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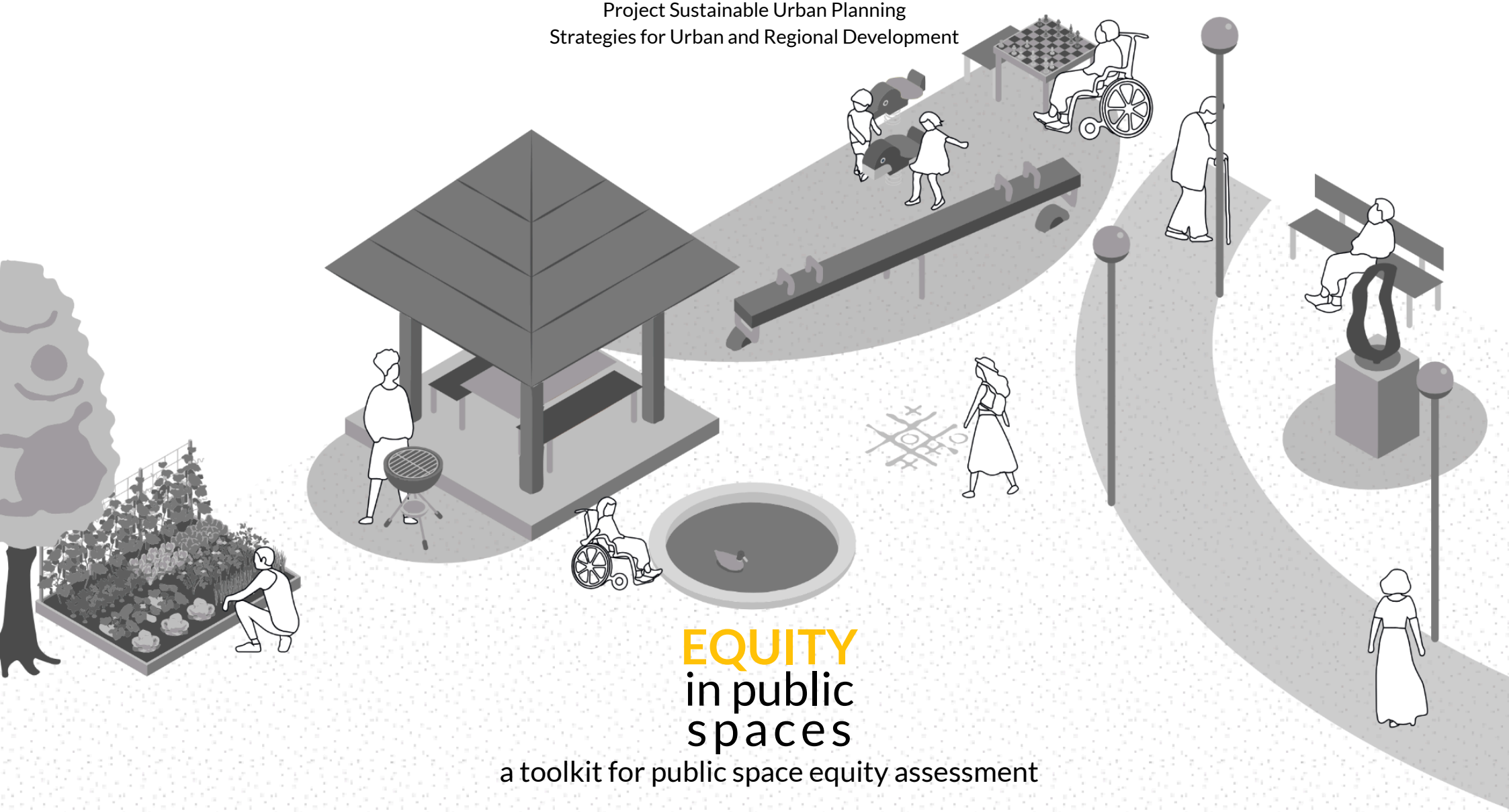

EQUITY in public spaces

a toolkit for public space equity assessment

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1. Introduction

This study aims to present a comprehensive toolkit for assessing public spaces through the lens of equity. The second chapter of this report establishes a theoretical framework encompassing equity, the needs in public spaces, and spatial satisfiers. The toolkit itself involves a three-step process, explained further in the third chapter, where public spaces are graded based on spatial satisfiers and the fulfilment of user needs. Moreover, this methodology recognizes the importance of incorporating participatory processes as a way to get direct input from the public, to conduct a more nuanced and intersectional study of how well public spaces meet users' needs.

