

Project report - Lighting installation in Haninge

KTH, December 2012

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# Guidance in the night



# Abstract

In December 2012, new lighting was installed at Rudan recreation area, as part of a course in lighting design at KTH.

The aim was to showcase how the, by many considered scary, pathway between the train station and Lakeside youth centre could be transformed into a pleasant environment.

This report describes the final installation, as well as the planning of it.

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# Introduction

This report describes the planning, installation, and result, of a lighting installation for the “Depth in Lighting Design” course at The Lighting Laboratory, KTH.

For our last course at the Lighting Laboratory, before the Master Thesis, we got the task to design a full scale lighting installation, appropriate as permanent lighting.

The aim of the task was to create a lighting installation that will increase the feeling of safety, and the general appeal, of the area between Lakeside and the nearby train station.

Lakeside is a much appreciated place where young people can meet and participate in different activities, but due to its location in a nature area mostly used during the day, many of the visitors feel uncomfortable about making the walk between the building and the train station.

# Site Analysis

The Lakeside house (south) is located a few hundred meters from the train station (northeast), in the Rudan recreational area, in the municipality of Haninge.

There is a creek leading up to the house, with several small buildings on both sides. Those house different functions, including storage rooms, offices, and a theatre. One of the buildings is a small

shelter consisting of a roof with no walls.

There are also two bridges over the creek, and some trees spread out through the area.

There is parking in the area, which can be accessed by car from the south, but most visitors seem to come on foot or bicycles from the train station.





# Lakeside during Day



The Rudan recreational area is a well visited place during the day. There are playgrounds and big open areas that groups of school and kinder garden children enjoy, as well as tracks for runners in the summer and skiers during the winter. The are

also two big lakes with sandy beach and rock entries that are appreciated by many during the summer.

# Lakeside at Night



During the night, the area has a quite different feel to it. The vast, open, areas, that previously provided open views over distance, make one wonder what lies ahead in the dark. With few natural boundaries and a limited amount of elements seen at once, it is easy to feel

exposed in the vast surroundings. The few light poles that are in place to light up the area produce a lot of glare, further lowering ones ability to orient in the dark.



# Day compared to Night





# Lakeside Interior



Lakesides interior is full of color, mostly warm ones between yellow and red. It is a place with many different elements, a lot of things to look at and many different spaces

to dwell in. Many parts are made to look home made, and create a cozy atmosphere.

# First Questionnaire

**Frågeformulär/ Questionnaire**

Kön/Gender: \_\_\_\_\_ Ålder/Age: \_\_\_\_\_

1. Beskriv området i 3 ord:  
Describe the area in 3 words:

\_\_\_\_\_

2. Hur upplever du området Rudan?  
How do you feel in the Rudan area?

Trygg/Safe    2    3    4    5    Otrygg/Unsafe  
☐    ☐    ☐    ☐    ☐    ☐

3. Använd 3 adjektiv för att beskriva hur du upplever området?  
Use 3 adjectives to describe how you feel in the area?

Morgon/Morning    \_\_\_\_\_  
 Eftermiddag/Afternoon    \_\_\_\_\_  
 Kväll/Evening    \_\_\_\_\_

4. Hur ofta kommer du till Rudan?  
How often do you come to the Rudan area?

en gång i veckan    2    3    4    5    mer än 5 gånger  
 a time a week    ☐    ☐    ☐    ☐    ☐    more than 5 times

5. Under vilken tid är du på Rudanområdet på dygnet?  
What time are you in Rudan area when you are there?

Morgon/Morning    Lunch    Eftermiddag/Afternoon    Kväll/Evening  
☐    ☐    ☐    ☐


6. Vad är orsaken till att du kommer till Rudanområdet?  
What is your reason for your visit to Rudan area?

Träffa vänner/Meet friends    ☐  
 Sport och aktiviteter/Sport and activities    ☐  
 Teater/Theater    ☐  
 Lake Side    ☐  
 Björns    ☐  
 Andra alternativ/Other alternatives    ☐

7. Pricka in på kartan den väg/de vägar du använder när du besöker Rudan området.  
On the map, please add the road/roads you use when you visit the Rudan area.

8. Stoppa följande ord på kartan där du tycker att de passer bäst på kvällen (då det är mörkt ute)  
Put following words on the map where you think they match in the evening (darker outside).

G = Glaring (Bländande)  
 W = Well lit (Väl upplyst)  
 D = Too Dark (För mörkt)  
 C = Cozy (Mysigt)  
 S = Secure (Trygg)  
 I = Insecure (Otrygg)



The answers to the questionnaire are displayed on the next page, and show that many people like the Rudan area, but also that many of them find it quite dark and uncomfortable at night.

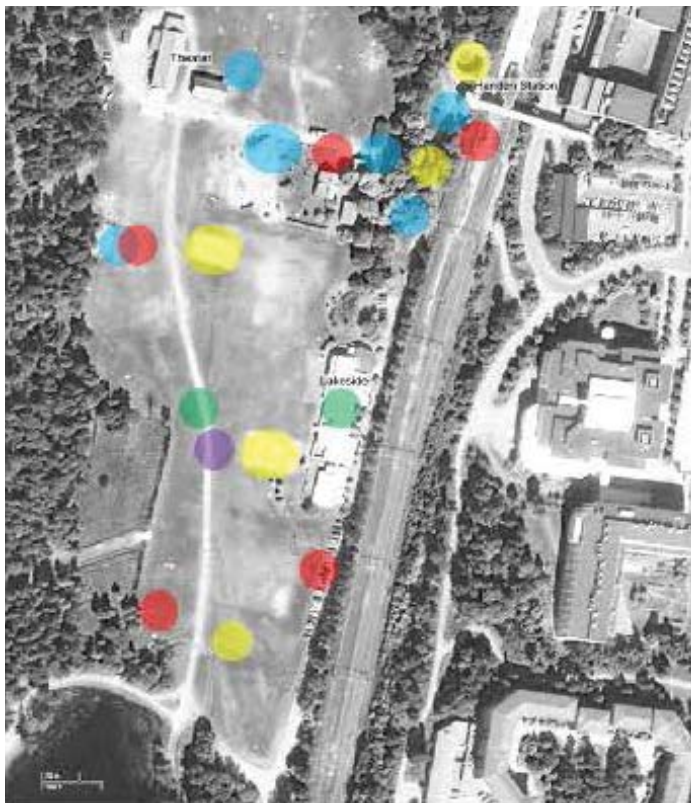
The questionnaire also supports our expectation that most people access Lakeside by the walkway from the train station.

On the map, participants have marked only the beginning of the path as unsafe, but considered a big part of the surrounding area to be so.

Many have also experienced much of the area as too dark, and containing too much glare from the luminaries that do exist.

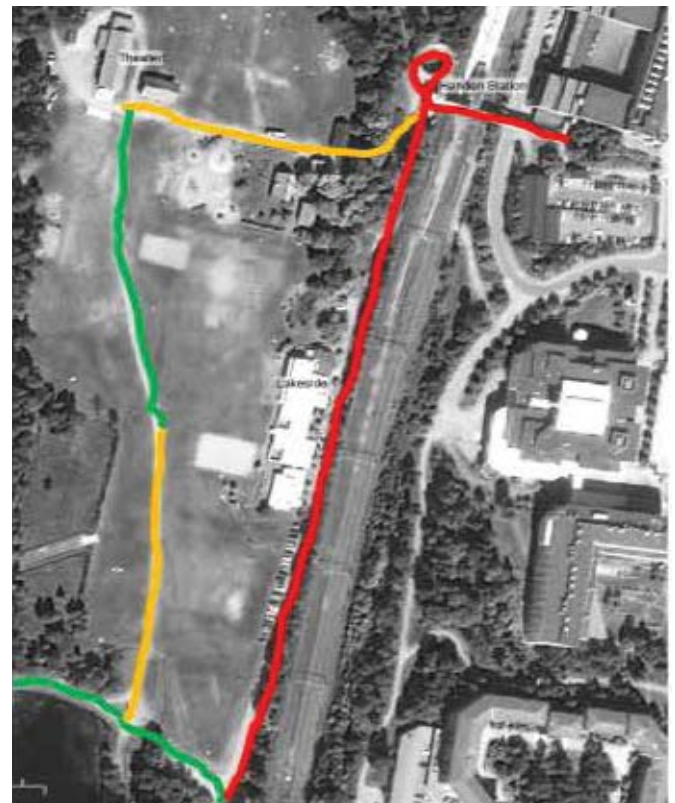
# Questionnaire Results

Gender:	Female 9	Male 8	
Age: 18-33	24	21	
Describe the area in 3 words	Most: Cosy, dark	Middle: Boring	Less: Pretty, chill, open, natural, peaceful, safe
How do you feel in the Rudan area?	Safe: 11	Unsafe: 14	
Use 3 adjectives to describe how you feel in the area?	Morning: Beautiful, quite/peaceful, cozy	Afternoon: Cozy, lively, fun	Evening: Dark, scary, lonely
What time are you in Rudan area when you are there?	Afternoon and evening		
What is your reason for your visit to Rudan area?	Meet friends and Lakeside		



