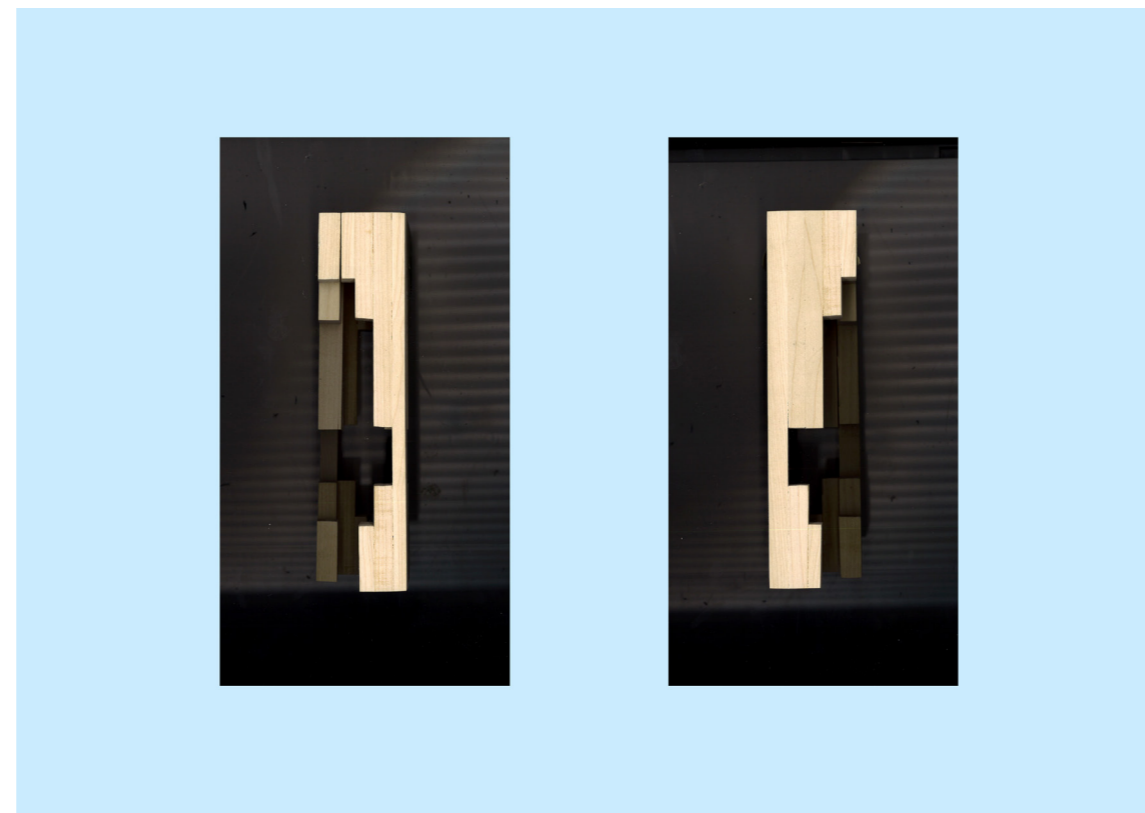


Sarah Rønning Hansen

LABORATORY BUILDING AT BLINDERN

Booklet



INTRO

Going so far as stating that “knowledge is the new oil” the Norwegian government has cited higher education and research as key focus points for the future. They have based this initiative on a long-term plan for research and higher education for the period of 2015-2024.

The plan is for Norway to become a leading research nation, and in turn attract leading researchers to come work in Norway, with a stated desire to develop a large number of world-class research groups in Norway. The government further recognizes that modern research facilities and state of the art research infrastructure are essential for creating world-class research groups and attracting international researchers.

My diploma project is a small research center, with workplaces for researchers in the field of biology.

SITE

The site is located at the campus area of the University of Oslo (UiO). While currently functioning as a parking lot, the site is regulated for a university building and public space. Placing the research center here ties its functions to an already developed research community, and ensures proximity to the university with its facilities such as auditoriums, seminar spaces, big canteens, cafes and so on.

