look at the definition of architecture, the dictionary states that architecture is the ‘art and science of designing and erecting buildings’. Science implies that there is a theoretical base, and that we can practice science. Architecture is a combination of art and science, with art defined as the quality, production, expression, or realm, according to aesthetic principles, of what is beautiful, appealing, or of more than ordinary significance. This means there is subjectivity to the idea of architecture. Besides this, architecture is utopian to a certain extent, as we are designing we are developing an image, a conception of what is to be copied or imitated exactly, as the idea of an element which should itself serve as the rule for the model. Where the model is more exact, type is more vague. This definition of type was linked to history and nature and was more related to form. Argan links this definition more to precedents from the field of architecture. For Rossi regarded as a type. An example is the corridor, by Rossi regarded as a type. When we relate this to the earlier definition of type where type and function are connected, it becomes interesting to see what interchangeable elements can be found within different building types and how this can influence the adaptability of a type.

Maybe the adaptation of the definition of type when considering transformation can be found in the direction Argan and Rossi propose. Their definition is not based on the connection between type and function or specific use. Or as an addition to Moneo’s view, since the start of a transformation is not a defining a rough type for a specific place, but already a ‘unique architecture’, that needs to be redefined to a new type. The search for an answer requires extensive research for which this paper does not offer the space. But we can conclude that the concept of typology when regarding existing buildings that are to be transformed, does not satisfy, thus typology could be redefined in relation to transformations.

**METHODOLOGY**

The goal is to solve the problem stated through a process of research, analysis, design, synthesis and reflection, resulting in a complete and well-composed design solution. Starting point was the research and analysis on different levels of scale of the past, current and future of the site that came forth from the studio, in order to create an awareness of the assignment and its setting. In the same period an inventory was made of architectural theory that relates to personal interests or issues brought forth in the studio. A synthesis between these elements formulates the problem and gives a direction for the creation of a design.
It offers a framework to test and reflect the steps made in the design process. Research is done by design and literature studies. I plan to use architectural theory to investigate some phenomena that relate to my design and program. Even though time for an extensive research is not available I see reading as an important aid for research and to formulate my own position in architecture. A theoretical background on the study into type can help during the design process. The importance of knowledge of type is defined by Argan as following: “Historical types are thought fundamental and constant. It is, therefore, essential to lay claim to all the experience matured in the past in order to be able to conceive forms in such a way that they will continue to be thought valid in the future.” The relation between typology and transformation can help in dealing with the existing building. All these methods should lead to a solid base upon which the design can be developed further into an urban, architectural and technological plan. In the final phase of the process reflection will be an important method to test if the problems encountered during the process are solved and if the aims have been reached, within the boundaries and framework formulated in the research and analysis.

LITERATURE
1. Meurs, P., during his lecture at the TU Delft on 6th of March 2014, as part of AR3A160 Lecture Series Research Methods.
6. Ibid. p.22
10. Lee, C.M. Ibid.
2. Research & Analysis

In this chapter I will summarize the most important findings of the analysis that I have done in the first half year of the project. Also I will conclude up on the research done during the design process.

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Paris

We all know Paris as the city of light, fashion, the Eifel Tower, and ‘chansons françaises’. As a large city in Europe it has an interesting and influential history that teaches us a lot about processes and problems a city goes through as it develops into a metropolis.

Founded by the Romans the city soon turned into an important place for trade, politics and religion. It was ruled by kings for a long time, all leaving their monuments in the city. The French Revolution was the start of a new democratic society influencing the rest of Europe. With the 19th century the process of industrialization led to huge growth and an increase of the population. New infrastructures and building typologies changed the city. Hausmann’s renovation opened up the old center, improving connections and creating monumental axes. Many immigrants from both the countryside and other countries came to the city, increasing the density. This led to numerous problems and bad housing conditions.

In the past the attention of the leaders was focused on the center of Paris, as this was the representative part while its outskirts where growing fast and were neglected. The ‘Boulevard Périphérique’, a highway that formed a ringroad around the center, was a physical barrier that meant the definite exclusion of the suburbs from the center. Many of these areas have been disadvantaged and turned into social problematic neighbourhoods with bad housing conditions.

Paris is nowadays famous for its monuments, art, culture, fashion, and so on. The Hausmannian boulevards and old streets are loved among all people. Still the center is surrounded by suburbs or ‘banlieues’ that have large amounts of people living in them but are badly connected and lack facilities. As most many metropoles Paris’ population is very multicultural and there is a lot of contrast between the different areas in the city. This is in terms of income, education, facilities, public transport, etc.

Over the past years the problems in the areas have drawn the attention of the city of Paris and currently there are a number of plans for urban renewal in the suburbs and problematic areas around the pheripherique. The city is improving public transport connections, and transforming areas into housing and business districts.

Paris Nord Est

The North East of Paris is an area that developed strongly since the 18th century. In those days a number of small villages was located in this agricultural area. They supplied Paris with food and were lay mostly along important routes. Three important international routes departed from Paris through the area. The old Roman road to the north, a route to Belgium (Flandre meaning Flemish) and a route to Germany to the east. In La Chapelle the French kings were buried. Paris expanded and from 1775 to 1810 a wall was constructed to maintain a new tax system. The ‘Fermiers généraux’, a toll wall, over all goods that entered the city, tax had to be paid. This generated a lot of trade and activity around the gates in this wall. The Rotonde de la Villette built by Ledoux is one of the few toll houses that still exists.

In the 19th century the canals and trainstations were constructed, giving the area another impulse besides the existing infrastructure of old roads. Industrialization took over the agriculture and activity along the roads and canals increased. Many warehouses, factories and workplaces were constructed. With this
increase of activity, the employment and population grew. The area was a place where the poorer working class lived between industrial activity.

As Paris expanded all villages within the newly constructed fortifications were annexed in 1860 and became a part of Paris. The Haussmann renovations led to a number of new boulevards and the coverage of a part of Canal Saint Martin. The périphérique would later be constructed upon the fortifications of 1860, creating, together with the railways, strong barriers between the city and its surrounding villages.

We can conclude that the industrial past has strongly influenced the character of North East Paris with the infrastructures as a strong mark and barrier. This also reflects on the population of the Paris Nord Est. It shows a large north african population, higher densities and lower education. The area is more poor, and ground prices are less high than in other parts of Paris. Also, we see a large number of unemployment, lower educated people, and a large number of immigrants. The origin of the population in the North East is mostly African. Closer to the center there is a large number of Chineze. Closer to the périphérique live more Maghrebis; Algerian, Moroccan, Libyan, Tunisian, etc.

With the railway selling ground, currently urban planners and architects are researching and designing plans for the northern part of the area to connect it better to the center and create more program. The numerous industrial heritage present in North East Paris area symbolizes its industrial past and among them are special examples of specific typologies or building styles. The question is now how we can deal with these buildings and give them a new future.

