A lighting design framework to assist the integration of Historical Urban Public Parks to modern city life

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PREFACE - CO-AUTHORSHIP

Alessandro, as a person grew up in a historical city with a background in engineering, provides a solid understanding of this topic with a rational technical solution.

Ran, coming from a rapid developing city with background in architecture, contributes better understanding of urban development and the connection between human and space.

The different life experiences and backgrounds are an embodiment of the contradictions of an Historical Urban Public Park. From one side the historic elements and value of the park, from the other side a city life that moves fast at the speed of innovations.

The dialogue between the authors represents the wish to harmonise the contradictions of the park and to project it to a possible future. This thesis work is the result of such dialogue.

In this thesis the research is divided as:

Alessandro: study of formal garden history, study of urban parks / open public spaces, Lighting regulations, Lighting technologies and Lighting history.

Ran: Study of heritage Preservation, Study of psychology and perception of outdoor public space, Study of urban transformation, Lighting qualities and considerations.

The case studies and lighting proposal are carried out by both.
TABLE OF CONTENTS

01. Introduction
   - Background - History of public lighting
   - Research Rationale
   - Research Questions
   - Methodology
   - Limitations
   - Use of Study

02. Literature review
   - Definition and description
   - ICOMOS document on Historical Urban Public Parks
   - Lighting regulations

03. Theory building
   - Background study - theory selection
   - Deduction of space qualities
   - Framework of space qualities
   - Lighting Strategies based on Space Quality Framework
   - Framework of lighting qualities

04. Theory testing - case studies
   - Bryant Park
   - Prato della Valle

05. Praxis
   - Humlegården case study
   - Humlegården lighting proposal

06. Discussion and conclusions

Bibliography
Lanternarius with cucullus - I-II century A.D. Rome
01. INTRODUCTION

Background - History of public lighting

In ancient times streets had no public lighting. Greeks and Romans used oil lamps for security reasons: to recognise obstacles on the path or to keep potential robbers away. Oil lamps provided long lasting and moderate flame. The Romans created a role called “lanternarius”, who was a slave responsible for lighting the oil lamps in front of their villas.

This figure kept existing up to the Middle Ages. In London they were called “link-boys” and escorted people from one place to another through the dark winding streets of medieval towns. In Venice they were called “codeghe”, and in France “porte-flambeaux”.

People used a variety of tricks for navigating their neighbourhoods at night. In The Downs, an area near the English Channel, patches of chalky soil were used as beacons in the night. In wooded areas, bark was removed from trees to expose the lighter wood underneath.

Around 1000 AD early street lamps were built in the Arab Empire, especially in Córdoba (Spain), Cairo (Egypt), and Baghdad (Iraq). A lamplighter was lighting up the lamp each evening generally by means of a wick on a long pole. At dawn, they would return to put them out using a small hook on the same pole.

In 1128 in Venice under the power of the Doge Domenico Michiel, little lanterns were hanged on the wall of the houses, so that they can lit up for the whole night and give courage to the wayfarers that could see the lights from far. In particular circumstances like pestilences, riots, or when the protection against criminals was urgent, it could be imposed to the house owners to turn on a lantern with a tallow candle on the windows of the first floor. This practice start to spread out more and more since the beginnings of the 15th century.

In 1417, Sir Henry Barton, Mayor of London, ordered “lanterns with lights to be hanged out on the
winter evenings between Hallowtide and Candlemasse.” In the early 16th century, the inhabitants of Paris were ordered to keep lights burning in the windows of all houses that faced the streets. The same type of regulations were issued in London later in the same century: one or more light should be hang out from six to eleven o’clock, otherwise a penalty would apply.

The first public street lighting with gas was demonstrated in Pall Mall, London, in 1807. In 1820, Paris adopted gas street lighting and gas lamp posts multiplied in the capital.

The first electric streetlight used the “Yablochkov candle”, a type of arc lamp. It was first used in 1877 in Paris to lit up 54 street lights on the Avenue de l’Opéra and 80 lamps in the Grand Magasins du Louvre. After that, all the main squares and streets of Paris were lit up with the arc lamp, so that the city was called “Ville Lumière” - City of Lights.

Thomas Edison's electric incandescent lamp was invented in 1879. Early incandescents only produced around 12 candlepower (about 148 lumens) and were 20 times less energy efficient than arc lamps.

While European cities placed “electric candles” on posts, like we do today with street lights, the Americans had the idea of lighting entire cities and villages by means of a grid of towers that stood up to 90 metres tall. These structures were equipped with 4 to 6 arc lights of 2000 to 6000 candlepower each (6000 candlepower is about 74000 lumens). The temperature in the arc could rise to 4,000 degrees Celsius. They were called moonlight towers and each of them illuminated more city blocks at once. The towers were most common in the 1880s and 1890s. In some places they were used when standard street lighting, using smaller, shorter, and more numerous lamps, were impractically expensive. In other places they were used in addition to gas street lighting. Arc lamps were known for their exceptionally bright and harsh light, but they did not last long. So in time they were replaced with incandescent lamps that were cheaper, brighter and lasted longer, while arc lamps remained useful on industrial sites. The tall light tower had the advantage of lighting up a large area with 1 single lamp (convenient also for being then 1 single lamp to maintain). On the other side, near tall buildings and in inner streets it created dark and dangerous areas.
The 20th century signed the multiplication of lighting technologies that improved the possible amount of light, the colour rendering, the maintenance costs and energy efficiency. This progression increased also the usage of lighting in the urban context.

The improvements of lighting technologies marked the historical evolution of public lighting. It is a process that involved across many countries and cultures. However, looking into the past, it seems that what never changed is the need for properly lit up urban places. Urban public lighting made the cities to be perceived safer at night. It allowed also more activities at night, became a way to express celebrations or support commerce, as some paintings can testify, even before the arrival of electrical light. It created more possibilities in the city and different atmospheres, possibly closer to the wishes of people. The evolution of public lighting fuelled a democratisation process that allowed the usage of public urban spaces at night to everybody, while in the past lighting in the night was a privilege of few that can afford it.

Since 140 year from the first electrical street light, lighting technology has evolved in all aspects and we have more possibilities than before. Its purpose is limited only by what we consider valuable and how we care about it.

**Research rationale**


This trend is common everywhere around the world. In Western countries the urban population is at least 70% of the total population and the trend is still growing (see picture: Urban and rural
population as proportion of total population, from “World Urbanization Prospects - highlights. Revision 2014”). It looks like Asian and Africa, that can already have now areas with high density of populations (see picture: gpw-v4-un-adjusted-population-density-global-2015, from Colombia University), are on the same direction, growing with higher speed. In this situation and under the pressure of urbanisation, it is reasonable that every land in the urban environment is very valuable.

The urbanisation and population growth in the modern context can affect the historical heritage in the urban context. It is important to preserve historical heritage so that it can “continue to inspire, to admonish (from the Latin, monere, the root for monument) or simply to provide the same or different uses in the present. We advocate for conservation because objects and places hold important information, associations, and meaning; because they embody social and cultural memory which, if lost, would make the world less understandable” (Frank Matero in Stubbs and Makaš, 2011, pp xvi).

Parks are important in the context of high density, and even more in context of increasing population and urbanisation. Public parks where created in the 19th centuries to answer an health problem. Public parks are still needed nowadays because we have modern health problems. In today’s people lives, more and more events happen on a screen: a television, a computer, a mobile phone or even a smart watch to keep in contact with our families and friends, to work, (to do shopping) or just to keep updated with what happens in the world. Modern life allows a level of “virtualization” and “efficiency” so that we do not need to go anywhere and from one device (like a smartphone) we can do anything just sitting in our couch. This convenience is raising new problems. People’s life is becoming more sedentary and this creates a long list of negative health effects. New type of social integration problems are raising. New words are coined to describe social phenomena like “Hikikomori”. It is an acute form of social withdrawal being defined for the first time in Japan, but more cases have been found in United States, Spain, Italy, South Korea and France. It affects teenagers and adults that replace direct relationships with those mediated by the Internet (Treo, 2013; Tajan, 2015). Those are some examples of the relevance in a city life of open public spaces like urban parks that can promote a healthy life style - active and social - where people can meet freely and have activities together (independently from commercial activity hours). Moreover well-designed open public spaces can eventually improve the feeling of living in a city open and safe.
Urban parks are one case of open public spaces that can enrich the citizen’s life with a lot qualities and activities. They soften the atmosphere and the sounds of hard-looking built environment. They introduce the vitality of nature in the city bringing animals, plants and flowers that give company to people with the changing of seasons. They provide a sensorial experience that can help to relax and balance the multitasking modern lifestyle. It is proved that natural places can improve people’s mental and physical health: they provide quality areas for social life and physical activities (Kaplan R., Kaplan, S., 1989; see other research works of Rachel Kaplan and Stephen Kaplan).

In conclusion, Historical Urban Public Parks are important to preserve because they host historic collective memory and cultural values. However their long term preservation has to face the modern pressure of the land usage in the urban area coming from high density cities and a worldwide trend of urbanisation and population growth. On the other side there is still a need for urban parks in modern times. It is reasonable to think then that the Historical Urban Public Parks can be better preserved for the future if they have an active role in the modern urban life, showing both their historical value and their qualities as an urban public park.

Considering that modern society runs 24/7 and life happens also when the sun goes down, this work envisions that artificial lighting can have a role in supporting the adaptation of a Historical Urban Public Park into the modern city life as an action of historical preservation.

In fact artificial lighting itself always represented a sign of modernity

**Research Question**

This work intend to create a framework of lighting qualities that can help to draw a lighting design plan that support the integration of Historical Urban Public Parks into modern city centres.

Crate a lighting design framework to support the proper usage of HUPP in modern city centres
1 - Which aspects should be taken into concerns when consider lighting in a historical urban public park?
2 - What are the main lighting qualities that should be considered to help a historical urban public park be better adapted in contemporary city life
3 - A general lighting recommendation for this type of space

Methodology

The process of Theory Building will be used to create a set of lighting qualities and it consists of three steps:
- Theory creation
- Theory testing
- Praxis

In the Theory creation, a framework of lighting qualities will be deduced. A conceptual analysis is performed on the concept of Historical Urban Public Park. Therefore it is decomposed in sub-concepts of historic preservation, formal gardens, urban parks, open public spaces, urban development and contemporary society. From current theories and texts dedicated on those concepts, positive space qualities are deduced and extracted. Then it is evaluated if they can be grouped in categories. This framework of space qualities is translated into lighting qualities through recommendations in lighting handbooks and intuition.

In the Theory testing, a set of case studies of historical urban public parks are performed. It helps to understand the various aspects to be taken into consideration. In landscape architecture, the
primary body of research and practice is built up through written and visual documentation. The method of case study is one very valuable and effective way of studying the collective record of the development and advancement of knowledge, and it has been used for both research and practice for a long history in architecture, landscape architecture, and urban planning etc.. All has shown that it is good to be applied in architectural lighting design.

More specifically, historical urban public parks have been chosen that received a renovation in the recent decades, providing a general improvement or a solution to some clear problematics. In this way it possible to make more explicit that certain qualities of the space, missing before renovation, made an improvement on the space. This positive qualities introduced in the space can be compared with the lighting framework to test the validity of it.

Although case study method has many benefits, as being empirical research, it is really hard to be comparative across the cases, as each case serves as an individual, and has its own peculiar real world context. Also detailed information is not always available or accessible.

In the Praxis, Humlegården park in Stockholm has been chosen as a practical case. Its last redesign dates on 1870s and it has got just a minor renovation in the middle of 20th century. Therefore it is possible that today this park, unlike the parks in the case studies, is facing more issues.

It is performed an analysis of the park and the current lighting following the same criteria in the case studies. The result is compared with the lighting framework, if it can predict some issues. If there are some differences, then it is interesting to see if-for example at safety level, some issues would have been recorded by the police safety reports.

It will be created then a lighting proposal that will follow the lighting criteria created before.
Link
A Lighting Design Framework to Assist the Integration of Historical Urban Public Parks to Modern City Life

INTRODUCTION
Research Rationale
Research Intention and Objectives
Research Method

LITERATURE REVIEW
Definition and Descriptions
Review of Literature

THEORY BUILDING
Deduction of Space Qualities
Space Quality Framework
Lighting Strategies based on Space Quality Framework
Lighting Design Framework

PRAXIS
Case Study
- Humlegården

THEORY TESTING
Case Study
- Bryant Park
- Prato della Valle

DISCUSSION AND CONCLUSION
Limitations

It was not possible to visit all the case studies by person. It has been possible to visit the local parks in Stockholm and Prato della Valle in Padova. It was not possible to visit Bryant Park (NY, USA) by person, however it was considered very relevant to put into the case studies.

Presenting lighting works in pictures gives a good impression on the work but is not always possible to have the same effect while we see it with our eyes. This is for multiple reasons. First of all the cameras have a “dynamic range” that is averagely smaller that what our eyes can see. It is possible to reach the same human eye sensibility when high-end cameras are used or when HDR High Dynamic Range techniques are applied in postprocessing. On the other side, the media we use for see the pictures, paper - or screen has its own limits as well.

It is possible to say that pictures of lit up environments taken with average cameras will presents higher contrasts between light up areas and dark areas, compared to what we could see with our own eyes.

Use of Study

The process of theory building helps to validate the creation of a general lighting framework valid for a generic historical urban public park. It will be then in the hands of the practitioner to modulate it following each situations.

It can be used as a general guideline or local policies to treat Historical Urban Public Parks.
02 LITERATURE REVIEW

Definition and descriptions

The International Council on Monuments and Sites formalised for this type of space the name “Historic Urban Public Parks” of in their document ICOMOS-IFLA (2017). Many of them date around 19th or early 20th century, when the public parks became part of the urban planning. However those parks can be younger or older. This type of spaces are open to general public. They can be of any size. They are usually public owned and represent “common wealth”. They can be owned by public entities or foundations that take care of them. The identity of these spaces relies on the composition of their elements as vegetation, architectural elements, water features, paths or topography. Historic urban public parks are not promenades, boulevards or tree-lined streets.

Nowadays what we refer with the name of “park” can be synonymous of words like “garden”, “square” or similar expression. In fact it is possible to follow the etymology of the words “park” and “garden” for spot similarities.

The etymology of “park” (from etymonline.com) comes from Old French parc “enclosed wood or heath land used as a game preserve” (12th century). Possibly this is derived from the West Germanic word is pre 4th century that originally meant the fencing, not the place enclosed. The meaning of “enclosed lot in or near a town, for public recreation” comes from the 1660s in London when the royal parks dedicated to hunting were eventually opened to public.