While the overarching focus of the study is on the development and testing of a grading tool for open public spaces, the relevance of this project is rooted in the context of growing income disparities across Sweden. Income gaps have widened in three out of four municipalities from 2015 to 2021 (SCB, 2023d), including Järfälla municipality, where this study is conducted. For instance, the mean income in Bolinder Strand is 366 100 kr, more than 60% higher than in Ulvsättra, which has a mean income of 222 100 kr (Region Stockholm, 2023). The examination of equity becomes crucial in understanding the fair distribution of resources, opportunities, and benefits within society, particularly in the face of increasing economic disparities. In this sense, it is important to acknowledge that equity is a complex concept and requires careful attention to ensure recognition of all its nuances.

The choice to investigate open public spaces as an indicator of equity within urban areas stems from concerns about the equitable distribution of resources in public spaces, especially in areas of varied socioeconomic conditions. The growing disparities in Sweden spark thoughts about the distribution of resources and public spaces. Is there an equitable distribution of public spaces between areas of different socioeconomic conditions? Does the design of public spaces contribute to or hinder equity in public spaces? To further explore these questions and demonstrate the application of the proposed toolkit, we conducted a pilot study of four public spaces located in the area of Kallhäll.

The focus on Kallhäll is motivated by noticeable socio-economic disparities, especially between Bolinder Strand and Ulvsättra. These disparities are also present in Viksjö but since most focus in the municipality is put on Barkarbystaden and the future regional core and subway coverage, we wanted to focus on the more remote area of Kallhäll which is less talked about. The disparities are apparent in the area type, where Bolinder Strand is of area type 5 (area with very good socio-economic conditions) and Ulvsättra is of area type 2 (area with socio-economic challenges). This disparity is further examined through a socio-economic index (developed by Delmos and SCB), considering indicators such as the proportion of people with low economic standards, pre-secondary education, and those receiving financial aid or experiencing long-term unemployment. As mentioned, the choice to concentrate on Kallhäll arises from the desire to shed light on a less-discussed area, thus contributing to a more comprehensive understanding of urban equity.

In this sense, the results of the pilot study are presented in the fourth chapter. These results are discussed in the fifth chapter, as well as the limitations of the proposed toolkit, and focus on the challenges of operationalizing equity which is a rather challenging task. Finally, the implications of applying the toolkit are discussed, in terms of what Järfälla municipality might gain but also should be taken into consideration when using this toolkit for public space assessment.

2. Equity as a lens to assess public space

The theoretical approach to addressing equity in public space within the project looked to the existing model developed by Järfälla municipality for measuring social sustainability, together with theories on spatial justice and equity, leading to a needs-based approach to open public space, and the identification of spatial satisfiers within the context of Järfälla. The following sections describe the key concepts as illustrated in Figure 1. The figure illustrates the development of the applied theoretical framework, indicating the understanding of equity as the distribution of resources according to need, the overlap between the aspects of Järfälla's social sustainability model and the connection to needs in public space, leading to the identification of spatial satisfiers to meet the needs.

