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The Rights to the City
Improving inclusivity in urban public spaces through lighting design for marginalised groups

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Supervisor:
Mette Hvass

Student:
Kaja Glenne Lund

Aalborg University Copenhagen
Frederikskaj 12,
DK-2450 Copenhagen SV
Semester Coordinator:
Secretary:

Abstract:
Marginalised groups are experiencing unwanted attention in the public realm worldwide, and gendered fear produces avoidance behaviour in many public urban places. Universal design has been implemented to ensure that everyone has access to the urban areas, but still, this access is restricted for many vulnerable groups. This investigation aims to find relevant lighting design principles for making public urban spaces more inclusive for the LGBT population in Oslo.
A literature review, case studies of three urban places, focus groups, and an experiment with torches in the field were the chosen methods to gain knowledge. First, two focus groups were established, each comprising five members from the LGBT+ population in Oslo between 30-60 years with different social identities. For the first part, they were interviewed about their risk avoidance behaviour in urban places in Oslo. For the second part, a method from visual ethnography was used where the participants used a video camera to record their own experiences without being influenced by the researcher's presence.
The findings suggest that the participants are experiencing both a need to hide in the dark and the ability to see their surroundings and the presence of others. In addition, the experiment showed how they wanted to use warm lighting and beautify the place by enhancing details. The conclusion suggests various lighting design methods to create inclusive public areas, such as beautifying details and legibility with vertically lit surfaces.
Other urban places should be investigated similarly. The results can be compared and possibly confirmed by using control groups with other non-marginalized groups.

THE RIGHTS TO THE CITY

Improving inclusivity in urban public places through lighting design for marginalised communities

Acknowledgement

I am immensely grateful for the people I've met during my two-year journey at Aalborg University. They have expanded my perspective on the potential of lighting design, and I'm thankful for their contributions. When I embarked on this journey three years ago, I was uncertain whether it was a wise decision, but today, I know it was the right one. However, I could not have reached this point alone.

I thank my academic supervisor, Mette Hvass, from Aalborg University. Without her inspiring discussions and encouragement, this master's thesis would not have been possible. Her work, research, and the light lab at the university are truly inspiring. I also want to thank my fellow students for the projects we have accomplished together and for providing valuable feedback and help during the thesis process.

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Kaja Glenne Lund, Oslo 25.mai 2023

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Part 1

1 INTRODUCTION

Unequal access to urban public places in the cities is problematic, especially from a gender perspective. The unequal use of the public realm is a global problem, so much that the United Nations included equal rights to the cities in one of their sustainable development goals. SDG goal 11, about making safe, inclusive, resilient, and socially sustainable human settlements and cities, has been implemented to ensure these rights (‘Goal 11’, n.d.). One of the targets, 11.7, explicitly states to provide universal access to safe, inclusive, accessible green and public places for all, especially vulnerable people. Safe mobility for women in public places worldwide has become so important that UN Women has created a project called safe cities. Safe mobility and inclusion in the public realm are the main issues (UN Women, 2021).

Groups outside the majority in our society are generally defined as marginalised groups. Women and other marginalised groups, such as those who break the norm, typically suffer from unwanted attention and misrepresentation in the public realm. This often leads to a heightened fear of crime. Consequently, their freedom of movement and mobility in the public realm is restricted.

How people experience inclusion in public places is very individual and often connected to perceived safety. One example is ARUP´s project with the “free to be” campaign in Melbourne, which shows how:

“vulnerability in public space after dark are consequences of gender inequality and perpetuate the social exclusion of women” (Yang et al., 2022, p. 86)

These findings complement previous studies (Fanghanel, 2016; Fox et al., 2009; Keane, 1998; Koskela & Pain, 2000; Valentine, 1989) and are often used to generalise to other vulnerable and marginalised groups. As Daria Casciani writes in her book *“The Human and Social Dimension of Urban Lightscapes”* (Casciani, 2020), socially inclusive lighting design is a new direction within the lighting industry. Not much research has yet been done on this subject. Still, research and literature on street lighting affecting the inclusion of marginalised groups need to be included. The author made a search on Google Scholar with the search words:

lighting + marginalised groups + urban public places

Google found 30.100 hits. Of the first 50, only two hits were related to the subject: one article from Arup (Yang et al., 2022), where marginalised groups is mentioned in the conclusion, and the other, the book where this article is published by (Sumartojo, 2022). So, the search was broadened to replace “marginalised groups” with “gender”:

lighting + gender + urban public lighting

A review of the first 50 articles (see Appendix 1) no one included marginalised groups or used an intersectional perspective in their sampling. However, though some of these studies included an overview of gender in their sampling, only six aimed to investigate women's perceived safety. A review by Trop. et al. (Trop et al., 2023) found that five of the 1315 articles they reviewed focused on how lighting influenced women's perception of safety. One conclusion in the systematic review by Trop et.al was that an

“…important knowledge gap is related to the insufficient representation of cultural or ethnic groups.” p.28 ibid.

1.1 Vision

What can be done to make urban places become more accessible and inclusive and not just appear safer? How can lighting designers create inclusive atmospheres? Which lighting design methods can be used to make socially sustainable cities? How can marginalised groups benefit from atmospheres created with lighting? These questions led to my vision for my thesis:

Imagine if lighting design could make urban places more socially inclusive and create freedom of movement for marginalised groups.

"other minority groups should be included in future studies" (Yang et al., 2022, p. 100)

As Yang, Berry, and Kalms conclude in their article about urban safety for girls after dark, this master thesis aims to explore this gap in the research described in appendix 1. How do marginalised groups experience restriction of movement in the urban environment, and how can lighting make a difference? To gain a more equitable insight into how marginalised groups can experience the public realm, the LGBT+ community in Oslo, will be the focus of this master´s thesis.

The LGBT+ community is a marginalised group as they break with the heteronormative society. This is described more in the context chapter. An intersectional perspective is used in the thesis, as this perspective can help to understand how this group is marginalised. The LGBT+ community consists of people of all different identities, ages, abilities, backgrounds, and ethnicities. However, they have one thing in common: they often experience unwanted attention, abuse, and personal attacks because of their presence in public spaces. Due to homophobia and transphobia, their presence might be perceived as threatening or provoking.

1.2 The structure of The thesis

The thesis structure is divided into four main parts:

- Introduction, methodologies, and context.
- A literature review.
- A case study.
- A field study.

The context chapter gives an understanding and foundation about why our behaviour in urban public places is influenced by our socialised gender roles, which is essential for understanding the LGBT+ community. Next, the literature review reviews how urban planning can become more inclusive and how atmospheres influence a place. The case study is a pre-study for the field study to learn how lighting can support social interaction in urban places. The last part, the field study, is conducted with two focus groups with members from the LGBT+ community and an experiment in the field.
Each chapter ends with a summary, and the main parts end with a summary and conclusion.

The thesis consists of three research questions. The first initial research question is answered using the knowledge from the literature review. The second initial research question is answered by conducting a case study, and the final research question is answered through a field study. The structure is displayed in Figure 1 on the next page

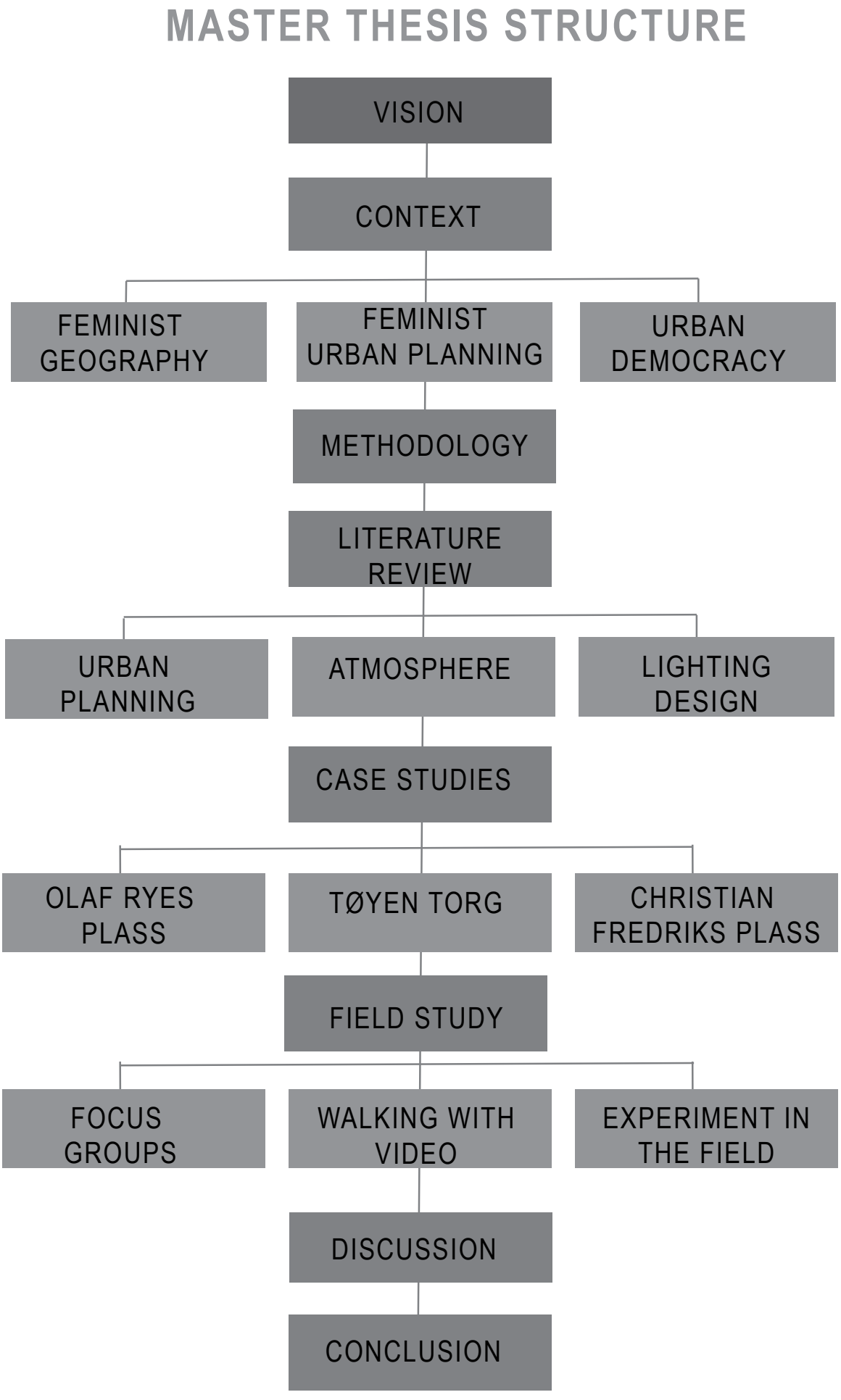


Figure 1: Diagram of the structure made by the author

1.3 Clarification of terms

Non-binary:
An identity for someone that does not want to be categorised.

Transgendered:
Someone that does not identify with the body they were born with.

LGBT+:
Lesbian, Gay, Bisexual, Transgender and other non-heterosexuals.

Queer:
An identity indlucing different gender identities and sexual orientions

Intersectional perspective:
To explore a groups expereince with their social identies markers

CIS:
An identity for someone that identifies within the binary gender categories.

Gender:
A social identity often associated with male, female or other identities.

Reassuring atmosphere:
An atmosphere that can make some feel less worried.

Welcoming atmosphere:
An atmosphere that can make someone feel welcome.

Inclusive atmosphere:
An atmosphere that can make someone feel included.

Actual safety:
Actual security and protection from crime.

Perceived safety:
A subjective experience of feeling safe.

(Cambridge Dictionary | English Dictionary, Translations & Thesaurus, 2023)

2 METHODOLOGIES

The methodology in this thesis is, first and foremost, based on the design experiment model developed by Ellen Kathrine Hansen (Hansen & Mullins, 2014) and shown here in Table 1.

This diagram shows how the problem-based, project-oriented learning approach works at Aalborg University. The design experiment model taught in the master in lighting design encourages students to use methods from different science fields: Nature, social science, humanities, and art. The aim is to make a conscious design choice or to make research proposals that can be tested and evaluated.

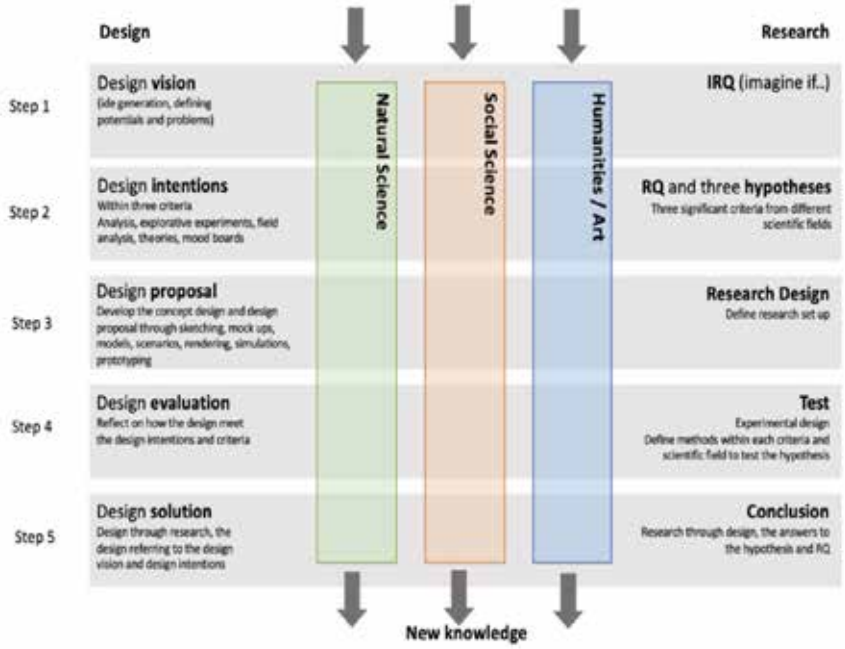


Table 1: the design experiment model as thought at the AAU

In this thesis, a literature review will be conducted, drawing from methods in the humanities. From the traditions of social science, the use of focus groups has been chosen using qualitative methods for analyses. In addition, quantitative data will be collected when performing the case studies to analyse existing lighting luminaries. This is a standard practice in the natural sciences.

In the literature review, literature on urban planning, atmosphere as a phenomenon, and atmospheres in lighting design will be among the topics that will be further investigated. Literature by Jane Jacobs, Oscar Newman, William Whyte and Jan Gehl has the main focus of the urban planning chapter. In addition, Gernot Böhme, Julian Pallassmaa, Mikkel Bille and Sarah Pink´s literature is being reviewed on the atmosphere. Moreover, on the topic of lighting design, literature from several lighting designers and researchers, such as Daria Casciani, Herves Descotte, Mette Hvass, Nigel Narboni, Ulrikke Brandi and Leni Schwendinger, will be reviewed.

A descriptive case study consisting of an analysis of three different squares in Oslo was conducted as a pre-study for the final research question. As a method, case studies is often used in the social science (Yin, 2018). The chosen cases were identified through reports published by the municipality of Oslo, describing how lighting can support the social interaction in urban public squares. The methods used in the case study are described in more detail on page 22. An analytical framework developed by the author, as described on page 19, was further used to analyse the findings from the case studies.

As Wayne C Booth writes, it is essential to use an appropriate method to ask and answer the right questions and to make a clear argument (Booth et al., 2016). Three ways of collecting data have been used to triangulate the findings to answer the final research question: focus groups, video recordings produced by the test participants, and an experiment with light in the field.

This study aimed to envisage how the LGBT+ community uses urban public places, so using focus groups is a productive investigation method. Two focus groups were carried out for this thesis. Each group was formed by five participants and one moderator identifying with the LGBT+ community in Oslo. They met twice for two hours each. The researcher prepared a guide for the discussions, consisting of eight and six structured questions in each session. (see Appendix 2)

In the book *"Focus Groups for the Social Science"* (Cyr, 2019), Jennifer Cyr explains how the types of data gathered from focus groups can be interpreted and analysed on three levels: in the social context of a group, from a particular context, and at the interactive level. The data from focus groups is generated through an emic process - meaning the data is produced as the conversation unfolds (ibid.). Since participants' information and experiences are personal, all the data has been anonymised. These data have been stored according to the Norwegian Data Protection Authority guidelines. Each group member consented to participation through the consent form. (see Appendix 3)

To analyse these data, Dote software was used as playback for the transcription, and NVivo software was used for performing a text-based analysis. The data were analysed using the steps of traditional text-based studies (Bjørner, 2015).

To capture people's experiences in the field, a method of visual ethnography called walking with video (Pink et al., 2022) was chosen. The participants were asked to record a walk in an area of their own choice and present the videos at the second meeting in the focus group. Their experiences were discussed with the group, and the lighting in the videos was analysed.

The experiment in the field with some of the members of the focus groups and two additional architects was conducted to investigate how they want the urban public places to be lit. The photographs and audio recordings from the experiment were analysed and used to develop a proposal for six socially inclusive lighting design principles.

3 CONTEXT

As this thesis focuses on how lighting design can support the mobility of marginalised groups in urban public places, especially the LGBT+ community, it is essential to understand why this group is marginalised and how this restricts their freedom of movement in urban public places. This chapter will describe some essential ideas and theories that can create an understanding of why the restriction in mobility is more than just a personal loss. The topics Urban democracy, Feminist geography and Gender-inclusive planning will provide some insights that is important for this thesis.

What makes people avoid public places? Is the right to public places a part of our democracy today? How can lighting play a role in all this? According to Painter, lighting for pedestrians was traditionally used to provide visibility and control anti-social behaviour (Painter, 1996). However, most of the research on this topic from the 90s was conducted in the suburbs and residential areas and needed an intersectional perspective.

As this thesis focuses on how lighting design can support the mobility of marginalised groups in urban public places, especially the LGBT+ community, it is essential to understand why this group is marginalised and how this restricts their freedom of movement in urban public places.

Some of these structures can be explained from the perspective of the intersectionality (Kern, 2020). This perspective shows how the power relations in our society consist of white heteronormative men on the top and the rest underneath. The consequences are that some groups are marginalised, and some more than others. This limits access to public places and affects urban democracy. Therefore, to design socially inclusive places, as this fear controls behaviour, it is highly applicable for lighting designers to consider urban lighting.

As Keane and Valentine argued, fear controls women's behaviour in the urban public environment. (Keane, 1998, Valentine, 1990). This fear also applies to those that identify with marginalised groups. Intersectionality offers an understanding of human behaviour, gender relations, bodies and identities are interlinked. The perspective shows how our socioeconomic status and privileges influence our behaviour and all the underlying structures and power relations that play a part in our everyday life. There needs to be more than just lighting design to solve these issues; however, it efficiently enhances the perceived safety in an area. For example, PhD research by Carina Listerborn shows that improved lighting can enhance women's safety in Sweden on many occasions (Listerborn, 2002). When using an intersectional perspective in research, lighting could improve the perceived safety of other marginalised groups.

A Marxist French philosopher Henry Lefebvre laid the outlines for the democracy movement that grew in the '70s (Lefebvre et al., 2013). His ideas and the combination of feminism and feminist geography supplied the foundation for this master's thesis.
The following chapter will review relevant theories of democracy, feminism, feminist geography, and intersectionality to gain an understanding that equal use, safe mobility, and access to public places for vulnerable groups are rooted in the human rights to democracy.

3.1 Urban democracy

Henry Lefebvre (Lefebvre et al., 2013) sees the right to the city as more than just the right to inhabit the city but also to be included in the planning processes. Lefebvre claims that citizens have a right to shape the public realm by appropriating urban space and the right to leave their material marks in the city. Lefebvre further suggests that the social production of space works through three different, yet interactive processes: ´spatial practice´ (*material or functional space*), ´representations of space´ *(space as codified language*) and ´representational space´ (*the lived everyday experience of space)* (ibid.)

From that angle, the city can be interpreted as somewhere that is perceived, conceived, and lived. The people's rhythm of life, certain moments, and the places to meet with each other and spend time together can enable the total usage of the cities. The urban space is made of, and by the people that use public places, so they are a product of the people. Lefebvre points to how the city needs to be seen as dynamic and ever-changing, and the public realm is at the centre of this (Lefebvre, 2003).

3.2 Feminist geography

In the late '80s, post-structuralism feminism started to emerge. (Rendell et al., 2000) Compared to earlier feminism, the new wave was more concerned with the power structures and critical thinking towards capitalism and patriarchal relations (Beebe & Davis, 2015). A decade later, post-colonial feminism critiqued earlier feminism's western and white approach and offered an intersectional view on how gender, culture and socio-economic background are interlinked and the impact that the legacy of colonialism has had on feminist thinking. As Leslie Kern writes in *"Feminist City":*

"Intersectionality led to a radical shift in how feminism understood the relationships among various systems of privilege and oppression including sexism, racism, classism, homophobia and ableism" (Kern, 2020, p. 16)

Feminism had an impact on the academic world and social geography as well. Being tired that women and gender were excluded from the field of human geography, feminist geographers started to redefine space, place, and culture from a feminist perspective (ibid.)

Social inequality was the main field of interest for feminist geographers (Bondi, 1991). They considered our gender roles interconnected with power relations, corresponding to space and public places. The Marxism dialectic view on class, power structures, and gender roles strongly influenced this view (Datta, 2020). However, in the late 80s, feminist geography became more concerned with the social construction of gender and started including cultural and social diversity. The women's private sphere, considered safe in the '70s and '80s, was deemed unsafe when considering domestic abuse and rape.

Doreen Massey, a feminist geographer, wrote an influential essay called *"Space, Place and Gender"* in 1994, showing the impact of space and place on gender. Her main findings showed that gender needs to be considered when looking at how it influences the city's areas and the lived experiences of people (Massey, n.d.). This essay changed how masculinities, femininities and bodies were viewed in the spatial relations (Rendell et al., 2000).

"Research shows that social relations within a space and the group(s) who control that space socially have a greater influence on how safe women feel than does the design of the space" (Valentine, 1990, p. 288)

3.3 Gender roles and urban planning

In 1981, Dolores Haydn wrote *"What a non-sexist city would be like",*
where she writes about the need to study the connections between our gender roles and the built environment (Hayden, 1981). This essay was ground-breaking at the time and significantly influenced feminist urban planners to the point that it is still being reprinted today (Rendell et al., 2000).

The feminist design collective Matrix was among the first architects to start working with this planning method. In the book, "*Making Space"*, published in 1984, (Matrix Feminist Design Co-operative, 2022), they write about how young girls are being socialised away from the streets through an understanding of gender roles which views girls as feminine and passive and boys as masculine and active. According to the design collective,

the urban spatial design of the cities replicates gender roles and power relations in the planning of the towns (ibid.).

Dr. Nicola Jayne Roberts's research on the gendered fear (N. Roberts et al., 2022) has shown how women are still taught to look after themselves in public spaces and become prisoners of fear from an early age. In other words, boys are taught to become fearless men, while girls grow up to become fearful women. In her article "Gender, sexual danger and the everyday management of risks: the social control of young females", (N. J. Roberts, 2019), Roberts also points out the role of media depicting sex and violence as selling points, contributing to spreading fear.

Leslie Kern writes about how she experienced being socialised into fear in the book *"Feminist city"* (Kern, 2020). She argued that this fear can be a form of social control over women. Unfortunately, this traditional way of viewing gender also replicates the view of females as vulnerable, repeating the cycle of fear.

The ideas of gender-inclusive planning have been implemented in the UN's SDG goals of inclusive cities, in the World Bank booklet of guidelines for gender-inclusive planning, and in the EU guidelines (Kail et al., 2020). As an example, the city of Vienna started planning the city for women already in the 90s. However, as the social inclusion of marginalised groups goes beyond biological gender and identities, several feminist scholars are sceptic towards this development. They think the underlying structures of power and fear are still predominant factors in everyday life of all citizens, and inclusive planning needs to be implemented on a societal level (Listerborn, 2020).

3.4 Summary

Henry Lefebvre views space as something that exists because of our lived practices and the specific meaning and significance of spaces and specialisations. He argued that public places should be easily accessible, and the use of materials, shapes, and forms should be considered as a method to give the identity and representation of the place.

We are socialised into fear and gendered restrictions, something that makes urban spaces homogenous, not only in the materials and shapes and forms, but also in terms of the diversity of users. Feminist geographers were the first genre of academia that started to link space, place, and gender by viewing these aspects in a larger context. They started to analyse how our gendered fear controlled our behaviour in urban public places and how this again restricts the freedom of movement.

Feminist geographers inspired the gender-inclusive planning movement, and the start of this wave saw some prominent design collectives in the 80s and 90s. By designing more gender-inclusive places, urban places could provide access to diverse activities and, in turn, create a feeling of belonging.

To conclude this part, these ideas and theories presented in the context chapter, being deprived of the rights to the city, freedom of movement, and access to urban public places is not just a personal loss. The SDG sustainable goal 11.7 aims to ensure this access by 2030, but to make a real change; gender mainstreaming might not be enough to create socially inclusive urban public places. As a lighting designer, there might be a possibility to start making a change on a smaller level first.

3.5 First initial research question

What aspects must a lighting designer consider when designing socially inclusive places? Which atmospheres can attract the public and make it feel welcoming? Is it possible to create atmospheres? Which methods could a lighting designer use to try to make inclusive places? How can a nocturnal atmosphere become inclusive? All these questions are summarised in the first initial research question below:

How can urban planning, atmospheres and lighting design make urban public places socially inclusive?

