

Project portfolio

Il fiore - an architectural experiment in color

ACEX16

Examiner: Mats Ander

Student: Vidar Lindberg

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Batchelor project portfolio

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Project description

Il fiore is the bachelor thesis project in architecture and engineering. The assignment was to make a proposal for an outdoor concert venue, and to work together with acousticians in an interdisciplinary student competition.

concept

In the middle of Italy, amongst bushes and trees, we find ourselves walking through a sculpture park. Somewhere in the distance we hear the soft tones of an orchestral concert, intensifying as we follow the meandering slopes down towards the river. As we come around a hill, a large glass flower appears before us, seemingly the source of the music.

The concert hall is located in a bowl-shaped sculpture park, with the audience seated at different levels across a varied, sloping terrain. Roof-covered seating areas, with roofs made of glass to mirror the aesthetics of the stage, are mixed with informal lawn seating. By designing the omnidirectional loudspeakers as Roman pillars they relate to the Italian site as well as supply the audience with sound. These are strategically placed around the seating area, and smaller loudspeakers are hung from the ceiling of the covered areas. The loudspeakers are delayed 20-40 ms relative to the main loudspeakers at the stage to simulate distance perception and reflections from for example the glass ceiling. 3,000 audience members are accommodated in the roof-covered seating area, while the lawn accommodates an additional 10,000. The informal seating areas absorb sound, making it anechoic.

The surrounding park has a hilly, varied landscape with earth berms, tree buffers, and sculpturally designed Helmholtz resonators of different sizes that absorb and scatter traffic noise. Noise propagation is further reduced by the bowl-shaped terrain, which also protects the residential area from noise of performances. Apart from the stage and immediate surrounding area, the sculpture park is open to the public. If needed, a temporary fence may be raised to separate the audience area from the public park. Along the edges of the seating area, as well as by the car parks located at the outer bounds of the landscape, toilets and refreshment booths can be found.



site plan and sequence

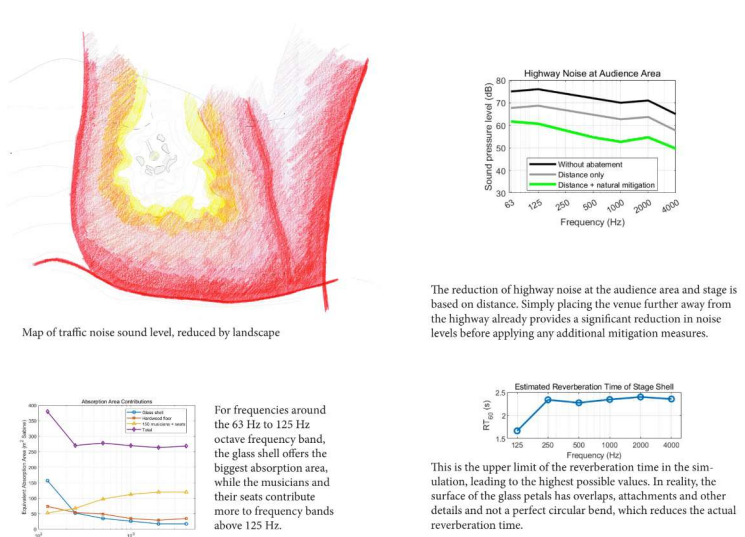


the flower stage

The stage is a freestanding, flower-like, sculptural structure with the audience almost completely surrounding it. The orchestra is encapsulated with multi-coloured glass panels in the form of flower petals, producing a closed environment for the musicians, free from outer noise, rain and direct sunlight.

The enclosed stage functions as a rehearsal room and relies on room acoustics. The petals function as reflective panels and the orchestra absorbs sound, producing an environment in which the musicians can hear themselves clearly. A hardwood floor supports these acoustics with a low absorption coefficient in the frequency range of interest. In spite of the orchestra being isolated, the audience can glimpse the musicians through the glass, and, most importantly, hear the music through the loudspeakers. This makes for a unique experience for the audience as well as the musicians.

