DENIS KRAJA

FROM INDUSTRIAL TO POST-INDUSTRIAL CITY

THE DETROIT CASE AND AN ADAPTIVE REUSE PROPOSAL FOR HIGHLAND PARK FORD PLANT

Dedicated to the people who define my world: Caleb Lahi, Fozi, Jasmina, Alma, Samuel and Thomas.

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FROM INDUSTRIAL TO POST-INDUSTRIAL CITY

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TABLE OF CONTENTS

table of contents

INTRODUCTION

INTRO
DUCTION

Global changes and the transition from industrial to post-industrial cities sees a rapid growth of the services sector more than production. This transition toward services has redesigned the lifestyle and the urban structure of cities. Most of the cities that changed through industrialization during the last two centuries, nowadays face the issue of unused spaces and derived problems. For this reason, the questions related to adaptive reuse and regeneration of the industrial cities bring the need for a multidisciplinary intervention. It is essential to understand what has happened in the past to make it better for the future.

Adaptive reuse is a sustainable approach, and it can be implemented effectively in Detroit, the city that once was full of energy, people, and with a significant leadership role in the automotive industry. Nowadays faces economic problems, and represents one of the cities with the largest violent crime rate seen in the United States. It is known as one of the main reasons for these problems, the large amount of unused land. More than half of crimes cases happen in these areas.

Focused on the Highland Park Ford Plant, an abandoned industrial site with much potential for future developments, An adaptive reuse proposal is part of the solution, this way keeping the memory and redeveloping a degraded area.

This research started two years ago, on April 2017, when the College of Architecture and Design (CoAD) at Lawrence Technological University (LTU), Detroit (MI) invited me as a Visiting Research Scholar. The experience in Detroit was extended from May 1, 2017, through July 15, 2017. The research in Detroit was done in the Detroit Center for Design and Technology (DCDT) persuing the work in the City of Detroit. The focus was on a project involving adaptive reuse, including historical analysis of industrial and post-industrial Detroit and also case studies of abandoned industrial areas in Detroit.

The structure of the thesis includes two parts: In Part 1, the focus is on history. The historical overview includes Industrial Revolutions and the contributions of each one in societies and urban development. From the First Industrial Revolution that started in 1760 to the Fourth Industrial Revolution that we are living nowadays, each one has had great importance in the world's history influencing not only the industrial productivity but also the lifestyle, the way how the cities have been designed and the way how countries were driven. The process of industrialization of the cities was a process that had the ups and downs, but it concluded mostly with the deindustrialization. The cities that once had all their life based on industrial production are not anymore the same. The changes in society have brought to changes in the structure of these cities. What once was considered industrial society is now mostly society based on services.

The case of Detroit is the best example of the curve that the industrial cities went through. The process was complicated, and the consequences were devastating for what was considered once the Motown Understanding the causes and highlighting the problems is on the focus of this research. Finding solutions and applying them is also part of this thesis.

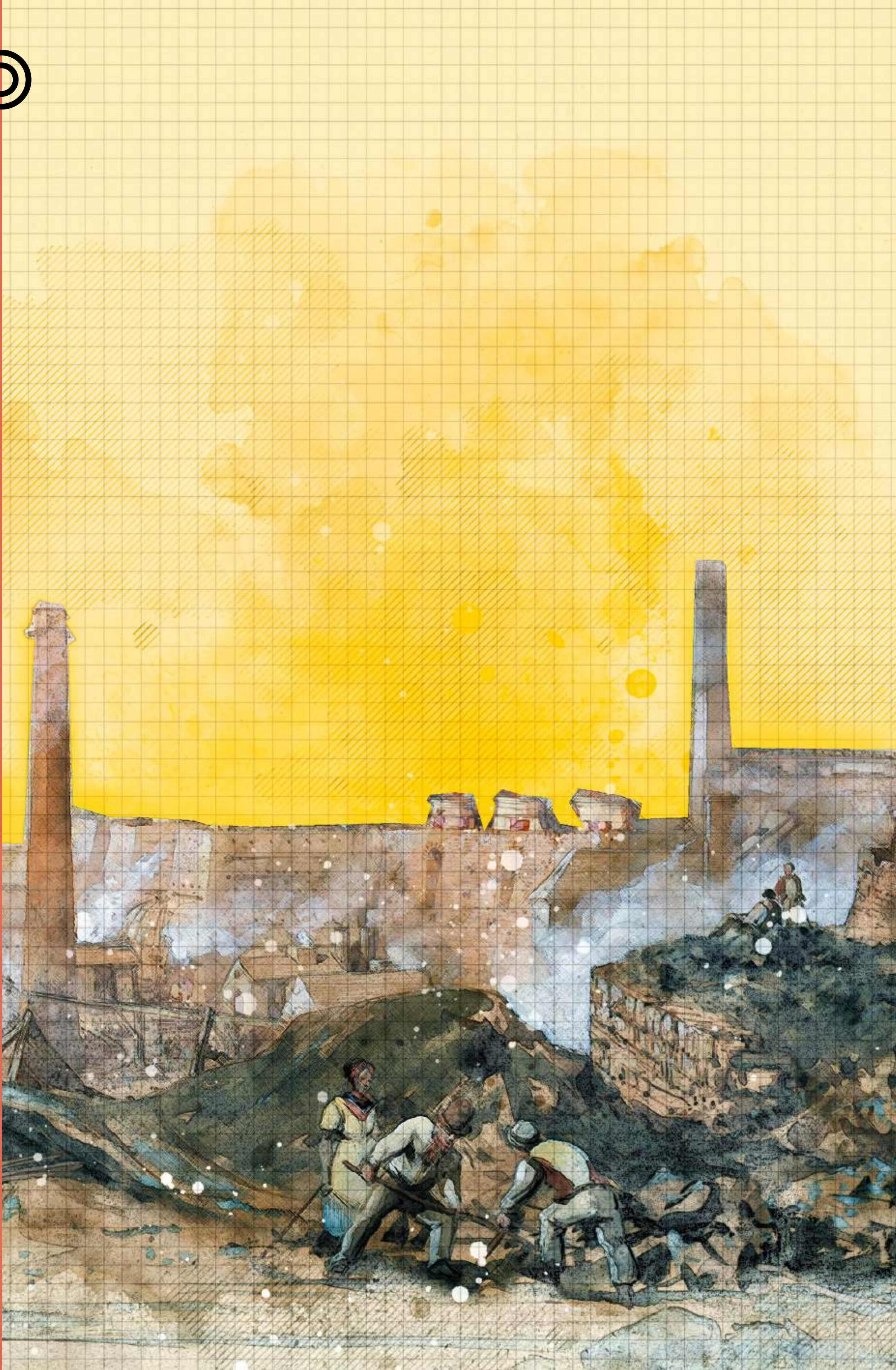
Adaptive reuse comes as a natural solution that not only conserves the structures but also gives them a new life keeping the memory alive. Industrial heritage very often might be abandoned and degraded, and this is a big problem for the industrial cities who went through the process of deindustrialization.

Degraded areas in the size of a neighborhood next to city centers is a familiar scene in these cities. The location, the size, the memory, define the necessary, and the best interventions for abandoned industrial heritage. Adaptive reuse is a universal solution and sees to be the best to conclude all that the stakeholders want.

Part 2 of the thesis is an in-depth study of the Highland Park Ford Plant. This is a historical abandoned industrial site which has great importance for the world. This is the place where for the first time the assembly line was introduced and used in the production of the cars. This innovation changed the world and made the mass production of cars a reality. Home of the famous Model T, the first mass-produced car in the world, Highland Park Ford Plant is an example of the history carried on a building and still abandoned and left unused. Understanding the importance of this complex was the main focus of the second part. Embracing this importance was also the intention of the research. Highland Park Ford Plant has a wide range of possibilities for adaptive reuse. Included as part of the Downtown Strategic Plan of Highland Park, the site is in a great position and has all eyes for the future developments that could bring to the area a new face and a big push for economic development.

An adaptive reuse proposal is the last part of the research. Understanding the history of the industrialization and deindustrialization of the cities, defining this process in Detroit and understanding the adaptive reuse as a solution for the reintegration of abandoned industrial heritage is the foundation of the definition of the program that the proposal has. Giving a close look at the importance of the building and analyzing the site and the location is also part of the process. As a conclusion of all the research, the project is a proposal for mixed-use adaptive reuse of Highland Park Ford Plant

PART 1



1 CHAPTER I

FROM INDUSTRIALIZATION TO DEINDUSTRIALIZATION

THE IMPACT ON THE CITIES AND SOCIETY

FIG. 1.1
G. Childs, Dowlais Ironworks, Merthyr Tydfil – 1840
source: https://www.historic-uk.com/HistoryUK/HistoryofWales/Merthyr-the-Welsh-Men-of-Steel/

1.1 FIRST INDUSTRIAL REVOLUTION
1.1.1 HISTORICAL OVRVIEW

The Industrial Revolution was the movement towards the new production processes in Europe and the US between 1760 until 1820-1840. This process included the transition from the handmade manufacturing of the products to the production done with machines, chemicals and steel, the usage of the power of steam and water, the development of the machines and the rise of the mechanical production system. Result of this revolution was also a significant increase in the population (Adler & Pouwels, 2012).

The beginning and the end of the Industrial Revolution is still an open case between the historians, as the economic and social changes cannot be defined precisely within a time frame. Eric Hobsbawm said that the Industrial Revolution started during the 1780s, but its effects did not feel until 1830s or 40s. The fast industrialization started in Britain with the mechanized spinning and was followed by the usage of the steam power and the steel production after 1800. Mechanical production of the textiles was broadly extended from Great Britain to the European Continent and after to the United States at the beginning of the 19th century, having essential centers of production of the textile, steel, and coal, from Belgium to the US and then France (Hobsbawm, 1962).

HISTORICAL OVERVIEW

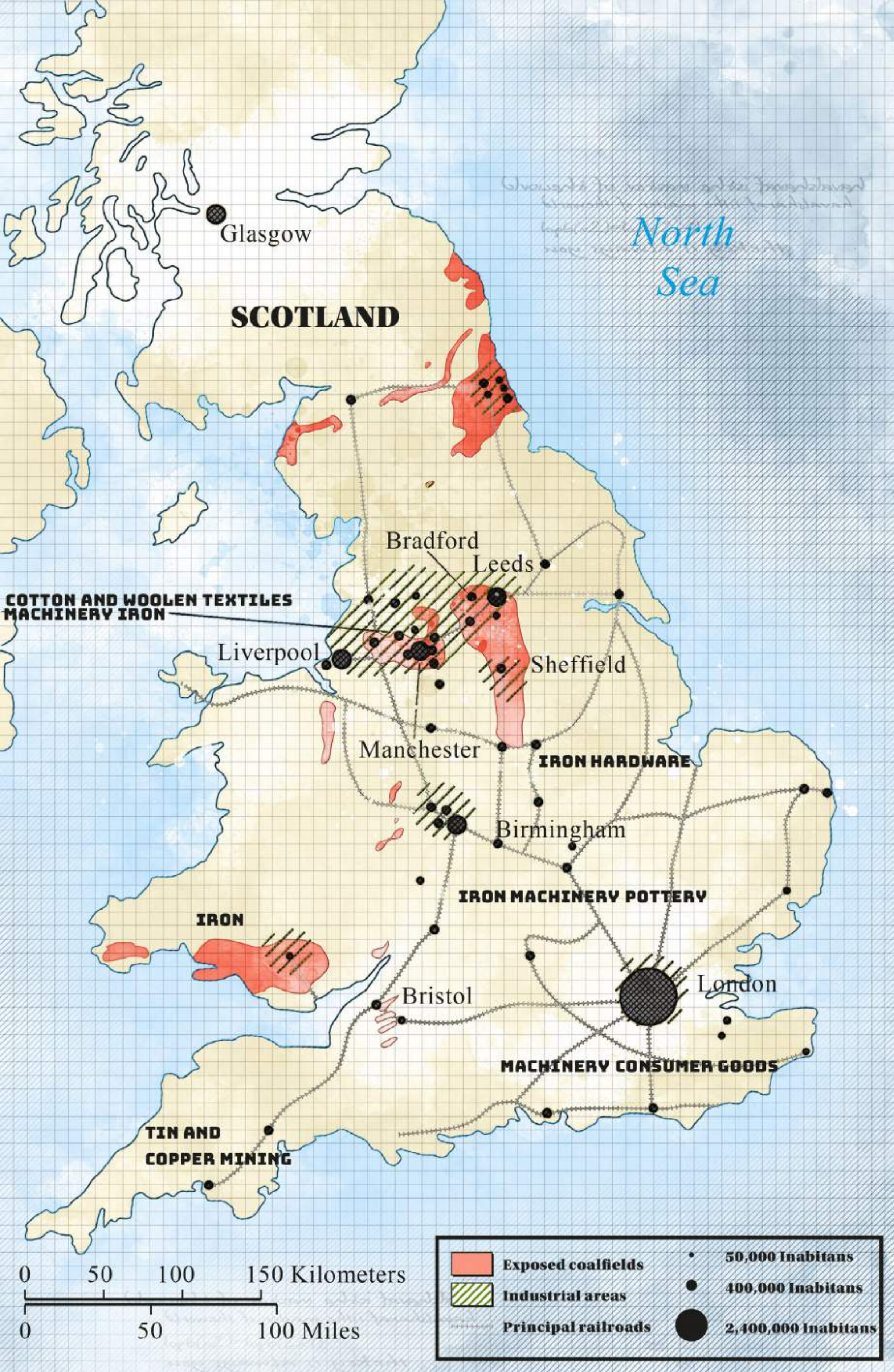
Textiles were the industry that was the most important during the revolution that was hiring more people, the output value, and the invested capital. This industry was also the first implementing the new modern methodologies and systems of production.

Different reasons created the conditions for the Industrial Revolution to start in Britain. One of these was the Agricultural Revolution during the 18th century. New methodologies of farming and breeding, characteristics of this revolution, increased food production. Agriculture in Britain during this period could feed more people cheaply and with less effort. Even the most ordinary families in Britain could avoid using all the income for food, and this allowed them to spend some of the income on other goods. At the same time, the growth in the population during the second half of the 18th century made it possible to have more working force ready to work in the new factories of Britain. The working people of the rural industries also were a potential for workforce ready to work in the new industries (Overton, 1996).

MAP 1.1.1 (PAGE 15)

Britain in the Industrial Revolution. Original source: Spielvogel, J. J. (2012). Western Civilization: Alternate Volume: Since 1300 (8 ed.). Belmont: Thomson Higher Education.

The Industrial Revolution is a crucial change point in history; almost every aspect of life was influenced in one way or another. Notably, the average income and the population started growing as never before. The most significant impact of the Industrial Revolution was in the living standards, this consistently, for the first time in history, started growing. Historians of the economy are on the same page when they consider the Industrial Revolution, the



North Sea
Glasgow
SCOTLAND
Bradford
Leeds
COTTON AND WOOLEN TEXTILES
MACHINERY IRON
Liverpool
Sheffield
Manchester
IRON HARDWARE
Birmingham
IRON MACHINERY POTTERY
IRON
Bristol
London
MACHINERY CONSUMER GOODS
TIN AND
COPPER MINING
0 50 100 150 Kilometers
0 50 100 Miles
Exposed coalfields
Industrial areas
Principal railroads
50,000 Inabitans
400,000 Inabitans
2,400,000 Inabitans

most significant event in human history after the domestication of the animals and plants. Although the structural changes from agriculture to the industry were widely connected with the industrial revolution, this process in Great Britain, it was almost completed in 1760.

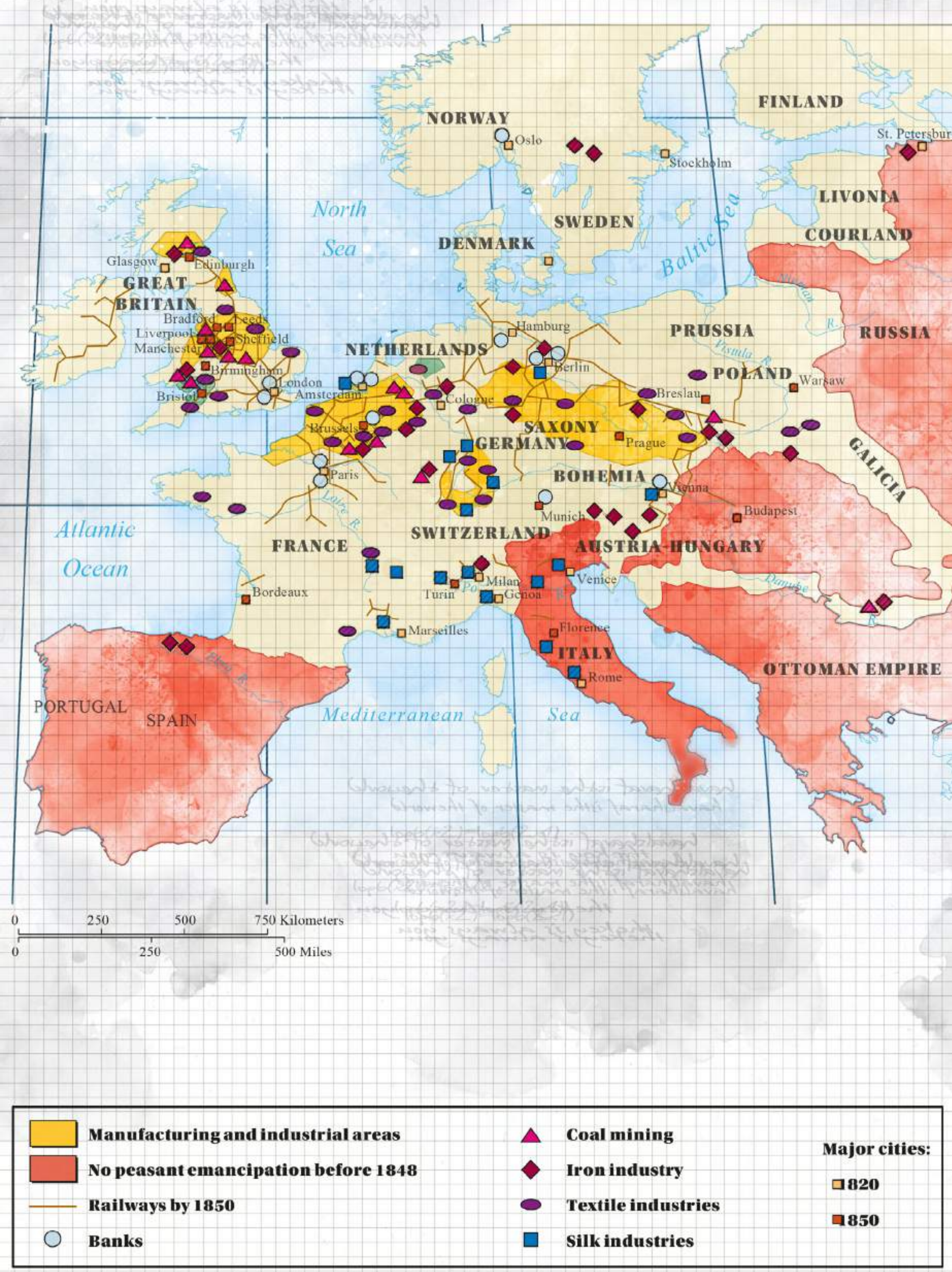
After the French Revolution, another revolution, the Industrial Revolution was changing the social structure of Europe although less dramatically. During the Industrial Revolution, industrial production faced improvements regarding quality. New sources of power and energy, especially coal and steam, replaced the usage of water and wind, creating machinery that could be used without the human impact reducing the participation of the human and animal power in the processes dramatically. Meanwhile, the levels of production were increased significantly, and this presence of new machinery changed the request for human forces and new ways of organizations, this way the factories replaced the workshops and the home production. The major part of the new factories had terrible working conditions. The reformers asked to change these conditions, focusing mainly on the rights of married women (Leach & Rashleigh, 1844).

Starting from Great Britain, the industrialization spread in the European Continent and the united states with different speeds during the 19th century. The first countries that were industrialized were Belgium, France, and the German states also North America, the new nation of the United States.

In 1815, France, Belgium, and the German states were still agrarian. During the 18th century, some of the European countries had the same development as Britain. Also, including the population growth, these countries made improvements in agriculture, extended their cottage industries, and witnessed growth in foreign trades. Although Britain was moving toward new industries between 1770 and 1780, continental countries were left behind because they did not share the same advantages as Britain that helped toward an industrial revolution. Lack of right roads and the problems of transport in the rivers made transport in general very difficult.

The Industrial Revolution in the Continent had three main centers between 1815 and 1850 - Belgium, France, and the German states. Here, also, the cotton played the leading role, although not as significative as the heavy industry. France was the leader in the production of goods from cotton, but still far behind Britain. In Britain, the Industrial Revolution was based on the cotton industry; in the Continent, steel and coal lead the way. Same as in textiles, the heavy industry in Continent before the 1850s was a mix of the innovations and old techniques (Hobsbawm, 1962).

MAP 1.1. 2
(PAGE 17)
The Industrialization of Europe by 1850. Original source: Spielvogel, J. J. (2012). Western Civilization: Alternate Volume: Since 1300 (8 ed.). Belmont: Thomson Higher Education.


NORWAY
Oslo
Stockholm
SWEDEN
FINLAND
St. Petersburg
LIVONIA
COURLAND
DENMARK
North
Sea
Baltic Sea
Glasgow
Edinburgh
GREAT
BRITAIN
Bradford
Leeds
Liverpool
Manchester
Sheffield
Birmingham
London
Bristol
Amsterdam
NETHERLANDS
Hamburg
Berlin
PRUSSIA
RUSSIA
POLAND
Warsaw
Vistula R.
Breslau
Cologne
Brussels
SAXONY
GERMANY
Prague
GALICIA
Paris
BOHEMIA
Vienna
Munich
Budapest
Atlantic
Ocean
FRANCE
SWITZERLAND
AUSTRIA-HUNGARY
Loire R.
Bordeaux
Turin
Milan
Genoa
Venice
Po R.
Danube R.
Marseilles
Florence
ITALY
Rome
OTTOMAN EMPIRE
PORTUGAL
SPAIN
Mediterranean
Sea
0
250
500
750 Kilometers
0
250
500 Miles
Manufacturing and industrial areas
No peasant emancipation before 1848
Railways by 1850
Banks
Coal mining
Iron industry
Textile industries
Silk industries
Major cities:
1820
1850

1.1.2 ECONOMIC IMPACT OF THE FIRST INDUSTRIAL REVOLUTION

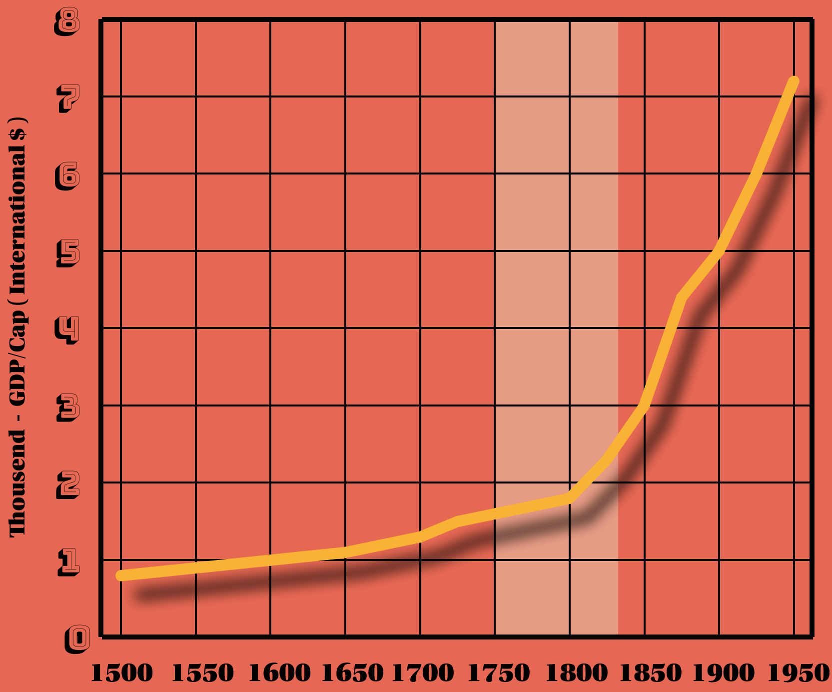
During the Industrial Revolution, Europe was in a phase of transition from the classical form of economy, based on agriculture and handwork, in an intensive capitalist economy based on the production using machinery, specialists and industrial factories. Somehow the Industrial Revolution took some time to spread; it was a big revolution in the way how it changed the Europeans, societies, and human relationships. The new big factories made it possible for people to move massively from villages to the urban areas where the cohabitation replaced the traditional intimate life of rural areas. The high levels of production brought to the necessity for research in raw materials, new forms of consumption, and a revolution in transport which allowed raw material and the final products move fast all around the globe. The creation of a middle class that was economically sustainable, and a bigger labor class changed the traditional way of social structure drastically.

Great Britain had a ready supply of capital for investment in the new industrial machines and also the factories which were necessary to house them. Additionally, of the profit from the trade and the cottage industry, in Britain was an efficient and developed central bank. Like not seen in other countries, in Britain was a significant number of people ready to invest and use every possibility that would be translated into income. In Britain, people were, as a historian has said, "*fascinated by wealth and commerce, collectively and individually*" (Landes, 1969). These early entrepreneurs aced financial difficulties at some point. The income was quick but also the lost. The structure of new firms was open and fluid. Individual or family proprietorship would usually be the operational mode, sometimes including also friends for help, but quickly and easily jettisoned them.

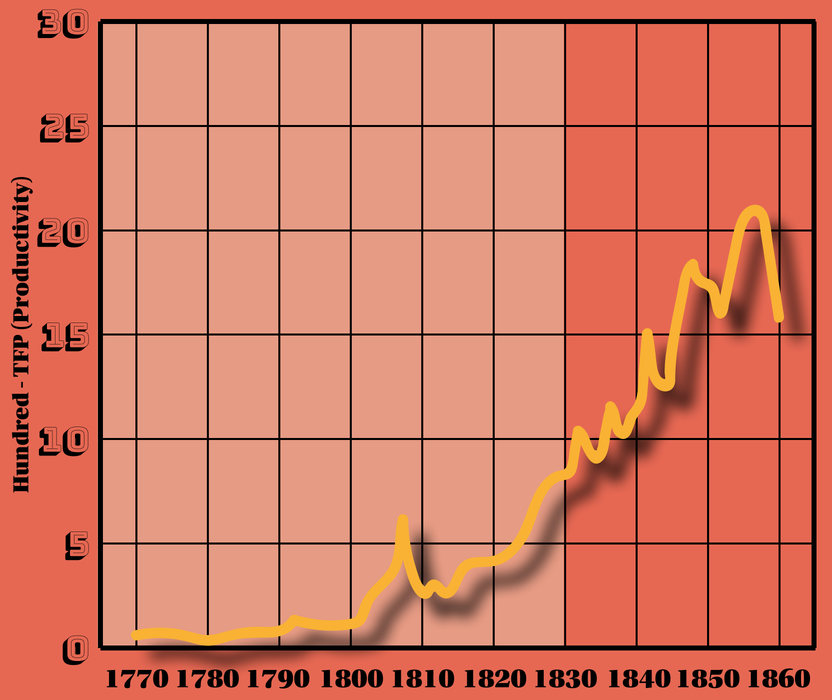
Britain was supplied with mineral resources, including iron and coal, very needed for the production processes. The island was also relatively small, and the small distances made possible easy accessed transportation. From 1780, roads, rivers, and channels made an excellent network, connecting the main industrial centers. Unlike the other countries in the Continent, there were no internal customs barriers that could cause problems for the domestic trade.

A market which was ready to absorb new products gave Britain the success of their manufactured goods. The exports quadrupled in Britain from 1660 to 1760. During the wars and conquests of the 18th century, Great Britain had developed a vast colonial empire comparing to the continental rivals such as France and the Dutch Republic. The success of Britain was supported by a developed trade marine that made it possible the transportaton of the goods on every side of the globe. (Lucas, 2003).

ECONOMIC IMPACT



GRAPH. 1.1.1
Gross domestic product (at purchasing power parity) per capita between 1500 and 1950 in International Dollars for Britain.
Source: Contours of the World Economy, 1–2030 AD. Essays in Macro-Economic History by Angus Maddison, 2007



GRAPH. 1.1.2
Cotton Spinning and Weaving Productivity, 1770-186o
Source: The Industrial Revolution, Gregory Clark, University of California, Davis

1.1.3 A REVOLUTION THAT CHANGED THE WAYS OF TRANSPORTATION OR A WAY OF TRANSPORTATION THAT CHANGED THE WORLD?

The 18th century was the witness of the expansion of the transportation facilities in Britain because the entrepreneurs needed better efficient move and transport of the resources and goods. New roads were built and, between 1760-1830 a network of the channels was already connecting different areas. However, the roads and channels started very soon to be replaced by a new form of transportation that was very quickly able to attract people with its promises. The railways were a very important factor in showing European economic progress in the 1830s and 1840s (Hobsbawm, 1962).

The first forms of the railways can be found at the beginning of the XVI century in the German mines and later in Britain after the XVII century where small handcarts were pushed along two parallel wooden rails. The rails reduced the friction, making it possible for the horses to pull more weight. From the 18th century, some entrepreneurs started introducing the cast-iron rails and begun replacing the wooden ones. The introduction and development of the steam engine radically changed the way how the railways were functioning until then. Railways until the beginning of the 19th century were still working with the horsepower.

In 1804, Richard Trevithick used for the first time the steam-powered locomotive in a line in the south of Wales. The new locomotive could pull 10 tons of minerals and 70 people for 5 miles an hour. Better ones came after, George Stephenson and his son built engines much superior. It was in their workshop in Newcastle, where the first modern locomotives in Britain were built. The Rocket was used for the first time in a public railway line in 1839 and extended in 32 miles from Manchester to Liverpool, having a speed of 16 miles per hour. In twenty years, the locomotives achieved a speed of 50 miles an hour, very fast for the time. During the same period, other companies started building railways and, it was proven ,that it was not only successful but financially profitable. In 1840, in Britain, the network included 2000 miles of railways, and by 1850, 6000 miles all around the country (Bellis, 2016).

The railways contributed massively to the success and growth of the Industrial Revolution. The Britain supremacy in the civil and mechanical engineering very noted in after the 1840s, was mainly based in the construction of railways. The construction of the railways opened new possibilities for jobs, especially for the working class of the rural areas that were obliged to find a job outside their villages.

What is more important, a new cheap and fast way of transportation had its benefits on the growth of the new industrial economy. Reducing the prices of the goods made it possible for broader markets; the increase in the selling brought the need for more factories and machines. The growth of the production made the entrepreneurs reinvest their money in new machinery extending the production capacities of the economy. The sustained growth of the economy was the fundamental characteristic of the new industrial economy.

The railway was the perfect symbol of the revolution. The possibility of transportation of people and goods in significantly shorter times also confirmed a new sense of power. When the railway engineers were able to pierce mountains with tunnels and connected chasms with bridges, people started to feel their power over nature like never before.

1.1.4 FACTORY, THE INNOVATIVE STRUCTURE OF THE INDUSTRIAL ORGANIZATION

The structure of factory started as a product of the new industry of cotton, the factory became the leader of the organization of the workers for the new machinery. The location of the working places was transferred from small workshops and farm stables into factories, which was not seen only as a bigger unit of the work. Employers hired only workers with no need to use their tools, but they would get paid to make the machines function.

From the beginning, the factory system brought a new discipline for the employees. The employers could not allow their expensive machines not to function. The lab-ors were obliged to work regular working hours and on shifts, making possible the functioning of the machines, having the maximum of the output. This would represent a massive adjustment of lifestyle for the factory labours.

The preindustrial labours were not used with a "timed" format. Those who were working in agriculture always worked within undefined time frames; the hard-working periods could be forwarded by long periods of no work.

The owners of the factories were facing an extraordinary duty. They needed to create a disciplinary system during the working time that would accommodate the labours in regular work, during the predefined working hours and performing specific duties during all the time in a more efficient way. Jobs like this were very dull and repetitive, and the owners of the factories used heavy methodologies to fulfil the duties (Spielvogel, 2012).

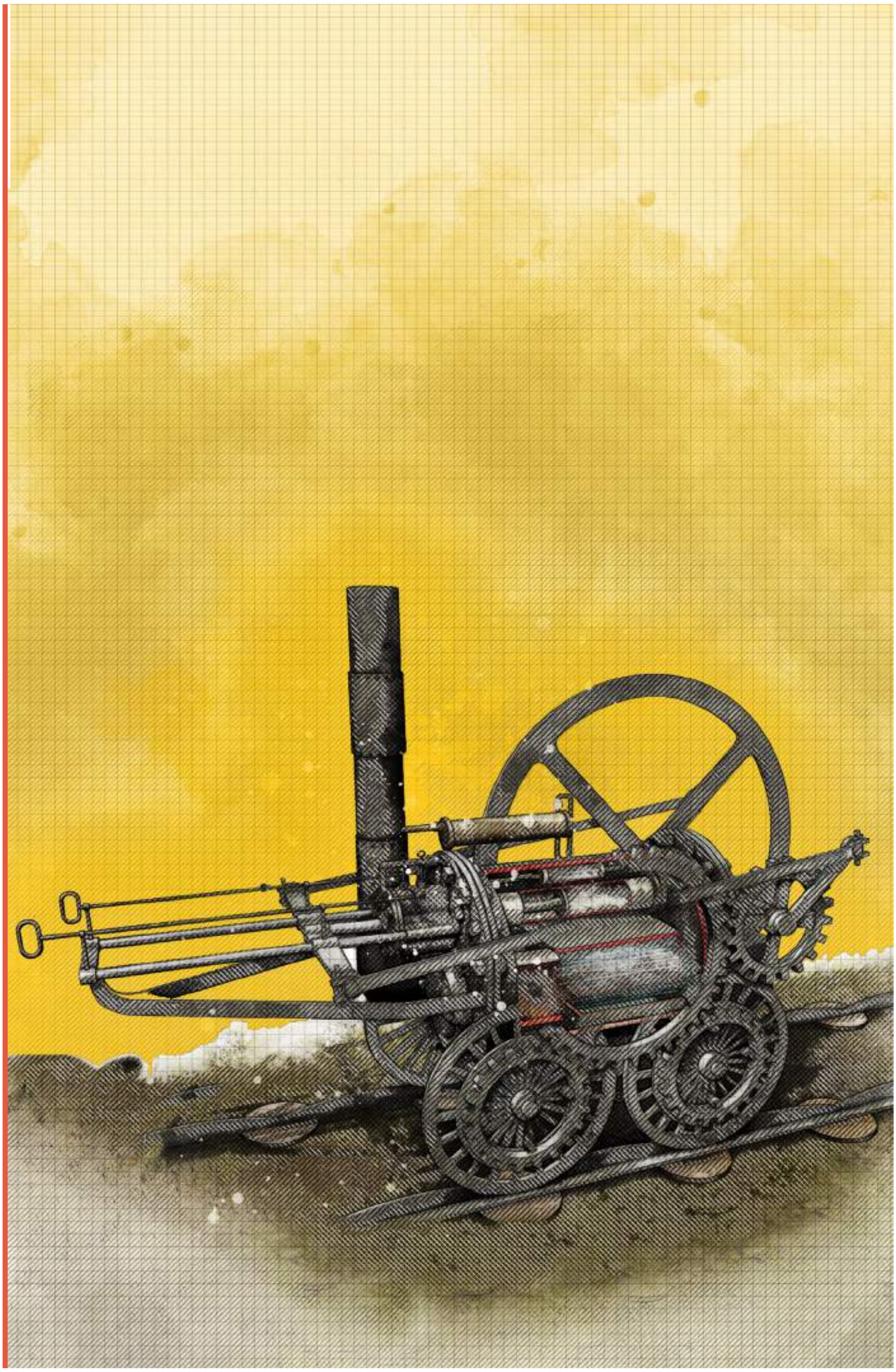


FIG 1.1.1
Trevithick's 1804 Locomotive Cutaway illustration depicting the inner workings of the first on rail locomotive designed by Georgian era inventor and entrepreneur Richard Trevithick. Original source: https://www.deviantart.com/vonbrrr/art/Trevithick-s-1804-Locomotive-238689997 Locomotive-238689997

DENIS KRAJA

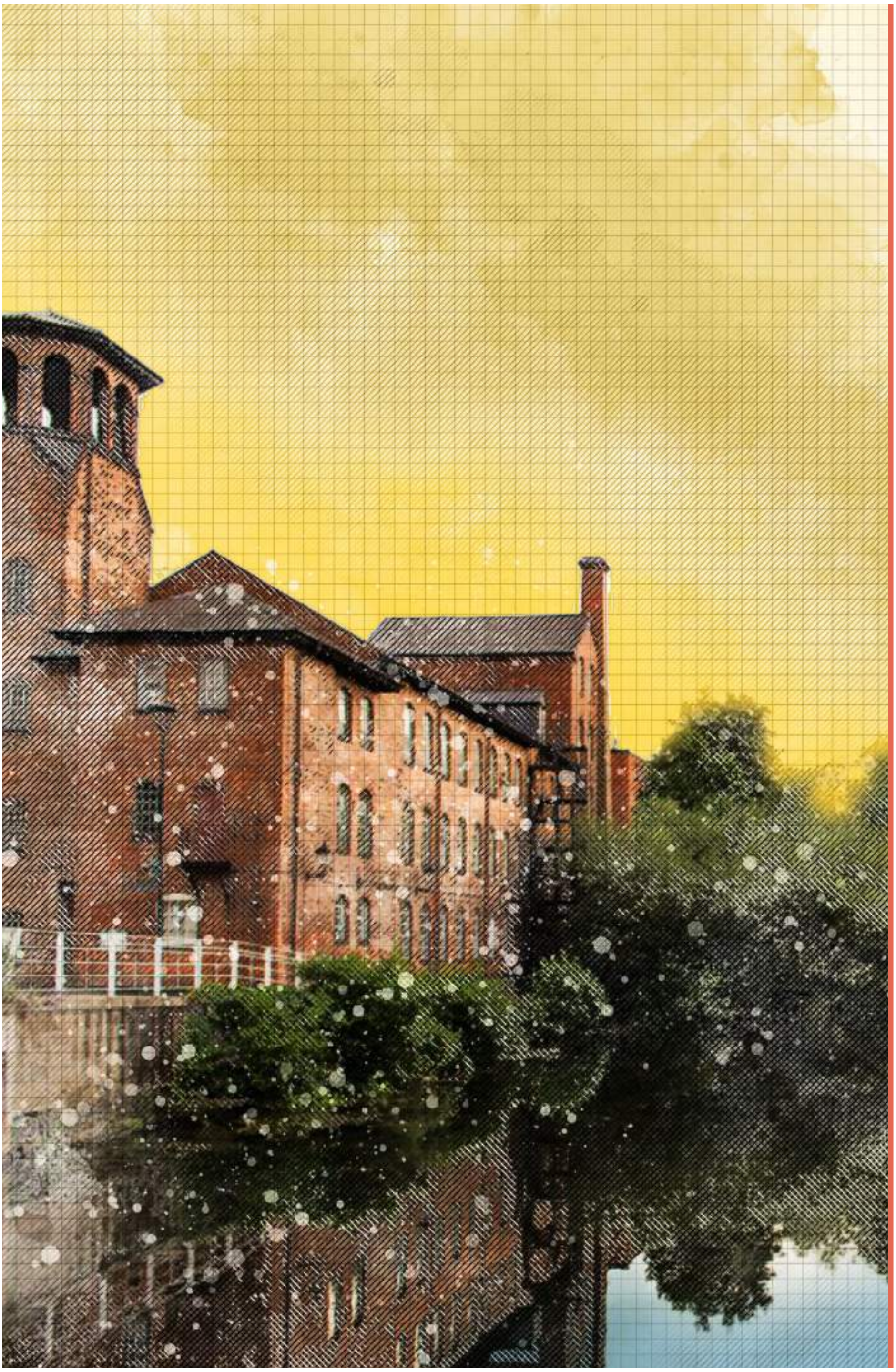


FIG 1. 1.2
(PAGE 23)

John Lombe's water-powered silk mill at Derby, UK, considered as first factory in the world. Original photo by : Caron Badkin
Source: Internet

1.1.5 SOCIAL AND URBAN IMPACT OF THE FIRST INDUSTRIAL REVOLUTION

SOCIAL AND URBAN IMPACT

For sure, the Industrial Revolution changed the social life in Europe and the rest of the world. Although part of Europe was still within the old and traditional ways of producing, during the beginning of the 19th century, the impact of the First Industrial Revolution was evident, and new stages of growth were appearing.

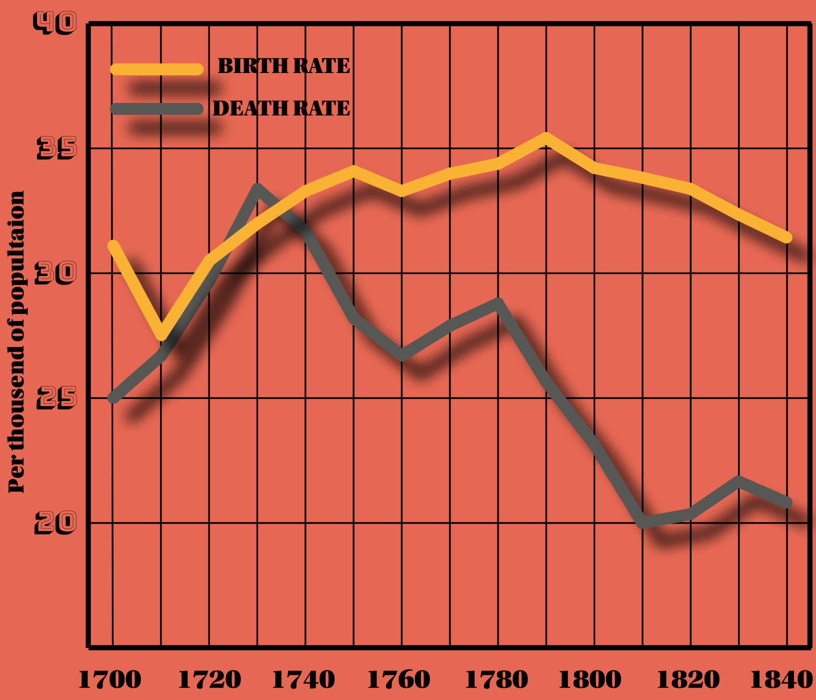
In the 19th century the population had significant growth. This growth was easily identified also because of the easer conditions to keep records. In the 19th century, the governments started making periodic censuses collecting data such as the date of birth, death, and marriage. In Britain, for example, a census was made in 1836. In 1750, the total population of Europe it is thought to have been 140 million, in 1800, it became 187 million and in 1850 266 million, almost doubled from 1750 (Wilde, 2017).

This population growth could not be explained with the birth growth because the number of births was decreasing. The key in the population growth was the decrease in the number of deaths. Two major reasons explain this. There was a decrease in the number of deaths by wars and epidemics. The major part of the epidemics like smallpox and plague, almost disappear, although small epidemics would appear from time to time. The natural death also decreased in number because of the possibilities for food supply, very ordinary from the Britain Agricultural Revolution at the end of the 18th century.

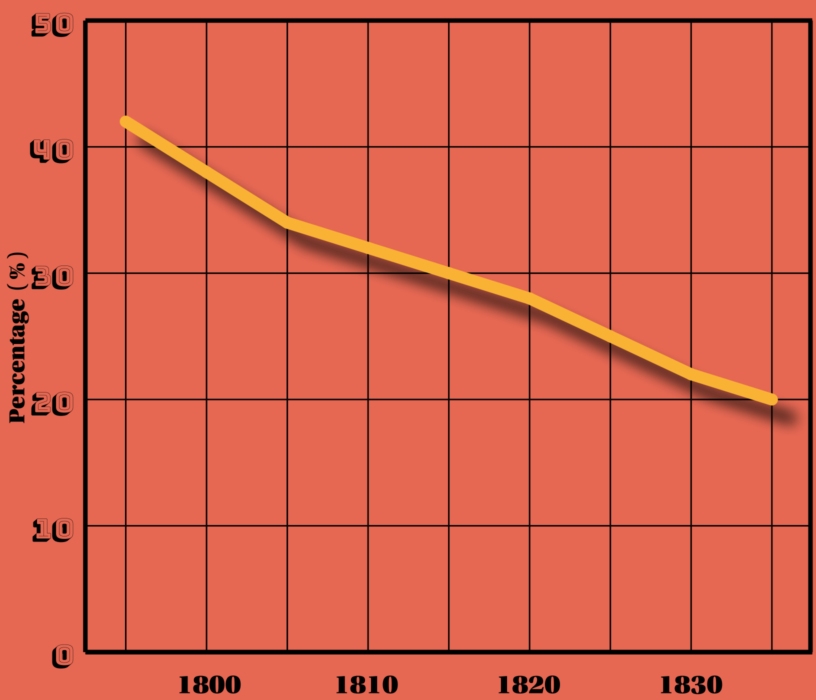
Industrialization itself did not bring population growth; industrial areas lived a change of the population composition. From the 1850s, the portion of people involved in the production, mines, and construction, was grown with 48% in Great Britain, 37% in Belgium and 27% in France. Anyway, the industrial centers in 1850s were still small and decentralized (Adler & Pouwels, 2012).

The western world was still not a predominantly urban society until the 20th century; the towns would live a dramatic growth during the first half of the 19th century, a phenomenon connected to the industrialization. The cities traditionally were the administrative center with courts, government and military offices, churches, and markets. From 1850, especially in Great Britain, the cities were grown very fast becoming places of production and industry. With the steam engine, the entrepreneurs could localize their factories close to urban centers where the access was, and the number of people coming from villages ready for work was higher.

Great Britain had one big city, London, with a population of 1 million on 1800. Fifty years later the population of London expanded to 2,363,000, and Britain had nine cities with more than 100,000. The same phenomena were also happening in continental Europe but with slower rhythms.



GRAPH. 1.1.3
Popilaton change in Great Britain 1700-1840
Source: Oxford Big Ideas Geography History 9 - Industrial Revolution



GRAPH. 1.1.4
Percent of total labour force working in agroculture in Great Britain.
Source: https://ourworldindata.org/employment-in-agriculture#note-2

The dramatic growth of the cities in the first half of the 19th century brought to a terrible situation of living conditions. For sure, this was real for a lot of European cities. Quick urbanization connected to the Industrial Revolution intensified the problems and made it possible for these horrible conditions to be more noticeable.

The wealthy and middle class as usual isolated themselves in the best way possible, often living in the suburbs or areas around the cities, where they could have individual houses with gardens. In the inner ring of the cities there were the small row houses, some with gardens, of the artisans and the lower part of the middle class. Located in the industrial city centers were the row houses of the industrial workers.

Rooms were not spacious and were usually overcrowded, as this official report noted: "*I entered several of the tenements. In one of them, on the ground floor, I found six persons occupying a very small room, two in bed, ill with fever. In the room above this were two more persons in one bed ill with fever." Another report said, "There were 63 families where there were at least five persons to one bed; and there were some in which even six were packed in one bed, lying at the top and bottom-children and adults*" (Spielvogel, 2012).

The sanitary conditions were appalling. Because of the inexistence of the local direction, the streets of the cities were used as sewers and open drains. Living with the presence of the human excrement, the cities during the new industrial era had a terrible smell and were extremely unhealthy. the burn of the coal covered the cities in black, as Charles Dickens described in one of his novel "The Old Curiosity Shop": "*Along suburb of red brick houses-some with patches of garden ground, where coal-dust and factory smoke darkened the shrinking leaves, and coarse rank flowers; and where the struggling vegetation sickened and sank under the hot breath of kiln and furnace.*"

The knowledge regarding the pathetic living conditions of the time in the industrial cities comes from the reports of social investigation. These investigations started in France in the 1820s. The investigators were very often struck by the physical and moral debilitating effects of urban life on the poor. They observed, for example, that the young men of the working class were shorter and scrawnier than the middle-class men and subject to diseases. They were alarmed from what they called moral consequences of this kind of living conditions such as prostitution, crime, and sexual immorality all justified by these living conditions.

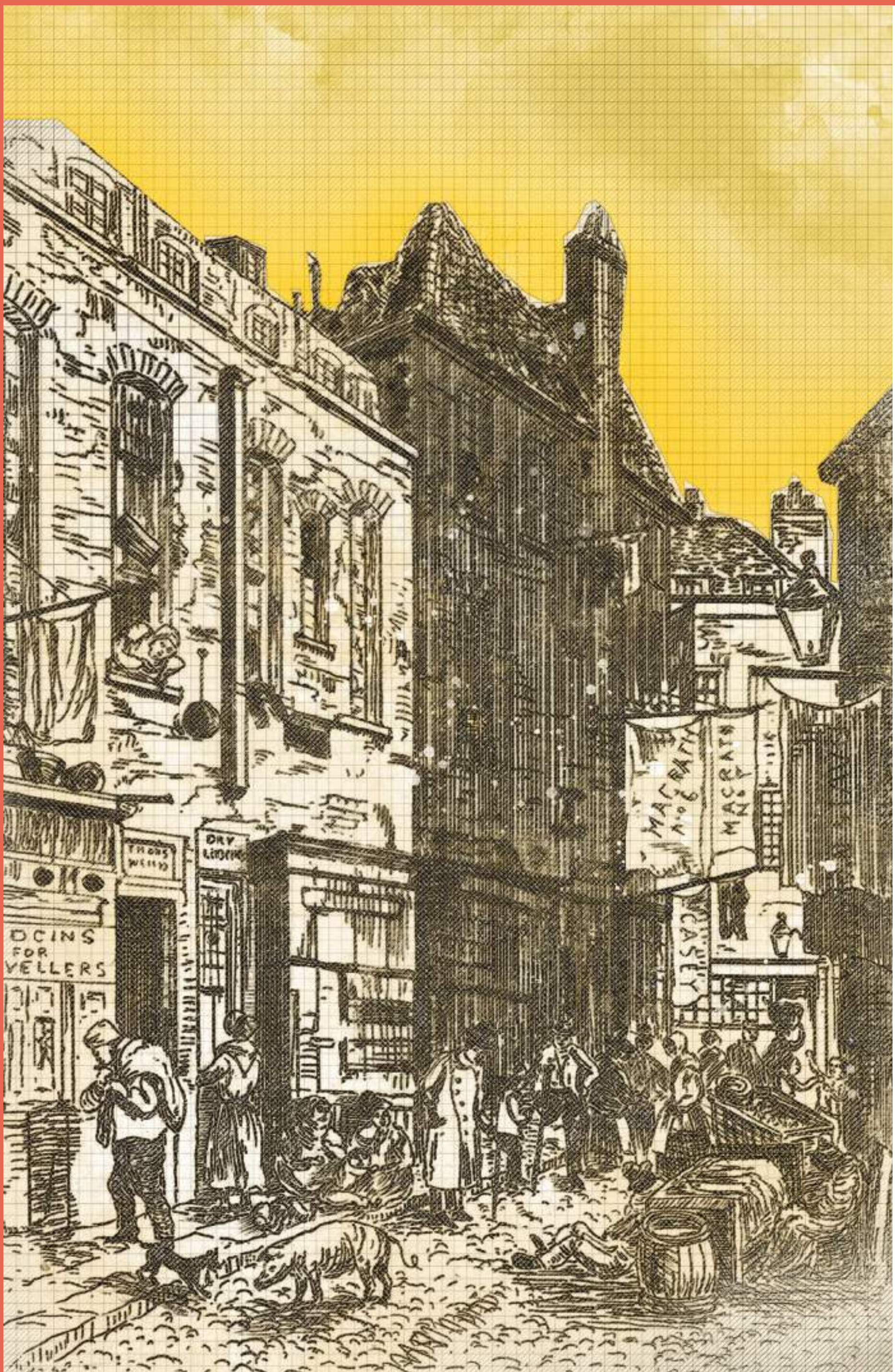


FIG 1. 1.3
Illustrations of the slums of St Giles, London, full of stereotypes about the area's inhabitants such as drunkenness and irresponsible parenting, 1837 by Thomas Beames
Source: https://www.bl.uk/romantics-and-victorians/articles/slums#

1.2 SECOND INDUSTRIAL REVOLUTION
1.2.1 HISTORICAL OVRVIEW

The Second Industrial Revolution is considered to have happened between 1870 and 1914, although some of the events that characterized had been seen before, from the 1850s. Anyway, it is acknowledged that the inventions happened to have a decrease in the number after 1825 and had a turn in the third part of the century. This says not much for the progress of the technology which did not have the same growth as the productivity and quality of the products; more depended on the small inventions, called micro inventions.

The inventions changed the aspects of energy, materials, chemistry, and medicine explained below. These did not have a significant impact on the production but had a super effect on the research and development of the activity of these micro inventions.

HISTORICAL OVERVIEW

During the First Industrial Revolution and more of the previous inventions had almost zero scientific bases. First Industrial Revolution created a chemical industry without chemistry, iron industry without metallurgy, machine power with no thermodynamics. Engineering, medical technology, and agriculture until 1850 were pragmatic bodies of applied knowledge in which things were known to work, but very rarely any research was made to understand why (Mokyr, 2002).

It was clear that the inventions that came after 1870 were very different from the previous ones. The period between 1859-1873 was considered as one of the most successful periods for historical inventions (Mowery & Rosenberg, 1989).

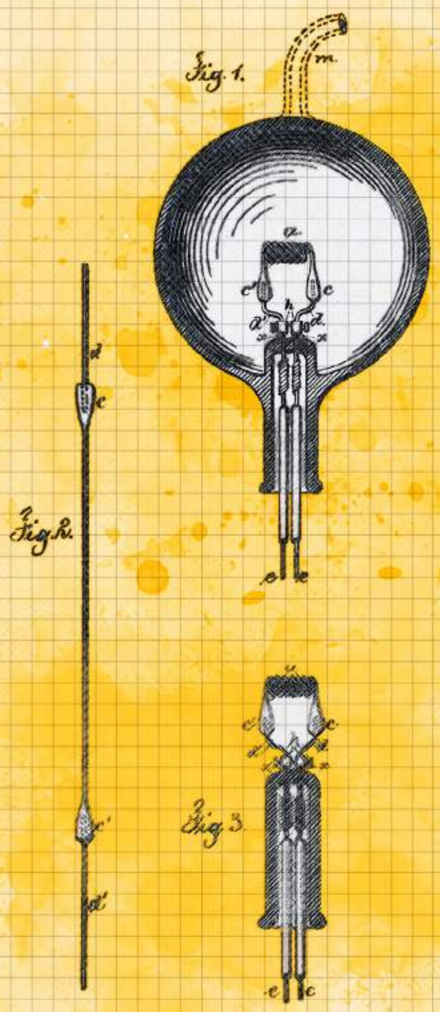
The Second Industrial Revolution put a working rapport between two forms of knowledge, science and technology. Second Industrial Revolution extended the limited and local success of looking at the activities and products from a broader angle. The living standards and the purchasing power of the money saw a fast growth, making the new technologies able to penetrate and be part of the everyday life of the middle and working class of the time.

Another aspect that should be mentioned is the change in the nature of the production organization. Second Industrial Revolution has seen a growth of the industries in great economies having some problems afterward, more significant than the ones lived until then. These changes came as a consequence of the growth of the potential to produce more and more.

FIG 1.2.1
(PAGE 29)
Patent#223898: Electric-Lamp. Issued January 27, 1880; Thomas Edison (reprinted by the Norris Peters Co.) Source: Internet

T. A. EDISON.
Electric-Lamp.

No. 223,898. Patented Jan. 27, 1880.



Witnesses
Chas H Smith
Geo T Pinckney

Inventor
Thomas A. Edison
per Lemuel W. Serrell
Atty

THE NORRIS PETERS CO. PHOTO-LITHO., WASHINGTON, D. C.

29

1.2.2 ECONOMIC IMPACT OF THE SECOND INDUSTRIAL REVOLUTION

ECONOMIC IMPACT

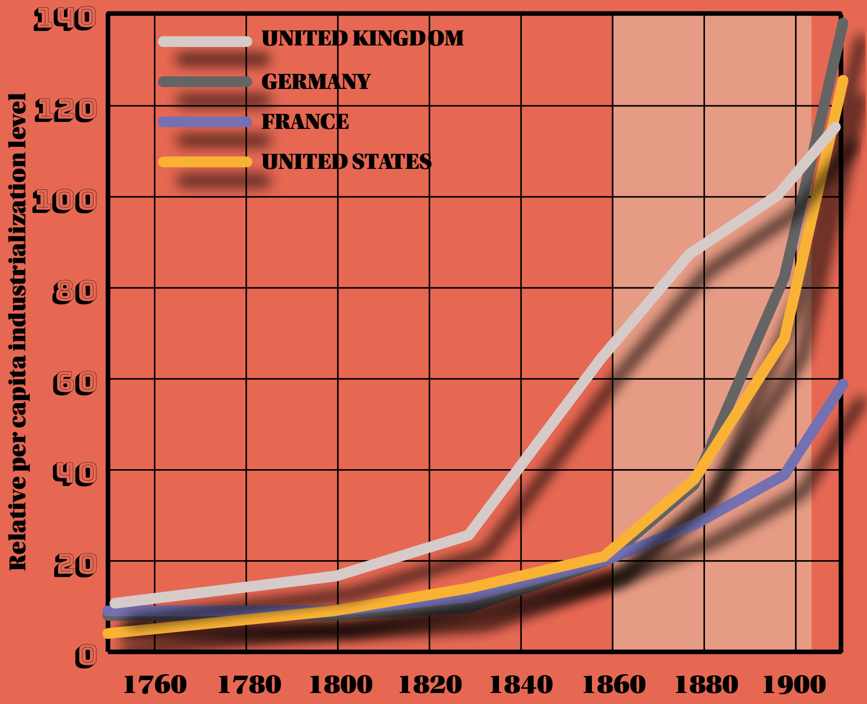
Although the creation and growth of big corporations as Ford Motors, General Electric or Carnegie Steel in the U.S. and other equivalents in Europe, the unemployment rate within the working class was still very high. The typical firm of the "*Industrialized West*" remains still small, and very often specialized only in one sector, covering one specific part of the market.

Railways and the telegraph network and in the big cities gas, water distribution and sewerage system existed already during this time. This system had a massive extension after 1870, and some new ones were added; electricity and the telephone are the most important. Second Industrial Revolution turned the big technological systems from exclusivities to normality. These systems asked for excellent coordination which the free markets of the time did not have, for this reason very often the governments would interfere making standards which would help for the standardisation and fair market.

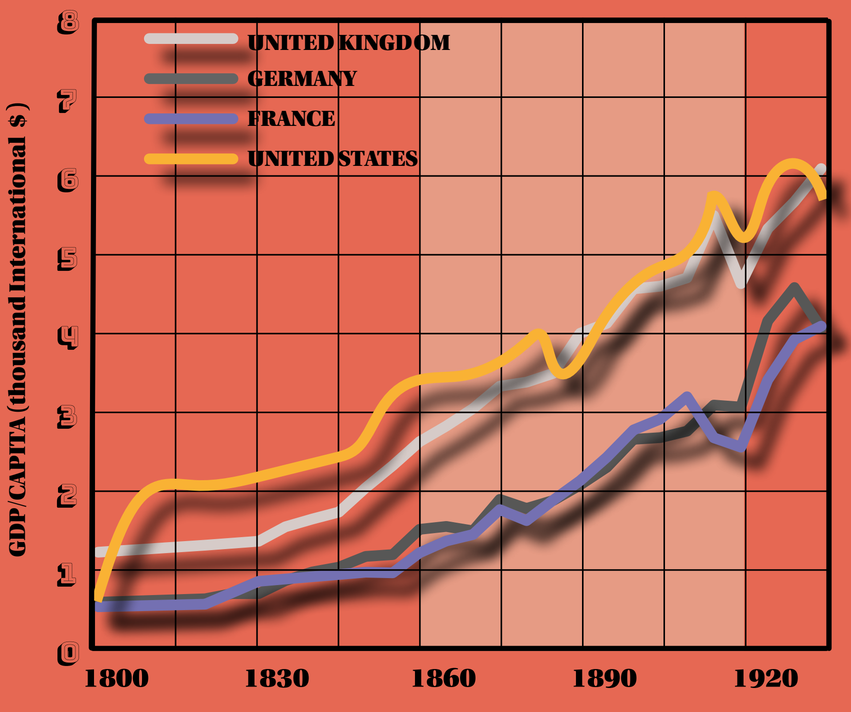
If during the First Industrial Revolution, the focus was on the use of the energy and muscles, during the Second Industrial Revolution, the focus was on the use of the brain and the information technology (Korten, 2001). This effect had an immediate benefit on the lifestyle. These benefits were in favour not only of the producers but also consummators.

This second phase of the industrial revolution very often is considered as a technological revolution. During this period vast range of inventions were developed in different fields of the industry. Electricity, chemistry, petroleum, and steel were the biggest inventions when discussed the Second Industrial Revolution (Adler & Pouwels, 2012). Most significant developments included the incorporation of the steam turbine burnt by oil and the steel ships working with internal combustion. The development of the airplanes is to be mentioned. The transport was improved significantly, same as the living conditions of people. As well to be mentioned is the invention of the telephone, the commercialization of the automobiles, the different ways of food preservation as the fridge, improvement of the processes that included canning and the mass production of consumed goods. The objectives included not only mass production but also the quality of the goods. These objectives led to other inventions that would come after.

In the middle of the 19th century, the growth of the usage of steamboats and moreover the railways were the main focus. Bessemer invented one of the most revolutionary inventions, the steel, much before 1871. Together with Siemens, tried to produce steel that was not only cheaper but lighter, making transport in general faster.



GRAPH. 1.2.1
Relative per capita levels of industrialization, 1750-1910. United Kingdom has the value of 100 at 1900. Values are triennial annual averages, except for 1913 Source: Paul Bairoch, "International Industrialization Levels from 1750 to 1980," Journal of European Economic History (1982) v. 11.



GRAPH. 1.2.2
GDP per capita between 1500 and 1950 in 1990 International Dollars for selected nations Source: Contours of the World Economy, 1–2030 AD. Essays in Macro-Economic History by Angus Maddison, Oxford University Press, 2007.

These developments interfered social life. The families, their life, the way of society set up, security, living standards, even the wages were impacted by the happenings of the Second Industrial Revolution. Also, the economic systems changed having the structure they have nowadays (Spielvogel, 2012).

From the point of view of the economy, the most important invention of the Second Industrial Revolution is the so-called "*American System of Manufacturing*", based in the assembly process of different parts produced in mass individually. The manufacturing would not be so successful without the interchangeable components. Interchangeable parts were not an invention, but it was a novelty that changed the way of manufacturing. It was possible to produce more in a short time helped by other micro invention and the presence of the steel. Anyway, the system was not supported massively until 1850. When the Civil War was finished in the U.S, the mass production processes were hugged widely in the U.S. and later in Europe.

The products done through the interchangeable manufacturing proved that are superior and replaced the work of artisans. Significant for the time was the development of a system that would make the process flow from one sector to another. At the end of the 19th-century, low processes were present and adopted widely. It was Henry Ford which combined both the flow process with the interchangeable parts at his automobile assembly plant, allowing him to produce in mass and with low-cost products that were very complex introducing the personal automobiles to the average people. Ford's great success was based in the fact that he developed this manufacturing process at the end and this success was not dedicated only to the inventor but also to the ones who were keen to accept the new methods (Giedon, 2013).

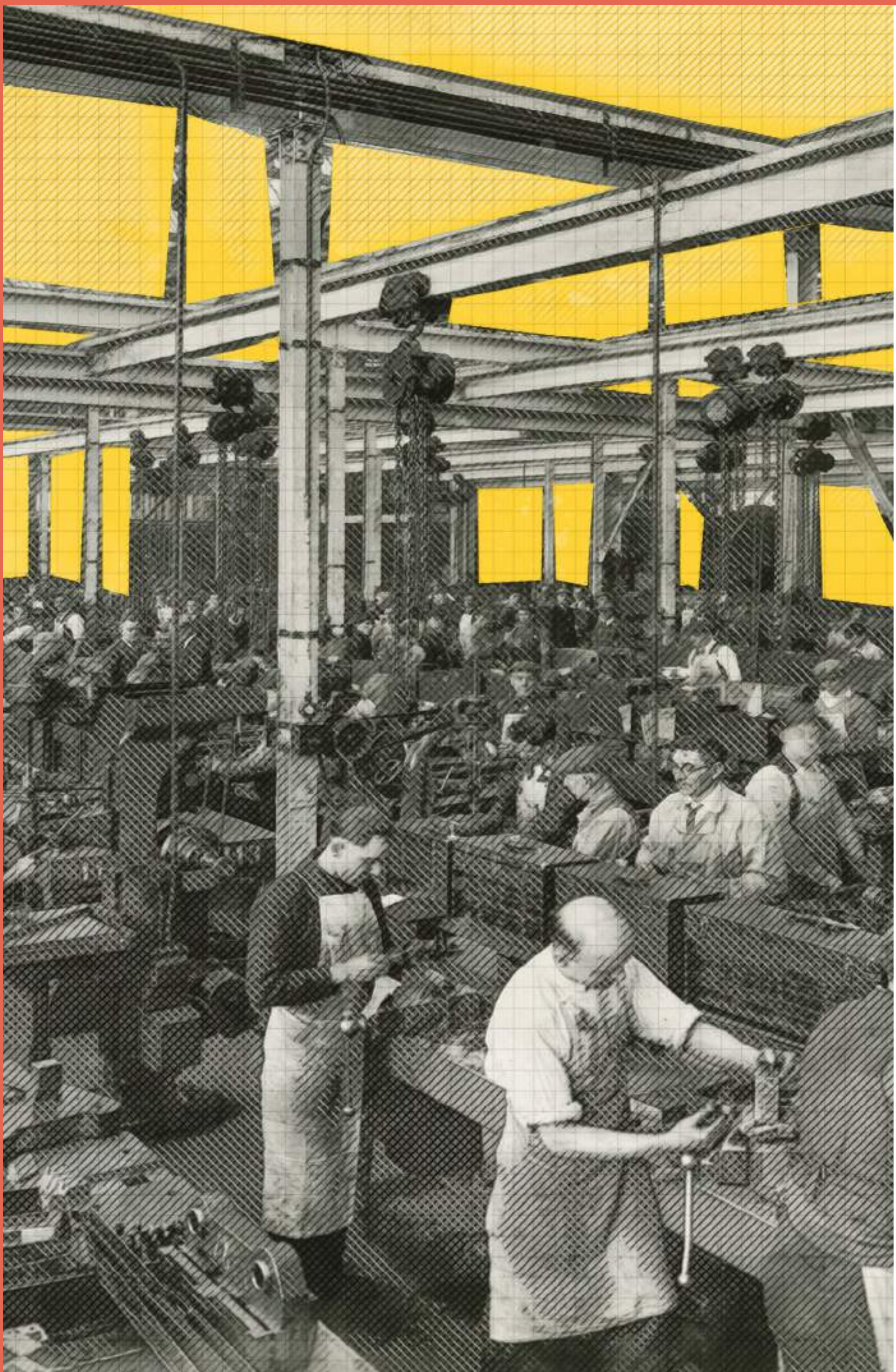


FIG 1. 2.2
(PAGE 33)
Illustrations of Ford Assambly Line. Workers in the tool and die department in the pressed-steel building at the Ford River Rouge plant,Detroit MI.
Credit: The Henry Ford Museum
Source: https://www.pbs.org/wgbh/american-experience/features/-gallery-henryford/

1.2.3 THE INVENTIONS THAT CHANGED THE WORLD

Steel - From 1850, the iron time was finally established. However, for many uses, the wrought iron was inferior compared to the steel. Iron usage for machine parts or the rails was expensive and challenging to work with and not enough elastic. The focus was not to make steel but to produce it cheaply. Henry Bessemer solved this problem in 1856. The development of the steel industry following his invention made him a symbol of the technology of the second industrial revolution; meanwhile, the steel gets this important place during this period other inventions were blurry.

