

RADIO REMNANTS

Diploma
Maximilian Svendsen



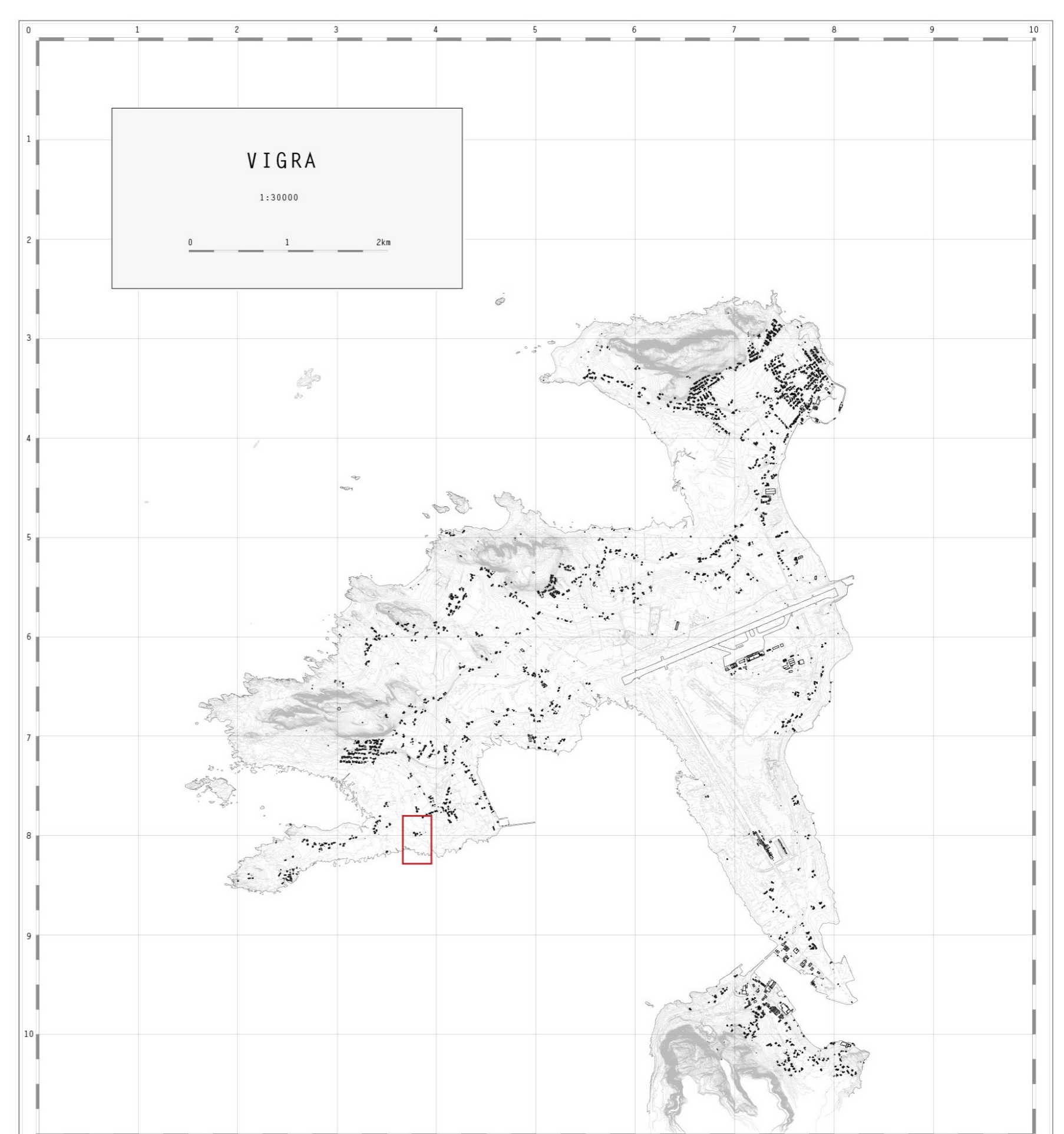
ABSTRACT

How do you commemorate something that no longer exists?
This diploma seeks to make amends with a loss through the processing of remains.

The 240 meter tall radio mast of Vigra broadcasting station was demolished in 2011, it left behind an almost 100 year long story of when radio came to Norway. The introduction of radio changed the very fabric of society and its continued use stands as a testament to the importance this technology still has in society. The radio mast at Vigra represented the early beginnings of telecommunication, at a time marked by rapid progress as wireless entertainment, information and communication came into everyday life. The radio masts destruction cannot be undone, but if you dig underneath the surface remnants will reveal themselves.

Like a tree, the radio mast had a subterranean grounding system of copper wires extending out from its base. The state and extent of the wiring poses an ecological risk, but also an opportunity to reconnect with the history of the site in a way that can generate a new future for Vigra broadcaster.

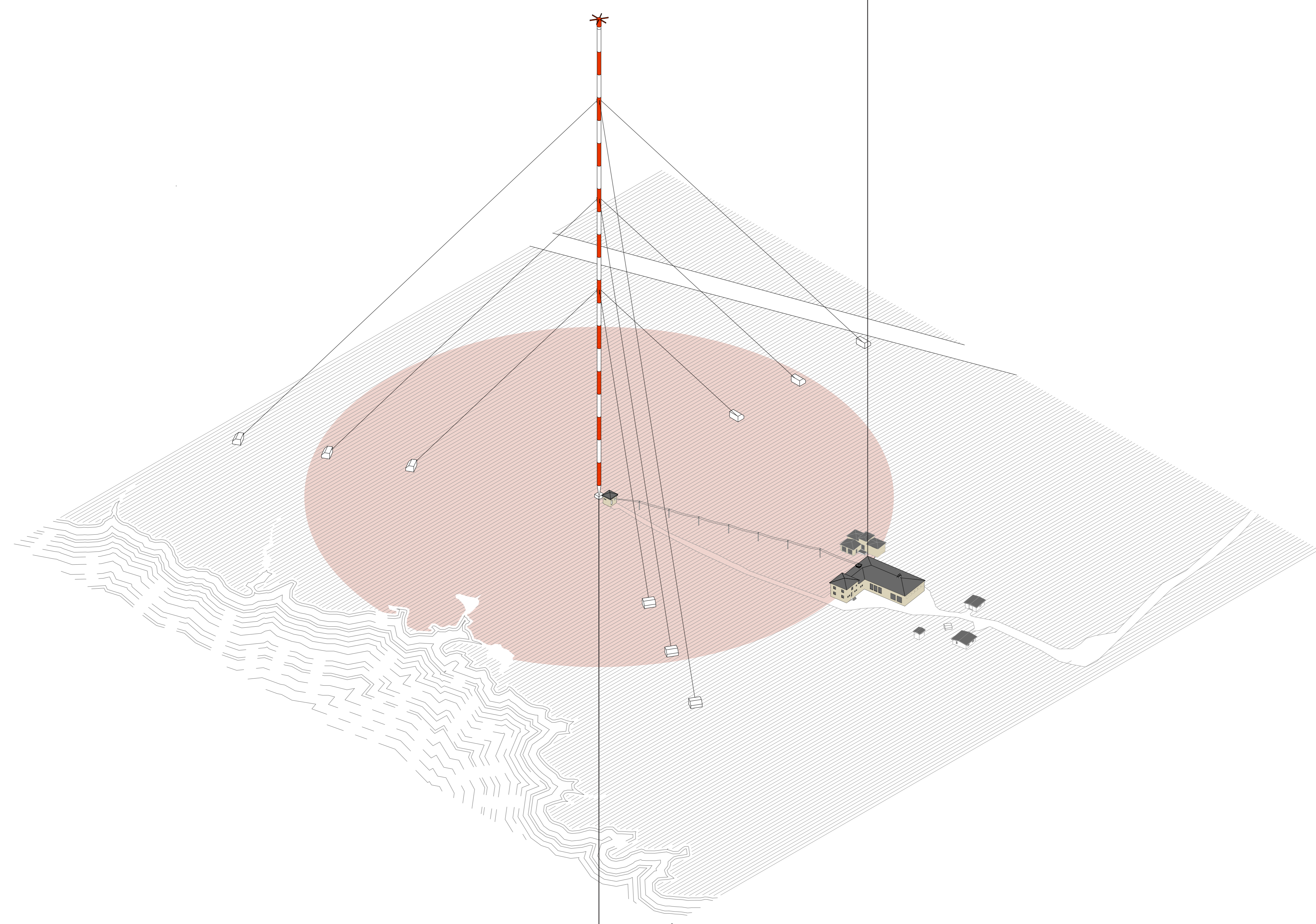
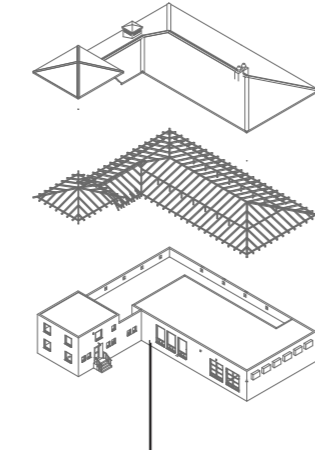
Since the site's closure several attempts at establishing a museum in the broadcasting station have been made, but none has succeeded. This project proposes an architectural program centered around the transformation of the remnants from the site and establishes a museum that is part of creating its own collection. By utilizing certain plants through a process called phytoextraction, heavy metals like copper can be harvested from the soil. The plants absorb the metal into their tissue and through repeated cycles of planting, harvesting and processing the copper can slowly be removed from the soil. This process is cyclical in nature, and as the seasons change so does the program to allow for the different processes to expand and contract together with the museum.



