

# OASIS DOCUMENTATION

DEC03200 - Assessment 3

Jodie Clothier | Miriam Green | Mikkel Astrom | Taha  
Kanj



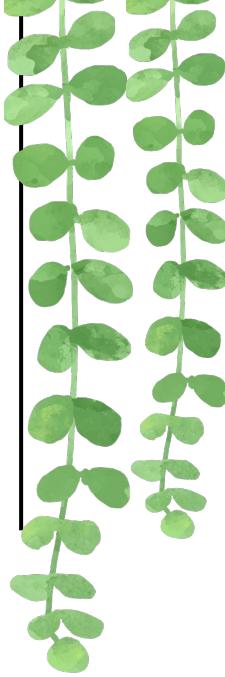
## PROBLEM: NOISE POLLUTION

Noise pollution is a major issue, particularly in cities which are becoming more densely populated due to an increased rate of urbanisation (United Nations, 2018). Exposure to noise pollution causes negative physical and mental health effects for the people living there. Noise pollution triggers a stress response in the body, leading to chronic stress and high levels of cortisol linked to heart disease, high blood pressure, depression and other health issues (Department of Health, 2018). Noise pollution not only affects streets, it's invading our city parks and greenspaces as well (Buxton, 2017). They are no longer relaxing refuges from stressful city work-life and oppressive noise pollution, they are a source of stress themselves.

We need a solution to address noise pollution in public spaces and improve the wellbeing of city dwellers.