The Canals

When Napoleon rose to power in 1804 Paris had a very outdated water system. In those days the density in the city was very high and hygiene very low, leading to epidemics spreading fast. Napoleon assigned engineers to create the Canal L’Ourcq. It would supply Paris of “free and fresh water for every citizen”, sewage and improve transport possibilities. Its headwaters come from the north east, via the river Ourcq and canal l’Ourcq to the Bassin de la Villette. Because of the geographical situation all infrastructures were positioned between two hills. This is why the old roads are located there, but also the railway and the canals are located close to eachother.

The Canal l’Ourcq was finished first as it was the main water supply. Then the Canal Saint-Denis was opened in 1821 connecting the Bassin de la Villette and Canal l’Ourcq to the Seine. In 1825 the connection through the center opened, canal Saint-Martin. Besides fresh water, possibilities of transport over water had now been improved and would give an impulse to the area. Many goods were transported from and to the areas connected by the canals. The Bassin de la Villette and Port de l’Arsenal were ports where transshipment of goods was organized. The canals create a shortcut in the Seine that makes the route 12 kilometers shorter. The Canal Saint Denis covers a difference in height of 25 meters by a series of 9 locks.
In post-war times the popularity of the car grew. The canals could not compete with the railway and transport over road. In 1963 there were plans to fill up the canal and make a highway on top of it. The highway was part of a larger plan of highways that were to be constructed in the center. The one on top of Canal Saint Martin was supposed to connect the two airports of Le Bourget and Orly and it should have a capacity of 6000 vehicles per hour. The neighbourhood started protesting against these plans and in 1971 they were cancelled.

In the following years the commercial use of the canal diminished. Canal Saint Martin is now used for tourist boats and leisure. It has become an important public space in the north east of Paris. The Canal l’Ourcq and Saint Denis are still in use but less then in the past. As industries moved out of the city many industrial buildings along the canal where replaced with modernistic housing complexes. The function along the canal became more residential and in current days the canal is used more and more for recreation. The quais along Bassin de La Villette have been reorganized into pleasant public spaces with facilities for visitors, also part of a connection to Parc de La Villette in the North. But the Canal Saint Martin itself still looks quite the same and has a lot of car traffic and parking along it. Public spaces here can be strongly improved to fit the new recreational use of the canal.
The area

The Usine Electrique is positioned in the middle of the 10th arrondissement. An area that strongly industrialized with the construction of the canal and the trainstations. The wealthier population left. Many warehouses were constructed and travelers found their way to nightlife in theaters, cabaret and bars, where the 10th arrondissement was famous for. Density in the area was very high with a maximum in 1881, when it had 159,809 inhabitants. Currently the arrondissement has 88,850 inhabitants and is still dense.

In earlier times it was the edge of the city. The area was the dump for garbage, feces and carcasses. Also it was the place where people were hanged. It smelled and did not have a good reputation. The area became the location for different hospitals constructed outside city walls. First the Saint Lazare for leprosy, and since the 17th century the Hospital Saint-Louis, to quarantine Parisians during pest epidemics. A military hospital and 2 hospitals more were also developed. In 1780 a large tollwall was constructed around the city forming the new border of the area. The rotonda the la Villette was a toll building that was an entrance to the city. When the canals where constructed the area quickly changed. Along the canal industrial buildings like warehouses and factories on larger plots were constructed. When these industries left, a number of housing projects was developed in the area in postwar years. The area was marked as a ZAC, a redevelopment zone, and collective housing complexes were designed. These have modern typologies, higher buildings with large open spaces in between. Further north are more modern building typologies.

Currently the area is becoming more popular. The canal attracts many Parisians and tourists. The area is well connected by public transport. Metro- and buslines connect the area on the level of the city. The RER connects it to the region, and the SNCF connect it to the region, the country and the whole of Europe. Thanks to the two international trainstations, 800,000 people travel through the area on a daily basis.

In the north the Place de Stalingrad is an important junction of routes, in the south the Place de la Republique, dating back to the haussmannian city renovation. The arrondissement aims for limiting traffic and renovating housing and other architectural heritage in its borders.
If we compare the population of the 10th arrondissement to the Parisian, the people are relatively young and poor. Unemployment is high, with 11-19%. In the 20th century a large number of immigrants came to the arrondissement making its population multi-ethnic; mainly North-African, Indian, Turkish, and Chinese. The level of education is low. The lower prices in the area (compared to the center and south of Paris) currently the population is relatively young, culturally diverse and with many students, artists, and creatives.

Spatially the area shows an interesting diversity in its buildings. This is due to the transformation of an industrial area into an area more dominated by housing.

In the south west the buildings are older, they date back from the Haussmannian renovation (+-1850) or are older. The typical Haussmannian typology can be found on page 1. The houses where inhabited by different social classes, from the first floor for the richest to the attic for the poorest. The Hopital Saint Louis dates back to the 17th century and expanded recently (+-1980). Along the canal a number of transformations have taken place. Different housing buildings were constructed in post war times. In the north east we see the large modern housing complex, on the quai Jemmapes built by Jacques Labro in the 80ies. This collective housing complex has an inner park, public green spaces and sport facilities.

The photo on the bottom left shows a typical Haussmannian block with a lot of houses crammed on each other with very small patios and little outdoor space. The right photo shows the newer housing complex.

Due to a change of building regulations in the 60ies, it was allowed to build higher if a setback was made to allow enough daylight to enter the streets. The newer buildings on the quai are higher and have this setback that make the canal wider. Some of these buildings have a ‘front’ private garden, and on some places the pavement is wider or a little plaza is made.
Location

If we zoom more in on the area around the building we find mostly housing, and a number of educational facilities. Especially in the south west there is more commercial use of the plint. The area has a number of schools, for different ages and of different levels. The Ecole is the primary education for kids from 4-12, after this the College is the first part of secondary school. From 15-18 kids go the Lycee. After this an academic education is possible. All of these different schools for different ages can be found in this area.

A further study of the functions in the area is shown on the map on the right. There is a medical library on the location of a former military hospital, and a small public library in the east. The Hopital Saint Louis is an academic hospital, with 2500 employees. It has its administration and offices in the old monumental buildings. A modern expansion houses the actual hospital. More facilities like a chapel, a mediatheque and a research center can also be found on the plot. And there is a nice old garden.

In the division of parcels we see that the post war transformations and new housing complexes have led to a larger plot size. Also there are different alignment of the buildings along the canal. The map of the built and unbuilt shows that the newer housing complexes have large interior open spaces. The ‘wall’ along the quais of the canal is not continues but is opened by the presence of parks or entrances to buildingblocks.
The block of which the building is part, has three alleys penetrating the block. They are common in Paris, a ‘cul de sac’ or dead end street enables construction in the middle of the block to create more habitations, leading to a higher density. The other open areas are private gardens, courts and parkingplaces. At the side of the canal the open space is the terrain of Exacompta where trucks park, load and unload.