Cheap steel quickly found extensive use beyond the initial intention and the needs of the time; from 1880, buildings, ships, and the rails were made of steel. Steel became the primary material that cars, guns, and others were made, including the tools to make them.

INVENTIONS

Chemicals - In chemistry, the Germans took the lead. In 1849 Justus von Liebig published Organic Chemistry in Its Applications to Agriculture and Physiology that explains the importance of the fertilizers and support the usage of the chemicals in agriculture. Together with Wohler, Bunsen, Gmelin, and so on, they created the modern organic chemistry. This was an example of how scientific knowledge would impact production techniques.

Chemistry also started the way to artificial materials. Charles Goodyear, an American tinkerer, discovered in 1839 the vulcanization process of the runner that made possible its usage widely in industry. Another American, John Wesley Hyatt, had success in the creation of the synthetic plastic in 1869, which he called celluloid. Anyway, the expansion of the synthetic materials did not happen until 1907, when another American born in Belgium Leo Baekeland invented the Bakelite.

The usage of drugs and anesthetic started to be massive. Disinfectants and antiseptics, especially phenol and bromines, were produced in mass during this period. Another success in the chemistry of the time was the invention of the aspirin by Felix Hoffman.

Electricity - Like the chemicals, electricity was a field of total new applied knowledge, solving a lot of problems, including the economy. The economic potential of electricity was seen from the beginning of the 19th century. First effective application of electricity was not in the transmission of power but was applied in the communication. The use of electricity as a tool to transmit power was technically much more complicated than the development of the telegraph. Before the distribution of it needed to have an efficient way to generate electric power using other sources of energy and needed a practical way to transmit electricity in big distances. The generators were crucial at this point. After the developments in the middle of the 1860s of the generation principals, the arc lamp became practical. Afterward, the factories, streets, railway stations, and other public spaces started using arc lamp instead of the gas lamp. On December 31, 1879, Thomas Edison demonstrates the first practical incandescent light bulb by lighting up a street in Menlo Park, New Jersey. The first modern power station in the world was built by the English electrical engineer Sebastian de Ferranti at Deptford. Built on an unprecedented scale and pioneering the use of high voltage (10,000V) alternating current, in 1891.

The use of electricity was expanded fast. In Berlin in 1879 a miniature electric railway was exposed in an exhibition; the electric blanket and hot plates appeared in the Vienna exhibition in 1883; electric street-cars were already running in Glasgow and Frankfurt from 1884.

Transportation - Until 1870, the use of the steam power remained a novelty, but those remained to be products of the First Industrial Revolution. The railways became faster, safer, and more comfortable during this period, but all as a result of micro inventions and not a revolutionary one. In 1897 was invented the Diesel engine which fount use during this period and the use of electric locomotives.

What changed the most during the Second Industrial Revolution was the ships. First, from 1870 more and more ships were built with steel. This made possible the built of bigger ships. The discovery of the steam turbine, by Gustav de Laval and Charles Parson in 1884, was a revolution at sea; the rotary motion of the turbine made possible the move with high speed. As a result, the cost of transportation decreased, and other consequences followed as a result of the technological improvements (Harley, 1988).

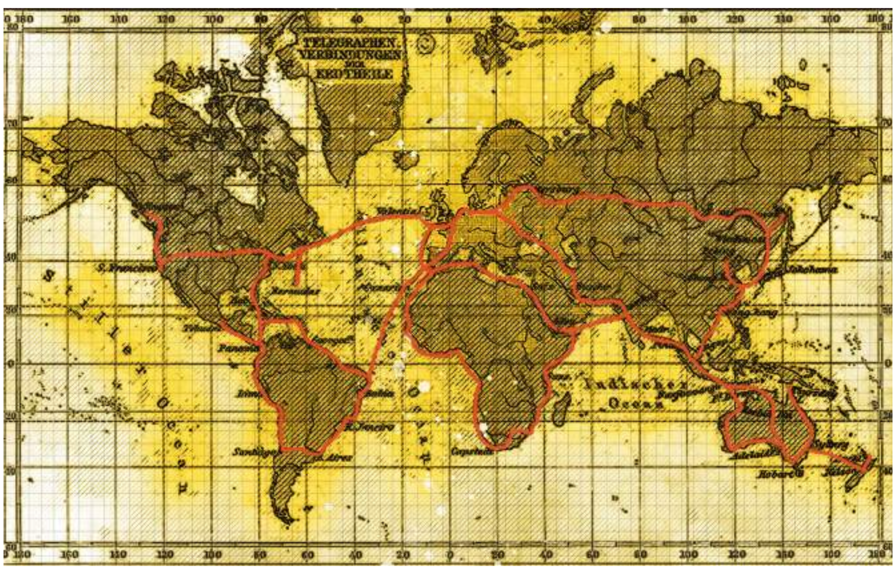
During the 19th century, mechanics were trying to create a device that would allow people to move fast while seated. Until John K. Starley, built the Rover safety cycle in 1885, making possible that the balanced position and easy steering to be the basics of the bicycle that we use today. The bicycle became a mass transport device with uncountable effects on the life of people and urban residential patterns.

A classic case of the combination of the existing technology, helped by some original contributions, was the development of the automobile. During the 19th century, many inventors tried to work toward a solution, considering all the advantages of the internal combustion engine over steam. A model of a gas engine that could work was built by Jean Etienne Lenoir in 1859 and was improved in Otto was an amateur with no technical education, but his engine is still the heart of most automobile engines. The gas engine had, which was not only its silence but the fact that was easily manageable to turn on and off. Very soon, this engine would adopt a new fuel (Adler & Pouwels, 2012).

In 1885, Gottlieb Daimler, and Karl Benz from Germany succeeded to build an engine similar to Otto's. The Dunlop pneumatic tire, which was made first for bicycles, found use in the new automobiles. Other inventions dated around 1900 include radiator, differential, the steering wheel, and the brake pedal. The effect of bicycles and automobiles in society was huge and would be compared with the invention of the mechanical clock five centuries earlier. Although the need for much research and inventions, the combination of these with the nineteenth-century ideas of interchangeable parts and mass production, and possible that by 1914 Henry Ford managed to sell almost a quarter of a million from the famous model T automobiles per year.

Being able to fly is an example of how formal knowledge and the experience combined bringing one of the most amazing micro inventions of the history, the first successful heavier-than-air powered aircraft by Wright Brothers at Kitty Hawk in 1903, The airplane is an example of new mode of technological progress of the time; informal and formal knowledge together made it possible to produce a discontinued event followed by other micro inventions that all together produced a significant industry.

MAP 1.2.3
Major telegraph lines in 1891. Source: Telegraph Connections (Telegraphen Verbindungen), 1891 Stielers Hand-Atlas, Plate No. 5, Weltkarte in Mercators Projection



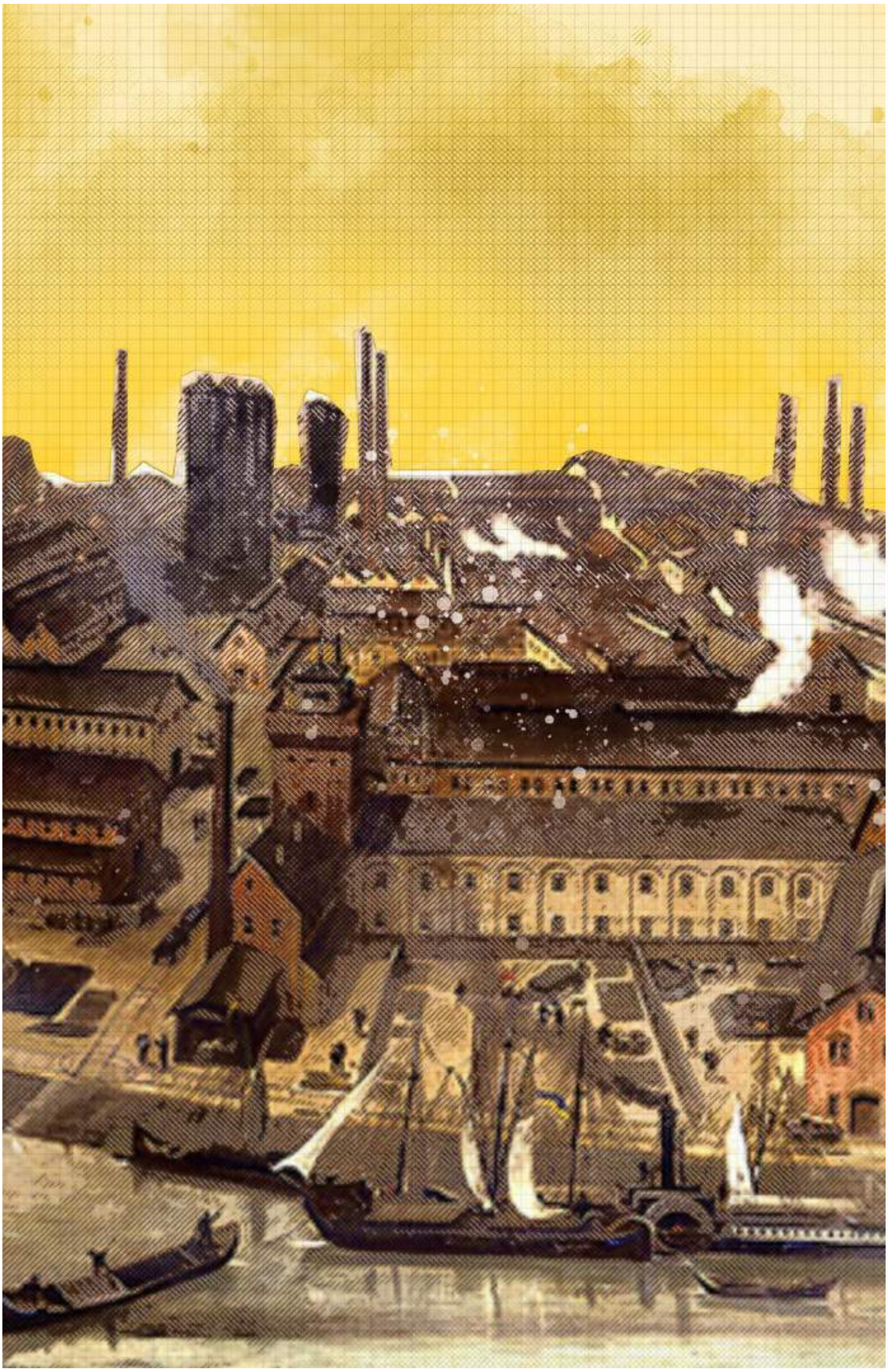


FIG 1.2.4
Illustration by Robert Friedrich Stieler (1847–1908)
The BASF-chemical factories in Ludwigshafen, Germany, 1881
Source: https://www.basf.com/de/company/about-us/

1.2.4 SOCIAL AND URBAN IMPACT OF THE SECOND INDUSTRIAL REVOLUTION

SOCIAL AND URBAN IMPACT

The work done by the workers was reduced during the Second Industrial Revolution, this way making possible more focus in the social life. This revolution went toward the reduction of the manual work, and consequently, the workers were losing their jobs.

Migration also was an element that contributed to the working places and made it possible that people move from a center to another to find jobs. Migration disoriented the life of families as it was hard to move and adopt to the new life.

Education during the Second Industrial Revolution became technical. There was a high demand for qualified labors able to direct technological operations. The technical schools became popular, and the workers could feel an immediate effect after the training.

More time was available to travel, this helped by the progress of the railways and other ways of transport. The communication was also changed during this period. This had an impact on social relationships (Synott, 2004).

The urban growth continued as never before, and the common illnesses tended to spread fast. The density of the population increased, and the sanitary problems were still present. Anyway, the sector of services was created during that time and was adapted to the new lifestyle.

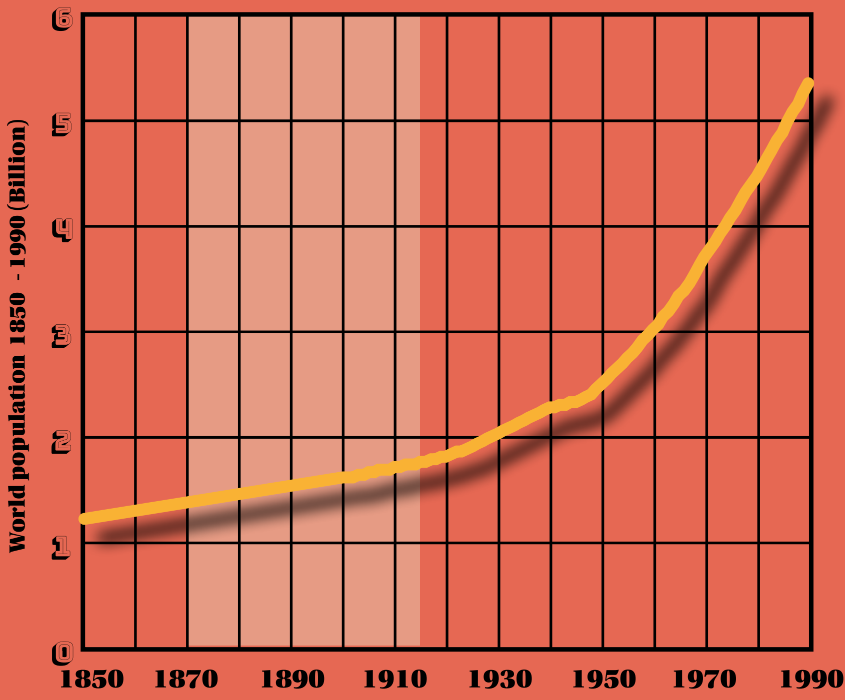
The way how the business was directed changed. The moral rules and social behavior became the order of the time and controlled the relations of families and society. The work of women was underpaid and sometimes unpaid. The slaves did not have any wage, too, and this created a form of racism with white supremacists. Men were favored during this period.

It was Henry Ford that introduced an idea that impacted the wages and as a consequence, the life of the workers. This was made to improve the worker's efficiency at work and became an agreement in 1933 that included a social security system. Being that the security was getting better and the equality was more present, the living standards changed drastically.

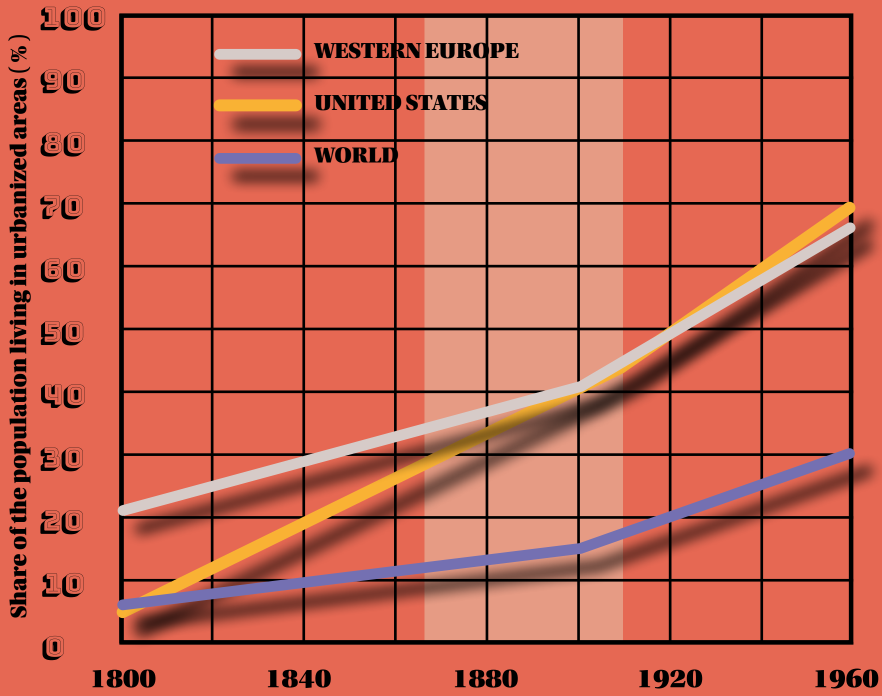
The population growth was present in every nation because of this revolution. The families could afford to take care of their members.

There was an improvement in the living standards and more education for the working class. On the other hand, only parts of the globe could feel the influence of this revolution, especially the highest classes. The fact that the effects of this revolution continue to be present even today makes it one of the most critical moments of human history.

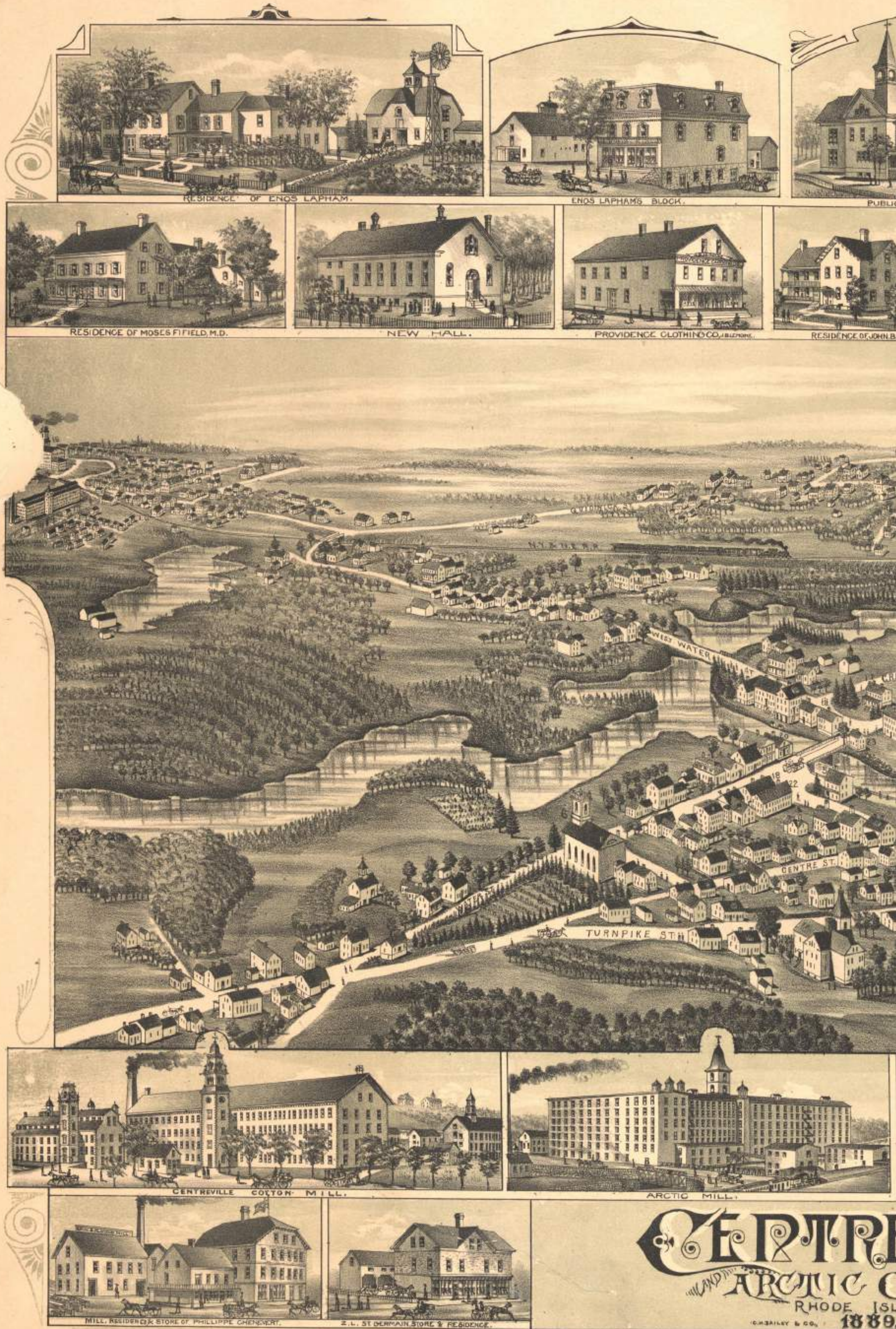
FIG 1.2.5 (PAGES 40-41)
Centerville, Rhode Island, 1889, a Mill Town at the Height of the SIR
Source: https://places.branipick.com/centerville-rhode-island-1889-a-mill-town-at-the-height-of-the-second-industrial-revolution/



GRAPH. 1.2.3
World population 1850-1990 Source: World Population over 12000 years - various sources (2019), Medium Projection – UN Population Division (2019 revision)



GRAPH. 1.2.4
Share of the total population, in Western Europe, United States ans World between 1800-1960. Source: Historical urban fraction estimate per region (HYDE 3.1 (2010))



A—Centreville Station, N. Y. & N. E. R. R., W. A. Rouse, Agt. 2. Arctic Station. 3 Anthony Station. 4 Centreville Post Office, Geo. Haddock, P. M.; L. C. Greene, Pharmacist. 5 Centreville National and Savings Bank. 6. M. E. Church. 7. St. John the Baptist Church (Catholic). 8. Convent. 9. M. E. Chapel. 10. Salvation Army Barracks. 11. Public

12. New Hall, J. P. Gibson, Proprietor. 13. Centreville Cotton Mill. 14. Kent Woollen Mill. 15. Arctic Cotton Mill. 16. Coventry Co. Cotton Mill. 17. Dake & Wood, General Store. 18. Perkins & Bigelow, Meat and Vegetables; P. Laravie, Boots and Shoes. 19. Moses Fifield, M. D., Physician and Surgeon. 20. Daniel Tibbetts, Variety

21. Town Hall. 22. L. C. Merrill, Carriage Maker and Undertaker. 23. S. M. Clarke, Stoves, Tinware, etc. 24. Albert Tyler, Variety Store. 25. J. W. Carpenter, Saw Mill. 26. Milton H. Arnold, Lumber, Hardware and Mason's Supplies. 27. Edward Tato, Photographer. 28. Providence Clothing Co.

30. Philippe Chenevert, Contractor and dealer in Sash and Blinds. 31. Levi A. Langley, Dry Goods, Boots and Shoes. 32. W. H. Place, Carriage and Blacksmith Shop; John H. Ward, Carriage and Sign Painting. 33. G. N. Fairbanks, Variety Store. 34. Patrick McMahon, Build-

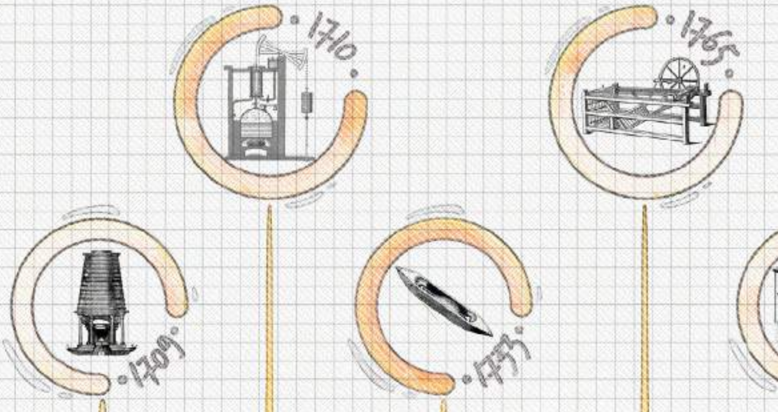
35. Lawton's Wood and Coal Yard, E. G. Lawton, Agent. 36. Lewis E. Williams, Carriage Repository, 37. M. G. E. Legris, M. D., Physician and Surgeon. 38. Frederick E. Matteson, Contractor and Builder. 39. Herbert B. Barton, Civil Engineer

41. Kilaire Roussie, Hair Dressing Rooms. 42. Joseph Suprenau, M. D., Physician and Surgeon. 43. John Herbert, Hair Dressing Room. 44. J. B. St. George, General Merchandise. 45. W. Bouthillier, Watch Maker and Jeweller; M. L. McManus, Tonsorial Artist; Joseph Bryant, Eating

TIMELINES OF THE FIRST AND S

FIRST INDUSTRIAL REVOLUTION

- MECHANIZATION, STEAM POWER, WEAVING LOOMS
- LARGE-SCALE TRANSPORTATION WITH STEAM-POWERED VESSELS AND RAILWAYS
- REPLACING HUMAN AND ANIMAL POWER WITH MACHINES



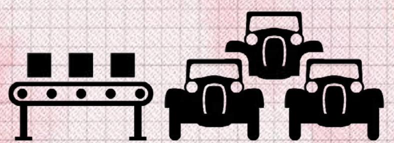
ABRAHAM DARBY DISCOVERES HOW TO MAKE COKE FROM COAL – A MORE EFFICENT FUEL IN THE PRODUCTION OF IRON.

THOMAS NEWCOMEN BUILDS A STEAM ENGINE TO PUMP WATER FROM COALMINES.

JOHN KAY INVENTS THE FLYING SHUTTLE, ALLOWING WEAVERS TO MAKE LARGER SECTIONS OF FABRIC AT GREATER SPEED, INCREASING DEMAND FOR YAM.

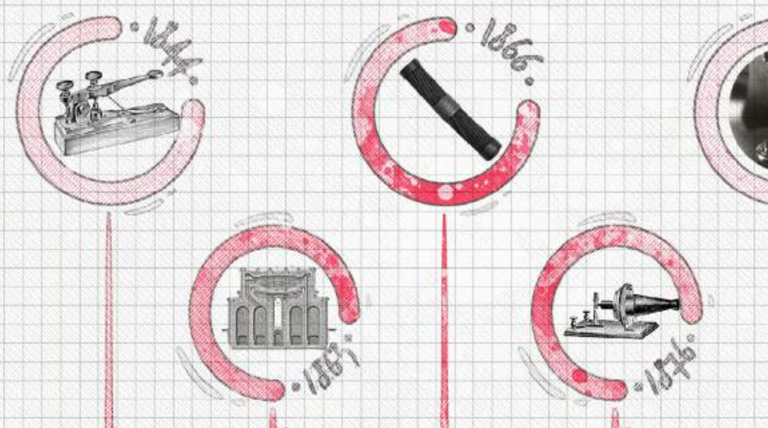
JAMES HARGREAVES' SPINNING JENNY ALLOWS ONE WORKER TO MAKE EIGHT TIMES THE PREVIOUS AMMONT OF YARN.

(REA S



SECOND INDUSTRIAL REVOLUTION

- ELECTRICITY, ASSAMBLY LINE, MASS PRODUCTION
- INTERNAL COMBUSTION ENGINES, AUTOMOBILES
- RADIO AND TELEVISION



SAMUEL MORSE INVENTS THE TELEGRAPH.

BULK STEEL CREATION IS MADE POSSIBLE THROUGH THEOPEN-HEARTH PROCESS CREATED BY SIEMENS-MARTIN; THE USE OF STEEL COMBINED WITH REINFORCED CONCRETE ENABLES THE CONSTRUCTION OF SKYSCRAPERS.

FIRST TRANSATLANTIC TELEGRAPH CABLE LAID.

ALEXANDER GRAHAM BELL PATENTS HIS 'ACUSTIC TELEGRAPH', OR TELEPHONE

THOM PERF INCANDE I

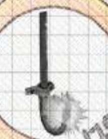
ECOND INDUSTRIAL REVOLUTIONS

1775

JAMESA WATT
ATES AN EFFICENT
TEAM ENGINE.

1779

STEAM-POWERED MILLS WITH AUTOMATIC WEAVING MACHINES BEING TO BE BUILT.



1792

WILIAM MURDOCH USES COAL GAS FOR HOUSE LIGHTING.

1793

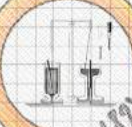
ELI WHITNEY INVENTS THE COTTON GIN 9ENGINE), WICH CLEAN LARGE QUANTITIES OF RAW COTTON.

1801

RICHARD TREVITHICK INVENTS THE SEAM-POWERED LOCOMOTIVE.

1811

RIOTS BEGIN, LASTING UNTIL 1815, IN WHICH WORKERS SMASH UP FACTORIES AND EQUIPMENT IN PROTEST, FEARING MACHINES WILL REPLACE THEM. TRHESE PEOPLE BECOME KNOWN AS LUDDITES.



1821

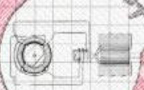
MICHAEL FARADAY DEMONSTRATES THE PRINCIPLE OF AN ELECTRONIC MOTOR.

1879

AS EDISON
FECTS THE
SCENT LIGHT
BULB.

1885

KARL BENZ USES AN INTERNAL-COMBUS-TION ENGINE IN THE FIRS 'AUTOMOBILE'



1887

NICOLA TESLA DEVELOPED AN INDUCTION MOTOR THAT RAN ON ALTERNATING CURRENT (AC), A POWER SYSTEM FORMAT THAT WAS RAPIDLY EXPANDING IN EUROPE AND THE UNITED STATES.

1901

THE FACTORY ACT IN GREAT BRITAIN RAISES THE MINIMUM WORK AGE TO 12 YEARS OLD.

1903

THE WRIGHT BROTHERS CARRY OUT THE FIRST POWERED HEAVIER-THAN-AIR FLIGHT.

1908

HENRY FORD USES A PRODUCTION LINE (ASSAMBLY LINE)TO PRODUCE THE FORD MODEL T.

1914

HISTORIANS OFTEN PLACE THE END OF THE SECOND INDUSTRIAL REVOLUTION WITH THE START OF WORLD WAR I IN 1914.

1.3 DIGITAL REVOLUTION
1.3.1 HISTORICAL OVRVIEW

HISTORICAL OVERVIEW

The Third Industrial Revolution started in 1969 when the Advanced Research Projects Agency Network was developed. This was a new packet switching network and the first network to implement the protocol suite TCP/IP, entering a new era of internet development and with it the age of information. As the previous revolutions, the Third Industrial Revolution was led by the technological developments in the production, distribution, and energy sources. This revolution was global but also local, creating this way the term "*glocal*" and its impact was present in the lifestyle, the management of the cities and regions.

The Economist would describe it: "*As manufacturing goes digital, a third great change is now gathering pace. It will allow things to be made economically in much smaller numbers, more flexible and with a much lower input of labor, thanks to new materials, completely new processes such as 3D printing, easy-to-use robots and new collaborative manufacturing services available online. The wheel is almost coming full circle, turning away from mass manufacturing and towards much more individualized production. And that in turn could bring some of the jobs back to rich countries that long ago lost them to the emerging world*" (The Economist, 2012).

Led by the advancement of the internet, fast communication, and metadata, the Third Industrial Revolution would see a shift on labor as the most significant element of the production. Most likely, this revolution will bring a further reduction of the report of work to the capital ratio. Information Technology will create an automated, robotic, and technology-dependent working, living, and travel environments. There will be an increase of the local production helped by the latest technology, internet potential in the trade, and advancements regarding the sustainable renewable energies, wind, sun, and resources.

According to Rifkin there are 5 columns that support the Third Industrial Revolution: (I) developing the renewable energy sources; (II) transformation of the building stock into green micro-power plants to collect renewable energies on-site; (III) deployment of hydrogen and other storage technologies in every building and throughout the infrastructure to store intermittent energies; (iv) use of Internet technology to transform the power grid of continents into an energy internet that acts just like the internet; and (v) transition of the transportation toward electric plug-in and fuel cell vehicles. Tesla lately has launched the Powerwall battery, which has the potential to make building self-sufficient for energy cell with its three-day storage capacity.

A transformation leader of this revolution is the 3D printing and robotics for the production and services. Rifkin explains that the manufacturing process is going toward the so-called "*lights out*" production, which means worker-less production. 3D printing will reduce the costs to almost zero, and the economies of scale might disappear industries like fashion and pharmaceuticals with products being locally produced (Rifkin, 2013).

"*Everything in the factories of the future will be run by smarter software. Digitization in manufacturing will have a disruptive effect every bit as big as in other industries that have gone digital, such as office equipment, telecoms, photography, music, publishing, and films. And the effects will not be confined to large manufacturers; indeed, they will need to watch out because much of what is coming will empower small and medium-sized firms and individual entrepreneurs. Launching novel products will become easier and cheaper. Communities offering 3D printing and other production services that are a bit like Facebook are already forming online—a new phenomenon that might be called social manufacturing*" (The Economist, 2012).

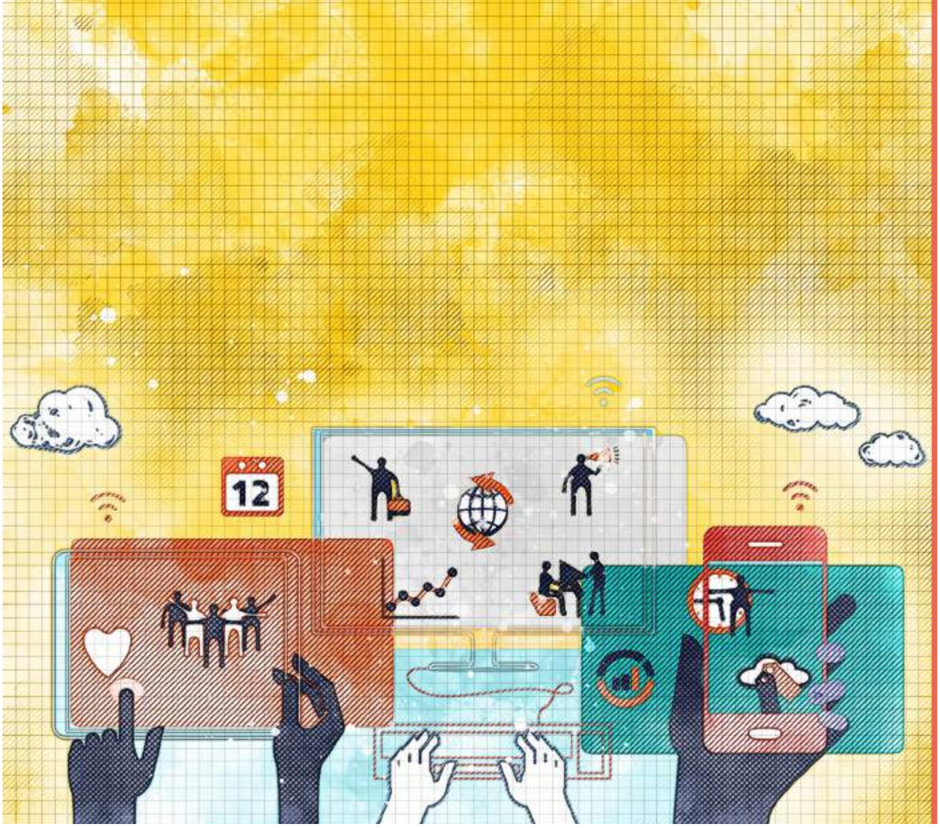


FIG 1.3.1
Illustration of the Digital Revolution showing the reality of the digital World seen from a screen.

1.3.2 POSSIBLE IMPACTS OF THE THIRD INDUSTRIAL REVOLUTION

Third Industrial Revolution has impact in every aspect of society. The most noted effect has been in the technological development and the explosion of knowledge. Started as a request by the business to reduce costs of production and services in more extended markets. This development later extended in the medical, economy, defense, agriculture, construction, and governmental services.

The third Industrial revolution has influenced every sector of the local and international economies; Anyway, the impacts is not the same for every sector and not at the same time. The main characteristic of the third Industrial Revolution is the movement toward the nanotechnology, new materials, intelligent systems, robotics, and 3D printing. These advancements in the technology will bring changes in the way how the goods and services are produced; how the management of systems and logistics systems are managed; how the practices are designed and developed and the life cycle of the materials (Rifkin,2011).

IMPACTS

The Third Industrial Revolution has changed the nature and spatial location of the production drastically; capital/labor cost ratio, and will have a focus on time delivery costs and efficiencies of distribution. Increasing the demand and decreasing the unit cost in the production and creating a territory for designer-driven products. It is also providing equity of access to the goods and services in areas which are not able to create advantage through economies of scope and scale.

The Third Industrial revolution is changing the way we look at the economics of agglomeration and clusters. This means that industries like pharmaceuticals and fashion will be more personalized, and production will be focused more on small and more specialized local workshops and centers of activities. The emerge of virtual clusters of knowledge and innovation in groups of interest will also be very present and frequent. There is a presence of digital technology in manufacturing and especially in the original products. The distances and barriers don't exist anymore as a result of this revolution. The knowledge and information, also products are very quickly distributed through the systems of today.

1.3.3 THE THIRD INDUSTRIAL REVOLUTION AND ITS IMPACT ON HOW THE CITIES ARE DESIGNED

This developments in technology and production created by the Third Industrial Revolution are placing pressure on the government to respond to the needs with proper planning and managing of the cities. The reorganization of the industries, localization, glocalization, and the advancement of services sectors integrated into the technology that is more focused on the personalized needs offer new potential for the jobs to growth. It will still need time to convince the large corporations and supply chains system to invest in more localized manufacturing and distribution systems.

Many large multi-nationals are already advanced in this process, but still, we are far from a total coverage of the system. Some industries will remain location dependents, but the services may not. The high value-added products and services will likely stay in more centralized production centers, but the low-valued ones will be distributed in local production and even personalized.

The new materials and designs will have their impact revolutionizing the construction of new buildings, infrastructure, the environment where we live and will open up new opportunities

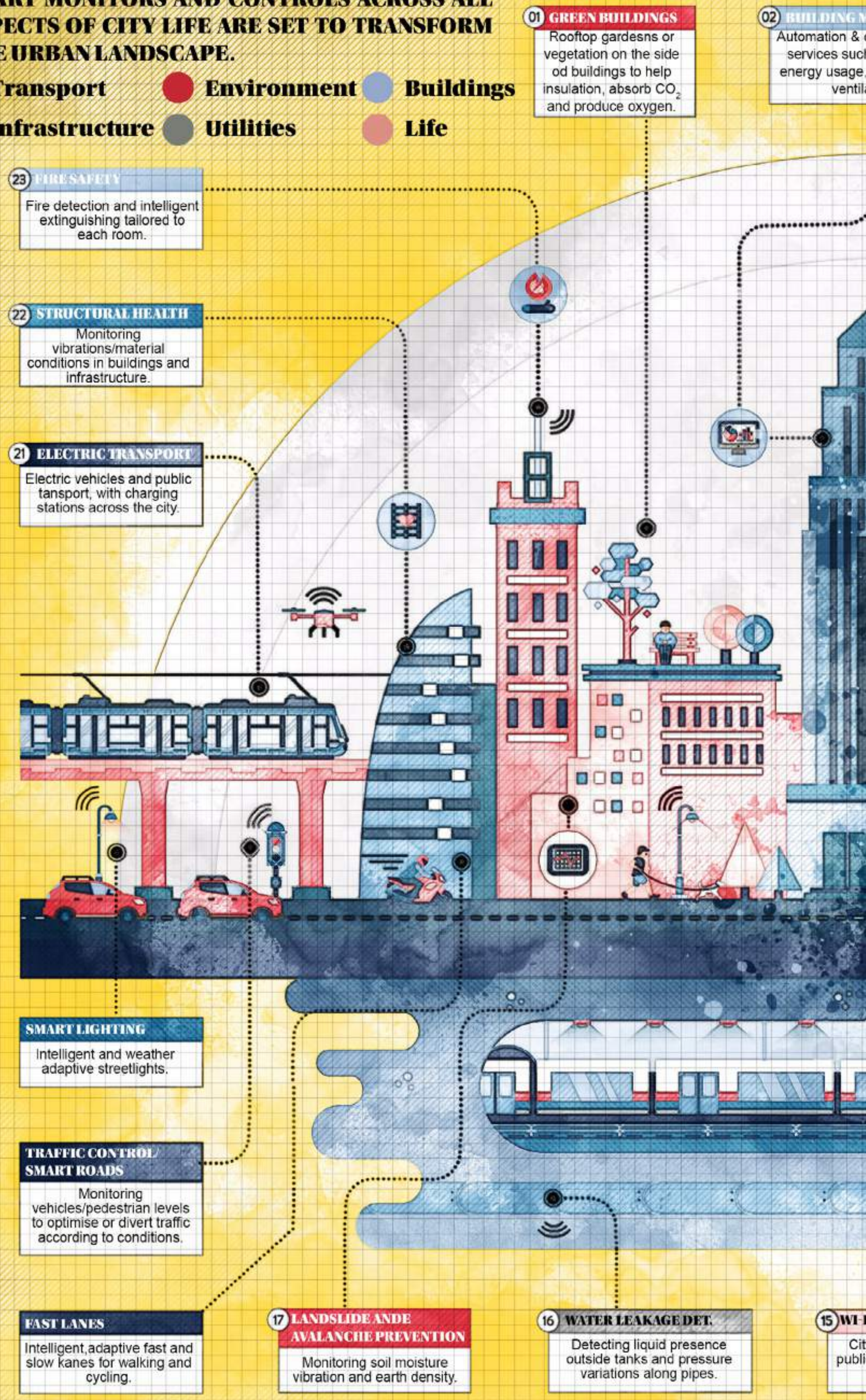
The impact that this revolution is having on planning is spreading widely and will need the cities to be prepared to take advantages of the novelties and manage in the best way the risks. New jobs will be created, but managing the cities is crucial to get most of this revolution, meaning that preparations must be done in terms of planning. Managers of cities must think in the future, imagine and prepare strategic plans and as consequence infrastructure to get the most. Planning, development, and change management of society must be more flexible to allow the changes to be adopted smoothly. The Third Industrial Revolution operates through a digital platform that connects integrated networks and systems that are continually changing. To have the best collaboration between people and the technology needs to be built and manage digital platforms that are strategically planed.

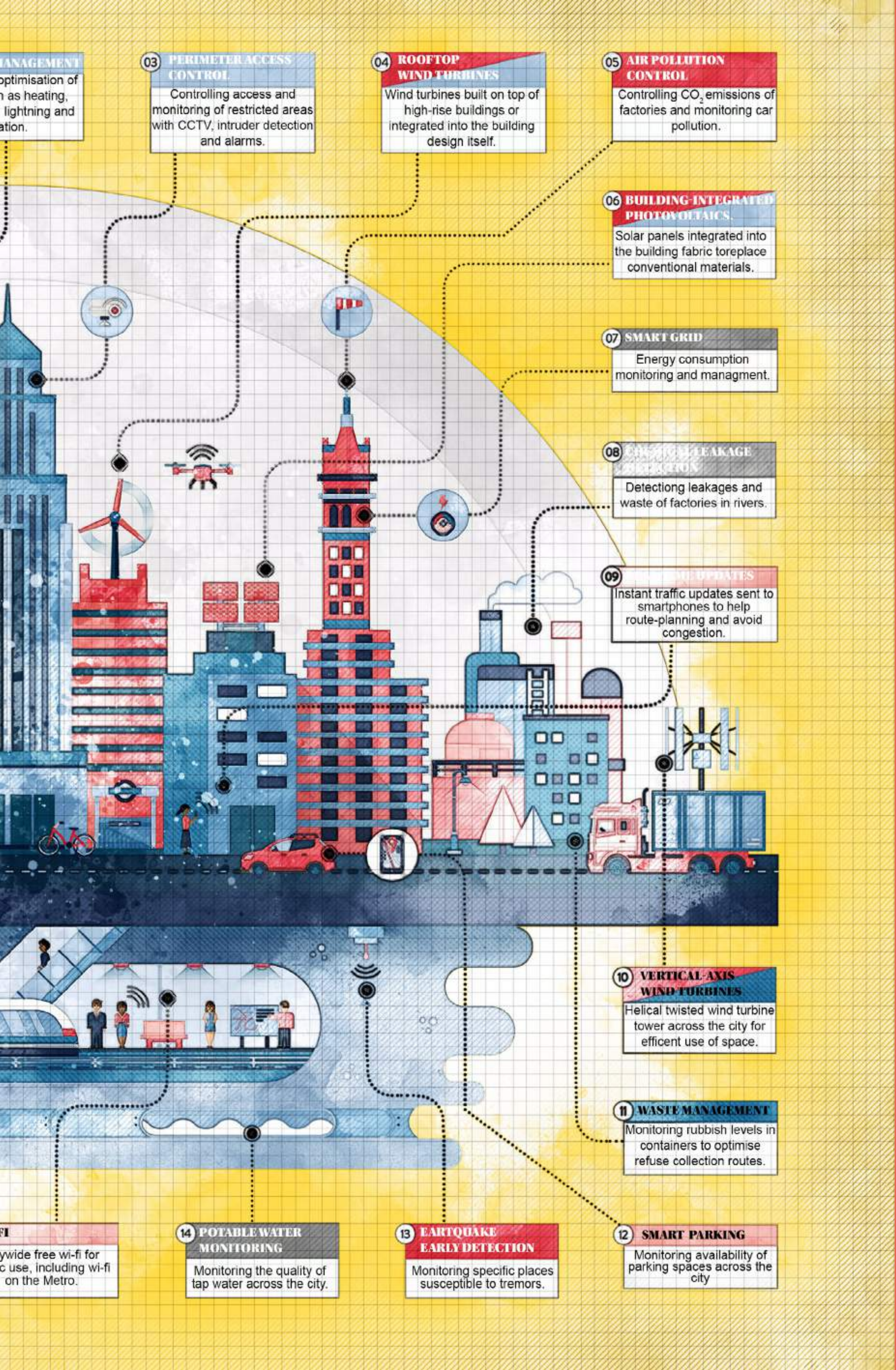
"People, machines, natural resources, production lines, logistics networks, consumption habits, recycling flows, and virtually every other aspect of economic and social life will be connected via sensors and software to the TIR platform, continually feeding Big Data to every node—businesses, homes, vehicles, etc.—moment to moment in real time. The Big Data, in turn, will be analysed with advanced analytics, transformed into predictive algorithms, and programmed into automated systems, to improve thermodynamic efficiencies, dramatically increase productivity, and reduce the marginal cost of producing and delivering a full range of goods and services to near zero across the entire economy" (Rifkin, 2013).

FIG. 1.3.2 (PAGES 48-49) *Smart solutions for smart cities will fall into six broad categories, transforming the urban landscape:*
1. Infrastructure
2. Buildings
3. Utilities
4. Transport
5. Environment
6. Life
Source: https://www.visualcapitalist.com/anatomy-smart-city/

SMART MONITORS AND CONTROLS ACROSS ALL ASPECTS OF CITY LIFE ARE SET TO TRANSFORM THE URBAN LANDSCAPE.

- Transport
- Environment
- Buildings
- Infrastructure
- Utilities
- Life





ANAGEMENT
optimisation of
n as heating,
lightning and
ation.
03 PERIMETER ACCESS CONTROL
Controlling access and monitoring of restricted areas with CCTV, intruder detection and alarms.
04 ROOFTOP WIND TURBINES
Wind turbines built on top of high-rise buildings or integrated into the building design itself.
05 AIR POLLUTION CONTROL
Controlling CO_2 emissions of factories and monitoring car pollution.
06 BUILDING-INTEGRATED PHOTOVOLTAICS
Solar panels integrated into the building fabric toreplace conventional materials.
07 SMART GRID
Energy consumption monitoring and managment.
08 LEAKAGE
Detectiong leakages and waste of factories in rivers.
09 UPDATES
Instant traffic updates sent to smartphones to help route-planning and avoid congestion.
10 VERTICAL-AXIS WIND TURBINES
Helical twisted wind turbine tower across the city for efficent use of space.
11 WASTE MANAGEMENT
Monitoring rubbish levels in containers to optimise refuse collection routes.
12 SMART PARKING
Monitoring availability of parking spaces across the city
13 EARTQUAKE EARLY DETECTION
Monitoring specific places susceptible to tremors.
14 POTABLE WATER MONITORING
Monitoring the quality of tap water across the city.
FI
ywide free wi-fi for
c use, including wi-fi
on the Metro.

49

1.3.4 THE IMPACT ON URBAN AND ARCHITECTURAL DESIGN

The revolution is influencing the land use in every level offering opportunity for growth pf secondary cities. These cities may be satellite cities that form a polycentric structure for metropolitan areas or can be cities that are located in an economic corridor development that creates more chances to integrate into the fabric of large cities and economies.

China and India are already moving toward the development of economic corridor cities building the necessary infrastructure and spreading the economic benefits beyond the big metropolitan cities. Smaller towns have the potential to produce first stage value-added products using the most advanced technology for lower costs than the metropolitan cities. The Delhi Mumbai corridor is the most prominent planning that includes this concept. It consists of the integration of 28 cities in six different states into one network.

It is likely to have an end of urban sprawl and suburban greenfield development. This is seen as long-term prediction as some of the most advanced economies as some efficient structures and systems are still missing. The growth of cities vertically and the extension of grey areas is inevitable, but still sustainable. Supporting the urban villages as a trend would need development through the increase of the density of cities. By this action is very likely to have cities with mixed-use developments in urban areas. In rural areas, the ones who like to have more space will find the right environment to live and work. Better transport and smart logistics will help toward this making the travel distance shorter and all with a green focus design.

The revolution has already changed the way how the buildings are designed. New technology and materials, multi-functionality, and energy efficiency have been considered as being driven by economic efficiency and technologies. New materials are making possible the build of structures that were never thought before as possible. The Third Industrial Revolution has also opened the vision on the way how the public spaces are designed and used. New technologies are making possible the building of structures that make use in its best of the air space also making possible the connectivity vertically and horizontally through the subterranean urban spaces.

The multi-functionality of the buildings is changing; for example, some are using energy sores harvesting solar energy for use during the hours of the peak. Building facades that take into consideration the power of the sun is helping on food production like in some Latin American cities, where rooftops will become green spaces for fruit and vegetable production.

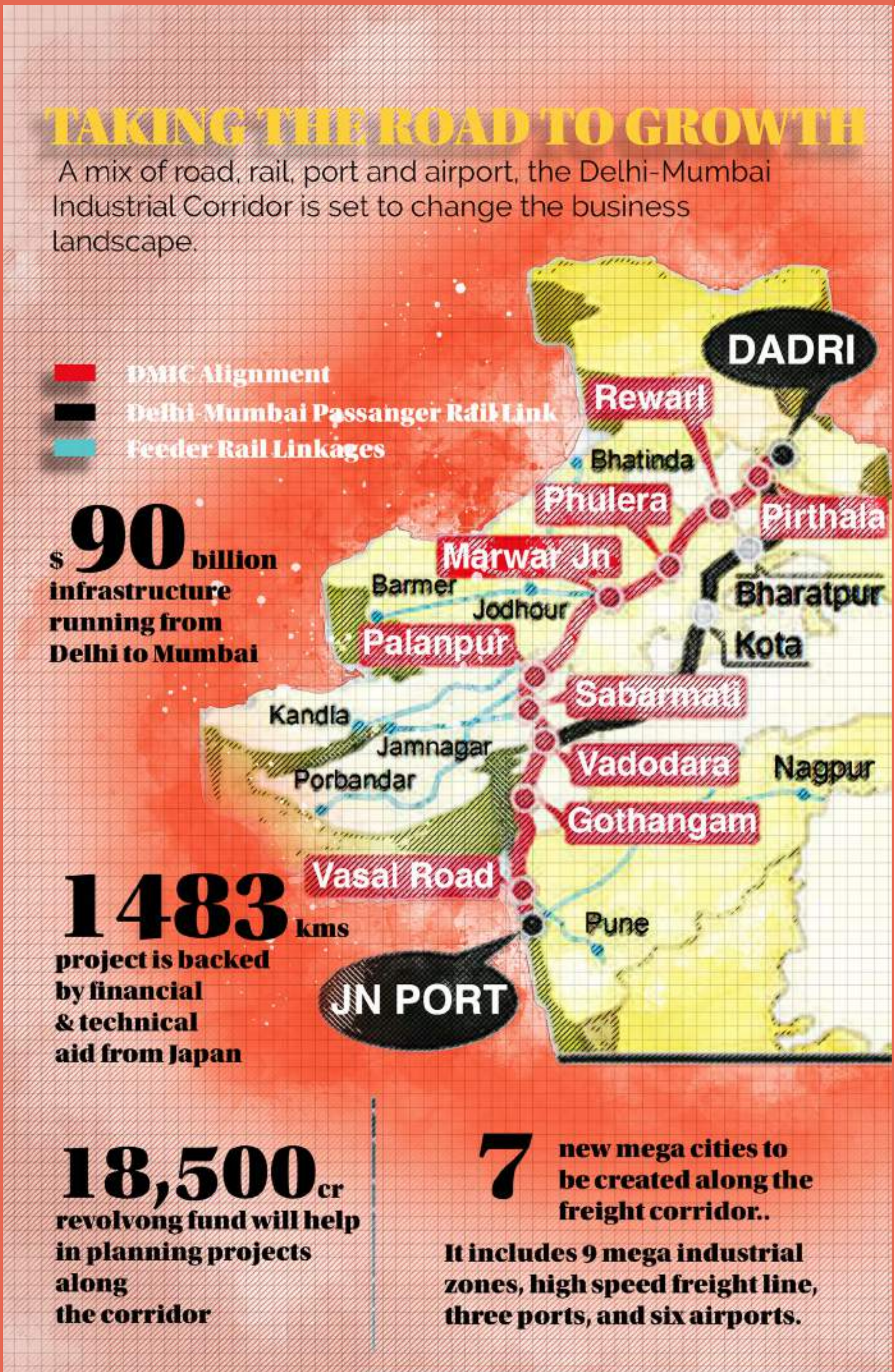


FIG 1.3.3
Delhi-Mumbai Industrial Corridor (DMIC) Source: https://economictimes.indiatimes.com/articleshow/9535583.cms

1.4 INDUSTRY 4.0

1.4.1 TOWARDS ANOTHER INDUSTRIAL REVOLUTION

The Fourth Industrial Revolution was first mentioned by Klaus Schwab, founder of the World Economic Forum; this revolution sees a world where individuals float between digital domains and offline reality with the help of connected technology making possible the managing of life. The speed and size of the changes coming in the Fourth Industrial Revolution are to be considered. These changes will impact power, wealth and knowledge. Only understanding this knowledge will be able to get the most of those, and we must ensure we reach all benefits. The Fourth Industrial Revolution involves computerization of life, product design, and production from a 3D printer, which will change the way we build up (Prisecaru, 2016). Now the Fourth Revolution is based on the Third Industrial Revolution, that started in the middle of the last century and has been characterized by a fusion of technologies which is making unclear the lines between physical and digital spheres.

There are three reasons why the today developments are representative of a new era, and not a continuation of the Third Industrial Revolution: velocity, scope, and system impact. The speed of transmitting the information has no historical precedent. The evolving of this revolution is at an exponential rather than a linear pace. It is changing every industry and the depth of these changes force a transformation and of entire ways and systems of manufacturing, management, and governance (Schwab, 2015).

Coming together with this revolution are lower barriers for the product to arrive the market, presence of the artificial intelligence, integration of different techniques and domains, better quality of the social life, and the network, Internet.

We are living the fourth industrial evolution, which has a different scale, speed, complexity, and power to transform. As industrial revolutions have moved from the use of machines for production in the First Industrial Revolution, to the mass production in the Second Industrial Revolution, and then to the digitalization and automation of production in the Third Industrial Revolution, the standards of living have improved. It can be mentioned that the effect of this revolution considering all the technological advancements can be much more impactful and can change the lifestyle much more than the previous revolutions.

All these changes and developments come with challenges. These include income inequality, cybersecurity and ethical dilemmas. Technology and advancements in science lead the transformation around the globe. We can see a transformation in how we live, work, and interact with other. Understanding the new technologies and their potential is important for the way how we plan and design.

INDUSTRY 4.0

There are different ways how the economy and life can be affected by the Fourth Industrial Revolution. The way how we exchange information and connect with people through social media. The way how we use the network platforms for marketing, sales, and distribution, improving the quality of goods and services. The way how we are involved in the production process asking for custom made products (Prisecaru, 2016).

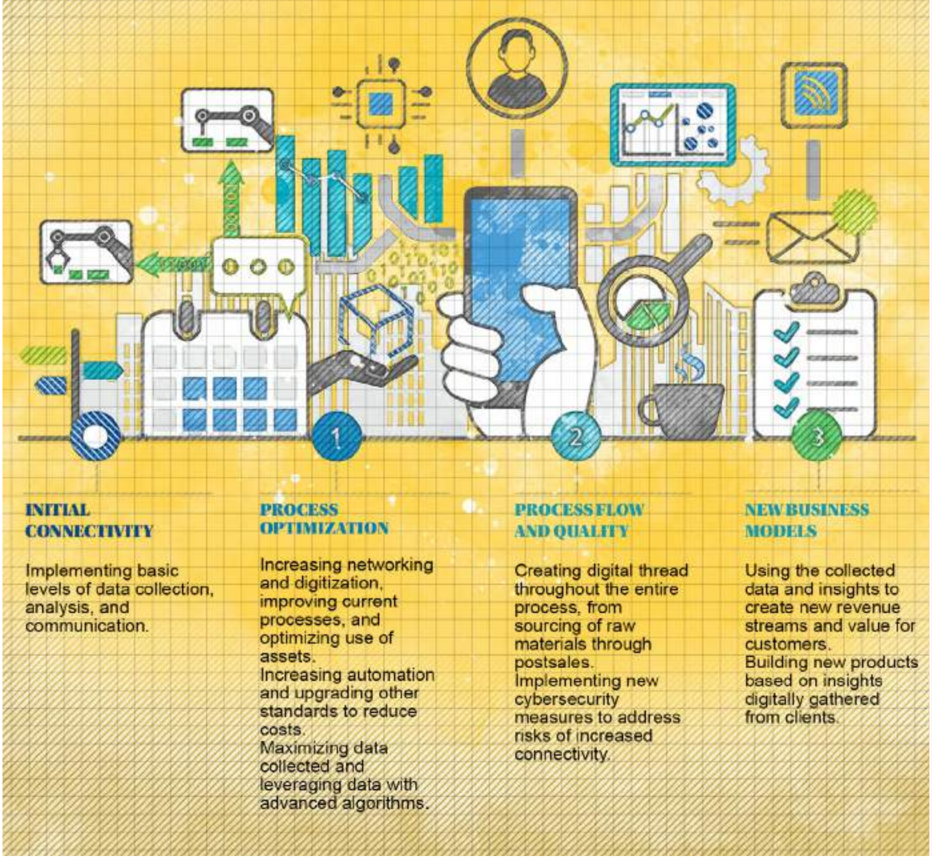
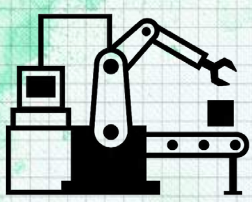


FIG 1.4.1
Three horizons of Industry 4.0. Manufacturers seeking entry into an integrated system require a basic level of connectivity. Once this connectivity is established, they can begin the journey toward integrating digitalization processes. This typically occurs in three different horizons: process optimization, process flow and quality, and new business models Source: Deloitte Analysis.

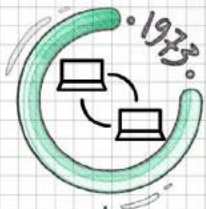
TIMELINES OF THE THIRD AND F



THIRD INDUSTRIAL REVOLUTION

- ELECTRONICS
- COMPUTERS
- AUTOMATION
- INFORMATION TECHNOLOGY

THE US DEPARTMENT OF DEFENSE'S ADVANCED RESEARCH PROJECTS AGENCY NETWORK (APARNET) DEVELOPS MANY OF THE PROTOCOLS USED FOR INTERNET COMMUNICATIONS TODAY.



ETHERNET IS INVENTED, THE FIRST SYSTEM FOR THE TRANSMISSION OF INFORMATION BETWEEN COMPUTER SYSTEMS.

ETHERNET IS STANDARDIZED. THE DOMAIN NAME SYSTEM (DNS) ESTABLISHES .EDU, .GOV, .COM, .ORG, AND .NET SYSTEM FOR NAMING WEBSITES.

TIM BERNERS-LEE, A SCIENTIST AT THE EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH (CERN) DEVELOPS THE HTML LANGUAGE AND INTRODUCES THE WORLD WIDE WEB TO THE PUBLIC.

THE
PAGE' I
TIM BE

FOURTH INDUSTRIAL REVOLUTION

- CYBERPHYSICAL SYSTEMS
- INTERNET OF THINGS
- SENSOR NETWORKS
- ADVANCED ROBOTICS
- BIG DATA
- MACHINE LEARNING
- 3D PRINTING

BITCOIN BECOMES THE FIRST WIDELY ACCEPTED FULLY DIGITAL CURRENCY.

BRING YOUR OWN DEVICE (BYOD) BECOMES MAINSTREAM.

GOOGLE BEGINS TESTING DRIVERLESS CARS.

51 OF US ADULTS REPORT THEY BANK ONLINE, ACCORDING TO A SURVEY CONDUCTED BY PEW RESEARCH CENTRE.

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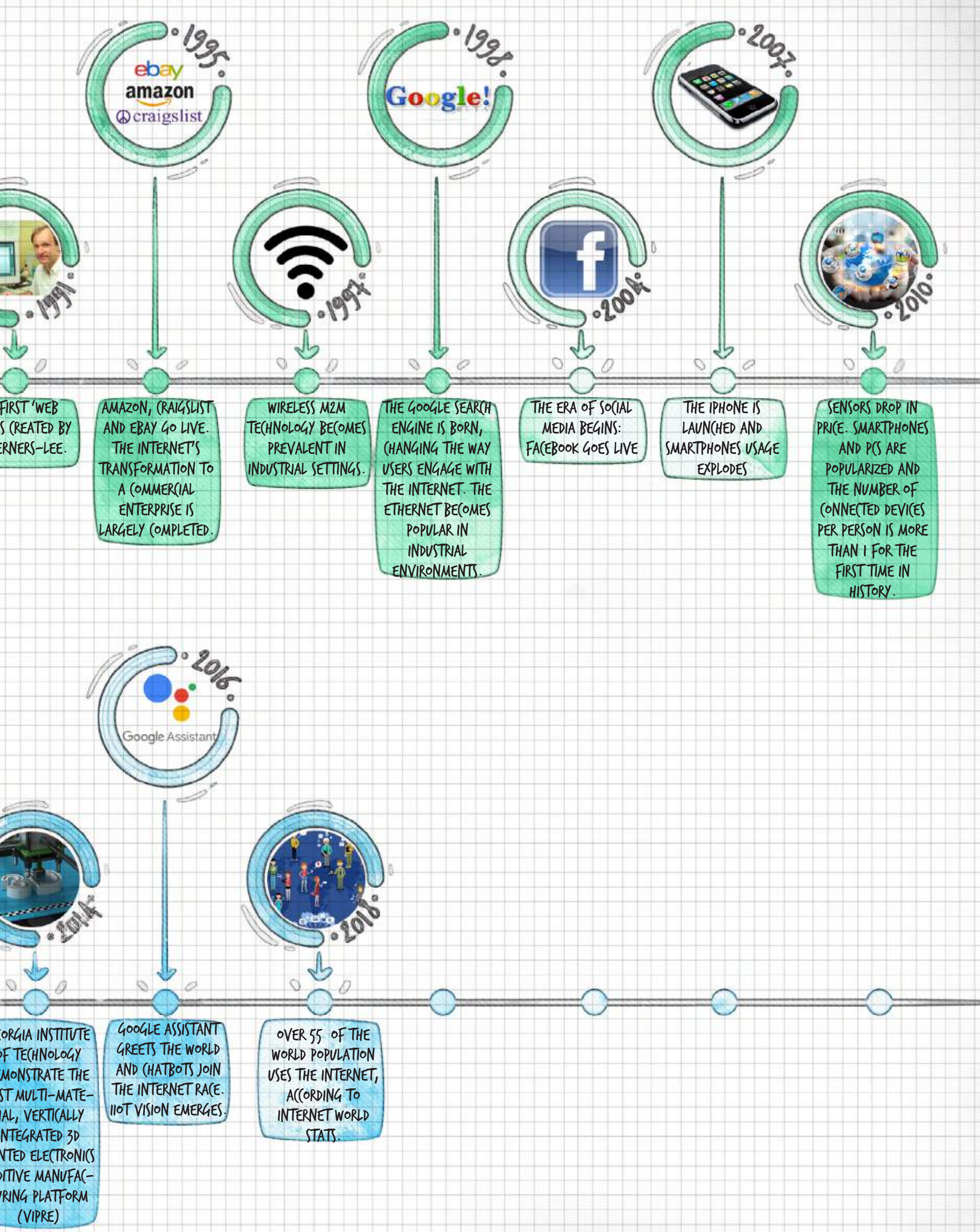
OURTH INDUSTRIAL REVOLUTIONS



1.5 DEINDUSTRIALIZATION AND POST-INDUSTRIAL CITIES

1.5.1 DEINDUSTRIALIZATION, THE PHENOMENON THAT CHANGED THE SCENE

DE INDUSTRIAL IZATION

Deindustrialization has been defined in different ways, but Alexander Cairncross explains it in four different definitions. First, deindustrialization can be defined as a drop-in employment in manufacturing. This might be misleading and often taken as deindustrialization even when this employment decrease is part of a regular cycle and happens in short terms. Second, the deindustrialization can be defined as the move toward a service economy where manufacturing is not the main component of the economy, and the employment in this sector is much smaller than in services (Cairncross, 1982). This can also be not true because manufacturing might grow in absolute terms, and the service still grows bigger (Dicken, 2015). Third, deindustrialization can be defined as a decrease in the world share of manufactured goods this way failing to maintain a balance between import and export because of the exportation remaining lower than import. And the fourth definition extends the third one to the point where the deficit in the trade grow to the point where a country is not able to pay for the imports to support the further production of goods, initiating this way a spiral of economic decline (Cairncross, 1982).