SECTION TAKEOUT

- **Our socialised gender roles are maintaining power structures**
- **Our gendered fear controls our behaviour in urban public places**
- **The spatial design and activity choices in urban public places are limiting the diversity**
- **The access to urban public space becomes limited**
- **Everyone does not access the appropriation of public life and their rights to the city**

Part 2

4 LITERATURE REVIEW

A review of related literature will be conducted to find an answer to the first initial research question. The review is divided into three main sections to new knowledge to answer the initial research question. The first section is about urban planning, the second investigates the different views on atmospheres as a phenomenon, and the last reviews the literature on lighting design theories and methods to create atmospheres. The findings are used to make an analytic framework to review the achievement of social inclusion in places within the public realm. This framework is used to analyse the case study's findings.

4.1 Socially inclusive urban planning

Whether it is possible to ‘design out’ fear is still debated. However, some methods to enhance safety and create socially inclusive places have been widely recognised, based on the literature by Jane Jacobs, Oscar Newman, Jan Gehl, William Whyte, and Jay Appleton. In the following part of the literature review, the main differences between Jacobs and Newman will be explored, and the ideas from Gehl and Whyte about making a space into a place where people want to stay will be investigated.

Planning for safety

The cities' social life and architectural design significantly impact the population's perceived safety. In 1961, Jane Jacobs wrote the book “*The Death and Life of Great American Cities*” (Jacobs, 1992), one of the more influential books about city planning. She observed how the suburbs were designed for women and the city centres as a professional business empire for men. Her main goal was to create sociable liveable cities with diverse activities and spatial and architectural design. From her point of view, anonymity is one of the city's attractions. However, she recognised the inevitability of the presence of people, even though they were strangers and considered them an asset in safety.

According to Jacobs, a safe city relies on these four principles: 1) Other people present at all times of the day (eyes on the street), 2) Short blocks of buildings with many streets and connections, 3) A diversity of buildings in age and design, and 4) A good amount of people always present. However, without feeling safe and secure among the strangers on the streets, the city districts would not be regarded as very successful.
Oscar Newman (Newman, 1972) developed his idea of designing a defensible space. Like Jacobs, he also recommended having diversity to secure a thriving community.

However, as Jacobs was more concerned with the design of cities, Newman was more focused on the diversity of residents and believed anonymity could increase crime. This was the main argument in his critique towards the modern tower blocks designed in the 60´ and 70s.

From his research, he defined three essential design elements that needed to be present to obtain perceived safety: 1) Territoriality, the subdivision of communal space; 2) Natural surveillance by the windows positioned towards the street; and 3) Location of the position of the building towards the public (ibid.).

Placemaking

When William Whyte did the research for his book "*The social life of small cities"* in 1980, reprinted in 2010 (Whyte, 2010), he observed how women and men acted differently in urban public places. For example, women tended to choose seats in the back row, while men chose the front seat with a street view. According to Whyte, what makes people feel safer in urban places, is to feel they are in an open place with good sightlines. He also sees the relationship to the nearby streets without defensive measures, such as walls or fences, as essential safety elements.

"Walls are put up in the mistaken notion that will make a space safer. They make it feel isolated and gloomy" p.128 ibid.

While Jacobs argued that living on the first floor of a building could create a safety (Jacobs, 1992). Jan Gehl (Gehl et al., 2006) was concerned with the influence that the first floors and building edges have on pedestrians. He saw the edges as something reinforcing the social contract between the indoors and the outdoors and where the city meets the building.

He pointed out that the lighting from the shops and cafes on the first floors would create softer edges and a friendly atmosphere in city squares and enhance perceived safety. Gehl talks about scale and distances. He refers to our ability to recognise each other on the street, the threshold for having contact between people at the street level, and the height of the buildings (Gehl, 2010).

The idea of eyes on the street only works if people are there. So, what makes people become attracted to a place? Moreover, what makes them want to stay? The gender-inclusive urban planners today are concerned with making a variation of activities and urban furniture to make people feel welcome (Kern, 2021).

Whyte's leading research (Whyte, 2010) was about how a space could become a place. A space can be of low importance; somewhere, people walk past without noticing it. On the other hand, a place has something that will attract the public, make it noticeable, and is somewhere the public would like to spend time. So, Whyte had to find out what makes people stay. He analysed the seating arrangement, sightlines, access to the sun, and places to eat, sit and socialise through observations and video footage. His main finding was that people are attracted to spaces where there are other people (ibid.)

Designing out fear

Not everyone considered Newman's ideas of designing a defensible space successful; the female geographers were especially critical as they questioned the idea of 'designing out' fear and not seeing the structural powers behind fear. The feminist geographer Gill Valentine criticises Newman's ideas for increased safety in her article *"Women's Fear and the Design of public space"* (Valentine, 1990). She sees his strategies as suggestions for property improvements rather than personal safety. Her interviews with women in the UK showed that they felt more unsafe in environments where symbolic barriers, like hedges, could conceal a potential attacker. However, her findings did correspond well with Jacob's ideas around social control, as the women felt safer in the presence or within the visual range of others.

Thus, safety can be divided into two categories: real and perceived safety (see term clarification on page 4. Listerborn has written her PHD around this topic and how perceived safety and fear of crime for women is problematic and needs to be considered a structural problem (Listerborn, 2002). In that aspect, the theory of refugee/ prospect from Appleton (Appleton, 1975) can enhance perceived safety. Safer urban spaces can be created by designing urban spaces without obstacles, so the ability to see (prospect) is attended to, and creating places where there is an ability to hide (refuge). This theory was later expanded to include the possibility of escaping as well. (Fisher & Nasar, 1992).

Summary

The context chapter showed that unequal use of public spaces restricts marginalised groups' rights to the city. In this chapter, the literature on the rise of social urban planning has been reviewed. Some ideas for gender-inclusive urban planning have evolved from Jacobs and her ideas about spatial diversity. She is, however, most known for her theory of how safety can be achieved by “eyes on the street” and that form of social control. Newman argued that smaller communities created more safety, leading to gated communities and more surveillance. Whyte made many vital observations when studying urban public life and strongly influenced placemaking. His theories show how to turn a space into a place people are attracted to. Gehl´s view of which elements in the spatial design influenced the social life in the cities. His theories have significantly impacted the methods of analysing what makes people stay.

4.2 Atmospheres

It is essential to explore how lighting can complement the human experience with atmospheres and how this can help make inclusive lighting design. The following part of the literature review will investigate how the atmosphere can be understood as a theoretical phenomenon. Culturally and socially, atmospheres can mean different things. The perception of the content in the atmosphere might change according to the presence of people. What makes an atmosphere? Is it possible to create atmospheres? Or do atmospheres depend on the people? Can there be an atmosphere in a derelict place? Can atmospheres created by lighting and produced for the stage be compared with atmospheres in the urban context? Literature by Mikkel Bille, Gernot Böhme, Juhani Pallasmaa, Sarah Pink and Shanti Sumartojo will be examined. As the reviewed literature will show, the atmosphere is a complex phenomenon.

Atmospheres as staged experience

Mikkel Billes's view of the atmosphere corresponds to Lefebvre’s (Lefebvre et al., 2013) theories about appropriating space. Bille considers that the presence of people provides the city with identities and its atmosphere. As described in the article *“Materiality, Culture and the Texture of the In-between”* (Bille et al., 2015), Bille connects the lived experience and the staging of atmospheres. He believes it will be possible to shape the social experiences related to the colonial powers of atmospheres through architecture.

“Architecture is so influential on the mode of movement that social exclusion and inclusion becomes orchestrated through atmospheres and hence becomes a way of allowing ideals of social norms to come into being” p.36, (ibid.)

In the essay *“Lighting up cosy atmospheres in Denmark”* (Bille, 2015), Mikkel Bille draws a direct link between the colour of the lighting and the creation of cosy atmospheres inside homes and explores how that affects the personal perception of atmospheres. Furthermore, he investigates how the relaxed atmosphere in Danish homes is connected to the warm lighting indoors. With this interpretation, the atmosphere could be seen as a sensuous experience, not just a material phenomenon.

“Atmospheres are dynamic, culturally experienced and continually evaluated, for instances through negotiating power, gender roles and sense of community”. p.57, (ibid.)

Germot Böhme is a philosopher with a different view of atmosphere than Bille. Böhme is not concerned about the materiality of architecture or the social aspect of atmospheres. He views atmosphere as something vague and tangible, as a subjective experience. This

view makes the atmosphere harder to define (Böhme, 2016).
Even though Böhme is more concerned with the subjectivity that happens through interpreting the perceived atmosphere, he still recognises that atmospheres can be produced in certain areas. In his essay *"the Art of the Stage set as a Paradigm for an Aesthetic of Atmospheres",* (Böhme, 2013), he makes a distinction between how atmospheres are created on the stage for a homogenous audience on one side and how one's subject mood can influence the perception of atmospheres in a public environment on the other side. However, the atmosphere can be perceived as an experience; if used correctly, it can still create a mood, defined as a felt presence of something indeterminate.

Atmospheres as a sensory experience

Another critical aspect of the atmosphere is that of architect Juhani Pallasmaa. He is also concerned with light and darkness, and like Böhme, he sees the atmosphere as something tangible. However, also something that can be sensed with all of one's bodily senses. He lists senses like motion, duration, illumination, balance, scale, and orientation. Pallasmaa even thinks the capacity to grasp qualitative atmospheres could be named the sixth sense, as it is a whole multi-sensory experience (Pallasmaa, 2012).

"Indeed, the immediate judgement of the character of space calls for our entire embodied and existential sense, and it is perceived in a diffuse, peripheral and unconscious manner rather than through precise, focused and conscious observation". p.231 (ibid.)

Pallasmaa is very concerned with the subjective experience, the sensory experience. He takes a philosophical stance on atmospheres but from an architect's point of view. He thinks, like Böhme, that atmospheres in the cities are something we grasp as the essence of something unnamed or consciously understood. However, even though it might not be fully understood,

Pallasmaa still believes the unconscious mind can capture the heart of the atmosphere. He further links to how lived experiences and memories come into play and colour the perception of atmospheres.

"vision reveals what the touch already knows. We could think of the sense of touch as the unconscious of vision. Our eyes stroke distant surfaces, contours and edges, and the unconscious tactile sensation determines the agreeableness or unpleasantness of the experience" (Pallasmaa, 2012, p. 16)

Others share Pallassmaa´s view of the atmosphere, including ethnographer Sarah Pink and anthropologist Shanti Sumartojo. They are concerned with how the movement, sensations and materials shape our surroundings and must be included in understanding atmospheres. In their book, *"Atmosphere and the sensory experience"* (Sumartojo & Pink, 2018a), they share Bille´s view on that an atmosphere cannot successfully be staged, designed, or created to give the audience a shared experience.

Sarah Pink and Shanti Sumartojo expand this argument by making a point about how lighting designers sometimes can try to design an atmosphere in an urban place without considering all the spontaneous movements of lighting that happen in a city. In their article *"Moving through the lit world"* (Sumartojo & Pink, 2018b), they are researching how commuters in Melbourne experience the urban atmospheres as they bike through the city. The lights from cars, traffic lights, road lights, accent lighting from shops and cafes, and signs also impact their journey. Unfortunately, lighting designers cannot plan for these light conditions affecting urban mobilities.

The atmosphere as lived experience

Pink and Sumartojo believe that the bodies, as in the representation of people, and participation in the urban places make the atmosphere. They think the atmospheres are always present, continuously dynamic as something that *"allows for an understanding of what they make possible in the future"* (Sumartojo & Pink, 2018b, p. 362).

The social and cultural context must be interpreted to understand all the phenomenological and sensual elements. Unlike Böhme, they consider the people responsible for creating and modifying the urban atmospheres and not as passive receivers that are mutually attuned together. Personal memories and subjective experiences play an active part in sensory reception.

"Atmospheres may be experienced differently, depending on cultural values, prior experience, and personal background. The apprehension of especially stimulating fearful, enticing, and convivial atmospheres may depend upon the familiarity of openness to encountering realms at variance to the usual, common-sense experience of the world"

(Edensor & Sumartojo, 2015, p. 257).

Gernot Böhme describes how illuminations with brightness and variation of colours on stages can be extended to the interior of buildings, in squares, and the cities, where they can be perceived as atmospheres. As he writes, *"To perceive lightness is to perceive space. Light creates space"* (Böhme, 2013, p. 199).

Illumination can create an atmosphere depending on the brightness, the interplay between dark and light, and the creation of depths and shadows. In his essay "*A Sense of Place*", Mikkel Bille makes a point (Bille, 2015) about how atmospheres produced by lighting influence how our surroundings are perceived. His view on lighting is to see it as more than just supporting our functional needs. In that way, lighting can become a way to create, shape and express people´s moods and ideas of belonging and neighbourhood (Ibid.)

Summary

Working with atmospheres in areas that are accessible for everyone, within a population's diversity of cultures, ages, identities, and socio-economic backgrounds, might be challenging. As the reviewed literature shows, there are two different views on atmospheres. The first view is that they can be created—for example, Bille. Böhme and Pallasmaa believe lighting or architecture can create an atmosphere for people. This view implies that the people that share this experience will have the same phenomenological experience of the intended atmosphere.

The other view on atmospheres is that the atmosphere is made from the participation of the people. Pink and Sumartojo are firm believers that the lived experiences of people influence how the atmospheres are perceived, the interpretation of them and, equally, the presence of others.

Like Pallasmaa, both Pink and Sumartojo are concerned about how sensory experiences influence the atmospheres perception of atmospheres.

4.3 Lighting design to create atmospheres.

As the world changes, the need for sustainable ways to think about using less energy and using lower lux levels is emerging. To make inclusive cities, inviting and welcoming atmospheres will be necessary in the urban public place. If the lux levels are to be lowered so the light pollution is decreased, how can different atmospheres created by lighting be maintained without losing important visibility?

In Mette Hvass's article *"Lights out"* (Hvass, 2021), she does precisely this. By lowering the lux levels at a tram station in Aalborg, her findings show that the participants felt safer as they had a better overview of their surroundings. Furthermore, by balancing the contrasts between light and dark, the participants experienced how they became less visible as potential targets when waiting at the station. Which other methods can light designers use to achieve atmospheres and lower the lux levels?

In the book *"Human and Social dimentions of Lightscape"* by Daria Casciani (Casciani, 2020), different types of atmospheres created by lighting have been discussed on many occasions, especially in chapter 7, where a group of students are designing a new lighting proposal for the "Piazza Leonardo da Vinci" in Milan. As this last part of the literature review aims to learn how atmospheres can be applied as a methodical tool to create inclusive cities, the literature has been divided into three categories.

Reassuring, welcoming, and inclusive atmospheres are all three categories often used by lighting designers and might help organise the material for the review. However, which methods can a lighting designer use to achieve these atmospheres? In this part, literature from professors Kevin Lynch, Ulrikka Wanström Lindh, Mette Hvass, Daria Casciani, Kaplan and Kaplan, and Böhme has been reviewed. Also, literature from lighting designers such as Ulrikke Brandi, Janet Moyer, Herves Descotte and Leni Scheiwinger has been reviewed in this chapter.

Reassuring atmosphere: visibility, legibility and wayfinding

The central concept of enhancing perceived safety for lighting designers is creating legibility and visibility. In 1960, Professor Kevin Lynch published his research in the book- *"Image of the City"* (Lynch, 2008). He points to the basic human need for orientation and explains how creating legibility in the cities is possible. Through interviews with residents and analyses of four cities, he defined five elements that need to be present in a city to create wayfinding and legibility: paths, edges, nodes, landmarks, and districts. In his research, he found that people noticed different things and would use a variety of visual cues to help the navigation. As the view of the city changes from day to evening, these elements are of great importance for lighting designers to help navigate and enhance the feeling of safety for the people of the cities in the dark. Lynch's theories of creating an imageable city became very important for lighting designers, especially when the work to make urban masterplans started in the 80s (Brandi & Geissmar, 2007; Narboni, 2016).

As the theories from Lynch have proven, creating a hierarchy between roads to ensure the imageability of a city is essential for creating perceived safety, legibility and wayfinding. However, as shown on page 12, another critical theory concerning perceived safety in space was described: Jay Appleton's Prospect and Refuge theory (Appleton, 1975). This has become a fundamental theory for lighting designers as a tool to enhance the feeling of safety by lighting up the dark corners and alleyways, ensuring a good overview of the whole space.

Professor Ulrikke Lindh (Lindh, 2012) developed this theory a step further. According to Lindh, perceived safety can be enhanced by lighting up dark corners and ensuring a good overview of the surroundings by using lower luminaires along the paths and illuminating the vertical surfaces.

Lighting up the surroundings to create perceived safety has gotten more focus in the last few years in the lighting design industry. This is important if the lux values are to be lowered, as Mette Hvass (Hvass & Hansen, 2022) points to in her paper submitted to the light symposium in 2022. The findings from her PhD were that

"lower and balanced brightness levels can sharpen our senses and create a relaxed atmosphere. Additionally, lower brightness levels enrich perceptions of and connections with spatial and social surroundings, thereby increasing perceived safety" p.1 (ibid.)

Welcoming atmosphere: beautification and scenography lighting

According to light designer Janet Lennox Moyer (Moyer, 2005), lighting can create any number of atmospheres and define how people should feel in a space. It can evoke excitement, drama, mystery, romance, or any number of moods. She also explains how lighting can extend or limit a view and direct how people see the space. Using lighting to enhance different atmospheres in urban public places strongly affects people's memory of a space and can be used to create a lasting impression.

In the book "*Human and Social dimensions of Lightscape*" (Casciani, 2020), Casciani refers to enhancing the landscape's composition by highlighting architectural details. She argues that lighting can make the city's ambience more attractive, increasing the general well-being and creating a welcoming atmosphere (ibid.). Beautification is also a subject in environmental psychology. Rachel and Steven Kaplan are among those who support the theories about how landscape features can enhance the feeling of nature and increase the population's well-being (Kaplan et al., 1998).

However, what does a welcoming atmosphere mean? Moreover, is it possible to create an atmosphere that everyone will perceive as welcoming despite their cultural backgrounds? For example, could scenography lighting be a method to create a welcoming atmosphere?

Böhme, the master of atmospheres (whose theories were introduced on page xx), writes about how scenography lighting can use colours, distribution, intensity, and diffusivity to create a specific atmosphere. Using the method of scenography lighting, an atmosphere where the illumination of the space is the essential aspect can be created (Böhme & Polish Academy of Sciences, 2014). Using Böhme's theories, Mette Hvass investigated the more social part of how scenography lighting can be a tool to support social interaction (Hvass, 2022). Hvass concluded that using a "scenography lens" could be a valuable tool for lighting designers when viewing architecture, social interaction, and activities in an urban context.

The lighting designer Leni Schwendinger confirms Hvass' findings in a recent article, (Schwendinger & Ross, 2022). Here, scenography lighting and theatre lighting techniques are recommended to create urban nighttime lighting that can support social interaction in cities. Schwendinger further recognises the need to lower the lux values as a crucial element *"The relevant recent ability to dim outdoor lights is a key to translating scenography into life"* p.6 (ibid.)

Inclusive atmosphere: contrasts and visual hierarchy

Which methods can make inclusive atmospheres in the nocturnal urban environment? What does it mean to perceive a space as inclusive? In environmental psychology, it is essential to make visible hierarchies for dividing public and private areas and similarly creating territories and personal spaces for accessibility and inclusion (Kaplan et al., 1998).

Kaplan and Kaplan write about how balancing the contrasts, using spatial brightness, and how shadows can create a visual perception of the space and enhance the legibility of the space. Using differences, a lighting designer can create a hierarchy to divide smaller areas depending on textures, colours, functions, and activities. (ibid.)

However, with a lower general illuminance, creating contrasts will also be essential to enhance visibility. In their book, "*Architectural Lighting: Designing with Light and Space*", Descotte and Ramos (Descottes & Ramos, 2013) show how the four types of contrasts: brightness, colour, pattern, and movement can make a separation of objects, essential for the three-dimensional experience of a place.

How a place is perceived is important for how people experiences space. Different methods to create contrasts and visual hierarchies can help develop territories and make spatial boundaries, but what about height? Can the height of the luminaires influence the atmosphere?

Ulrikka Lindt Wanström points to how the height of the luminaires can create a visual hierarchy and influence how we relate to the space and the luminaires (Lindh & Billger, 2021). Her research showed how participants perceived the space as high using highly mounted luminaires and lower when using low-mounted fixtures. Their feeling of safety also increased when the lights were placed at a lower height. Similarly, lighting designer Descotte explores light sources at different mounted heights about the principle of perception of space and how it can influence the way we interact and move in space (Descottes & Ramos, 2013).

The colour of the lights can contribute to an inclusive atmosphere and influence our feeling of inclusion.Daria Casciani has researched methods and techniques to create inclusive atmospheres. Some of her findings suggest lowering the general illuminance to make a difference between areas and create a social interest. Warm colour-correlated temperature (CCT), human scale and layered lighting are suggested to make more human and socially oriented atmospheres. (Casciani, 2020),

Summary

To achieve a reassuring atmosphere, the main focus is on perceived safety. A lighting designer alone can only change some areas' architecture or basic safety. However, the social aspects of perceived safety are still important when considering how lighting design can make a difference. Using methods such as creating legibility and wayfinding helps people recognise themselves and navigate the space after dark. It is a basic need to be able to search for opportunities to hide or escape if necessary.

A welcoming atmosphere can increase the well-being of the people by enhancing details and generally beautifying the urban places. By creating mystery and curiosity, more people can become attracted to the place and increase the diversity of the people present.

An inclusive atmosphere is more complex but needs to facilitate a diverse group of people. So the most basic common aspects could be based on human needs such as personal territories and a good overview. Important places, such as entrances and exits, and a visual hierarchy to define the space can be achieved with lighting design.
At night, the contrasts enable us to see, so enhancing contrasts, using colours, creating depths and lighting for navigation, and wayfinding impacts general well-being. Therefore, these elements will be essential when designing nice sustainable places.

4.4 Analytical framework for social inclusivity

The findings from the literature review show how complex it can be to make socially inclusive urban places. All three factors must be present: spatial design, social life and lighting design. In addition, these factors must be assessed using three categories of atmospheric environments: 1) reassuring, 2) welcoming, and 3) inclusive. These three categories of atmospheric environment result from methods commonly used by lighting designers, as explained in the literature review on page (CXX). When analysing these factors together, it might become clear what is lacking and what is needed to make urban places socially inclusive.

1. Reassuring environment. To create an atmosphere of reassurance that can truly be experienced as reassuring with enhanced perceived safety, certain aspects need to be present. Spatially, the urban place must offer good opportunities for refuge, prospects, and escape. Socially, there need to be enough people around to ensure that there can be an intervention from on-lookers if necessary. Lighting design can enhance the legibility of the space by lighting vertical surfaces and provide for wayfinding by lighting important landmarks and creating sightlines.

2. Welcoming environment is also dependent on aspects from these three categories to be achieved as genuinely welcoming and accessible. Spatially, the architecture and urban furniture need to be diverse and preferably on a human scale. Socially, the opportunities for diverse activities will attract different types of users. Using lighting to enhance the beautification of buildings and landmarks and using scenography lighting will define the space.

3. Inclusive Environment. For an urban place to be inclusive, it needs to be accessible by universal design. Spatially, everyone needs to have access regardless of their physical ability. Socially, there need to be diverse users to avoid homogenous urban places. Lighting design can contribute by balancing the contrasts, making it easier to see. A visual hierarchy can make it appear more attractive by creating zones and using heights; the luminaires can clarify the use of the place.

The analytic framework can be read from all sides. From left to right with a focus on atmospheres, or from top to bottom with a focus on spatial, social, or lighting for inclusive places. However, all the categories need to be present to be seen as socially inclusive. The categories will be scored between 0-2, from not good to one being moderate and two being good. The final score is added and divided into nine. This scoring method is based on Reid Ewing's method for measuring urban design (Ewing & Clemente, 2013). Ewing uses this method to analyse walking behaviour and mobility in urban places using five categories: imageability, human scale, transparency, complexity, and tidiness. As Ewing´s framework is related to the physical aspects of urban design, his framework needed to be more practical to use in this study, where the social aspects are more important.

ANALYTICAL FRAMEWORK FOR SOCIALLY INCLUSIVE PUBLIC URBAN PLACES			
	Spattial	Social	Lighitng
Reassuring Atmosphere	Refuge, prospect and escape	Eyes on the street	Legibility and Wayfinding
Welcoming Atmosphere	Human scale	Variation in activites	Beautification and Scenographic lighitng
Inclusive Atmosphere	Universal design	Diversity	Balancing contrasts and Hierarchy
Total Sum:			

Table 2: Analytical framework for Socially Inclusive Urban Public Places created by the author

4.5 Summary and conclusion

To answer the first initial research question, a literature review was conducted. The literature reviewed on urban planning shows the importance of considering the social aspects of spatial design. Inclusive and more participatory planning processes will help urban planning to create urban spaces with a gender-inclusive design that can make urban public life more accessible for everybody.

The literature on the atmosphere as a phenomenon shows that the atmosphere is complex and will not be able to create a socially inclusive place alone. Participation, such as light walks with lighting designers and architects, can help create a foundation for more sociable sustainable places and to find atmospheres that could change the place. Lighting design can contribute towards making a change by highlighting elements like urban furniture, activities, and dark corners of an urban place. In that way, predict future use and promote diversity and inclusion. In addition, by lighting architectural features, lighting design can enhance public places' perceived safety, beauty, and image so more people are attracted to the place. This, in turn, can attract more people and ensure more eyes on the street, making the place safer and more inclusive.

The answer to the research question is that both the spatial, social and lighting aspects need to be present for a place to have a possibility to become more socially inclusive. A place must provide reassurance and be perceived as welcoming and accessible to become socially inclusive. And as the analytical framework shows, this relies on elements from spatial design, social life and lighting design.