## Legend

- GLARY
- WELL LIT
- TOO DARK
- SECURE
- INSECURE



## Legend

- Heavily used route
- Medium used routes
- Lightly used route



# General Concept

*“Take the inside out, there the light communicates with the interior.*

*With colors and shapes we can reflect the joy and coziness to the outside and give people the feeling of safety.*

*With Hans and Greta as a inspiration story, we can led people to Lakeside and create a magical story world around the area.”*

- \* Define space trough light.
- \* Create diversity of space, visual stimulation.
- \* Adequate light levels, in order to avoid disturbingly high contrasts.
- \* Give a warm and welcoming feeling to the darkest part of Haninge.
- \* Make the outside as a mirror of the inside, there the joy and security are.
- \* Take elements and color from Lakeside to the outdoor environment.
- \* Make the walk a magical story.
- \* Give the place identity at night.
- \* Create guiding lines.
- \* Mix colors with warm white light, for visibility and a cozy atmosphere.
- \* Communicate with the light, have special light for different elements.
- \* Let the surroundings light up the pathway.

# Image board and

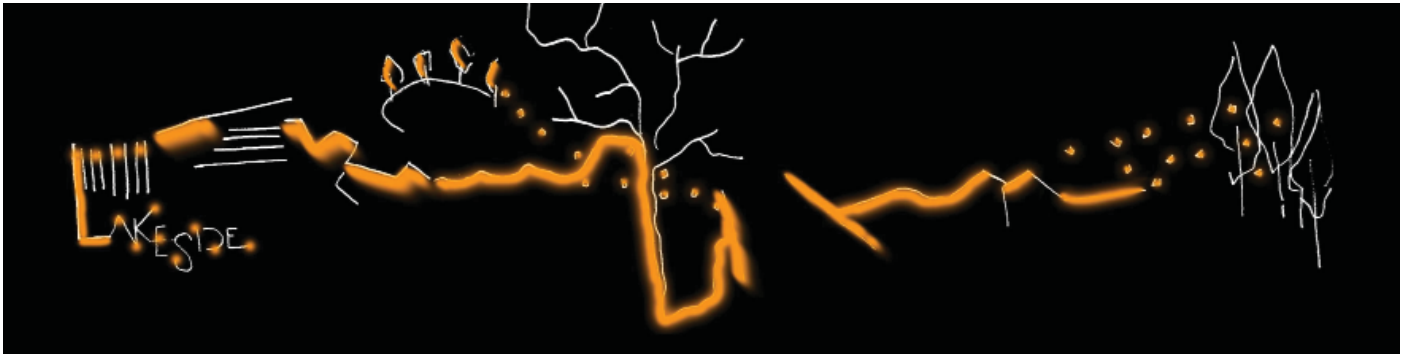


With **HANSEL AND GRETEL** as an **INSPIRATION**,  
we can **GUIDE** people through the darkness to Lake Side

Open up a **COLORFUL** and **MAGICAL** space  
with reflection of **JOY** and **HAPPINESS**, from the inside to the outside

Give the people **CREATIVE ELEMENTS** of **NATURE**  
with the feeling of **SAFETY** and **TRUST**.

# Project Sites



As the path between Lakeside and the train station is by far the most used outside area in the evening, this is the part we chose to focus on.

We wanted to create an environment where people can see what is going on around them, rather than just seeing the path they're walking on. It was therefore decided to light up the surrounding elements rather than the path itself, and let ambient light from them spread onto the path.

We also wanted to give some focus to the edge of the forest in the distance, to insinuate that it is there as a site border, just like during the day.

Our idea was that all elements would connect into a path of light along the walkway, and guide visitors towards Lakeside through a pleasant environment.

We decided to each focus on different elements along the path, and tie them together with a story;

1; Once upon a time in a magical land...

- Lake at the entrance to the site by Caroline Zima.

2; ...there were shelters protecting from the night...

- Shelter and small houses along the creek by me.

3; ...when crossroads offered many directions...

- Bridges by Anders Lind.

4; ...the trees guided the right way...

- Trees on site and at the edge of the forest by Janna Witt.

5; ...while accompanied by the sparkles from the water...

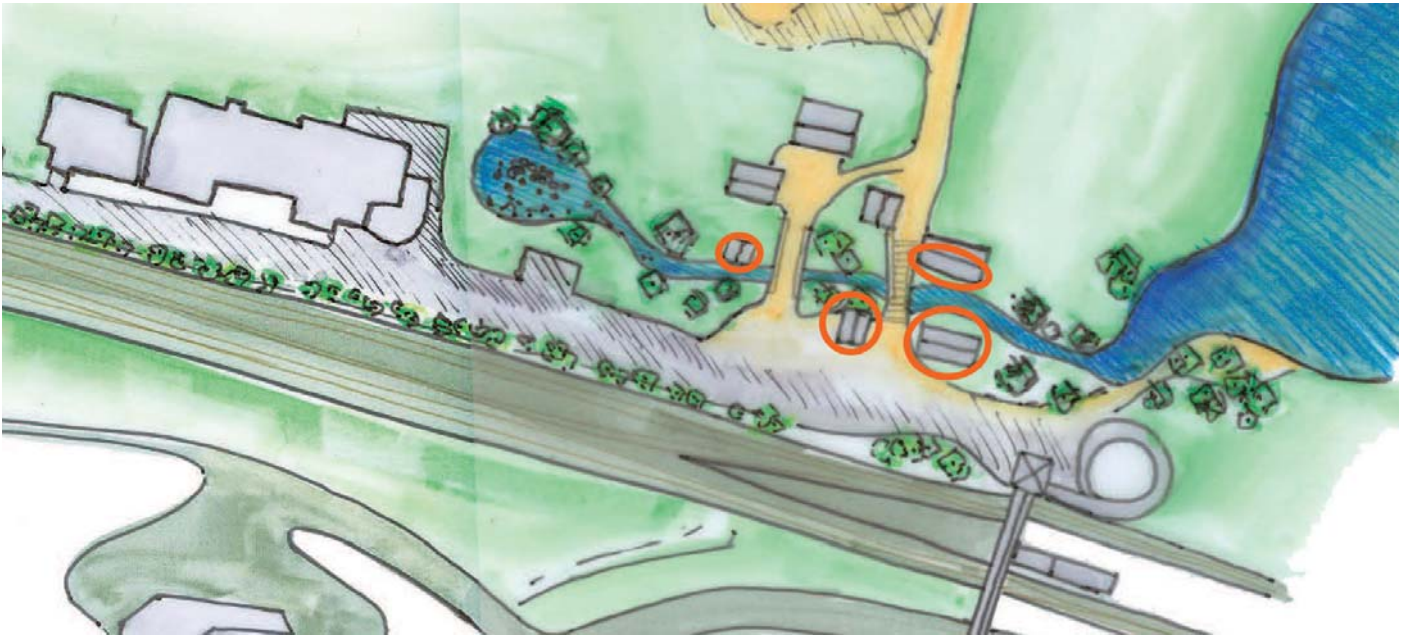
- Little dam by the Lakeside building by Natasha Ilidaou.

6; ...to a welcoming place enlighten from the inside"

- The entrances to the Lakeside building by Cristina Martínez and Alexandra Vogel.



