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Analysing the Design Criteria of Public Open Spaces for the Disabled Persons: An Evaluation of Kumsal Park in Northern Cyprus

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ABSTRACT
Every person, regardless of their race, culture, origin, or religion, has an inherent right to move and live comfortably in various environments. This principle extends universally to include individuals with disabilities. It is crucial to recognize and uphold the rights of disabled individuals to equal access, participation, and inclusion in all aspects of life, including physical environments, public spaces, transportation, communication, and social interactions. By promoting inclusivity and eliminating barriers, society can create a fairer and more accessible world that allows people with disabilities to fully engage in their rights as valued members of the community. Hence, it is crucial to guarantee the convenient accessibility of all public areas since they play a substantial part in our everyday experiences. The objective of the research paper is to examine the standards for designing POS, particularly emphasizing their appropriateness for people with disabilities. The study conducts a comprehensive evaluation of Kumsal Park's design elements, assessing whether they adequately consider the needs of disabled individuals. The data collection involves a structured questionnaire that covers demographics, general information about Kumsal Park, park design features, and design criteria for individuals with disabilities. Additionally, data is collected through observations using a checklist created based on the study's observations. While Kumsal Park in Nicosia, Northern Cyprus, demonstrates satisfactory design criteria in certain areas, improvements are required to cater to disabled individuals and enhance the overall park experience. Addressing the identified issues, such as lighting, parking, security, activities, and signage, and improving accessibility features will contribute to creating a more inclusive and satisfying environment for all visitors.

Keywords: design criteria, public open spaces, parks, disabled persons, universal design, Kumsal Park, Northern Cyprus.

1. Introduction

This research paper focuses on analysing the specific needs of disabled individuals when it comes to public parks. Public parks are important spaces for various activities, such as resting, reading, playing, and more. To ensure that these spaces are inclusive and accessible to everyone, regardless of their physical abilities, it is crucial to design them in a universal manner. Therefore, the design criteria of public parks are essential to accommodate all users, as these spaces are meant to be freely accessible to everyone.
Design is the process of conceptualizing and creating something that does not exist through human imagination (Harvey, 1960). It is typically an outcome of a human's thinking

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which is then integrated (Cross, Nigel, 2011). Design criteria are guidelines or proposals that aim to help resolve a design problem (Nowack, 1997; Mcadams, 2003). This statement advocates for and determines the design property of an artefact, ensuring its fundamental needs are met (Danny Greefhorst, Erik Proper, 2011). They are instrumental in promoting the advancement and progress of the whole concept (Leopold, K, 2006). They enhance architecture's function by highlighting design limitations without revealing all details, making them crucial in enhancing the overall design (E. Woods, 2016).

Public open spaces, such as parks or green spaces, are crucial environmental contexts that facilitate various activities (Bedimo-Rung et al., 2005; Krenichyn, 2006) such as recreational activities, walking and sports (Bedimo-Rung et al., 2005; Kaczynski and Henderson, 2007). These spaces are usually accessible by all without being charged any fee since they are public property as the name itself suggests (Edwards N, Hooper P, Trapp GSA, Bull F, Boruff B, Giles-Corti B, 2013). The quality of public spaces (POS) significantly contributes to the environmental, social, and economic value of towns and cities through efficient design and well-operated public spaces (Beck, H., 2009). High-quality public spaces enhance user satisfaction, allowing them to spend more time and engage in a variety of activities (Gehl, J, 2011).

Disability is a complex condition influenced by personal and environmental factors, affecting an individual's health condition (WHO, 2002). Over 1 billion individuals worldwide are disabled, accounting for 15% of the global population with a specific disability type (WB, 2017). There different types of impairments that are categorised as a disability which include intellectual, neurological, physical, psychological, sensory and other type of other impairments (Office for Disability Issues, 2016). These can restrict one's ability to engage in activities and negatively impact their participation (Zealand, S. N, 2013).

1.1 Aim of the Research

This research study's principal goal is to explore and investigate the design criteria that is used in the parks and critically evaluating if these design principles accommodate the disabled persons. Moreover, the research focuses on the design criteria of the Kumsal Park which is located in Nicosia in Northern Cyprus which is analysed to investigate if fit for the comfort of the disabled persons and also if they can easily access the park without any challenges which makes it a study that has not been done before.

1.2 Research Question

There is one main question that this research study is analysing to solve. The results of the questionnaire and the observation checklist which are the two methods used in collecting data for the research paper determines this. The question is:

- Do the design criteria (accessibility, public services, security, maintenance, urban furniture, lighting and other factors) of the Kumsal Park in Nicosia, Northern Cyprus meet the standard design requirements for the comfort and ease of access of the disabled persons?

1.3 Limitations of the Study

The study acknowledges potential barriers, including limitations in data collection techniques for the case area (Kumsal Park). These limitations arise from challenges such as language barriers and the reluctance of disabled individuals to answer questions from

strangers. Additionally, the study is constrained by a limited time frame, as it is conducted within a single semester, which may restrict the depth and comprehensiveness of the research.

2. Literature Review

Key terms related to the research study are reviewed through articles, books, and theses. The focus is on public open spaces, understanding disabled individuals, and park design criteria for accessibility.

2.1 Public Open Spaces

Researchers generally agree that public open spaces enhance urban life, despite differing opinions on the topic (José Beirao, Nuno Montenegro and Jose Duarte, 2012). They are crucial in creating the aesthetic and architectural form of cities (Council of Europe, 1986) and serve multiple purposes, including education, economics, and socialization (Wooley h, 2003). Public open spaces offer recreational activities for people of all ages, from children to the elderly (Carlisle R. and Stankovich A. M., 2014). These spaces have been significant in urban design since the time of the Greek Agora, where people gathered to relax and socialize (Zemelak Ayitenew Ayele, 2017). Scholars have identified public spaces based on location, ownership, accessibility, functioning, and scale to understand their importance in public life (Nasution & Zahrah, 2014, Cattell et al., 2008). Examples of public spaces include parks, plazas, squares, streets, gardens, and markets (Nasution & Zahrah, 2012). They are 11 identified functional types of public space, including parks, memorials, squares, playgrounds, markets, streets, and waterfronts (Carr et al., 1992).

Studies have indicated that the presence of various POS in different regions improves the quality of life for individuals (canter, 1977). The assessment of public open spaces involves assessing their physical features and their role in facilitating interactions with people from diverse cultures and traditions (Carr et al., 1992), underprivileged groups (Kurniawati, 2012), and individuals with unique needs (Husssein, 2010). Physical principles such as accessibility and availability of public transport are also important factors (Public Space Project, 2000; Carmona, M., Latham, I., Swenarton, M., & Chatwin, J, 2001 and Gehl, 2002). Public spaces exhibit various characteristics that are interconnected with the main components being identity, people, place, and use.

Public spaces are essential for human life as they provide a space for social interaction and interaction, preventing isolation and enhancing overall well-being (Ardent, H.1958). People come together from distinct backgrounds and share different ideas with each other (Gehl, J, 2011). Moreover, various culture thrive in these spaces and also various cultural practices can be performed as activities such as arts and music (Zukin, S, 1995). Public spaces offer numerous benefits at cultural, individual, and city levels, benefiting individuals, children, adults, and those with special abilities, promoting economic, social, and environmental development (Zukin, S, 1995).

Public spaces offer numerous benefits but also present challenges like poorly designed entrances, inaccessible areas, inadequate lighting, and poor accessibility. Issues include inadequate security measures, poor playground facilities, and lack of gathering points (William H., December 2019).

Creating a thriving public open space relies on four key components: access and linkages that enable people to connect with the area, a diverse range of uses and activities to offer engaging experiences, the comfort and aesthetic appeal of the space with visually pleasing elements and well-maintained amenities, and sociability, fostering interaction among people from different backgrounds.

2.2 Design Criteria of Public Open Spaces

Spatial design techniques can enhance social engagement and belonging in redevelopment areas by incorporating design principles and public open spaces to attract leisure time and community (Asadollahi A., Mamaghani M. and Mortezaei S., 2015). The design criteria of POS as depicted in Figure 1, encompass several important factors.

