



MESSA DI VOCE

Opera in Montréal

Course: Bachelor Thesis
Year: 3
Hp: 15
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Omar Cossío
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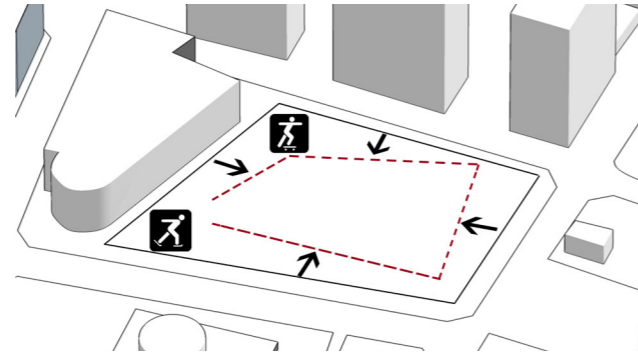
Location: Montréal, Quebec, Canada
Program: American Acoustic Society Student Competition. This year the task was to draw a 1200-seat multipurpose opera for McGill University in Montréal, Canada. It was much focus on the acoustic and noise cancelling.
Tools: SketchUp
Rhino
Grasshopper
AutoCAD
Adobe Ps, Ai, Id

Concept: The main concept was to create an unpretentious building available to everyone. To achieve this the roofs are tilted and accessible directly from the urban parks ground level. A special silent asphalt is applied to the entire site, including the roof. The asphalt open up for people to use the park for skating and cycling. In the winter the roof acts as a slope perfect for skiing or sledding.



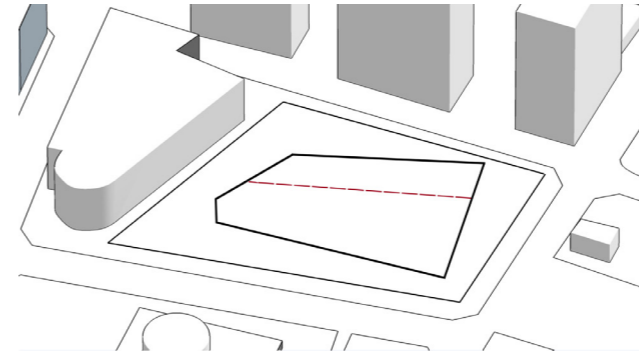
Site

Asphalt is dominating the urban environment, concealing a enchanted place beneath.



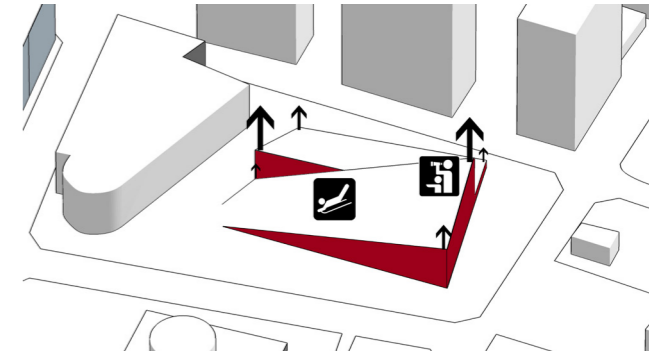
Social space

We make room for various activities on the site for all the seasons.



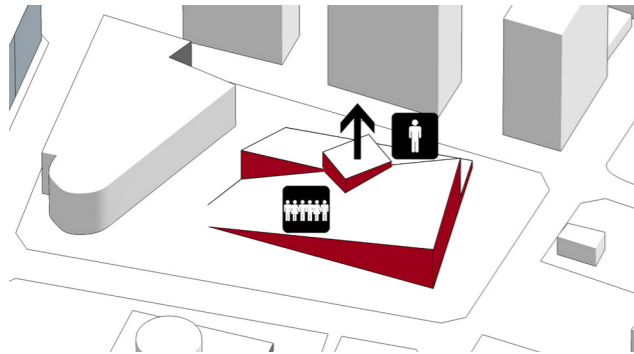
Split in two

To face all directions the site splits in two parts, a north side and a south side.



Break up the ground

By breaking and lifting up the ground the opera gets exposed, creating a sloping roof that can be used for various activities.



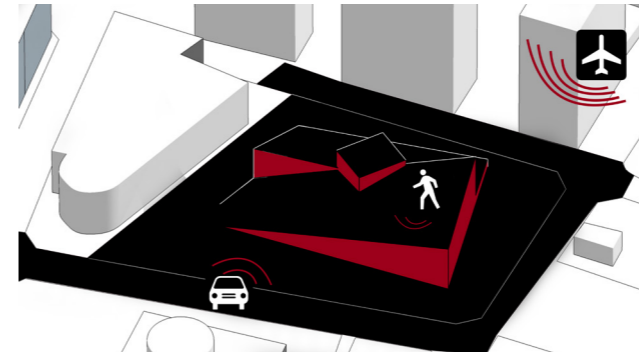
Public and private

Creating one public roof accessible for everyone and one private roof accessible to the opera visitors during breaks.



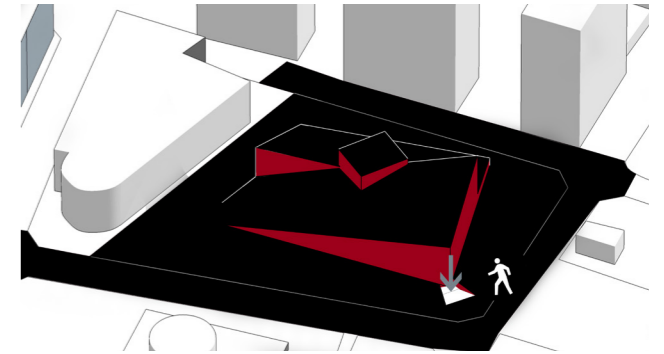
Noise reduction

To reduce the street noise and the vibrations on the roof a rubberized asphalt is applied on both the street and the roof.



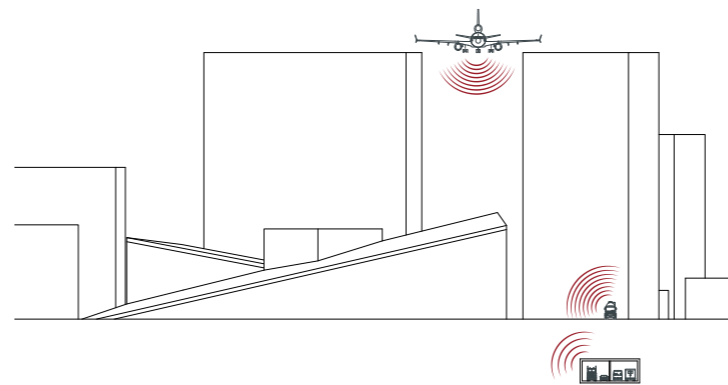
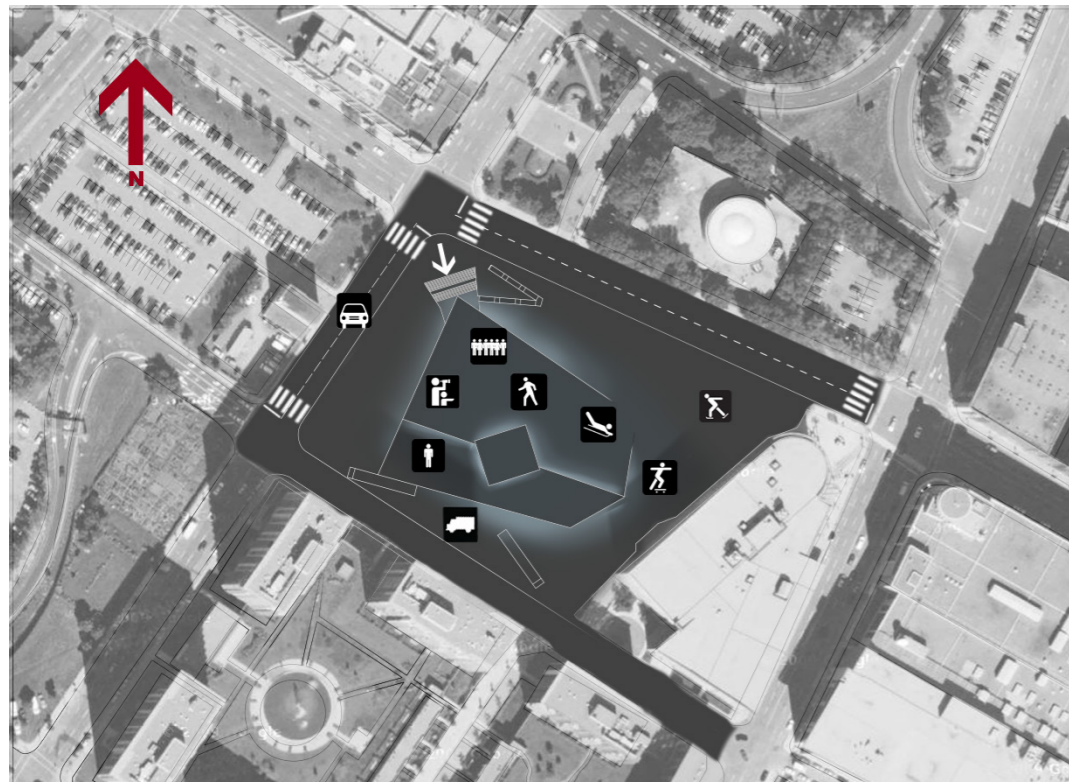
Rubberized asphalt

The rubberized asphalt reduces tire and engine noise with 50-75%, resulting in a lower noise level for the entire site.



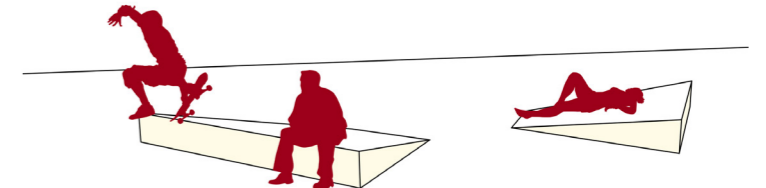
Enter the magic

To enter the enchanted place of opera you have to go below the urban asphalt.