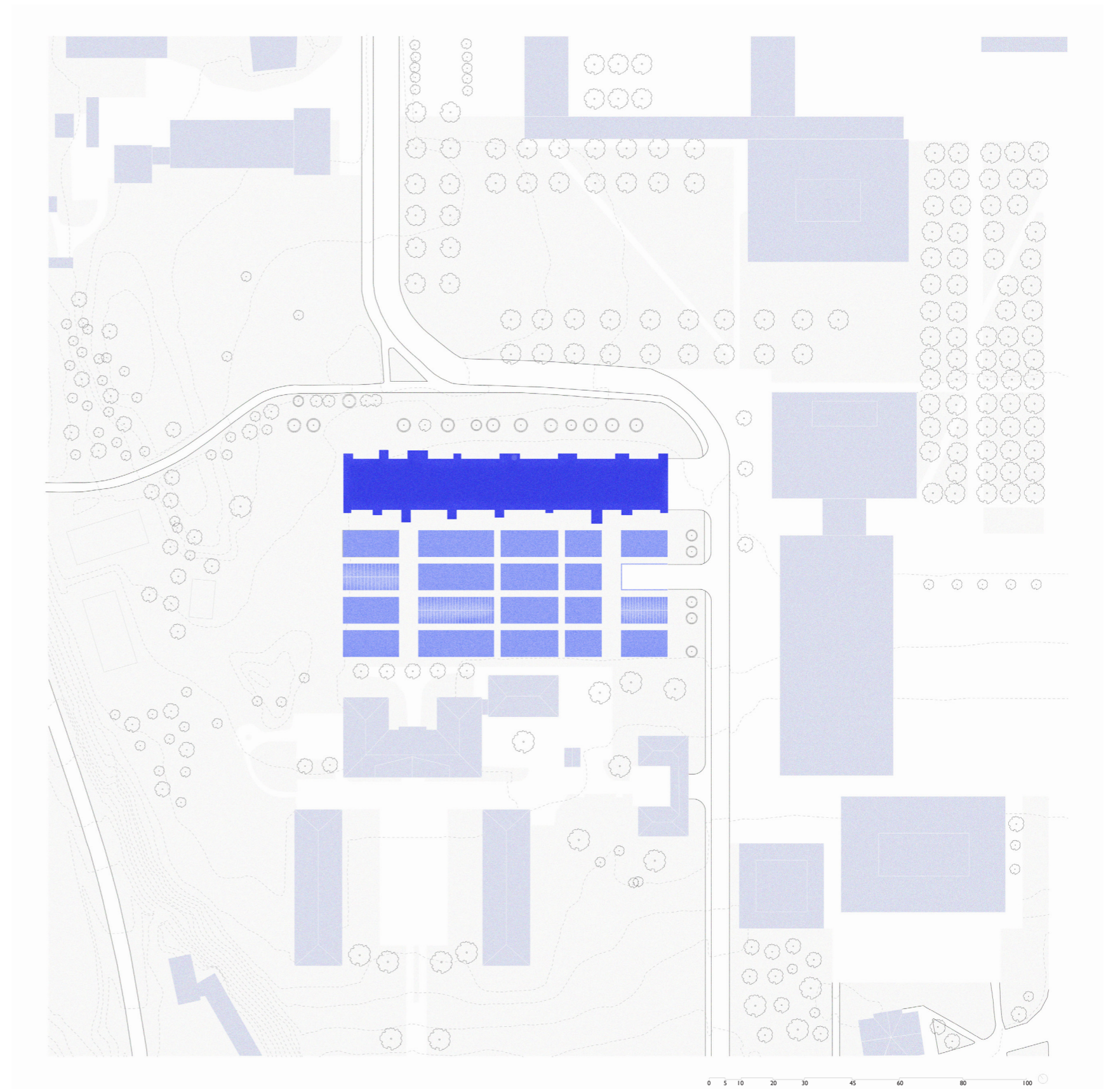
History

Until the 1920s Blindern was a rural farm area at the outskirts of the Oslo city center, with Nedre Blindern farm dating back to 1790. In 1917, after surveying several locations in Oslo, Blindern was chosen as the site for a planned Student Home. In 1923 it was further decided that Blindern was to become the location for the University of Oslo.

The first buildings to be erected was the neoclassical Blindern Student Home, which opened its doors in 1925. The first university buildings opened in 1931, and the university grew and developed considerably after the second world war.