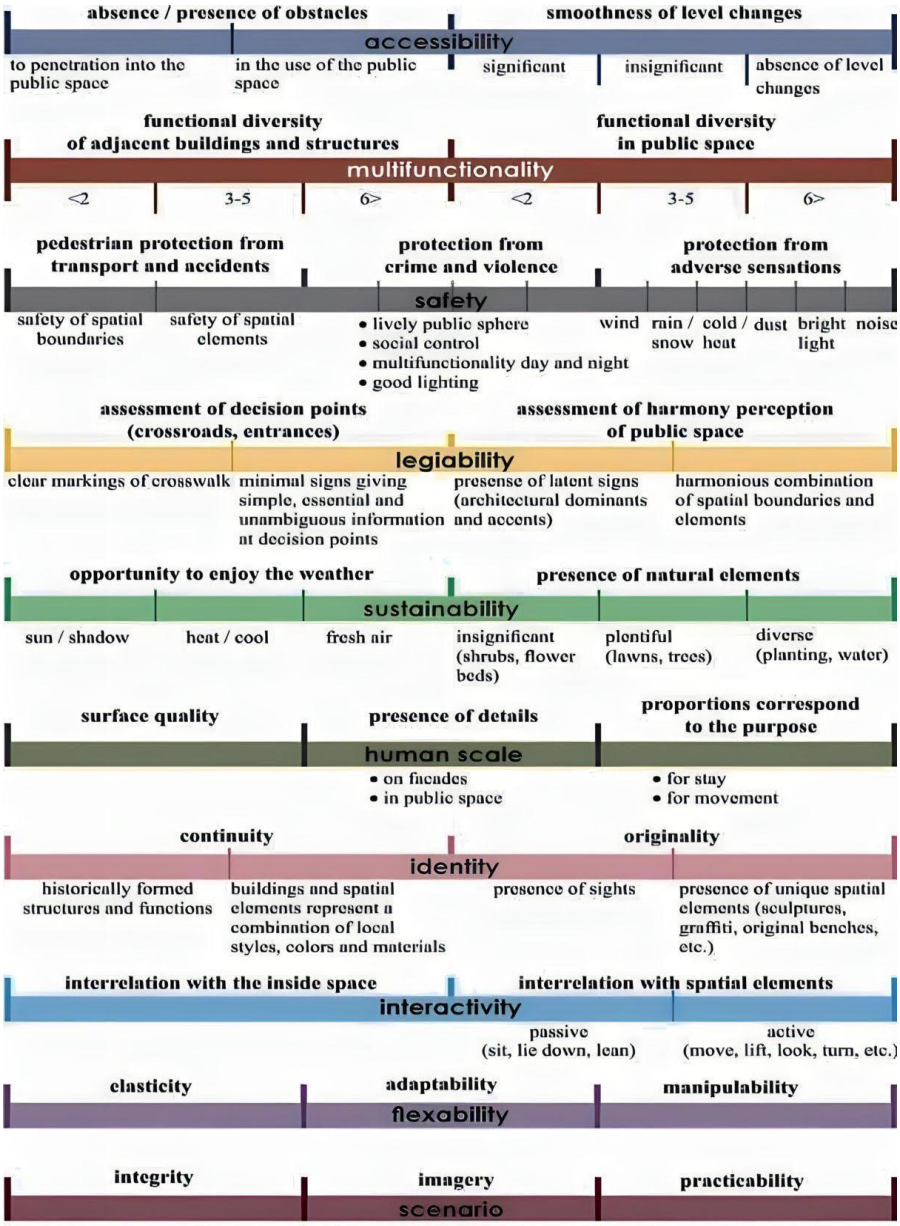

Figure 1. Design criteria of Public Spaces (Ludmila Kozlova, Valery Kozlov, 2018).

When considering the design principles of public open spaces, several key criteria emerge. Safety is crucial for the protection of individuals within these areas. Accessibility ensures that public spaces are easily navigable and usable by everyone, regardless of physical or mental limitations (Jacobs, 1961). Multi-functionality, also highlighted by Jacobs, provides diverse options and functionalities within public spaces. Sustainability, a fundamental concept, promotes environmentally friendly practices and meeting needs without harming the

environment. Legibility ensures easy navigation through clear signage and well-defined routes. Identity and sense of place contribute to shaping unique public spaces that reflect local character (Lynch, 1964). Human scale creates environments proportionate to people's needs. Size, determined by dimensions, boundaries, and level of detail, should align with the space's purpose (Shimko, 2006). Interactivity encourages public participation in city life and activities. Striking a balance between defined and open areas is essential (Kozlova, 2018). Flexibility allows urban environments to adjust and accommodate diverse uses, responding to changing needs and preferences (Lynch, 1984). Lastly, the concept of "scenario" refers to spatial coherence and semantic depth, revealing a city's structure and development. By considering these criteria, public open spaces can be inclusive, functional, and community-oriented.

2.3 Disabled Persons

The World Health Organization (WHO) reports that 1 billion people worldwide are disabled, accounting for 15% of the global population, with a fifth experiencing serious impairments due to their conditions (Krahn, G. L., 2011). A disabled person experiences mental or physical disorders, or both, due to environmental factors or inheritance.
World Health Organisation highlights that there are three dimensions of disability and that the phrase stands for all the three. They are as follows:

1. Constraints in carrying out activities: Restrictions one faces when performing a task
2. Impairment: The issues one has in the structure of their body and functioning
3. Participation barriers: The challenges one face in real life circumstances

There are various types of disabilities according to the (National Baseline Survey on Disability, 2011) which are as mentioned below:

1. Physical type of Disability
2. Hearing Impairment
3. Intellectual form of Disability
4. Visual Impairment
5. Albinism
6. Speech form of Impairment
7. Autism
8. Mental Disorder/Illness
9. Certain Disorders such as Celebre Palsy
10. Multiple Disabilities (Okoli, Ebele, 2016)

Individuals with mobility issues, especially those with physical disabilities, are highly sensitive to urban contexts, including the accessibility and quality of parks (Fergusson, P.M, 2001; Zola, I.K,1989; Krahn, G. L., 2011). The United Nations General Assembly initiated the Convention on the Rights of Persons with Disabilities to ensure equal opportunities, effective inclusion, accessibility, and non-discrimination for the disabled (Stein, M. A., & Lord, J. E., 2009).

2.4 Disabled Requirements in Public Open Spaces

Accessibility is crucial for disabled individuals, ensuring seamless connectivity between buildings and public spaces, as defined by the ADA (Arvanitis, A. V. 2004). An accessible

public space is a location that caters to all abilities, enabling them to visit and engage in various activities (Bertolini, L., & Dijst, M, 2003). Standard guidelines have been established to ensure accessibility in buildings and public spaces, aiming to facilitate convenient access for disabled individuals and older adults when utilizing public open spaces. To determine the viability of a park's design, it should align with the principles of facilities and disability, encompassing factors such as health, safety, comfort, security, beauty, ease, and independence (K. Widyawati and R. Laksmitasari, 2015). When designing public spaces, it is essential to adhere to specific technical guidelines for facilities and disabilities, as outlined by S. Thohari (2017):

1. Walkways should ensure pedestrian safety, considering road slope, surface condition, lighting, and proper drainage, with a minimum width of 120 cm and safety handles.
2. Guided pathways need warning tiles at entrances, exits, intersections, and connections, ensuring accessibility.
3. Open spaces should accommodate adult human dimensions and various functions.
4. Ramps must meet specific dimensions for accessibility, including a maximum horizontal length of 900 cm, a width of 95 cm without protective edges, or 120 cm with safeguarding edges. Well-lit, flat beginnings and ends of ramps with railings are crucial for design compliance.
5. Design guidelines emphasize a maximum horizontal length of 900 cm and a maximum width of 95 cm without a secure edge or 120 cm with a protective edge. To aid wheelchair users in transitioning from the toilet, right-angled handrail designs are recommended.
6. Disabled parking areas should connect to accessible pathways between parks with proper evaluations.
7. Signs and markers are essential for indicating disability-specific spaces, amenities, and providing directional information along pedestrian pathways.

Table 1 outlines the standard design requirements for parks for the elderly and disabled, incorporating special considerations for public spaces (Turel, H. S., Yigit, E. M., & Altug, I, 2007) (Keerthirathna, W & Karunasena, Gayani & Rodrigo, V, 2010). In addition to accessibility, disabled individuals require specific toilets, urban furniture, and a sense of place tailored to their needs.

Table 1: Design principles for public open spaces catering to individuals with disabilities.