4.6 Second initial research question

The spatial and social aspects of public life must be considered for a lighting designer to understand the wholeness of the urban environment. The findings from the literature review showed that for a place to be socially inclusive, it needs to be socially attractive to become a place which attracts a diverse group of users. However, as the literature reviewed had a general perspective, a question became apparent: can these findings apply to all places? This question led to the initial research question two, which will be investigated in a case study of three different public squares in Oslo:

How can lighting design support social interaction in urban public places in Oslo?

SECTION TAKEOUT

- **People are attracted to places which facilities for diverse activities**
- **Spatial and social diversity attracts people, which again attracts more people.**
- **Atmospheres can be viewed as staged, sensory, or lived experiences.**
- **Atmospheres created by lights can provide a foundation for socially urban public places.**
- **By using different techniques, lighting design can create legibility, wayfinding, hierarchy, beautification, mystery, and curiosity.**
- **By using the analytical framework with elements of spatial, social and lighting, urban public places can show the potential to become more socially inclusive.**

Part 3

5 CASE STUDIES

In the following chapter, case studies will be performed to answer the second initial research question and as a pre-study to prepare for the fieldwork. Following an introduction, the methodology of the case studies will be presented. Then, an in-depth analysis of three urban public places in Oslo will be conducted to understand how and why urban public places can appear as non-inclusive. The findings are summarised in tables in chapter 5.5. Finally, the findings will be analysed using the analytic framework.

As discussed in the context chapter, safety is an integral part of the mobility aspect of how marginalised groups get excluded from urban public places. Previous research has shown that lighting design can contribute to enhancing perceived safety.
To answer the second initial research question, it was necessary to find three urban areas that represented demographic differences. The report "*Perceived Safety and mobility throughout the day*" from the Institute of Transport Economics (TØI, 2018) was the starting point when these three urban places for the case studies were chosen.

TØI did a map-based online survey where they asked the participants to mark on the map where they felt most unsafe in the central parts of Oslo. (ibid.) 61 % of the women felt unsafe after dark, compared to 47% of the men. The areas marked as most unsafe were around the central railway station and in Grønland/Tøyen area. These findings gave an insight into how different Oslo is perceived. To investigate how urban public places can be socially inclusive, it was essential to look for places in other areas to see how diverse these places in Oslo can be. A third area, Grünerløkka, marked as relatively safer and hence can give more insights into why one area feels safer and more inclusive than others, became the third area of interest as displayed in figure 2.

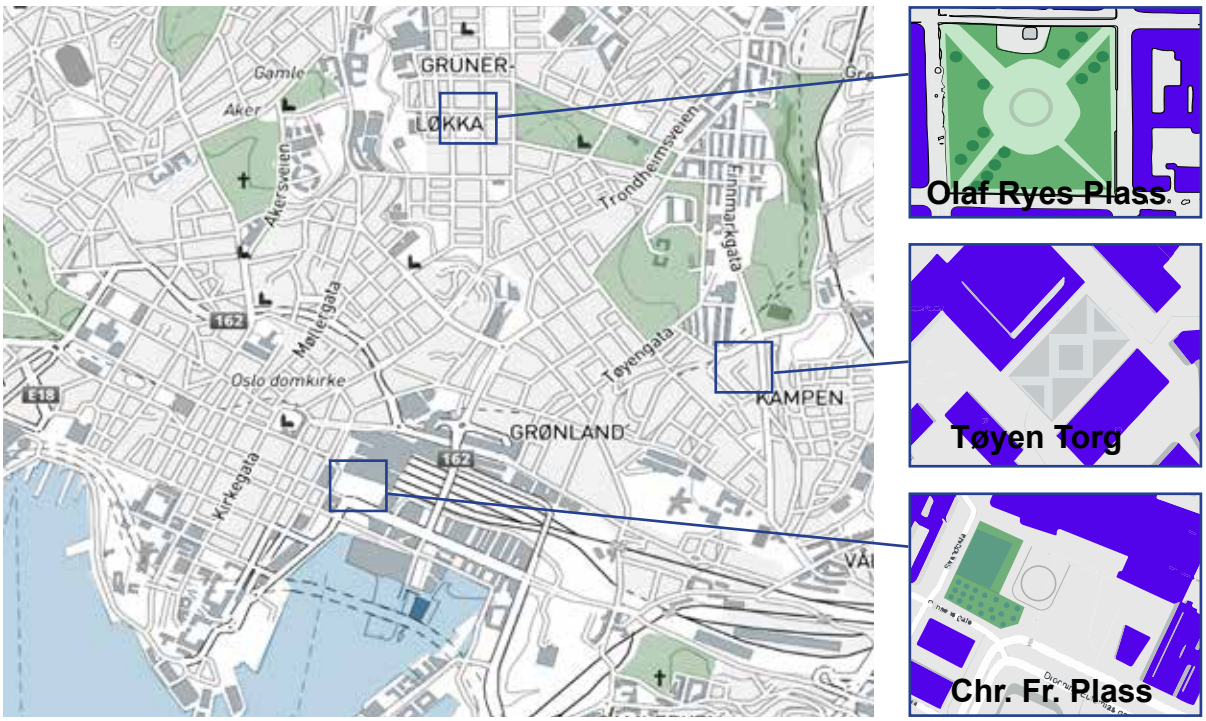


Figure 2: A map of Oslo, showing the locations to the three chosen urban places for the case studies from Kommunekart.no. Detailed maps made by the author

1. Olav Ryes Plass

Olaf Ryes Plass is a local square with a long history that can be seen in the old trees and partially in the layout of the square. Grünerløkka is a gentrified area with small local brands of bars and restaurants and young residents.

2. Tøyen Torg

Tøyen Torg is a small square in an area that is socially challenged. It is accessible, but only for those who know its location as it is well hidden between high tower blocs on each square side. As an area, Tøyen has a demography of people with different ethnicities and backgrounds, with a high crime rate with gangs and other drug-related crimes.

3. Christian Frederiks Plass

Christian Frederiks Plass represents the total opposite of the other two squares. As located next to the central railway station and to tourist attractions surrounded by office buildings and hotels. It is also an open square with multi-functions for visitors, commuters, and locals. It has a bad reputation as it used to serve as the meeting point for drug addicts and drunks. Office buildings and hotels surround.

5.1 Case study methods

To analyse the chosen squares, methods of analysing the spatial context, the social context, and the lighting qualities will be used. The analysis starts on a macro level using Kevin Lynch's elements of a city as presented in the literature review on page 16. Then it goes more into the micro levels to gain in-depth knowledge, using two methods from Jahn Gehl that are presented in Table 3 and 4, based on the principles of Jan Gehl. The social life will be studied through phenomenological observations during two occasions in each square. These findings will be presented in a framework developed by Project for Public Spaces (project for public spaces, n.d.).

Additionally, an in-depth semi-structural interview with lighting designer Kristin Bredal from Zensik made by the author (see appendix 4) will be used in the study of Tøyen Torg. However, the lighting principles from Herves Descotte (Descottes & Ramos, 2013) will be the primary methods to understand whether the lighting design can support social interaction in the chosen urban public places. The findings will be presented in a model based on Descotte's principles and developed by the author.

Spatial context

For the macro analyses of the spatial context of the urban squares, the five elements of Kevin Lynch have been utilised (Lynch, 2008). Lynch defined these five elements as a part of the city's morphology. He pointed out how these elements create a mental image of the city and help with the orientation. The elements are:

- Nodes: strategic points for orientation.
- Districts: areas characterised by common characteristics.
- Landmarks: usually identifiable physical objects in the urban landscape.
- Paths: routes along which people move around in the city.
- Edges: boundaries and breaks in the continuity.

On the eye level, to start analysing the spatial context on a more micro level, the tools developed by Jan Gehl in his studies on what makes an urban place somewhere people want to stay will be used (Gehl et al., 2006). He made 12 design principles divided into three main categories, desctibed on the next page and displayed in Table 3.

The categories are:
1. Protection: protection against traffic, accidents, crime, and weather.
2. Comfort: opportunities to walk, stand, sit, see, talk and listen, play and exercise.
3. Delight: sunlight/shade, details, materials, scale, positive sensory experiences.

These categories contributes to give an impression on how these spatial elements influences the social life in urban public places. This matrix as shown in table three will be used to analyse the spatial design and the findings summed up in the table 5 on page 39.

PROTECTION	COMFORT		DELIGHT
1: Protection against traffic	4: Accessibility for everyone	7: Unhindered sightlines	10: Buildings to human scale
2: Eyes on the street	5:Edges to lean upon	8: Low noise levels	11: Possibilities to enjoy the sun
3: Possibilities to seek shelter	6: Benches for resting	9: Invitations to play	12: Good design and details

Table 3: A table displaying Jan Gehls 12 design criteas, based on the method developed by Gehl, and modified and drawn into a table by the author

Social context

As discussed in the background chapter, diverse activities are essential to make socially inclusive urban places. Feminist urban planners emphasise the idea that limiting activities result in monotonous areas. So, it is necessary to learn how people use urban squares to see what it might take to make them more socially inclusive.
The analysis of the social interaction in urban public places is very important. First, to understand how people use the sites, and, most importantly, to understand who is missing. The phenomenological observations made by the author with a pen and paper were done for two hours in each square. These observations can show how people use the square, which is important knowledge for a lighting designer so the social interaction can be supported.

The phenomenological observations will be analysed by using the framework developed by the project for public spaces (project for public spaces, n.d.) According to PPS, this framework consists of four elements that must be present to make a thriving place that attracts people. (see Figure 3 on the next page)

1. Sociability is good when the place offers different types of social activities, which creates a stronger sense of place and attachment to the community
2. Uses and activities are the reason why people are attracted to the place and what makes it special
3. Comfort and image include the perception of safety, cleanliness, and availability of seating areas
4. Access and linkages are linked to the visual and physical connections to the space.

The phenomenological observations of how people use the places will also be used when analysing the square on a micro level. An observation technique called `Complete Observer`(Bjørner, 2015) will be used to gain this knowledge. The author will make the observations without interacting with the users. They will be registered by drawing lines on paper. The observations will be made for one hour during the afternoon and one hour after dark.

When studying the social life in the cities, Gehl found that the activities performed in the places could be divided into three categories according to the user's activities. His framework will be used when analysing how well the different activities were facilitated in the urban squares with a rating as poor or good se table 4, based on Gehl (Gehl, 1987).

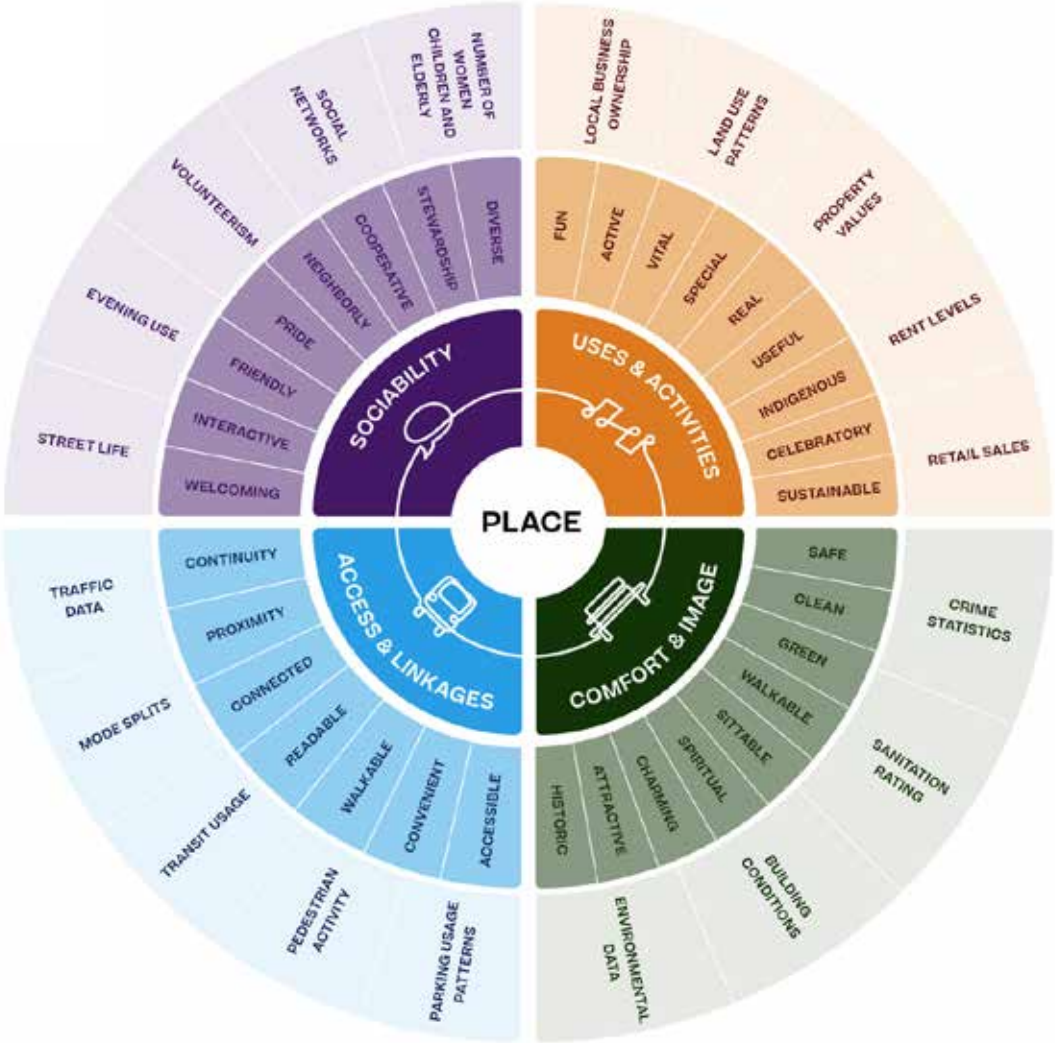


Figure 3: describing the differerent elements of the PPS framwork in more details.

Table 4 shows a digram of how the activites can be rated and thereby become a very useful tool for analysing urban public places:

- Necessary activities: Activities that are rated as necessary could be like using the place as a shortcut by walking across the square, a place to walk the dog or space for parking the bike or waiting for the tram.
- Social activities: Activities that comply with social interaction, where it's possible to sit secluded or facilitate unexpected meetings.
- Optional activities: Activities for play or pure enjoyment. Activities that enrich the social life and give room for diversity.

The activites will not be rated as poor and good in the case study, but the findings will be incoporated in the findings diplayed in the framework by PPS on page 40.

Type of activity	Rating of the activites	
	POOR	GOOD
Necessary activites		
Optional activities		
Socialble activites		

Table 4: A table displaying a rating of activites based on Jahn Gehls diagram, modifed by the author

Lighting qualities

"For lighting to play the role the designers intended, we need to understand and engage with the diversity of atmospheres, both desired and undesired, that people, lighting, urban design and usages co-create" (Bille & Jørgensen, 2022, p. 131).

When analysing the lighting qualities in an urban setting, measuring the visual factors that interact with the lighting design is essential. The six principles by Descotte and Ramos will be used to do this. They have defined these principles based on the human nature of perception(Descottes & Ramos, 2013).

1. Illuminance, the light output from a light source.
2. Luminance, or brightness. This can create hierarchy and depth. For analysing the brightness at the squares, luminance maps will be used.
3. Colour and temperature. Colour temperature is measured in Kelvins and can contribute to making contrasts.
4. Height. The light source can become a reference point for wayfinding and orientation.
5. Density, consists of two parameters: the number of fixtures and the arrangement.
6. Direction and distribution. The direction of the beam depends on the position of the light fixture, while the distribution can depend on optics, whether it is focused or diffused and create sharp shadows or an ambient layer.

The analyses of the different squares will be performed using a table developed by the author of the thesis as discribed on page 19.

5.2 Case study 1: Olaf Ryes Plass

The users of Olav Ryes Plass are mainly residents from the local area. In the '80s, it was one of Oslo's poorer districts, where people lived tightly with low incomes. During the '90s, it changed with the gentrification of new cafes and shops. New residents, like hipsters and young couples, moved in. According to the municipality, the residents have an average age of 31 with an income that is a bit higher than the mean average of the city. The population of other ethnicities have a quick turnaround in the residency (Godal & Askjer, 2023). Today it is still considered a trendy district but also relaxed and welcoming. The fountain in the middle makes it less universally designed than the spatial layout of the square that was created at the end of the 1930s.

Figure 4: Olaf Ryes Plass during the day

Figure 5: Olav Ryes Plass during the evening

Spatial context

Today, Olav Ryes Plass position is central for the route stretching from the town centre to other parts of Oslo. When considering the city's morphology and using Kevin Lynch´s five elements (Lynch, 2008), its use and position make it qualify as a node. When viewing the square in a macro setting, Olaf Ryes Plass has a central part at Grünerløkka and is a place for orientation and navigation. The buildings surrounding Olaf Ryes Plass make noticeable edges and define the square's position.

According to Jahn Gehl's 12 criteria (see Table 3), Olav Ryes Plass offers good protection from traffic but could be better in eyes on the street as it has trees blocking the view and offers no protection from the weather. The first floors consist of a mix of cafes and shops, and the rest of the buildings are residential, resulting in a good combination of lively soft edges full of life and light in the evenings. Benches around the fountain and in some smaller areas provide more intimacy (B4, figure 6). Some zones exist for more intimate conversations and a few benches to sit and talk. However, there are no opportunities to play and few exciting views.

However, the building around the square is quite tall, and the old trees are very tall, as shown in B2 in figure 6, so there is little variation in the scale. The materials used in the benches are very traditional with wood and metal as shown in A1, the floor is partly concrete and grass, and the trees offer good opportunities for shade. The design is very symmetrical, as shown in figure 6. The lighting scheme is displayed using symbols in blue, red and purple and a luminaire is displayed in the pictures A1 and B1.

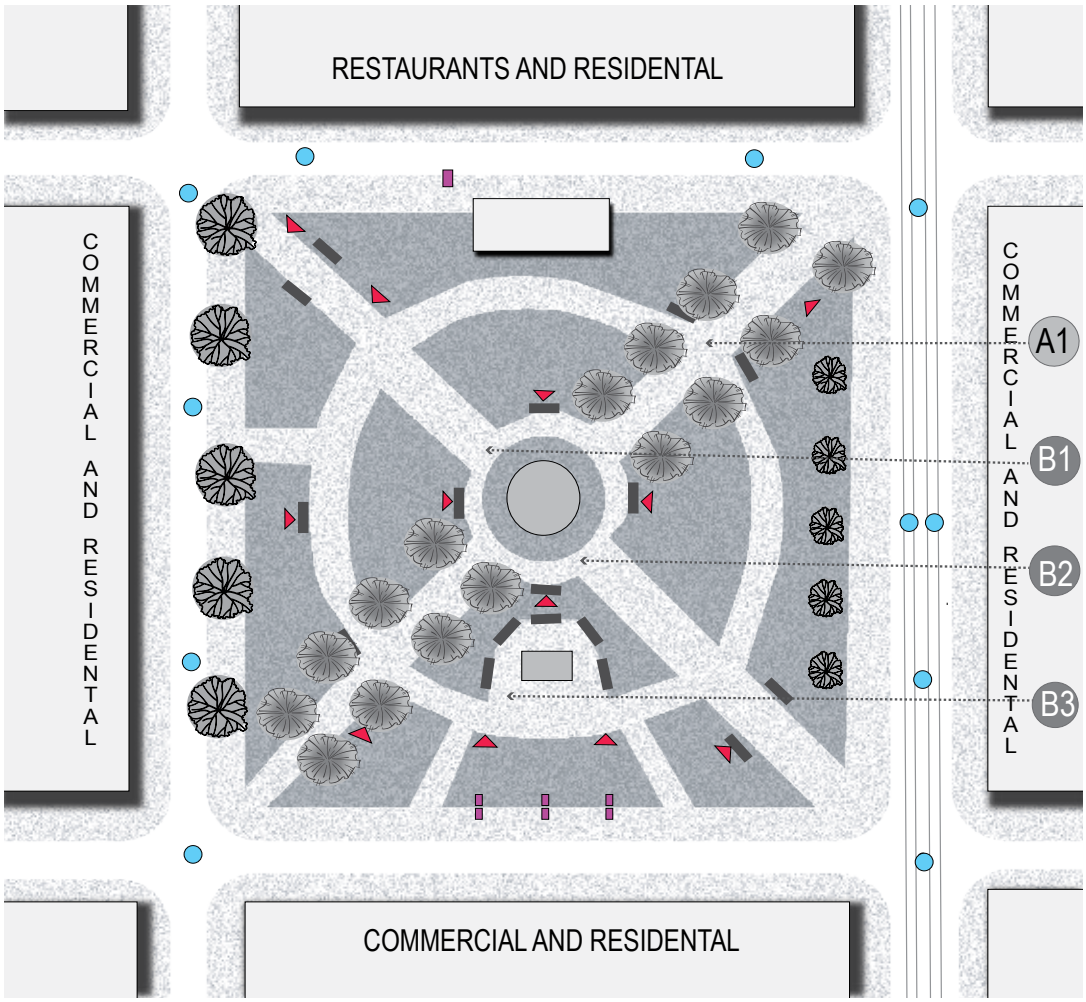


Figure 6: A map of he spatial design and the layout of the ighting scheme at Olaf Ryes Plass with describing pictures A1, B1-B3..

Social context

The buildings surrounding Olaf Ryes Plass make noticeable edges and define the square's position. At the north end of the square, many restaurants and a concert hall attract many people from all over the city. Olav Ryes Plass is also a tram stop on three different tramlines, making it easy to travel to the square and accessible. People travel to Olaf Ryes Plass to sit on the benches, walk the dog or bring their children to play in the fountain. The square is near a larger park, so the square is mainly used for a shorter time.

However, Olav Ryes Plass has few activities to offer when viewing the square on the micro level and using the Gehls scale to rate the possibilities for activities (Gehl, 1987) see Table 4. Only the benches and the grass provide opportunities to sit on. On a sunny day, people can enjoy the sun or the shade if desired. Olav Ryes Plass can be an oasis for many people in the daytime, with social and necessary activities. However, this changes after dark as people only use it as a shortcut as the lines on the map in Figure 8 shows.

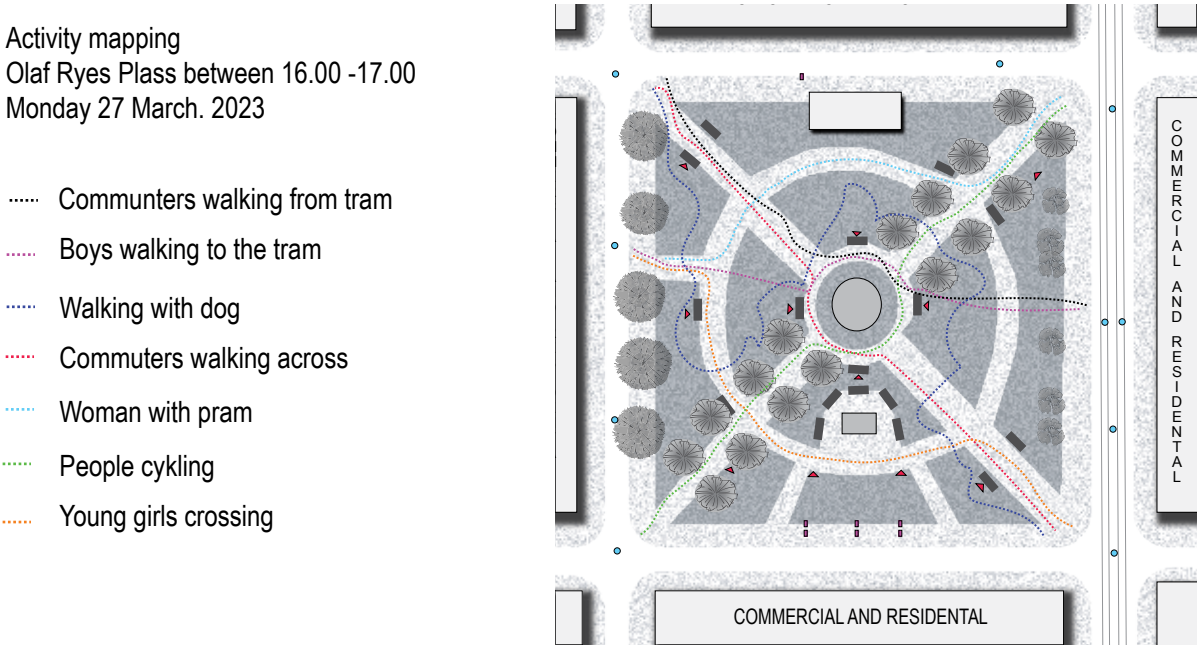


Figure 7: Activity mapping during the daytime at Oalf Ryes Plass

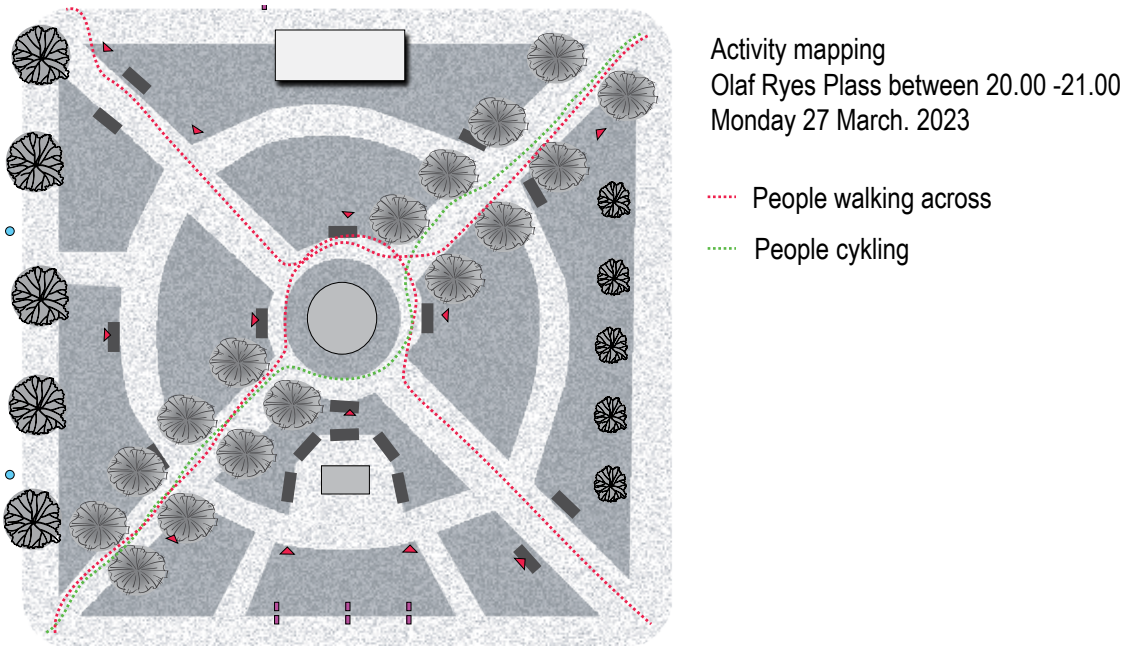


Figure 8: Activity mapping during the evening at Olaf Ryes Plass

The author observed Olaf Ryes Plass at a busy hour between 1600-1700 hours and between 2000-2100 hours. Many people were walking across, and many locals were cutting across the grass to go to the tram stop. People were walking with prams, commuters were cycling through, some were walking their dogs, and groups of younger children enjoyed walking around. However, no one chose to sit down on the benches. The lines on the map in figure 7 give an example of the typical activities observed.