On the other side the word “garden” (from etymonline.com) comes form the Latin “hortus gardinus” meaning “enclosed garden”, itself coming from the Proto-Germanic “gardaz”, “to grasp, enclose”.

It seem that both of those terms refer to a place with fences or enclosed, protected.
ICOMOS document on Historical Urban Public Parks

International Council on Monuments and Sites is developing a document specific to Historical Urban Public Parks.
The ICOMOS-IFLA Document on Historic Urban Public Parks recognises historic urban public parks are an essential and inalienable part of the traditions and plans of many towns and settlements and the need from them to be preserved as historic sites for the use and enjoyment of present and future generations.

It specify 4 main categories of character-defining elements:
- spaces, views, planting and vistas
- topography
- light
- environment

In the document is considered important to protect various qualities of the spaces that can be park of the park:
- the sizes, relationships and their proportions
- the component parts
- the original purposes and meanings
- the views, focal points, viewpoints and vistas that are part of the design and identity of the place
- the movement, colours, sounds and shades of vegetation must be seen by people from the surrounding areas
- the settings where the parks were designed with, like in relation with adjacent urban spaces, streets, canals or buildings
- the elements in the edge of the park like streets widths, paving materials, street tree planting, lighting.

Topography qualities should be protected:
- historic landforms, mounds and swales, terraces and rockeries
- large underground structure should not be built within historic urban public parks
Light qualities should be considered:
- natural light, sunshine and shade
- night light can be added to enable enjoyable and safe public use in darkness
- lamp posts and fixtures should enhance the character, spacial relationships, views, vistas, sight-lines and other historic-character-defining elements of the park
- night lighting should not spill into the night sky

The environment should be cared:
- the parks provides urban biodiversity
- flora and fauna should be protected
- ecological corridors should be enhanced

When caring about a historical urban public park, it is important to base the work on a careful research, original documents, as photographs, and evaluate their condition based on a current park inventory and future usage. It is important to research the evolution of the planning and development of historic parks and their settings.

An overuse of the park can stress the vegetation. So appropriate procedures can be prepared to control the number of visitors.

Original elements and furnishing, as fences, gates, lamp posts, railings, paving material, art works and vegetation should be protected and repaired.


Since historical urban public parks are public-owned, they should be accessible to all, some parts may be modified to allow they can be universally accessible.
Lighting recommendations

Not so many regulations cover the case of historical urban public parks. It is usually referred to recommendations of lighting for traffic in urban areas.

The CIE – International Commission on Illumination released these documents:
- CIE 136-2000 Guide to the lighting of urban areas
- CIE 115:2010 Lighting of roads for motor and pedestrian traffic

The European Committee for Standardisation released:
- EN 13201:2003 Road lighting

These publications state that road lighting aims to support the traffic through-put, to arrive at the destination of the trip and to avoid accidents. For residential streets, lighting should promote also safety and well-being.

Road lighting regulations are modelled on the “foresight” view, as the driver looks ahead. To apply this idea they rely on the luminance concept”. In fact their aim is to provide a bright road surface against which objects are seen in silhouette.

On the other hand, in residential streets, pedestrians’ speed of movement is less and the objects that are close are more important that those far. The surface pattern and texture of objects on the road and footway are more important. Then, for lighting of local and residential streets (conflict areas), is it used illuminance.

Recommendations are generally about the task area, that is the road area.

Road lighting recommendations are in luminance for horizontal surfaces at ground level, with requirements for the overall uniformity and longitudinal uniformity of the road luminance. A threshold increment factor helps to measure and control the disability glare from the road lighting luminaires. The surrounding ratio factor summarise the need of light on the areas surrounding the
road. These can help the drivers to perceive the environment and detect objects in curved sections and allowing to still follow the “luminance concept”.

Conflict areas are those places when a vehicles traffic is crossing areas with pedestrian, cyclists or other road users. Parking areas are considered conflict-areas. Lighting should reveal all the obstacles in the area. For conflict areas, luminance is the recommended design criterion. If viewing areas are short or there are more factor, illuminance can be used in a part of the area of for the whole area. They are considered:
— average illuminance over whole of used surface
— uniformity of illuminance
— threshold increment

Streets for pedestrian or cyclists, for example residential roads or parking places, are in illumination. Recommendations consider:
— illuminance of horizontal surfaces at ground level (average and minimum)
— illuminance of vertical surfaces (minimum) and illuminance for facial recognition (minimum semi-cylindrical illuminance at 1,5m, as a head height)

Control of discomfort and disability glare is not as critical as for drivers because pedestrian movement is slower and this gives a larger reaction time.

All the values indicated should be maintained throughout the life of the installation for the specific light classes.

Motorised roads, conflict areas and pedestrian areas are divided in classes. Various factors contribute to the choice of level of lighting connected with the class. For example: traffic speed, traffic volume, traffic composition, separation of carriageways, parked vehicles, ambient luminance, visual guidance / traffic control. Pedestrian areas add the parameter of facial recognition.

The higher is the class, the higher are the light levels suggested. A road is selected with an higher class when it has one or more of the following qualities: higher traffic speed, volume and composi-
tion; no separation of carriageways means higher class; presence of parked vehicles; higher ambient luminance; poor visual guidance / traffic control.

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The CIE 136-2000 “Guide to the lighting of urban areas” gives more specific recommendations on how to lit up public areas and streets in old and new type of urban context. This guide states that the main purpose of urban lighting is not only the safety and easiness of progress for the road user, but also the improvement of the appearance and character of the urban area in the night.

The recommendations consider 4 types of urban areas:
- residential areas (collector roads, local roads, specialised residential areas)
- industrial areas
- commercial areas
- miscellaneous areas (dedicated to pedestrian and cycle paths in special situations)

The case of historical urban public paresis more related to “specialised residential areas”, since they describe areas dedicated to pedestrians where the usage of motor vehicles are strictly reduced. On the other side these areas are considered high density. Suggestions for the “commercial areas” can also be considered since the park itself could lie on a commercial area of a city centre. Commercial areas are considered limited for vehicles, and designed to attract people. It is suggested that building and monuments of historical or local importance can be used to stimulate interest. It can rise the curiosity of people and invite them to explore further.

The lighting design criteria for both areas should consider:
- visual orientation in the environment
- detect obstacles on the path
- perceive movements and intentions of other people
- read street signs and house numbers
- reveal landmarks, bus stops, etc..
- highlight and respect the appearance and character of the area
- create a social atmosphere to support meeting with people
- allow children to play
- discourage criminal activities in the complex by eliminating any dark corners

Lighting should provide an interesting, pleasant and vibrant night-time visual scene, so that can attract people to the area and encourage social contact. Buildings and monuments of historical or local importance can all be used to stimulate interest in an area which will arouse the curiosity of people and invite them to investigate further.

The guide suggests that a lighting installation promotes pleasant feelings when it creates good modelling of human figures and of the decorative elements in the area. In residential areas where vehicle have limited access, it is recommended not have uniform lighting levels throughout the area. Variations can make the night time environment more attractive. Circulation and play areas will require appropriate high levels of light. Meeting areas will require intermediate levels with appropriate semi-cylindrical illuminance. Landscape area and parking of vehicles will require minimum standards.

It interesting that the recommendation find that lighting up an urban area is an occasion to highlight good qualities of the space and hide or reduce the negative elements: “Much that is ‘negative’ within our urban environment can be lost at night, and by imaginative public lighting the finer and more worthwhile elements of an area can be highlighted. It is a growing need of public lighting to enhance all that is good within the urban environment and hence bring to as many people as possible better visual appreciation of good architecture and town planning that will in time help to enrich their lives. If the area is totally uninspiring then thought should be given to using the lighting equipment itself as an attraction and choose columns and luminaires accordingly.”

As installation design, it is suggested that the mounting height of the luminaires should be chosen in relation with the buildings around (no more than half of their height), generally between 4m and 8m. The distance between the luminaires is determined eventually by the illuminance level and uniformity value. It is possible to consider to group luminaires in clusters.
The presence of trees will define the lowest mounting height. Luminaires in tree lined roads should be installed wisely. In new installations, young trees will eventually grow to the same height of the luminaires, and it might require to change all the lighting.

It is important to light up vertical planes as much as horizontal planes. In fact, it illuminates not only pedestrians, but door entrances, signs and important objects in the urban environment. In an environment of relatively bright vertical surroundings (background luminances) higher light intensities can be permitted, since they will not create glare.

Special bollards or luminaires integrated with other street furniture at low mounting heights can be used, if they are designed using special materials, as concrete. Illuminated bollards can provide decorative effect along pathways and in landscaped areas.

Good colour rendering of the light source should be considered. It should respect the looking on people, buildings, parks, tree areas, flower gardens and squares.

Pedestrians may like a degree of “sparkle” in the lighting equipment.

The recommendation concludes saying that “the final choice of system and design will therefore be dictated by many extraneous conditions and the lighting designer will need to work in close collaboration with building and landscape architects.”

In fact there can be many environmental factors that can influence the lighting plan.

It is important to make these areas as attractive as possible so that residents are encouraged to use the facilities. For doing so it is important that the total environment is considered in the lighting design. “Lighting equipment and methods should be diverse within the complex to provide variety and interest. Variations in brightness and comparative darkness should be deliberately arranged to
provide modelling of buildings, ornaments, flora and people.”

The lighting equipment should be respectful of the environment where it will be install, like other street furniture. The appearance of the street lighting equipment should be pleasant by day and night time. It should respect the aesthetically aspects of the environment. This is even more important when historical, architectural or special aesthetic areas are treated with light. “Period style lanterns” should be chosen matching the historical periods.

Lighting should provide good modelling, and create a natural appearance as possible, without harsh shadows. Statues, fountains, trees and other object of special interest in the area should be individually illuminated. The night-time appearance of lighting within trees can be attractive. However the luminaire should perform properly to illuminate horizontal and vertical planes. Its stray light or a special dedicated component should be dedicated to trees. In some case it is possible to consider lower-than-normal mounting heights to bring luminaires below the tree canopy. It is important to locate equipment safe from vandalism or accidental damage, possibly without increasing the difficulty of maintenance. (often conflicting requirements).

When possible, the design of lighting elements should be integrated into other elements of street furniture to create less clutter in the street. The pole should be either as unobtrusive as possible, or the a feature of its own.

The scale is important. Consider:
- the mounting height of the luminaire
- overhang or outreach of brackets
- shape and proportions of the luminaire and of the pole, individually and in relation of each other and their surroundings.
For example, light poles it should not be more the half the average height go the buildings.

To contain lighting pollution, luminaires with limited upward light component should be chosen. Light trespassing in the windows of residential buildings should be avoid.
During the late evening and night when the shops are closed, the public lighting must be good enough to ensure security of shops and pedestrians. In commercial areas, temporary events, exhibitions, fair and other activities are often organised. Therefore it is important to make possible to add more light or electricity outlets on need.

It is important that the lighting installation will be maintained properly. Specific cleaning intervals should be decided following the changing weather conditions in the area throughout the year.
03 THEORY BUILDING

Background study

Formal Gardens

Italian Renaissance garden
It emerged in the late 15th century in private villas of rich families in Rome and Florence for their own private usage. It was intended for private usage, to delight their owners and impress visitors. Often the villa lies on top of a hill to give an overview on the land or the city owned by the family.

The Italian Renaissance garden emerged from the rediscovery by Renaissance scholars of classical Roman models. It is inspired by classical ideals of order and beauty.

The Italian Renaissance garden is a formal garden. The design is based on symmetry, axial geometry and on the principle of imposing order over nature. There are planting beds, or parterres, created in geometric shapes with symmetric patterns. The plants are shaped following geometrical forms (topiary). There are fountains and cascades to animate the garden, stairways and ramps to unite different levels of the garden. Moreover there can be examples of grottos, labyrinths, tunnels, theaters and statuary on mythological themes.

Gardens of the French Renaissance
The gardens of the French Renaissance evolved from the Italian Renaissance garden around the 16th century in France. The gardens were often owned by rich and noble men or for the king himself. They were surrounding the castle and they were extension of it. However they were not integrated with the architecture of the castle and they were usually enclosed by walls. The different parts of the gardens were not harmoniously joined together, and they were often placed on difficult sites chosen for terrain easy to defend, rather than for beauty.

The gardens were design to represent the Renaissance ideals of measure and proportion, to remind
the viewers of the virtues of Ancient Rome.

The gardens had symmetrical and geometric parterres (planting beds), plants in pots, paths of gravel and sand. Terraces, stairways and ramps followed the elevation of the area. There were canals, cascades and monumental fountains to entertain and refresh the owner. There were artificial grottoes, and labyrinth to games in the gardens. Statues of mythological figures were decorating the garden all around.

**French formal garden / jardin à la française**

It developed in the 17th century in France and it evolved from the French Renaissance garden. It is often commissioned by rich noble man or by the king himself. The garden à la française was often used as a setting for plays, spectacles, concerts, and displays of fireworks.

André Le Nôtre was the designer of the Gardens of Versailles, the greatest example of the French formal garden. Among other designers, we can remember André Mollet who took the French style to the Netherlands, Sweden and England.

French formal garden was theorized as branch of architecture. The garden extended the space of the building to the space outside. The nature was rules following the rules of geometry, optics and perspective. The sequence of rooms was an inspiration to design the spaces in the garden.

The design of the French formal garden was bases on a geometric plan. The garden was presented to the guests from a terrace. “It is desirable that the gardens should be seen from above” says the French landscape architect Olivier de Serres. The plants are shaped to demonstrate the power of man over nature (topiary). The trees are placed in straight lines, carefully shaped and their canopies are trimmed at a chosen height. The castle is the central point of the garden. To make this clear, there are no trees close to the house and instead around the main building are designed low parterres and trimmed bushes. The main axis of the garden starts from the back façade of the main building, perpendicular to it. Parterres were designed in the shape of squares, ovals, circles or scrolls. There are fountains, canals and basins that often are extended through the main axis. Mythological sculptures are set in the garden to underline perspective or mark the intersections of
the axes. Versailles is a good example of utilizing bosquets to create small spaces within the larger design. These mini gardens were used for ballets and plays.

**English Landscape gardens**

They established in the 18th century in England. They were owned by wealthy men, who had large country estates, classical education, appreciate art. They often had taken the Ground Tour to Italy where they had seen the Roman ruins and Italian landscape that they wanted to be reproduced in their gardens.

The English landscape gardens represents and idealized idea of the nature. The garden should be composed like paintings of landscapes: with a foreground, a middle ground and a background. It's all about a beautiful composition. In the same period European travellers reported descriptions of classic Chinese gardens of the East that were eventually integrated in the landscape as a touch of exotic taste.

