



# NORDIC REEF

*In the center of the suburban community, full of noise and traffic, a new municipal building is being erected. The Nordic Reef provides a shelter from the hectic city and is the home for justice and democracy.*

**PROJECT-** municipal building

**YEAR-** third

**COURSE-** bachelor

**EXAMINATOR-** Morten Lund

## CONCEPT

The Nordic Reef is a combination of the nordic simplicity and the organic growth of a reef. Upon encountering the building one takes note to the strict colonnade used by ancient Greece, the first democratic society. The heavy limestone facade gives the municipal building a feeling of importance and dignity.

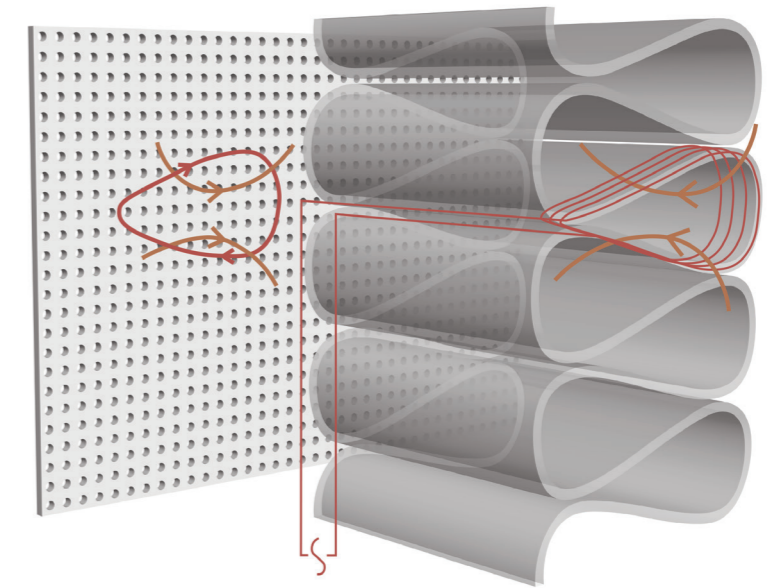
When entering the lobby of the building you find yourself in a sea of light. Between the organic panels in the ceiling the nordic light gently finds its way into the room providing diffuse streams of light, just like under water.

Natural light is provided in all of the major spaces of the building. In the courtroom raking light passes through the slightly rotated stone wall, illuminating the room with a nordic ambience. The walls surrounding the audience on the balcony are overgrown with corals that are both decorative and of acoustical importance.

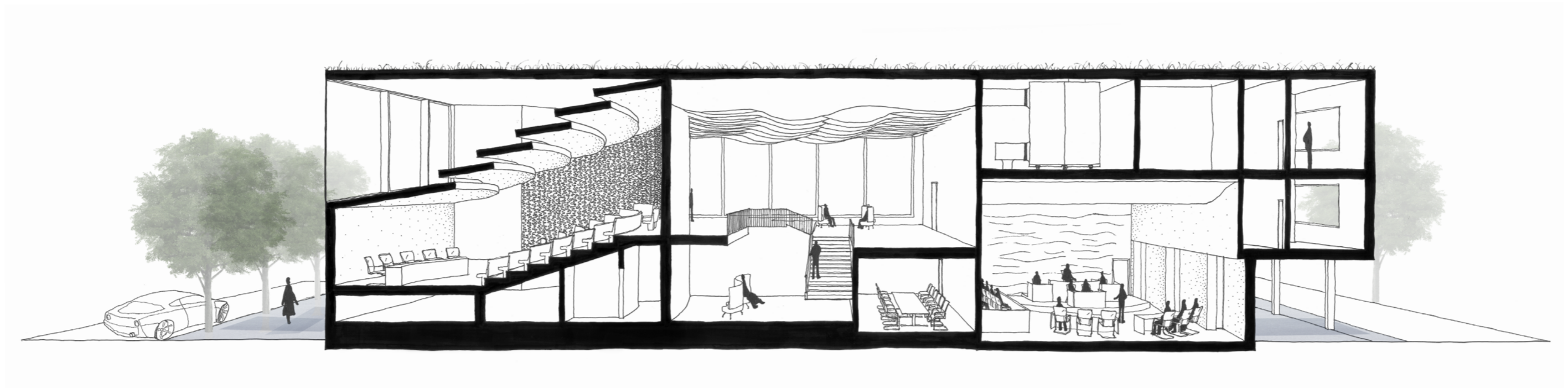
The Nordic Reef is found in the community hall aswell. Here the vinyl corals are flexible and can be erected by magnetic levitation. Thus, providing variable acoustics to serve different activities in the hall.