Pavement	• The maximum height allowed is 15 cm.
	• The pavement should have a minimum width of 150 cm to provide ample space for pedestrians, including those with disabilities, to navigate comfortably.
	• The pavement surface should have a non-slip, matte texture that is easily walkable.
	• Pavements should be continuously even, without any changes in level, to ensure smooth and uninterrupted movement.
	• The ramps with no less than a width of 90 cm and a gradient of 1:10 should be installed at the beginning and end of pathways to provide for simple access.
	• A minimum-security band of 25 cm on the side facing private property and 50 cm on the other side which is with the curb, incorporating the curb stone, should be provided alongside the pavement.

Ramps	• If the ramp exceeds a length of 10 m, it should have a maximum slope of 6%, a minimum width of 90 cm, and a gradient of 48% (1:12).
	• At the start and end, there ought to be a 150 cm space that is straight and has varying textures.
	• Between the ramps or on ramps more than 10 m in length with an elevation change greater than 50 cm, a resting area of at least 250 cm in length should be provided.
	• The covering material should possess strength, stability, and a slightly rough, non-slippery surface.
Stairs	• The height of each step should be 15 cm, with a width of 28 cm (the sum of width and twice the height should be around sixty-two or sixty-four centimetres).
	• Staircases must feature gunwales on each of the sides, with an overall width of at least one inch of 180 cm between them and a height of 80 centimetres.
	• When the elevation difference exceeds 180 cm, a landing of 200 cm in length should be provided between flights of stairs.
	• The stair cover material should have a textured surface for improved traction and resistance to slipping.
	• Landings at the start and end of the stairs should have distinct colours and textures for enhanced visibility and orientation.
	• Stairs should be adequately illuminated for safe use during night-time.
Handrails	• Handrails should be installed at a height of 900 mm at both ends.
	• The width should be 1300 mm (1000 mm if the stairs are shorter).
Orientation Board	• They should be positioned in easily noticeable locations, with an adequate number of boards that are well-illuminated and comply with international standards.
Pedestrian Crossing	• The minimum width should be 180 centimetres.
	• To facilitate usage by all pedestrians, traffic lights should have buttons and audible signals, and the height of the button should not exceed 120 cm.
	• The slope of the pavement and the surface of the vehicle road must have different textures.
	• When the width of the road allows for two levels of passage, a building island should be present to provide a safe waiting area in the middle.
Underpass And Overpass	• They should be equipped with escalators to assist elderly individuals and elevators to accommodate people with disabilities.
	• To enhance safety, all underpasses and overpasses must have sufficient lighting to facilitate night-time usage.
Street Trees	• Planting trees along roads is necessary to create a sense of safety for pedestrians on boulevards, avenues, and streets, considering traffic conditions.
	• To avoid obstructing pedestrian flow, there should be a minimum clearance of 2.5 meters underneath the planted trees, ensuring an unobstructed space.

Toilets	• There should be a continuous accessible pathway from the entrance to the toilets.
	• The doors should open outward.
	• The door opening width should be at least 900 mm.
	• The floor area inside the toilet should be a minimum of 1700 mm by 1700 mm.
	• Grab rails should be provided at a height of approximately 700 mm.
	• A seat should be available for individuals who are unable to squat or use a standard commode.

2.4.1 Walkways and Pavements

Walkways and crosswalks connect urban spaces, ensuring safe movement, including for those with physical
challenges. OZIDA recommends 1.5-2.0 m widths (wider at bus stops and storefronts). They should be obstacle
should be obstacle-free with a 25-50 cm safety band for tactile warning. Slopes shouldn't exceed 6% for wheelchair users
users. Strategic design aids visually impaired individuals with directional elements and non-slip surfaces as elaborated in
Figure 2. It should enable easy navigation for those using canes. (BM, 2004).
When designing walkway guide lines, consider these key principles:

- Keep guide sign designs straightforward.
- Position guide signs parallel to the direction of pedestrian movement.
- Standardize the width of guide signs at 0.60 units for better visibility.
- Maintain a safe distance from drainage canals or manholes to avoid confusion and hazards, especially for the
  visually impaired.

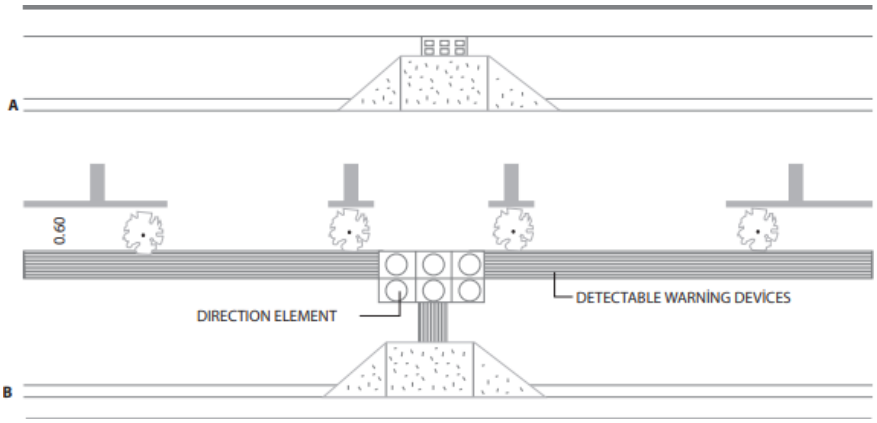

Figure 2. Detectable warning devices (World Disability Foundation, 2012).

2.4.2 Trees and Urban Furniture

Walkways should remain obstacle-free, including trees, electrical equipment, and signs. They should have a continuous pathway, ranging from 75 cm to 120 cm in width, which includes the border stone as illustrated in Figure 3.

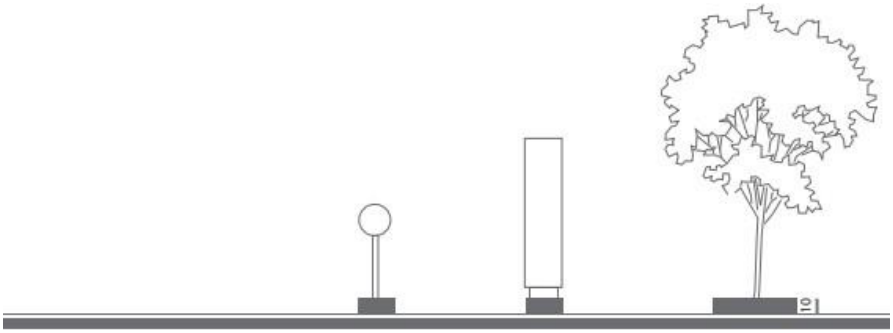

Figure 3. Elevated platforms around trees and other intentional elements on pavements (World Disability Foundation, 2012).

To enhance safety and awareness, a 60 cm-wide tactile surface as shown in Figure 4 should encircle tree surrounds and street furniture, acting as a warning to pedestrians about these objects and reducing the risk of tripping (BM, 2004).

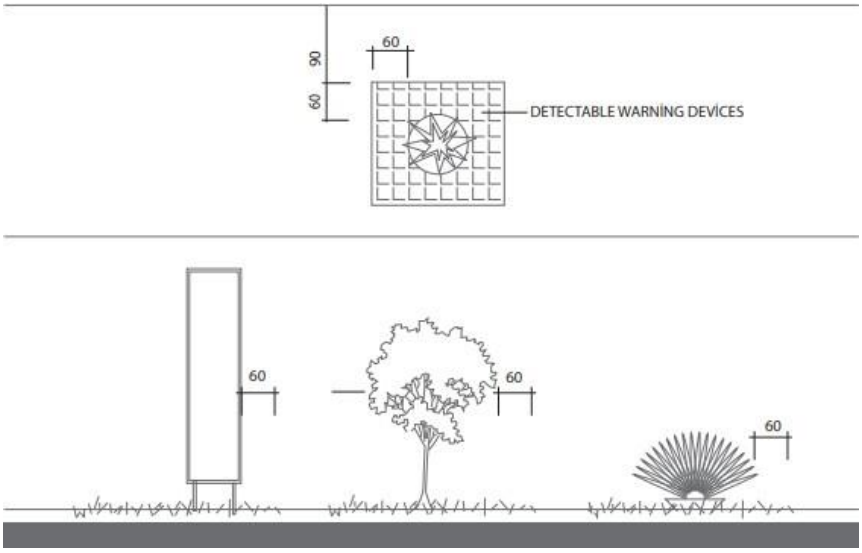

Figure 4. Tactile surfaces around the surfaces. Measurements in cm (BM, 2004).

For pedestrian safety, walkway surfaces should be smooth and free from obstacles like grates, floor mushrooms, and parking lot chains, ensuring unobstructed and secure travel as elaborated in Figure 5 (BM,2004).