During the hour of observation, the people observed did their regular activities. They were walking the dog or taking a detour to cross the square on their way home. Most people did not tend to make a stop. While in the evening, people mainly used it as a shortcut, as displayed with the lines on the map.(Fgure 8) One could think that the existing lighting design needs to give more support for social activities. Still, then again, if there are no activities to support, maybe the lighting only provides what is currently needed?

Lighting quality

The lighting was upgraded in 2020 to 12 Vivita luminaires from the Fagerhult group after the municipality decided to use LED technology in the urban public places of Oslo. (see A1, B1 and B2, Figure 6) It consists of one typography of luminaires, which consist of an LED source directed up in a reflector and down towards the ground. The luminaires are placed on four meters high poles, and the reflector gives a symmetric soft round edge around the bar with a white colour temperature. During Christmas, strings of lightbulbs are hung across the whole square, giving the park a warm, welcoming atmosphere. At the south end of the court, a parking area with three tall poles with streetlights provides visibility for the cars.

The first floors of the buildings around the square have accent lighting that influences the square, and the streetlights also have an impact on the square, as seen on the cross-section displayed in Figure 9.

Figure 9: Crosssection of Olav Ryes Plass to show the accent lighting influencing the square

There is a visual hierarchy in the lights between the streets and the park. The density of the luminaires is good, as they have been placed evenly around the park. According to the standards, the illuminance in the square is between 5 and 3 lux, following the A1 or A2 lighting qualification class with a uniformity of 1.5. The accent lighting from the bars and restaurants and the windows around the square does give a reassuring atmosphere, as it is visible that there are people around. This gives the lighting in the square a very functional purpose. The luminance in the square does feel uneven as it is so much accent lighting around at the edges. However, this also provides wayfinding and creates an overview for navigation, as displayed in the luminance map in Figure 22 on page 38.

5.3 Case study 2: Tøyen Torg

Tøyen Torg is part of one of Oslo's eastern districts and belongs to the “Gamle Oslo” (oldtown) district. The district has many landmarks, such as the botanical gardens, the old Munch Museum, a culture house called Trafo and a park called Tøyenparken.
Today, the district is one of the densest areas in Oslo, with a demography of multicultural citizens worldwide. With the urban renewal project in 2013-2018 from the municipality called Tøyenløftet, new residents started to move in as the area became more attractive. As the house prices raised, younger white residents with a higher income and cultural capital moved in. However, as they tend not to stay for an extended period, the crime levels have stayed the same, and the poorer residents are becoming poorer(Kadasia et al., 2020).

As a part of Tøyenløftet, new floorcovering was put in place, with colourful bricks which made it look like Iranian carpets. In addition, new urban furniture and upgraded lighting design by Zensik have made the square into a home with a thriving social atmosphere (Landskapsarkitekter, 2018). Kristin Bredal was in charge of the new lighting design and was interviewed by the author 18. April. She spoke very highly of processes the municipality used to interact with the residents during the renewal of the square and the involvement of local users to get ideas for the new spatial layout. (see appendix four)

Figure 10: Tøyen Torg in the daytime

Figure 11: Tøyen Torg during the evening

Spatial context

Tøyen Torg is well defined as a square, with buildings all around the square's four edges, making the square feel somewhat enclosed. According to the theories of Kevin Lynch (Lynch, 2008) Tøyen Torg is a node. It has a central location with people walking across the square back and forth from work and home, and it serves as a point of orientation. The daytime image of being a square where residents would go shopping and socialise. This changes in the evening when the bars attract a younger, trendier crowd.

According to the criteria of Jan Gehl- (see table 3) Tøyen Torg feels safe with lots of eyes on the square from the lively first floors; the shops, bars, and cafes with big windows fill the squares’ first floors, creating softer edges with lighting and a feeling of life towards the square (see B3, figure 12).

It has suitable surfaces that make it accessible for everyone, edges to lean against, and it has opportunities to sit on the new urban furniture where it is possible to hear one another (B1 and B2 in figure 12). The use of materials and colours makes the square visually attractive. Colourful brickwork on the floor has been completed to look like carpets, and the new urban furniture with a combination of wood and metal creates a modern feeling. The big windows on the first floor give good reflections, and soft golden aluminium frames the windows.

The spatial layout is presented on the map, and the red circles mark the position of the luminaries diplayed in all the pictures, which shows the design of the lighting scheme. A1 is a picture of the luminaires under the balconies.

Figure 12: A map showing the spatial design and the layout of the lighting scheme. The picutres are show details of the urban funiture on the square and the luminaires.

Social context

Tøyen Torg is a transportation hub well-connected to public traffic, with the entrance to the tube station at the square's north end and a main street with busses just behind. The easy access makes people travel there to enjoy the authentic atmospheres in the bars. Universal design has ensured broad entrance points and ramps to make it easy to access for everyone. Tøyen Torg sufferers of high crime rates, and the place needs to be better maintained. However, it is very charming and attractive with the Iranian carpets in bricklayers, it is walkable, and seatings are available.

According to Gehl´s categories (Gehl, 1987) as explained in Table 4, the square offers necessary and optional activities, such as the local welfare office and urban furniture with planted greenery. The use of colours and variation in the urban table appeals to an extensive range of people who sit there during the day and in the evenings. Tøyen Torg is in the shade most of the day and only starts to get sunlight in the afternoon and evening.

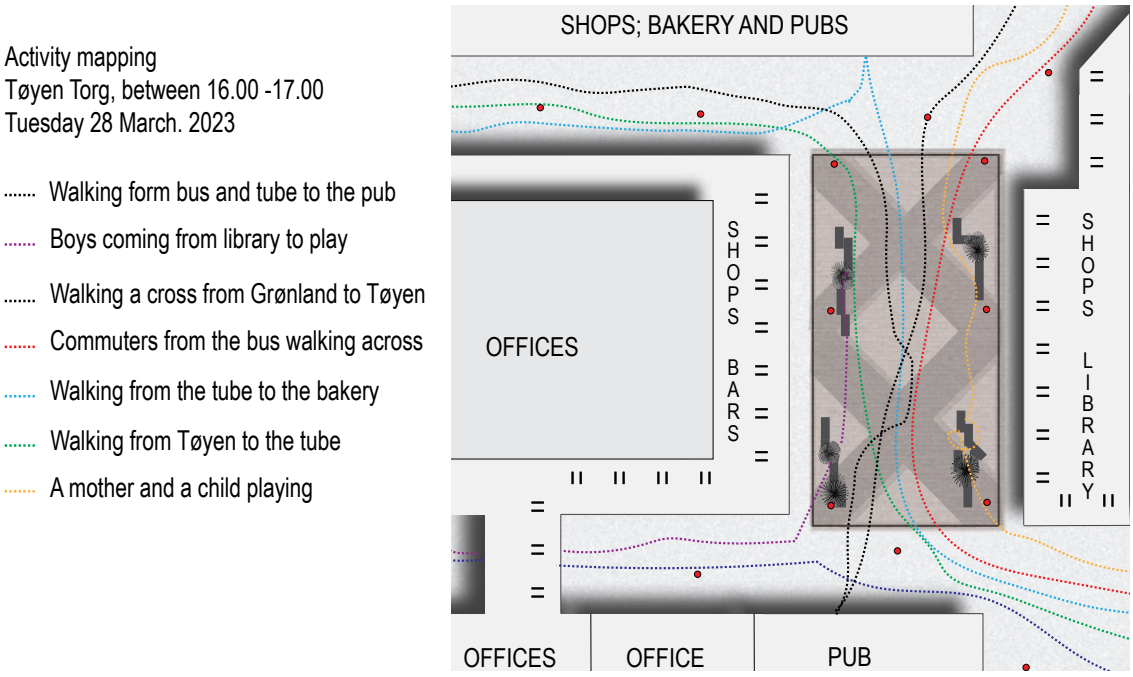


Figure 13: Activity mapping during the daytime at Tøyen Torg

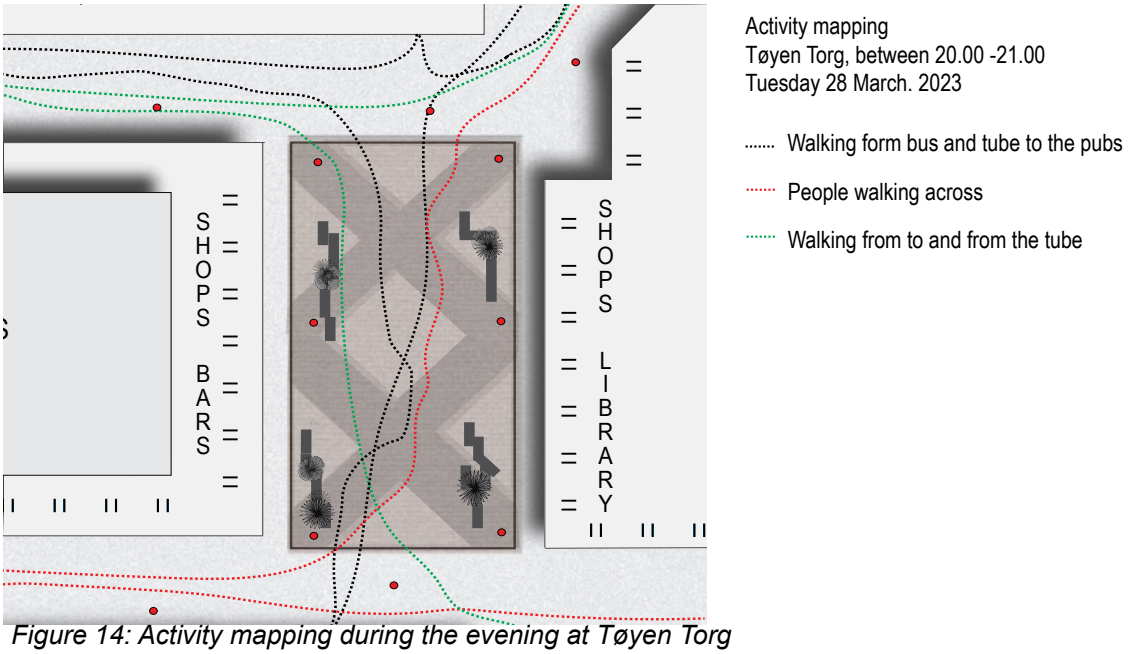


Figure 14: Activity mapping during the evening at Tøyen Torg

During the hour of observations made by the author, one hour after work and one hour in the evening of 28. March, many people were crossing through the square. During the day, many children played and ran up and down on the urban furniture. Some people stopped and talked, others walked to and from the shops, bakery, or library. The lines on the map in Figure 13 show a typical example of their routes.

During the evening, only a little social interaction occurs in the square. But some establishments attract people to the place; a pub and a bar on each side of the square make people come and go. Commuters and residents also cross back and forth from public transport. The map's lines in Figure 14 show the routes people made in the hour of observation. The square has some potential to be used more after dark, and the lighting could support this, but it is a small square with little intimacy. It also is a very local square for the residents and is mainly used by visitors to the bars and pubs after dark.

Lighting quality

Before the renewal of Tøyen Torg, some old globe lighting was lighting up the square. In 2018, Zenisk lighting design company was invited to work with the landscape architects. he 70´s original lanterns were a significant part of the square's identity, so the new luminaires had to be made similarly.

Zensik developed the new lights. They used new warm white LED bulbs and a reflector to aim the beams downwards through round transparent globes. As a result, the look of the 5-meter light poles complements the square's identity in the daytime as in after dark. In the interview with Kristin Bredal on 17 April, she spoke about their aim to create a warm atmosphere in the square:

“The warm atmosphere is the warm colour temperature. So, I think we picked 2007 Kelvins. I don't know; maybe it was even warmer. Today, we will probably pick 2200. This was back in 2017, but I think we picked the warmest we could.”

Kristin Bredal also spoke about how the golden facades on the first floors and the warm colours in the brickwork complement the warm atmosphere. In addition, accent lighting was implemented as a part of the design concept. By using warm white LED bulbs, the lighting is perceived as friendly, but the atmosphere on the square is also strongly influenced by the illumination from the first floors and the number of people using the bars at night, as shown in the cross-section in figure 15.

Figure 15: Crosssection to show the influence from the 1st. floors at Tøyen Torg

There is no visual hierarchy of the lighting at Tøyen Torg, as it consists of one typology. However, the architecture above the shops and bars has some integrated armatures from the original lighting design. These provides vertical lighting that influences the square. The poles are placed evenly, giving a good horizontal surface distribution and visibility.

The accent lighting from the bars and restaurants provides a reassuring atmosphere, and the integrated lighting (see pictutre A1 in Figure xx) provides vertical luminance to the buildings giving soft edges to the square. The phenomenological observations concluded that a welcoming nocturnal atmosphere is present after dark with the pole lighting and the colours in the materials. see Figure 23 on page 38.

5.4 Case study 3: Christian Frederiks Plass

Cristian Frederiks Plass is next to the central railway station, and three edges consist of tall buildings that are only hotels and businesses. The location of Christian Frederiks Plass makes this square an ideal place for trespassing commuters and tourists at all times of the day. There are local amenities, but the fact that there are three hotels surrounding the square, there needs to be a sense of community present.

Christian Frederiks Plass is in the middle of a district with offices, businesses, shops, and some of the most well-known landmarks in Oslo. Moreover, most of the museums, theatres, and important buildings, such as the new opera, the new Munch Museum, the main library, the main cathedral and the town hall, are located within this district of central Oslo.

Figure 16: Christian Frederiks Plass in the day

Figure 17: Evening at Christian Frederiks Plass

Spatial context

When using Kevin Lynch (Lynch, 2008) elements of the city and considering Christian Frederiks Plass's place in the morphology of Oslo, it is a node because of its position between the central railway station, the harbour, and the business district. However, for the place to be a clearly defined node, it needs to be a clearly defined square. It is hard to understand where it starts with undefined edges. It could appear more visually memorable, too. According to Lynch, it fits nicely into the category of being extroverted with its similarities to Bostons Dewy Square:

"General directions are explained, and connections are clear to the office district, the shopping district, and the waterfront" (Lynch, 2008, p. 77).

When looking at the square at a micro level, the square has been zoned into different areas with a new playground (see B1 and A3 in figure 20) and bike parking on one side, a part of the old garden on the other, and a colossal statue in the middle (see A2). There are benches at the park's edge (B1) and among the trees on the side where there are possibilities to sit more secluded. However, it has quite a few obstacles, with a submerged area by the fountain and the statue, and only two actual edges that define the square. This makes it uncertain where the place starts or stops, as illustrated in the pictures and the map of the spatial layout (see Figure 18).

According to Jan Gehl's categories (see Table 3), there are no eyes on the street from any side of the square, and it has unpleasant experiences as the lighting causes uncomfortable glare. The buildings on both the east and the west side are tall modern buildings belonging to a smaller business area called Barcode. There is no human scale in the buildings surrounding the square. There are some old trees, and apart from the area around the new playground with a soft and colourful cover on the ground, the rest of the square is pebbled. The lighting scheme of the square is illustrated here in figure xx with blue, black, orange and green symbols, and pictures A1, A2 and A3 are displaying the luminaries.

Figure 18: Showing the spatial design and the lighting schedule with pictures of luminaires

Social context

Christian Frederiks Plass is well connected to public transport, making it very easy to travel there. As it is neighbouring to the central railway station, bus, tram stations, and even the harbour, it is very accessible. However, despite its central location, people tend to stay only temporarily. As no residents are connected to the area, there is no real community using the square, so there are few local businesses or activities related to the place.

When using the framework from Jahn Gehl (Gehl, 1987), there are optional and social activities available, such as the playground and surrounding seating areas. As shown in the illustration of the activity mapping in Figure 19 and 20, people tend to use Christian Frederik's Plass as a place for their necessary activity to walk across.

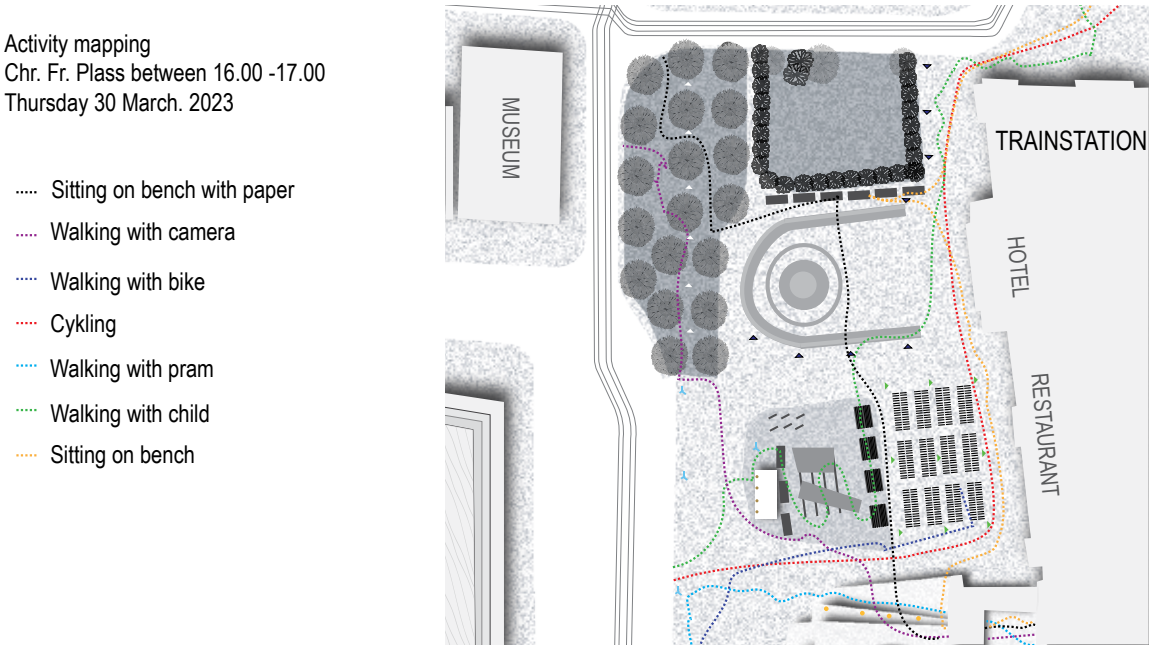


Figure 19: Activity mapping of Chr. Fr. Plass during the day

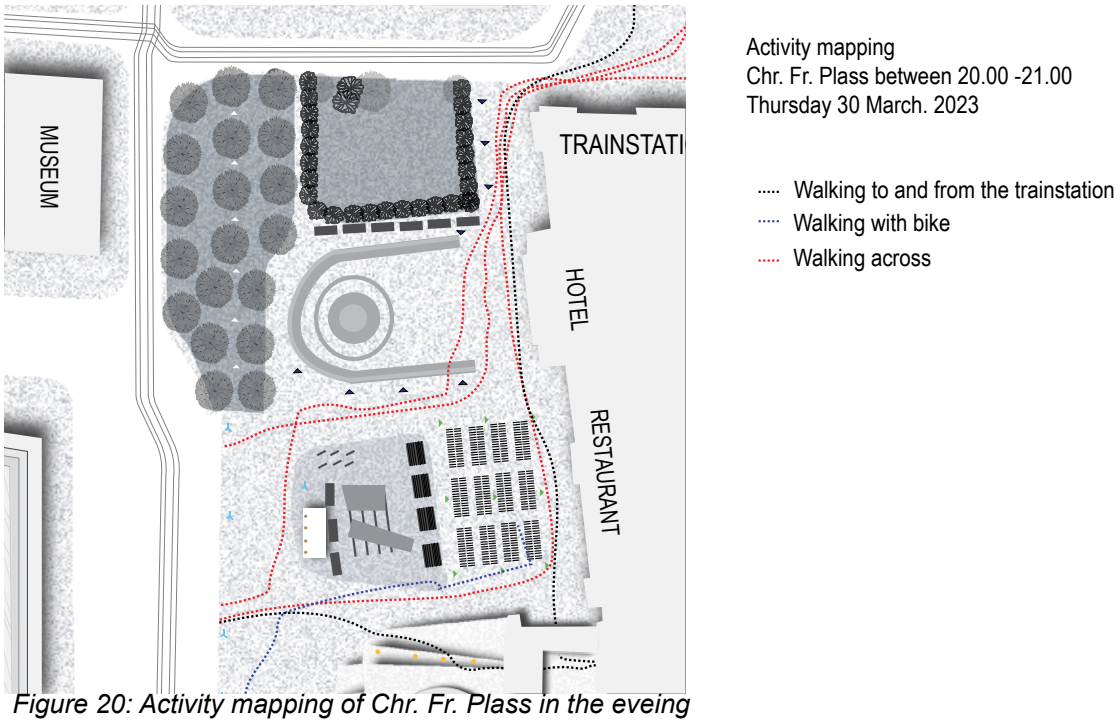


Figure 20: Activity mapping of Chr. Fr. Plass in the eveing

The phenomenological observations at Christian Frederiks Plass were done similarly to the other squares by drawing lines on paper for an hour between 16-17 and 20-21 on 30 of March. During those hours, most commuters used the square and some tourists.
In the daytime, some parents with children were using the playground briefly. Many people were coming to the central railway station from the edge by the water. They walked fast in direct routes while the tourists stopped to take pictures and wander around in the trees on their way to the opera, the Munch museum, and the waterfront. A few people stopped on the benches by the garden; they are, however, only used for shorter periods.

In the evening, as shown in Figure 20, the square is only used to walk across. There could be more interaction, but the lighting is not supporting this. The bike parking is used the most, but the area around the fountain and the garden is not used. There is no support for social interaction after dark. Not in the lighting and not in the architecture either.

Lighting quality

The lighting is not coherent and consists of several poles with different heights and serves other purposes. It could seem like some hierarchy if it had been planned, but as it is, it looks more random. The night-time identity is therefore mainly non-existing, with only accent lighting from the outdoor serving place during opening hours.
Four different styles of luminaires have been used on the square. Within the old part of the garden, among the trees, are six luminaires with dirty opal globes and white light beams. Also, a newer version with LED technology and clear glass has the same look as the old ones and can be found elsewhere on the square. They are a double pole, mainly around the west side of the square marked with black triangles on the map (see Figure 20). The new pole lighting has an even soft distribution but has very cold and white beams.

In addition, there are nine five-meter poles with the 12 Vivita luminaires from the Fagerhult group around the bike parking area. They have a very warm colour temperature. Along the pavement on the south edge, four 20-meter long poles with three spots on each are lighting up the pavement and bleeding onto the square. The same pole has been erected on the square by the information stall for the city bikes. The station entrance also has some lighting influencing the square and the streetlights in the nearby streets, as illustrated in the cross-section below.

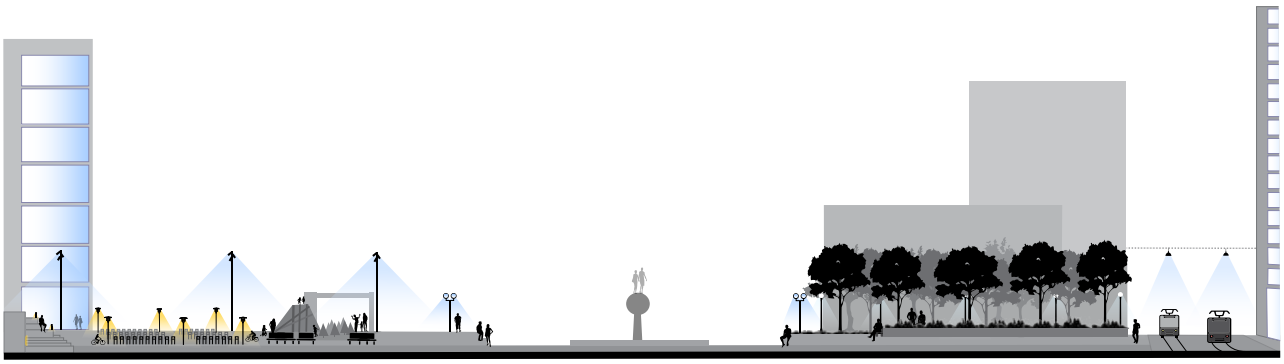


Figure 21: Crosssection of Christian Frederiks Plass showing the different typology in the luminares

Overall, the lighting at Christian Frederiks Plass could give a better impression. The existing lighting gives the impression that it is unrelated to the architecture or the people; however, it is functional and provides visibility. There are not much height differences, as all the lighting is from four meters high poles, and no layers. No visual hierarchy and no constancy in the distribution of the illuminance. There is little accent lighting on the square. The phenomenological observations of Christian Frederiks Plass show that the lighting contributes to a dull atmosphere with low social interaction and no support for social activities or spatial design. As illustrated in the luminance map in Figure 24 on the next page, the luminance is unbalanced and very patchy.