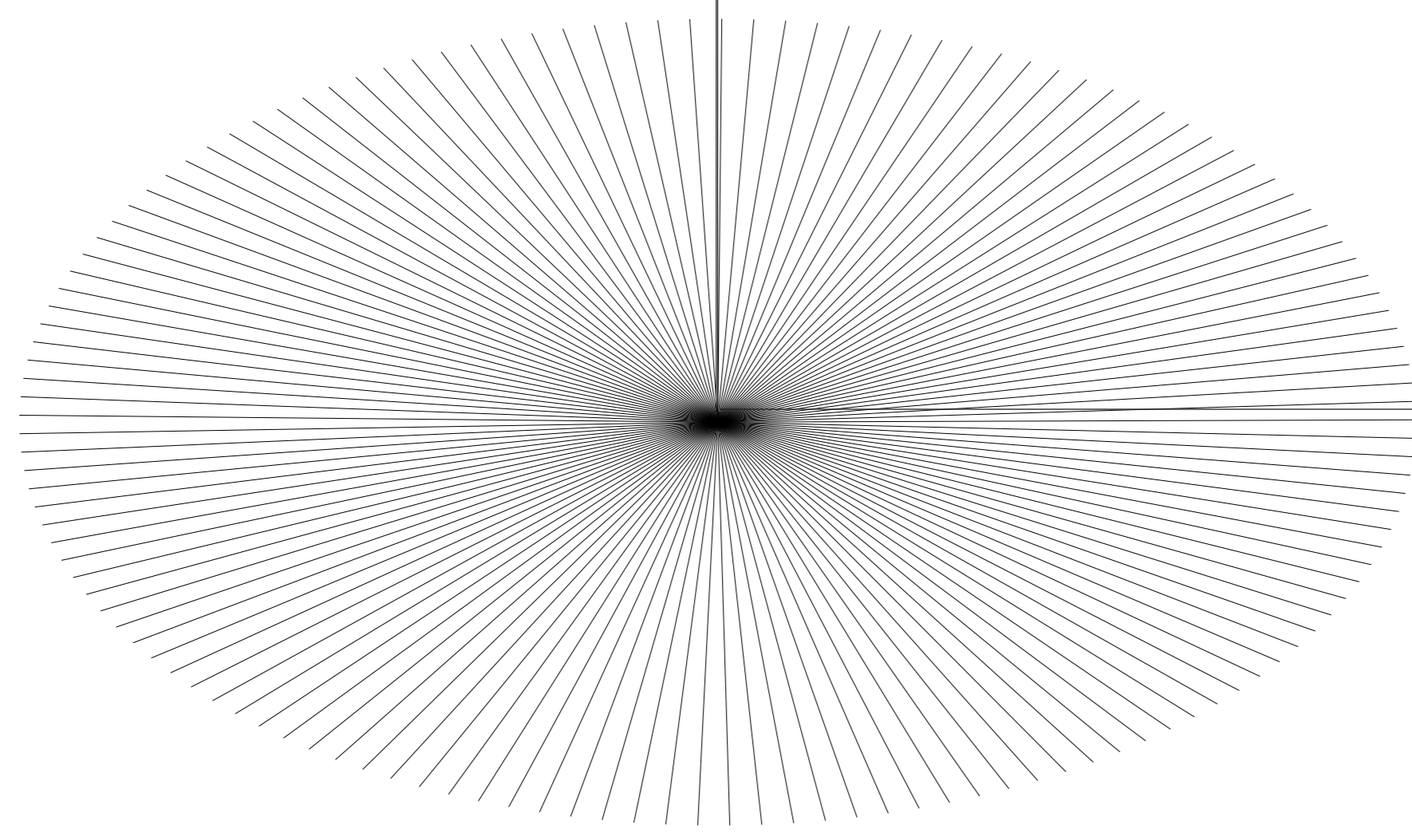
Supervisors

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Nick Coates
Alena Beth Rieger

REMNANTS
OF A
RADIO
STATION



REMNANTS
OF A
RADIO
TOWER



5 4
GROUND FLOOR

SECOND FLOOR

6 7

SECTION

ELEVATION

VIGRA
RADIO
STATION

1 SENDER HALL
2 TRANSMITTER ROOM
3 CONTROL
4 TECHNICAL
5 WORKSHOP
6 BREAK ROOM
7 OFFICE
8 BEDROOMS
9 LOFT

DRAWING

FORMAT A1

SCALE 1/200

RADIO REMNANTS

480 M

120 M

240 M

1

2

3

COPPER WIRE
16/15 GAUGE

VIGRA
RADIO
TOWER

DEMOLISHED

1 Wave length 480 m (λ=270kHz)
2 Mast height 120 m
3 Grounding system 120 m

The ideal height of a radio mast depends on transmission frequency, the geographical distribution of the listening audience, and terrain. The height of the mast is usually specified in fractions of the wavelength, or in electrical degrees. The mast at Vigra was 1/4 electrical degrees, 1/4 of the length of the wave. Vigra was operating at a frequency of 429 kHz thus giving it a wavelength of roughly 698 meters, a mast height of 120 meters and grounding systems in one quarter of that of 120 meters. Vigra's grounding system consists of 120 copper wires 16 mm (roughly 1/4 inch) diameter run from the base of the mast. While the mast was removed in 2011 the wires still remain in the ground.