# INTRODUCTION



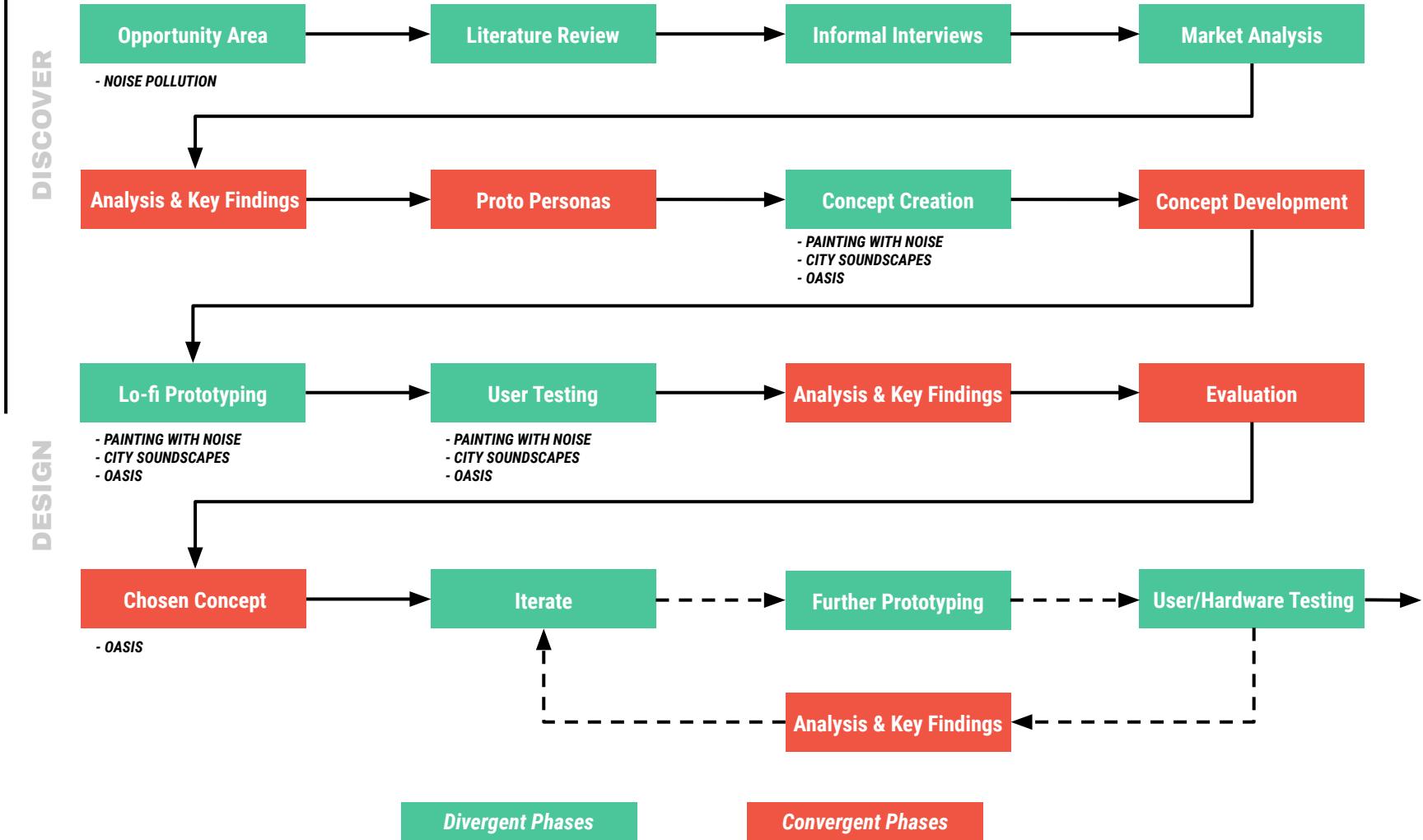
## OUR SOLUTION: OASIS

Oasis is a pocket of tranquility within urban parks and greenspaces, providing a respite from stress-inducing noise pollution.

Oasis consists of a large angled wall with integrated speakers, interactive light discs and greenery placed in parks and greenspaces. Oasis picks up the environmental noise pollution, predominantly road traffic, and actively transforms it into a more pleasant listening experience which is played through the speakers. The light discs turn to allow users to customise the sound to their liking, each corresponding to a specific tone they can turn up or down. Users sit in front of the wall and can relax with their desired soundscape, with calming lights to help them unwind.

Oasis aims to reduce exposure to noise pollution in urban greenspaces, targeting users who frequent parks to relax and unwind, with the overall goal of positively impacting the health and wellbeing of urban communities.