# Site - Houses by the River



My site consisted of three little houses and a shelter without walls, along the creek running next to the walking path from the train station to Lakeside.

The shelter (between the two bridges, photograph on the right) is an element one notices quickly during the day, as it stands there welcoming, but with no obvious practical use.

The feeling that it is an important element for the site is further enhanced by that it is the only one of the buildings that has some permanent, decorative light, three spotlights shining on the ground below it. I therefore decided to make this the centerpiece of my installation. I wanted create some motion in the light, enhance the warm and welcoming feeling, and bring in some

signature colors from the interior of the Lakeside building.

On the other buildings, I wanted to focus on the surfaces that can be seen from the path, and give them an appearance that differs from the one they expose in daylight.



# Concept

“Lines of light lead one to a roof, housing a fire-like light underneath, and from there further on towards the Lakeside house.

The roof provides shelter on ones way, and creates a cozy atmosphere in the dark, while the lines emphasize textures of the surfaces they graze.”

\* Use the yellow-red color scale of Lakesides interior, take the warmth outside.

\* Create cozy, mystical lighting, that guides one through the night.

\* A warm, flaming, light underneath the little roof, is created by diffusing the light present today, and adding an rgb luminaire that will shift in a yellow – red color scale.

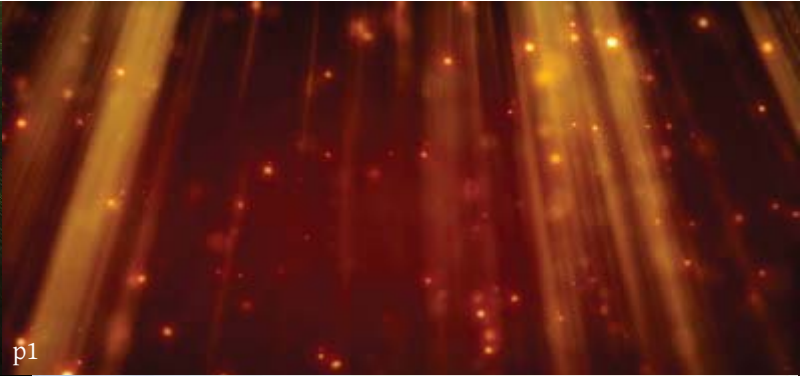
\* The three little houses will have only certain surfaces lit to enhance the view of the structure, rather than the volume, creating a mystical feeling.

\* Lines of light lead one towards the Lakeside house.

\* The little shelter provides a pleasant place to halt on the way to Lakeside.

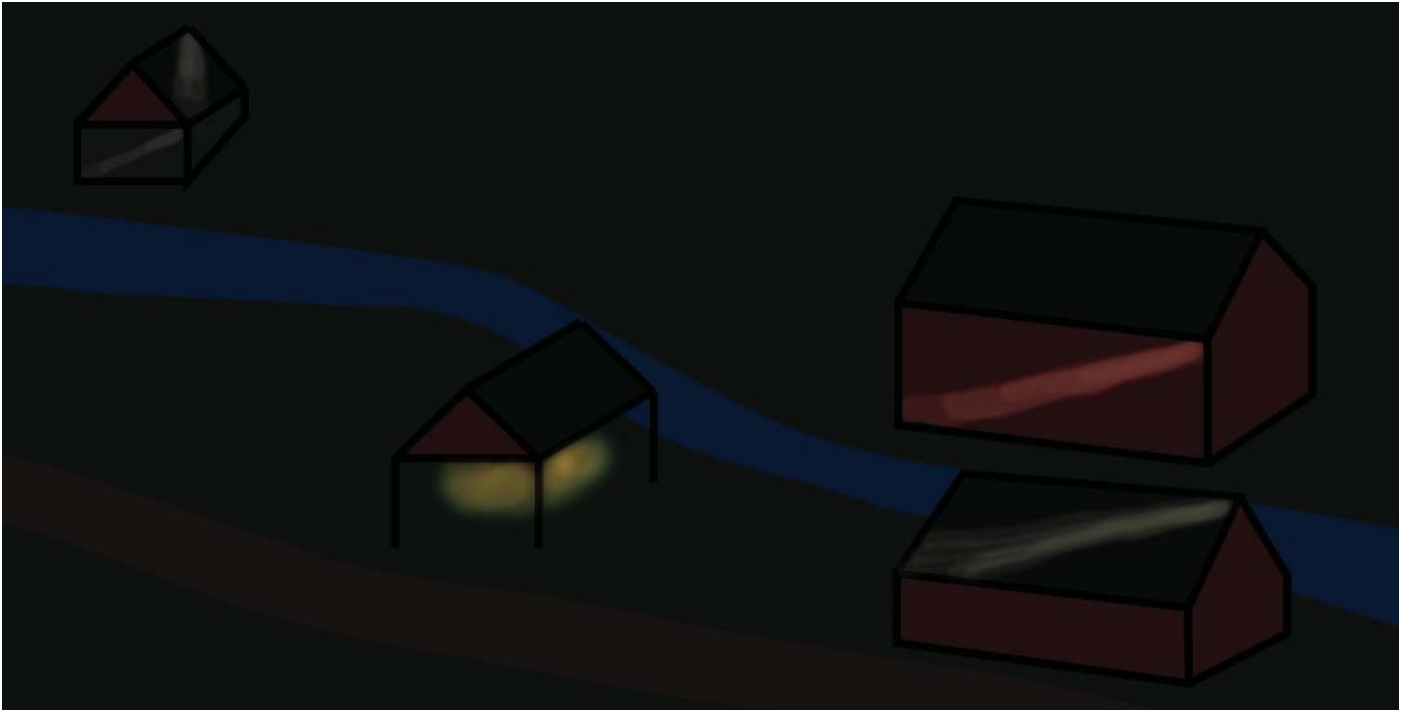
\* Ever changing, sparkling light in the shelter creates an interesting feature to look at.

# Image board





# Sketches





Concept sketch, the first lines of light and the fire installation can be seen already from the stairs down from the train station.

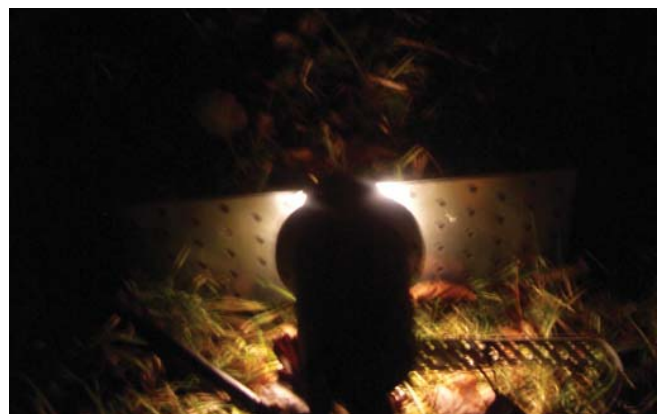


Concept sketch, stopping below the fire-roof, additional lines of light lead one on towards the Lakeside house.