The road along the canal continuous to the north towards Place Stalingrad and has quite some traffic. Right behind the block lies the Hopital Saint Louis.

The bottom two photos show the building at the canal in the beginning of the 20th century, the building on the back right with the chimneys is the Usine Electrique. The second photo show the canal in current days. We see more construction and higher buildings. The factory is no longer visible. Trees have been planted, and the strip of asphalt for cars has been added, but the further lay out of the street is still very much the same.
The facades along the canal show a large diversity. On the west side the housing is dominant, the buildings correspond in height and style. On the east side of the canal where the Usine Electrique is located, the facades are more different. The formal facade of the Usine Electrique, currently in use by Exacompta, stands out strongly. The other buildings are smaller, and due to the open space of the company the facades form a very discontinuous total. The height, age, depth, materials, in these facades all differ.

The bottom row of photos show the activity that is seen along the building and the canal on regular days. Many people sit along the quai, to eat or drink something, chat, read a newspaper, etc. Next to the bridge there is a small park. Here we see different people sitting in the sun, among who is a group of homeless people that carry a mattress along on which they rest.

On the other side of the canal the skatepark is intensively used. Both kids as young ‘pro’ skaters were there stunting and filming each other. Next to the skate park is a basket field that is also intensively used during the day. The roads along the canal have quite some traffic, both pedestrians, bikes and cars. The large Exacompta trucks arrive frequently and they have to manoeuvre their big trucks backwards through the gates of the terrain of the company in order to load- and reload. On the water, mostly tourists boats pass by, the photo show a small boat of the municipality fishing garbage out of the water.

We can conclude that the block in which the building lies, is chaotic due to a large diversity of buildings regarding size, type, age, etc. Spatially the open terrains of Exacompta create a ‘hole’ in the facades that makes them discontinuous. This does offer a good view on the monumental Usine Electrique.

The public space along the canal is used intensively, but could be equipped better. Especially more places to sit along the canal miss.
West side of the canal


East side of the canal


The discontinuous facade shows the ‘hole’ in the facades along the canal. Exacompta’s buildings are placed on the back of the lot and maintains open terrain in front.

Large diversity in size of building volumes. The block is chaotic due to different heights, depths, alignment and open plots vs very dance plots.
On the Quai de Jemmapes 132-134 lies the Usine Electrique. An electricity factory that was constructed from 1895-1898 and is a monument since 1992. The architect of the building is Paul Friesé. He developed into a well known industrial architect during the late 19th century since he worked on different industrial buildings. He was thus the appropriate person to design this electricity factory. He would design a series of buildings related to electricity production and distribution, among which a number of substations, so called sous-stations, can be found. His work is appreciated as being remarkably renewing in terms of construction and architectural forms.

The building was constructed as an electrical powerplant driven by steam engines. The powerplant produced electricity that was distributed through north-east Paris. The Usine d’electrique is the only one with the 2 functions of steam engines and generators organized on top of each other. In normal factories they were organized besides each other. But there was not enough space on this plot.

Throughout time the building had different functions. The electricity factory became to polluting for the area. In 1926 the building was transformed and used to house a clothing factory. Parts of the building were changed and pieces were added.

Later the building was owned by a printing company, Exacompta-Clairefontaine, that grew into an internationally operating business. Currently they still use this building and other buildings adjacent along the quai for the production and management of the company.

The architectural Ouvre of Paul Friese contains many industrial buildings, but also housing and other. His style regarding industrial buildings could be linked to the dutch rationalism. But an industrialized version with more iron constructions. His constructions are all very logic and rational. Brick is used for subtle details, and he pays a lot of atten-
Research & Analysis

Paul Friesé was educated at the Ecole des Beaux Arts in Paris. He continued to work in this city and constructed many industrial buildings as companies rehired him after successful assignments. He designed many Sous-Stations but also two other electricity factories and buildings for the railway and metro company. He also designed a number of warehouses and housing projects.

L’usine électrique du Metropolitain Bercy, 1904

Paul Friesé
The Usine Electrique was constructed by the Compagnie Parisienne de l’Air Comprime. As the name Paris had an extensive system of compressed air that was sent through a network of tubes to move post, power machines, and actuating clocks on stations, etc. Paris was divided in sections that were supplied by different companies. The Compagnie Parisienne de l’Air Comprime decided to expand and produce electricity for the growing needs of the population. They bought the plot on the Quai de Jemmapes because of the proximity of the canal. This way there was sufficient water for the steamengines and the 140 tons of coal needed per day could be transported directly to the factory by boats.

The city of Paris was early in developing an extensive electrical system in the city. Since 1881 they started constructing electricity networks. These were used for lighting, the metro and industries. Also the richest people could afford to buy the electricity as private consumers. The bottom map shows the distribution of electricity in different sectors.

There were different companies active in the different sectors. The Compagnie Parisienne de l’air comprimé was active in the east. It was preferable to place the polluting electricity factories outside of the city but the technique to transport electricity was not yet developed enough to cover larger distances. This map dates from 1894. In the beginning of the 19th century this quickly changes and factories move out from the center. Sous-stations take over the distribution within the city but production is located further out.
Since the city of Paris only gave licenses for this type of industry for 18 years, they decided to build the building in four stages. The financial investments were related to what could be earned in this period. Eventually only half of the U-shaped design was constructed. When the building was constructed it was state of the art and regarded the largest and most modern electricity factory in France. It was part of the Exhibition Universelle of 1900.

After the First World War technical developments in the production of electricity and heavy air pollution by the chimneys became a problem as there were many complaints from the neighbourhood. This in combination with high taxes opposed by the city council of Paris made the factory move.

The building was transformed into a clothing factory. The coal elevator was removed from the tower and its height diminished, also the chimneys disappeared. On the back of the building an expansion was added. In a later period a building was added on the side where the original second wing was planned, completing the U-shape.
The building was never completely constructed as design- ed. But the building did developed and transformed through time. This page shows the phases and different building volumes and the order in which they were built.

The first part of the original design was finished in 1897-98. The bottom photo shows the complete factory operating. The machine hall has been finished and has 9 chimneys on top. Why the other part of the plan that would have created a symmetrical building was not constructed is not clear. This could have to do with financial problems, regulations, or protest from the neighbourhood connected to air pollution problems.

The building on the right side is following the form of the originally planned shape. These 'Ateliers' are built in 1950. A permit de construire from 1916 refers to a 2 storey high building on this address that stood here before the current building. It were ateliers for the Pinchart-Deny frères company producing engine parts.

Here the chimneys of the building already seem to have disappeared and the building is not called the 'Usine Électrique' but the Établissements Saderne. Also the crane for the coals that can be seen on the quai on an earlier picture is gone. Probably the picture was taken when the function of the building had already changed in the 1920's.
After the electricity company had moved out the building was transformed into a clothing factory. Many ateliers were needed for the workers, and in 1929 in the half of the former machine hall a number of floors were implemented and the roof was raised to house another floor.