For most of the economists, the problem of deindustrialization is seen as a problem for several reasons, for example, if the economy based on the services is sustainable, there will be difficulties on the mismatch within the workers market being that the number of white-collars is increasing and the number of blue-collars, decreasing. That has been named as "hollowing" of economies making manufacturing industry "moving up" and "moving out." By "moving up" means that the industries in older industrial countries have developed new technologies leading to capital intensification higher value-added and thus higher profit. By "moving out" means that manufacturing has moved to other Newly Industrializing Countries where the costs and wages are lower these changes that include economic social and environmental happened during the '60s and '70s of the 20th century, considered as the start of the post-industrial society. For some, this new society meant a better environment, better air quality, reduced demand for labour, which meant enhanced leisure opportunity, and greater personal satisfaction (Bell, 1976).

The economies and culture of heavy industrial cities such as Detroit and Pittsburgh have drastically changed during the last twenty years. The differences between the affluent and the poor are stronger, geographically, and economically. At the same time, governments are trying to implement policies that are helpful to reinforce the market perspectives focusing more into the welfare ideologies, thereby liming and ability of local agencies to minimize the impact of deindustrialization.

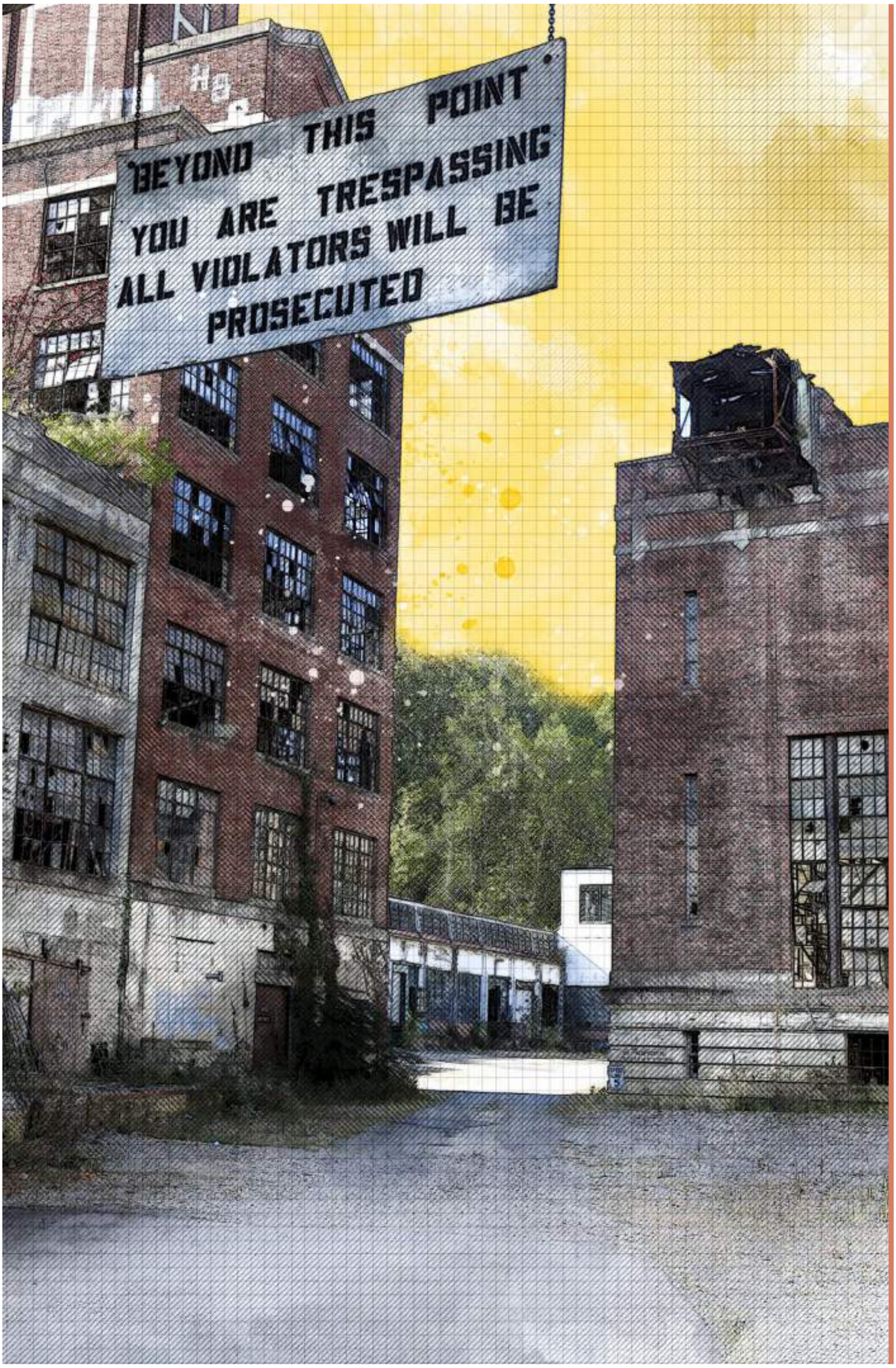


FIG 1.5.1
Former Peters Cartridge Factory, Kings Mills, Ohio Abandoned in 1968,
Original photo by Maxim Alter
Source: https://www.wcpo.com

1.5.2 THE POST-INDUSTRIAL CITIES AND SOCIETY

The time we live, is the time of the “*posts*” according to Kevin Gotham. He refers to the urban scholars who mention postsuburbs, postmetropolis, posindustrialsm, postfordism, and postmodernism (Gotham, 2001). In the sociological point of view, the term “post-industrial” is related to Daniel Bell’s ‘coming of the post-industrial society’ and describes the industrial change which according to him is a new era (Bell, 1976).

As the name tells, post-industrialism comes after industrialism. The period within industrialism and post-industrialism is considered the industrial decline and deindustrialization. the term “post” means the passing from an old form to a new one (Gotham, 2001). According to Bell, the post-industrial era is the pass from manufacture-based society to a service-based economy (Bell, 1976).

The term “post-industrial” is commonly used in ordinary speech when we refer to the deindustrialized cities which struggle with the economic aspects and urban renewal; or to the ruination of industrial sites which can be found in the post-industrial cities.

The terminology used as “post-industrial” is general; it delineates the space-time but puts the issue of abandoned industrial buildings into a context which is more general.

The post-industrial times are translated into the decrease of the jobs that means higher unemployment, worse standards of living and broader disparities in income and wealth, less caring attitudes and an environment that is already damaged and abandoned and were the short term profit decision lead the action taking. the will to take action in this context is insufficiently strong.

Paris, New York, and London are cities that in general are not considered post-industrial cities, but they are in every aspect. Generally, these cities are considered as global cities with diverse economies. Detroit, on the other side, is a symbol of deindustrialization. In the Detroit context, the term post-industrial is referred to a city which is still on the way to redevelopment and recovery.

After the industrial decline and the deindustrialization process, it was the turn of urban decline to take place. Visions, strategies adaptation, and regenerations where presented from researchers and politicians. The urban redevelopment is a phenomenon that is not spontaneous or isolated. To understand the phenomenon needs to understand the socio-cultural, economic, and political context (Gotham, 2001).

The primary transformation in the society after the industrialization is the shift from an environment of production to an environment of consumption. The ‘urban imaginary’ is present

POST INDUSTRIAL CITY

in society as a vision of the future of the cities that go through a process of transformation. Urban imaginaries can be found in the collective memories creating urban myths and nostalgia that is related to the city. According to Alice Mah these imaginaries are connected to "*identity, belonging, aspiration, memory, equality, and justice*" (Mah, 2011). The actors included in the urban imaginaries are various: developers, urban planners, officials, artists, and most important residents.

The visual consumption of space and aesthetics production and consumption became essential for the redevelopment of urban spaces. The post-industrial city this way is seen as an entertainment machine. The urban space is treated in a way to bring pleasure and consumption and also profit.

Other models refer to creative, global, and entrepreneurial cities. 'creative cities' are more attractive for qualified workers, well-educated and creative people. These are also considered as 'global cities' that have advanced services able to attract workforce from everywhere in the world.

The main task for the post-industrial city is to reintroduce itself as places of knowledge and creativity, open to everyone.

The abandoned industrial sites have been transformed into places for entertainment and consumption, museums, galleries, music halls, shopping malls, sports facilities, etc. History and culture are cohabitating together in the redevelopments, while the urban space becomes open for new purposes.

Not all the post-industrial cities have been successful in their try to regenerate themselves after the deindustrialization. Not all cities can be creative and successful. There are limited solutions, and the tendency to have an innovative and art city does not always work and sometimes is not possible.

The industrial decline that lasts for long is described as "*chronic*" industrial decline by Gotham. Cities like Detroit, where the deindustrialization also had social effects, had difficulties in attracting external capital, which is necessary to regenerate the cities. Some cities are not succeeding in their post-industrial challenge. They are shrinking, representing new urban planning challenges (Gotham, 2001).

2 **CHAPTER II**

THE DETROIT CASE

THE RISE AND FALL OF MOTOWN

FIG. 2.1
*Michigan Central Station,
May 2017
Original photo:
by author.*

2.1 THE RISE OF MOTOWN

2.1.1 THE INDUSTRIAL REVOLUTION IN THE UNITED STATES OF AMERICA

INDUSTRIALIZATION OF THE U.S.

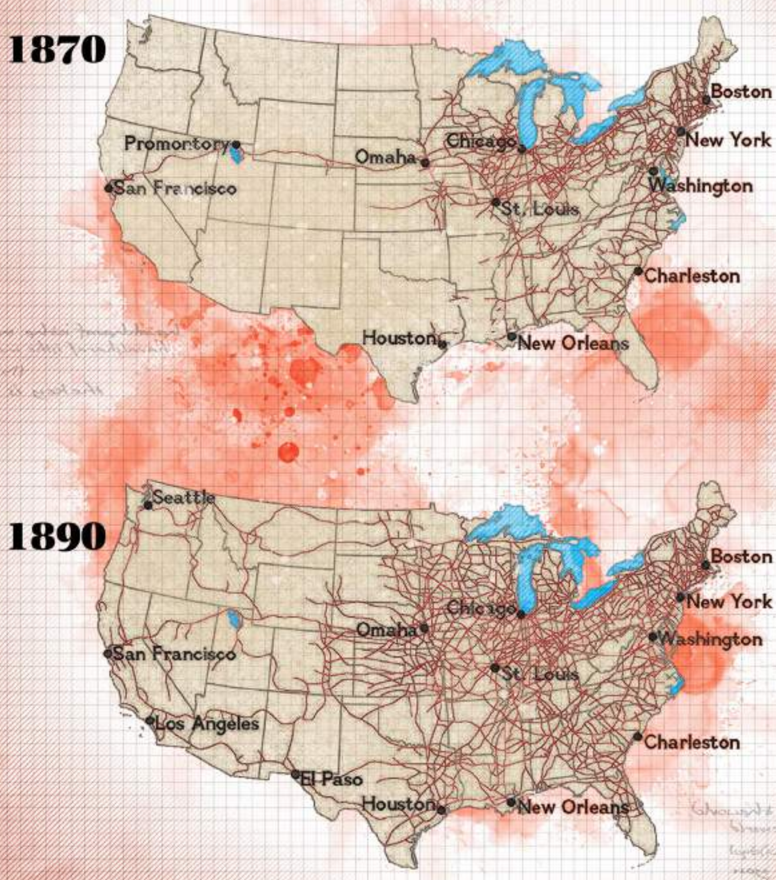
In the beginning of the 1800s, the base of the United States society was agrarian. There were no cities with more than 100.000 of population, and 6 of 7 labours were women. From 1860 anyway, the population saw growth from 5 to 30 million. Even bigger than Great Britain of the time. The number of states was more than doubled, from sixteen to thirty-four and nine American cities had more than 100.000 residents. Only 50% of the workers were farmers. Between 1800 and the starting of civil war, the United States were living their Industrial Revolution and the urbanization following.

First applications of the machines, the same as in Continental Europe, was borrowed from Great Britain. Samuel Slater, a British immigrant, built the first textile factory using the power of water to push the machines to Rhode Island in 1790. From 1813, factories were built with power looms copying the British mode, soon after the Americans were at the same level and surpassed the British. The arsenal of Herpes Ferry, for example, built muskets with interchange parts. All the individual parts were identical, making the final product quickly and easily built; this helped the Americans to avoid expensive systems where the skilled workers were needed. The so-called American System reduced the cost and revolutionized the production saving in the labours, very important in a society with a lack of competent artisans.

The United States of America was larger than Great Britain. It was impossible to have a great internal system of transportation, limiting the potential of the American economy, making the transportation of the goods especially expensive. This deficiency was solved through the usage of the steamboats, the construction of railways, roads, and channels. Thousands of miles of roads and channels were built on the east coast. Steamboats simplified the transport in the Great Lakes, Atlantic coast and rivers. It was especially crucial for the Mississippi Valley, from 1869, one thousand steamboats were transporting goods and people in the river. The most important of all forms of transport, for the United States, was the railway. With 100 miles in 1830 as a starting point, in 1860 more than 27.000 miles of railway covered the United States. This transportation revolution turned the United States in a massive unified market for the goods of the Northeast, first industrial center of America (Spielvogel, 2012).

The Industrial Revolution of the 19th century, in America, brought significant change and excitement. The impact that the revolution had in the U.S. was beyond the country borders. Industrialization had a way to America at the end of the 18th century. The biggest growth of the industry was in northern part of the country and then the spread in the west (Gelernter, 1999). As everywhere else where the industrial revolution was present, also in the U.S., the population moved from villages to cities. The urban population growth was three times more than each decade between 1820 to 1860. The factories saw a big growth and need for more workers, as the population also rose, there was a flood of people moving in the cities. This time was a key moment of the creation of the cities as they are today. This way, the cities became the center of society.

This movement present during the Industrial Revolution in the U.S. although it was accompanied with excitement, still brought problems. The workers who moved to the cities without any financial support had to live in slums, very different from what people who moved into the cites were dreaming. The industrial city was far from what people dreamt, and still, this did not stop people from deciding to move, and the growth was a force that was impossible to stop (Talen, 2005).



MAP. 2.1.1
Map showing the amount of railroad tracks in the U.S. which tripled between 1870 and 1890. Present-day boundries are shown. Source: National National Geographic Society

2.1.2 THE INDUSTRIALIZATION PROCESS OF DETROIT

FIG. 2.1.3 (PAGES 68-69)
Detroit, 1917. "Looking up Woodward Avenue." Source: Detroit Publishing Co

The city of Detroit, or as well known 'Motor City' was the 13th biggest in the U.S. at the beginning of 1900 and was the 4th in 1920. This growth was attributed to the car industry, which started the transformation from the small-scale manufacturing to mass production of cheap cars. By 1900 the vehicle production numbered only a few hundred units per year before achieving a few thousand by mid-decade. Shipbuilding, pharmaceutical, and railway industries were also present in the Detroit of the late 19th century (Sugrue, 1996)

The center of the Detroit development initially was the riverfront. Transport through the river and the easy access made the riverfront very attractive for the entrepreneurs to invest and build their factories. In Detroit was based the most known automotive company, Ford Motor Company in 1932, in Rouge River industrial complex that for the time was the largest factory in the world, and had its power station, railway line, and more than 100000 workers. Other car pioneers like William C. Durant, the Dodge Brothers, Packard, and Walter Chrysler based their activity in Detroit.

INDUSTRIAL DETROIT

In the early 1920s, it was built the Ford's new Highland Park, away from the riverfront and this made other industries to migrate too, spreading northwest along the Woodward Avenue.

Two developments changed the city into the center of automobile production, however. The first was Ford Motor Company's design of a simple, rugged automobile, the Model T. The second was Henry Ford's adoption of the assembly line for automobile production beginning in late 1913. It was considered a revolution and novelty the Fordism system, rationalizing the method of production developed by mechanical engineer Frederick W. Taylor. Ford adopted Taylor's ideas for its production line. The idea was to put the labor force into specific tasks into several separate moments placed out on an assembly line. This methodology of production made possible a quicker assembly process and cheaper. The assembly line rapidly inspired other automobile producers. Ford and other companies in Detroit needed far more labor than was available locally. This led to higher wages, which attracted labor from the American south, Europe, the Middle East, and other regions around the world (Sugrue, 1996).

FIG. 2.1.4 (PAGES 70-71)
Aerial view of the Ford River Rouge plant in Dearborn, Metro-Detroit, Michigan, 1927 Source: Detroit Publishing Co

This expansion of the city had no boundaries, and the urban grid of Detroit extended with industrial complex and single-family houses, becoming this way a low-rise city.

The migration of the economic focal point of the city led to a depletion of the downtown and further to greater segregation of the city. On one side there was a metropolitan Detroit with great potential and on the other side the inner part of the city Detroit, populated by poor and unemployed and without any significant industry and business. The first signs of the downtown recession began to appear in the early 1940s (Darden, 1990).

There were three reasons for this expansion of Detroit: the mass production with new technology, the fabrication of desire and demand for consumption in mass markets, and decentralization of production and consumption through the transport facilities and infrastructure.

The rationalism of the production process was connected and reflected in the architecture of the plants. The reinforced concrete allowed greater flexibility following the demand of the production. The production also showed abilities to change according to the needs. During the second world war, the plants changed the subject from cars to tanks and airplanes. Detroit was considered as "*arsenal of democracy*." when the war was finished, most of the facilities returned the initial production processes (Henrickson, 1991).

During this time the size of the plants grew and began to take on the scale of the city, where a single operation could be an entire building, linked to other buildings in the assembly order. The same principle of industrial production was used for the planning and architecture of Detroit. The industry defined the physical appearance of the city, not the planners and architects. Using the rationalist tools of science and engineering, the urban grid was possible to assemble just like the car, and the extension of the city brought to the need to use cars to move.

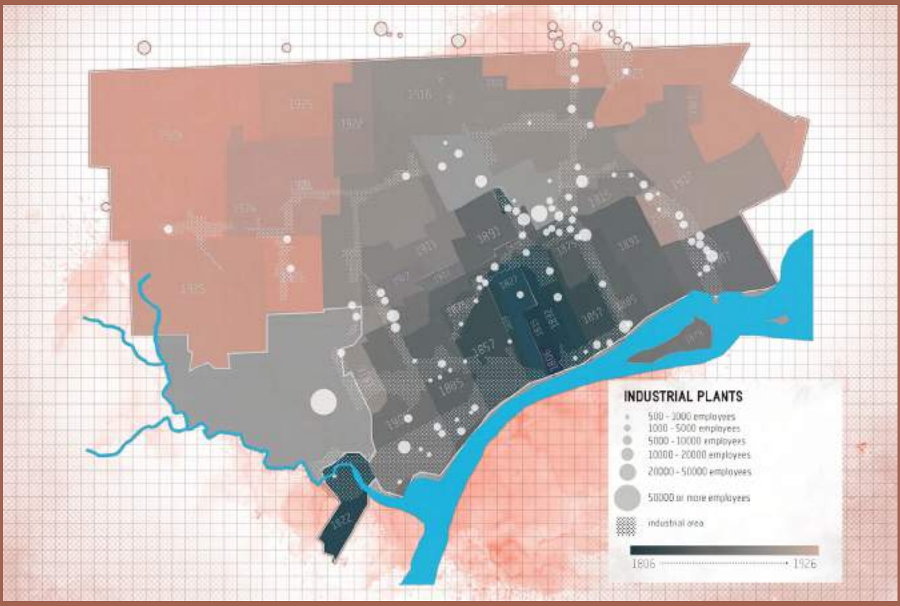
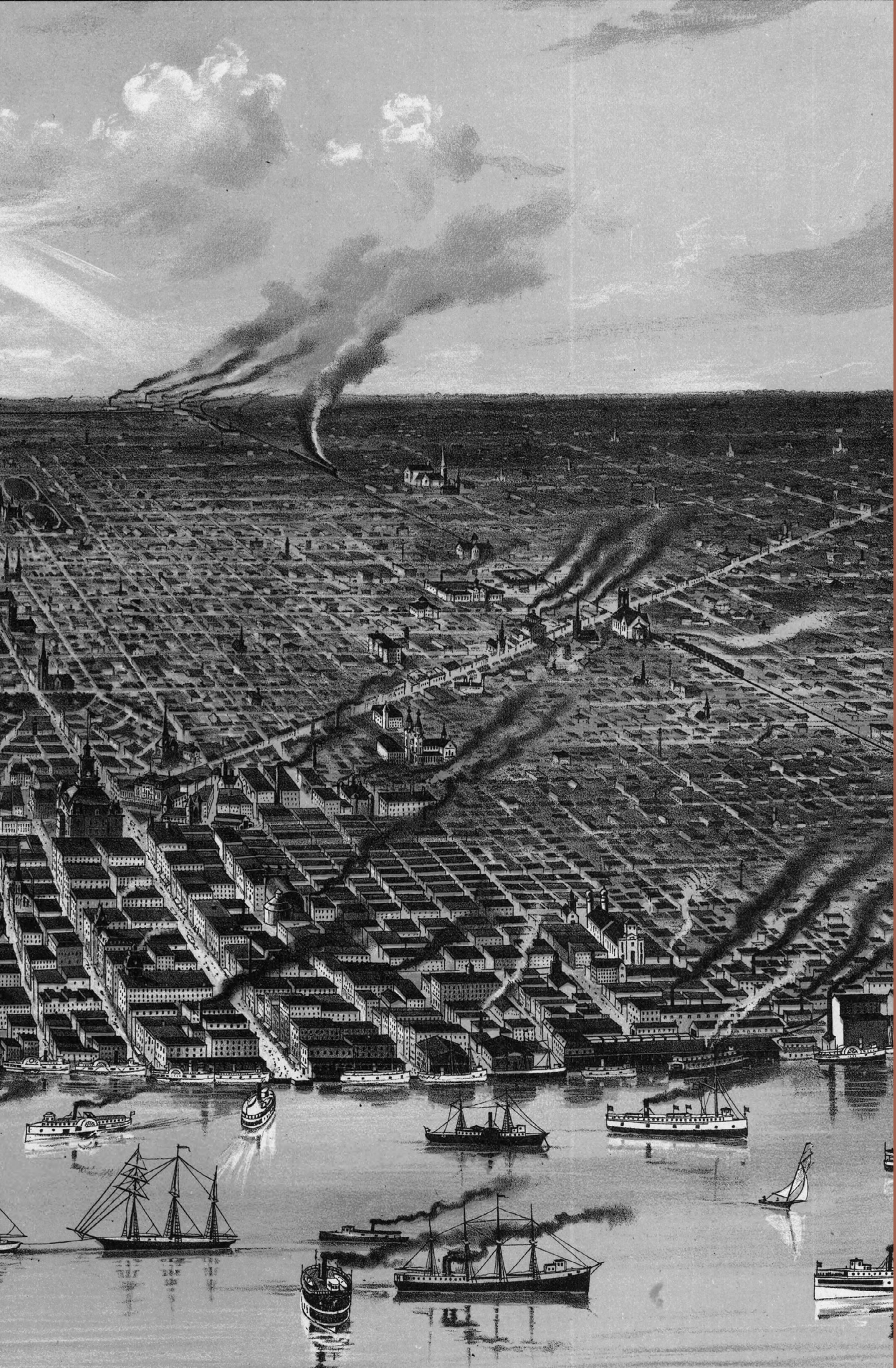


FIG. 2.1.2 (PAGES 66-67)
Birds eye view, showing about three miles square, of the central portion of the city of Detroit, Michigan (1889). Perspective map not drawn to scale.
Author: Calvert Lithographing Co
Source: http://www.bigmapblog.com/2013/birdseye-view-of-the-central-portion-of-the-city-of-detroit-michigan/

MAP. 2.1.2
Detroit, city growth 1806-




HUDSON'S
GROWS WITH DETROIT
DETROIT CREAMERY MILK
IS HEALTH INSURANCE
KERN'S
Kelly-Springfield
TIRES
MADE TO MAKE GOOD
ELMER'S
SUITS
ELMER'S
FURS
GOLDE CLOTHES $15
GOLDE $15 CLOTHES
GOLDE $15 CLOTHES
FORT


WAITT & BOND
BLACKSTONE
MILD 10¢ CIGAR
HENKEL'S
FLOUR
CASCADE
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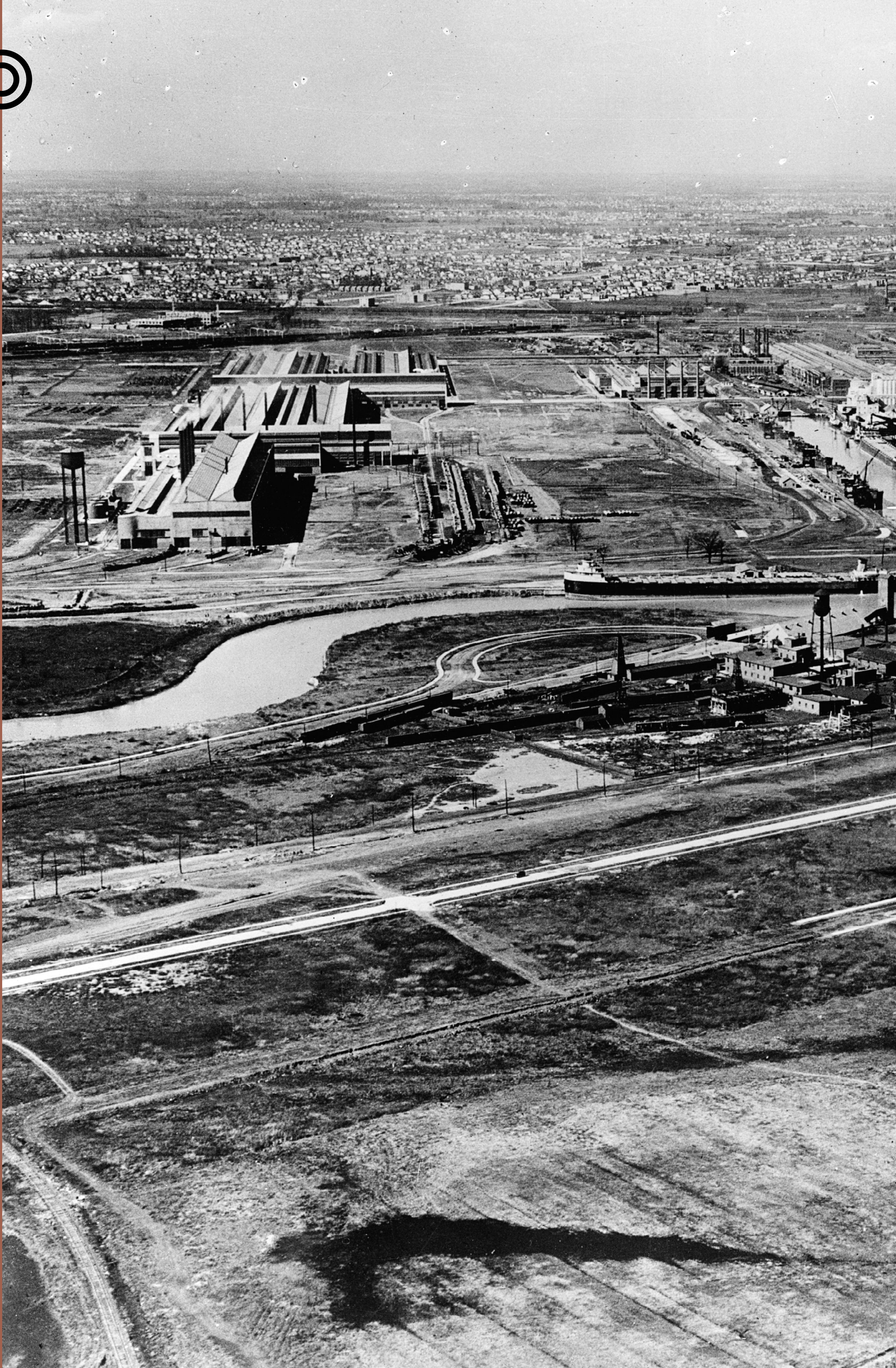
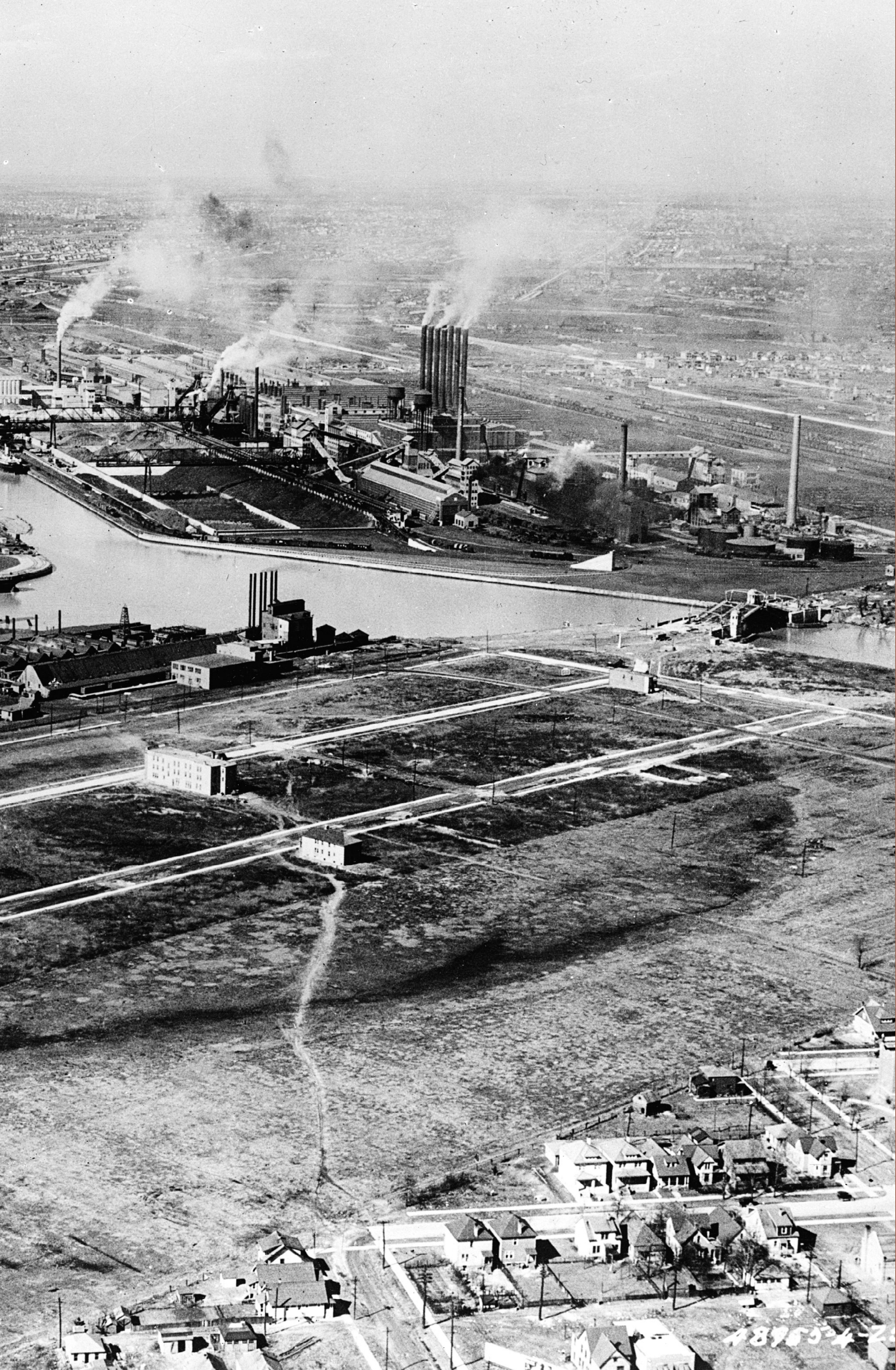
BOND'S





2.2 DECLINE OF A 'GREAT' DETROIT
2.2.1 THE URBAN CRISIS AFTER THE SECOND WORLD WAR

The radical changes of Detroit in the last century, are, must essentially, connected to the questions of ethnicity, although it was a city of the opportunities in the first decades of the century, was also a symbol of ethnic segregation. The migration started in Detroit when the need for unskilled manual labor increased. Migrants from the poor southern states with Afro-American origins and Europe came to Detroit. Each ethnic group settled in different parts of the city.

The ghettos established in the territory as a result of the lack of housing and the attitude of white landlords and neighbors against the black people. The areas inhabited entirely by Afro-American population, on the northeast and lower east, were called "*Paradise Valley*". Characteristics of these areas were the houses of poor quality, sometimes missing necessary facilities like kitchen and plumbing. Almost 60 percent of the residential buildings in Detroit were single-family houses by the 1940s. Often these were houses in the form of a small bungalow with wood frame construction, packed tightly in lots of 8x3m.

DECLINE

Renting in this area was not in proportion to the apparent deficiencies of the houses. A common cause of death in the Paradise Valley was the fires because of the low-quality buildings, old wood-framed buildings, and the outdated electrical system.

Another reason for the segregation of the city was the building of the freeways, planned to go through the poorer areas although were considered as "*handy devices for razing slum,*" leaving behind them a "*no man's land of deterioration and abandonment*" (Sugrue, 1996).

Although they were separated geographically from the rest, the black people got hired at the auto industry. Very often working on the dangerous position of dead-end jobs. These substandard social strata were an integrated part of the economic success of Detroit in the first part of the 20th century (Thompson, 1999).

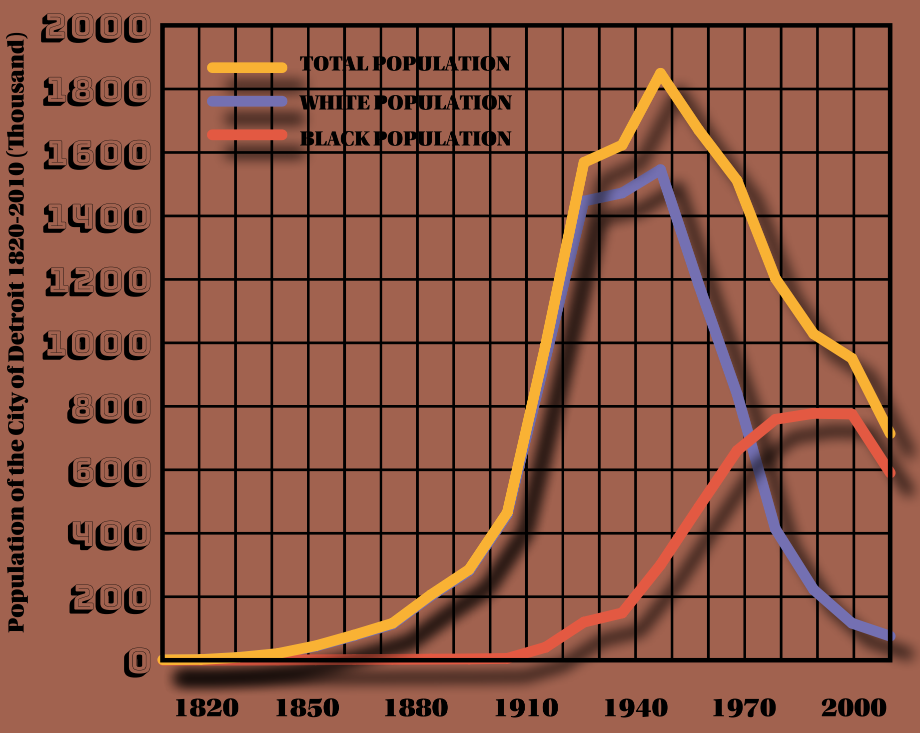
The Afro-American population sometime had the resources to move from the poor areas and would settle somewhere wealthy in the city. This caused other phenomena called "*white flight*", the white middle class would protest violently or move as soon as the black people would buy property in their neighbourhoods. Between 1970 and 1980, 310000 white people moved to the suburbs form the city continuing further the segregation of Detroit.

The industries drove the extension of the city during the first part of Detroit's boom. Later the expansion of the city was a result of the ethnic tensions and the poverty in the inner city. Migrating to the outer suburbs, people left downtown, which lost the strongest source for taxes. Detroit was even deeper into decline.

The recession within the industries began to show at the beginning of the 1960s and continued for two decades. Detroit went through the deindustrialization process, which was just as fast as the industrialization a few decades before. This process brought big social problems, which include unemployment and the brain leaving the city. Although the recession started from the auto industry, this hit the small supplier business hard.

In the early 70s, there were attempts to revitalize the city. A group of investors form the industries, led by Henry Ford II, put their money on a center called Renascence Center. This project was located in the river-front and included four cylindrical skyscrapers with mixed-use functions. This investment was intending to bring the focus back to the downtown, but within a few years, the center itself was struggling economically (Poremba, 2003).

According to Jerry Herron, the turning point for the city of Detroit was in the 60s when the "*city stopped being believable as a story*" and "*violence became the compensation: the radical, interruptive gesture whose 'rhetoric' could not be refused; a desperate literalization of democracy*" (Herron, 1993).



GRAPH. 2.2.1
Demographic history profile of Detroit, Michigan, Between 1820-2010
Source: https://www.census.gov

2.2.2 THE PROCESS OF DEINDUSTRIALIZATION

DE INDUSTRIAL IZATION

In a Time's article in October 1961, it was noted that "*Detroit's decline has been going on for a long while*." The days when Detroit was the "*Arsenal of Democracy"* during World War II were followed by a series loss pf production capacity and jobs. Between 1947-67, the number of blue-collar employees had a drop of 47%. During the 50s was the worst period for job loss in Detroit.

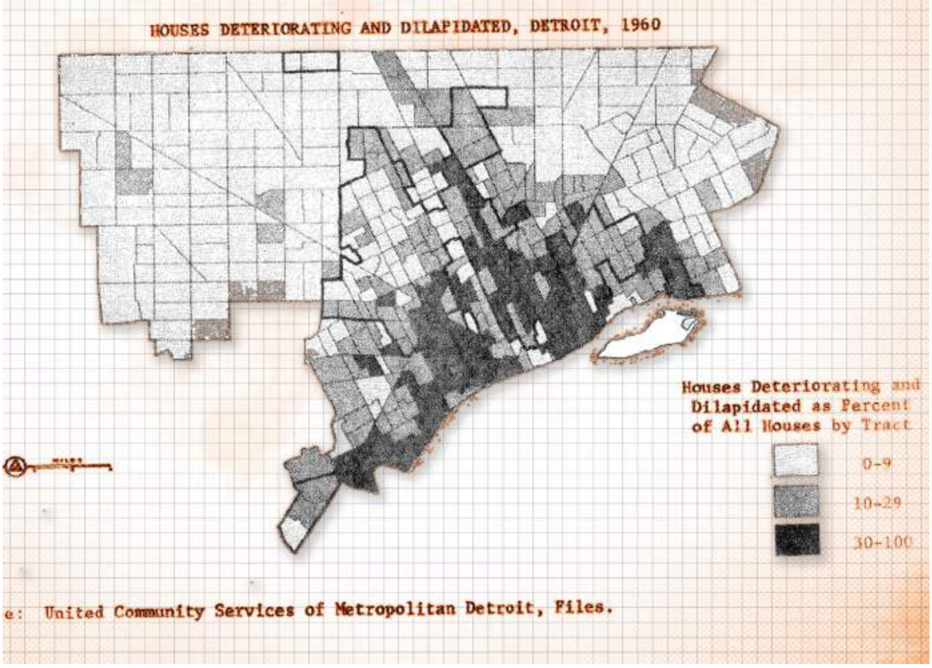
This restructuring of the economy in Detroit was not only a result of general economic change, but it also happened because the leaders of the industries made strategic choices. It is essential to consider the particular historical timeframe. In the 1930s there was a revolt of the workers that led to the creation of the United Automobile Workers Union - UAW, which transformed the city into a fortress of the industrial union movement.

The post-war period saw a complicated scene. Companies like Ford, General Motors and Chrysler, spent $5.9 billion on new plants within 1946-56. The new facilities were built in the suburbs where the land was cheap. This three companies built more than twenty new plants around, and five more were planned to be build and all of them in the suburban areas. As the production plants were moved in the suburbs, the entrepreneurs also looked for sites beyond the region and the state. Ford also influences in the drop of employment in Detroit around the 60s. Parts of manufacturing processes were moved from the Rouge complex in Dearborn to factories in Ohio. The effects were dramatic. Hardest hit by Ford was the Motor Building, which was connected with the transformation of the engine production to the new Cleveland plant, and this way, the loss of jobs for thousands of African Americans.

The automatization of the processes and the corporate battles for production led to devastating effects on Detroit. The six small independent car producers could not be up to date with their technological processes. In 1954, Hudson merged with Nash and Packard with Studebaker. The number of people employed in the plants of Hudson and Packard was 41,000 workers, but within three years of the merges, the factories were closed. The geographic impact was huge in the deindustrialization. Michigan Employment Security Commission reported that between 1953-60, the west side of the city lost ten plants and more than 71,000 jobs related (Sugrue, 1996).

City planners under the direction of Mayor Albert Cobo and later Louis Miriani (1950-62) tried to respond to the decline of the industry. Strides were made to solve the problem of closed, abandoned factories. Some plants were sold privately and converted mostly into warehouses. In the case of huge plants, like Packard Plant, empty form 1954, they were partially used for small industries

MAP. 2.2.1
Map showing the rate of unemployment, Detroit 1960. Source: United Community Service of Metropolitan Detroit, Files.



MAP. 2.2.2
Map showing the houses deteriorating and dilapidated, Detroit 1960. Source: United Community Service of Metropolitan Detroit, Files.

and as storage. Other plants disappeared from the map before the end of the 60s. Vandalism and fire became another problem for the unsecured sites, making the city to take legal steps against the companies who would abandon their factories. Another way of response by the city was by clearing the land from the industrial waste. This tentative was to make the industry stay in the city and new industry come by offering estate ready for use with very low price.

Detroit saw a period of success and fast reborn when the expansion of the U.S. economy happened during the 1960s helping to erase any doubts about the economic viability of Detroit, but just temporarily. In the national scene, unemployment fell from 6.6% to 4.6% within 1961-65. This was one of the most prosperous time for Detroit. The production of cars made a huge rise arriving twelve million cars, five million more than during 1961. The sales increased and consequently, also the profit of the companies. This was translated as more employment for the people of Detroit. The unemployment among African Americans dropped to 3.4% (from 17.4% in 1961), helped by the roaring economy and the $47.7 million granted by the federal government to the city. The percentage of African American household in poverty declined from 21% in 16% during the period 1965-67. The city of Detroit spent $143 million in urban redevelopment by 1965. This way, the image of Detroit as a place for business was improved drastically. There was a moment that influenced the economy of the city. This was in 1962 when a 1% income tax on residents and non-residents who worked in the city was established, charging the individuals and not the business. In 1963 Detroit was not anymore on the Federal list of economically distressed cities. The following year Mayor Cavanagh with a lot of confidence told to New York financial leaders was in the throes of "*comeback*." Some have seen the boom of Detroit during the 60s as something aching to a mirage. First. The Detroit of the Big 3 (General Motors, Ford Motor Company, and Chrysler Automobiles US) was different from the working population of Detroit. UAW Research Department made a study in 1964 and came into conclusion that there was a growth of 42.5% in the output of their production from 1956 to 1963, but the growth of compensation for the employees was an average of 2.7% per year. The number of workers required for production fell 7.7% due to improvements in the production process and use of overtime by employees, saving this way money for the companies by not hiring others and working overtime. According to a calculation that UAW made, an average of 5.9hours per week overtime saved the auto industry 100,000 jobs (UAW Departamanet Research Department of Collection).

Despite the improvements in the labor market, there was a big difference in the employment of African American and white people, three times less. In 1967, the unemployment rate of African American was 10.9%; meanwhile, the rate of white people was 3.2%. The unemployment was geographically concentrated, according to Robert Conot, the unemployment rate in some areas was up to 30% (Bureau of the Census).

Mayor Cavanagh asked for help to a subcommittee of the U.S. Senate in 1966, asking for $10 billion to fight the poverty in the next ten years.

Detroit Riot of 1967, series of violent confrontations between residents of predominantly African American neighbourhoods of Detroit and the city's police department that began on July 23, 1967, and lasted five days , unmasked the unpalatable truths about class and racial inequality in major metropolitan areas around the U.S. It was a mistake to believe that the economy of Detroit and the manufacturing was sound before 1967 (Emeka, 2017).

There were attempts to revitalize the downtown. In the early of 70s it was built a commercial center called Detroit Renaissance Center by a group of investors led by Henry Ford II. The project included 5 towers located on the riverfront with hotels, theaters, offices, shops, and restaurants. The intention was to bring back the glory of the days when Detroit was in its best but within only few years the center was struggling economically (Poremba, 2003).

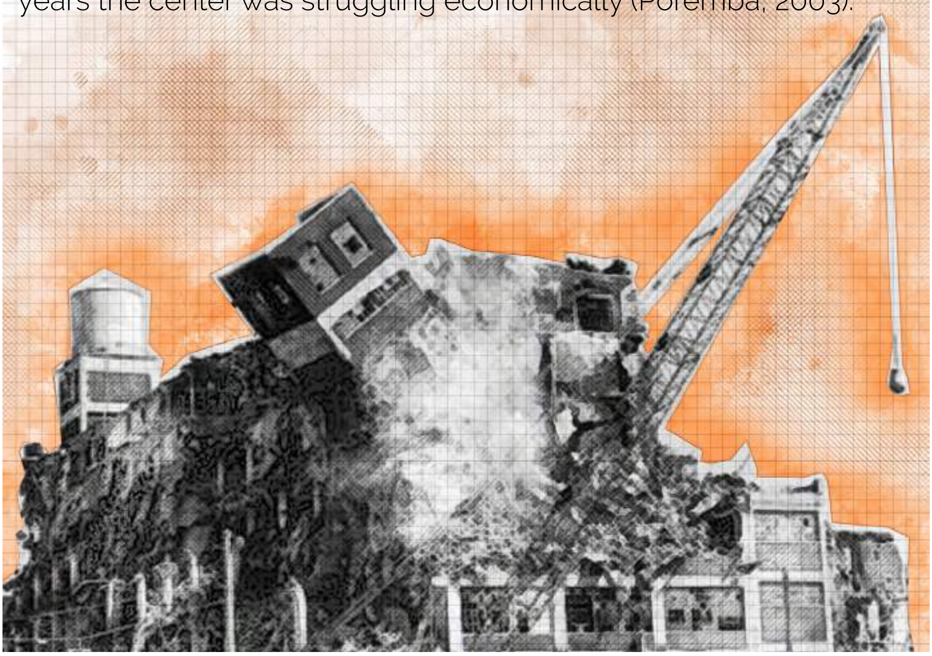
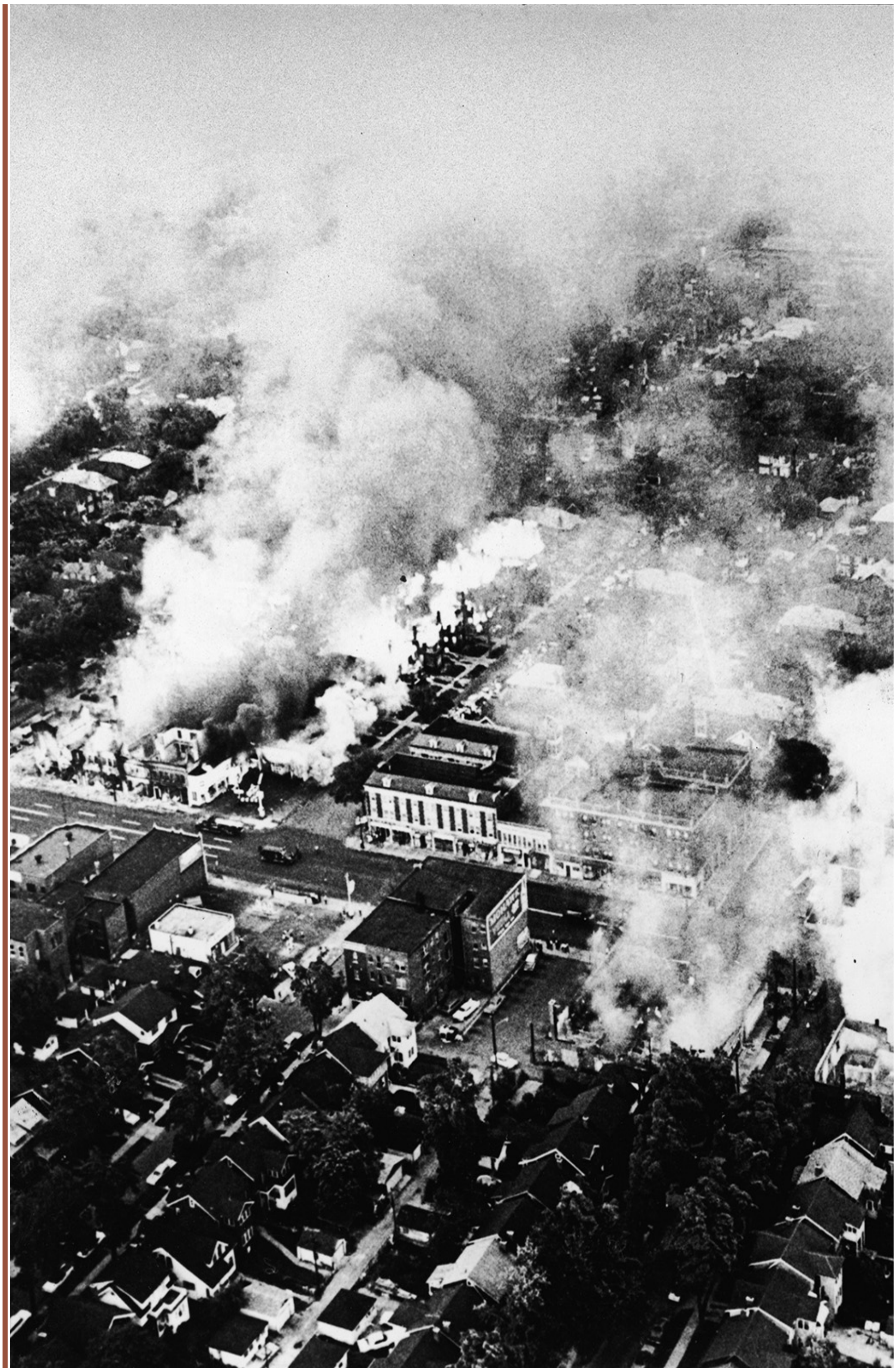


FIG. 2.2.1
Chrysler Corporation; Plants; Hamtramck; Assembly. Formerly Called Dodge Main. Demolition of Plant, 1981 Source: http://www.detroits-great-rebellion.com

FIG. 2.2.2
Pingree Street in Detroit burns during rioting in 1967. Source: Hulton Archive/Getty



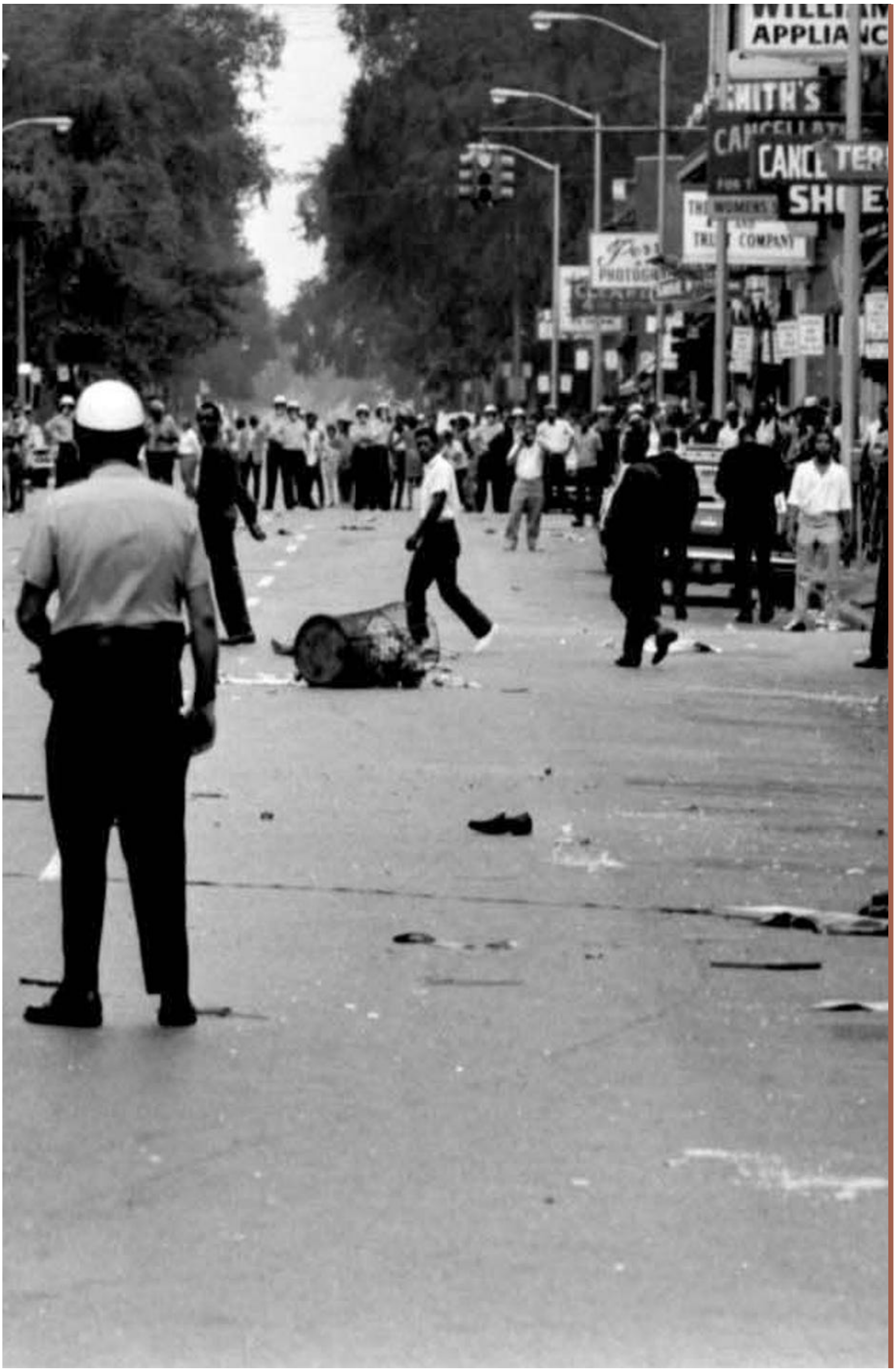
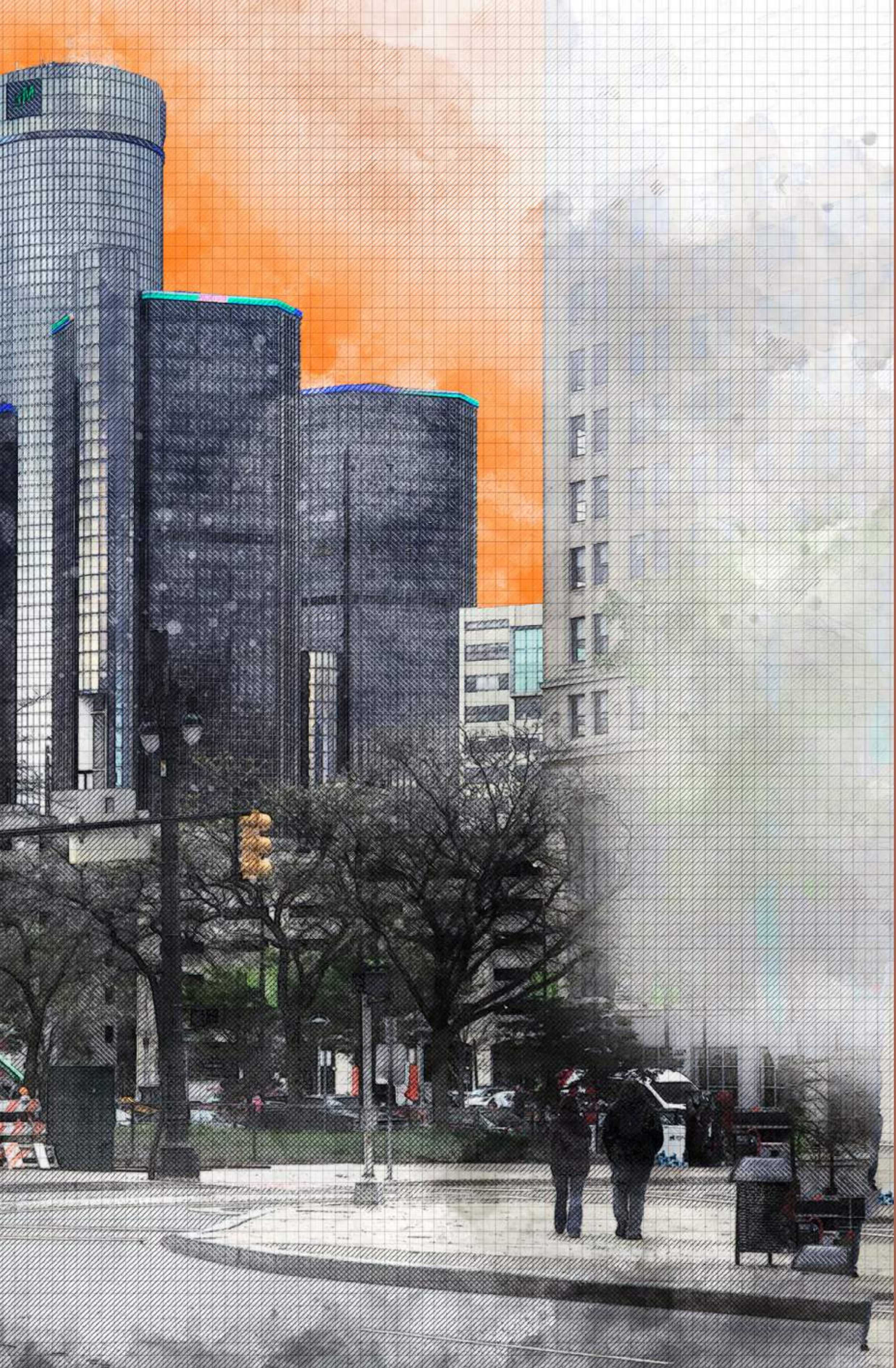


FIG. 2.2.3
Police watch as chaos spills into the intersection of 12th and Clairmount in Detroit following a pre-dawn police raid on a blind pig — an illegal drinking establishment. It is Sunday, July 23, 1967. When the violence ended five days later, 43 people had died. The racial unrest became known as the nation's worst. Source: Internet

FIG. 2.2.4 (PAGES 80-81)
Detroit's Iconic Renaissance Center, 2017 Original photo by author.


W Monroe



2.2.3 DEGRADING DETROIT

The situation in Detroit by the end of the 70s was critical. More than 30% of the population did not earn their income, and public assistance was supportive for 60% of the people. The industry of automobiles was experiencing the most significant recession since the Great Depression. In 1980. More than 500,000 people lost their jobs in the industry. From 1958 to 1982, the production industry fell by 48%; this was also reflected in the retail and service businesses in Detroit. The same decline continued until the 1990s (Darden, 1990).

As a result of this crisis, people were leaving Detroit, moving to the suburbs or left for good. In 1950 the density was 14,400 people per square miles, and in 2006 there were 6,500 people per sq mile. The migration of population brought to the phenomena of vacant lots which were 66,000 in 1993, making a total area of 60 sq. miles in a city of 137 sq. miles in total.

DEGRADING DETROIT

Drug, violence, and arsons were a problem for the city as the abandoned houses were present in the neighbourhoods. The effect of an abandoned house was huge; an abandoned house would immediately drop the value of the adjacent proprieties. In the 1980s firing the abandoned houses became a tradition called "*Devil's Night,*" the night before Halloween abandoned houses were burnt (McGraw, 2007).

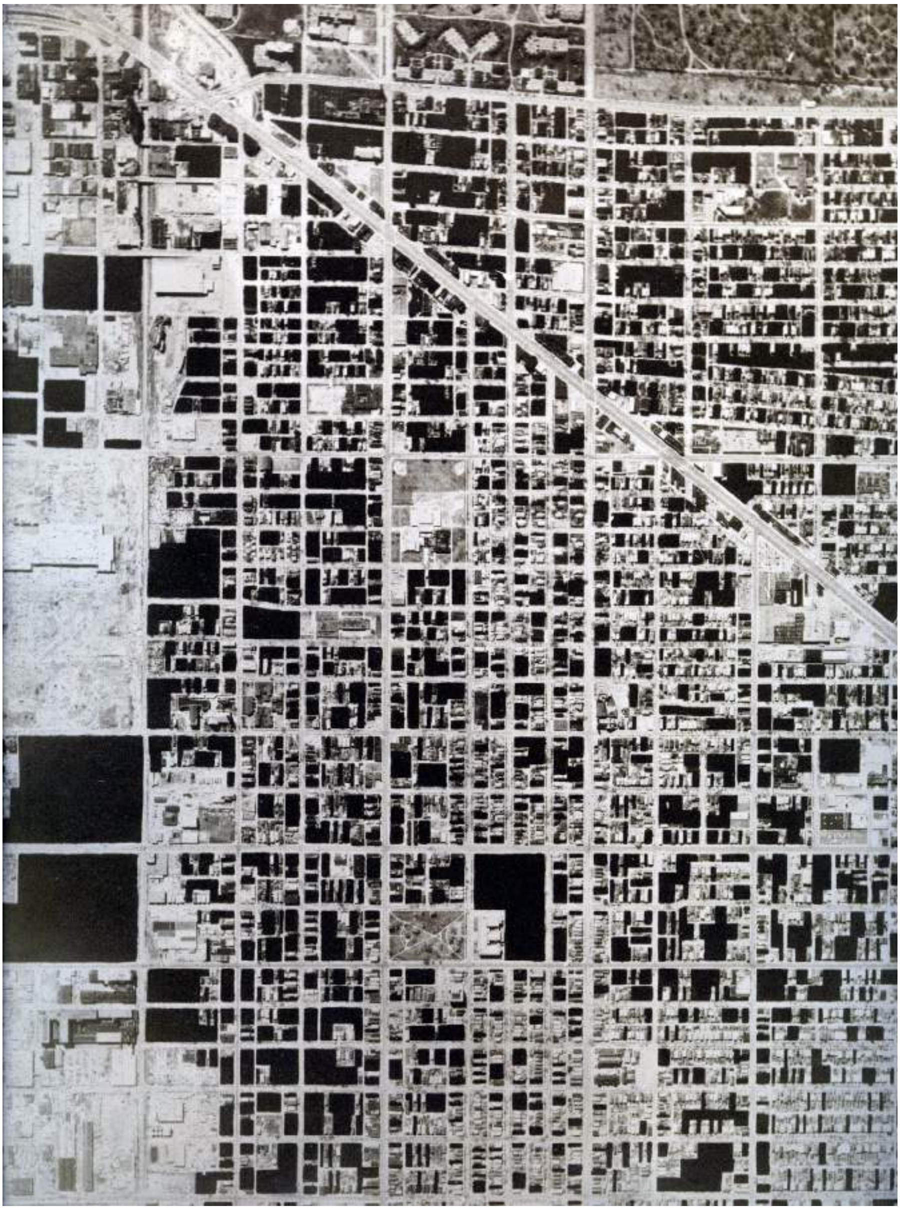
De-urbanization in that scale and pace is only seen in Detroit. As the abandoned buildings were burnt down, bulldozed away, the remaining is just streets and vacant lots. All this was translated into a chaos where the grass grew wild, trees thrive and animals not seen for the last century, returned.

Alan Weisman speculates, in his book The World Without Us, on how an American city would be if all the people abandon it. According to him within the first couple of years, roads and pavements would start to deteriorate because of the change of temperature and the roots. After ten years, water would have engulfed most of the buildings and corrosion slowly would reduce the structural stability (Weisman, 2007).

What Weisman predicted; all is happening in certain areas of Detroit. Streets and pavements are cracked, and garbage blocked the system of the sewer. From the buildings are taken everything that has a value, and the fire is present very often. Bushes have colonized the abandoned structures, with the Ailanthus altissimo, known as "*tree of heaven,*" which can be seen everywhere including the rooftops of the deserted factories. Animals are returning in some areas of Detroit. The peregrine falcon, foxes, coyotes, and raccoons are a common sight.

As the regenerating process of Detroit continues, social activists are considering farming and gardening a way of using the abandoned land. By transforming the vacant suburbia into gardens, the production of Ford's urbanism will be turned into agriculture.

In July 2013, the City of Detroit filed the bankruptcy, the largest municipal bankruptcy in the history. The financial struggle of the city was no surprise, and the bankruptcy came after General Motor one in 2008 (Gallagher, 2010).