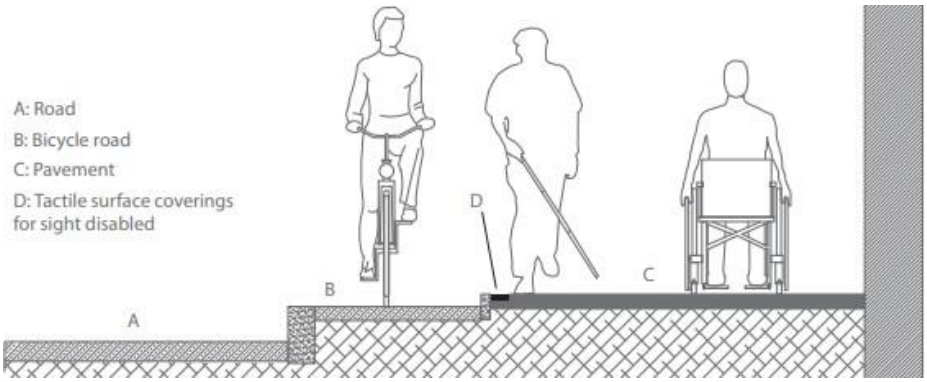

Figure 5. Tactile surface coverings are applied to the pathway that runs alongside the bicycle path (BM, 2004).

2.4.3 Ramps

Ramps enhance pedestrian pathway accessibility, benefiting individuals with disabilities and others. They must have gradual slopes for comfort and safety as shown in Figure 6, accommodating wheelchair users, those with strollers, and more. In heavily used areas, ramps should be 180 cm wide, with resting areas for longer ramps or height differences exceeding 50 cm. In less crowded places, 90 cm wide ramps suffice, with wider options for turns. These guidelines, aligned with UN recommendations, ensure inclusive pathways for all.

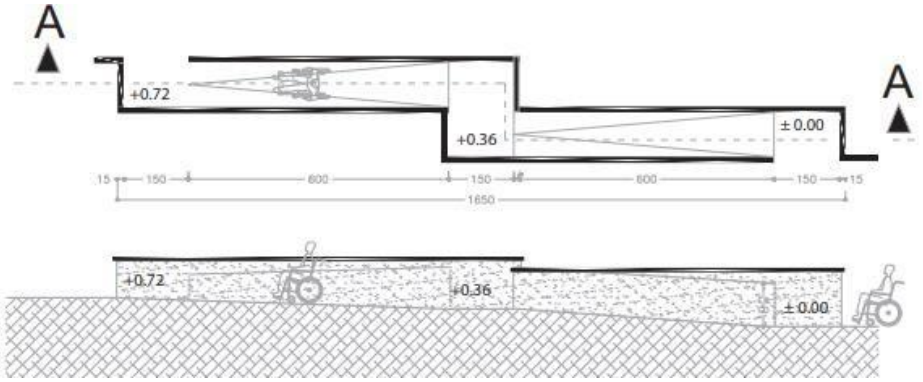

Figure 6. Ramps should have both a slope and a level landing area that spans 250cm in length. (UN, 2004).

Ramps should have slopes that ensure the safety of pedestrians with disabilities as depicted in Figure 7. A recommended gradient is no steeper than 8% or 1:12 for vertical obstacles rising 20 mm or more from the completed floor. Table 2 provides guidance for gradients in cases where limited space makes an 8% slope unfeasible, following United Nations (UN) standards.

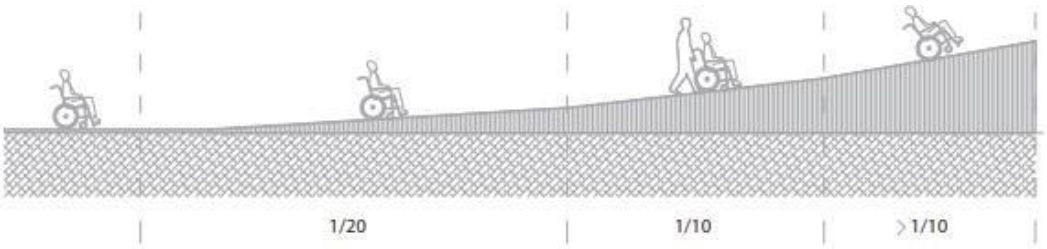

Figure 7. Safe slope differences on ramps (UN, 2004).

Table 2: The gradient, length, and height ratio of ramps (UN, 2004).

Maximum slope	Maximum length	Maximum height
1:20 (5%)		
1:16 (6%)	8.00m	0.50m
1:14 (7%)	5.00m	0.35m
1:12 (8%)	2.00m	0.15m
1:10 (10%)	1.2m	0.12m
1:8 (12%)	0.50m	0.06m

2.4.4 Parking Space

Additional parking space is crucial for individuals with disabilities, allowing wheelchair users to transfer between their mobility devices and vehicles. Vehicles with ramps or lifts also require more space for users to access and exit while in wheelchairs or mobility equipment. To meet these needs, it's essential to allocate parking spaces in car parks and on-street parking lots for disabled individuals.

The Parking Lot Code mandates a minimum of 5% of total parking spaces for people with disabilities, with visible markings and a maximum height of 2.0 meters. Designing accessible parking spaces is vital, with Figure 10 illustrating three suitable configurations, including a recommended width of 3.90 meters according to UN guidelines (2004). The second design includes an access corridor between two standard-size parking stalls, ensuring easy wheelchair access for those using their vehicles as shown in Figure 8, with a minimum width of 1.20 meters.

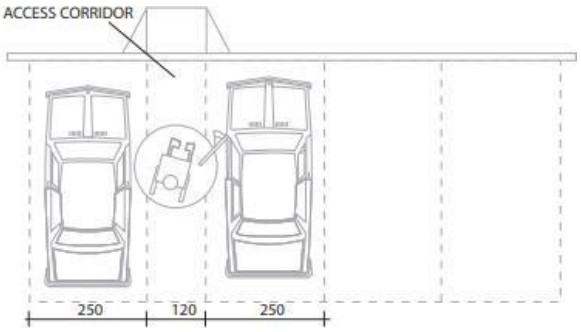

Figure 8. Parking area with an access corridor. Measurements in cm (UN, 2004).

2.4.5 Resting Areas

Rest stops along pedestrian routes should have durable and non-slip surfaces as shown in Figure 9. There should be ample space for the bench, with at least 1.20 meters of clearance beside it for individuals using wheelchairs or other mobility aids.

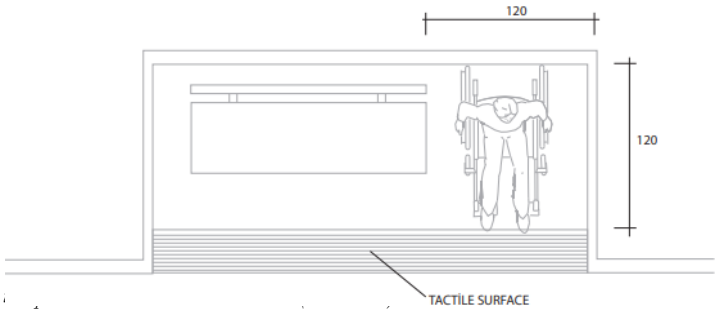

Figure 9. The layout of a rest place that

Benches should be 45 cm high with a 70 cm backrest as elaborated in Figure 10. Tables at rest areas should be positioned between 0.75 m and 0.90 m in height with a minimum 60 cm clearance beneath as depicted in Figure 11 to ensure wheelchair users' accessibility and comfort.

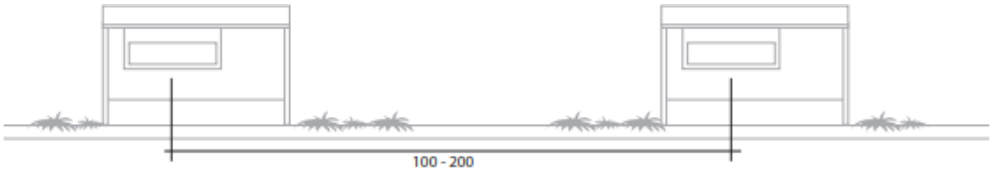

Figure 10. Positioning of rest areas. Measurements in cm (UN, 2004).