The underground floor was expanded, a former water canal that ran around the building for condensation water was opened and became a part of the halls. The elevator tower (that exceeded building regulations with 7 meters) was removed as well as the chimneys.

There was also a 5 story building constructed next to the hall on the back of the plot, this appears to be done in the same period as the expansion of the machine halls.

During a transformation that was probably in the 70ies a garage was housed in the building and multiple floors and ramps were constructed in its interior. These ramps were removed when Exacompta, the current owner, moved into the building and changed it into a printing company.

The process of the production of electricity is shown here. The top floor of the building has generators with boilers. Heated by coal water is turned into steam. This steam moves to steam engines, turbines that create movement, (kinetic energy). With this energy a dynamo rotates, generating electricity, that is then led to an inductor and from there distributes to the city.
Normally the boilers and engines were organized next to each other on the same level. Due to the small plot and high ground prices the two functions are placed on top of each other here. As boilers could not be placed underneath engines because of safety restrictions (explosion) they are placed on top.

The upper hall for the boilers is 17.3 meters wide, this was the minimum width that was needed to fit in all the facilities that this process demands. For the hall beneath with the engines, a width of 14m was sufficient. The cantilevered volume on top is thus a consequence of functional organisation and regulations.

Coals would enter the building on a conveor belt underneath the building. Coal was unloaded from boats into a whole by an electric crane. It would then go up through the central tower and moved to the hall by another belt, and from there it was divided over the coal bunkers that are integrated with the columns. These funnels lead the coal to the floor below where workers would fire the boilers.

Water was taken from the canal and led through a canal around the building with entering and exiting water to exchange heat, and than to a reservoir in the basement. Trough pumps and filters the water is lead to a reservoir on the second floor from where it is transported to the boilers. The left over slag was stored in a container and brought to boats on the quais with cars moving on a rail.
The building has a very characteristic industrial expression thanks to its structure and materialization. The photographs taken during the construction give us a nice view on the structure of the building. Since the building had to house a large number of heavy machines, stock of coal and large water reservoirs, the construction had to be exceptionally strong. As an example, the ground floor pilars carry 414.000 kg each, and the round column 405.000 kg.

The building is mainly constructed out of masonry and iron. The type of stone used for the large structural pilars are typical for the Ile-de-France region. It is called Meulière (millstone). A quite porous red-brown stone that was used in combination with portland cement.

The structure is made of stone and wrought iron. The structural elements like floorbeams, roofbeams and columns in the facade are composed of different standard elements and connected with rivets. The round columns with ribs are made of cast iron.

The top 'house shaped' volume with the boilers, generators, coalbunkers and water reservoirs is constructed out of iron. The hall underneath is a combination of the stone pilars and cast iron columns and wrought iron beams.
The buildings on the courtyard with the supporting facilities is a skeleton of iron filled with brickwork in the facade. Also this building contains water reservoirs, elevators and coal transport, thus its structure has sufficient dimensions. The administrative building on the front is also a combination of iron and brickwork. The iron construction is very dominant in the expression of the building.
The facades show a difference in appearance connected to their function. The front building is a very representational building that fits in the haussmannian type of building we see quite often in Paris. The left part is an exception to this with the large glass and iron open fragment. Behind this open fragment are the battery rooms. The combination of materials can be seen here. The plint is made out of nature stone, on top of that are a red and a more brown yellow stone. The iron in the facade is light blue. The facade has a strong division in plains and lines following a classical proportions because of the different materials.

The engine hall that is at the back of the front building has a more industrial character than the front building because of the exterior iron structure. This part also shows a diversity of materials.

The bottom stones are the so called Meuliere, or millstone. The iron is light blue as in the front facade. The facade of the boiler hall on top of this has a section of red bricks with white safety doors in it. The section above that has brown yellow bricks. The pattern of the facade is a consequence of the coal containers that are placed on this floor. Therefore there are the diagonally sloped windowframes. The facade of the buildings on the other side in the court are more simplistic, since in the original design the building would have been constructed all around it they would be invisible from the street.
Conclusion & Problem statement

After an industrial period the area became more residential. There is a high density and people use the spaces along the canal for recreation. But the organisation of the canal is still very much dominated by cars, parking and does not facilitate this recreation. How can this be improved?

Industrial versus Recreational Use

The situation around the building is dominated by a number of buildings, sheds and parking from Exacompta. This leads to a discontinuous image of facades and a rather chaotic whole.

Also because newer buildings constructed in the ’80s have a setback in alignment that the factorybuildings don’t follow.

Discontinuous & Chaotic

The building was never finished according plan and transformations and adjacent buildings where constructed throughout the years, leading to an incoherent whole.

Interior walls were broken out and many floors were added leading to a loss of spacious quality and confined spaces.

Incoherent & Confined spaces
The library of the future

After the analysis of the location and the building the question arises what could be a suitable program for this building that can help solve the problems that are stated in the former chapter. The scheme on the right page collects the who, what and how linked to elements that came from the analysis.

WHAT TO DO WITH THIS BUILDING?

CONCLUSIONS ANALYSIS:
Who? High density, relatively young, students, multicultural, lower incomes, higher unemployment.
What? Housing, educational buildings, Gare de l'Est with 800,000 travelers a day.

MASTERPLAN:
Canal as connection between the center and banlieues
Canal as pleasant public space for recreation

BUILDING
Unique industrial monument in need of renovation
Special typology and eclectic iron architecture
Direct context chaotic with possibilities for new construction
Interior spaces with potential
As a start I analyzed different famous libraries through time to see how the typology and function develop and what elements are common. Also I made a timeline that shows what media was used in libraries (from papyrus scrolls to computers) and what the future role will be.
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 BC</td>
<td>Library of Alexandria, 3rd century BC</td>
</tr>
<tr>
<td>200 BC</td>
<td>Library of Ashurbanipal, 7th century BC</td>
</tr>
<tr>
<td>100 AD</td>
<td>Codex replaces rolls, easing re-reading and searching</td>
</tr>
<tr>
<td>500</td>
<td>From 5th century AD</td>
</tr>
<tr>
<td>1329</td>
<td>Invention of printing press by Johannes Gutenberg</td>
</tr>
<tr>
<td>1838</td>
<td>Bibliotheque St. Genevieve (Labrouste)</td>
</tr>
<tr>
<td>1914</td>
<td>Readingroom</td>
</tr>
<tr>
<td>1931</td>
<td>Viipuri Library (Alvar Aalto)</td>
</tr>
<tr>
<td>1941</td>
<td>Publication of The Library of Babel by Jorge Luis Borges</td>
</tr>
<tr>
<td>1941</td>
<td>Bibliothèque Nationale de Mitterand (Perrault)</td>
</tr>
<tr>
<td>1971</td>
<td>Exeter Library, Louis Kahn</td>
</tr>
<tr>
<td>1984</td>
<td>80ies, 90ies: Development of computer and internet creates a new information medium competing with the book.</td>
</tr>
<tr>
<td>1994</td>
<td>Bibliothèque Nationale de Mitterand (Perrault)</td>
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<table>
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<tr>
<th>Libraries evolution</th>
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<tr>
<td>Library of Alexandria, 3rd century BC (Papyrus)</td>
</tr>
<tr>
<td>Library of Ashurbanipal, 7th century BC (Clay tablets)</td>
</tr>
<tr>
<td>Codex replaces rolls, easing re-reading and searching</td>
</tr>
<tr>
<td>From 5th century AD (Handwritten books)</td>
</tr>
<tr>
<td>Invention of printing press by Johannes Gutenberg (Printing press)</td>
</tr>
<tr>
<td>Readingroom (Medici family showed they belonged to the intelligentsia)</td>
</tr>
<tr>
<td>Biblioteca Medicea Laurenziana (Michelangelo) (Enlightenment of the people through accessible knowledge)</td>
</tr>
<tr>
<td>Bibliothèque Nationale (Boullée) (Enlightenment of the people through accessible knowledge)</td>
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<tr>
<th>Bibliothèque Nationale de Mitterand (Perrault)</th>
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"A temple of knowledge and space for contemplation"
Libraries become more public