DIAGRAM

FORMAT A1

SCALE 1/1500

RADIO REMNANTS

VIGRA
GROUNDING
SYSTEM

Vigra broadcasters grounding system consists of 9648 meters of wire and a little more than 1 tonne of copper. Copper is a heavy metal and trace amounts in the soil are important for plants, but too much is problematic. Copper will accumulate in plants that absorb soil and can cause serious health issues over time. While this is a highly localized issue, the copper will continue to leach into the ground in decades to come if nothing is done to remedy the situation. This project proposes utilizing plants to remove the copper in a process called phytoextraction. Certain plants can accumulate large amounts of copper in their tissue, and through repeated cycles of planting and harvesting the copper can essentially be harvested from the soil.

PHYTOEXTRACTION

DIAGRAM

FORMAT A4

SCALE 1/2500

RADIO REMNANTS

INTERVENTIONS

New insulation on the outside protects the structure from further weathering from the harsh coastal climate.
Re-used slate from old roof as cladding.

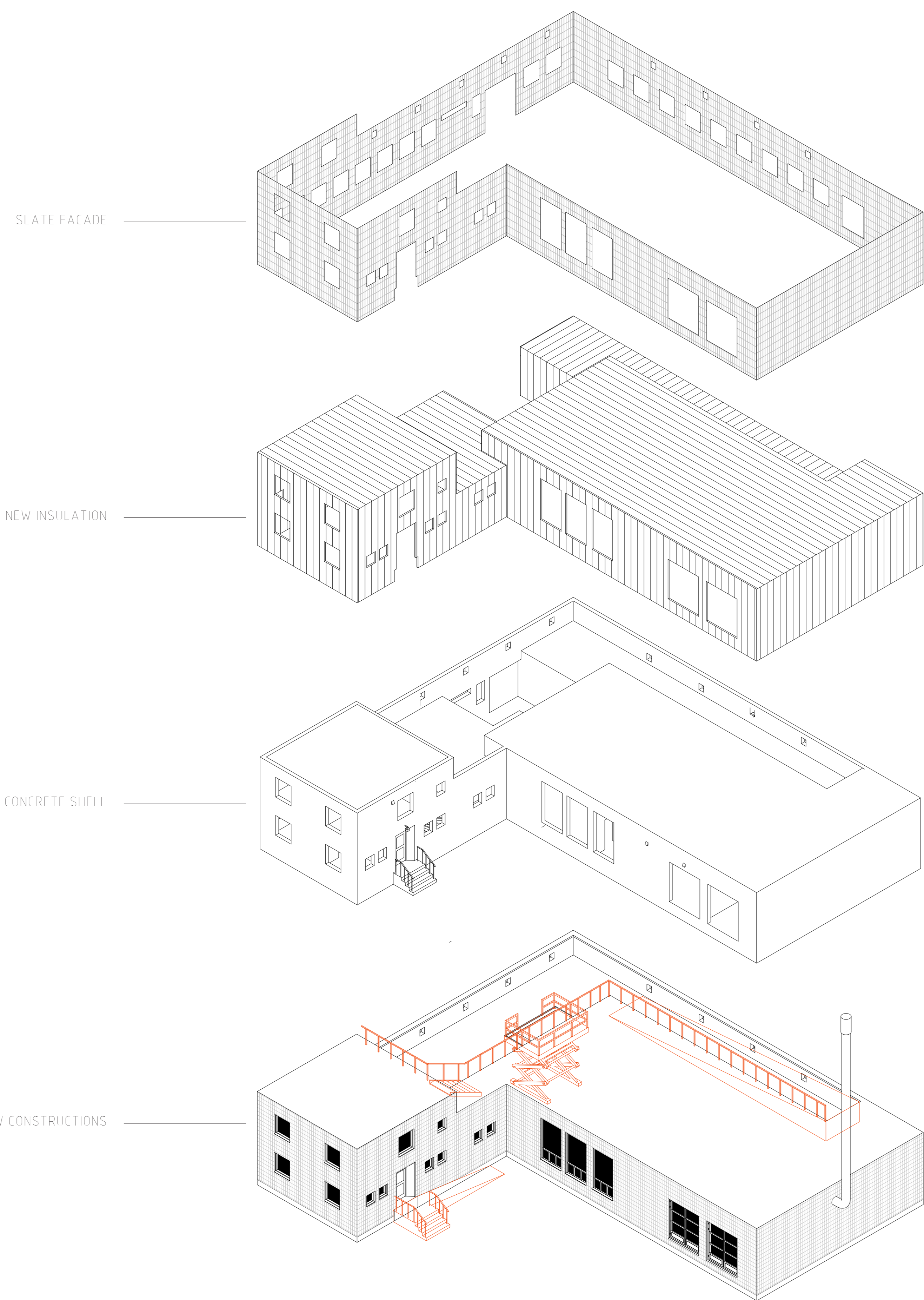
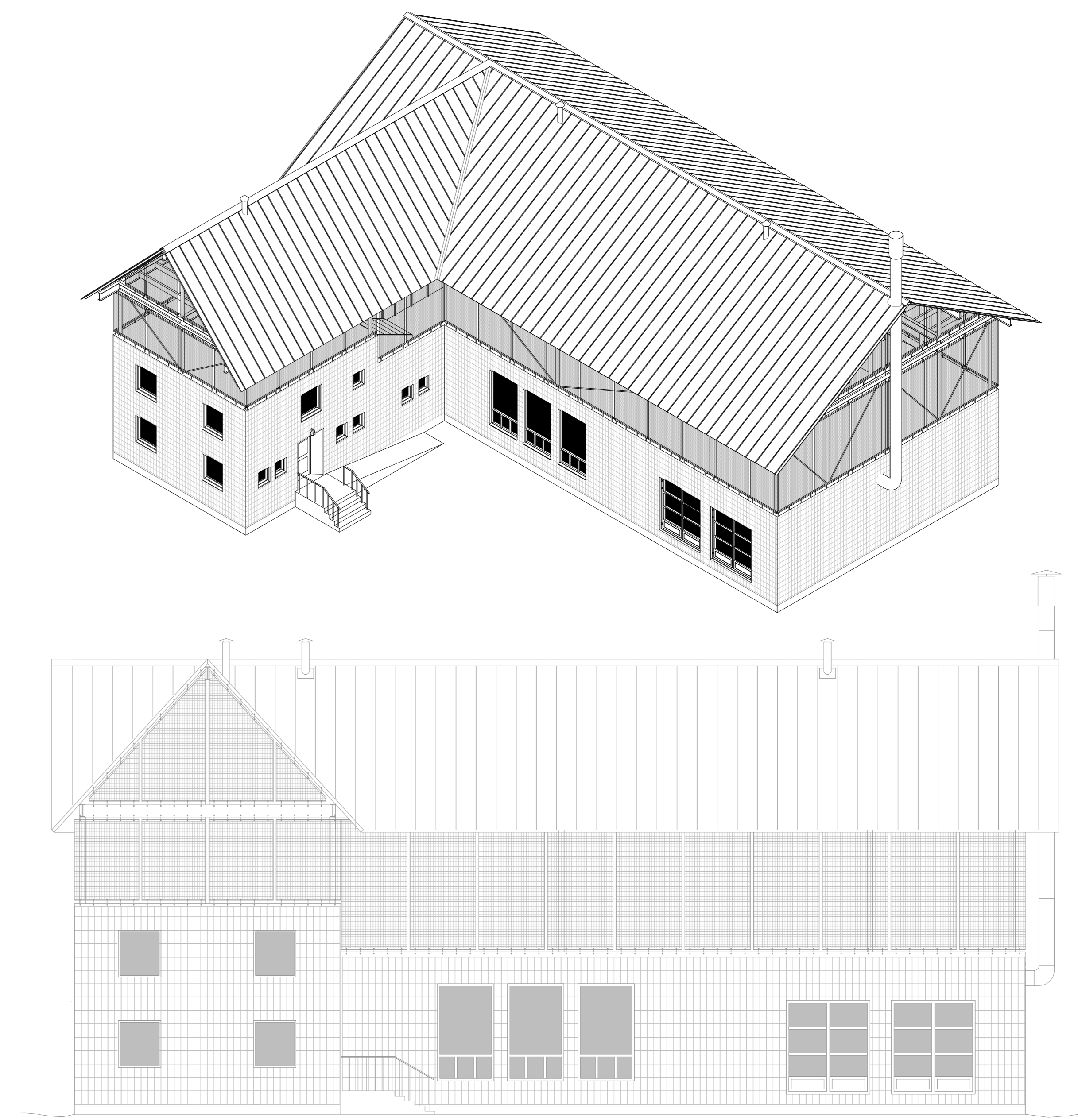