My site, which is the field north of Blindern Student Home, has hosted several activities and functions during this period. When Blindern Student Home was created, the site was used as recreational areas for the student home. This lasted until the second world war, when the German occupation forces demanded control of the university area and placed several barracks at the site. Then again, after the war and until 1963 the site hosted a running track and soccer field, owned by the Student Home.

From that point on, the space was rented out to the university, due to high expropriation pressure from the university leadership to make space for university functions at the site of the Student Home. The site was transformed into a parking lot for the university, and has remained so since.



Site plan.

PROJECT

My interest in the laboratory as a program is centered around the contrasting needs of research facilities. These facilities need to be flexible and adaptable to the ever-evolving field of science, but at the same time they need to be incredibly specific to the exact requirements of any given experiment.

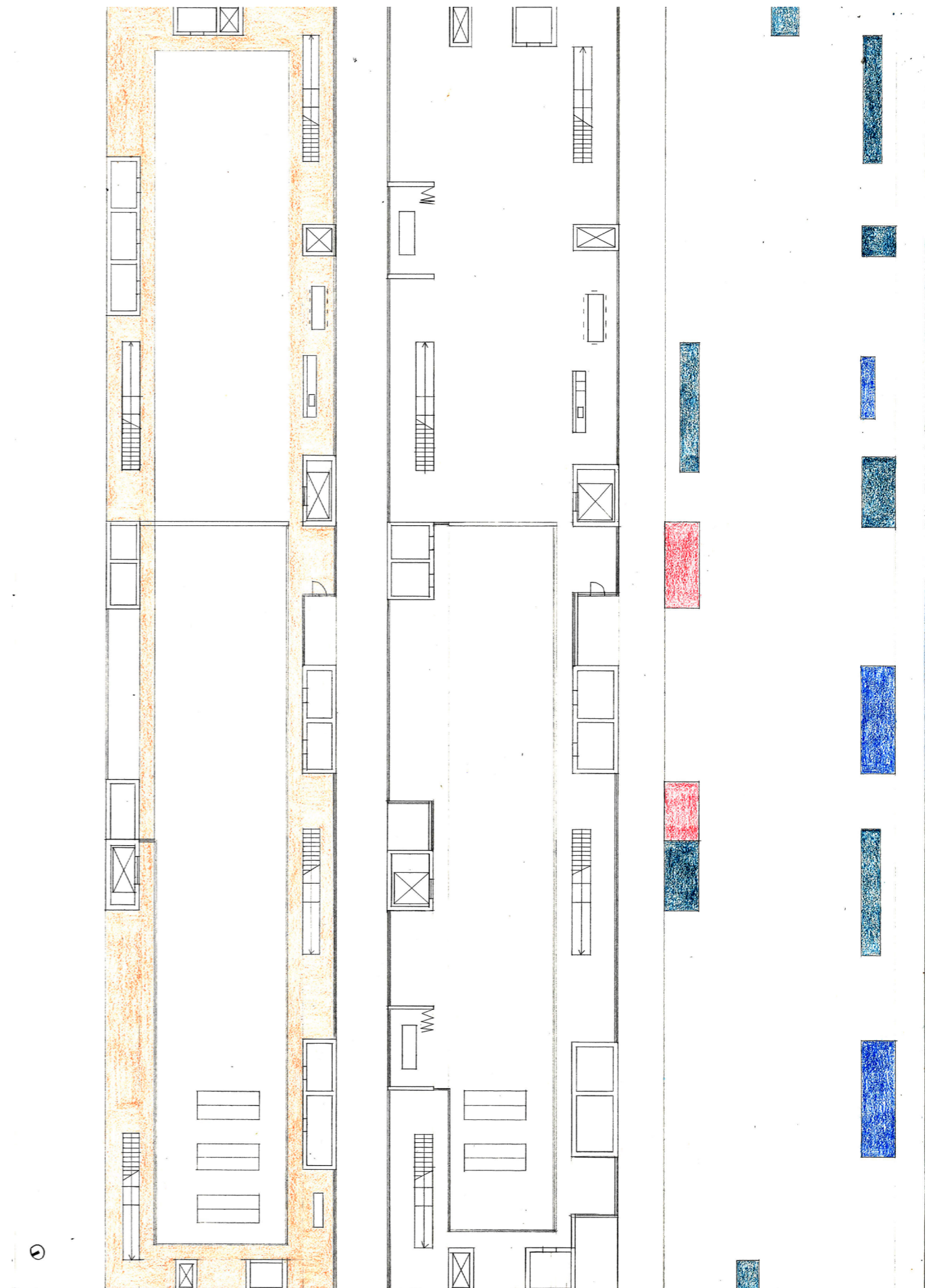
The project is a small research center, with workplaces for researchers in the field of biology, located at the Blindern campus area of the University of Oslo. I chose Biology due to the varied and strict demands placed on its laboratories. The program includes laboratories with different containment levels, animal testing facilities, and greenhouses.