More than just books: a conferenceroom is added. Special attention paid to acoustics, lighting, etc. optimized for user.

"A place where the librarian can lay-out the books, to seduce the reader"  
"Reading spaces should be near the books and also to natural light"

Development of ‘Gallica’ an online collection offering numerous booktitles and text (online since 1997)
<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>Amazon</td>
<td>Amazon starts selling books online.</td>
</tr>
<tr>
<td>1999</td>
<td>Library Copenhagen</td>
<td>The Royal Library Copenhagen (Schmidt Hammer Lassen) consists of 32% books, other functions (as computerspaces and meeting spaces) become more important.</td>
</tr>
<tr>
<td>1999</td>
<td>Development</td>
<td>Since 1990ies development of the e-reader or e-book.</td>
</tr>
<tr>
<td>2004</td>
<td>Library</td>
<td>Seattle Public Library (OMA) (Jury of 1999). The program of this library consisted of 32% books, other functions (as computerspaces and meeting spaces) become more important.</td>
</tr>
<tr>
<td>2004</td>
<td>Google</td>
<td>Start of Google books.</td>
</tr>
<tr>
<td>2004</td>
<td>Library</td>
<td>Musashino Art University museum and library (Sou Fujimoto). The relation between book and user is that books surround and shelter the users. The physical being and its senses can be compared to digital information.</td>
</tr>
<tr>
<td>2010</td>
<td>3D Printing</td>
<td>Since 2010 3D printing has become available for consumer use. Some libraries have started developing ‘MakerSpaces’ with 3D printing equipment for clients.</td>
</tr>
<tr>
<td>2013</td>
<td>Library</td>
<td>James B. Hunt, Jr. Library (Snøhetta): People can scan a code while in the metro, allowing them to read the first 10 pages of a book. When they exit the underground, they receive the route to the nearest library so they can borrow the book.</td>
</tr>
<tr>
<td>2013</td>
<td>Library</td>
<td>The Underground Library, (by Miami Ad school for NYPL): The digital innovations of the last half century have changed the role of the library. But will the physical library cease to exist? Some innovative ideas for future libraries show possibilities for an alternative role. As a bookless library with just e-readers (Bexar County, Texas), a pop-up library in Boston, bring the books where the people are, on popular sites in town. Many libraries have added ‘MakerSpaces’ with 3D printing equipment. We could imagine a possibility of an Underground Library as that of the NYPL that delivers the books at home, reducing the physical library to no more than a storage depot. And what will happen in the future? New inventions are being developed as we speak. Such as augmented reality glasses or supersmart computers that can help us find the right information (think about the film ‘Her’). What are the spatial consequences for the library? The digitalization of information might offer the opportunity to realize a “Universal Library” as described by Jorge Luis Borges in one of his short stories published in 1941. There is a lot more in the story, but applied to the concept of a library it could be an utopian collection of all knowledge existing, endless, ever expanding. Physically this would be impossible. But the technical progress could make it possible to create this online and accessible to all. So the information itself could be found elsewhere. In my opinion libraries will more and more become a place to learn, study, gain knowledge, exchange, meet people, and create and make things. A place to contemplate on the information you find, and a place where you can be inspired and motivated to discover more.</td>
</tr>
</tbody>
</table>
The library of the future

A library is or was in its essence a collection of knowledge. Or Information, as only through experience and education we can gain knowledge where we use information for. Information used to be in books but is now conveyed through different electronic media as computers, smartphones, tablets, etc. Internet makes information accessible to anybody, anywhere, anytime. In current times the book is suffering from the competition with these new electronic media and this influences the being of the library. The question rises what the future function of a library will be?

To gain knowledge we study on information. The library should not only be the place where the information is offered in an accessible and well organized way, it should also provide the spaces in which people can study the information to gain knowledge. It is a place for exchange of knowledge and meeting people. Since the 18th century libraries have developed into important public institutions allowing the enlightenment of the people. In the future the library as a public institute should offer its users more than just information. The library could be a shelter. A place to contemplate. A place to create or to get inspired.

Libraries are based on the concept of a physically centralized knowledge hub. Online collections of knowledge can add to this but can’t replace this. Libraries should accommodate the access of knowledge and information in any form.

The library has a role to educate people, to offer a place with ideal learning conditions, and a place where the exchange of knowledge is fostered.

The library of the future should:
- Provide information/literature digital+physical: accessibility/atmosphere/overview
- Accomodate the user to gain knowledge/read: silence/focus/privacy/light
- Stimulate exchange of knowledge and meeting: interaction/organization
- Inspire/educate through art/culture/music/lectures/etc: diversity/flexibility
- Accomodate creating/making/ideas: atmosphere/equipment

What are the spatial consequences and/or architectural expression of a library that is fit for the future?

The program of demands implicates a diversity of spaces with different atmospheres, from silent study cells to large readingrooms, a central meetingpoint and clear and accessible entrance.

Important is the relation between the user and the building. The modern digital techniques are only accessible through electronic media. Our being, our body relates to the space we live in and has a need for shelter and social interaction. The architecture of the library should optimize the conditions to accommodate in the needs of the user. The atmosphere, light, acoustics, materialization, proportions, address the senses of the user and influence his experience of the building. Sou Fujimoto states that the (real) connection between user and space should be emphasized in the age of digital information (as it doesn’t adress to our senses as reality does). The smell of an old or very new book, the ink, the feel of the paper, the sound of turning the page, is something that electronica doesn’t offer us.
Process

The graduation project consists out of different phases, starting with a broad analysis and eventually leading to an architectural design partly worked out on a 1:5 scale. The different phases of the process that this project has gone through will be discussed in this chapter.