DIAGRAM	
FORMAT	A4
SCALE	1/2500
RADIO REMNANTS	1



ELEVATION

1/100
RADIO REMNANTS

INTERVENTIONS

New open roof structure on top of existing building will provide ample room for drying of plant matter before processing.

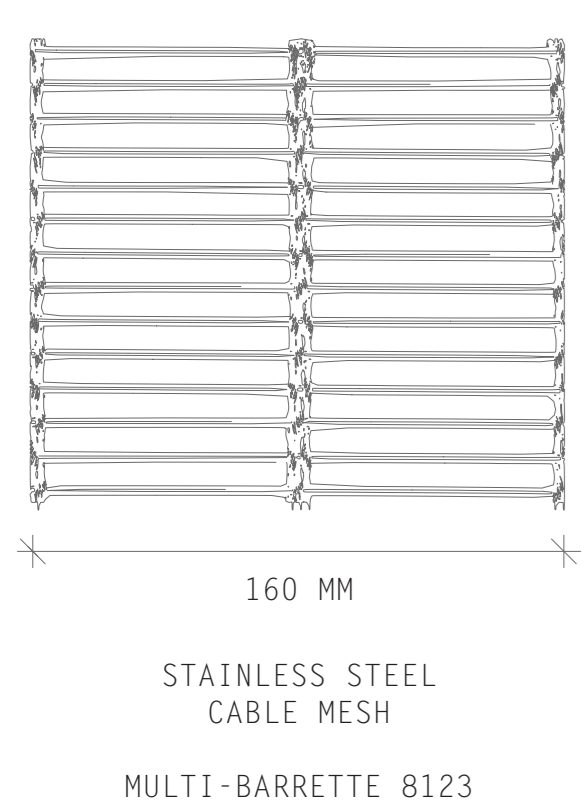
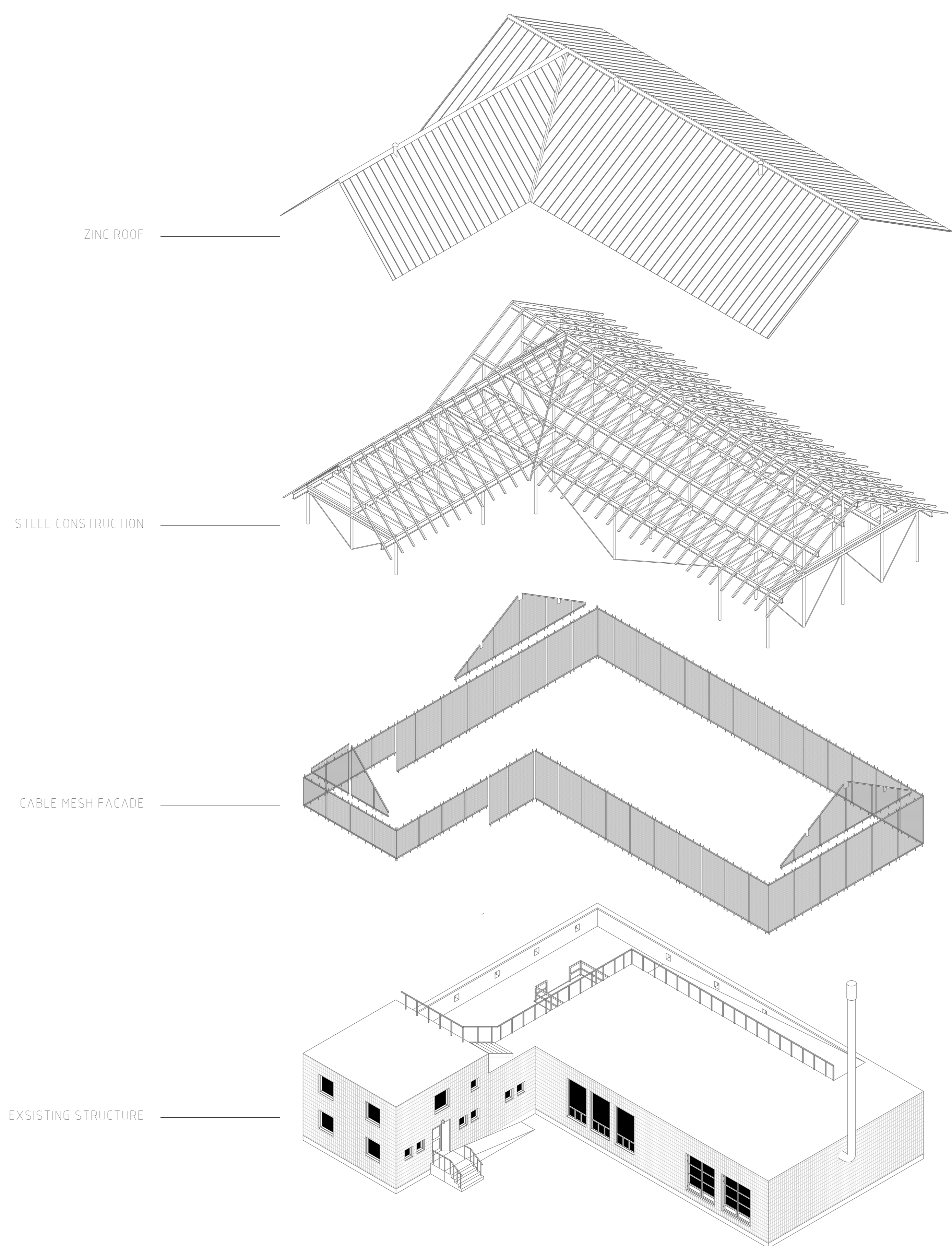
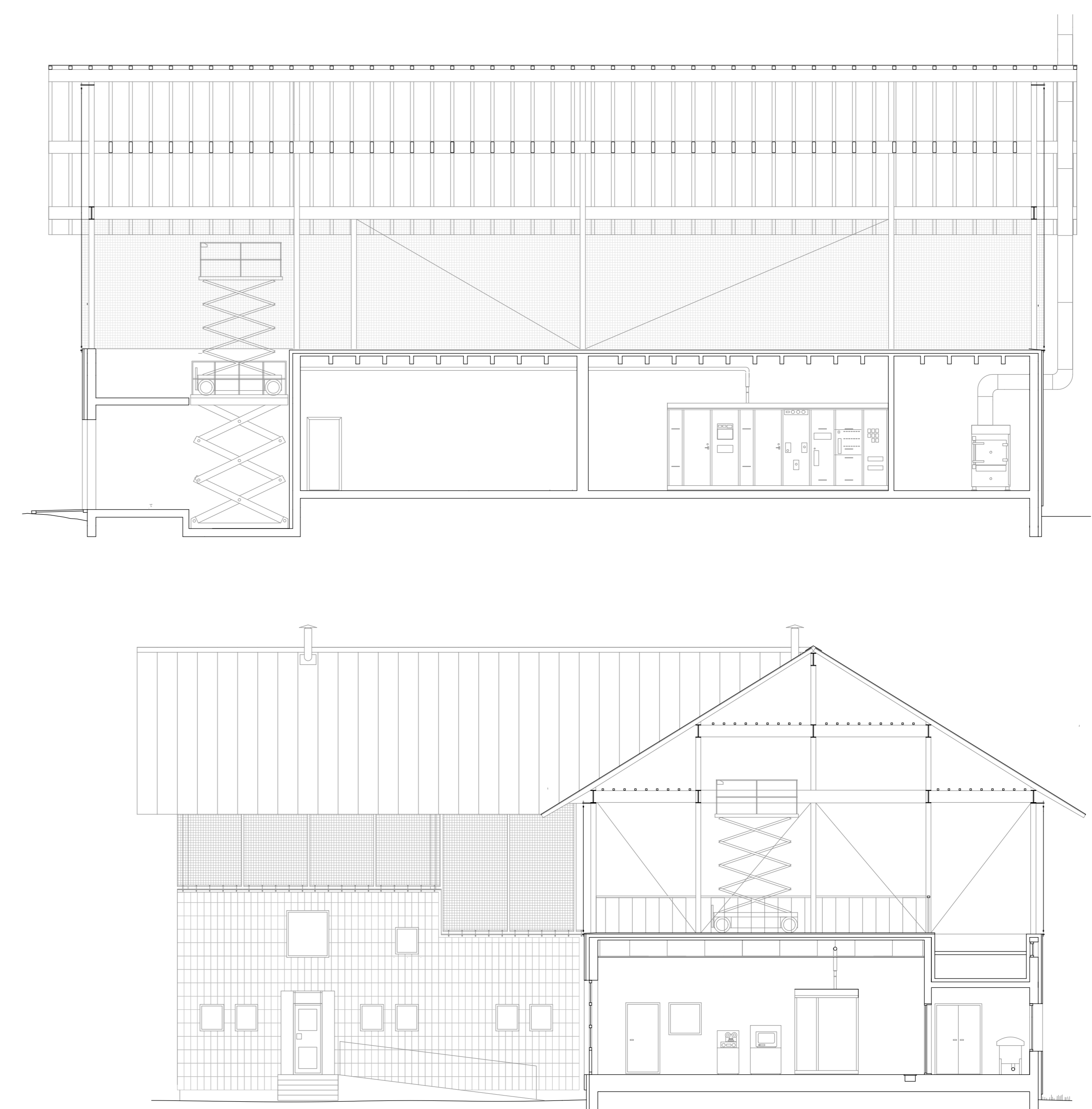
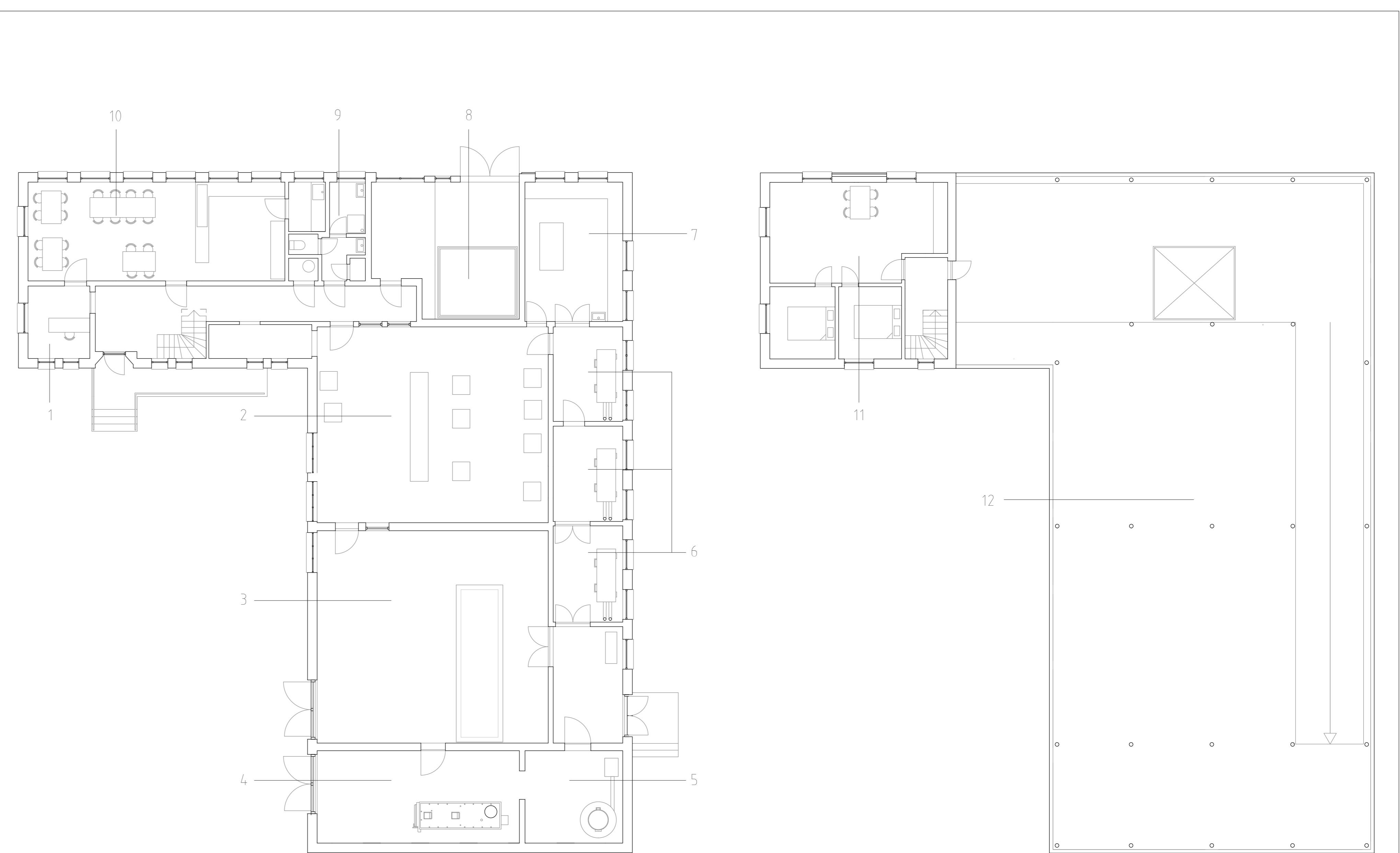


DIAGRAM	
FORMAT	A4
SCALE	1/2500
RADIO REMNANTS	1



SECTION

1/100
RADIO REMNANTS



SECTION

- 1. RECEPTION 3. EXHIBITION 5. TANK ROOM 7. WORKSHOP 9. BATHROOM / WC 11. APARTMENT
- 2. EXHIBITION 4. PROCESSING ROOM 6. ELECTROWINNING 8. ELEVATOR 10. CAFE 12. DRYING HALL

1/100
RADIO REMNANTS

THE COLLECTION

02.01 - 19.04

Come and experience the permanent collection of Vigra telemuseum. A wide range of tools, equipment and structures will be on display relating to Vigra broadcasters long and fascinating story as Norway's largest radio station. A post, pre and mid-war history told through one collection and four buildings.