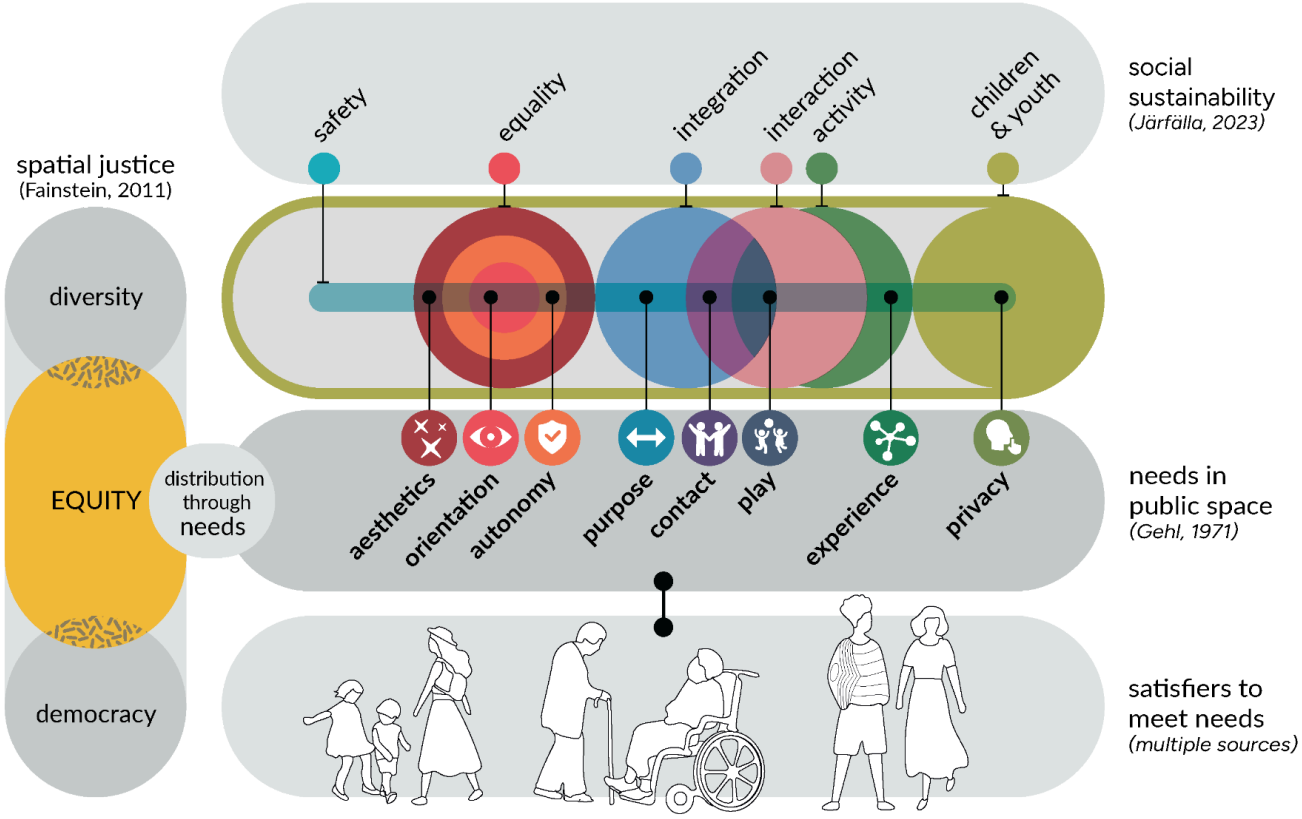


Figure 1. Theoretical Framework

2.1. Social sustainability

Järfälla municipality (2023) provides a preliminary model for measuring social sustainability based on six aspects (see Figure 2). Social sustainability is considered as "a process for creating sustainable, successful places that promote well-being, by understanding what people need from the places they live and work." (Woodcraft et al., 2011, p.16). Järfälla's model considers the effect of the urban planning process on equality, safety, inclusion, physical and outdoor activity, social interaction, and children & youth.

The model (Järfälla municipality, 2023) highlights the importance of equality throughout the planning process. This includes an understanding of whether certain genders are given preference in the planning process, whether equality is integrated into the purpose of the plan, and whether the proposal addresses accessibility requirements, together with active citizen participation. This can be tied to the municipality's approach to integration and social inclusion as a strategy to counteract segregation and improve its social sustainability in the region. As argued by the municipality, areas with higher income and level of education typically have more access to resources and opportunities, again noting the importance of citizen participation in the decision-making process towards public space.

The model (ibid) also considers whether urban proposals promote physical activity, health, and outdoor activities. The municipality notes the importance of promoting a range of opportunities for local recreation for those who have a limited range of motion, including children and people with increased accessibility requirements. The model also looks at whether the proposal allows for the possibility of social interaction and meetings, noting the importance of access to public spaces as meeting places to promote social interaction, create conditions for meaningful leisure time and cohesion, and develop a sense of ownership and belonging.

Järfälla municipality is responsible for ensuring that the rights of children and young people are taken into account. In relation to physical planning, this means that the municipality must ensure that their needs for space are met and their ability to move around safely on their own in outdoor spaces. Moreover, it is important to provide opportunities for children and young people to participate and influence the planning process. Children and young people can thus be considered to be affected by all aspects of the social sustainability model. The model lastly considers the aspect of safety, an aspect which influences other aspects of social sustainability within public space. When considering public space, the perception of safety is in many cases the determining factor as to whether or not users stay or visit that area. This has particular implications for the facilities and management of public space, since certain demographic groups, including elderly, women, people with higher accessibility needs, and ethnic minorities, may have specific requirements towards creating a sense of safety in public space (Shaftoe, 2004).