As the building is placed within a larger campus, and close to student housing, it needs to coexist with the world around it. Throughout the building the degree of specificity increases, from an open, general first floor, to a restricted, specific top floor. This allows for a connection with the wider campus at ground level, while at the same time restricting areas that need to be sheltered from the public.

I have been studying the spatial potential of the laboratory, with its different requirements within a free plan. The building being a general, infrastructural system allowing for the specific functions of the laboratory.

The floors are 14,5 meter wide and 102 m long, spanning between 17 cores in the façade. The cores house functions such as stairs and elevators, toilets, rooms that need total darkness (such as electron microscopy rooms), cold rooms and so on.

The different laboratories are placed freely in the plan, with other functions inbetween and around them. I have been working with different biosafety levels and animal biosafety levels, which will be elaborated on further down. The 8th floor contain the laboratory with the highest biosafety level, and the 2nd floor contain the most open one, with the laboratory blending in with the office spaces of the researchers.



Early plan and diagram.

The different laboratory types

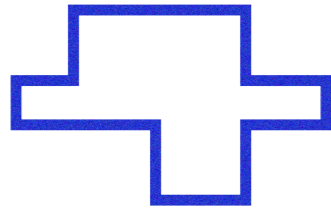


BSL-4

Biosafety level 4 is the highest biosafety level possible in laboratories. It is suitable for working with dangerous/exotic agents, which post high individual risk of aerosol-transmitted laboratory infections that are frequently fatal, for which there are no vaccines or treatments. There is strict access control, and researchers do a complete change of clothes upon arrival, the use of positive pressure personnel suits and so on. The air supply and exhaust is dedicated to the BSL-4 and is filtered with HEPA both in and out, and all equipment is decontaminated.

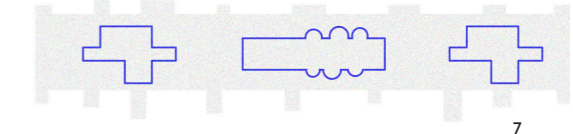


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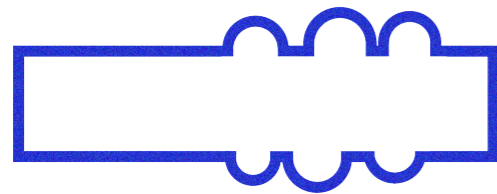


ABSL-3

The ABSL-3 laboratory has stricter requirements than the ABSL-1. The entrance is through a change room, with airlock, where needed laboratory clothing and shoes are put on. All windows and penetrations are sealed. The animals are kept from daylight, and most of the work is done in biosafety cabinets, and there is a negative airflow into animal and procedure rooms. An autoclave is required in the laboratory, and hand-washing sinks are required by the exits.



7



ABSL-1

An ABSL-1 laboratory is a laboratory where animals are used for research. As with the BSL-1, the agents in this specific safety level are not known to consistently cause diseases in healthy adult. The animals need to be kept in rooms without daylight, as their daylight rhythm is to be constant, and another requirement is that there is no recirculation of exhaust air. Hand washing sinks need to be available throughout the lab.