FEEDER



GERMAN BARRACKS



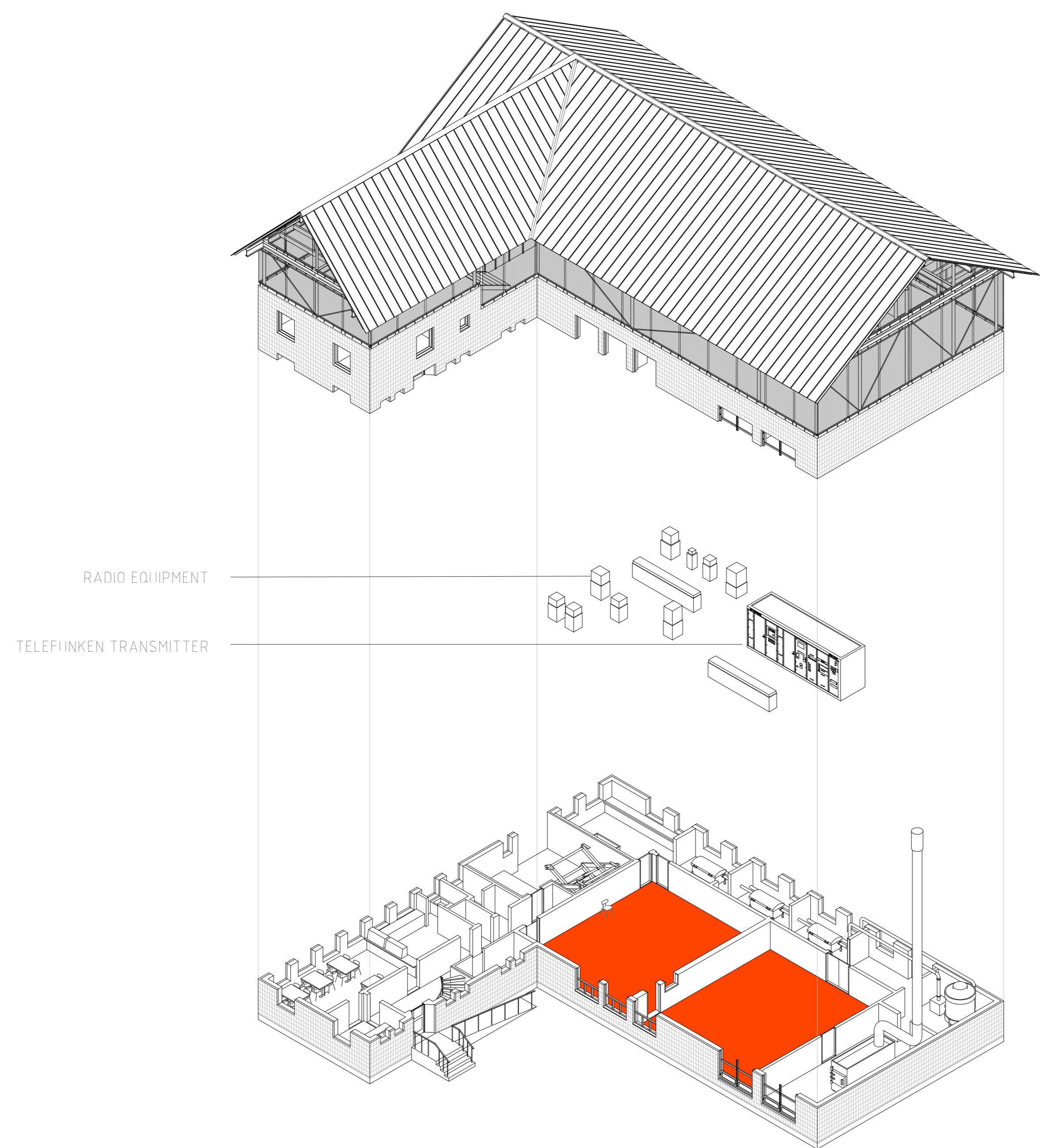
OLD TRANSMITTER

1/50

ISOMETRIC PROJECTION

RADIO REMNANTS

1



TRAVELING EXHIBITION

01.05 - 31.07

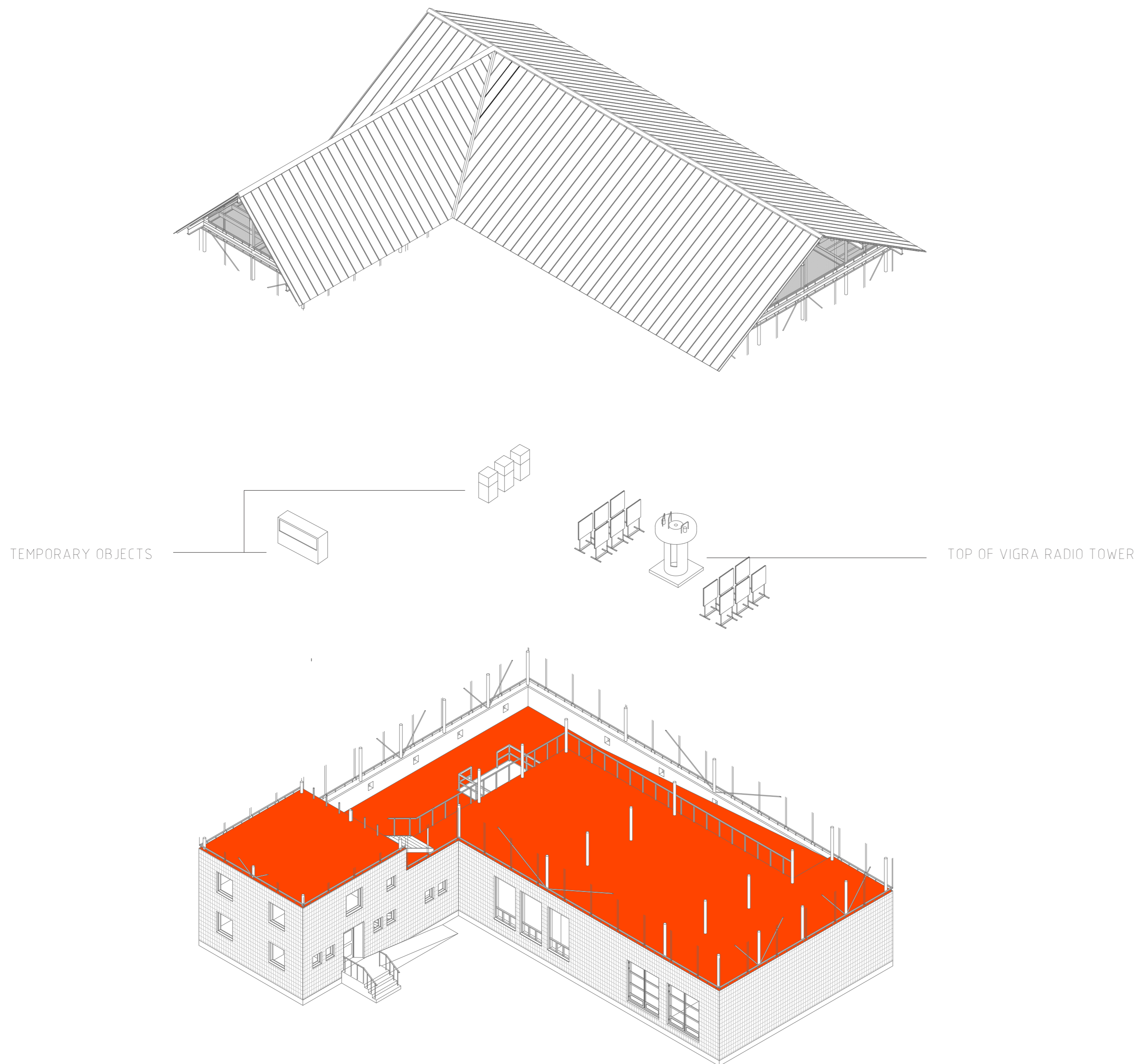
Through our partners at the Technical Museum of Oslo, we have the opportunity to display items from the Norwegian Telemuseum collection. This year the exhibition explores the riveting history of Norwegian radio equipment, from Macroni to 5G.