# DISCOVER + DESIGN DESIGN PROCESS

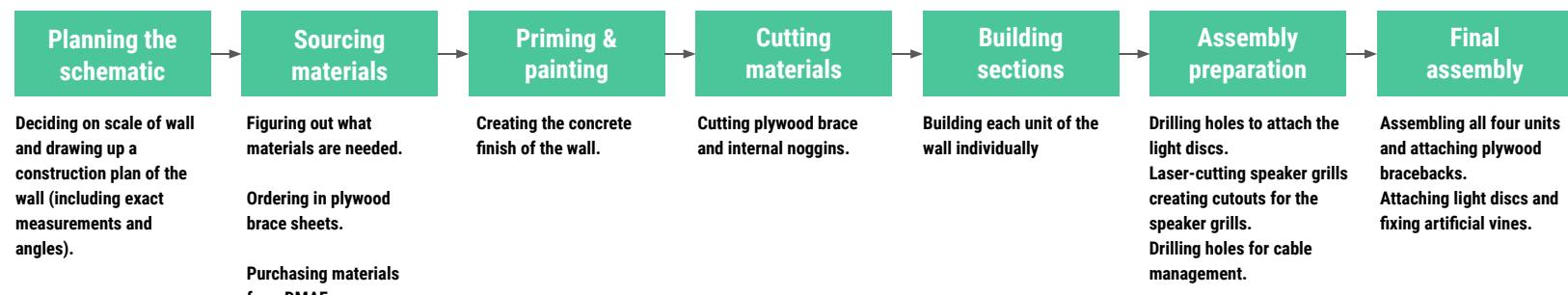


# DELIVER 1.0

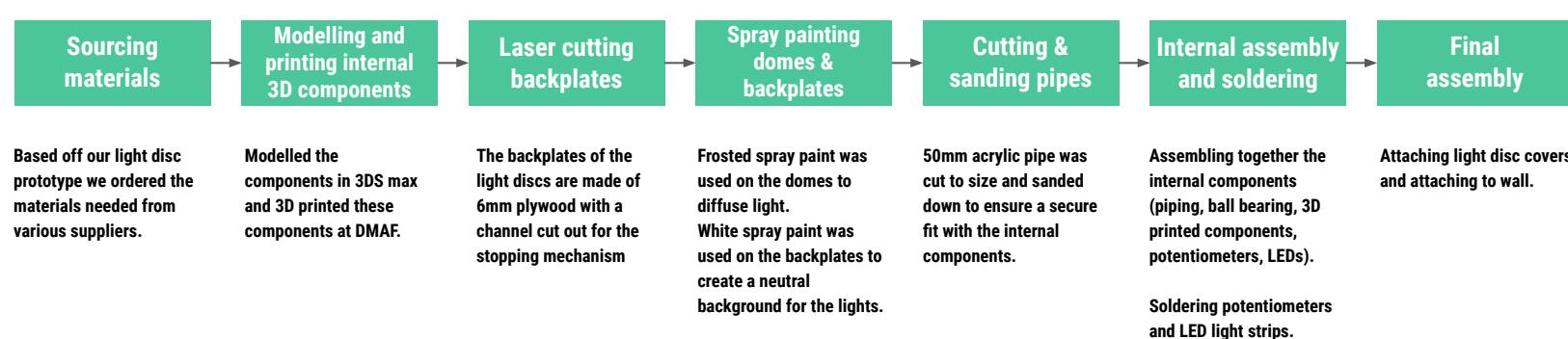
## DESIGN PROCESS

### DELIVER

#### WALL FABRICATION



#### LIGHT DISC FABRICATION (x6)

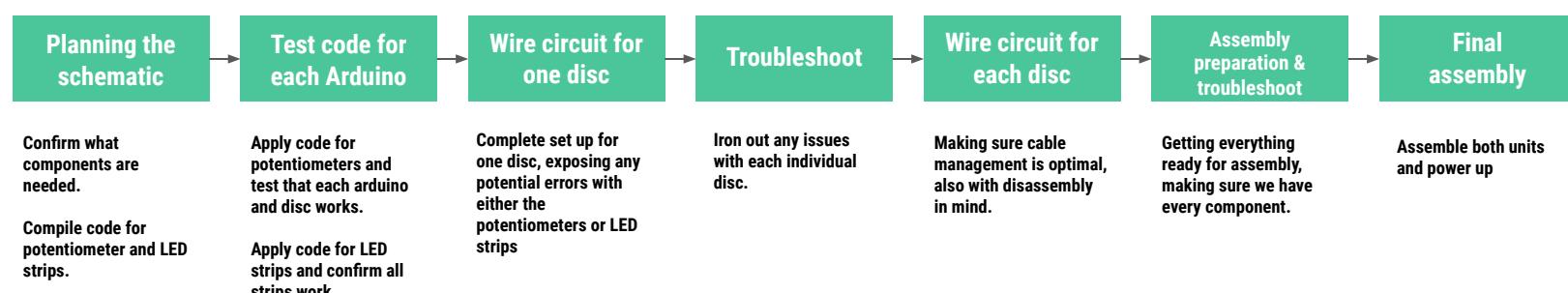


# DELIVER 2.0

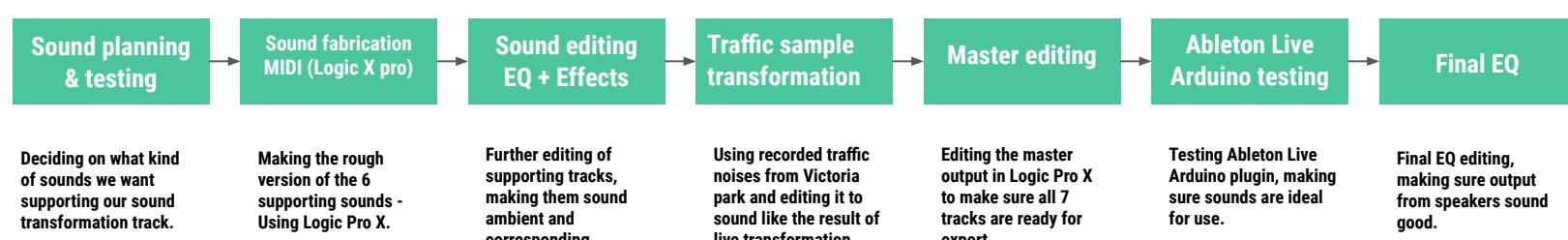
## DESIGN PROCESS

### DELIVER

#### TECHNICAL IMPLEMENTATION



#### SOUND DESIGN & PRODUCTION



# SOUND: NOISE TRANSFORMATION

Oasis has speakers which play transformed traffic noise for the user. Ideally, sound transformation would occur live, but due to a variety of technical and time constraints, we had to compromise and create a sample of what live transformation would sound like.

Using Logic X Pro, a sound clip recorded in Victoria park was manipulated using effects like reverb, compression & EQs. The outcome is nearly identical to what the live output would have been. The manipulation is done by chopping high frequency audio tops, using multiple reverb effects to create ambience as well as multiple EQs to balance the ambience, all to create soothing and much more pleasant audio.



Creating the transformed sound in Logic

## SOUND: CUSTOMISATION

Oasis allows the user to customise the sound to their liking so they can relax. There are 6 different light discs which contain knobs in the center, acting as midi controllers to Ableton. Each disc creates a larger handle to turn the central knob. Each light controls the volume of a different musical note created in Logic Pro X. Three major notes (C, E#, G) were used on each side in different octaves, with the left side of the wall playing a higher octave and the right side playing a lower octave. Lower octaves were used as they were more soothing and meditative.

Users turn each of the discs as much as they like to create their perfect soundscape for the environment. The discs increase the volume of each note and add it to the transformed backing track. The sound can be louder and more musical, or just masking for the noise, depending on user preference.