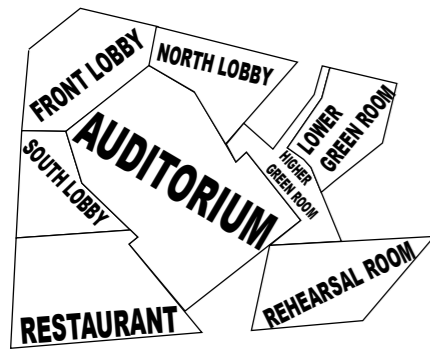
Soundscape

The traffic along Rue Peel and Rue St-Jacques generates most of the noise in the surroundings. With noise levels of 60-70 dBA with some peaks at +70 dBA from the airplanes.

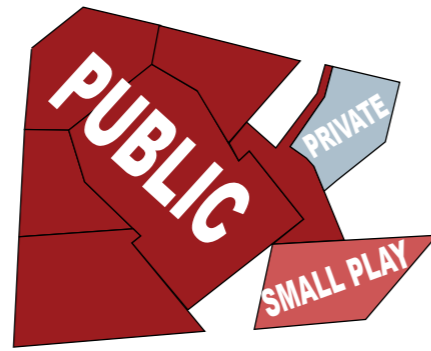


Urban furniture

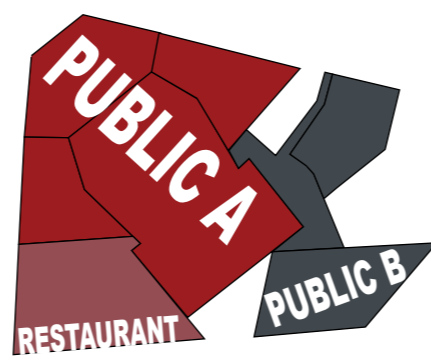
Like the building is pushing through the ground so does these obstacles randomly over the site. They are perfect to lie down on and reading a book, sit down and just relax or why not just make a sweet pop-shovit of the ledge to impress your friends.



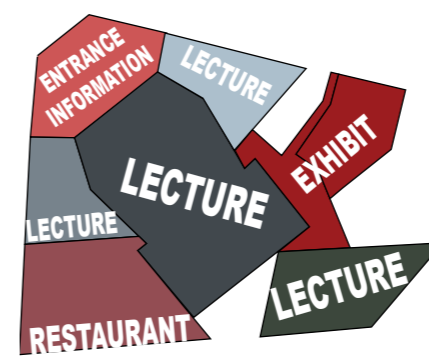
Multipurpose
The building is divided in 8 parts that can be used differently at various occasions.



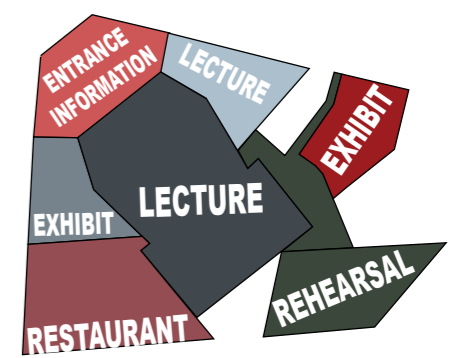
Opera
During an opera the lower green room will be used by the performers and the rehearsal room can be entered from the roof.



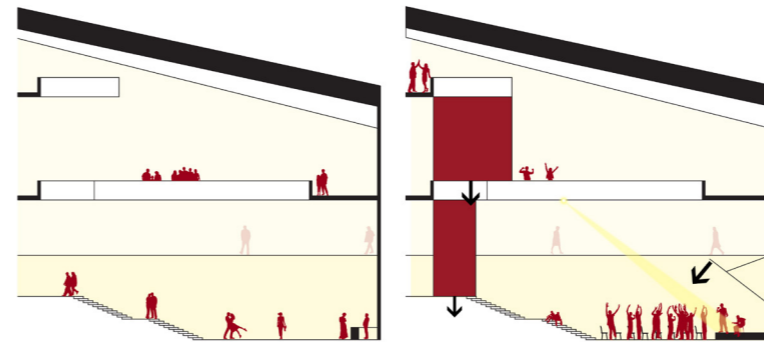
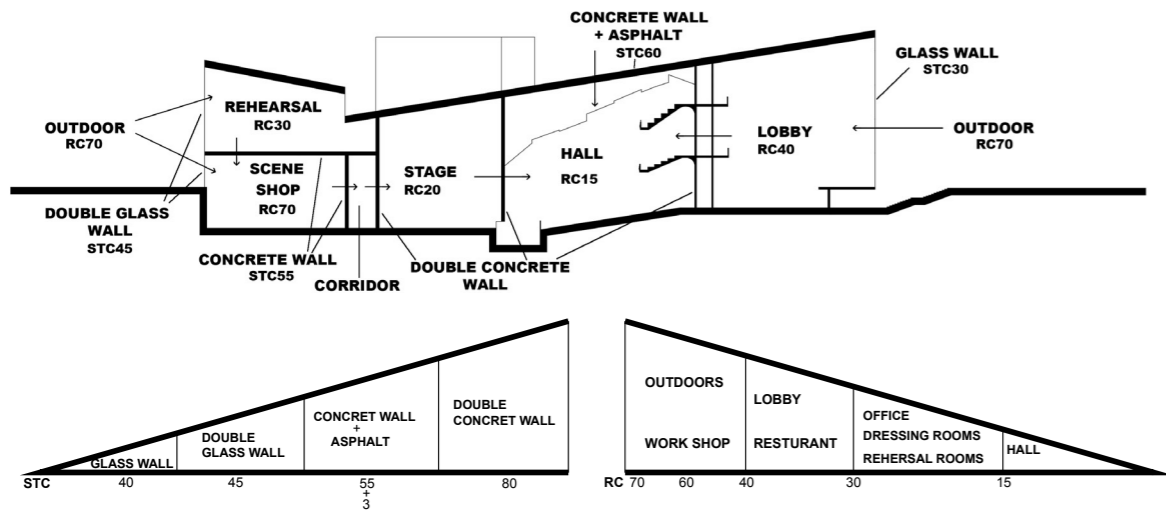
Concerts
There can be two larger plays at the same time where the green room works as a lobby for the smaller of the two.



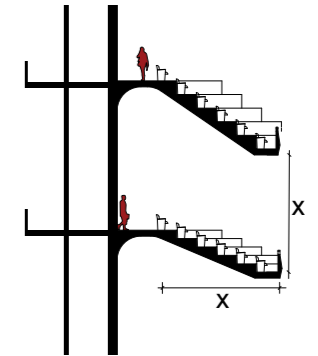
Conference
There can be several lectures and/or shows in the building at the same time.



Day activity
The building is built to always be active if its not rehearsals there can be several activities there.