# Early Testing

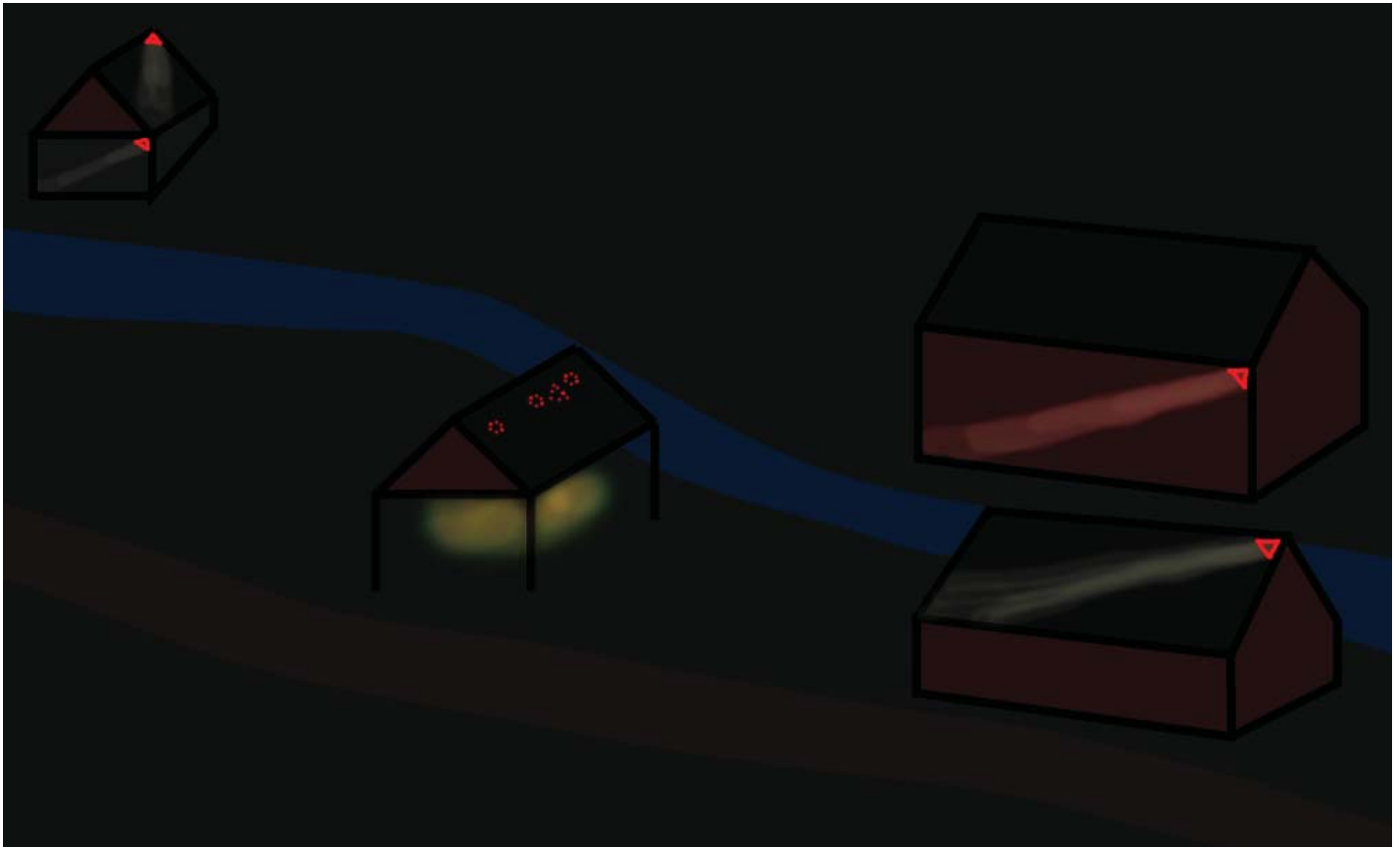
When testing different aspects of my installation, I was mainly focusing on four things, how to create clear lines, how to diffuse the existing light in the shelter, how to create a color-changing effect, and how to mount the luminaries.

For the lines, I realized I needed to get a hold of focused led-luminaries, as the halogen spotlights I started with were spreading to much and disappearing to fast. As for the fire-colored effect in the shelter, I was trying to see if I could create it with filters fastened in such a way that they sway by the tiniest wind, but decided to use a DMX installation with color-changing light instead.





# Proposed Luminaire Plan



I planned to create the three lines of light leading to Lakeside by four LED spotlights. They are placed to be seen as you walk the path towards Lakeside.

As the first house along the path is set quite low into the ground, I decided to have the line on it running across the roof in order to maximize visibility.

The next house is quite a bit higher, and as I want the line to be most obvious once you have walked past the first house, the line placed here runs across the facade.

The third house has its corner facing the fire little shelter, here I wanted to use two spotlights to have a line running across one side of the roof, and continuing down across the facade around the corner.

Underneath the roof of the shelter, the three existing spotlights will be colored with filters and directed towards the outskirts of the area. Additionally a rgb luminaire with DMX controller will be placed underneath the roof, following a color changing program.

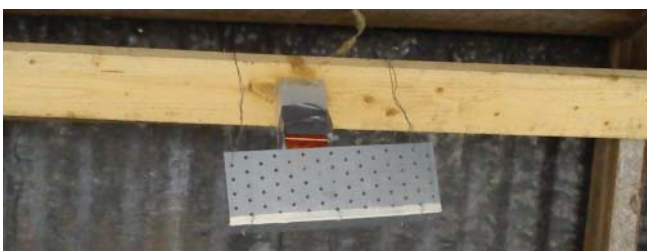
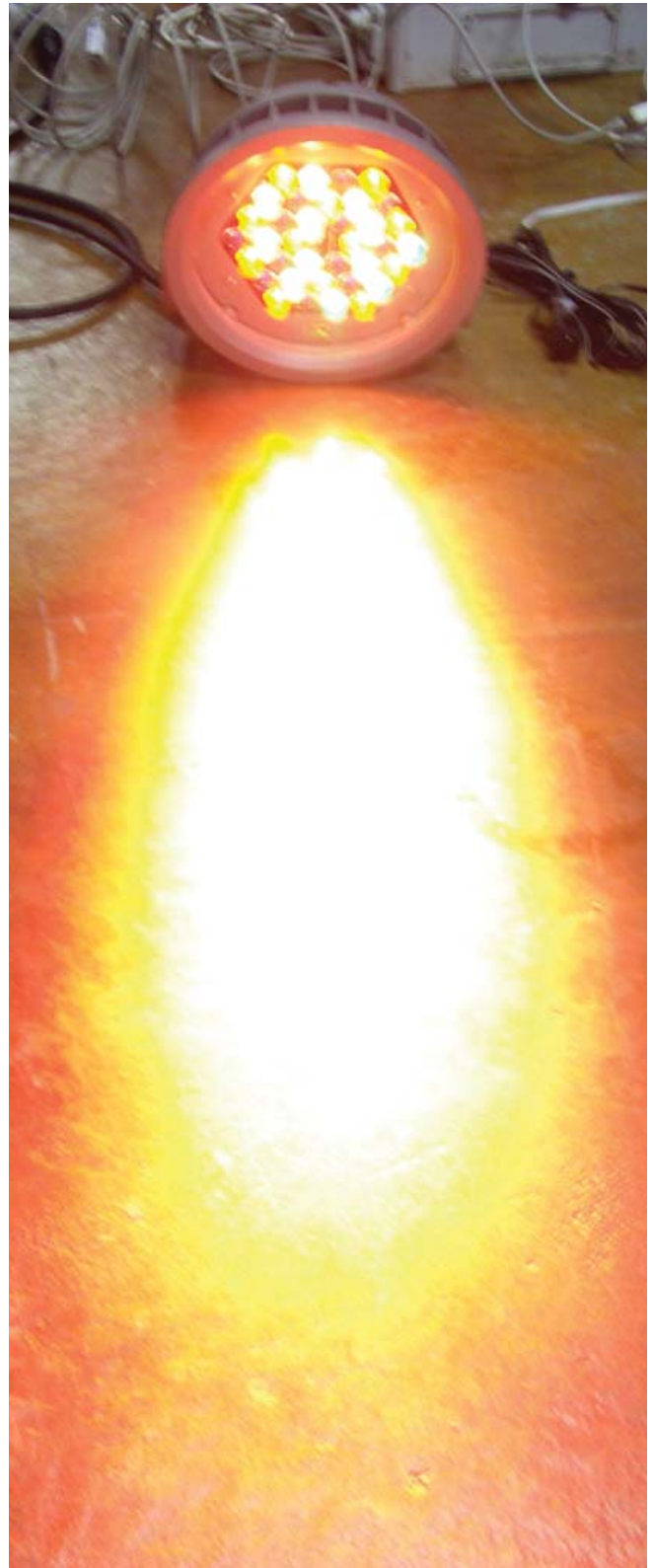
# Fire Effect

For the flaming light underneath the shelter, I decided to use a Colorburst rgb luminaire, with a DMX controller.

The controller I got was a Philips IPlayer 3, and I have used the accompanying software ColorPlay 3 to create a program that changes the color of the luminaire in a scale between yellow and red at different intervals and intensities.

