

östersund hospital

future visions for healthcare, housing and work



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drivers of the future of healthcare



the intelligent patient



robotics



drug development



DNA/RNA/stem cell



private finance



therapeutic environments



the elderly/chronic illness



nano technology



surgical techniques



infection control



artificial organs



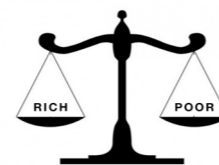
home diagnostics



alternative therapies



pandemic risks



affordability

utilising themes in the design

Evidence Based Design

It is becoming more and more apparent that architecture has the ability to support the healing process. Through strategic design and integration of factors such as connection with nature, daylight access, ease of communication and wayfinding, hygiene and presence of family and friends, environments can be created to support the healing process of patients in hospitals.

Many of these issues are also important for staff working in the hospital, as they need appropriate areas for work, rest and socialising. A more decentralised and social workspace is known to promote productivity and happiness.

Sustainability

Hospitals consume a large amount of natural resources and produce an enormous amount of waste. Simple interventions can be introduced on a number of levels to reduce the impact a hospital has on the Earth's environment.

Grey water recycling and rainwater tanks are used in the proposal to reduce water consumption. Solar panels and wind turbines work in conjunction with battery storage to reduce energy demand. Daylight is improved with expansive windows and careful planning of spaces.

Social sustainability is an important issue, and the introduction of non-commercial public spaces and nodes such as science and education centre, play room, public courtyards and reading room promote interaction within the city and between people.

Adapting to the Future

The ability to deal with change is an important factor of healthcare buildings. As healthcare is constantly changing with science, technology and an array of other factors, it is becoming more important for buildings to be able to adapt to external conditions.

The proposal for Ostersund hospital was designed with an understanding of design for disassembly, modular systems, materials and a grid structure. The hospital was designed on a grid structure of 4.8 x 4.8m, where internal walls and furnishings fit into a 0.3m, 0.4m or 1.2m grid.

The new buildings - specifically the high tech containing operating machines - provides generous floor heights ranging from four to six metres to allow for large machinery and operations. It also allows spaces to host a large range of equipment and operations.

Wayfinding

Wayfinding is a major issue in the existing hospital, however this proposal provides ease of circulation and guidance on both a large and small scale. Access to the hospital from the city and surrounding streets is easy with the relocation of entrances and creation of new forms.

The internal wayfinding is solved with the creation of the 'gallery' where visitors and patients can easily find their way between emergency, inpatient and outpatient departments. Corridors are well lit in each department and linear corridors provide views and a clear understanding of location.

östersund today

Östersund

With a population of about 45 000, Östersund is the only city in the county of Jämtland. It is also the only hospital Jämtland . in It is situated by the Lake Storsjön. Östersund ventures in renewable energy sources, e.g. district heating and natural gas, and it is among the most successful Swedish municipalities in reducing carbon dioxide emissions.



Östersund Hospital

The current hospital has 370 beds and is the only one in the county of Jämtland. Within the catchment there are only around 128 000 inhabitants, but the ski tourism may periodically doubling the figure. The hospital has a central surgical department with 10 operating rooms, divided into general surgery, orthopedics, gynecology and otology/ rhinology surgery.

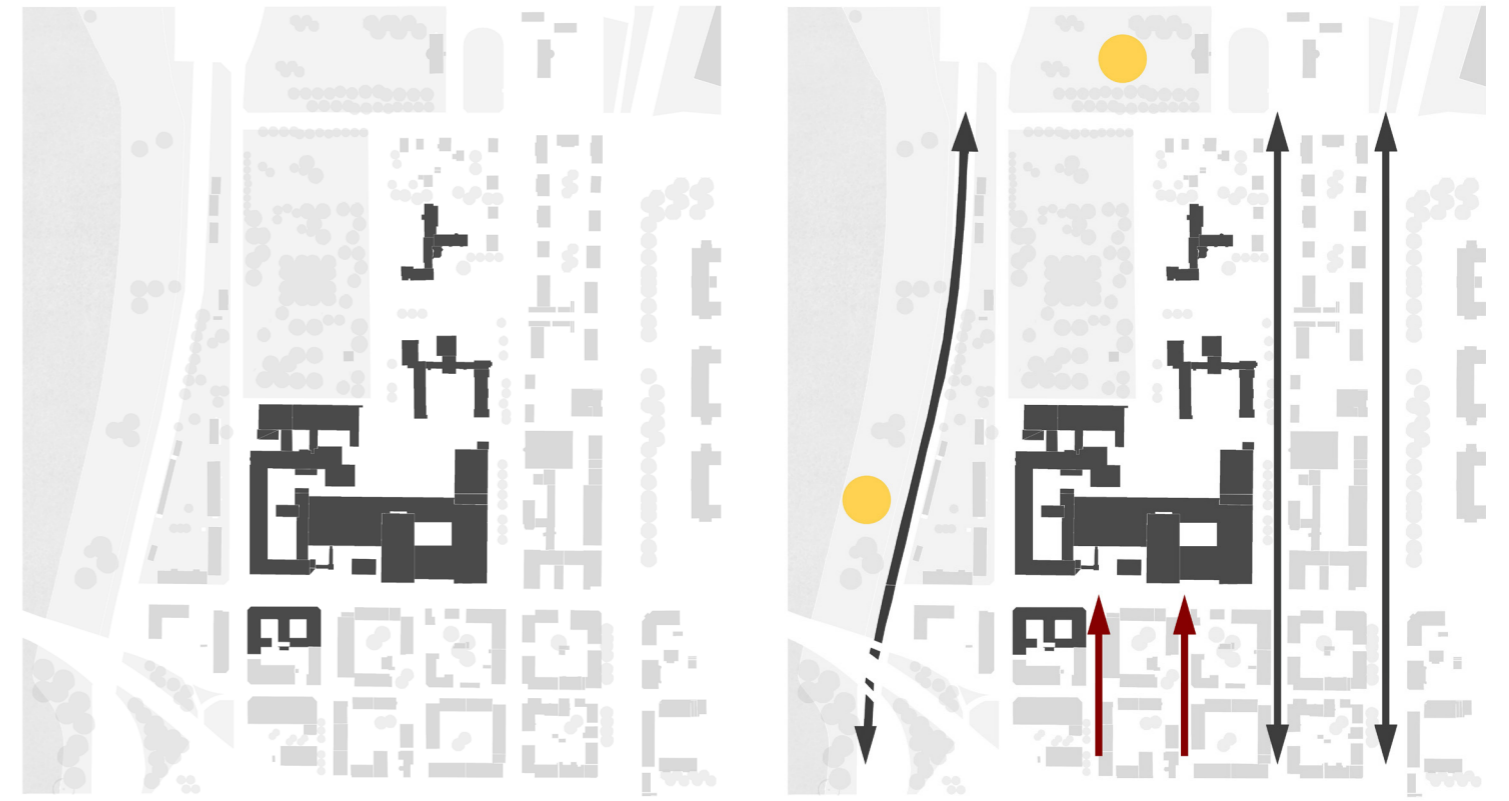
Östersund Hospital faces a multitude of issues, including lack of daylighting, minimal single-patient rooms, low floor to ceiling heights, lack of an integration with nature, undesirable workspaces and no integration of the city or surrounding context. Furthermore the hospital was built over several stages over several decades, and has been outdated for several years. This new proposal seeks to solve many of these issues through the removal and construction of new buildings and areas.



A site analysis of a figure ground drawing shows a low rise grid structure in the city to the south and open green space to the north. The main square is located to the south and easily accessed by footpaths down two streets. Main vehicle access to Ostersund is via a bridge on the east or main road on the west.

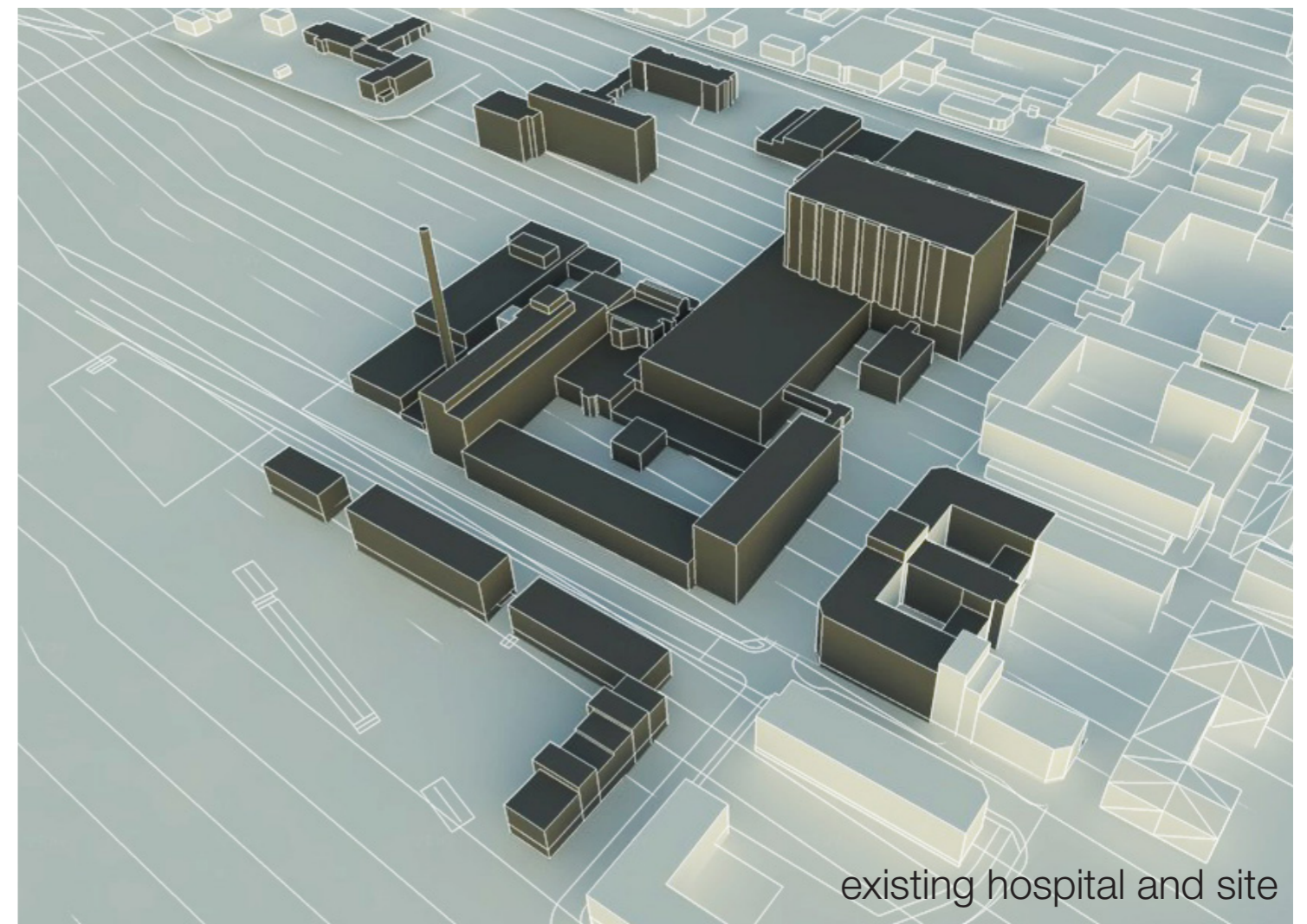


0 100 200 500m



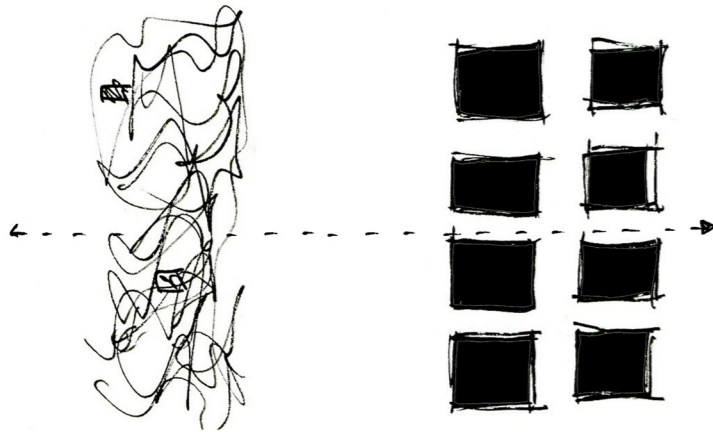
0 20 50 100
The existing hospital master plan

Train, bus and car access flows from north to south on either side of the site. Pedestrian access to the north and waterfront park are blocked by the hospital.