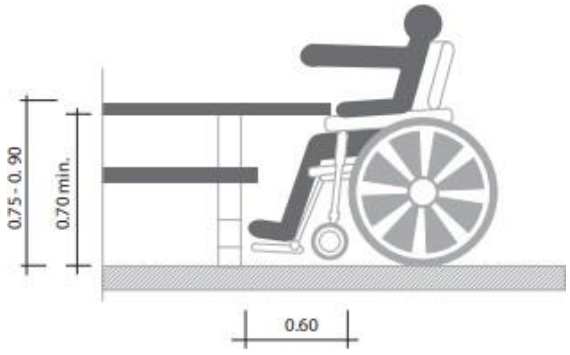

Figure 11. The height and depth measurements below the table are provided in meters (UN, 2004).

2.4.6 Trash Containers

containers should be positioned between 90 and 120 cm in height from the bottom to the container's opening and placed 40 to 50 cm away from the route, from the container's edge to its midpoint as depicted in Figure 12. This placement ensures convenient access and safe pathways.

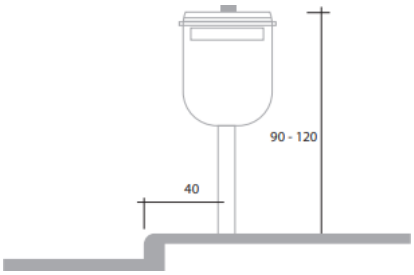

Figure 12. Trash containers. Measurements are in cm (UN, 2004).

2.4.7 Mailboxes

According to the United Nations guidelines in 2004, the installation height of mailboxes should fall within the range of 0.90 m to 1.20 m. This measurement is taken from the mail slot's opening or handle to the completed surface, as illustrated in Figure 13.

Figure 13. Mail boxes. Measurements are in meters (UN, 2004).

2.4.8 Public Telephones

Public telecommunication is vital, especially for individuals with disabilities who may lack mobile phone access. To ensure safety and visibility, position public phones strategically with reflective or illuminated signage for the visually impaired as portrayed in Figure 14. Design open phone booths with dimensions of 120 cm x 85 cm to accommodate wheelchair users. Enclosed booths (120 cm x 140 cm) with
90 cm wide doors should protect against adverse weather with TTY phones and ample lighting. Place the shelf at 75 cm height, currency deposits at 90-120 cm, and use elevated dial pad letters. Provide a telephone cord of at least 75 cm length for wheelchair users. Include at least one accessible booth in a bank of public telephones for individuals with disabilities, including those with hearing impairments (UN, 2004).

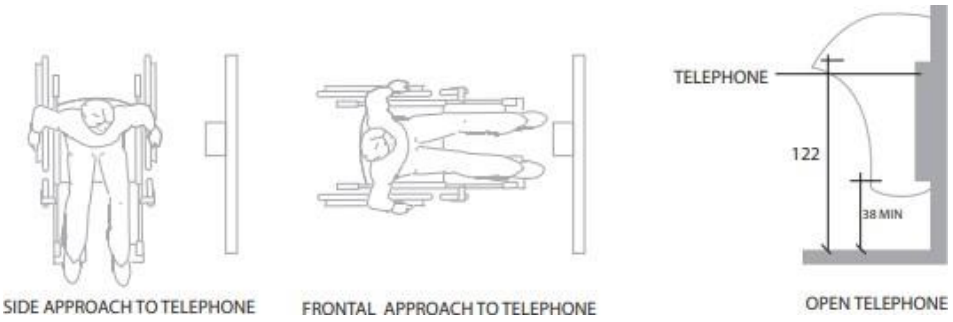

Figure 14. Design of open telephone booths. Measurements are in cm (UN, 2004).

2.4.9 Public Restrooms

When designing public restroom facilities, the inclusion of accessible restrooms for individuals with physical disabilities should be a top priority. Adhering to specific dimensions and guidelines is essential as depicted in Figure 15. Both the universal lavatory and easily accessed restroom cubicle should have dimension of at least 230 cm x 230 cm to allow for adequate movement. Within the allocated space, it is crucial to incorporate a restroom and transfer spaces on either side, each with a minimum measurement of 85 cm. This allows wheelchair users the flexibility to transfer onto the water closet from either the left or right side, ensuring convenience and independence. In addition, it is crucial to ensure that fixtures, do not encroach on the required rotating radius of 750 cm should be provided. This clearance provides individuals using wheelchairs with enough space to maneuver comfortably. Furthermore, it is important to prioritize the selection of appropriate materials and finishes for accessible restroom facilities. Non-slip flooring materials should be used to prevent accidents.

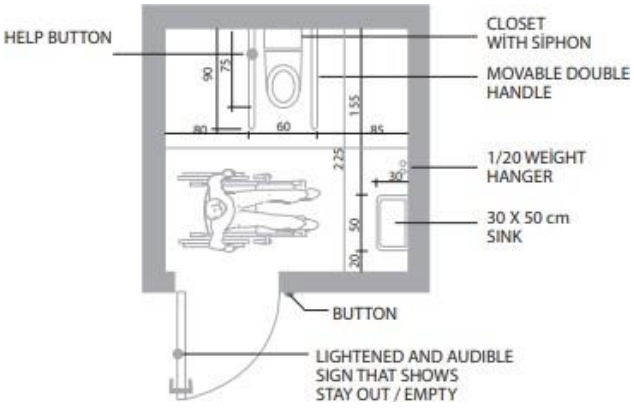

Figure 15. Toilet and sink. Measurements are in cm (UN, 2004).

2.5 Related Research Examples of Parks with Design Criteria Inclusive for Disabled Persons

This research paper focuses on analysing the design criteria of public parks for universal use, with a focus on accommodating disabled individuals. Parks provide free outdoor recreation and a connection to nature, encouraging physical activity and community engagement (UN-Habitat, 2018). They are essential in urban areas (Sakip S., Akhir, and Omer S., 2015). Figure 16, 17, and 18 show examples of high-quality, universally designed public parks that benefit various communities, including the elderly and disabled, promoting inclusivity for all.

2.5.1 Dilworth Park, Philadelphia in USA

Dilworth Park, situated at the base of Philadelphia City Hall and serving as a central transit hub, has become a renowned tourist destination. The park faced accessibility issues before renovation due to divided spaces, raised terraces, and staircases, which made it difficult for visitors.

OLIN's visionary design has transformed Dilworth Park into a universally accessible public plaza. Figure 16 showcases the park's new layout and features. The previously sunken plaza has been reimagined to be at street level, eliminating barriers such as walls and stairs and greatly enhancing access to City Hall.

Figure 16. Dilworth Park is a public park located in Philadelphia, Pennsylvania, designed by OLIN (Sahar Coston-Hardy, 2014).

2.5.2 Tongva Park in Santa Monica in California

James Corner Field Operations designed accessible restrooms at Tongva Park's entrance in Santa Monica, ensuring their accessibility for park visitors, as shown in Figure 17. The bathrooms are conveniently located off the street, ensuring accessibility for individuals of all abilities, ages, and housing statuses. The public bathroom, a visually striking sculptural element, is strategically designed to be visible from anywhere within the park, enhancing easy way finding. Tongva Park's exceptional design and inclusive features were awarded the ASLA 2018 Professional General Design Honor Award.

Figure 17. Tongva Park and Ken Genser Square are public parks situated in Santa Monica, California, and they were designed by James Corner Field Operations (Tim Street-Porter, 2018).

2.5.3 Rittenhouse Square, Philadelphia, Pennslyvania

ADA standards emphasize accessible and inclusive furniture in public spaces, ensuring tables and furniture accommodate mobility devices like walkers or canes for safe storage and use. Additionally, parks and plazas should provide comfortable seating options with armrests and seatbacks, and regularly distribute a variety of seating options to cater to anticipated needs.

In terms of comfort, considerations should be given to temperature, sun exposure, shade, and the choice of materials used in the furniture. Rittenhouse Square in Philadelphia, Pennsylvania, serves as an example of meeting these standards. The square features benches with arms along all pathways as depicted in figure 18, ensuring inclusivity for all individuals through accessible seating options. The park offers ample wheelchair parking, wide pathways, and diverse materials for comfortable walking and resting. Large trees provide shade and sunny seating, enhancing overall visitor comfort.

Figure 18. Rittenhouse Square is a public park located in Philadelphia, Pennsylvania. (Thomas Holme and Paul Philippe Cret, 2010).

2.6 Evaluation of the Related Researches

The three related researches highlight different public spaces and their design features that promote accessibility, inclusivity, and comfort for park visitors.