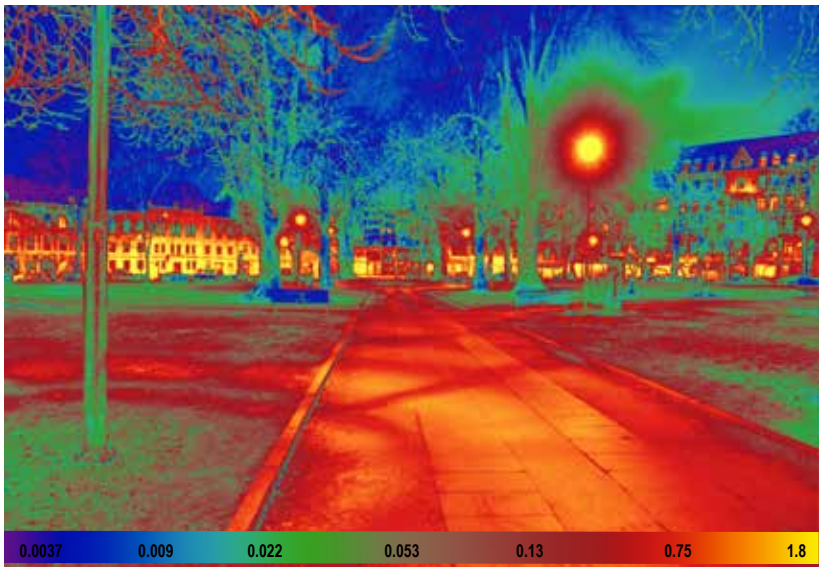


Figure 22: luminance map of Olaf Ryes Plass displayed in false colours

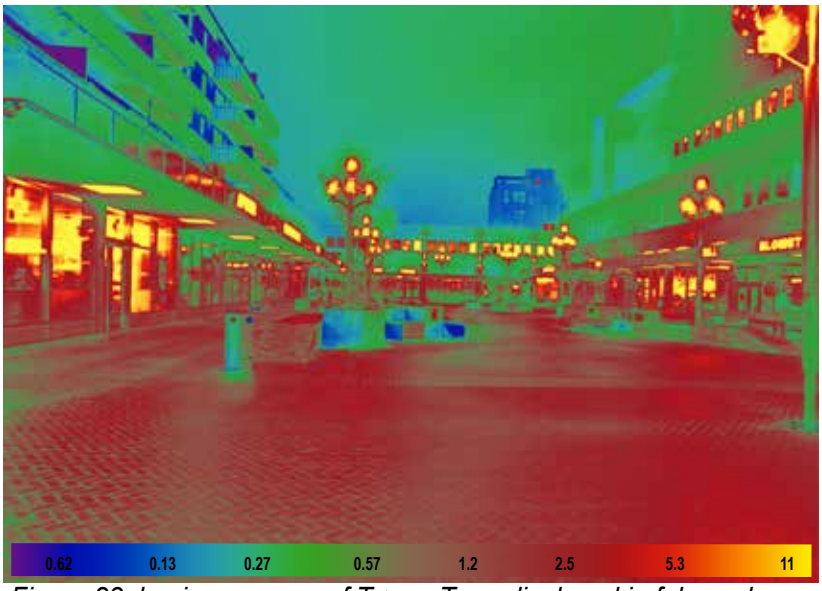


Figure 23: luminance map of Tøyen Torg, displayed in false colours

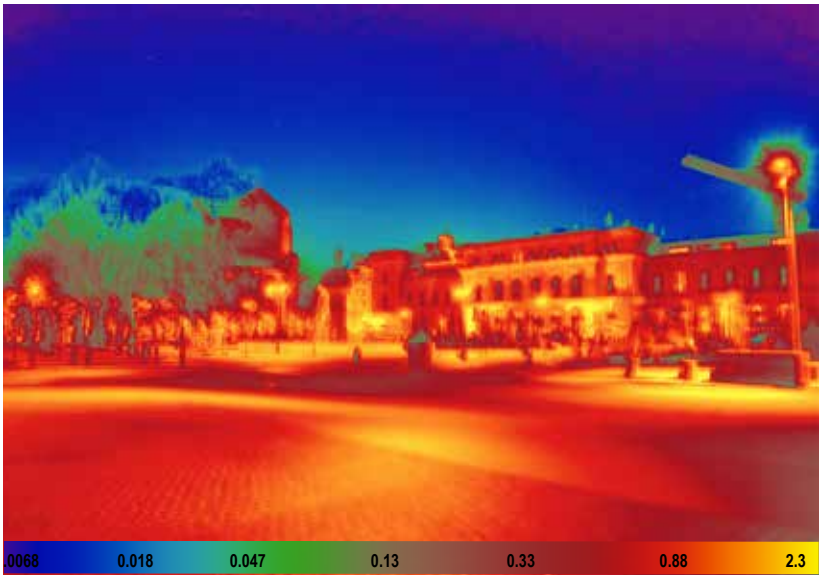


Figure 24: luminance map of Chr. Fr. Plass, displayed in false colours

5.5 Findings

Spatial context

The spatial analysis of these three squares is aimed at understanding how lighting can support social interaction in urban public places. To do so, it is also important to understand the architectural context. The findings are analysed in a table produced by the author based on Jan Gehls 12 criteria, see Table 3 on page 23. The score is a yes or no, something that can give an indication of how successful the urban place is.

Categories	Qualites	Olaf Ryes Pl	Tøyen Torg	Chr. Fr. Pl.
Protection	Protection for pedestrians	yes	yes	yes
	Eyes on the street	no	yes	no
	Protection against snow and rain	no	no	no
Comfort	Accsessible for wheel chairs	yes	yes	no
	Edges to lean upon	no	yes	no
	Zones for sitting	yes	yes	yes
	Clear sightlines	no	no	yes
	Low noiselevels	yes	yes	no
	Invitatiations to play all year	no	yes	yes
Delight	Buildings in human scale	no	yes	no
	Places to enjoy the sun/shade	yes	yes	yes
	Urban greenery and mixed materials	yes	yes	no

Table 5: Spatial analyses where Jan Gehls 12 criterias is rated with a simple yes or no. This can give an indication on how sucsefull the spatial design is at each square

Olaf Ryes Plass got 6 yes of 12 possible. The trees restrict the view, making it feel less safe. The trees obstruct the wayfinding, making it unsafe to cross after dark. The human scale is not present in the square. Olaf Ryes Plass is accessible; however, the fountain in the middle creates an obstacle. It gives protection from traffic and provides seating where people can sit and enjoy the sun or shade.

Tøyen Torg got 10 yes of 12 possible. This is the best score of all the squares. However, it has very tall buildings surrounding the small square, obstructing the view and creating poor wayfinding and very low refuge, prospect, and escape options. It scores very high on delight, with the human scale with the first floors and in the urban furniture, the mixed materials, and accessible edges. This makes it feel welcoming and inclusive. It has ramps on all entry points, and everything is on the same level.

The last square, Christian Frederiks Plass got 5 yes of 12 possible. The best category is Comfort as there are many opportunities for people to sit, there are good sightlines, and it is the only square with a play area for kids. The human scale in the architecture needs to be more present. All the different levels on the ground, with the submerged area around the statue, the bike parking area, and the cobbled square, make it non-accessible.

Social context

The spatial design can be an element that intrigues the public, but it also depends on other factors. During the day, these places are being well used, but that all changes after dark. Lighting is therefore a crucial factor in prolonging the hours of use in urban public places. To review how successful the social life in these squares is, the phenomenological observation of the squares has been analysed through the PPS Diagram from the Project for Public Spaces (project for public spaces, n.d.) based on the criteas displayed in figure 3 on page 24.

	Statement	Olaf R Plass	Tøyen Torg	C. Fr. Plass
Use and activites	People are meeting each other in the space	YES	NO	NO
	People are interacting with each other	YES	YES	NO
	People bring their friends and relatives to see the place	NO	NO	NO
	People stay in the space for prolonged periods	YES	NO	NO
Social use and activities	There are choices of things to do	NO	NO	NO
	Many different types of activities are occurring	NO	NO	NO
	People of different ages are using the space	YES	NO	NO
	People passing by are drawn into the space	YES	NO	NO
	There are a security presence/ the area feels safe	YES	YES	NO
Comfort and image	There are enough places to sit, seating conveniently	YES	YES	YES
	The space makes a good first impression	YES	YES	NO
	People use a variety of transport options	YES	YES	YES
Accesss and linkage	The space functions for people with special need	YES	NO	NO
	The pavements lead to and from adjacent areas	YES	YES	YES
	Good connection between the space and adjacent buildings	YES	NO	NO
	Residents use the space	YES	YES	NO
	The space can be seen from the distance	NO	NO	YES

Table 6: PPS diagram with statements based on their four categories for sucsufull places. The rating is a simple yes or no. This gives an indication on how socially sucsefull the place is.

Olaf Ryes Plass got 7 yes of 17 possible. The best scores were in comfort and image and low in the other categories. To score high in the attributes of comfort is important for attraction and the feeling of safety in a place. But without a variety of activities and things to do, there are fewer possibilities for people to stay longer.

Tøyen torg got 13 yes of 17 possible. This is a high overall score, but the scores were moderate for sociability. This lower score comes from the fact that there are few varied activities on the square. That means that there are limited options suitable for only a few people.

Christian Frederiks Plass scored 4 of 17. The best scores were in access and linkages; in all the other categories, the scores were deficient. The low scores of sociability and comfort and image indicate that the users mainly use it as a link for transportation rather than considering it a place to stay, especially at night. The location in the middle of the city's business district contributes to a lack of local users or residents that feel some sense of belonging and ownership to the space.

The social life in an urban public place might be going on unaffected by the lighting design. However, with a good lighting design, it can attract people and provide reassurance and a night identity. But maybe the most important is that it can contribute to prolonging the use of urban places after dark. To analyse the findings from the case studies, a diagram based on the theories of Descotte (Zotero), developed by the author, will be used. The scoring is a simple yes or no.

Qualities	Statement	Olaf R Pl.	T Torg	C. Fr. Pl.
Illumination	There is enough visibilty of the space	yes	yes	no
	The lighting provide reassurance	no	yes	no
	Light sources are lighitng vertical surfaces	no	yes	no
Brightness	The lighitng is creating reflections of the materials	no	yes	no
	The lighitng creates contrasts in the space	no	no	yes
	There is an absent of glare	no	yes	no
Colour and temprature	The light sources gives a good colour rendering	yes	yes	no
	There is a good variation in warm colour tempratures	no	no	no
	The use of colours proivdes identy to the place	no	yes	no
Height	Ther is use if low heigts that provides intimacy	yes	yes	no
	The lighting differenceses between public/private	yes	yes	no
	There is a variation of heigts in the lumiaires	no	no	yes
Density	The placing of the lumiaires adds to a spatial hirachy	yes	yes	yes
	The denisity used creates a rythm	yes	yes	no
	The placing of the luminairs gives a depth perception	yes	no	yes
Direction and distribution	There is a variation of directions as inderct/direct	no	yes	no
	There is a variation of the angles in the distribution	no	no	yes
	There is a variation of the sizes in the beams	no	no	yes

Table 7: Statements based on Descotte´s six qualites lighitng qualities with a simple yes of no rating.This can give an indication of how sucsessful the lighitng deisgn is.

Olaf Ryes Plass scored 7 yes of 18 possible. The square was illuminated, though the luminance produces some glare. The colour temperature was the standard of 2700K, and there was no variation in the height of the luminaires. As it only has one type of luminaire, the category with the lowest score is the variation of direction and distribution. However, the direction of the beam was pointing downwards onto the path, which gives good visibility on the paths.

Tøyen Torg got 12 yes of 18 possible, and? it shares many of the same qualities as Olaf Ryes Plass. The five-armed pole lighting illuminates the square, and the luminance is very well-balanced. The colour temperature is warm and inviting, and though there are no variations in the heights, as they are all at five meters, the different heights on the arms and the five translucent globes make them visually attractive. The placing of the armatures is also well distributed, and all the illuminance is directed towards the bricks on the ground with a softness to the beam.

Christian Fredriks Plass got 6 yes of 18 possible, with a very low score in illumination and colour. The three different typologies of luminaries can explain why this scoring is so low. The lighting is disorganised, as illumination, luminance, colour temperature, and heights. The density gives a random impression with no rhythm, and all the types of luminaires are different in direction and distribution. There is no coherency with the architecture, and the luminaries have serious glare issues. The absence of accent lighting creates an empty, lifeless space with the random lighting scheme.

Summary of the findings

To make people stay longer, there need to be diverse optional activities present in urban places. How urban places are used indicates that the location greatly impacts how people use an urban public square. With a local community feeling ownership of the urban place, it is easier to create a reassuring, welcoming or inclusive atmosphere. The phenomenological observations made on-site during dark hours can indicate that lighting needs to support both the spatial design and the architecture, as well as provide social interaction and support social activities.

If urban public places become more accessible and inclusive for marginalised groups, everyone can feel included. The lighting has a vital role in facilitating this inclusion. By analysing the findings from the case study together, the true potential can be found for making socially inclusive places for marginalised groups.

5.6 Analyses

The findings from the case studies can point towards how lighting design can be a starting point to facilitate nocturnal atmospheres; it needs to be done with a holistic approach towards human and social interaction in urban life. The architecture and social activities of the urban places need to be integrated within the lighting design, so these three elements can work together. The literature review revealed that these certain factors are the minimum spatial elements that need to be present:

1. Refuge, prospect, and escape to make a place safer and give room for necessary activities.
2. Human scale to create a place that feels welcoming and place for sociable activities.
3. Accessibility for everyone with the possibility for diverse optional activities.

The atmospheres at the three squares change significantly depending on the year and the time of day. As found in the literature review, both the spatial and social aspects of a place impact the atmosphere, and the lighting design creates a foundation for creating the atmosphere. When using the analytic framework developed by the author, the findings from the case study can be analysed in connection to each factor that interplays in the creation of atmospheres. As page xx describes, the analytic framework can be read from all sides, from left to right or from top to bottom. The score is between 0-2: 0 is not good, 1 is moderate, and 2 is good. The final score is being added and divided into 9.

Olaf Ryes Plass	Spattial	Social	Lighitng
Reassuring Atmosphere	Refuge, prospect and escape **1**	Eyes on the street **2**	Legibility and Wayfinding **1**
Welcoming Atmosphere	Human scale **1**	Variation in activites **0**	Beautification and Scenographic lighitng **0**
Inclusive Atmosphere	Universal design **1**	Diversity **1**	Balancing contrasts and Hierarchy **0**
Total Sum:			**0,78**

Table 8: Analyses of Olaf Ryes Plass using the analytical framework developed by the author. The socring gives an indication of how inclusive the place is.

Tøyen Torg	Spattial	Social	Lighitng
Reassuring Atmosphere	Refuge, prospect and escape **0**	Eyes on the street **2**	Legibility and Wayfinding **1**
Welcoming Atmosphere	Human scale **2**	Variation in activites **1**	Beautification and Scenographic lighitng **1**
Inclusive Atmosphere	Universal design **2**	Diversity **2**	Balancing contrasts and Hierarchy **1**
Total Sum:			**1,33**

Table 9: Analyses of Tøyen Torg using the framework developed by the author. The score can give an indication of how sucsessful the square is.

Chr.Fr. Plass	Spattial	Social	Lighitng
Reassuring Atmosphere	Refuge, prospect and escape **2**	Eyes on the street **1**	Legibility and Wayfinding **0**
Welcoming Atmosphere	Human scale **1**	Variation in activites **2**	Beautification and Scenographic lighitng **0**
Inclusive Atmosphere	Universal design **0**	Diversity **0**	Balancing contrasts and Hierarchy **0**
Total Sum:			**0,66**

Table 10: Analyses of Christian Frederiks Plass using the framework developed by the author. The score can give an indication of how sucsessful the square is.

Tøyen Torg has the most successful square when analysing the findings from the case studies. What are the differences, and which factors make this happen?

Spatially: Tøyen Torg uses the human scale well with the new urban furniture that has been spaced so they can face each other and provide more personal use. It has ramps to provide access, and everything is on the same level. However, it is cramped between tall buildings and does not provide a good overview.

Socially: As it is mainly offices in the tall buildings surrounding the square, more is needed to ensure a feeling of people being able to see what is happening and provide for eyes on the street. However, there are lively first floors with a library open late and bars. There are few varied activities, but still, there is a wide diversity of users in the day and evening.

Lighting: The lighting gives a solid identity to the square, both during the day and after dark. This might be the reason why it works so well. There are a few variations in the lighting, but it provides a good overview of the square. In addition, the fluorescent tube lighting above the shops also provides some illumination of the vertical surfaces, creating some contrast. Together these factors create a warm and welcoming atmosphere so that the square is experienced as accessible and inclusive.

The three different squares represent all types of users, demography, locations, architecture, and purposes. And it shows that spatial, social, and lighting design aspects must be present to make urban public places in Oslo more socially inclusive.

5.7 Summary and conclusion of the case study

The case studies of Olaf Ryes Plass, Tøyen Torg and Christian Frederiks Plass were performed to answer the research question of how lighting design can support social interaction. The sites chosen are squares that are used very differently. Furthermore, both Tøyen Torg and Olaf Ryes Plass are in the middle of a residential neighbourhood, while Christian Frederiks Plass is positioned in the business area of Oslo.

The findings show that the spatial and social context is equally crucial as lighting design to support social interaction by creating socially inclusive urban public places. All aspects depend on each other, and to analyse the squares, these factors must be viewed together. The findings show that people use these three urban public places in Oslo very differently in the daytime compared to the evening. This is not only relying on the lighting, as the squares offer very different types of social activities during the day compared to the evening. It is, however, equally important for lighting designers to understand how an urban public area is used during the day as well as after dark. The lighting generally does not support the squares' social interaction, except for Tøyen Torg.

The conclusion to the research question is that the lighting designer needs to gain a complete understanding of how people would like to use the place to be able to support social interaction. The case studies show that by analysing the spatial, social, and potential atmospheres together, lighting design could help social interaction in urban public places.

SECTION TAKEOUT

- **An understanding of the urban place's social life in the daytime and the evening must be gained through analyses and observations.**
- **The architecture, spatial design and the choices of materials and colours need to be analysed so the lighting design can support the spatial identity of the place.**
- **Arranging participatory workshops with residents and stakeholders might contribute to a stronger attachment to the place.**
- **Gaining a complete understanding of how people would like to use the place will allow the lighting design to support social interaction.**
- **The case studies show that by analysing the spatial, social and the lighting in relation to each other, socially inclusive places can emerge.**

6 FINAL RESEARCH QUESTION

Universal design has been implemented as a governing set of planning, aiming to create built environments accessible to as many people as possible. In other words: to make the environment functional for all people. Aimi Hamraie uses feminist disability theories to criticise universal design for its lack of collective access and social sustainability. In her critique, she highlights how exclusion from the planning processes produces inaccessible design. She claims that intersectional coordinated access in urban planning is necessary for making urban public places broadly accessible (Hamraie, 2013).

Working with lighting in an urban public environment to make spaces accessible for everyone with a diversity of cultures, ages, identities, and socio-economic backgrounds within the population might be challenging. The literature review on urban planning, atmospheres, and lighting design methods has shown a need to change how lighting designers light urban public places. To be sustainable, be socially inclusive, protect the democratic rights of cities, and ensure equal use of the public realm, how the world is lit needs to change.

One marginalised group in Oslo is the LGBT+ community. Sara Fanny Maria Sandberg Vik wrote a master thesis called “Skeiv I Oslo” in 2019, investigating how young queer couples are experiencing different urban spaces in Oslo (Vik, 2019). She used walk-along interviews, photographs, and in-depth interviews. The couples took pictures during a walk-through of Oslo and were interviewed about how their feelings of acceptance and perceived safety are related to the specific areas. Viks results were displayed on a map; see Figure 25. The red area is where they felt most unsafe, the yellow area is in between, and the green marks the safest places.

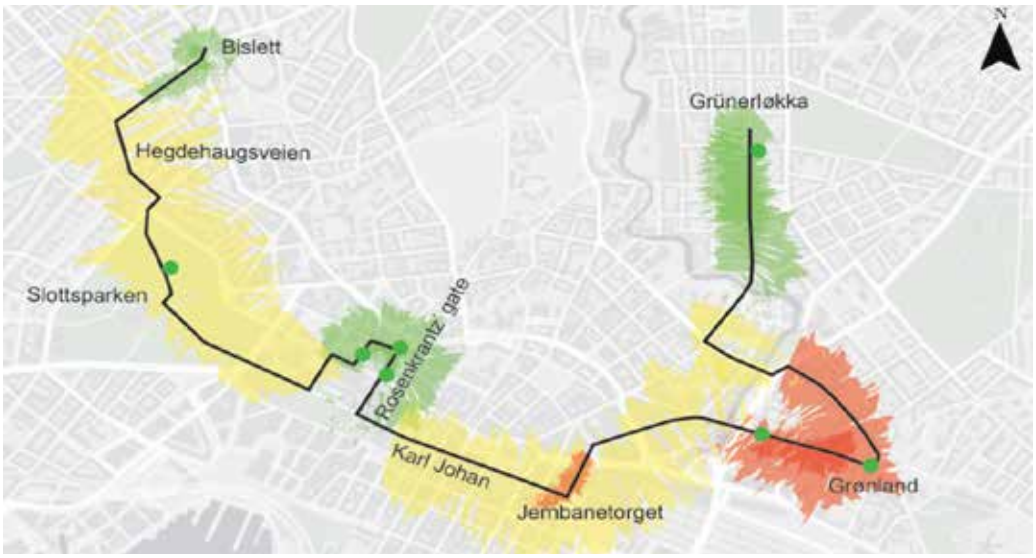


Figure 25: the findings from Vik´s master 2019, reprintet with permission

As described in the introduction on page xx, there needs to be more research on how lighting design can cater for the needs of more vulnerable groups other than women. So, the final research question for this thesis will seek to investigate this gap by broadening the research to include another marginalised group and explore how lighting design can make a difference:

How can the lighting design of urban public places enhance the freedom of movement for the LGBT+ community in Oslo?

Part 4

7 FIELD STUDY

This part of the thesis consists of three main chapters that start with an introduction, the chosen methodology, a description of the interviews, the video watching, the experiment, and an analysis of the findings.
To answer the research question, it was essential to learn how the LGBT+ community in Oslo is restricting their movement in urban public places and how they would like the urban public places in Oslo to be lit. To do this, two focus groups were established. They participated in the following:

- Focus groups interviews
- Watching video recordings made by the focus groups and discussing together.
- An experiment in the field

The first session, which lasted for 2 hours, was an interview to understand their behaviour in urban public places in Oslo.
To get further insights into how lighting design could make a difference for this community, the participants were asked to make a video recording of a walk after dark.
The experiment in the field at Vaterland in Oslo was the third time the focus groups met. This lasted two and a half hours and was documented by a photographer and a tape recorder.

7.1 The use of focus groups

As mentioned in the introduction of the thesis, to gain more equitable and inclusive insights into how lighting design can contribute to more socially inclusive urban places for vulnerable groups, the research needs to be broadened to include marginalised groups. Everyone's experience of public places is subjective and personal, but as the context chapter discussed, underlying structures interfere with how they are used. One aspect that makes the LGBT+ community different from other marginalised groups is that they are breaking the norm of sexuality and gender. Public places are regulated heavily by these norms., When showing affection between members of the LGBT+ community in public, they break these norms (Beebe & Davis, 2015).

Tim Cresswell writes about this in "*Place, an introduction*" (Cresswell, 2015) how the heteronormativity is overwhelming, and how: *"other kind of sexuality…threaten the link between space, meaning, and practice that make up "place" and suggest other ways of being"* p.172 (ibid.)

These breakings of norms might be the reason for the minority stress (Diplacido, 1998) many members of the LGBT+ community experience in public places. Like the findings shown in the visual display from the master thesis by Vik (see figure 25), quite a few public places in Oslo are not experienced as "gay friendly" by the community.
As the research in the thesis is are concerning a comunity, where the individual perspective might not be so relevant, the use of focus groups is applicable. However, creating an inclusive space with an awareness of the social impact on the group members is essential. According to Bjørner (Bjørner, 2015) is creating a safe space in the focus group necessary to maintain each member. Hence, everyone feels comfortable participating and it is equally important to end the session inclusively. (ibid.)

7.2 Selection of members

Two focus groups were established, each comprising five persons from the LGBT+ population. The members had different gender identities and gender expressions and identified themselves as members of the LGBT+ community in Oslo. In addition, asking friends that feel excluded from the public realm because of their gender expression and identity was suggested at the light symposium at AAU in September 2020. As the author identifies with this group, the theme of feeling unsafe and excluded, which results in a restriction of movement, has been a recurring topic.