I chose the “burst” effect to get every new color to start from the middle of the luminaire, and spread outwards towards the edges, further enhancing the flaming feeling.

To enhance the warm atmosphere, I used orange filters on the existing luminaries, I also redirected their light by reflecting it of metal sheets in order to put focus on the color changing light, and widen the colored atmosphere.



# The arrival of the Snow



When I was testing my installation after the arrival of the snow, it became quite obvious that it would not be possible to place spotlights on the different roofs in order to create lines of light by letting them graze the surface, as their direction would depend on the height of the snow

to achieve the desired effect. I therefore decided to work with luminaries hung a distance away from each building, creating lines by lenses that project the light into the desired shape.



# Final Installation



Line 1 seen from the steps down from the train station, with the other parts of my installation in the background.



Line 2, with Anders' bridge lighting on the left.



The shelter.



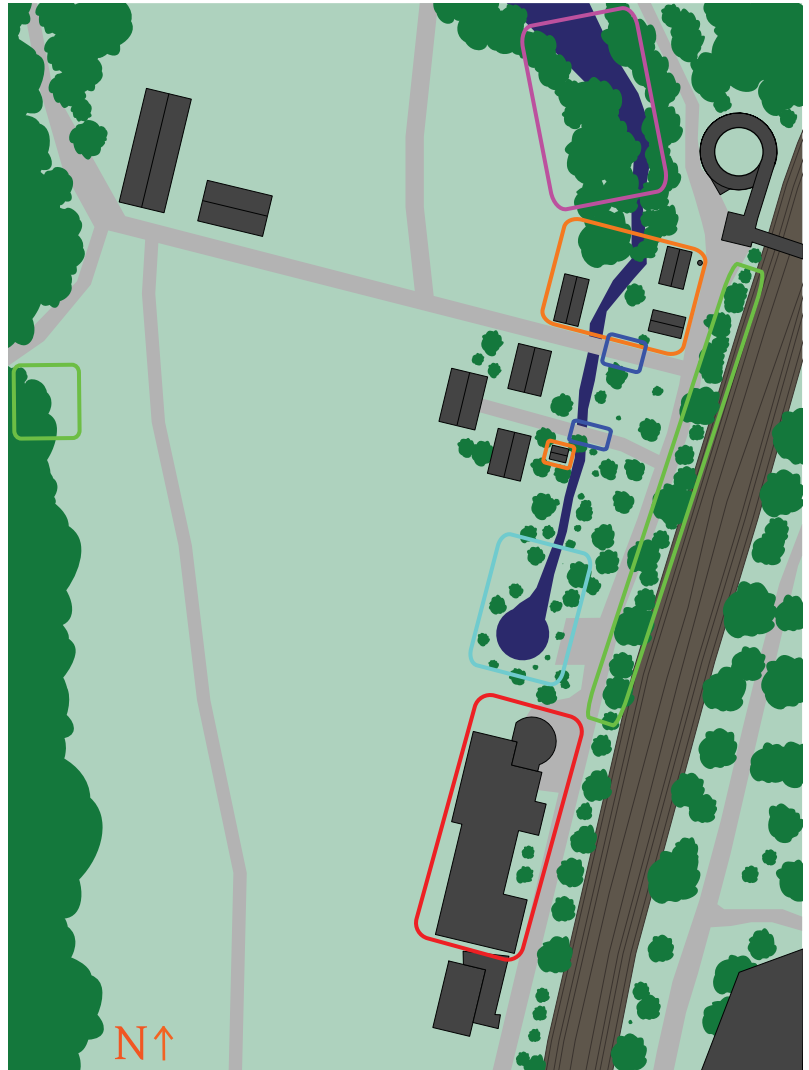
The shelter at a different point in the color changing program.



Line 3, with Joachim Klahr standing next to the house.

# Final Plan Overview

- \* My installations, houses and shelter
- \* Anders' installations, bridges
- \* Carolines installation, lake and island
- \* Natachas installation, lake
- \* Jannas installations, trees
- \* Cristinas and Alexandras installation, the Lakeside building



The site plan above is shown at the scale of 1:2000, displaying the sites we worked on along the path between the train station and Lakeside.

Some images of the different installations can be seen on the following page, marked with the same color coding as on the map above.

Apart from the constructed installation, some work was also carried out to turn off and shield some of the existing lighting fixtures, in order to lower the maximum light level and create a comfortable environment with less glare and appropriate contrasts.



# Site images



Lines and fire



Colors around the lake



Bridge lighting



Trees in the distance



Green and orange in the woods




Colors by the entrance

# Final luminaire plan



## Legend

-  Fergin metal halide
-  We-ef FLLC131 LED
-  Philips colorburst 6
-  Existing downlight spot

## Total power consumption

113 watt

including dmx controller

Plan displayed at a scale of 1:500

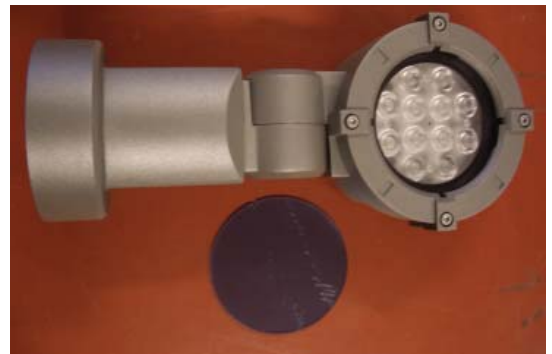
Full specifications of luminaries used  
can be seen on the following page.

# Equipment List

1 x Fergin lensed 35 watt  
cube metal halide with  
linear spread lens



2 x We-ef FLC131 LED  
24 watt with very narrow  
beam, linear spread,  
sharp cutoff lens