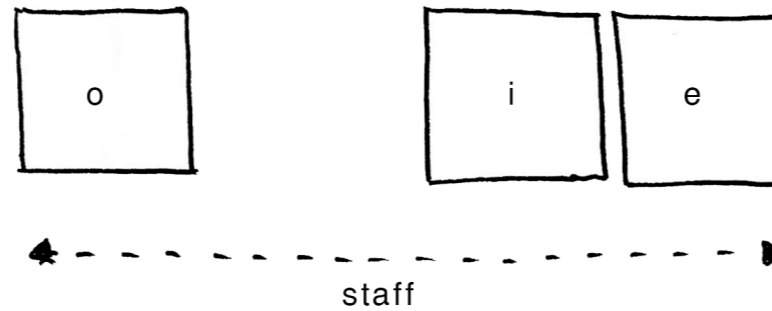


existing hospital and site

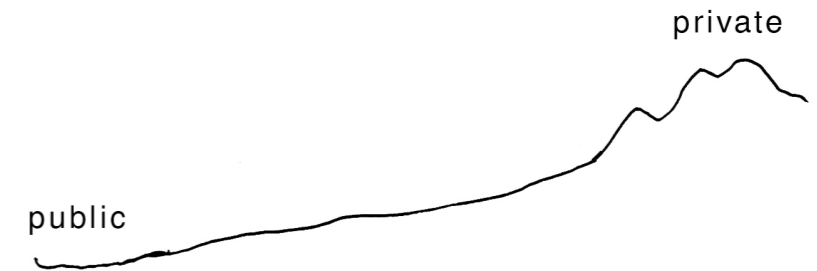
generation of the concept



1. creating a connection from open greenspace to the city



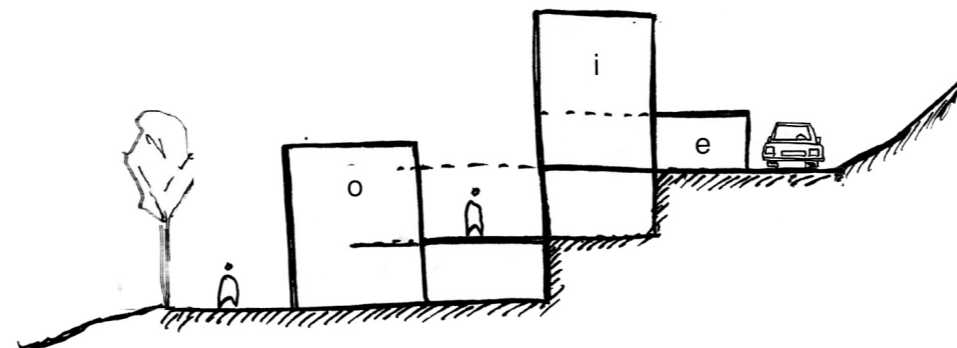
2. understanding the relationship between outpatient, inpatient and emergency departments and the circulation of staff between all spaces



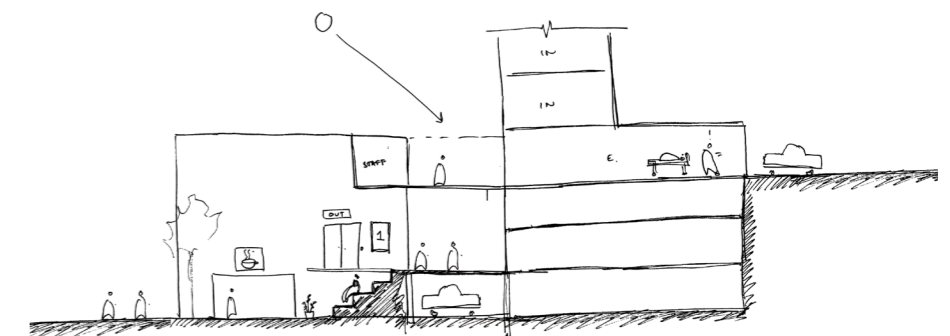
3. the slope of the site on both a large and small scale creates a sense of hierarchy between public and private spaces.



4. the final concept



5. the final concept is translated to strategically divide outpatient from inpatient and emergency. Staff access to all spaces is considered.



6. a sketch of more levels shows the creation of more public spaces to the bottom of the slope and private at the top. Emergency access is close to the main road and inpatient perched above, providing views and safety. Public spaces are located on level around courtyards and in the gallery.



Several existing buildings will be removed in stages to make for for new buildings



New outpatient departments are created on the west, and a new high-tech building is added to the existing building on the south-east. Psychiatry is relocated to the north and transformed into a patient hotel.



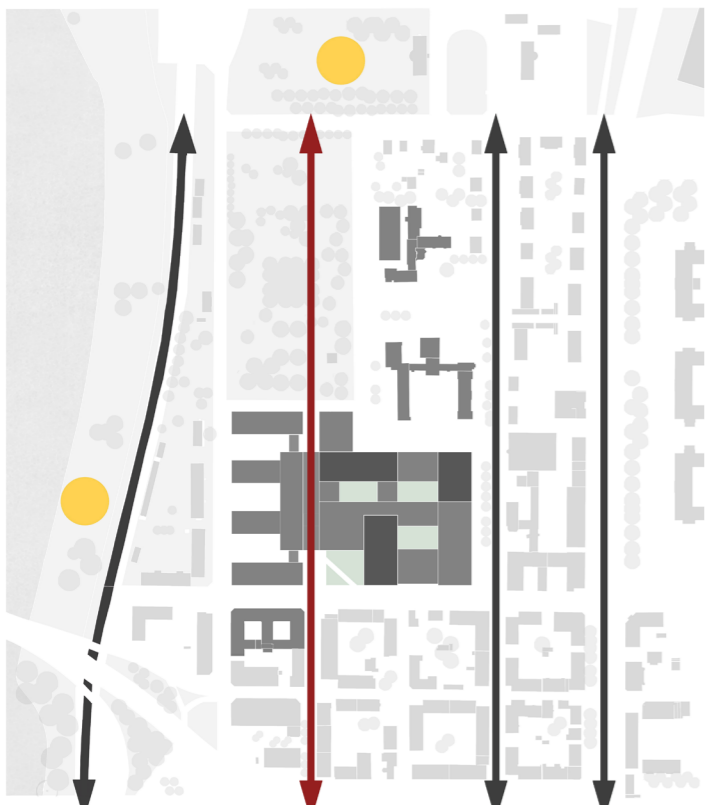
The final masterplan.

the new masterplan

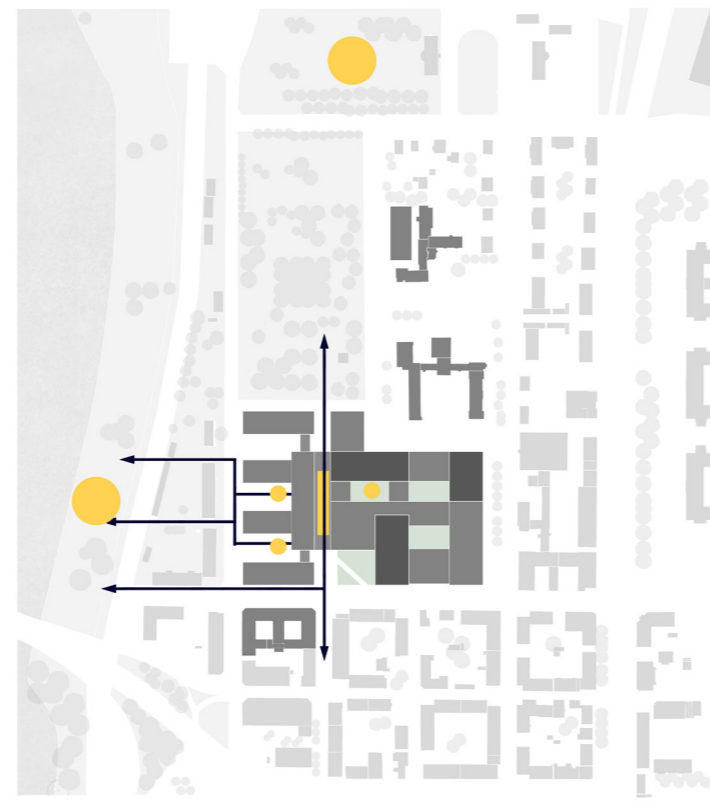
The project proposes the creation of a 'gallery', that adapts to the slope of the site and creates a new main entrance for the hospital. New public spaces, such as a science/learning centre, cafe, play room, reading room and blood bank were created and bring new meaning to what a hospital could be.

The technical/emergency floor is located at the top of the site and closer to the main road for ease of access. In patient wards sit on top and overlook the natural views of the river and mountain.

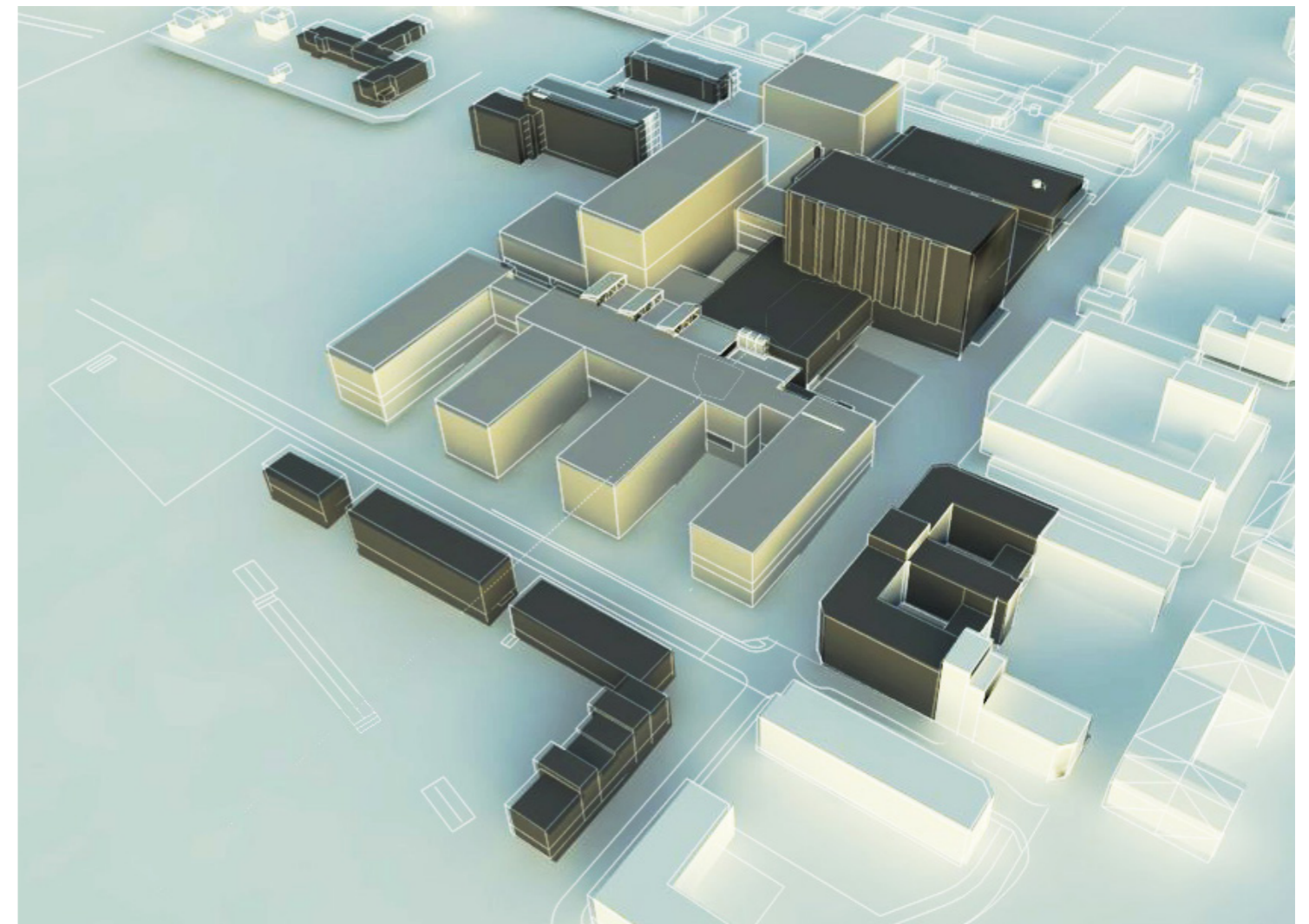
The outpatient department is located on the bottom of teh slope towards the west. As visitors are only there for the day, a lot of movement is expected. It is designed on a grid structure where internal walls are lightweight. The new buildings can easily be expanded to create more volume, and interior rooms can be changed to suit particular needs.

