

# Reimagine a Factory



## 3. Analyzes

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<b>BACKGROUND</b>	<b>4</b>
<b>SITE</b>	<b>54</b>
<b>BUILDINGS</b>	<b>74</b>
<b>PORCELAIN</b>	<b>128</b>

# Background

# Background

## Past and present Fredrikstad

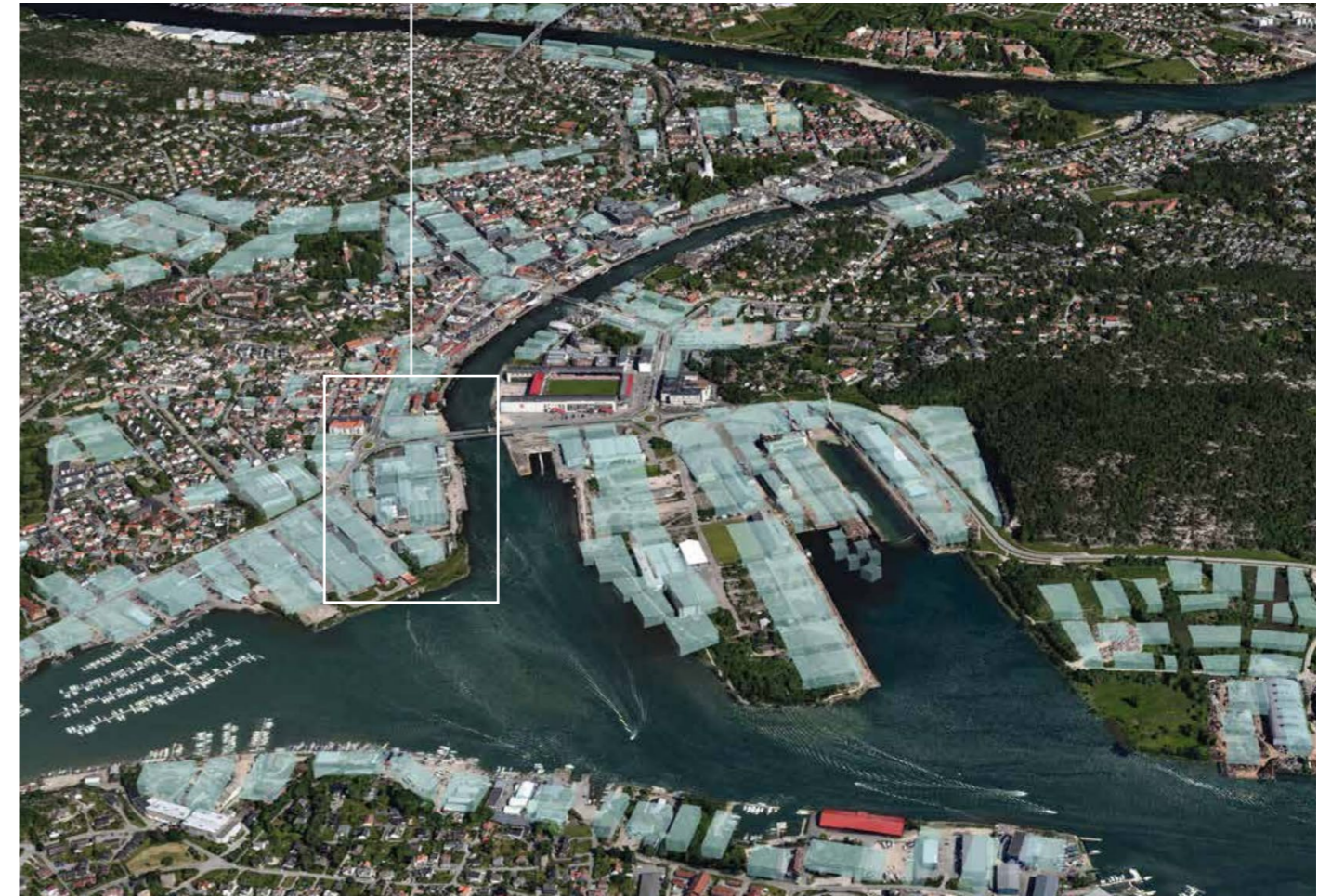
Norsk Teknisk Porselensfabrikk



*Aerial view of Fredrikstad in 1920.  
The site in the south west corner.*

Along the river Glomma, the city was built on sawmills, brickyards and shipyards. Especially after World War I, where most of the goods needed where produced in or around the city. This made Fredrikstad the one of the most important industrial cities in Norway in the early 1900s.

Norsk Teknisk Porselensfabrikk

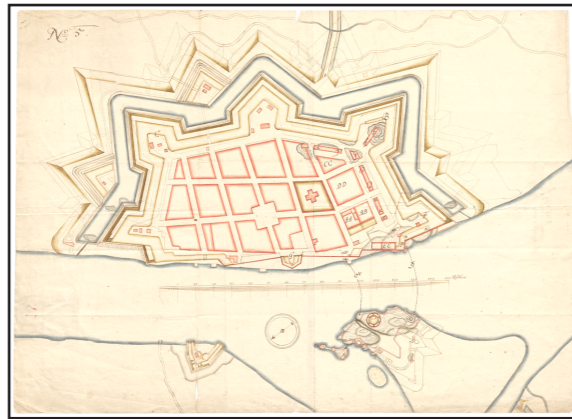


*Densification strategy created by the  
Municipality of Fredrikstad and alt. arkitektur.*

The historical development of the city, going east to west, can be followed along a public river promenade. Today, almost all industry is gone, and have been replaced with housing developments. The volumes marked blue are areas the Municipality plan to densify in the years to come.

# Background

## Historical timeline of Fredrikstad



1567

*Establishment*

Borg (Sarpsborg) burns down, and king Frederik II decides to move the city closer to Glomma's estuary. The bourgeoisie moved and the city privileges were transferred to the new city.

1644

*Fortified town*

Fredrikstad becomes an official fortified town, after a defence point in Bohuslan in Sweden was shut down. It was also the rising times of the military.

1690

*The city fires*

After several city fires, it was decided to move housing to the west side of Glomma. This meant that the fortified city would turn into a fortress with only military present.

1860

*Plankebyen*

A suburban area were decided built closer to the harbour at Gressvik, Trosvikstranda. This is also the start of "plank era". Fredrikstad Mekaniske Verksted is established at Kråkerøy.

1916

*Norsk Teknisk Porselen*

Norsk Teknisk Porselen (NTP) is established. The first building were drawn by Arthur Brynhildsen, and according to the current trends, the building has a functionalistic style.

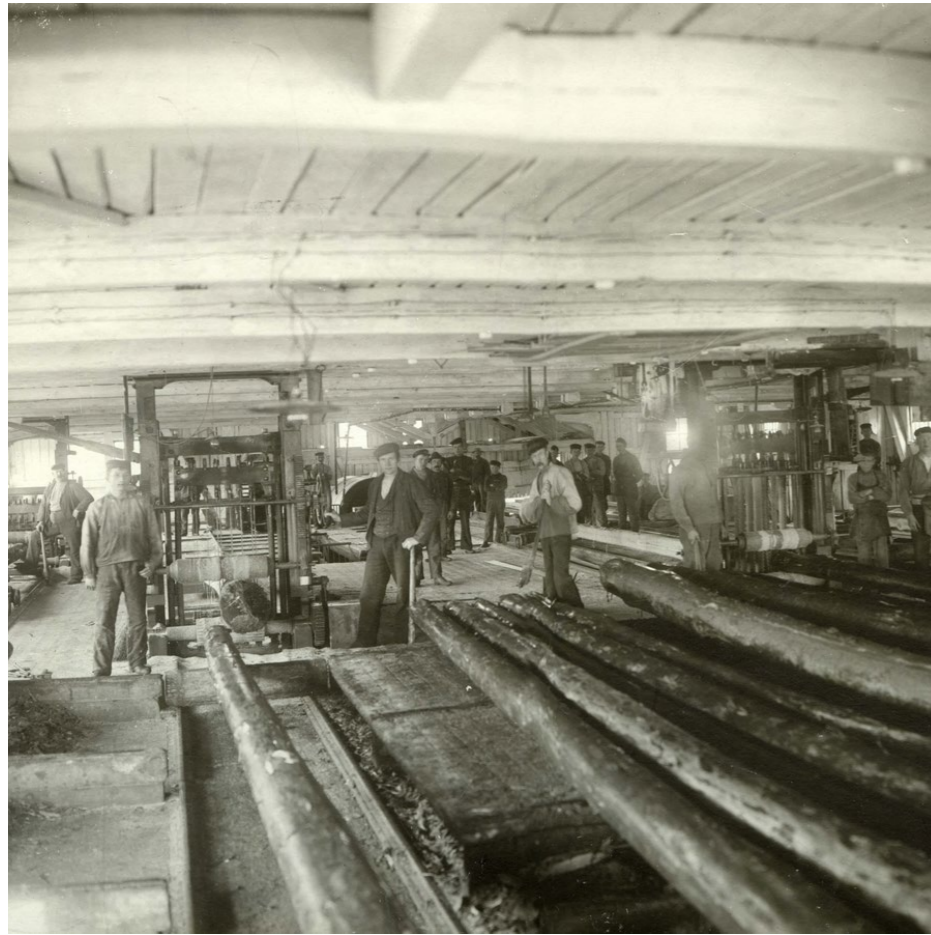
1998

*The closing of the wharf*

Fredrikstad Mekaniske Verksted is officially closed. 7000 workplaces get lost. NTP is still going strong, and getting more clients after the recent development of plastic products.

# Background

## The historical development of Fredrikstad



*Gressvig Brug (1873)*

From saw mills →



*Fredrikstad Mekaniske Verksted (1898)*

to docklands and factories.

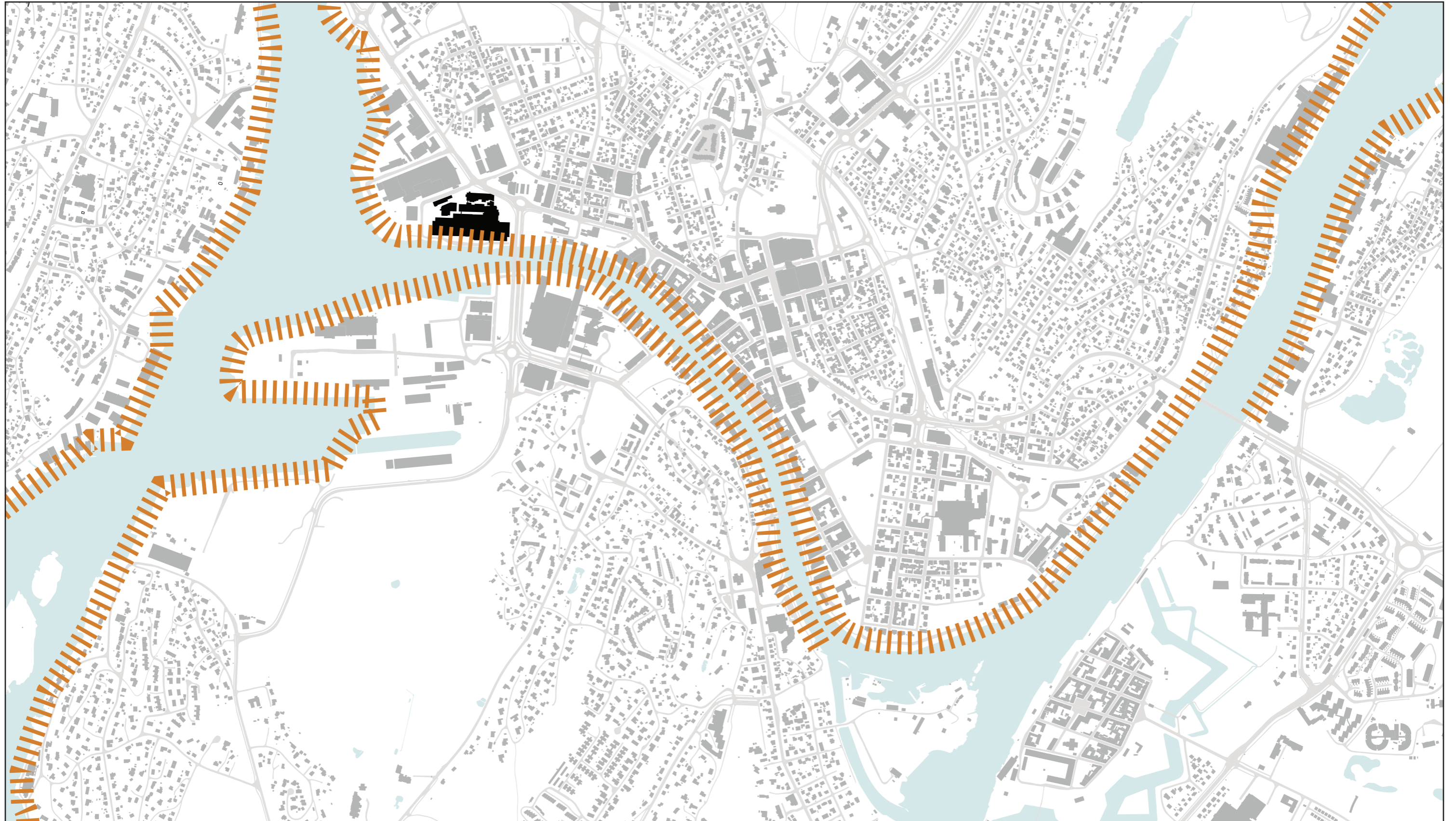


*Norsk Teknisk Porselen (1916)*

# Context and identity

## The industrial belt along the river Glomma early 1900s

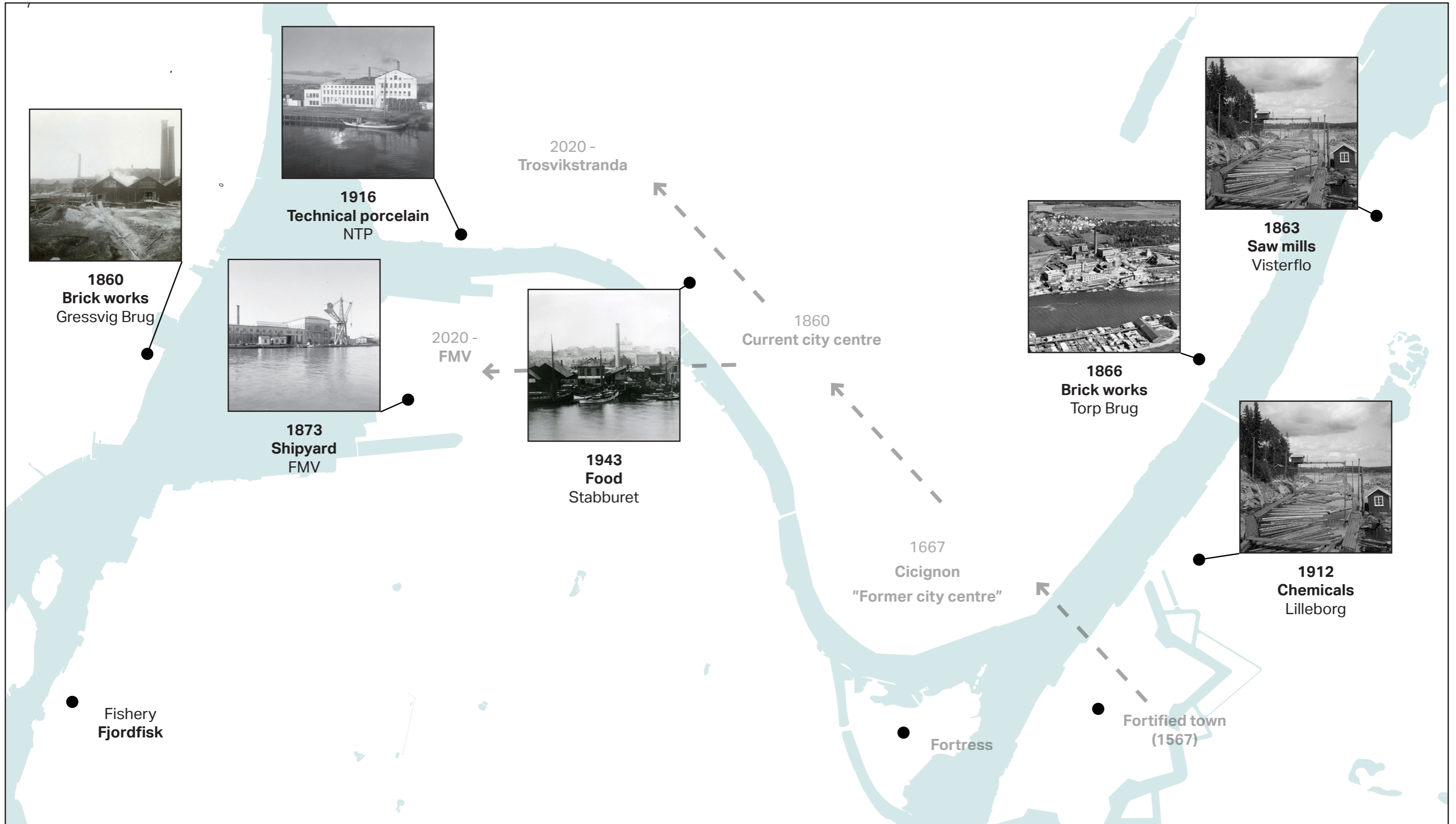
Former industrial establishments ●



# Context and identity

## The river Glomma as the artery through the city

City development pattern ●  
Industrial establishments ●





# Context and identity

## Current industrial establishments

Marine service industry

①

Stene Stål (recycling)

②

Jotne (boat repairs)

③

Vy

④

Unger (soap and chemicals)

⑤

Europriis (warehouse and HQ)

⑥

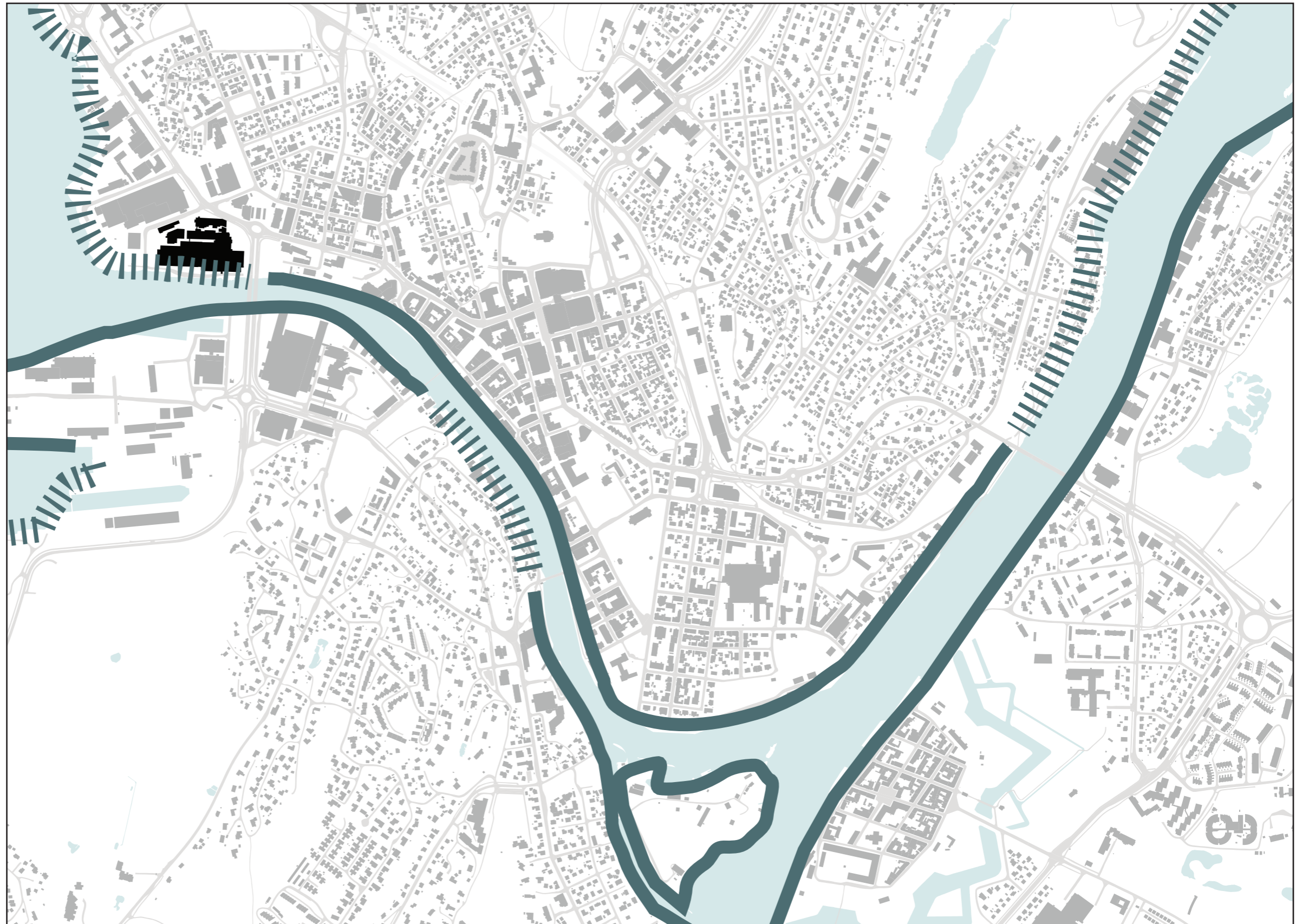


# Context and identity

## Industry replaced by a river promenade

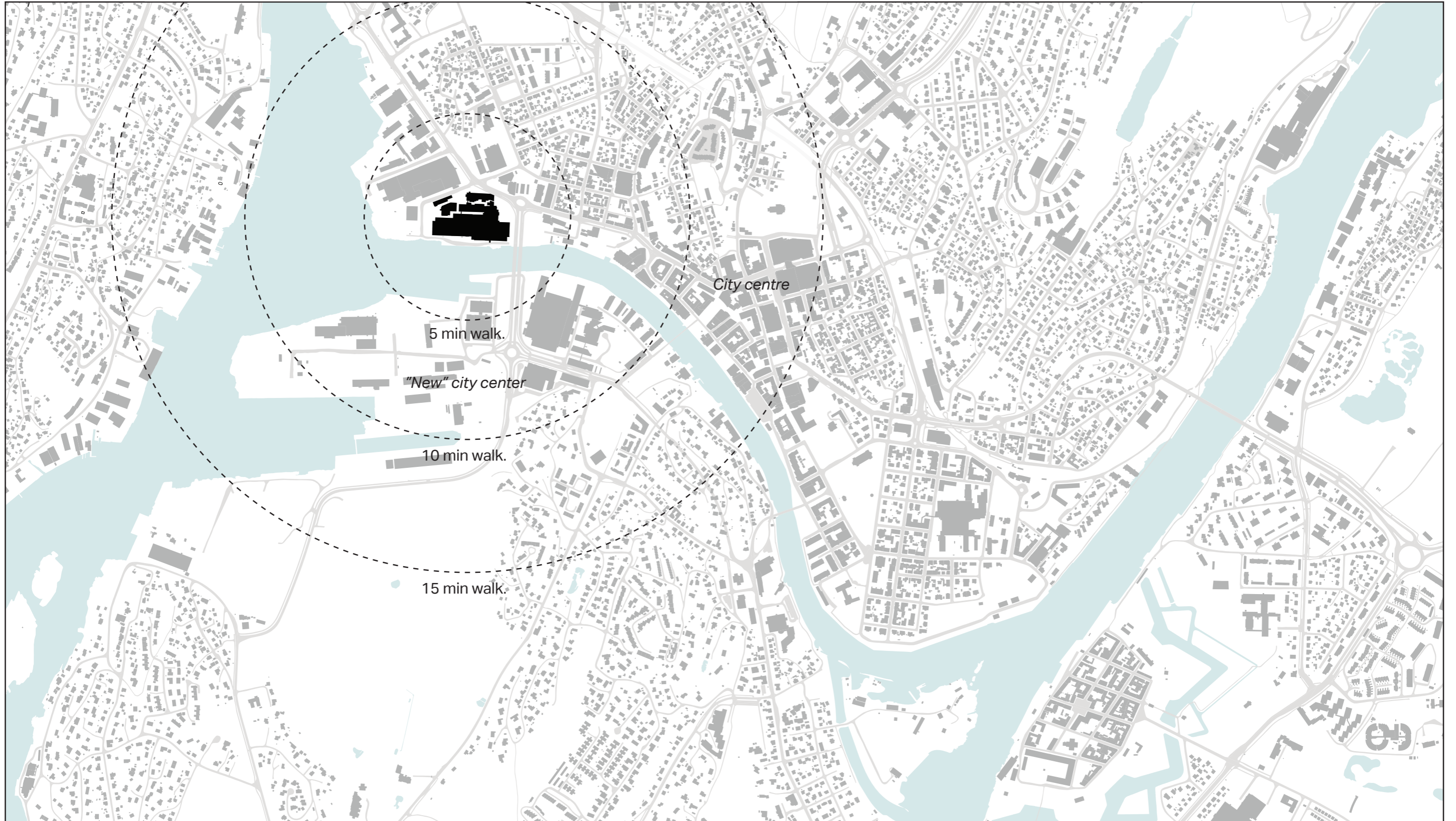
Glomma is the historical premise for the city's existence, and in recent years the river has been strongly active in the city. Glomma divides the town between the west and east sides, Kråkerøy and Gressvik, and Isegran. The industry was previously heavily involved in the "river promenade" from the Øra industrial area via Gressvik, to Sarpsborg.

Accessible river promenade ●  
Unaccessible river promenade ○



The chosen site

# Norsk Teknisk Porselensfabrikk (NTP)



*Indsalget*



*Eneret*  
1061. *J.H. K enholdt, A.S.*

Fredrikstad, Porselansfabrikken

# Background

## Densification strategies from the Municipality



*Densification strategy*  
Fredrikstad 2019 - 2031



*Toolbox for succesful city planning*  
Fredrikstad 2019 - 2031

# Background

## Toolbox for successful densification, according to the Municipality of Fredrikstad

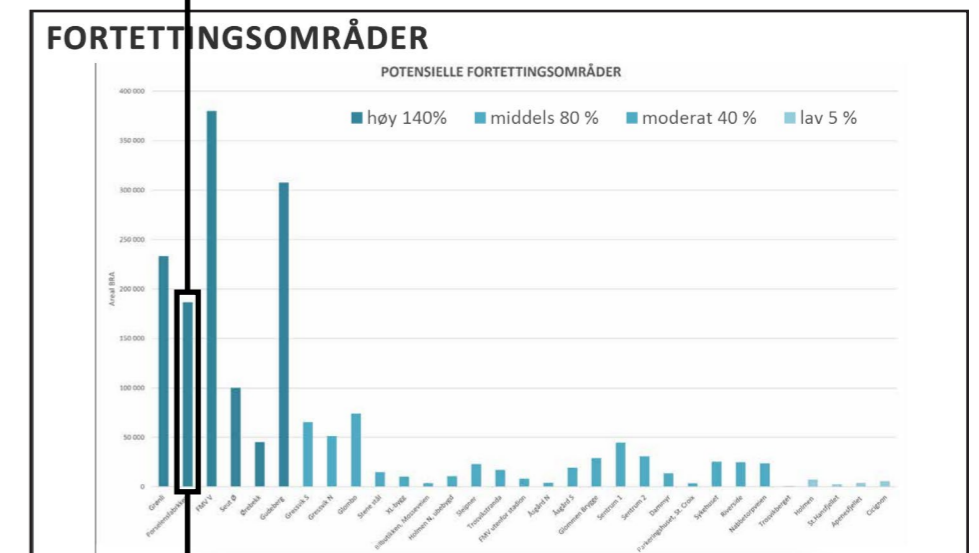
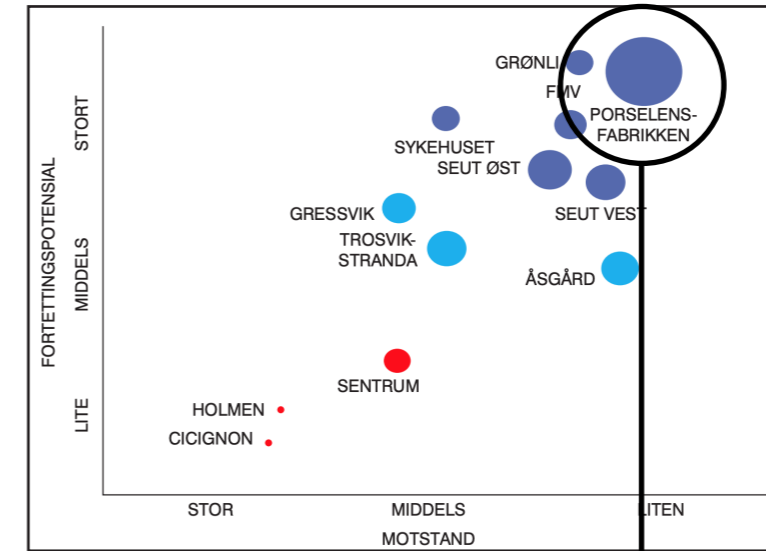
- 1 Take care of nature and outdoor areas - save the "delights" for the new generations.
- 2 Densify existing city - enhance growth from the inside out.
- 3 Prioritize walking, cycling and public transport - create a fine-meshed and cohesive network.
- 4 Create new connections and new urban areas.
- 5 Take advantage of the town's distinctive features - pay attention to protection plans and adapt new development measures.
- 6 Adapt new projects to existing structure - create private plans for more than one building.
- 7 Ensure good living conditions - with good urban spaces and rooms for living.
- 8 Strengthen the city as a framework for city life and create attractive public spaces.
- 9 Contribute to a mix of functions with housing, shopping, culture and leisure.
- 10 Ensure a varied housing offer - several typologies can meet several groups.