1 x Philips Colorburst 6  
led rgb, 25 watt



p9

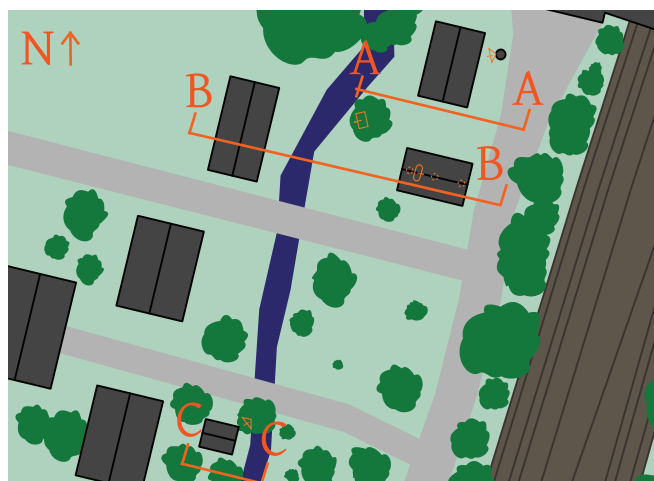
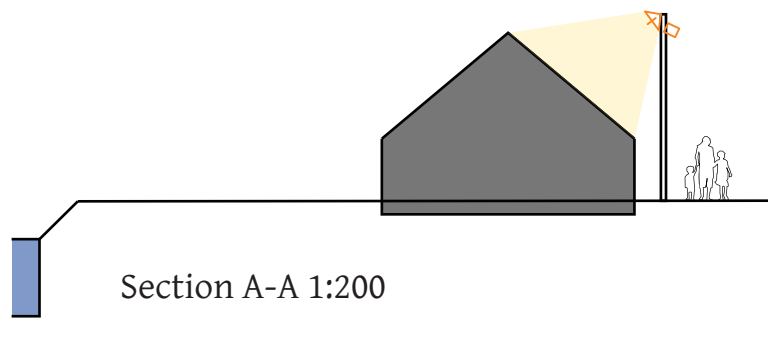
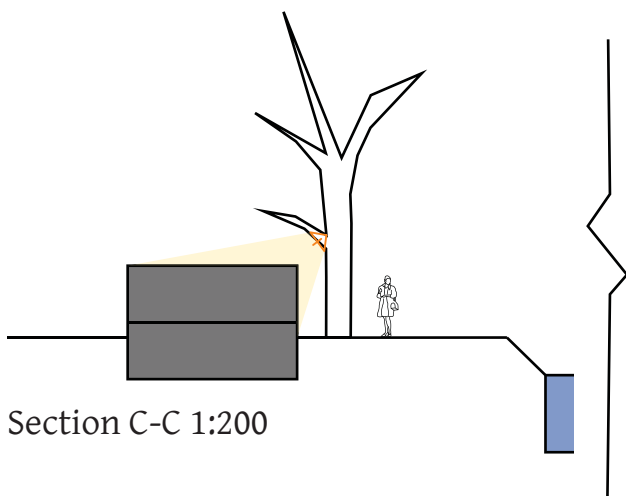
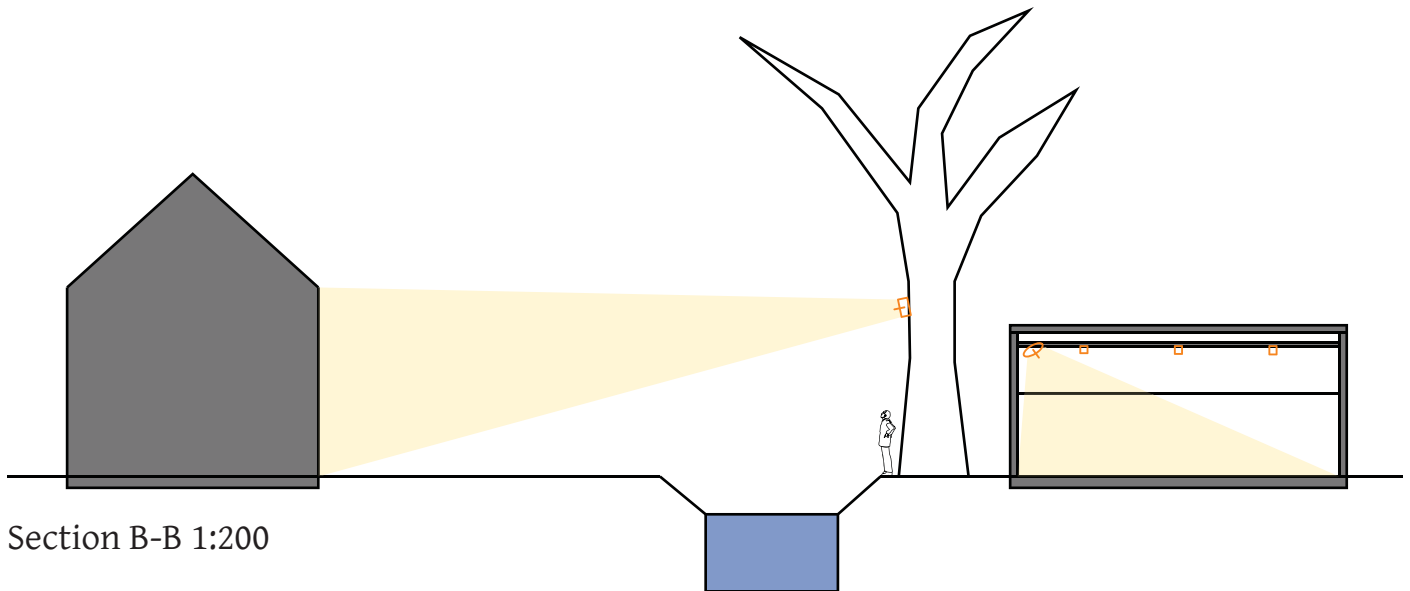
1 x Philips Iplayer 3,  
dmx controller, 5 watt



p9



# Installation Sections



## Legend

-  Fergin metal halide
-  We-ef FLLC131 LED
-  Philips colorburst 6
-  Existing luminaire

# Second Questionnaire

1. Kvinna / Female

☐

Man / Male

☐

2. Ålder / Age

14 eller yngre / or younger

☐

15 – 30

☐

31 – 64

☐

65 +

☐

3. Hur ofta besöker du Rudan-området?

How often do you visit to the Rudan area?

Detta är första gången

This is my first time

☐

Mindre än en gång per månad

Less than once a month

☐

Varje månad

Every Month

☐

Varje vecka

Every Week

☐

4. Beskriv hur du upplever Rudan-området ikväll, med tre ord.

Describe your impression of the Rudan area tonight, with three words.

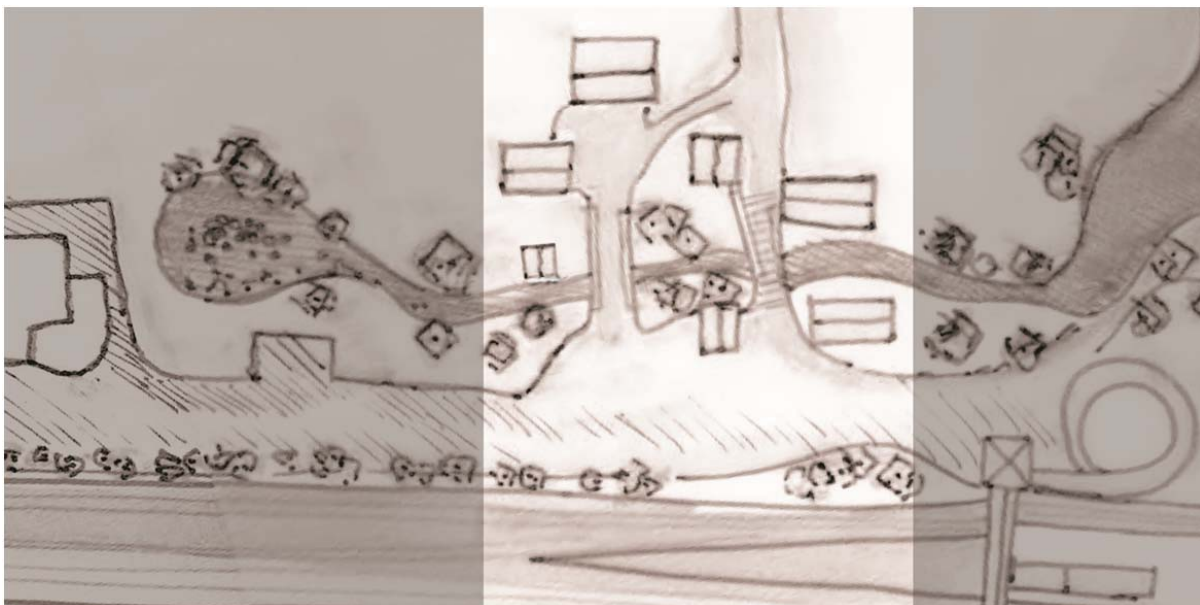
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5 . Hur många linjer av ljus kan du se på olika hus? \_\_\_\_\_

How many lines of light on different houses can you see?

Markera var på kartan nedan.

Mark where, on the map below.



6. På vägen mellan pendeltåget och Lakeside-huset passerar du ett litet skjul, hur uppfattar du atmosfären där?

On the way between the pendeltåg and the Lakeside house you pass a little shelter, what is your impression of the atmosphere there?



Lugn /Calm	2	3	4	5	Dynamisk /dynamic
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Kall /Cold	2	3	4	5	Varm /Warm
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ful /Ugly	2	3	4	5	Tilltalande /Appealing
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Tråkig /Boring	2	3	4	5	Intressant /Interesting
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. Hur trygg känner du dig i Rudan?