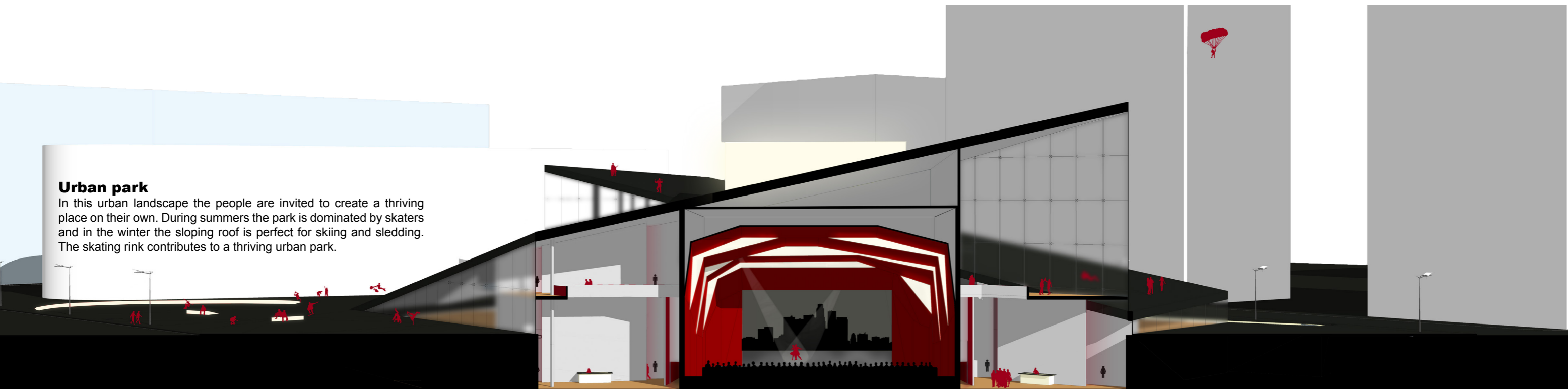


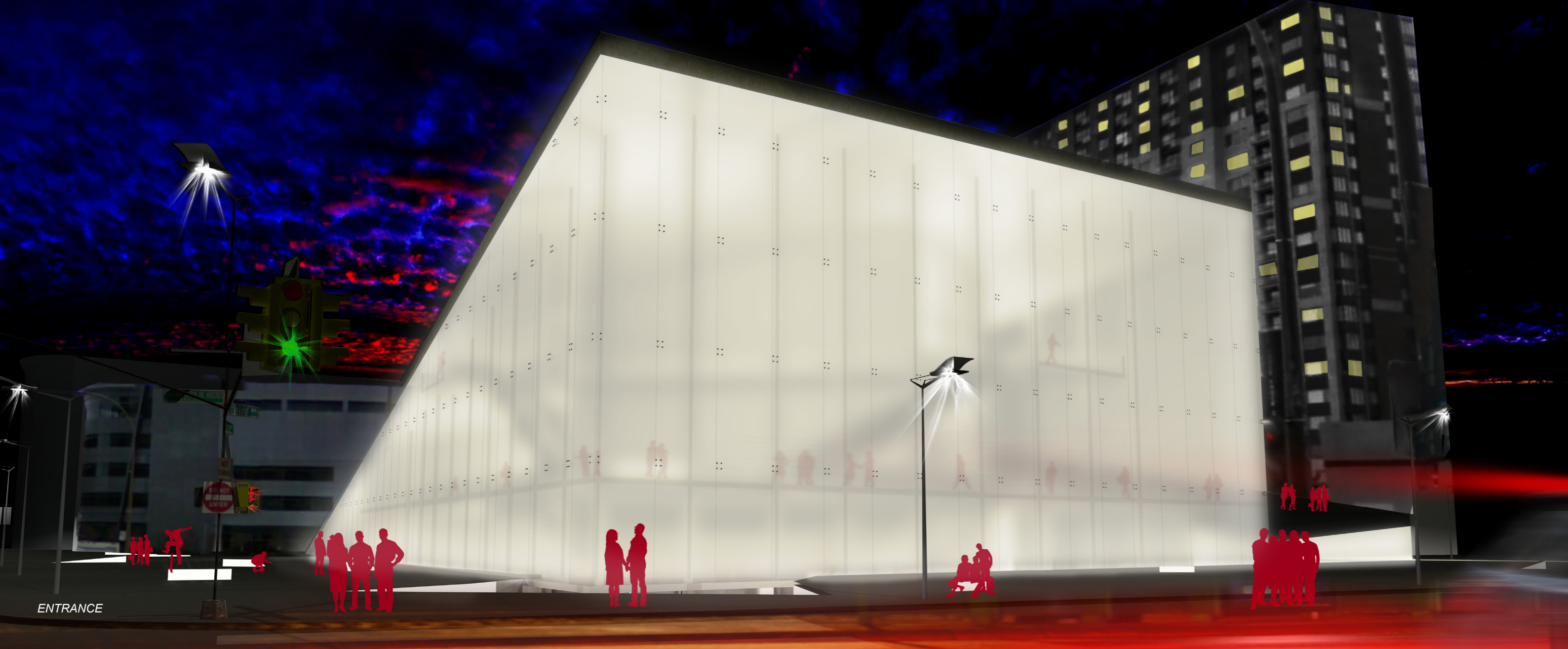
Lobby performance and lecture (n)
By lowering down a curtain from the balconies railing and tilting a plane above the stage the lobby wings are great for occasional performances.



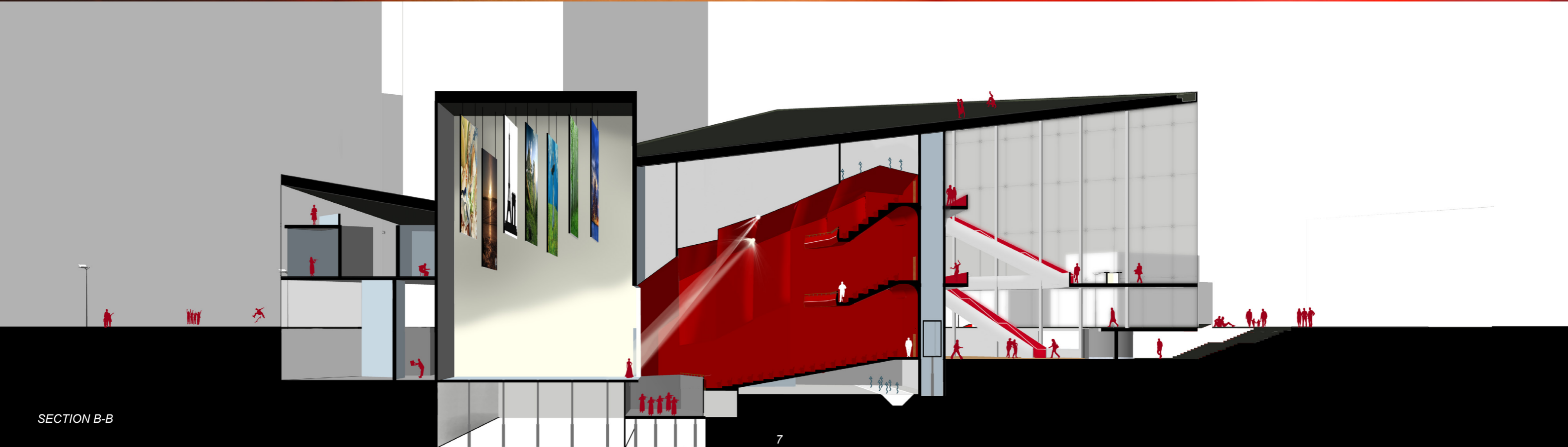
Balconies
The hall has no classical side balconies in regard to the bad visual aspects they generate. Instead there are two large balconies on the rear wall. They are calculated to have the same height as depth, giving great visuals and even better sound.

Urban park
In this urban landscape the people are invited to create a thriving place on their own. During summers the park is dominated by skaters and in the winter the sloping roof is perfect for skiing and sledding. The skating rink contributes to a thriving urban park.