The studio is organized in a way that sets some boundaries on where and when what products are needed, therefore they guide you through the process. At the same time are rather free to research, analyse or design longer on specific things if that is needed in the project.

The set up of the studio is in two semesters, and contains of five presentations. Halfway the first semester a P1 presentation shows the analysis of the city, area and building. The P2 presentation is the moment where you conclude on your analysis and come with a design proposal. If this is approved you can continue to Msc4 and work out your design, at p3 the main story and architecture must be developed, p4 is the presentation where it all comes together and an integrated design in which both research, architecture and technique are all present and well integrated. After passing this presentation you move forward to P5 which is the final graduation presentation.
The studio RMIT Canal Saint Martin started of with a 2 week in depth analysis of Paris as a whole, then an analysis of North East Paris was started. It was important to know about the history and different areas of Paris because this way we could compare the North East with the rest of the city.

After a few weeks we went to Paris for an on site analysis with the studio group. Also meetings were arranged with students from architecture universities of Geneva and Paris Belleville.

Having done all the research and then going to the site was a good thing, some things completely matched my expectations and some were very different.

The first trip was more general, it was a search for interesting buildings that were potential projects, and an attempt to understand more about Paris. Several moments of simply sitting down and sketching what happened around were a way of on site analysis.

After the visit to the city a choice had to made for a building. Every student could freely choose a building under two conditions, drawings had to be found and a visit to the building was needed.

While I was wandering around in the North East of Paris I noticed the factory on the Quai de Jemmapes. I had earlier spotted this building while ‘digitally’ wandering the streets of Paris with google maps. This was when I was considering what studio to choose for my graduation and I looked into Canal Saint Martin. Its appearance intrigued me and I decided to try to find more information about the building.

It was rather insecure if I could find the drawings of the building and if a visit was possible, and also choosing a large building like this on my own meant a lot of work. But it intrigues me enough do definitely choose it and make a design for it.

I started with rough designs for the building in its context, where could the entrance be? Where can I add or remove to the existing? These where questions I started with. In the following chapter I will further explain my design process and the methods I have used through a series of sketches.

As the previous chapter explains there is a given planning and a number of presentations that give guidance in the process. In this chapter the actual design methods and process that I followed will be discussed. Through sketches and explanations of my way of working I will make an overview on my way of working and it will also be an introduction to the design that was the result in the end.
In my design process I sketch a lot to test possible solutions. On the following pages I will show some examples of studies that I made on different scales.

This sketch shows the building in its context with a new addition on the right. That I also tested in section and floorplan to see what division of the program is possible.

This sketch is a try-out to see if I can open up the existing building to make the entrance there since the corner is very present along the canal. I decided not to do this because I thought it would damage the existing building and expressive facade too much.
On the left and top are a series of sketches that study the different interventions that are possible in the context and what the possibilities are for the building and the entrance in the design.

The fact that the current alignment of the buildings differ made me doubt and research a lot where the new addition should be, on the new or on the old alignment.

The bottom sketch shows the first idea of a central atrium and the studyroom.
To test out different options I built a model on scale 1:500 of the context and building blocks around it. This way I could research different options for both the building as the masterplan. An easy way to make quick conceptual models is with the white foam. It is not very exact but all models communicate a specific idea or concept.

I would also investigate the ideas that I tested in the model by drawing because it offers other options, you can add more detail and test the expression.
When the form started to develop more and more I was drawing a lot of floorplans to see how the program could be organized and also what the new addition could be. I made many different versions for the new expansion, following different ideas. In the end it turned out that the existing part was the leading design element for the new, it became a modern reflection following the existing grid and proportions.
As the plan developed I knew what I wanted for the engine room or new study room so I could go more into detail on these parts. For the new part the sections were still on a larger and rougher scale because more options were open there.
Many sketches were made to understand the existing parts of the building. How are things made? Once you know you can design and improve them.
In this chapter the final design of the building will be discussed. Through conceptschemes, plans and impressions the design will be explained. A complete overview of drawings can be found in the Appendices at the end of this report.

The conclusion of the analysis was that on the scale of the building a lot had to be improved to regain its spatial qualities and that the location could use a public and accessible building in the form of a library.

The conclusion of the research on the library of the future was that it was very much about meeting and exchanging knowledge. No matter whether the medium is a book or a computer, it is a place to study contemplate and exchange. Here I made a parallel, where the library is a place where knowledge is produced, the existing building was as a factory also very much about production and a rational processes.

The old factory as a symbol and metaphor for a place where knowledge can be produced. The original design of a round shape with a center fits the scheme of a central meeting space with libraries organized around it. Within this central space the old tower that would always transport all goods throughout the building can now function as the facilitator of meeting. All routing through the building is organized through this central building.

In the existing part I wanted to bring back spatial quality by removing all floors that where added and place new floors in the center as the engines where before. This will be the studyroom of the library. The central space, or atrium in the middle should offer overview so the building is easily to understand and people can see eachother. Here the roof connects the old and the new that follow the same grid and proportions. In the new part the front is very open to connect to the public space along the canal. A collonade follows the old alignment and finishes the old building. The actual building follows the new alignment. An inbetween space that is both part of the library and both part of the public space along the canal is created in this way. The new part offers a diversity of workingspaces. With a view on the atrium, or a view outside, for all people a place to study or read in an optimized way.
Context & entrances

The building has different entrances to make it accessible as possible. On the front there are two. The main entrance is between the old and the new part. On the back the cul de sac towards the hospital saint louis has been opened and another entrance is created there.

The public space on the left of the building has an entrance that goes down with a stairs into the exhibition space in the basement and than up into the central atrium.

All entrances lead to the central atrium space from where the further routing will lead through the tower and into the building.
The Atrium

These sketches show the central hall of the building. First the entrance, where a meetingsquare is created by lowering the roof and placing rooflights that let light fall in from the top. The four pillars carrying the roof define the meeting space. The next impression shows the view of the part that follows after we continue. Here the roof is very high and the middle building connecting all different parts can be seen.

Stairs spiral up these building bringing the visitor to the walking bridges that allow them to access the library functions around the atrium.

In the design a connection is sought between the new and the old building. In rhythm, grid and proportions the new building reflects the old, in material it is contrasting and contemporary.
The studyroom

The little schemes and picture show the goal to place the new floors almost as ‘furniture’ in the room.

The new part

The new part is more open and seeks interaction with the central atriumspace. There are walking bridges that connect the central building to all the different floors. The pillars that can be seen here are a reflection of the large pillars that the existing building has. They are much slimmer and made out of concrete. Together with the pillars of the existing building the new roof covering the atrium is carried.
Model

The front of the building with the new addition and the corner of the old part.