2.6.1 Dilworth Park, Philadelphia, USA

The redesign aimed to create a universally accessible public plaza that prioritizes equal access for all individuals. The sunken plaza of the park renovated to be level with the street, reducing the need for stairs and fences that presented obstacles for individuals with mobility impairments. This redesign ensures improved accessibility for all park visitors. The introduction of a water feature at ground level facilitates easy navigation around it. Additionally, the park's connectivity to the metro further enhances accessibility, ensuring that individuals with disabilities can easily access and navigate the park.

2.6.2 Tongva Park, Santa Monica, California

Tongva Park places a strong emphasis on accessibility by incorporating accessible bathrooms at the park's entrance. These facilities are strategically located near the street, ensuring easy access for individuals of all abilities, ages, and housing statuses. The design of the public bathrooms is noteworthy as they are treated as sculptural elements, making them easily visible from various vantage points within the park. This approach enhances the overall aesthetic of the park. The central spine location of the bathrooms further contributes to their accessibility, allowing easy access directly from the street. The recognition received by Tongva Park, specifically the ASLA 2018 Professional General Design Honour Award, highlights its commitment to universal design principles and accessibility.

2.6.3 Rittenhouse Square, Philadelphia, Pennsylvania

Rittenhouse Square in Philadelphia exemplifies the integration of accessibility features guided by the ADA standards. The pathways within the park are equipped with benches featuring armrests, providing accessible seating options for individuals with disabilities. These benches allow wheelchair users to conveniently stop alongside them, promoting inclusivity and convenience for all park visitors. The wide pathways allow multiple groups to pass one another comfortably. The park incorporates a thoughtful use of different materials to delineate walking paths and resting areas, aiding individuals with visual impairments.

3. Methodology

The research conducted for this study employs both qualitative and quantitative analyses to gain comprehensive insights. The qualitative analysis is conducted through an extensive literature review, which critically examines the design criteria necessary for creating accessible public open spaces for disabled individuals. This review delves into standard measurements, design principles, and the specific requirements that cater to the needs of disabled persons in such environments.

On the other hand, the quantitative analysis involves two distinct approaches: questionnaire surveys and direct observation. The questionnaire is distributed to the residents of Lefkosa, focusing on their experiences with Kumsal Park, the specific case area under

investigation. It consists of four sections that aim to gather comprehensive data. The first section focuses on demographic information, including gender, age, education, and whether participants have any existing health problems. The second section explores various aspects of Kumsal Park, such as the reasons for visiting, the frequency of visits, preferred times to visit, and any challenges encountered while using the park. This section provides valuable insights into the overall perception and experiences of the residents. The third section assesses participants' satisfaction levels regarding the park's design criteria, particularly concerning the needs of disabled individuals. Using a scale of 1 to 5 (ranging from Very Dissatisfied to Very Satisfied), respondents rate various park features, including location, accessibility, parking area, sidewalk width, sidewalk surface, lighting, signage, maintenance, and security. The fourth section specifically focuses on the satisfaction levels of disabled individuals regarding the park's design criteria. Similarly, using the 1 to 5 scale, participants evaluate aspects such as access, slope, curb design, ramp materials, hardscapes, handrails, seating components, and disabled parking.

In addition to the questionnaire surveys, the study incorporates direct observation as another method. An observation checklist, developed from the literature review, is utilized to analyse the presence or absence of standard design criteria for disabled individuals within Kumsal Park. This checklist examines elements such as accessibility features, ramps, hardscapes, handrails, seating, and disabled parking. The aim is to determine if these design criteria are implemented and, if so, to assess their level of satisfaction or identify any areas that require improvement.

The chosen sample size in this study reflects practical considerations stemming from the dominant user group and patterns of activity within Kumsal Park. The park is primarily accessed by students who use it as a passageway to get to the other side of Dereboyu, a busy commercial area in Lefkosa, Northern Cyprus. Situated adjacent to a bus stop that serves municipal, school, and university buses, the park becomes readily accessible to students, amplifying its use as a convenient passage for them. This observation suggests that the majority of park users are students, and they use the park regularly on a daily basis. Given this predominant user group and their frequent use of the park, it is reasonable to have a sample size that reflects this demographic. In this case, the study has included 156 participants in the analysis, which provides a substantial amount of data for the research objectives. The sample size is likely influenced by the practicality of reaching and surveying the predominantly student population who frequent Kumsal Park. However, it's important to acknowledge that the sample may not be fully representative of the entire target population. The study does mention efforts to diversify the sample by distributing questionnaires at various times throughout the day and week, which is a reasonable approach to capture a broader range of park users.

By employing both qualitative and quantitative analyses, this research aims to offer a comprehensive and thorough examination of the subject matter. evaluation of the design criteria necessary for creating inclusive and accessible public open spaces, specifically focusing on the case study of Kumsal Park.

4. Findings and Discussion

4.1 Case Study Area, Kumsal Park, Nicosia

Kumsal Park is a park that is located in Dereboyu (35°11'10"N 33°21'19"E) as shown in Figure 19, in Nicosia in Northern Cyprus. Northern Cyprus is an island located above Africa and to the West of Asia.North Nicosia which is the capital city of the country is shown in Figure 20. The park is located in Lefkosa and is situated around a residential and commercial area. The park is a long one which is mostly used forrecreational purposes. It has multiple entrances from all sides; north, south, east and west and one of them has a public bus stop. The entrances are 6 which include the Onder gate, Bus stop gate, Dereboyu Gate, Nurullah Street Gate, Mehmet Street Gate and the car park. It also has two main streets that lead to it andcan be accessed at all time. The park is situated around residential homes which means users can access the park easily. Furthermore, they are restaurants and cafes around and mostly also surrounded by shoppingareas all over.

Figure 19. Aerial Map View of the Case Area (Google Earth, 2023)

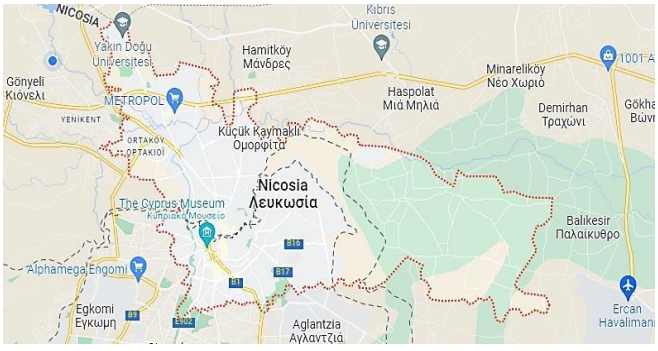

Figure 20. Location of the study area (Google Map, 2023)

4.2 Evaluation of the responders and findings

The study analysed 156 participants as presented in Table 3, with 51% male and 49% female. The majority,

67.5%, are aged 18-30. A significant majority, 49.7%, are university students. Most respondents, 88%, reported no
disabilities, while 12% identified as having disabilities.

Table 3: Demographics of respondents (Author, 2023).

	Frequency	Percentage		Frequency	Percentage
Gender			**Education**		
Male	79	51.3	High school	23	14.9
Female	75	48.7	Bachelor's degree	77	50.0
Age			Master's degree	40	26.0
18-30	104	67.5	PHD or higher	14	9.1
31-40	22	14.3	**Disability**		
41-50	12	7.8	Yes	18	11.8
51-60	8	5.2	No	135	88.2
61+	8	5.2			

Table 4 shows that 47.4% of respondents visit Kumsal Park for passing through, while 26.6% visit for recreational purposes. The majority visit between 12:00 PM and 6:00 PM. The park is accessible via public transport, walking, or private cars. The bus stop gate is the most common entry point. The quality of the space and access to public transport are the most cited reasons for accessing the park. A significant portion enjoys visiting with friends, while 41.6% prefer solitary visits. Challenges encountered include streets, sidewalks, parking, and lighting.

Table 4: Kumsal Park, Lefkoşa (Author, 2023).