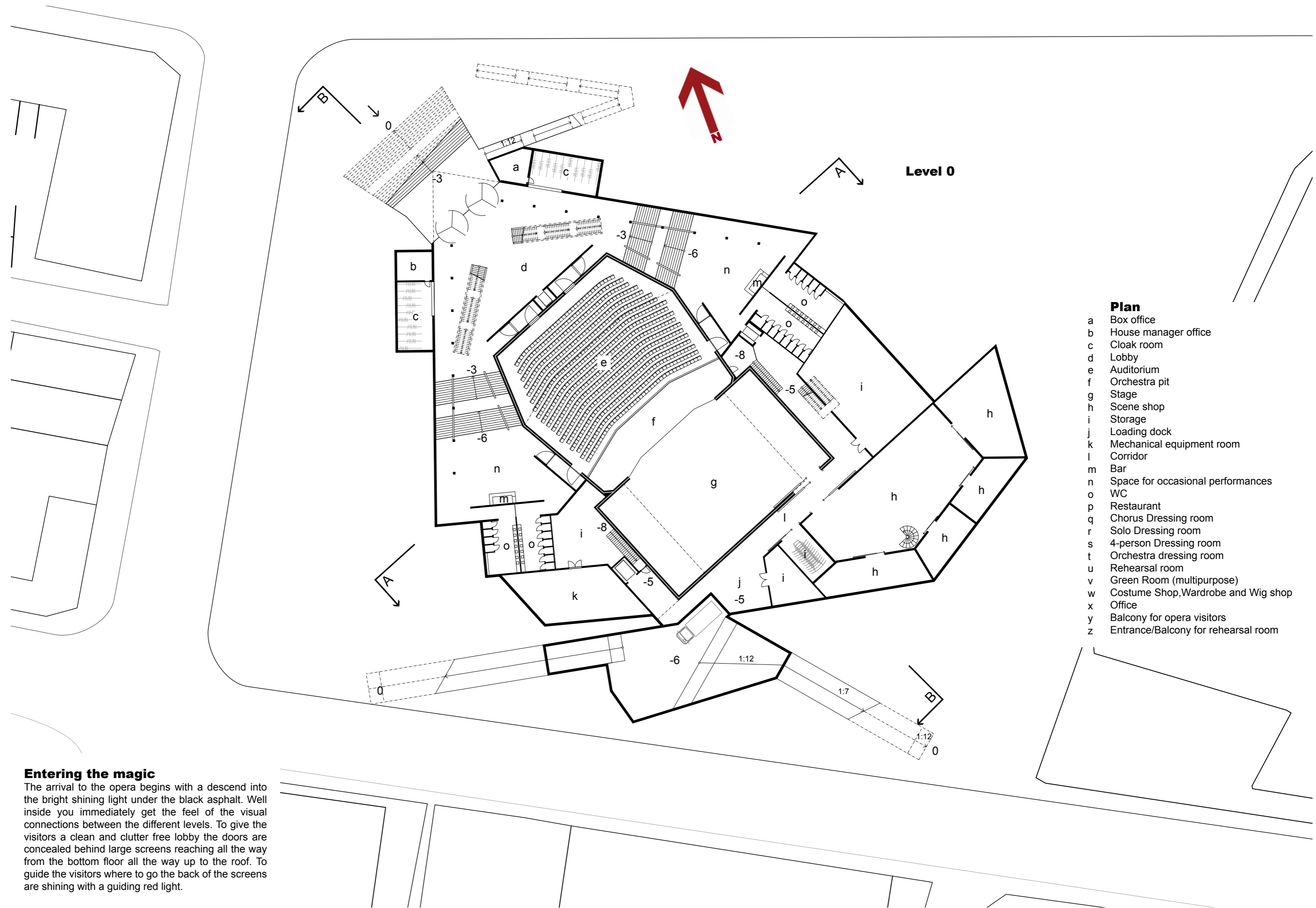




ENTRANCE



SECTION B-B



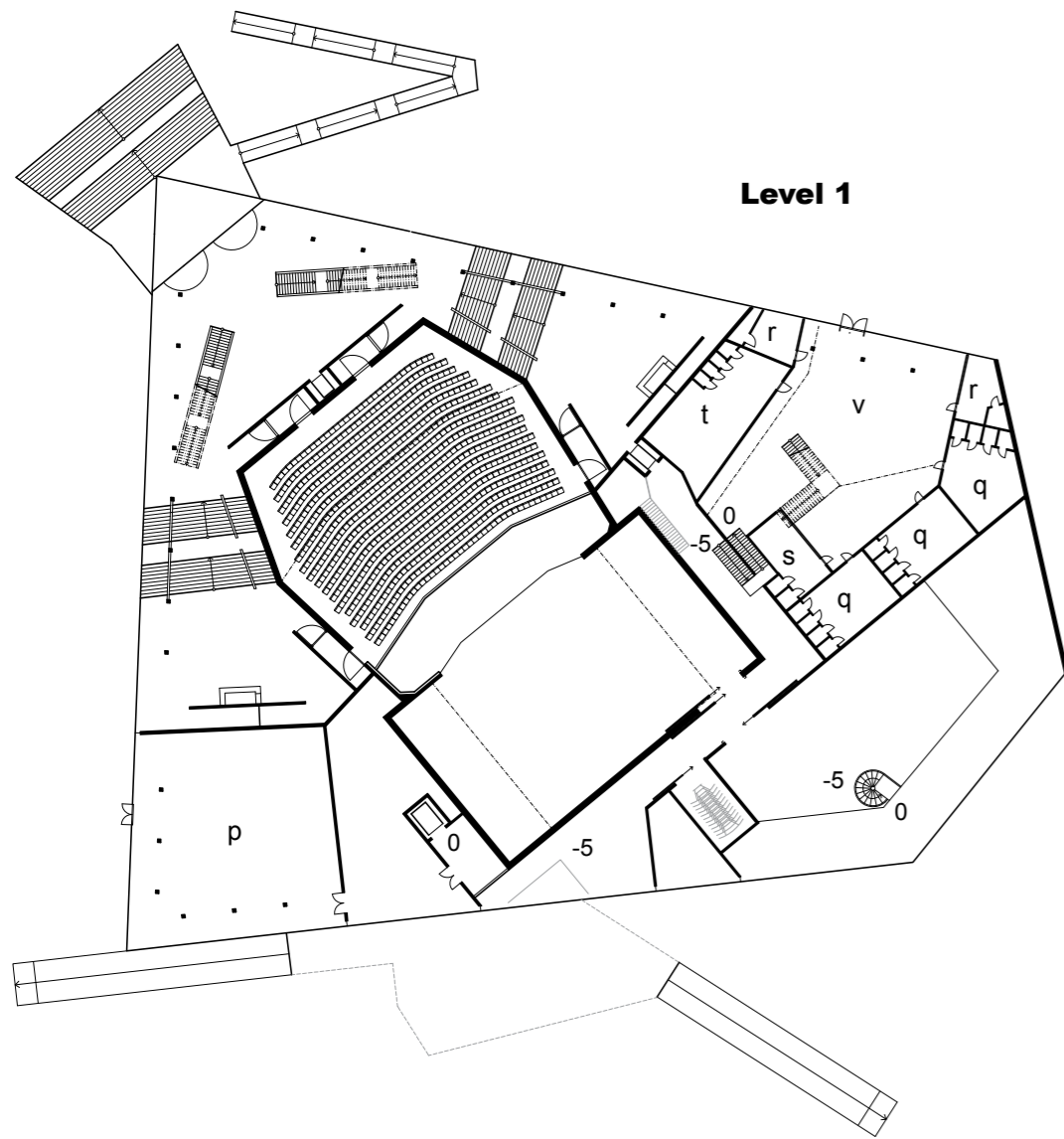
Level 0

Plan

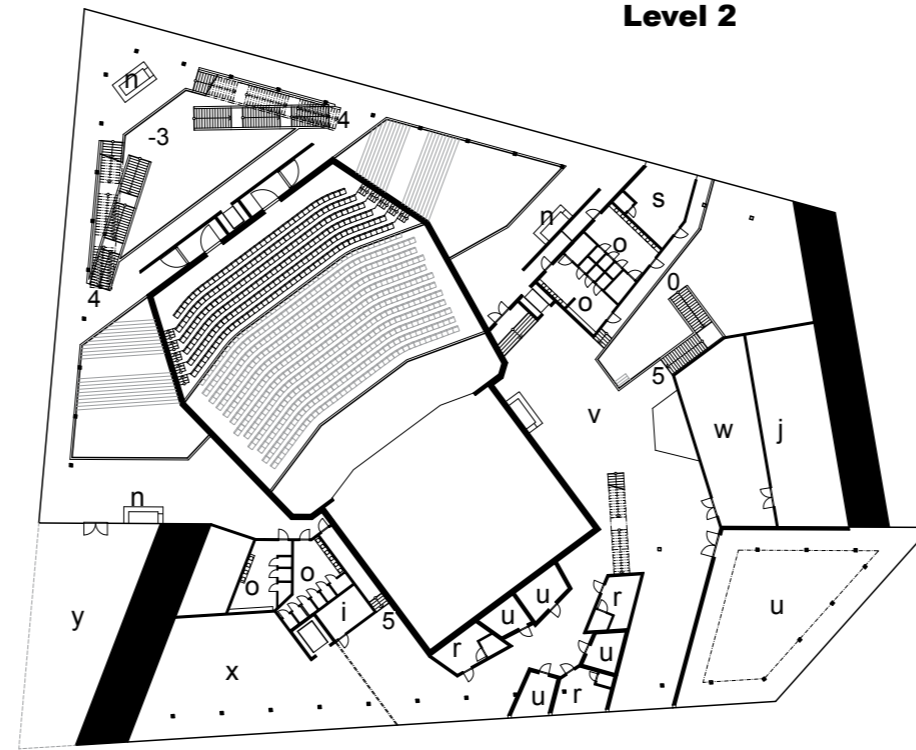
- a Box office
- b House manager office
- c Cloak room
- d Lobby
- e Auditorium
- f Orchestra pit
- g Stage
- h Scene shop
- i Storage
- j Loading dock
- k Mechanical equipment room
- l Corridor
- m Bar
- n Space for occasional performances
- o WC
- p Restaurant
- q Chorus Dressing room
- r Solo Dressing room
- s 4-person Dressing room
- t Orchestra dressing room
- u Rehearsal room
- v Green Room (multipurpose)
- w Costume Shop, Wardrobe and Wig shop
- x Office
- y Balcony for opera visitors
- z Entrance/Balcony for rehearsal room

Entering the magic

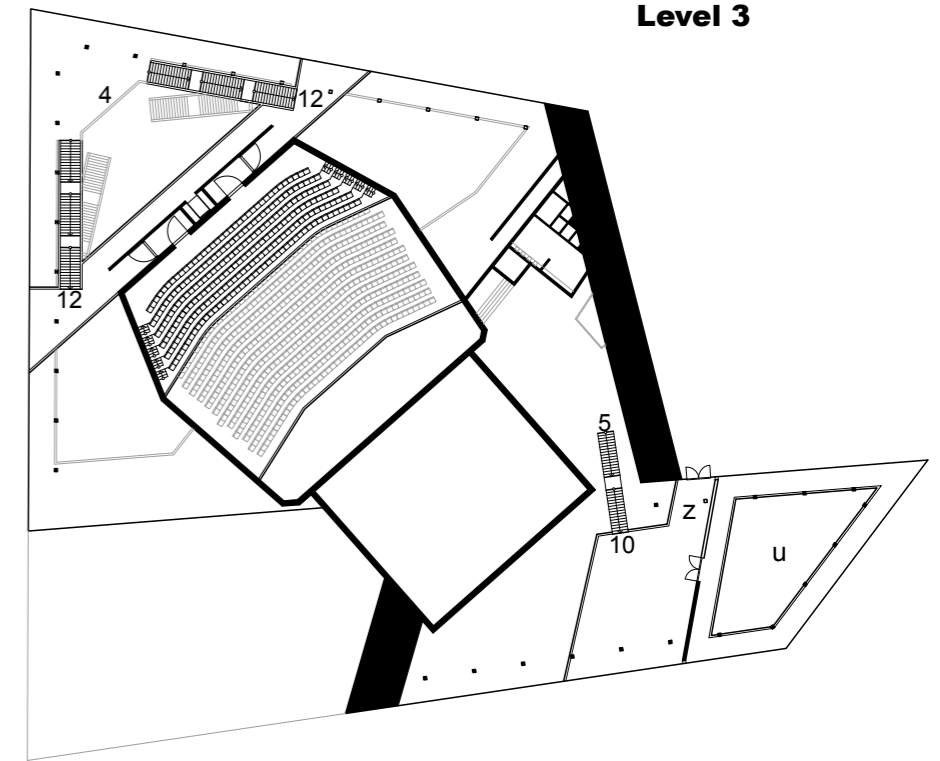
The arrival to the opera begins with a descend into the bright shining light under the black asphalt. Well inside you immediately get the feel of the visual connections between the different levels. To give the visitors a clean and clutter free lobby the doors are concealed behind large screens reaching all the way from the bottom floor all the way up to the roof. To guide the visitors where to go the back of the screens are shining with a guiding red light.



Level 1



Level 2



Level 3

Green room (v)

The Green Room is a two-story room with a more private space in the lower room and a public space in the upper room. It's a room that can work not only as a ordinary green room but also as a multipurpose room during different venues.

Operas:

Pre/post events on the upper level where the performers and visitors will have a visual interaction. If the performers want to be more private they can enter their dressing rooms.

Rehearsal room Performance:

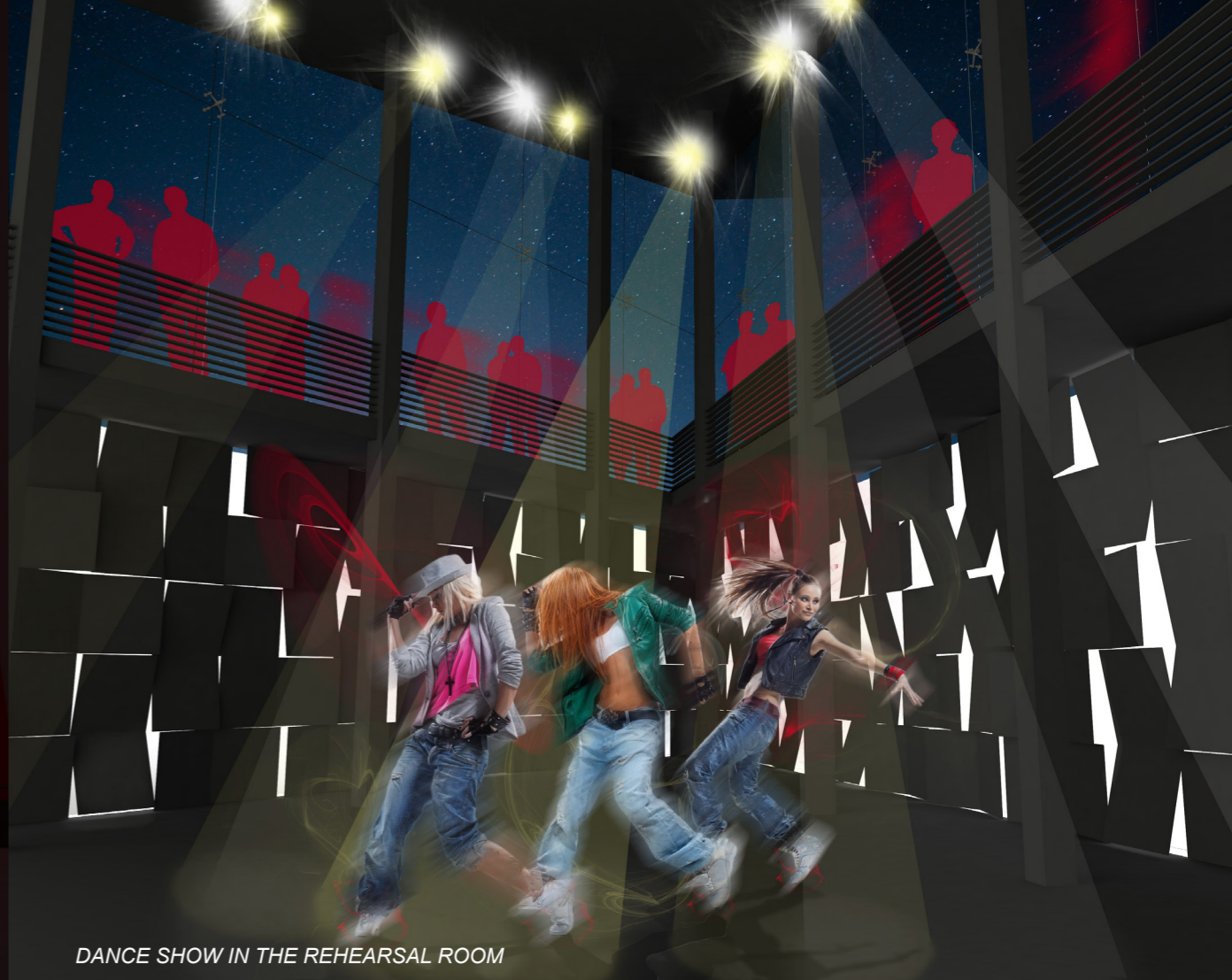
When there is a smaller performance in the rehearsal room the green room will work as a lobby with direct access to the exterior.

Other days:

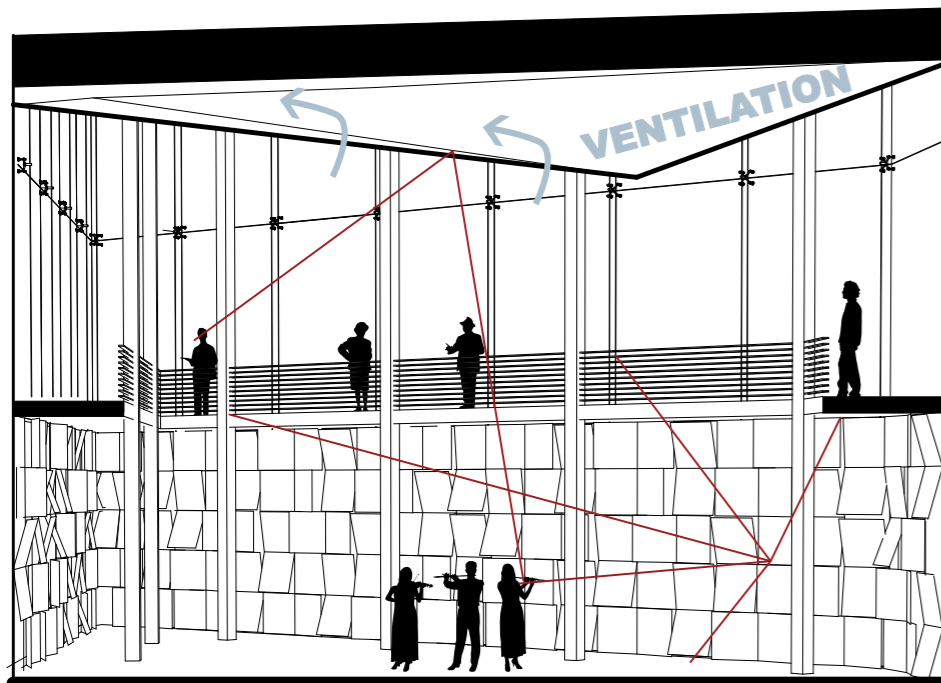
The green room can be used separately from the lobby so there could be different workshops, exhibits and ensembles in different parts of the building at the same time.



THE OPERA HALL DURING BALLET



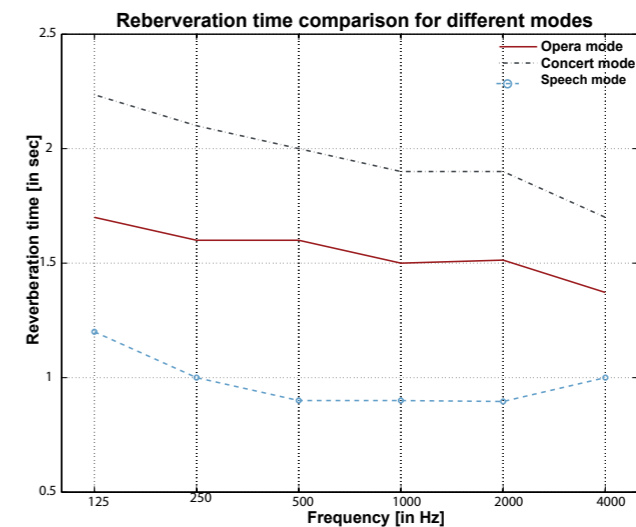
DANCE SHOW IN THE REHEARSAL ROOM



Secondary stage

The rehearsal room designed for multipurpose. It is capable of hosting small performances as well as rehearsal for a full opera orchestra. The rehearsal room functions as a secondary stage with its own separate entrance. The balconies are for the audience mainly and provides the visitors a good view.

The acoustics of the room are designed for flexibility. The reflective panels covering the double glass walls can be tilted to increase the scattering and exposing the back part of the planes that is covered with heavy absorbing material.

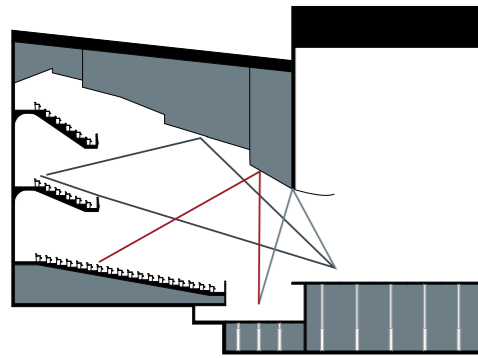


Reverberation time

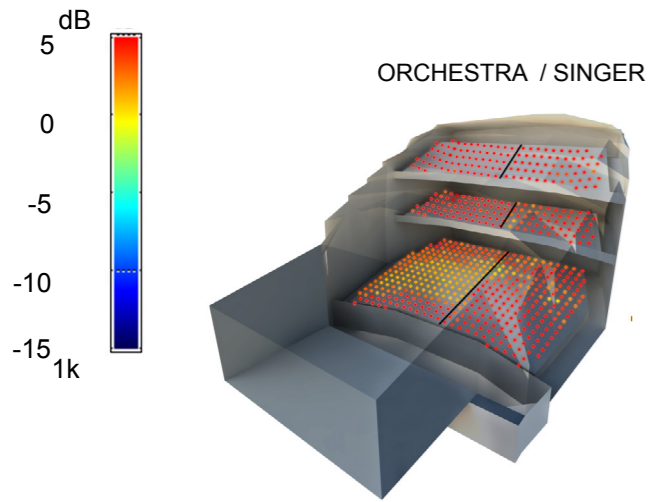
This is the measure of how long the sound remains in the room after being produced. As reference for opera auditoriums good values are considered between 1.4 and 1.6 seconds, for orchestra auditoriums 1.6 to 2.2 seconds.

Opera Mode

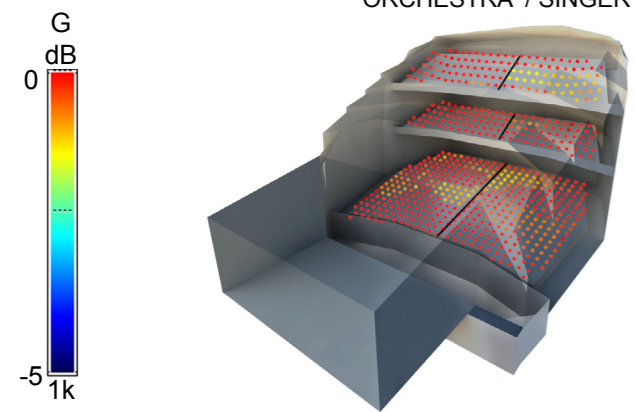
Basic configuration for opera performances focusing on good balance between the singers in the stage and the orchestra in the pit and in an appropriate reverberation time suitable for operas for most musical eras.