However, when asked, many of these friends needed more time to participate in focus groups, so the search for participants was broadened to include a broader sample from the LGBT+ community. The participants were recruited through a personal messenger invitation to the researcher's network of Facebook friends. A total of 51 people were asked during the first week of February, of which 16 said yes. Both focus groups have a broad representation of the queer community in Oslo. In the initial Facebook invitation, the message was as follows:

"I am writing my master's thesis regarding lighting design in the public realm and how it can become more inclusive. I am looking for people within the LGBT community that sometimes feel excluded or unsafe in the public realm or change their behaviour to avoid certain places in Oslo to participate in a focus group. The participants must be able to meet two evenings in March." (Facebook msg, February 2023)

Many of those that declined said it was because of lack of time. Also, some of those who said no, stated that they did not feel unsafe or that their movement was not restricted.

The participants that agreed to participate in the focus groups have in common that they all feel excluded or unsafe in different aspects of the urban public life in Oslo and that the public recognises them as members of the LGBT+ community. Before the first session, an email with all practical information was sent to the participants and more details on the background for the master project. They were asked to meet two evenings for two hours between 1800-2000 hours.

After some cancellations, the two focus groups ended up consisting of altogether ten people. This made each group, consisting of five people, a mini-focus group, as most focus groups typically consist of six-twelve members (Bjørner, 2015). The focus members were between the age of 32 and 59. The members were three CIS women, three identifying as non-binary and using the pronoun they/them, two transgendered, and two CIS men, as listed below. (See term clarification on page 3)

A: non-binary, 37
B: non-binary, 42
C: cis-woman 36
D: transperson 32
E: cis-man 43
F: non-binary 37
G: cis-woman 59
H: transperson 40
I: cis-woman 42
J: cis-man 32

8 FOCUS GROUP INTERVIEW

As the final research question for this thesis is to find out how lighting design can make urban public places more inclusive for the LGBT+ community, it is essential to learn about their mobility routines. This was the main theme of the interview session.
The material is sensitive and personal. So to preserve anonymity, the participants will be referred to by their gendered identity and age. However, letters will be used instead to make it simpler when referring to conversations. The participants were given identity markers as letters from the alphabet depending on where they sat at the table. For example, (A, B, C..) To preserve anonymity, the transcript will not be included in the appendix but can be requested by the author if needed.

8.1 Methods

A dual-moderated focus group was chosen to monitor the group's social impact and facilitate the discussions. The moderators were chosen beforehand. The moderator for group one was chosen because she has experience leading consciousness raisings groups, a method used to facilitate group discussions. The moderator for the second focus group was selected because she has a degree in Art in Public Spaces. She has facilitated group readings, critiques, projects, and discussions concerning her degree and praxis. The moderators were present in the sessions to facilitate the discussions and followed a structured interview guide (see Appendix 3) to ensure both groups were asked the same questions (Bjørner, 2015).

All the interviews were recorded on an audio recorder and transcribed. Traditional coding was used for coding the transcripts in a four-step method. The first step is to transcribe the interviews; the second step is to recognise the concepts and themes in the text. The third step is coding and making subcategories avoiding too many codes. The last and fourth step is about interpreting and analysing the categories.
After coding the material through the NVivo software, a systematic analysis of the results called “Content analyses” were chosen. This is text-driven, problem-driven, and method-driven content analyses which detect themes. These analyses were applicable and related to the research question (Bjørner, 2015).

8.2 The interview session

The first interview started with the participants being met in the reception of the National art academy in Oslo by the author and guided to the meeting room. There were snacks and a serving of coffee, information about facilities, and what to expect before the session started.

The moderator started with a preliminary round where everyone introduced themselves, then went more in-depth about which external factors influence their everyday mobility routines. For the two first questions, the participants were asked to answer in rounds around the table. Afterwards, the discussions were divided into topics about how the spatial and social factors would influence their feelings of inclusion and safety. After a break, the questions in the last part focused on how lighting influenced their choices and experiences. The final part of the session was spent marking the map of Oslo with different colour pins. The red pin marked the places they would avoid, and the green marked places they felt included (see Figure 28). The following sections will describe the findings from the focus groups after it was transcribed and coded.

Figure 26 and 27: pictures showing the participnats marking inclusive and uninclusive areas on the map.

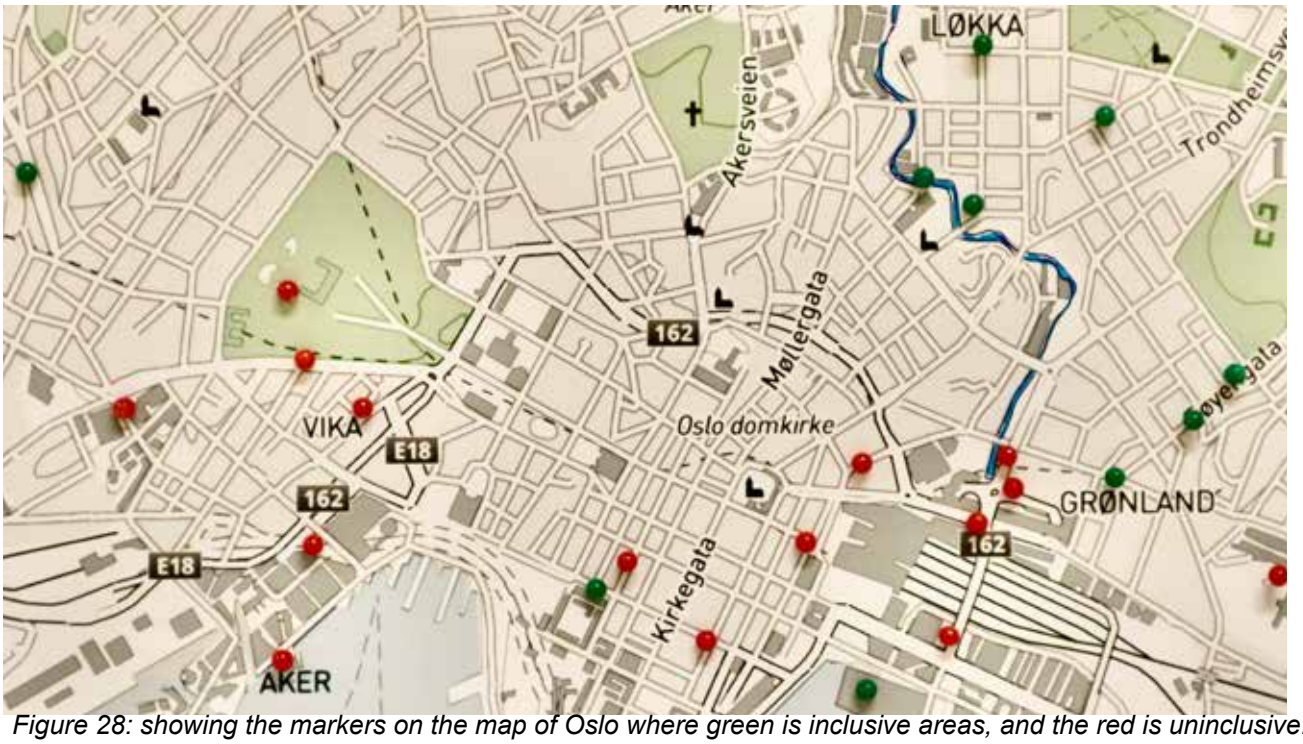


Figure 28: showing the markers on the map of Oslo where green is inclusive areas, and the red is uninclusive.

8.3 Main themes

The first apparent theme was how their walking behaviour was connected to gender expression. Many mentioned how they tended to walk fast as a safety precaution. Some members with a female body had a masculine gender expression and used this as an advantage. As one of them said:

"I experience Oslo as a safe city. But I have always thought that what makes me confident is that I can blend in as a man. Or - I won't be recognised as a woman for a quick moment. So, if I walk fast enough... then no one notices... now I don't identify as a woman either, but I have a woman's body, and then no one notices when I walk fast and look like I do."

Non-binary, 37

Even though most felt safe and included in places that were correctly lit, with enough visibility and overview, it turned out that darkness could also serve as protection. Those with the more masculine gender expression all had in common that even though darkness could provide areas for people to hide, it also meant that the likelihood of being read as a male would be higher. However, as one of the transgendered people pointed out, this could also become a dangerous situation like this conversation shows:

"H: it's a balancing act. Is it better if they read me as a cis woman, or is it better if they can see that I'm trans? If they read me as a cis woman and then figure out I'm trans..."

"F: yeah, if they find out what they thought it's not true, then that's dangerous. Because it reencounters the situation, and that's when I often have experienced aggression. Especially men when they find out they are wrong."

A second theme detected in the analyses was how strongly the members were affected by minority stress. Most members of the LGBT+ community and other marginalised groups experience different levels of minority stress in different situations. For example, Joanne Diplacido (Diplacido, 1998) explains that minority stress in the LGBT+ population occurs because of heterosexism, homophobia, and stigmatisation. This is underlined by one of the participants here:

"I notice that this is why I feel so safe in Oslo East, because there are rainbow flags almost everywhere, and then I feel that there are so many of us here. But if there are other places where there are mostly heteronormative people, where everyone is straight, white, and CIS, I do not feel included there."

Transperson, 32

This interlocks closely with the third theme: diversity. Despite the participant's diverse identities, the experience of feeling included in the urban environment was heavily reliant on variety. Oslo is a divided city, with an east side and a west side, where the west side has more residents that is mainly white, with more comprehensive education, better incomes, and better housing. The east side has more immigrants, students, smaller houses, and flats and is generally seen to be more diverse. Some areas in Oslo East, like Grünerløkka (see case study on page xx), are seen to be very gay-friendly with physical representations, like the rainbow flag, which generally makes the LGBT+ population experience the area as welcoming and inclusive. However, not everyone in the focus group had the same experiences about the east side:

"There are places I would not hold hands with my partner. That is especially around where I grew up, or at places down in lower Tøyen, Grønland area. Some streets that where there are, you know, groups of men hanging out on the corner- so I would… Well- it is much more stressing walking with a partner and showing that your together than it is walking alone."

Cis-Woman, 59

Both social and spatial diversity was a subject discussed several times through recurring discussions as to how the influence of other people would influence their feeling of safety. Admittedly, it was a twisted subject. However, as one of the participants says here, it is apparent that also social diversity was important:

"You don't quite know what can happen when facing individuals or homogenous groups, especially in places where it's not that busy. I can think about that a bit in relation to feeling safe."

Non-binary, 47

Jane Jacobs (Zotero) is known for her theory about eyes on the street. For the members of the focus groups, however, it was essential to know who´s eyes were watching and why. Many of them mentioned feeling safer if the first floors of buildings and the edges consisted of lit places where people were present before making it possible to see inside.

However, even if it was well-lit and no one was around, or the lighting had a specific colour, this was also experienced as threatening. This is a topic in the discussion between three participnats as referred here:

"G: When I came into the brightly lit area, I felt more unsafe because I could hear that there was someone there, but I could not see him. And because it was almost floodlit, I felt more unsafe because I know he could see me. I kept looking behind my shoulder.
And as a contrast, the rest of the streets are very dark, and you know there will be people hiding there.

F: To me- it also depends on the colour of the lighting. I don't know why, maybe because my eyes don't adjust well to that colour light at night- but if it's too warm and yellowish, it also makes it feel darker for me, so I don't feel safe."

I: I feel the opposite- the yellow light is warmer and makes it feel cosier.
If it's like white, blueish light, it feels too observing, and it often has a camera next to it."

The fourth theme detected in the analyses was actual safety. Members of both focus groups felt generally safe in the streets of Oslo, but a topic discussed was how they felt most safe and included when walking without a partner. Walking with a partner and showing affection, they became more visible queer, felt more like possible targets, and got looks from people. As one of the members from the focus groups expressed:

"I think it's a shame that there are areas in Oslo we don't use. It restricts our freedom of movement. I also walk a long detour to avoid some places because they feel less inviting."

Cis-Man, 32

The discussions worked well as the moderators facilitated and ensured everyone contributed and was heard. The members of the focus groups were often personal in their sharing, and it was perceived as a safe space to do so. The very apparent themes were how their gender expression could influence their walking speed and how their minority stress was influencing their perception of safety. All the members expressed a need for socially diverse urban places to relax and be themselves.

8.4 Analyses

The findings can be divided into two themes, risk avoidance behaviour and lack of social and spatial diversity:

1. The first finding was discovering how much their identities impact their risk avoidance behaviour regardless of whether they were alone, with a partner or with friends. This was the most substantial outcome and the main finding from the first interview session. As described in the introduction on page xx and in the context chapter, the LGBT+ community continues to be marginalised by the structures of heteronormativity. This marginalising contributes to risk avoidance and results in the need to have an overview of the surroundings in the urban environment.

This finding shows that feeling of exposure as someone that breaks with the norm can vary depending on the surroundings and in the company of a partner or with friends. This session focused on how the participants experienced their mobility routines in urban public places in Oslo. A couple of the questions in the interview guide were directed at how walking around in Oslo alone, with a partner or with friends felt.

2. The second finding was how the spatial design, lack of diversity in architecture, scale and how social diversity influenced their mobility choices were all discussed regarding their feeling of inclusion. This was strongly connected to the sense of safety. Some of the members in the focus groups expressed much anxiety and felt unsafe when faced with possible threats because of their gender expressions.

The participants expressed a strong need for urban public places with high diversity in both social and spatial environments.

This finding is essential, as it is characteristic of this group. Belonging to a minority group because of gender expression, identity, and sexuality can lead to a more vital need to control the environment and the presence of other people.
This insecurity makes this group unique compared to many other groups and restricts their freedom of movement. In addition, the LGBT+ community involves many people with different intersectional identities, such as gender, background, ethnicity, and age.

Summary of the focus group interviews

The outcome of the focus group interviews shows how the marginalising of this group results in the need to have an overview of the surroundings in the urban environment. Furthermore, feeling scared because of the minority stress leads to a change in behaviour, impacting their daily mobility and the patterns in their walkability routines.
Although many participants spoke about how they did not notice the lighting unless it was very uneven, full of contrasts, causing discomfort glare by blinding directly in the eyes, or if it was absent, several factors contributed to their changed mobility routines, but also the lighting, or the lack of illumination, could result in changed mobility behaviour, one of the participants said:

"Well, at night- it depends if I'm walking with someone or if I'm walking alone. Because I would prefer to take the shortest route home, but if I'm walking alone, I will not go where there is less light. I will not take the shortest street. And I will not walk where I can't run."

Cis- Woman, 42

9 WALKING WITH VIDEO

Sumartojo et al. show how an ethnographic method can be utilised by placing themselves in the middle of the location of interest to immerse in the atmosphere. (Sumartojo et al., 2019). They go on a light walk where their experiences are mixed with ´sensory, imagined, and representational elements of urban public place´ and not placing themselves as observers. As researchers, they have biases and assumptions about how urban atmospheres influence people. But by using this method of recording their walk, they somehow liberated their preferences and captured their reactions and thoughts unaffected by their roles as researchers.

Another commonly used method, especially within social lighting, is to go on a light walk with participants to speak about lighting or to understand how the lighting affects the participant's perception of safety or inclusion in urban environments (Casciani, 2020; Davoudian & Royal Institute of British Architects, 2019; Sumartojo, 2022). However, this method can create biases because the researcher is present during these walks and might influence the participants and the results.

The visual ethnographic method of using a video recorder was chosen to understand how the LGBT+ community experiences walking in Oslo after dark.

9.1 Methods

Sarah Pink has introduced several methodological ways to conduct empirical research on atmospheres using photography and video (Pink, 2007). One of the methods is to hand over the camera to the participants. In this open method, the atmosphere could be captured through the lenses of the participants as they walk through the place. In addition, this method could document rhythms, activity, and movement like a visual diary (Sumartojo & Pink, 2018a).

One method, known as an open method, is to hand the participants a camera (Pink et al., 2022) and ask them to take pictures or video recordings of their experienced walk. All the members of the focus groups had been asked to record a 5-7min video of their walk home with their mobile phones. This would be used to create a common language and a source for discussion when watching the videos together. In addition, this method prevents the participants from being influenced by the researcher's presence.

"Such methods open out evaluation beyond assessment against a set of fixed criteria, and can instead account for the complex ways in which people experience, use and understand design and the built environment." p.42 (ibid.)

This visual ethnographic method of using the video camera was chosen to capture better and understand the individual experiences when moving in urban atmospheres.

Furthermore, to enable the participants to reflect on how the lighting influenced their walks and their embodied experience in the space, this open method of handing over the camera to them was chosen so they could reflect on the felt experiences and used as a method to start a discussion with the participants, (Pink, 2013).

9.2 Watching the videos.

The second focus group session started similarly to the first session; however, with one change. After the participants had arrived, the author had a brief presentation of 15min with some slides that described with a few examples how much difference lighting design could make for the feeling of inclusion in urban public places. Again, this was to create a

common language and to inspire the focus group members to think of different solutions.

When watching the videos, the centre of the discussion after each video was about how the lighting influenced their experience when viewing the different recordings. Each participant showed their video, and the moderator asked the predefined questions (see appendix 3). The questions were asked individually before the group could comment on how they would have wanted the lighting to be different.

The following section describes the findings from the focus groups after it was transcribed and coded.

Figure 29: a picture of the session where the participants of the focus groupw are watching the videos

9.3 Main themes from the videos

One first theme to arise from this session was the strong contrasts between the dark and light sources when some lights would blind them with discomfort glare. For example, the first video showed a path going down a hill with a dazzling light at the bottom of the mountain. A person that came the opposite way became silhouetted by the light behind. Most participants had chosen routes they felt uncomfortable with or remembered as dark and uneven. The first participant to show their film identifies as non-binary and uses the pronoun they. Thus, the participant will be referred to as they in this section. When they were asked how they felt about the chosen route, they answered:

"I thought it was very uneven. Lots of contrasts, and the long perspectives and lines of sight are broken up a bit. And it contributes to us not getting a good overview, which makes it feel disorienting, claustrophobic, and unsafe."

Non-binary, 37

However, they also said this route was in an area they knew well from before and could choose a detour to walk around if they felt unsafe or uncomfortable. In addition, the detour only took a minute more, so changing the mobility routine when necessary was considered manageable.

Being forced to make detours to avoid risks was a common theme in both groups and sessions. In this session, however, it was easier to point out how lighting impacted their feeling of safety and how it could change urban public places to become more inclusive. The glare was often mentioned as disturbing. One of the other participants commented about the glare he experienced in his video:

“I was completely dazzled when I filmed the lamps, so it almost hurt. I think it would be better with a lower lux level in the lamps. Then I would also have a better overview. The times I went off the path, I had a better overview because there were not such harsh contrasts and my eyes had time to adapt.”

Cis-Man, 43

The second theme for this session was contrasts between light and dark areas. Many participants kept referring to the difference between light and dark when presenting the videos. For most parts, they had chosen to film areas where they would be comfortable during the day but have yet to feel safer during the evening or night.

One video started in a dark area between buildings and went through the park towards the road. The park has been redone lately with the new Oslo lamps along the path. When asked why he had chosen that route, it turned out that it was a part of his daily route to work. However, the other group members commented that they would have liked more light in other parts of the park and talked about how lighting trees or the urban greenery would make a more inviting atmosphere. Still, when asked if he felt included in using the park, he answered:

“Yes, I didn't feel excluded, but I still didn't feel comfortable because I didn't have an overview. It's a shortcut that I want to feel safe on, so that's why I go there. But it doesn't feel safe. And I go there during the day too, but it is scariest at night.”

Transperson, 32

In connection to this, a third theme was their need, their wish to see the faces of approaching people: facial recognition. The subject was also mentioned in the first session and often occurred when they spoke about how lighting could influence their decision of route. Facial recognition is a common research topic within the perceived safety (Boyce, 2014). Also, the need for horizontal visibility with a high degree of uniformity was something most participants agreed upon. One of the participants mentioned a situation where they would feel most unsafe:

“That is when it is a little uncertainty who the approaching person is, when encounters may occur in passing, so... It's also the case when I go without glasses and can't read faces, then it gets worse. And the same if there is a bit more of a silhouette like that as well, then you probably won't be able to see the face. So it makes me feel unsafe if I fail to see the details of the other person's face.”

Non-binary, 35

One recording that created a good discussion showed a route past a brightly lit football stadium, up towards darker and more narrow streets with dark doorways and alleyways and ended into a wider road. In the participant’s presentation, she often mentioned the presence of people. When passing the stadium, the strong contrast made the neighbouring area appear darker, and the noise from the stadium would drown out any cries for help. The narrow streets were also full of obstacles, making it hard to get an overview and did not help the wayfinding. She felt safer when she got to a wider road with more lights, a better overview, and local amenities such as cafes and bars that attracted people to the area. Some urban greenery was lit alongside the road as well. The moderator asked the group how they felt about the lighting of the trees, and a small discussion came up:

“B: It makes it much softer, in a way. More inviting somehow.

A: yes, and it doesn't dazzle either. It is very nice.

C: yes, and it also gives a good overview because you can see if there are people standing behind the trees. There are also wide streets and wide sidewalks in that area too, you can see it if you need to run.

B: you can see far ahead. There are good sightlines there, and the lighting helps create orientation and wayfinding.

C: in the other narrower streets there is a lot that gets in the way of the view, many things that cluster the view like that barrack there (points to a box). So it feels unclear."

B: Many of the doorways are so dark, and again, most of the lighting is there for road safety, and not for pedestrians.

E: Yes, and it's a residential area, so it's just random windows that are lit. Not much lighting is coming out on the streets."

This discussion highlights another important fourth theme: the spatial layout. The analyses showed that this significantly impacted the perceived safety and feeling of inclusion in urban public places. The participants were always aware of the sightlines and expressed a strong need for having an overview for wayfinding and orientation. This topic became easier to pinpoint and discuss after watching the videos together. Many participants said the streetlights appeared functional for cars but neglected the pedestrians. Also, the lack of vertical lighting was often mentioned in the discussions. Doorways were dark, windows on the first floors were often dark, and most of the facades were unlit. A small conversation between these two participants shows this topic:

"J: I think what could help me to feel more included is if the general area feels more sociable and is more appreciative. It's hard though if it's hideous, but some buildings can still have some excellent features that could be highlighted and that could really make a difference.

I: Yes, and if you had more vertical lighting on the buildings, then maybe you did not always need so much lighting from the first floors either?"

After the presentation of different lighting techniques, the participants actively discussed the lighting and suggested changes to what could have worked better when watching the videos together. Specific themes were discussed repeatedly, such as glare and the lack of façade lighting that created dark doorways and alleyways. They showed areas with solid contrast and how glare could blind them and make it hard to see the surroundings. They also expressed a need for orientation and that lighting should help with the wayfinding.

9.4 Analyses

The visual ethnographic method of using the video camera was chosen to capture better and understand the individual experiences when moving in urban atmospheres. When comparing with the analyses from the first session, the finding from the second can similarly be summed up in the two categories: lack of social and spatial diversity. However, the videos and the discussions showed how lighting could make a difference when considering the participant's perceived safety and feeling of inclusion in the urban built environment.

1. *Lack of social diversity* causes feelings of unsafety and a wish to be overlooked.

This topic was consistent in both sessions but with a slightly different outcome. When watching the videos, they pointed out how non-uniformity made them feel unsafe, and it is essential for the lighting to provide good visibility. However, they also felt safer if it was possible to hide in the darker areas. As they have experienced more abuse and attacks when visibly breaking the norm, the darkness can also provide a feeling of security. In addition, the members of this group know that the lack of social diversity in urban public places is prominent during the day, so it is easy to assume this also applies after dark.

This finding shows that this group is complex as belonging to a minority group because breaking societal norms can lead to a more vital need to control the environment. As a

lighting designer, it is hard to provide for both those needs: both to provide good visibility and uniformity and for places with more darkness.

2. *Lack of spatial diversity* causes feelings of unsafety as it influences legibility. The spatial design, lack of diversity in architecture, and how the scale influenced their mobility choices were recurring topics discussed regarding their feeling of inclusion in the urban built environment. The videos and the discussions pointed to many occasions the participants would have felt more welcome, included, and safe if the lighting had lit up the vertical facades, doorways, and dark corners. In addition, they thought the general street lighting from above needed to provide more legibility. Also, if the first floors were dark, closed with metal gates, or only contained businesses and offices, they felt unsafe due to the lack of eyes on the street.

This finding is complex to solve with lighting design. On the one hand, lighting the vertical surfaces, doorways, dark corners, exits, and entry points to a square is easy. Creating legibility and providing for wayfinding is one part that can contribute to creating a more inclusive place, but the architecture itself is a different field. Both for scale and what the first floors contain are outside the lighting designers' control.

Summary of the video walking

The videos showed that the anxiety caused by minority stress is most predominated in the daytime or when other people can be identified. The videos' walking patterns and movements could indicate that they became more aware of their presence than the surroundings. Things change in the dark, and people are often seen as silhouettes; anyone can be a potential threat. The lighting needs to provide an overview, legibility, and wayfinding.

After the two sessions, two questions become apparent: How can lighting contribute to more inclusive urban places so they can feel more at ease when using them? Which atmospheres can encourage more use and inclusion in the built environment? To find out, the participants will be given the role as lighting designers in an experiment in the field.

10 EXPERIMENT

It is hard to change the spatial design of a place, and it is also hard to change social diversity, but enhancing the perceived safety and creating atmospheres is a point where lighting design could start to make a change. Therefore, an experiment in the field was conducted to explore how the LGBT+ community would like the urban built environment to be lit. One area in Oslo was mentioned as particularly unpleasant during the first interview session with the focus groups. All the participants in both groups agreed on this, and this area was mentioned several times. The place is called Vaterland.

It is an area is that is struggling spatially and socially and is considered one of the more unsafe areas in Oslo. It is the hotspot for drug dealing as it is hard to have an overview. It is walled on one side and has the river on the other. The buildings surrounding them are mainly offices though also one of the tallest hotels in Oslo, and the largest concert hall is close by.