*Toolbox for succesful city planning  
Fredrikstad 2019 - 2031*

# Background

## Critique of the toolbox



NTP site with a 140% possible densification rate. (Source: alt. arkitektur)

### Comment

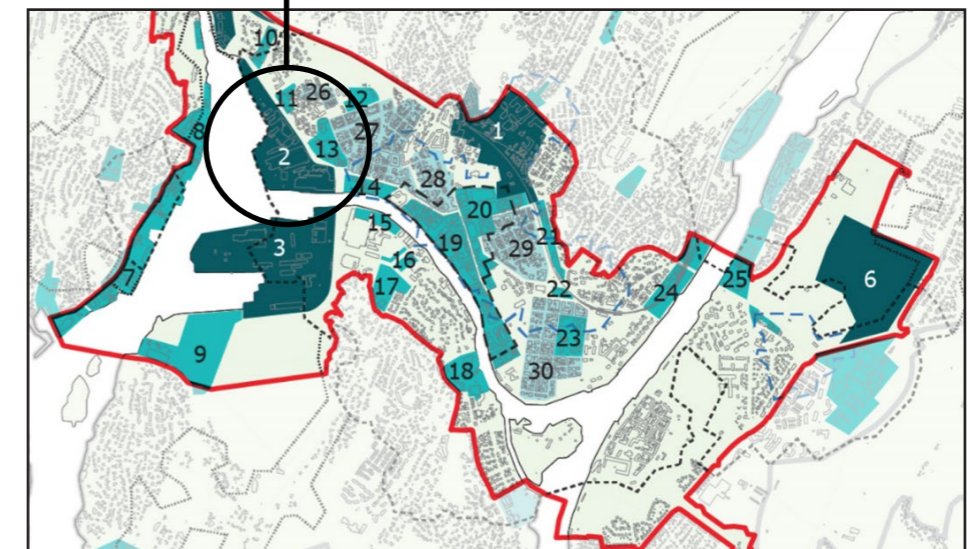
**That's why you want to densify the site of Porselensfabrikken with 140%?**

- 5 Take advantage of the town's distinctive features - pay attention to protection plans and adapt new development measures.

### Comment

**What about workplaces like factories or production facilities? Not in the city centre?**

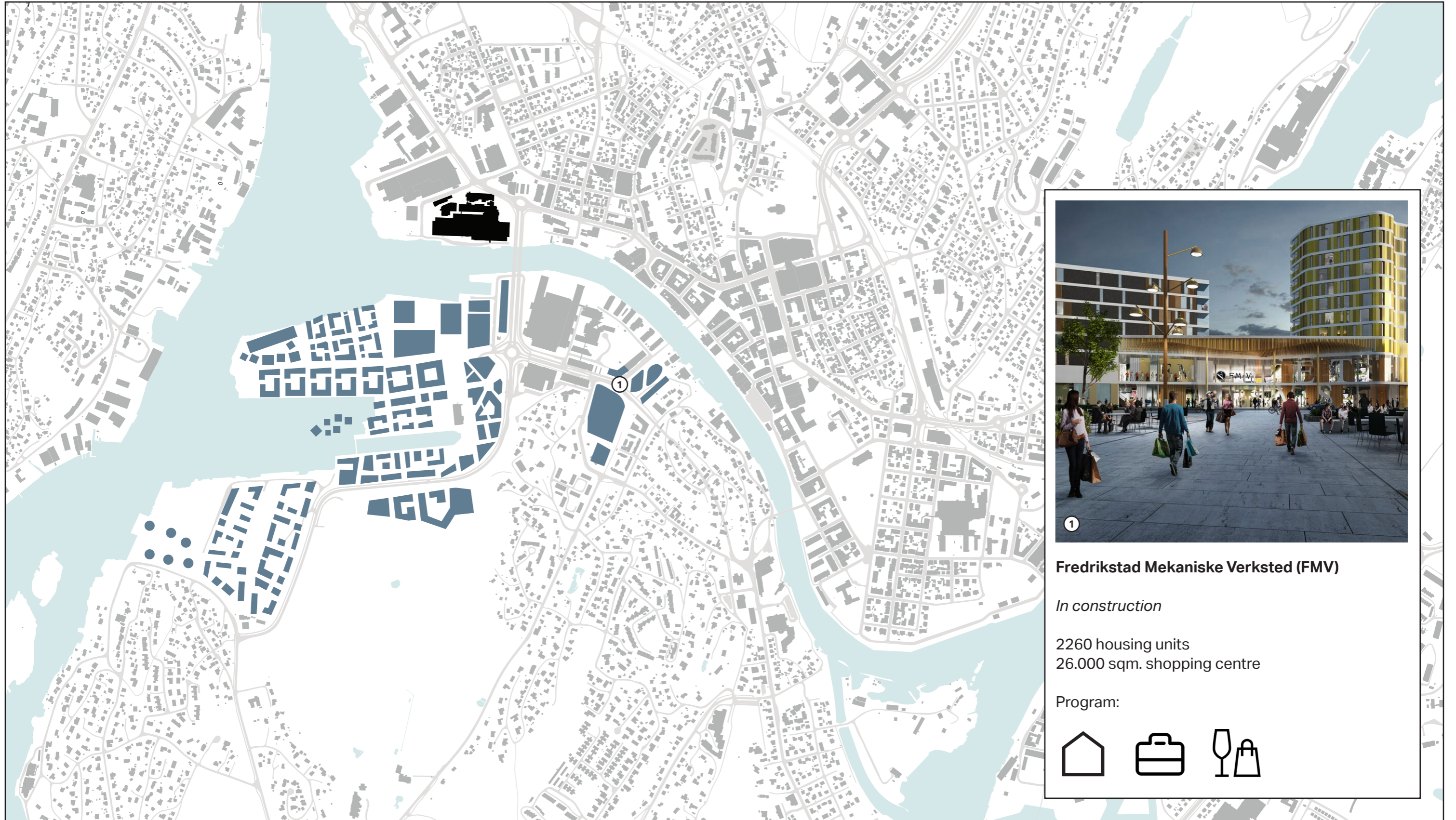
- 9 Contribute to a mix of functions with housing, shopping, culture and leisure.



The sites coloured blue are marked as the areas where it is suitable for densification in the future. All of them former industrial sites.

Future context

# Current city densification plans



1

**Fredrikstad Mekaniske Verksted (FMV)**

*In construction*

2260 housing units  
26.000 sqm. shopping centre

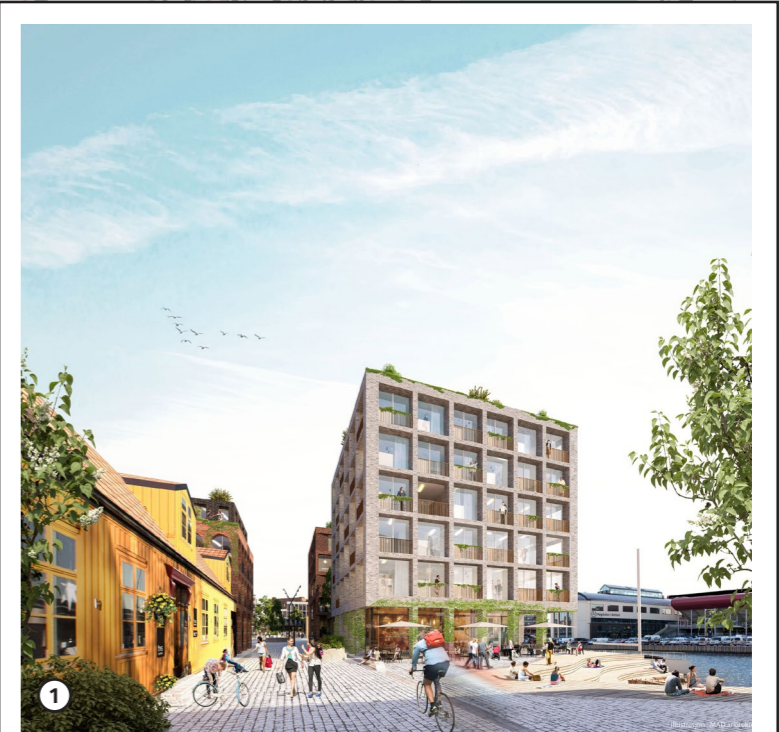
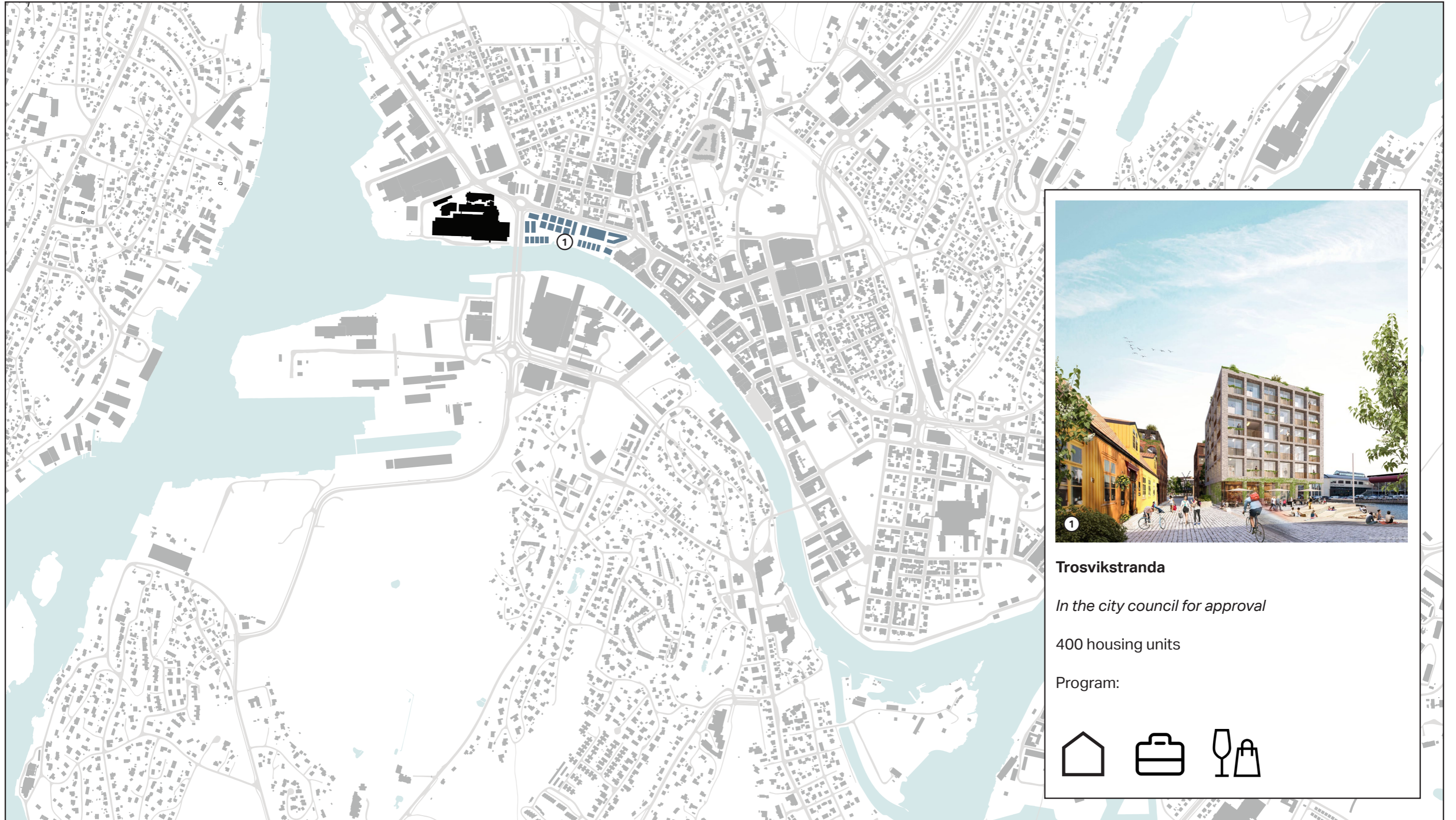
Program:





Future context

# Current city densification plans



### Trosvikstranda

*In the city council for approval*

400 housing units

Program:

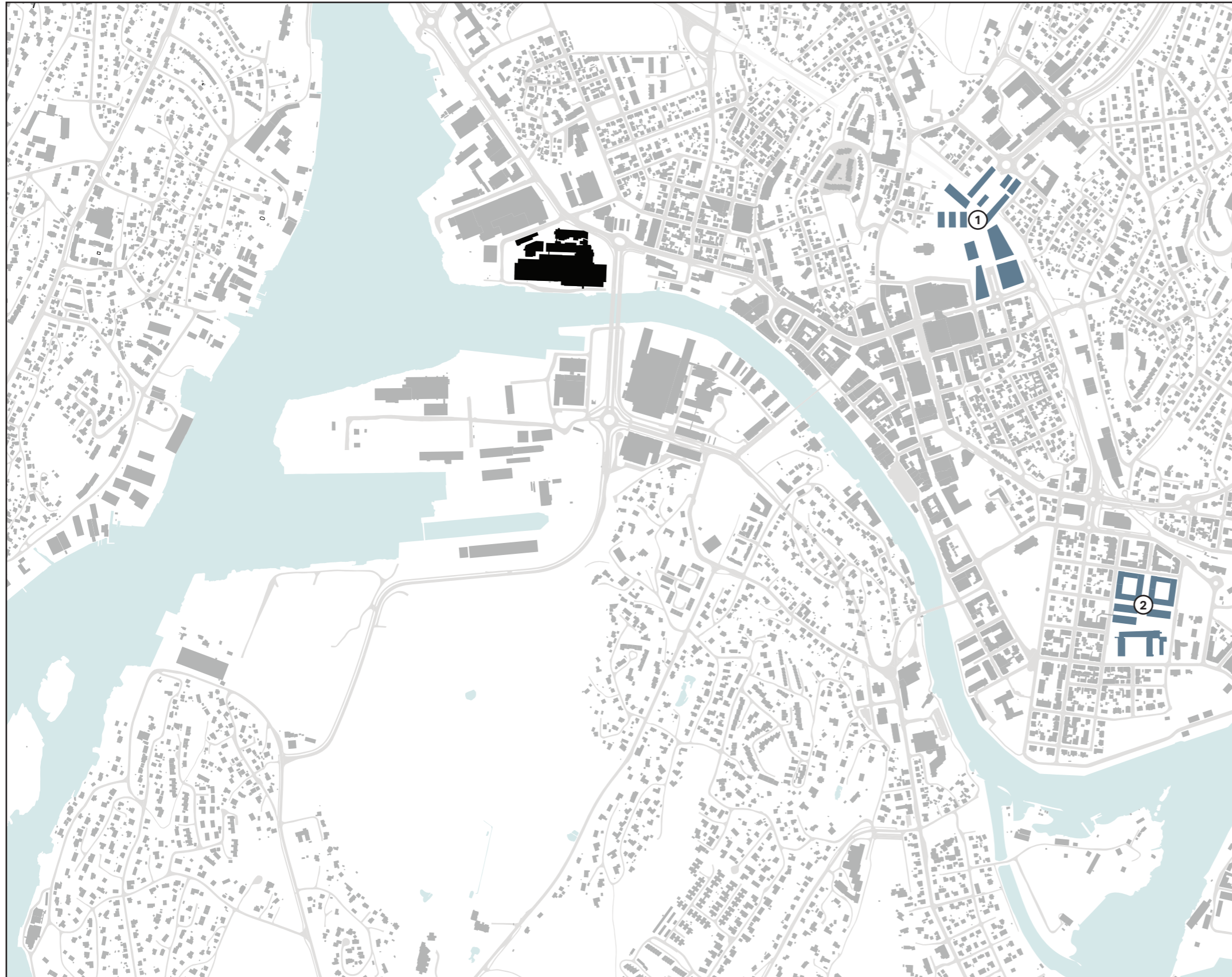




Illustration of Trosvikstranda and NTP highlighted.  
Reproduced by permission from MAD Arkitekter.

# Future context

## Current city densification plans



**Grønli - new public transport hub**

*In planning*

600 housing units

Program:



**Former hospital site**

*In planning*

1000 housing units

Program:



Future context

## Possible future densification plans at the Porselensfabrikken site



# Values

## Value registration

### 1) The program as an industrial value

The industrial facilities are large and significant elements in the cityscape, and they represent an important part of the city's history. An important factor is that this factory is the only operating in the city centre, as the only trace of the industrialized city of Fredrikstad.

### 2) Facade as a historical and an identity value

The NTP façade facing the river has a very characteristic silhouette and serves as a landmark in the area. The area is part of a business history that can be placed in a larger context at the local and regional level, which indicates that the industrial area has played a central role in Fredrikstad's urban development.

### 3) The plot as an economical and market value

As the city of Fredrikstad expanding, both towards Værste and Trosvikstranda, the plot is getting more attractive. The plot is attractive, and is expected to have a high market value. Important to keep as a factory.

### 4) Political value

With the development of the area of Trosvikstranda, there is a heated discussion of the neighbouring plots. In fact, none of the tenants in the area wants to leave. Every time a new urban development concept is published, there is a new discussion on whether the city is only for housing and no industry.

#### Right:

Current regulation document. Riksantikvaren propose to expand the cultural heritage area towards Gressvik, because of its central part of the industrialization. In my opinion, it then also needed to preserve NTP as the only existing evidence of this industrialization.



### NB!-registeret - Revisjon

#### Høringsnotat

Dato: 28.05 2020 vfh/sab

### Kulturmiljø: K251 Fredrikstad FMV

#### Tema:

Forslag til endring av kulturmiljøets avgrensning

#### Begrunnelse:

Kulturmiljøet er ment å fortelle historien om Fredrikstads Mekaniske Verksted. Innenfor dagens avgrensning inngår administrasjonsbygninger og verksteder mot Vesterelva.

Kulturmiljøet foreslås utvidet ettersom området mot Gressvik er en sentral del av den industrihistorien som danner grunnlag for oppføring i NB!-registeret. Innenfor foreslått utvidelse (Fig. 1) finnes der blant annet maskinhaller, dokk og kraner. Innenfor utvidelsen finnes der planer for omdannelse og videre utvikling. I den forbindelse vil Riksantikvaren med utvidelsen signalisere at de industrielle strukturene bør inngå som ressurs i kulturmiljøets videre utvikling.

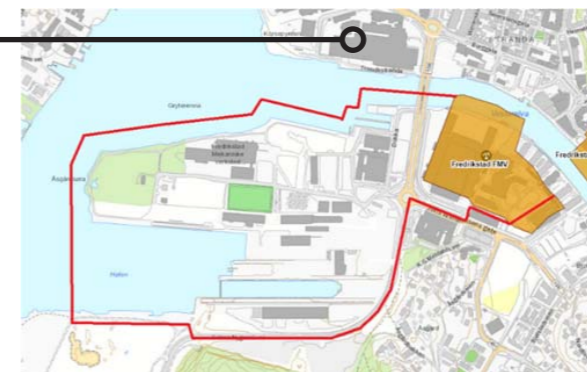


Fig. 1 - Tidligere avgrensning i oransje/brun farge. Den foreslåtte nye avgrensningen er vist i rød farge.

# Values

## Current regulation statuses

"Kulturmiljø"



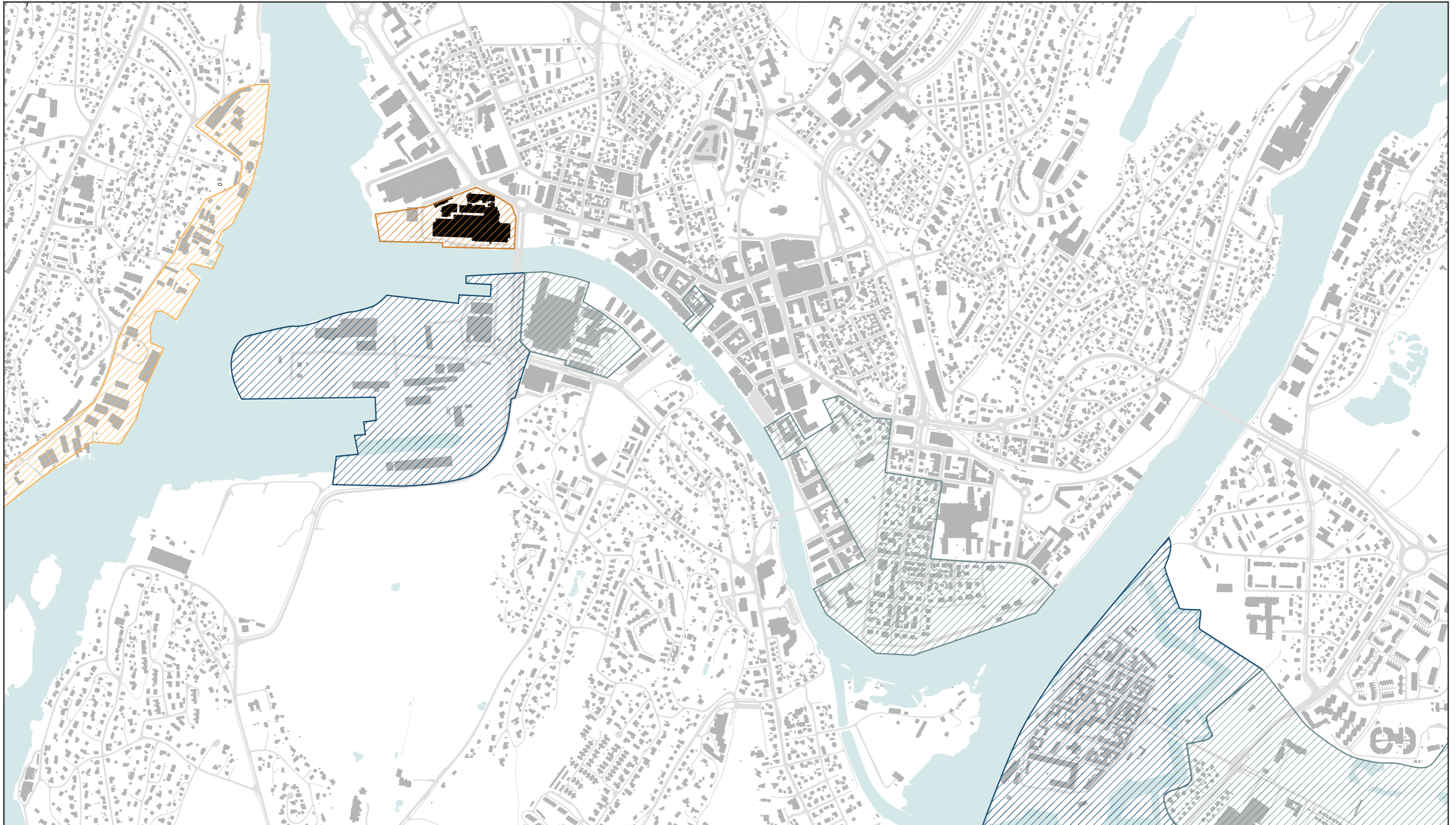
Proposed expanding



Current regulation



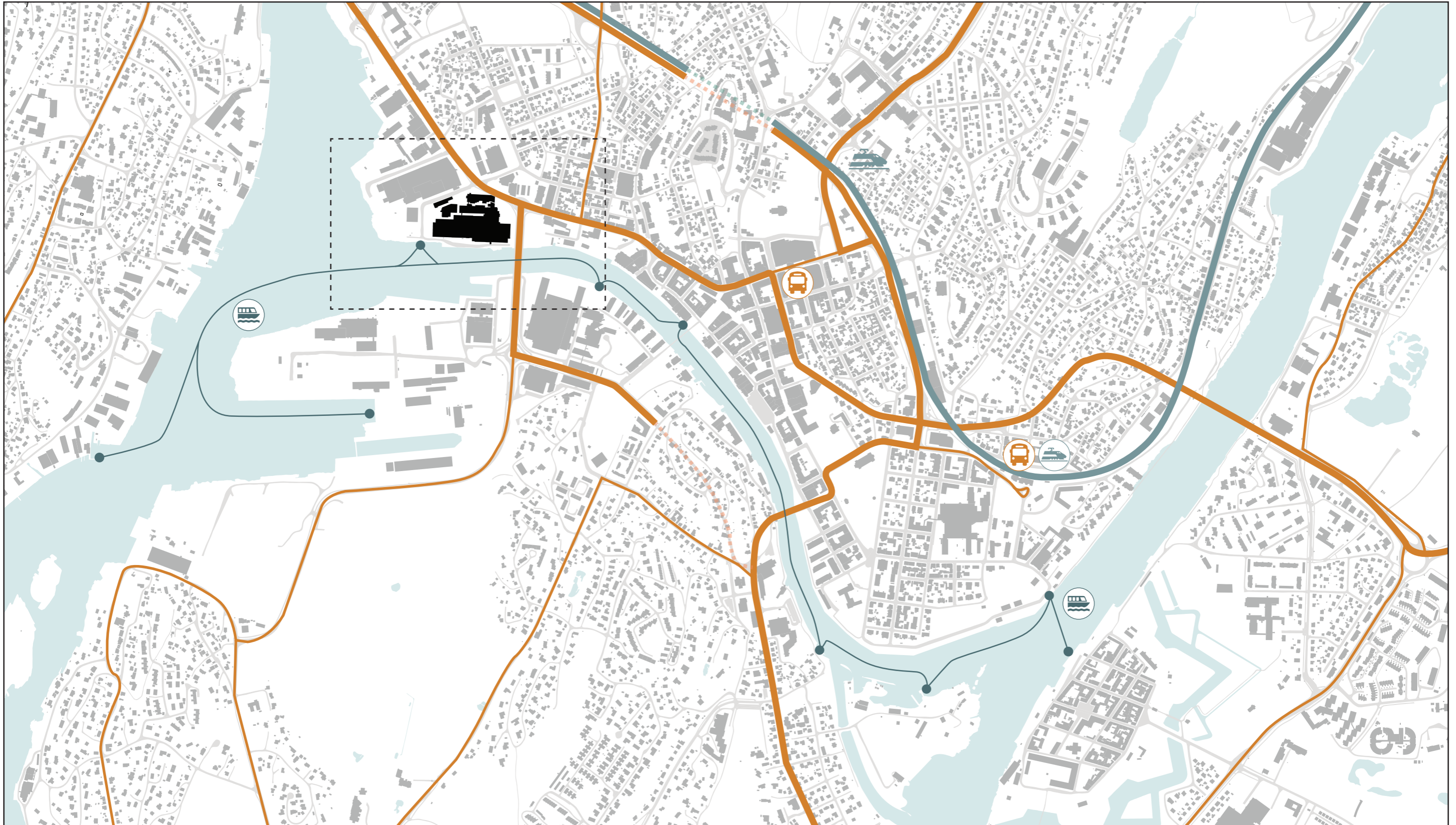
My proposed expanding



# Context

## Infrastructures of the city

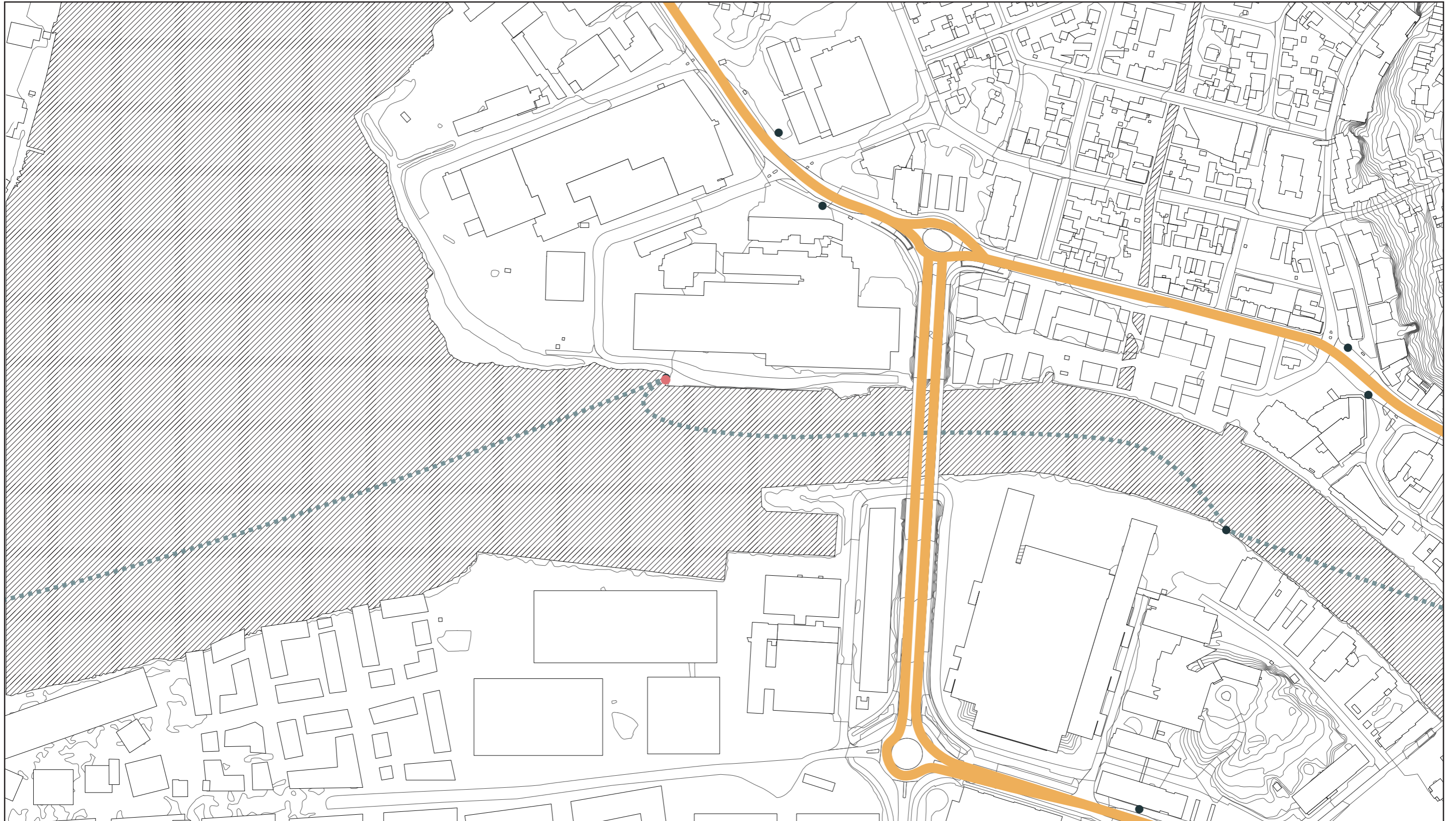
- Ferry ●
- Train ●
- Buses ●



# Context

## Infrastructures of Trosvikstranda

- Possible new ferry stop ●
- Ferry route ○
- Main road network ●
- Public transport stop ●