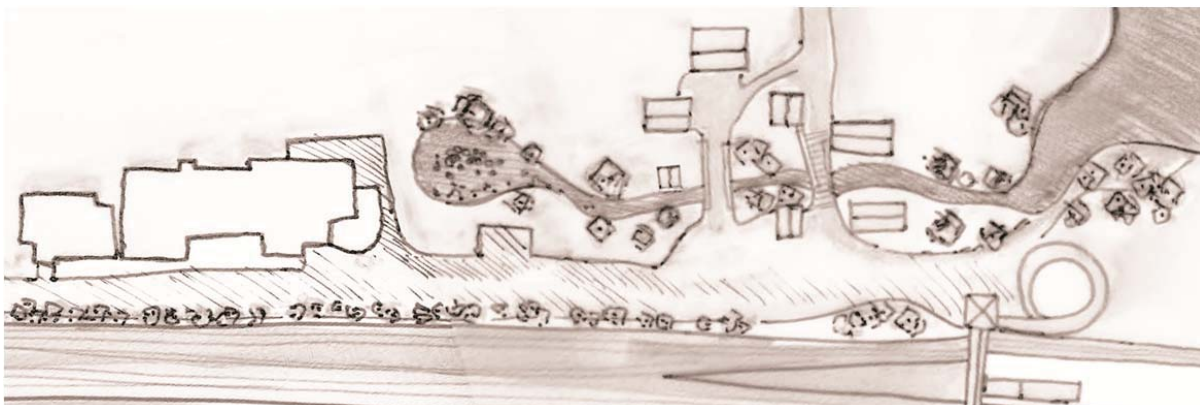
How safe do you feel in the Rudan area?

Otrygg /Unsafe	2	3	4	5	Trygg /Safe
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. Markera de atmosfärer du upplever i Rudan-området kvällstid, på motsvarande plats på kartan.

Mark the atmospheres you experience in the Rudan area after dark, at the appropriate point on the map.

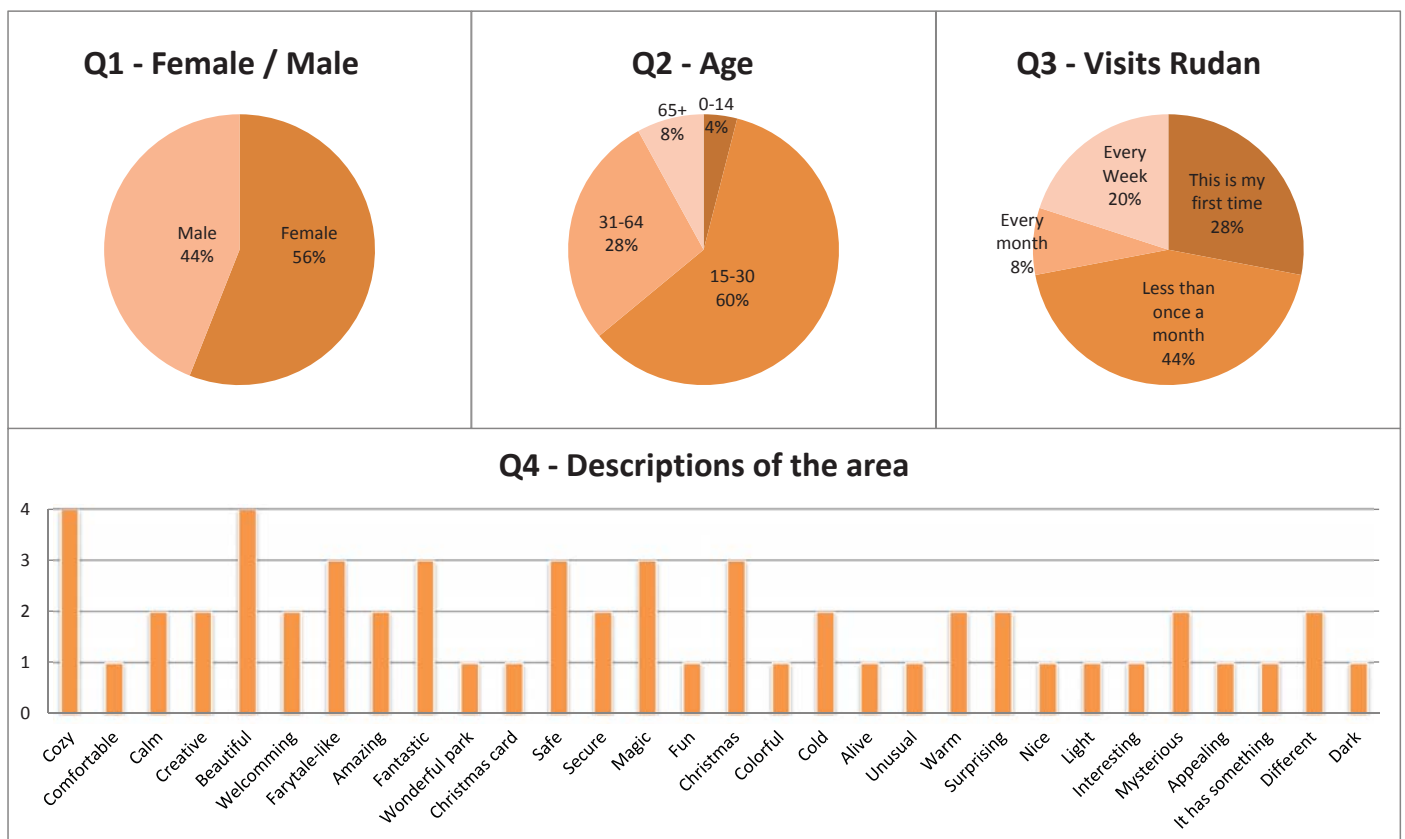
U = väl Upplyst / well lit	Y = mysigt / cozy
B = Bländande / glary	T = mystiskt / mystical
L = för Ljust / too bright	S = Säkert / secure
M = för Mörkt / too dark	O = Osäkert / insecure



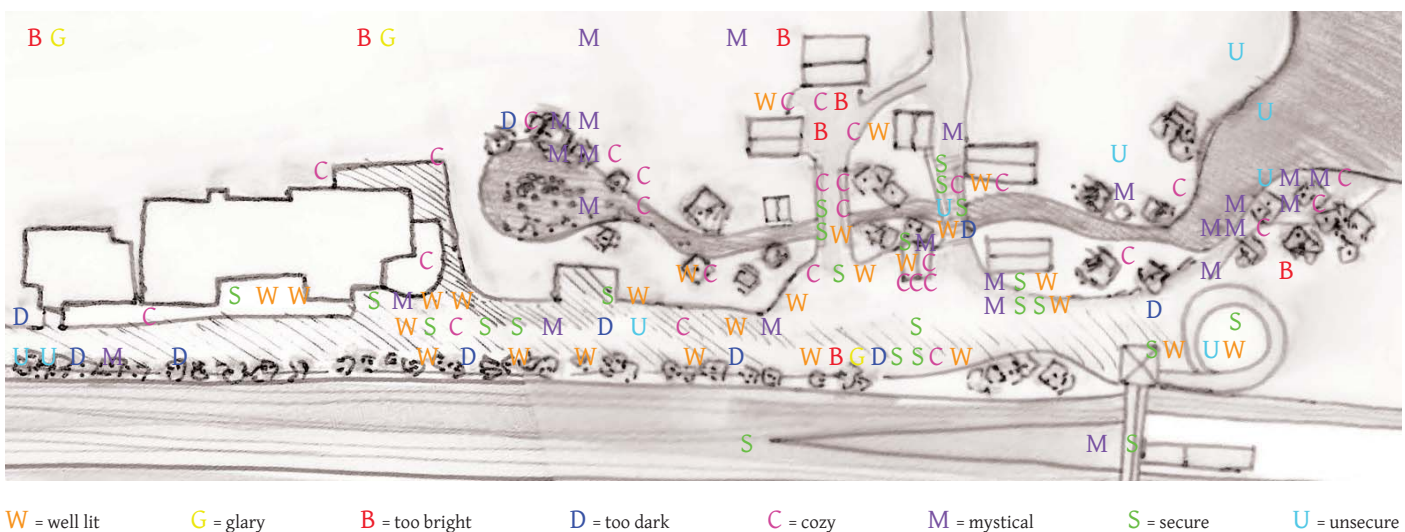


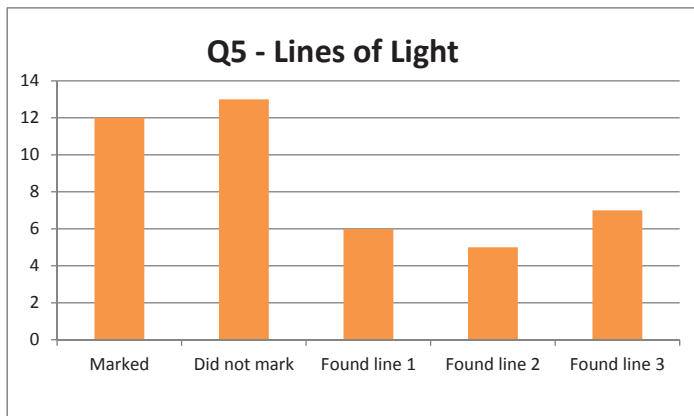
# Questionnaire Results

The questionnaire was answered by 25 people in total, 11 men and 14 woman, with the majority being between the ages of 15 and 30.