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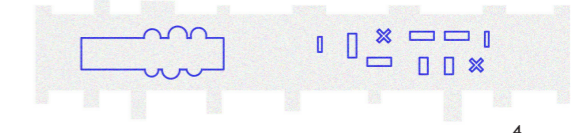


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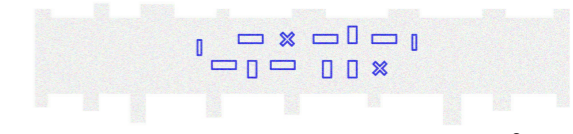


BSL-2

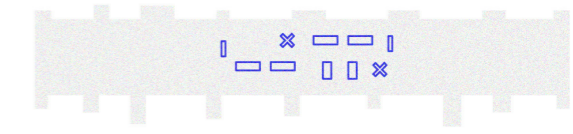
A laboratory with biosafety level 2 is suitable for working with agents associated with human disease, with routes of transmission including ingestion and mucous membrane exposure. The BSL-2 requires more limited access, biosafety cabinets, and an autoclave available in the same building.



4



3



2

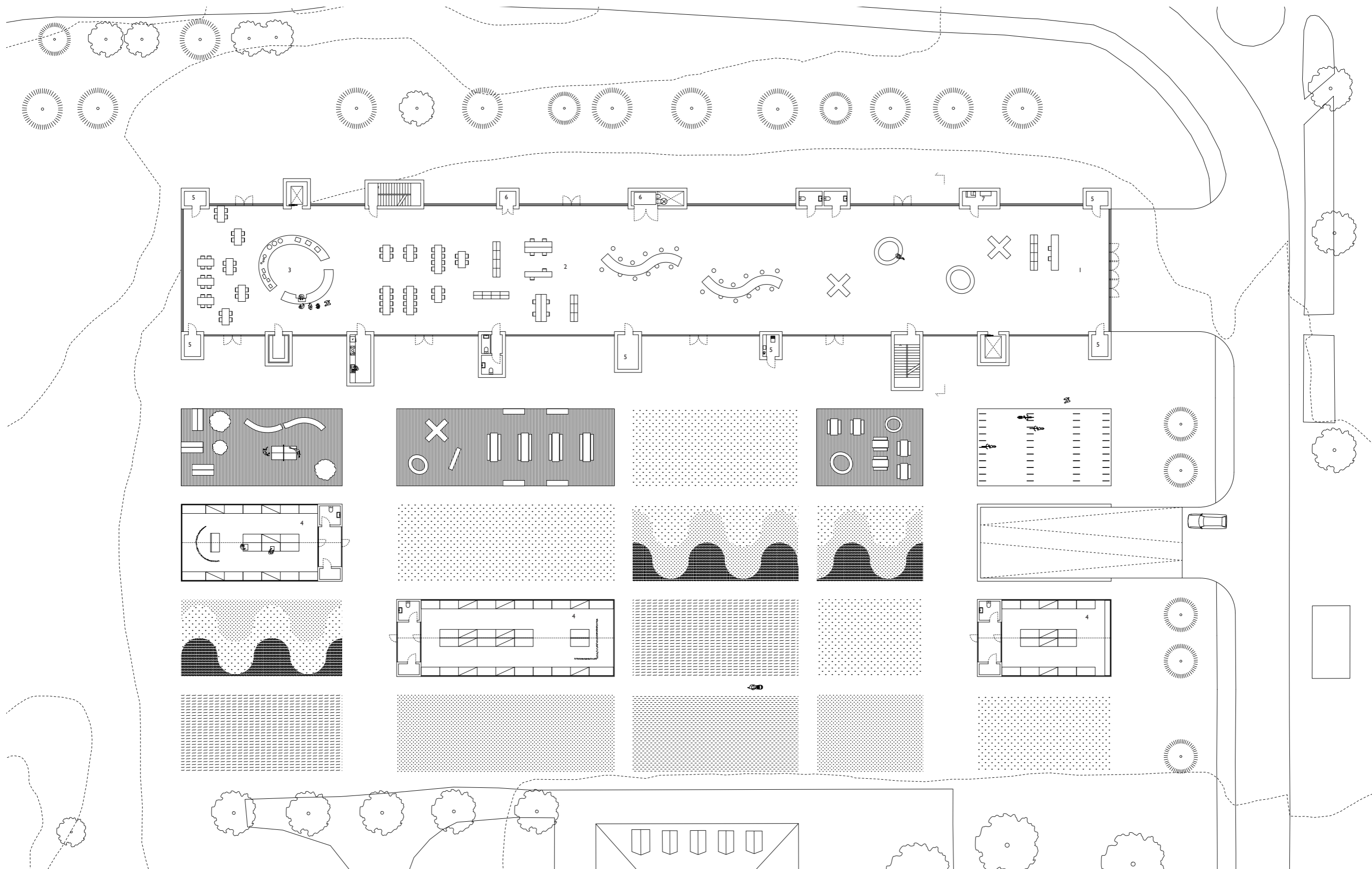


BSL-1