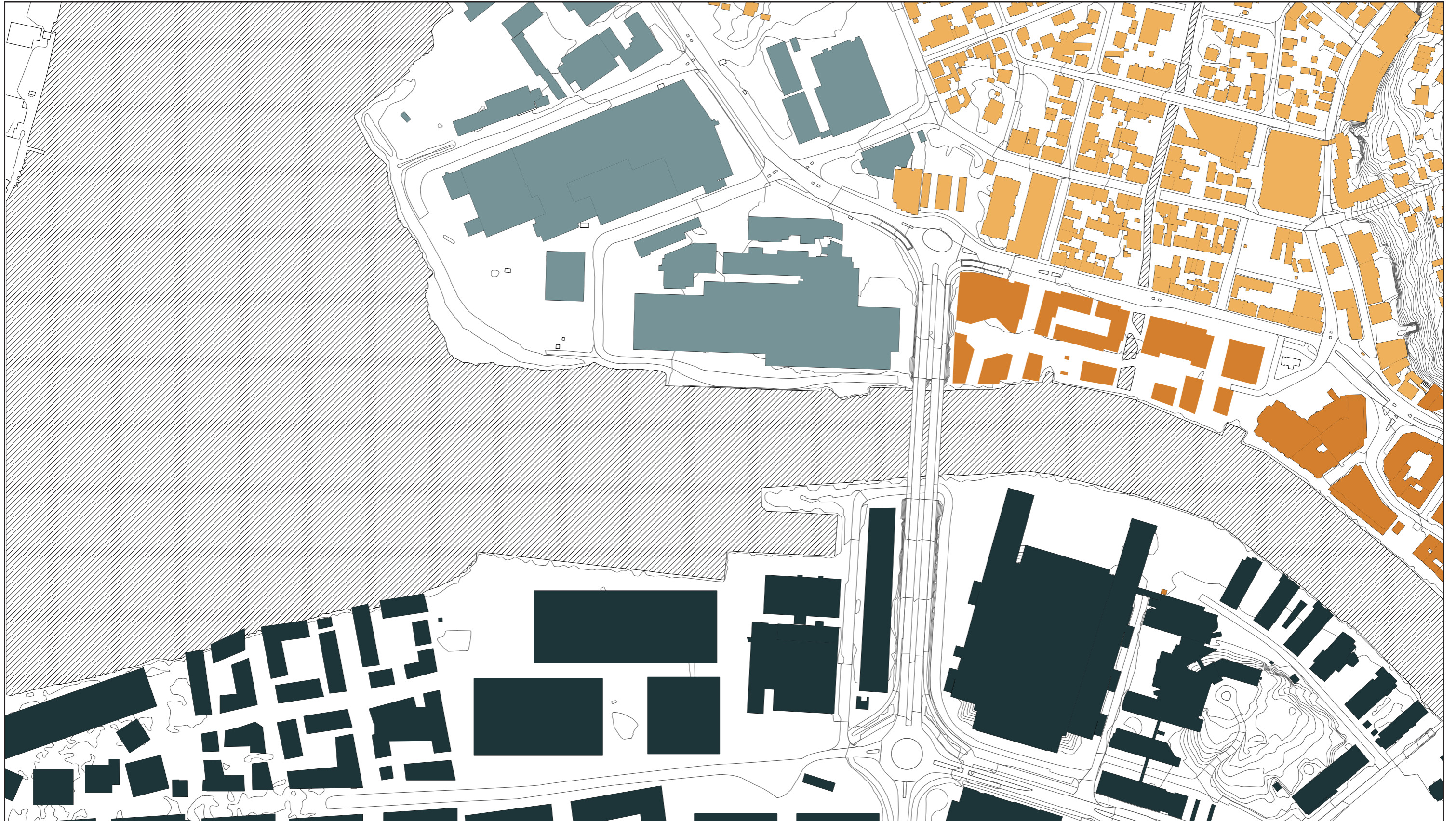
# Context

## The plot in the borderline of multiple programs

New developments  
Industrial



Suburban  
Urban



# Context

## Current establishments at Trosvikstranda

- 1 Brynildsen Group**  
Factory and HQ  
*Producer of sweets and nuts*  
*Status: factory will go international in a few years*
- 2 Sleipner Motor**  
Factory and HQ  
*Producer of marine engines and propellers*  
*Status: factory will go international in a few years*
- 3 Berggård Amundsen**  
Electronics store
- 4 Onninen**  
Grossist
- 5 Kokkim Trykkeri**  
Publisher
- 6 Friskis & Sveltis**  
Gym
- 7 Express Vask / Heidenreich**  
Cleaner / Truck producer
- 8 JKE Design / Glass & Ramme**  
Kitchen producer / Framist
- 9 Toyota Fredrikstad**  
Car dealership



# Context

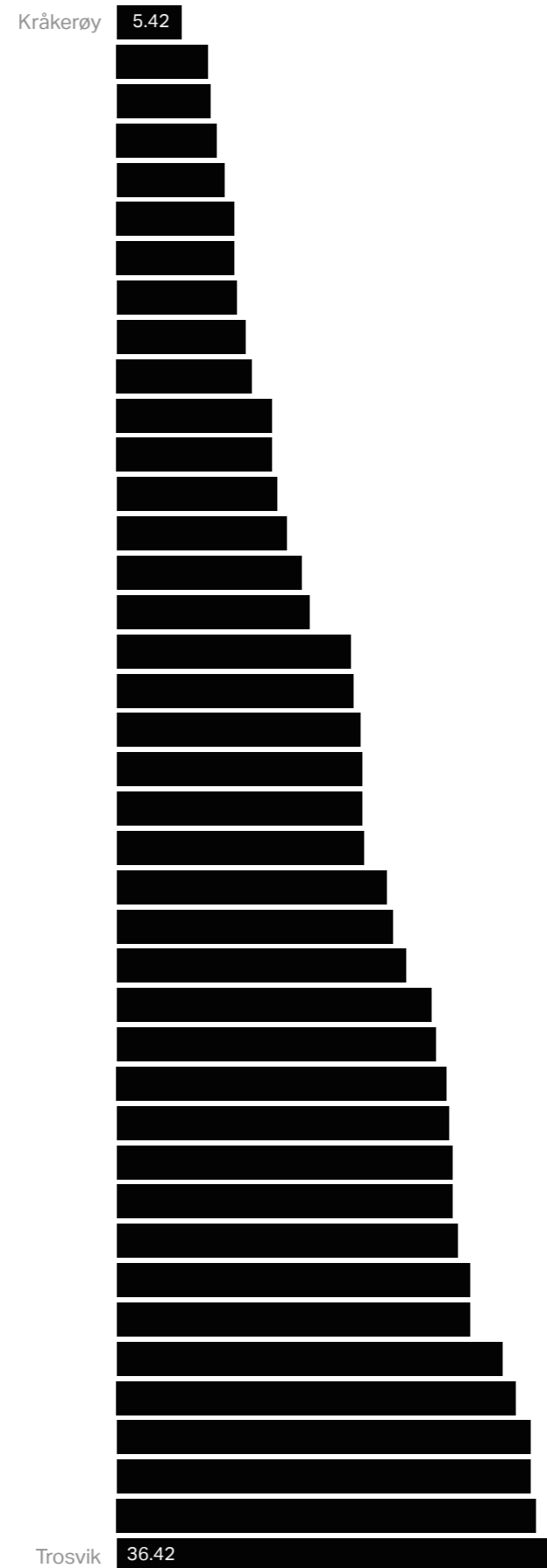
## Demography

The Municipality of Fredrikstad recently published a report showing the living conditions in each borough of the Municipality. The report was based on 12 factors:

- 1 Child share
- 2 Immigrants
- 3 Relocations
- 4 Low education (30-39 years)
- 5 Higher education (30-39 years)
- 6 Net income (median income after tax)
- 7 Persons in low-income households
- 8 Registered unemployment
- 9 Social assistance recipients
- 10 Recipient of AAP (Arbeidsavklaringspenger)
- 11 Youth unemployment rate
- 12 Proportion of single people

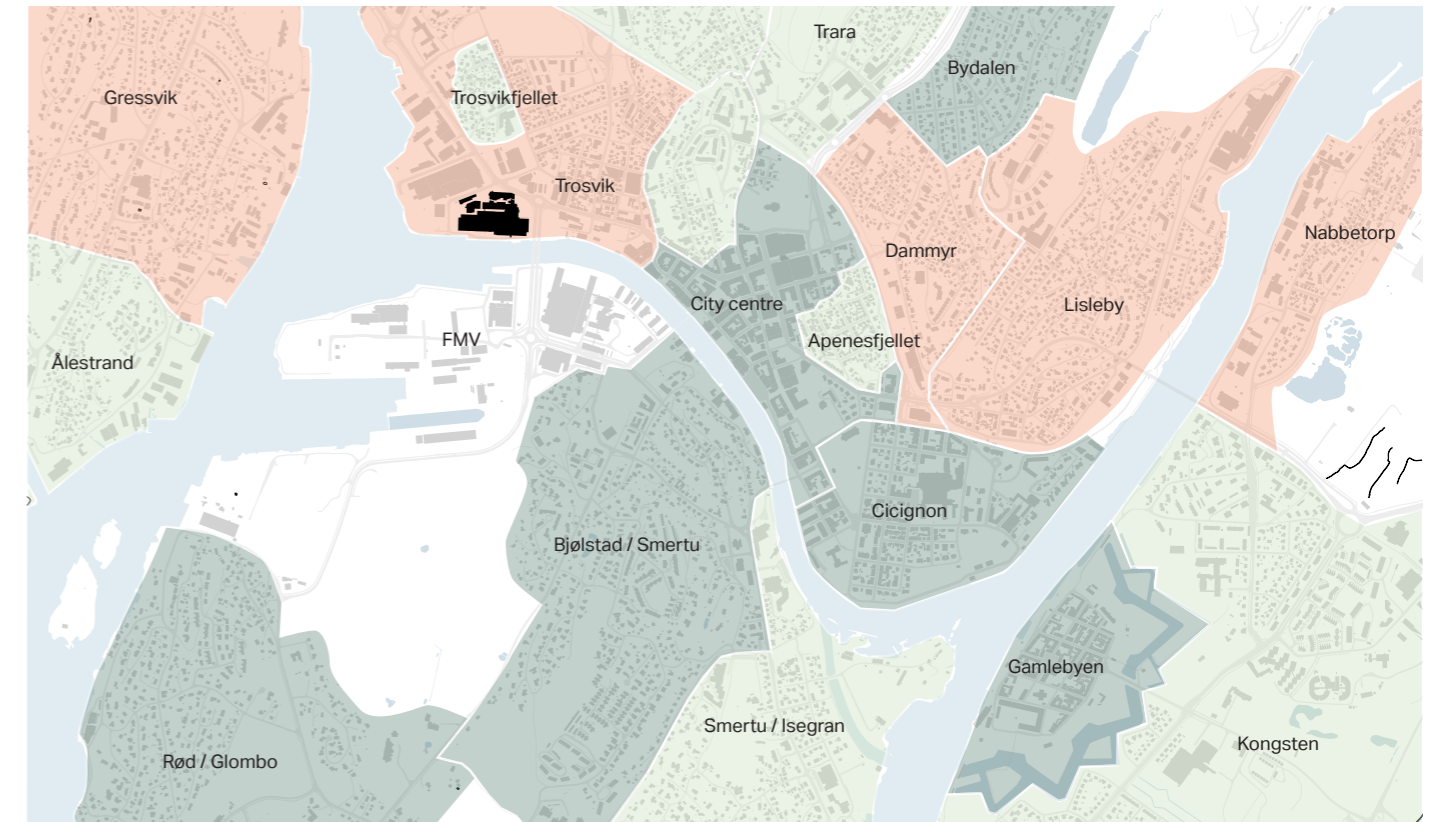
Holmen and Seut (NTP is situated here), parts of the city center, and the areas on both sides of Glomma (on Lisleby and Selbak) have stood out with the the biggest challenges in terms of more children in low-income families, higher unemployment rate, a high proportion of immigrants and more recipients of social assistance.

The table is showing the welfare rate in the Municipality. It's based on a scale from 1 - 40, where 40 is the lowest score.

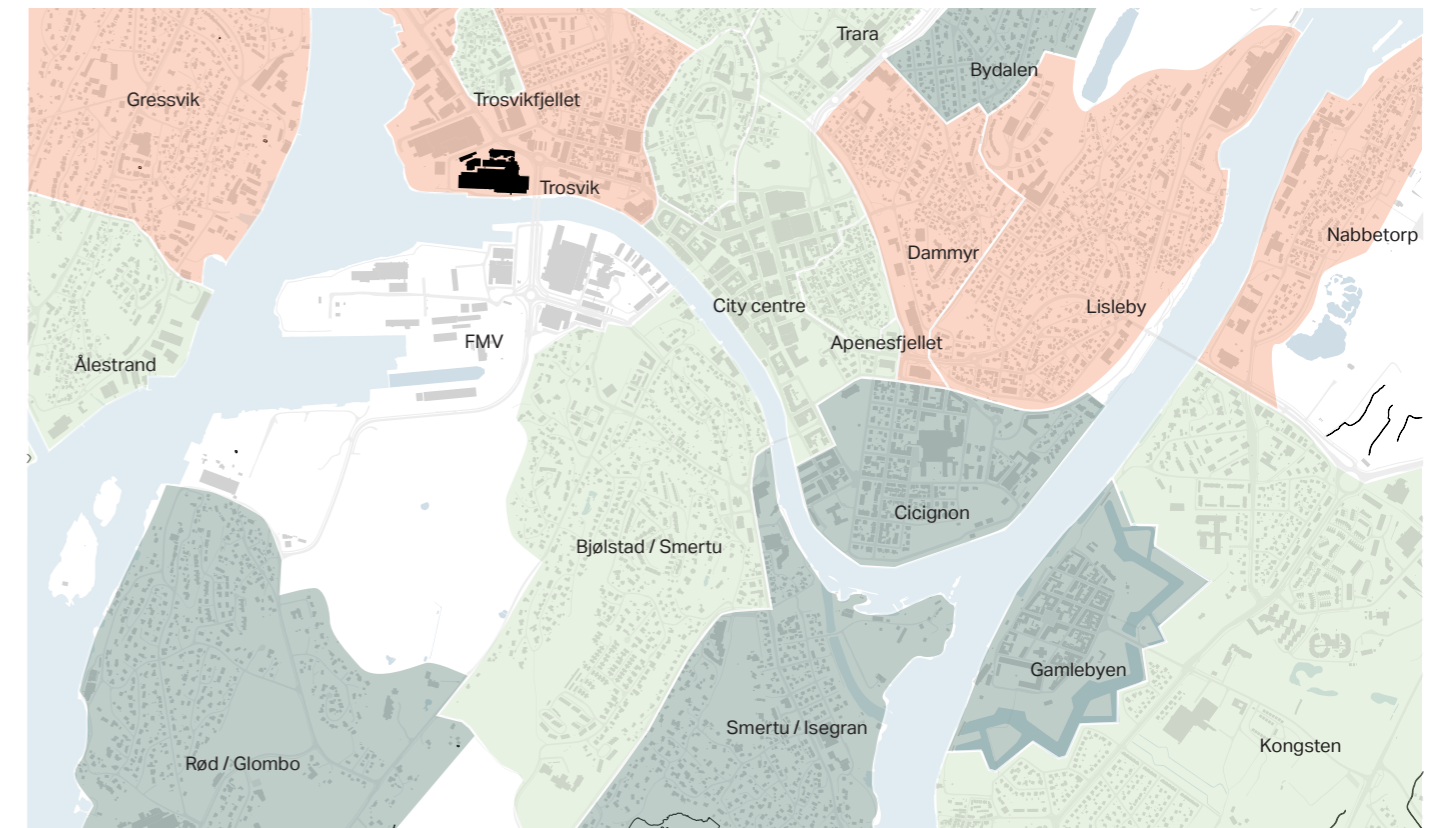


- Above 50%
- Equally divided
- Under 50%

Higher education rate



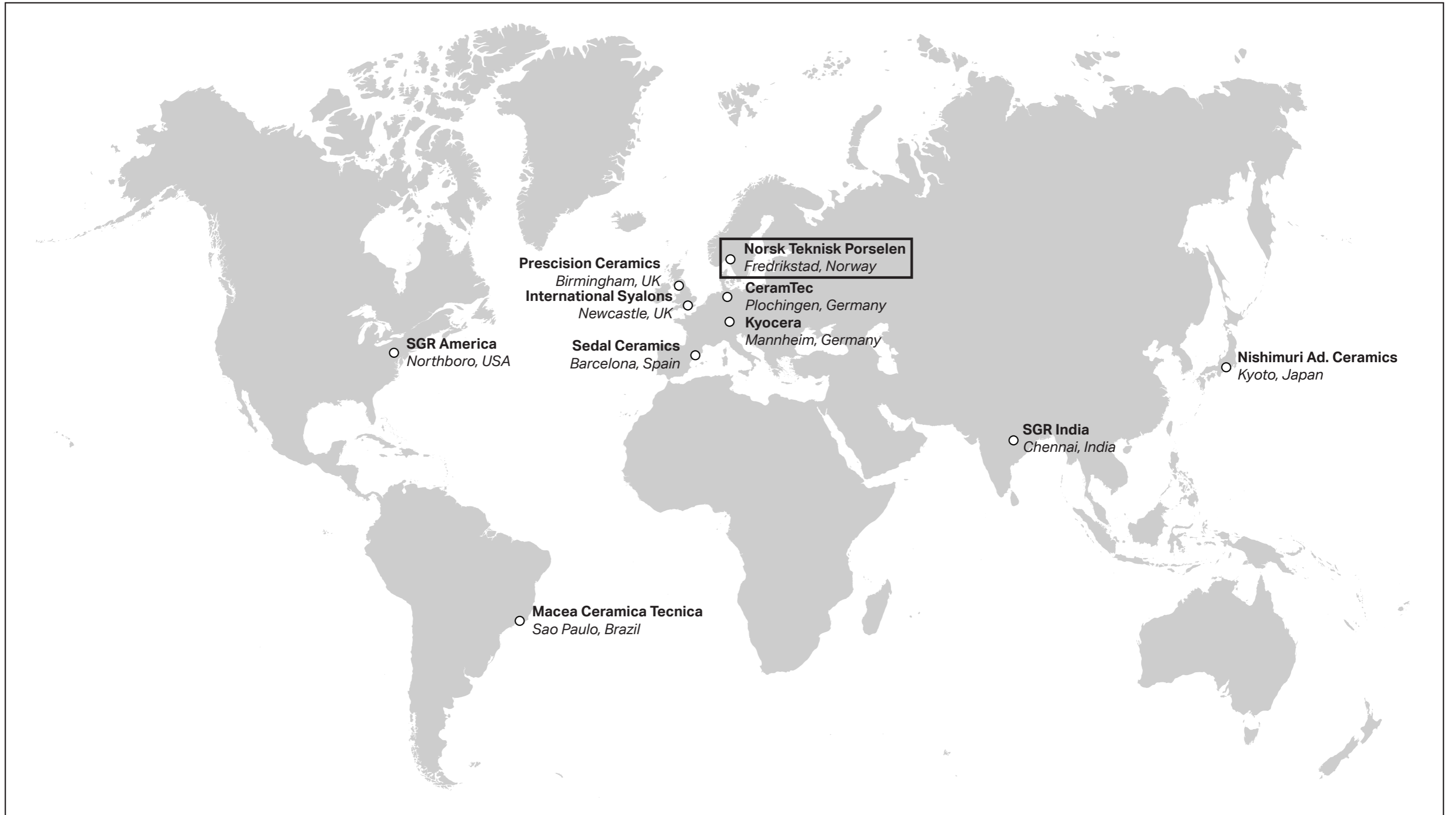
Unemployment rate



**Site**

Site

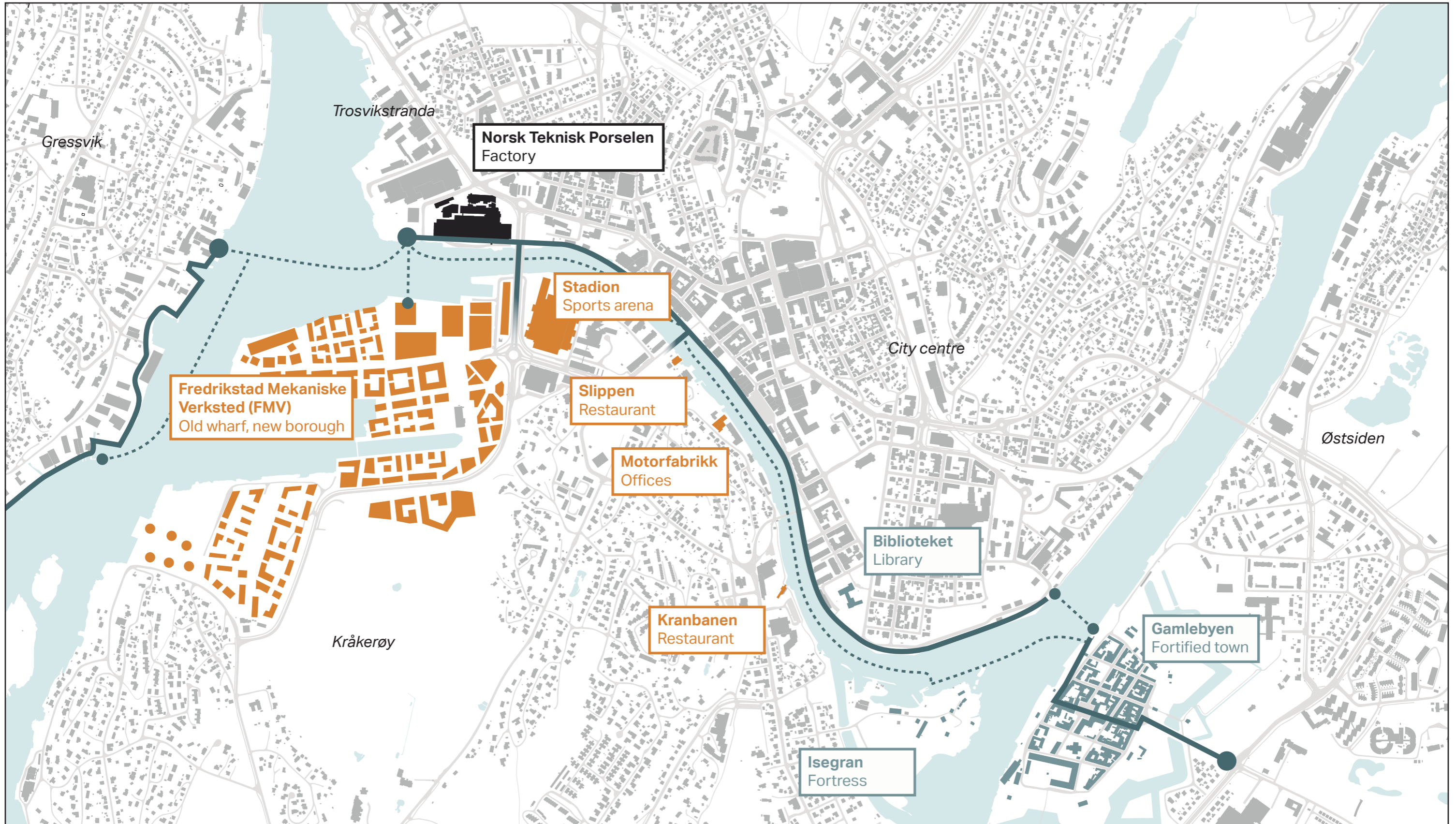
## One of few technical porcelain factories in the world



# Site and intention

## Protect the only existing factory from the industrialization

- Cultural and historical sites ●
- Former industrial sites ●
- Ferry route ○
- Cultural and industrial path ●



Site

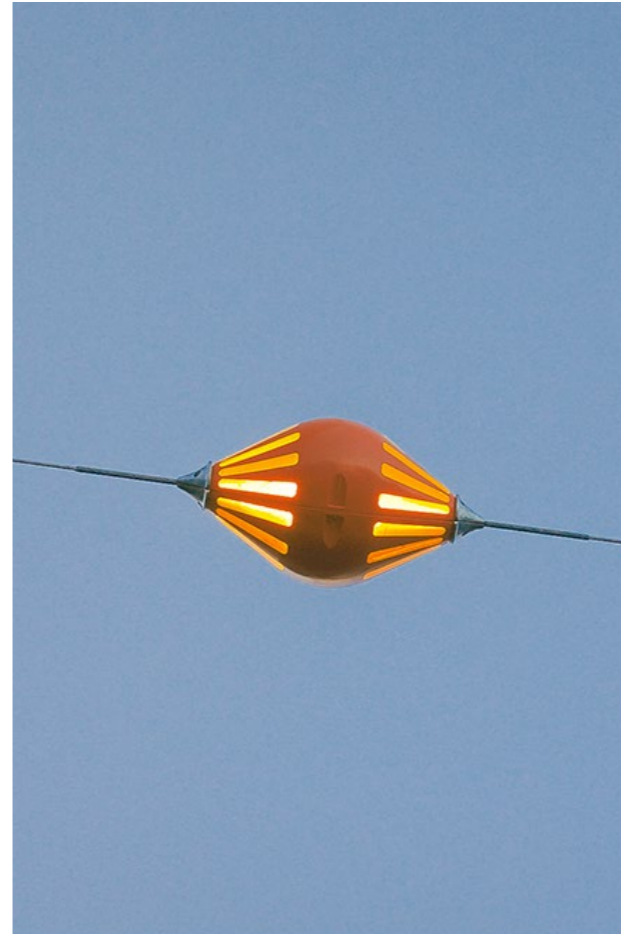
**Objects produced at the site**



RESIN INSULATORS



CERAMIC HOLLOW INSULATORS



AIRCRAFT WARNING SPHERES

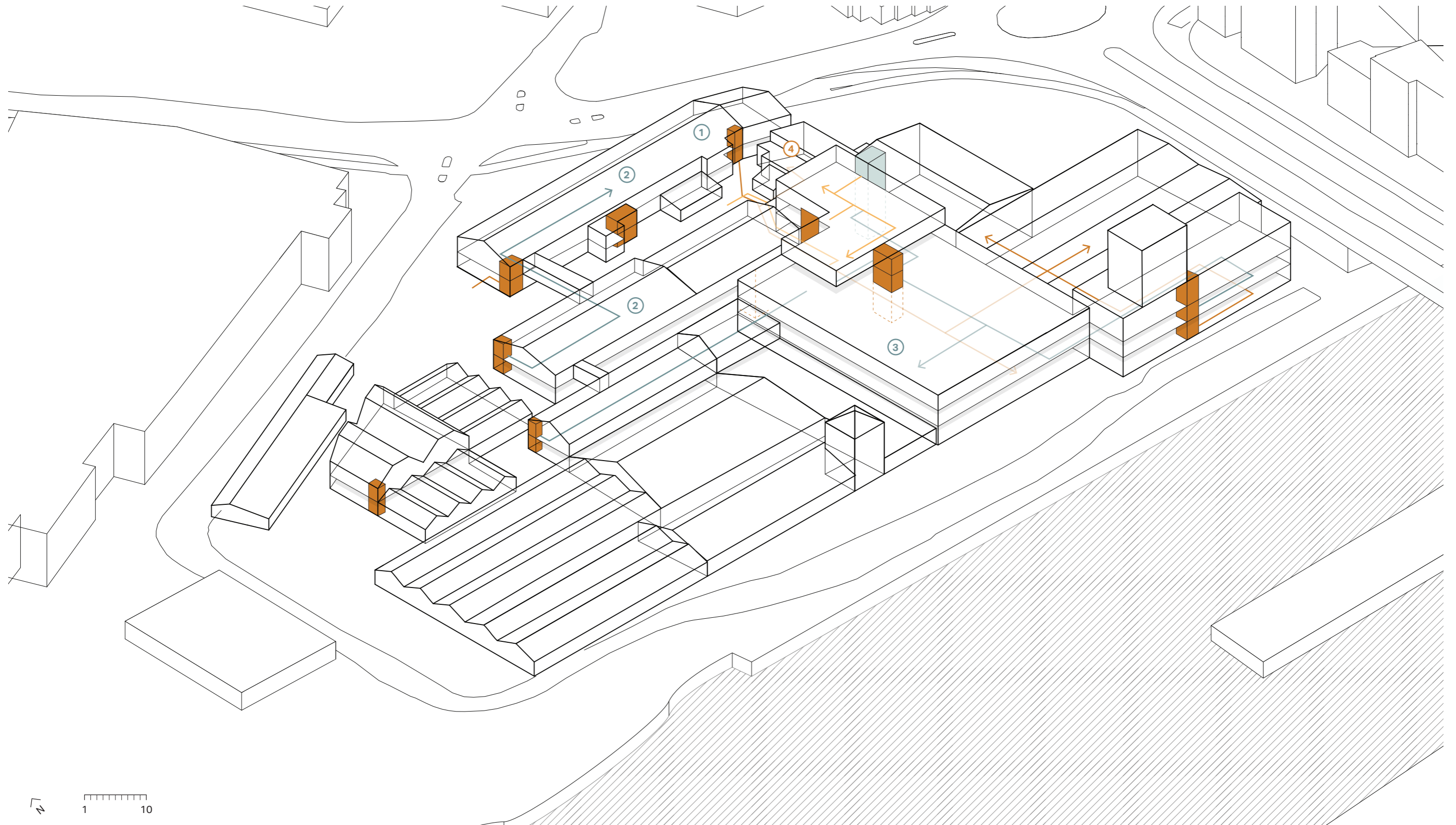


INSULATORS FOR ELECTROSTATIC  
PRECIPITATOR (ESP)

# Site

## Communication patterns

- Cantine ①
- Offices ②
- Labratorium ③
- Workshop ④
- Staircases ●
- Elevator ●
- Artists path ○
- Workers path ground floor ○
- Workers path 1st floor ○