	Frequency	Percentage
Reason of visit of Kumsal Park		
Passing through	73	47.4
Recreational use (sitting, strolling, exercise etc.)	41	26.6
Socio–cultural use	10	6.5
Eating	16	10.4
Essential use (Shops, ATM etc.)	13	8.4
Regular visit of Kumsal Park		
Daily	17	11.1
Once a week	31	20.3
Over once a week	37	24.2
Once a month	50	32.7
Once a year	18	11.8
Favourite time to visit the Kumsal Park		
00:00-06:00	9	5.9
06:00-12:00	36	23.5
12:00-18:00	66	43.1
18:00-24:00	42	27.5
Distance to the park		
Below 500 meters	28	18.2

501 meters-1 kilometres	42	27.3
1-4 kilometres	53	34.4
Above 4 kilometres	31	20.1
Time travelled to the park		
Below 15 minutes	51	33.3
15-30 minutes	48	31.4
31-45 minutes	30	19.6
46-60 minutes	15	9.8
More than an hour	9	5.9
Mode of transport used		
Public transport	55	35.7
Walking	54	35.1
Private car	38	24.7
Bicycle	7	4.5
Entrance /exit normally used		
Bus stop Gate	73	47.4
Onder Gate	17	11
Dereboyu Gate	30	19.5
Nurullah Street Gate	12	7.8
Mehmet Street Gate	9	5.8
Car Park	13	8.4
Influence of access to Kumsal Park		
Quality of the space	33	21.4
Distance/ Proximity	26	16.9
Access to public transport	27	17.5
Security	15	9.7
Services in the space	15	9.7
Convenience	21	13.6
Streets, parking and sidewalks	15	9.7
How they like park visits		
Alone	34	22.2
With family	28	18.3
With friends	67	43.8
As a couple	21	13.7
Tourist group	3	2
Regular activities done in the park		
Spend time with family or friends	45	29.2
Kids entertainment	9	5.8
Eating	18	11.7
Attending community events	9	5.8
Leisure use (sitting, strolling, etc]	64	41.6
Regular problems faced while using Kumsal Park		
Accessibility Challenges	28	18.4
Streets, Sidewalks Parking and Lighting	44	28.9
Security (Beggars, Snatchers, Animals etc.)	24	15.8

Socio-cultural Problems (inappropriate user behaviors)	15	9.9
Pollution	10	6.6
Poor maintenance	23	15.1

The satisfaction survey for Kumsal Park indicates that it generally meets its users' needs in terms of location, with a mean score of 3.86 out of 5 as displayed in Table 5. This is followed by the access to municipal transport, which obtained a satisfactory mean score of 3.65 (Good). This is attributed to the park's proximity to a municipal bus stop, as discussed in Table 4, suggesting that bus service is the most popular means of transportation for visiting the park. The park's cleanliness was highly regarded by respondents, with a mean score of 3.64. Moreover, the park's accessibility criteria were highly satisfactory to 85 respondents, with a mean score of 3.57, considering its six entrances.
However, there were several design criteria that fell short of meeting the satisfaction level of park users. The park's lighting received the lowest mean satisfactory score of 2.82, indicating user dissatisfaction possibly due to night-time light switch-offs. Additionally, the parking area received a satisfactory score of 3.01, indicating a concern about inadequate parking space. Security also scored low, with a mean score of 3.04, possibly due to the lack of lighting at night, which compromises safety. The park's lack of activities was rated as dissatisfying by users, with a mean score of 3.18. Lastly, the park's signage has raised concerns due to its low mean score of 3.29, indicating room for improvement. The study provides insight into the perceived strengths and weaknesses of Kumsal Park's design criteria among its users.

Table 5: Satisfaction rating of park design criteria of Kumsal Park, Lefkosa on a scale of 1(Very Poor) to 5(Very Good) (Author, 2023).

Park Design Criteria	Mean Quality	Remark
Location of the park	3.86	Good
Accessibility	3.57	Good
Access to municipal transportation	3.65	Good
Parking area	3.01	Fair
Distance from the car parking space to the park	3.41	Fair
Width of parking space	3.22	Fair
Park entrance	3.31	Fair
Attraction of the park	3.45	Fair
Harmony of the parks design with its natural surrounding	3.51	Good
Shade and shelter in the park	3.52	Good
Surface of the pathways	3.37	Fair
Width of the sidewalks	3.46	Fair
Plant arrangement	3.59	Good
Activities and spaces for people of different ages and disabilities	3.18	Fair
Playground areas	3.50	Good
Playground equipment	3.35	Fair
Seating equipment	3.38	Fair

Waste receptacles/trash bins	3.42	Fair
Signage in the park	3.29	Fair
Lighting of the park and streets around the park	2.82	Poor
Landscape of the park	3.51	Good
Security in the park	3.04	Fair
The cleanliness in the park	3.64	Good
Park management	3.31	Fair
Maintenance of the park	3.42	Fair
How would you rate the overall design quality of the park?	3.44	Fair

The questionnaire included a specific inquiry about the accessibility challenges encountered when visiting Kumsal Park, as depicted in Figure 21. It revealed that lighting is the most significant accessibility challenge for 34.6% of respondents at Kumsal Park, especially during night-time. Sidewalks were the second most problematic issue, affecting 17.6% of participants. Ramps and stairs were the third most problematic issue, impacting 15.7% of respondents. Improving these areas is crucial for a better visitor experience.

What are the accessibility challenges faced while accessing the park?

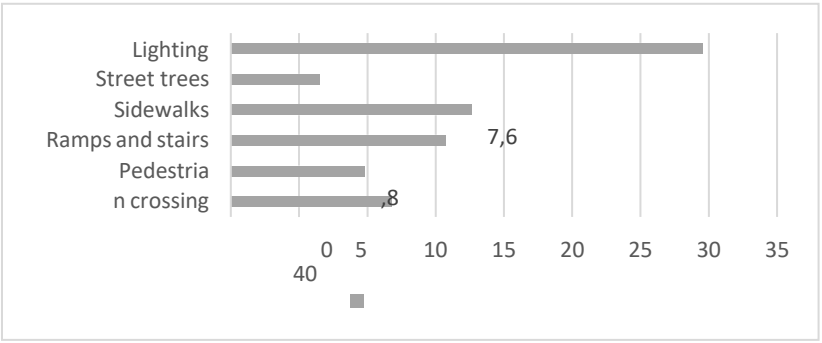

Figure 21. Chart representation of the accessibility challenges faced while accessing Kumsal Park (Author, 2023)

Table 6 reveals generally acceptable satisfaction levels in the questionnaire regarding park design aspects for individuals with disabilities, averaging between 3.00 and 3.35. However, disabled parking received the lowest satisfaction score of 3.06, with 64 respondents expressing dissatisfaction. Disabled exercise equipment also fell just below the satisfactory threshold, scoring 3.07. Other design criteria showed similar satisfaction levels with no significant differences. The overall park design quality for individuals with disabilities are rated as fair at 3.18, indicating the need for further improvements to meet disabled individuals' needs and elevate overall satisfaction.

Table 6. Satisfaction rating of park design criteria of the disabled of Kumsal Park, Lefkosa on a scale of 1(Very Poor) to 5(Very Good) (Author, 2023).

Park Design Criteria of the Disabled	**Mean Quality**	**Remark**

Access ramps	3.24	Fair
The ramps' slope	3.22	Fair
Width of the ramp	3.22	Fair
Curb of the ramp	3.30	Fair
Material of the ramp	3.32	Fair
Hardscapes (considering the visually impaired)	3.35	Fair
Handrails	3.20	Fair
Orientation board	3.32	Fair
Pedestrian pathway width (considering wheelchair users)	3.32	Fair
Seating components (considering the disabled)	3.32	Fair
Disabled parking	3.06	Fair
Disabled exercising equipment	3.07	Fair
How would you rate the park's overall design quality for impaired visitors?	3.18	Fair

In response to the open-ended questionnaire, users provided suggestions for improving Kumsal Park's design quality, including:

- **Enhancing Accessibility:** Install ramps and wheelchair-accessible paths to key attractions for independent access.
- **Increasing Seating:** Add more benches in areas with long walking distances for convenient resting spots.
- **Improving Signage:** Use maps, directional signs, and information boards for easy navigation and locating accessible amenities.
- **Inclusive Playground:** Develop an inclusive playground with sensory equipment, ac wheelchair-friendly structures.
- **Providing Shade:** Plant trees, install shade sails, and create covered picnic areas for direct sunlight.
- **Wheelchair Rental Services:** Consider offering wheelchair rental services to enable i with disabilities to explore the park independently.

In the questionnaire, 67.6% of respondents (100 participants) affirmed that Kumsal Park is wheelc Figure 22 showed that 48 respondents disagreed.