CLARITY

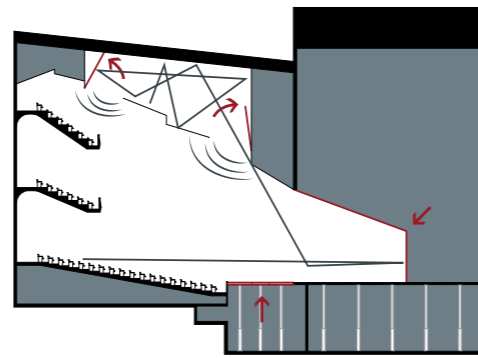


STRENGTH

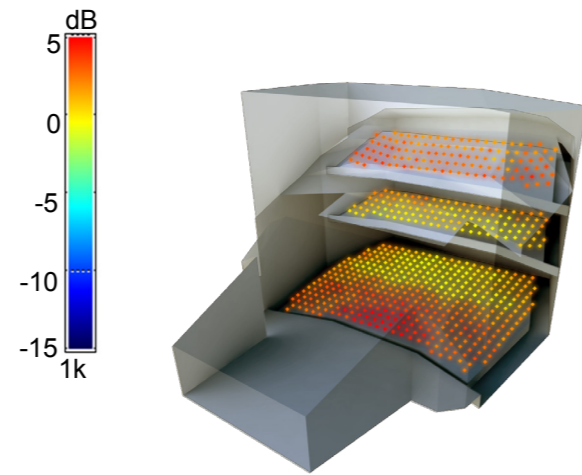


Concert Mode

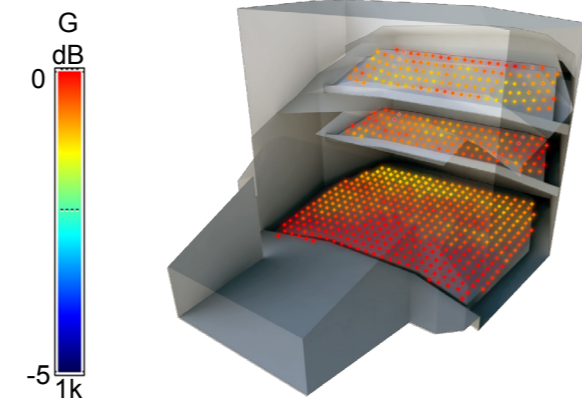
A stage shell is deployed to reinforce the feedback for the performers and the projection to the audience. The pit is lifted to give a closer contact with the audience. A reverberation chamber located above the reflecting roof is open to generate longer reverberation time.



CLARITY

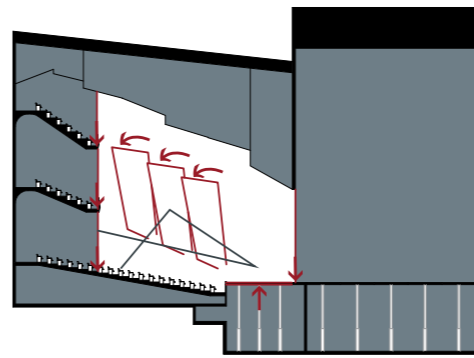


STRENGTH

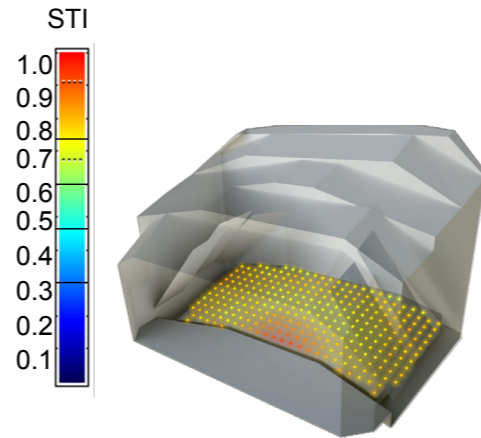


Speech Mode

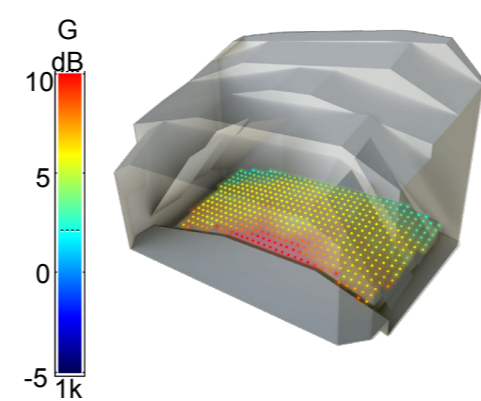
The volume and reverberation time is reduced by lowering special curtains down to close the balconies. Reflecting planes integrated in the walls are lowered to increase the early reflections, helping the speech intelligibility.



SPEECH INTELLIGIBILITY

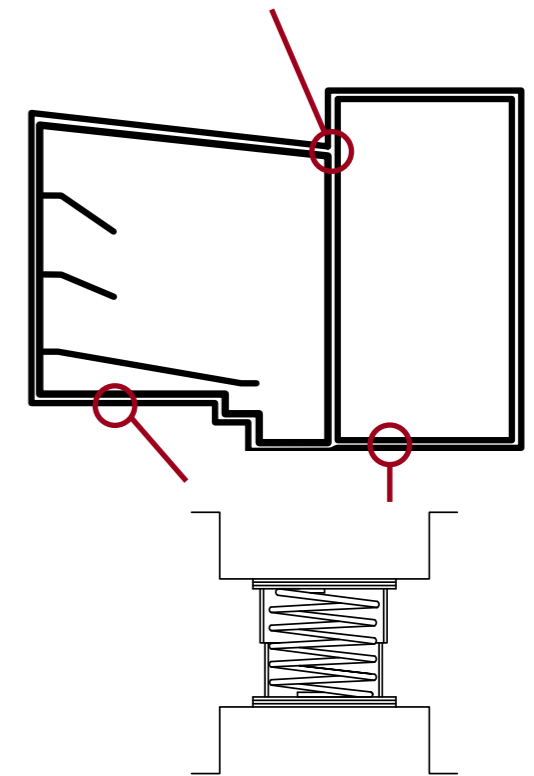
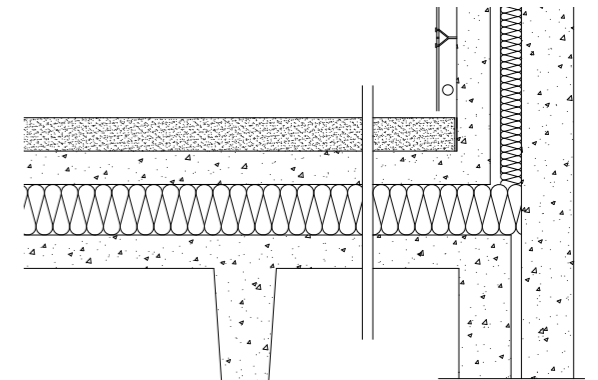


STRENGTH



Double Shell

The hall and the main stage are built using the "box in a box" approach: a concrete room contained inside a second concrete shell. The physical connections between the two structures are kept to a minimum to avoid flanking transmissions. The inner room is suspended on springs with rubber foundations. The space between the roofs of both shells is filled with elastic absorbent material for structural purposes.