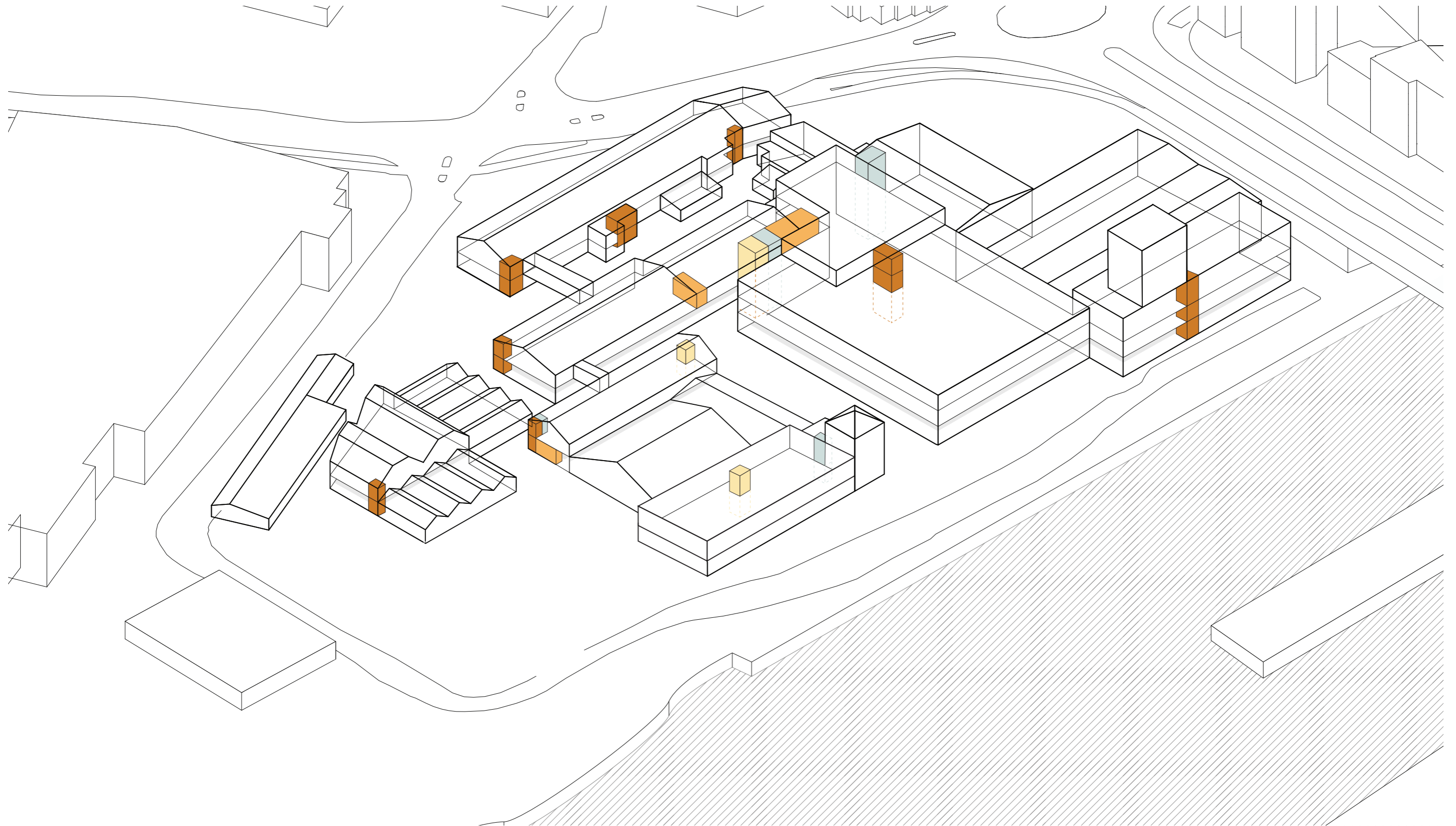




# Site and intentions

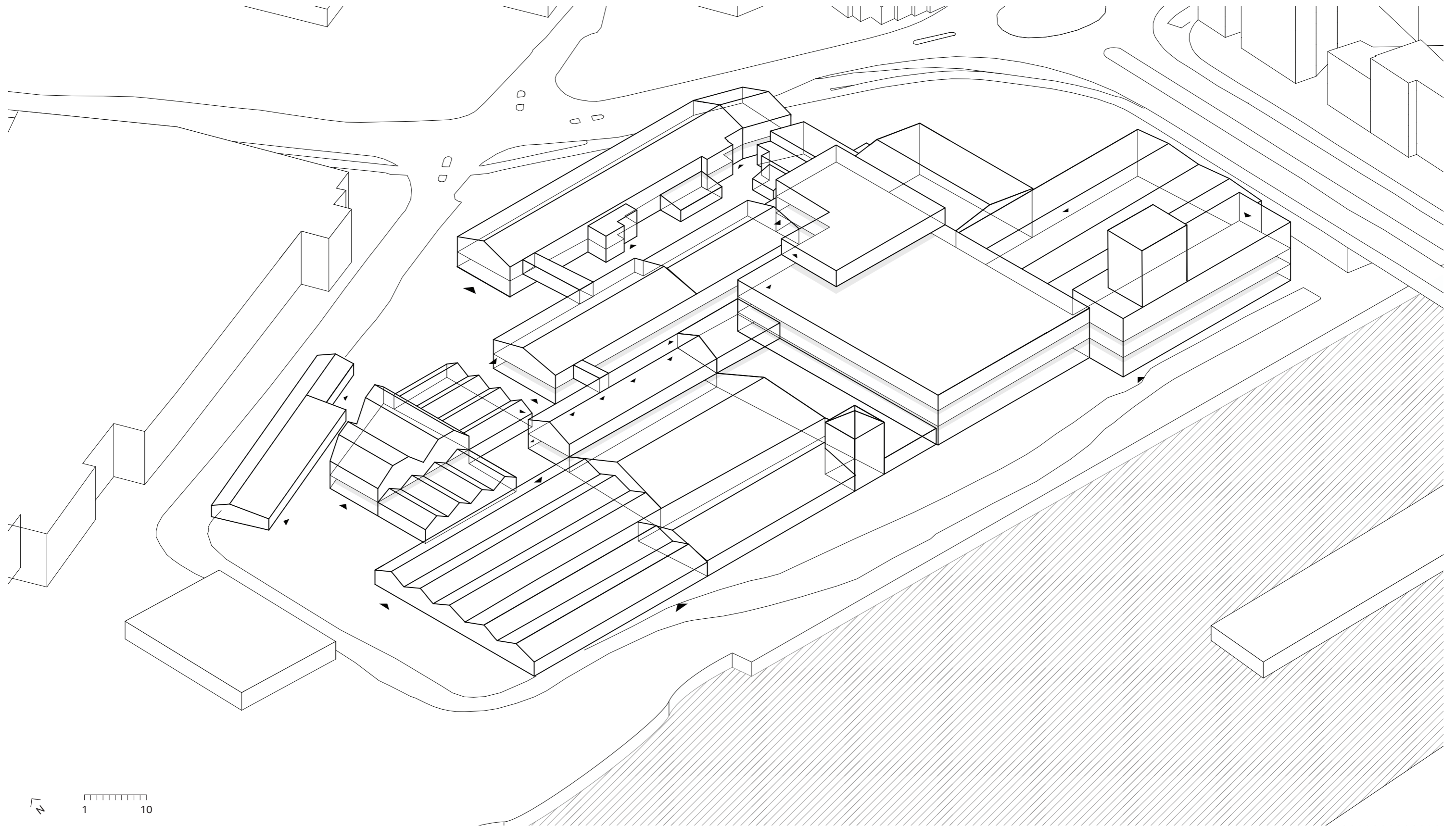
## Possible added cores and toilets

- Existing staircases ●
- Elevator ●
- New staircases ●
- Toilets ●



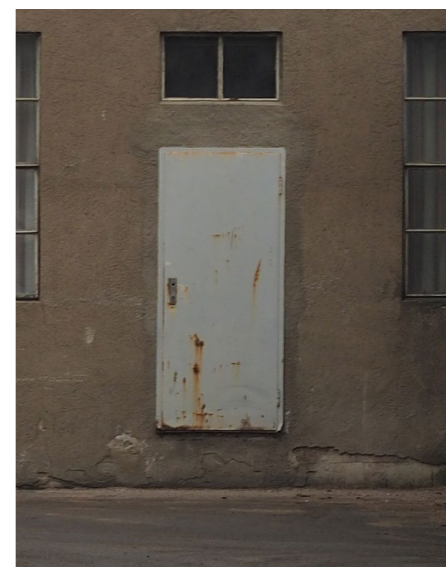
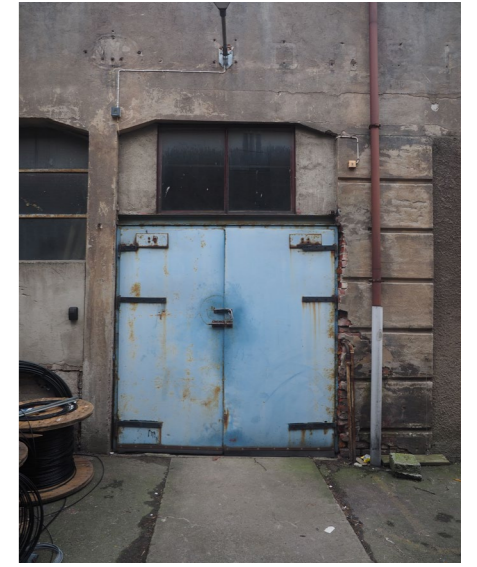
# Site

## Entrances



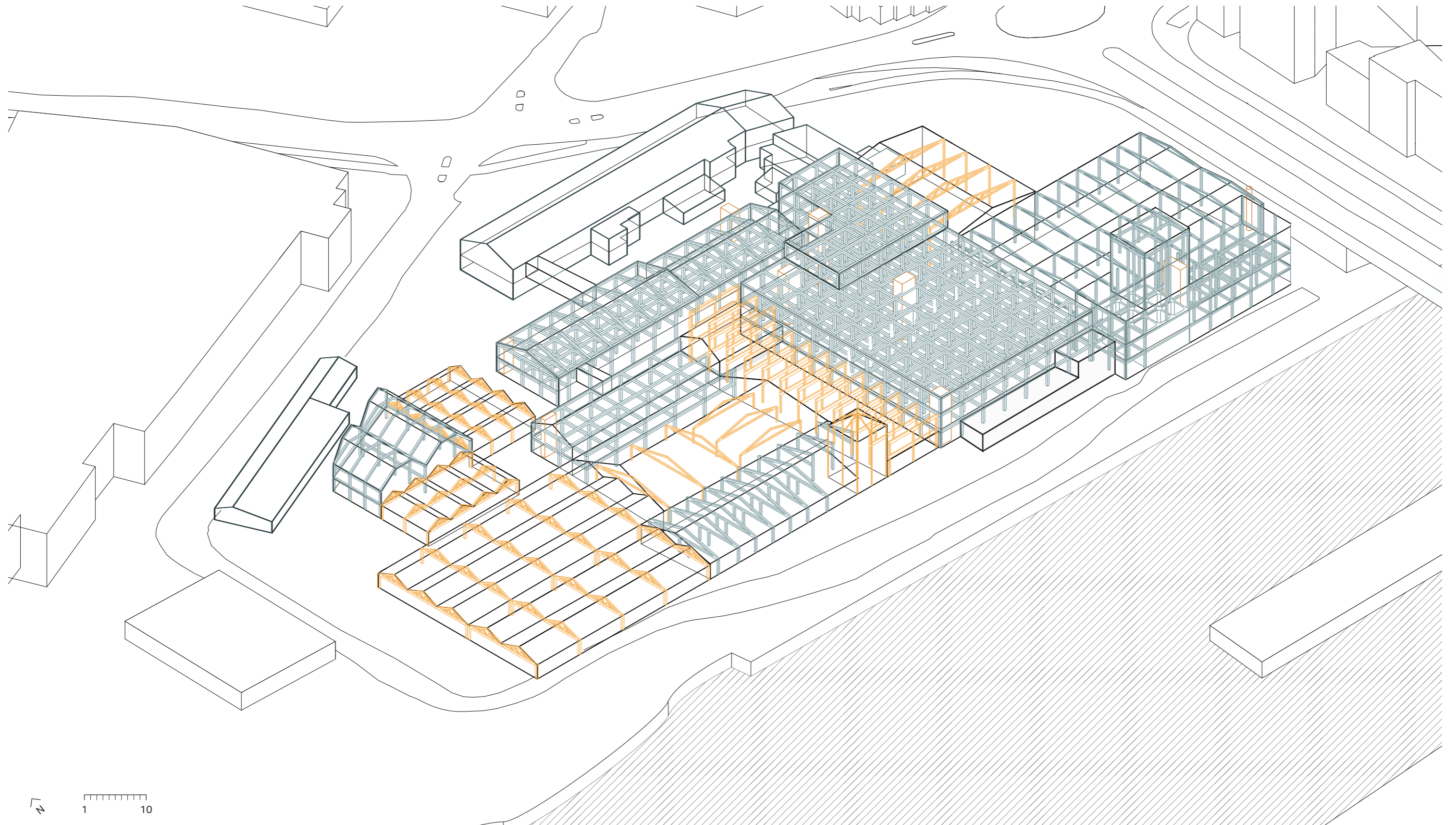
# Site and observations

## No clear entrance



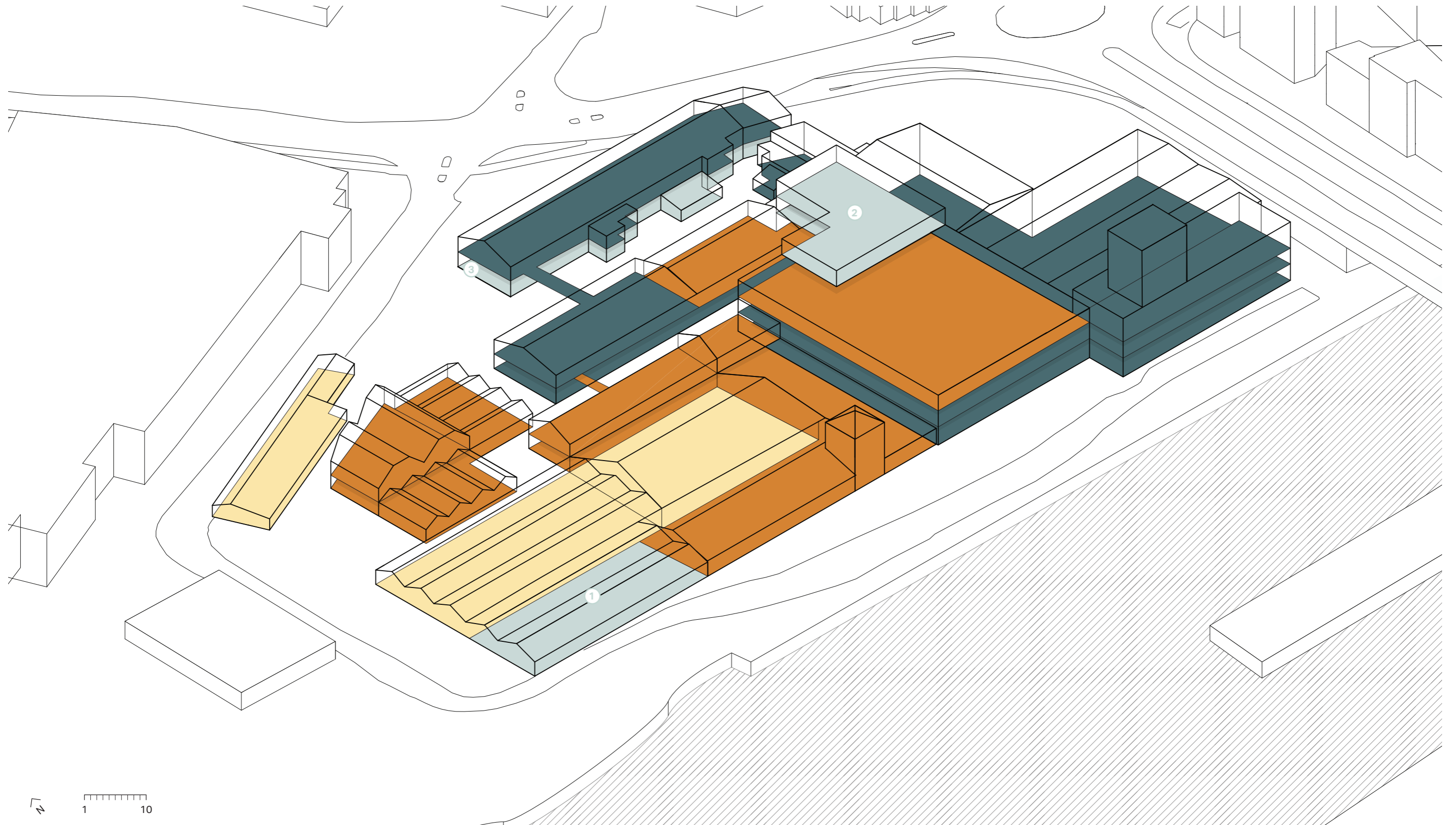
# Factory Structures

- Prefab. concrete columns and slabs ●
- Unknown ○
- Steel frames ●
- Communication cores ○



# Factory Usage

- Factory ●
- Rented out ●
- Empty ●
- Storage ●
- Flea market ①
- Art collective ②
- Electronic supply store ③



# Buildings

# Buildings

## The history of the Porcelain factory

Fredrikstad and electricity has a long lasting relationship. The first electrical lamp in Scandinavia was turned on here in 1877. In the early 1900s, the use of lights also began to increase in the mechanical workshops. The first electrical power station opened some years later.

The World War I made the foundation for industrial growth in Norway. The economy and shipping made the country rich, and because of the restrictions of the war, it was a need to produce products they usually imported. It was a need for a technical porcelain factory. A decision to locate it in Fredrikstad was based on its cheaper rental prices on seaside plots, compared to Kristiania (Oslo). It was decided to locate it on a plot with a symbolic value: where the sawmill of Stang & Brecke at Trosvikstranda.

July 24, 1916, marks the opening of Norsk Teknisk Porselensfabrikk (NTP). Here they produced insulators, electrical equipment, tiles and sanitary ware.

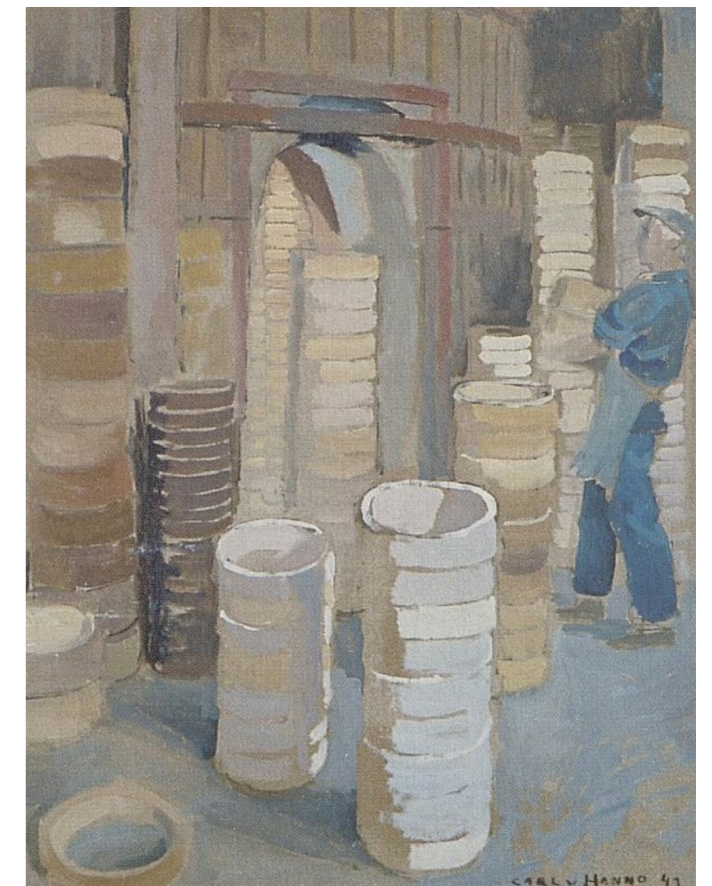
At this point, Fredrikstad was in an enormous industrial growth. The shipyard of Fredrikstad Mekaniske Verksted (FMV) had its peak years, and the city hosted several factories in textile, clothing and grocery business.

From entrepreneurial time to depression. NTP had great expectations, but sadly it did not go as planned. The employees did not have that expertise to produce technical porcelain. The factory had some troubling years until they in 1923 bought a transformer. This gave a whole new product series creating new sockets, hobs and hanging insulators.

In addition, NTP were Norway's first plastics factory, creating gramophone records. During the World War II, the factory was occupied by the Germans, and sadly parts of the factory burned down in 1946. The fire made damage for 2 mill NOK (today: 50 000 000 NOK).

Luckily, the government realized how big an imprint this factory made in Fredrikstad and Norway, so they contributed to the opening of the whole production line on year later. As a phoenix rising from the ashes.

In the peak years of 1970, they operated a building mass of 28 000 m<sup>2</sup>, 500 employees and a 30 mill. turnover (260 mill NOK today).



Carl von Hanno painted the life at NTP in 1943.