Creating the 6 supporting tracks in Logic Pro X

## LIGHTS: INTERACTION

The light discs for Oasis rotate to control the sound customisation. The discs turn half-way with a cut-out and nail in the back to prevent user error from over-turning of the knobs and twisting of the wires. The interaction is smooth and enjoyable due to the internal ball-bearing and the smooth external dome. The large size of the discs makes it easy to turn and control the sound. The discs sit out from the wall slightly to enable space to hold it.

The spinning motion and round shape of the discs imitates the interaction model of volume dials, so it's more intuitive to users what the function is. The placement of the light discs were as per the average height of men (175cm) and women (161cm) in Australia (Australian Bureau of Statistics, 2013), so most people could interact with the discs comfortably, without stretching or bending.



Internal components of light including ball bearing and wires



Lights are placed to be accessible to most users

## LIGHTS: DISPLAY

The light discs have LED strips inside which cycle through green and blue colours, slowly 'breathing' in and out, creating a meditative aesthetic.

The dome casing on the lights has a frosting spray on the inside to diffuse the light over the larger disc area, hide the internal components and make the display more visually appealing.



Calming colours of light Discs

## AESTHETICS: CONTEXTUAL DESIGN

Oasis is designed to suit the park environment in which it would be built. The structure is a concrete-looking wall with a hollow inside to house the arduinos and cords. There are laser cut grills to hide the speakers. To complete the aesthetic design, faux ivy foliage covers the wall on both sides. This helps the large structure fit the colour palette of the green space. It is also a calming feature of nature which complements the green and blue of the light discs. The hard plastic light domes have a smooth rounded finish to be more enjoyable to interact with and improve durability with many users.