ISOMETRIC PROJECTION

RADIO REMNANTS

3



GUIDED TOURS/DRYING

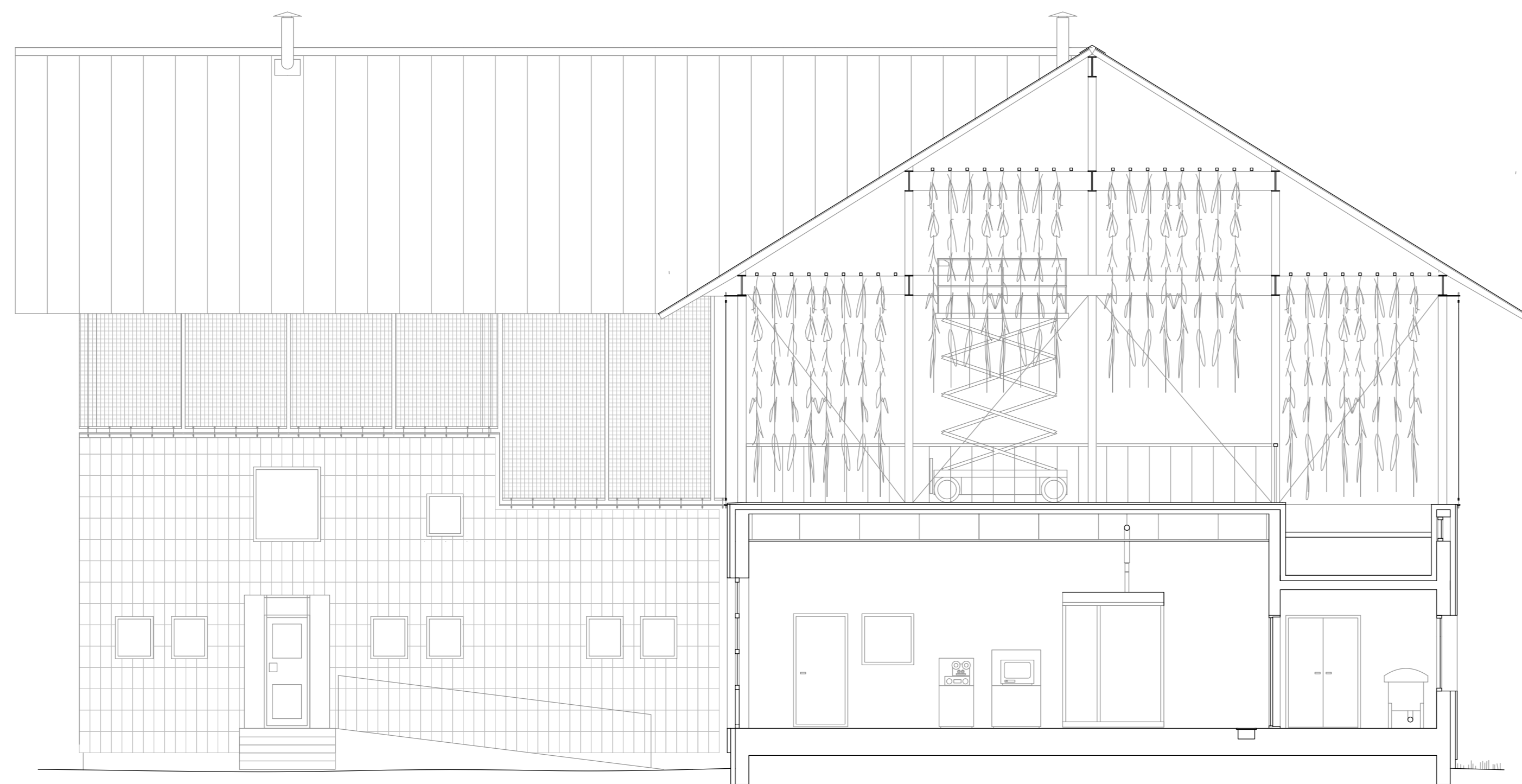
10.08 - 31.08

Get the opportunity to see the inner workings of how we process the plants here at Vigra Telemuseum. Come and see the museum's spaces filled with plants waiting to be transformed into copper.

SECTION

RADIO REMNANTS

5



PLANTING

20.04 - 30.04

Every year Vigra telemuseum goes through a large scale operation to remedy the ecological scars left by Vigra broadcaster. Large amounts of copper was left behind in the soil when the radio station was closed down. With the help of plants we are able to extract this copper from the soil. This operation unfortunately demands that we close down for certain parts of the year.

BLACK MUSTARD (Brassica nigra)

ISOMETRIC PROJECTION

RADIO REMNANTS

2

HARVEST

01.08 - 09.08

The annual harvest is a big happening at the telemuseum. This year we will have great help from our local partners harvesting 30.000 plants.

ISOMETRIC PROJECTION

RADIO REMNANTS

4

PROCESSING

01.09 - 02.01

With state of the art equipment we process the plant matter throughout the winter. The plants first dry, before they are incinerated in a furnace. The remaining ash is mixed with acids to create a leachate that will be processed in our electrowinning facility. The finished product is copper plates that can be used by artist working with copper etchings.

COPPER CATHODES

ELECTROWINNING CELLS

ISOMETRIC PROJECTION

RADIO REMNANTS

6

REMNANTS OF A MUSEUM

ALL YEAR

The old bedrooms used for the nightshift at the broadcaster is transformed into an apartment that can be used by artists. The old workshop is transformed into a printing workshop that can be used for copper etchings. This step completes the yearly cycle and allows the once toxic remains of the radio mast to generate a new heritage unique to the site.