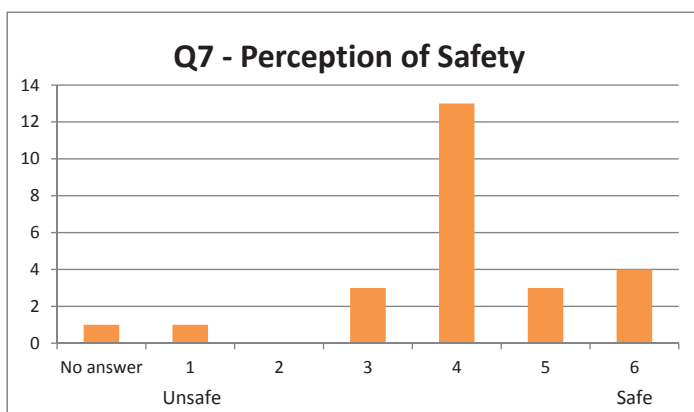
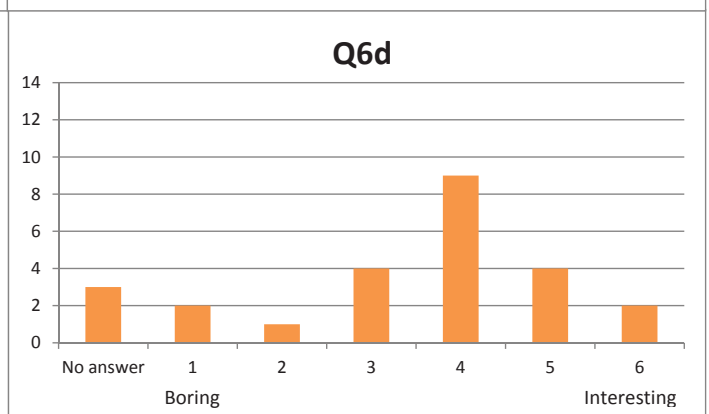
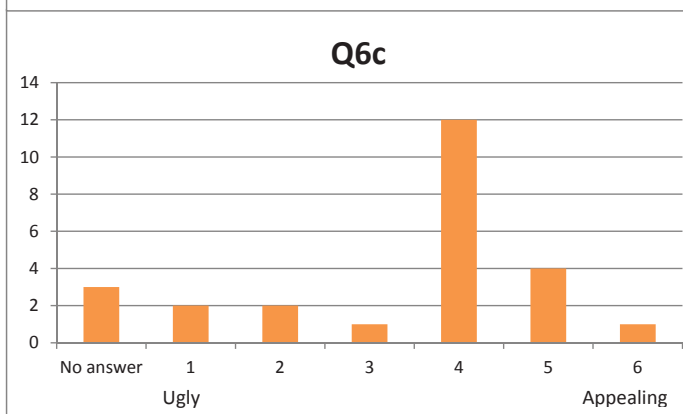
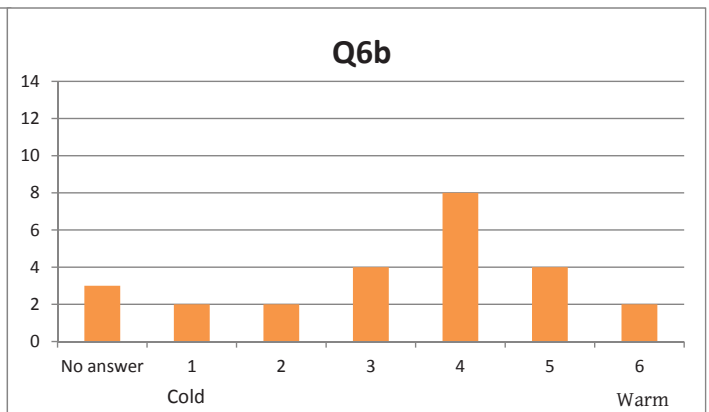
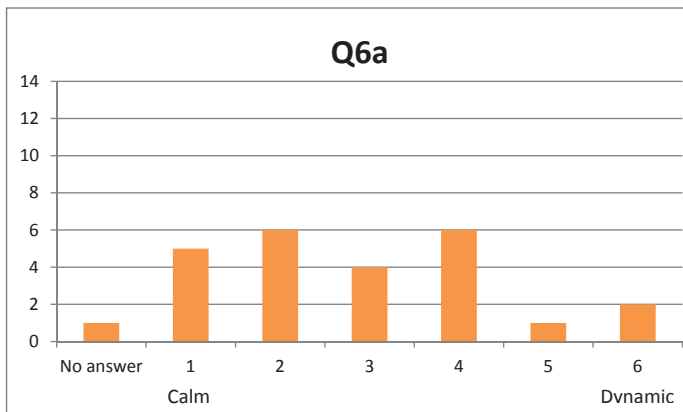
## Q8 - Atmospheres experienced





There was a slight confusion among some participants of what “lines of light” were, and only half of them answered this question by marking on the map.

**Q6 - On your way between the train and the Lakeside-house you pass a little shelter, what is your view of the atmosphere there?**



The perception of safety has been cross-checked by comparison of answers between those who visit Rudan more often than once a month, and those who do not, and no significant difference could be derived.

# Design Analysis

The new lighting substantially changed the impression of the area, and was commented kindly on by many people passing by. The installations were well integrated in the existing environment, which was noticeable when visitors sometimes had trouble distinguishing between the installation and some of the pre-existing lighting.

We reached our goal of bringing color from Lakesides interior to the outside environment, while creating a pleasant atmosphere.

Comparing the two questionnaires made during this project, it is clear that many people felt safer as the new lighting was installed. We have no data of whether the actual security of the area was affected, but we could see that reduced glare made it easier to look over distance across the area.

When asked to describe the feeling of the area freely, the words most commonly used by participants were; Cozy and Beautiful. Looking at all of the words, the majority of the participants seem to have experienced the welcoming and magical atmosphere we were aiming for.

Out of the “lines of light” I created, L3 (see page 33, question 5) was the most obviously visible one, as there was not as much ambient light competing with the projection as in the other areas. In the survey, it was found slightly more often than the other lines, but all of them were seen by almost 50% of the participants who answered this question.

Question 6 in the second questionnaire was aimed at looking into how people experienced the color changing installation underneath the shelter. But as the answers to all of the questions were very much spread out, no distinct conclusions can be drawn. It is however interesting to see how varying opinions visitors can have about an installation like this.

Over all, I believe that the installation was a successful showcase of what could be done in the area, and much of the lighting put up could work permanently. Especially in an area that is used for entertainment and creative activities, partly colored light works good, as long as it is well thought through.



# Appendix

## Acknowledgments

I would like to thank;

Fredrik Winqvist at Stockholm lighting for support in dmx programing.

Stockholm Lighting, We-ef, and Fergin for equipment lent for the installation.

Kenneth Lindgren and fellow electricians at Rudan, for assistance in installing the equipment in place.

Fina Sundqvist and fellow staff at Lakeside, for nice cooperation.

And finally, fellow students and staff at the KTH lighting laboratory, for cooperation on a successful project.

Most images in this report were created by our project group, as follows below. Images borrowed from other sources are credited on the right.

Project group;  
Katja Tsyckova  
Anders Lind  
Caroline Zima  
Anastasia Ilidaou  
Cristina Martinez  
Alexandra Vogel

## Image sources

p1 - <http://footage.shutterstock.com/clip-1164406-stock-footage-background-flying-particles-in-light-beams.html>

p2 - <http://www.darren-price.com/android/>

p3 - <http://www.erco.com/projects/simula/spatial-patterns-and-lighting-patterns-4922/en/sim-1.php>

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