*Oasis in Victoria Park*

## WALL: PHYSICAL FABRICATION

- Plywood Brace Sheets (x9) - *front and back walls*
- 18mm Chipboard - *internal structure*
- Structural Timber - *internal structure*
- White Primer (4L)
- Dulux Stone Paint (4L)
- Artificial Ivy Vines (102 metres)
- Black fabric seat cover
- Laser cut speaker grill (x2)

## OASIS: TECHNICAL COMPONENTS

- 50W Speakers (Stereo)
- Audio Amplifier
- LED light strips (6m)
- Analog Potentiometers (x6)
- Arduinos (x4)
- Powered Breadboards (x2)

## LIGHT DISCS: PHYSICAL FABRICATION

- Skylights - *light disc dome covers*
- Laser cut plywood - *back plates*
- Frosted glass spray paint - *light disc domes*
- White spray paint - *for back plates*
- 3D printed internal components
- 50mm ball bearing (x6)

## SOUND: TECHNICAL IMPLEMENTATION

- Java (Arduino IDE)
- Arduino to Ableton Plugin (Midi Controller)
- Ableton Live 9 (Prototype Playback)
- Logic Pro X (Sound Production)

# ILLUSTRATED SETUP

## Light discs

Breathing lights  
(Blue & green)

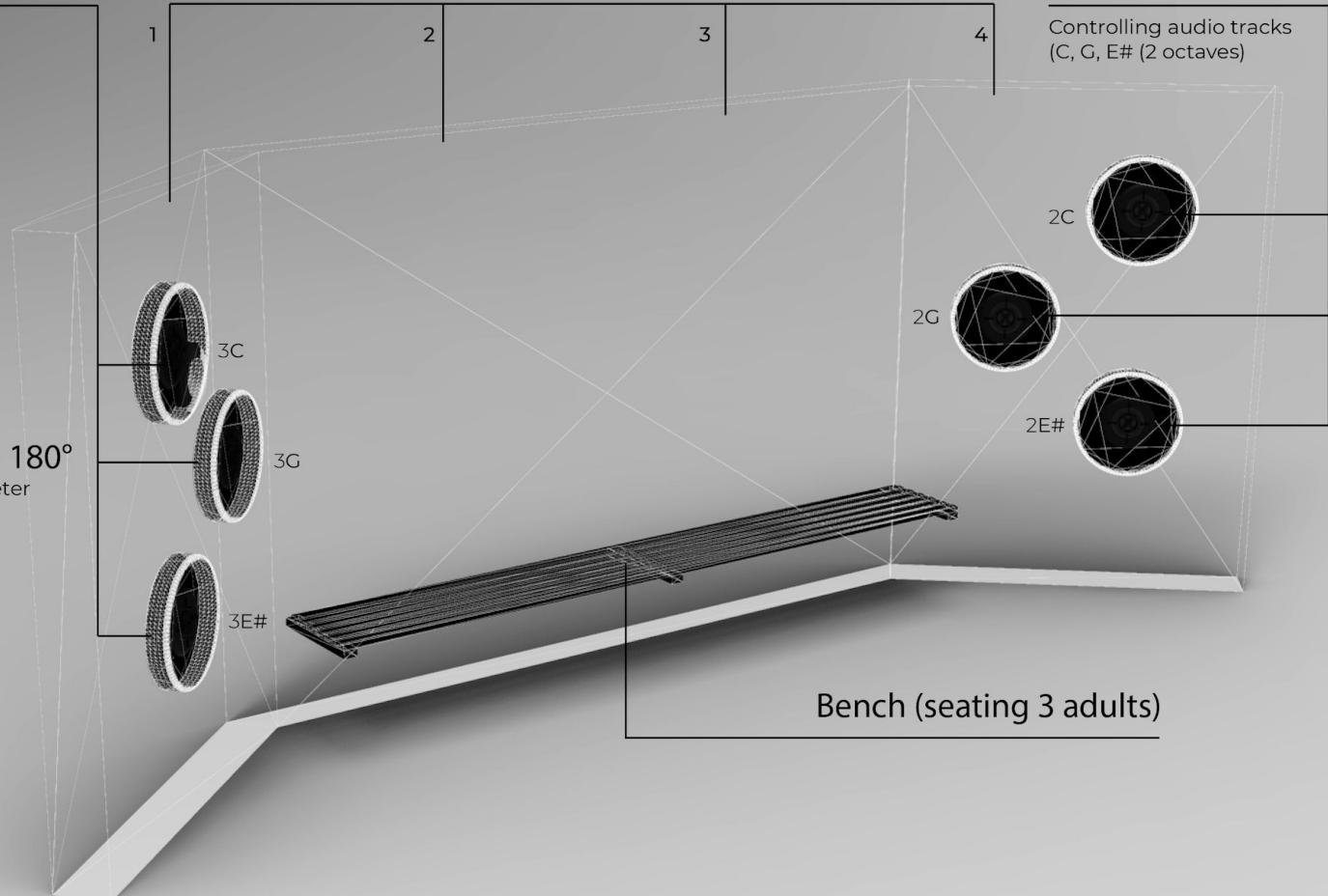
## Wall structure (4 units)