The park accessibility for wheelchair users

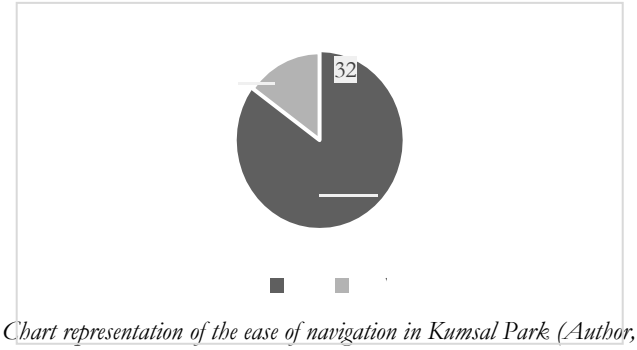

Figure 22. Chart representation of the ease of navigation in Kumsal Park (Author, 2023)

Table 7 evaluates essential park features, revealing certain absent and deficient elements. Notably, the parking situation is unsatisfactory, with limited spaces and unclear entry points at only two of the multiple gate entrances. However, the park improves its accessibility with nearby municipal transportation, benefiting the substantial number of users who rely on public transit, comprising 35.7% of questionnaire respondents (55 participants) and 40.9% of survey participants (63 individuals).

The park faces a significant challenge due to the scarcity of urban furniture, which hinders the ability of people, particularly those with disabilities, to rest or relax. Furthermore, Lighting is a significant issue, with the lowest mean satisfaction level of 2.82 among all design criteria. Inadequate lighting not only impacts the safety of disabled individuals but also compromises the security and peace of all park users during night-time visits. Kumsal Park lacks accessible toilets, limiting stay duration and impacting visitors from other neighbourhoods, especially those with disabilities who require frequent access due to specific ailments. The park's lack of a security outpost further contributes to its overall unsafe environment, exacerbating the concerns raised by insufficient lighting.

The park's cleanliness and proper placement of trash bins suggest that the maintenance efforts are insufficient and require improvement. The park's pavements, specifically concrete carbo, are designed to accommodate disabled individuals, reducing slipping risks and promoting wheelchair use. However, the application of the pavement lacks precision, leading to gaps, discontinuity, and unevenness. Additionally, the park lacks curbs to aid disabled individuals in transitioning from the pavement to seating or green areas.

The park's ramps are unsatisfactory and limited, requiring improvement to accommodate disabled users' diverse needs. The width is inadequate, particularly for those with disabilities. The park's sidewalks are inadequately wide, improperly high, and inconsistently applied, making them unsuitable for disabled individuals. Moreover, street trees encroach upon the sidewalks, further jeopardizing user safety. The selection of plant species within the park is appropriate for the environment and users. However, seats atregular intervals along the sidewalks, encouraging people to stroll and providing resting spots, are noticeably absent.

Overall, the design and urban infrastructure of Kumsal Park are suitable for disabled users. However, improvements are needed in parking facilities, toilets, ATMs, shops, and other services. Lighting, safety concerns, and inadequate urban furniture are significant areas that require attention and improvement. This is due only to the survey results, that represent the

perception of the respondent. Further in field assessments can be carried out in future studies.

Table 7: Park Features Assessment Form.

Accessibility	**Satisfactory**	**Unsatisfactory**	**Absent**
Parking lot		☐	
Accessibility to municipal transport routes	☐		
Blend access to neighbouring environment	☐		
Harmony with local environment	☐		
Convenience in ingress and egress	☐		
Perceived symbolization		☐	
Essential Urban Fixtures	**Satisfactory**	**Unsatisfactory**	**Absent**
Seats		☐	
Lighting		☐	
Trash bins	☐		
Defined boundary	☐		
Directory panels		☐	
Pavilions			☐
Lavatories			☐
Possible Urban Fixtures	**Satisfactory**	**Unsatisfactory**	**Absent**
Bike hub	☐		
Telephone cubicles			☐
Swimming bath			☐
Flower vessel			☐
Stall		☐	
Timepiece			☐
Spring			☐
Flexible features		☐	
Administration	**Satisfactory**	**Unsatisfactory**	**Absent**
Cleanliness	☐		
Safety		☐	
Upkeep thoroughness		☐	
Formation of interactive features		☐	
Maintenenace	**Satisfactory**	**Unsatisfactory**	**Absent**
Landscape quality	☐		
Operational quality		☐	
Design Element	**Successful**	**Partially**	**Unsuccessful**
Stability in design	☐		
Directness in design		☐	
Link to other interactive spaces		☐	
Pavement	**Successful**	**Partially**	**Unsuccessful**
Finish	☐		
Harmony with design	☐		
Skill formation		☐	

Table 8: Assessment Form on Disabled Persons Needs for Accessing Kumsal Park.

Ramps	**Befitting**	**Unbefitting**	**Absent**
Slope		☐	
Width		☐	
Pavement Application		☐	
Pavement Material		☐	
Stairs	**Befitting**	**Unbefitting**	**Absent**
			☐
Sidewalks	**Befitting**	**Unbefitting**	**Absent**
Width		☐	
Height		☐	
Pavement Application		☐	
Pavement Material		☐	
Continuity		☐	
Pedestrian Crossing	**Befitting**	**Unbefitting**	**Absent**
			☐
Pedestrain Subway & Flyover	**Befitting**	**Unbefitting**	**Absent**
			☐
Street Trees	**Befitting**	**Unbefitting**	**Absent**
Plant Placement		☐	
Plant Species	☐		

5. Conclusion and Recommendation

This research study aimed to analyse the design criteria of Kumsal Park in Nicosia, Northern Cyprus, with a specific focus on accommodating disabled individuals. A survey was conducted with 156 respondents to evaluate various aspects of the park, including accessibility, public services, security, maintenance, urban furniture, lighting, and more. The survey results indicated that most participants were between 18-30 years old, with a majority pursuing a bachelor's degree. The majority of respondents reported not having any disabilities, while a smaller portion identified as disabled. Kumsal Park was primarily used for passing through or recreational purposes, with a significant number of visitors coming once a month or more than once a week. Public transport and walking were the preferred modes of access, with the bus stop gate being the most common entry and exit point.

The overall satisfaction level survey revealed that Kumsal Park generally met users' needs in terms of location, access to municipal transport, cleanliness, and plant arrangement. However, there were areas of concern, including lighting, parking, security, available activities, and signage, which fell short of meeting satisfaction levels. Accessibility challenges in the park were identified, including inadequate lighting, problematic sidewalks, and issues with ramps and stairs. These issues must be solved in order to improve the overall accessibility of the park for all visitors, especially those with disabilities. Evaluation of essential park features revealed shortcomings such as insufficient urban furniture, inadequate lighting, absence of toilets, and the lack of a security outpost. Maintenance efforts were also found to be insufficient, and sidewalks leading to the park were unsuitable for disabled individuals. Based on participant suggestions, recommendations for improving accessibility and inclusivity in Kumsal Park include installing ramps or wheelchair-accessible paths, increasing

seating in areas with long walking distances, improving signage, developing an inclusive playground, providing shade, and considering wheelchair rental services.

While Kumsal Park demonstrates satisfactory design criteria in certain aspects, there is room for improvements to accommodate disabled individuals and elevate the overall park experience. Addressing the identified shortcomings, such as improving lighting, parking facilities, security measures, available activities, and signage, along with enhancing accessibility features, will contribute to enhancing user satisfaction and creating an inclusive and enjoyable park environment for all visitors.

The findings of this research study on Kumsal Park's design criteria, particularly its focus on accommodating disabled individuals, resonate with and extend the existing literature on inclusive public spaces. Prior studies have emphasized the significance of accessible and welcoming urban environments, particularly for diverse user groups, including people with disabilities. The survey results revealing both areas of satisfaction and shortcomings in terms of lighting, parking, security, available activities, and signage aligns with previous research highlighting the multifaceted nature of public space design.

Furthermore, the identified need for improved accessibility features, such as ramps, wheelchair- accessible paths, and enhanced urban furniture, aligns with the broader discourse on creating inclusive and enjoyable park environments. These findings underscore the ongoing importance of prioritizing accessibility and inclusivity in urban planning and design, contributing to the evolving body of literature dedicated to enhancing public open spaces for diverse communities.

5.1 Recommendations

The study recommends conducting more extensive research on the condition of public open spacesfor disabled individuals across various locations in the TRNC, with a larger sample size. It underscores the importance of government and developers prioritizing the needs and safety of disabled users. Additionally, the study emphasizes the creation of neighbourhood parks, revitalization of existing public areas, and the importance of designing inclusive and safe streets and walkways leading to public open spaces for individuals with disability.

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