Figure 30: Maps displaying the location to Vaterland, the site for the experiement

Figure 31: A picture of Olafia gangen at Vaterland

Figure 32: A picture of Vaterland parken

The darker part of the area is underneath a flyover. It is in the shade all day, with one edge towards the central bus station and the Grønland tube entrance just opposite. All the shops or offices on the first floors are closed after six o'clock in the evening. This place became the chosen site for the experiment.

Kate Painter's (Painter, 1996) research shows that street lighting could work as a catalyst to change some social behaviour. However, she recognises that it takes more than adequate street lighting to reduce crime as a societal problem. This is very applicable to the situation in Vaterland. The lighting design's impact in this area is limited, and the change of atmosphere would also depend on other factors. Still, as a starting point to see how much difference lighting can make, this site was chosen for the experiment.

In the chapter “How the City Feels” by Shanto Sumartojo (Sumartojo, 2022), she describes how they arranged a co-design workshop with Arup and the Monarch University XYX Lab to see how lighting could enhance the perceived safety of girls. As expressed by Sumartojo, the participants in this experiment were similarly allowed to use their lived experiences and explore the luminaires on their terms. Also, the workshops arranged by Light Follow Behaviour (Light Follows Behaviour, n.d.) are similar as they aim to teach residents of social housing projects about the impact lighting can have in creating atmospheres.

10.1 Methods

The experiment aimed to investigate how light could influence the participant's feeling of inclusion at the site and how they would light the areas if they could. Altogether 11 participants showed up to participate in the two-hour experiment. However, a couple of people had to leave before it ended. Nine of the participants came from the focus groups, and additionally, two architects came from the queer architect collective called SPEED, recruited by the author. All the participants were aged between 30 and 60 years and had different gender identities. None of the participants were lighting designers. Five tasks were given to the participants during the experiment:

1. Exploring angles of lighting a person's face
2. Exploring direction and distribution of beams to enhance details and define space
3. Exploring colour and indirect lighting methods
4. One group lit a passage with different angles, and the other group walked through
5. Lighting a dark area to make it appear more welcoming

The equipment used was handheld torches provided by the lighting department at the University of Southeast Norway (SN) and two work lights. The equipment consisted of 10 tiny LED torches called Ledlenser P7R Core with 1500lm, 6 Ledlenser P18R Signature with 4500lm, and two work lights called Canopus 3000 RE. These two had a colour temperature range of 6500K-27000K and a dimming function. The audio from the whole experiment was recorded using a tape recorder in the author's pocket and documented by a photographer.

10.2 Vaterland 17 April 2023

Figure 33: A picture of Vaterland park in the day

Figure 34: A picture of Vaterland park after dark

The experiment started with an introduction to the torches as a method to encourage the participants to think about light and familiarise them with the equipment. The participants were lined up and given a torch. The beams were pointed to a set of stairs to check the colour temperature and size differences. A small task was given to the participants to start with. This task was to light the author's face, use different direct and indirect lighting

techniques, and experiment with angles. Two participants held the torches and directed the beams, while the others commented on what they thought was most successful. Shining the light beams on the concrete in front of the author and using the reflections from the materials to light the face proved most successful by the onlooking participants. Facial recognition had been a topic of discussion during the focus groups, so it felt like a natural theme to start the experiment.

The participants enjoyed exploring the five tasks given during the two hours. Facial recognition was a topic during the sessions; the first task was to light a person's face using direct and indirect illumination. Two people were lighting up the face, while the others commented and gave suggestions. Then the participants moved on to light the path leading down to the square. Next, a couple tried to light the trees and a small statue along the path, illuminate vertical surfaces and finally define the space using the beams from the torches.

At some point, they put the torches down on the ground and created different patterns. Using them this way, they became an indirect light source as they reflected from the concrete and the opposite wall. Next, the participants walked up and down and manipulated the distribution of the beams to test how it felt to walk in the path with the different lighting. Finally, one of the participants said:

"This is like walking in some pattern. It makes it so much fun and interesting. I wonder what it would be like if it was like this all the time."

Woman, 42

Some participants also decided to light points further away to create wayfinding and longer sightlines from the entries to the square as shown here:

Figure 35: Paricipants looking across form the park to the other side of the river to see if the long sightlines would help the wayfinding

The participants started exploring more details as they grew more confident handling the equipment and being in the area. As described earlier, this is an area where only a few people feel very included or safe, but the participants seemed to need to remember more about this as time passed. For example, one of the participants placed one light source underneath a bench with 2700 Kelvins. This inspired the participants to put another luminaire with a colder colour temperature to create a contrast on the other bench. However, most said they liked the warm source best and experienced it as inviting. Moreover, the white light source on the bench was perceived as cold and uninviting.

One of the participants made a reflection on how the materials became different, as displayed in figure 36 to 38:

Figures 36- 38: Pictures showing how different the benches could be percieved when they were lit inside or underneath

During the experiment, the participant's vocabularies were developed to express more precisely how the lighting influenced them. A dark passage became a subject for testing different angles and heights with the torches. The group was divided into two subgroups, with one part of the participants getting the task to find a way to light the passage so it felt more inviting to walk there. The other group was experiencing how it was to walk in different settings. (see Figures 39 and 40)

"It changes the materials completely when the lighting is coming from underneath the bench rather than when the lighting is coming from above".

Non-binary, 37

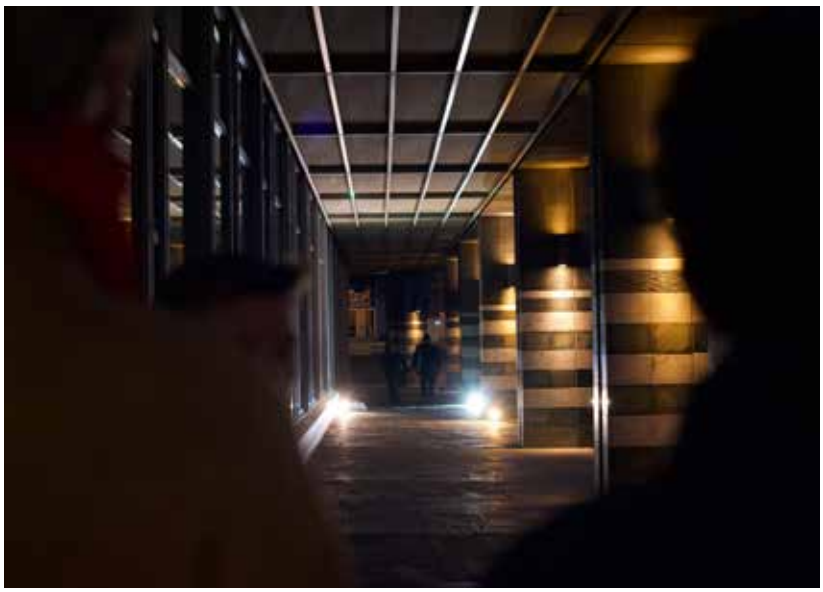


Figure 39: The picture shows how the direction of lights can cause glare

For the first try, they tried lower heights and indirect sources that lit the walls and pillars, but this was experienced as glary and blinding the walking group. The second test made the place be experienced as too dark and impossible to see anyone's faces. The group changed the settings to light the ceiling reflecting down on the horizontal plane. This setting of the lighting changed everything for both groups. It made the space feel bigger, at the same time as it gave a clear definition of the space. The faces of the people walking were also easy to see. This was a relevant experience for many participants, as they better understood the impact different angles and heights could have on the space and their perception of safety and inclusion.

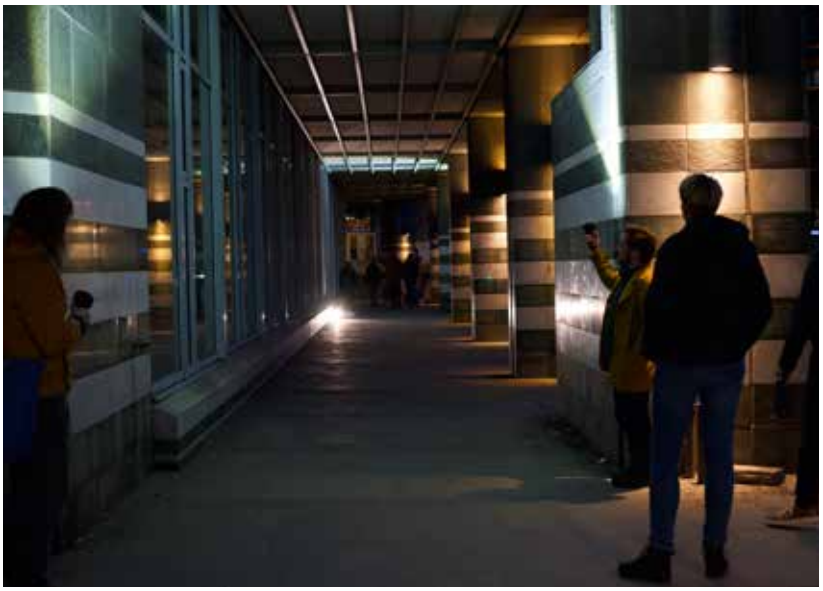


Figure 40: The picture shows paricipants exploring different directions

The last area that was explored was an area near a flyover next to the water. This part of Vaterland was mentioned in the focus groups as an area they would choose to avoid during the day as well as after dark. The Oslo municipality has tried many different planning ideas to make the experience safer and more welcoming but has yet to succeed. Instead, they have installed overhead lighting fixtures that floodlight the whole space. Unfortunately, it has not had the preventing effect the municipality hoped for, as the shadier activities continue. Next to this area, just by the water, is a dark corner that became the subject of the last part of the experiment. The participants were asked to take control of the luminaires and use their experiences to make the place more inclusive and safer.

Figure 41: A warm colour temprature makes a differnce on the wall

Figure 42: A picture showing how the participants were exploring

By this point, the participants had grown more confident with each other and using the equipment, and they used one another to discuss and change to something they felt could work better than the first try. For example, among some things that were tried out was a warm light source lighting a wall. This detail was noticed by many of the participants, and one of them said:

"It is kind of strange because it is just one of those walls that you typically do not think is very nice and think is ugly, but when using the warm light, it becomes a useful light source and creates a nice detail in the space. It is so much better to use the warm lights rather than those harsh white beams you see used in other urban places".

Woman, 59

The participants continued to light different details and discovered how using different directions, distribution, colour and heights; the lighting could relieve corners and hidden areas that were not noticed earlier. They lit trees, benches, and a railing discovering how much difference a place could be perceived by using contrasts just by manipulating the distribution of the beam to create depth and legibility. In the end, the group assembled for a last round of comments to reflect on their experiences.
After the first task of lighting the path and creating wayfinding by lighting areas further away to provide for long sight lines, they felt more confident to explore and test on their own. This became very prominent when they tested how to make the corridor feel safer and more inclusive at both ends of the passage. For the first try, the position of the torches caused an uncomfortable glare for the group that was walking, so the more indirect method was tried instead. The result was that it felt safer for both groups.

10.3 Findings

One obvious limitation of the experiment when using handheld torches is height and variation. The size of the light sources could never be very large, so all the testing was done at lower elevations. The colour temperature on the smaller torches was static, and the distribution remained the same. Only two of the luminaires could have a variable colour temperature, which contributed to a lack of variety in the attempt to create atmospheres using more variations in the colour temperature. Trying methods using the materials as surfaces that reflected the beam as an indirect light source was explored more in the walkway next to the hotel entrance, as shown in figures 39 and 40.
The exercises from the experiment resulted in three main findings:
1. Use of colour.
2. Enhancing details, and
3. Directions.

In the first finding, using colour, all the participants agreed upon the success of using the luminaires setting on 2700Kelvins, which produces a warm, almost amber colour. They felt the place became more inviting and inclusive by changing the colour. This colour temperature also contrasted the area's general lighting, which is very cold and white.

The participants expressed how they missed this warm atmosphere in more urban public places and how something perceived as ugly and repelling changed the experience to something more attractive, with the warm colour. Moreover, using this friendly source to illuminate materials, walls, greenery, or darker areas, made a more welcoming atmosphere.

However, unfortunately, the site has suffered much crime and surveillance cameras are everywhere. Therefore, the area is lit with bright white spots to ensure facial recognition on the recordings. The participants noticed this, and one of them expressed it very clearly:

“the white light makes it feel creepy, and the warm light feels more safe and welcoming” *non-binary 37*

The second finding was how the participants used the materials and the urban furniture with the beams. The materials could be highlighted by direct illuminance or hidden by using contrast to create a brighter area next to the material. By using light and dark, light and shadow, unexpected corners and darker areas became revealed. This made the place appear more predictable, as seeing what was hidden and feeling safer as possible.

Another part of this finding shows how lighting, materials, and landscape elements contributed to legibility and created visual variety. By illuminating the trees and the greenery and highlighting the materials, it gave a more substantial definition of space and the vertical planes in the place. Again, the participants picked out details automatically. Beautifying the space also made it feel more inclusive.

For the third finding, exploring directions, they tested how it felt to walk in different settings when the lighting came from another order than they were usually experiencing. When the beams created different visible patterns on the path, it was perceived as very successful and diverse. This aspect of lighting design can be compelling as it gives a layer of something unexpected. A high uniformity rate and evenly lit paths and walkways are often mentioned as a method to enhance the perceived safety in an area. The findings show that the non-uniformity created the desired effect in this case.

Summary

The participants naturally explored reflections, distribution, contrasts, and direction by manipulating the beam from the torches and the two larger luminaires. Sometimes prompted by the author, other options such as directions or colour were explored, but mainly using their own experiences to use the equipment provided.
They highlighted details and materials, and by beautifying the space, they also made it feel more inclusive. When they came to light the last area, the testing with different techniques, colour temperatures, and angles showed how they would like the more abundant space lit at night. The lighting created layers, revealed areas, expanded borders, and created legibility.

The participants were not lighting designers; they mainly used handheld LED torches. However, during the two hours of the experiment, they developed a language to express their feelings and more understanding of how much impact lighting can have in urban places.

10.4 Summary of the main findings

The findings from the field study with the two focus group sessions and the experiment can be divided into two main themes:

1. The lack of social and spatial diversity and the consequences
2. The influence of lighting.

The participants felt most safe when they could choose whether they were recognised as someone breaking the norm, depending on the presence of other people controlling the space. On behalf of this, they developed two risk avoidance behavioural strategies. The first was avoiding using places that made them feel unsafe. The other approach was to walk at a high speed.

The findings from the video recordings were that they preferred to have the surroundings lit to see places for refuge, possible prospects, and routes for escape. In other words, legibility. In addition, they wanted the lighting to provide visibility and wayfinding and a warm and welcoming atmosphere. Finally, they expressed a need for glare-free visibility to recognise approaching people and non-uniform lighting so they could choose to be less visible themselves.

The main finding from the focus group sessions is non-uniformity. The fact that participants felt most safe when choosing when they were in evenly lit places and felt most visible contributed to making non-uniformity the most important finding for this group.

This was confirmed in the findings from the experiment; it became evident that contrasts and illumination on vertical surfaces created legibility. The indirect lighting of benches and other urban furniture was seen as welcoming without causing glare. And the use of warm colour temperature and highlighting of details provided beautification and a nighttime identity to the place.

As a conclusion on the field study, the findings can be summed up as three main findings that have a direct consequence on how lighting design can contribute to making socially inclusive places for the LGBT community in Oslo:

- The participants felt most safe when choosing
- Beautification was seen as making the urban place feel more welcoming
- Legibility can be improved by using different techniques to illuminate vertical surfaces when they were most visible, so non-uniformity was most important for this group.

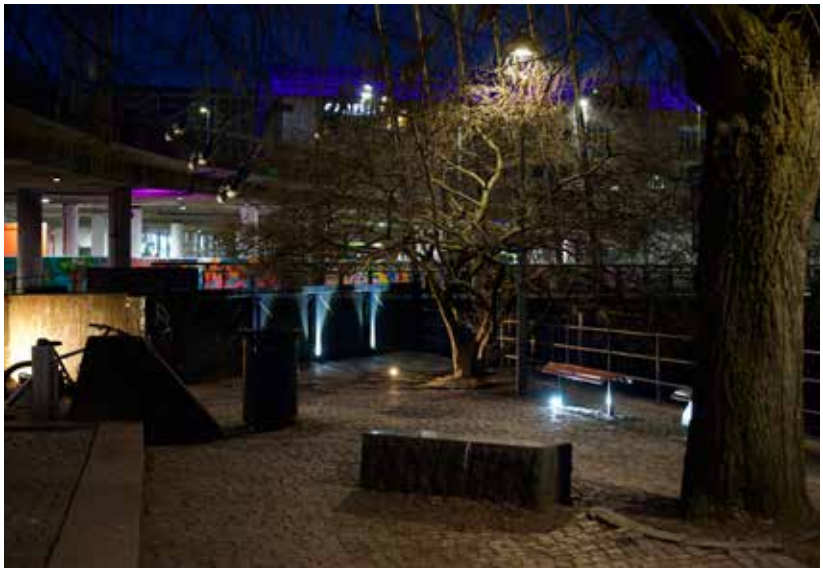


Figure 43: The final lighting design made by the participants in the experiment at Vaterland

11 DISCUSSION

The literature review and the findings from the case studies suggested some methods for making urban public places more inclusive for marginalised groups. Still, one question remains: Lighting design can enhance perceived safety, but is it possible to design out fear? As the context chapter touched upon, this topic is highly debated. Koskela and Pain (Koskela & Pain, 2000) did a study to investigate this, interviewing women in Edinburgh and Malmø about their thoughts about fear. They found that fear's social and physical aspects cannot be separated.

These findings correspond with the research by Fangall (Fanghanel, 2016) that investigated which elements were most problematic concerning girls' safety in the UK. This subject of designing out fear has been discussed for decades and raised by feminist geographers, especially in work done by Gillian Valentine:

"Research shows that social relations within a space and the group(s) who control that space socially have a greater influence on how safe women feel than does the design of the space" (Valentine, 1990, p. 288)

Hoa Yang et al. also discusses this subject in their article on their work with the girls in Melbourne during the Free to Be campaign workshop (Yang et al., 2022). Their findings were that lighting has the potential to be an element that can have a substantial spatial and social impact. However, as Koshela and Pain also referred to, (Koskela & Pain, 2000) lighting can only significantly affect the existing underlying structures. Feminist geographers like Valentine and Rachel Pain have discussed the gendered fear and the consequences of this since the beginning of this field (Pain, 1991; Valentine, 1989).
As discussed in the context chapter, they were concerned that it would not be possible to design out fear as the socialised gendered fear and the gendered power relations would maintain this fear. Today, UN Women have highlighted this problem through Safe City (UN Women, 2021), implemented in SDG goal 11. However, feminists today (Kern, 2021; Listerborn, 2020) are still critical to whether it is possible to eliminate fear, as this is one of the selling points to gender mainstreaming in urban planning, fronted by governmental plans through the World Bank (Kail et al., 2020) and the EU.

The members of the focus groups in this master thesis belong to a marginalised group, as their identities and gender expression often clash with the norms in the public realm (Cresswell, 2015). Being marginalised can lead to a double fear common among minorities. The fear they described in the interviews was based on several incidents: gender expression, biological gender, minority stress and previous personal experiences. These factors make this group a marginalised group with lived experiences and risk avoidance behaviour different from others. How to make inclusive urban places for everyone without excluding others? Rachel Pain and Tim Townshend used four separate focus groups in their study: "*A safer city centre for all? Sense of ´community safety in Newcastle upon Tyne*" (Pain & Townshend, 2002) where they conclude with:

"The challenge is to achieve this in an inclusive way, which does not further restrict the freedom of those already marginalised in city centre life" p.117 (ibid).

One of the main findings from the focus group interview with the field study was that most of the focus group members agreed that they felt uncomfortable if they had to walk across very evenly brightly lit spaces with no places to be less visible. This contradicts most of the research on perceived safety, which concludes that the participants have felt most safe in uniformed lit urban areas with white-coloured lighting. (Bullough et al., 2020; Peña-García et al., 2015; Rakonjac et al., 2022; Svechkina et al., 2020) And so, using non-uniformity to enhance perceived safety for the LGBT+ community might make urban public places feel safer for others.

However, the focus groups consisted only of 10 people. The findings could have been different if there had been more participants. In addition, the participant's opinions might have been influenced by each other, which could have impacted the results. Other methods, such as lighting walks or walk-along interviews where participants took pictures like the methods used by Mette Hvass in her PhD (Hvass, 2022) or Sara Fanny Vik´s thesis (Vik, 2019) could have resulted in different outcomes.

Still, the findings from the interviews are valid as they were confirmed through the triangulation method of collecting data with more than one method. Furthermore, the walking with video method from visual ethnography also showed that they felt uncomfortable when visible and exposed.

Another important finding from the focus group sessions worthy of discussion is the consequences of the lack of spatial and social diversity. As the literature review and case study findings were implicating, the atmospheres in urban public places consist of all three elements- spatial, social and lighting. When urban areas become homogenous because of a lack of spatial ad social diversity, changing this through lighting design alone is impossible. However, as the findings from the experiment suggested, lighting design can do a lot to make urban atmospheres reassuring, welcoming and inclusive. The literature review also discussed whether it is possible to stage atmospheres or if the people's lived experiences shape the urban atmospheres. One angle was that the lived experiences shape the atmospheres in the urban environment. What happens to the atmosphere when significant numbers of people feel restricted from using the public realm? Which atmosphere will be created then? What kind of urban environments will be made? And for whom?

The consequences of restricted freedom of movement can be greater than just a personal loss. Madeleine Hjorth describes how the natural exclusion of women and children develops if men dominate public spaces (Hjort, 2017). This was also a recurring topic in the focus group discussions as the participants spoke of how they would avoid homogenous urban public places.

How gender relations are made in our everyday spatial practices and gendered power relations, need to be challenged is something also Yasminah Beebeejaun problematises in the article "*Gender, urban space, and the right to everyday life"* (Beebeejaun, 2009) However, Beebeejaun comes up with some simple solutions, like moving a bus stop away from a pub with a homophobic reputation. Such measures can only be taken through participation where marginalised groups are invited.

Some things might be easy to change, but it is impossible to change a place's spatial design with lighting design, nor to change social diversity. Still, lighting can enhance perceived safety and lay a foundation for inclusive atmospheres. This is the point where lighting design could start to make a change.

12 CONCLUSION

The findings from the field study are divided into three parts, where the first main finding is rooted in the focus group sessions, while the second and third finding is rooted in the experiment:

1. First and foremost, the participants felt most safe when choosing when they were most visible, so non-uniformity was most important for this group.
2. Beautification was seen as making the urban place feel more welcoming
3. By using different techniques to illuminate vertical surfaces, creating legibility.

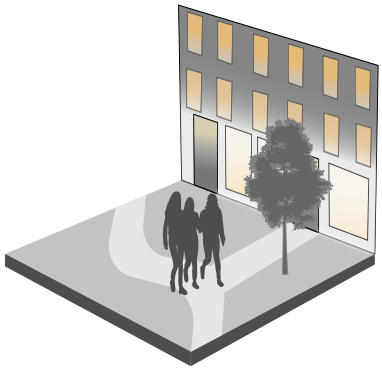
These findings were the most important background for the creation of six principles which are the answer to the main research question:

How can the lighting design of urban public places enhance the freedom of movement for the LGBT+ community in Oslo?

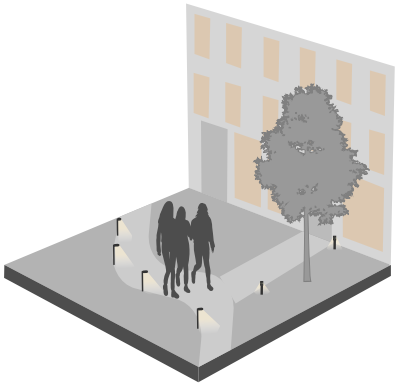
When used in a layered lighting design, these six principles can create reassuring, welcoming and inclusive atmospheres. By making lighting design based on these atmospheres, urban public places can become more inclusive for the LGBT+ and marginalised groups. These principles could create a foundation for making urban public places more socially inclusive for everyone, thereby contributing to more freedom of movement for the LGBT+ community in Oslo.

6 principles of Socially Inclusive Lighting Design

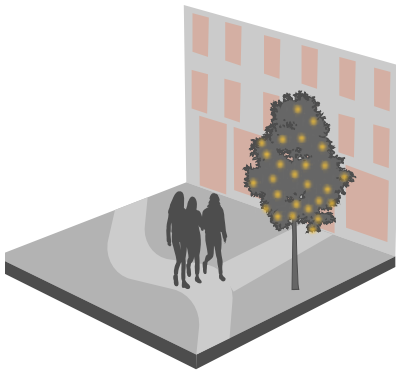
1: LEGIBILITY



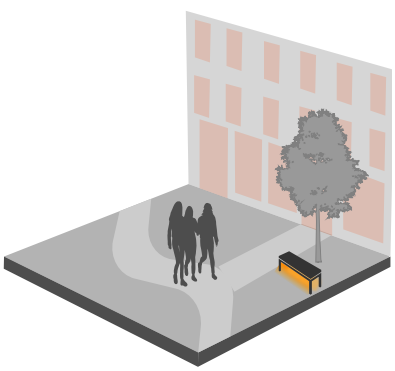
2:WAYFINDING



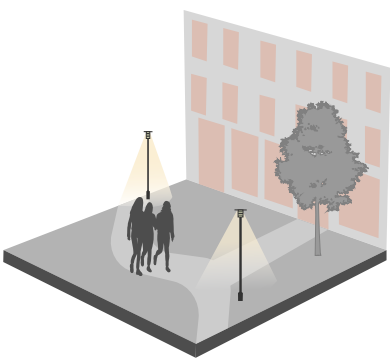
3: BEAUTYFICATION



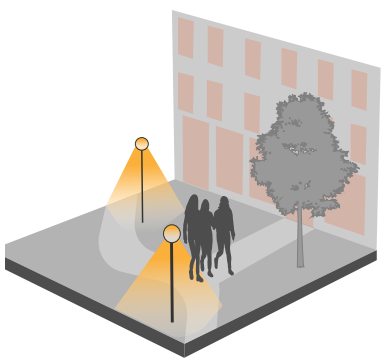
4: WELCOMING



5: HIERARCHY



6: WARM COLOURS



The principles for socially inclusive lighting design

1 Legibility by illumination of vertical surfaces

The LGBT+ community needs to feel safe in urban environments, as there is an actual risk of experiencing unpleasant and unwanted attention. Creating legibility can enhance perceived safety by illuminating vertical surfaces. By illuminating dark areas and corners, it makes it easy to navigate around places of refuge, prospect, or escape. By illumination and contrasts between light and dark, light and shadow, unexpected areas can become revealed. This made the place appear more predictable, as seeing what was hidden and feeling safer as possible.