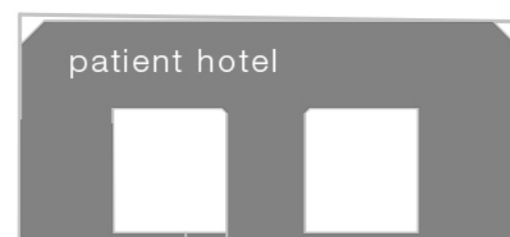
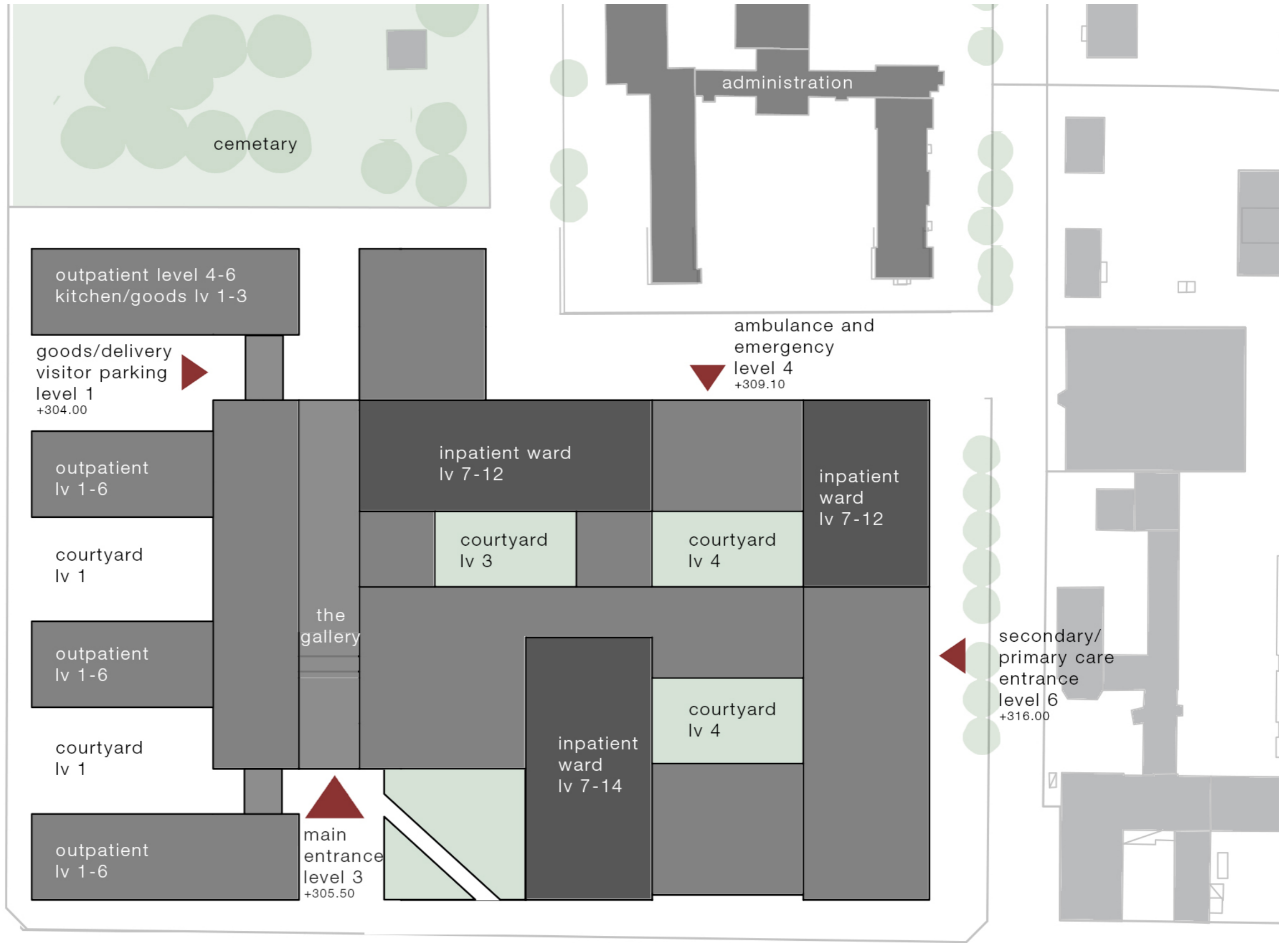
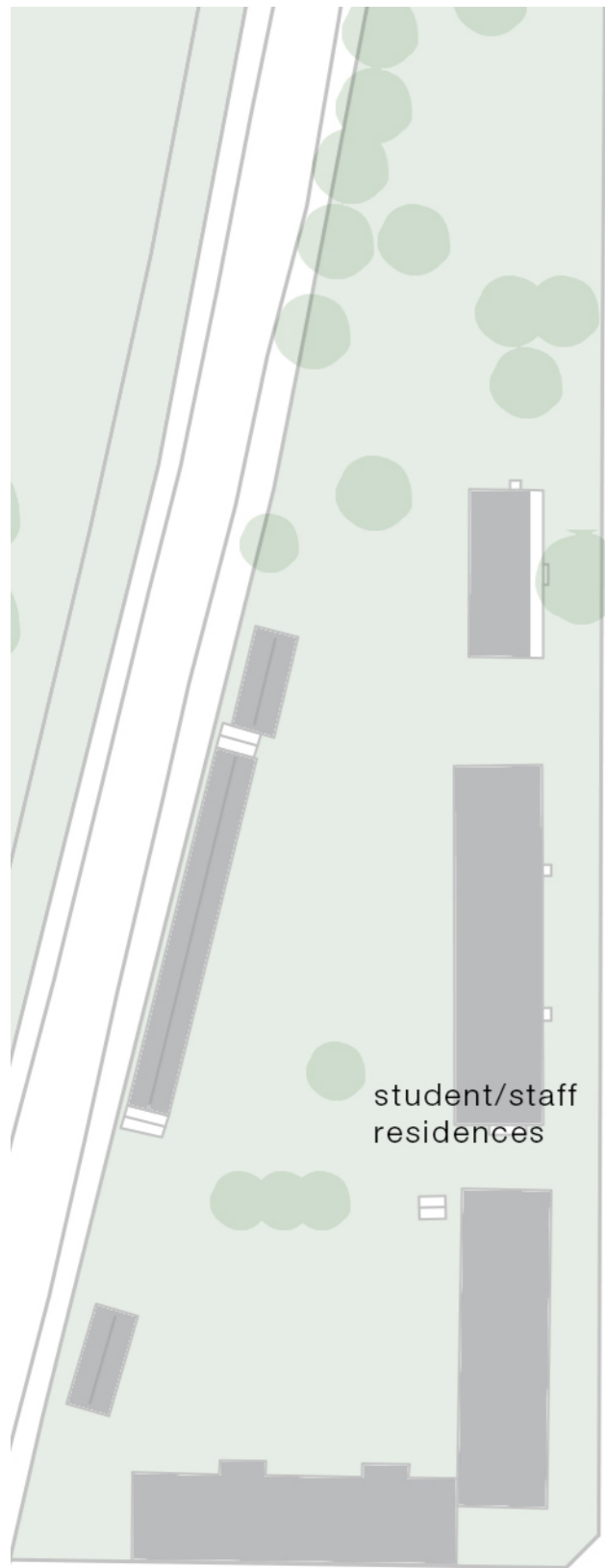


The creation of a new public gallery divides the outpatient flows from emergency and inpatient, and allows the continuation of pedestrian access to the north of the city.



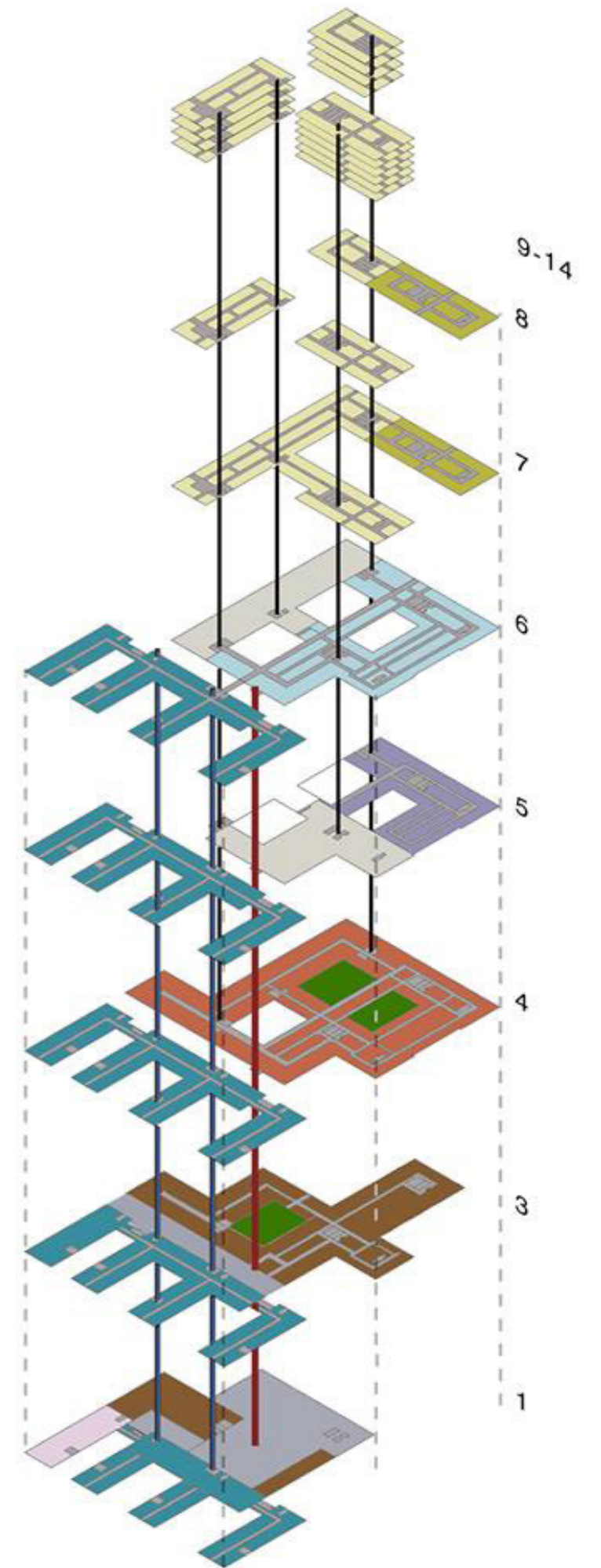
The new masterplan creates new courtyards, both in the inpatient and the outpatient departments. This not only improves daylighting and views in all departments, but activates the waterfront park owned by the hospital.



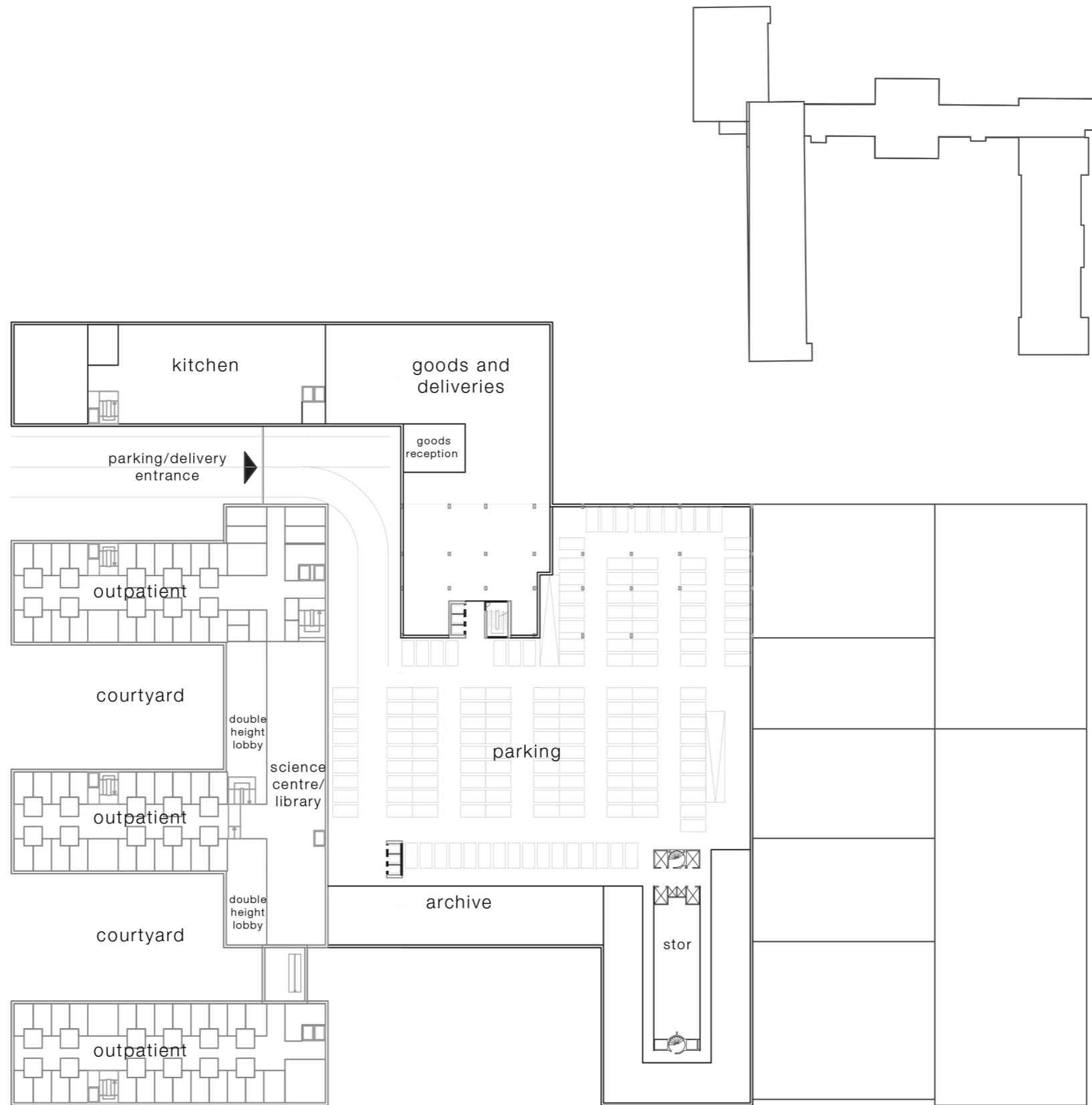


masterplan 1:1000

- INPATIENT WARD
- HOT FLOOR
- OUTPATIENTS
- TECHNICAL FLOOR
- STORAGE, LOGISTICS, KITCHEN, CHANGING ROOM, STERILISATION, PHARMACY, MORTUARY
- PATIENT HOTEL
- STAFF, ADMINISTRATION, CANTEEN, RESEARCH AND EDUCATION
- PRIMARY CARE
- INFECTION
- DELIVERY
- PSYCHIATRY
- LABS