The design of the gardens includes winding paths, a lake, a bridge, large lawns that end towards groves of trees. Some classical temples and Gothic ruins are inserted to recreate an idyllic landscape. The Continental European English garden has a smaller scale and it has more “eye-catchers”: grottoes, temples, tea-houses, belvederes, pavilions, sham ruins, bridges and statues.

To conclude, as a summary Baljon(1992) provides a “scheme for the decomposition of the styling”: 

Blenheim Palace Park
<table>
<thead>
<tr>
<th>Spatial Structure</th>
<th>Classicism</th>
<th>Landscape Style</th>
<th>Modernism</th>
</tr>
</thead>
<tbody>
<tr>
<td>expressed in</td>
<td>Axiality and central perspective</td>
<td>Continuity by means of sight lines and scenes</td>
<td>Zoning by means of articulation and connection</td>
</tr>
<tr>
<td>Symmetry</td>
<td>Asymmetry</td>
<td>Symmetry</td>
<td>All sorts simultaneously</td>
</tr>
<tr>
<td>Hierarchy</td>
<td>Sequence</td>
<td>Sequence</td>
<td>Object-linked form</td>
</tr>
<tr>
<td>Intersection and terminus</td>
<td>Pause and focus</td>
<td>Pause and focus</td>
<td>Penetration/linkage of spaces</td>
</tr>
<tr>
<td>Geometrical construction</td>
<td>Pictorial composition</td>
<td>Pictorial composition</td>
<td>Both as counterpoint</td>
</tr>
<tr>
<td>Unity building and garden</td>
<td>Contrast building and park</td>
<td>Contrast building and park</td>
<td>Gesamtkunstwerk</td>
</tr>
<tr>
<td>2 Spatial Experience</td>
<td>Sharp boundaries</td>
<td>Vague boundaries</td>
<td>Walking, going</td>
</tr>
<tr>
<td>Abstract, volumetric form</td>
<td>Sculptural, plastic form</td>
<td>Successive experience</td>
<td>Simultaneous experiences</td>
</tr>
<tr>
<td>Tangible space</td>
<td>Flowing space</td>
<td>Individual and subjective</td>
<td>Collective and relative</td>
</tr>
<tr>
<td>Static balance</td>
<td>Picturesque</td>
<td>Intricate order</td>
<td>Clear order</td>
</tr>
<tr>
<td>Axiality</td>
<td>Dynamic balance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decorative</td>
<td>Continuity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Reference</td>
<td>Eminence</td>
<td>Harmony</td>
<td>Pragmatism</td>
</tr>
<tr>
<td>Ostentation, parade</td>
<td>Delight in nature</td>
<td>Efficiency</td>
<td>Efficiency</td>
</tr>
<tr>
<td>Theatrical</td>
<td>Dramatic</td>
<td>Unemotional, succinct</td>
<td></td>
</tr>
<tr>
<td>Intellectual (rationality)</td>
<td>Instinctive (emotionalism)</td>
<td>Efficiency (functionalism)</td>
<td></td>
</tr>
<tr>
<td>Self-assured</td>
<td>Melancholic</td>
<td>With élan</td>
<td></td>
</tr>
<tr>
<td>Rational</td>
<td>Pictorial</td>
<td>Functional</td>
<td></td>
</tr>
<tr>
<td>Mythological</td>
<td>Literary</td>
<td>Programme of facilities</td>
<td></td>
</tr>
<tr>
<td>Rational/artificial nature</td>
<td>Uncultivated nature</td>
<td>(agriculturally) exploited nature</td>
<td></td>
</tr>
<tr>
<td>with respect to time (at the moment the pure/original style was current)</td>
<td>Future: innovation or renaissance</td>
<td>Past: then and elsewhere</td>
<td>Today: here and now</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>
| **4 design tools** | Avenue and *bosquet*  
Hedge, row of trees as wall  
Canal, mirror  
Fountain, cascade  
*Tapis vert*  
Sight axis  
Terrace, steps  
Parterre | Group of trees (clump) and avenue as autonomous element  
Ah-ah, boscage  
River, brook  
Waterfall, rapids  
Stream valley  
Scene  
Hill, slope  
Meadow with deer | Avenue, loose grouping of trees and shrubbery bed  
Hedge, row of trees ad line  
River, brook  
Waterfall, rapids  
Stream valley  
Scene  
Hill, slope  
Meadow with deer  
Play pond, sprinkler reservoir  
Playing field and sun terrace  
Sight lines for access system  
Incline (embankment, talus)  
Flower garden |
| **Plant patterns** | Plant as form tools  
Structure and added ornament  
Geometry | Plant by itself, individual or group form  
Organic/naturalistic  
Loose | Plant as dividing device  
Structure and construction as ornament  
Geometry and invisible geometry |
| **Technology** | Horticulture | Botany | Forestry and agricultural engineering |
Urban open spaces in the 21st century


Contact with nature is a fundamental human need and so nature is an important part of an open space. Access to nature gives psychological benefits (see Kaplan R., Kaplan S., 1989, Experience of Nature: A Psychological Perspective. Cambridge University Press, New York.), and the lack of contact with it will bring substantial health costs in the long run. Today, for many people in the city, the park is a place connected with the idea of “garden” where the contact with nature has a spiritual dimension. Parks are also the place where to find privacy and intimacy.

The urban open space network as social space

Richard Rogers in his Towards an Urban Renaissance (1999) (Rogers, R. et al., Urban Task Force, 1999, Towards an Urban Renaissance: Final Report of the Urban Task Force Chaired by Lord Rogers or Riverside. Department of the Environment, Transport and the Regions, London) says “to achieve urban integration means thinking of urban open space not as an isolated unit – be it a street, park or square – but as a vital part of urban landscape with its own specific set of functions. Public space should be conceived of as an outdoor room within a neighborhood, somewhere to relax, and enjoy the urban experience, a venue for a range of different activities, from outdoor eating to street entertainment; from sport and play areas to a venue for civic or political functions; and most importantly of all a place for walking or sitting-out. Public spaces work best when they establish a direct relationship between the space and the people who live and work around it”. Corraliza (2000) (Corraliza, J. 2000. Landscape and the social identity: the construction of territorial identity. In: Proceedings of the 16th Conference of the International Association for People-Environment Studies, Paris) found that “non-spatial qualities of landscape are just as important as any spatial qualities (motivation, age, etc…). People prefer pathways to “stay places” because there are more possibilities to engage with other people or the environment. In fact in the streets –
more than in parks or plazas - we can find places like shops, cafés or shady boulevards. “Are the urban public parks becoming places for special categories of people like children, old people, etc…?”

The free world of the public parks
Marc Augé (1995) (Augé, M., 1995. Non-places: Introduction to the Anthropology of Supermodernity. Verso.) says: “in the controlled spaces of modern urban commerce and design – shopping malls, airports, even some high streets – there is an automatic assumption of guilt about anybody not engaged in purposeful consumer behavior. In contrast, the free world of the public park has always evoked a pre-lapsarian world of innocence and autonomy.”

Open space and the information age
Information Technology allows us nowadays to work and communicate remotely, but on the other side it creates the need of face-to-face activities in the city to balance the virtual experience through a screen. “People need human contact and the city is the place for that, even if technology allows us to do otherwise if we choose”.
Rogers (1999) predicts that in Britain in the future there will be an increasing of new households from minor ethnic group and up to 80% will be single-person households. Therefore in the future more and more people will live in a dense urban area, but the social contact coming from sharing homes or living in district with the same culture will miss.
Our contemporary community is more and more becoming a virtual one, “based on friendship and shared interests regardless of the geography of individuals”. On the other side Internet allows to plan and organize more easily events and open spaces use when it concerns large number of people. “It does mean that we can now use those streets, squares and parks with much greater confidence that we will find what we want there, meet whom we want, be able to do what we choose.”
“Perhaps public open space will be more, and not less, used in future that it has in recent decades.”
“Perhaps in this context the value of engagement with the real environment will become more precious.”
Growing things in town
Growing plants could be an educative experience for the children. Finally they could make “the connection between that and the food they eat”.
Some immigrant groups would find appealing the possibility to grow familiar plants and vegetables they may have left behind.

The role of public open space in a democratic society
The 19th century park was considered a democratic place, which meant a place where “the poor, the rich, the mechanic, the merchant and the man of letters” meet in the same space. The park was seen as a “melting pot” where cultural differences became homogenized to create a united national culture.

Today instead, the park is seen as a place where different cultures “can find individual expression”. This brings a challenge to parks that were designed for single, predominant, culture like the historical parks. How much their design, as their programmed use, needs to change in the 21st century?

Usually the people that need more the urban parks and social places, are those that can least available to move independently: children, older people, disabled people and the unemployed. “So the there will always be a demand for good access to appropriate, local open spaces.”
Urban parks


Features
Facilities that allow sports and play are important. For example playground and tree for climbing would attract children play. Adults would prefer constructed and natural trails. Barbeques, seating, water fountains, picnic tables and bathrooms are enjoyed by everybody.

Condition
The use of the park is influenced by the lack of maintenance. For example characteristics of playing surfaces, uneven ground, lack of grass, poor quality sidewalks or cleanliness in the parks are considered important by adults and kids. Dog feces are considered also an issue for the park usage.

Accessibility
People use the park more frequently if it is in a short walking distance from their place. Specific park attributes can influence park usage. For example dog-owners would go to parks that have dog exercise areas. Public transportation would help to bring more people to the park (and then go back home easily).

Aesthetics
Graffiti and vandalism discourage the usage of the park. Litter, uncleanliness and dog feces do the same effect. Wildlife can have positive effect, reminding people of the beauty of nature. On the other side it can keep away for example dog-owners that do not want their dog to have possible encounters with wildlife. Trees, bushes, gardens, grass, flowers, natural settings and water features are elements of interests for people. Fresh air and the presence of nice smells contribute to the positive qualities of a park.
In the same way the nature sounds and the quietness are qualities comparing to the noisy environments of the urban life.

Safety
The presence of drug users, homeless persons or loiterers acts as deterrent to the usage of the park. The same effect is produced by the presence of secluded paths and areas. Positive factors are the presence of the lighting, of law-enforcement, increased security and surveillance. Enclosed areas with fences dedicated to dog activities without leash will encourage dog owner to visit the park.

Social environment
Organized festivals and celebrations in a local park can bring together people from different background. Safe and supportive social environments are important to encourage woman and girls to participate in the life of the park. Social clubs and neighborhood associations can bring more people to the park with various activities.

“Actual and perceived safety within parks may be achieved by providing sufficient lighting and sight lines (i.e. field of view) thereby increasing opportunities for users to see and be seen by other park occupants, introducing a police presence in parks known for antisocial behavior, and building parks designed to facilitate informal monitoring of behavior (i.e. house fronts overlooking parks, networks routing pedestrian through or near parks). Moreover, regular maintenance and upgrading of park features and facilities could reduce the risk of injury, while at the same time contributing to aesthetics and functionality within park settings.”

“The provision of amenities such as water fountains and washrooms may allow parks to be used for longer periods.”
Urban Development and Contemporary Society and Urban Lifestyle

Cities, especially big cities, are attractive to live in, not only because the convenience from the better services, more opportunities, also they are often gathering lots of valuable resources and respond to people’s evolving needs. As people have bigger chance to find a more satisfying situation to live, thus the trend of more and more people move to the cities. According to the United Nations - World Urbanisation Prospects (2014 revision), 54 percent of the world’s population residing in urban areas in year 2014 globally, within only less than fifty years the number estimated to be 66 percent by the year 2050. Most urbanised regions include Northern America (82 percent by 2014), Latin America and the Caribbean (80 percent by 2014), and Europe (73 percent by 2014). Other regions are expected to urbanise further over the coming decades.

Urbanisation globally is proceeding on an unprecedented scale in the human history, and it directly influences on the urban land usage. Cities are expending larger than ever, and the density also rises dramatically. It threatens the sense of place and identity of communities. Meanwhile, large scale immigration has brought different cultures mix together, the scale of anthropological and ecological transformation due to the interaction between evolutionary factors (social, cultural, economic, and technological) has no historical precedent.

Under such development, our ecological environment is also facing huge challenge. The natural equilibria require serious considerations to keep balanced between human society and nature.

From twentieth century to twenty-first century, cityscape has changed dramatically. Many cities used to be city of cars now are transforming into city of people, city of streets now is favoured instead of city of buildings, mixed-used development instead of segregation. These progress greatly influence on public space design and planning methods. From the traditional physical environment first consideration to people first consideration, the new approach show more focus on urban life quality.
The term lifestyle can denote the interests, opinions, behaviours, and behavioural orientations of an individual, group, or culture.

It is a way of living of individuals, families (households), and societies, which they manifest in coping with their physical, psychological, social, and economic environments on a day-to-day basis.

Lifestyle is expressed in both work and leisure behaviour patterns and (on an individual basis) in activities, attitudes, interests, opinions, values, and allocation of income. It also reflects people's self image or self concept; the way they see themselves and believe they are seen by the others. Lifestyle is a composite of motivations, needs, and wants and is influenced by factors such as culture, family, reference groups, and social class.

Many values shift quickly in modern society, from work life to private time, live becomes much complex and sometimes even filled with tensions.

Highly efficient technology makes the work much faster, but it also contribute to the high competitiveness and intensity. Fast-paced processing helps to optimise the time management, yet it leads to a hectic working schedule.

When it comes down to an individual's private time, from everyday eating habits to family life, they all reflect the influence of the changing environment. The twenty-four seven society makes life rhythm more flexible, though sometimes it does not suit for human being's natural circadian
rhythm. (One typical example of the consequence of efficient time planning can be viewed though people's eating pattern: much more people eat outside, large number of pre-cooked or pre-packaged food become easily approachable everywhere, or eating while doing other tasks etc.) Also, family gathering time becomes less than before, interpersonal relationships are also facing new challenges.

The sense of community has been seen as a losing value follows the growth of the individual lifestyle, meaning people seem to be much more isolated. One example is the increasing number of high-rise buildings leads to the “vertical separation” between people, although people are living more-than-ever closer than before, the neighbour interpersonal relationship has been so distant.

Not only for local residents, global tourism also experiencing a shift. More people travel independently with a more flexible itinerary, the experience becomes a primary concern instead of focusing on visiting major touristic attractions. This shift makes the urban environment a holistic experience to visitors.

Besides, the development of science and technology influences on people's lifestyle in everyday pace, many changes are shown, sometimes in unforeseen ways whether people are well-prepared. The increasing deep involvement of technology has brought lots of new experiences and choices in life as it never happened in the past history. Internet has brought the level of human interconnection progressively covering the whole world. Technologies such as virtual reality is indeed impressive, yet in some extent it makes life much more abstract and less connected with the real world. And by far, most of technology based activities are operated indoors.