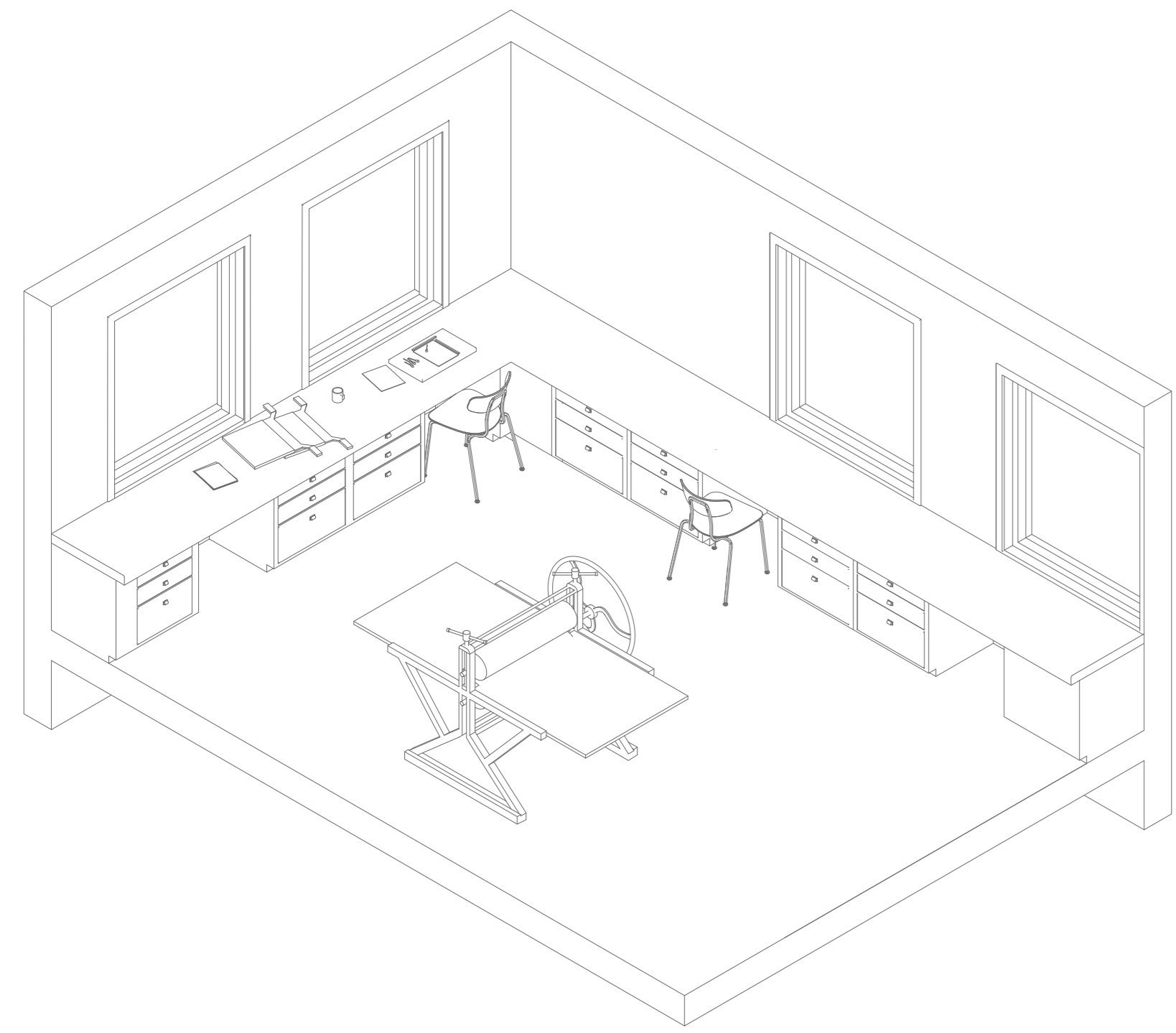


SECTION

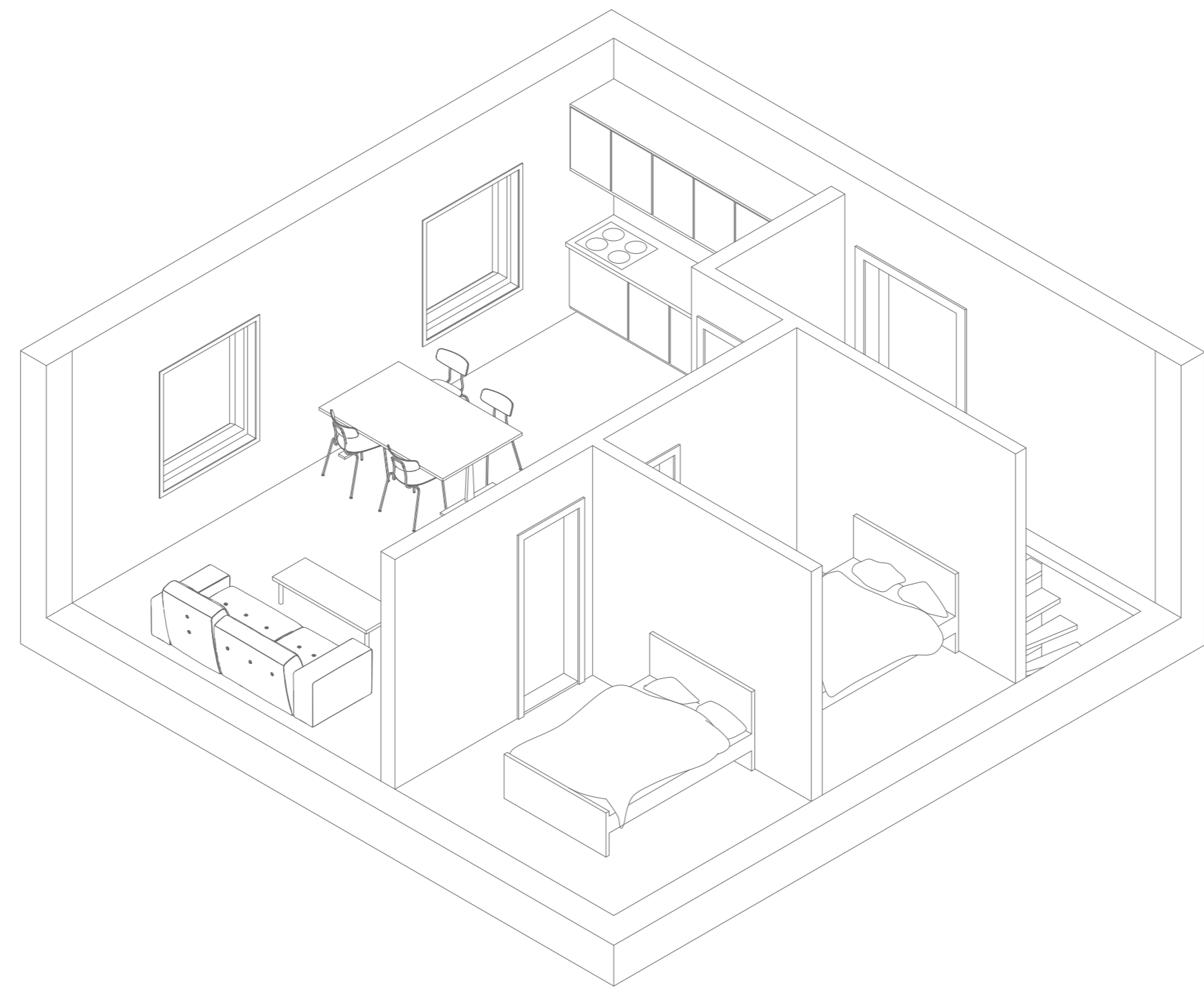
FORMAT N/A

SCALE 1/100

RADIO REMNANTS



THE WORKSHOP



THE APARTMENT