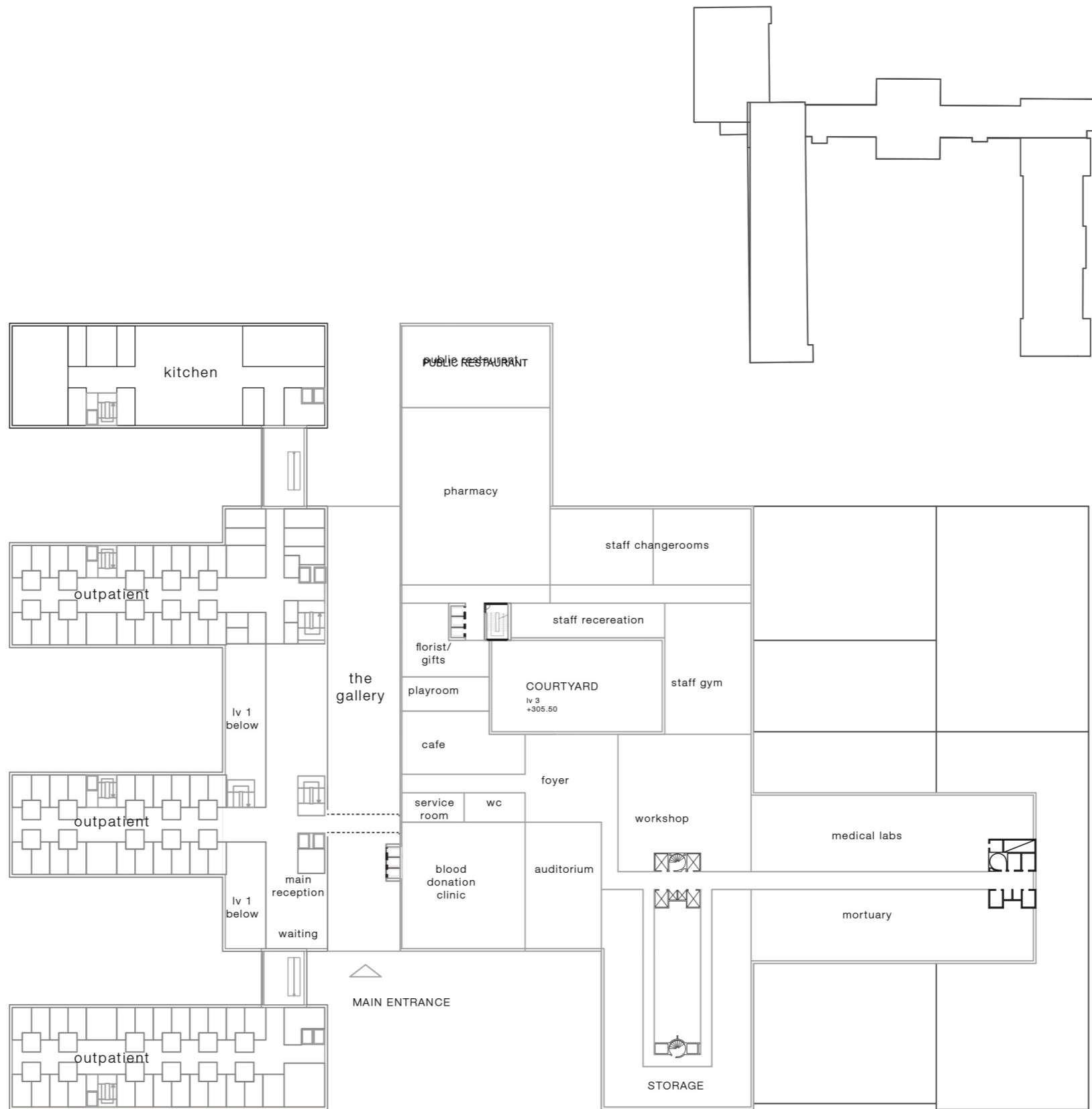


functional and vertical circulation diagram



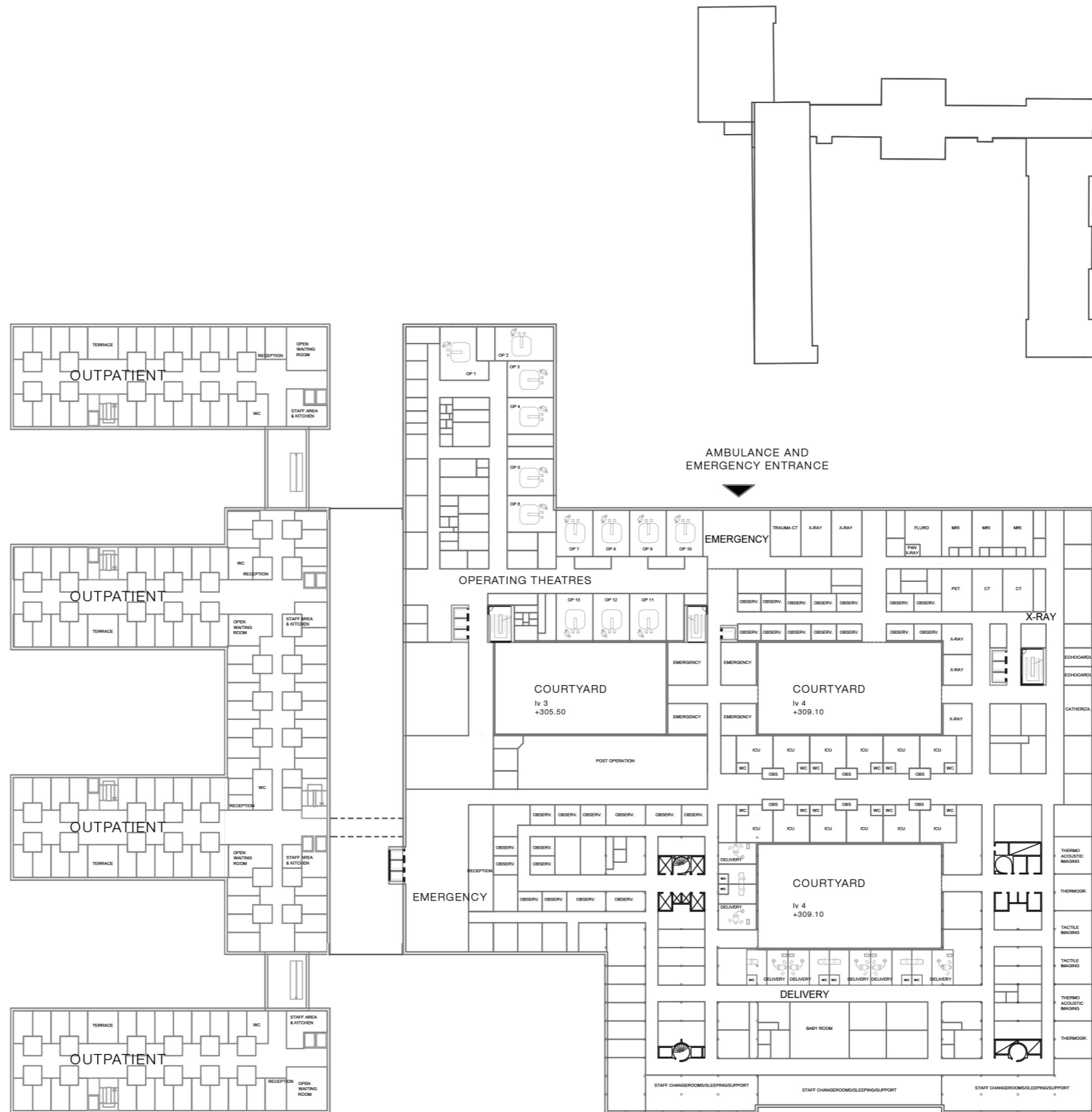
- goods delivery
- parking
- outpatient
- courtyard
- science/education centre
- archives