# Buildings

## Historical timeline of the Factory



1889



1947



1963



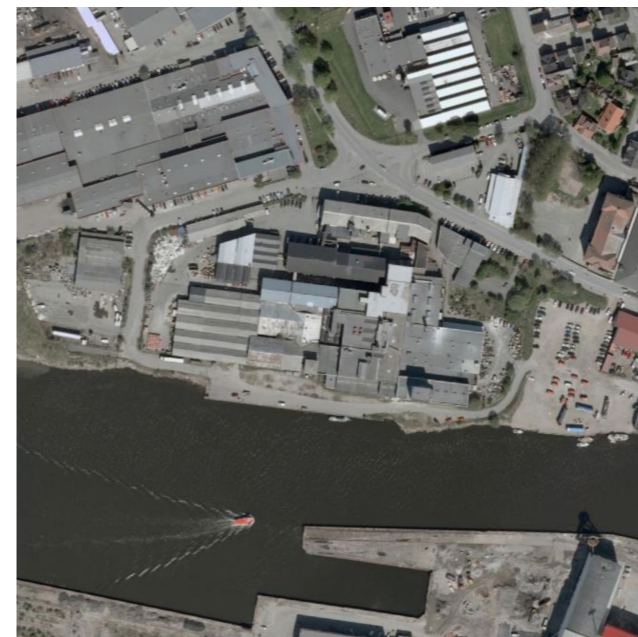
1978



1988



1997



2011



2020



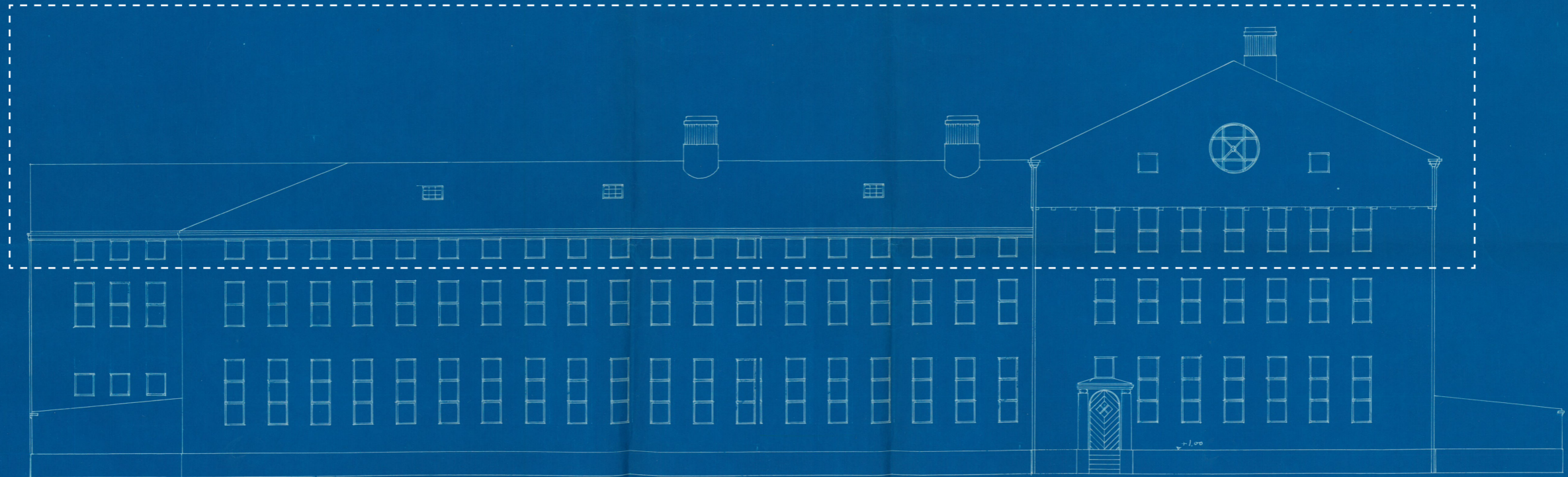
18-67  
16

NORSK · TEKN · PORSELENSFABRIK · FREDRIKSTAD ·

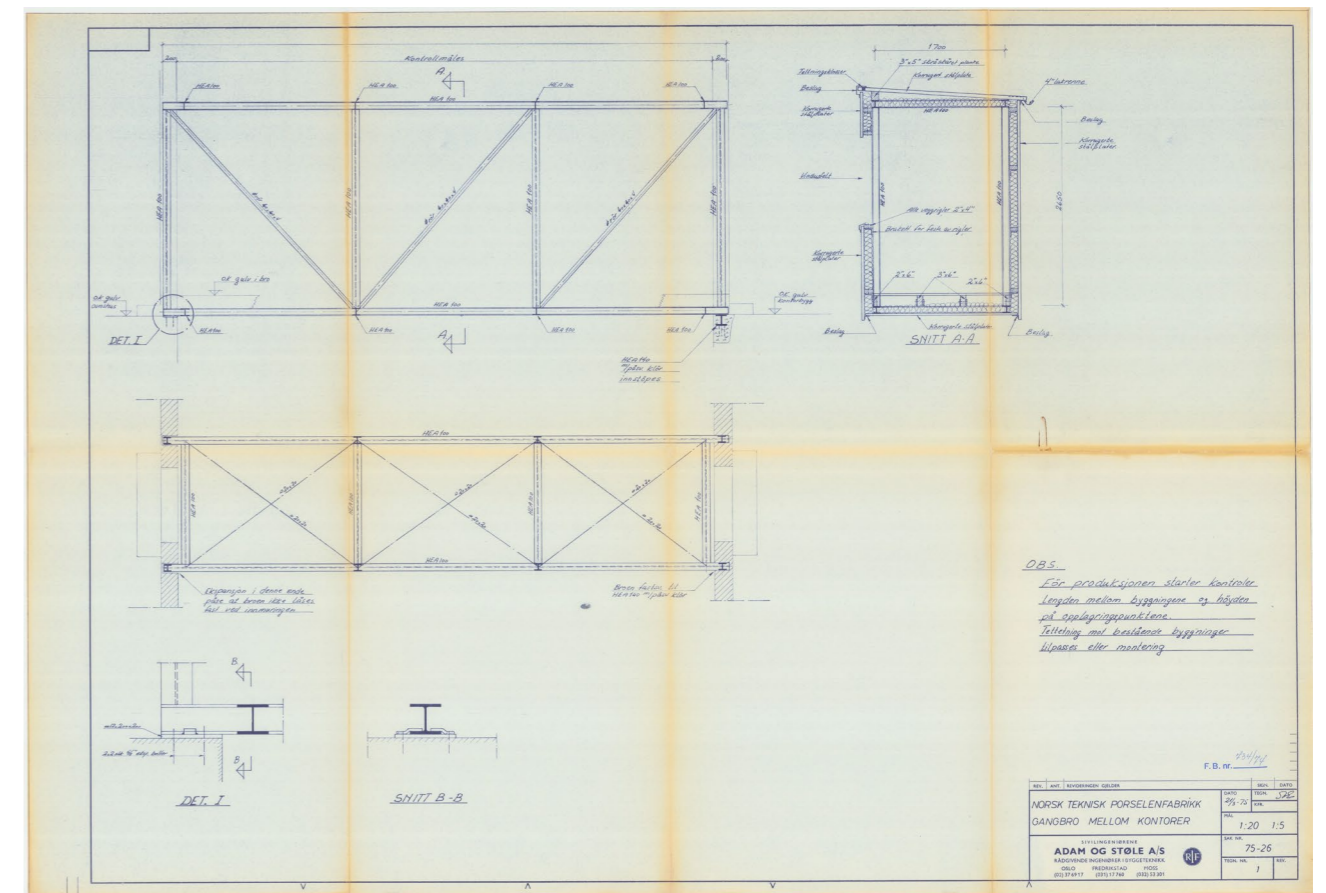
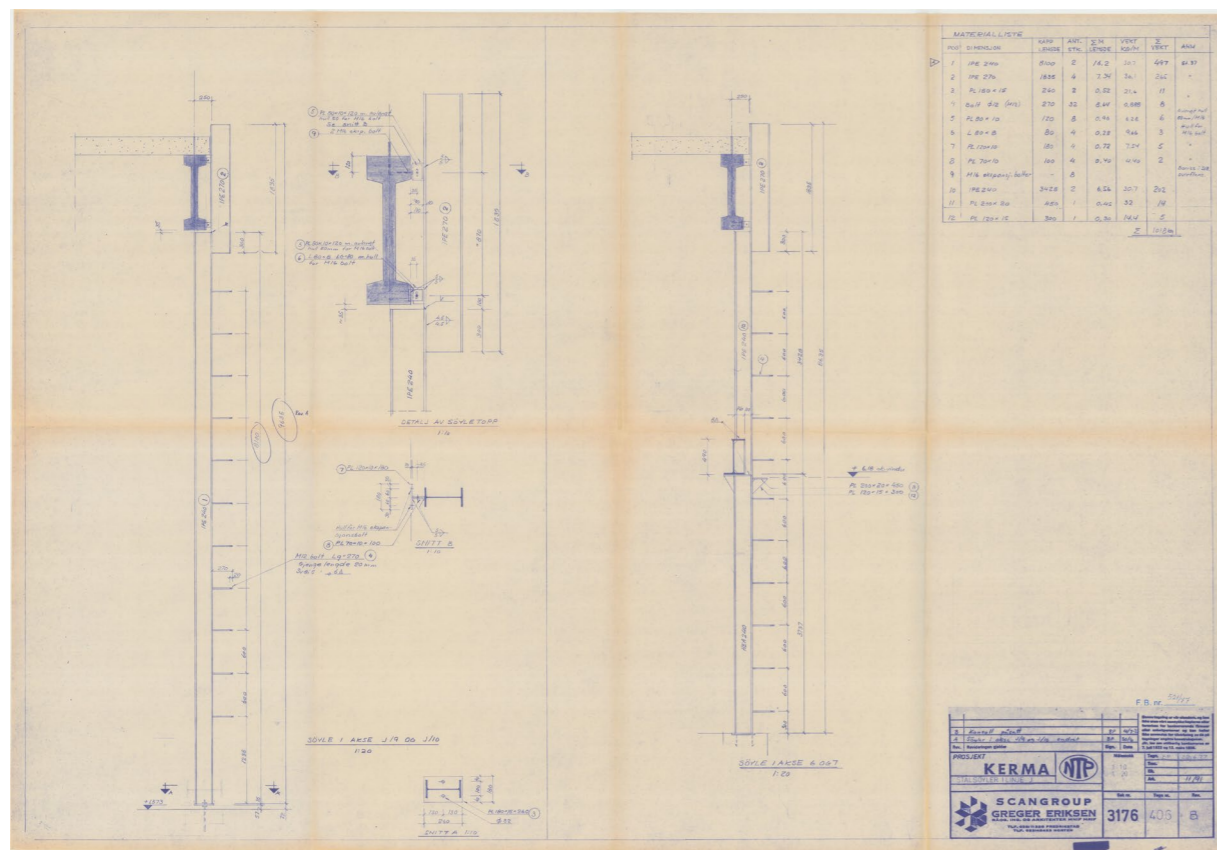
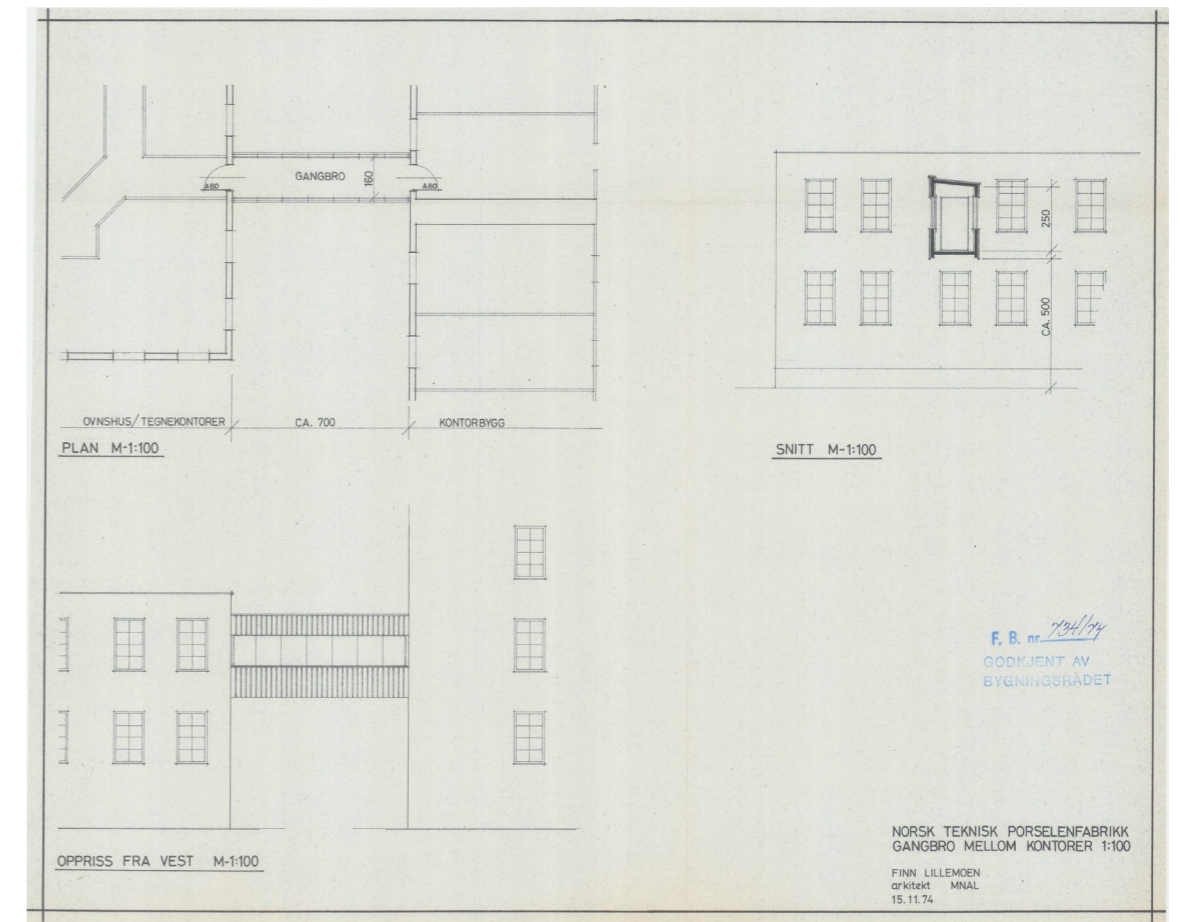
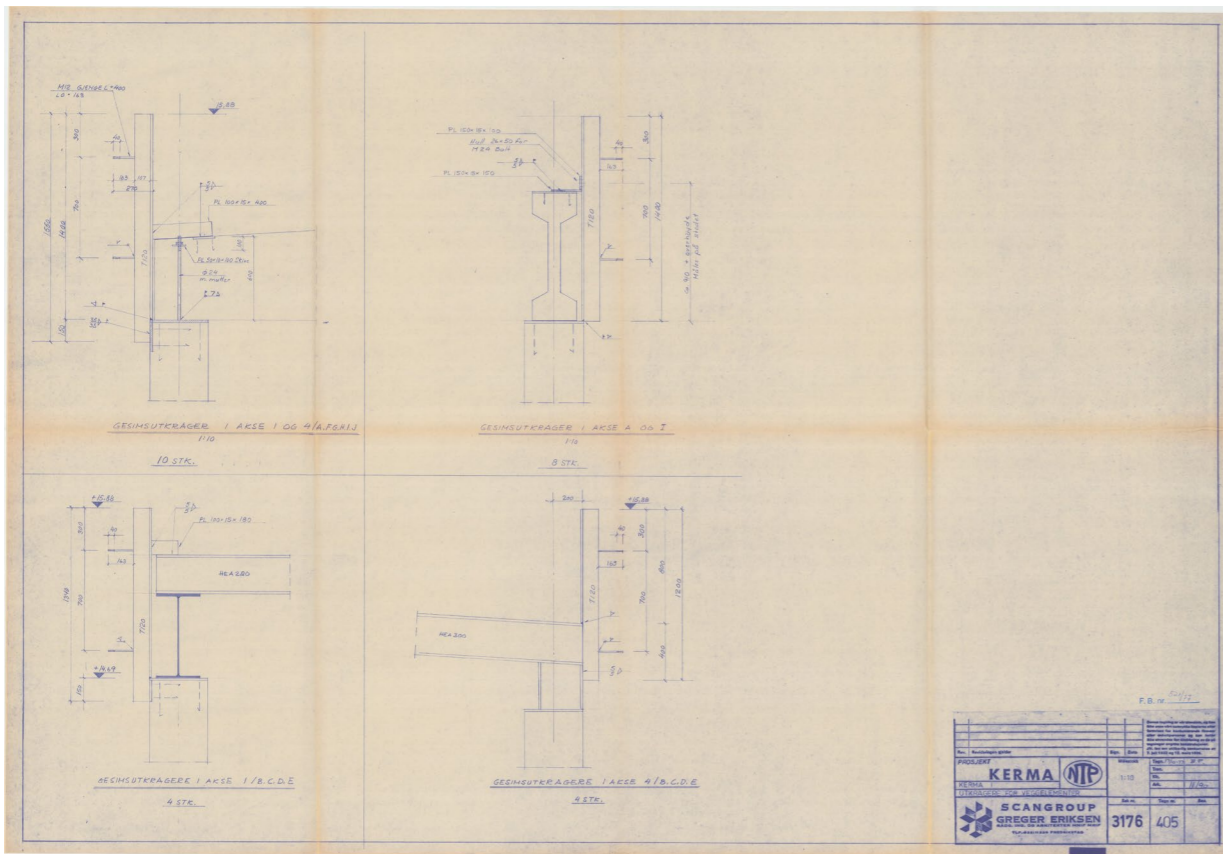
292  
TEGN. N<sup>o</sup> 6664

2/16  
FREDRIKSTAD

Burned down  $M=1:100$

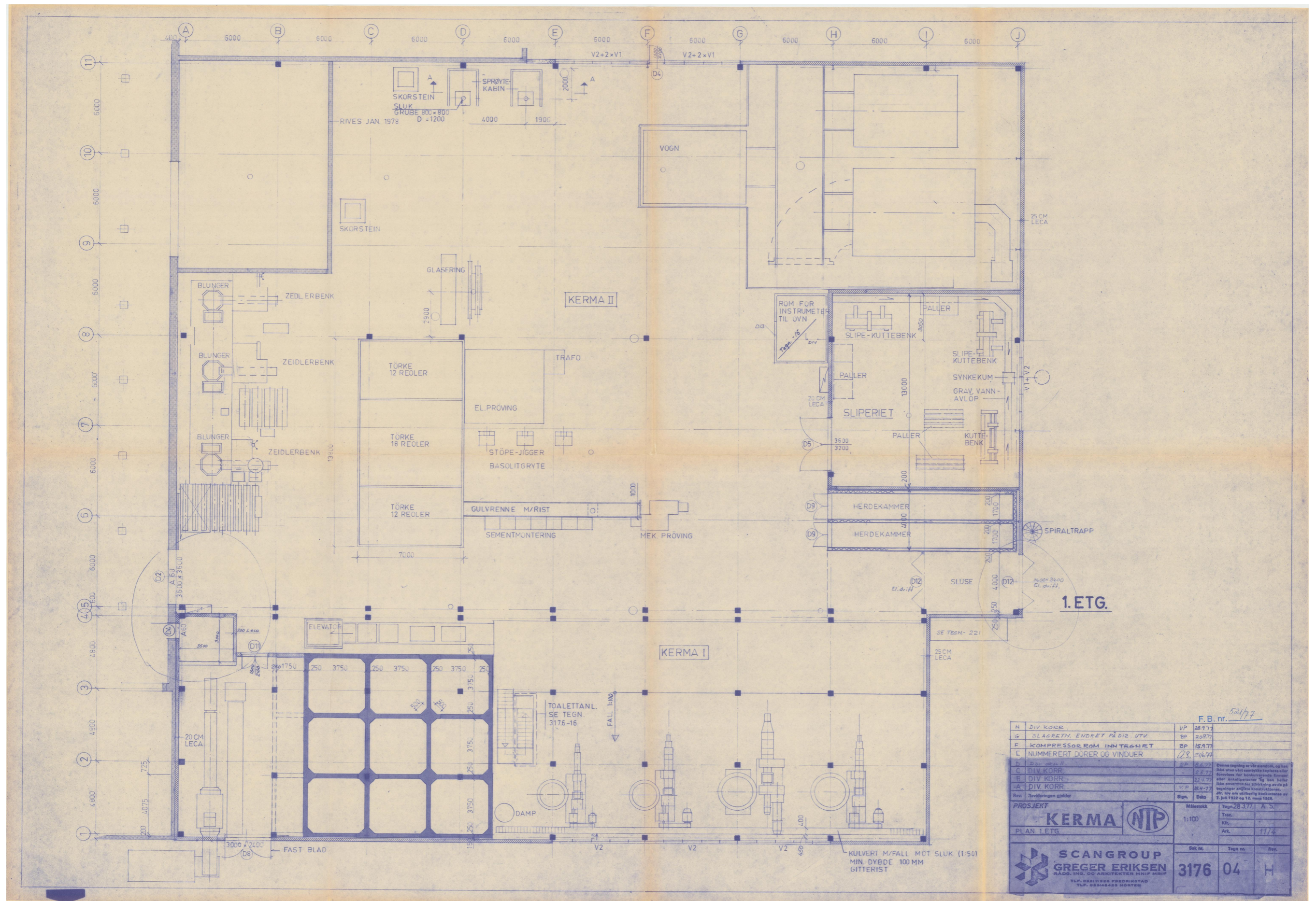


· FACADE · MOT · ELVEN ·



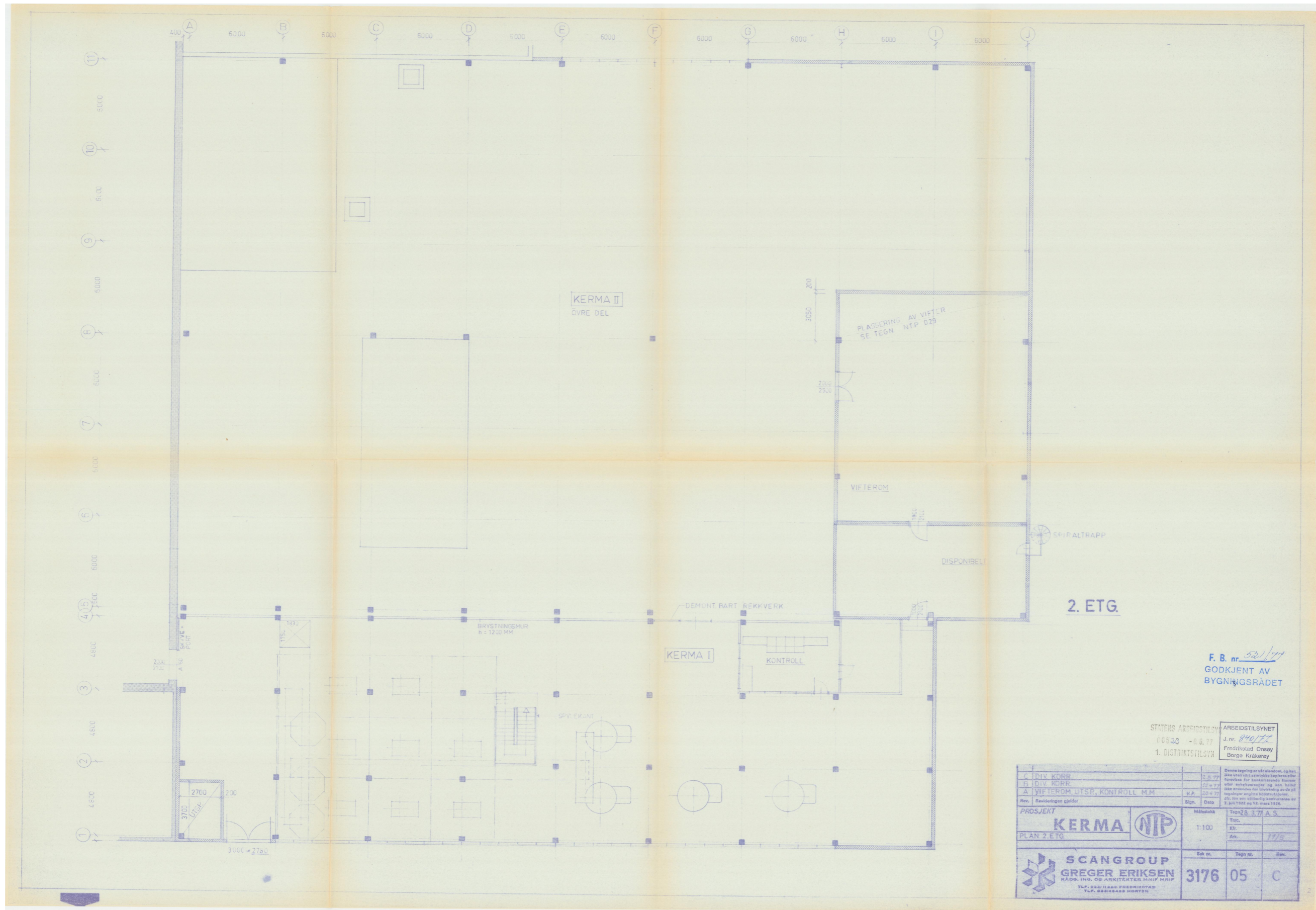
Details  
Construction in the Kerma building

Details  
Bridge between Composite and Treatment dept.



F. B. nr. 521/77			
H	DIV KORB	VP	28.97
G	SLÅBETH. ENDFET PÅ D12. UTV	BP	20.87
F	KOMPRESSORRUM INNTRÆK	BP	15.47
E	NUMMERERT DØRER OG VINDUER	BP	21.77
D	TRAPPE	BP	2.77
C	DIV KORB	VP	2.77
B	DIV KORB	VP	2.77
A	DIV KORB	VP	2.77
Rev.	Reviseringen gjøres	Sign.	Dato
PROSJEKT		Målestokk	Tegn. 28.377 A.5.
KERMA NIP		1:100	
PLAN 1. ETG.			
SCANGROUP GREGER ERIKSEN		Bl. nr.	Tegn. nr.
RÅDG. ING. OG ARKITEKTER MNIF MNIP		3176	04
TLP. 0218308 FREDRIKSTAD TLP. 0254622 HORTEN		Rev.	H

Plan  
Ground floor in the Kerma building

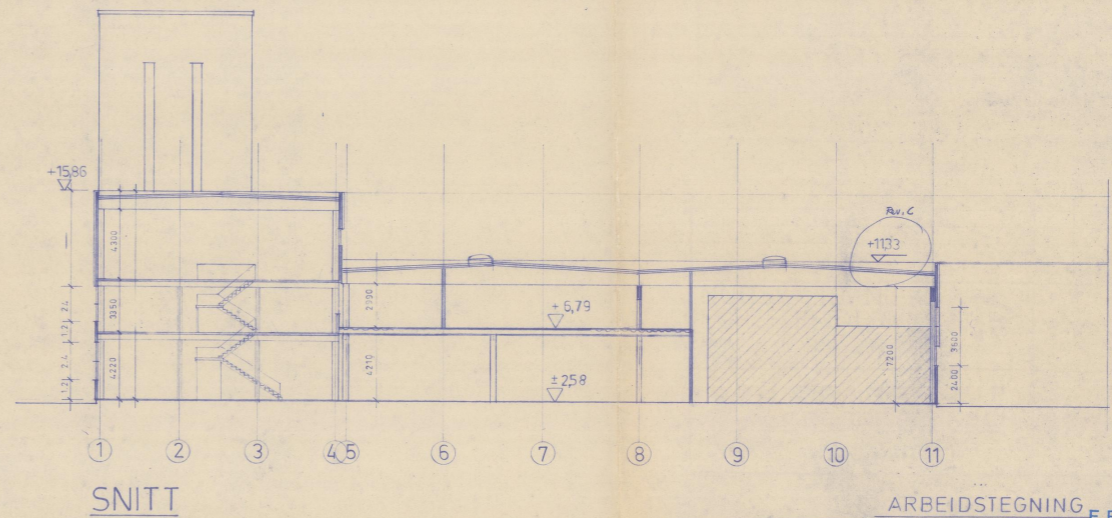
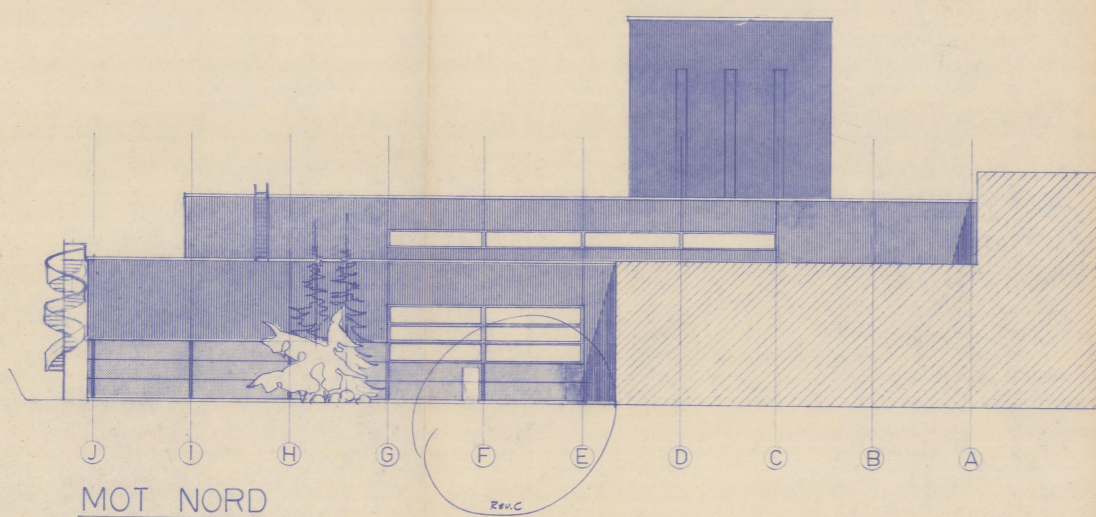
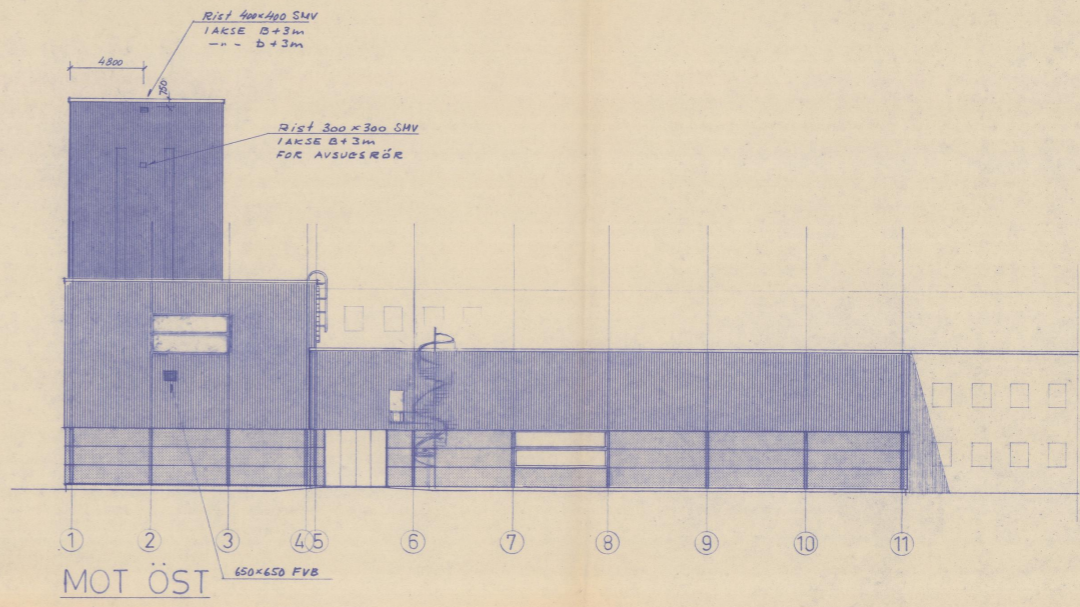
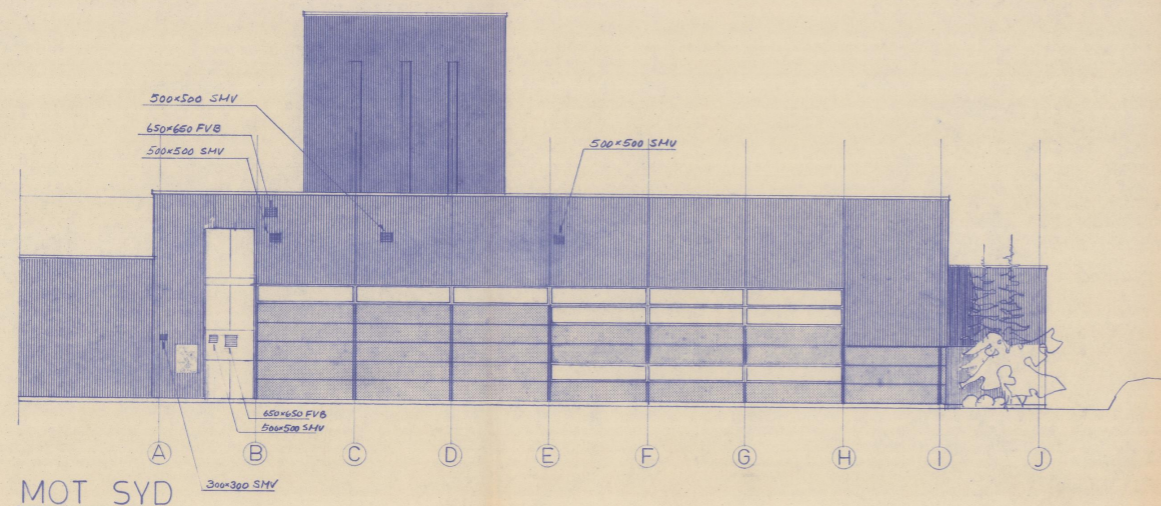


F. B. nr. 52/1977  
 GODKJENT AV  
 BYGNINGSRÅDET

STATENS ARBEIDSTILSYN  
 06523 - 0.6.77  
 1. DISTRIKTSTILSYN  
 ARBEIDSTILSYNET  
 J. nr. 840/77  
 Fredrikstad Omegns  
 Borge Kråkerøy

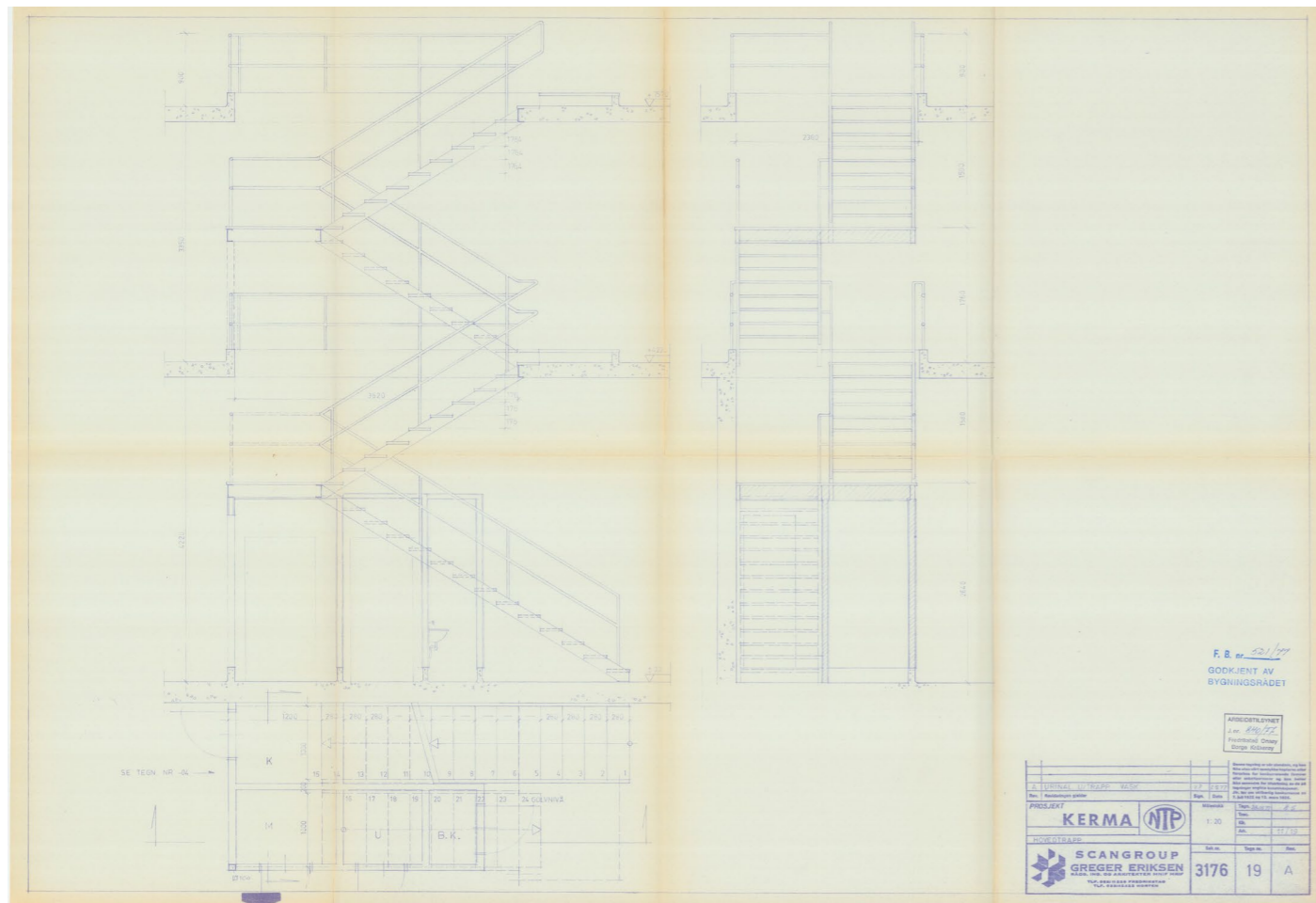
C DIV. KORR	1.3.77	Denne tegning er utarbeidet, og kan ikke brukes uten tillatelse fra forfatteren eller foretaket for bruk i andre prosjekter eller i andre sammenhenger og kan heller ikke menes å ha tilknytning til de til enhver tid gjeldende tekniske bestemmelser for 7. juni 1972 og 13. mars 1975.
B DIV. KORR	22.7.77	
A VIFTEROM, UTSP. KONTROLL M.M.	22.7.77	
Rev. Revidertegning gjelder	Sign.	Dato
PROSJEKT	Målestokk	Tegn. B. 3.77 A.S.
<b>KERMA NIP</b>	1:100	Trac.
PLAN 2. ETG.		Kv.
		Ark.
<b>SCANGROUP</b> GREGER ERIKSEN RÅDG. ING. OG ARKITEKTER MNIP MNIP TLP. 068111665 FREDRIKSTAD TLP. 06816688 HORTEN	Sak nr.	Tegn. nr.
	3176	05
		Rev.
		C