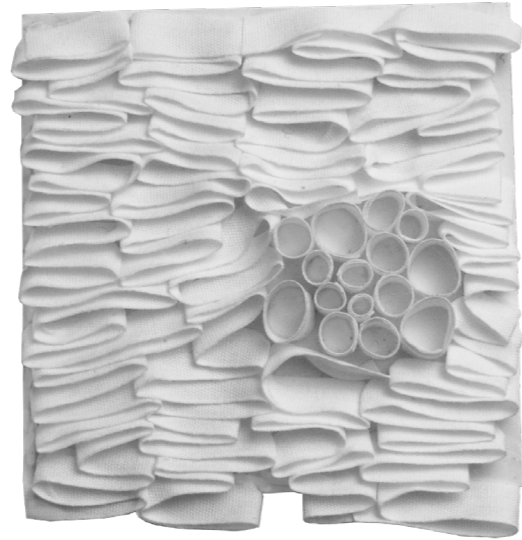
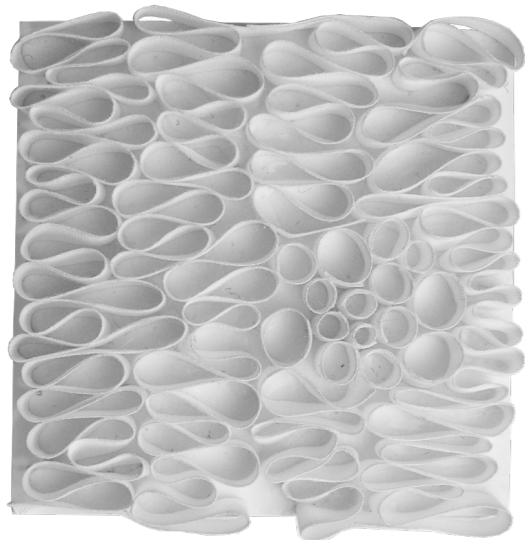
## MAGNETIC LEVITATION

The acoustical concept for the community hall is based on the principle of magnetic levitation. Flexible vinyl sheets, shaped as corals, are fixed to a perforated conducting metal plate. Copper threads are then installed in the vinyl as coils, creating closed circuits. As the alternating current from the power supply is switched on, the fixed coil and the metal plate repel from each other, due to opposing magnetic fields. Thereby the vinyl corals are forced to erect from the wall exposing the resonant absorbent behind.



Magnetic levitation principle





#### SPEECH MODE

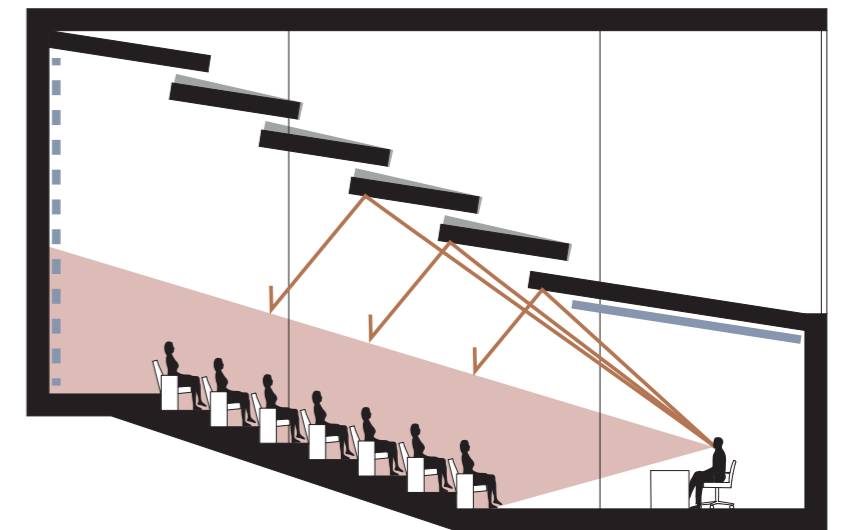
The speech setup indicates the composition where the corals are erected exposing the room to the highly absorptive void behind them. The speech setup is complemented by adjusting the angle of the ceiling reflectors in order to reflect more of the sound energy towards the highly absorptive back surface than towards the audience.

#### MUSIC MODE

The music setup is characterized by the coral wall being closed and covering the absorptive microperforated panel, however the Helmholtz resonators remain open. Due to the irregular pattern of the corals the result is an asymmetrical surface with high scattering and reflecting properties in the mid and high frequency region. The ceiling reflectors are in their original position reflecting the sound towards the audience.

## ACOUSTICAL DESIGN

The shape of the community hall along with its low suspended ceiling reflectors produce the necessary short-initial-time-delay reflections, yet the upper volume of the hall is available to allow a longer reverberation time. In its acoustical attributes the community hall can be compared to the Salzburg Wienersaal in Mozarteum, with a similar volume, capacity and RT. In the speech setup the rear wall is highly absorptive ensuring that no echo is present. A suitably low RT is obtained, providing a good speech transmissibility over the entire audience area, but it is high enough to provide a background noise level that masks unwanted disturbing sounds.



- ▬ Variable absorption
- ▬ Reflection
- ▬ Direct sound

## REFLEKTION

Nordic Reef har varit ett mycket lärorikt projekt. Att samarbeta med en annan disciplin och få ut så mycket av varandras expertis har varit en utmaning men också en av delarna jag tyckte vi lyckats väldigt bra med. En god kommunikation gjorde att alla var involverade i alla delar av projektet och kunde ge sin åsikt och bidra med sin kunskap i beslutstagandet. Samtidigt var arbetet tydligt uppdelat och alla var införstådda i vem som hade ansvar över de olika delarna i projektet. Det ledde till att arbetet fortlöpte effektivt och sammabetet var utan komplikationer.

Det jag fann mest utmanande var att inte tappa helheten. I ett så stort projekt med så många delar är det viktigt att med jämna mellanrum ta ett steg tillbaka och se till att det går en röd tråd genom hela projektet. Vad jag kommer göra till nästa gång jag inleder ett projekt av denna storlek är att tydliggöra vad de genomgående inslagen kommer vara. Det kan vara gällande material, fönstersättning och möbelutformning. Vid tillfällen blev det mer utav att vi försökte passa in projektet i konceptet vilket kanske inte hade behövts göras om vi haft en tydligare bild av vad konceptet var.