level one 1:1000

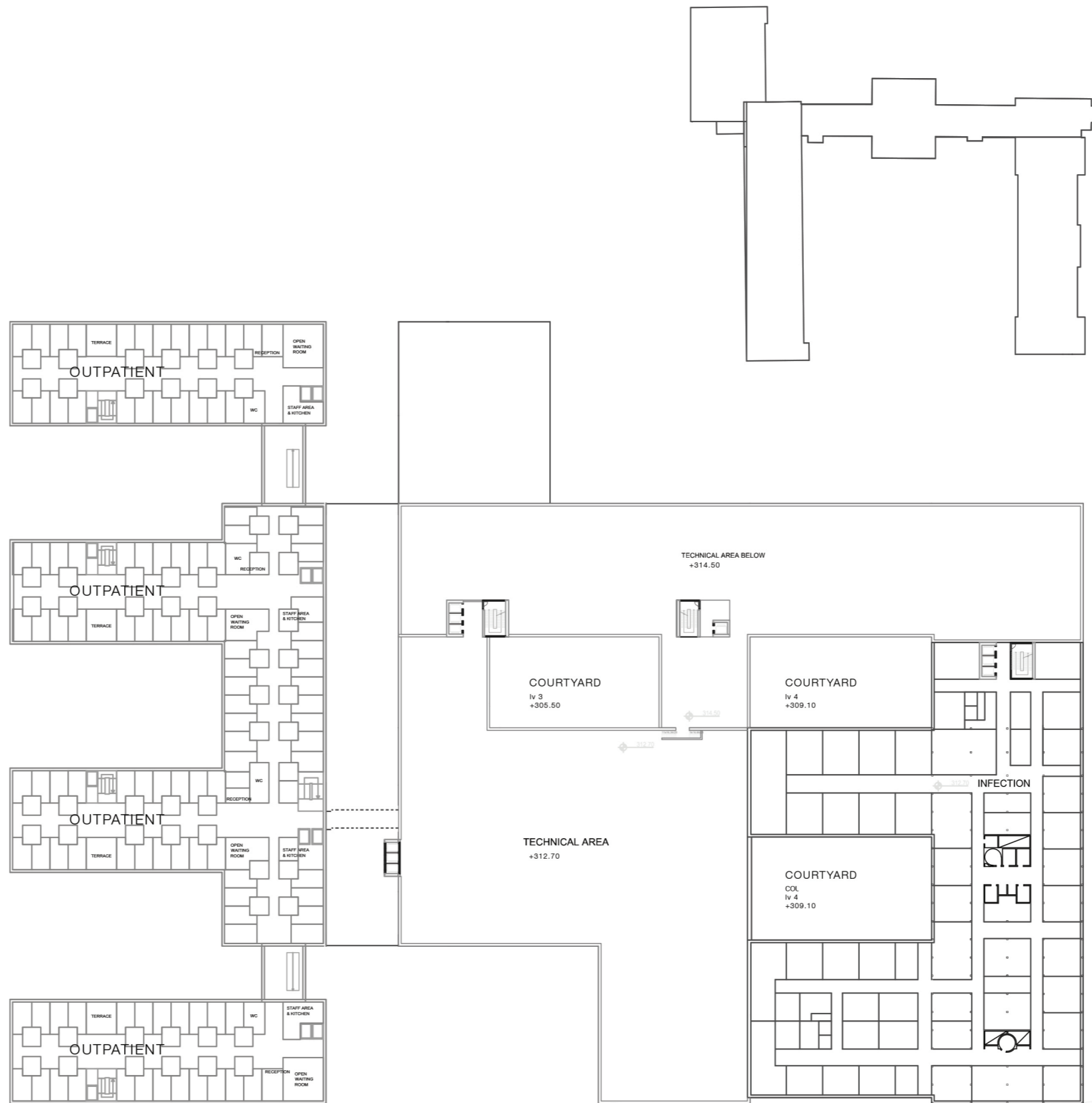


the gallery
 outpatient
 public spaces
 main entrance
 reception
 staff areas

level three 1:1000

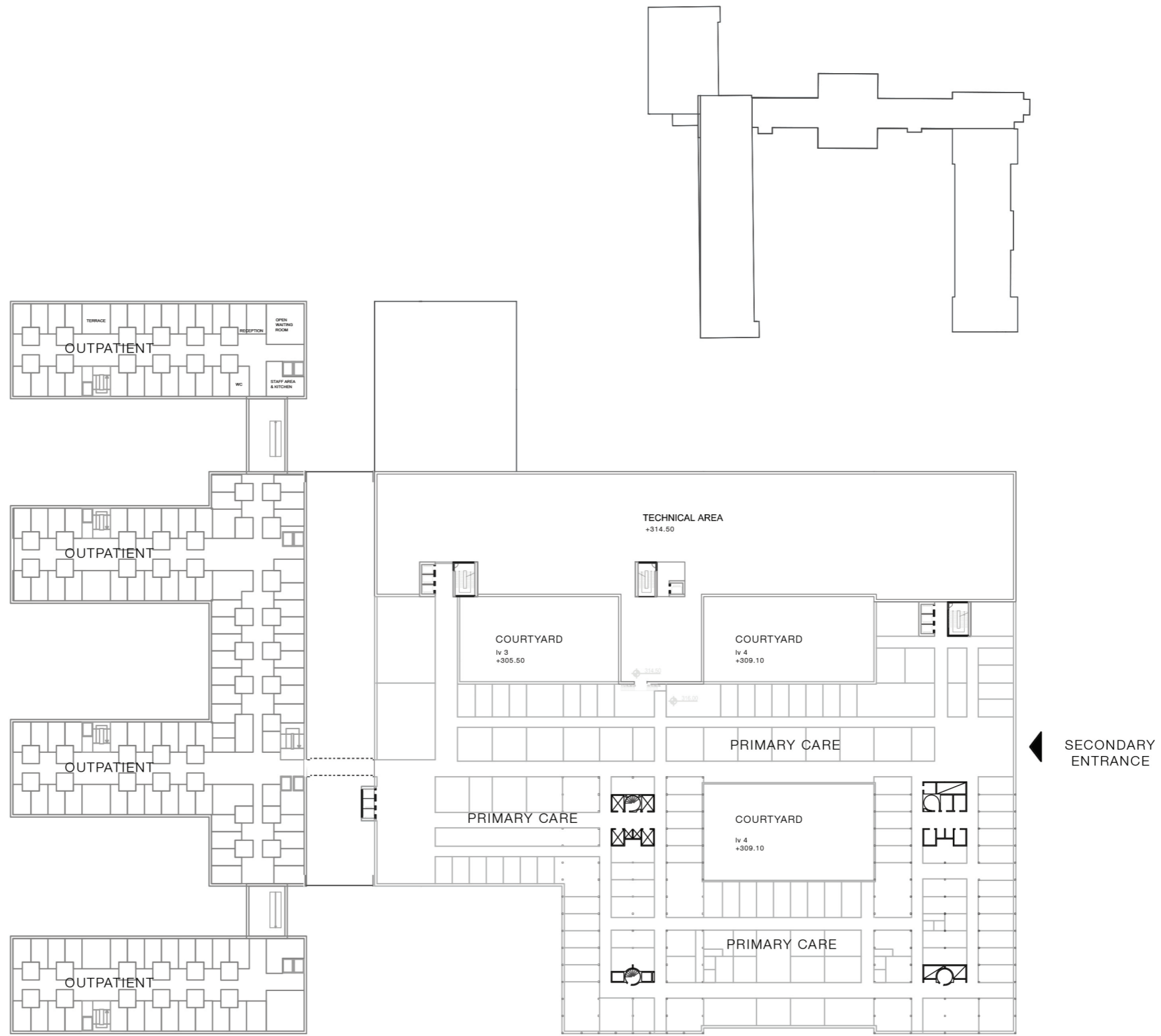


outpatient
 emergency
 x-ray
 delivery
 operation



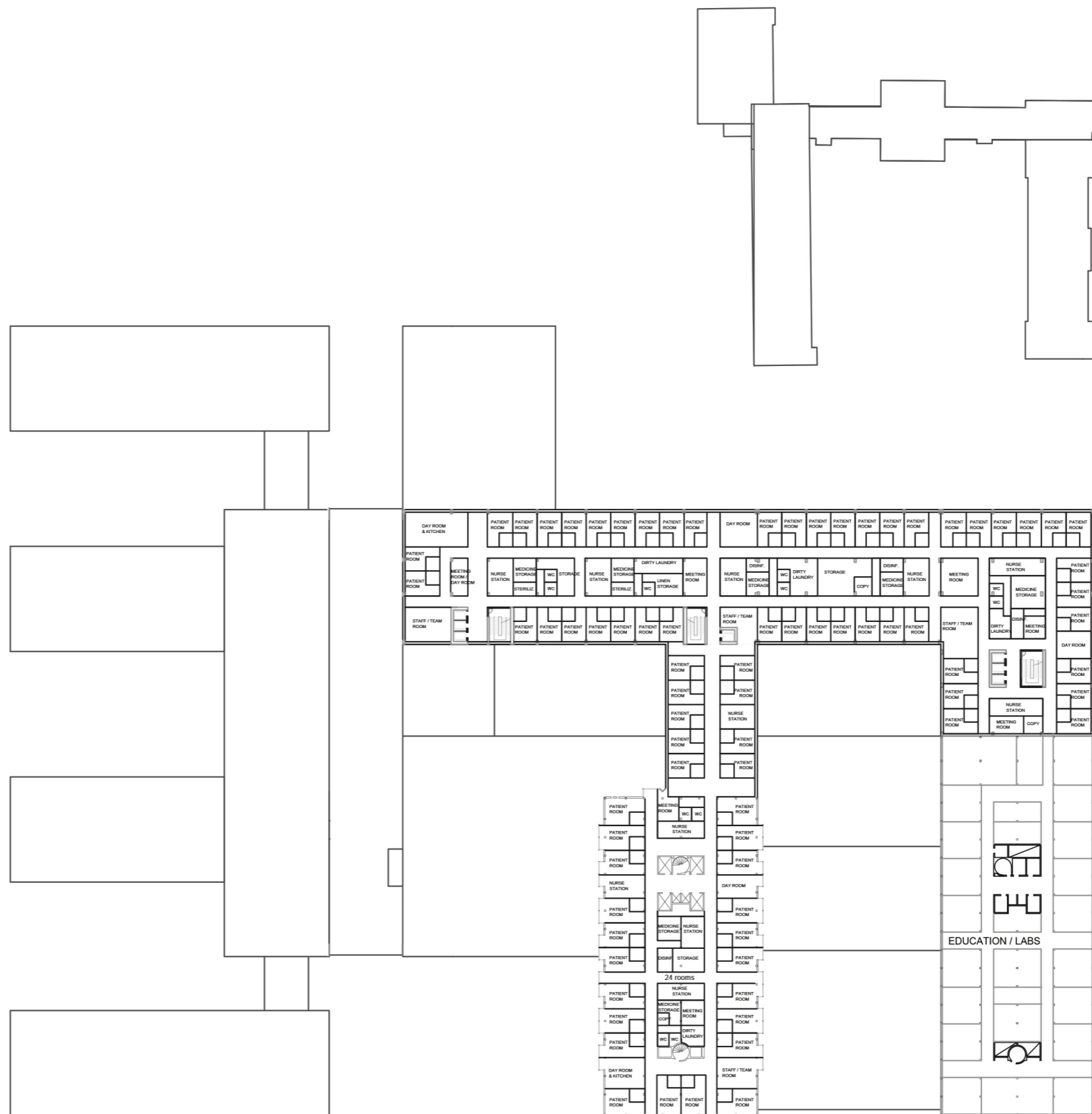
outpatient
 technical area
 infection

level five 1:1000



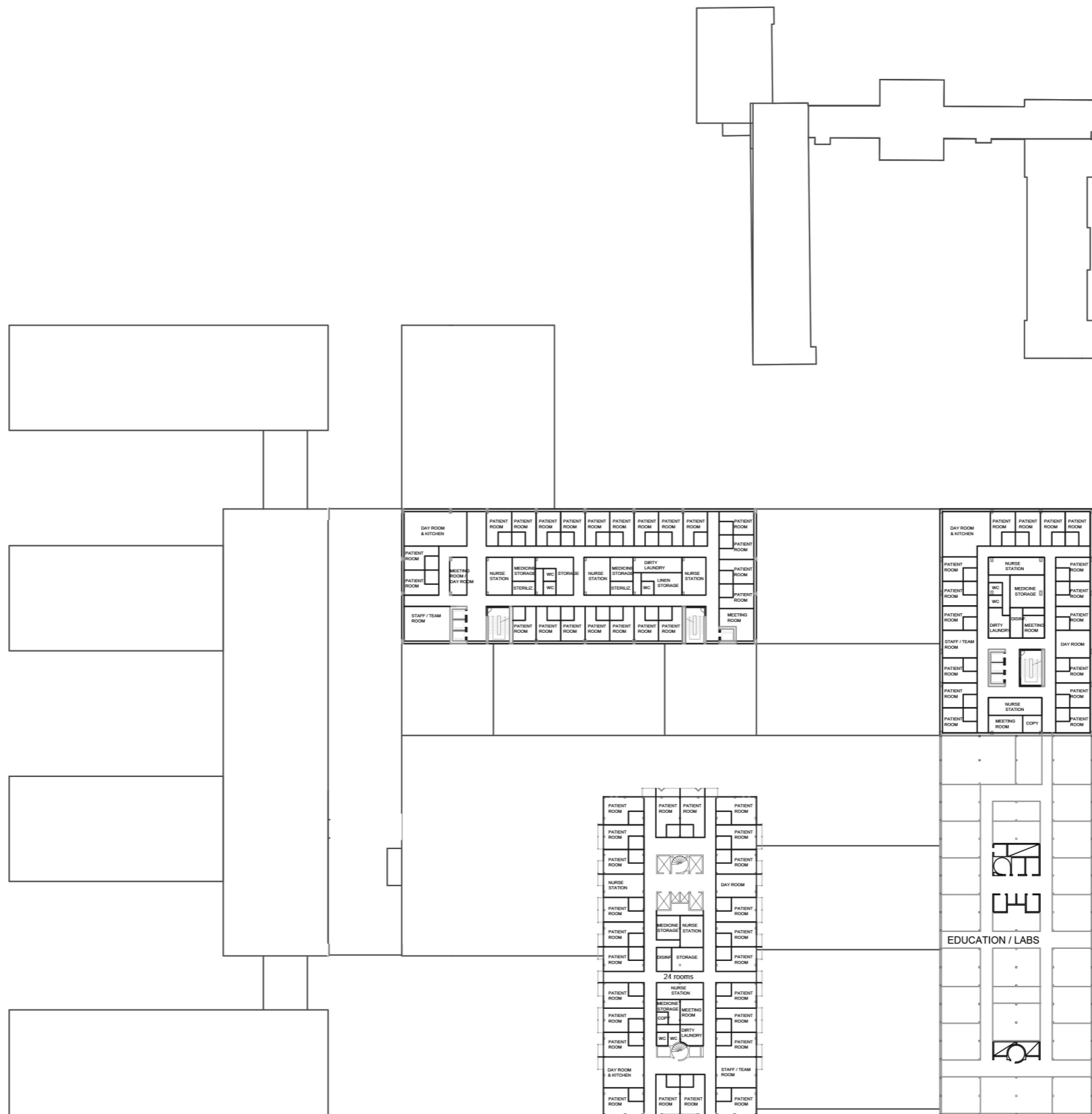
outpatient
 technical
 primary care
 connecting bridge

level six 1:1000



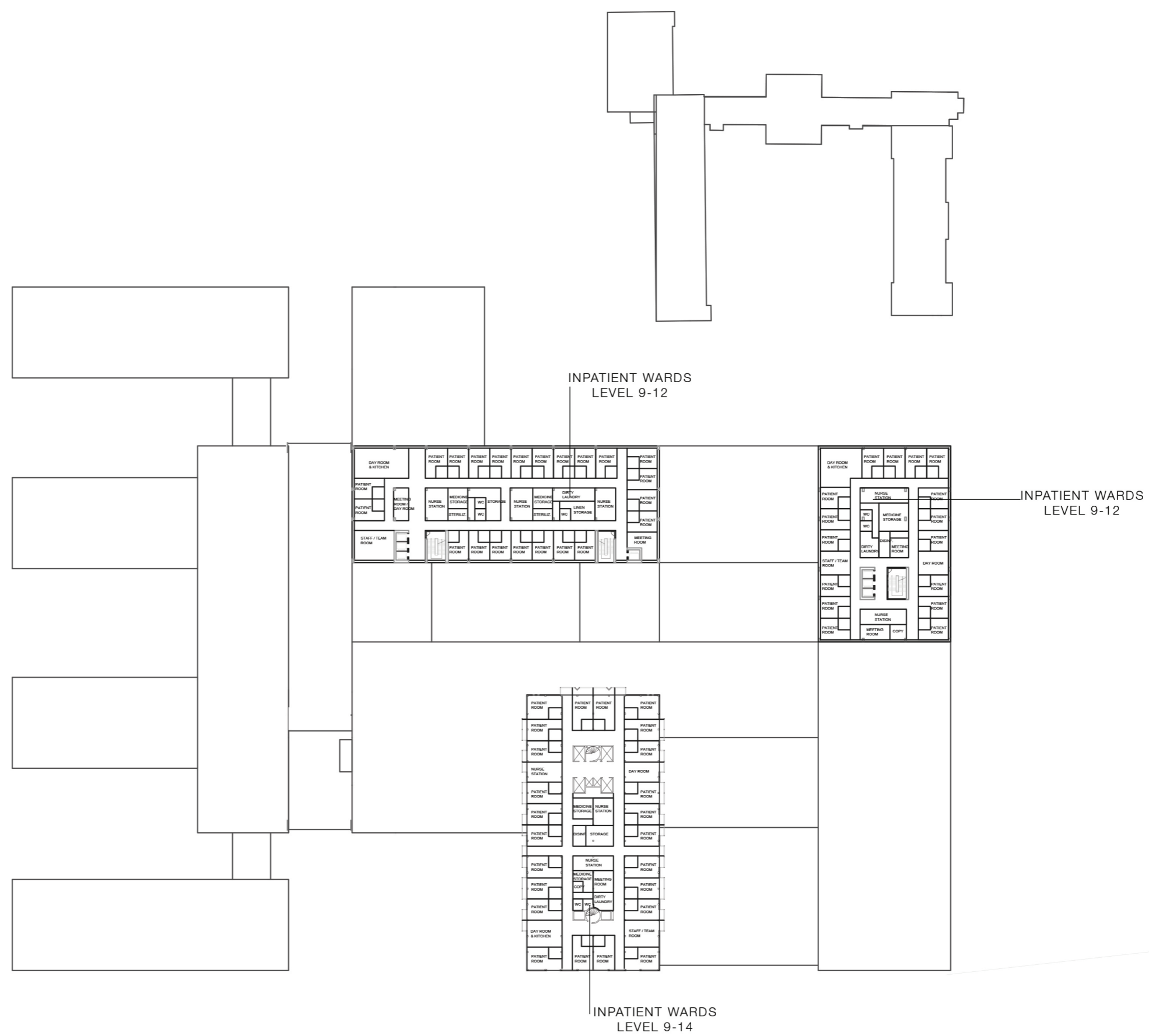
research/labs
78 inpatient rooms

level seven 1:1000



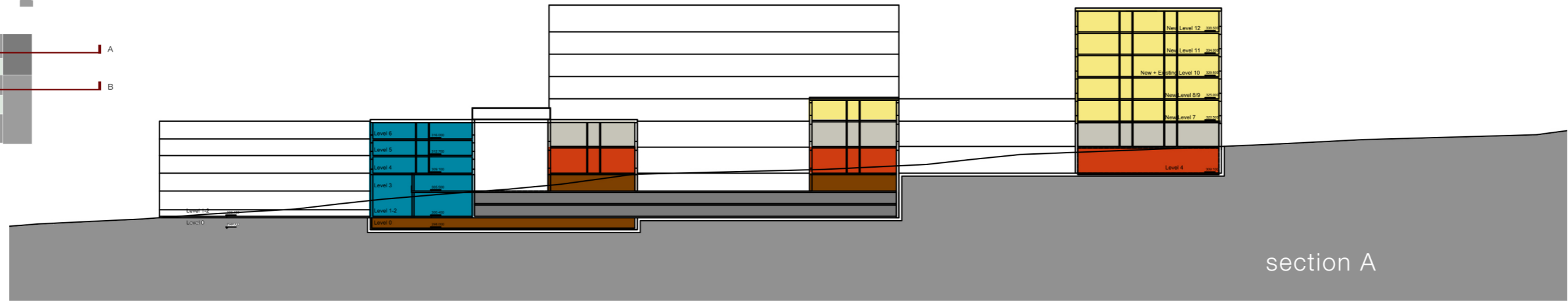
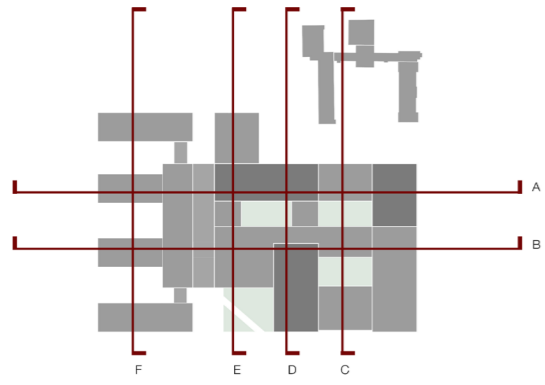
research/labs
62 inpatient rooms