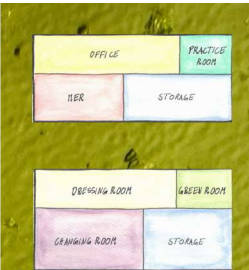
The glass petals are mounted to two attachments each, placed on rails, making them movable in two directions. For touring acts such as pop or rock concerts, where visibility of the musicians to the audience may be desirable, the front glass petals can be slid between the back petals creating an opening at the front. They can also be tilted open, using tilting mechanisms in the attachments, creating a striking visual effect of a blooming flower. When the petals are open the absorption and dissipation of sound is increased and thus the room acoustic qualities are diminished.



acoustic target values

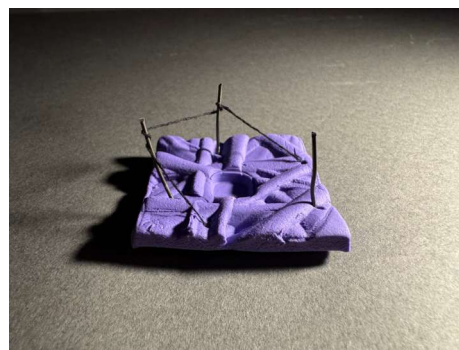
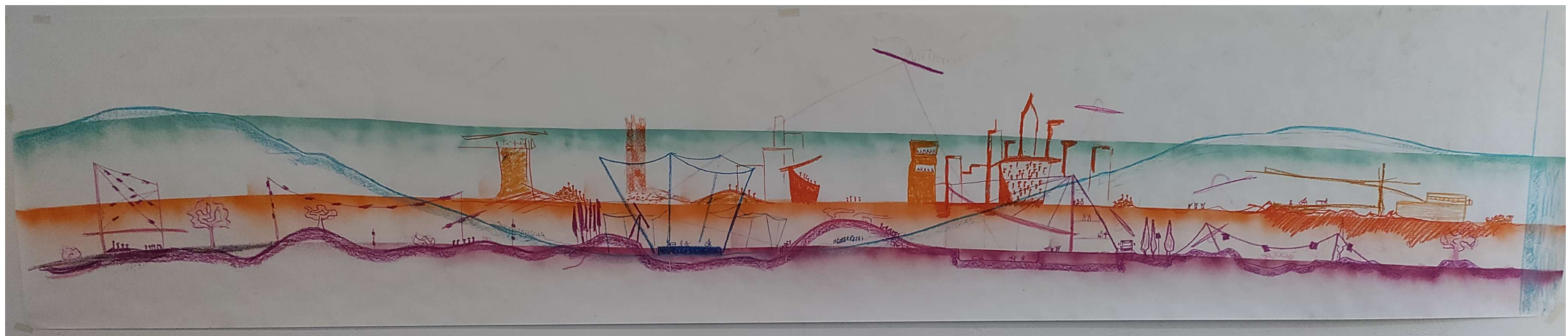
Internal Noise	Sound Pressure Level $L_{eqp, music}$	Reverberation Time RT_{60}	Clarity C_{80}	Sound Strength G
Stage	85 to 90 dB A	0.8 to 1.2 s	+3 to +6 dB	+3 to +6 dB
Covered Audience	80 to 88 dB A	1.2 to 1.6 s	0 to +3 dB	+4 to +6 dB
Lawn Audience	75 to 85 dB A	-	-	-
Front of House	90 dB A	-	-	-