(Overview)
Urbanisation and globalisation are transforming what makes urban areas unique. While globalisation brings economic, social and cultural benefits, if urban growth is not managed effectively the changes that occur can result in loss of community identity, urban fabric integrity and the sense of place (UNESCO 2011). The impact of urbanisation and globalisation such as many cities’ functions are decided more by global forces such as tourism and real estate industries but their local inhabi-
Effective management of historic urban areas involves services and tourism as a means of maintaining the areas and their cultural heritage. This can be done through the availability of information technology and sustainably planning, building and design practices. If these opportunities are not recognised urban cities can become unsustainable and unviable leading to the loss of heritage assets (UNESCO 2011).

(RECOMMENDATION ON THE HISTORIC URBAN LANDSCAPE, 2011)

As Edward Said considered New York as the capital of the twentieth century, it was “Restless, turbulent, unceasingly various, energetic, unsettling, resistant, and absorptive” (Said, 2000). And amazingly when time entered twenty-first century, many big cities share similar descriptions.

Edward W. Said, Reflections on Exile and Other Essays, Harvard University Press, 2000,
Environmental psychology as an interdisciplinary field that focuses on the interplay between individuals and their surroundings, is in the pursuit of individual wellbeing within a large society (Proshansky, 1987), it solves the questions of how environment imposes on people, and how people responses to environment. It is both problem oriented and value oriented. The relationship is examined by focusing on how the physical and ambient stimuli (or features) of an environment affect behaviour and emotions (Mehrabian and Russel, 1974).

Since the study of environmental psychology is lack of unifying theory that can be applied to all type of environments, different environment-behaviour models have been speculated. This thesis examined theories major from perception aspect.

According to stimulus load theory, environment as a source of sensory information provides people with psychological stimulation, which may range from simple ambient features to complex physical features (Gifford, 2002; Veitch and Arkkelin, 1995). When there is an excessive amount of stimuli, people have a propensity to ignore some features and give more attention to those that are perceived as more important to the task at hand. But in a stimuli-deprived environment, it causes boredom and behavioural deficiencies (Bell et al, 1996; Veitch and Arrkkeilin, 1995).

Cognition theory focus on how people perceive the environment according to their learned experience, cultural difference and personality features (Veitch and Arrkkeilin, 1995).

The Behaviour constraint theory posit that the environment is capable of preventing, interfering with, or limiting the behaviour of individuals. It focus on the real or perceived restrictions that are imposed on people by the environment (Gifford, 2002; Veitch and Arkkelin, 1995). When people perceive under control over their environment people gain the sense of belonging, and show more responsibility to the environment, but when people perceive out of control it may result in feeling despair, and change their movement patterns.
Many theories shown that light is an important environmental feature that influences on people in a great level both physiologically and psychologically. Artificial light as the tool to functionalise urban public space has to be carefully concerned.

**Heritage Conservation and Urban Development**

(Urban Heritage)  
World heritage is our legacy from the past, that we live with today, and what we will pass on in the future generations. Our cultural and natural heritage are both irreplaceable sources of life and inspiration  

— UNESCO World Heritage Centre

Historic areas among the most abundant and diverse manifestations of our common cultural heritage, shaped by generations and constituting a key testimony to humankind's endeavours and aspirations through space and time. Urban heritage is for humanity a social and economic asset, defined by an historic laying of cultural and natural values and attributes, that have been produced by successive and existing cultures and an accumulation of tradition and experiences, recognised as such in their diversity(UNESCO, 2011).

Urban heritage, including its tangible and intangible components, constitutes a key resource in enhancing the liveability of urban areas, and fosters economic development and social cohesion in a changing global environment. As the future of humanity hinges on the effective planning and management of resources, conservation has become a strategy to achieve a balance between urban growth and quality of life on a sustainable basis (UNASCO 2011).

(Urban Heritage and Urban Development)  
As urbanisation is proceeding on an massive scale, the rapid and frequently uncontrolled develop-
ment is transforming urban areas and their settings, which may cause social and spatial fragmentation and deterioration to urban heritage with deep impacts on community values, throughout the world. Therefore, in order to support the protection of natural and cultural heritage, emphasis needs to be put on the integration of historic urban area conservation, management and planning strategies into local development processes and urban planning (UNESCO 2011).

(Urban Heritage Conservation)
The shift from emphasising on singular monument primarily towards a broader recognition of the integral townscape demands tools to define the value system of an historic place or townscape, define and protect integrity of the urban fabric and the urban landscape and identify the trade-offs and the limits of the acceptable change in a historic context (Bjurström, 2011).

According to UNESCO’s Recommendation on the Historic Urban Landscape, it suggests a landscape approach for identifying, conserving and managing historic areas within their broader urban contexts, by considering the interrelationships of their physical forms, their spatial organisation and connection, their natural features and settings, and their social, cultural and economic values. It considers cultural diversity and creativity as key assets for human, social and economic development, and provides tools to manage physical and social transformations and to ensure that contemporary interventions are harmoniously integrated with heritage in a historic setting and take account regional contexts. Such tools include civil engagement tools, knowledge and planning tools, regulatory systems and financial tools. Research should target the complex layering of urban settlements, in order to identify values, understand their meaning for the communities, and present them to visitors in a comprehensive manner. To document the state of urban areas and their evolution is essential, it facilitates the evaluation of proposals for change, and to improve protective and managerial skills and procedures.

The historic urban landscape approach learns from the traditions and perceptions of local communities, while respecting the values of the national and international communities.
Universal Design Principles and Goals

Universal design (close relation to inclusive design) refers to broad-spectrum ideas meant to produce buildings, products and environments that are inherently accessible to older people, people without disabilities, and people with disabilities.

Seven principles expounded by The Center for Universal Design at North Carolina Universigy are:

1. Equitable use - The design is useful and marketable to people with diverse abilities.
2. Flexibility in use - The design accommodates a wide range of individual preferences and abilities.
3. Simple and intuitive - Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.
4. Perceptible information - The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
5. Tolerance for error - The design minimises hazards and the adverse consequences of accidental or unintended actions.
6. Low physical effort - The design can be used efficiently and comfortably and with a minimum of fatigue.
7. Size and space for approach and use - Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

The Center for Inclusive Design and Environmental Access expanded definition of the principles of universal design to include social participation and health and wellness. Eight goals were developed as follow:

1. BODY FIT
   Accommodating a wide a range of body sizes and abilities

2. COMFORT
   Keeping demands within desirable limits of body function and perception
3. AWARENESS
Ensuring that critical information for use is easily perceived

4. UNDERSTANDING
Making methods of operation and use intuitive, clear and unambiguous

5. WELLNESS
Contributing to health promotion, avoidance of disease and protection from hazards

6. SOCIAL INTEGRATION
Treating all groups with dignity and respect

7. PERSONALIZATION
Incorporating opportunities for choice and the expression of individual preferences

8. CULTURAL APPROPRIATENESS
Respecting and reinforcing cultural values, and the social and environmental contexts of any design project

Universal Design and Vision

Making a place functional and comfortable for individuals who have visual deficiency is as important for urban public parks.

People’s visual quality includes visual acuity, coarse stereopsis, colour discrimination, contrast sensitivity and visual field. They describe an individual’s ability of resolve fine details, processing spatial informations, distinguish between colours, distinguishing ability under low contrast and the angular amount of the world that is visible to a person when looking straight ahead. A great number of
people suffers visual deficiency at different level, the percentage increases among elderly people.

Visual discomfort can be caused by insufficient light, illuminance uniformity, glare, veiling reflections, shadows, and flicker (SLL Lighting Handbook, 2009).

Guided by the universal design principle, when design a space, all surfaces should be evaluated by the glare condition, glare can be a significant issue for people who has eye conditions such as glaucoma, cataract and macular degeneration, the direction of light and reflection should also be taken into consideration. The choice of colours should be well thought, certain colour combination can be very difficult for people who has trouble distinguishing colours. Critical elements should be made more noticeable by high luminance and contrast with surroundings. Obstacles and edges should be more considerable with luminance and contrast. The Lighting needs vary according to people's eye condition, so although adequate lighting is very important, one level of light might work well for a person with glaucoma could be too low for someone with macular degeneration.
Space quality framework

CULTURAL AND HISTORICAL VALUE
- Identity
- Diversity
- Heritage
- Monuments
- Local Pride
- Arts
- Natural Setting and Features
- Image
- Cultural Influence
- Social Value
- Economic Value

HISTORICAL URBAN PARK
- Connection with City
- Accessibility
- Easiness of Orientation
- Navigability
- Circulation
- Readability
- Walkability
- Convenience
- Continuity

URBAN CONNECTION AND ACCESSIBILITY
- Safety
- Green Coverage
- Cleaness
- Accommodativeness
- relaxation
- Attractiveness
- Spiritualness
- Public Health
- Sustainability

PLEASANTNESS
- Aliveness
- Activeness
- Diverse Usages
- Celebration
- Special Events
- Provision of Public Services
- Image and Views
- Maintainance
- Sense of Belonging

SOCIABILITY
- Equality
- Equity
- Friendliness
- Interactiveness
- Welcomingness
- Sense of Community
- Provision of Channels of communication
Lighting Strategies based on Space Quality Framework

**Exterior Lighting Design Criteria**

According to IESNA Lighting Handbook (2000) quality of the visual environment, Exterior lighting design criteria include:
- Appearance of Space and Luminaries
- Direct Glare
- Illuminance (Vertical)
- Lighting Distribution on Surfaces
- Lighting Pollution/Trespass
- Modeling of Face or Objects
- Point(s) of Interest
- Reflected Glare
- Source/Task/Eye Geometry

**Appearance of Space and Luminaires.**
Appearance includes both the arrangement of elements such as furnishings and luminaires in a space and their relationship to one another. These elements can provide visual cues that assist occupant orientation. It is important that the style of the luminaires coordinate with and enhance the design and architecture of the space. Lighting systems can also help create an image for the space (e.g., “corporate,” “casual,” “luxurious,” “industrial,” or “avant garde”).

**Direct Glare.**
Glare can cause discomfort and interfere with visibility. Direct glare occurs when the light travels directly from the source to the eye. This may include “disability glare,” “discomfort glare,” and “overhead glare”.

**Illuminance (Vertical).**
Vertical illuminance is the density of luminous flux falling onto a vertical surface, measured in lux (lumens per square meter) or footcandles (lumens per square foot).
Light Distribution on Surfaces.
Patterns of light resulting from the spacing and light distribution of the luminaires, as well as from objects that can cast shadows, can affect task visibility, comfort, and perceptions. Harsh striated patterns of excessive brightness or noticeable shadow should be avoided. Illuminance patterns should correspond with architectural features (e.g., a regular pattern of glowing sconces) or objects (e.g., lighting art on the walls). Random patterns can be confusing or distracting. Surfaces should not have extremely different brightnesses. For example, ceiling and walls should have luminance within a 3:1 ratio. Spaces with totally uniform brightness, however, lack visual interest. “Luminance ratios” refer to the relative luminance of any two areas in the visual field (e.g., ceiling-to-wall luminance ratios or immediate-surround-to-task luminance ratios).

Light Pollution/Trespass.
Light that is directed upward to the sky or reflected from surfaces that interferes with astronomical observations or appreciation of the night sky is termed “light pollution.” “Light trespass” is unwanted light that falls beyond the property line or area intended to be illuminated.

Modelling of Faces or Objects.
Lighting can reveal the depth, shape, and texture of an object. Through the creation or elimination of shadows, faces and objects can have more or less contrast. The distribution of light in a retail display is critical to attracting attention and making the merchandise look appealing. Appropriate direction and distribution depends on the type of merchandise, but generally a combination of diffuse light and directional light will enhance appearance. In industrial applications, modelling is critical to assessing material quality, finish quality, and degree of consistency. Appropriate direction and distribution of light vary depending on material and task. Often diffuse ambient lighting is inadequate for assessing fine texture; task lighting is therefore used to provide the required direction, distribution, and intensity of light. A high percentage of communication is nonverbal. It is important that the pattern of light on faces enables clear recognition and interpretation of expressions by enhancing contrast in certain areas around the mouth and eyes. Concentrated downlighting, which creates harsh facial shadows and accentuates blemishes and wrinkles, should be avoided because it creates too much contrast on the face. Multidirectional lighting improves facial modelling. Inter-reflected light from walls, parti-
tions, ceiling, and light-coloured work surfaces helps increase vertical illuminance on faces, filling in sharp shadows and rendering faces in a more pleasing way with easier-to-read facial expressions.

**Point(s) of Interest.**
A point of interest is the object or place to which attention is drawn, using movement, luminance contrast, and colour contrast.

**Reflected Glare.**
Bright reflections from polished or glossy surfaces are uncomfortable and reduce task visibility; this is known as "reflected glare." "Veiling reflections" are contrast-reducing reflections from semi-specular surfaces that reduce task visibility. The possible negative impact of reflected glare and veiling reflections can be estimated. The ratio of illuminance on the task from the mirror angle relative to the total illuminance on the task should be less than 0.3 for satisfactory results, whereas unsatisfactory results can occur if the ratio exceeds 0.7. Both reflected glare and veiling reflections can be mitigated by providing illuminance from the sides of the task or by special luminaire optical designs. It should be noted, however, that reflected glare can improve visibility for some tasks such as paint inspection for defects or reading increment marks on a steel rule (see also the section "Source/Task/Eye Geometry" below). For VDT applications the most practical solution to both veiling reflections and reflected glare is to select a VDT monitor with a diffuse reflecting screen and one that provides a bright background and dark text.

**Source/Task/Eye Geometry.**
The angular relationships between the viewer, the task, and the luminaire are frequently critical to task visibility. This geometry can both enhance contrast (e.g., scribed marks on a micrometer) and reduce it (e.g., viewing a meter dial through glass).

As in this work, the evaluation is the relationship between light quality and space quality, issues such as Source/Task/Eye Geometry is not taken. Also, Point(s) of Interest is defined as “A point of interest is the object or place to which attention is drawn, using movement, luminance contrast, and colour contrast”; so from the light quality aspect, Contrast and Colour contrast are taken in-
stead of. For similar reason, Modelling of Faces or Objects is replaced by shadow and contrast. Note that since Contrast can be formed in many ways, such as uneven illumination or the use of highlight and shadow etc. In this part of the study Contrast is considered between the park and urban environment. In practice, lighting Index method can help with such assessment.