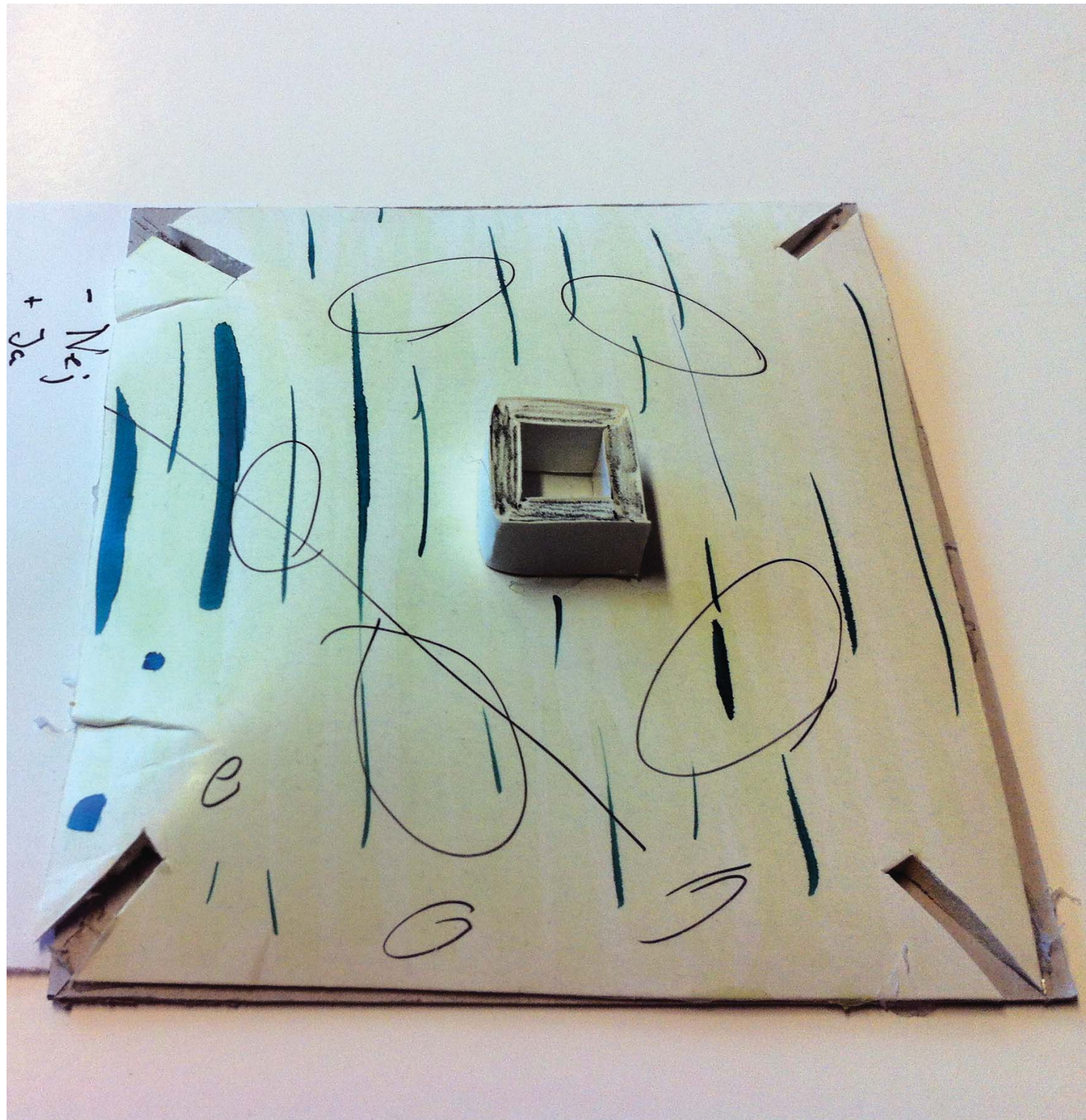


Reflection

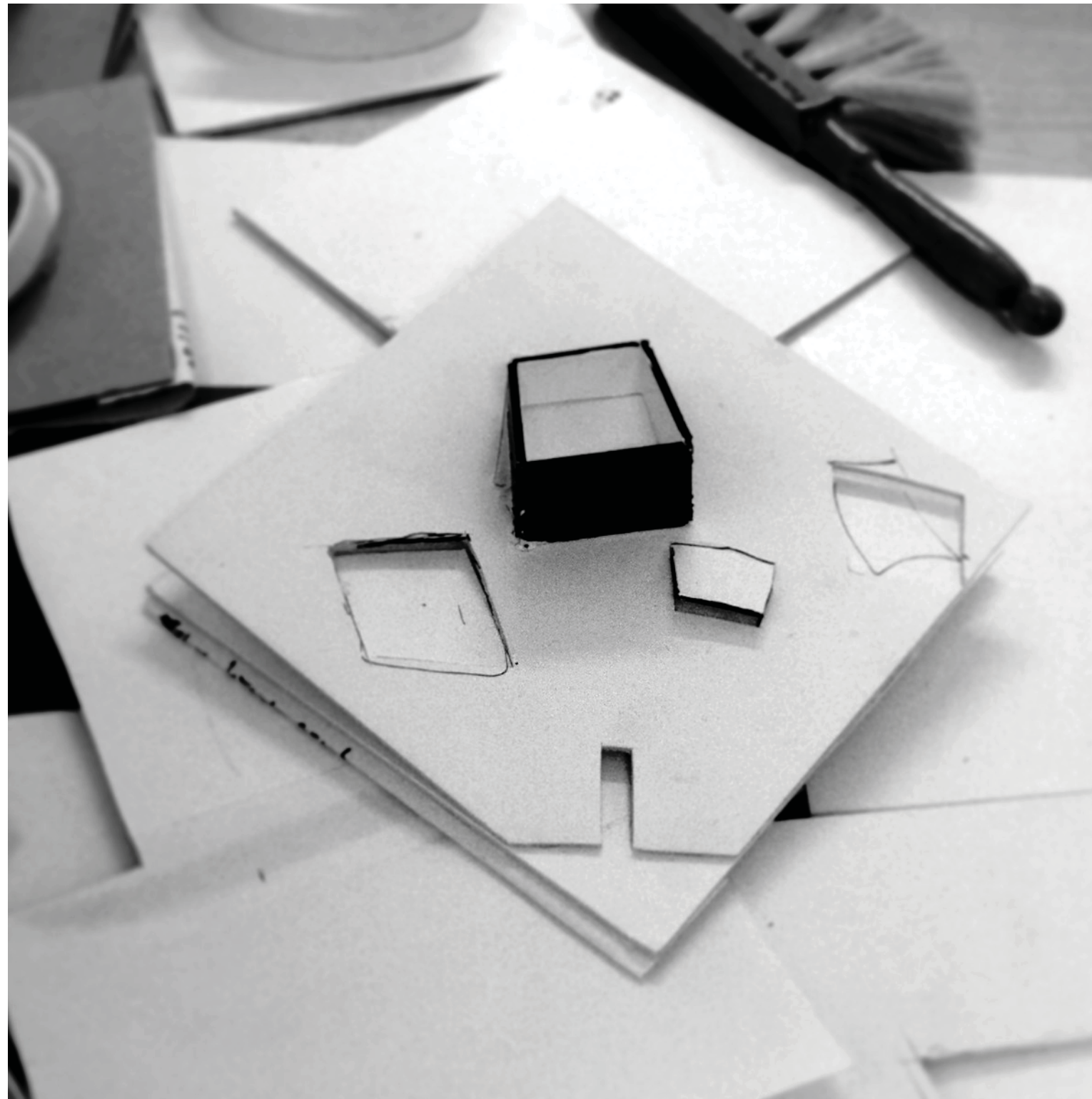
It was a big and complex task at a challenging location. We had to consider lots of noise generating sources such as car traffic, an underground highway, railroad and airplanes surrounding the lot. The task was to create an opera for the university and therefore we really wanted to make it a public space available for everyone. I think the idea with tilting planes and asphalt make the building and its environment unpretentious and inviting for the public.

The tilting roof made it hard to draw a good plan and we struggled a lot with it. The outcome is okay but there are still room for improvements. In regard of multipurpose use I think we really succeeded. Especially with the green room that functions both as a green room for performers when there is an ongoing play, and a second lobby when there is an event in the rehearsal room.

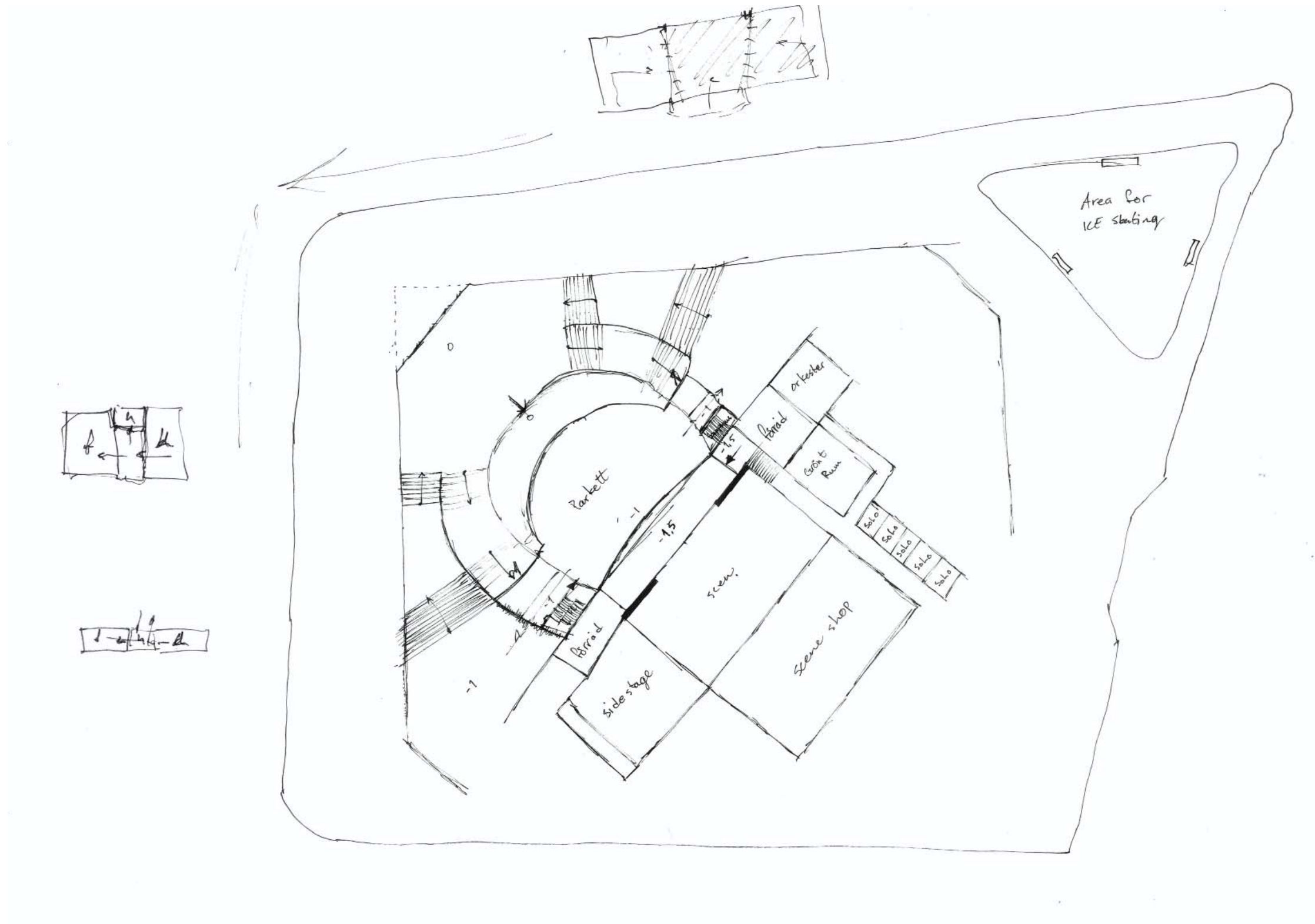
Overall I am glad that we chose a such strong concept and managed to complete it despite all the challenges. One can see that the concept penetrates most parts of the building. I am satisfied with the final result and the work we did.