level eight 1:1000

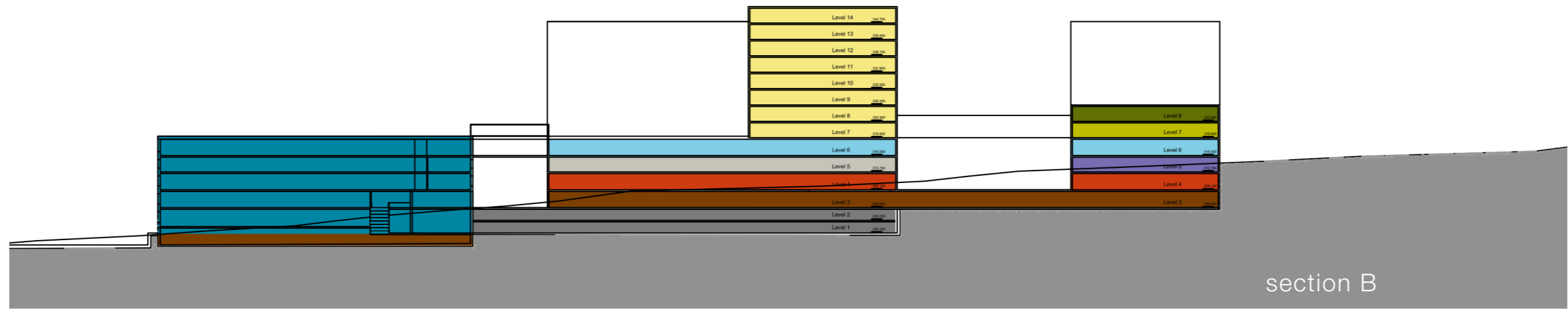


296 inpatient rooms

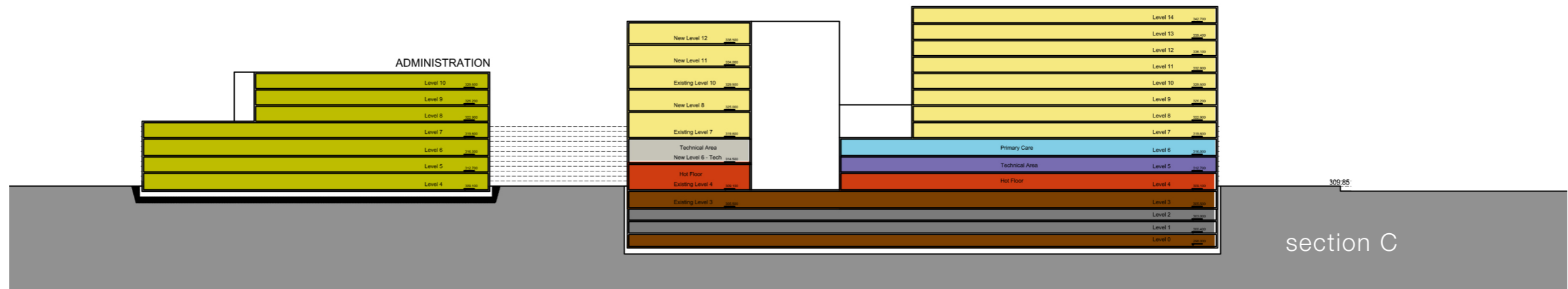
level nine to fourteen 1:1000



section A

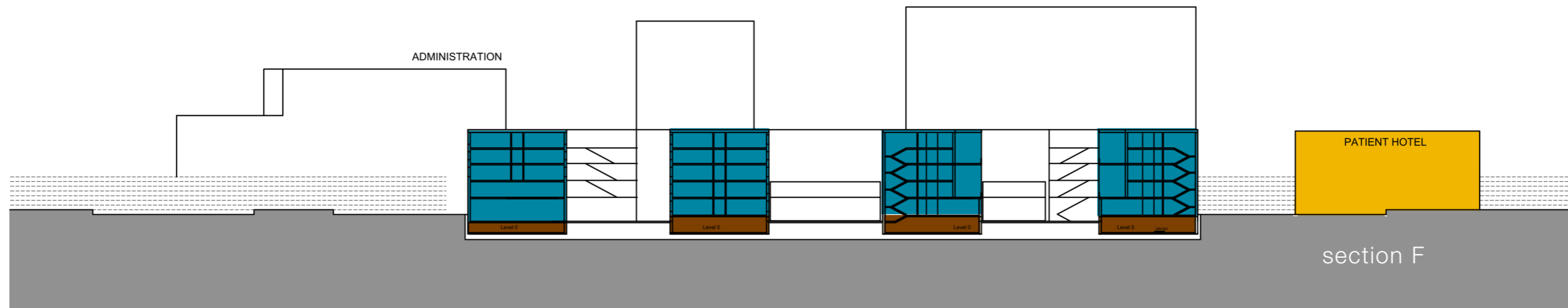
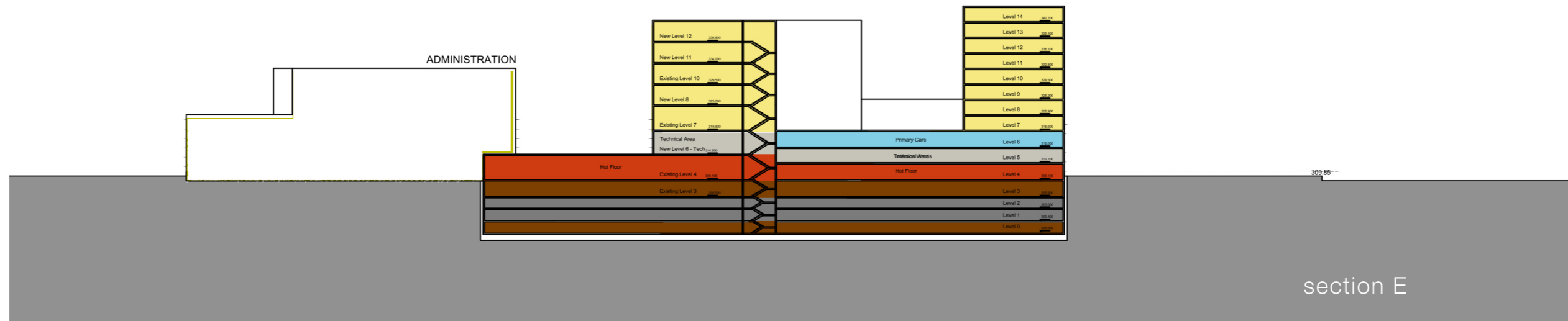
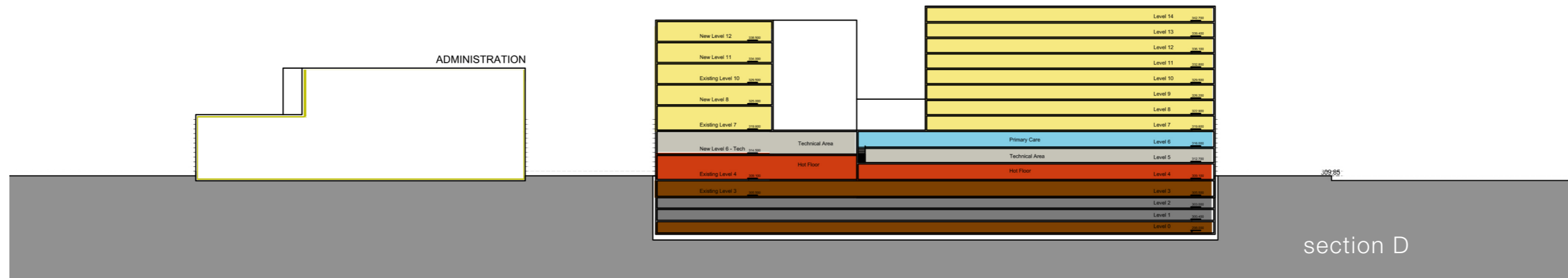


section B

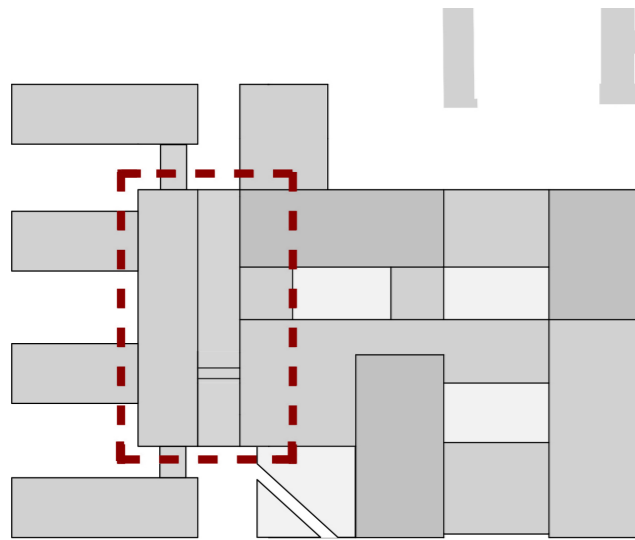


section C

master sections: 1:1000



the gallery

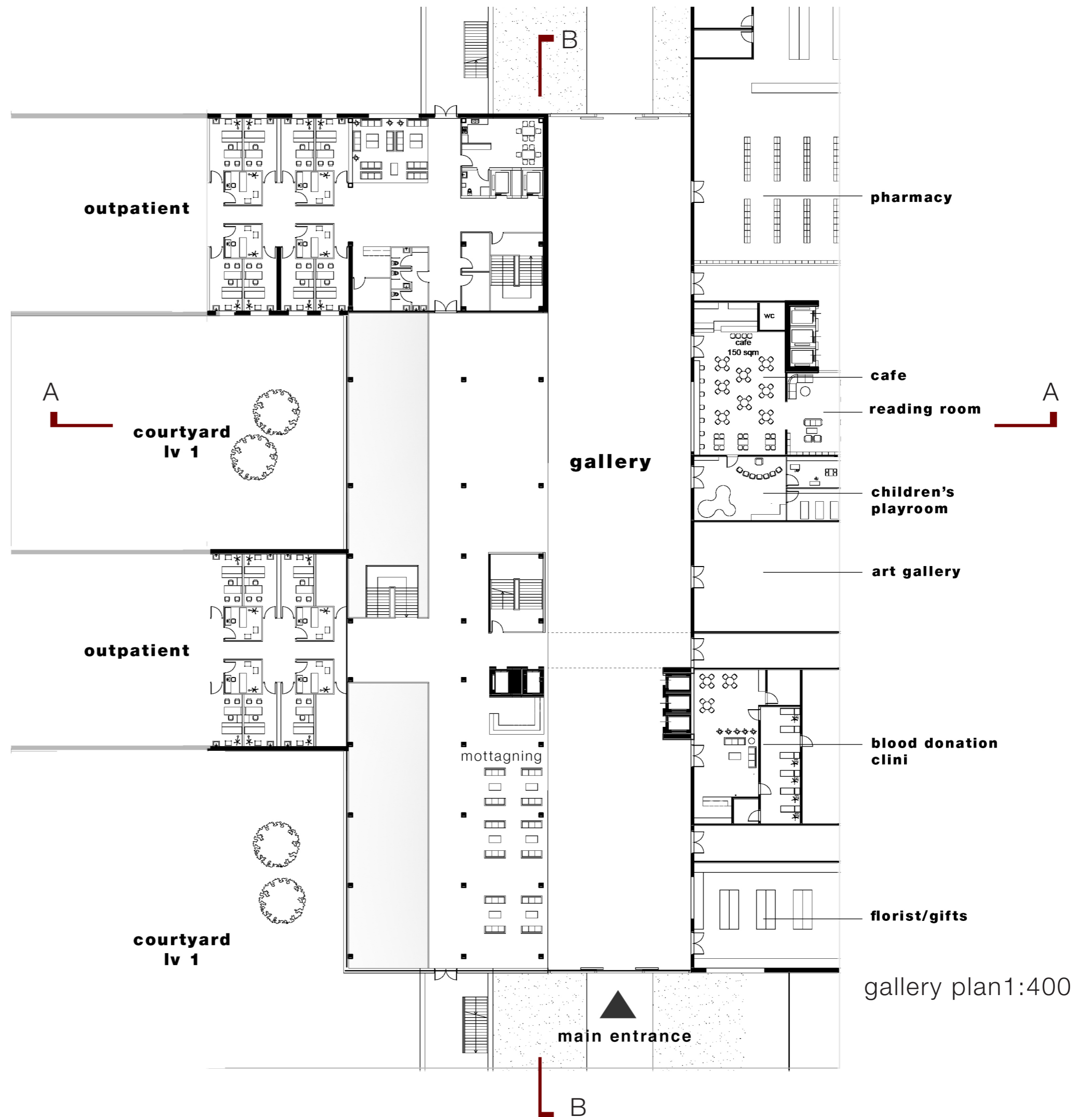


The gallery is the core element of the masterplan. It solves the issues of wayfinding, flows, topography and urban context. It divides the outpatient from inpatient and emergency, and introduces several new spaces in order to deinstitutionalise the hospital.