IMG. 2.2.5
Aerial view of the city, where the parts painted black are the sites of removed dwellings. Source: Dan Hoffman. "Erasing Detroit." Detroit, Michigan, USA, 1991

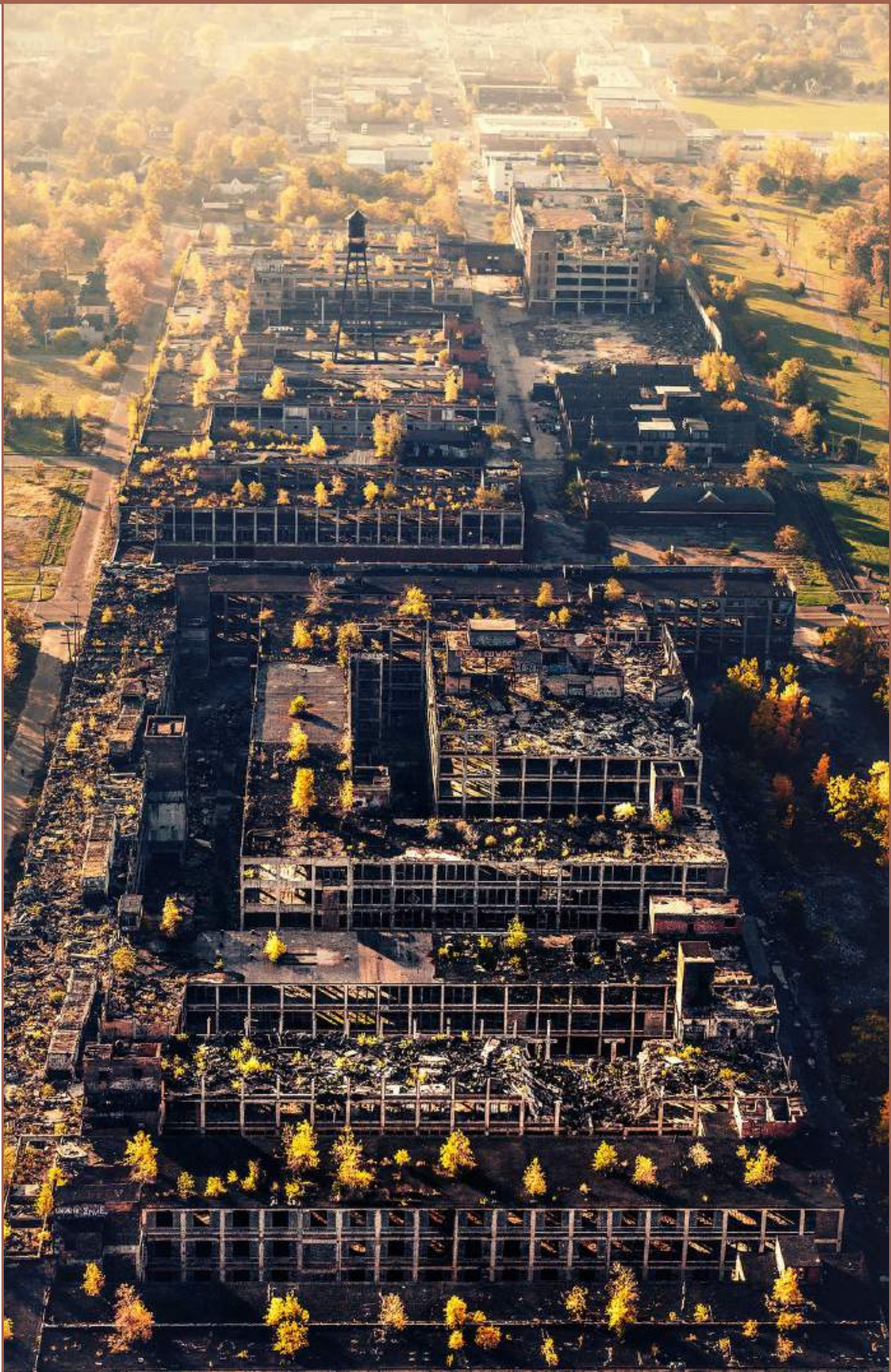


FIG. 2.2.6
Packard Plant, largest abandoned factory in the world. The factory complex closed in 1958, though other businesses operated on the premises or used it for storage until the late 1990s. A number of the outer buildings were in use by businesses up through the early 2000s. In 2010, the last remaining tenant, Chemical Processing, announced its intention to vacate the premises after 52 years. Source: www.camerajesus.bigcartel.com

FIG. 2.2.7
Interior photo of Fisher Body Plant 21, abandoned in November of 1982, photo taken in 2017.

FIG. 2.2.8
PAGES (86-87)
Abandoned houses in Detroit,2017. Photo by author.

2.3 'THE RESURRECTION'
2.3.1 DETROIT TODAY

DETROIT TODAY

Detroit bankruptcy was foreseen a long time before it came. The rise of Detroit was fast and stunning, the same as the decline in the second half of 20th century. The city of Detroit reached two million inhabitants during the boom and now only is housing nearly 700,000 people. Anyway, the city is working toward a better future, projects helped by the federal government has been implemented, giving immediate results and making Detroit again raise the head.

It all started three months after the bankruptcy when a partnership, between the federal government and the city of Detroit, together with the philanthropic and business community, took place with the idea to help the city debt of $19 billion. The Downtown has a different face today because of private investments. Adaptive reuse and other projects took place lately, making the Downtown revive again. Mixed-use developments are present everywhere, making the city more approachable and life more comfortable. Midtown also has the same construction. This part of the town has become the center for arts and culture institutions, even universities. Same here, the mixed-use development has brought a new perspective for this area. The approach of the design is always to attract millennial urban dwellers and young generations.

The east river-front is also being considered for further developments. Sold as waterfront lofts and apartments, this part of the city is becoming very popular. On the other hand, regarded as the most historic neighbourhood of Detroit, is one of the areas who was seen the best development and growth through the investments in the residential and business. In this neighbourhood is located the iconic Michigan Central Station, totally abandoned for years, but now is seeing the light at the end of the tunnel as Ford Motor Company has purchased it and is investing in three phases for a new mixed-use function of the building.

New Center, located north of Midtown, is also seeing bright moments. Investments in hospitals are helping the community for a better life. Henry Ford Hospital is building the new cancer center there. The basketball team, The Detroit Pistons, has a project for their new office complex in this part of the city. Motown museum is foreseen to have an expansion too that will cost $ 50 million. The New Center is connected to the Downtown via the new street-car Qline, which is a tram service reopened on April 2017, very modern and helpful for the city and connectivity through the Woodward Avenue. Three miles of the Qline connects Downtown with other neighbourhoods where all the activity is happening, and there are projects to extend the line further down the New Center. Although these developments in the city, still there are neighbourhoods that struggle.

Detroit still has a long way to achieve the economic figures that would make the city as it was during the boom. Between 2010-15, it was ranked 35th out of 53 largest metropolitans, for the income change per capita but remaining the last in terms of actual income per capita.

Even though the city has been abandoned for a long time, it remains the biggest city in Michigan at the hub of economic and culture of the state. The business that left before are considering relocation back in Detroit, and a lot have done so. People are coming back although they said they would never do such a thing. Millennials who want to experience the urban life and its benefits, having close to the habitat all that is needed, are finding the right environment in the Motown. Everything is changing in Detroit, again.

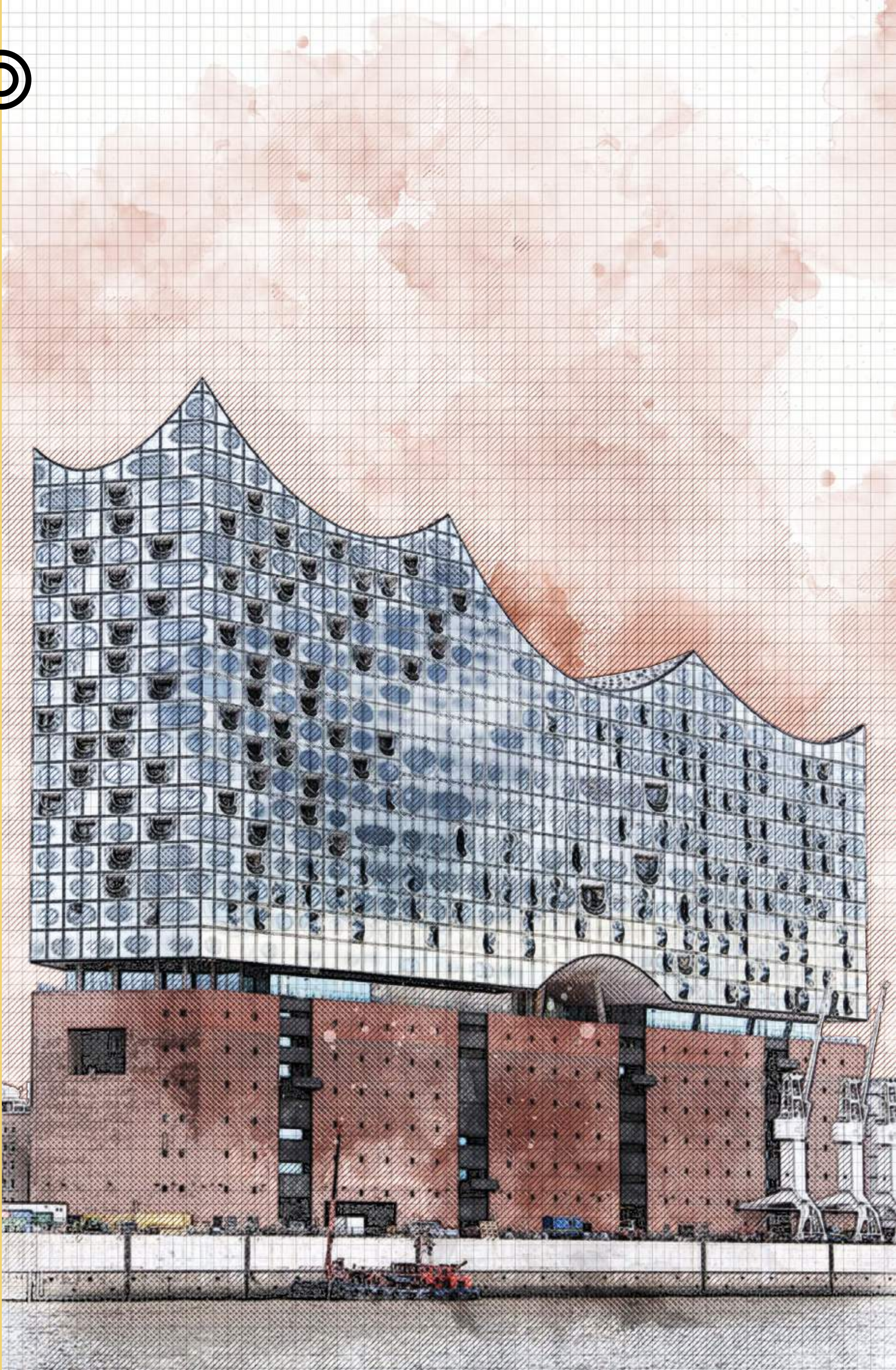
The attempts to revive the city earlier might have failed because they were not able to address the problems into the roots. The new factories built thinking that will make the city manufacture again failed because of the global competitors who were much better. The People Mover and the Renaissance Center had no substance in what gave to the city. These were present in other cities but working much better because of the proper studies before construction. What is needed to save Detroit is the renascence of the city soul. People see possibilities in a place that they saw no hope and future.

FIG. 2.2.9
Mural by Australian-based street artist MEGGS David. At over 6,000 square feet, Rise Up towers over the eastern section of Detroit's Russell industrial district and serves as an iconic symbol of the city's ups and downs. Photo by author.

FIG. 2.2.10

Campus Martius Park is a re-established park in Downtown Detroit, Michigan. The new Campus Martius Park was dedicated November 19, 2004 and includes two performance stages, sculptures, public spaces and a seasonal ice skating rink.

FIG. 2.2.11
The Dequindre Cut Greenway is an urban path that offers a pedestrian link between the East Riverfront, Eastern Market, and several residential neighbourhoods in between. Formerly a Grand Trunk Railroad line, the Dequindre Cut is a predominantly below-street level greenway that runs parallel to St. Aubin Street, between Mack Avenue and Atwater Street, just north of the Detroit River.



3 CHAPTER III

ADAPTIVE REUSE

ABANDONED INDUSTRIAL HERITAGE

FIG. 3.1
Elbphilharmonie, Hamburg, Germany. With a red brick waterfront cocoa factory as its base, the old building is crowned with a gleaming silver construction made from 2,200 glass panels. Architect: Herzog & de Meuron Original photo by: Sophie Wolter

3.1 THE CONCEPT OF INDUSTRIAL HERITAGE
3.1.1 WHAT IS INDUSTRIAL HERITAGE?

The concept of Industrial Heritage was introduced in England in the 1950s during a time when cities were going in the process of deindustrialization. This concept is connected to an area that previously has been used for industrial activities and because of economic and social changes during the time it has lost its primary functions. According to the Nizhny Tagil Charter for the Industrial Heritage, industrial heritage is "*...the remains of industrial culture which are of historical, technological, social, architectural or scientific value. These remains consist of buildings and machinery, workshops, mills and factories, mines and sites for processing and refining, warehouses and stores, places where energy is generated, transmitted and used, transport and all its infrastructure, as well as places used for social activities related to industry such as housing, religious worship or education*" (TICCIH, 2003).

INDUSTRIAL HERITAGE

Industrial heritage is evidence of activities that have been part of the life of a city, activities which very often had broader social effects, beyond a city or a country. Industrial Heritage is identity of the industrial cities, is the reason why people live in those cities, and the reason why the city is structured that way.

Industrial heritage is a complex structure, and according to Sir Neil Cossons, industrial heritage as the most complex heritage category. He noted that "*Industrial heritage is, arguably, a unique cultural discourse; it brings challenges found nowhere else in the heritage sector and requires new answers...It demands knowledge, great judgment and real understanding*" (Cossons, 2012).

Through the Industrial heritage we can understand the achievements from the past in infrastructure and technology, processes, and production. This heritage is a reflection of the history of the city, the ambition, rise, and decline with a big load of memory and social impacts.

Post-industrial societies face these industrial sites which represent achievements and memory, and often might be in the very heart of the cities. These remains are more than buildings where the industrial activity was held. In the industrial heritage is included a wide range of other elements like landscapes and precincts, tools and machinery and other traces of production.

Deindustrialization of the cities also brought the phenomena of the abandon of the industrial sites a long time ago. Although some tentative might have been done to change the production line and reuse for industrial purposes, very often these sites did not survive the wave of post-industrial society.

Industrial Heritage is very often loved and appreciated by the members of the community where they are located because of the historical, aesthetic, technical, and social significance. Very often these sites are also endangered, more at risk than any other kind of heritage.

It is essential that the general approach for the Industrial Heritage should be towards the protection and conservation, very often the adaptive reuse might be the best solution to keep the memories of the moments of industrialization of the nations because these represent an important part of history, is a testimony of cultural, social and economic development. The way how we can save these sites is part of a process that is more complex.

FIG. 3.1.1
Continental Motors Plant, 2017. It was built in 1911 and was designed by noted Detroit architect, Albert Khan. Towering high above the complex was the iconic smokestack with the brand name "CONTINENTAL" written down its south side. Photo by author.

3.2 ADAPTIVE REUSE AS A SOLUTION
3.2.1 THE CONCEPT OF ADAPTIVE REUSE

According to Matteo Robiglio adaptive reuse is "*the process of reusing an existing site, building or infrastructure that has lost the function it was designed for, by adapting it to new requirements and uses with minimal yet transformative means*" (Robiglio, 2017).

Adaptive reuse is also considered as a process by which older buildings are developed into new economic uses. This is also a way to preserve the historic buildings, protecting them from demolition. Adaptive reuse is also a component of rehabilitation.

The reuse of a building for different proposes is an old way of preservation practice. As society develops, the needs also change. For this reason, the structures have been altered to fit the needs through different processes as enlargement, embellishment, reconfiguration, and other physical changes (Fitch, 1990).

ADAPTIVE REUSE

The adaptive reuse of today is very different. The process is encouraged massively by public policies. It is a response to the process of deindustrialization that occurred cities and left abandoned industrial sites totally degrade. Only in Detroit, there is a number of 70,000 buildings that are abandoned. Under this pressure of urban degradation, the cities needed to undertake actions that would reduce the phenomenon and would make the urban environment healthier (Eisinger, 2013). There is a wide range of uses that can be placed in the reused buildings. It can vary from residential to offices, retail, cultural, and most common mixed uses.

The industrial character of a city is essential to maintain through the preservation processes of the industrial icons. The industrial complexes are architecturally fascinating, impressing with the size and decorations. They were built with a focus on the principal "*form follows function*", having in mind the practicality and production processes. For this reason, the industrial buildings are a facilitator for innovation, allowing the creation of spaces for new ideas, reducing the costs. It is a usual practice that the communities are involved in the decision-taking proposing ideas to meet their needs.

Artists especially needed more space to practice their art, and these abandoned industrial spaces offered this. It was cheap and flexible and most important open space, close to the city, giving the opportunity to live, work, and exhibit their work. In this way, the "*loft*" concept was created, seeing it first in New York during the 60s.

The positive aspects of the reuse include the savings for infrastructure, energy, and most importantly, the reduction of greenhouse gas. In another point of view, adaptive reuse allows the conservation of the built heritage. Because very often is very expensive to restore a building, more and more prominent support can be given to save the most significant parts of construction that will be adapted. This include governmental and social support.

There are economic benefits when spaces have been reused, and less time needed to build. Rehabilitation typically takes half to three-quarters of the time necessary to demolish and reconstruct the same floor area but still there are problems that eventually are presented when trying to reuse the existing structures. These include structural aspects, the presence of materials which are dangerous to the health and also urban planning problems. All these can be translated as a significant cost increase. That's why very often decisions have been taken to demolish some existing buildings as after a proper study of feasibility; it happens not to be feasible (Langston & Lauge-Kristensen, 2011).

There are also environmental benefits. These include the recycling of material, reuse of structural elements and the reduction of the landfill waste. The reused buildings offer a chance to use and understand better the sustainable architecture. The natural ventilation, natural light, and the use of passive energy is an excellent opportunity to build "*green*" buildings using the help of new technologies (Langston & Lauge-Kristensen, 2011).

Adaptive reuse has an impact also in the social life of a city. Usually, communities where reuse is going to happen, are participants in the decision-making process, involving community makes sense of identity stronger where different elements remain forever in the memory as represent the past of a city. Being that usually, the reuse offers a mixed-use function, communities find themselves next to areas which are regenerated and that offer activities which make the life even better, like art spaces, shops, supermarkets restaurants and so on (Langston & Lauge-Kristensen, 2011).

In their book "Rereadings: Interior Architecture and the Design Principles of Remodelling Existing Buildings", Graeme Brooker and Sally Stone describe three categories of building interventions in relation to the host building. These are intervention, insertion, and installation.

Intervention - the transformation in the existing structure is major, and no longer can exist separately. The old and the new are totally integrated.

Insertion - is a new element which is inserted inside the boundaries of the old building. This element can also exist independently.

Installation - Is the addition of a new independent element which is located within the boundary of the existing building. The design is not necessarily related to the existing building but may be influenced. When the installation is removed, the existing structure might go back to the previous state (Brooker & Stone, 2014).


I LOVE MY NEW NEIGHBORHOOD!
NO PARKING
ALL THE BEAUTIF
THE GRIT'S STILL HERE...
IT'S ALL HERE FOR ME, RIGHT AT MY FEET

DENIS KRAJA

FIG. 3.2.1
His New 'Old New York' Neighbourhood By Pete Gamlen, Illustration that shows how people are fascinated by the historical feeling of the city.

3.3 ADAPTIVE REUSE CASE STUDIES
3.3.1 LESZCZYNSKI ANTONINY MANOR BY NA NO WO ARCHITEKCI

This is a project that saw an adaptive reuse transformation through the restoration and extension of three farm buildings in Leszno, Poland into a healthcare and residential building complex dedicated to the older people. This project was finished in 2015.

The Leszczynski Antoniny manor complex was a mansion of the 19th century, farm buildings, farmhouses, and two stables, one built approximately in 1865 and the other in 1900, a granary, constructed in 1865, and the cowshed built in 1909. The new complex includes a rehabilitation center with other facilities like hotel, art and cultural center, restaurants, and all the needed infrastructure. The area of the complex is 8928 square meters.

According to the architects, one major design challenge was the conversion of the existing buildings into a coherent complex and the attribution of specific functions to each of those. The structural system of the existing 19th-century stables and the 20th-century granary did not help to accommodate the necessary features, and it was impossible to adopt them directly. For this reason, the reconstruction and expansion were required. In the former stables it was accommodated a cellar to put all the technical rooms. Because the existing building had no basement, the underground floor was added under the historical foundations. The upper-level ceilings have been raised adding volumes to the existing building this way accommodating the hotel rooms which would get the direct sunlight. This difference in the levels of the roof helped in the creation of recreational spaces. The terrace is a meeting point for senior, where you can enjoy the beautiful scenery of the city, have a coffee in the cafeteria and other activities. A restaurant, a cultural center, a chapel, conference room are all located in the historic building. In the other side, under the former granary roof, are located the hospital rooms and the general hospital ward. Each of the departments has direct access to the terraces and activity areas.

The additional building of the complex is a residential building surrounded by gardens. This building accommodates fully equipped apartments for seniors, and on the rooftop, other activities can be held. Because of the different times of the constructions of the existing buildings, the materials used are different from each other. For this reason, the architects have decided to combine them using perforated corten sheets. Corten has been used as balustrades, shades, stands, fences, and other interior design elements. According to the architects: "The rusty steel plate material symbolizes the transience and the inevitable passage of time. The dynamic cracks appearing on the façades refers to volatility and a number of turning points making up human life" (NA NO WO architekci, 2016).

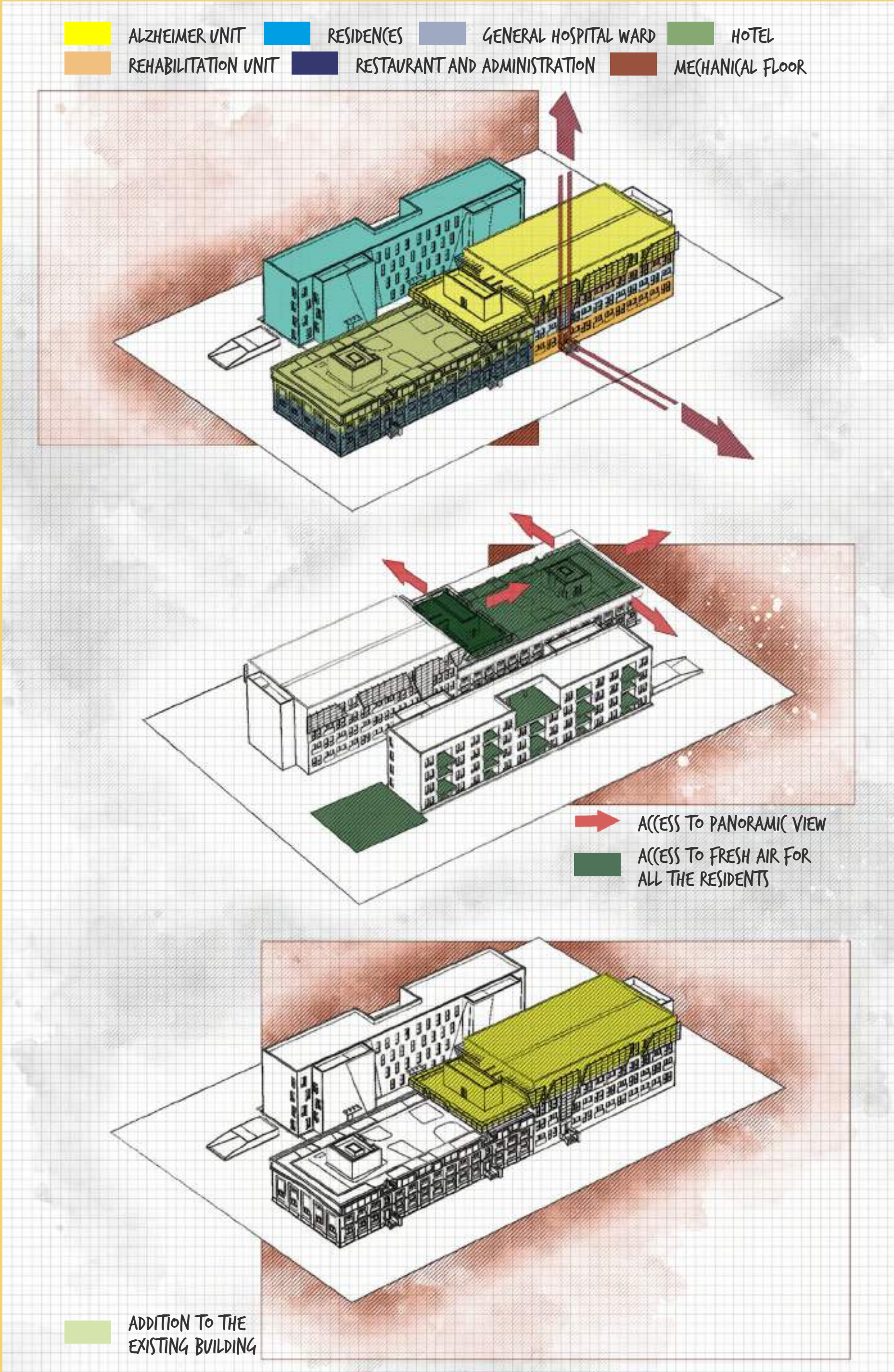


FIG. 3.3.1
Axonometric drawing showing the intervention in Leszczynski Antoniny Manor.

1. *Functions*
2. *Green and recreational area*
3. *The additional floor to the existing building.*

FIG. 3.3.2
Photo of the 19th-century stables and the 20th-century granary taken before the adaptive reuse intervention. Credit: Maciej Lluko Source: archdaily.com

FIG. 3.3.3
Photo of the 19th-century stables and the 20th-century granary taken after the adaptive reuse intervention. Credit: Maciej Lluko Source: archdaily.com

FIG. 3.3.4
Photo of the 20th-century granary taken before the adaptive reuse intervention. Credits: Maciej Lluko Source: archdaily.com

FIG. 3.3.5
Photo of the 20th-century granary taken after the adaptive reuse intervention. Credits: Maciej Lluko Source: archdaily.com

3.3.2 GHIRARDELLI SQUARE BY LAWRENCE HALPRIN; WILLIAM WURSTER

The project of Ghirardelli Square is a project developed on the old woolen mill owned by Heynemann Pick and Company, in San Francisco, California. The original structure was built in 1858. In 1861 destroyed the original building and later was replaced by the two-story structure designed by William S. Mooser. Two additional floors were added later, and until 1889 the building was used as a wool mill. The site was the propriety of Ghirardelli Chocolate company for nearly 70 years before the transformation. New buildings were added on the site during 1900-1923 designed by the son of the Pioneer Woolen Mills architect, William S. Mooser Jr. In the complex were cocoa, mustard and chocolate buildings, a powerhouse, clock tower and the iconic symbol of the company erected in 1923. This was a giant 25-foot by 125-foot-long sign, lighting up the word "Ghirardelli." This sign was so large and bright that it was possible to be seen miles away from shore. At this point, the original structures had been adaptively reused for new functions needed for the factory. The Ghirardelli company was sold to the Golden Grain Macaroni Company in 1962. After this new ownership, the production processes were relocated to a modern facility outside of San Francisco. William M. Roth and his mother purchased the buildings and had the idea to build a complex of retail shops, offices, restaurants, and a movie theatre. More than 75 tenants brought life to the square. All of the buildings were reused for a new purpose, and construction of new structures was limited to protect and keep the site's original atmosphere and characteristic architecture. The complex was finalized in 1964 and was considered the first successful adaptive reuse project in the United States of America. In 1965, Benjamin Thompson and Associates designed a Design Research store on the ground floor of the Clock Tower. There was an attention to existing architectural elements. The lower levels of the Clock Tower are now home to Ghirardelli Square's main chocolate shop. Fairmont Heritage Place hotel opened In 2008 using part of the former clock tower building. The hospitality structure includes 53 rooms expanded on four floors. The service provided in the hotel is 5-star service. In 1982, it was listed as a heritage building, being registered on the National Historic Register. Ghirardelli Square is now a popular tourist attraction that is a combination of shopping, restaurants, and history. Having a massive success as a retail location, Ghirardelli Square continues to serve as a model for restoration complexes throughout the country (GHIRARDELLI SQUARE, 2019).

GHIRARDELLI SQUARE

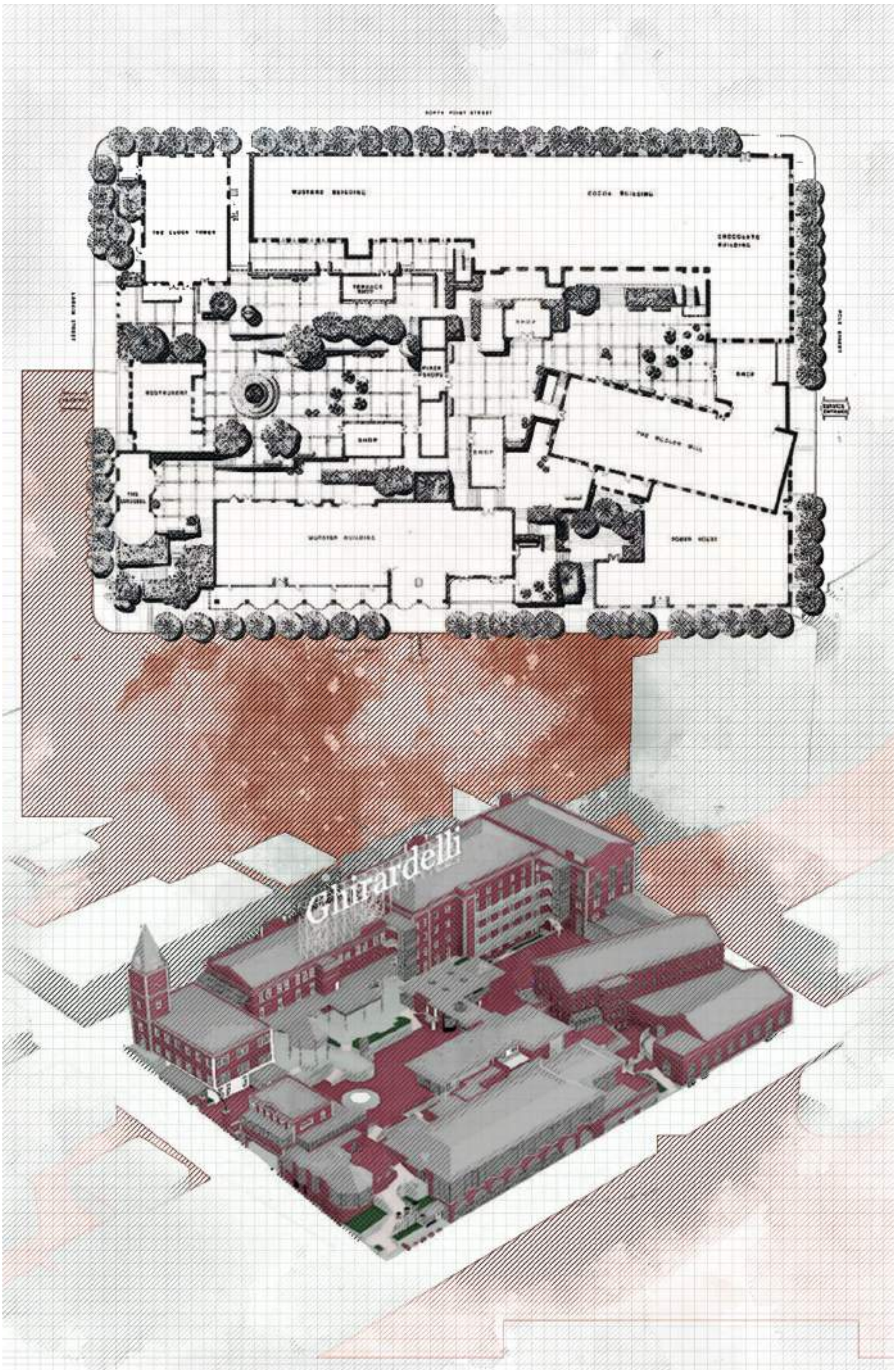
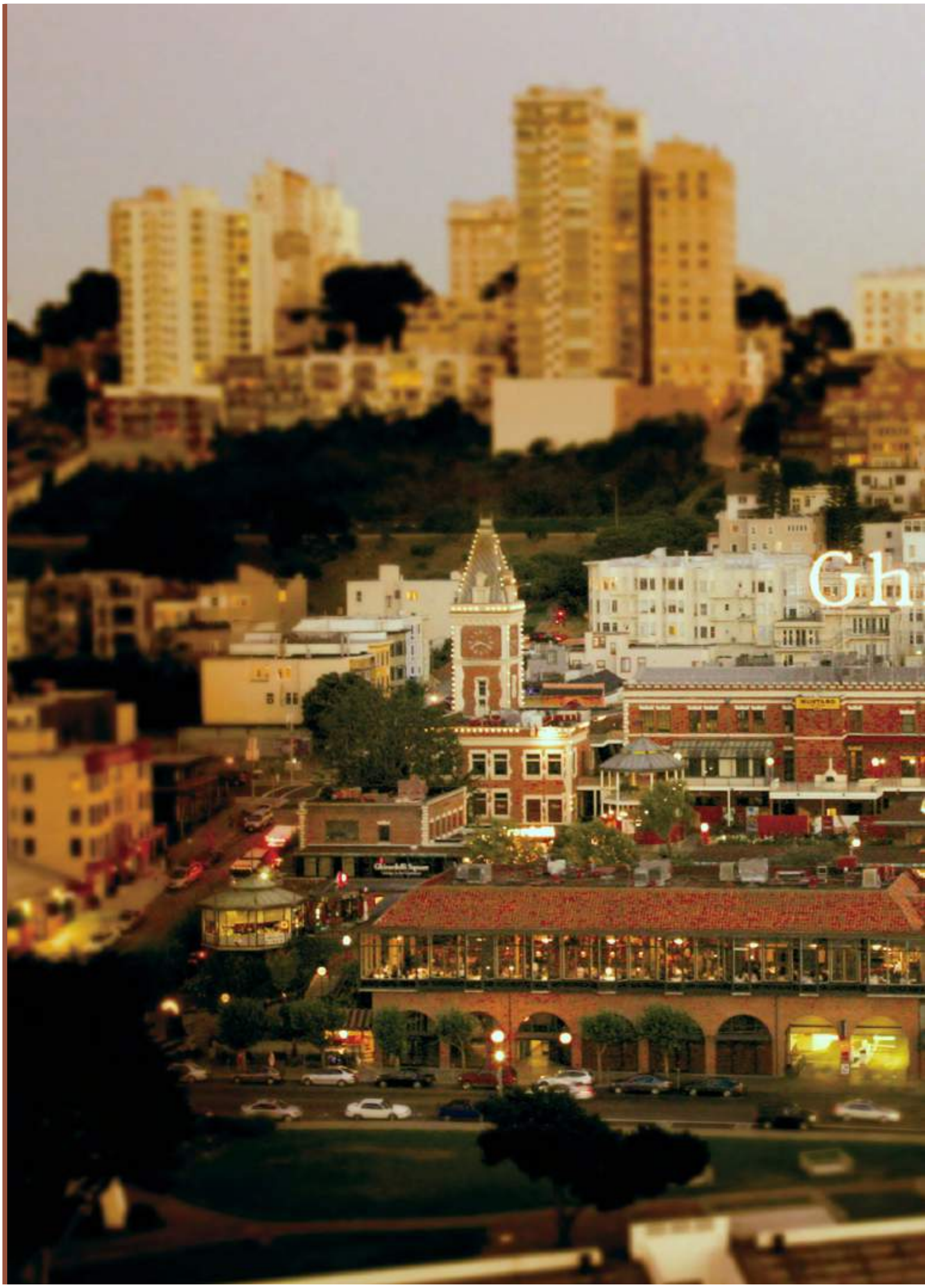
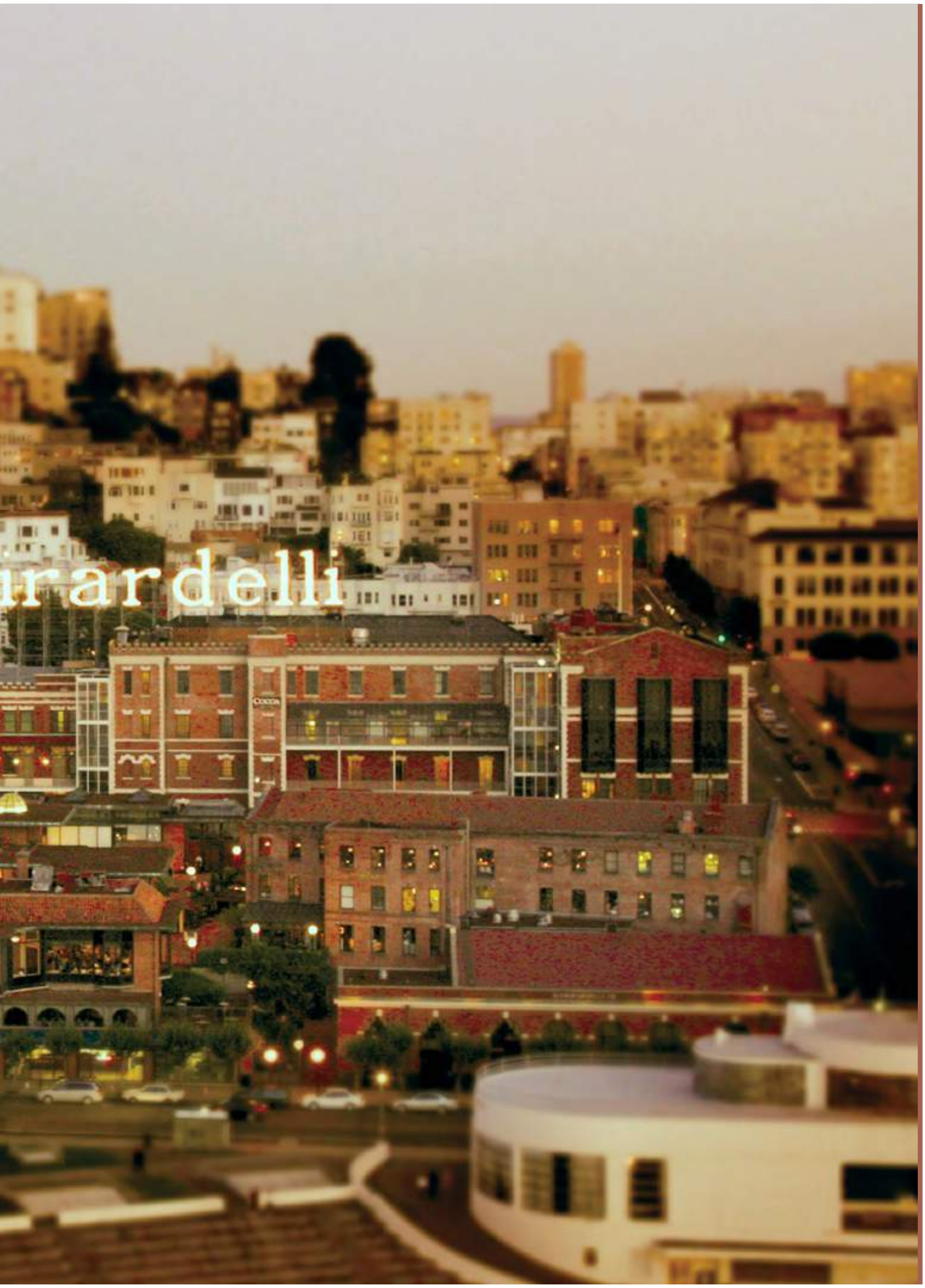


FIG. 3.3.6
Floor plan and axonometric drawing of Ghirardelli Square.

FIG. 3.3.7
Aerial photo of Ghirardelli Square, Source: www.theregistrycollection.com




rardelli

3.3.3 SEAHOLM POWER PLANT RE-DEVELOPMENT BY STG DESIGN

The old Seaholm Power Plant had been abandoned a long time until 2013 when actions were taken. This historical building, located near Lady Bird Lake in the heart of downtown Austin, Texas, got a second life as part of an exciting mixed-use redevelopment. The Seaholm Power Plant previously served as Downtown Austin's primary electric resources from 1951 to 1996, in which it shut down entirely. The site lay dormant until 2004 when Austin City Council considered redevelopment partners to reposition the building as a business incubation space.

The power plant was part of the National Register of Historic Places and was a Recorded Historic Landmark. This was the first time that Austin had made preservation of a historical landmark. The collaboration between the city and the developers was very close over three years to formulate a master development agreement. The Seaholm Power Development LLC was successfully formed as a public-private partnership with the City of Austin and several other private development agencies. The site master plan was approved in 2008, and construction began in 2013.

The Seaholm Power Plant Redevelopment project called for renovating the landmark Seaholm Power Plant, developing a new high-rise multi-family residence and a new office building, and creating a three-story underground parking garage that serves the plant and office building. Adaptive reuse project included 7.8-acre neighbourhood development.

The reuse project includes 280 high-rise condo units, 4,500 square meters of retail, and 13,300 square meters office. The primary tenant, the healthcare tech company Athena-health occupied four floors of office space product of the conversion of the plant. The building was also transformed into a two-story contemporary glass-and-steel building offering 6,300 square meters of mixed-use space for retail and offices. Seaholm Residences, a residential tower was constructed at the west end of the site.

The neighbourhood encompasses a 30-story, 57,100 square meters high-rise with luxury condominiums. The high-rise was completed in June 2016. Another essential part of the development is the one-acre public plaza, adding vitality, and qualitative public space. The building itself retains the original architecture. The turbine generator was converted for offices, retail, and restaurant spaces. Seaholm was a semi-outdoor power plant, with its boilers outdoors which were preserved as an aesthetic component in the redevelopment (STG Design , 2018).

FIG. 3.3.8
Master plan and aerial view of Seaholm Power Plant Re-Development Project. Source: STG Design

FIG. 3.3.9
Photo of the interiors, Seaholm Power Plant Offices, athenahealth, Inc. Source: architizer.com

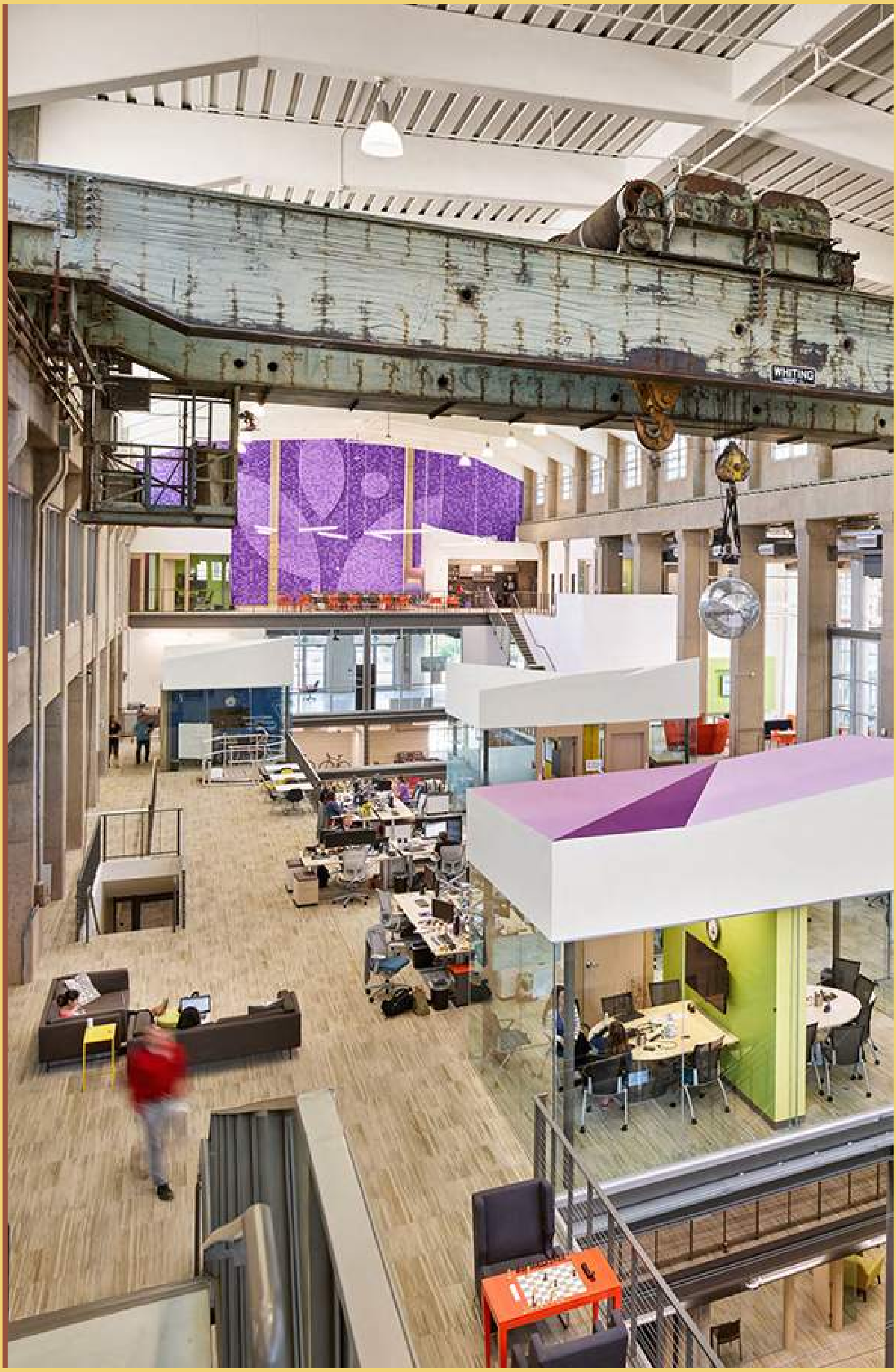


FIG. 3.3.10
Photo of the exterior
Source: texasarchitects.org

3.3.4 MANUFAKTURA BY VIRGILE & STONE AND SUD ARCHITECTES

MANU FAKTURA

The Manufaktura is a complex in Łódź, Poland which hosts an arts center, shopping mall, and entertainment facilities. Manufaktura complex is Poland's largest renovation and adaptive reuse project since the reconstruction of Warsaw's Old Town in the 1950s. The site has a big significance for its historical importance. The development was done on the walls of a series of factories which used to produce textiles, built at the end of the 19th century. The existing mills were built in a red-brick industrial style incorporating elements of Art Nouveau flourish. Hilary Majewski designed the original buildings, and they were the property of Izrael Poznański, a merchant who used the need for high-quality textiles, producing these for the eastern markets of Russia, Japan, and China. Łódź was the most westerly city in the Russian Empire. This location helped Poznański to match western textile expertise and industrial practices with the eastern markets demand and limitless access. The site was sold to French developer Apsys in 2000. A plan was made for the adaptive reusing the buildings and work began in 2003. The design had as a goal the transformation of the crumbling mills into a multifaceted cultural extravaganza. The building was opened for the public on the 17th of May 2006. This was the achievement of more than five years of planning and construction. The results are simply amazing. The largest public square in Łódź was part of the scope in the adaptive reuse design of Manufaktura. This square acts as a venue for cultural and sports events. The total area of the complex is 67 acres. The focal point of the design is the original 19th-century brick buildings, entirely renovated. The only missing element was the chimney stacks very dominant for the time that stayed raised from the ground. The restoration project included more than 90,000m2 of red brick buildings. Some other buildings have been added to the complex, most notable the shopping center which took the place of the communist era Poltex factory after being demolished. The shopping center was made of glass and steel. It is lower than the surrounding buildings, and, it cannot be seen from the outside. All the buildings of the complex keep a similar style but are of a lesser size than the four-star Andel's hotel opened there in 2009. A triumphal arch-like gate is one of the entrances to the Manufaktura complex, leading to the old spinning mill. The design of the complex was by the British firm Virgile & Stone from London, and they collaborated with the French architecture studio Sud Architectes from Lyon (Manufaktura, 2017).

FIG. 3.3.11
Fragment of the adaptive reuse of Manufaktura Source: en.manufaktura.com

DENIS KRAJA

FIG. 3.3.12
Aerial photo of Manufaktura after the adaptive reuse intervention. Source: skyscrapercity.com

3.3.5 DETROIT FOUNDATION HOTEL BY MCINTOSH PORIS ASSOCIATES AND SIMEONE DEARY DESIGN GROUP

This adaptive reuse project includes the former Detroit Fire Department Headquarters and Pontchartrain Wine Cellars building. These buildings have been adapted into a new boutique hotel and opened for the public on the 14th of May 2017. The new design includes a ground-level restaurant, private dining room, chef's table, bar, lounge, retail, two business meeting rooms, and podcast studio. The hotel includes a fitness center and an addition to the top floor to host banquets and parties. The architects, McIntosh Poris Associates, worked closely with Aparium Hotel Group for the design of the Detroit Foundation Hotel. Both of the buildings are heritage listed. The project cost $28-million and embraces a "Detroit State of Mind" welcoming visitors to experience an authentic feeling. Detroit Fire Department headquarters was located on the northeast corner of Washington Boulevard and West Larned Street and was built in 1929. Reclaimed wood from the building as well as from abandoned buildings throughout Detroit was used for the interior features as Mcintosh Poris Associates worked with Architectural Salvage Warehouse Detroit.

The existing façades were restored with care maintaining the original character. Decorative terracotta panels sporting fire-house themes of the Detroit Fire Department Headquarters' were repaired and put under the lights. The original red doors are being reused. The entrance in the Neoclassical building is through a massive arched portal, formerly one of the fire engine doors; guests are transported into an open space that once housed the fire engines. In this open space are the check-in, lobby, and a restaurant. The history in the interior is celebrated by the existing glazed brick tiles, and the new finishes together with decorative lighting, and interior architecture add that hint of modernity. In this space is also a display kitchen. The antique brass metal rail system, symbolizing a fireman's pole, runs through the restaurant and highlights the strong architecture. Simeone Deary Design Group's vision was an homage to Detroit's past and a celebration of the promising future of the city. "Coming Home to Detroit" was the conceptual design inspiration. Historic important moments and materials from the Fire Department Headquarters, as well as from Detroit, are being taken into consideration and have been used to create a contemporary design. The furniture is a reflection of Detroit's rugged industrial design and is mixed with luxurious materials. The collaboration between Aparium Hotels, McIntosh Poris Associates, and Simeone Deary Design Group achieved the best representation of the city's design, art, architecture, and manufacturing communities (Runyan, 2017).

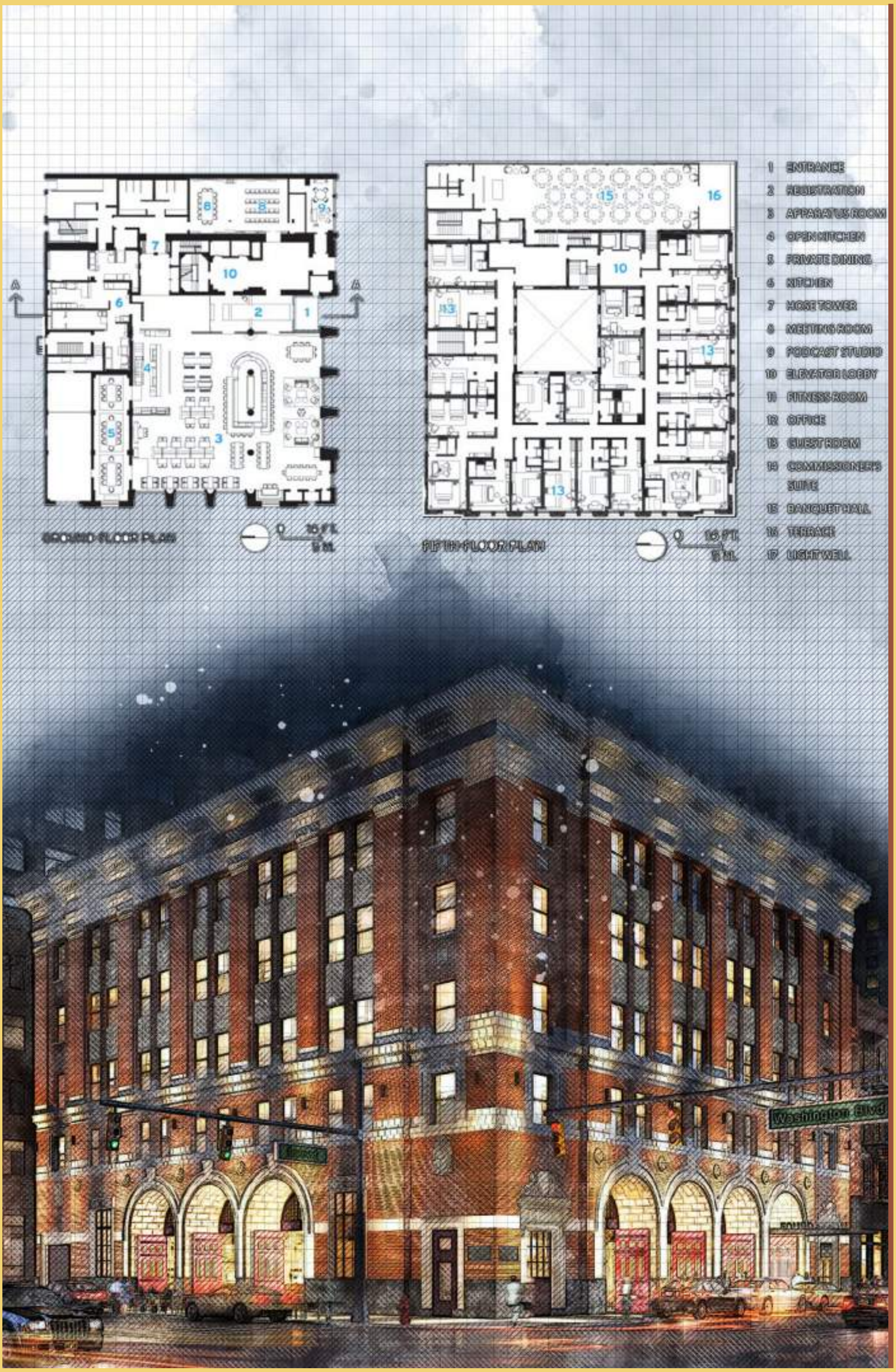


FIG. 3.3.13
Artist's impression and floor plans of Detroit Foundation Hotel Source: McIntosh Associates

FIG. 3.3.14
One of the iconic fire-station doors, restored and reused in its original location in Detroit Foundation Hotel.

DENIS KRAJA

FIG. 3.3.15
Photo of the Interior

3.3.6 OUTDOOR ADVENTURE CENTER BY HOBBS AND BLACK ASSOCIATES & ANN ARBOR

Outdoor Adventure Center in Milliken State Par, in Detroit is an adaptive reuse of the Detroit Dry Dock Company and later the Globe Trading Company. The building which is part of the National Register of Historic Places owned by the Michigan Department of Natural Resources'. The Outdoor Adventure Center features hands-on activities and exhibits including a waterfall, zip line, suspension bridge, airplane simulator, bike and snowmobile simulators, rock and tree climbing, fishing simulator, a native fish aquarium, and more. Mostly an attraction for kids, this center has become a landmark for the city of Detroit as it carries a lot of history and represents it in its best way possible.

The building that accommodates the Outdoor Adventure Center was the steel and brick machine shop building constructed in 1892. This building was constructed as part of what would become a six-building complex by 1919. The design and construction were done by the Berlin Iron Bridge Company. Although various companies used the different parts of the buildings of the Dry Dock Company over the years, all left the complex, and most of the buildings were abandoned and demolished. The only standing structure is the machine shop complex, although it was shuttered and abandoned for two decades. In 2013 plans began to formalize for a renovation of the building, as part of the development of Milliken State Park. The commissioned architects where Hobbs and Black Associates, Ann Arbor. The Outdoor Adventure Center opened in July of 2015.

The Outdoor Adventure Center maintains much of the historical character of the site, keeping the original brick walls, and highlighting its cast iron and Wellman supporting trusses. There is an exhibit at the center that explores the building's unique back-story.

This center has become a focal point for the Detroit riverfront as it is also the beginning of the Dequindre Cut Greenway. It is also considered as an excellent example of the adaptive reuse in Detroit and all the goods that it can bring in the development of the city. The use of an abandoned industrial building has been entirely successful. Only after one year from the inauguration, 100,000 visitors have visited the Outdoor Adventure Center, enjoying all the entertaining that offers.

This adaptive reuse project is the perfect balance of the new and the old, mixed together, to bring the history in the nowadays making the city fascinating for the habitants but also the visitor which are introduced to the pieces of the history of the city and also important national historical landmarks (Golden, 2015).

FIG. 3.3.16
Artist's impression of the exterior. Source: Hobbs and Black Associates

FIG. 3.3.17
Photo of the interiors of Outdoor Adventure Center

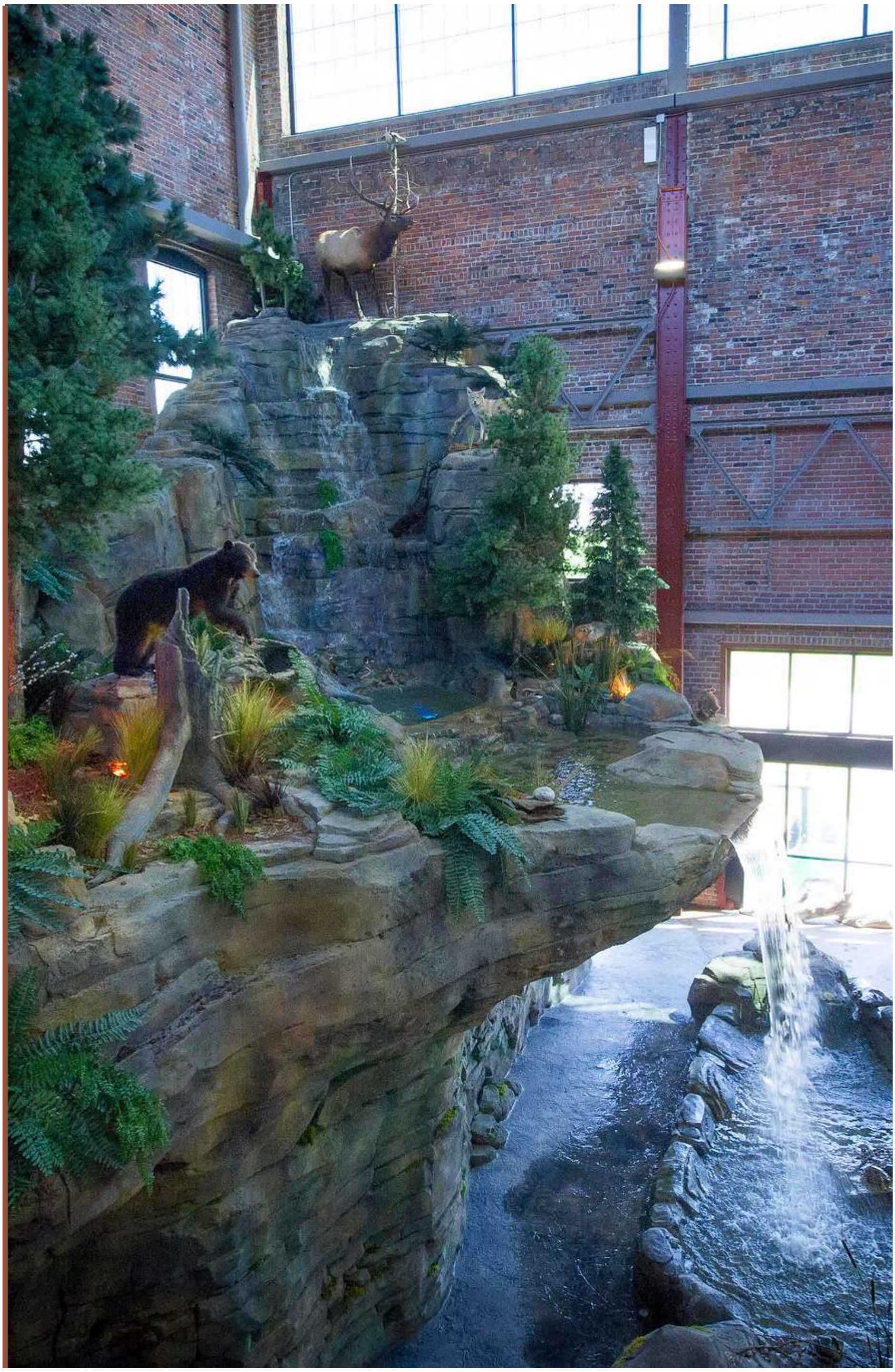


FIG. 3.3.18
Photo of the exteriors.

2

PART 2

POTENTIAL ABANDONED INDUSTRIAL SITES FOR THE PROJECT OF ADAPTIVE REUSE

Personal comment: While in Detroit, I had the chance to visit different abandoned industrial buildings. I had to take a decision for the building I wanted to develop the adaptive reuse project. I had in mind different criteria such as the historical importance of the building, the location, the possibility to be developed in stages, and personal inspiration and preference for the project. Seeing in person these building was a unique experience and in the end I have shortlisted only 4 of the buildings that have the best potential for adaptive reuse.

PACKARD MOTOR CAR PLANT

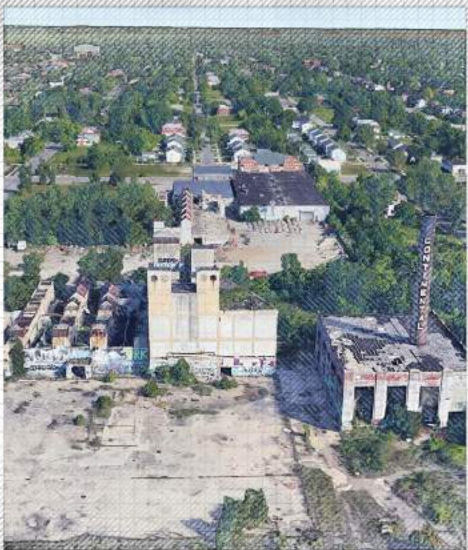
1580 East Grand Boulevard

This is the nation's foremost and most famous industrial ruin. Indeed, it is probably the biggest industrial ruin in the United States and, perhaps, in the world. Designed by Albert Kahn and built in 1903, this building represents a very significative change in the way how the factories were built until then. For the first time, Albert Kahn used here his reinforced concrete system, which made possible to have bigger spaces with big windows. As a consequence, more flexible use of space full of natural light.
The size of this abandoned factory is enormous, and this is one of the reasons why it hasn't been reused yet. Anyway, plans are to have partial adaptive reuse soon. For these reasons, I have found it impossible to develop a project within the timeframes that would give the possibility of a work done in stages and also the building itself doesn't represent any architectural interest on me.

NASH-KELVINATOR PLANT

14250 Plymouth Road

The Kelvinator Corporation was an appliance manufacturer founded in Detroit in 1916. To accommodate the growing operations, Kelvinator built a new factory and headquarters on Plymouth Road on the northwest side of Detroit. Designed by Amedeo Leoni, the plant included an office complex in the front, a three-story factory, and a power plant in the rear. After changing different tenents, the plant has been abandoned since 2013. This plant represents a very iconic architecture with its tower in the administrative building. Detailing and composition make it a potential site for the adaptive reuse project, but its size is something that let me down. This plant is all one, the buildings are all connected, and this does not give much chance for a project to be done in stages. Another downside of Nash-Kelvinator Plant is its location.



CONTINENTAL MOTORS PLANT

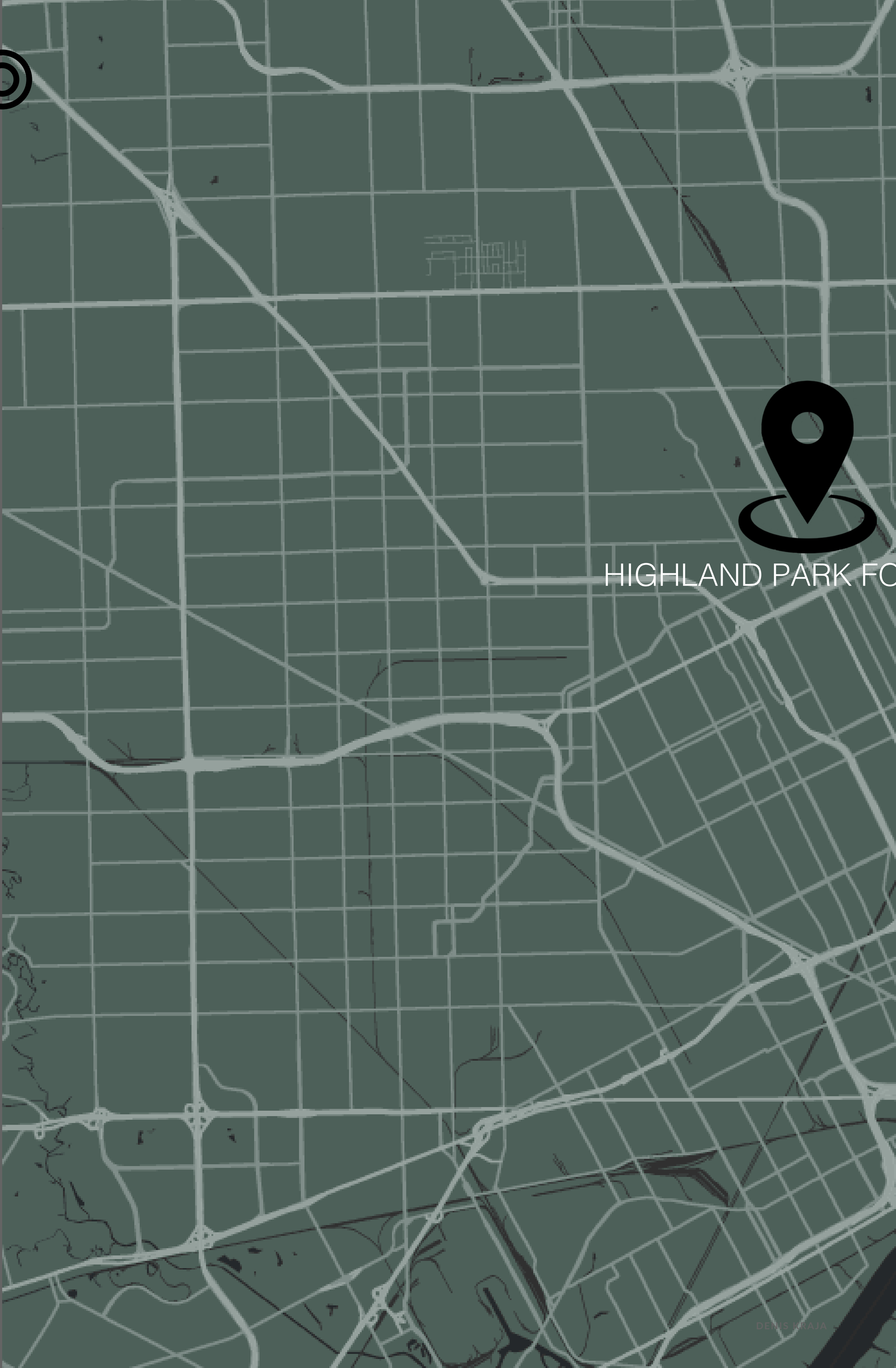
1610 Algonquin Street

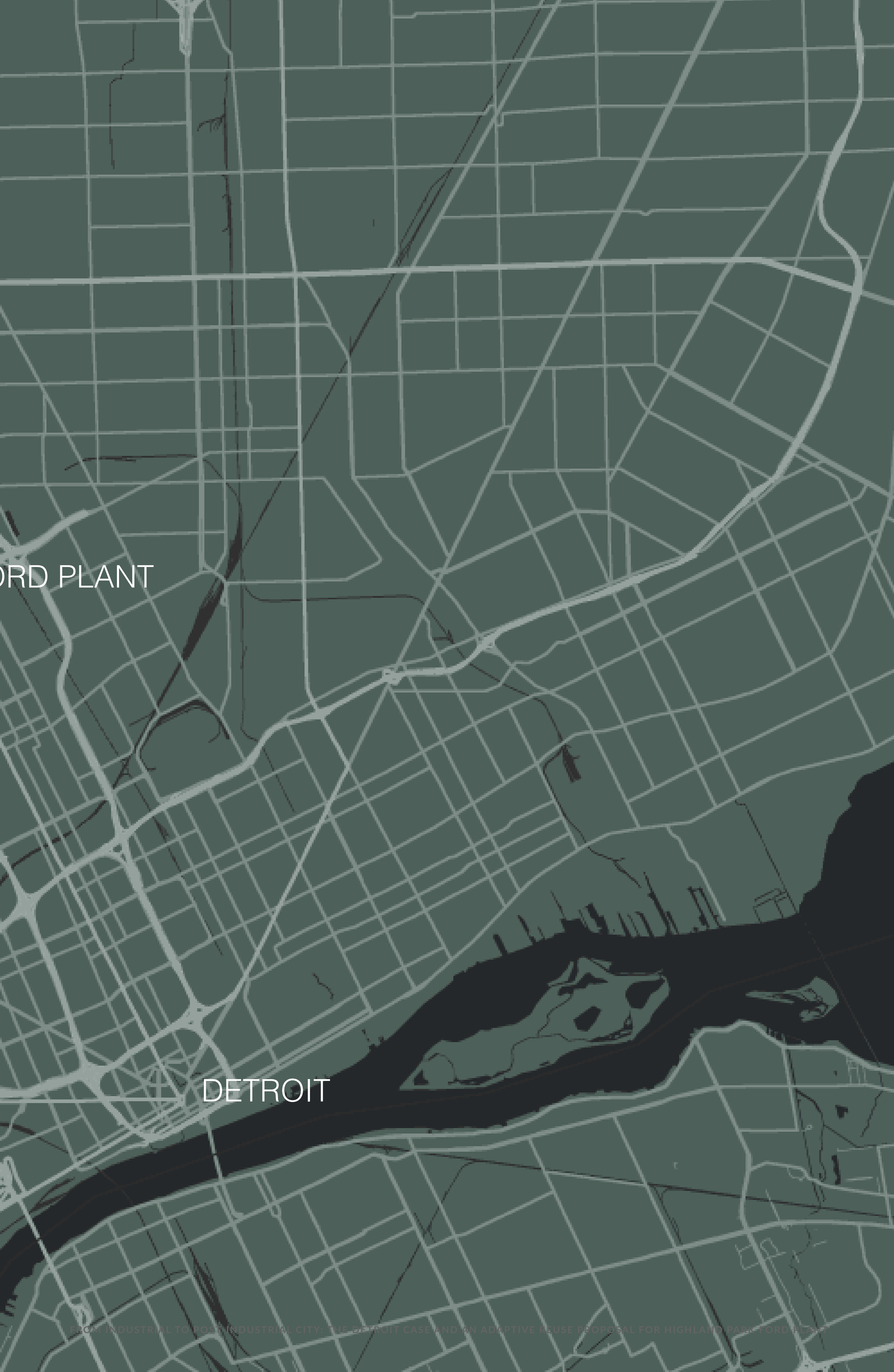
Continental Motors was founded in 1903 when it was presented a 2-cylinder engine at the Chicago Auto Show. Continental began construction on a large plant along Jefferson Avenue on the east side of Detroit in 1911, designed by Albert Kahn. Most of the plant had been demolished by 1961, aside from the power plant, a foundry building, and the test cells. Most of the land close to Jefferson was cleared. The plant's last occupant Continental Aluminum which moved out in 1998, abandoning the Jefferson Avenue plant. This plant was a big inspiration for the adaptive reuse project I was imagining when I started working on this thesis. The test cells together with the power house chimbey represented an excellent opportunity for a unique design. Its size was acceptable and easy to manage. The only problem was the lack of information. I could not find any document or architectural drawing.