Other criteria like Horizontal Illumination and Light Distribution (on task plane) are considered relevant to the task lighting on historical urban public park's usages and activities. System Control and Flexibility together with Shift Between Daylight are seen a contemporary consideration of lighting design, thus taken into the criteria list. At last, Intrinsic Material Characteristic - visual cues about surfaces and materials, such as texture or transparency, are revealed by lighting. The ability to see these cues, like nap and grain, maybe critical to evaluating the type or quality of material, or the degree of consistency (IESNA Lighting Handbook, 2000). According to the description, it is believed that such quality can contribute to people's experience in a exterior environment, it enriches people's perception of the space, triggers people's emotion, thus is taken in to the list of criteria.

The final list of criteria is:
- Appearance of Luminaires
- Shift between Daylight
- Lighting Distribution
- Glare Control
- Colour Appearance
- Colour Contrast
- Horizontal Illuminance
- Vertical Illuminance
- Shadow
- System Control and Flexibility
- Intrinsic Material Characteristics
- Highlight and Shadow
- Light Pollution
- Contrast
## Lighting quality framework

<table>
<thead>
<tr>
<th>URBAN CONNECTION AND ACCESSIBILITY</th>
<th>LIGHTING DESIGN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connection with City</td>
<td></td>
</tr>
<tr>
<td>Accessibility</td>
<td>Luminaires appearance can bring different impression on people. Different height, material, style etc. can directly relate to how people perceive a place. By mixing various luminaires, it enriches the experience, and it also helps people to navigate.</td>
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<tr>
<td>Easiness of Orientation</td>
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<td>Navigability</td>
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<td>Circulation</td>
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<td>Readability</td>
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<td>Walkability</td>
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<td>Convenience</td>
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<tr>
<td>Continuity</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Appearance of Luminaires</td>
<td></td>
</tr>
<tr>
<td>Shift Between Daylight</td>
<td>As historical urban public parks are directly integrated into the urban fabric, it has to match people's life rhythm, and adapt with the urban lighting system following the change of daylight.</td>
</tr>
<tr>
<td>Lighting Distribution</td>
<td></td>
</tr>
<tr>
<td>Glare Control</td>
<td>Glare can cause discomfort and interfere with visibility, Both direct glare and reflected glare should be avoided to ensure the safe movement.</td>
</tr>
<tr>
<td>Colour Appearance and Contrast</td>
<td>Colour appearance can affect visibility. Lamps with better colour rendering values ensures a better safety and readability of the situation. Colour contrast can be use for safty signage or markings.</td>
</tr>
<tr>
<td>Contrast</td>
<td>The least amount of contrast between light level of the streets and the park helps create visual connection between the urban environment and the park.</td>
</tr>
<tr>
<td>Horizontal Illuminance</td>
<td>Comparable lighting level with the surroundings makes a smooth transition between the urban environment and the park. Also it assists people to navigate in the space.</td>
</tr>
<tr>
<td>Vertical Illuminance</td>
<td>Vertical illuminance makes the place visible from a distance.</td>
</tr>
<tr>
<td>Shadow</td>
<td>Shadows can interfere with task visibility by placing detail in darkness, and they can also enhance definition of three-dimentional details.</td>
</tr>
<tr>
<td>System Control</td>
<td>Many spaces require different light levels for variety of tasks. Also to adapt better during the dusk and dawn period of the day system control provides a such flexibility.</td>
</tr>
<tr>
<td>Design Criteria</td>
<td>Notes</td>
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<tr>
<td>---------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Appearance of Luminaires</td>
<td>Luminaires appearance is directly related to the space’s characteristic. The appearance of the luminaires should either relate to the spirit of the place or the characteristic of nature. It can complement the atmosphere of the park.</td>
</tr>
<tr>
<td>Shift Between Daylight</td>
<td>Following the transition of the amount of the daylight, and create a fading transition of different phase of the day, so people can feel comfortable and enjoy the park all day round.</td>
</tr>
<tr>
<td>Lighting Distribution</td>
<td>Different lighting distribution can create different zones in the space to make people feel interested to discover around.</td>
</tr>
<tr>
<td>Glare Control</td>
<td>Glare can cause discomfort and interfere with visibility. Both direct glare and reflected glare should be avoided. Yet certain control amount of glare can be used creatively without being excessive.</td>
</tr>
<tr>
<td>Colour Appearance</td>
<td>Good colour rendering announces the inner beauty of the greenery elements, make the environment more attractive to people. Also it helps to improve safety and security issues in a urban public park</td>
</tr>
<tr>
<td>Horizontal Illuminance</td>
<td>Horizontal illuminance helps to reveal details in the design of the park. Also it helps to create a nice environment for people to walk around</td>
</tr>
<tr>
<td>Vertical Illuminance</td>
<td>Vertical illuminance helps to create vistas in the space, to announce important elements such as monuments and statues.</td>
</tr>
<tr>
<td>Intrinsic Material Characteristics</td>
<td>Good lighting helps people to perceive the textures and materials in the environment, which will bring emotional impact on people and enrich people’s experience in park.</td>
</tr>
<tr>
<td>Design Criteria</td>
<td>Notes</td>
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</tr>
<tr>
<td>Appearance of Luminaires</td>
<td>During temporary events, luminaires can be used to adapt to the atmosphere. Installations can be considered to be set for enhancing the theme.</td>
</tr>
<tr>
<td>Lighting Distribution</td>
<td>Lighting distribution should follow regulations and codes to be sure it assists the usage of the space.</td>
</tr>
<tr>
<td>Glare Control</td>
<td>Although glare can cause discomfort and interfere with visibility, and both direct glare and reflected glare should be avoided. Controlled amount of glare can be use to enhance the atmosphere for certain events.</td>
</tr>
<tr>
<td>Colour Appearance</td>
<td>A good base setting of colour appearance for everyday use, special events may have stronger expression of colours.</td>
</tr>
<tr>
<td>Horizontal Illuminance</td>
<td>A good balanced horizontal illuminance always the guarantee for the good walkability of the park and promotes divers usesages.</td>
</tr>
<tr>
<td>Vertical Illuminance</td>
<td>Vertical illuminance helps to strengthen the spatial quality. It can help to attract people from a distance and express the atmosphere of the certain events.</td>
</tr>
<tr>
<td>System Control and Flexibility</td>
<td>System control can create different scenarios in the park following seasonal usages. It also could support temporary events and transform the image of the park.</td>
</tr>
<tr>
<td>Design Criteria</td>
<td>Notes</td>
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</tr>
<tr>
<td>Appearance of Luminaires</td>
<td>Luminaires serve as visual cues, they can be used as little landmarks in the space.</td>
</tr>
<tr>
<td>Shift Between Daylight</td>
<td>A proper controlled amount light through out the day make the park a good place for meeting and different activities.</td>
</tr>
<tr>
<td>Lighting Distribution</td>
<td>Different lighting distribution creates diverse atmosphere for people meeting up.</td>
</tr>
<tr>
<td>Glare Control</td>
<td>Glare can cause discomfort and interfere with visibility, Both direct glare and reflected glare should be avoided.</td>
</tr>
<tr>
<td>Colour Appearance</td>
<td>Colour appearance can affect visibility and aesthetics. Lamps with better colour rendering values ensures a more pleasant appearance of people, it provides a good environment for interactions.</td>
</tr>
<tr>
<td>Horizontal Illuminance and Vertical Illuminance</td>
<td>A well lit space shows the friendliness of the place and welcomes everyone to come.</td>
</tr>
<tr>
<td>System Control and Flexibility</td>
<td>System control can assist the park adapt to different seasons and weather conditions, so it can keep being active through out the year.</td>
</tr>
</tbody>
</table>
## LIGHTING DESIGN

<table>
<thead>
<tr>
<th>Design Criteria</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance of Luminaires</td>
<td>Luminaires serve as visual cues, their appearance is directly related to the space’s characteristic. Many historical urban public park never had lighting in the original design, as a new element introduced in such context, it needs to be thoughtfully selected.</td>
</tr>
<tr>
<td>Shift Between Daylight</td>
<td>The value and meaning of the historical urban public park should be carefully evaluated. The daylight reveals the natural setting and support activities during the day, when getting dark, the priority of the usage of the park should be set clear, and lighting design will be done accordingly.</td>
</tr>
<tr>
<td>Lighting Distribution</td>
<td>Harah striated patterns of excessive brightness or noticeable shadow should be avoided. Brightness should be well balanced.</td>
</tr>
<tr>
<td>Glare Control</td>
<td>Glare can cause discomfort and interfere with visibility. Both direct glare and reflected glare should be avoided.</td>
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<td>Colour appearance can affect visibility and aesthetics. Lamps with better colour rendering values ensures a more pleasant appearance.</td>
</tr>
<tr>
<td>Colour Contrast</td>
<td>Colour contrast is the difference in perceived colour between a task and its background or more surfaces, it can be used for display or markings.</td>
</tr>
<tr>
<td>Horizontal Illuminance</td>
<td>Horizontal illuminance helps to announce the formality of the space and highlight the obstacles.</td>
</tr>
<tr>
<td>Vertical Illuminance</td>
<td>Vertical illuminance helps to enhance the perspective of the space and the three-dimensionality feeling of the space, makes the space easier to read for visitors.</td>
</tr>
<tr>
<td>Highlight and Shadow</td>
<td>Highlights give a good visual clue about surfaces, but care must be used so that highlights do not become dazzling or hypnotically repetitive. Shadow is a good indicator of surface forms and textures, provided it is not so strong as to conceal relevant detail. They are often considered for lighting up three-dimensional objects.</td>
</tr>
<tr>
<td>Light Pollution</td>
<td>Light pollution is light that is directed upward to the sky or reflected from the surface that interferes with astronomical observations or appreciation of the night sky. It should be controlled during the design process.</td>
</tr>
</tbody>
</table>
By study design issues from the five fundamental attributes of space quality, it tells that the appearance of luminaries, lighting distribution, glare control, colour appearance, vertical illuminance, together with horizontal illuminance have great contribution on space quality, they bring a solid foundation of a promising space. Issues such as shift between daylight and system control and flexibility can help the place to a better usage, they bring more possibilities to the place, with lots of benefits and potential. Lighting pollution as a special design issue, although it seems that it does not impact on space quality directly, yet it is excessive and inappropriate, and should be carefully taken care of. Also, some design issue often seem to be problematic such as highlight, shadow and glare, when it is been well thought and used in a controlled manner, they may transform into surprises.

According to this part the study, one important lesson learnt is that, when dealing with design, a single aspect can actually bring benefits to many qualities of the space, just as the choice of luminaries, when chosen with care and rational thoughts, it does bring great impact on the overall quality of the space.
<table>
<thead>
<tr>
<th>Design Criteria</th>
<th>Urban Connection and Accessibility</th>
<th>Pleasantness</th>
<th>Usages and Activities</th>
<th>Sociability</th>
<th>Cultural and Historical Value</th>
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<tr>
<td>Appearance of Luminaires</td>
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04. THEORY TESTING - CASE STUDIES

Case Study 1: Byrant Park

1 General Information

Location: Midtown Manhattan, between Fifth and Sixth Avenues and between 41st and 42nd Streets, adjacent to the New York Public Library.

Size: 9.6 acres (38,860m2)

Date Designed: Original design completed in 1934

Redesigned early 1990s, completed in 1995

2 Context

Bryant Park located in a office and educational district of Manhattan between 41st and 42nd Streets. It is right behind New York Public Library, and just one block from Time Square. Its particular location makes it a rare place for people to relax and retreat in the city centre.

Nowadays it often visited by local residents as an outdoor retreat among the high-rise buildings, also it serves as a popular touristic destination. But before the redesign in the 90s, it used to be an unappealing place and populated by homeless, and crime activities although according to a study in the 70s, it shown that relaxing or resting was the most frequent activity engaged in by the park users interviewed (Nager and Wentworth, 1976).v

Bryant Park's history shows the conflicts inherent in managing public spaces in dense urban centres. The successful redesign of the park has brought it to an entire new chapter of its life.

3 Project Background and History

1686 New York's colonial governor Thomas Dongan designated the area as public space.

1823 - 1840 It was designated a common grave for the poor. Then the bodies were moved.

1847 The first park at this site opened as Reservoir Square. Many historical events took place in this square.
The western section of the area hosted the exposition hall known as the Crystal Palace, and it was burnt down in 1858.

The area was designated a park
(In the year 1878, the construction of the Sixth Avenue Elevated railway cast both literal and metaphorical shadow over the park.)

The park renamed as Bryant Park, to honour the New York Evening Post editor and abolitionist William Cullen Bryant.

New York Public Library construction began and the Reservoir structure was removed. Terrance gardens, public facilities, and kiosks were added.

By the 1930s, the park was suffering from neglect and was considered disreputable.

The park was redesigned as a Great Depression public works project under the leadership of Robert Moses. The new park was redesigned in the French style by Lusby Simpson, featured a great lawn, and added hedges and later an iron fence to separate the park from the surrounding streets. It was built in 1934.

The park was temporarily degraded by the tearing down of the El and construction of the New York City Subway's underground work. Mid-1900s, the forbidding,
divided space became a gathering place for prostitutes and drug addicts.

By the 1970s the park had been taken over by drug dealers, homeless and prostitutes. It was considered as an avoided area, and the police barricaded the park nightly after dark.

1979 Bryant Park was demolished for building an underground storage for the New York Public Library.

1979 - 1983 A coordinated program of amenities was initiated by the Park Council, and since brought new life to the park. Improvements including adding book and flower markets, cafes, entertainment activities, as well as landscape improvements. It also serves as a greed roof for the underground storage of New York Public Library.

1988 - 1992 A privately funded redesign and restoration with the goal of opening up the park to the streets and encouraging activity within it began. Visibility from the street was increased, the French garden layout was well enhanced, paths and lighting were repaired and improved. The park renovation completed and fully reopened in 1992.

4 Maintenance and Management
Currently Bryant Park is public owned, managed by the private non-profitable Bryant Park Corporation, which supplies all the funding for the park and manages its maintenance, security, and event programming.
5 Criticism
Among multiple positive reviews and feedback, some also have expressed fear that the park has become privatised. Its redesign in the 90s was considered that the park attracted more upscale group of people, undesirable users were discouraged. Also some has expressed the worry of if the park could still serve as a place of retreat and relaxation while accommodate all the new activates and events.

6 Lessons Learnt from this Project

The new layout and formal programming make Bryant Park a vibrant social space. Now it serves as a popular gathering place among city residents and tourists.

The brilliance of the new design lies in its connectivity and free movement. By increasing visual accessibility, the park demonstrates enhanced safety. Public facilities such as public restrooms, loose chairs etc. are scattered around the area foster informal social interaction and mobility. By the careful plant selection, the vegetations still allow the sight lines into the park from city sidewalks. The large lawn provides a wonderful space for various events such as concerts, festivals, and fashion shows. Materials such as statues, lighting fixtures, and stone paving are saved in the new design, those elements’ inclusion adds historical significance to the park.