The main entrance on the front of the building between the old and the new part, with a see trough into the atrium.
The entrance below, the patio on the higher level, and the atrium behind it.

An impression of the patio on the higher level. An outdoor space with a glass roof that lets in light above the entrance square.
The entrance on the front in the old part of the building. The entrance leads to the ‘street’ that goes all the way down to the entrance on the back.

The back side of the building with the entrance between old and new. The bottom picture shows a view above the entrance into the Atrium.
A view into the study room, here we can see how the light falls through the old facade. The complete height of the old space is now again possible to experience, instead of before when there were more floors installed from wall to wall.
Overview of the whole building.

The atrium
The backside of the atrium

The front side of the building
The facade on the new part.
In this chapter I will reflect upon my graduation project. During the project I have gone through different phases of analysis, research and design. Influencing each other mutually and leading to different steps in the design process. In the beginning of the project the writing of a graduation plan and position paper was a first orientation in a direction of research and design. To start this reflection I had to look back into these writings to see what my ideas and expectations were in the beginning of the project.

In my graduation description I formulated the following research question:

“How can the former electricity factory be transformed into a library of the future, solving the disintegrated context, while maintaining the industrial character of the building and adding value to the public space along the Canal Saint Martin?”

In my graduation plan I formulated the following goal:

“The goal of the project is to solve the problems stated by improving the public space along the canal through facilitating the more recreational use and involving the Usine Électrique within this plan as a public library. Through renovating, demolishing and adding to the Usine Électrique and its direct context, the discontinuity along the canal can be diminished. The aim is to re-establish the quality and expression of the monument.”

This goal and research question were formulated while I was still working on the analysis. This analysis resulted in a problem statement addressing a problem on different scales.

- First on the larger scale, the level of the area and the canal, research showed that the use of the canal had changed from
Reflection

I find it hard to answer on the question if I designed a library of the future, since I can’t look in to future. But it has been a very important element of my research and I strongly influenced my design. I studied many different books, articles and references on what the library of the future is, the common conclusion in almost all sources I consulted is that the library is not ‘dead’, but very much alive. The library of the future is a place to meet, exchange and consume knowledge. The medium that transfers this knowledge can be a book or a computer, printed mediums might be replaced by digital ones. It is thus most important that the library facilitates the meeting and exchange of knowledge, and is capable of changing along with transitions in the mediums that ‘carry’ the knowledge or information.

Thus in my design I tried to facilitate the meeting, this is done in the way you enter the building, and how you move through the building as well as sightlines and views connecting different spaces. Part of a public building as a library is the notion that you are among people, that you look at, and that look at you. The process of ‘to see and be seen’ plays a role here. I also created different kinds of spaces, workplaces and atmospheres to meet up to different demands of different people and what they expect from a library. From solitary spots where you can close yourself of from the rest of the world to spots with a view on the building and more interaction with others. This way the library becomes a place to exchange knowledge and meet eachother, now and in the future.

More time could be spent on the specific interior organisation of some parts of the building, on a smaller scale, to give more detail and elaborate more explicit on how the building will exactly be used in all parts. But it was simply too big to plan out the whole building up to this level of detail. Also I had to limit myself in the research I could do on the aspect of how people work and concentrate in relation to our sences and environment. Through an online questionnaire I tried to collect more information on this and I would have liked to research this more and integrate this more in the building. It did give me a general view of how different preferences of people are concerning workspaces and their ideal study place.

Part of the research question is how the new program can be integrated while maintaining the industrial character of the building. I think that in the final design the building still has a strong industrial character. Especially the different facades of the factory are very expressive in construction and material and I tried to keep these existing facades intact. In the organisation of the library I use the original tower again for all vertical transport and movement through the building. People and books will move through the building as before coal, water and electricity did.

RELATIONSHIP BETWEEN RESEARCH AND DESIGN

To reflect on the relationship between research and design made me think about what research it is that I have been doing. As the research questions formulated above show there is more than one question or issue to adress in the research. I consider a design process a constant research in which different options are identified, researched and tested leading to a step in the design process. As the result of the process is a design, the question is if the design answers the research question and solves the problems that are stated.

In my opinion I answered most of the research question. The design shows how the former electricity factory can be changed in a library, and how through changes in the context the public space along the canal can be improved. Looking back now I think I could have been more explicit in the solution of some of these issues. Especially on the larger scale of the canal I have not been specific enough on the actual spatial organisation that should form this improvement of the public space along the canal.

On the level of the building and the direct context this has been more extensively done. I spent a lot of time in researching different options for the building in its context and what to do with the different buildings surrounding the factory and their different alignments, also in relation to the entrance of the library. My final solution to demolish most of the buildings and follow the ‘modern’ alignment gives a lot of extra space along the canal and this is according to my earliest statements. It was a point of doubt because the demolition also meant removing a part of history. Therefore I identified the most valuable buildings and tried to integrate them in the new plan.

Besides the problems or challanges created by the buildings and its location the program I chose brought along another element of research. The library as the instution we know now will certainly change. As books are read less and different new electronic media change the society and partly take over the function of the printed book, a library may no longer be a palace of books. This led to another important research question for my project:

“What is the library of the future?”

In the following reflection I will look back upon these questions and see to what extent I answered them.

industrial to recreational but the lay-out of the canal was still the same with a lot of traffic and car parkings.

- Second on the scale of the location, that is to say the building and its direct context, the addition of several buildings throughout the time created a discontinuous and incoherent total. This contrasts strongly with the newer buildings arranged a long a new alignment that is set back and creates a larger public space along the canal.

- Third on the scale of the building, due to many transformations throughout the years it has lost its spatial quality and monumental expression. It is badly maintained and dus not add to the public space along the canal.

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THE STUDIO RMIT AND THE PROJECT
The theme of the RMIT studio is the re-use of built heritage. The name RMIT stands for Research & Education in Modification, Intervention and Transformation, relating to different levels of scale, from the level of materials and technology (modification), reuse and redesign on the level of a building (intervention) to the development of the urban structure (transformation).

The Studio Canal Saint Martin focused on the North East of Paris, that as a formal industrial area has numerous industrial buildings that are potentially interesting as case study within an RMIT studio. I considered the subject of the studio interesting as it is quite relevant, many larger cities in the world have these former industrial areas, that need transformation. The question of how to deal with these areas and the built heritage within it are important for the future. What do we keep and what do we demolish?

This theme is also present in my project, on both the scale of the building that is an industrial monument, as the area that has an industrial past, both leaving their mark on the location. I think my project fits in the theme of RMIT, it addresses the different levels of scale and theme of dealing with built heritage and how interventions can facilitate a new function and use and thus renew a buildings future.

What attracted me to this specific RMIT studio was the freedom to choose your own building and program. I did not have a specific idea of what I wanted to design when I started, but when I saw the former electricity factory I was intrigued by the building and its context an opportunity, and I knew that I did not want to do an ‘interior’ project or more renovation orientated project. I wanted to design both new and old, and this location and buildings and the state they were in could, in my opinion, use a large intervention.