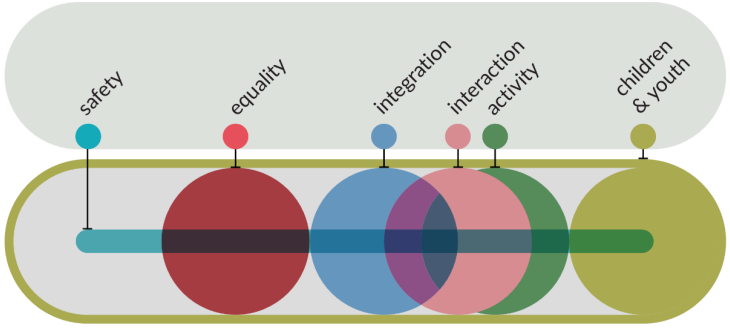


Figure 2. Social Sustainability model based on Järfälla municipality (2023)

2.2. Equity

The notion of 'the right to the city', coined by Henri Lefebvre in 1968, and popularised by David Harvey in 2008, considers the exclusionary nature of the urban together with the necessary inclusion of citizens in shaping the city (LeGates & Stout, 2015). The segregation between those who are included and those who are not has clear spatial manifestations, which can be combined with other dimensions such as racial dimension and socio-economic dimension (Musterd, 2020). Building on the social sustainability model developed by Järfälla municipality, the question can thus be asked how spatial planning can be utilised to promote socially sustainable and just public space. To this Fainstein (2011) suggests three governing principles for spatial justice, namely, democracy, diversity, and equity, with equity as the most important guiding principle. Equity is thus a central concept in developing the project approach to assessing public space in Järfälla.

While equality and equity are often used interchangeably, the planning processes driven by either differ in outcome. Equality looks to distribute resources, including material and opportunity, equally amongst all parties, irrespective of their initial positions, to meet their respective requirements. Equity, on the other hand, calls for an understanding of the needs of vulnerable or marginalised groups, ensuring access to material resources and opportunities based on specific needs, thereby affording more support to those who are most in need (Leach et al., 2018). In order to identify the various needs of divergent groups and individuals, both participation and recognition beyond participation play a crucial role. In this equity does not only carry the most weight as characterised by Fainstein, but also relies on aspects of democracy and recognition.

In planning Pérez-Paredes & Krstikj (2020, p. 2) note that spatial equity is "related to the spatial match between public facility level of service and the distribution of residents and is intimately related to the accessibility of public goods, which should exceed the technical, cognitive, physical and socioeconomic capabilities that the various population groups might have". Wilkinson and Pickett (2011) note the impact of the distribution of urban amenities on the quality of life in both advantaged and disadvantaged communities. The well-being of communities can thus be said to be tied to the equitable distribution of public space.

2.3. Well-being

Sumner (1996; in Diner et al, 2009) differentiates between objective and subjective well-being. Objective well-being includes features that are considered universally ideal, irrespective of individual evaluation, such as physical health, which is objectively recognized as an important component of well-being. Subjective well-being in turn is based on individual perception, in cases such as life satisfaction. Whilst a subjective approach could allow for a situated analysis of well-being brought about by public space in Järfälla, the approach relies on individual perceptions, thus calling for an in-depth and participatory approach. Taking on an objective approach to well-being, Fuchs et al (2021, p. 10) state that "it is possible to name elements that are decisive for human well-being regardless of how they are experienced". Hence, it is argued that an objective approach could allow for the development of a framework for further investigation of elements of social and environmental context that would ensure the opportunity to live a good life. This approach should however be considered the initial approach to identifying well-being distribution gaps, but is incomplete without further investigation together with community members, as it may exclude individual perspectives and experiences.