2. Wayfinding by luminaires on a human scale

Using light sources with a human scale in the light topography can help with wayfinding as it does not create any obstacles and provides the opportunity to see the surroundings better. The LGBT+ community expressed a need to navigate easily in the urban environment and have an overview of the surroundings. Human-scale luminaires can also create feelings of intimacy. Another element to assist wayfinding could be using different heights of the luminaries by creating focal points. The variation can also distinguish between the public and the private and give an extended experience of space.

3. Beautification by highlighting materials and details

Illumination can enhance details, texture, and the colour of the different materials and the materials themselves. Enhancing details and beautifying the space creates exciting and attractive urban places. LGBT+ community are very much aware of their surroundings and the social interaction in urban public places. Homogenous places without diversity are avoided if possible. When beautifying an urban place by highlighting the details and materials, more people can become attracted to them. Also, illuminating the greenery and highlighting points contributes to more definition of the place.

Figure 44: Principle of legibility

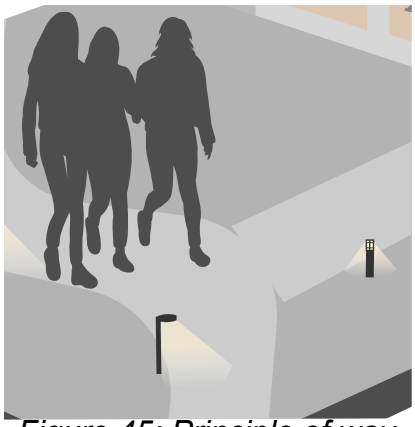


Figure 45: Principle of wayfinding

Figure 46: Principle of beautyfication

The principles for socially inclusive lighting design

4. Welcoming by indirect light sources

Indirect light sources stimulate curiosity and make urban furniture more attractive. It can also become a playful element. As a marginalised group, the freedom of movement for the LGBT+ community gets restricted due to the lack of spatial diversity and lack of activities in an urban public place. However, using indirect sources on urban furniture invites them to be used and creates a focal point on the activity that can enhance social interaction. Another part of this principle is to avoid glare. This technique can make materials become a light source when bouncing the luminance of the materials without discomfort glare. Glare can be blinding and contribute to unsafe environments.

5. Visual hierarchy by balancing contrasts

The LGBT+ community expressed a need to be able to be less visible when they felt unsure of their environments and the other people present. With non-uniformly lit paths, people can choose if they want to be more or less visible when walking on the paths. Lighting can define space by the placement of the luminaires, and highlighting the entrance and exits of an urban public place can also help determine the space and create an overview. Using the lighting to divide the place into functional zones of activities.

6. Identity by warm colour temperature

When used carefully, colours can provide visual cues and enhance a place's identity. Using colours can also attract other people, primarily through warm colours. In the Nordic countries, warm-coloured lighting is perceived as cosy, candlelit indoor atmospheres. This is extended when used in an urban outdoor environment. The LGBT+ community can benefit from creating a visual identity that can change the perception of the urban place and make it more inclusive and welcoming. For example, a warm colour can help beautify the home and make it feel safer. By changing the perception of a place, it can make it more inclusive and welcoming.

Figure 47: Principle of welcomming

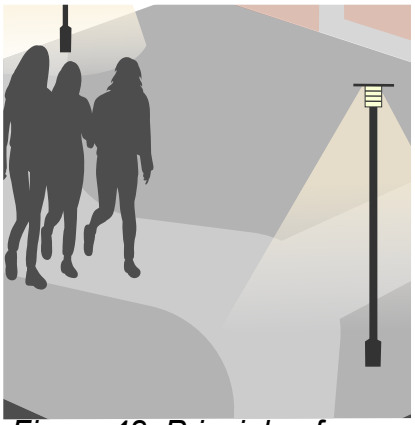


Figure 48: Principle of hiearachy

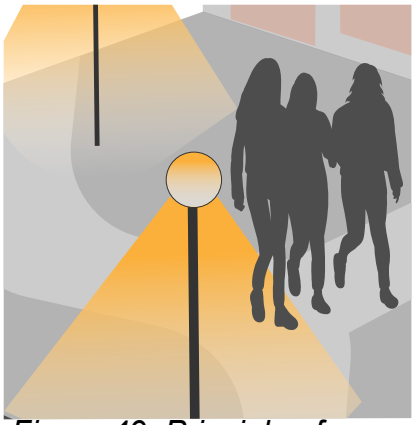


Figure 49: Principle of warm colours

11 FUTURE WORKS

The lighting standards restrict much of the lighting design for urban public places. Today, the standards dictate how much illumination they must provide on the horizontal plane and the uniformity rates. However, these standards need to take other factors into account. Like how much light comes from the headlights on a car or how much influence accent light can have on a square. More research is needed to determine how the uniformity rating needs to be to provide enough visibility.

Other recommendations for future works are to continue to do research with including other marginalised groups. This can be done using the same methods as in this master thesis. Using focus groups efficiently got people to share experiences and thoughts in a safe space. Creating knowledge and establishing a language can start in this space and extend this by arranging co-designing workshops.

Future workshops can be prepared with the municipality, arranging for the existing luminaires to be turned off in the two hours the workshop will be organised.
Another method could be to go on light walks with the focus groups and look at places they have marked as inclusive or unsafe to look at the differences together. Or use pictures as a visual ethnographic method instead of video recordings.

Similarly, the use of case studies of other successfully inclusive places can also be done as a part of the research and compared with other areas seen as non-inclusive by that group. To find out what applies to marginalised groups, including control groups in the study is recommended.

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Appendix 1. Review of 50 articles: urban, lighting, gender

	Lighitng	pedestrians	gender	women	lgbt+		
walk safe project, percieved safety related to soundscaoe of urban space and conditions of artifical lighitng	x	x	x	x		Sweden	2018
perdestian safety percetion and urban steet setting	x	x	x	x		Australia	2022
citation: urban liging, light pollution and society (book)	x	x	x	x		netherlands	2012
Evaluating street lightig quality in resedential areas by combining remote sensing tools and a survey on pedesertians perception os of saftey and visual comfort	x	x	x	x		Germany	2005
Balancing Luminance and Illuminance Consepts in Urban Liging	x	x	x	x		UK	2014
Lighitng Injury is a disaster in Bangladesh? Exploring its mangitude and punlic health needs	x	x	x	x		Serbia	2022
Light and Perception of safety in-beween buligingds: the role of lighitng in perceprtion of safety from a female perspective, master thesis	x	x	x	x		Sweden	2011
The impact of artifical lighitng on visual comfrot and visual satisfation of people, with special reference to outdoor public spaces in Colombo	x	x	x	x		UK	1996
Lighting charachterstics and Design Considerations to Facilita Placemaking for Worl Heritage Sites	x	x	x	x		Iran, France	2022
Are citizens willing to accept changes on public lighting for biodeveristy conservation?	x	x	x	x		Spain	2004
Artificial lighting systems and the perception of safety in underpass tunnels	x	x	x	x		sout africa	2020
citian: dawns and city lights- (a book)	x		x	x		china	2022
User-oriented method as a way to humanise the user-energy relationship in public lighitng	x		x	x		Colombia	2018
Lighting modes and their effects on impressions of public squares	x		x	x		USA	2010
People's ecpereinces of urban lighitng in public space	x		x	x		India	2017
The architecture of crime and of fear and crime: research evidence on lighting, cctv and cpted features 1, chapter 2 i a book- a review of 4000articles on safety	x		x	x		review	2018
Sustainable urban infra strudture for all. Lesseions on solar-powerd street lights from Kampala and Jinja, Uganda	x		x	x		South Africa	2017
Perception of gender-based violence around public toilets in Mumbai slums	x	x	x	x		usa	2020
Peceptions of safety of safety in cities after dark	x			x		book	2019
Queers in the American City: Transgendered perceptions of urban space	x	x	x	x		Bnglades	2016
Balanded Brightness Levels: Exploring human sensonory expereince of lighting and darkness in urban public contexts	x	x	x			United Arab I	2022
Descriptive epidemiology of unintentional burn injuries admitted to a tertiaty-level gofernment hospital in Nepal: gender-specific patters	x	x	x			USA	2017
Saving eneregy while maintaing the feeling of safety acciciated with urban street lighing	x	x	x			Israel	2021
Addressing fear of crime in public space: Gender differences in reaction to safety meassures in train transit	x	x	x			USA	2017
Prepception of the noctumal public space and technological innovations- citizen evaluation of a smart public lighing installation in Nantes	x	x	x			china	2023
Lighting the Way: Lighting, sanitation and the risk of gender-based violence Omugo extension camp, Uganda	x	x	x			Sweden	2021
Virtual reality for smart urban lighting design: Review, applications and opportunities	x	x	x			Sweden	2014
Urban-Centric Lighting Task Group: Tactical Lighitng as an innivation strategy	x	x	x			Italy	2020
Rethinking sustainible cities at night: paragidm shit in urban design and city planning	x	x				Portugal	2018
Increasing the Livability of open public spaces during nighttime: the importance of lighitng in awterfront areas	x	x				Denmark	2022
Impressions of lighting in public squares after dark	x	x				France	2019
Emotions and the urban lighitng environment, a cross cultural comparison	x	x				Italy	2020
Migration and gender in South Africa: follonwing bright lights and the fortunes of others?	x	x				Spain	2022
Research in Comfort Evaluation Model of Urban Resicents'Public Space Lighting Inergratin Public Perception and Nighttime Light Remote Sensing Data	x	x				Poland	2022
Linking nithtine outdoor lighitng attributes to pedestirans feeling of safety: an interactive survey appraoch	x	x				China	2022
Urban planning, gender and the use of public space in a peripherial neighbourhood of Barcelona	x	x				Israel	2020
Gender inclusivity and development in South Africa public urban spaces	x	x				France	2022
Impact of public lighting intensity on the feeling of safety in VR	x	x				Israel	2020
Light distribution in dynamic street lighitng: two experimental studies on its effects on perceived safety, prospect, concealment, and escape	x	x	x	x		Netherlands	2012
Individual factors influencing the assesment of the outdoor lighitng of an urban foothpath	x	x	x	x		Sweden	2007
Percieved danger in urban public space: The impacts of physical features and personal factors	x	x	x	x		USA	2020
Feeling safe in the dark: examing the effect of entraoment, lighting levels and gender on feelings of safety and lighting policy acceptability	x	x				mexico, spai	2016
The influence if street lighitng imporvemnts on crime, fear and pedestrian steet use, after dark	x		x			Iran, France	2022
Lighting Design in Shared Public Spaces (book)	x		x			France	2022
Modeling the public perception of urban public space lighting based on SDGSAT-1 Glimmer Imagery: A Case Study in Bejing, China	x					China	2015
In the eveing I dont walk in the park": The interplay between street ligting and greenery in percieved safety	x					Belgium	2007
Percieved outdoor lighting quality (POLQ) A lighting assessment tool	x					Ankara	2009
How much lighting is required to feel safe when walking through the steet at night?	x					Uganda	2019
Factors Affecting Pedestrians'Perceptions of Safety, Comfort and Pleasantness Induced by Public Space Lighing, A systematic litterature review	x		x	x		review	2015

Appendix 2. Interview guide for focusgroups

Discussion guide to the interviews with the focus groups
“How can lighting design contribute to making the urban public places feel more inclusive for the LGBT population in Oslo? ”

Session 1:
The session will start with the researcher introducing the main goal with the focus groups and anonymity. Then she will continue with information about the timescale and expectations, term clarification of the word “inclusive”, and some thoughts around mobility and different types of walking. Finally, the focus group members are told about the experiment in the field scheduled on Monday 17th of April.

The researcher, a moderator and the focus group members will be present. The discussion will be recorded and transcribed. It will last for 90min, 10min pr questions.

Preliminary questions asked in rounds around the table:

Can you describe how it feels to walk around in Oslo?
Alone
With friends
With a partner

Can you describe which factors make a difference if you walk alone, with friends or with a partner?

Can you describe if it is perceived differently when you are:
Walking home at night?
Just going for a walk?
Just casually walking around with no specific purpose?

More detailed questions to be asked in the plenum to everyone:

How do you experience your freedom of movement being restricted?
How does it feel different in the daytime versus the evening?
How does lighting influence your choice of route?
How do the public urban places in Oslo feel different at other times of the year?
Can you mark urban places on the map that you avoid?
Can you mark locations on the map where you feel included?

Pause

The researcher gives practical information about «walking with video” and answers questions about the task. Finally, the members of the group are sent out.

Session 2:

To create a common language, the researcher will start the session with a 15-minute presentation with slides showing examples of different urban places and a lighting design showing different atmospheres and techniques.

Secondly, each participant presents their video, and the moderator will ask the person that made the video:

How did you experience the walk?
Did you feel included?
How did you perceive your personal safety?
Which factors contributed to your choice of route?
How did the lighting influence your walk?

Then the moderator will ask everybody to comment on the video:

What do we notice about the lighting?
How would you like the lighting to change?

Appendix 3. Consent form

AALBORG UNIVERSITET

Oslo, 2 mars 2023

Samtykke erklæring

Masterstudie ved Institut for Arkitektur, Design og Medieteknologi, Aalborg Universitet København

THE RIGHTS TO THE CITY- Investigation of methods to make socially inclusive lighitng design

Informasjon om din deltagelse:

Du er invitert til å delta i en fokusgruppe som skal møtes to ganger. I møtene vil du bli bedt om å svare på noen spørsmål om din opplevelse av byrom i Oslo, og dine bevegelses mønstre som en del av en diskusjon med gruppen. Du vil også bli bedt om at å ta et video opptak av en selvalgt rute på 5-7min med tale etter det første møtet.

Med ditt samtykke vil samatelene bli tatt opp, og din video bli anvendt til forskningsformål i masteren. Uttalelsenene vil bli anonymisert og publisert som en del av min masteroppgave.

Bidrag i diskusjonene og videoer vil bli oppbevart og slettet i henhold til norsk datatilsyns retningslinjer.

Du kan trekke din deltagelse eller tilbakeholde bruk af spesifikke identifiserbare data fra publisering på ethvert tidspunkt uten videre forklaring ved å kontakte Kaja Glenne Lund, på kajagl@gmail.com

Samtykkeerklæring:

Jeg gir frivillig mitt samtykke til å delta i masterprosjektet. Jeg har blitt informeret om at jeg kan trekke min deltagelse på ethvert tidspunkt eller kan have spesifikke identifiserbare data tilbageholdt fra publisering ved at kontakte projektlederen av dette studie.

Jeg gir min tillatelse til at anonymiserte data fra besvarelser samt video kan anvendes til forsknings publicering og formidling.

☐ Ja ☐ Nej

Underskrift: _____ Deltager ID: _____

Dato: ____ / ____ / _____

Appendix 4. Transcript from interview with Kristin Bredal

modified and approved by Kristin Bredal 21.05.2023

Interiew with Krisitn Bredal, Tuesday 18 april kl.15.00

KB: Refurbishing Tøyentorg was a result of Områdeløft Tøyen. A political deal withing the municipality of Oslo that resulted in the political majority to build Munch museum in Bjørvika . The deal with SV was allocating a considerable amount of money to lift/develop all of Tøyen which is a more social challenged living area with low income families and immigrants.

Tøyen Torg started with a lot of sketches of fancy visualisations fromdifferent architects, and I remember thinking- oh my god, what are they doing here? But the Municipality hired Grindaker landscape architects that actually got to design the whole space, floor and the refurbishing. Before this, a collaborative initiative with volunteers had been initiated. They tested out how they would like the square to be. So Grindaker landscape architects took the information from the people that are living there and used this to make the furniture and the floor. They designed a new floor that was in different coloured bricks (tegelstein). The pattern was really nice and the furniture as well. The lighting concept also included the tall facades around and the accent lighting around the square. The concept had very little accent lighting on the top of the buildings. I was concentrated around the first floor where the illuminated signs needed to be coherent and work well with the light on the square.

And I don't remember right now, but I think it was already then we decided to reuse the old historical, well not that old, I think they are made in the 60´s—a five-armed light poles with round glass balls with opaque glass. They were overly glary and had far too bright light sources in them. We managed to persuade the heritage person (byantikvaren), to change the opaque glass ball to a transparent one. And then to find a light source that gives 95% light downwards and just a few percent out. To keep the functional light on the floor and still have a glow from the light source.

It meant that we did get to reuse the old poles, int their old positions. Which again meant that we didn't have to do a lot of digging and mounting. This was good because there is a garage under, and very hard to mount any poles or do any kind of digging. Luckily there was no need for it. This is a very good example of the sustainable refurbishment of a square.
Although I do think they had to make the pole over gain as it was rusty.

K: how did you work with the square:

KB: So we did analyses, and as you can see here: (showing a picture of how the square used to look like) it was so dark there and there- pointing at different areas.

R: so how do you work with these things- when you work with a new project- do you go out and make analyses and so on?

KB: Oh yes, we always go there too and look at the place if we can, if it's not a new built. So, we are you know, we go there (referring to Tøyen Torg) and we are desiccating, we are looking at the challenges and looking at the possibilities. Actually I think we did suggest some new placements, and I think that's how it ended up being. And then you know, we vizualise it. That's really just to make it readable for the decisions makers so this is how it used to be (showing the picture) and this is what we wanted, which is very simple, and we found this light new source. But the heritage person really wanted keeping the poles, and I was happy to do that. And it got much nicer with a new transparent glass ball and also with a newly painted body.

R: what colour temperature did you have?

KB: 2700? But there's also a gold reflector, so it reflects really warmly and also it shines down on the warm bricks. It's really important to get that reflected warmth from the floor. What is good with this project is that we didn't have to dig anything as the cables were all there. So it was easy to have it done.

R: What about them? (pointing at some lights on the picture)
Because I've noticed that some fluorescent tubes in the, like, above all the shots and integrated in the architecture, they're not done by us. No. So why did you choose to keep it? Was that a decision you made? Or somebody else decided to do

KB: that? No, no, you can't just go and ask about removing things. When it has just been built? But I mean, we wouldn't have done it like that. Probably.

R: But so they were new as well?

KB: Well, yes. I have the old photos somewhere... (looking at her computer) but they did change the balconies. Yes. And they changed the signs. But it all belong to different departments, and this was with the architects.
We were with the landscape architects. And I think that all in all.. there was nothing we could do about this.

R: So also the facades the material that was also new?

KB: No, not on the actual- (scrambling with chair..)

R: so only the balconies, yes. Okay.

KB: Yeah. Just the back on this Yes. (pointing on the map on the screen) Although you can't really see it. No, we can't go there. (referring again to the map) Yeah, because they have all this brick? Yeah. Would you say it's, it's also outside there, then? Yeah. And the passages here (pointing at the map) we would also have done something with if we got the possibility, but the architects did it. I think even before we got involved, you know, it's Yeah, it is in this process. Unfortunately, you can´t get control of everything.

R: It says on your project, like in the description, it says that your aim was to make a warm, nice atmosphere and to make this glow on the atmosphere. And obviously, by changing the, the inside of the lights, you might get glow on below, like on the atoms here, but to create a warm atmosphere. How did you work with doing that?

KB: The warm atmosphere is basically the warm colour temperature. So, I think we picked 2700 Kelvins. Maybe it was even warmer. Today, we will probably pick 2200. But this was back in 2017. I think we picked the warmest we could. And with this light source that we've used before, we have managed to persuade the manufacturer to make a version with a gold reflector. So that gives it even more warmth. It actually means quite a bit. So that is mainly what gives the warm atmosphere. But it was also sort of the colour of the whole square. The colour of the mast was warm, and the colour of the floor was is mainly warm. It's hard to make a warm atmosphere if you have like blue or something similar but in this situation. It was easier.

R: Yes, I also think that the which is not your colour but the golden material as well on the first floor between the all the shops and everything that also adds to the warm
How about the standards? I've tried to read up on the standards in Oslo it says the class is an A1 or

A2, and so on, but this is between two and five lux.

KB: Yes, well there is no cars there, I think it is minimum, maybe five lux is the minimum, as an average was not hard to reach at all. Actually, we had to dim down everything because there's, you know, five balls on each mast. So, it's dimmed down. And it is more important to get control over it so you actually are able to lower the lux levels. But, yeah, I mean, I personally think that the biggest problem with lighting designers is that they go blind in the light calculations. And they have no idea of how little lights you actually need in order to see. And we should go below the standards most of the time if you can; of course, there's a problem if there's a spot overly lit just next to it, but yes.

R: I do agree, but I would also think that like as a lighting designer, that it should be within like, not necessarily in your core, but knowing about how much you really need should be something that they

KB: But it can be really hard to say. Because it's situationally specific because it depends on what is the function of the place. How many other lights do you have? We have made fantastic lighting in the past, the kind that was kind of subdued and very well organised, but then suddenly comes a huge commercial sign up next to it. And then all looks just pitched dark. So this is a problem.

R: As a totally different thing. It was very interesting. Your thing at the symposium where he talked about this, it's very interesting.

KB: I mean, your eyes can see, from 100,000 Lux, in the bright sunlight to 0.1 Lux in the moonlight. So this spectre of vision that we have in us as human beings are not tremendous. I mean, we could have said I would save easily 70% energy use for city lighting, if we manage to do it well. No problem. But you need a control system and you need to remove at least a third of all the shit that's up there.

R: I agree. One thing that I do think though, that I have found many people react to is the rate of uniformity. If the uniformity is not very high. So like if it's very patchy or they experience that there is a lot of contrast in the room. The class in the standards is 1.5 uniformity. Did you have that?

KB: Oh,I don't remember. But you know, in the room, it is you know, when you're inside… the perception is very different from when you're outside. I think uniformity can be much less outside than inside because it's just a very different way of understanding the space. Come back and interview me when I'm 90 and we'll see what the world looks like because then we will have to reduce. I mean all the poles are along the roads there is no need for them.

R: Yeah, no. But the standards are they mainly used for insight like are they been made for instance; they are also made outside, right? Yeah,

KB: very much. I mean for the standards in Norway, is enormously 30 lux for, you know, the top of stairs. Even for the signs it was just like that. Hmm, this is insane. Why would you want 30 lux on something just to make it visible? You don't need it. But unfortunately, we see now, you know, over-lit spaces all over and it's really, really over-lit. But because the floor is dark. Yeah, it's just more and more, it is just too much.

R: I've said that one question and then question number six is the municipality Oslo that has had a lot of focus on creating new urban public places in Tøyen Torg after the Munch museum left. And I was wondering what you thought about their method of involving users as their method? Could they have done anything differently? Or how do they work? How did they feedback from that

KB: when it comes to an “områdeløft Tøyen” I think the municipality has done a really good job. We also work on a report called “Parkløft Tøyen”, together with Sola, landscape architects and Rodeo architects where we went in and did a huge user participant work to find out what the needs were, and what do people want.
And as lighting designers, we ended up suggesting trimming the trees instead of cutting them down so just let some daylight in and some sunlight in. Yeah. And in that process, we ended up lighting up streets-art on facades that made a huge difference. Because only one spot on each façade is needed. ~~can just, you know, show a~~ This give much more visibility for the space. But so in that sense, I would say that they did a good job. It’s still I mean, it still is, you know, it’s ongoing, but I do think that they do a lot of good work

R: So when you think about Tøyen Torg, what, what do you think is the reason for their success?

KB: success? Well, first of all, it has the activity on the first floor, it has the shops, and it has the cafes, and there’s more cafes. So it has a lot of people passing through, then you just have to make the space nice and functional, both for them. And, and if you like I do love the architecture, ~~and that sort of is~~ I care for that period is spirit, I care for the publicness of it, because it’s mainly public buildings around it. And if you think you have to be very careful “nøktern” then not do too much. But really just what’s needed. I think that it is the simplicity of it. I was very happy that heritage person wants to keep the masts. So it was a hard process to persuade them to change to a transparent glow. But we managed to.

R: Im also looking into the atmosphere and trying to do research about reassuring atmosphere, welcoming atmosphere or inclusive atmosphere- I think it is a little bit problematic- what is making an atmosphere? How is the atmosphere created?
If you were thinking of making an inclusive atmosphere, is it even possible?

KB: not with lighting alone I don’t think. It is totally depended on the physical side of things you know—The buildings and what they contain, the signs, the floors. You can not make an ugly space nice with lights- that is very difficult.
But you can find something nice in every space that you can pull out as a quality. And you can add quality to it with light. You can also make it look poorer with light, which might be the case most of the time. But you can contribute by adding an atmosphere.
And I think readability and sightlines is crucial when it comes to that. Consider the long views.