HIGHLAND PARK FORD PLANT

14522-14784 Woodward Avenue

Highland Park Ford Plant is the birthplace of assambly line and the factory where the famouse Model T was mass produduced. It was designed by Albert Kahn. The Highland Park Ford Plant has been heritage listed on the National Register of Historic Places in 1973 and in 1978 it was designated a National Historic Landmark. The factory has gone through a lot of changes until it was in 2012 after Ford Motor Company moves out of AA building, anyway parts of the buildings are still in use. I decided to pick this site because of its vicinity to Downtown Detroit, the fact that it is a historic landmark. This site has the potential to be developed in stages as the buildings are all separated and all different typology giving a chance for different uses and exceptional architectural design. It is essential to mention that as the building is heritage listed, the information and documents are more accessible.


HIGHLAND PARK F


ORD PLANT
DETROIT


FORD

4 CHAPTER IV

HIGHLAND PARK FORD PLANT

HISTORICAL OVERVIEW OF THE FACTORY THAT CHANGED THE WORLD

FIG. 4.1
1926 Highland Park Ford Plant, facade along Woodward Avenue, Detroit, Michigan Original photo: James Dearden Holmes

4.1 THE INVESTOR, THE ARCHITECT AND ONE COMMON VISION

Henry Ford was born in 1869 near Dearborn, Michigan. His first car was built in 1896 when he was only 36 years of age. His attempts to convert his small workshop into a big factory failed twice, until 1903 when he started Ford Motor Company. Ford's focus was in the production of automobiles that are not expensive, and durable and would fit different types of customers. The first factory of the company was in a rented warehouse on Detroit's Mack Avenue. Refining engineering and production techniques were the main focus of Ford, keeping his goal of producing cars quickly, efficiently, and cost-effectively (Bryan, 2003). Having larger demand and the possibility to produce more, in 1905 Ford Motor Company moved into its first factory build in purpose for the production of cars, at the Piquette streets. The Piquette Plant was designed by the Detroit firm Field, Hinchman and Smith in the style of New England mills. This style was traditional but in addition to being too small, was unable to accommodate assembly techniques that Ford was looking towards. It was in this plant that the early vehicles were produced such as Model N, the model popular before the famous Model T, considered the car that changed the world. Ford had already planned to move to a larger factory for its new Model T which started the production at the Piquette plant in 1908 (Hyde, National Historic Landmark Nomination - Ford Piquette Avenue Plant , 2005).

More space needed to support the success that Ford's cars had during that time. For this reason, Ford planned to move from Piquette plant within the first year of its existence. The space that would fit Ford's dream was in the area of Highland Park, a new site next to Woodward Avenue, located in the northern Detroit.

Highland Park attracted Henry Ford for different reasons such as the distance to the railway lines, taxes which were lower than the city of Detroit and the size of the land available. In 1906 Ford had already found the area where he wanted to build his new project. It was the year 1907 when he purchased 60 acres of the site and always had in mind the possibilities for expansions which were present around that site. For the Highland Park Plant, Ford hired Albert Kahn, an innovative architect who would fit the character of Henry Ford (Williams, Haslam, & Williams, 2003).

Albert Kahn was a German architect who, in 1880, immigrated to the U.S. spending his first years of work in a Detroit based firm, Mason and Rice. It was 1902 when Kahn established his own firm, after several short-lived partnerships. Like other architects of the time, Kahn was able in working in the multi "reborn" styles that were "reused" in the late 19th century and beginning of 20th century. His work on the industrial buildings that made him famous and successful (Johnson & Langmead, 1997). In 1903, Ford started

FIG. 4.1.1
(PAGE 133)
Albert Kahn, Henry Ford, April 1942
Source: Bentley Historical Library

FIG. 4.1.2
(PAGE 135)
-Drawing sheet from the original Kahn System patent (Julius Kahn, 1903, Composite Building Construction, U.S. Patent 751,921) Source: wikipedia.org

Ford Motor Company and Albert Kahn was contracted to design next plant for Packard Motor Car Company. In the beginning, Kahn designed these buildings following the mill construction, but when he designed the Building 10, everything changed.

Kahn utilized new methods of reinforced concrete in this building. Kahn's brother Julius was an engineer who had created and worked toward this new system. Kahn contributed on the creation of a new typology of industrial building using the reinforced concrete. This was a revolutionized the construction of the industrial buildings because the traditional type of building had limitations by their construction methods and materials. The size of the factory buildings was dictated by the massive masonry walls, timber floor structures and roofs. The windows were small, and the interiors dark. A different case was for the reinforced concrete structures which gave the chance to have multiple stories buildings, large windows, and less internal columns (Hyde, Assembly-Line Architecture: Albert Kahn and the Evolution of the U.S. Auto Factory, 1905-1940, 1996).

Anyway, in the new design of the industrial buildings form Kahn, a new aesthetic vocabulary was introduced. During this time the revival styles were dominant, and the ornament was also used on the industrial buildings to hide their essential nature. However, Kahn abandoned this style, having clean and simple designs that expressed their function. Kahn experimented with the style. He wrote in 1927, "Purity of style in modern work is therefore of secondary importance. The best designers are those who, thoroughly grounded in the work of the past and familiar with the principles underlying same, apply them to new problems, adding what they can of their own individuality and creating something characteristic of our day." In his point of view, the historical styles were acceptable for traditional buildings such as residential, religious and so on, but Industrial architecture was a new typology, and it was not necessary to stick to the traditions of the past. New solutions needed to take place, and he was able to design buildings that would cover all the needs of the time. (Bucci, 2002).

Ford's intention was to bring in the same building the production, administration, and assembly. Kahn created a consistent structural grid, giving the possibility for further extensions.

Large space, natural light and multiple stories were integrated into the new factory at Highland Park. While designing the first part of the plant, Kahn changed the original design which shows wood sash windows, to steel sash, in what he later pretended to be the first application in the U.S of this type of windows (Hyde, Assembly-Line Architecture: Albert Kahn and the Evolution of the U.S. Auto Factory, 1905-1940, 1996).

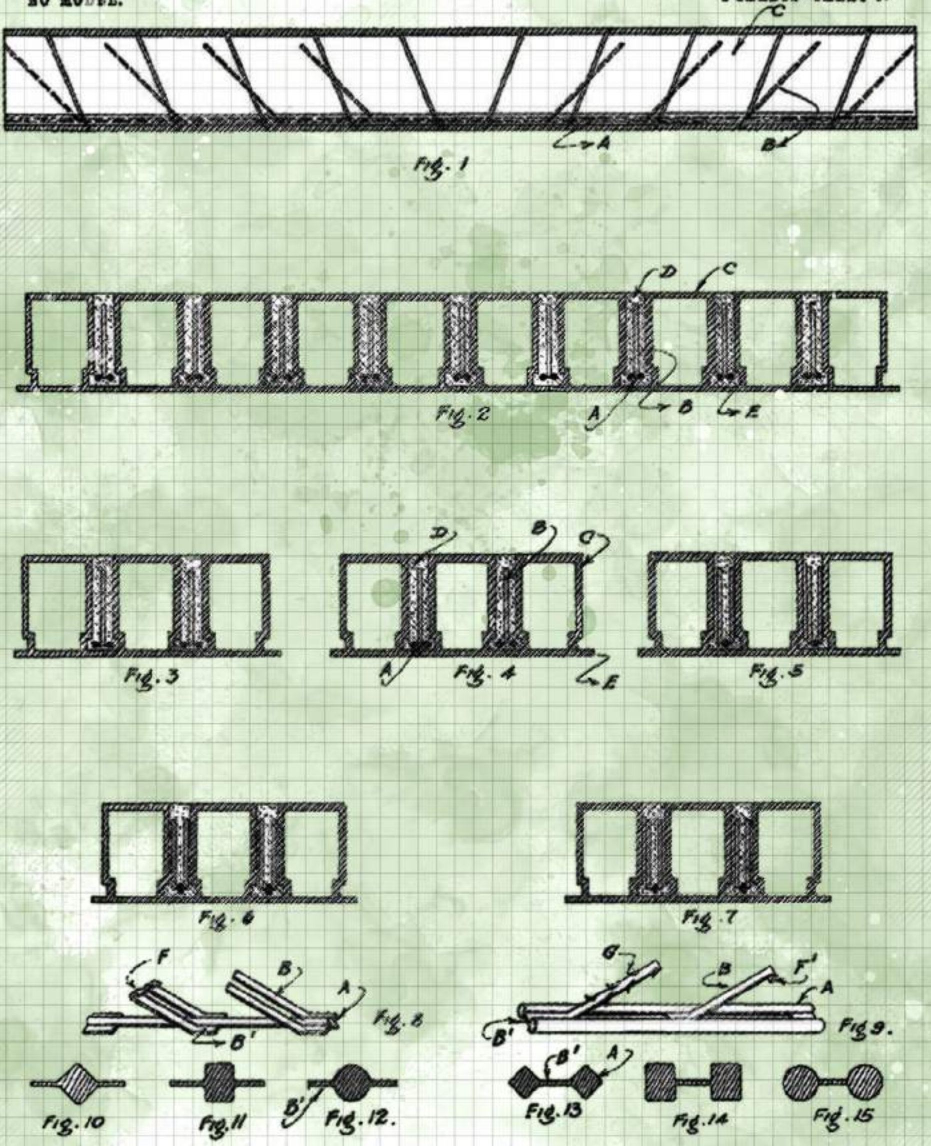
No. 751,921. PATENTED FEB. 9, 1904.

J. KAHN.

COMPOSITE BUILDING CONSTRUCTION.

APPLICATION FILED AUG. 14, 1903.

NO MODEL. 2 SHEETS—SHEET 1.



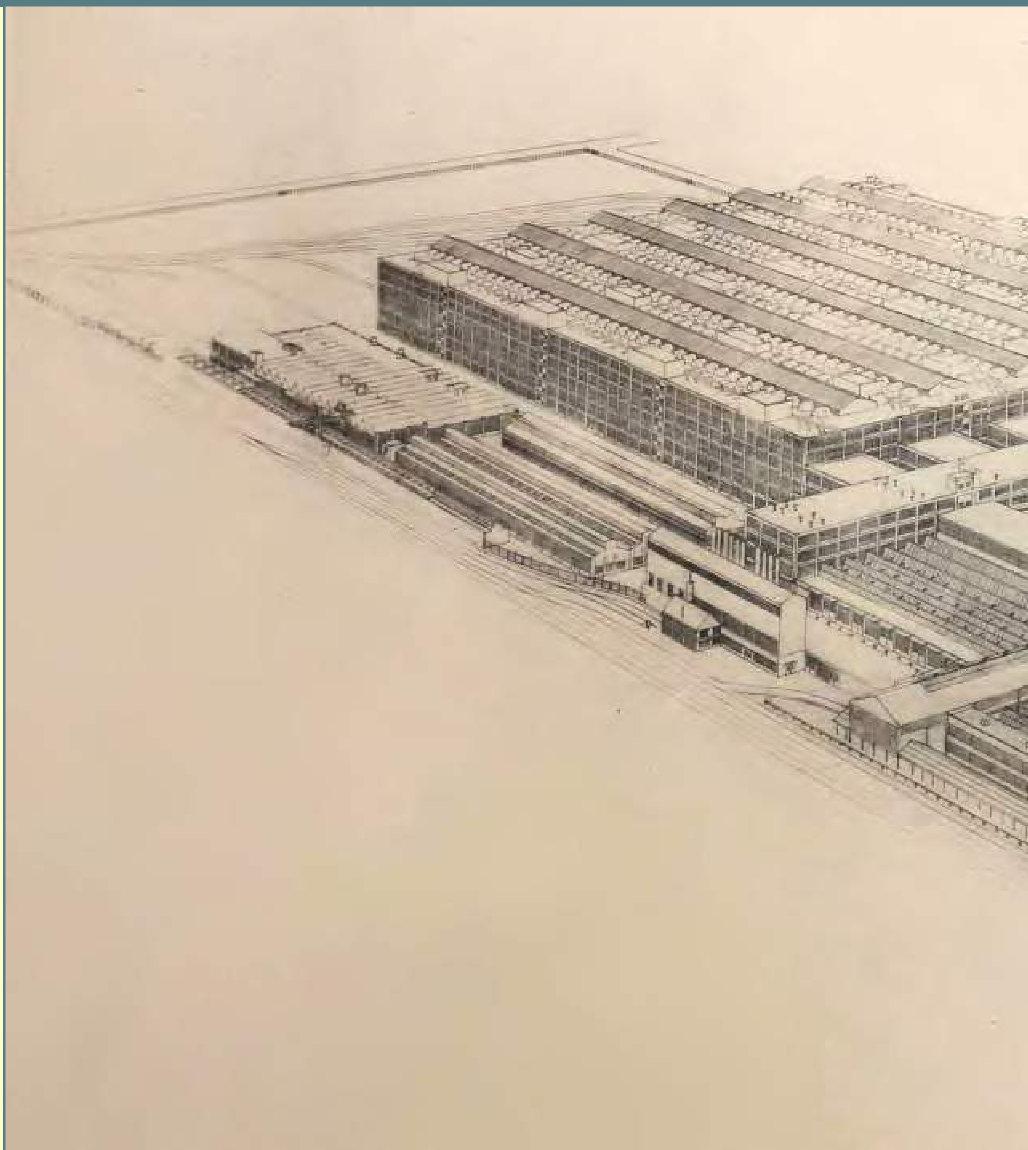
WITNESSES.

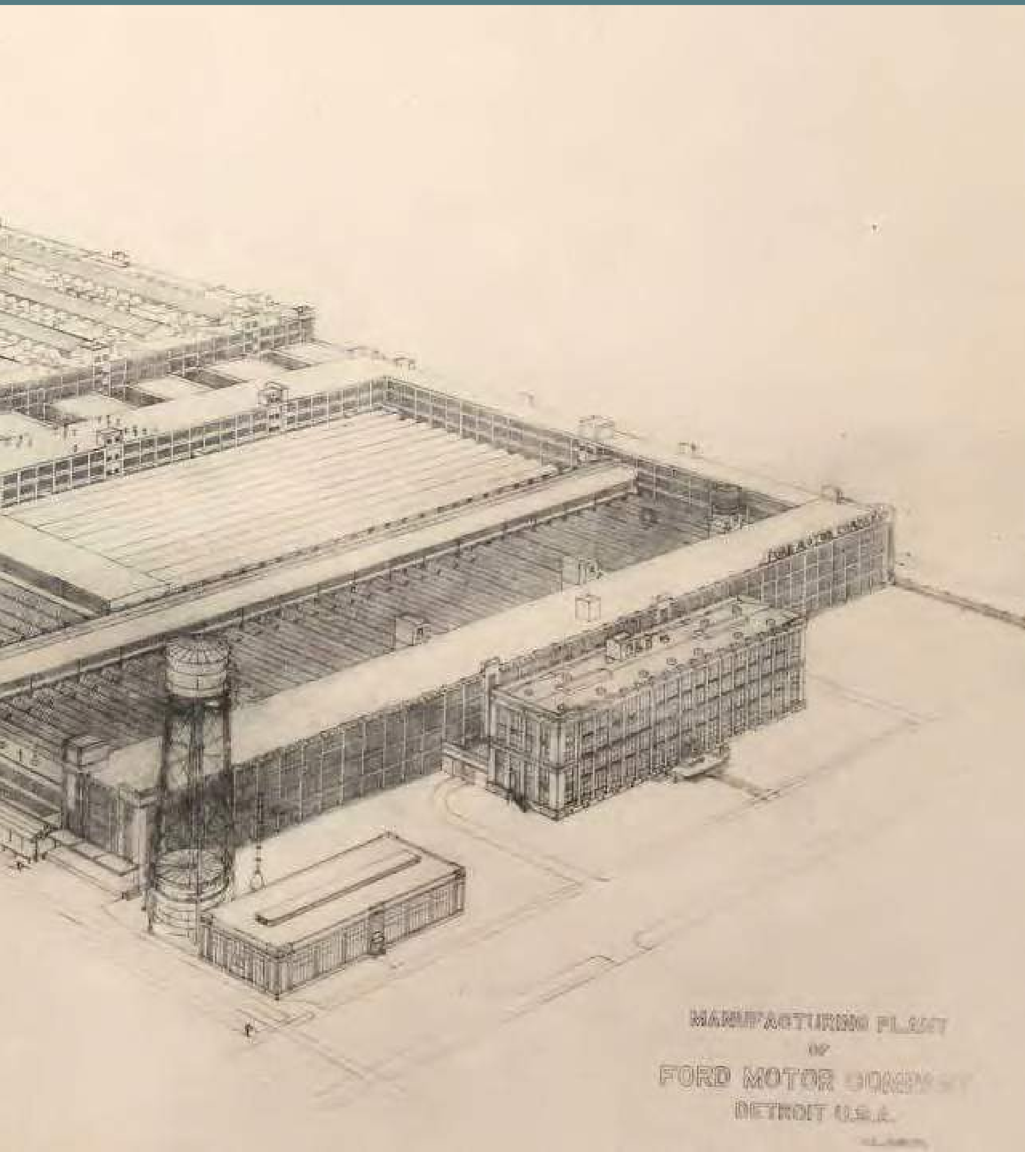
INVENTOR.

Attorney

FIG. 4.1.3

Concept drawing of the original Highland Park pltant designed by Albert Kahn, ca. 1910. Source: Benson Ford Research Center, Acc 1660, Box 131




MANUFACTURING PLANT
OF
FORD MOTOR COMPANY
DETROIT U.S.A.

4.2 THE HIGHLAND PARK FORD PLANT AND ITS GOLDEN AGE

On the 1st of January 1910, the Model T production moved to the Highland Park Plant. By that time or within the first year, other additional buildings were built. These included the foundry K, the oil house P, and two floors of the administrative buildings O (Hyde, National Historic Landmark Nomination - Ford Piquette Avenue Plant , 2005).

The factory was massive compared to the other plants, but this stage was just a fraction of what was planned to be built. During the first five years, it was built the administrative offices and a stand-alone showroom facing Woodward Avenue. A garage N, connected the administrative building O with the first factory building A, positioned along to Woodward. Other factory facilities, machine shops, and crane ways were extended to the east. There was an advantage with the railway located at the eastern end of the site, making possible the transport of the material directly into the assembly buildings for distribution throughout the system (Christian, 1975).

GOLDEN AGE

Albert Kahn decided to decorate the public face along the Woodward, recognizing the importance of it. Something that he did not apply to the Packard Plant, making it have a lack of ornament (Hyde, Assembly-Line Architecture: Albert Kahn and the Evolution of the U.S. Auto Factory, 1905-1940, 1996). In the Highland Park plant, the plain concrete facade was broken by vertical brick towers. In these towers, he used ornamental brickworks and concrete details, which made the building more attractive, losing the extreme length visually. The administrative building and the showroom along Woodward Avenue had more attention from the architect and were highly decorated with brickwork and tiles. Later was built the powerhouse along Woodward, although not a public building, it was still decorated showing the significant power of the Highland Park Ford Plant.

The plant had different stages of growth. During the increase, there was created another public facade along Manchester Street. It was in this street where the main entrance was located. Thousands of workers would enter and exit every day from there. The factory was extended along Manchester Street.

These two exposed facades hid a less interesting architecture. The ornament was used rarely, and these structures showed more functionalist style with big volumes full of light penetrating the big windows.

The role of Albert Kahn in the design of the further stages of Ford Highland Park Plant is not clear. He collaborated during the design with his associate Ernest Wilby who worked with Kahn from 1903 to 1918.

Chief engineer for Ford Motor Company, Edward Gray that

FIG. 4.2.1
4 o'clock Shift Change at the Highland Park Ford Plant in Detroit, Michigan,1916 Author: Unknown

it was the company engineers who designed the additions to the factory, including the six-story building W and building X, accepting that the specifications and details were done by Kahn. However, it is evident that the new structures were based on the principles that Kahn used in the original structures. Kahn's architecture practice was actively participating in the further developments (Christian, 1975).

Highland Park Ford Plant was from the beginning under continual construction but the focus for the first five years was on the original plan that covered 60 acres. The machine shop B and a crane way C was built in 1911. Another machine shop E, Crane way F and the factories G, H and M were built in 1912 located on the east of the original factory building A. In 1912/13 other buildings were added, these included the ancillary buildings. This was a process that would take time, and many of these small buildings would appear and then disappear as another extension of the factory might have been needed (Christian, 1975).

There was a moment that changed the production process in the world. That happened in this plant with the idea of Ford which integrated the continuously moving assembly line, on 1st of October 1913. Since the foundation of the company, Ford had been working to find the best efficient way of the assembly process. He had in mind the reorganization of the materials and workers to minimize the time that would take to transport equipment and to move from one to another phase of the production and assemblage. The moving assembly line was an original idea in which travellators made possible the transportation of parts of the car through different sectors of the building. Workers would perform only a specific task as the vehicle would move past. The result was amazing. Because of this invention, the entire car would be assembled in 93 minutes, which was a vast improvement compared to 728 minutes needed before this system existed (Hyde, Assembly-Line Architecture: Albert Kahn and the Evolution of the U.S. Auto Factory, 1905-1940, 1996).

FIG. 4.2.5
(PAGE 142-143)
Cutaway of the Highland Park Ford Plant by David Kimble Source: David Kimble's Cutaways: Techniques and the Stories Behind the Art, 2015

Having more production which was done quickly and efficiently, the prices for the cars dropped, and this made the demand increase. The Model T had a cost of production of $850 in 1908, but in 1924 the cost of production was only $260. Model T became affordable for almost everyone. This model had the advantage of being a reliable car that could be used in farms as it could be used for extended traveling. The increase in the income made him take another move, which would change the scene of the time. He decided to pay his workers 5 dollars a day; this was an excellent salary for the average industrial worker of the time. Moreover, this affected the purchasing power of the workers. Each of them could now afford to buy the

FIG. 4.2.3
1917 Ford Motor Company postcard showing parts from the assembly line. Source: Hemmings Motor News

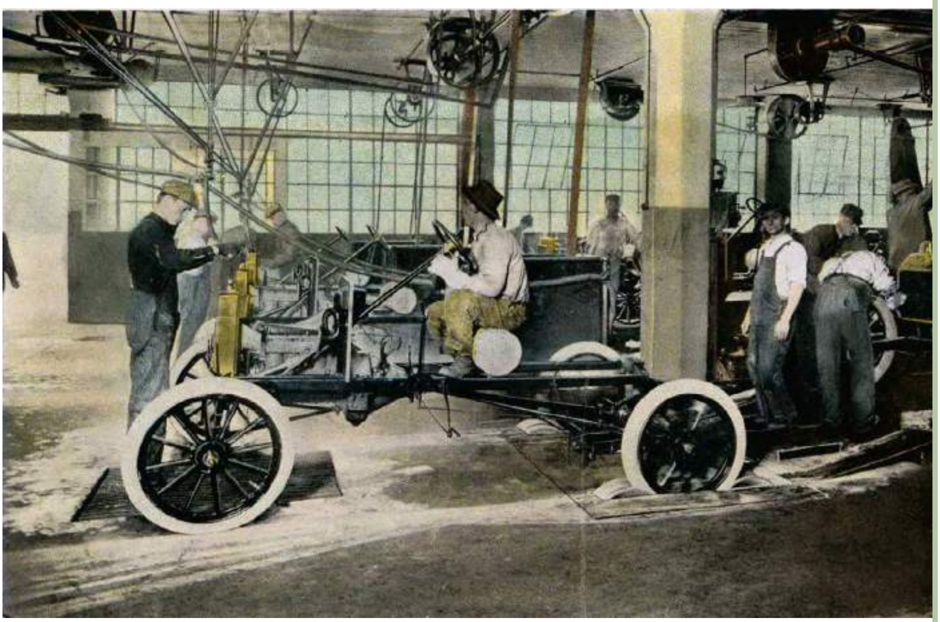
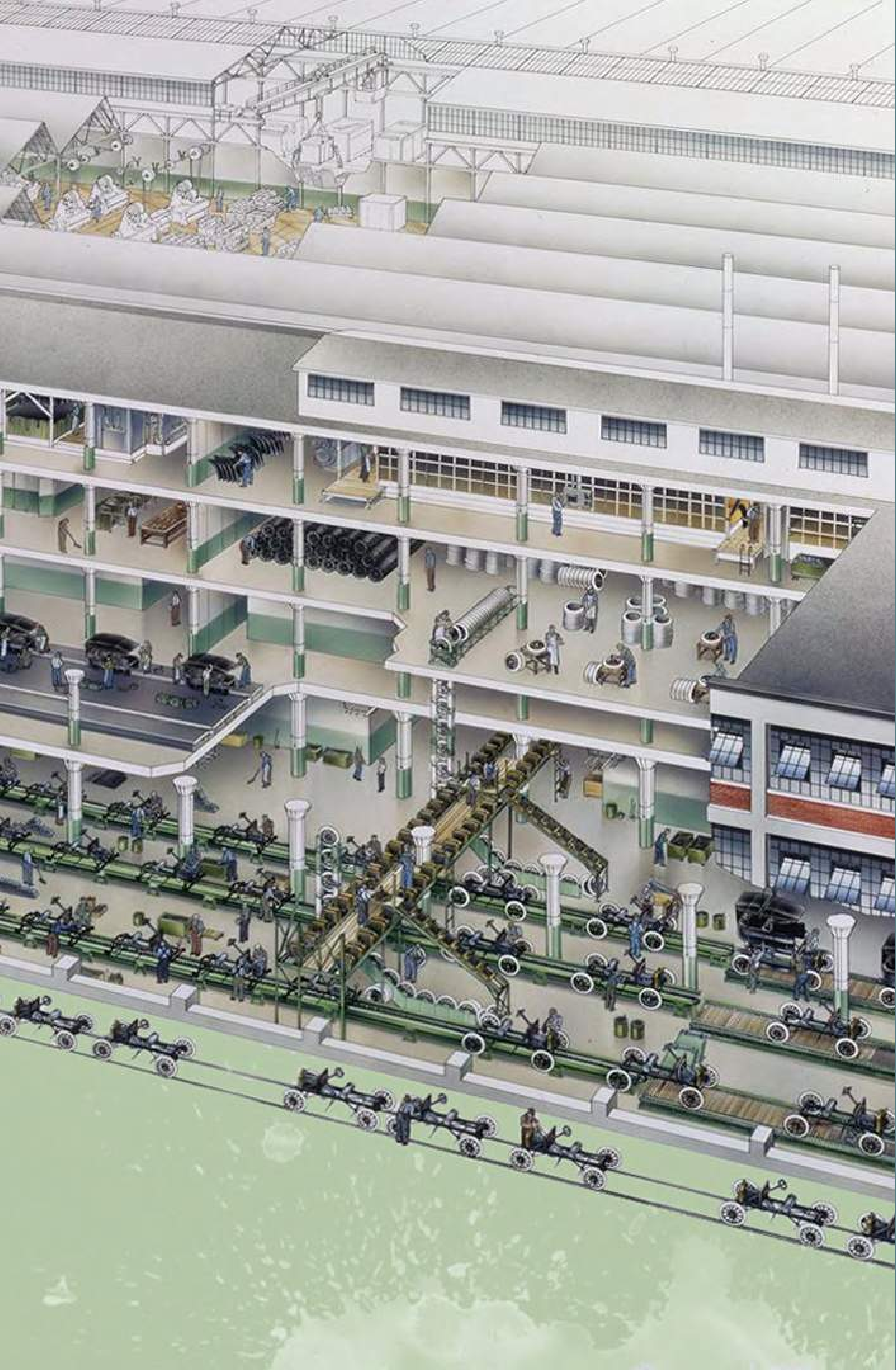


FIG. 4.2.4
1917 Ford Motor Company postcard showing the final parts from the assembly line; from here the cars run on their own power. Source: Hemmings Motor News



car that they were producing, this way increasing, even more, the demand and the profit for Ford (Raff & Summers, 2003).

Ford Plant in Highland Park had a massive impact in the area. The village had a population of 427 people before the plans for the new Ford plant were put on paper. In 1908 the population doubled before the plant was operational for production. The population was 4210 inhabitants in 1910, ten times more and after 10 years reached 46,499 inhabitants. Highland Park changed its status from a village to a city in 1918. Ford Motor Company would directly benefit the city investing in infrastructure and influencing the economy (Bak, 1990).

Ford supported his workers in many different ways. The company organized necessary services in the factory area, these included health and safety of the workers. More than 36,000 people worked for Highland Park Fort Plant and those needed to be safe and secure. Ford built a hospital and an emergency service on the factory. This would cover all the job-related emergencies. There were present also lunch facilities to feed the workers. Ford also helped his workers with a school. In this school, workers would learn English, hygiene, etiquette, and civics. Many of the workers were immigrants, so this helped them for integration. The factory had a post office, grocery stores, and tailor shop. Ford sponsored the employee band. Another contribution he did was the trade school for youngsters. This was after he took the orphanage on the north side of the complex. All these actions made Ford a point of interest for everyone. People would come from all over the world to visit and understand the innovations that this complex brought at that time (Akhtar, 2015).

During the 1910s the factory was continuously growing. The office building O had two more stores by 1914. By that time, two floors of the factory W and X were built. Other buildings completed during that year was the dry kiln, clay shed, and loading dock. In 1916 the most significant construction was the construction of factories Y and Z and the two more floors of the factory W and X. At the same year, the powerhouse D was built along with other loading docks, sheds, and shops. The two next years after 1916, the construction of new buildings was one or two every month, should mention that some of these were just sheds and shops. The architect, Albert Kahn, would direct the construction of significant buildings, utilizing outstanding contractors; meanwhile, the smaller constructions were done by Ford's workers (Christian, 1975).

The expansion of the factory until 1917 was mostly at the east of the original factory (A), generally at the south of the railway running through the centre of the site. By 1918 the construction began to move toward the north side. These new constructions were placed

FIG. 4.2.6
Ford English School on factory lawn. Source: https://www.pbs.org/wgbh/

FIG. 4.2.7
1917 Ford Motor Company postcard showing the factory hospital. Source: https://www.mtfca.com/books/15_factory.htmSou

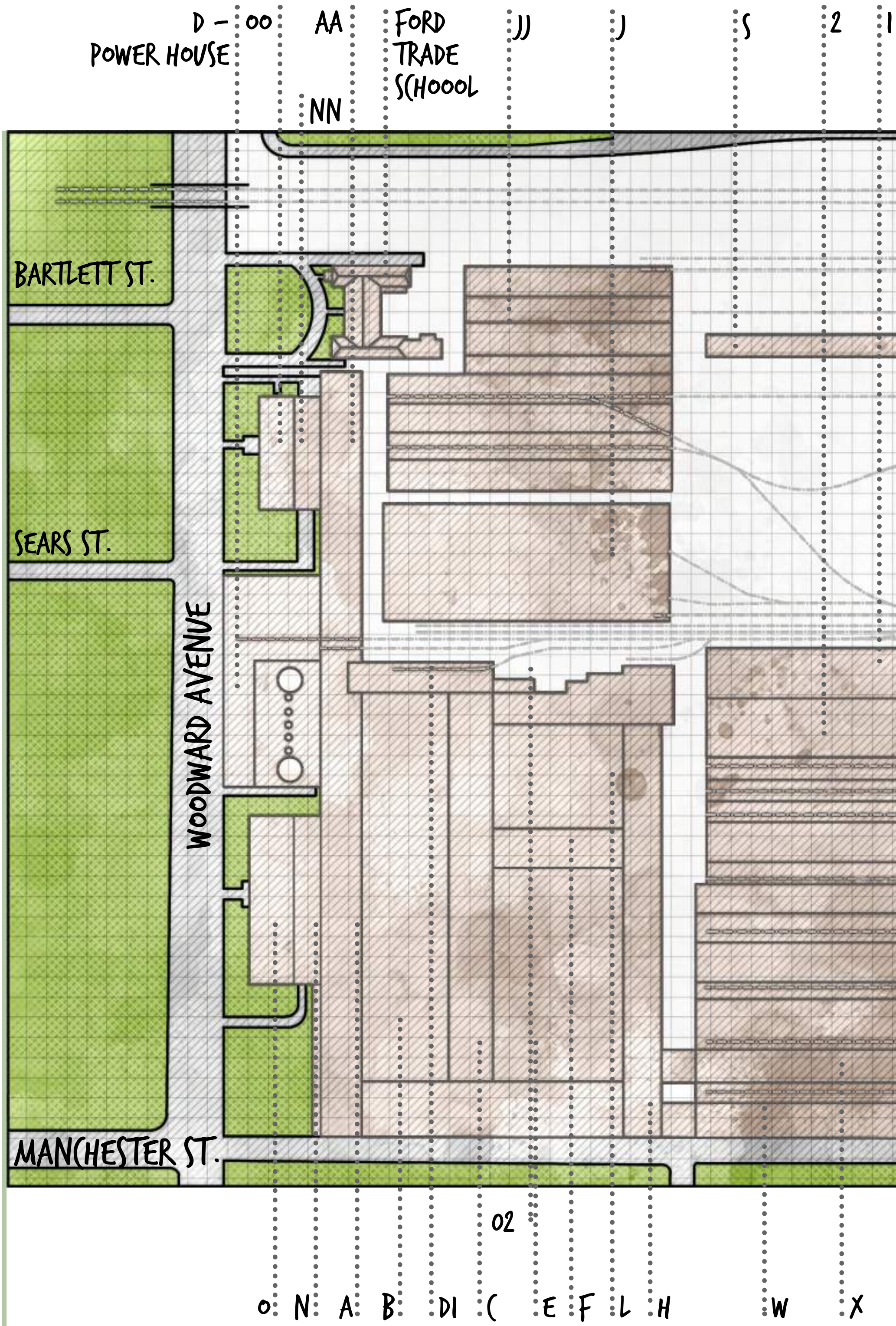
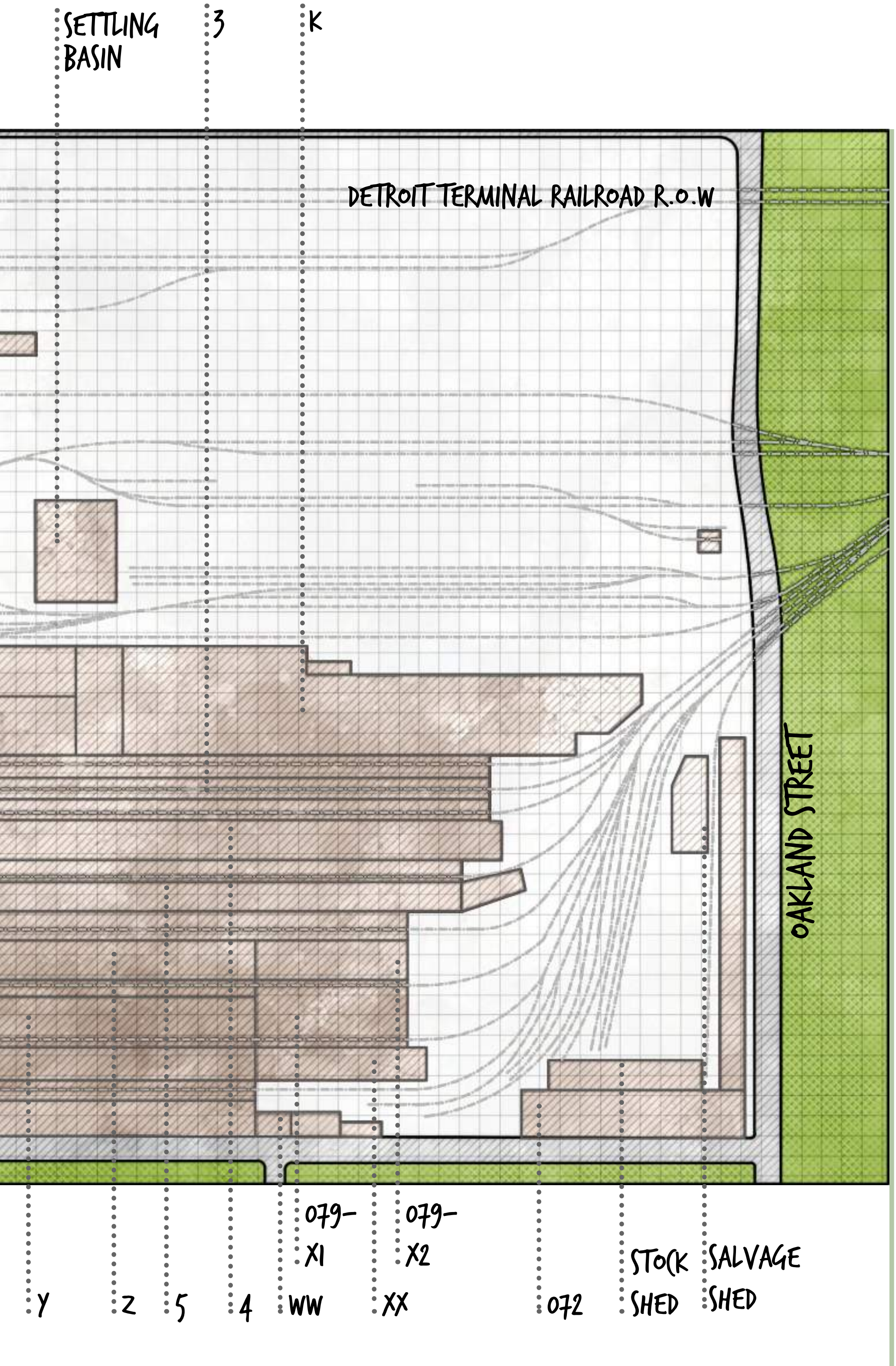


FIG. 4.2.8
Site Plan of Highland Park Ford Plant in the late 1920s, fully completed. Nomination as per original drawings.


SETTLING BASIN
3
K
DETROIT TERMINAL RAILROAD R.O.W
OAKLAND STREET
079-X1
079-X2
STOCK SHED
SALVAGE SHED
Y
Z
5
4
WW
XX
072

between the power plant and the school, along Woodward Avenue. The first building to be constructed at that side was a shop. This was an expansion to the factory A, nominated as AA, it was very same as the original building, again keeping a decorative facade same as buildings at that part of the site. After the construction of the building (AA), several stock buildings were built, these included J, JJ, and S. other sheds and ancillary buildings raised during the same period. The northern part of the site was dedicated to the stock of raw materials such as coal, iron, sand. Along the rail lines on the east of Oakland Avenue were built other stock sheds (Christian, 1975).

The rapid growth of the Ford Company was not anticipated correctly by Henry Ford when he decided to move to Highland Park. By the end of World War I, Ford already had organized his next move to a bigger facility, less than ten years from his last move. He decided to build a facility that would accommodate everything on one floor as he understood this from experience with the Highland Park plant. Ford was looking for land close to the river that would make transport much more accessible. Ford decided to build his next complex at River Rouge in early 1917 (Harris, 2018).

Although Ford had made plans for the next facility, the production and construction at Highland Park plant continued. In the early 1920s other sheds, offices, and shops were built. Building OO was the most significant and would offer space for sales and services on the ground floor and offices on the other floors. Building OO, together with building NN and AA had the same composition as building A, building O, and building N located on the other side of the powerplant (Christian, 1975). In the factory during those years, a Model T was commind out of the assembly line every minute, being the leader in the world, covering 56 percent of the world car sales. One in two cars in the world during that time was a Model T. By 1925, a record in the production of cars was reached, producing one vehicle every ten seconds (Hyde, Assembly-Line Architecture: Albert Kahn and the Evolution of the U.S. Auto Factory, 1905-1940, 1996).

Twenty years after the first Model T coming out of the assembly line, in 1927 the last one rolled off the line. Model T was retired by Ford and it was replaced by Model A, moving the assembly at the new Rouge Plant. As the Rouge Plant was also the headquarters of Ford Company, Highland park plant became just a glorious time from the past (Hyde, Assembly-Line Architecture: Albert Kahn and the Evolution of the U.S. Auto Factory, 1905-1940, 1996).

FIG. 4.2.9
Construction of Power House, early 1916. Source: Benson Ford Research Center

FIG. 4.2.10
Building AA under construction, September 1916 Source: Bentley Historical Library

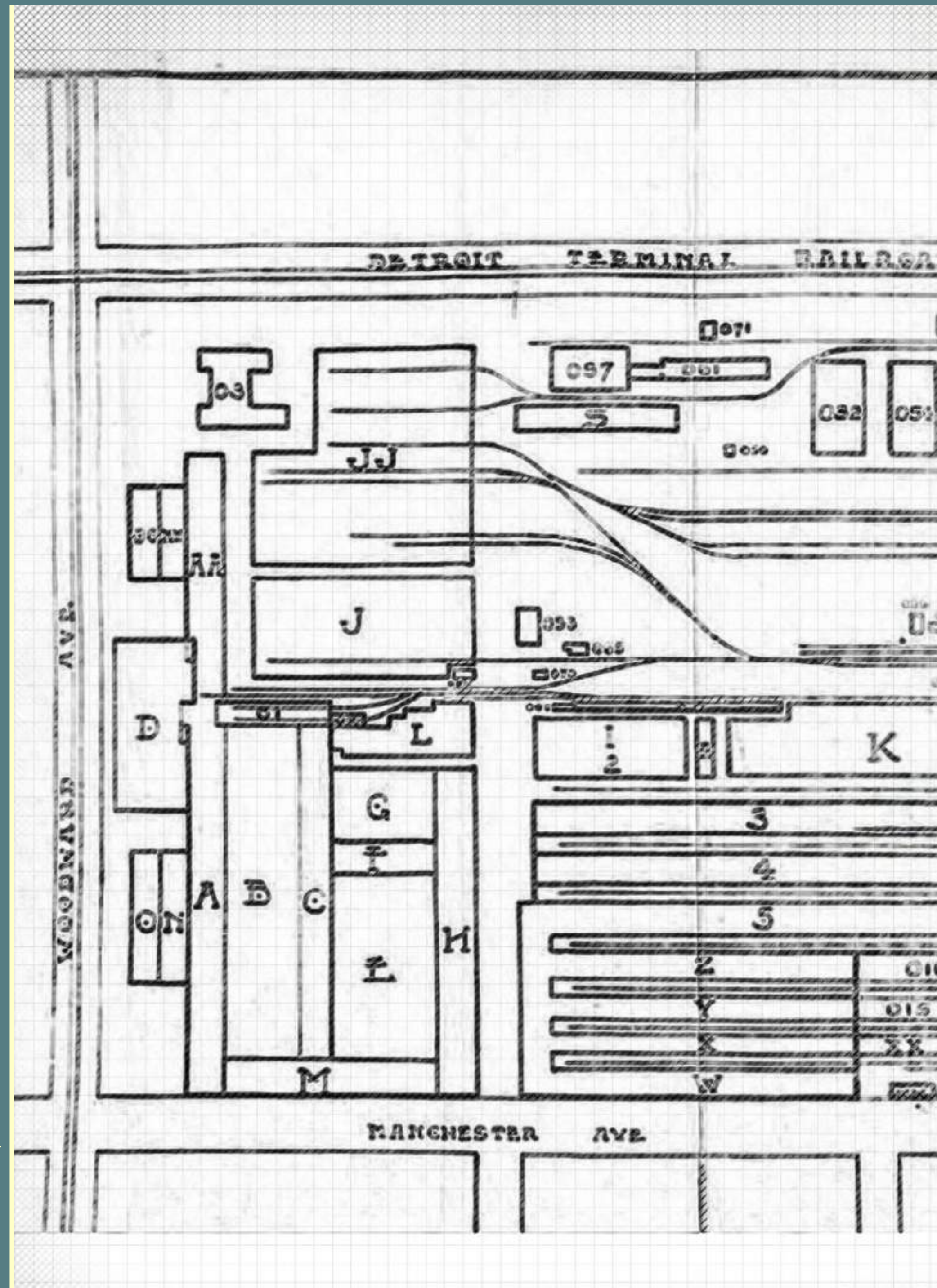
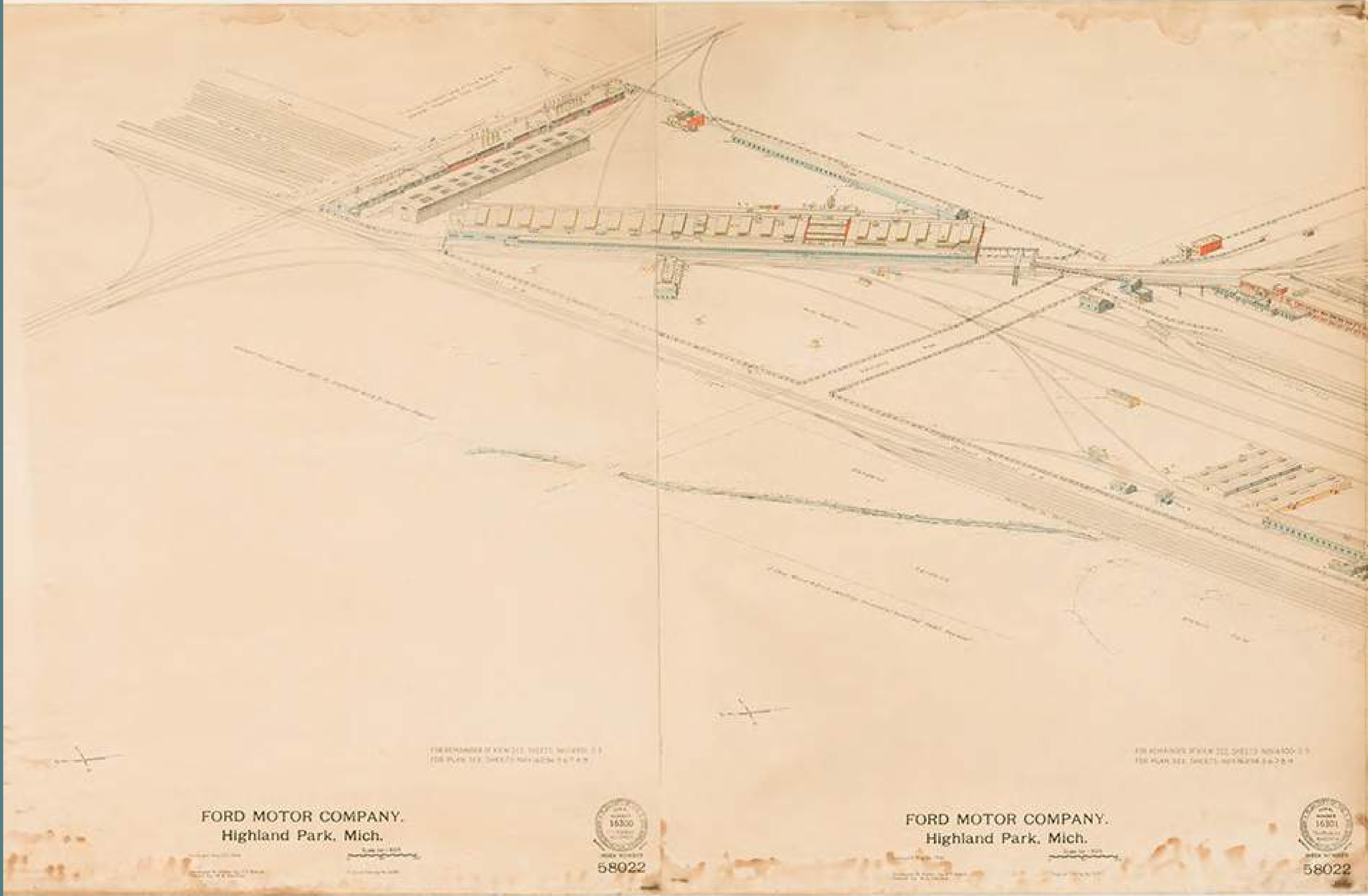


FIG. 4.2.11
Site Plan, undated, possibly around 1920 Source: Benson Ford Research Center

FIG. 4.2.12
FOLDED PAGES
Ford Motor Company Highland Park Rendering: bird's eye view in 1924. CAM 2008.18. Draftsman: O.P. Black. Tracer: W.G. Harlow. Ink on paper, 33 5/8 x 89 1/2 in. Collection of Cranbrook Art Museum. Gift of the Estate of John Bloom. Center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FORD MOTOR COMPANY.
Highland Park, Mich.
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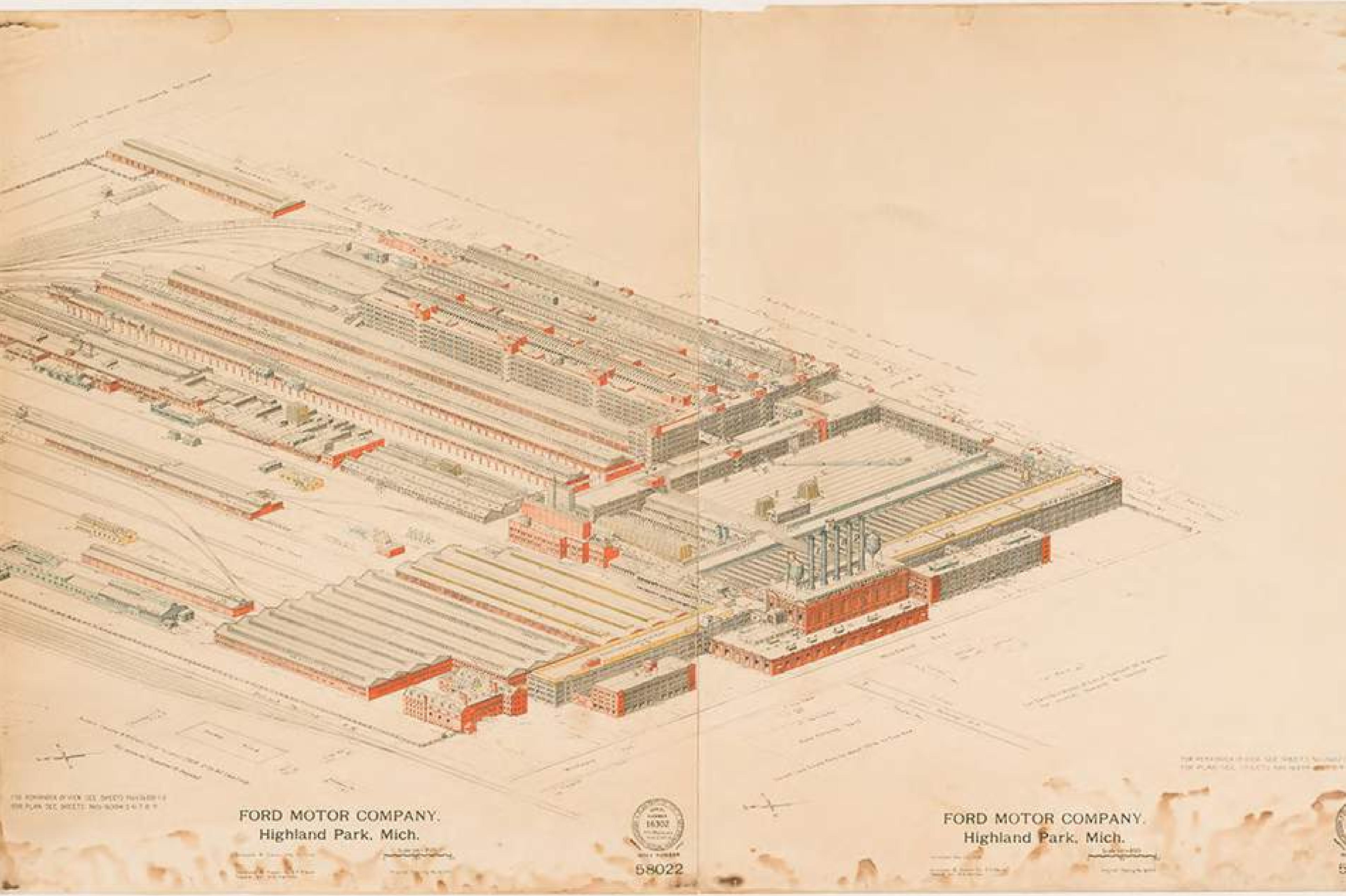
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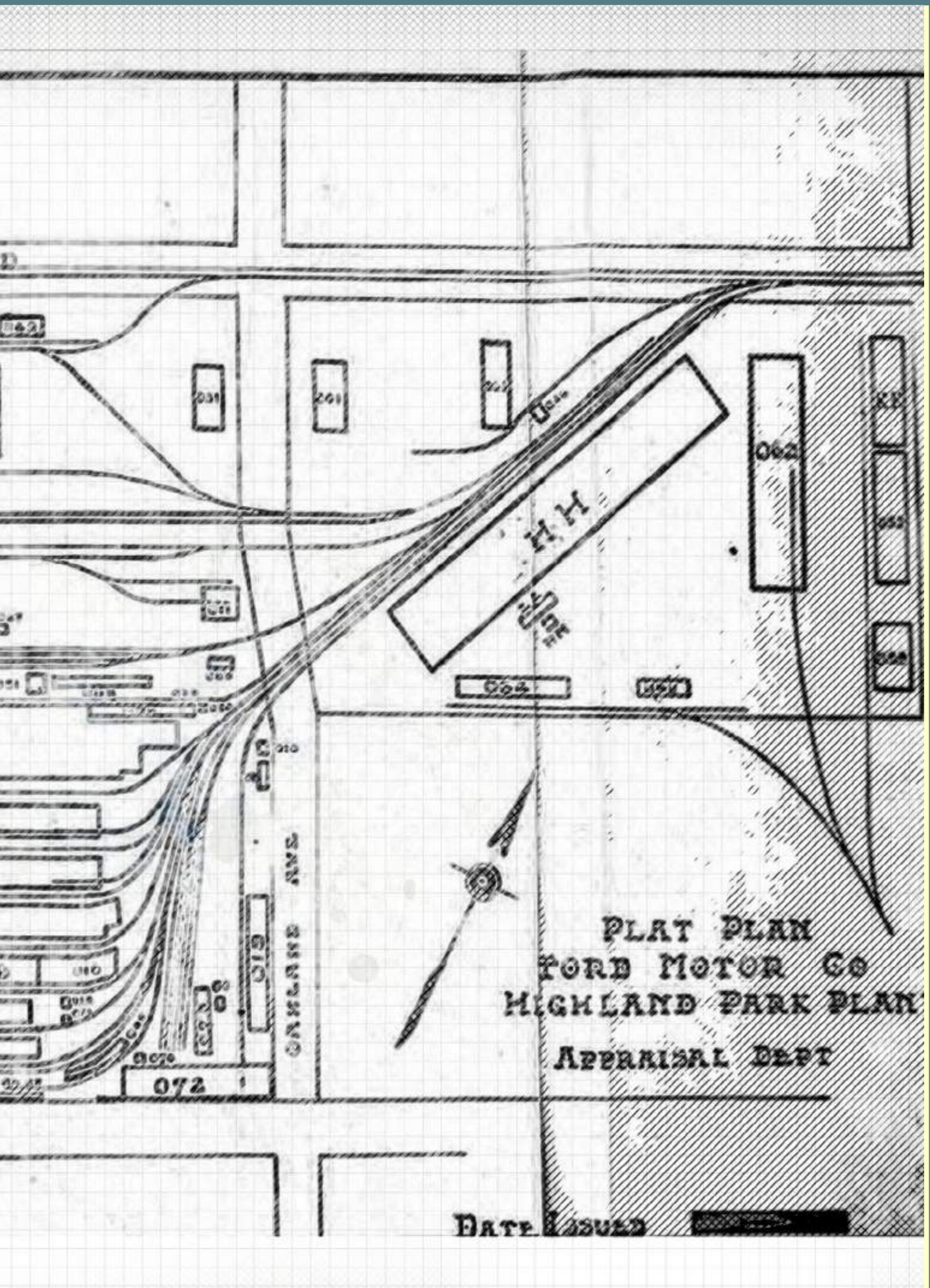


FIG. 4.2.13
Interior view of a warehouse showing Model-T cars, Highland Park Plant, between 1908-1970 Source: Collection Center Canadien d'Architecture

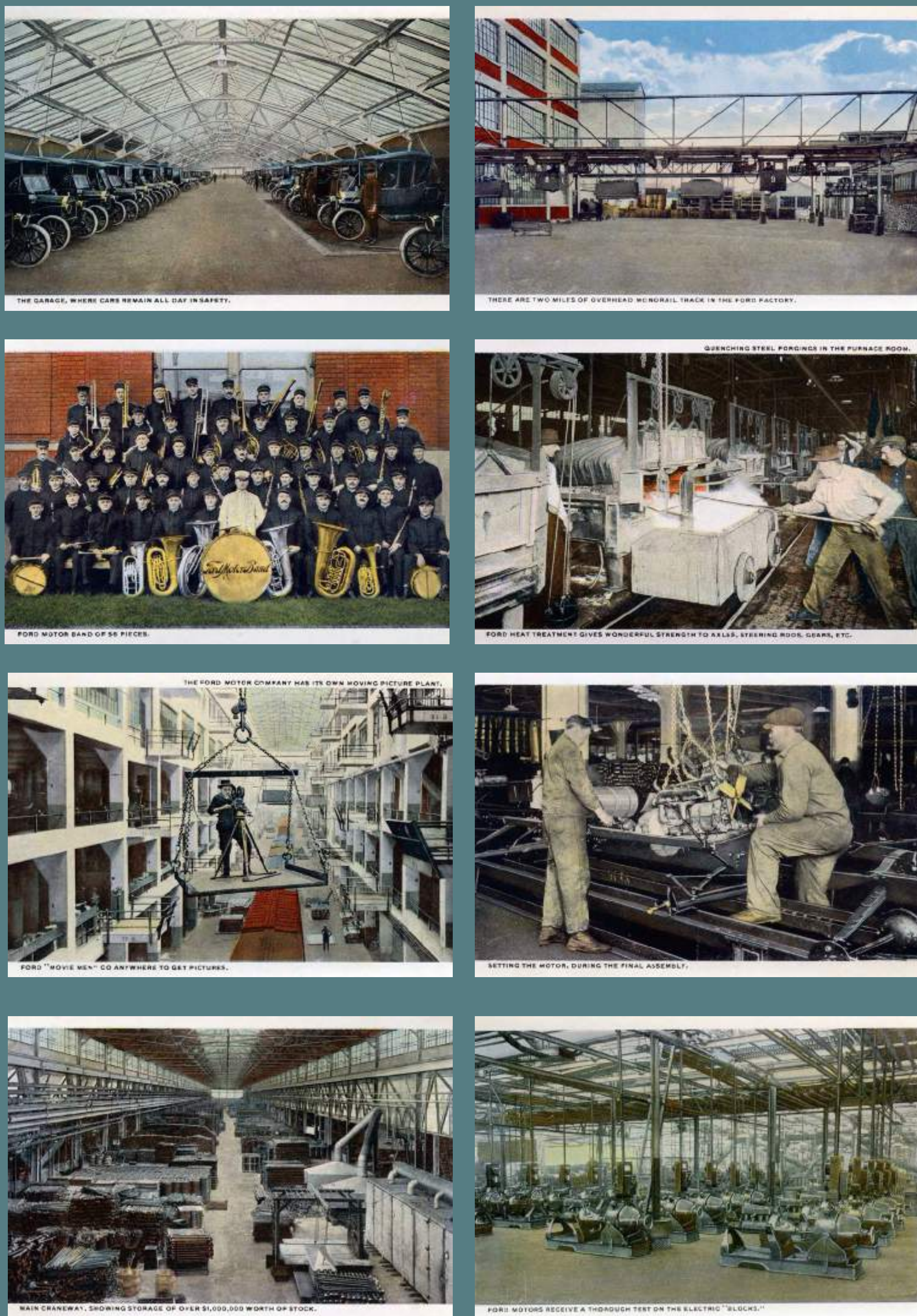
FIG. 4.2.14
View into the crane hall, 1916, Source: Albert Kahn Architects

FIG. 4.2.15
The administration building (AA) and garage in its prime. Source: Woodward Avenue Action Association

FIG. 4.2.16
Buildings A, O, N And Powerplant, from Woodward Avenue, 1927 Source: Corbis

FIG. 4.2.17

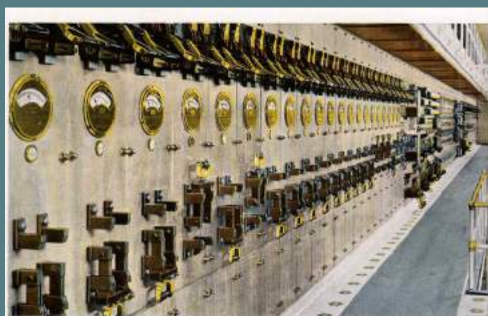
A collection of postcards produced in 1917 showing Highland Park Ford Plant in different aspects. Source: Hemmings Motor News



MOVING CONVEYORS HASTEN THE MOTOR ASSEMBLY.

CRANEWAY IN NEW 6-STORY BUILDING, SHOWING LOADING PLATFORMS.

PISTON MACHINING DEPARTMENT. VERITABLE JUNGLE OF BELTS AND SHAFTING.

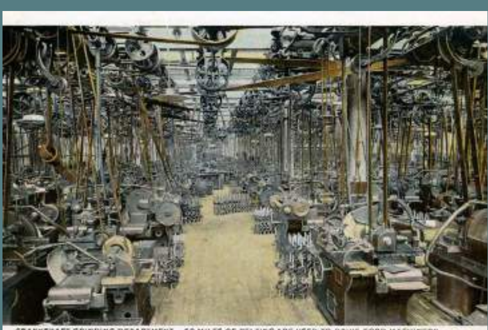


THE LARGEST DIRECT CURRENT CONTROL BOARD IN THE WORLD IN THE FORD POWER HOUSE.

PRESSED STEEL DEPARTMENT, WHERE SMALL PARTS ARE MADE.