From the gallery, visitors can easily reach the different departments of the hospital or step down to level 1 to reach the science/education centre or a courtyard before reaching the waterfront park.

The roof of the gallery is designed with the concept sketch in mind. The roof is divided into two heights by the bridge connecting inpatient and outpatient. the first part of the roof from the main entrance is a relatively low solid roof with a green roof on top. After walking a bit more light shafts in a taller roof bring about a larger sense of space and an interplay of light through the gallery.

Internal rooms in both the inpatient and outpatient side have views of the gallery, increasing daylight access.

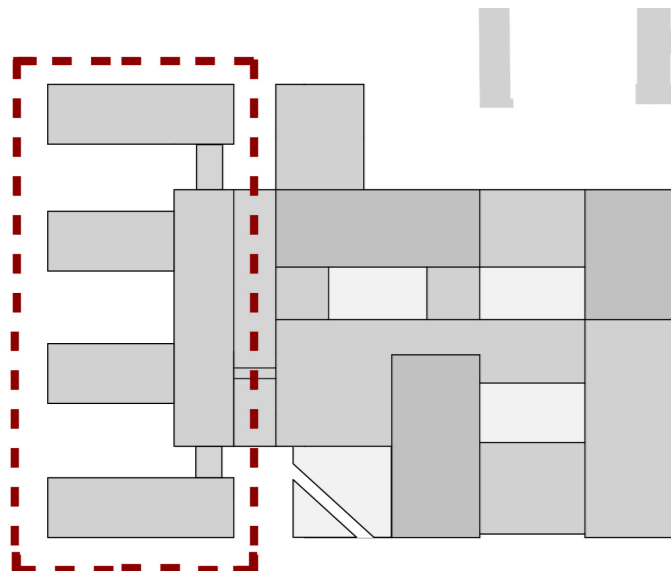








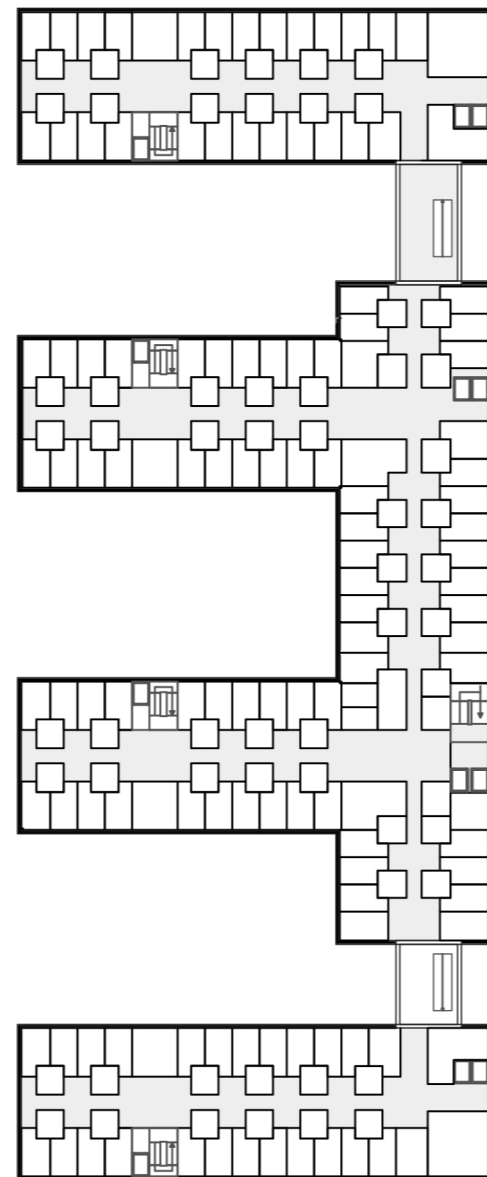
the outpatient department



The outpatient department is located on the west of the site, towards the bottom of the slope. It was designed to solve issues of wayfinding, social sustainability, flexibility and adaptability, circulation and daylight access.

From the gallery, patients access particular outpatient 'fingers' via elevators or stairs where circulation is simply one axis. Staff rooms are located to increase privacy and also provide views over towards the lake or over the gallery.

Connection to the inpatient and emergency department for staff is located on a bridge from level 6. Patients can travel to these areas via the gallery.



plan outpatient department 1:1000

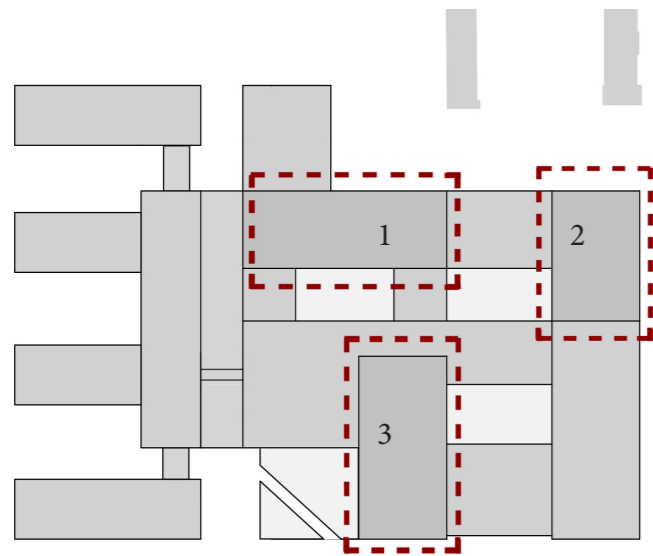


The terrace and waiting area provide natural light to the corridor spaces. Each corridor has a vista over the river



typical outpatient plan: 1:200

inpatient wards

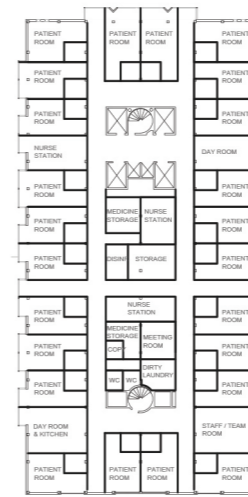


1

inpatient ward plans 1:1000



2

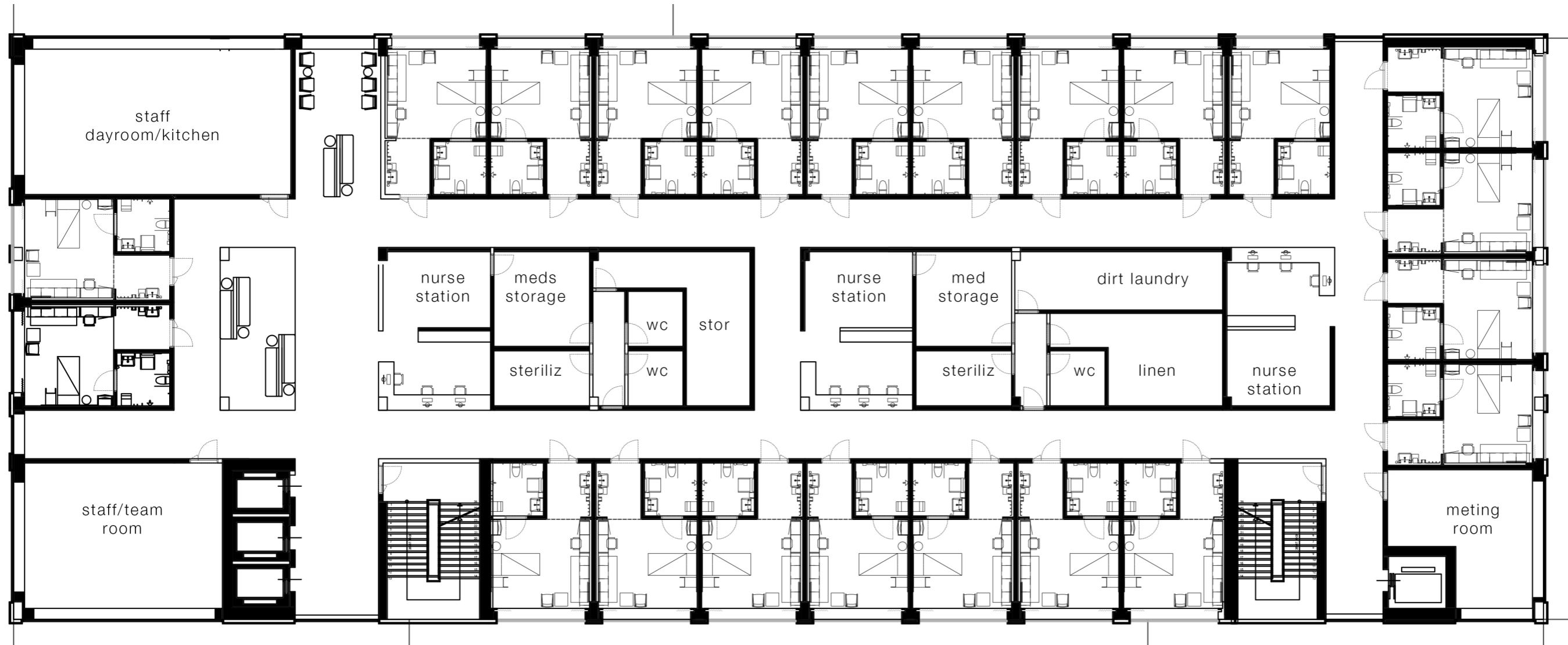


3

Inpatient wards are designed with a strong consideration of views, daylight access, circulation, relatives/visitors and staff circulation. Single patient rooms were designed in conjunction with evidence-based design, and an understanding of the ability of architecture to support the healing process.

Wards are located around the perimeter of each floor and support rooms in the middle. Nurse stations are created to provide ease of access and overlooking of specific patient rooms.

Corners of the plan are assigned to dayrooms, team rooms and meeting rooms.



inpatient plan 1:200

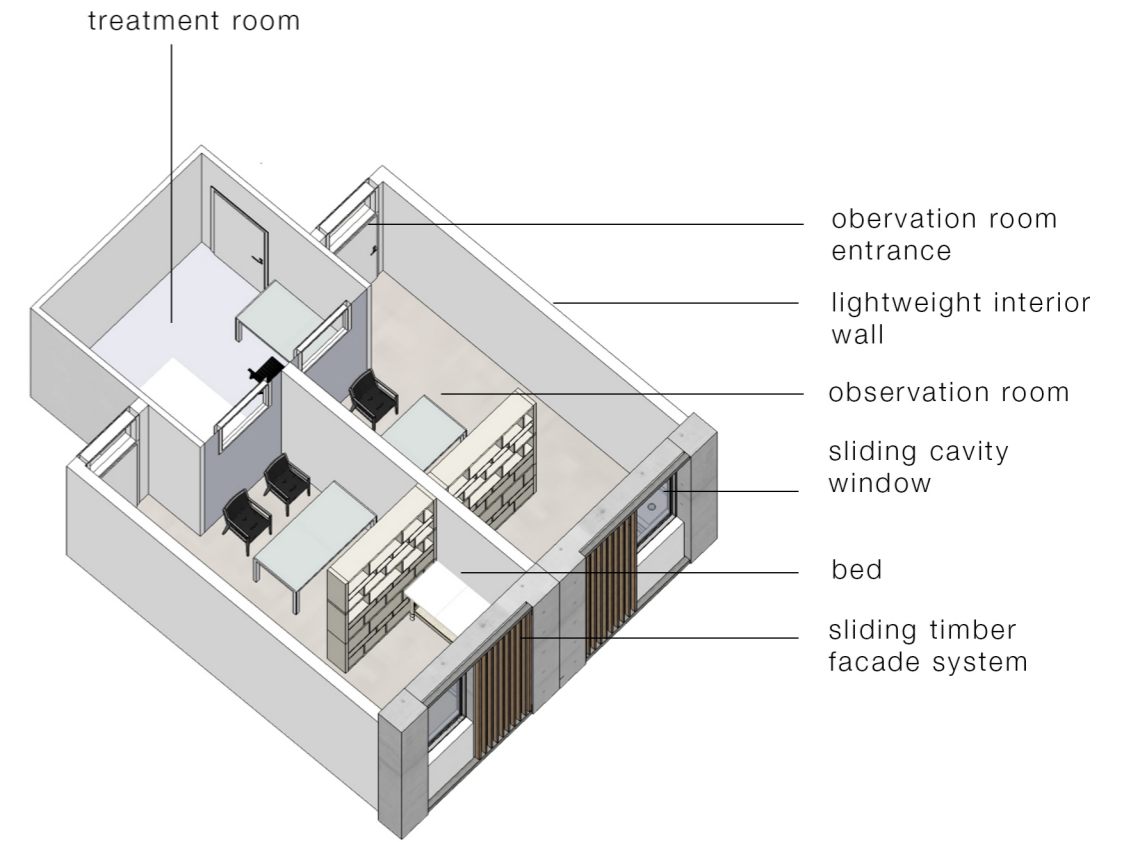
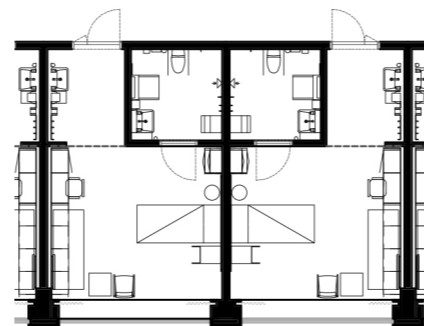
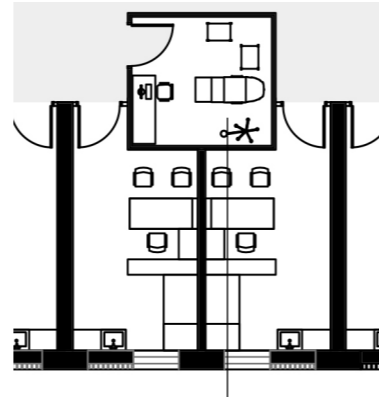
modular construction

The buildings are designed on a grid structure of 1.2 metres where every room and wall can be adapted to different departments if necessary. They are each divided to create two courtyards in between and one driveway with parking access and goods delivery.