Back of House	Sound Pressure Level $L_{max, music}$	Sound Pressure Level $L_{max, voice}$	Weighted Sound Reduction Index R_w in Walls
Rehearsal Rooms and Soloist's Dressing Rooms	80 to 90 dB A	30 to 35 dB A	50 to 55 dB
Other Dressing Rooms	-	35 to 40 dB A	45 to 50 dB
Green Room	-	35 to 40 dB A	-



back of house

The back of house is embedded within a hill, open in a direction facing away from the stage and thus not visible to the audience. The soil covering the back of house acts as insulation between stage and back of house, allowing for concurrent activities between the stage and back of house practice rooms. From the loading dock, the main storage area and stage entrance are easily accessible and on the same level. On the ground floor, there is also a staff entrance, orchestra locker rooms, toilets for the performers, as well as a grand staircase leading up to the green room. In addition to the green room, the first floor also accommodates changing rooms for the orchestra, solo dressing rooms that also function as practice rooms, one star dressing room housing a piano, and additional storage. The walls between loud rooms, such as practice rooms, have a high sound reduction index, minimising sound interference. The second floor accommodates a mechanical equipment room, storage, offices, and a separate practice room. Rooms intended for prolonged occupancy are oriented towards the windows facing the river for the performers and staff to enjoy. Rooms intended for short-term use, such as storage or changing rooms, face the hillside.

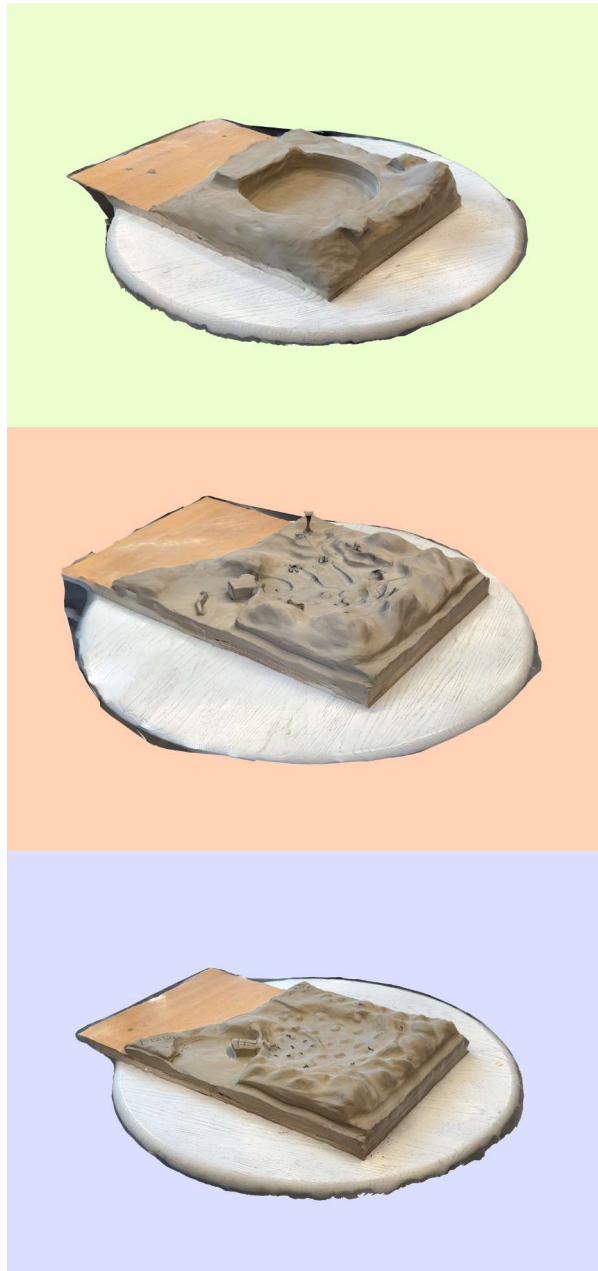


Early concepts

The blue crater, a dug out concert venue, like a volcanic crater.

The orange towers, seated audience spread out in towers.

The purple garden, audience and nature intertwined.



Clay models

Three different concepts and scales. First the dug down stage, then audience spread in a terraced landscape. Finally the noise barriers in the shape of hills.