Plan  
 Third floor of the Kerma building

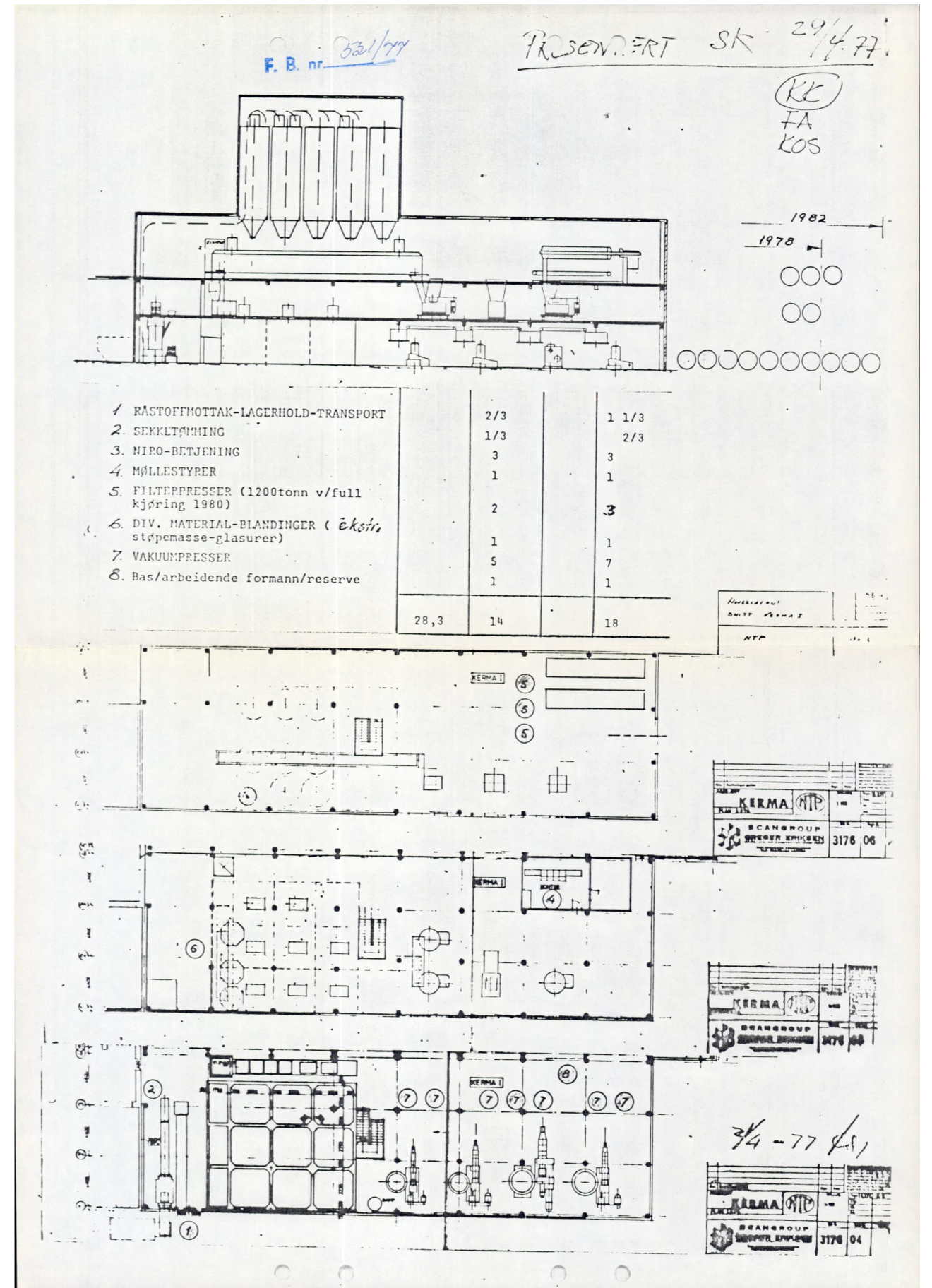


ARBIDSTEGNING F.B. nr. 524/77

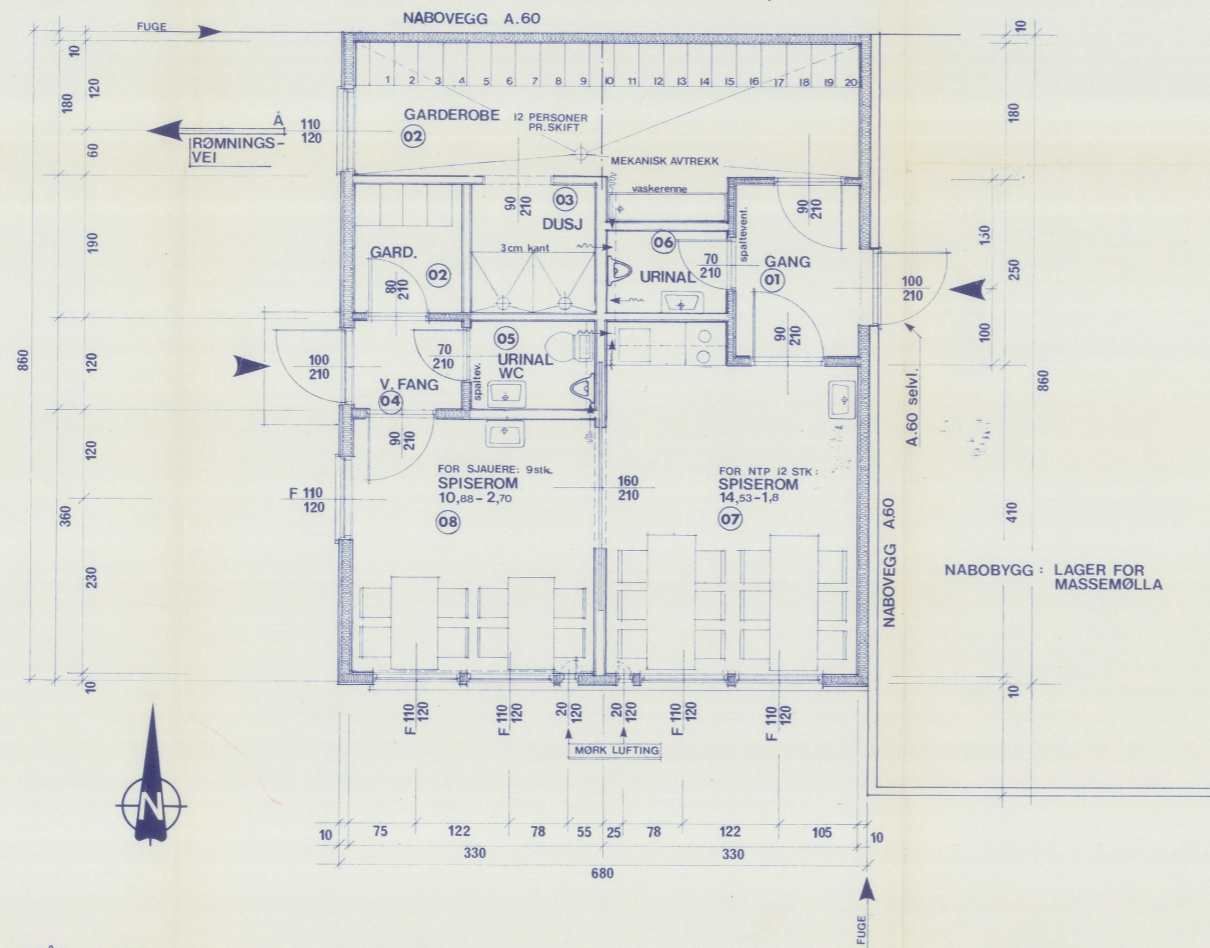
D	RISTEN innlagt	RP	31.7.76	Denne tegning er utarbejdet, og kan ikke uten videre utnyttas lagvis eller foretales for konstruksjonsformål eller ombygginger og kan heller ikke anvendes for utbedring av de på tegningen angitte konstruksjoner. (V. for en utbedring i henhold til 7. juli 1922 og 12. mars 1928.)
C	300 KORTER SINDRET DØR FLYTTET	SP	25.6.77	
B	DIV KORR	SP	22.7.77	
A	DIV KORR	SP	18.9.77	
Rev.	Revideringen gjelder	Sign.	Dato	
<b>NORSK TEKNISK PORSELENFABRIKK</b> <b>NTP</b> KERMA I, KERMA II FASADER				Målestokk 1:200 Tegnr. 28.377 A S Trac. Kl. A/L. 11/3
<b>SCANGROUP</b> <b>GREGER ERIKSEN</b> HÅND. ING. OG ARKITEKTER MNIF MRIF TLF. 022/11225 FREDRIKSTAD TLF. 022/46222 HORTEN				Sak nr. 3176 Tegn nr. 03 Rev. D



Detail  
Staircase in the Kerma building

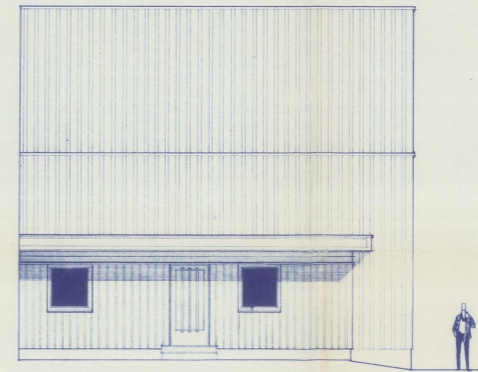


Detail  
Production flow in the Kerma building



PLAN MÅL 1:50

BRUTTO AREAL: 58,48 M<sup>2</sup>

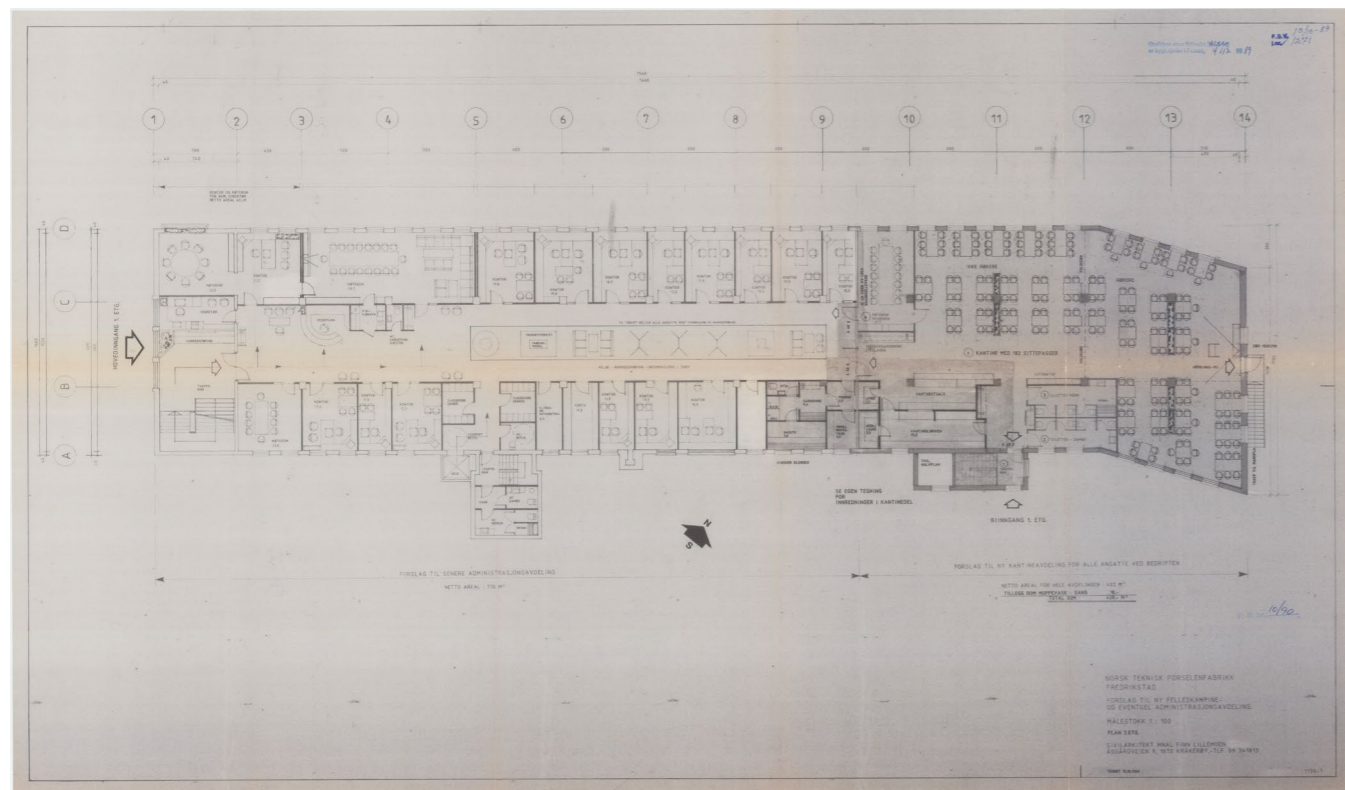


VEST

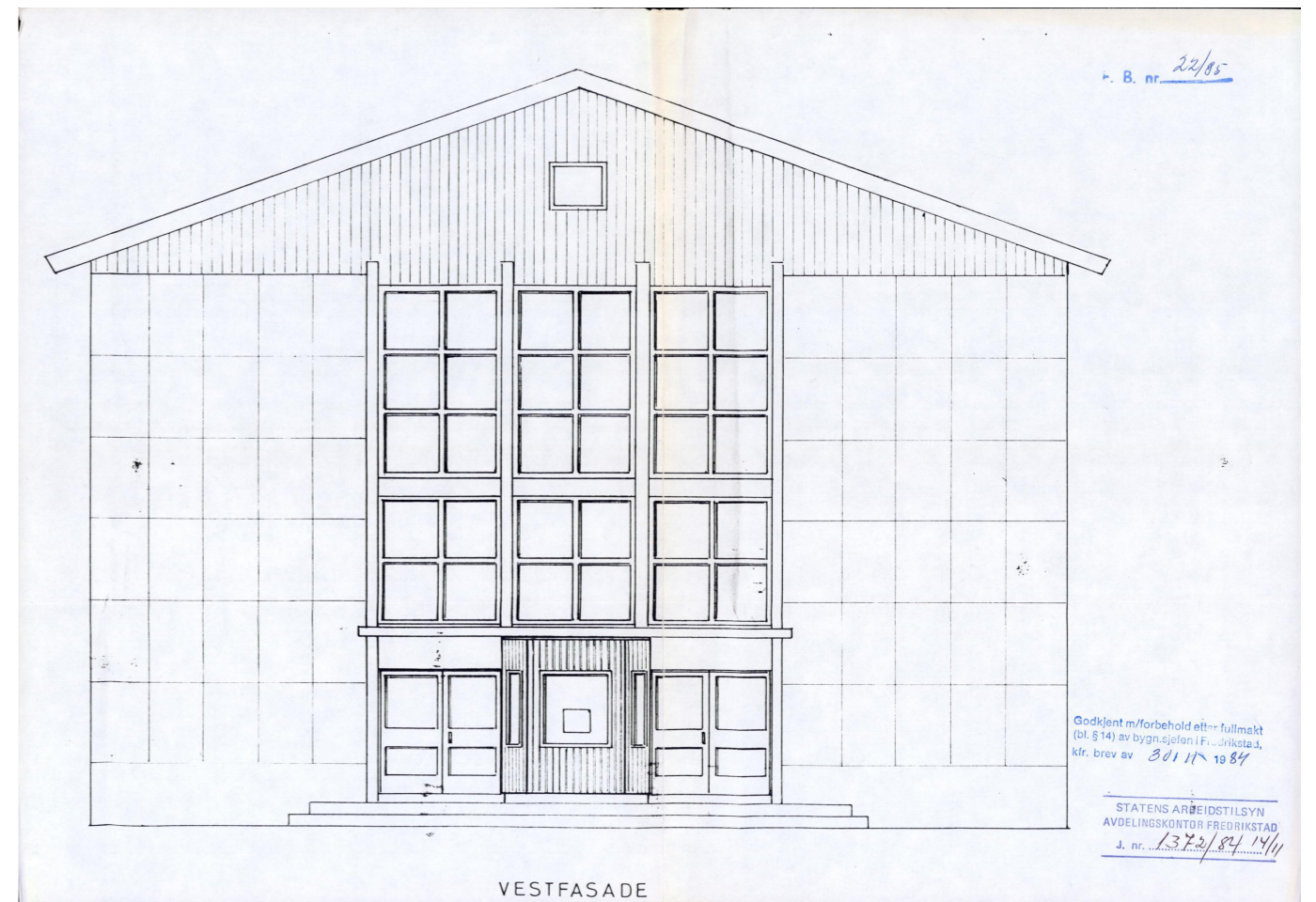
		beises	som males.
05	PERGINOL	Granpanel som beises	13 mm gipsplater som males.
06	PERGINOL	Granpanel som beises	13 mm gipsplater som males.
07	P.V.C. banebelegg som sveises	Granpanel som beises	13 mm gipsplater som males.
08	P.V.C. banebelegg som sveises	Granpanel som beises	13 mm gipsplater som males.

F. B. nr. 193/26  
GODKJENT AV  
BYGNINGSRÅDET

<b>FINN LILLEMOEN</b> Arkitekt mnal, Fergestedsvn. 1, Fredrikstad, telefon (032) 16964		<b>VELFERDSBYGG FOR DE ANSATTE VED MASSEMÖLLA</b>	
BYGGERRE:	<b>NORSK TEKNISK PORSELEN</b>	TEGN. DATO	SIGN.
ADRESSE:	<b>SEIERSBORG</b>	25.3.76	
BYGGEADRESSE:	<b>SEIERSBORG</b>	MÅL	<b>1:50-1:100</b>
		TEGN. NR.	<b>772</b>



Plan  
First floor of the Administration building



Detail  
Facade of the Administration building



# Buildings

## The historical development of the site

1916 - 1946

*Start up years*



**1.**  
The Factory (1916)

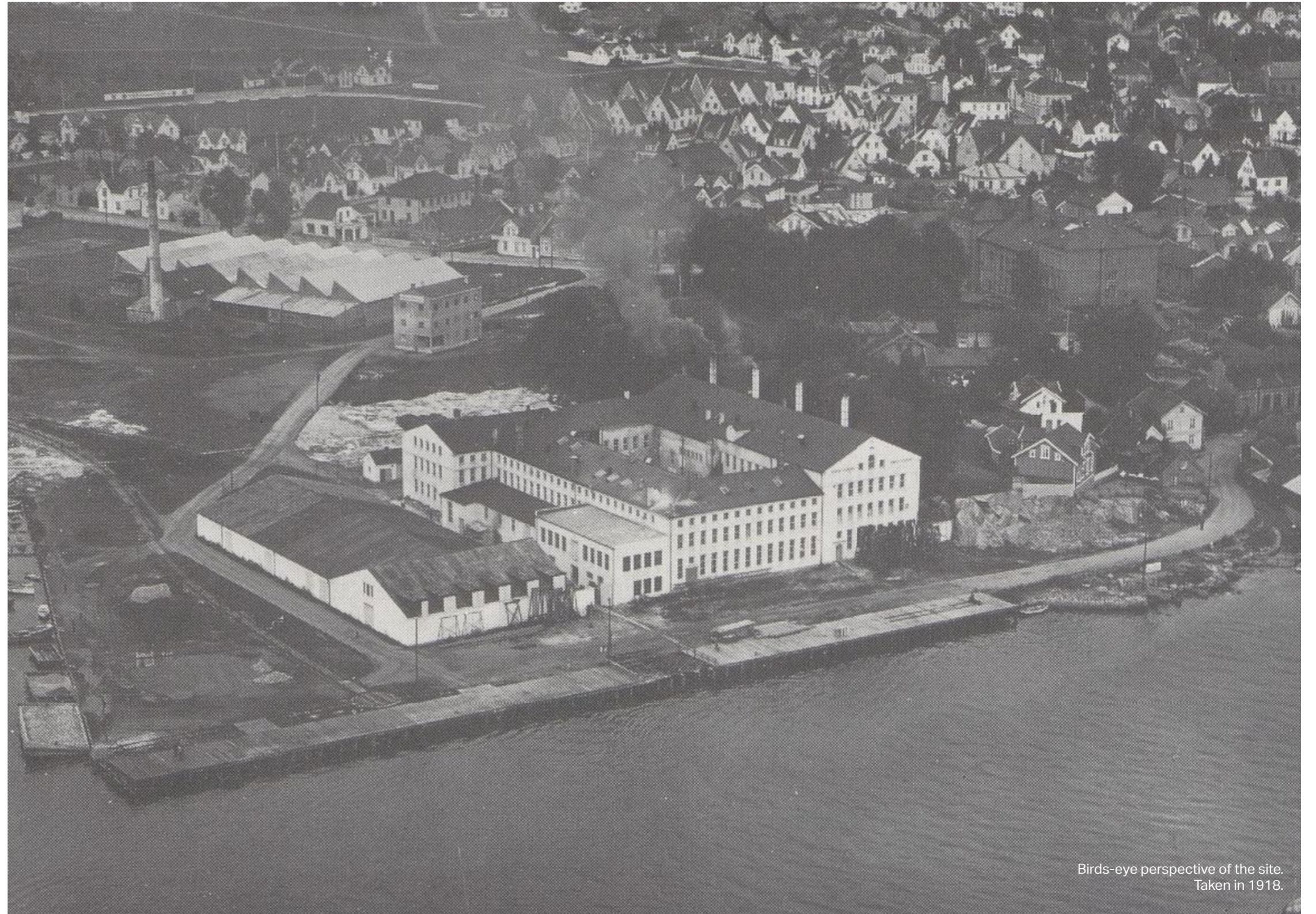
**2.**  
The Raw Material storage (1916)

**3.**  
The shed (1920)

**5.**  
Train track to Kristiania (Oslo)

**6.**  
The factory port

**7.**  
Fredrikstad Mekaniske Verksted (FMV)



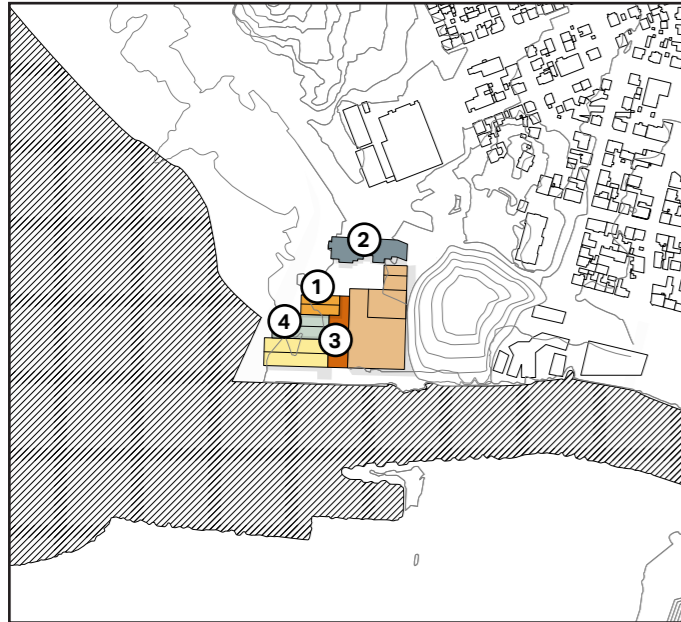
Birds-eye perspective of the site.  
Taken in 1918.

# Buildings

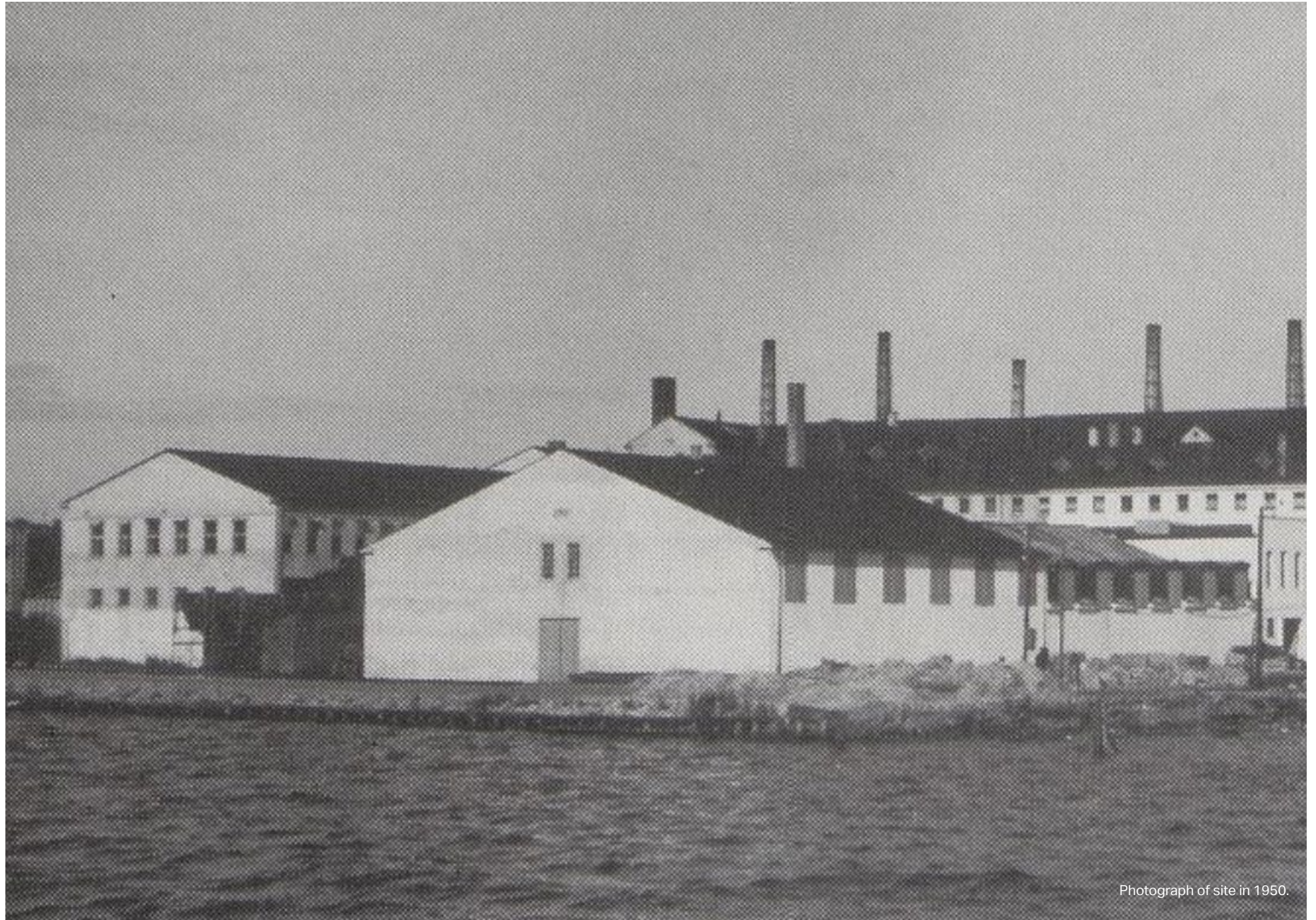
## The historical development of the site

1948 - 1955

*After World War II*



1.  
Composite building (1936)
2.  
The Administration (1948)
3.  
The Niro building (1950)
4.  
Shed nr. 2 (1951)



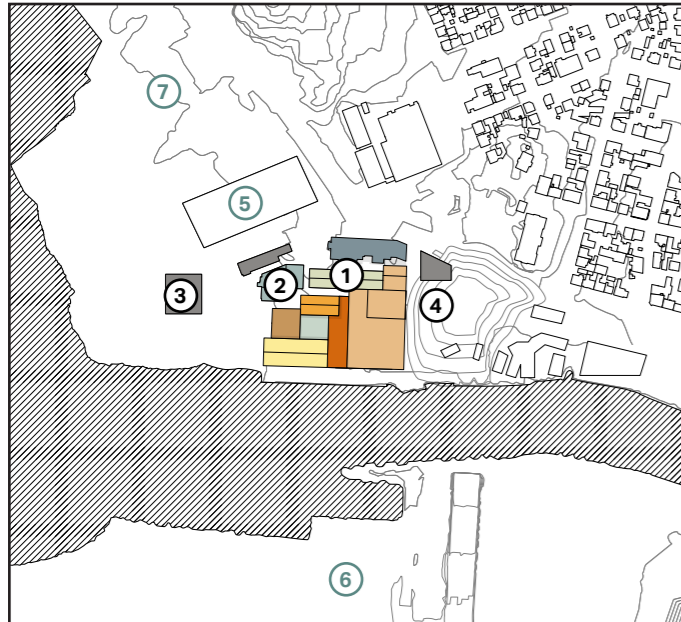
Photograph of site in 1950.

# Buildings

## The historical development of the site

1955 - 1980

*Introduction to plastics and glass prod.*



1. Treatment (1955)
2. Kitteriet (1966)
3. Insulator building (off-site) (1973)
4. Plastics factory (1979)

---

5. Brynildsen AS established

6. Fredrikstad Mekaniske Verksted closed down (1988)

7. Trosvikstranda industrial area expanding



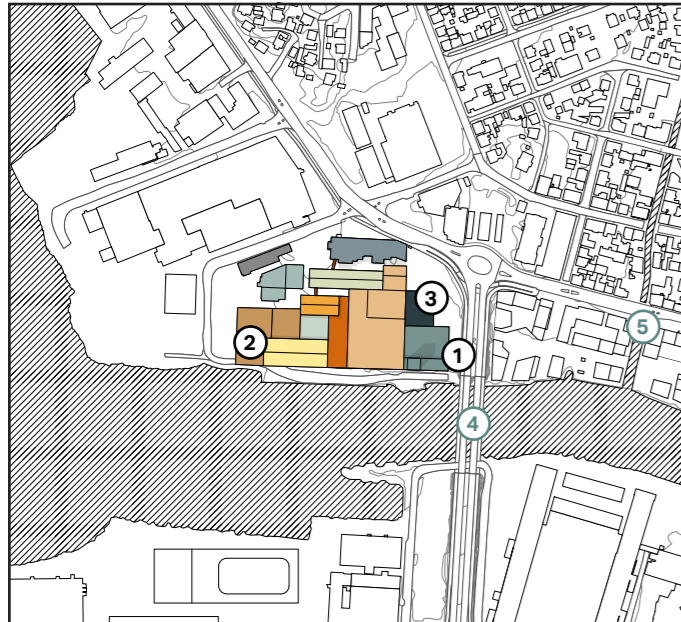
Interior view of Kitteriet

# Buildings

## The historical development of the site

2021 -

*The factory in danger of being kicked out*



1.  
Keram (1984)

2.  
The storage shed (1989)

3.  
New oven building (1999)

4.  
Værstebrua is opened (2011)

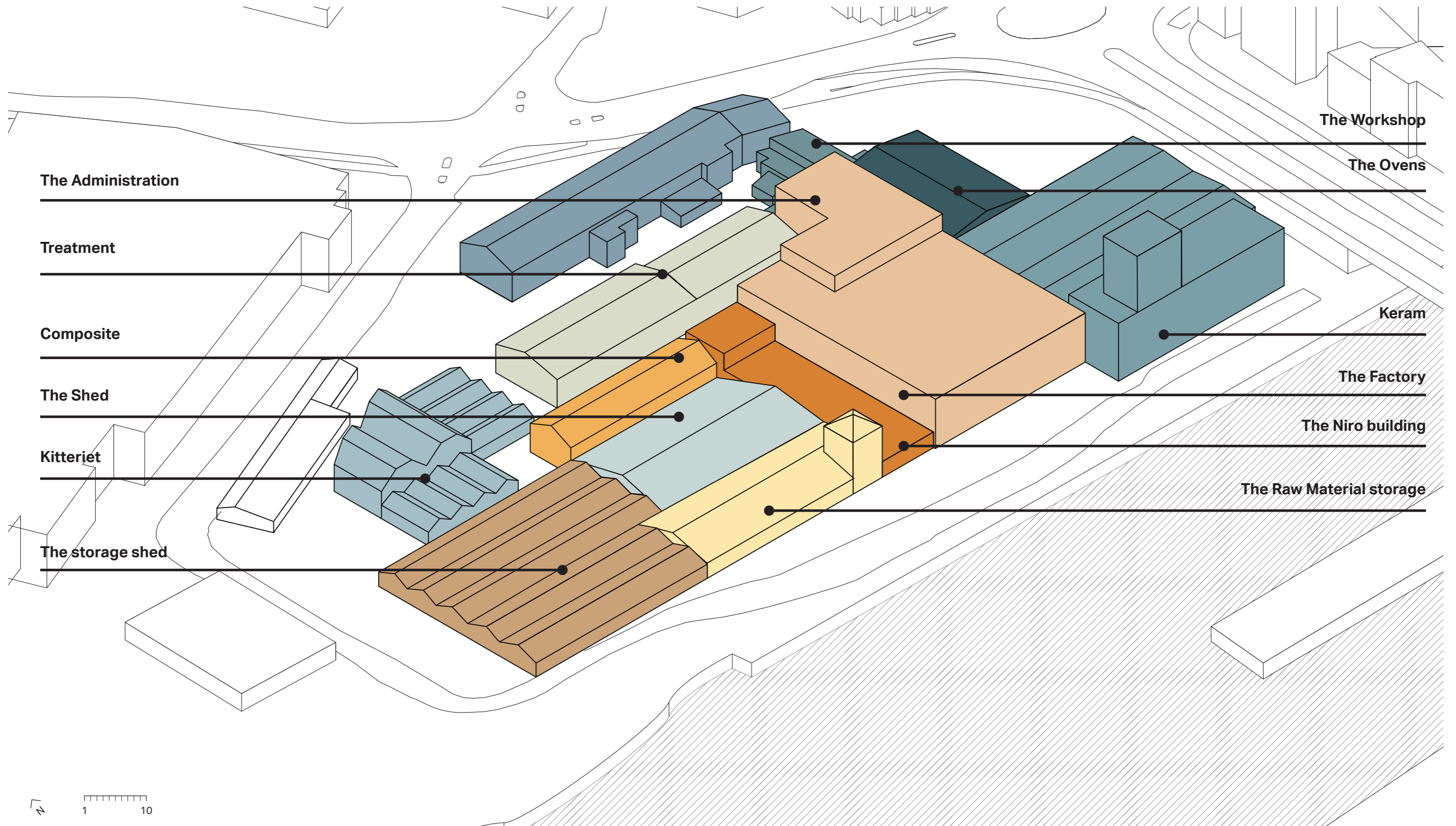
5.  
City centre is expanding and the hidden river is exposed



Photograph of site in 2021.