An anthropological understanding of well-being forms part of the objective approach and investigates individuals' ability to meet their needs or fulfil their capabilities (Fuchs et al, 2021). This perspective allows for the identification of “factors that are influencing the individual ability to live a meaningful life” (ibid, p. 12), thus, enabling well-being. It includes two main approaches: a capabilities approach and a needs-based approach. Both approaches differentiate between means and end to bring about well-being and consider a broad range of dimensions and determinants. In alignment with the definition of equity as the distribution of material and non-material benefits according to need (Fainstein, 2011), a needs-based approach to objective well-being is followed in approaching equitable public space in Järfälla.

2.4. Needs in public space

Max-Neef developed a matrix of fundamental human needs which are simultaneously defined by existential categories of being, having, doing and interacting (Max-Neef, 1991). Together with the identification of objective needs, Max-Neef identifies culturally specific and highly contextual satisfiers. Max-Neef thus provides a framework in which universal objective needs can be identified, whilst allowing for differentiated and situated conditions to meet the needs (Fuchs et al, 2021). Enabling well-being thus requires the provision of opportunities and the conditions to fulfil those needs. In approaching the spatial equity of public space in Järfälla, the distinction between objective and subjective needs and needs and satisfiers allows for the development of a neighbourhood scale analysis, based on universal needs whilst allowing for situated satisfiers.

Apart from philosophical and economic models for need-based approaches, architects, urban designers, anthropologists and environmental psychologists have been developing an understanding of public life through human needs based on field observations primarily oriented towards public space. The Charter on Public Spaces (2013) defines public space as: “all places publicly owned or of public use, accessible and enjoyable by all for free and without a profit motive.” Public spaces encompass open environments like streets, sidewalks, squares, gardens, and parks, as well as sheltered places without a profit motive like public libraries.

An empirical approach focused on the spatial manifestation of needs and the provision of physical design elements to meet the needs could allow for the analysis of the spatial equity of public space in Järfälla. Environmental psychologist Ingrid Gehl argues that the basic needs in relation to housing are universal, but are expressed in different ways depending on the individuals (Peters, 2015). The eight psychological human needs in the living environment identified by Gehl in Bo-miljø (1971) are contact, privacy, experience, purpose, play, orientation, autonomy, and aesthetics. Peters (2016) in turn evaluates the eight needs defined by Gehl in relation to social sustainability, indicating a contributor to human well-being. The approach thus relies on a two-phased framework based on (1) the universal objective needs in public space and (2) the situated design elements that enable the meeting of a need.

2.5. Spatial satisfiers for the needs within public space

Whilst the identification of needs within public space is considered universal and objective, the determination of the spatial satisfiers relies on a differentiated and situated understanding of the contextual conditions of the public space together with the specific requirements of individual users as considered through an intersectional lens. According to Catterall, public spaces are not neutral as they are shaped through the normative understanding of what public space ought to be by spatial practitioners, a profession largely dominated by white males, and designed for use by particular groups (University of Westminster, n.d.). Azzouz and Catterall (2021) further state that public space is neither controlled by the public nor accessed evenly by members of the public, whilst Sassen (2015) notes that urban planning is not gender-neutral. Azzouz & Catterall point out that most public spaces are male spaces, and do not typically take into consideration the specific spatial conditions required for LGBTQ+ users.
Similarly, people who are differently abled are often excluded from social life in public urban space, because their participation is limited by special needs and adaptations (Seeland & Nicolè, 2006). Even when there are attempts to offer different opportunities, they might not be accepted by the intended recipients. The inclusion of all users does not just apply to public places but also to the planning process. Studies have shown that not all voices are heard in the planning processes, and women participate to a much lower extent than men (Mortazavi, 2020). This highlights the importance of including many different interests and representatives from the start of the planning process. Both to include the needs of different groups and to make sure that the result can promote equity for all recipients. The toolkit thus considers the differentiated satisfiers to meet the specific spatial satisfiers to meet the needs of all users within the selected public space.

2.5.1. Contact

The need for contact is a concept referring to the physical and psychological connection and interaction between individuals (Gehl, 1971). As it positively affects people's life experiences and emotions, it is contributing to function in society and lacking contact can affect the mental state of individuals. There are two types of contact, one-way and two-way, which differentiate through the number of parties interacting. To elaborate, contact can be stimulated by passively observing others, referring to one-way contact. To stimulate the human senses and psychological requirements in the context of contact, reasonable measures within public space is crucial, as the human senses are limited. Moreover, it is also important to have elements that encourage contact by inviting interaction, and that the spaces are inviting and accessible.