Seasonal Programming is also well planned in the park. Numerous events are hosted during warm weather months (February to October). Modeled on Europe’s Christmas market, Bryant Park introduced the holiday shops the Winter Village since year 2002 as an effort to liven up the park space during dark seasons. The lawn then transforms into an ice skating rink open to public freely. The winter village truly transformed the park into a year-round destination.

The Reading Room as a traditional feature of Bryant Park which began in August 1935 has been reopened in 2003. Initially started by New York Public Library, the Reading Room provided out-of-work people a place to interact and share ideas without having to pay money or show any identification. The open air library was a great success. Having been paused since 1944 due to the WWII, now the Reading Room has come back to Bryant Park with even more programming content such as book clubs, writers workshops and story telling for kids. Since then the Reading Room became a literary destination.

The redesign of Bryant Park pioneered research that showed how design impacts human behaviour. The new park is a model for how public place can facilitate human interaction and the success of public-private partnerships. It is a great example of urban renewal. What was once an underused public space is now one of the best-loved parks in the city.
Space Quality and Lighting Quality Analysis

Urban Connection and Accessibility

Space Quality:

Bryant Park locates right between 42nd Street and 40th Street, 5th Avenue and 6th Avenue, it is adjacent to the New York Public Library, occupies as a block in the city.

It has entrances from all sides of the street, the entrance facing to 6th Avenue is connected right to the E41st Street. The entrances have open visual access from the street side, information can be found nearby.

Bryant Park has the subway station named after it near the New York Public Library, signage in the city helps people to find their way to the park, also bus stops are on all sides of the park, and it is friendly to pedestrians also.

The form of the park is classic symmetrical, all the paths are easy to navigate. With clear landmarks around, it is very easy to orient.

The greenery on the boarder of the park is carefully planted, as it offers the first hint to people of entering a park area in the city but not as a visual barrier.
Lighting Quality:

Bryant Park’s location is right in the city centre, the border of the park is well defined by equal-interval lampposts which are integrated in the fence.

The entrances on 40th Street, 42nd Street and 6th Avenue are marked by the massive decorative lampposts which gives people the first hint of arriving in the park.

In the near blocks of the city there are well lit signs that shows direction to Bryant Park to lead people’s way.

Surrounded by skyscrapers, the average surrounding light index is relatively high.

As Bryant Park is filled with activities and events around the year which always require well designed lighting, it definitely makes the park noticeable from a distance.
Pleasantness

Space Quality

Bryant Park Corporation is responsible for the security in the park, rule and regulations are clear defined. It encourages people to enjoy the park with good public manner, and strict prohibit behaviours such as drug use, smoking, alcohol use in the public space, etc., vandalism is also well watched. The crime prevention is also done by be attractive, visitors at all hours fostering a safe environment naturally.

Trash bins are places within reachable distance with good sorting system for recycling, litters are well controlled.

The greenery are carefully maintained, flowers change seasonally which offers various scenarios in different time of the year, and the species are carefully selected. Bryant Park is a truly horticulturist's delight.

Bryant Park has well circulated allée for walking around. Many different sitting options as benches and loose chairs are provided for flexible usages. It is welcome to speed blankets on the lawn. The redesign embraced barrier-free design method which provide convenient access for everyone, routes are well planned for wheelchair users, and marked on all the park maps.

Information signage is well designed in the park. They provide different informations needed for people, and can be easily reached and read.

Public serves are well integrated in the park, public washrooms were added, kiosks, restaurants, cafe, flower and newspaper stands are carefully placed in the park, their exist provides convenience also the sense of destination to draw people into the park. Parking lot is down the street near the park.

It also has been able to incorporate a healthy lifestyle by offering activities such as free Yoga classes with Yoga mats included, professional training, etc.
Lighting Qualities:

As in general Bryant park has a balanced light level that matches the surrounding urban environment while providing its regular activities. It enhances the character of Bryant Park being a urban oasis, brings people a relaxing feeling in the busy city centre. People use the park during dark hours mainly because the sense of being safe, the good lighting is definitely part of the reason.

In the allée area, classical-looking lampposts are placed regularly following the design, which give a very even low contrast ambient light. All the kiosk, cafe and restaurants are well lit that makes them can be found easily. Public facilities as the information signs and public washroom can be seen from a distance.

Attractions like Le Carousel are decorated with light that brings a pleasant atmosphere. Some monuments such as the fountain are lit up in the night, not only for people can see them during the dark hours, the light gives a different experience for appreciating the beauty of the work.
Usages and Activities

Space Quality

The location makes Bryant Park a refuge of peace and calm among dense skyscrapers.

For the office works and students nearby, it serves a great lunch place; for urban residents Bryant Park is a wonderful place for a short retreat, no matter taking a walk or just sit and think, it offers a escaping moment to the busy city life. Generous space and various public services also makes it a popular spot for meeting friends. Also for tourists, Bryant Park has lots to offer as it brings people a rich and dynamic visual and cultural experience.

It is also welcome for dogs (on a leash).

Free public WiFi which has been launched in Bryant Park in the summer 2002, it brought more possible usages to the park. Also power outlets are available for people to plug in their electronic devices.

Three terraces and two allée serve different activities. Amenities and attractions can be found all around the park, including Le Carrousel, Chess & Backgammon, Pétanque, Bryant Park Ping Pong, Knitting, The Reading Room and Shoe Shine Stand etc. Food services can be reached easily as well. The management of Bryant Park is open for new things, offering unexpected activities makes the park more exciting to people.

During warm season, the park often is used for hosting events such as concerts, film festivals, fashion events, Yoga, etc. When is winter, unlike some parks are “unofficially closed” due to various reasons, Bryant Park transforms itself into a winter village to continue invite people in, as the great lawn then serves as a public ice skating rink, and holiday shops are set up around.
Lighting Qualities:

Bryant Park is filled with activities and events all year round, the general lighting in the park provides a good foundation to present the aliveness of park by assist various activities and diverse usages. Seasonal arrangements make the park more attractive, different light settings are designed accordingly.

During warm seasons (February to October as defined by Bryant Park Corporation), the great lawn is lit up by stadium light which is installed on the top of Salesforce Tower across the 6th Avenue, the lighting fixtures are placed high enough that will not cause glare to regular activities in the park. Also the stadium light serves as facade lighting of New York Public Library that makes it a landmark which can been seen from a distance. Events such as film festival or concerts are favoured by visitors, lighting are designed accordingly.

During the cold seasons (November to January), Bryant Park transforms into Winter Village during cold season, the great lawn is then replaced by a public ice skating rink, holiday shops and food stands are set up around the ice rink. Lit up by temporary fixtures on the corners, the ice rink is definitely a successful attraction in the city. The holiday shops are built with glass facades and roof, the interior lighting makes them as light cubes in the park, which contribute to the general lighting in Bryant Park. Seasonal decorations such as the well illuminated Christmas tree serves as an focal point to people, events as “Tree Lighting Skate-tacular” has successfully brought visitors to the park as an original holiday tale. During holiday seasons colours are more embraced in the public lighting.
**Sociability**

**Space Quality:**

Bryant Park welcomes people from all kinds of backgrounds, different activities get people involved spontaneously, it builds all kinds channels for people to communicate and triggers people's sense of community. Also it provides opportunities to introduce different cultures and traditions to each other. The diversity in Bryant park is rich in gender and age group, it represents the true equal and democratic value of public parks.

By improving the park, it helps to enhance the real estate values of its neighbourhood.

**Lighting Quality:**

Bryant Park is an accommodative place in the city, it is friendly and open to everyone. As Bryant Park’s diverse usage, lighting in the park is adaptive for different activities. Firstly, the general lighting provides a safe environment that makes people feel comfortable to stay, and by provision of channels of communication, it encourages people to interact and communicate with each other.
Culture and Historical Value

Space Quality:

The rich history of Bryant Park makes itself a monument in the city’s life, it carries the city’s history and continues to create new memories.

The classic French style planning is well maintained, to enhance such atmosphere, items such as La Carrousel was created specifically for the theme. The loose chairs are also chosen for its French bistro style. Historical monuments and elements are placed all over Bryant Park, they are quietly telling people their stories to people and witness the history.

The Reading Room was once a great success but long lost in the history has made it return to Bryant Park in the year 2002. Originally began during the Great Depression era in 1935 for the out-of-work people to interact and share ideas without to pay money or show any identification by the New York Public Library, now it has been recreated. Modeled after the original, it opens during the warm season for all ages. Also it became a place to host events such as writing workshops, poetry reading, discussions, etc.

Multiple cultural events are programmed throughout the year, which enriches public life. Seasonal programming are well planned so people can celebrate different time of the year.

Also the restaurants and cafes in the park tend to serve American cuisine than other food to support the local tradition.
Lighting Quality:

Bryant Park's lighting design is respectful and responsible. It enhances the park's identity, also makes it well adapted to the current city life. From the choice of the lighting fixtures to the planning, it all reflects the consciousness in the design process.

Historical features are well preserved such as the lampposts at the entrances, permanent lighting fixtures are chosen to match the park's style.

Historical monuments in the park are well lit, along with information boards. Elements such as the Josephine Shaw Lowell Memorial Fountain is rendered gorgeously by light, makes it appreciated by more.
Case Study 2: Prato della Valle

1 General Information

   Location: Italy, Padua city centre, between Abbey of Santa Giustina and Via Umberto I
   Size: 88.620 m²
   Date Designed: First recorded usage by Roman times as military meeting area (49 BC?)
                   Major redesign on the idea of Andrea Memmo in 1775, finished around 19th century
                   Last renovation in the 1990s

2 Context

Prato della Valle is one of the largest squares in Europe. It lies on the southern part of the city centre of Padua, in Italy. In its centre there is a green “island” called “Isola Memmia” of about 20.000 m² surrounded by a water canal bordered by two rings of statues. Around the central island there are 78 statues representing university professors, artists, leaders or previous governors of the city.

It is enclosed by historical buildings all around, where residents and institutions are located. Notably, it faces the Abbey of Santa Giustina. Close by the area there are well known places as the Basilica of St. Anthony and the University of Padua - Botanical Garden (UNESCO Heritage). On the south of the park there is a large parking space. In one of the building around the square there is a police station.

Prato della Valle is always been considered a place of markets, public shows and religious devotion. In summertime its lawns are enjoyed by a lot of youth, for studying or just a sunbath. The external part of the square it often used by skaters also for some professional competitions. The square host many important concerts or events, like new year’s eve celebrations or marathons.

In the 1990s it has been deeply renovated and this brought more people in the park.
3 Project Background and History

In Roman Times It was one of the main way to get into the city. It was called Field of Mars and there is the Zairo roman theatre, a temple and the roman Circus. In the area was buried Santa Giustina and from now on that area is linked with the memory of the saint.

Middle Ages A lot of floods changed the hydrological situation of the area. From now Prato della Valle became partially a swampy terrain. The bishop Gauslino promoted the construction of the Abbey to help and support the growth in the area. This made good outcome and markets came back into the area. From now the place in called Pratum. From the 12th century a lot of games and religious plays are performed in the area.

1767 The ownership of Prato passes from the Abbey of Santa Giustina to the municipality. From now on is this authority responsible for the centuries-old instability of the terrain.

1775 Andrea Memmo became the superintendent and started a plan of renovation for the city based on relaunching commerce and improving public hygiene. Prato della Valle was the perfect symbol of his plan. He imagined Prato to be a place that can host the traditional fairs and commerce, and in the other days also a place where the local people have a stroll and some refreshment. The idea was to create a central island in elliptic shape, surrounded by an artificial river, bordered by a double line of statues. Domenico Cerato was the architect of the project. In the island 54 wooden shops were prepared. Their rent would have supported the cost of the works for the project. However they lasted few years. The artificial river around the island is in fact a proper work of treatment against the swampy terrain.

19th century Memmo’s project was eventually finished
1910  Electrical lighting was installed

1926  The fountain at the centre of the island is installed, last piece of the original Memmo’s plan.

1960s-80s  The external part of the square is dedicated to vehicle parking, and the island itself was perceived as a traffic roundabout.

1990s  Large renovation plan took place to restore the physical aspects of the square, but also its social-functional aspects. There were about 100 Platanus trees in the island. They reached eventually the typical heights of their species, which is about 35-40m. This factor modified heavily the aspect of the island and moreover it created a different visual perception than what was design in Memmo’s project. The trees in the island have been cut out and fewer trees have been replanted bordering only the alleys. This allowed the lawn to grow healthy. The tree species selected was the Acer platanoides ‘Summershade’, that can reach max 20 meters. This is more respectful of the urban qualities of the park but still it can create good shadow. Car traffic was set outside the square. The increased amount of lighting allowed the evening use, especially in summertime.

2014  Lighting renovation with LEDs. The current light poles in the island and the lights on the statues are retrofitted with white LEDs with better colour rendering comparing to the previous high-pressure sodium lamps. The light will be harmonised in case of events in the square. The lighting fixtures are also colour changing allowing an “emotional tourism”, as described by the president of the Chamber of Commerce (Rossi 2013)
4 Maintenance and Management

Prato della Valle is owned and maintained by the municipality of the city of Padua. The municipality has a continuous program of maintenance. In 2015 there has been a program of renovation of the inner walls and sitting areas in the island (PadovaOggi 2015). The flooring of the inners axes has been improved with lime. Parts of statues have been reattached. In the end of the 2017 there are some excavation around the area there the roman theatre was. In 2018 they will continue to clean up the statues (PadovaOggi 2017).

5 Criticism

Remove the car parking may have raised a lot of critique from the citizens, that would use that area to easy park their car and walk into the city.
It has not been found any particular protest or objections about the park.

6 Lessons Learnt from this Project

It is interesting that a space conceptualised more than 240 years ago is still relevant and modern nowadays. It has timeless qualities like openness, accessibility and flexibility of usage. However the some problematic occurred when the trees were left growing. In the pictures in 1885 the tree’s crowns look tall and nicely trimmed. However in the 1970s the trees looks large, the crown is expanded and closer to the ground. All in all they create a tight forest in the island, hiding its internal space from the outside. Apparently a renewal in the 1990s improved the situation. People responded positivity to changes of the environment and, as proof, embraced the new lawns.
7 Analysis (spatial qualities and lighting qualities)

The main characteristic of the space is its large size and openness. Comparing to the density of building and small roads in the Padua city centre, Prato della Valle is a large opening in the city, and in this it holds its main value. This is also a quality been used already at the beginning of its history, for example for grouping military troops. The island in the centre appears the main decoration of the environment, giving a landmark in the large areas, but also creating 2 different types of space around: one “hard” and “fast” as the asphalt area, the other “soft” and “slow” like the grass area in the centre island. The ancient buildings around the area remind the visitor that he is still in the city centre.