Disc rotation 180°  
Audio potentiometer

## Audio potentiometers

Controlling audio tracks  
(C, G, E# (2 octaves))

\* All 6 light discs are equal and control one allocated soundtrack.



### LIGHTS DIFFUSION

The placement of the LED strips inside the disc affected the diffusion of the lights and caused a dark circle in the centre. This was because the lights were wrapped around the 3D printed case for the bearing and wires, facing the outer edge of the dome. This means there was no lights placed in or pointing towards the center to diffuse off the dome. Ideally, the light would be fully dispersed around the dome and hide the internal components. The uniformity of the lights could be assisted further by using a more opaque spray or diffusing material to cover the dome.

The lights were also not very bright in daylight which is the context the prototype would be used in, so in future iterations a stronger light source could be used to solve this.



Dark circle in centre of light

## NOISE TRANSFORMATION

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Due to time, skill and resource limitations, the noise transformation wasn't occurring live, transforming the external noise as it occurs. Instead, the Oasis prototype used a recording of traffic noise which was manually edited to create the melodic sound played to users.



**Integrated speakers with custom laser cut grill mesh**

## LIGHT COVER

In the previous assessment, it was discovered that the vacuum former being used for the light cover was unsuccessful as it wasn't smooth on the outside and was quite bendy, not durable enough for user interaction.

For this prototype we decided to use premade skylights which we ordered from Ebay. These were much more durable and had pleasing round edges and a dome finish.



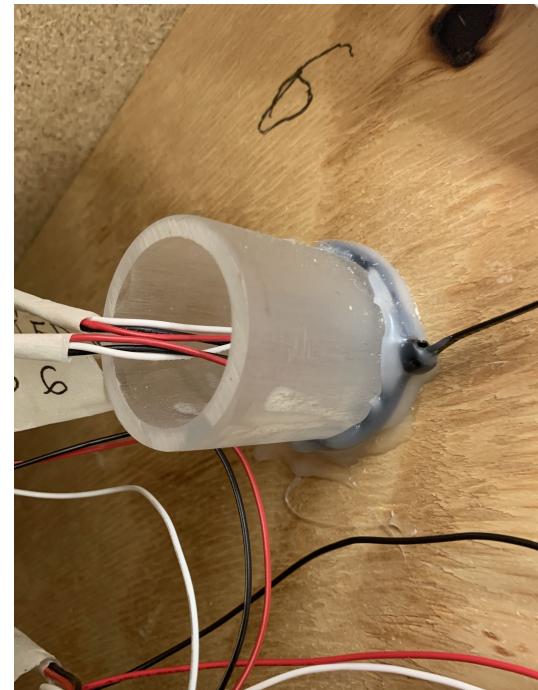
Vacuum former test from assessment 2



Light with the skylight dome cover

### LIGHT DISC INSTALLATION

The light discs were difficult to fix to the wall and we used a temporary solution of hot glue and zip ties in case we needed to change or remove them. The main issues to consider were creating a barrier between the disc and wall to give users a handle and encourage interaction with the light, as well as keeping the discs straight to aid the turning mechanism and securing them for durability in case a user attempted to pull it out of the wall.