A deeper analysis of the needs of different groups reveals both similarities and differences. General needs such as seating elements, shade and spaces to hang-out are general across most groups, but more important to some than others. For instance, seating elements are particularly important for the elderly because of their greater need to rest compared to others (RISE, 2022). Furthermore, the elderly also stated their desire for cluster seatings (Fang & Soo, 2018), which also is a need of LGBTQ+ people (Azzouz & Catterall, 2021).

Another desire of the elderly is shaded areas, because of their vulnerable nature (RISE, 2022). Moreover, Sadeghi & Jangjoo (2022) emphasise the right of women to be able to enjoy the shade safely and undisturbed, highlighting its importance for women's presence in public spaces. There is also a particular need for young people to be able to hang out under

shelters which are neither too close to home to disturb others, nor too far away to put the youth in a dangerous position (Shaftoe, 2012).

Apart from the general needs, children have the need to move freely and play to form contact (Danenberg et al., 2018). However, stimulating contact through activities is not only a need for children, but also for groups such as the elderly, who also need elements that encourage interaction, such as barbecue pits and chess boards (Loukaitou-Sideris et al., 2014).

2.5.2. Privacy

As much as we need human interaction, we also need privacy, meaning to be on our own, mainly to disconnect from our stressful lives and environments (Gehl, 1971). Just as privacy is a need in the home, it is also a need outdoors. To create space for privacy within the public, the space must isolate the individual from the surrounding environment, while making the individual feel safe and secure. Important parameters to consider are therefore the perceived dimension of the space, devices that add a private environment to the space, the location of the space – i.e. the more isolated the space, the more private it is perceived – and finally the externalities, i.e. the less external impact, the more private the experience. Furthermore, to create a feeling of privacy, all human senses, including hearing, must be taken into account, meaning that noise also has to be isolated.

The need for privacy can be studied from the perspective of different groups. As mentioned by Danenberg et al. (2018), children under the age of 12 need designed places that offer an overview and enclosed spaces that allow a certain freedom of children's movement and exploration, as well as elements that can serve as shelter from noise and sun that can also be hiding or playful spots. Those measures allow children to develop a sense of privacy and intimacy in the public realm. However, studying youth, defined here as people between 13 and 18 years old, is different from studying children. According to Matthews (1995) and Depeau (2001), adolescents should be provided with special places in parks that they can claim for themselves, places where they can loiter, hang out and interact with their friends. This specific need calls for more attentive design and suggests examining public spaces considering the specificity of the atmosphere that can be found within them that suits adolescents.

When considering the presence of women in public spaces and ways to satisfy their need for privacy, according to Zimm (2020) public spaces must offer the opportunity to see without being seen. However, in that way, the need for privacy can be satisfied but those spaces must provide intimacy without being constrictive (ibid) because the feeling of safety is crucial for women. Qucit (2021) points out that women often feel unsafe in public and might only choose to walk through a public space instead of spending time there. Therefore, it can be argued that the perception of safety is an especially important precondition for satisfaction of the need for privacy for women.

In addition, Azzouz and Catterall (2021) highlight the importance of "cosy corners" for gender and sexual-orientation non-conforming public space users. It is important that those "cosy corners" make it possible to see but not be seen, so they can contribute to satisfaction of the need for privacy. Moreover, street furniture itself can be designed in a way that allows more intimacy, which is also found to be essential to bring a sense of privacy for the specificity of those users (ibid).

What is more, Loukaitou-Sideris et al. (2014) studies about elderly users of public spaces point out several physical elements that contribute to the satisfaction of the need for privacy. One of them is providing more

secluded individual seating. Another one can be ensuring that parks offer sub-areas that enable visitors a level of physical and visual privacy. One more idea is to screen outside noises with natural sounds and place seating areas away from the noise of the street. Moreover, planting can be used as a buffer to create a sense of enclosure around quieter and more private subareas of parks. All of the above spatial factors aid satisfaction of the need for privacy in the case of elderly users.

2.5.3. Play

Play involves being in touch with your body and experiencing life through physical activity (Gehl, 1971). The need is not limited to playgrounds or specific spaces, as often assumed in today's society, but rather refers to the freedom of expression and interpretation and allows for the use of one's imagination. It is also something that cannot be forced but rather has to be a spontaneous activity. While Gehl mainly focused on children in play, it is recognised that this need could extend to other age groups as well.