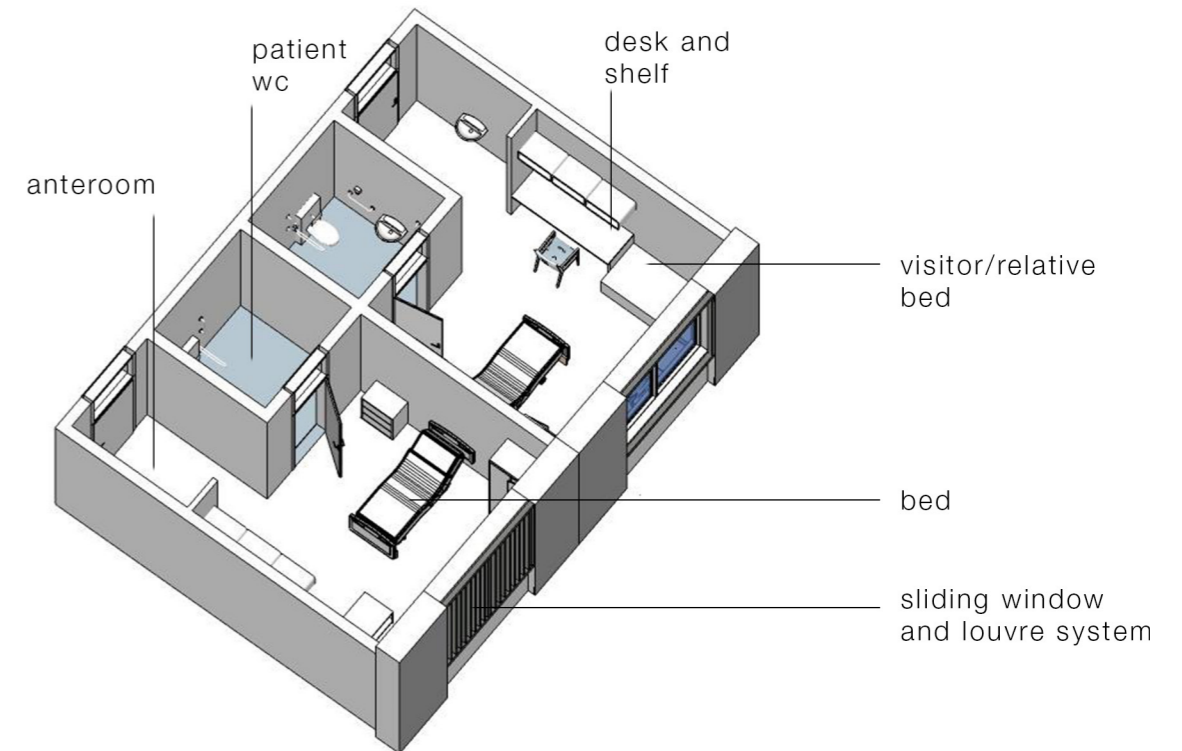
Individual outpatient rooms were planned to reduce a sense of hierarchy between the staff and visitors in order to promote social interaction and open conversation.

The inpatient rooms promote natural daylight through expansive windows yet allow control through louvred windows. Bathrooms and sinks in the anteroom are located close in the modular system for efficiency in piping.

Both modules use a concrete, timber and glazing facade system that is fully operable by the user. Windows can be fully recessed into walls to allow completely open views and timber louvres can be easily slid along a rail



typical outpatient module



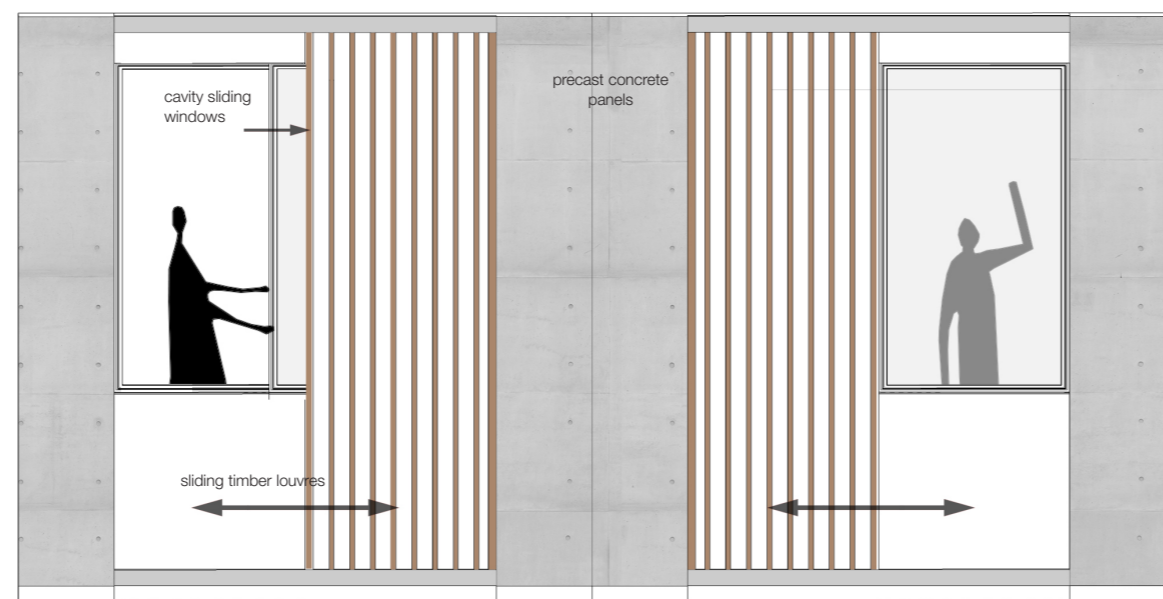
typical Inpatient module

the facade system

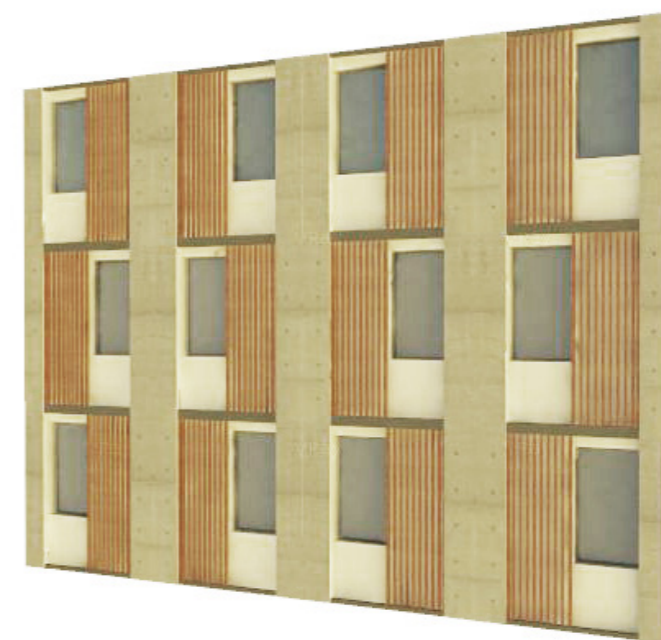
The facade of the outpatient depart is comprised of precast concrete walls, each adapted to the module of individual outpatient department modules. Each module features sliding cavity windows that recess into the concrete walls. Sliding timber panels are used to control light and privacy. It is expected the timber will grey over time, creating a sense of time to the form.

Terraces are located every second level to maximise daylight access.

Every component of the facade can be dismantled and replaced or repaired with ease.

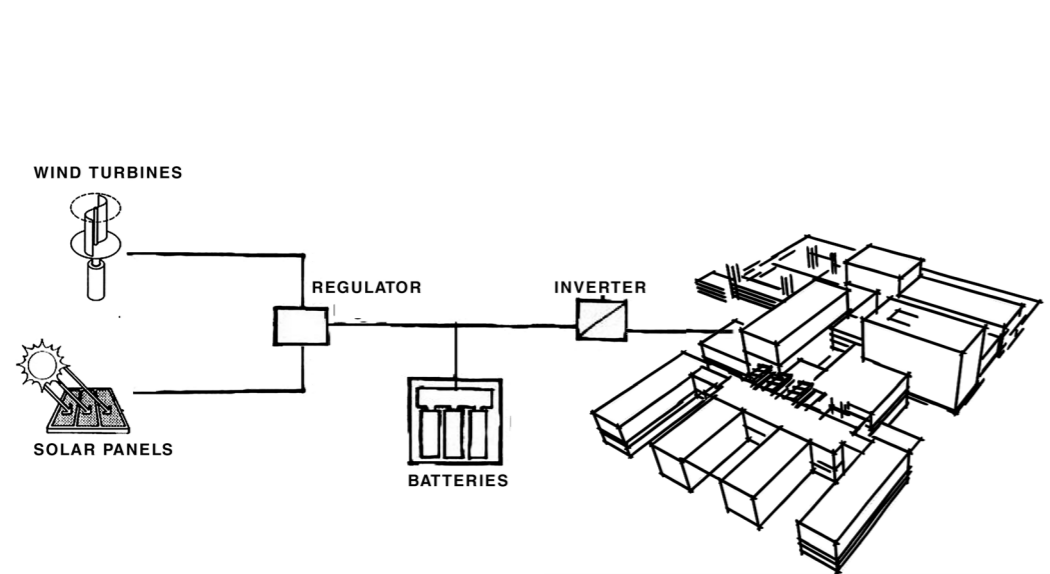


facade module



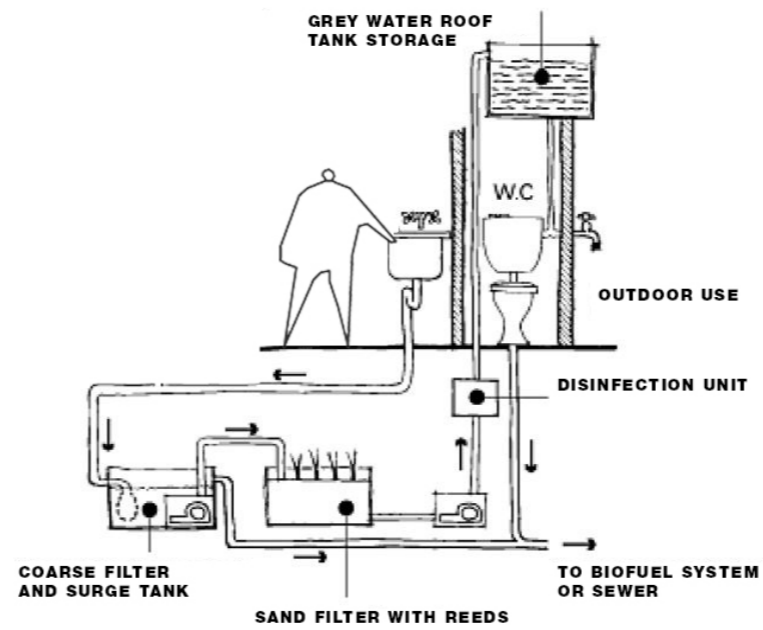
outpatient elevatoin 1:200

sustainability interventions



power generation and storage

Wind turbines and solar panels are located on and around the building depending on sun and wind patterns. During the summer months there are long day hours and solar panels generate more than enough electricity. Batteries are stored on site for future use. Solar panels are generally oriented south where possible and located for ease of access for maintenance.



grey-water recycling

A grey water recycling system was integrated into non-hazardous area or spaces where potential contamination were not possible. It is generally located in outpatient and public areas/bathrooms.



rainwater tanks

rainwater tanks are located on level 3 underneath the new courtyard on level 4. Water collected on roofs are generally diverted towards the water tanks for future use.