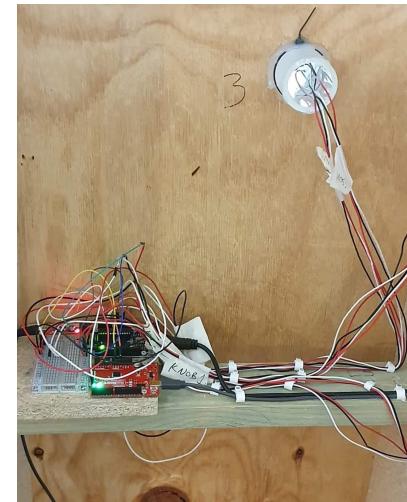


Hot glue and zip tie holding the light to the back of the wall

## MAPPING POTENTIOMETERS

Each potentiometer controls the output of specific sounds, turn the potentiometer clockwise, sound increases, turn the potentiometers anticlockwise and decrease the sound. However, once we were ready to test a potentiometer within the sound software, the potentiometers were working in reverse, spinning the disc anti-clockwise caused the sounds to increase.

In an attempt to correct the potentiometer, we reversed the ground and power cables that were connected to the potentiometer. This changed the current of the circuit to run in the opposite direction and thus corrected the potentiometers. Although this corrected the spinning interaction, it also caused a new set of problems when assembling all six potentiometers. That is, each ground wire had to be placed in a power position and vice versa.



Arduino setup; 2x boards (1 pot, 1 lights)



One potentiometer (later secured in centre of light)

### POWERING EACH LIGHT DISC

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The circuit was assembled in two parts, the lights first and the potentiometers later. Once each disc was connected and power was turned on, the light discs were either extremely dim or not on at all. Each light disc was tested individually so it was certain that they all work, yet none of them worked once they were all set up on the wall.

After disassembling the circuit, power was kept on and each disc was wired up one at a time. The first light disc turned on perfectly, the second caused both lights to dim. This made it clear it was a power issue. Originally each light disc was going to run through a single USB hub to allow only one USB cable to be responsible for the six lights. With power being shared between the six, the lights would barely turn on.

Eventually, we split the lights into two units, left and right, powering one set of lights through their own power source. As well as this, the breadboards were fitted with a breadboard powering shield that powered the lights, eliminating our dim light issue.

OASIS PROTOTYPE  
CURRENT VERSION



### VERTICAL GARDEN OASIS

Future versions of Oasis would be customised to the urban green space it was located in, making it more targeted to the users in that particular area. The shape of the structure, colour of the lights, sound transformation and display on the back of the wall would all be altered to fit the space.

A second version of Oasis used in a community space or park, has similarities to our original prototype, but utilises the back of the wall to fit with the community space. It may include a vertical garden with notice boards or posters, allowing the residents to see the events happening in that park or in their area. This version promotes community engagement with local residents. A similar version could include digital signage and wayfinding instead to expand the target audience to non-locals or tourists.