The main efforts coming from the lighting plan, that adapts to an historical context and highlights what are the main historical components. In fact there one type of light pole and it has a historical design. In the island they light poles follow and enhance the line of the axes. Lighting poles are present at the entrance of the axes. The in-ground light spots lit up the statues bottom-up. This however can give to the statues faces strong shadows. Moreover all the buildings around the square are lit up thank to the street lighting. Lighting renovation, has been a retrofit work, supporting the idea the the previous light plan was satisfying. It is interesting to notice what the vice mayor said before approving the new lighting renovation in 2013: “70% of the public expenses are about the electricity bill” (Rossi 2013).
Urban Connection and Accessibility

Space Qualities

It lies in the city centre of the city, between Abbey of Santa Giustina and the southern end of Via Umberto I.

It has entrances with many streets from North, East, and South. The West side is one block of buildings. There are no obstacles from the street to recognise the place. One street connects Prato with the famous Basilica of St. Anthony. Via Umberto I connects the area with the central part of the city centre. From this street there is no possible to see Prato from far, unless the visitor is very close to the area already. On the south there is a street with heavy vehicle traffic.

There are many bus stop right at the North, East and South side of the park. Moreover there is a tram stop on the North side.

Navigation is very easy in the area since it is flat and open, and there are no visual obstacles. The island in the centre has a cross layout. The only way to access to the island are the 4 bridges. However the entrances are flat with no steps. The space is highly accessible. The fountain in the centre is a clear landmark in the space.

For a person who never visited the park before, there are no clear hints that he is in the right direction. The awareness arrive very close to the entrances to Prato.

Lighting Qualities

The lighting in the area is soft and strategically placed. There are some light poles in antique style that follows the axes of the island. All the statues are lit up in front. A big effect is given by the building that surrounds the square been lit up. This compensates for not having light up the large area of asphalt between the island and the side of the square. The fountain in the centre is lit up.
Pleasantness

Space quality

High visibility in the the area helps with the surveillance. Moreover there is a Police station in one
building surrounding the park. The area has video surveillance.
There are no major complains about cleanness. There are many trash cans in the area.
The grass is well maintained, thanks also for not having a lot of trees around that would shade the
good influence of the sun. The trees are recently planned and in good conditions.
There are no accessibility problems since whole the area is flat. There are stone benches on the sides
of the axes in the island. The stone border of the canal acts also as sitting area. The asphalt area
around the park is completely walkable and flat. The same is valid for the alleys in the island. The
grass is well maintained and it can be considerable good for walk or sit.
There are some signage for tourist destinations and for local rules, like parking, etc..

In the island is possible to find drinkable water fountains, and sometime there are some shop
stands. However the majority of the service are on the border of the square, like bars, restaurants,
parking areas.

The large oval asphalt ring around the park acts as a circuit for skating or cycling. Some short runs
or marathons are organised with arrival in the park. The grass welcome people to sunbath in sum-
mertime.

Lighting Qualities

The light poles in the island are aligned with the axis and give a sense of order and not obtrusive.
It also gives a sense of direction and orientation. Everything important in the environment looks
visible, but nothing has a strong characterisation. Soft light gives a feeling of relax and calmness.
The good colour rendering of the general lighting in the island make feel everything natural.
The surrounding buildings lit up, gives a sense of space and in a certain way of safety, in such a
large area.
Usages and Activities

Space qualities

The inner island counts 42 trees aligned with the axes. The 4 lawns represent the green area in the park. Even tough not whole surface of the square is “green”, it is a very large green area in the urban environment and it represents a great refreshment for a city so densely populated. Its size and it openness to the sky allow a proper disconnection from the city life.

Prato della Valle is one of the most popular tourist destination of the city. For the local, it represents a proper destination to spend some leisure time, especially when events are organised. It a perfect place to take a brake from the stress in the city.

The municipality welcomes dog owners are welcome into the parks as long as they walk their animals with a leash.

The internet connection provided by the municipality is located only in the northern area of the park, out of the green island.

The large area and the diversity of surfaces allow different activities to happen without disturbing each other. While people inside the island can sit and enjoy the sound of the fountains, outside people are skating or jogging.

In summertime, in day time the lawns are frequented by people enjoying sunbathing. As long as the sun goes down, the lawns became a soft and fresh refuge for the city. They came a popular meeting place, to hang out with friends or sign a song together.

Everyday from monday to friday there is a fruit and vegetable market. Every saturdays a market with more than 160 desks takes place and every third sunday of the month there is the antique market.
The size of the park make it a perfect place to organise large events dedicated to the whole city inhabitants.

There are sports events like professional or amateur running contests and it is the finish line for the city marathon.

During the year there are many food tasting fairs, like Oktoberfest. There are many public concerts and also dance events like tango.

In general it is the place for the city to host religious or not religious celebrations. The feast of St. Anthony brings Luna Park in the south-east corner of Prato for the first 13 days of June. Prato della Valle is a place of fireworks for celebrations like Ferragosto in mid August, and New Year's eve.

**Lighting Qualities**

The areas is easy adaptable to events. The lighting is soft and leave space for integration with other events, without taking too much attention or creating safety problems.
**Sociability**

**Space quality**

Prato della Valle is a public space and it is open to charity event (Pink Run, p63 Syndrome EEC).

It is a representative place where people meets for celebrates large events.

**Lighting Qualities**

The light plan creates brighter circulation zones and relative darker relaxing areas. The soft transition of brightness between the areas allows visibility and comfort in the area. The slightly darker areas of the lawns right beside the circulation areas become in this way relaxing and laid-back. The openness in the area add a feeling of safety. All the social events in the island happens with the against the bright surface go the buildings lit up in the background.
Culture and Historical Value

Space qualities

The area itself is a “reservoir” of history. Recently the remains of the roman theatre Zairo have been dug up, and the archeologists organised some visits open to public. Virtual reality glasses will be available to see how was the area in the past.

Traditional events important and symbolic of the city are performed here.

Literature events are organised in the square like “Parole in Prato” people brings a extract of literature that enjoyed the most and reads it to the people around. All with a evening picnic.

Lighting Qualities

The light poles follows the historical design, and the lighting highlight the historical elements in the park as the axes and the statues.
05. PRAXIS
Case study: Humlegården park

1 General Information

Location: Stockholm city centre, near Stureplan area, between Birger Jarlsgatan and Karlavägen
Size: 10.8 Ha (about 108000 m2) (StockholmsStad 2009)
Date Designed: First formal layout in 1619 as a hop farm
Last large design in 1864 when, among other changes, the national library is added

2 Context

It is the second oldest park of the city after Kungsträdgården, and it is three times the size of it. Humlegården park lies in the northern side of Stockholm city, in Östermalm district. The park sits between the highly commercial and office area of Stureplan and the exclusive residential area of Villastaden.

It is one of the largest green areas in the city centre. Its layout with double-treed alleys gives a strong identity as a historical park. It is hosting the nation library building, that attracts many visitors in the area. In fact the library collects and preserve all domestic printed and audio-video materials created in Sweden. The park hosts 12 art works and statues, with the Carl Linnaeus’ statue at the centre of the park.

The park is not flat, but present as a slope (higher on the north side, lower in the south side). It presents a hill on the north-east corner of the park. The parks founds a lower point at its centre where Linnaeus’ statue lies.

It hosts many sport facilities, like a small football field, a skate park and a recreation park for kids.
It is a very popular place in summertime where people come together for sunbathing and barbecuing. In that period two bars are open for the season.

On 27th April 2011 the local newspaper Metro publishes an article called “Här är Stockholms farligaste parker” about Stockholm’s most dangerous parks. According to the 4000 police reports made between 2007-2011, Humlegården results the second park in the city for “muggings” (25) right after Kungsträdgården (36). It is the third park for “rape, sex crimes, molestations” (12), after Kungsträdgården (44) and Tantolunden (32).

3 Project Background and History

Thanks to the work of Asker(1986) and Topia(2004), it is possible to reconstruct an idea of the park in different ages. The history of the park can be divided by the change of purpose and therefore the change in the design in 6 stages:

(1619 - 1640) The origins – the hop farm (in Swedish, Humlegården). In the outskirts of the Stockholm town, a slope facing south was chosen to be the new King’s orchard. The orientation of the land was appropriate for the cultivation of fruit and vegetables for the royal kitchen. Large parts of the land were also used as pasture.

(1648 – 1687) The leisure park for the royal family. Queen Christina called the French garden designer André Mollet to redesign the park as a leisure area in a French garden style. Queen Ulrika Eleonora cherished so much the orchard that she ordered to erect a villa “Rotunda” at the centre of the park. 4 orthogonal and 4 diagonal alleys with trees connect the villa with the borders of the park. The land itself is still used as an orchard. Even the more exotic trees were planted like walnut, peach and apricot. A hotbed for growing melons was also built.

(1700 – 1799) + (1800 – 1860) The process of opening to public. A new renovation brought new plant and new flower to the garden. The park opens to the public. Street lighting in
the park was installed. The Rotunda is used as popular theatre. North part was first used for cow grazing and then became English style. A swinging carousel was spinning at the end of the west avenue. A spa lounge was built in the northwest side of the park. In 1835 the Linnée Association restored the park and it brought in rare animals and birds from foreign continents. Several dams were built; greenhouses, fences and cages for the animals and birds were built.

(1864 – 1930) The park is public. Stockholm’s population multiplied during the first half of the 1800s with social and hygienic problems as a result. The city buildings had by this time reached Humlegården and the city’s population began more and more loudly to make demands to get their park needs met. The crown donated the park to the city of Stockholm around 1870. The park is officially public. The addition of the National Library building in 1878 to the park brings a redesign of the park itself. Linnaeus statue was placed in the intersection of the alleys where the Rotunda stood. All older lawns were ploughed and a fountain was set in front of the library building. The radical transformation in the 1870s blighted most of what was left of the old pleasure garden in French style. Then the diagonal avenues were removed. King Oskar stopped the elimination of the old linden trees that was meant to create a more contemporary architectural style. Many exotic plants were planted. A playground for children was added in the park and it was the first playground in the district. During the winter Stockholm citizens went skating in the park or found themselves on Flora’s hill for a sledge ride.

(1938 - 1970) Rationalization – Stockholm school. The park is renovated following the current criteria for modernization. In the park new elements were introduced:
- playgrounds for children
- playing fields and sports fields for youth
- other parts for those adult visitors.

The modernization created large contiguous lawns and reduced maintenance costs by many times again, but at the expense of the romantic lushness that previously
characterized the park. The fountain and the pond in front of the library were removed. At the foot of Flora’s hill south side, land was allotted to a mineral water factory, which set up a “water store” for outdoor dining by the park divisions plans. In south-western corner, at Lidingö line terminal station, was built the hot dog stand Bumblebee (Humlan), with its outdoor serving area and here was also built a small pond.

(1979 – 2002) Recent years. The National Library expanded. The walkway that crosses the park diagonally from northwest to southeast is much used and was originally a trail. It was made permanent during the renovation in 1998. Similarly, many new pathways were added in the later years. Many of the old walkways still remain which resulted in many of grass areas cut up into smaller pieces. A music pavilion installed in 1998 at the base of Flora’s hill.

Is it interesting to notice that the end of each period there is marked by a moment of decadence of the park, resurrected by the next period of restoration.

It is possible to create a timeline of the public lighting evolution in the park:

(3° period – open to public) Around 1763 first artificial lighting, right when the park was open to all citizens. In the first half of the 19th century (1800-1860) for the royal name days, coloured paper lanterns were hung on the avenues trees.

(5° period- rationalization) In 1959 the work was concentrated on the strengthening of the lighting, whereby it was hoped to make these parts less attractive to the clientele who visit Humlegården after nightfall, and that has given the park a less good reputation.
In front of the library entrance was placed coated bronze urns, a new light fixture and large stone globe. At the same time was added the facade lighting.

Before 1998, an extensive renovation was performed. The lighting was replaced with a light fixture designed by a century-old model.

A new lighting renovation called “Ett ljusare Humlegården” has been implemented in the end of the year 2008, in consideration of safety factors. It consisted in renovation for the plants and new lighting that includes 300 new light points, and increased maintenance efforts.

Together with Fortum, Stockholm City invests 4 millions Swedish crowns on new lighting in Humlegården. The lighting should illuminate areas of the park that are perceived as dark and insecure, but also highlighting the statue of Linnaeus and several of the park’s beautiful trees.

From the document released by Fortum and the City of Stockholm called “Ett ljusare Humlegården – Pressrapport January 2008”:

- In the playground, remove the existing lights and install new glare controlled lighting.
- The football field is illuminated with a warm white light evenly.
- The skateboard field is illuminated by a directional light that highlights the different skateboard ramps.
- The National Library is lit up so that even the lower portions of the facade are illuminated.
- The entrance to the National Library is illuminated with more gas lamp style lamps together with lighting trees and stairs.
- Engelbrektsplan’s lamp posts are replaced with classic poles and luminaires of the same type found on Stureplan.
- Southwestern entrance: the sculpture ‘Game of forms’ (Spel med former) is illuminated.
- The big chestnut tree is illuminated so that light plays across the little park area at Engelbrektsplan.
- Southeastern entrance: the chestnut tree on the small square at the entrance is illuminated.
with light directed both up into the crown and down through leaves and branches.

- Northwest entrance: in spotlight straight into the park from the entrance, bushes of Rhododendron are illuminated inside the foliage.

Here is the map with the lighting measurements taken in the park.

Outside the park there are 2 levels of lighting in the urban environment. On the Stureplan area it has been measured up to 40 lux at 2m from the lighting pole. On the north side of the park, the lighting on the curb measured about 10 lux and it looked averagely uniform.

The lighting levels under the lighting poles in the park have been measured. At 1 meter from the pole there is a ring of light of 13 lux. At 2 meters there is a ring of light of 9 lux. At 5 meters from there is ring of light of 2 lux.

The inside the park, the majority of the area is colorized gray because it not measured any lux.

As the map can show, the park is averagely very dark, and in great contrast with the 40 lux levels measured near at the Stureplan area.
unsafe area that criminals take advantage of. It important to notice that the crimes are registered not only in the deeper areas of the park, but mostly in the closest area of the park to Stureplan.

More in details, there are visibility issues because of large vegetation, terrain levelling and the architecture in the park (for example the library itself act as a visibility barrier between the centre of the park and the crowded area of Stureplan. This -beside the amount of light- can bring challenges to keep the area always safe.

7 Space Quality and Lighting Quality Analysis

Urban Connection and Accessibility

Space Quality:

Humlegården park lies in Östermalm district in central Stockholm. It sits between the major streets Birger Jarls gatan and Karlavägen.