1000 ASSEMBLED FORD CHASSIS, ONCE A RECORD OUTPUT.

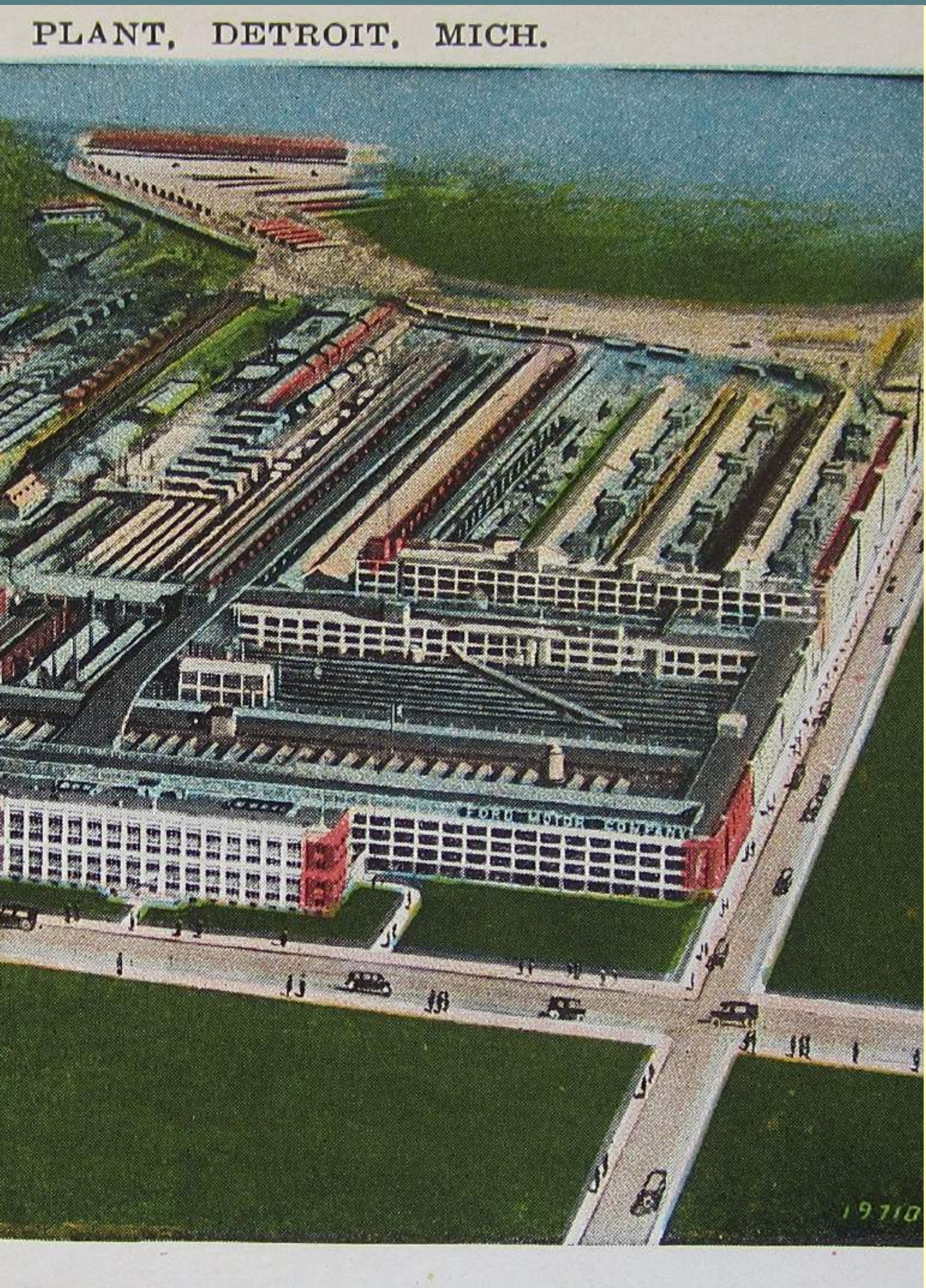
IN 1916, FORD PRODUCTION MOUNTED AS HIGH AS 2768 CARS IN A SINGLE DAY.



CRANKSHAFT GRINDING DEPARTMENT. 60 MILES OF BELTING ARE USED TO DRIVE FORD MACHINERY.

LOBBY OF ADMINISTRATION BUILDING SHOWING INFORMATION DESK AT THE RIGHT.

FIG. 4.2.18
Postcard produced in 1920s showing Highland Park Ford Plant in its complicated shape, covering 278 acres. Source: picclick.com


PLANT, DETROIT, MICH.
FORD MOTOR COMPANY
19710

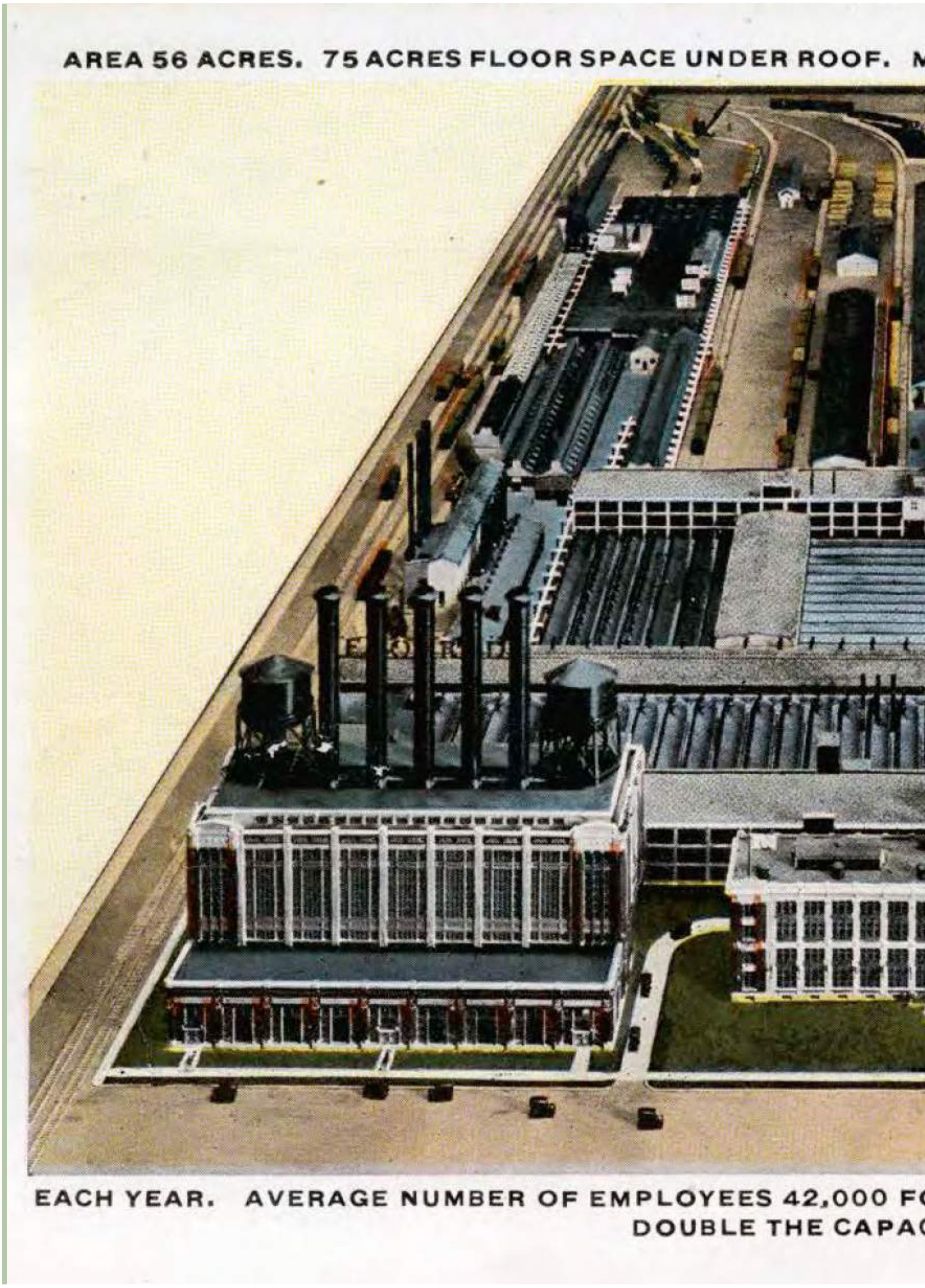
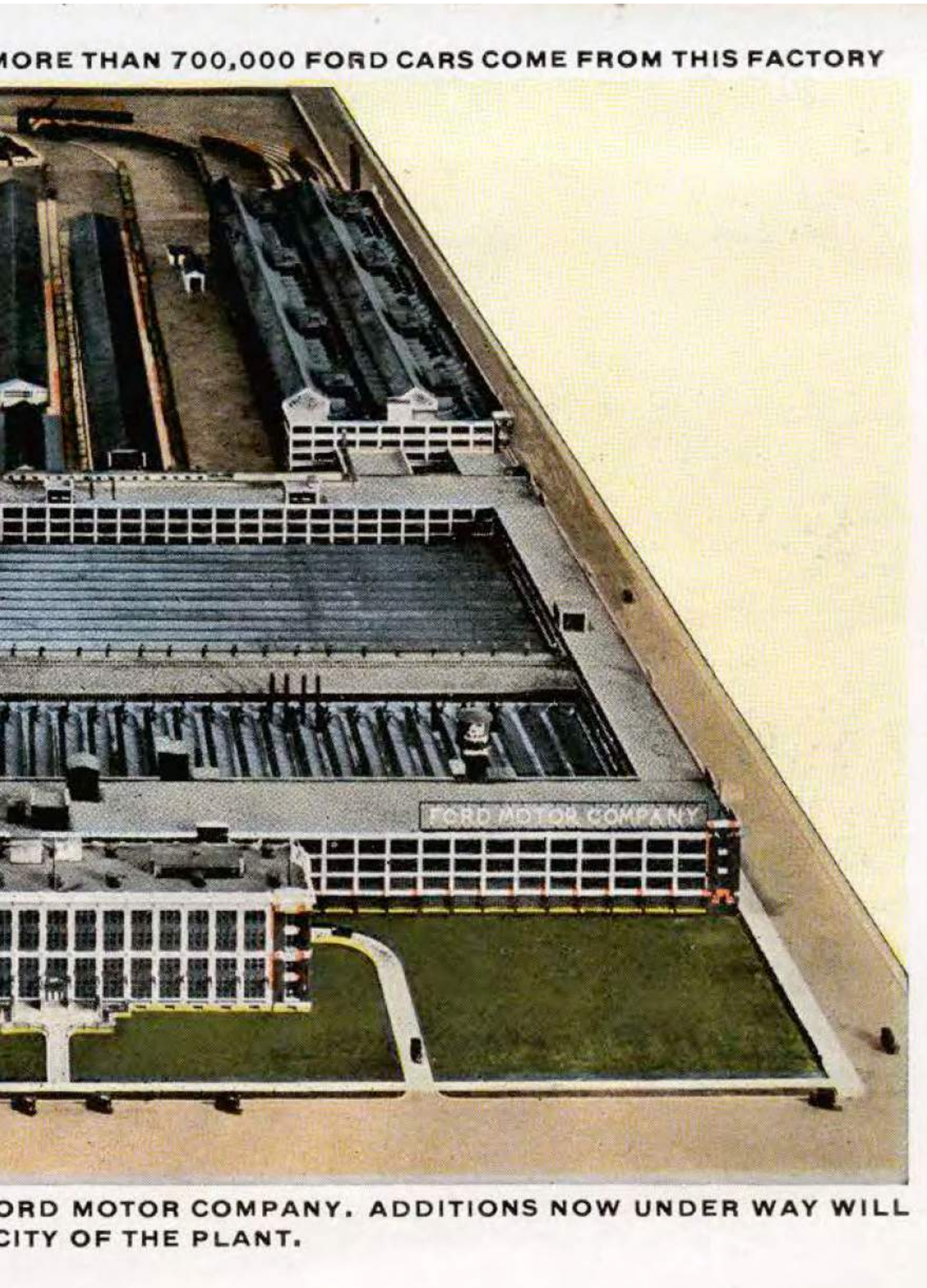


FIG. 4.2.19
1917 Ford Motor Company postcard showing a bird's eye perspective. Area 56 acres. 75 acres floor space under roof. Source: Hemmings Motor News


ORE THAN 700,000 FORD CARS COME FROM THIS FACTORY
FORD MOTOR COMPANY
ORD MOTOR COMPANY. ADDITIONS NOW UNDER WAY WILL
CITY OF THE PLANT.

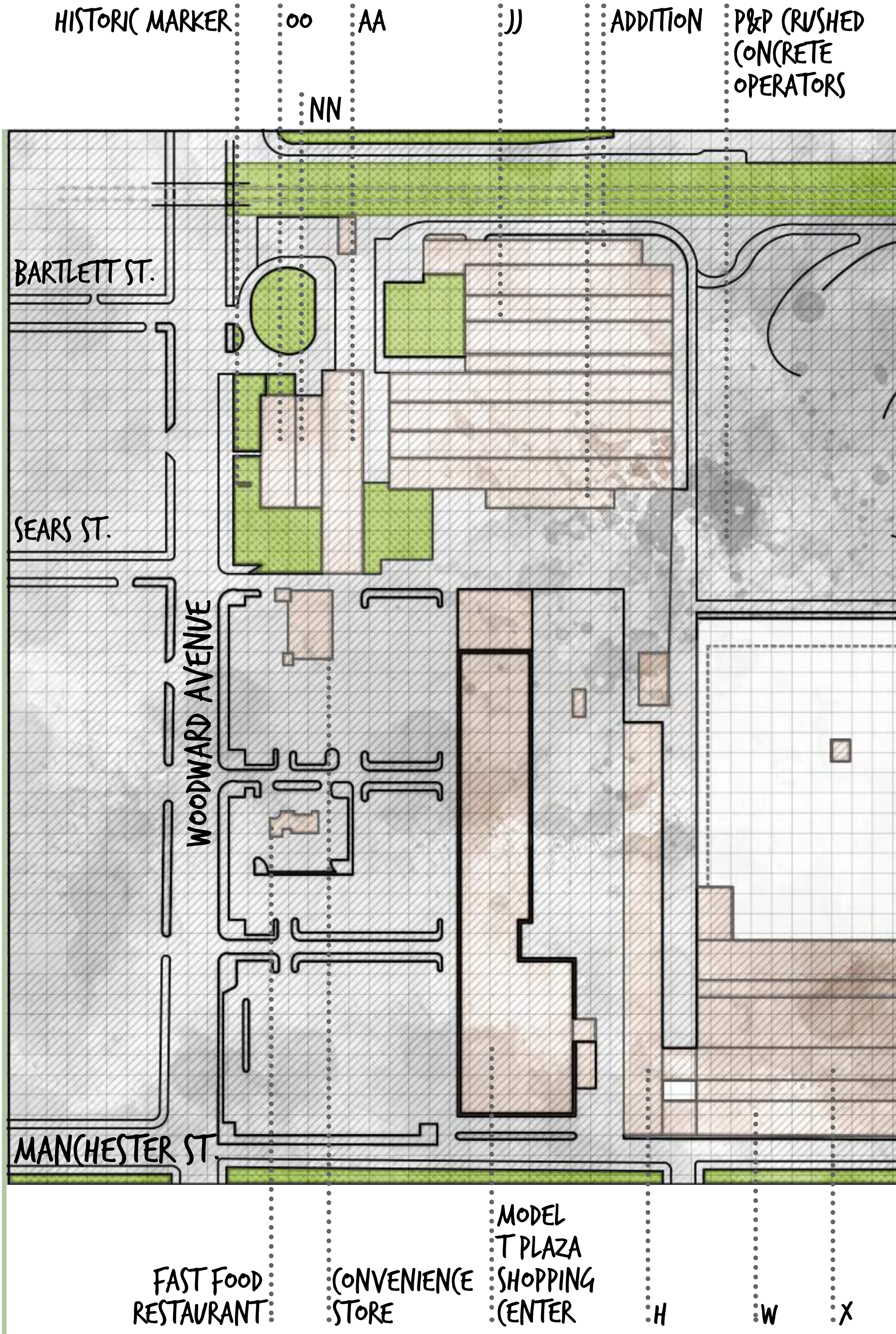
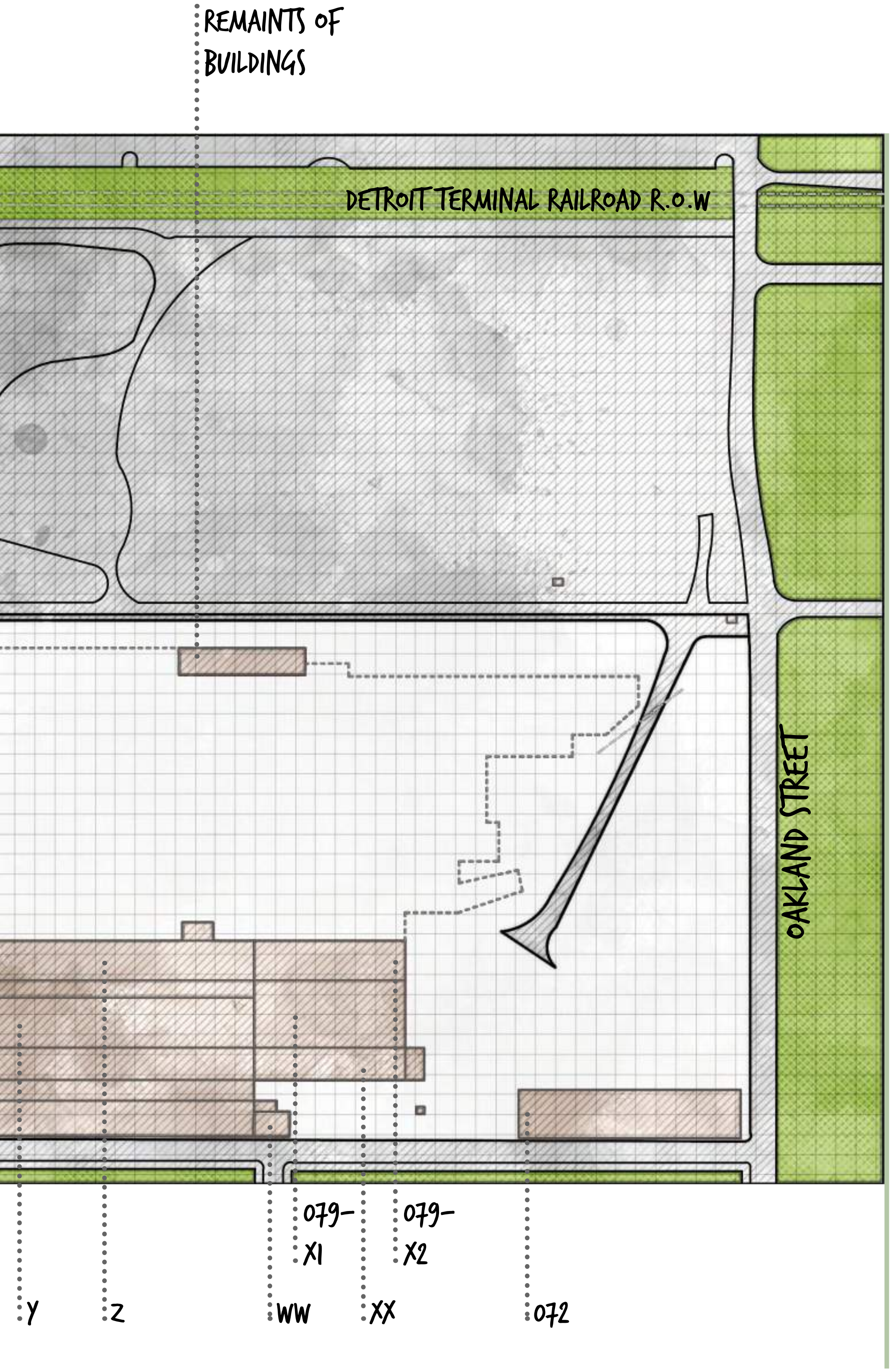


FIG. 4.2.20
Site Plan of Highland Park Ford Plant in the existing condition.


REMAINTS OF BUILDINGS
DETROIT TERMINAL RAILROAD R.O.W
OAKLAND STREET
079-X1
079-X2
Y
Z
WW
XX
072

161

4.3 THE DECLINE OF HIGHLAND PARK FORD PLANT

After the last Model T produced, the factory was not abandoned by Ford Motor Company. The investment done in this complex was enormous, so it was not worth to leave it without use. The company decided to bring there the production of trucks and tractors. For almost 30 years the complex had still in work most of the factories. The transition started with the Henry Ford Trade School after a branch of the same was open at the Rouge Plant in 1927 and the focus shifted there. Finally, in 1931, the Highland Park school was shut and was rented by the Lawrence Institute of Technology, known today as Lawrence Technological University. They would use the building for 24 years, and shortly after they moved out, the building went through the process of demolition (Gaft, 1998).

Highland Park Ford Plant remained a site connected to the automobiles although there were no cars produced anymore. In the 1930s and '40s, both the showrooms were still used as car showrooms. In some 1930s photos, a Lincoln sign appears over the main entrance of the building OO. In the 1937 Ford invested in the landscape of the building along Woodward Avenue, also he improved the parking lot at OO in 1940 and took care for that area all the time (Christian, 1975).

Like other plants across the U.S., Highland Park Ford Plant played its role during World War II. This plant was adapted to war related production. To fit the new needs, a track was built at the east of Oakland Avenue to test the tanks (Casey, Dodge, & Dodge, 2010).

After the war was over, the factory returned to the production of trucks and tractors. Henry Ford II, the grandson of Henry Ford, created in 1946 Dearborn Motors, and took over the Ford 9N tractor. Dearborn Motors used the buildings OO, the building for sale as office buildings. Space was enormous for the new uses, so Ford was leasing part of the factory during the '40s; '50s (Christian, 1975).

It was 1947 when Henry Ford, passed away at the age of 83. His grandson inherited the company from 1945 (Bryan, 2003). The Highland Park plant started the decline over the next two decades. By 1952 part of the complex were demolished or removed. These included the school, railways track and building at the east of Oakland Avenue. The production of trucks ended in Highland Park in 1957, but the military vehicle and tractors continued to be produced until the 1970s.

A lot of dramatic changes took place at the site by 1960. It was demolished the original factory building A, the powerhouse with its iconic five smokestacks, the original office building O and all the buildings located on the west of the building H. Parts of the building AA were demolished. For the next forty years, this area set mostly vacant (Christian, 1975).

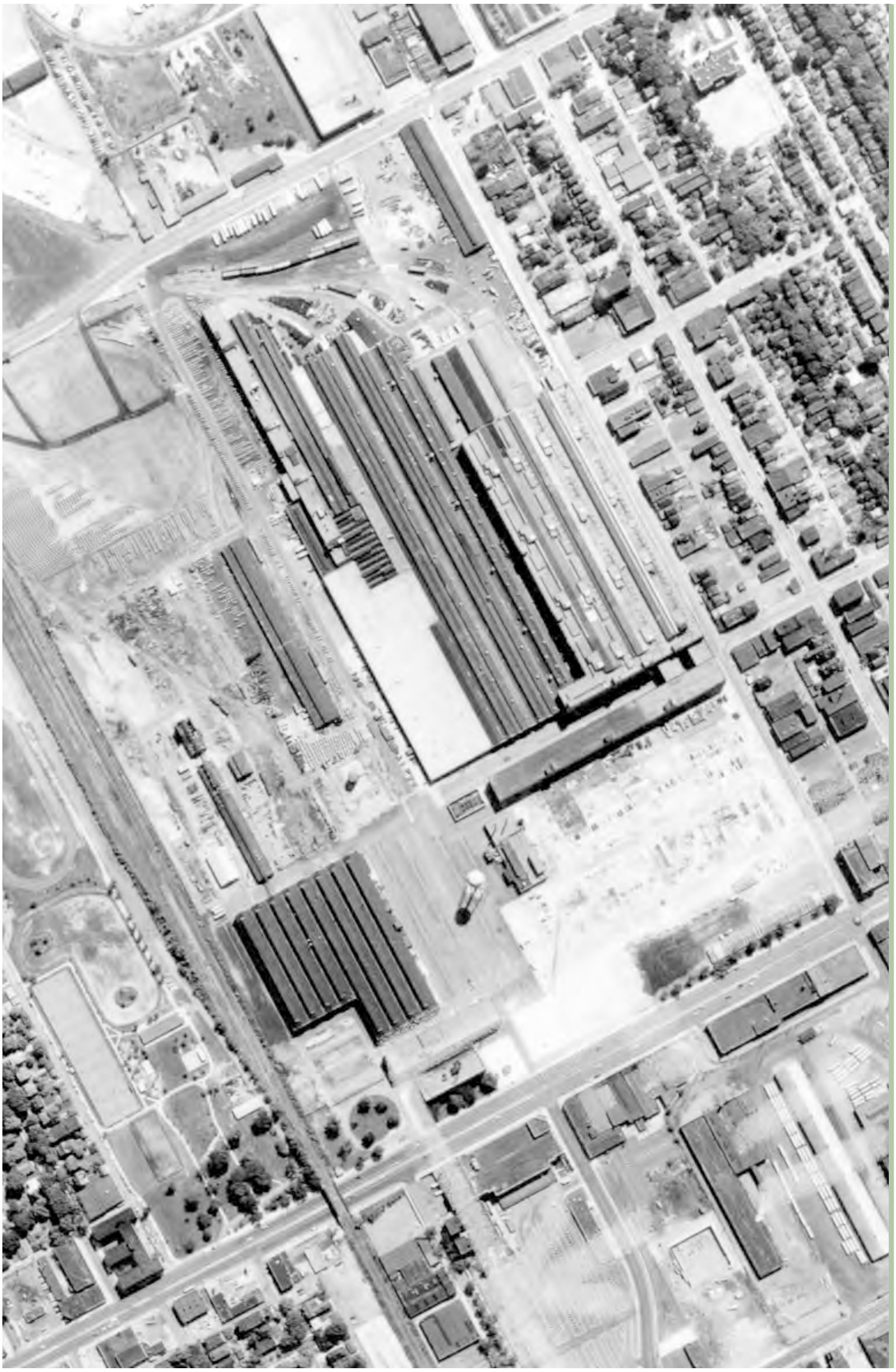


FIG. 4.3.1
Aerial photo taken around. 1961. The original factory, administration building, and power house have been demolished by this time Source: DTE Aerial Photograph Collection, Reuther Library, Wayne State University

4.4 THE LAST CHAPTER OF HIGHLAND PARK FORD PLANT

LAST CHAPTER

The decline did not overshadow the importance of Highland Park facility. Although most of its historic buildings were demolished the historical significance of it kept growing. It was 1956 when leaders of the community and Ford Motor Company delegates worked for the proposal to list the Highland Park Ford Plant on the Michigan State Register of Historic Sites. The sign identifying the landmark was moved to the building O form the building OO, after the building O was demolished. The site became part of the National Register of Historic Places in 1973, and in 1978 it was registered as National Historic Landmark (National Park Service, 2013).

In 1974 the tractor production ended, and the building was used for storing and light production. The decline saw a scene of difficulties for Ford Company, which made it open to sell the complex (Staes, 2019). The city of Highland Park tried to take advantage of this opportunity and created preliminary plans for the redevelopment of the site. These new plans foresaw an administrative use for the city and civic centre in the building OO, and an industrial site expanded on the rest. This plan never came to life, but the interest was always present for the redevelopment of the site. The plant was sold to HPF Associates in 1981, keeping the leasing rights for the next 25 years. Another plan saw the subdivision of the site keeping buildings OO, NN and AA, renovation and used for offices. The buildings JJ was proposed to have industrial usage and buildings W, X, Y and Z was thought to be divided into different tenants. Also, this plan did not succeed. The northern part of the site is currently being used as a storage. In 1997, a shopping centre "Model T Plaza" and two separated buildings (Mc Donald's Restaurant and Convenience Store), were built in the place were power hose and buildings O, N and A stood. The building JJ had been used these last years from Forman Mills, a retail clothing outlet. The buildings OO and NN remain vacant and in adverse conditions. The building AA has been used for record storage by Ford until 2012.

The Woodward Avenue Action Association purchased it, and the executive garage for $550,000 in 2013 and now is selling it again. Although they had plans for it, creating an "automobile heritage welcome centre, which would include galleries, a theatre, and a retail store. The centre would also serve as one of the stops of automotive history tours of Detroit, such as WA3's current "In the Steps of Henry," which features stops at area landmarks significant to the life of Henry Ford. The renovation project would cost $7.5 million but was cancelled in 2016 (Kelly, 2015).

Although some of the most significant buildings of the complex have been demolished and lost, a large block of the Highland Park Ford Plant remains to say \ the story of the famous Model T, the car that made history and changed the world. Buildings OO, AA, and NN are still there, reflecting the original characteristics of the complex. The factory Buildings H and WXYZ and their crane ways that made possible the first moving assembly line remain the same essential buildings as they were during the big success time, vast open spaces full of natural ligh

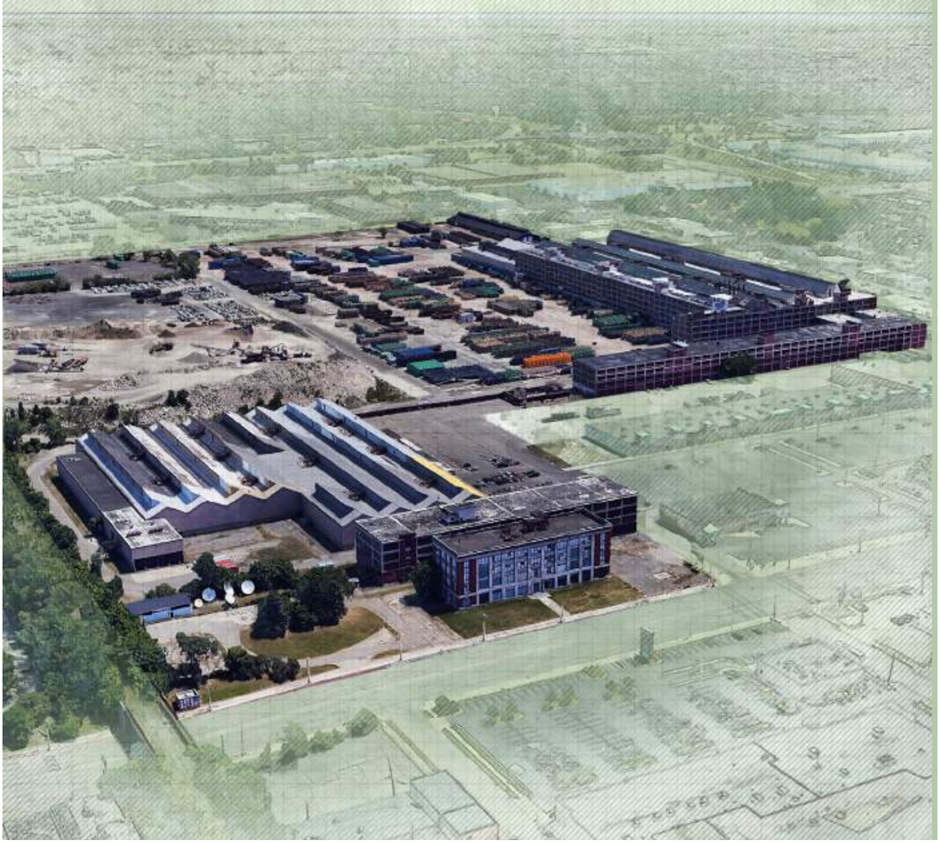


FIG. 4.4.1
Aerial photo of Highland Park Ford Plant taken in 2019. Source: Google Earth

FIG. 5.1.2

Aerial photos of the plant taken in different years:

1. 28-03-1999
2. 25-03-2002
3. 31-12-2002
4. 31-03-2005
5. 20-07-2005
6. 31-12-2005
7. 04-08-2006
8. 30-06-2007
9. 10-05-2010
10. 22-06-2011
11. 12-04-2015
12. 14-04-2016
13. 08-04-2017
14. 16-07-2017
15. 06-07-2018
16. 14-08-2019

03

04

07

08

11

12

15

16


MICHIGAN
HISTORIC SITE
HOME OF MODEL T
Here at his Highland Park Plant, Henry Ford in 1913 began the mass production of automobiles on a moving assembly line. By 1915 Ford built a million Model T's. In 1925 over 9,000 were assembled in a single day. Mass production soon moved from here to all phases of American industry and set the pattern of abundance for 20th Century living.

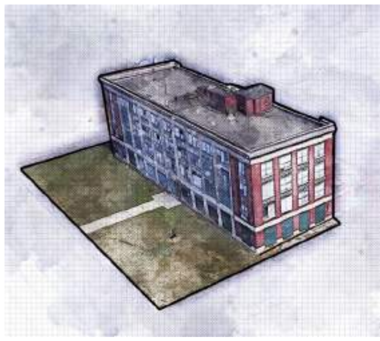
5 **CHAPTER V**

HIGHLAND PARK FORD PLANT

EXISTING CONDITIONS

FIG. 5.1
The building OO and the sign that identifies the landmark, 2017 Photo by author.

5.1 BUILDINGS REMAINING CONDITIONS
5.1.1 BUILDING 00



BUILDING 00

DATE OF CONSTRUCTION	***1921***
ORIGINAL USE	***OFFICE***
CURRENT USE	***VACANT***
CONSTRUCTION MATERIAL	***REINFORCED CONCRETE***
EXTERIOR	***BRICK CURTAIN WALL***
AREA	***4180 Sq.m***
OVERALL DIMENSIONS	***17m X 60m***
NUMBER OF FLOORS	***4***
CONSTRUCTION OF FLOORS	***REINFORCED CONCRETE***
AREA PER FLOOR	***1050 sq.m***
CEILING HEIGHTS - 1ST FLOOR	***4.9m***
2nd THROUGH - 4th	***4m***

This four-story building was constructed in 1921 to provide administrative offices for the burgeoning Ford manufacturing complex in Highland Park. The building has a reinforced concrete structure. It is 60 meters wide and 17 meters deep with 3.6 x 8.5 meters bays. The floor to ceiling heights are 4.9 meters on the first floor and 4 meters at the upper floors. The building is clad in a finish red brick with limestone and tile trim. This contrasts with the industrial buildings on the site that are finished in concrete and common brick

The windows are wood double-hung with transoms. These are more formal than the steel industrial windows. The building appears to be structurally sound. Its location on Woodward Avenue makes it the most visually accessible element of the complex to this important regional thoroughfare. As such, it provides a public face to the complex and an opportunity to tie the complex to the broader community.

5.1.2 BUILDING NN

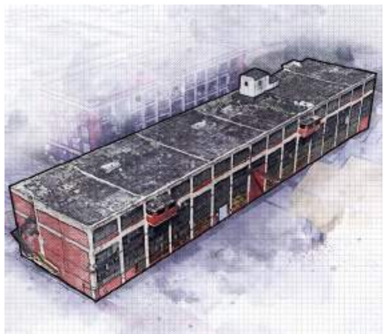
BUILDING NN

DATE OF CONSTRUCTION	***1917***
ORIGINAL USE	***PARKING GARAGE***
CURRENT USE	***VACANT***
CONSTRUCTION MATERIAL	***REINFORCED CONCRETE***
EXTERIOR	***BRICK***
AREA	***835 sq.m***
OVERALL DIMENSIONS	***14 m X 60 m***
NUMBER OF FLOORS	***1***
CONSTRUCTION OF FLOORS	***REINFORCED CONCRETE***
AREA PER FLOOR	***835 sq.m***
CEILING HEIGHT	***4.6 m***

This one-story building was constructed in 1919 as a parking garage. The building is 60 meters long and is sandwiched between the Administration Building OO to the west and Building AA to the east. Its steel trusses span the 14 meters width of the building to provide a bright open space of 835 square meters. The height to the bottom of the trusses is 4.6 meters. The ceiling consists of fascinating ribbed glass panels directly supported by the steel trusses.

The steel framing appears to be in good conditions. However, many of the glass panels are broken or missing. This building is relatively hidden in its location between the Administration Building and Building OO, but it is architecturally quite interesting. Its open floor plan with no columns, 4.6 meters ceilings height, and sun-filled space give the potential for a variety of adaptive uses.

5.1.3 BUILDING AA

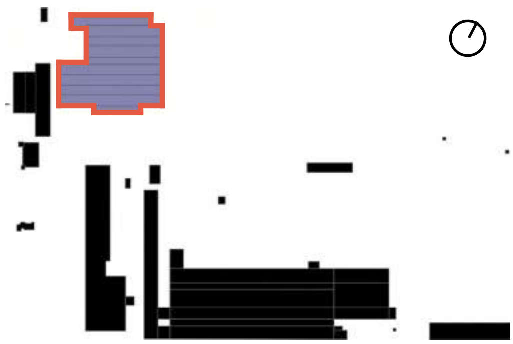


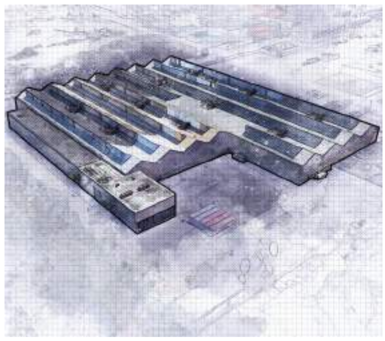
BUILDING AA

DATE OF CONSTRUCTION	***1917***
ORIGINAL USE	***MANUFACTURING***
CURRENT USE	***VACANT***
CONSTRUCTION MATERIAL	***REINFORCED CONCRETE***
EXTERIOR	***BRICK CURTAIN WALL***
AREA	***6500 sq.m***
OVERALL DIMENSIONS	***23 m X 110 m***
NUMBER OF FLOORS	***4***
CONSTRUCTION OF FLOORS	***REINFORCED CONCRETE***
AREA PER FLOOR - 1st, 4th	***2440 sq.m***
AREA PER FLOOR - 2nd, 3rd	***813 sq.m***
CEILING HEIGHT - 1st FLOOR	***3.5 m - 4.3 m***
CEILING HEIGHT - 2nd FLOOR	***3.3 m***
CEILING HEIGHTS - 3rd, 4th FL.	***3.4 m***

This four-story building was constructed in 1917 for manufacturing use. The building was originally 23 meters wide and 127 meters long. The west end of the building was demolished, leaving it 110 meters long. The first and fourth floors extend the full width of the building. The second and third floors only span the west bay creating a two-bay wide opening to the first floor. The building structure is reinforced concrete floors, beams and columns. The exterior walls consist of brick panels and steel industrial-style windows that fill the openings between the exposed concrete beams and columns. The structure is in good condition except at the exterior where rusting reinforcing bars are causing the concrete to spall. The steel windows are in fair condition. The west elevation that faces Woodward Avenue has a simple concrete and copper cornice. The architectural character with the second and third floors overlooking the first floor is unique and lends itself to uses that can take advantage of the balcony-like space at the 2nd and 3rd floors.

5.1.4 BUILDING JJ





BUILDING JJ

DATE OF CONSTRUCTION	***1919***
ORIGINAL USE	***MANUFACTURING***
CURRENT USE	***RETAIL CLOTHING OUTLET***
CONSTRUCTION MATERIAL	***STEEL STRUCTURE FRAME***
EXTERIOR	***BRICK CURTAIN WALL***
AREA	***approx. 18580 sq.m***
OVERALL DIMENSIONS	***62 m X 158 m; 62 m X 116 m***
NUMBER OF FLOORS	***1***
CONSTRUCTION OF FLOORS	***REINFORCED CONCRETE***
AREA - OFFICE	***890 sq.m***
AREA - WAREHOUSE	***1670 sq.m***
CEILING HEIGHT	***9.4 m***

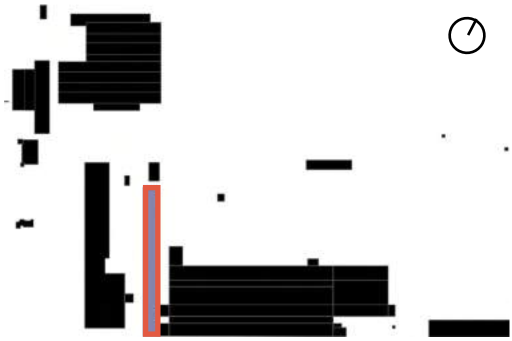
This one-story building was constructed in 1919 to house manufacturing facilities. The currently is in use by the retail clothing outlet company Forman Mills. The building is L shaped with dimensions of 62m x 158m and 62m x 116m for a total floor area of 17095 square meters.

The building has steel trusses with large clerestory windows that have been mostly covered. The trusses sit on concrete columns that are spaced to create 16m and 6m bays. The ceiling height is 9.4m.

The exterior walls were originally concrete beams and columns with brick panels and industrial steel sash. The walls have been cladded in steel siding. The building appears to be in good condition. This building is essential for its association with the Fordson tractor. The Fordson tractor helped revolutionize farming in this country and around the world. The historical significance of the building has been compromised with the installation of the steel siding.


BOYS 4-7

5.1.5 BUILDING H



BUILDING H

DATE OF CONSTRUCTION	***1912***
ORIGINAL USE	***MODEL T ASSEMBLY LINE***
CURRENT USE	***VACANT***
CONSTRUCTION MATERIAL	***REINFORCED CONCRETE***
EXTERIOR	***BRICK CURTAIN WALL***
AREA	***21200 sq.m***
OVERALL DIMENSIONS	***22 m X 232 m***
NUMBER OF FLOORS	***4***
CONSTRUCTION OF FLOORS	***REINFORCED CONCRETE***
AREA PER FLOOR	***5300 sq.m***
CEILING HEIGHTS	***3.9 m***

This four-story building was constructed in 1912 to house the final assembly line for the Model T cars. The building is 22 meters wide and 232 meters long. The ceilings heights at all four floors are 3.9 meters. The building has 5,300 square meters per floor and a total of 21,200 square meters. The building has no basement.

The building structure is reinforced concrete floors, beams and columns. The exterior walls consist of brick panels and steel industrial-style windows. The structure is in good condition except at the exterior where rusting reinforcing bars are causing the concrete to spall. The steel windows are in fair condition. Some have been replaced with aluminium windows. The brick infill panels are in generally good condition. The south and west elevations have been painted. The building has great historical significance both as the location of the first operational assembly line and as the final assembly plant for the historic Model T automobile. It is also significant as an early example of Albert Kahn's innovative reinforced concrete structural design that permitted the installation of large windows that provided ample daylighting.

5.1.6 BUILDINGS W, X, Y, Z AND CRANEWAYS

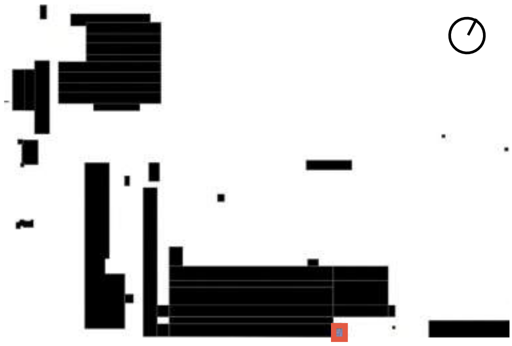
BUILDING W, X, Y, Z AND CRANEWAYS

DATE OF CONSTRUCTION	***1913 & 1917***
ORIGINAL USE	***MANUFACTURING***
CURRENT USE	***WAREHOUSE***
CONSTRUCTION MATERIAL	***REINFORCED CONCRETE***
EXTERIOR	***BRICK CURTAIN WALL***
AREA	***111500 sq.m***
OVERALL DIMENSIONS	***22 m X 232 m***
NUMBER OF FLOORS	***4***
CONSTRUCTION OF FLOORS	***REINFORCED CONCRETE***
CEILING HEIGHT - 1st FLOOR	***4 m***
CEILING HEIGHT - 2nd-6th FLOOR	***3.5 m***

The historic core of this complex was constructed between 1913 and 1917. It consists of three 28 meters tall by 12 meters wide by 256 meters long crane ways that are topped with glass skylights. Flanking the crane ways are 6 story manufacturing buildings. The crane ways were designed so that freight cars could be driven into them for unloading directly onto balconies that project from the adjacent manufacturing buildings. The skylight provided daylight while keeping the unloading operations out of the weather. The manufacturing buildings are each 18 meters wide and 256 meters long. Their first floor ceiling heights are 4 meters and upper floor ceiling heights are 3.5 meters. The building has a total of 111,500 square meters with 28,000 square meters on the first floor alone. The condition of this complex of buildings is generally very good. The exposed concrete structure at the exterior shows evidence of rusting reinforcing rods. The original industrial style steel windows and the steel skylight framing appears to be in good condition.

The exterior of this building is reminiscent of many of the manufacturing buildings designed by Albert Kahn. The interior with its six story, almost 400 meters long, sky lit atriums, is stunning.

5.1.7 OTHER BUILDINGS

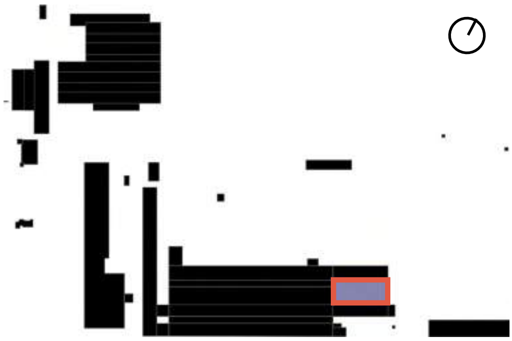


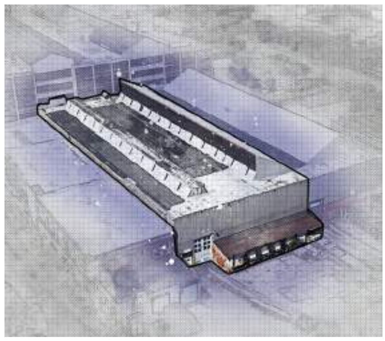
BUILDING WW

DATE OF CONSTRUCTION	***1917***
ORIGINAL USE	***MANUFACTURING***
CURRENT USE	***WAREHOUSE***
CONSTRUCTION MATERIAL	***REINFORCED CONCRETE***
EXTERIOR	***BRICK CURTAIN WALL***
AREA	***547 sq.m***
OVERALL DIMENSIONS	***18 m X 12 m***
NUMBER OF FLOORS	***2***
CONSTRUCTION OF FLOORS	***REINFORCED CONCRETE***
CEILING HEIGHT - 1st FLOOR	***3.5 m***
CEILING HEIGHT - 2nd FLOOR	***3.4 m***

BUILDING XX

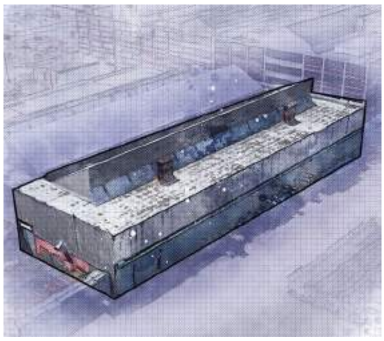
DATE OF CONSTRUCTION	***1917***
ORIGINAL USE	***MANUFACTURING***
CURRENT USE	***WAREHOUSE***
CONSTRUCTION MATERIAL	***REINFORCED CONCRETE***
EXTERIOR	***BRICK CURTAIN WALL***
AREA	***3300 sq.m***
OVERALL DIMENSIONS	***18 m X 104 m***
NUMBER OF FLOORS	***2***
CONSTRUCTION OF FLOORS	***REINFORCED CONCRETE***
CEILING HEIGHT - 1st FLOOR	***3.6 m***
CEILING HEIGHT - 2nd FLOOR	***3.4 m***





BUILDING 079-X1

DATE OF CONSTRUCTION	***1923***
ORIGINAL USE	***MANUFACTURING***
CURRENT USE	***WAREHOUSE***
CONSTRUCTION MATERIAL	***MASONRY BEARING WALL AND STEEL TRUSSES***
EXTERIOR	***BRICK CURTAIN WALL***
AREA	***2600 sq.m***
OVERALL DIMENSIONS	***30.5 m X 85 m***
NUMBER OF FLOORS	***1***
CONSTRUCTION OF FLOORS	***REINFORCED CONCRETE***
CEILING HEIGHT	***8.6 m***



BUILDING 079-X2

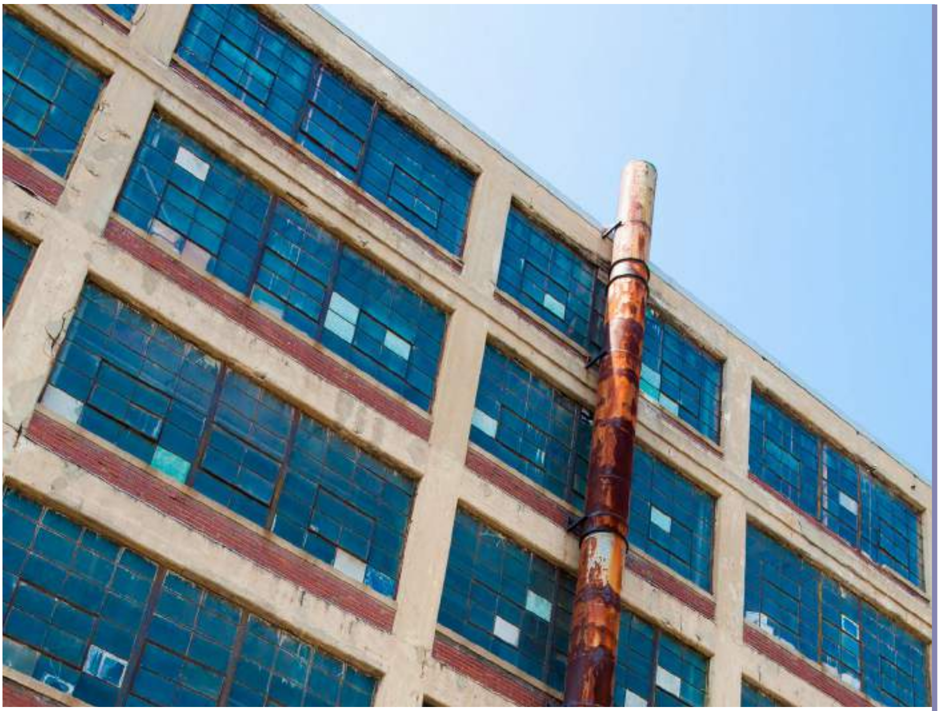
DATE OF CONSTRUCTION	***1923***
ORIGINAL USE	***MANUFACTURING***
CURRENT USE	***WAREHOUSE***
CONSTRUCTION MATERIAL	***MASONRY BEARING WALL AND STEEL TRUSSES***
EXTERIOR	***BRICK CURTAIN WALL***
AREA	***1400 sq.m***
OVERALL DIMENSIONS	***16 m X 85 m***
NUMBER OF FLOORS	***1***
CONSTRUCTION OF FLOORS	***REINFORCED CONCRETE***
CEILING HEIGHT	***8.6 m***

5.2 THE PHOTO FOLDER, JULY 2019

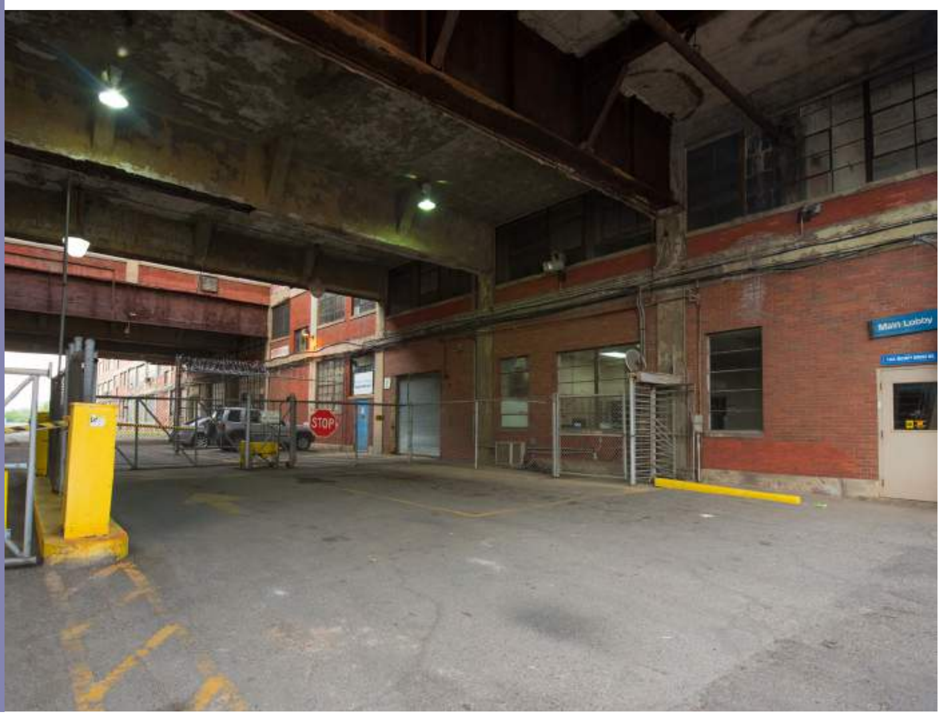

CVS

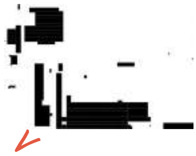


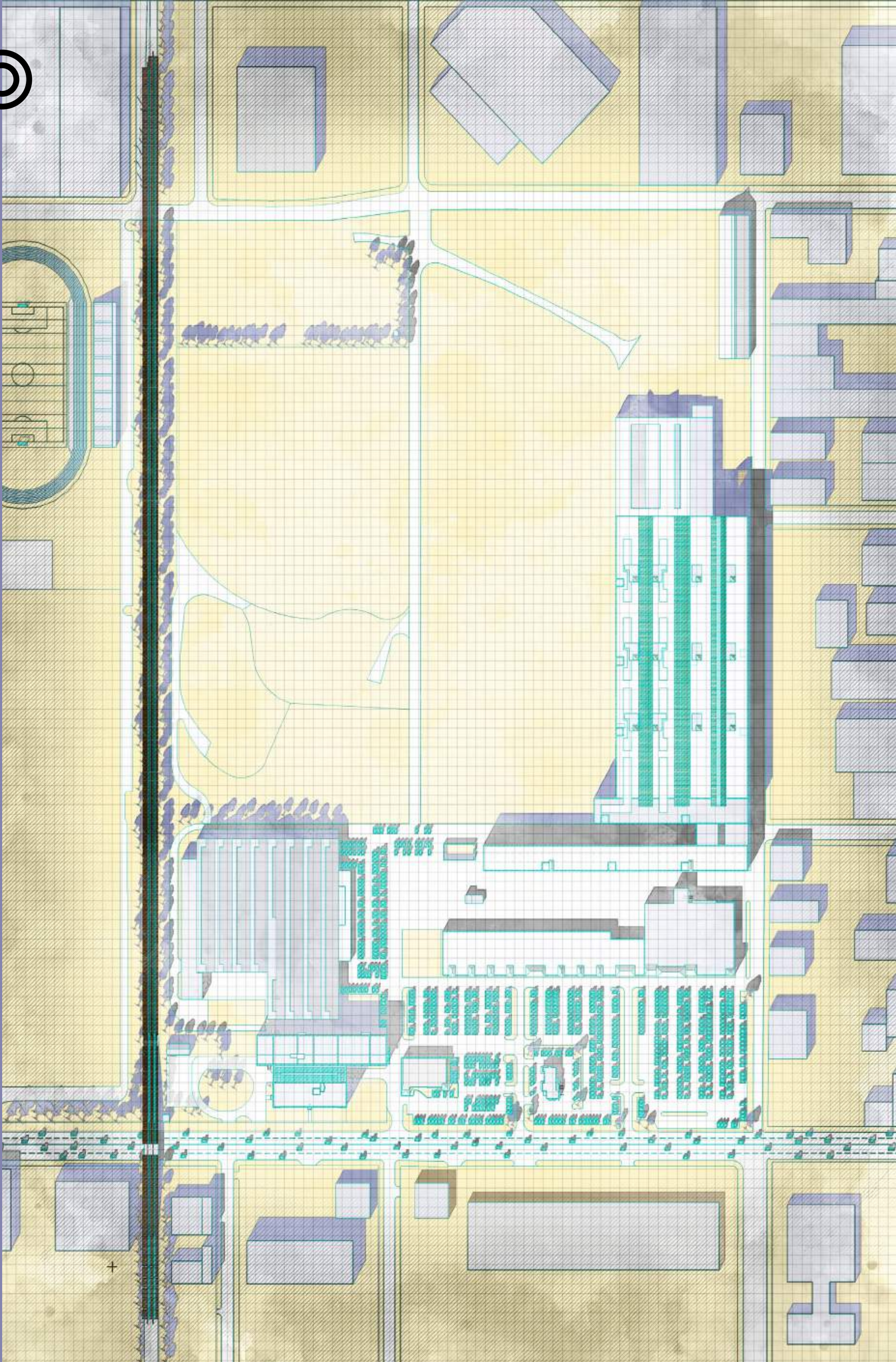
DENIS KRAJA




MICHIGAN
HISTORIC SITE
HOME OF MODEL T
Here at his Highland Park
Plant, Henry Ford in 1913
began the mass production
of automobiles on a moving
assembly line. By 1915 Ford
built a million Model T's.
In 1925 over 9,000 were
assembled in a single day.
Mass production soon moved
from here to all phases of
American industry and set
the pattern of abundance
for 20th Century living.


Main Lobby
STOP





6 CHAPTER VI

THE PROJECT

SITE ANALYSIS AND PROGRAM

FIG.6.1
Existing Site Plan

6.1 THE HIGHLAND PARK DOWNTOWN STRATEGIC PLAN

Highland Park has an incredible opportunity along the Woodward corridor and beyond and needs to be considered when talking for development of Detroit and areas around.

Tax Increment Financing Authority (TIFA) Board of Directors was commissioned to develop a plan for Highland Park, in 2016 by Highland Park Mayor Hubert Yopp. This plan would include the development in the next two, five, and ten years of the Downtown Highland Park. According to board chair Theresa Johnson, there is a demand for growth, and for this reason, they should be prepared with a proper development plan (Ronyan, 2017). The proposal included community-driven, targeted, short term wins in multi-modal infrastructure, activated public spaces, and pop-up experiences celebrating the strength and vitality of Highland Park.

The Tax Increment Finance Authority (TIFA) Board is an overseeing body of the Highland Park Tax Increment Finance (TIF) district (MKSK STUDIOS, 2016). A TIF district is an economic development tool that captures increases in taxable property within a specific boundary from a certain base year and sends it to a separate account. The money collected is to be used for various projects, programs, and purchases to improve the overall vitality of the district. Many communities use these funds to operate façade improvement programs or special events in the district, to incentivize new development or purchase vacant properties for redevelopment, or to hire additional services (i.e. trash removal and snow plowing) for the district.

The TIFA Board is creating a Strategic Plan to map out what programs and projects they should be concentrating their efforts on. This will be a "Grand Vision" for downtown Highland Park. Through a six-month process, the team met with and interviewed local businesses, residents, and property owners to chart out an aspirational future for the area.

MKSK Studios was in charge of Urban Planning. In it, they presented opportunities for increased public space, adaptive reuse of historic buildings, an emphasis on pedestrian safety, increased retail opportunity, and taking advantage of the Inner Circle Greenway, connecting neighborhoods of Detroi (Ronyan, 2017). Initiatives include tactical infrastructure including bike lanes and programs such as a pop-up outdoor movie theater and civic square for music, dancing, public art, food, and beverage. These early uses become the anchors and amenities for future development. Future development initiatives include installing a critical piece of the regional greenway, mixed-income housing, new cultural and retail experiences, and entrepreneurship support for culinary startups (Ronyan, 2017).

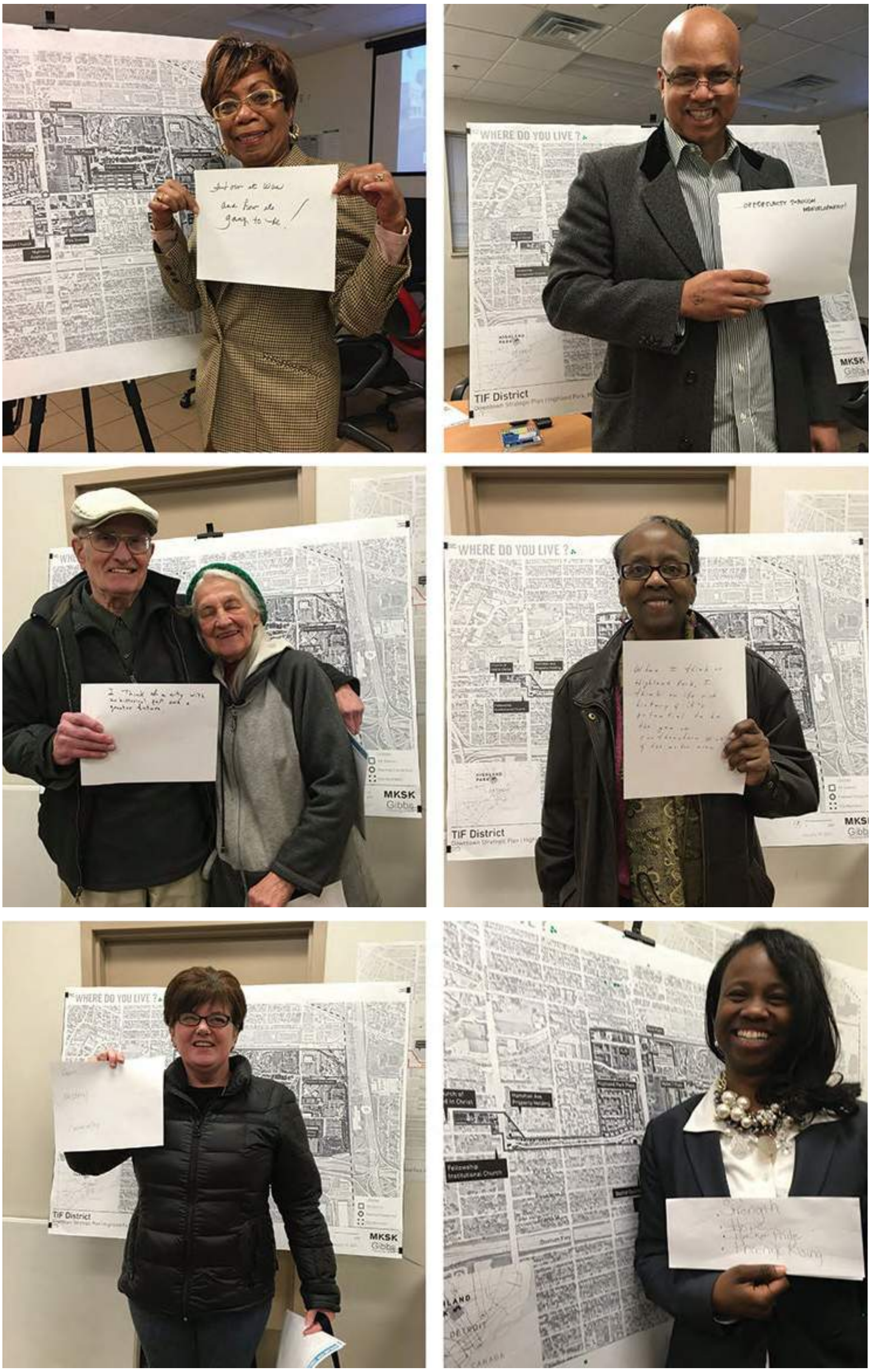
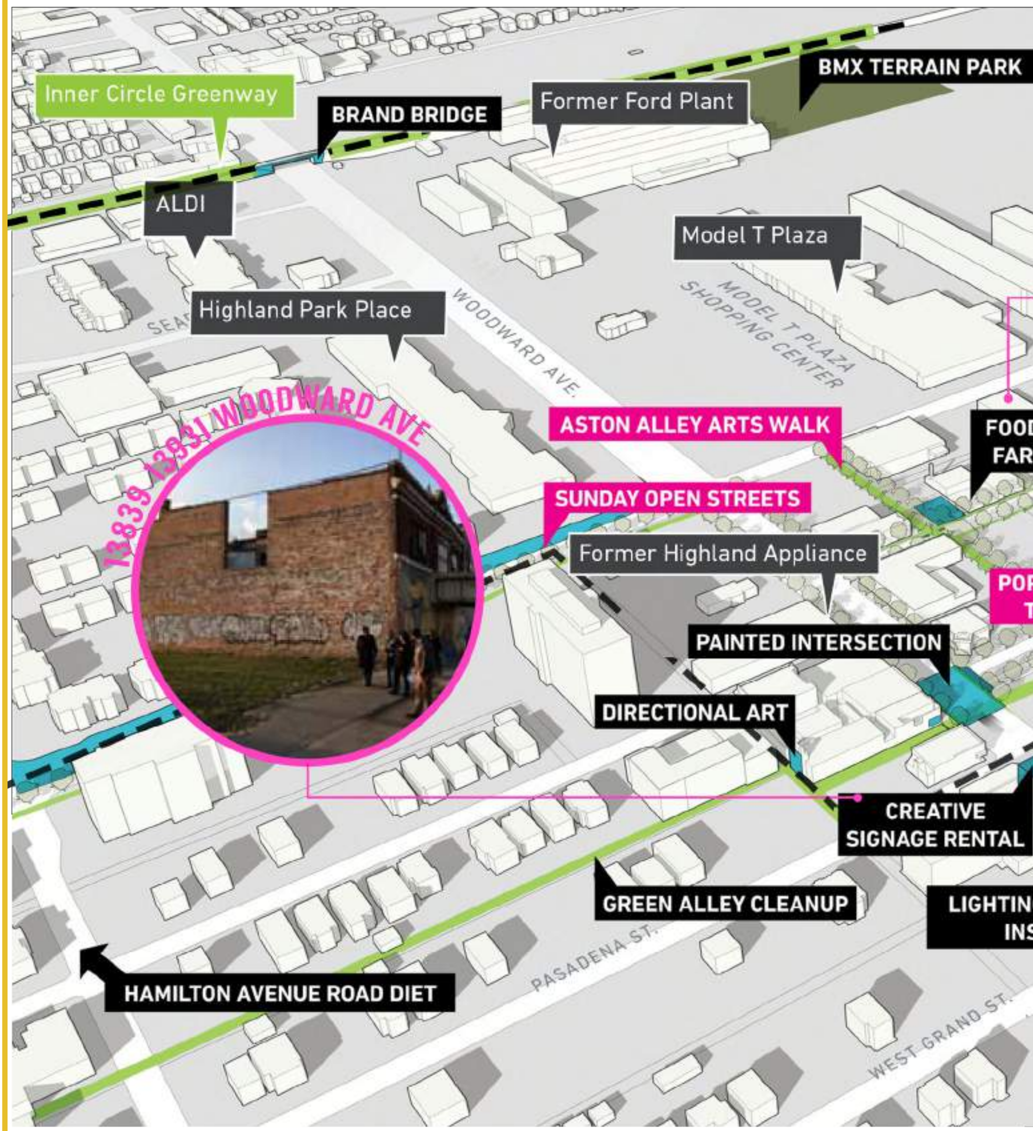


FIG. 6.1.1
Photo of Highland Park inhabitants who participated in the process of public consultations for the Highland Park Strategic Plan, 2017
Source: https://www.highlandparkmi.gov


Inner Circle Greenway
BRAND BRIDGE
Former Ford Plant
BMX TERRAIN PARK
ALDI
Model T Plaza
MODEL T PLAZA SHOPPING CENTER
Highland Park Place
WOODWARD AVE.
13839-13931 WOODWARD AVE
ASTON ALLEY ARTS WALK
SUNDAY OPEN STREETS
Former Highland Appliance
PAINTED INTERSECTION
DIRECTIONAL ART
CREATIVE SIGNAGE RENTAL
GREEN ALLEY CLEANUP
PASADENA ST.
HAMILTON AVENUE ROAD DIET
WEST GRAND ST.