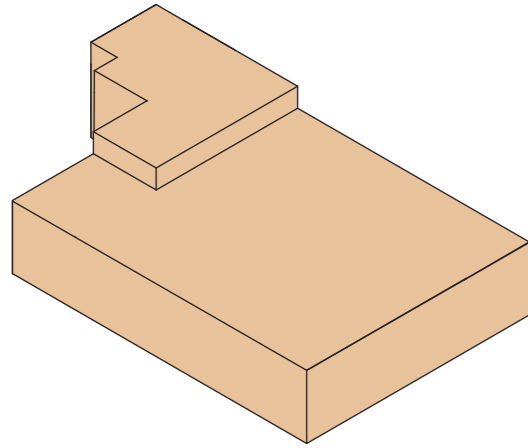
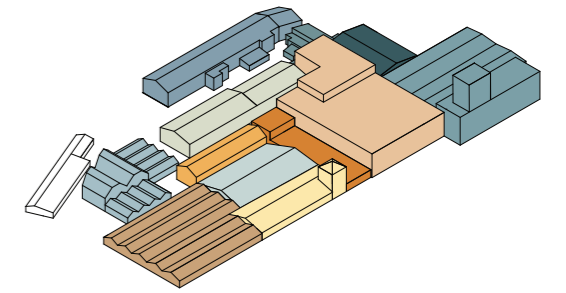
# Buildings

## A complex system of buildings

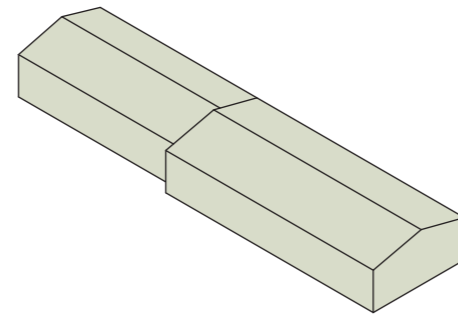


# Buildings

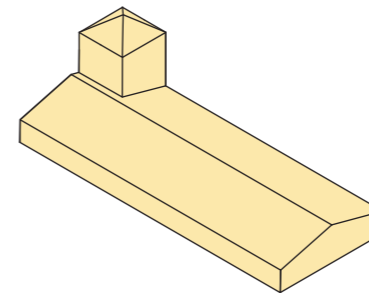
## The buildings sorted by m<sup>2</sup>



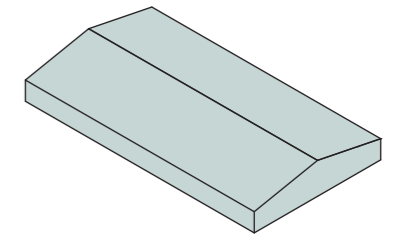
**The Factory**  
Partly in use  
9700 m<sup>2</sup>



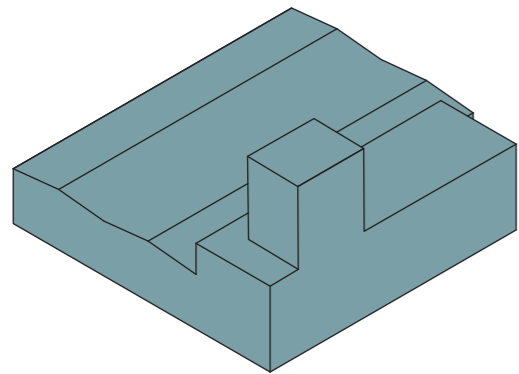
**Treatment**  
In use  
2500 m<sup>2</sup>



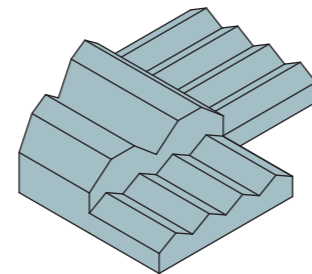
**The Raw Material storage**  
Not in use  
1400 m<sup>2</sup>



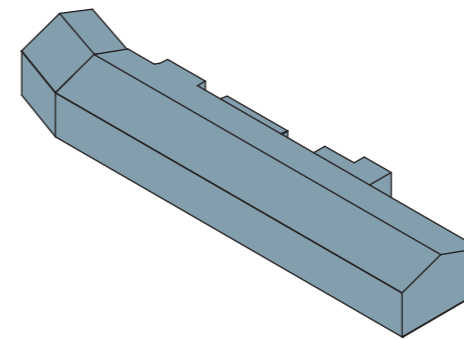
**The Shed**  
Not in use  
1125 m<sup>2</sup>



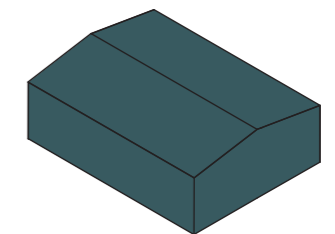
**Keram**  
In use  
3900 m<sup>2</sup>



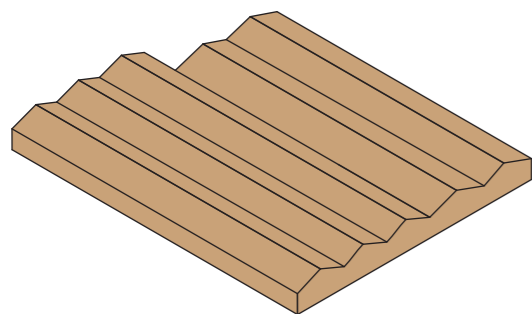
**Kitteriet**  
Not in use  
2100 m<sup>2</sup>



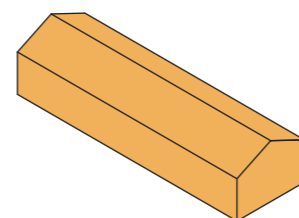
**The Administration**  
In use  
1400 m<sup>2</sup>



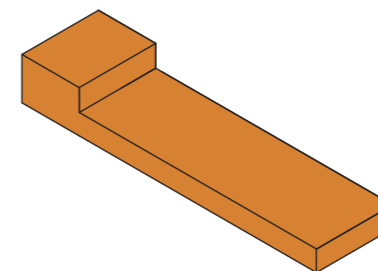
**The Ovens**  
In use  
910 m<sup>2</sup>



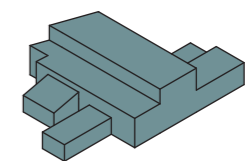
**The storage shed**  
Not in use  
3000 m<sup>2</sup>



**Composite**  
Not in use  
1500 m<sup>2</sup>



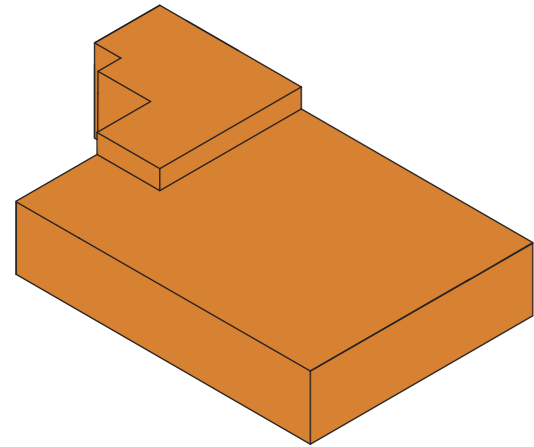
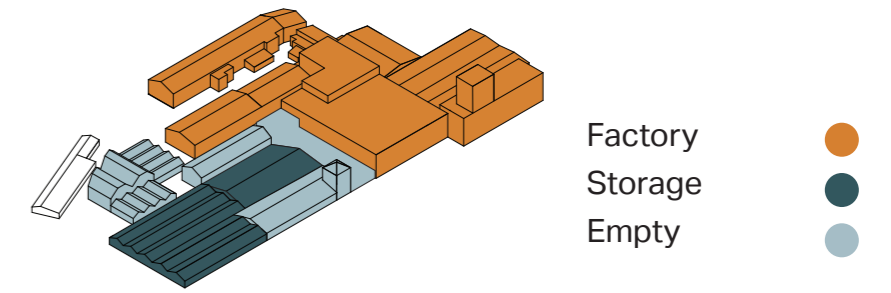
**The Niro building**  
Not in use  
1200 m<sup>2</sup>



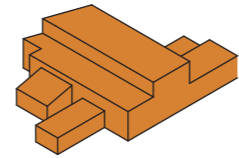
**The Workshop**  
In use  
200 m<sup>2</sup>

# Buildings

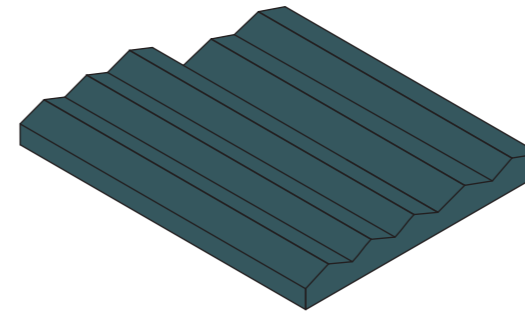
## The buildings sorted by use



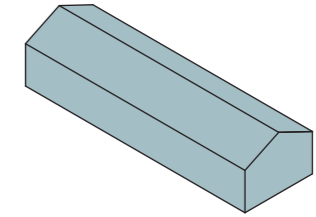
**Keram**



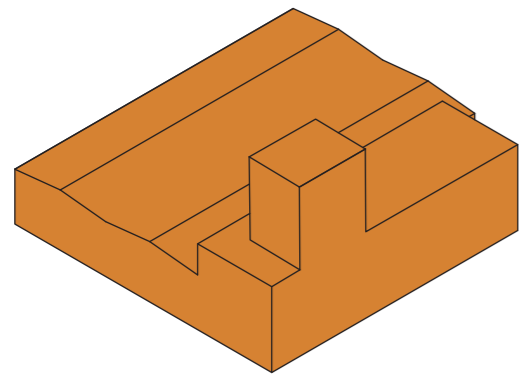
**Treatment**



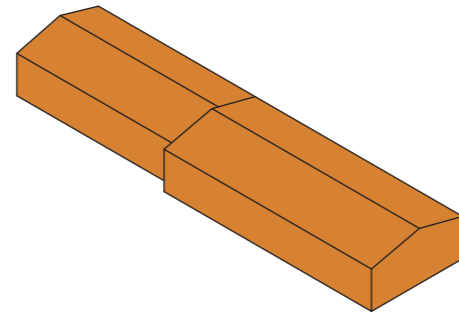
**Kitteriet**



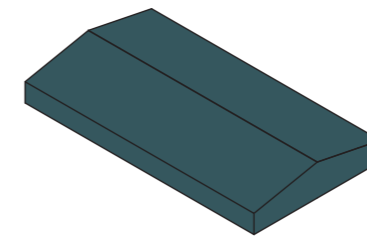
**The shed**



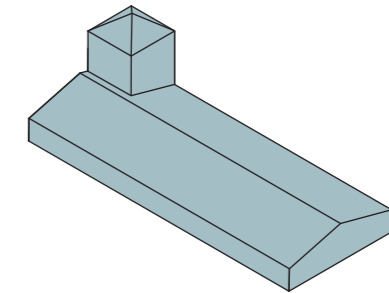
**The Ovens**



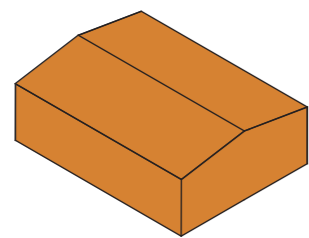
**The Workshop**



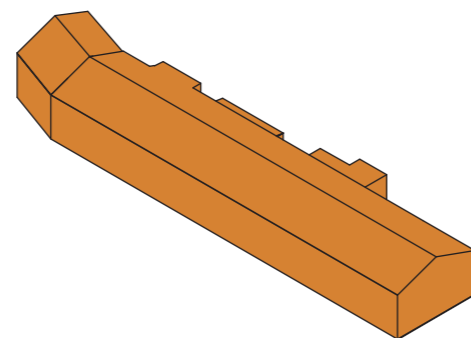
**Composite**



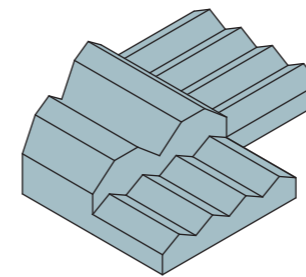
**The storage shed**



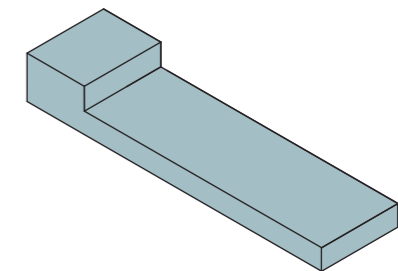
**The Administration**



**The Factory**



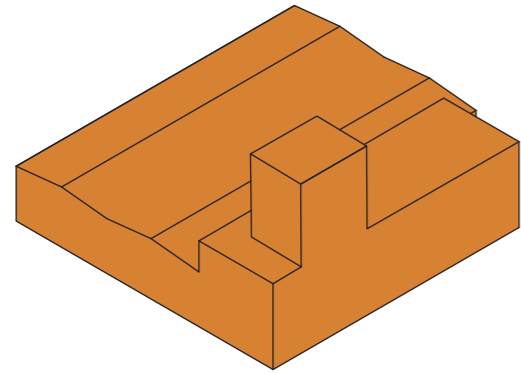
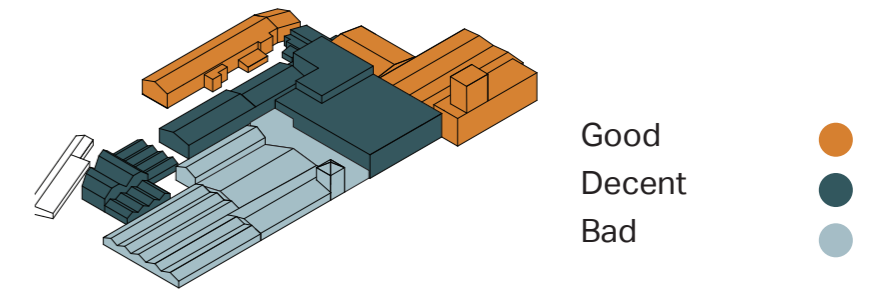
**The Raw Material storage**



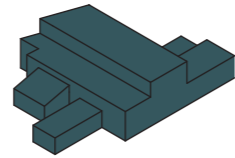
**The Niro building**

# Buildings

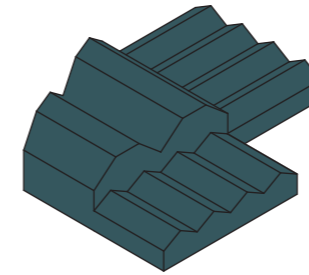
## The buildings sorted by condition



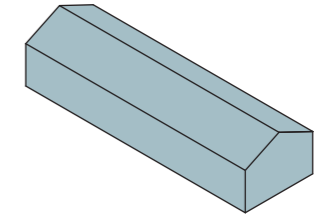
**Keram**



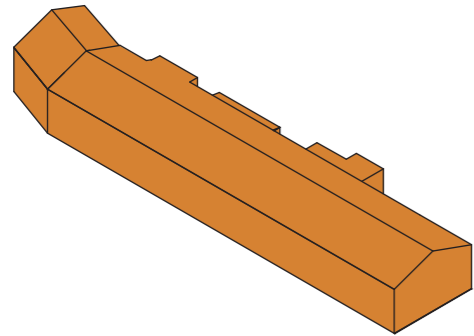
**Treatment**



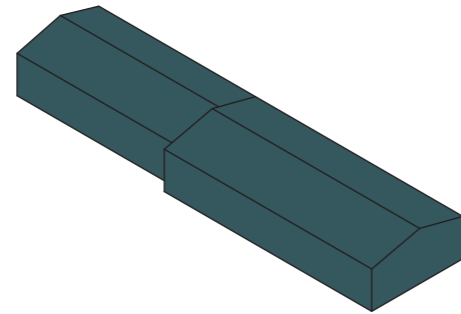
**Kitteriet**



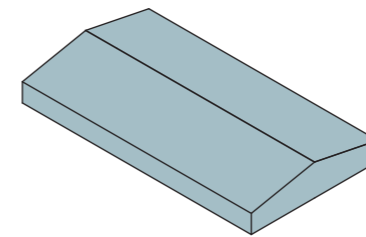
**The shed**



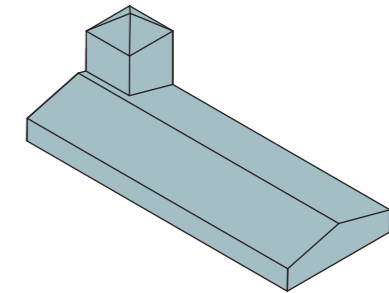
**The Ovens**



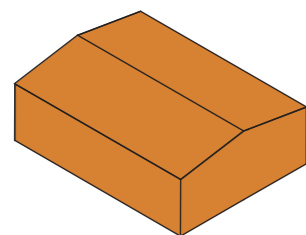
**The Workshop**



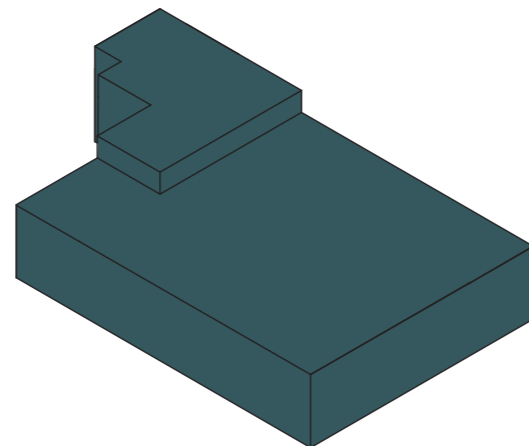
**Composite**



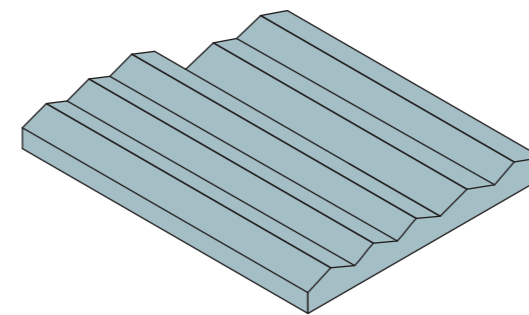
**The storage shed**



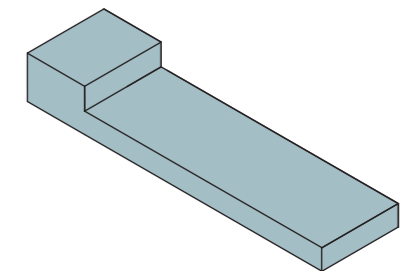
**The Administration**



**The Factory**



**The Raw Material storage**



**The Niro building**



# Buildings



**Keram**



**Treatment**



**Kitteriet**



**The shed**



**The Ovens**



**The Workshop**



**Composite**



**The storage shed**



**The Administration**



**The Factory**



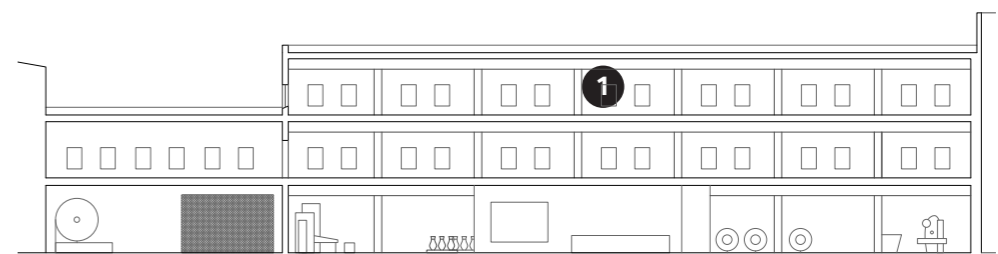
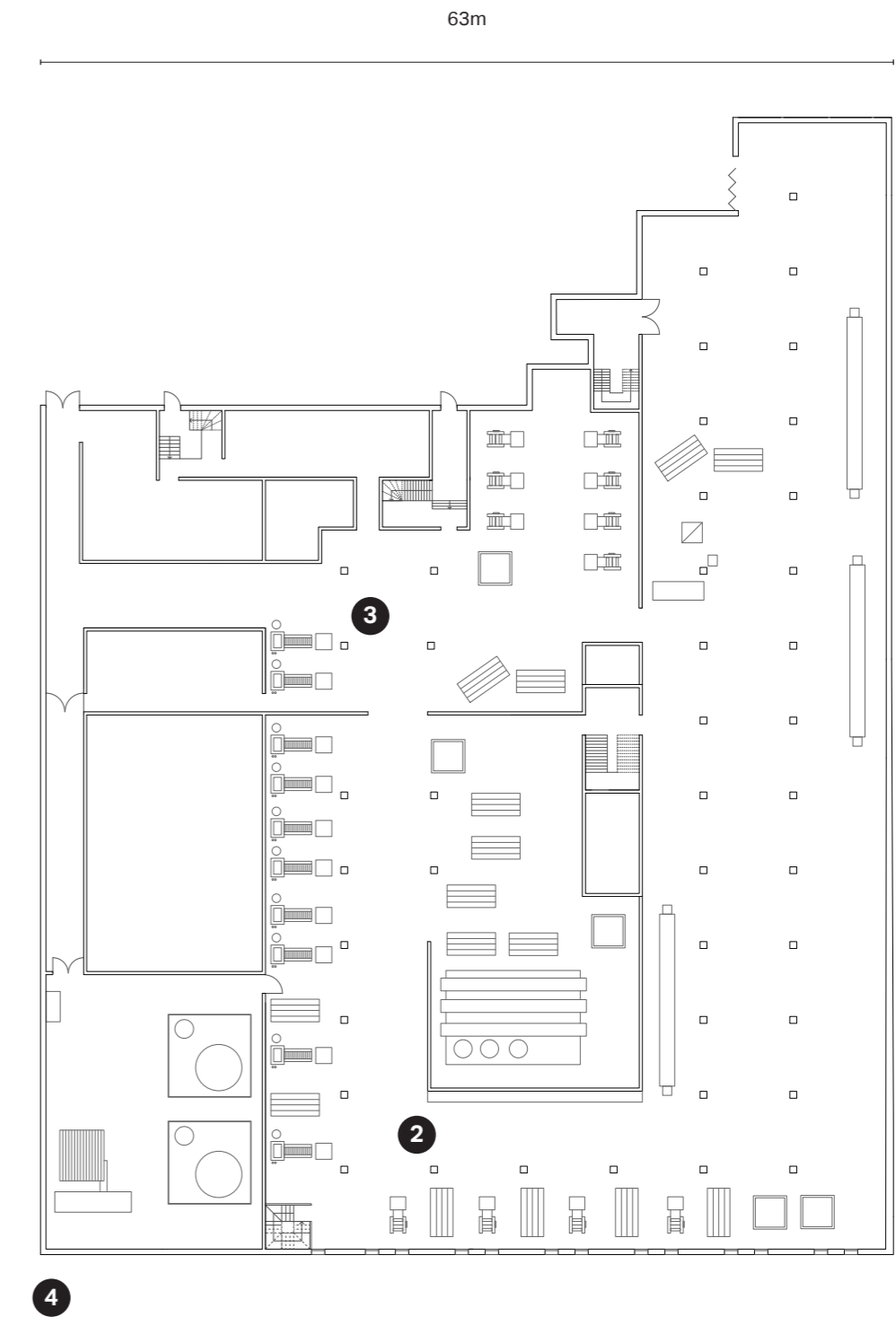
**The Raw Material storage**