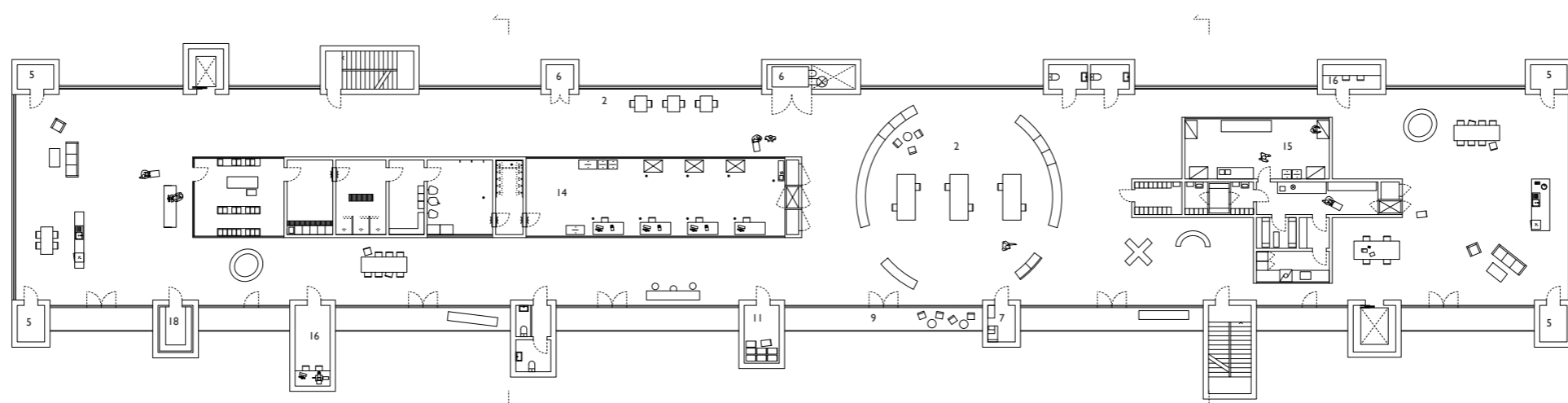
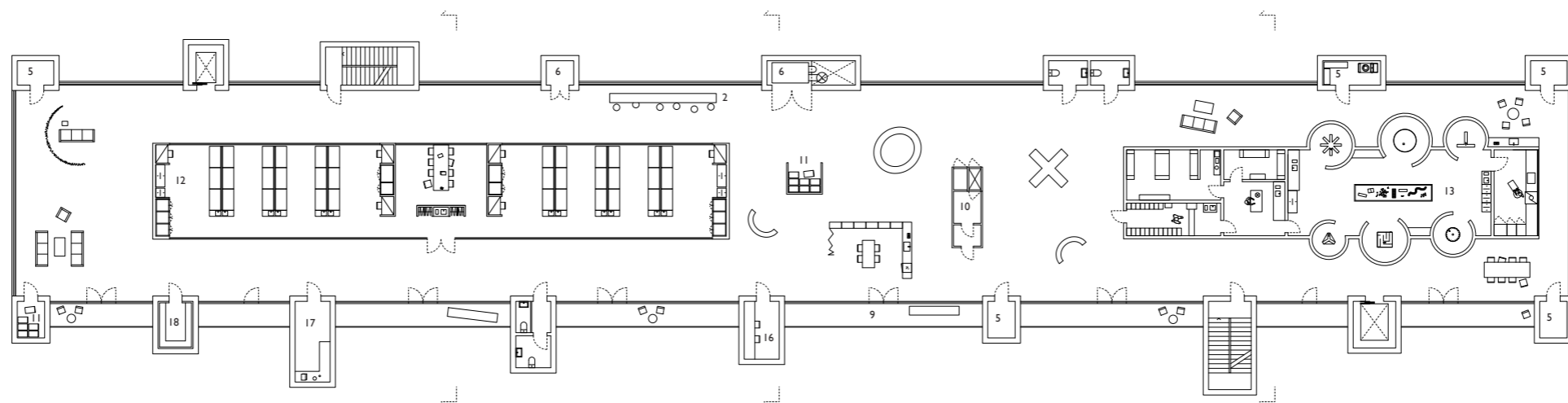
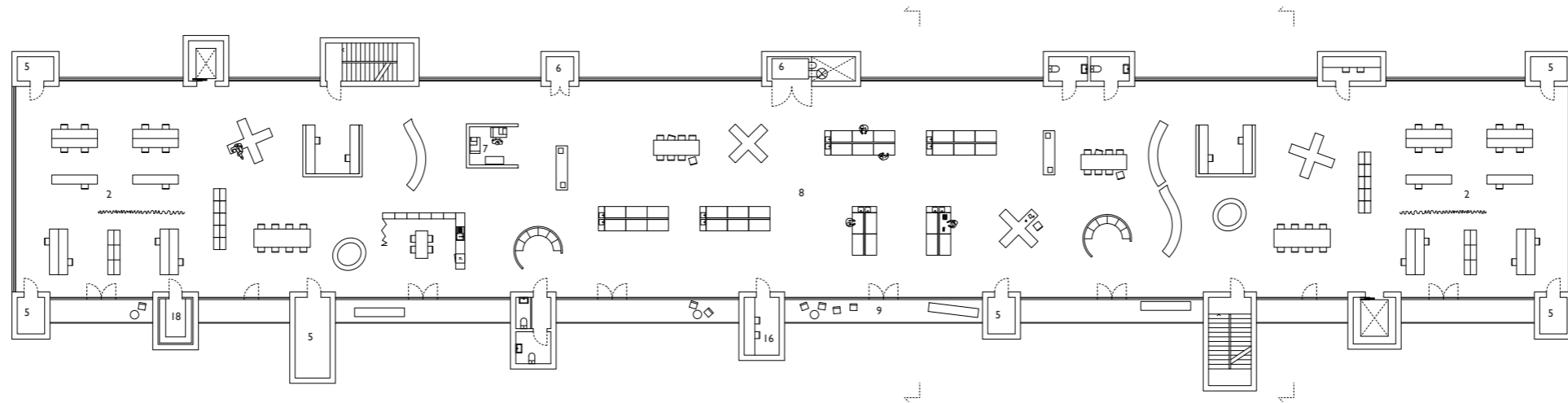
A laboratory with biosafety Level 1 is suitable for working with agents not known to consistently cause diseases in healthy adults. Facilities required are laboratory benches and sinks.