It is possible to reach Humlegården from 18 access points in the city from North, East, South or West. From North and from East, the access streets are straights and perpendicular to the park. So it is possible to perceive the large vegetation of the park from far thanks. The West access streets are small and curvy, therefore it is difficult to perceive the park from far. On the southern side, the park is hidden by the buildings between Birger Jarls gatan and Humlegårds gatan. It is possible to have a partial view thanks to the opening made by Sturegatan and Biblioteksgatan.

It is peculiar that often the entrances of the park do not correspond to the accesses to the city. The clearest example comes from the park alleys. Only the North alley is aligned with a street (Floragatan). The East and West branches end toward buildings.

There are bus stops on the North, East and South side. There is also the metro station Östermalmstorg 300 meters south the park.
The park presents a complex setting of natural elements in the space. The alleys give a sense of order in the space. However, once inside the park, there is a network of smaller paths and a clear connection with the city around is lost. Once inside the vegetation, the main orientation landmark are the alleys or, when visible, the nation library.

The roundabout in the centre of the park offers a point of reference. However in the same way it takes so large space that it feels it is deviating away all the routes.

Large trees all around the park create large hints about the presence of a large greenery. However when closer to the park, large bushes hide the view into the park. The large national library building is both a hint from the far street, but also an obstacle to see through the area.

**Lighting Quality:**

Generally the park looks darker than the streets around. The facade lighting of the library's front side acts a visible surface from far. More precisely, the interior lighting of the library, through the windows, appears very bright and bring a sign of life into the space. The street side on the south edge of the park on Humlegårdsatan results brighter.

Coming from the North-East or North-West, residential area, the park results slightly darker, mostly hidden behind the vegetation. On the other side, coming from South-East or South-West, a commercial and night life area, the park results particularly darker.

From outside it is possible to distinguish a set of soft light spots that, supposedly, follow the paths in the park. This does not provide a clear understanding of the space. It possible to perceive large dark areas. Only the alignment of the lights on the alleys gives the visual pleasure, readability and predictability.

When there is snow in the park, the visibility increase dramatically, and the whole park is visible in one sight.

South-East entrance. View from Stureplan and view from inside the park. The light contrast is strong.

View of the east alley from the street side
Pleasantness

Space Quality

In daytime the park feels safe, despite the large vegetation. This because, on one side sunlight provides large amount of light. On the other side large spaces alternates between large vegetation. The area has video surveillance.

The park result clean with many trash cans available. However In case of rain, the path and alleys become muddy and difficult to walk.

The large vegetation and the size of the park gives a complete disconnection from the noisy city life. The central roundabout acts like centrepiece on a table, collecting all the interests from the space. Plants and flowers of various type decorate and embellishes the land around Linnee statue. The nature expresses itself fully in this park. Trees are grown in full scale, reaching and surpassing the height of the library. Their crowns are large and soft. They make feel to be in English garden. However the aligned trees in the alleys add some rigidity and structure in the mostly “free form” space. There are many lawns, as result of the cutouts made by the paths.

The alleys call for a long walk between those aligned trees. However the size of those alleys is not in proportion with the importance of the destination they bring you to. Definitely they are the quickest way toward the central roundabout with the Linnee statue.

The park has many benches in the alleys or grouped on the lawns. They lie around the roundabout and on top of Flora’s hill. Often the benches organised in groups are oriented toward south.

There are some information boards about the park at the entrances. Inside the park there are no maps or direction to orientate.
In the park are present one restaurant (Debaser) and one bar (Humlan) at the south-eastern entrance. However those services are open only for the summer season. One public toilet is present near at the south-eastern entrance. During working hours, in the library there is a cafeteria.

On the West part of the park there is a Youth house, that serves as a youth community meeting points. On the North side there is “recreational park” house that give services to parents playing with kids. In the north side of the park the is a shower that free of usage in summertime.

They park provides sport areas as basketball field, football field, skate park and a running track. However the local use the whole park for their own exercises. No particular areas are dedicated to sport or exercises, however the locals embrace nature and sport. In fact there are self-organised sport teams that meet up in the park for some training session. It is interesting how they use various part of the park for different kind of training. They take advantage of the slope for some strength training. Otherwise they use the flat lawns for group training. The alleys are use for running. Yoga sessions are organised in warm seasons.

**Lighting qualities**

The light posts oriented in parallel line in the alleys give a pleasant sense of order, direction and perspective. However generically the light levels are low, and it feels more comfortable to go that to stay in the park by night.

The usage of the same light pole and the same quality of light through such a large space, makes difficult to transmit a sense of three dimensional space and orientation. The spaces are not defined clear, but its only possible to follow the light poles are modern torches of navigation throughout large areas of darkness.

The front facade of the library and its front area are lit up.

From the north part of the park, the library windows transmit a sense of human presence in the
space. The library extension glass looks bright and gives a reference in the space.

Here are there in the park, there are some upwards spotlight to lit up some of the canopies of the trees.

**Usages and Activities**

**Space Quality**

Such a large green area in such a busy environment give a sense of refreshment for the district. Office workers can take a break and enjoy some nature in their lunch break.

In summertime all the lawns are used to sunbathing and recreate a personal spot from people to relax. They also use the trees as pole for slacklining.

In wintertimes some protections are installed in the lower part of Flora’s hills and lower than the playground, so that, in case of snow, kids (and sometime adults too) can play tobogganing. Moreover it is installed a Christmas tree and a sledge carousel.

The space of the area is so large that guarantees different users to have their own area of activity without disturbing each other. People can sit on the benches for relax, while young people can play basketball in their field. At the same time joggers are running around the border of the parks, while commuters are crossing the parks to go home.

There is a large dog park in the south west quadrant of the park. However many dog owners prefers to use any lawn available to play with the dog.
There is no public internet service, unless very close the library area.

There are many and large activity areas on the west and north side of the park. Parents bring their kids here to play in the playground in the norths side of the park. Youth have their sport area, with basketball, skate and football. There is also a dog park.

No large public events are organised by the municipality.

**Lighting qualities**

In the activities areas, additional projectors add more light. This create good lighting for activities. There are some colourful lights in the basketball park to create a sense of attraction and energy.

**Sociability**

**Space quality**

Large areas allow large meetings. For example there is a music pavilion on the bottom of Flora's hill that can allow spontaneous music events between people.

As a large natural park, it attracts many dogs owners, and this create a social context for them.

It large lawns create many sport opportunities that eventually can become also a social opportunity between people.

**Lighting Quality**

Light is soft and very low levels, that generically could be associated to a relax space. However the
park is so big that this type of lighting does not guarantee social meeting under this light.

It not easy to perceive completely the face of persons from far. The light poles mostly follow the place like a soft “acupuncture” and there is not much “vertical lighting” in the space.

**Culture and Historical Value**

**Space Quality**

The space how we see it nowadays comes from a continuous minor changes from the last redesign in 1864. The size and the age of the tree are themselves a testimony of the historical message.

There are 12 statues (representing most valuable persons in the local culture) and artworks collected during various decades:

1. Carl von Linné by Frithiof Kjellberg, 1885
2. Carl Wilhelm Scheele by John Börjesson, 1892
3. ”Farfadern” by Per Hasselberg, 1896
4. Peter Wieselgren by Gustav Malmquist, 1910
5. Anders Fryxell by Walter Runeberg, 1910
6. Fredrika Bremer by Sigrid Fridman, 1927
7. ”Tufssen” by Egon Möller-Nielsen, 1949
8. ”Isobartema” by Martin Holmgren, 1970
9. ”Spel med former” by Christine Lohe, 1977
10. ”Cordillera de los andes” by Francisco Gazitúa, 2000
11. Hjalmar Söderberg by Peter Linde, 2010
12. “Geodetisk skulptur” by Einar Høste, 1998

Moreover the presence of the nation library itself create a sense of protecting history and culture.
Lighting Quality

The antique design of the light post spreads the feeling of the original times of the park. In fact the light post is a copy of the original light poles that were used in the past.

Unfortunately most of the statue do not have lighting.
Humlegården lighting proposal

Following the recommendation from the Lighting Quality Framework we can compose a lighting proposal that better support the integration of the park in the modern city life.

Urban connection and accessibility
The lighting enhance the trees along the border of the park to announce its presence to the city and to the city accesses that have limited view on the park. This enhance the sense of destination of the park. The entrances in the park are enhanced so to improve the entrance and the navigation in the park.

Pleasantness
Vertical illuminance is introduced in the park. The architectural elements, like the library, have facade lighting on all the sides. Lighting creates a continuous loop path around the park to improve the walkability. It may increase the interest for people such as dog-walkers, joggers. Consequentially it will help to increase the perception of safety in the park. The still projection on the backside of the library building creates a carpet-pattern boxwood impression during the bare season of the vegetation. It reminds people the history of the park.

Usage and Activities
The lighting design has a year-round program. In wintertime, by creating both still and motion views it helps to encourage people came to visit the park. The motion projection in the kid playground area triggers peoples curiosity and excitement, and adds active atmosphere in the winter low season.

Sociability
The different activity areas in the park are lit up properly, so people with the same interest can have a chance to gather together and interact.
Cultural and Historical value

The luminaires are chosen following the nature of the park. Lamppost with antique looking are used for announcing the historical features. Also as a icon to define the border of the park which offers people the first impression of the park. Other lighting features tend to be more humble and subtle to match the naturalistic atmosphere of the park.

The perspective created by the trees in the alley is enhanced by placing those antique-looking luminaires, respecting the rhythm and symmetry of the axes.

Historical monuments, artworks and statues, including the national library itself, are properly concerned and lit.
Enhanced "practical axis" makes the park better connected to the city grid.

Improved architecture lighting allows the park to be noticed from far (as an end view of Biblioteksgatan).

Lighting layered by different lighting fixtures gives smooth transition between zones in the park.

Entrance's brightness is judged by Surrounding Brightness.

A defined border gives the hint of arrival to the park.
PLEASANTNESS

Adaptive lighting always goes with the spirit of the environment

Well lit sits and walking paths

A walking loop path led by light

Human scale lighting fixtures gives more relaxing and intimate feeling

Well lit monuments and arts scattered all over the park

Still floral projection gives people company during the bare season

Motion projection triggers people’s senses.

A view created by the topology of the park serves as a in-distance vista
USAGES AND ACTIVITIES

- Generous space that has potential to host different kind of events
- Bars as good meeting place in summer
- Perfect place for a outdoor workout
- Public Bathroom inside the park
**SOCIABILITY**

Large green area is filled with people in the warm night for the same interests such as workout, or just simply for the nice atmosphere.

Sports field, playground and dog park are well lit and ready for their visitors.

Universally accesible lighting concern allows everyone to enjoy the park.

Activemess increases the sense of safety, inter-twined paths increase the opportunities of encounter. Sensory triggering projection stimulates people.

Great potential for hosting gatherings and events.
Cultural and Historical Value

Defined border, announced formality and architecture

Well conserved natualistic atmosphere with humble and subtle low light

Announced monuments and arts

Projection use light instead of carpet-pattern boxwood in formal gardens (with theme of “Humle”)

Choice of antique style luminaire
06. DISCUSSION AND CONCLUSION

This study intended to find a Lighting Quality Framework that can guide the practitioners or authorities toward a proper set of lighting qualities that can support an historical urban public park to be better integrated into modern city life.

After have found the most relevant theories that can support a proper understanding of the space, a Space Quality Framework has been extracted following 5 fundamental attributes:
- Urban connection and accessibility
- Pleasantness
- Usages and activities
- Sociability
- Cultural and Historical value

This is the base over which we build the Lighting Quality Framework, a set of ready to use suggestions to guide a lighting plan.

In the case study, the Space and Lighting Qualities Frameworks are able to express the qualities introduced by the renovations of Bryant Park and Prato della Valle. In fact both parks, being well known cases nowadays, have many positive items in each attribute of Quality Framework. This can prove, in reverse, that the usage of the Space or Lighting Qualities Frameworks to structure an of intervention of improvement can be helpful.

On the other side, applying the Framework to analyse Humlegården park that has some documented issues with security, raised the attention toward more considerations, for example some issues with Urban Connection and Accessibility both in space quality and lighting qualities.

Artificial lighting is one factor that can contribute to improve historical urban public parks. This work suggests the Lighting Quality Framework to structure the improvements with light.
From the case study resulted evident the importance of visibility in public space. Both in Bryant Park and in Prato della Valle it has been worked for improving visibility inside the park and outside the park. In Prato, the visibility has been improved by removing the old large trees and replanting the new smaller one. It might not be always possible and in this case lighting can have a major role, bringing visibility where before could have been an safety issue.

Experiencing Humlegården in various seasons, it is easy to notice the strong influence of weather in visibility of the park. While in a rainy day the environment seems even darker, after a snowy day the whole park becomes visible in one sight. This can be explained with the albedo of different material. Albedo is the measure of diffusive reflection of solar radiation out of the total solar radiation received by a body. It can be used as a percentage factor. For example fresh snow reflects between 80-90% of the light it receive. it is interesting to notice how dry soil reflects between 20% and 30%, while wet soil only about 10%. This explain how a natural park in a rainy day can look darker than in normal days. If we consider other elements typical in a park, green grass reflects 25% while concrete can reflect 55%.

This can give an insight how much the elements in the park and the weather conditions can influence the visibility for people and the performance of the lighting system. A weather sensor in a public lighting system can help modulate the amount of light to guarantee visibility and visual comfort. In case of snowy day, for example, it could be possible to reduce the amount of light output of the luminaire and save energy. In a rainy day it might be necessary to raise the light output.

All this, while might sound just a speculation, it can be very close to be implemented in reality since lighting control systems are very advanced.

In conclusion, it is safe to say that It is never about the absolute amount of light output, but it is about its usage in relation with the surroundings.
The case of historical urban public parks are peculiar because they bring many contradictions. One side the planning of the park can present some issues that conflicts with nowadays usage. As William H. Whyte said about Bryant Park “many of the social problems were a direct result of the park’s historic design which isolated it from its surroundings.” But tend not to change the parks because they represents the prestige and roots of a country culture.

On the other side, like in the case of Humlegården, it is the surroundings that change following the modern needs faster the park itself. In fact, in this case, while in its last large renovation, it was conceived still has a park on the border of the city life, decades after decades the city grew around it, making it a place in the city centre.

The result of this work (Lighting Quality Framework) can be see eventually as a more detailed extension of the suggestions for lighting provided by the ICOMOS document about historical urban public parks and the general lighting recommendations for urban lighting.

From an historical perspective, public lighting spread out rapidly when electrical light was invented. However, public lighting -as shown in the introduction- was an expression of human care for safety many centuries before. We hope this work can continue to contribute to care for people and their spaces.

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