**The Niro building**

# Buildings

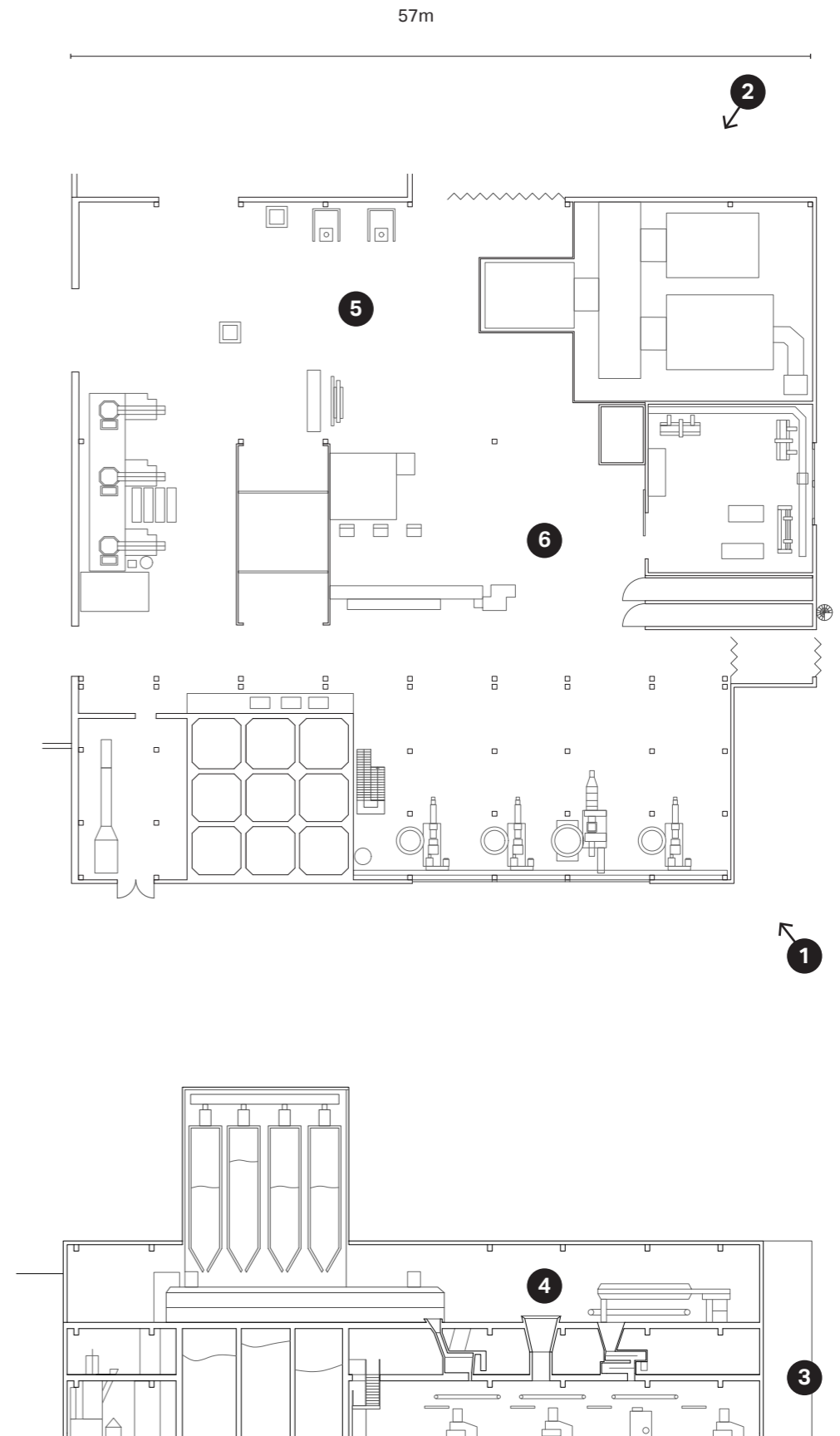
## The Factory



Drawings in scale 1:500

# Buildings

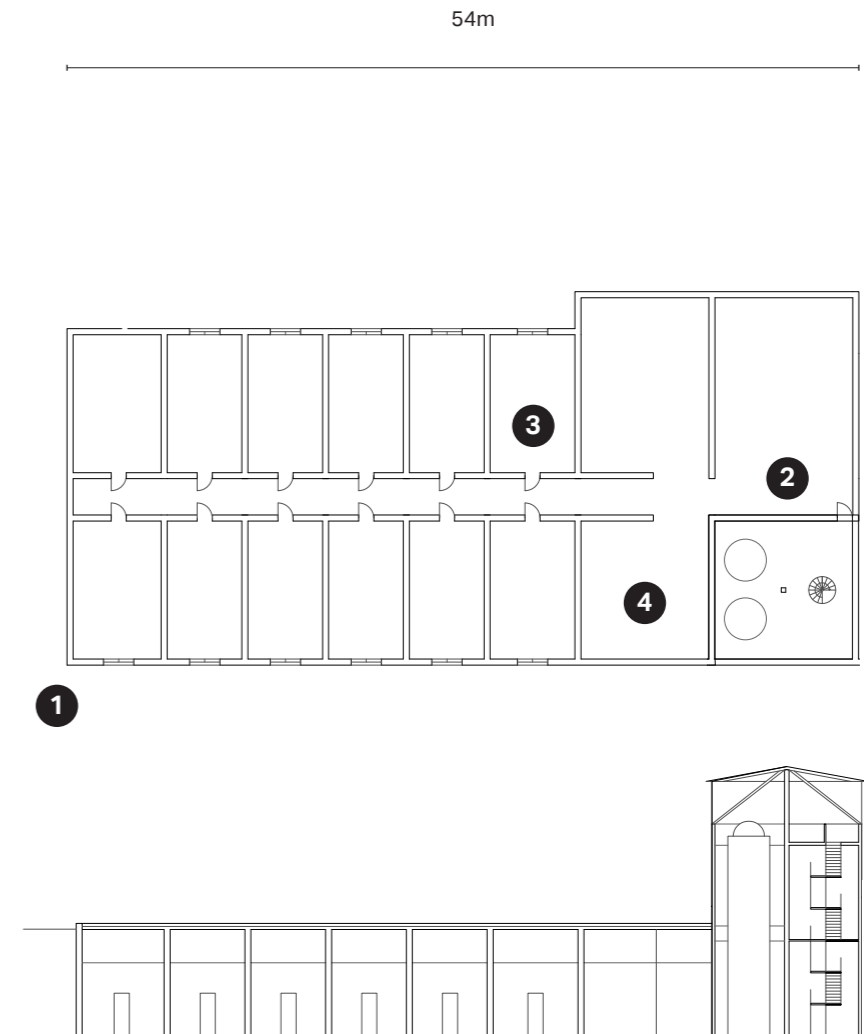
## Keram



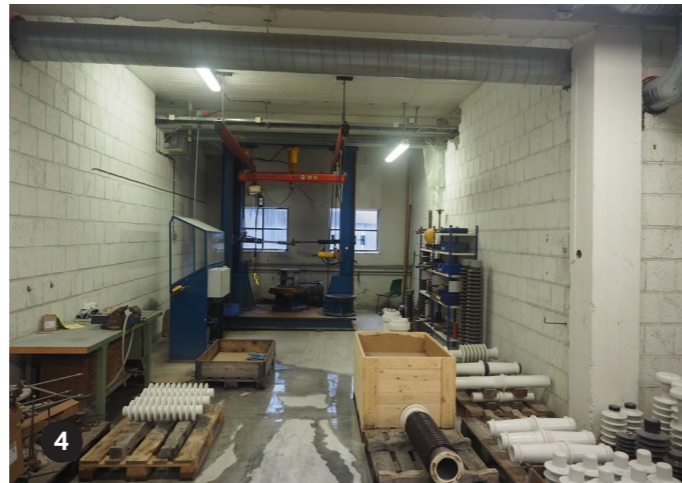
Drawings in scale 1:500

# Buildings

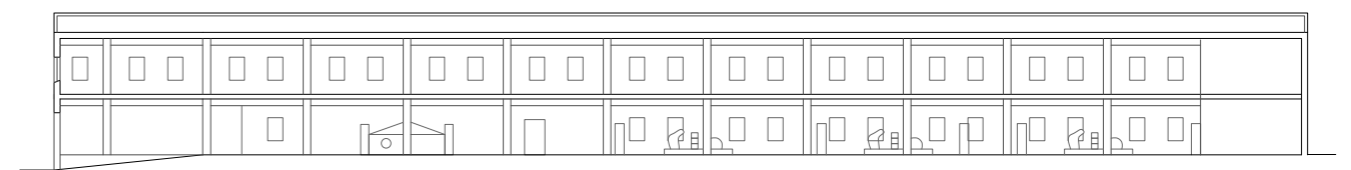
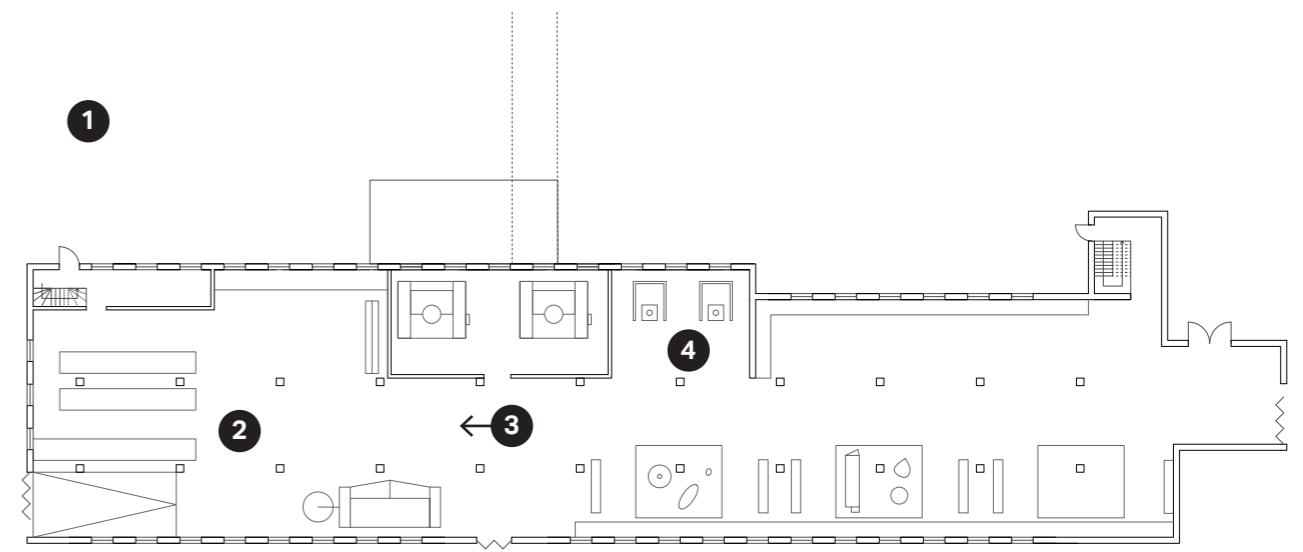
## Raw Material storage



# Buildings Treatment



84m



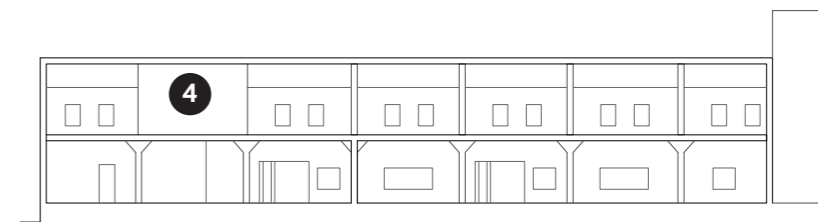
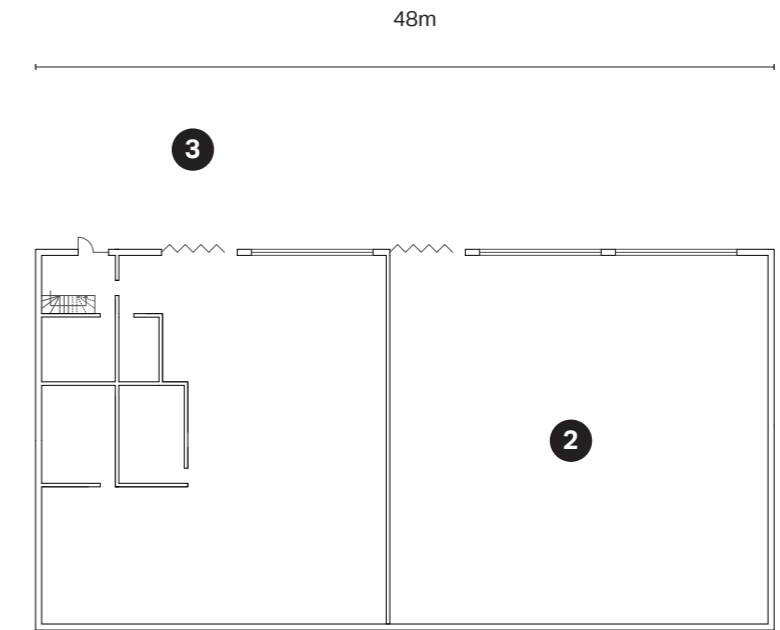
Drawings in scale 1:500

# Buildings

## Composite



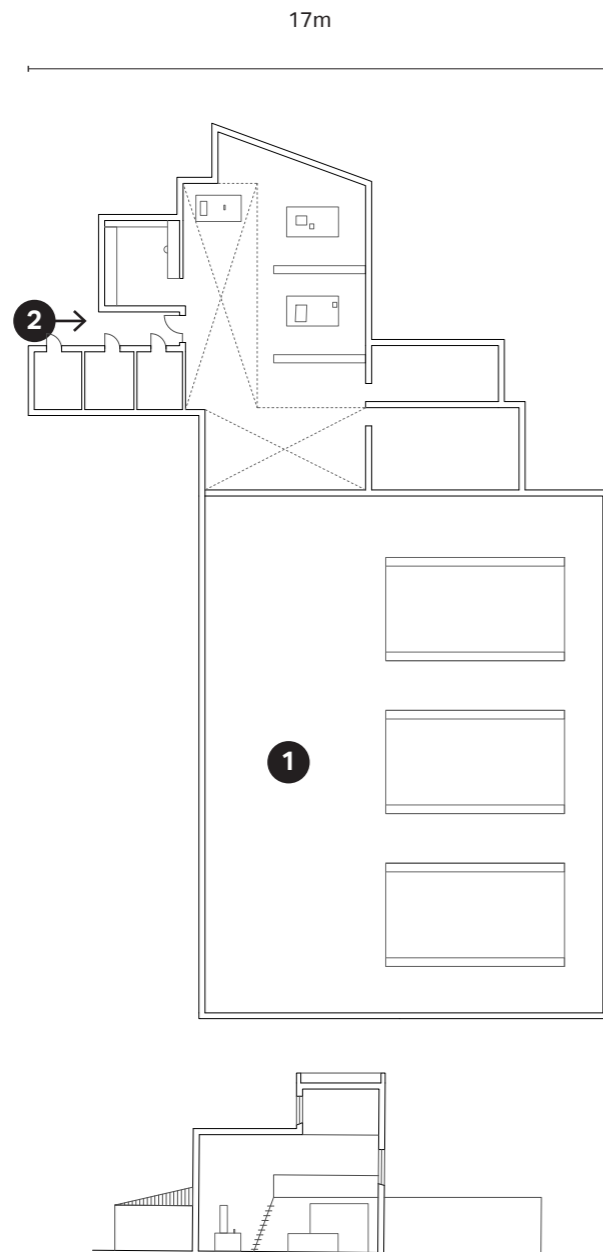
1 →



Drawings in scale 1:500

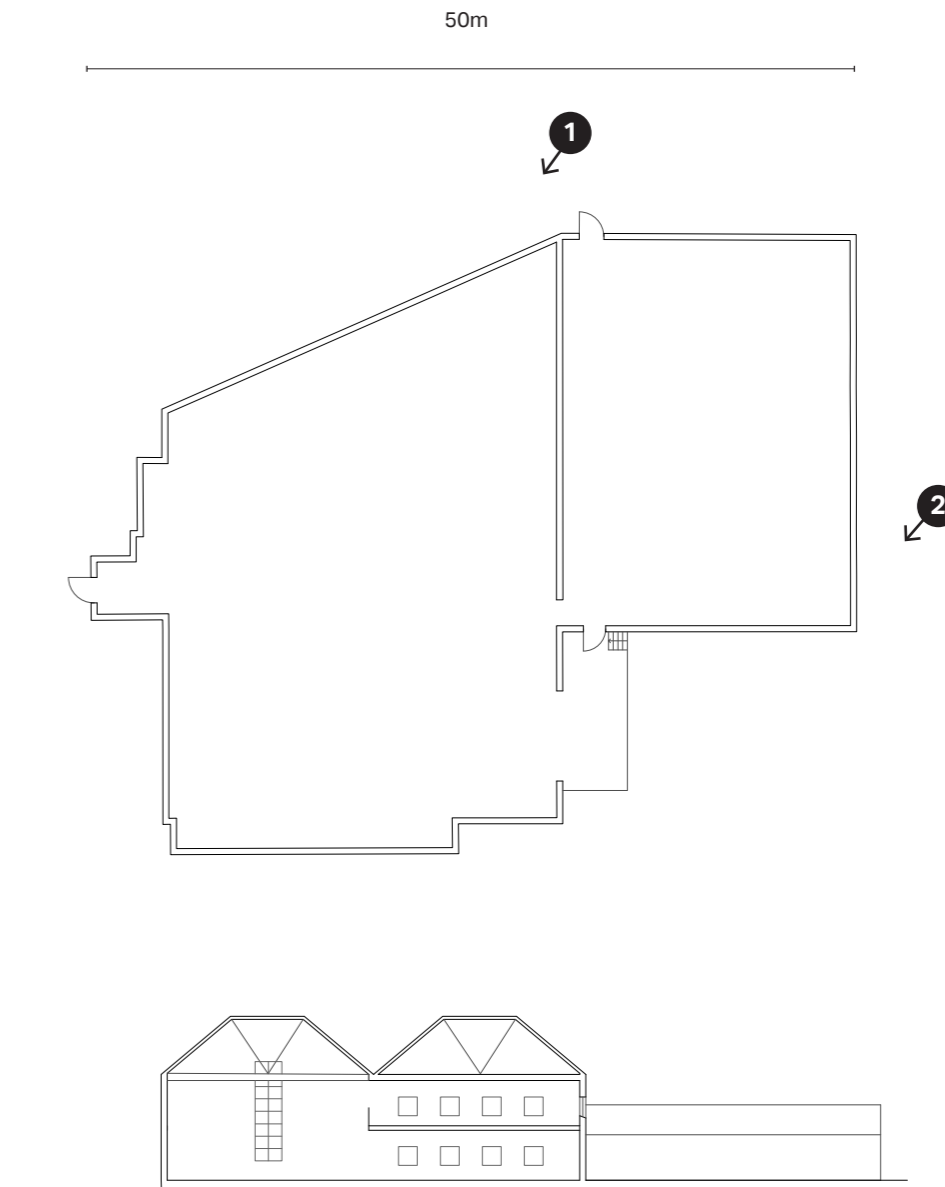
# Buildings

## Workshop and ovens



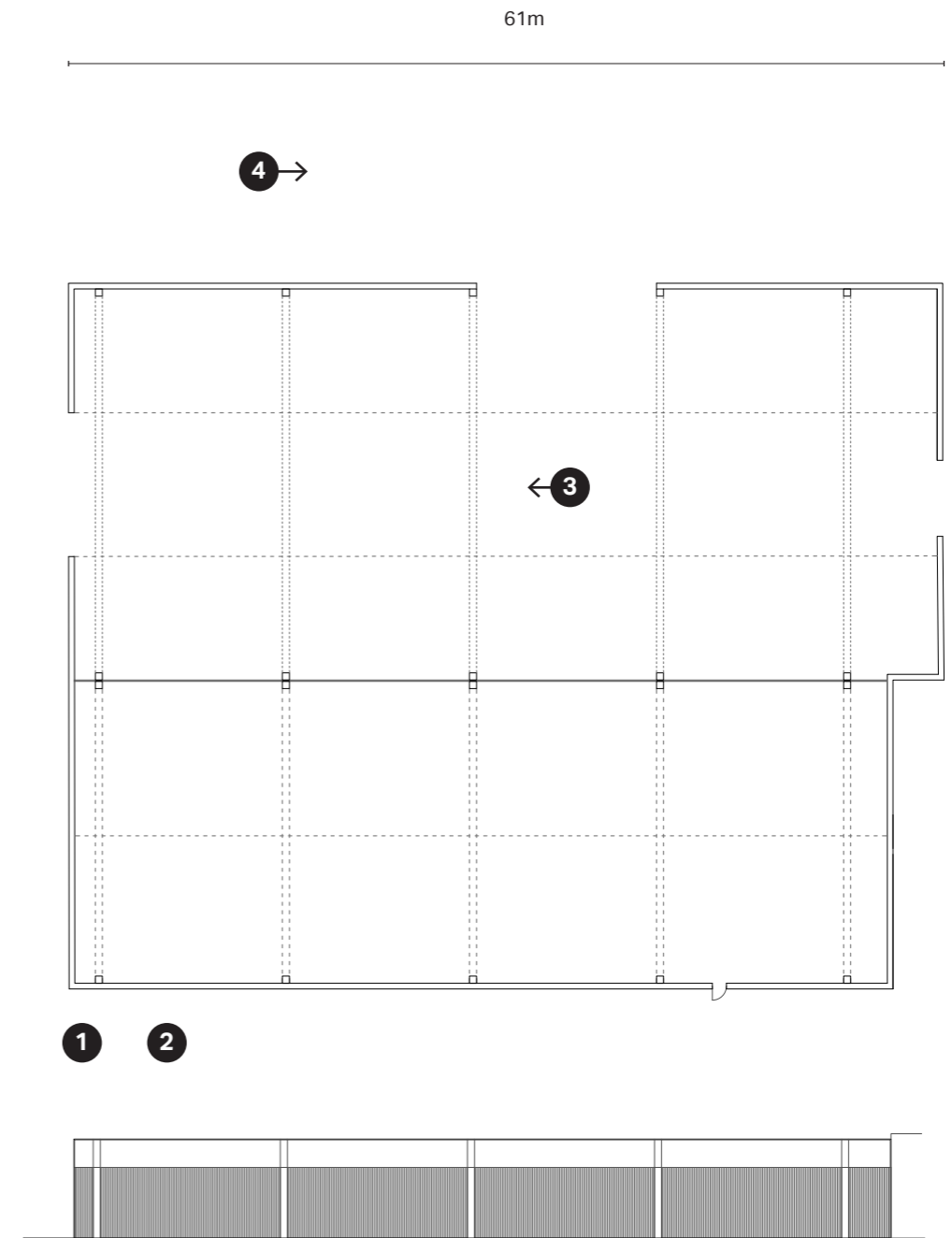
# Buildings

## Kitteriet (Puttiry)



# Buildings

## The storage shed



Drawings in scale 1:500



# Porcelain

Porcelain

**Main ingredients**



**Kaolin**

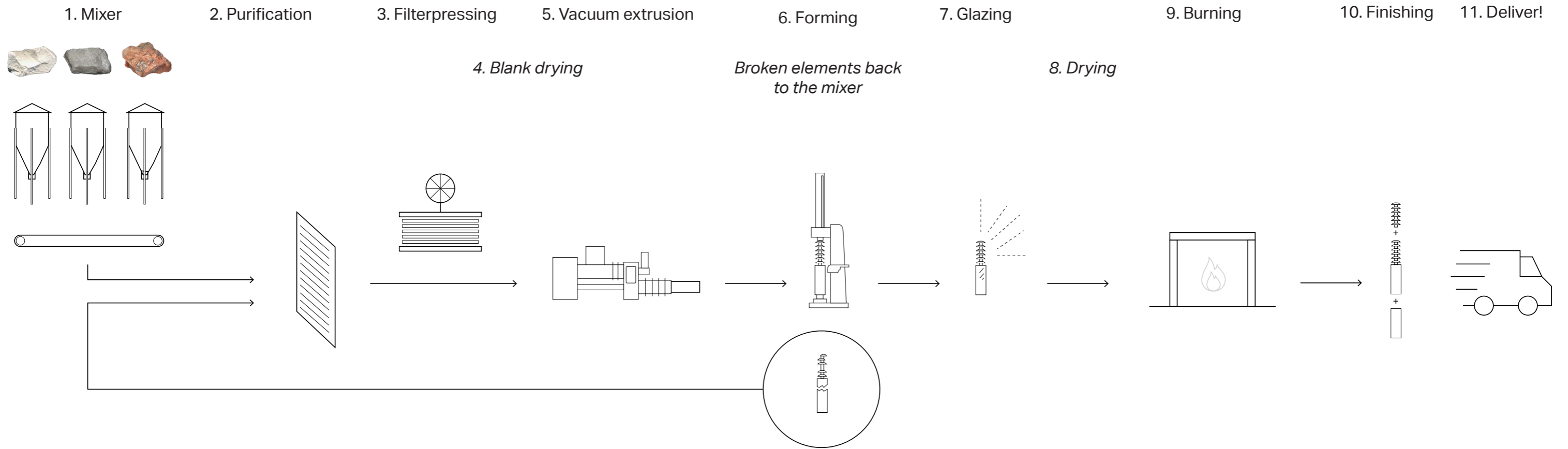


**Quartz**



**Feldspar**

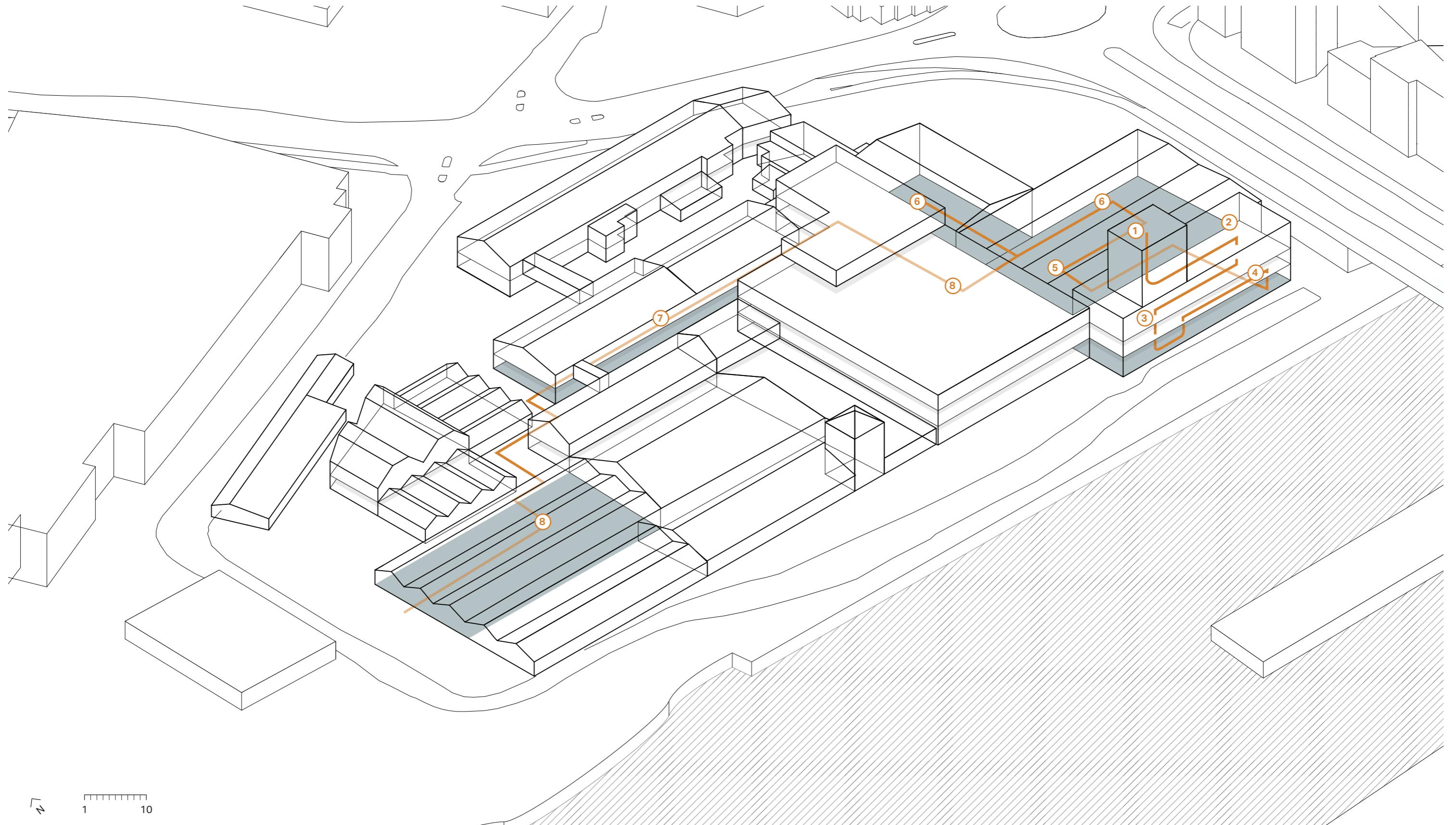
# Porcelain Production process



# Porcelain

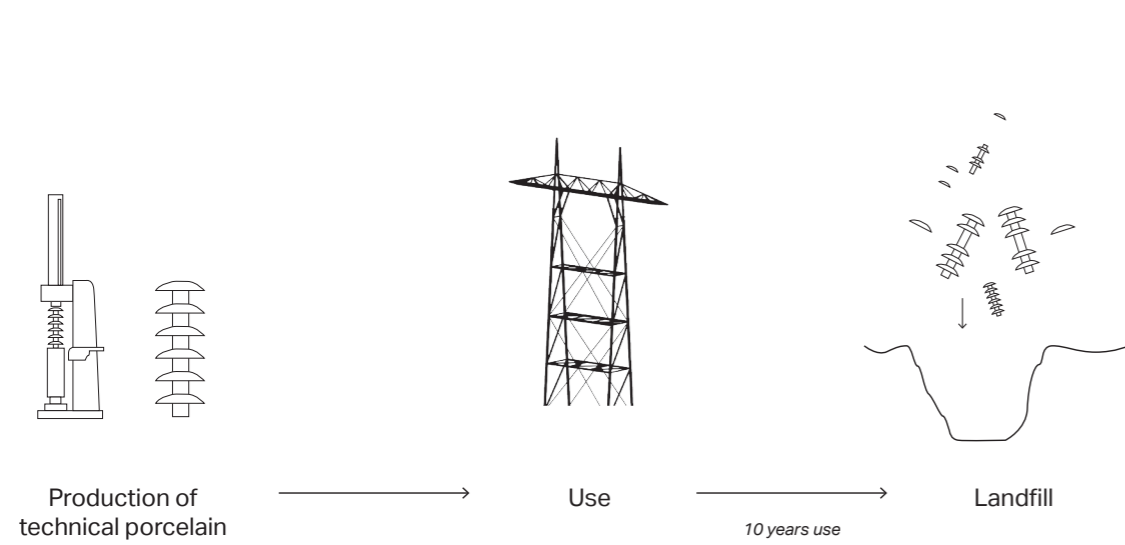
## Production process at site

- |                  |   |         |   |                       |                |   |
|------------------|---|---------|---|-----------------------|----------------|---|
| Mixing           | ① | Forming | ⑤ | Main production areas | ●              |   |
| Purification     | ② | Burning | ⑥ |                       | Porcelain flow | ● |
| Filterpressing   | ③ | Glazing | ⑦ |                       |                |   |
| Vacuum extrusion | ④ | Storage | ⑧ |                       |                |   |

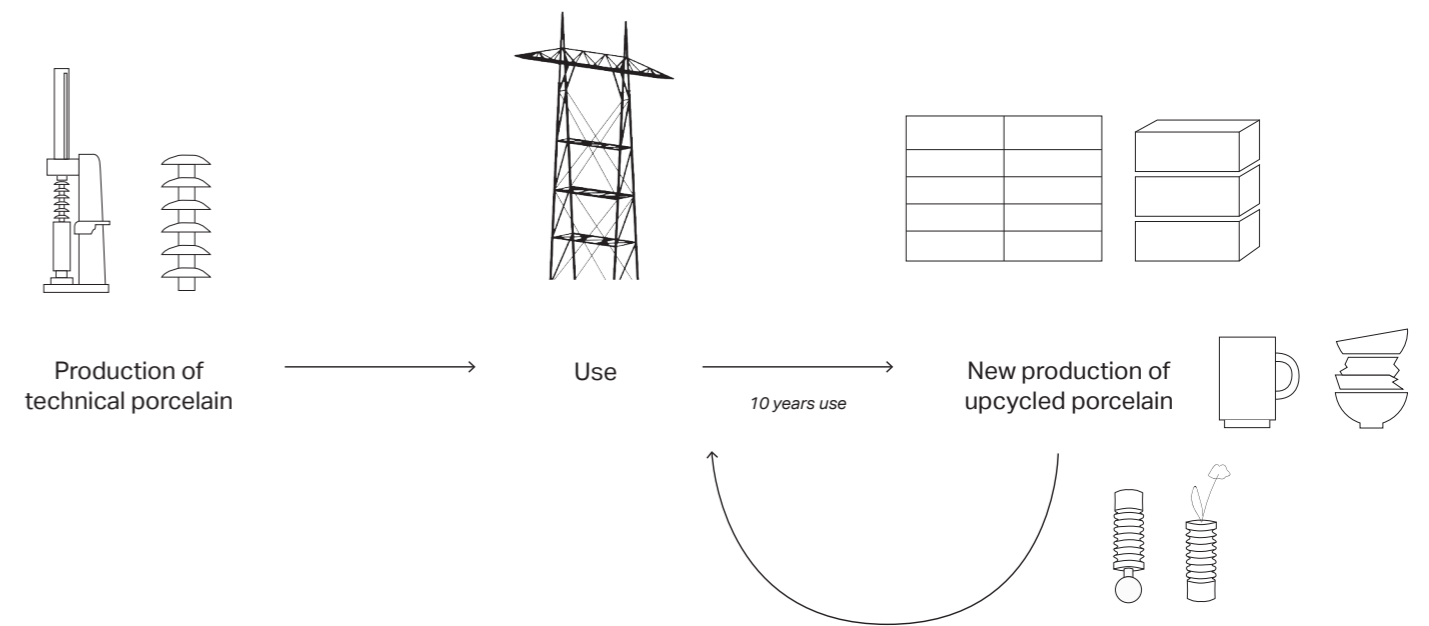


# Porcelain intentions

## Porcelain - from a linear economy →



## to a circular economy!



# Porcelain intentions

## Future porcelain production

Current production ●  
Upcycling process ●