# FUTURE VERSIONS

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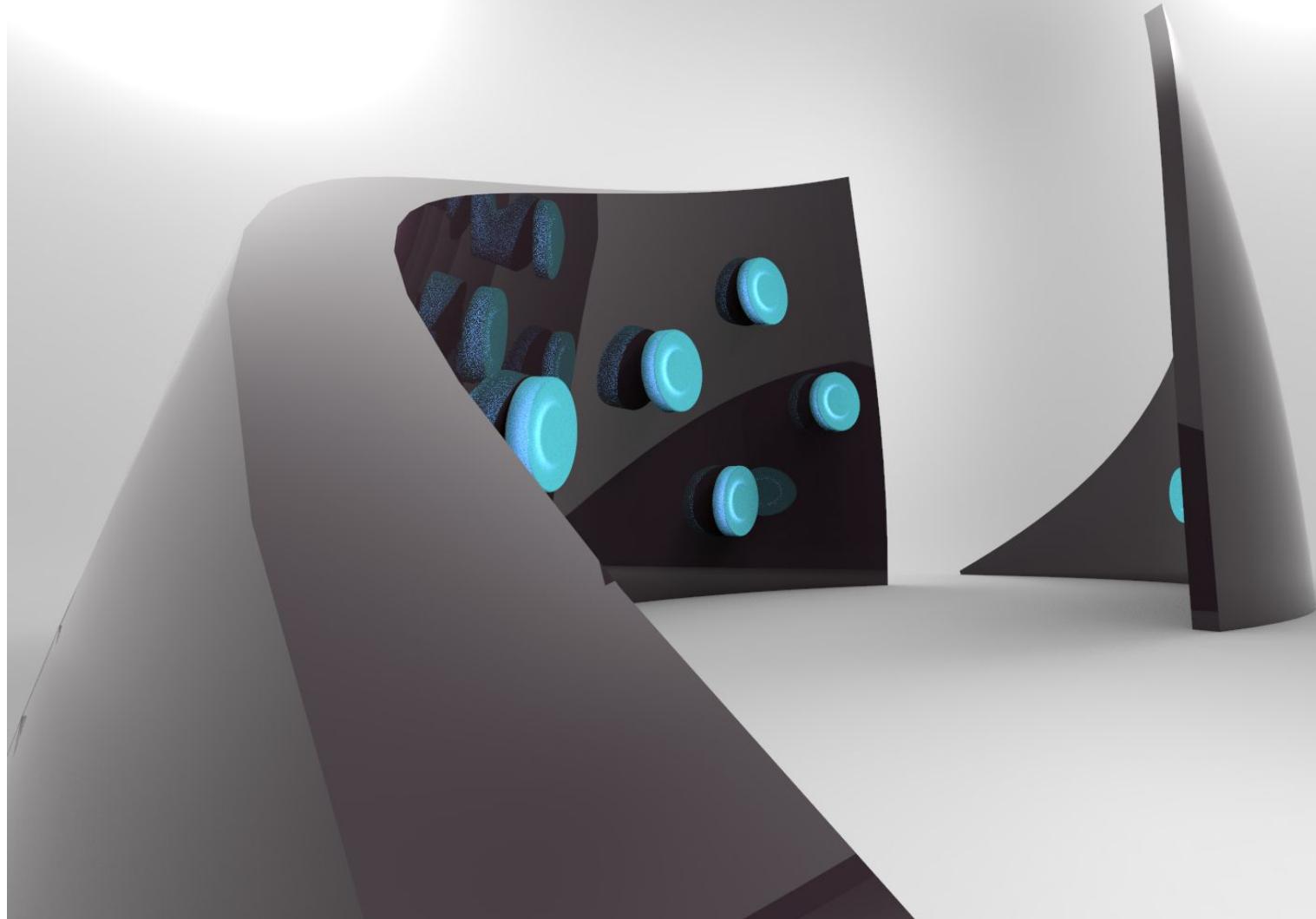
### SCULPTURE OASIS

In tourist areas such as Hyde Park or The Rocks, Oasis would turn into a larger scale art installation focusing on collaborative play through sound creation. For example, a more sculptural design made of a sleek material with tesalating pieces and uniform coloured lights which contrast with the material could be installed. Tourists could interact with this installation while visiting attractions in the city.



## FUTURE VERSIONS

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