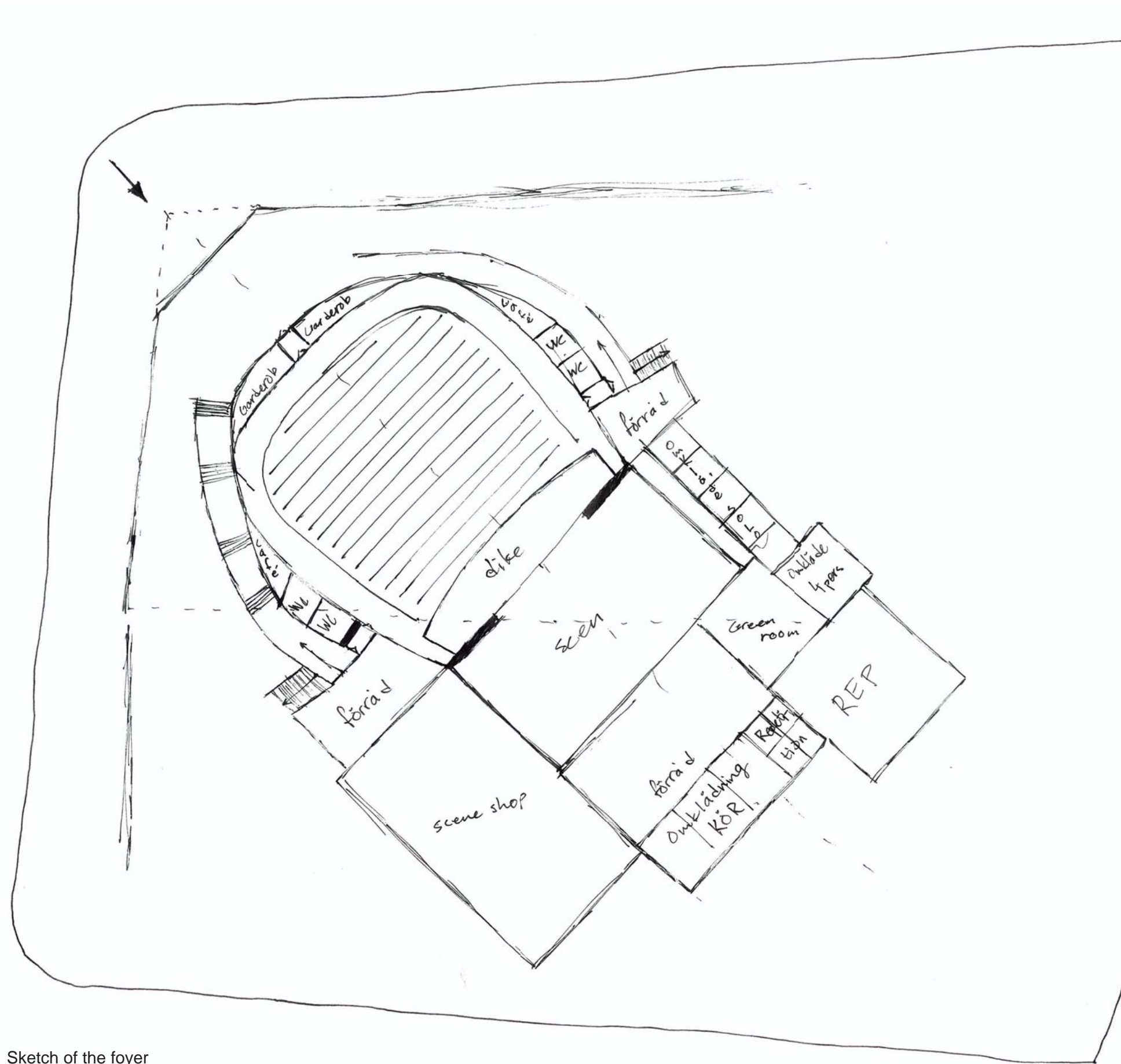
Early concept sketch model



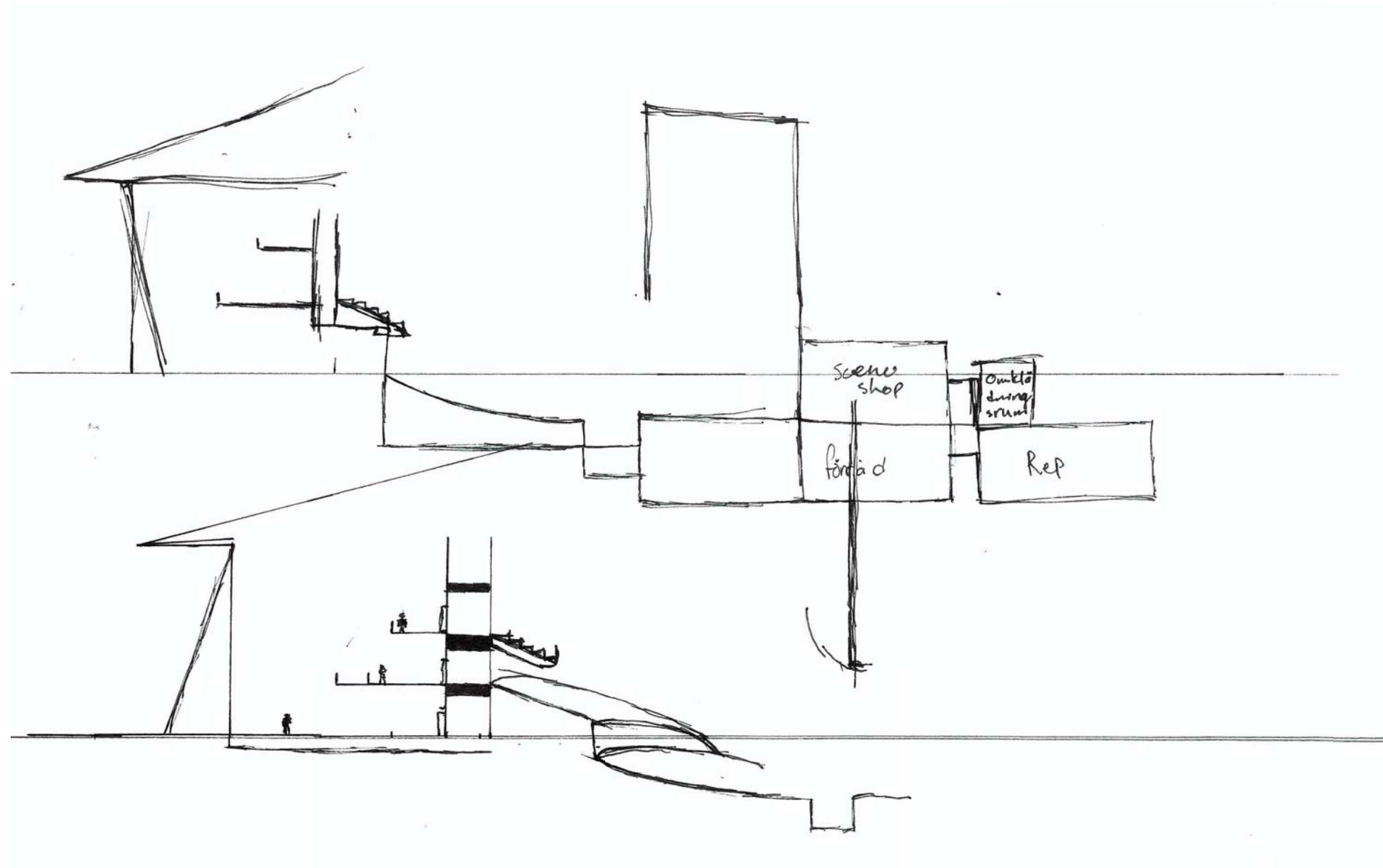
Early concept sketch model



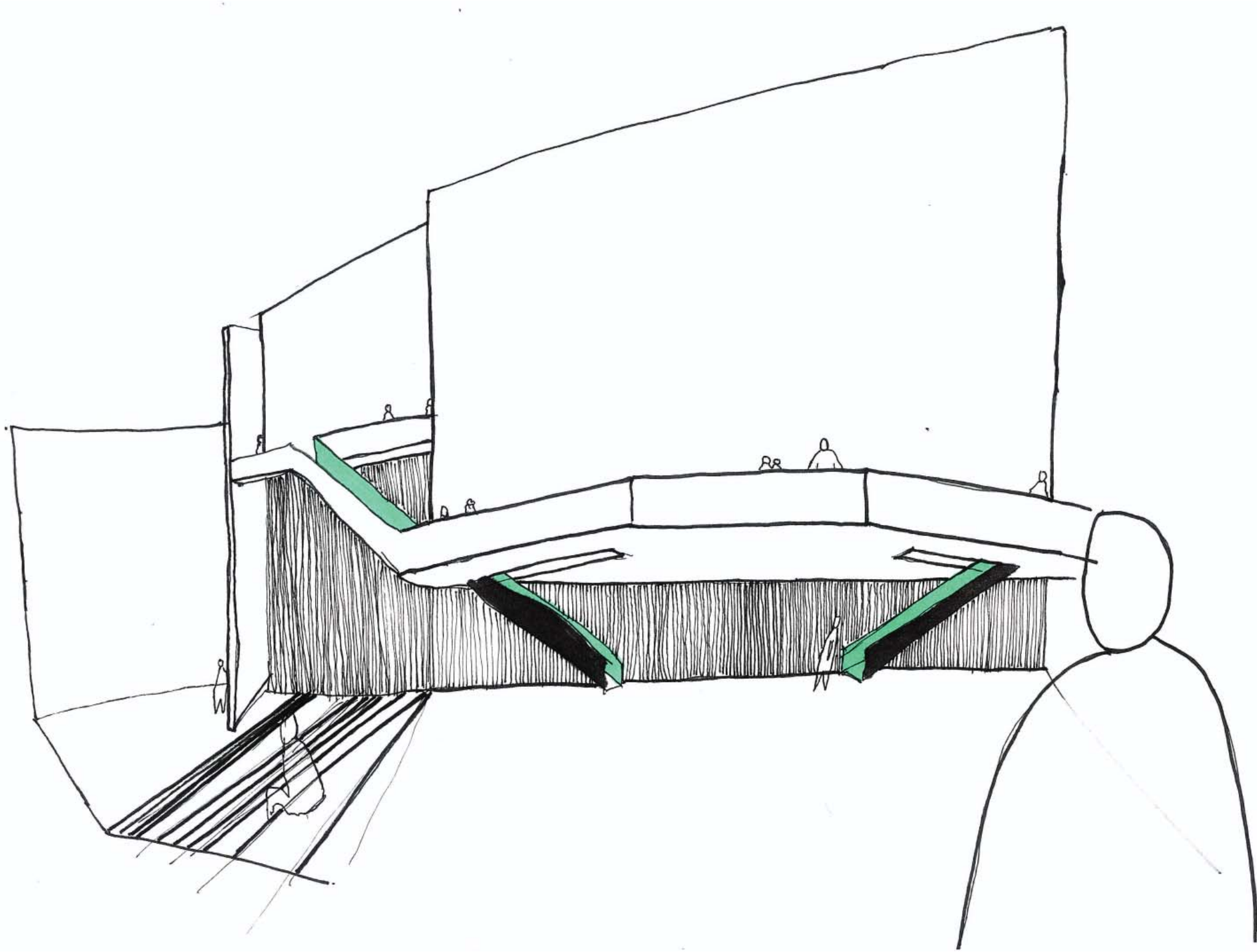
Sketch of a solution of the foyer without elevators



Sketch of the foyer



Analysis of different facade angels



Early perspective of the foyer