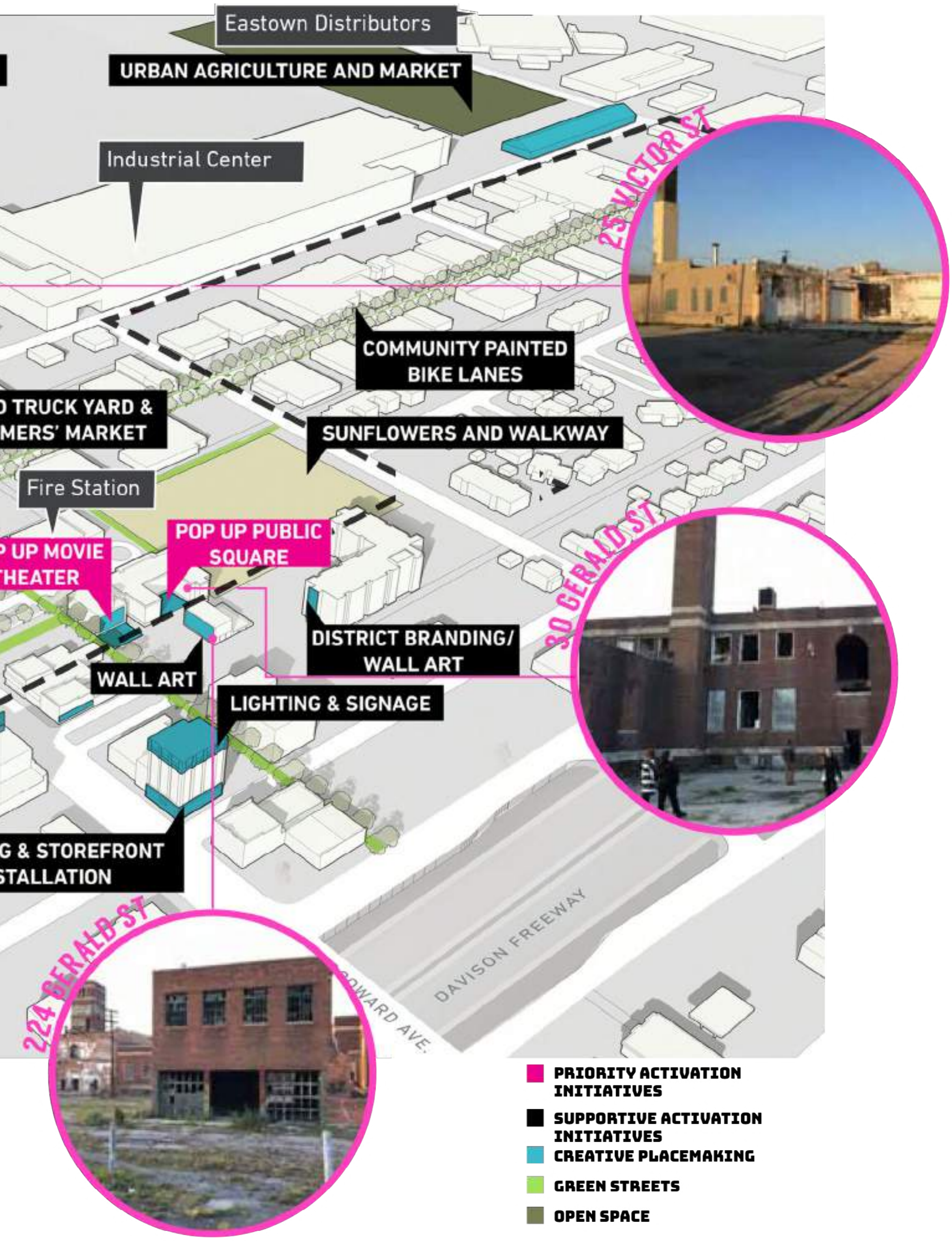
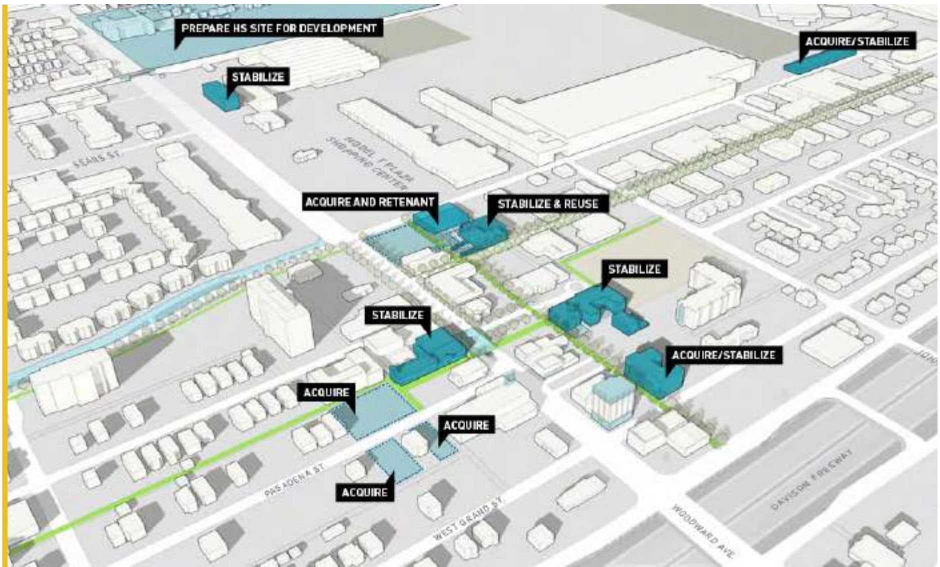


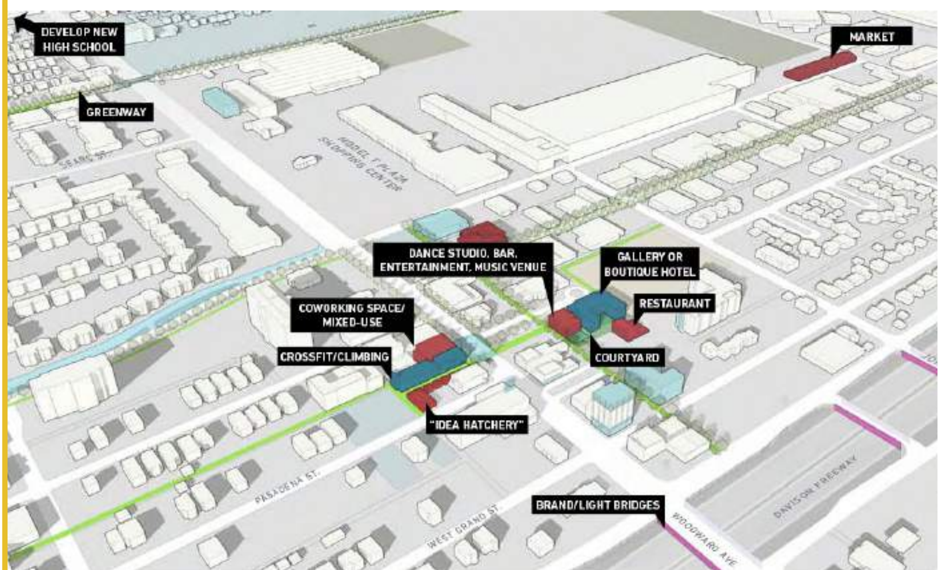
FIG. 6.1.2
Highland Park Downtown Strategic Plan: 0-2 Years - Organize and Activate. Source: https://www.highlandparkmi.gov

FIG. 6.1.3
Highland Park Downtown Strategic Plan: 0-2 Years - Organize and Activate. Source: https://www.highlandparkmi.gov



BUILDINGS TO ACQUIRE/ STABILIZE | SITES TO ACQUIRE | STABILIZE/ ACQUIRE INITIATIVES

FIG. 6.1.4
Highland Park Downtown Strategic Plan: 2-5 Years - Recruit and Anchor. Source: https://www.highlandparkmi.gov



BRANDING | COMMERCIAL | INSTITUTIONAL / OFFICE

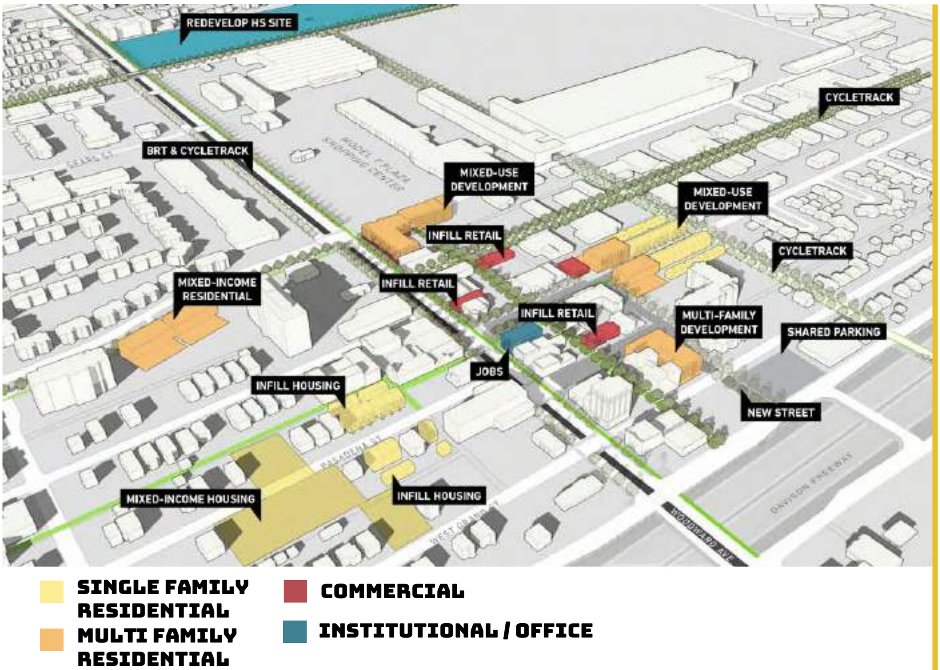


FIG. 6.1.5
Highland Park Downtown Strategic Plan: 5-10 Years - Grow. Source: https://www.highlandparkmi.gov

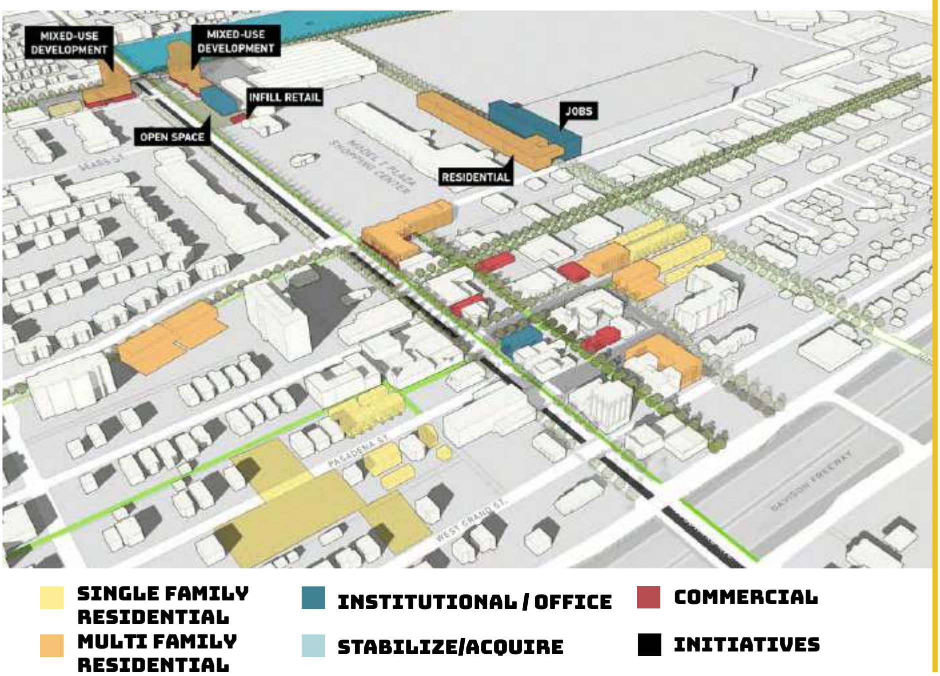
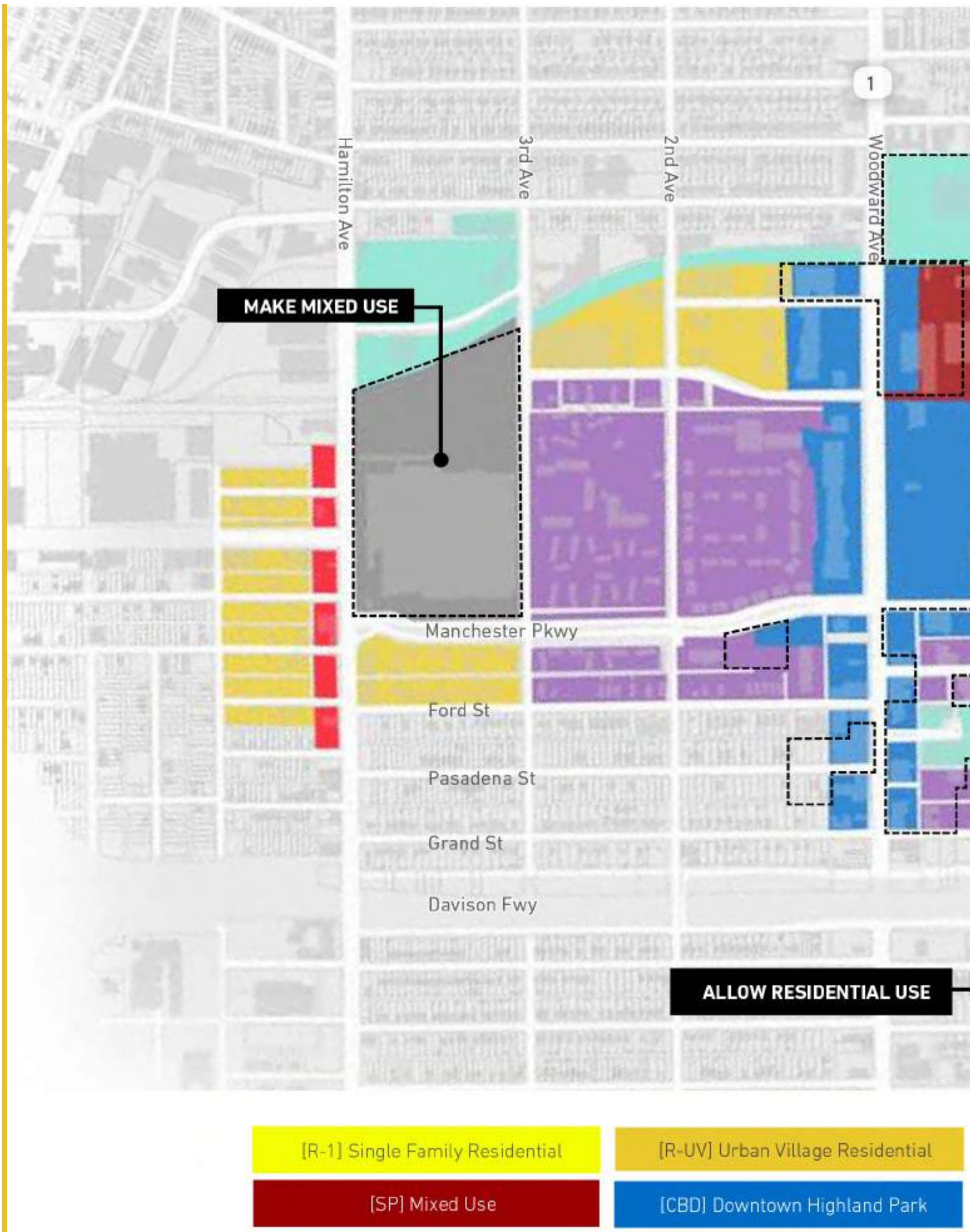


FIG. 6.1.6
Highland Park Downtown Strategic Plan: The Future. Source: https://www.highlandparkmi.gov

FIG. 6.1.7
Highland Park Downtown Strategic Plan: The Jackie Wilson Block: Now, after 2 Years, after 5 Years. Source: https://www.highlandparkmi.gov

FIG. 6.1.8
Highland Park Downtown Strategic Plan: Victor Street: Now, after 2 Years, after 5 Years. Source: https://www.highlandparkmi.gov


1
Hamilton Ave
3rd Ave
2nd Ave
Woodward Ave
MAKE MIXED USE
Manchester Pkwy
Ford St
Pasadena St
Grand St
Davison Fwy
ALLOW RESIDENTIAL USE
[R-1] Single Family Residential
[R-UV] Urban Village Residential
[SP] Mixed Use
[CBD] Downtown Highland Park

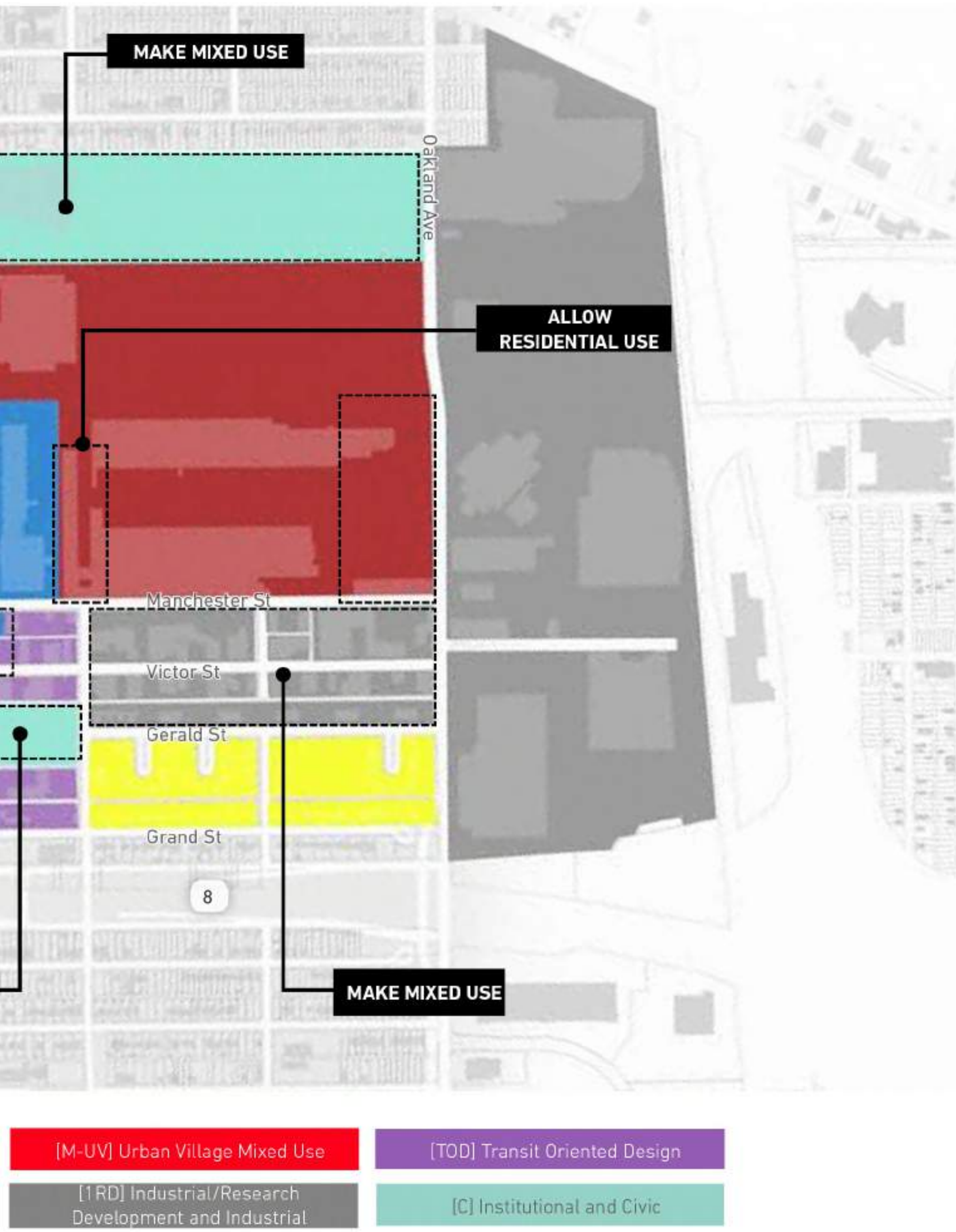
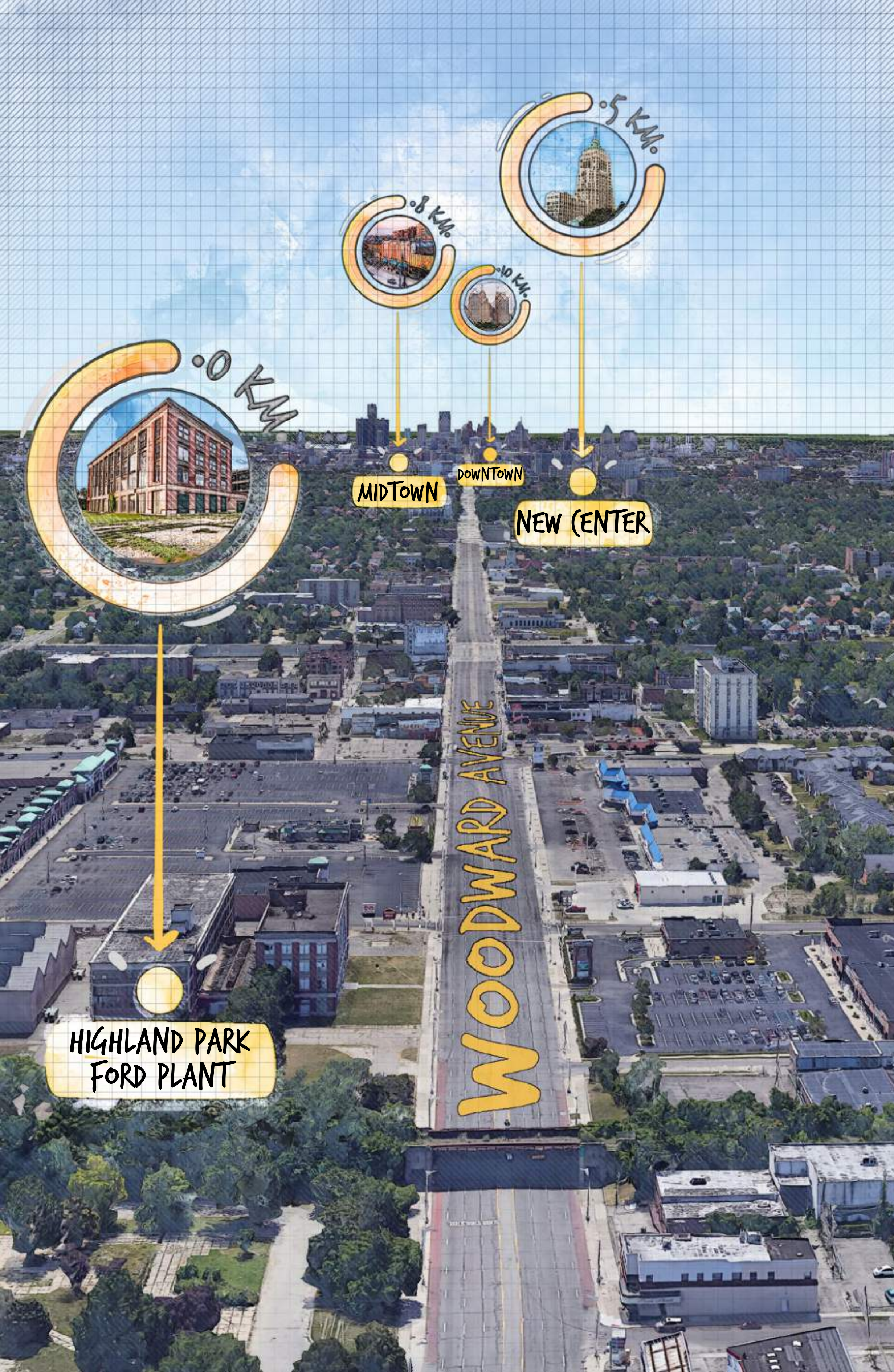


FIG. 6.1.9
Highland Park Downtown Strategic Plan: Ptoposed Zoning
Source: https://www.highlandparkmi.gov

6.2 SITE LOCATION AND ACCESS

FIG. 6.2.1 (PAGE 206)
Highland Park Ford Plant distance from Downtown Detroit, Midtown and New Center.

The Highland Park Ford Plant is located on Woodward Ave. The parcel is a 102-acre parcel. The property faces both Woodward Avenue, Oakland Avenue and Manchester Street and uses 91 Manchester as the main address. The site is rectangular-shaped, and it is bordered by the former Detroit Terminal Railroad on the north, Oakland Ave. on the east, Manchester Street on the south, and Woodward Avenue on the west. Woodward Avenue is the main north-south street for the Detroit metropolitan region, and it leads directly out of downtown Detroit to the region's northern suburbs, including Royal Oak, Birmingham, and Pontiac. The plant is located approximately ten kilometers northwest of downtown Detroit, and just over 0,4 kilometers north of the Davison Freeway. The plant is located in the middle of former heavy industrial corridor of Highland Park's, which developed along the Detroit Terminal Railroad in the city. Manufacturing took place to the west of the plant across Woodward Avenue, and this manufacturing district continued east across Woodward Avenue and proceeding south through the industrial area. The main access in the plant is by Manchester Street with additional entrance points from Woodward Avenue and Oakland Avenue. Oakland is a secondary street serving both Highland Park and Detroit. The plant is located within two kilometers of three of the region's limited-access highways. The Davison Freeway (M-8) is only 400 meters to the south of the site with access from the Woodward Ave./Oakland Ave. Exits. Both the Walter P. Chrysler Freeway (I-75) and the John C. Lodge Freeway (M-10) connect into the Davison Freeway, thus giving tremendous access to the facility. I-75 runs approximately 400 meters to the east of the plant, and in addition to providing access to the Davison Freeway, there is an exit on McNichols Road that is 1 kilometer to the northeast of the plant. The John C. Lodge Freeway (M-10) runs approximately 1 kilometer to the west of the plant and is accessible from the Davison Freeway. The Detroit Terminal Railroad right-of-way abuts the complex to the north, but the tracks have been removed. Both major bus systems, Southeastern Michigan Area Rapid Transit Authority (SMART) and the Detroit Department of Transportation (D-DOT) provide public bus service along Woodward Avenue and John R Street. Additional D-DOT lines run service both Oakland Ave and Manchester Street.


0 KM
HIGHLAND PARK FORD PLANT
8 KM
MIDTOWN
10 KM
DOWNTOWN
5 KM
NEW CENTER
WOODWARD AVENUE

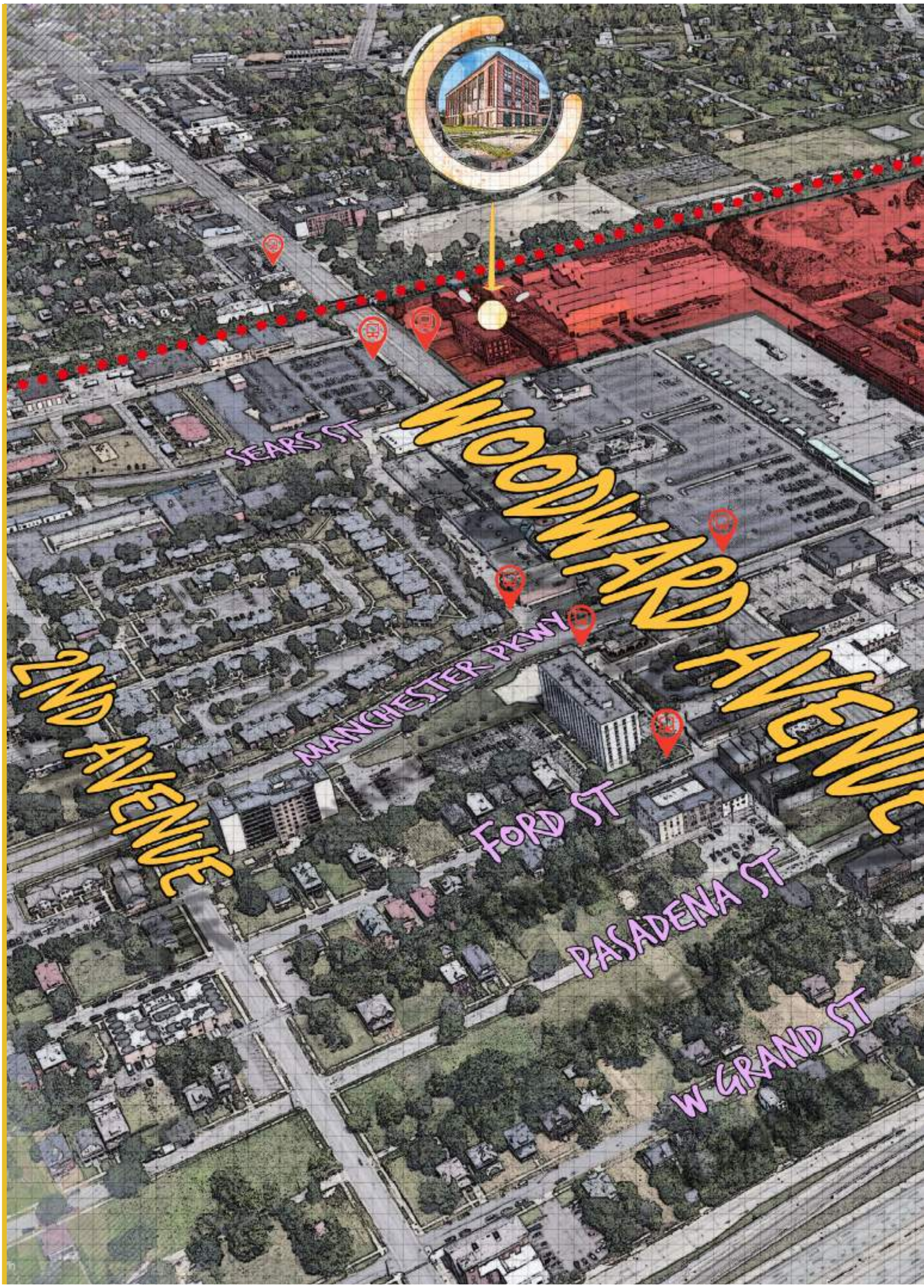

WOODWARD AVENUE
2ND AVENUE
SEARS ST
MANCHESTER PKWY
FORD ST
PASADENA ST
W GRAND ST

FIG. 6.2.2
Site Access

6.3 THE REUSE PROGRAM

As a sum of factors, the site can be developed in various ways giving excellent opportunities for future reuse. Elements that have been included into consideration in this program are:

The size of the site - The site is big but allows the reuse to be extended in time and stages.

The different types of buildings- this offer an excellent opportunity to use various functions and mixing the use.

The location - Considering the distance to Downtown Detroit, Highland Park offers a great location for future developments. Easy access and served with public transportation, the site has great potential to move away from the "industrial" feeling and becoming a popular, center of youngsters.

The Detroit / Highland Park population - The population of Detroit is increasing after the decrease of the 70s. Young generations chose Detroit as a place to live, as is one of the most affordable cities in the US. This change that Detroit is facing is an excellent chance for the reuse project of Highland Park Ford Plant.

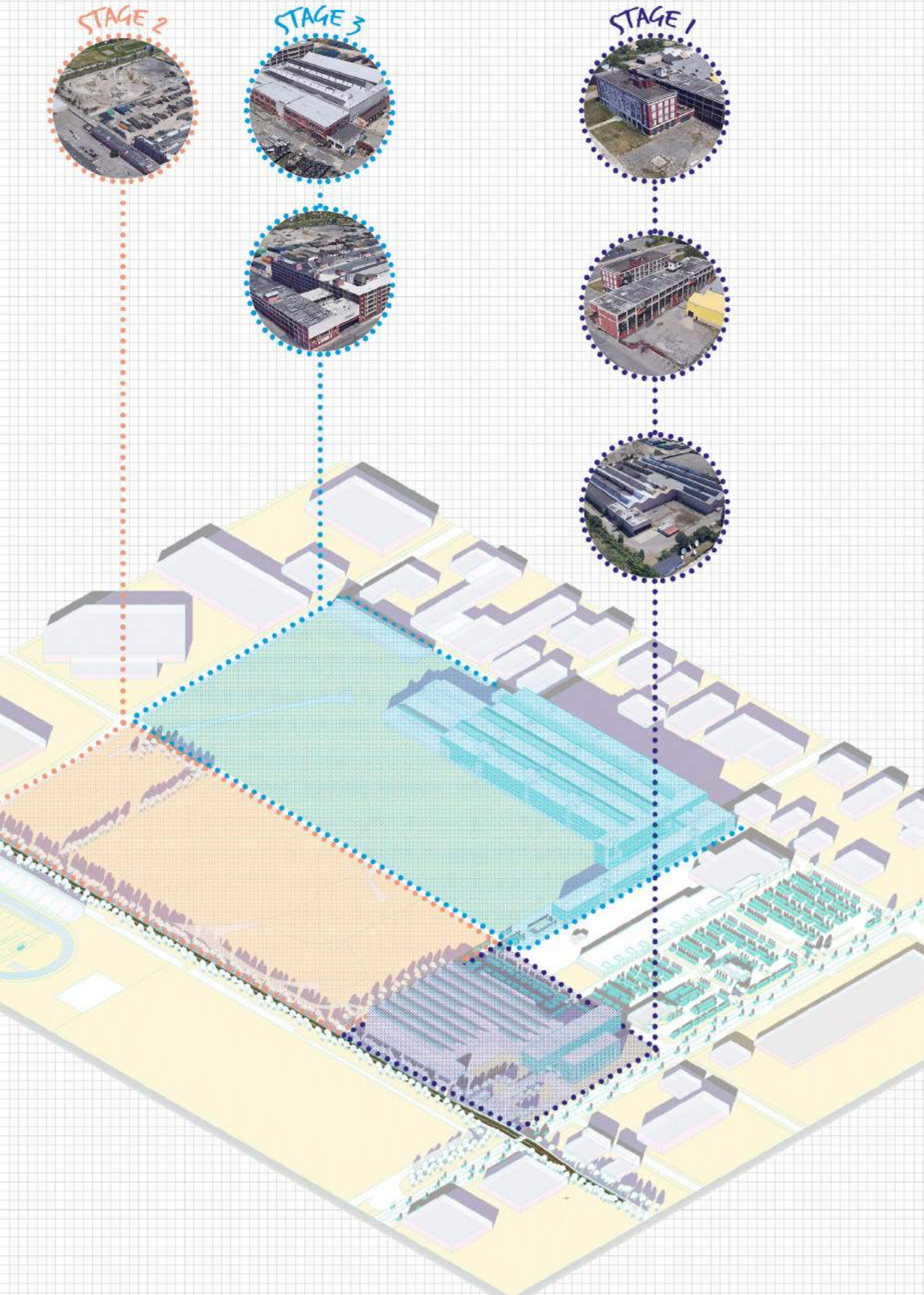
The program includes three stages.

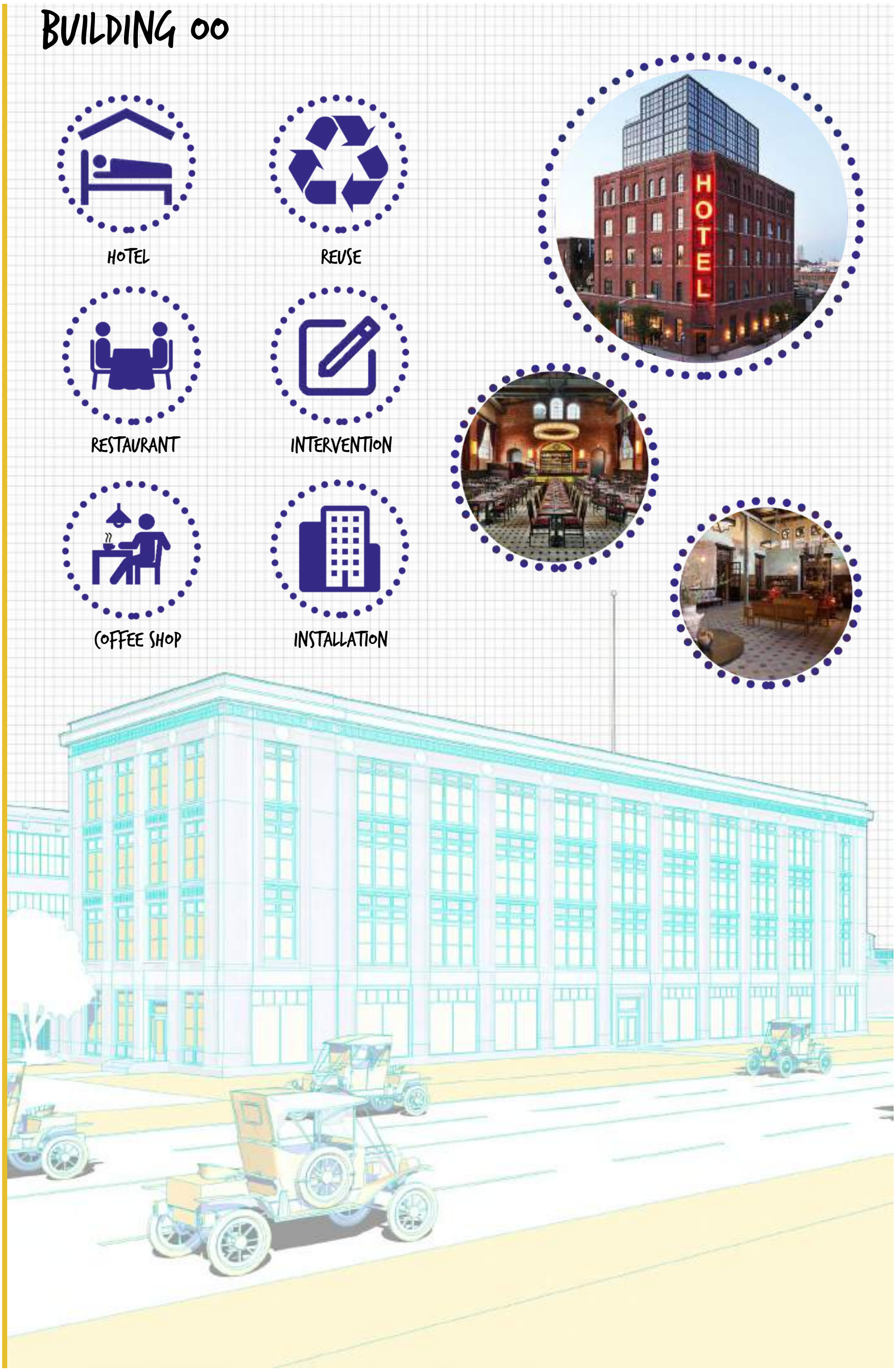
Stage 1 - Includes the Building AA, NN, OO, and JJ. Buildings AA, NN, and OO are heritage listed and represent a crucial moment in history. Also, the size is modest compared to the rest of the buildings making the development more manageable.

Stage 2 - Includes the brownfield in the north part of the site. An empty area that needs rehabilitation and can have different functions.

Stage 3 - The rest of the plant (buildings H, W, X, Y, Z, WW, XX, 079-X1, 079-X2). The reuse of these buildings is more challenging as the size is enormous and parts of the buildings are leased and under a contract of use. This means that the administration would need more time for the procurement of adaptive reuse.

Functions - the Highland Park Downtown Strategic Plan sees for a mixed-use development in the area. This also fits with the vision that I have for the adaptive reuse project. In the program are included functions such as residential, hospitality, educational, recreational, administration, and light industry.


STAGE 2
STAGE 3
STAGE 1

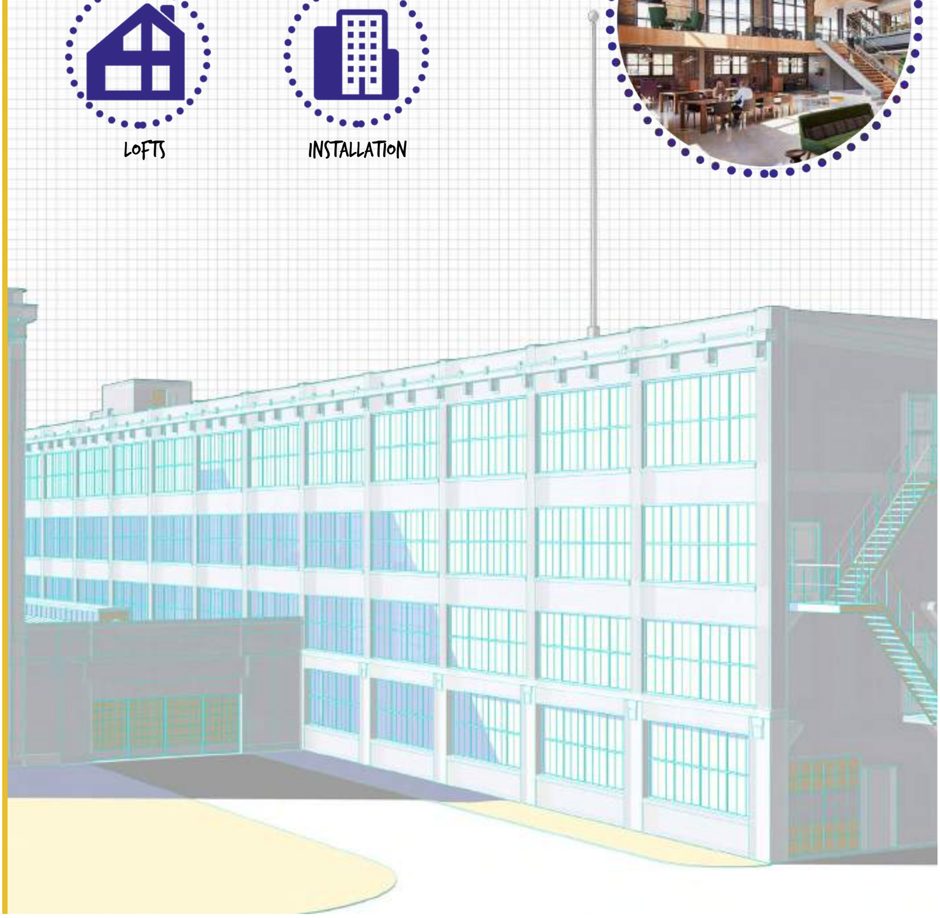

BUILDING 00
HOTEL
REUSE
RESTAURANT
INTERVENTION
COFFEE SHOP
INSTALLATION
HOTEL

BUILDING NN

ART GALLERY
REUSE
CONFERENCE ROOMS
INTERVENTION
EVENT SPACE

BUILDING AA


OFFICESS
REUSE
CO-WORKING SPACE
INTERVENTION
LOFTS
INSTALLATION



BUILDING JJ


HOUSING
REUSE
URBAN GARDENS
DEMOLISH
WORKSHOPS
INTERVENTION

BROWNFIELDS

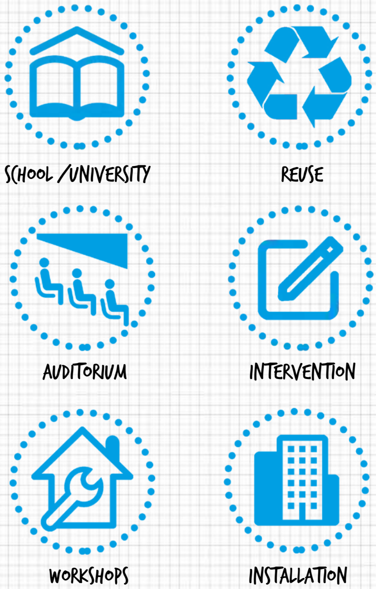
PARK

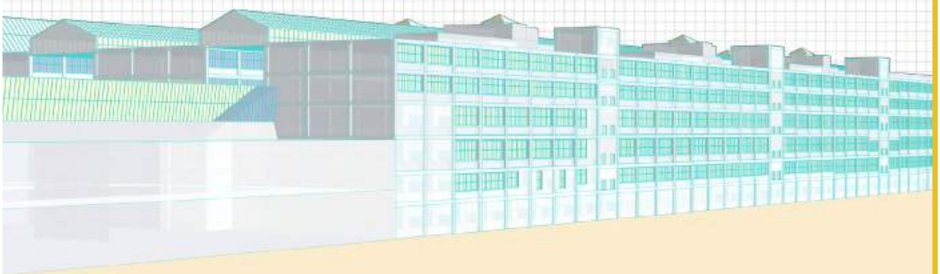
INTERVENTION

SPORT FACILITIES

ENTERTAINMENT

BUILDINGS H, W, X, Y, Z, WW, XX, 079-X1, 079-X2





7 **CHAPTER VII**

THE PROJECT

ADAPTIVE REUSE PROPOSAL FOR HIGHLAND PARK FORD PLANT

FIG. 7.1.1
FOLDED PAGES

Masterplan of the adaptive reuse proposal for Highland Park Ford Plant.

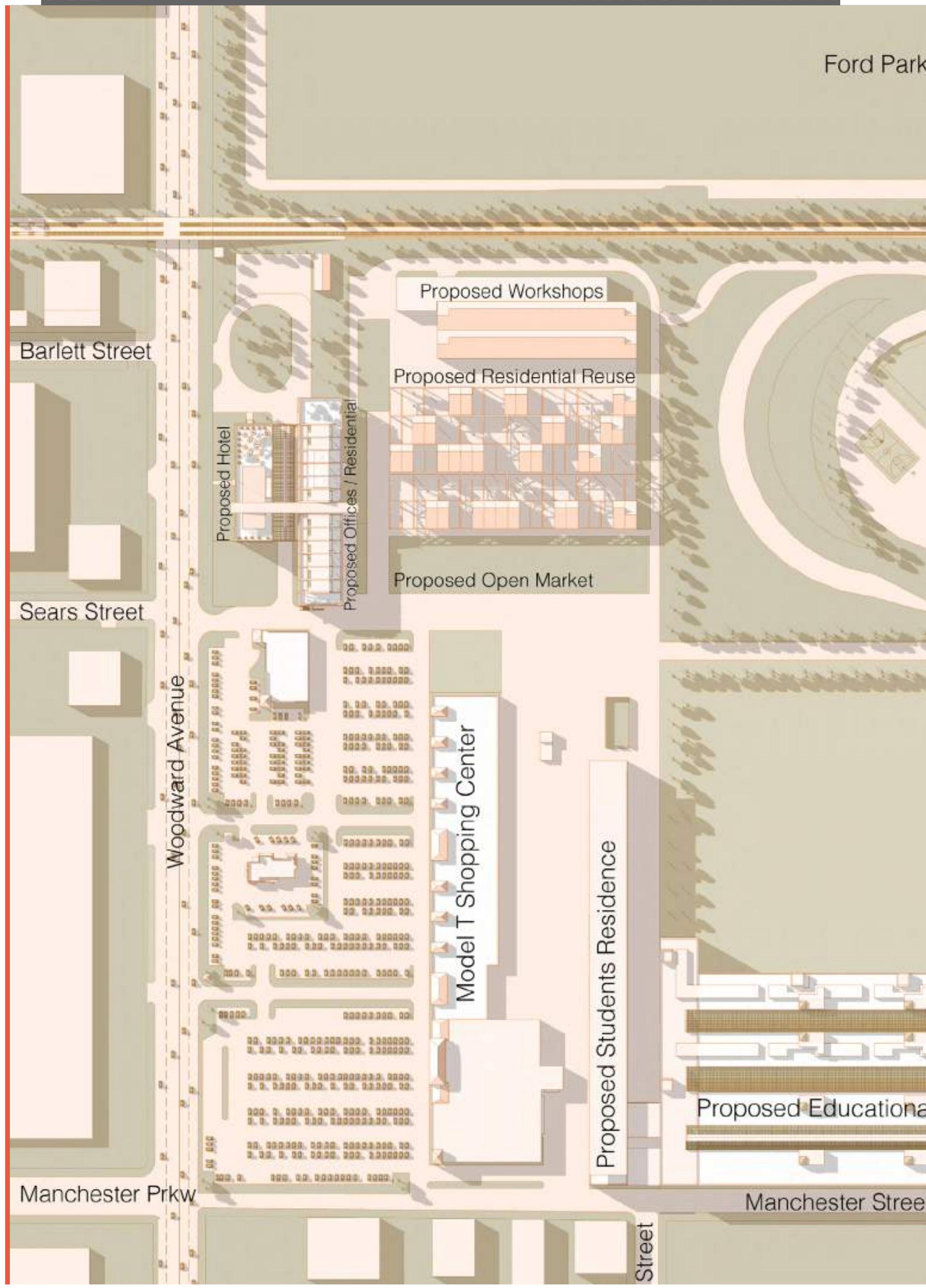
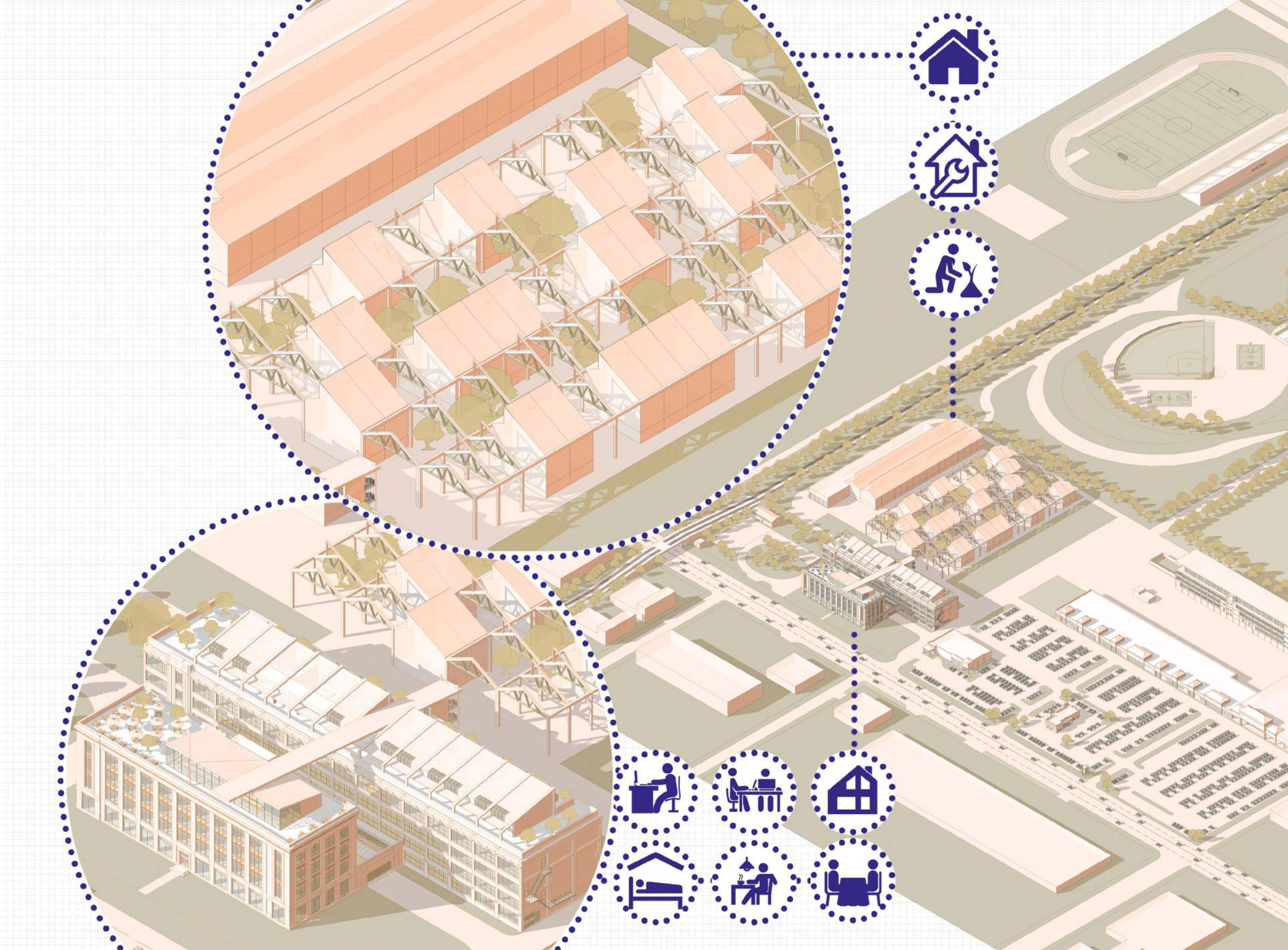
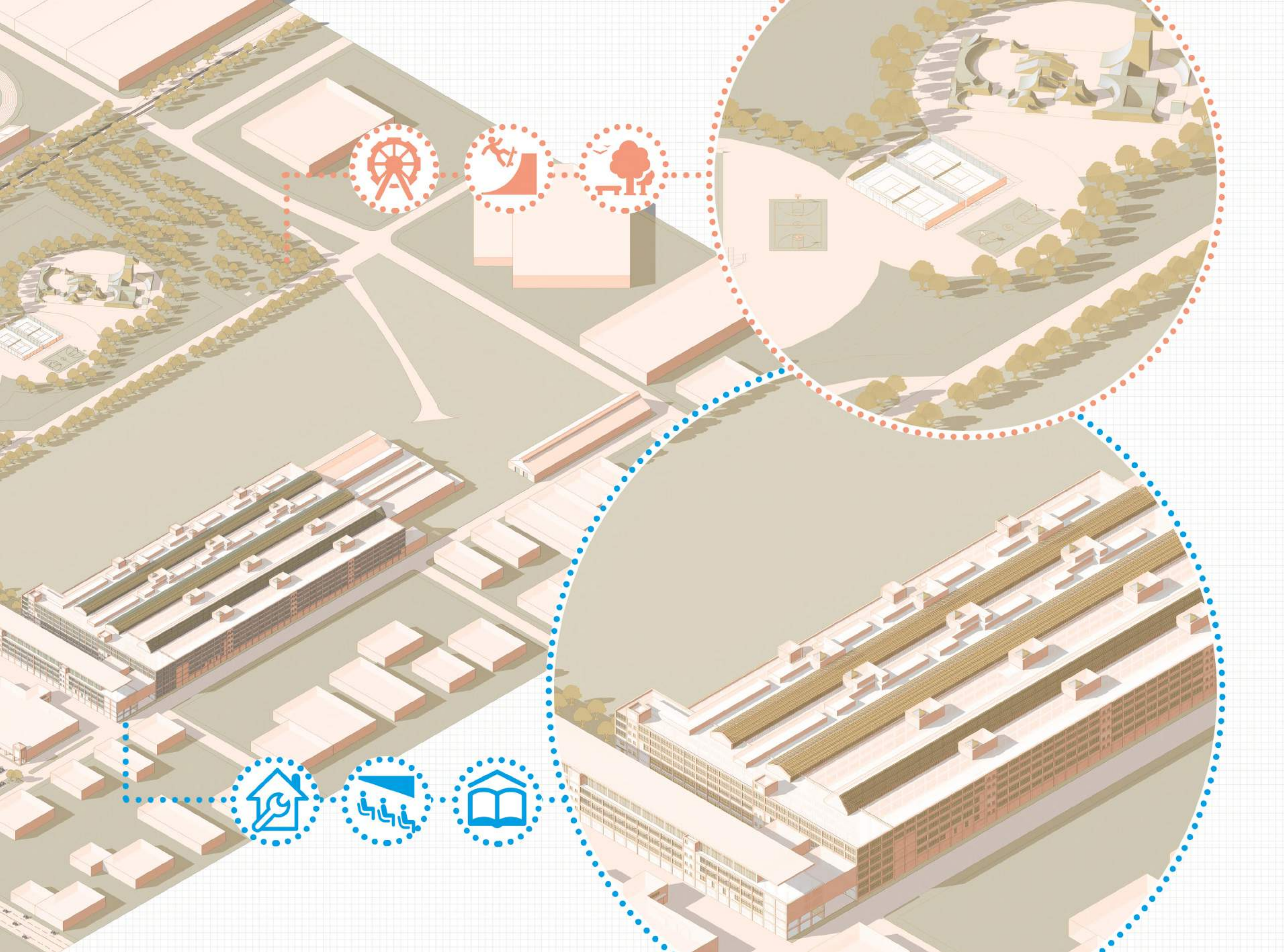


FIG. 7.1.2
FOLDED PAGES

Axonometric view of the Masterplan Proposal for Highland Park Ford Plant.





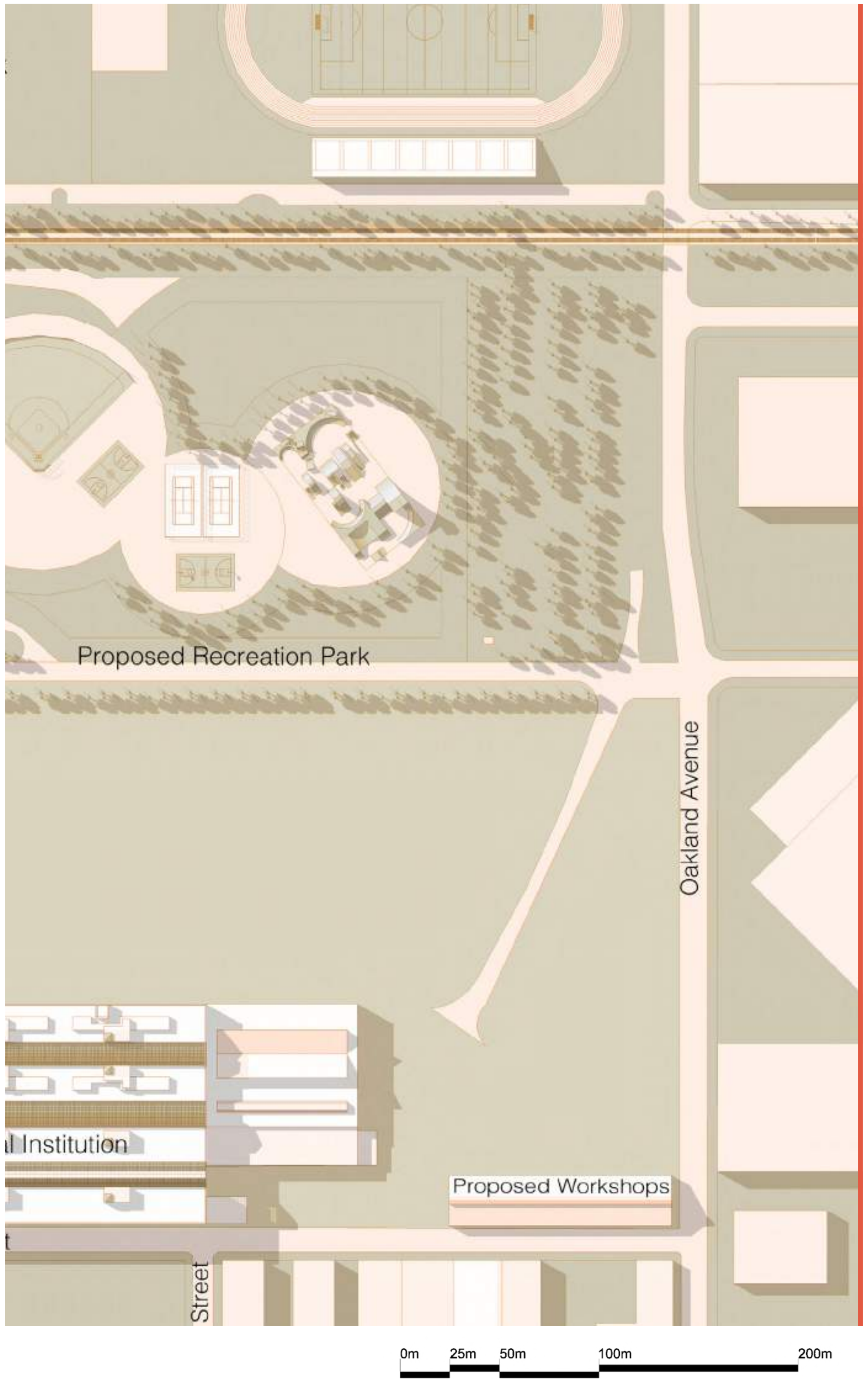
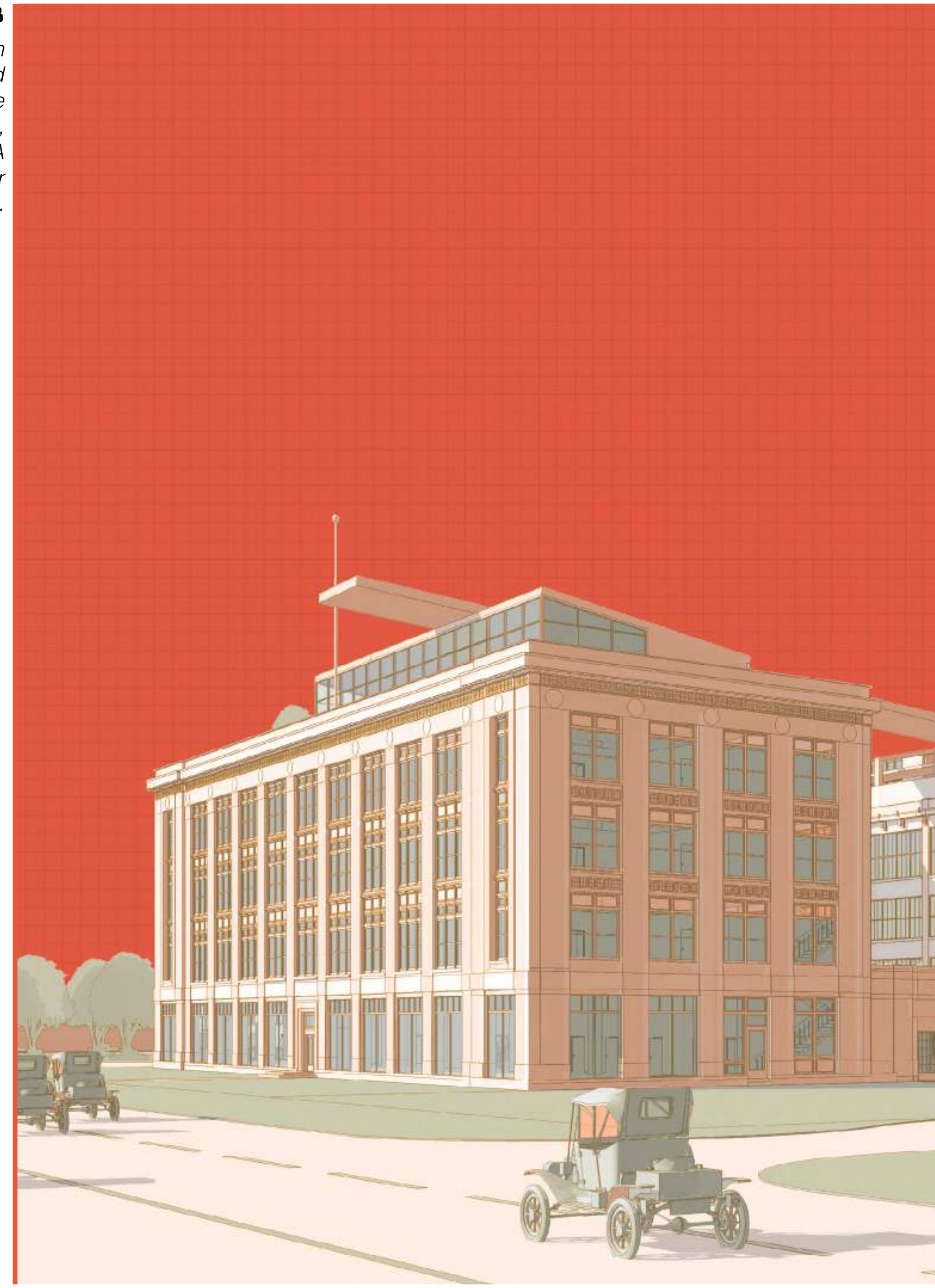
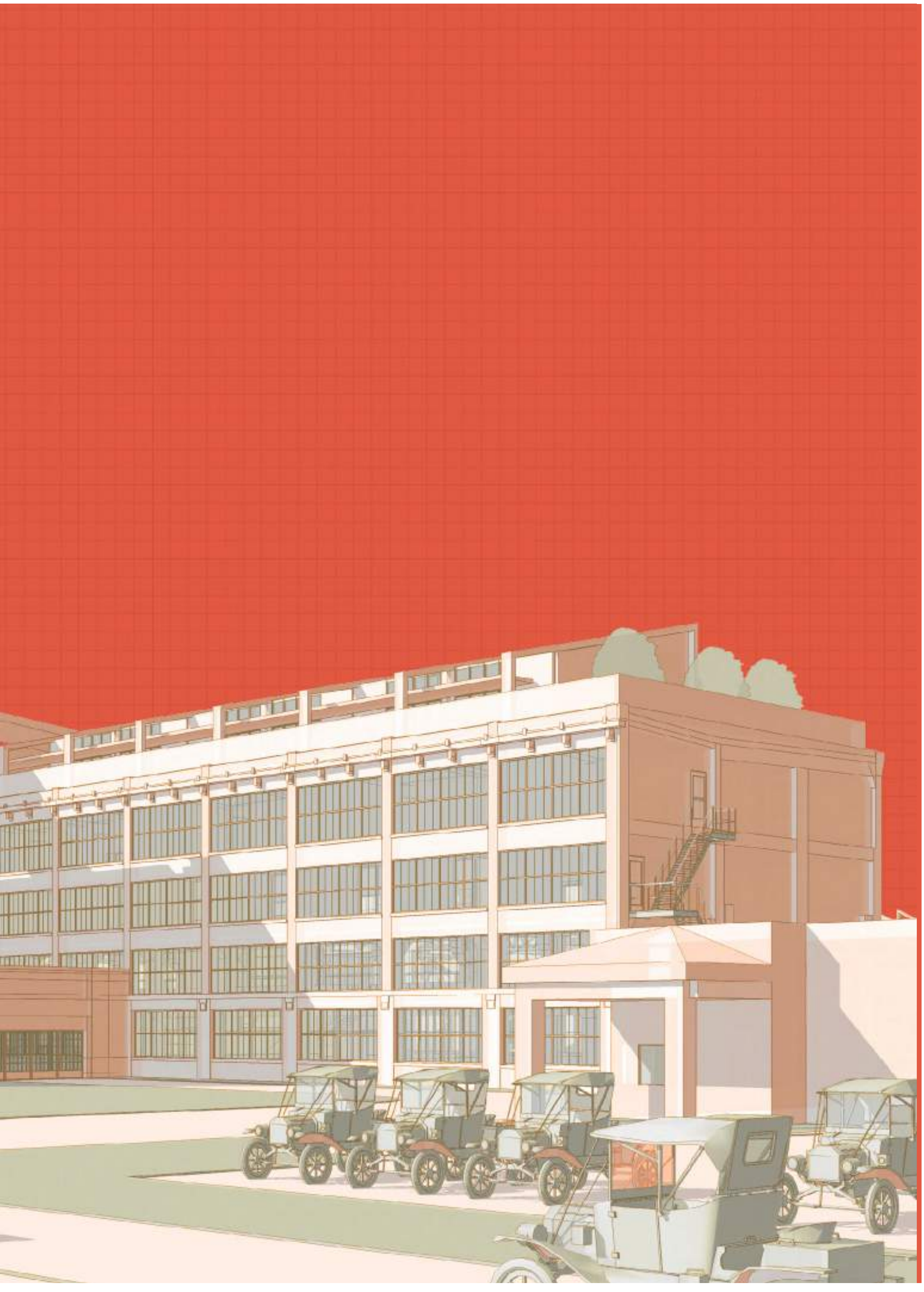


FIG. 7.1.3

View from Woodward Avenue of the Buildings OO, NN and AA proposed for adaptive reuse.