1



Ground floor, showing the fields in front of the laboratory building.

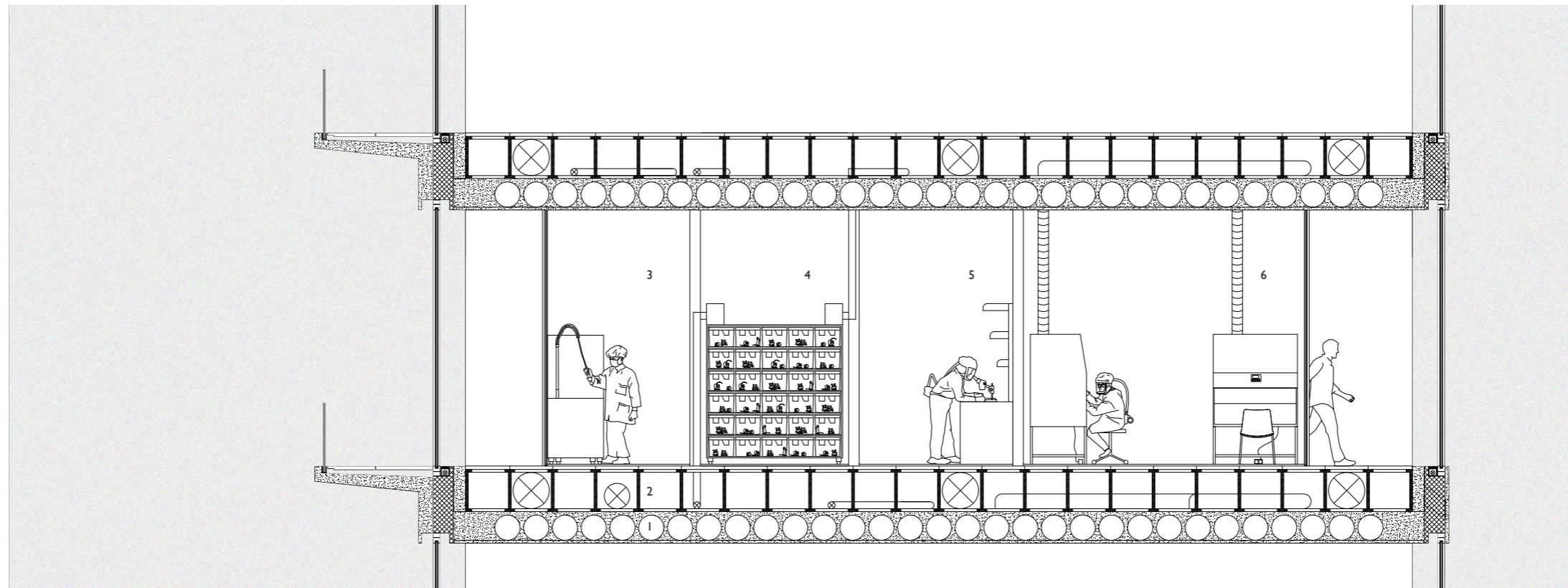


- 1 entrance
- 2 work space
- 3 cafeteria
- 4 green house
- 5 storage
- 6 technical room
- 7 copy room
- 8 BSL-1 lab
- 9 balcony
- 10 autoclave room
- 11 trolleys
- 12 BSL-2 lab
- 13 ABSL-1 lab
- 14 BSL-4 lab
- 15 ABSL-3 lab
- 16 microscopy room
- 17 workshop
- 18 cold room

Plans of floor 2, 5 and 8. The numbers by the section lines represent the floor it illustrates in the cross section.

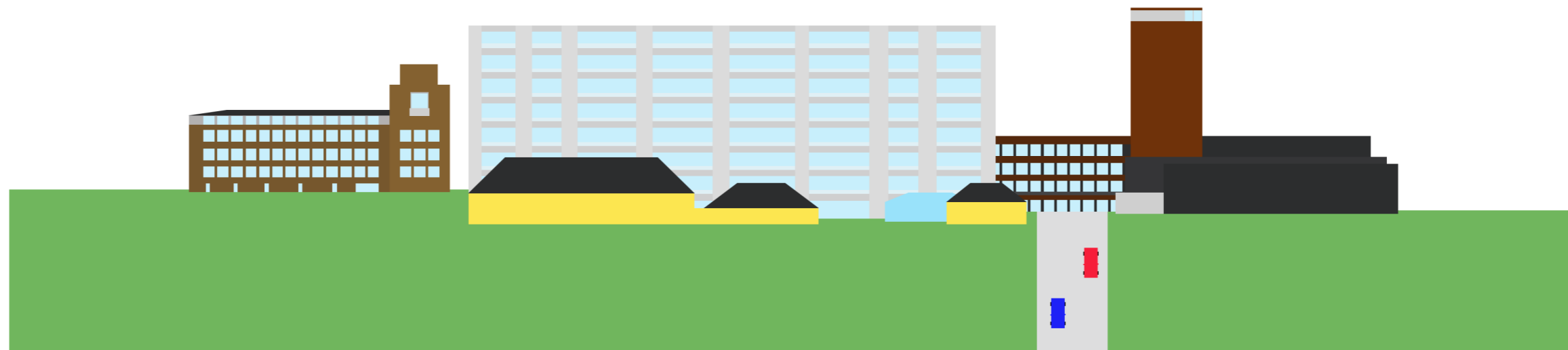


Cross section.



- 1 bubbledeck
- 2 technical floor
- 3 ABSL-3 laboratory, cage washing room
- 4 ABSL-3 laboratory, animal room
- 5 ABSL-3 laboratory
- 6 ABSL-3 laboratory, biosafety cabinets

Section through an ABSL-3 laboratory.
1:50



Situation at Blindern. Laboratory building seen from South East and North West.