METHOD OF THE STUDIO VERSUS MY METHOD
The RMIT studio has quite a clear approach, the starting point is an extensive analysis on all scales and elements of a project. Based on this analysis and research the different aspects of the existing situation are validated. What is valuable and essential for the identity of the building or location? The answers to these kind of questions in combination with the research and analysis lead to a problem statement that identify the problems or elements of the project that need improvement or an intervention. This way a design assignment is formulated, that can be answered upon through an architectural design. In the process of designing it is important to formulate statements or an attitude towards the building based upon the validation that is made. This can give you a grip on the building throughout the design process, in which you formulate statements that give a direction to what you are doing.

I don’t think that I deviated strongly from the RMIT approach, I followed the steps or phases as formulated. But I did not follow the validation as the ‘RMIT method’ prescribes. They work with tables of aspects on different scales that lead to a quite detailed value assigned to a part or element in the building or context. I did this in ‘my own way’, maybe more general, trying to summarize my analysis and conclude what the most important elements are that define the project. The design methods I used did not differ strongly from the way I worked before so I think they are not related very strongly to the way RMIT works. For example the research I did regarding the program is I think the same as I did before in other studios.

I do think that the RMIT teachers work in the RMIT way, testing your attitude towards designing in the existing. And throughout the project I did small design research assignments that were taught to me by my design teacher. For example analysing the way a specific architect dealt with a situation and if you can adapt this into your own project.

What I like about the RMIT studio is the fact that you work with an actual existing building with a specific structure and construction, that makes the technical aspect quite concrete and I think its a fun challenge to connect to this existing structure.

PROJECT IN A WIDER SOCIAL CONTEXT
I think the project is relevant in a wider social context because it adresses two themes I consider actual now. In the first place because it is a transformation of an existing building and re-use of the existing is an important issue in current times. Second because it is an attempt to design the ‘library of the future’ and therefore addresses changes in society and the way we deal with knowledge.

A large percentage of current design assignments is set within an existing context, or considers an existing building. Over the past decades there has been a shift from building on the outskirts of cities, expanding their borders, to densifying the cores and re-using existing structures. Also we can see a change in the way that heritage is appreciated. There is more awareness of the historical layers or significance of existing structures.

This makes the RMIT studio very relevant. The question of how to deal with these existing structures and how we can re-use them is something that is relevant in many cities over the world. During the graduation project I participated in the workshop ‘De week van het lege gebouw’ where we where placed in an empty building with a group of students of different fields and studies and had to come up with a new plan for the empty building. Many experts from different fields of came by and lectured on the problems with vacant heritage, the size and challenge of this problem in the Netherlands alone is vast.

My project is an example of a potential approach towards these design assignments. I tried to both take the existing
building in account but not be too careful with adding new parts to create a new whole that can facilitate its new function sufficient.

The library of the future is also a relevant theme in current society. The digitalization of books and knowledge mean the library will change. The library as a physical collection of knowledge might be outpaced by the possibilities that digitalization offer. In “The Library of Babel” Jorge Luis Borges describes the conception of an endless library with all knowledge collected in it, but with an incoherent ordening that leads to never ending quests in the limitless spaces filled with books. The story has many layers and meanings, but relevant here is the fact that knowledge without ordening is of no use. An important function of the library is to facilitate the accessibility to knowledge, and order it. This could be part of the role of the library in the future.

Francine Houben of Mecanoo lectured on The library of the future, reflecting on her design for the Birmingham Library. A very large building collecting different functions inside. She emphasized the importance of the library as a meeting place and named a number of trends in society that I found interesting. First is that more and more people keep learning throughout their lives, following further education needed for jobs or to keep their knowledge up to date. Also more and more people are self-employed and need a place to work and meet clients, coffee shops offer wifi and are filled with people escaping the normal office setting to work or flexworkers renting short term office spaces. These trends all indicate that a pleasant workspace where you can easily acces and share knowledge and meet other people is needed, which can be in the form of a library, I myself do not doubt whether the library will continue to exist. It will change, and these changes will have spatial consequences. Libraries should be flexible, and RMIT projects show that with some flexibility a lot is possible within existing structures. And I would like to conclude the same for the library of the future.

http://aladyinfrance.com/parisian-stone-called-meuliere/


F. Journet, Les Nouvelles Installations Electriques de la Compagnie Parisienne de l’Air Comprime, Le Genie Civil, 1897.

Histoire et vies due 10°, De l’usine a air comprime aux papeteries Clairefontaine, (http://hv10.org/pages/Friese.pdf)


APUR:

Atlas 10th arrondissement
Atlas 18th arrondissement
Atlas 19th arrondissement
Ceinture Verte
Gare du Nord Gare de l’Est

www.geoportail.gouv.fr

APUR, Mairie de 10ieme, geoportail.gouv.fr

Source: Le Genie Civil, 189
Appendices

These appendices are a collection of all drawings of the project such as floorplans, sections, details, etc. All drawings are downscaled to fit them on to the pages.

Content:
- Floorplans
- Sections
Fragment new facade

Fragment existing facade
Details new facade 1:5

- Insulation: 150mm
- Vapor barrier
- Concrete facade panel
- Bitumen roofing
- Anchor for concrete beam
- Hard insulation, sloped to center
- Concrete roof, 300mm
- Steel L-profile 320mm
- Concrete column, 400mm
- Wooden windowframe, 100x125mm
- Double glazing 4mm, 13mm cavity
- Sprinkler
- Steel truss, plate finish
- Hard insulation 150mm
- Bitumen roofing
- Velux “Ridgelight” (rooflight)
- Profiled steel plate
- Openable window
- Glass with PV-cells
- Acoustic panel, openable
- Sprinkler
- Concrete floor, 300mm
- Concrete lamel, prefab glassfibre reinforced
- Horizontal stud for connection panel
- Concrete roof ridge
- Screed, concrete 30mm
- Screed, cast in situ, 600mm
- Insulation 100mm
- Concrete facade panel
- Insulation 100mm, beam framework
- Gutter with grille
- Floor combining for connection facade and panels
- Cable tray
- Concrete column, 400mm
- Concrete floor, cast in situ, 300mm
- Screed, cast in situ, beam 200mm
- Anchor for concrete lamel
- Bitumen roofing
- Concrete facade panel
- Insulation 100mm
- Steel truss, plate finishing
- Hard insulation + roofing
- Profiled steel plate
- Openable window
- Glass with PV-cells
- Acoustic paneling, 50mm, openable
- Sprinkler
- Concrete floor, 300mm
- Concrete foundation wall, 600mm
- Gutter with gravel
- Floor overhang for connection facade and panels
- Concrete column, 400mm
- Concrete roof, 300mm
- Vapor barrier
- Sprinkler
- Concrete facade panel
- Insulation 100mm