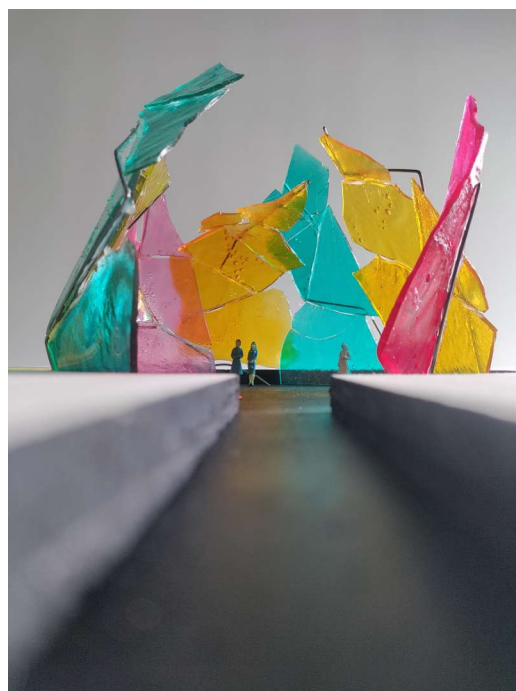
Final models of hill landscape with glass stage.



Glass model

Experimenting with sugar glass and light. These were used as the glass petals for the stage design.

Model in plywood and sugarglass.



Reflection architectural qualities

This project revolves around an exploration in architectural qualities that arise through creative experimentation. With the boundaries set by the assignment the venue has grown through sketching, clay models and sugar glass, and all stages have further developed architectural as well as acoustical qualities.

Central in the development of these qualities have been the visual experience in the flower, the stage envelopment, the Italian olive garden landscape, and the logistics of a venue of this size. An artful and curious concept combined with a logical solution. Throughout colour has been an important theme used and developed in all stages.

What type of architectural and musical experience is created by the stage?

The whole concept of this stage design is to create an extraordinary musical and visual experience, and at the same time solve problems that arise with outdoor music venues. How these problems are solved are discussed further on. By separating the audience from the artists, a visual distance is created. This is a problem as a concert is not only enjoyed through hearing, but also seeing and feeling the music. The direct visual contact with the musicians is instead elevated through other means. As the music is played light will cast colored shadows, moving as the artists move their instruments. The flower petals themselves can change angle, with wave-like motions. And as the stage acoustics are solved inside the flower, the audience can sit very close all around the flower for an intimate and organic concert experience, one that is more alive, like seeing a flower bloom.

Reflection on sustainability

In our day and age, as architects and engineers, sustainability in our projects is a factor that can not be ignored. In il fiore, sustainability has not been the driving force of the concept. But this does not make it unsustainable per say. There are both qualities that handle emissions and biodiversity well, and others where there is room for improvement.

The main sustainable aspect of il fiore is the landscape. There is minimal damage on the environment long term, and the amount of built space is small.

The materials used, especially the glass petals, are not made with sustainability in mind. Constructing an object of this size and so specific is resource intense.

Reflection on interdisciplinary work

Aspects of architecture, engineering, acoustics and art have been combined to make il fiore.

The process itself has largely revolved around exploration of color, light and working creatively by hand. In later stages, acoustics and engineering inputs has made for a more realistic design. It is especially here where more work can be made to take the project further towards reality.

Personal reflection

The bachelor thesis project has in ways been a good learning experience. For me personally, I have realized how the creative process in exploring ideas, making models and sketching is what is most joyful. And on the opposite side, finalizing these ideas has been incredibly tiresome. The problem I find is exactly the "real situation", where the final stages just feel like unpaid work on a project that never will be built.

Three years in the AT-program made me realize foremost my inability to put time on uninteresting work. Most projects have mostly felt like a boring job that just had to be done. The truly joyful moments have been in hard problem solving, mathematics and in the complete freedom at the start of an architectural task, creating and discussing fun and creative ideas.