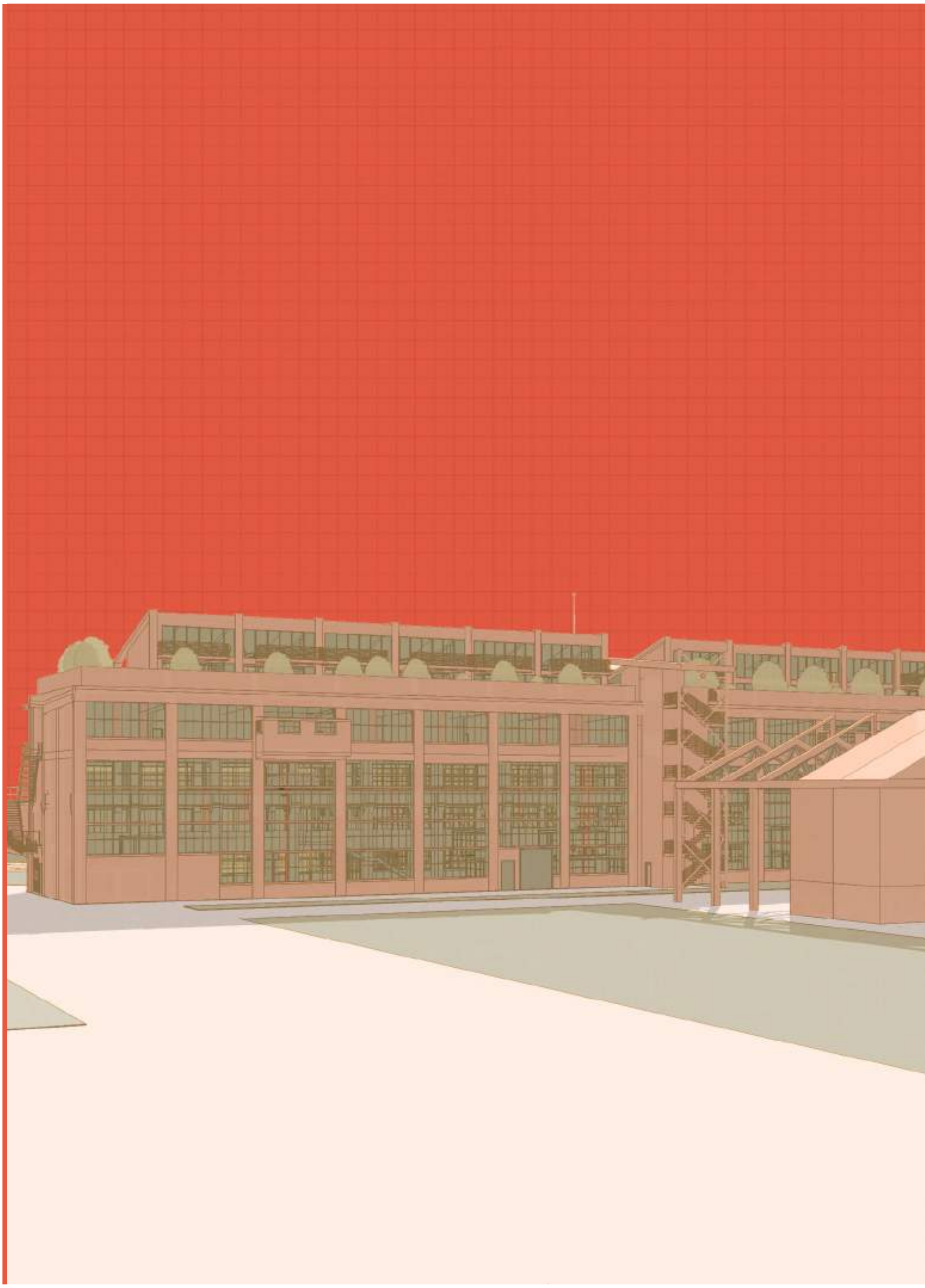


FIG. 7.1.4

View from the inner part of the complex of the Buildings JJ and AA proposed for adaptive reuse.

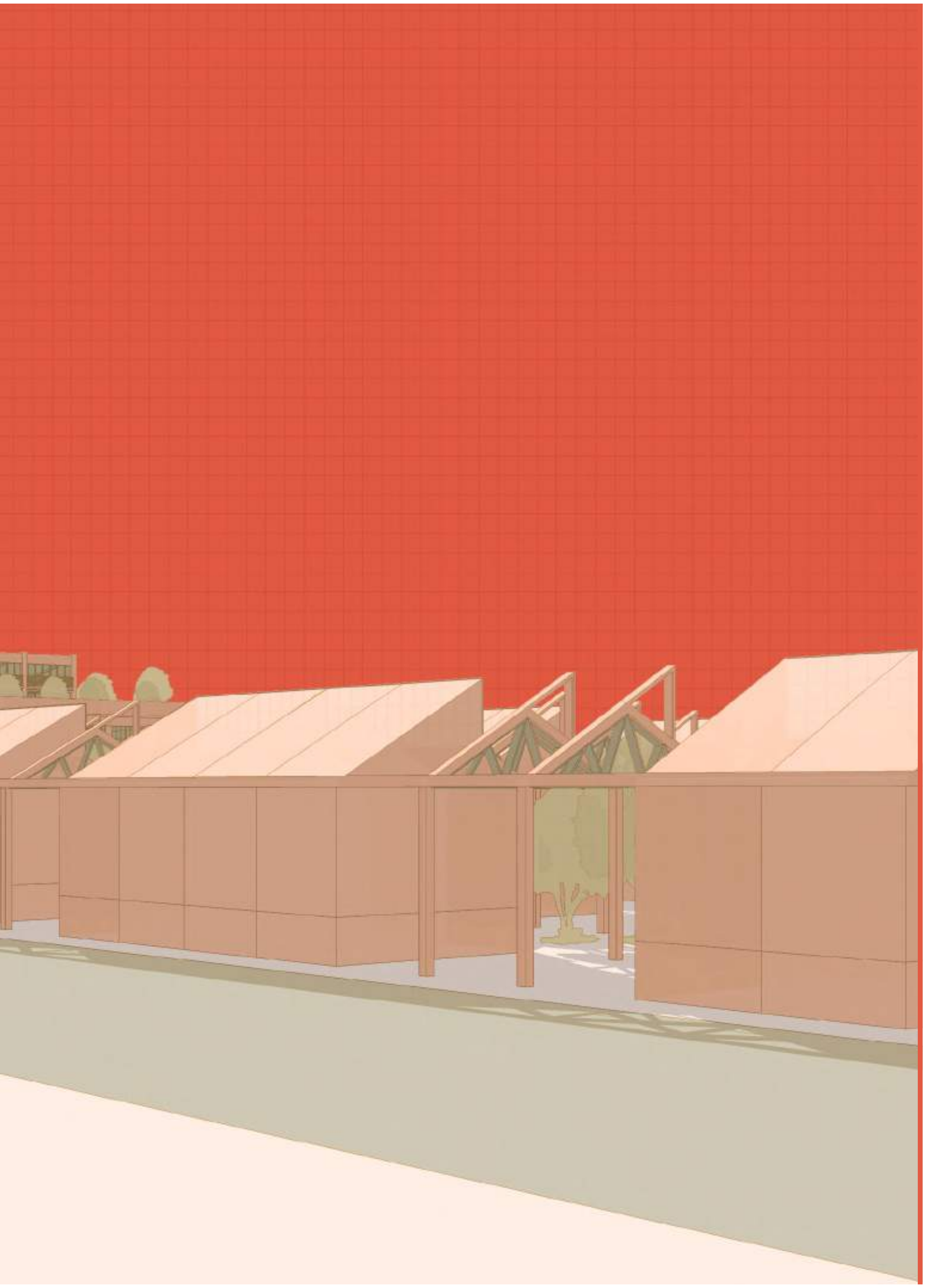
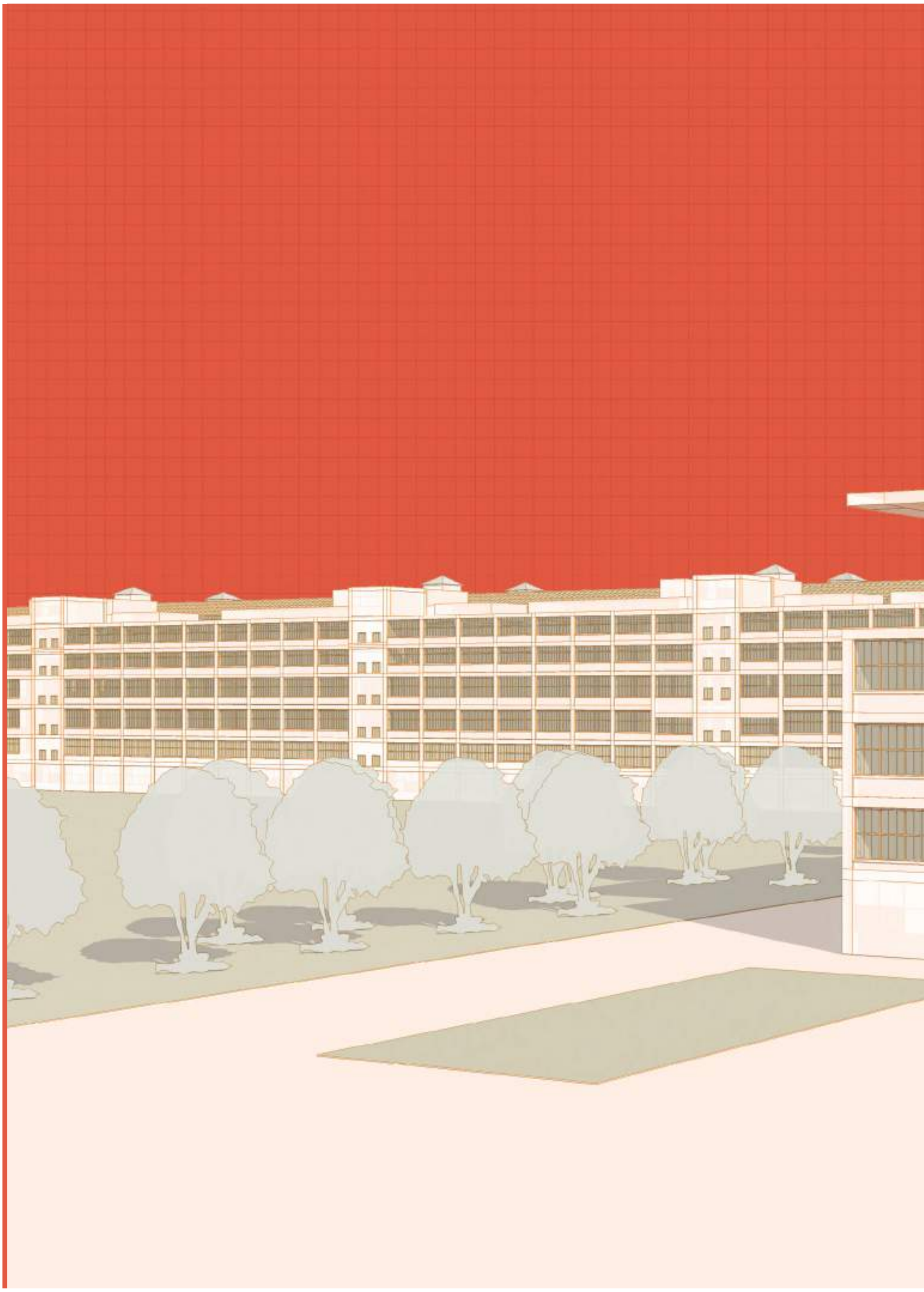
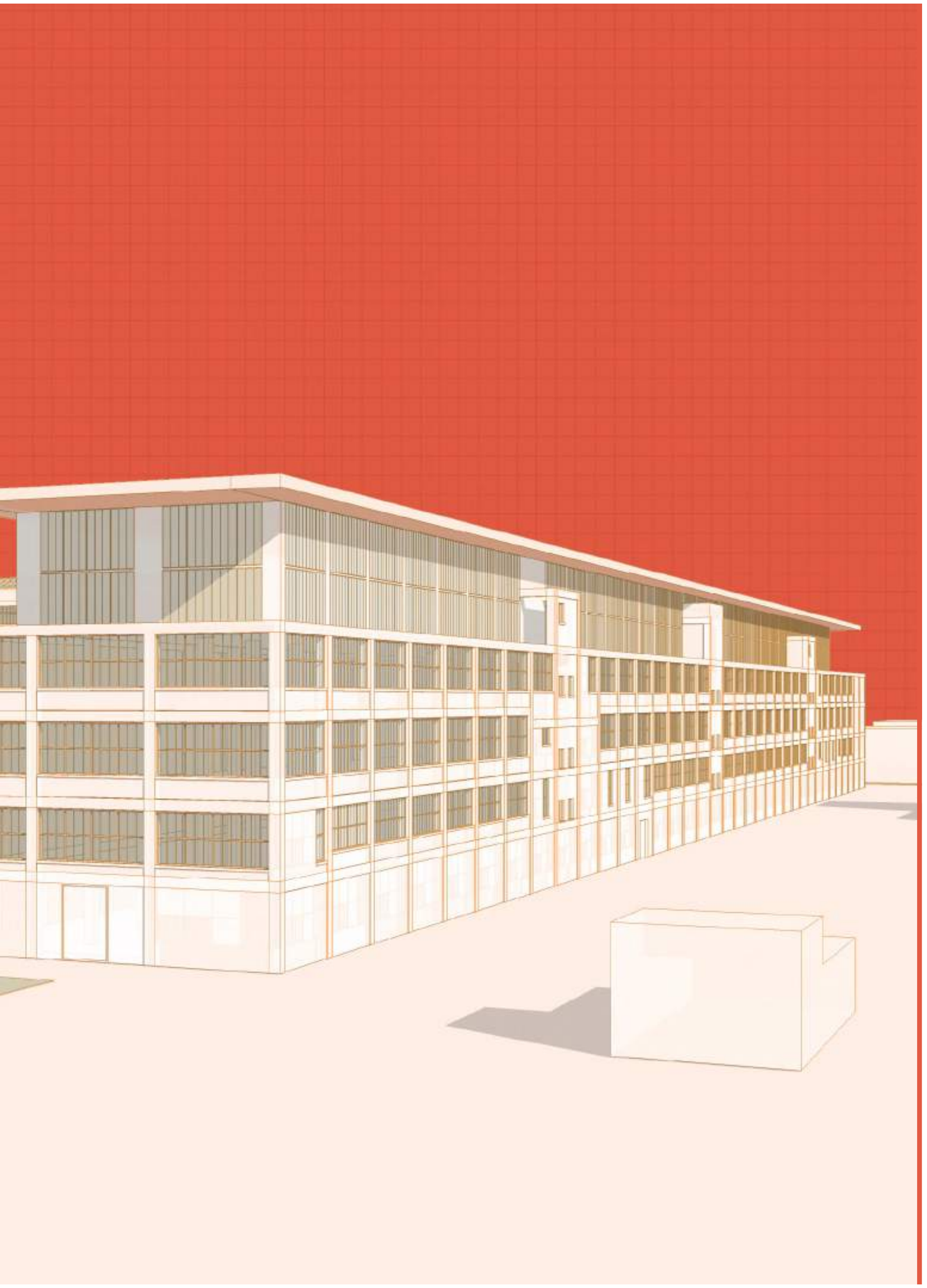


FIG. 7.1.4

View from the inner part of the complex of the Buildings H, W, X, Y, Z, WW, XX proposed for adaptive reuse.

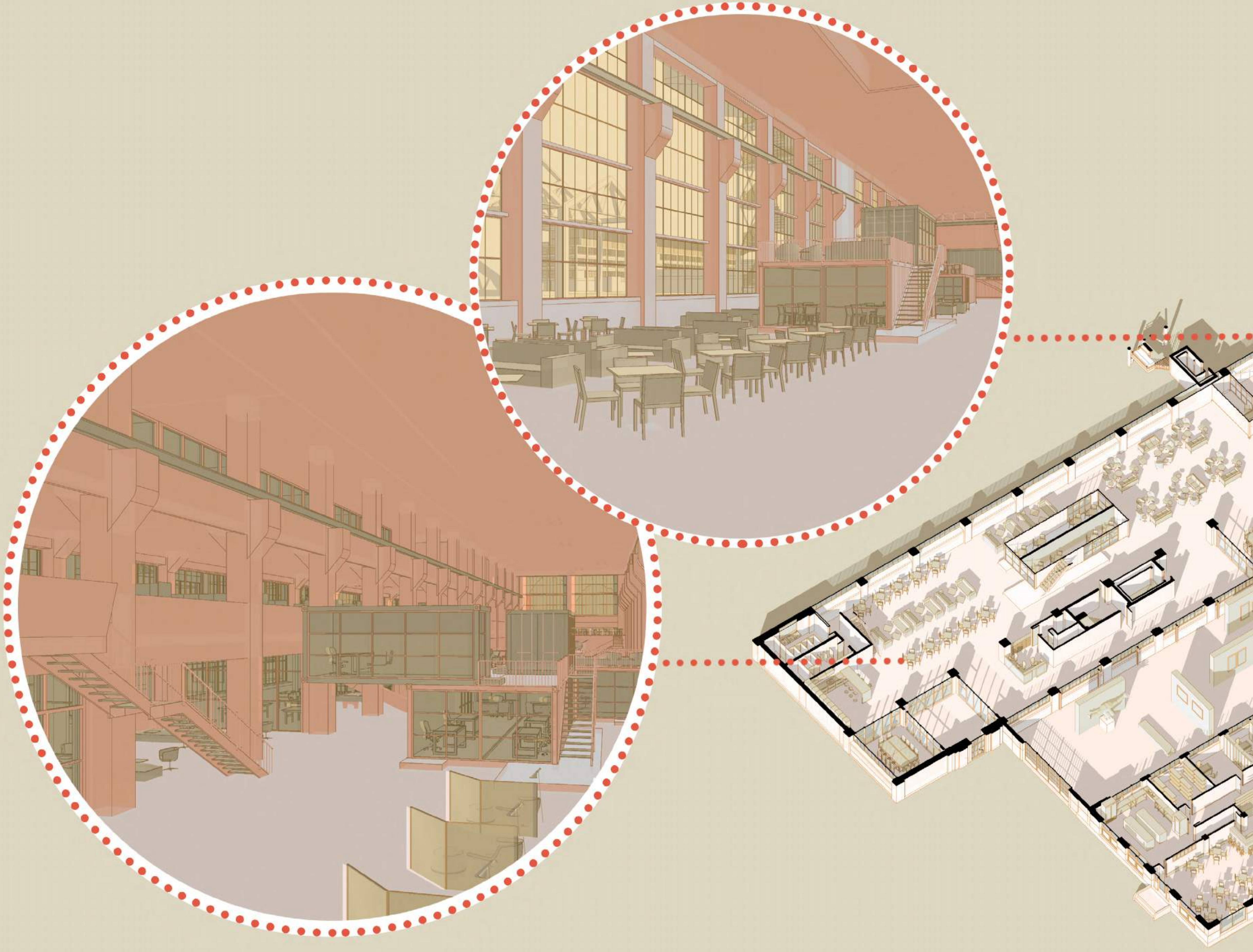


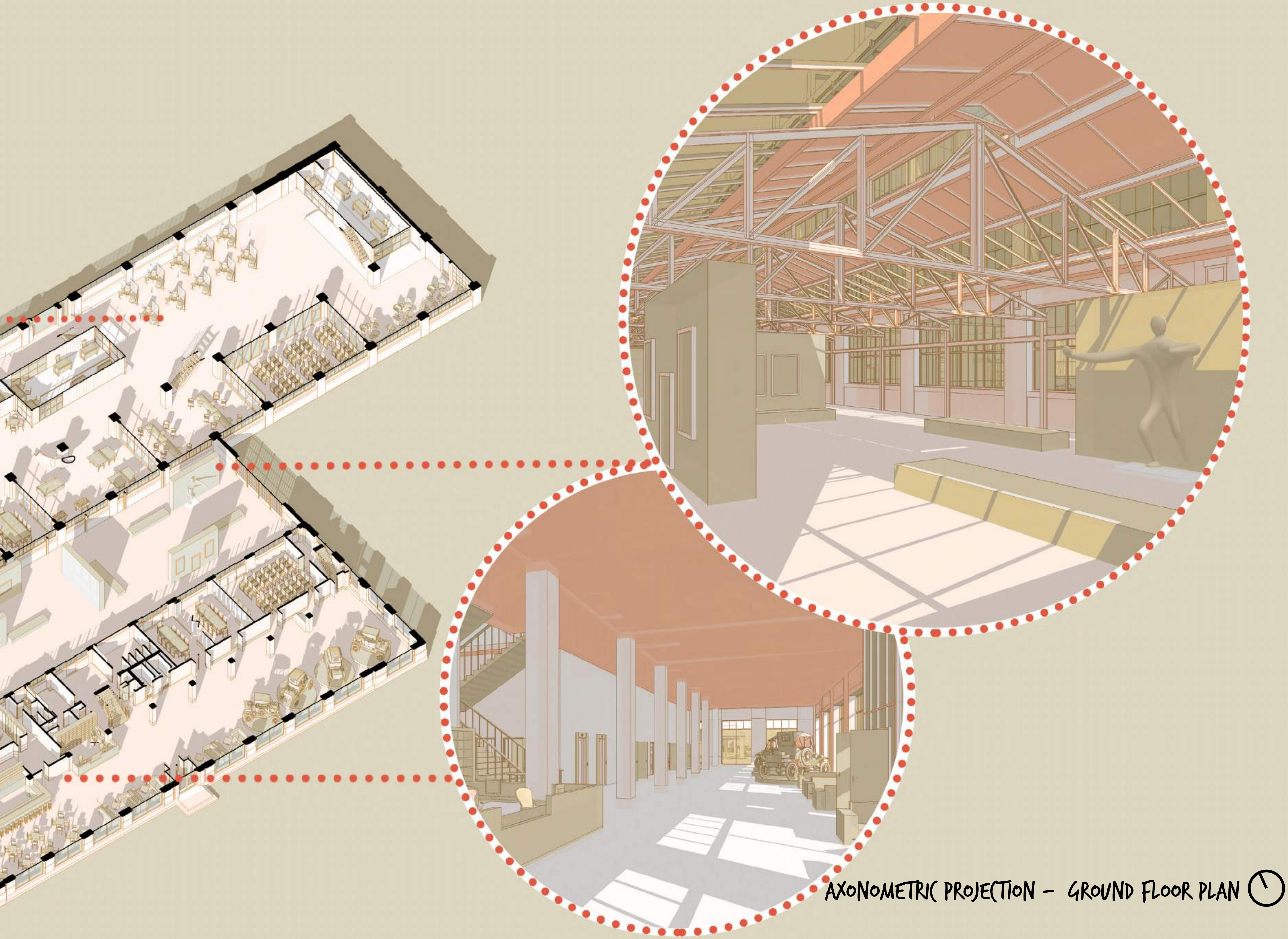


7.2 ADAPTIVE REUSE PROPOSAL FOR BUILDINGS "AA", "NN", "OO"

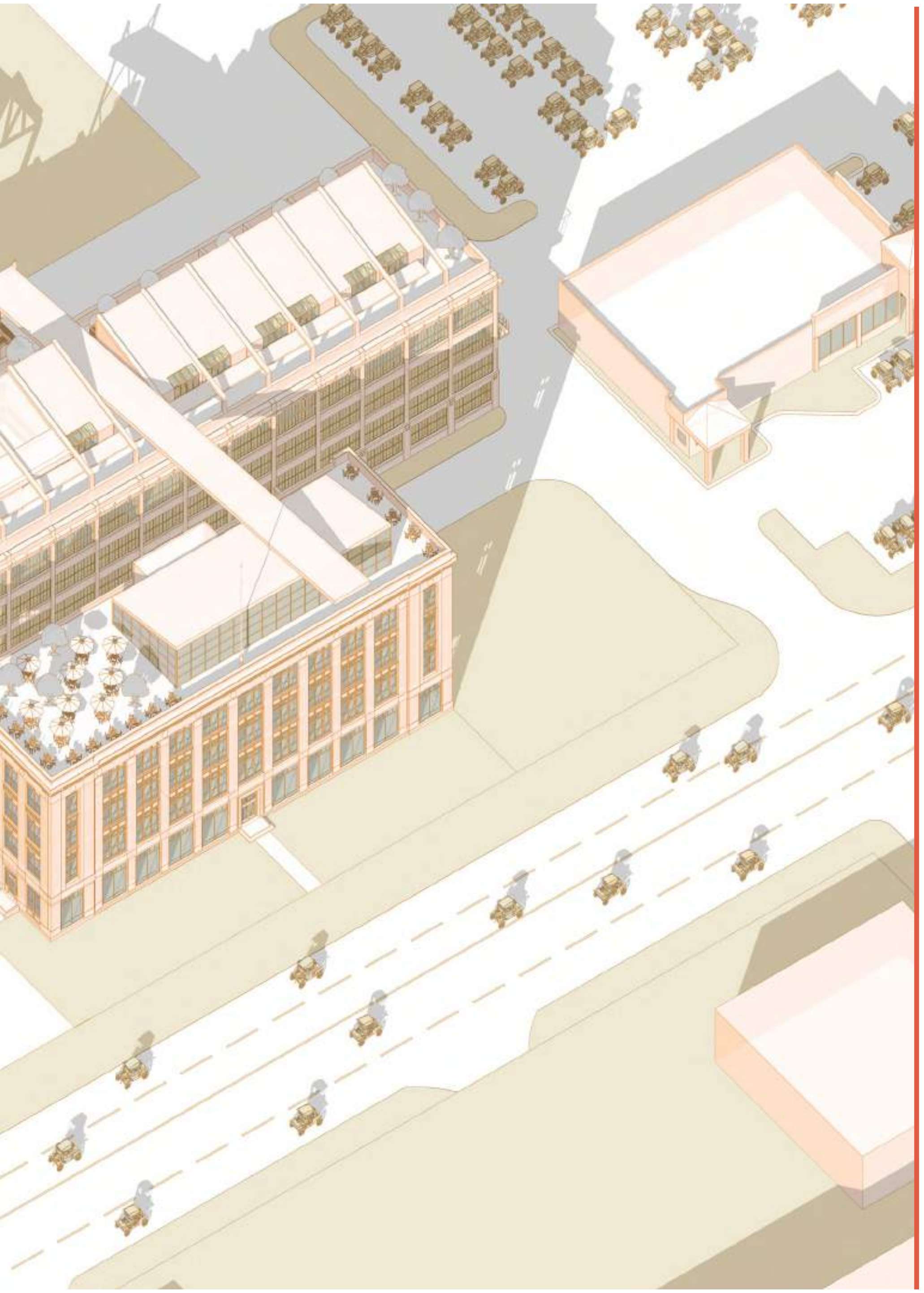
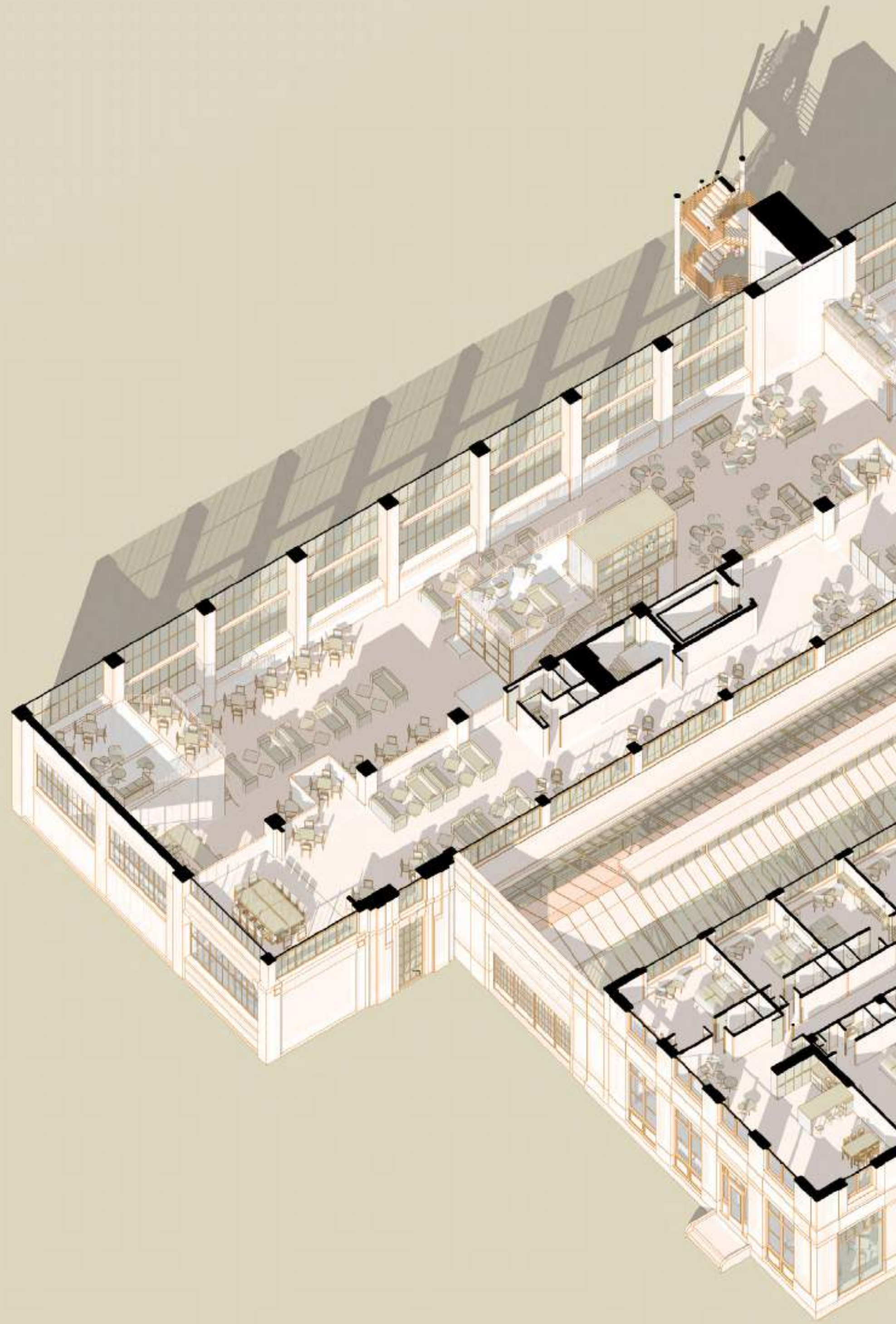
FIG. 7.2.1

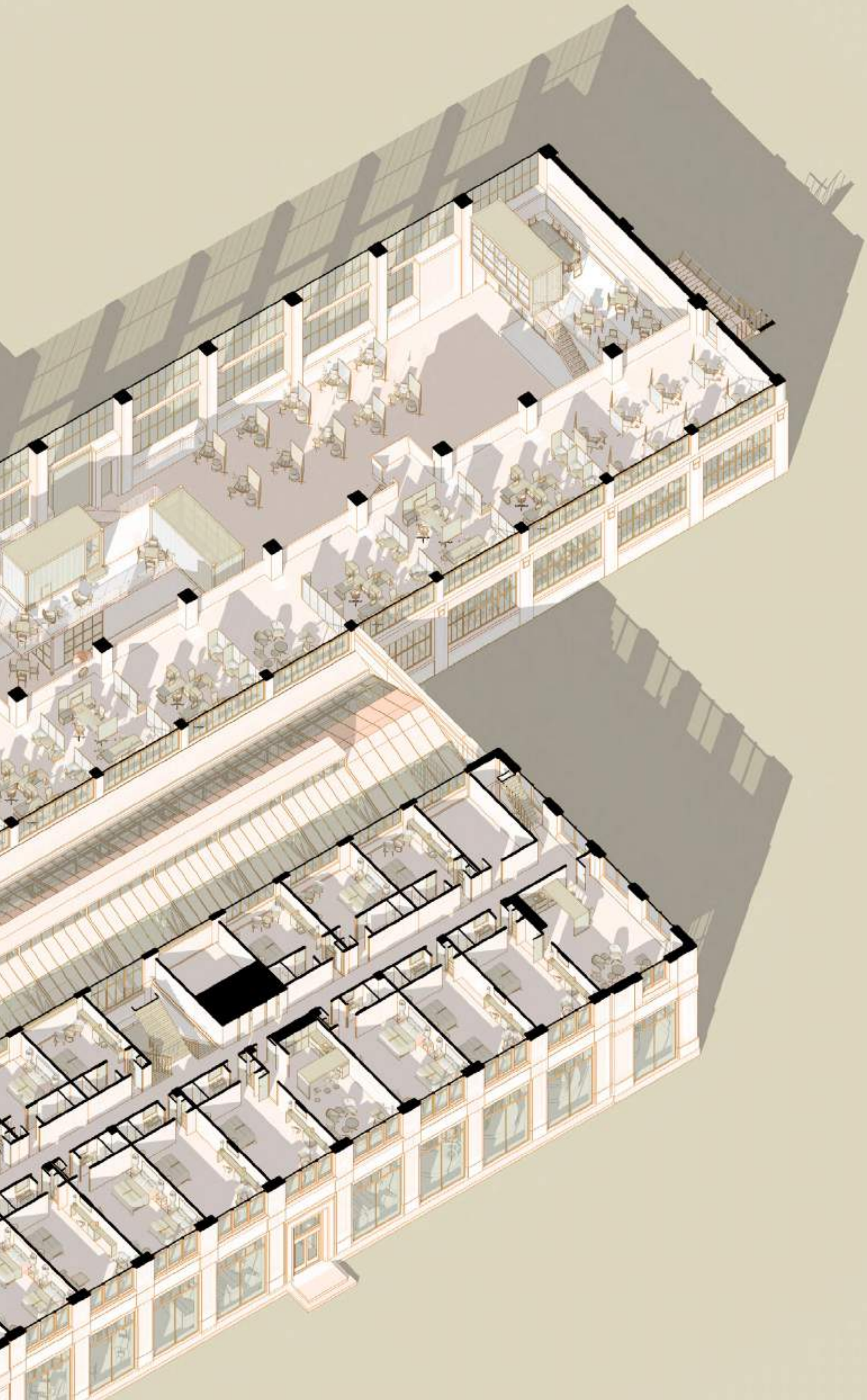
Axonometric View of Buildings AA, NN and OO.



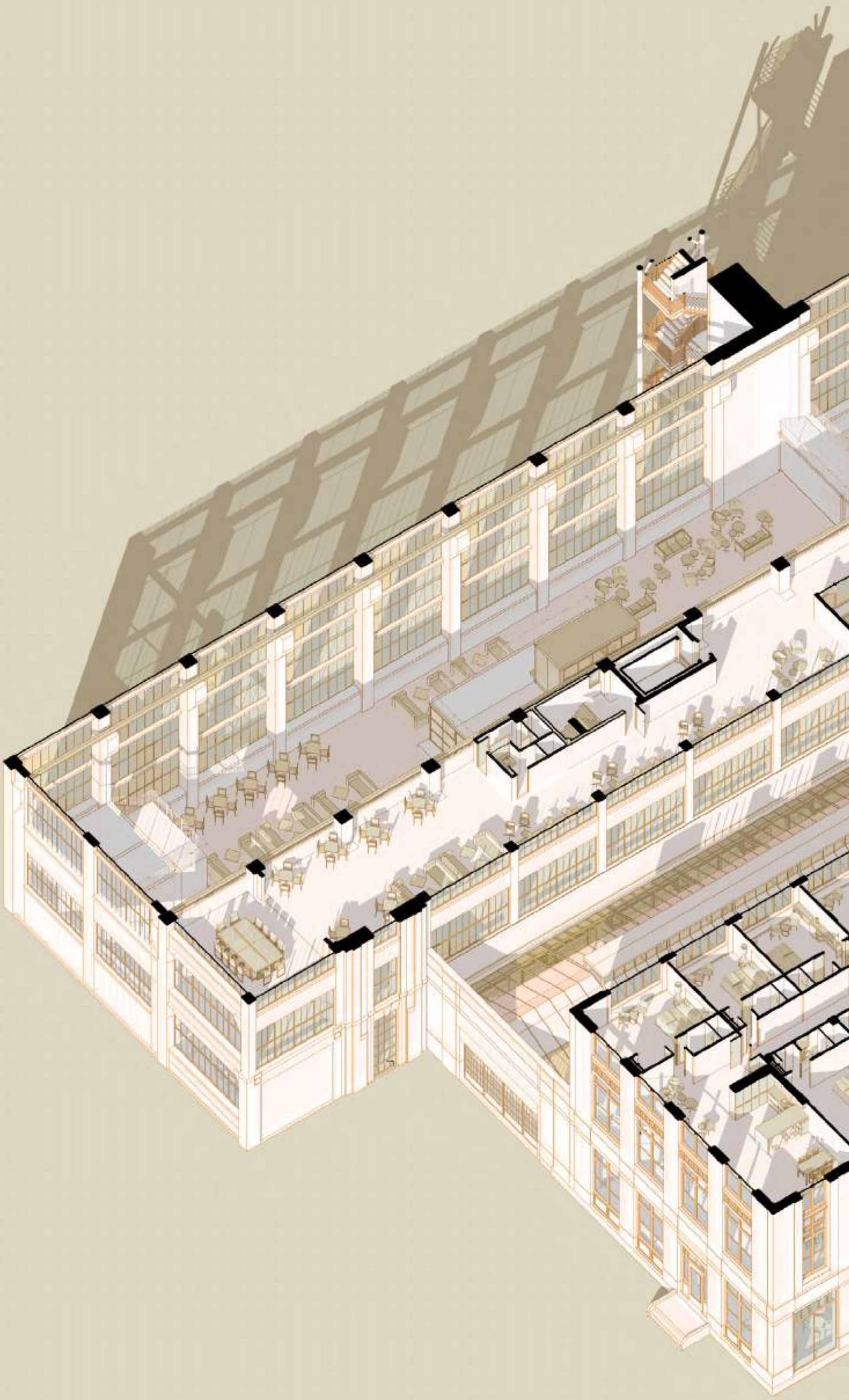


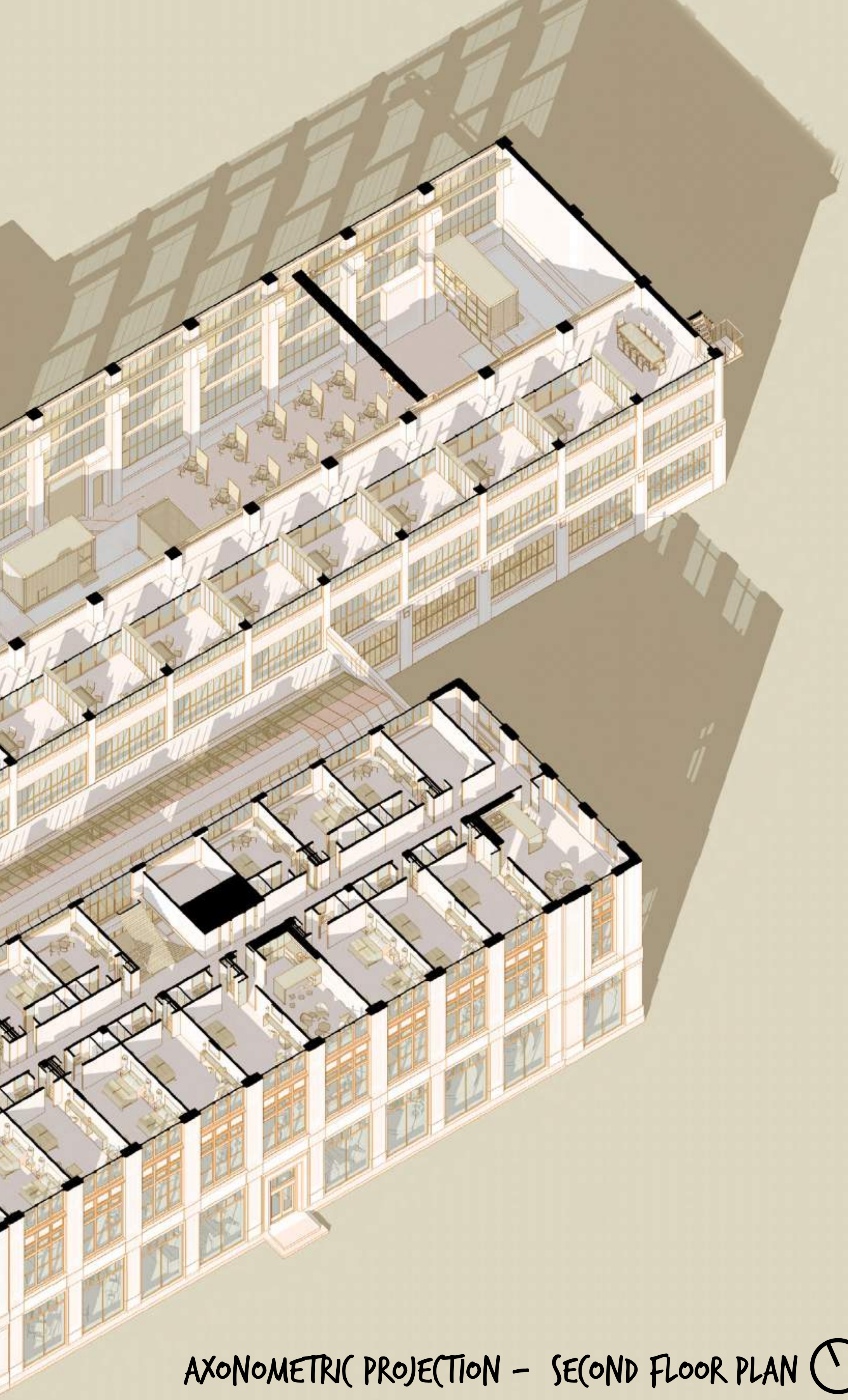
AXONOMETRIC PROJECTION – GROUND FLOOR PLAN

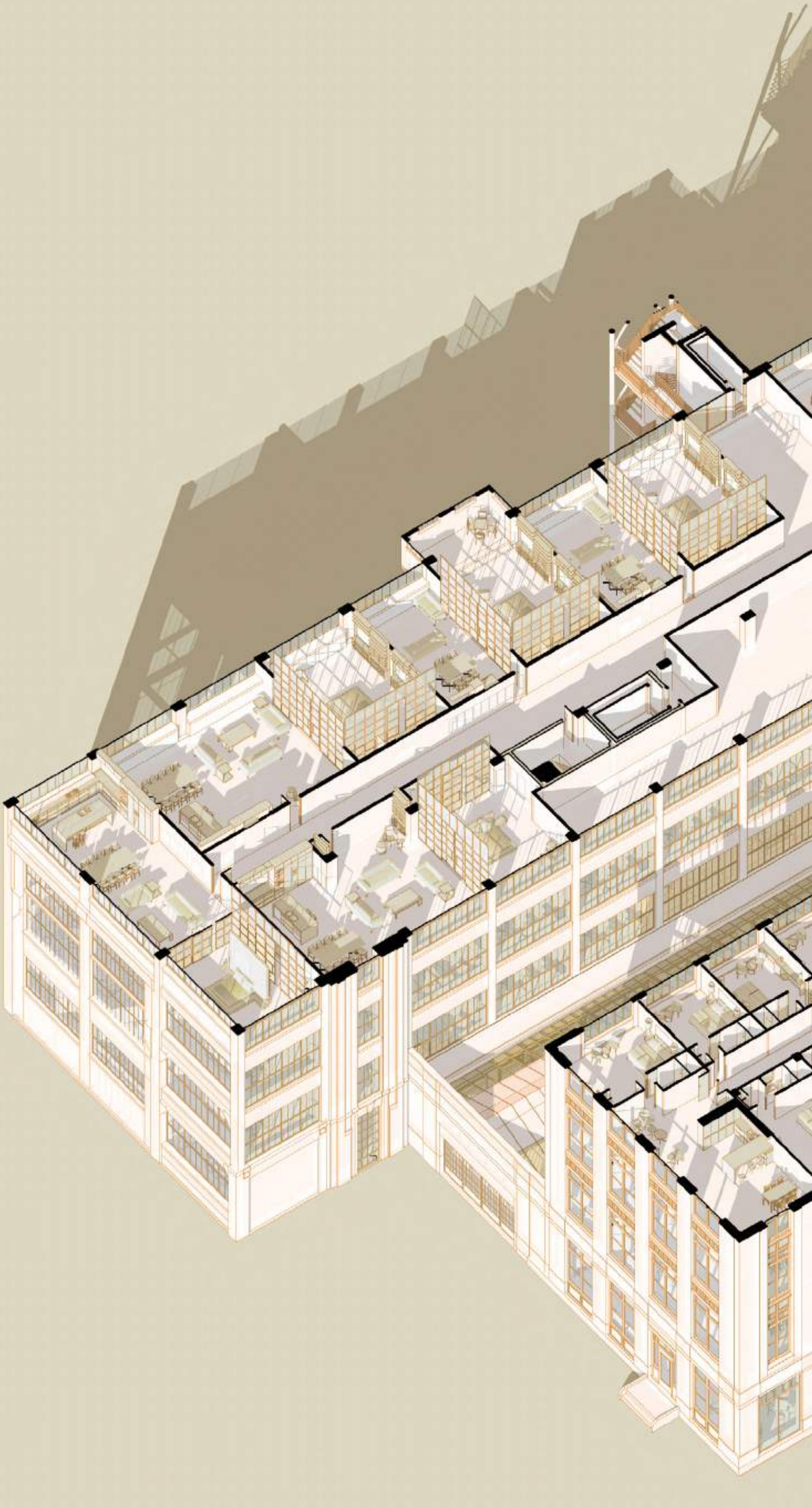


AXONOMETRIC PROJECTION - FIRST FLOOR PLAN

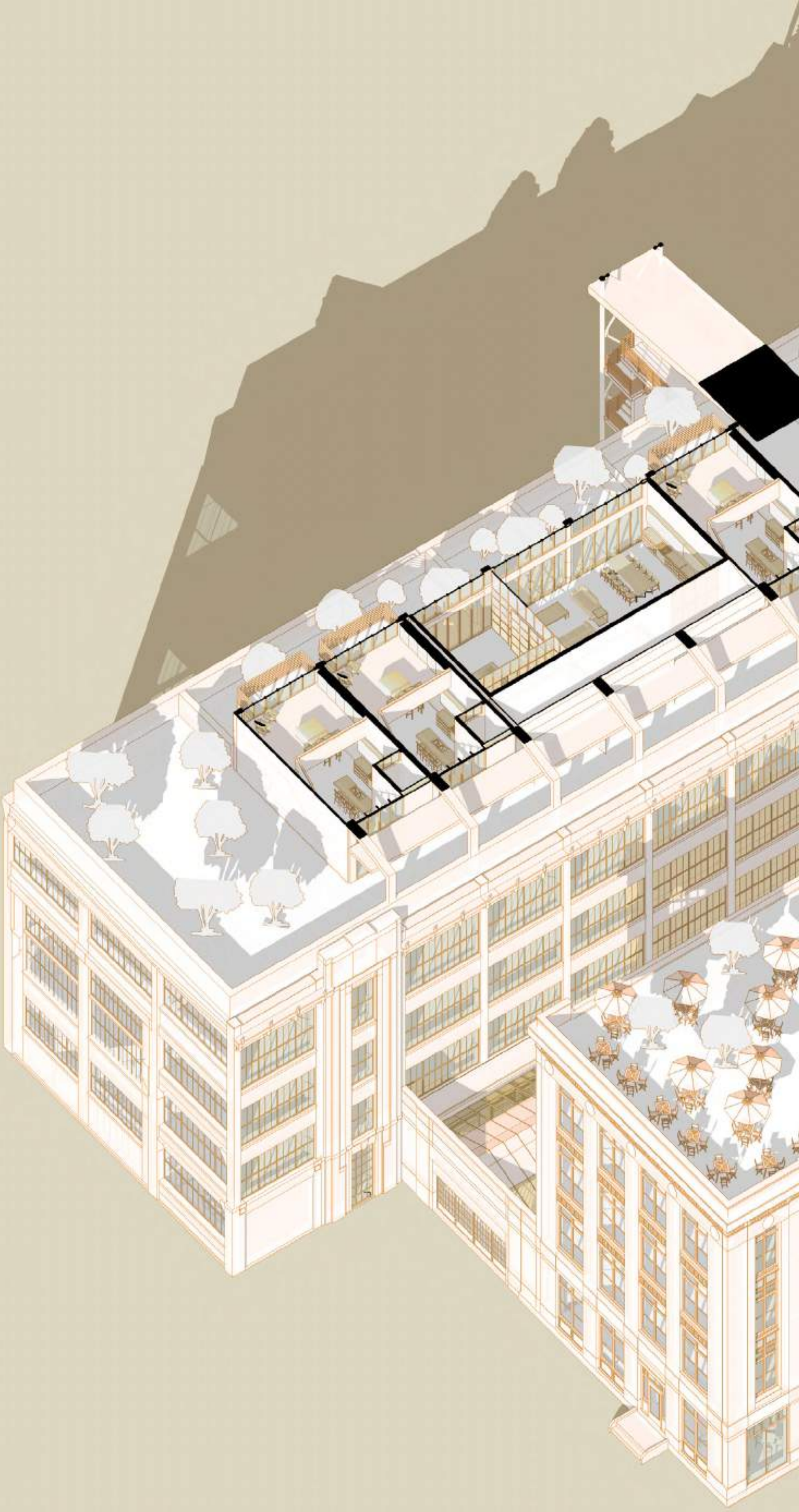


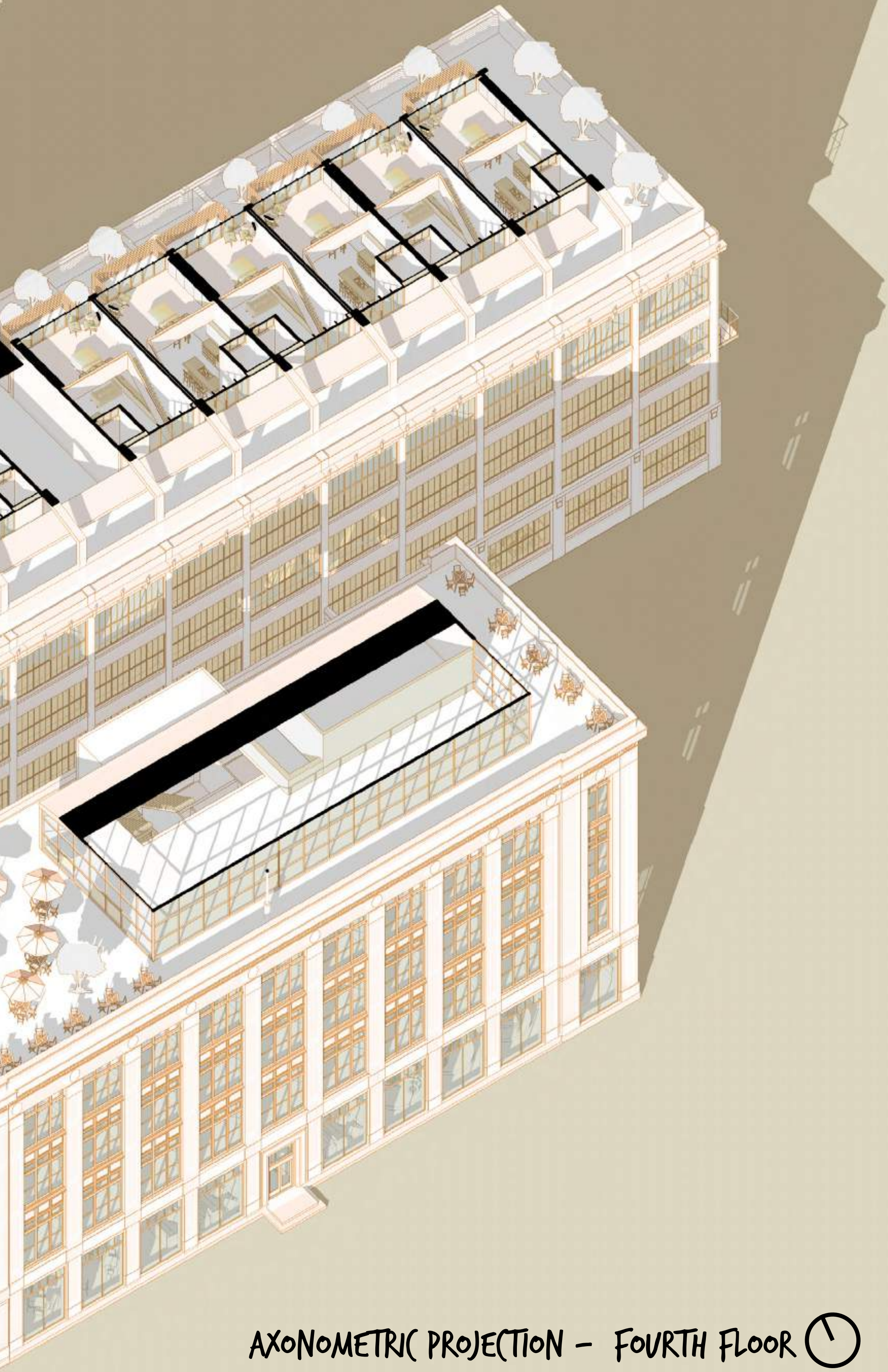


AXONOMETRIC PROJECTION – SECOND FLOOR PLAN



AXONOMETRIC PROJECTION – THIRD FLOOR PLAN





AXONOMETRIC PROJECTION - FOURTH FLOOR

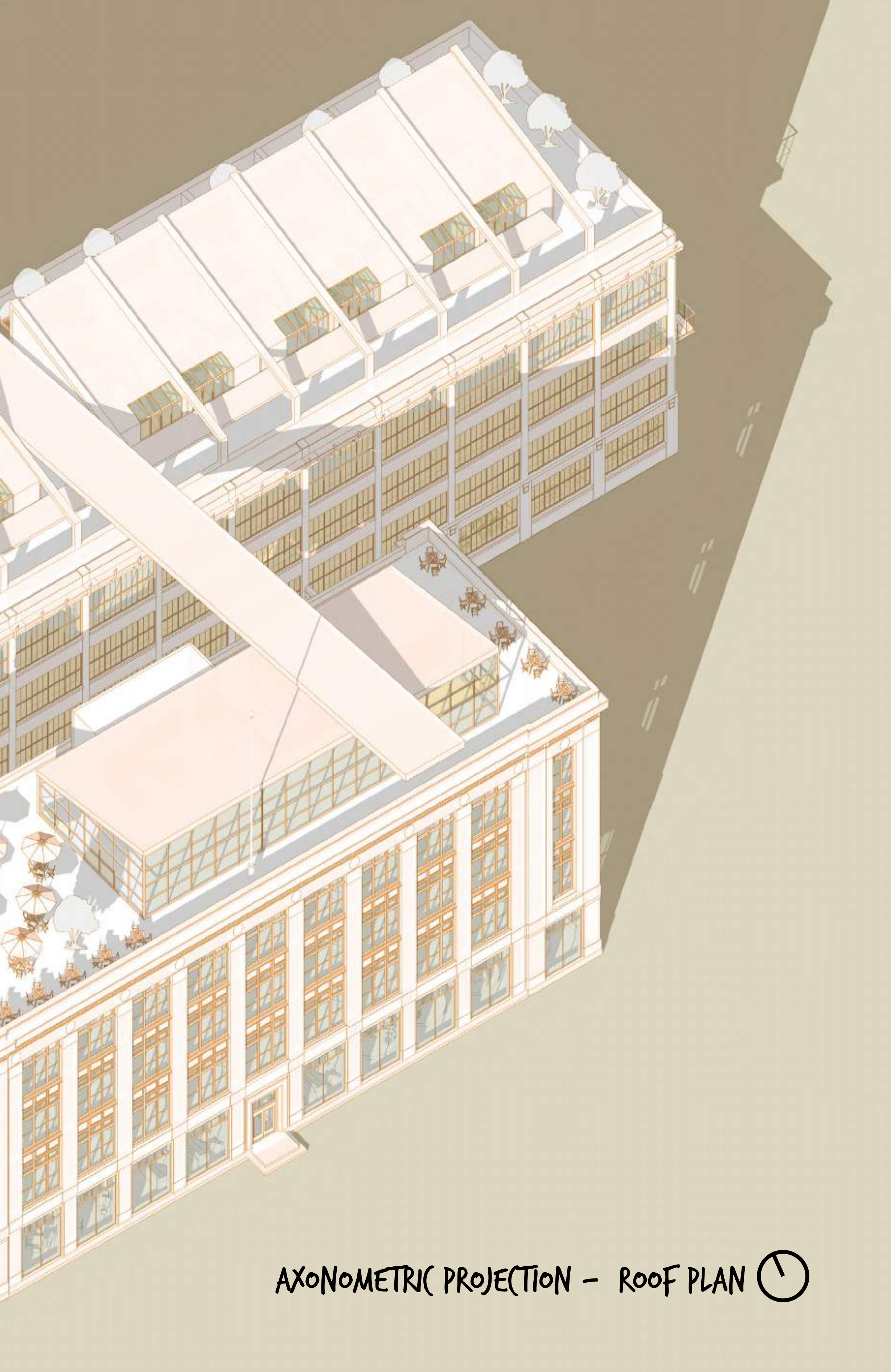
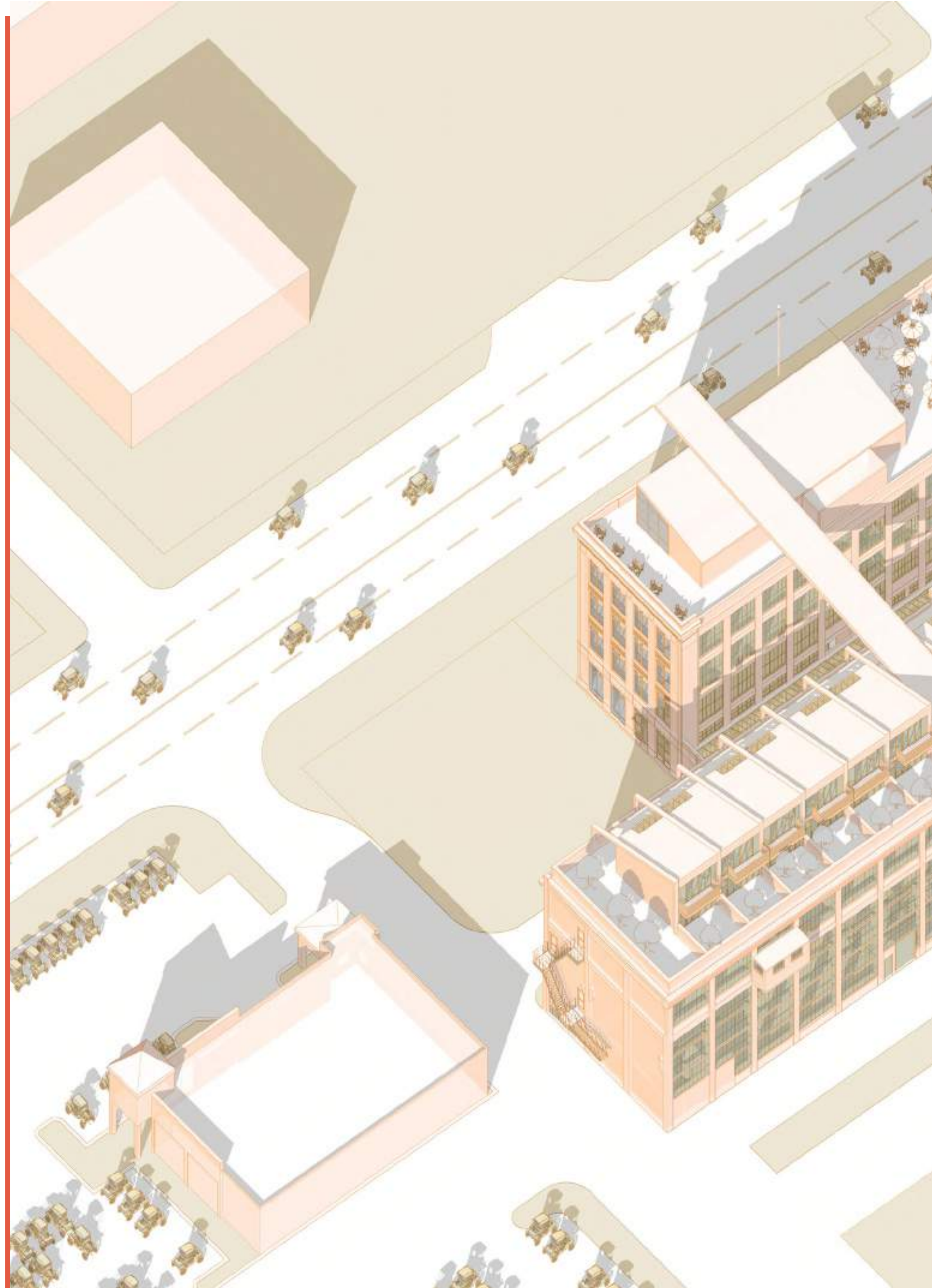


FIG. 7.2.1

Axonometric View of Buildings AA, NN and OO.

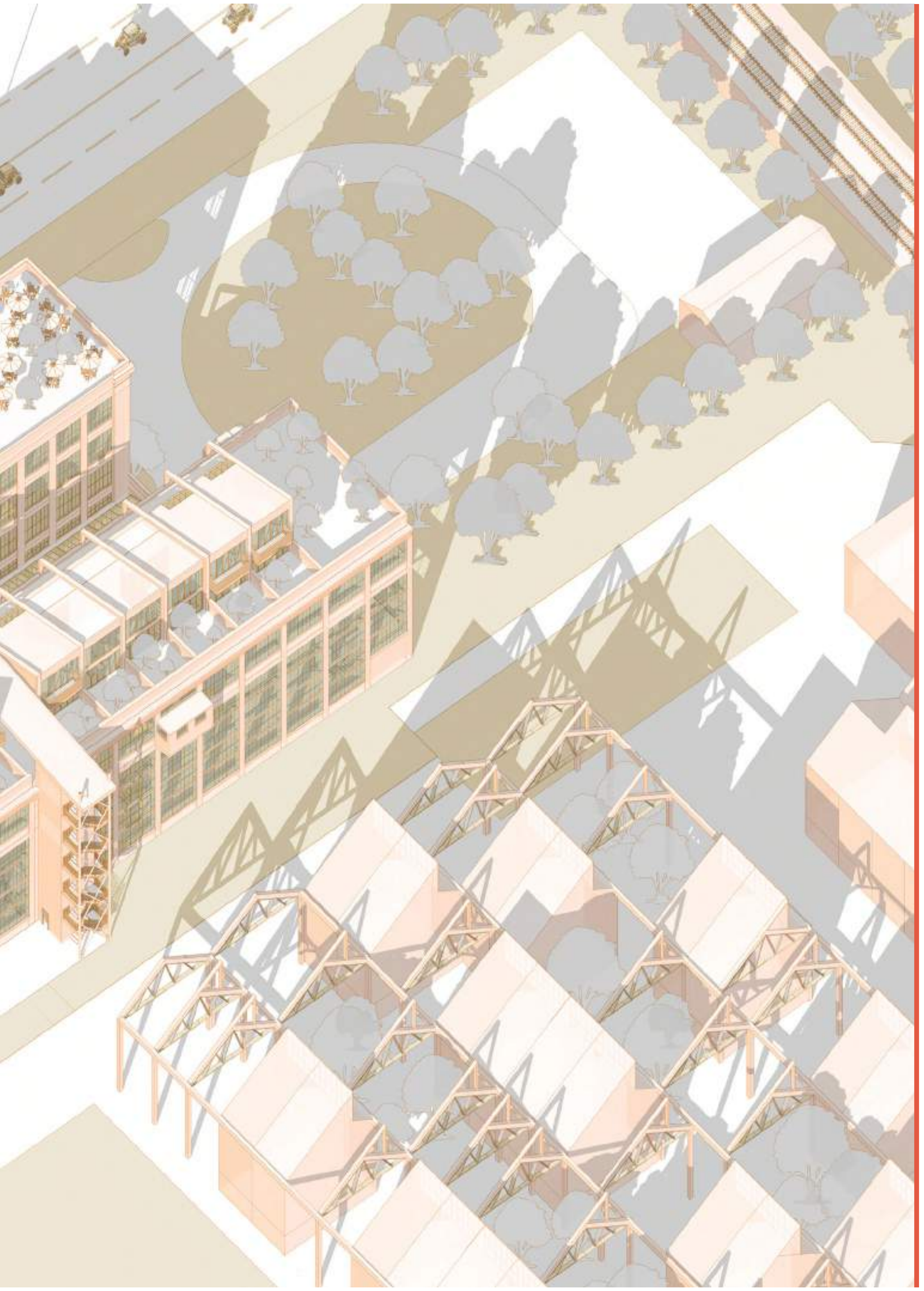


WEST ELEVATION

EAST ELEVATION

SOUTH ELEVATION

NORTH ELEVATION



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