Multiple sources point to spatial satisfiers that fulfil children's need for play. An important reference is Danenberg et al. 's (2018) publication "The City at Eye Level For Kids" which provides a list of criteria that child-friendly public spaces should meet, one being opportunities to play, learn, and engage. Both Danenberg et al. (2018) and ARUP (2017) state that simple types of playground equipment and physical access to amenities can be insufficient, and that there are important requirements regarding different physical conditions and mental capacities in order to be inclusive. Diverse play equipment designed for a variety of ages and genders can accommodate different preferences of play and interaction (e.g. coloured markings, flexible structures, and installations), providing a wider range of possibilities for children to explore their surroundings and socialise.

In general, the case studies presented by Danenberg et al. (2018) make evident that public spaces can provide opportunities for play when there are spaces to carry out designated activities, e.g. playgrounds or sports areas, but also spaces that allow for spontaneity. In this sense, it is possible to say that the diversity of play is encouraged both by different kinds of elements, as is by the diversity of spaces. Furthermore, it is also important to consider the adaptability of play elements in different seasons to ensure that there are possibilities available throughout the year.

When considering the need for play for male teenagers in public spaces, sports areas are usually mentioned in the literature, such as football fields or basketball courts. However, Lange (2021) points out that teenage girls would prefer hangout spots with round tables where to create art or play games that foster interaction.

Regarding elderly people, RISE (2022) states that some wish for places to play games such as boule courts. Sitting areas with tables for board games like chess are also appreciated. According to Nordström & Gora (1995), elderly people prefer to use places that are easy to reach and spend time in with a wheelchair or a walker. These kinds of spaces make them inviting for the elderly as they provide them with the opportunity for leisure and social interaction.

Finally, Svensson (2008) highlights that both children and adults with reduced mobility or orientation should be able to use playgrounds. The playground should offer a varied and exciting environment that enables movement games and motivates physical exercise. To make it more inclusive, playgrounds should be easy to find even for visually impaired people. An example is the use of sound as an orientation aid, such as. running water. Moreover, play equipment should be designed so that everyone can participate as much as possible and children with disabilities

should not be relegated to a corner of the playground where special adaptations are available. For instance, climbing frames and other play equipment can be painted in high-contrast colours so that different parts and surfaces stand out clearly, making it easier for children with visual impairments to use them. Many children with disabilities need assistance to be able to play, and thus there must be sufficient width and height for adults to also be able to enter play huts and under climbing frames (Klaesson et al., 2008). Play equipment such as swings and slides should withstand the weight of, and have space for, both children and adults together.

2.5.4. Experience

Experience refers to the perception of the environment using all human senses (Gehl, 1971). A place, whether indoors or outdoors, requires variety to satisfy the different senses by breaking the monotonous structure. Variation can be in the form of objects as well as perceptual variation such as size, scent, texture and flow. Unlike privacy, experience places great value on social presence as human contact is the most important experience, and therefore elements which attract people are particularly important. The experience also values the size of the environment as the perceived experience is greater in smaller spaces.

The spatial satisfiers to meet the need of experience are categorised as either sensory impression elements or elements that encourage active physical engagement (Peters, 2016). Sensory impression elements include elements that intentionally engage visually with the users in public space, including artwork, elements that contribute positively to the auditory experience, such as the sound of a water fountain or the wind blowing through trees, and positive olfactory engagement, such as the presence of flowerbeds (ibid). Equitable public space calls for a range of sensory impression elements, taking into account the sensory impairment or disabilities of potential users, such as blindness or deafness (Loukaitou-Sideris et al., 2014). Colourful or textural elements are also considered an important aspect in capturing the attention of young children, whilst ‘soft’ interventions in public space in the form of temporal elements, including space for changing activities or events such as music, contribute to the sensory impression across ages, but specifically to youth (Spencer, 2013).

Active engagement equipment includes elements designed for functional movement, including exercise equipment, together with elements for play taking into account a range of age groups. Inclusive active engagement requires equipment or activities that allow for a range of joint motion and mobility, such as walking paths together with running tracks (Levinger et al., 2018). Safety considerations, including soft-fall flooring around equipment also contribute to the possibility of active engagement for children, the elderly, and other users with mobility impairments (ibid). Scaled elements to jump, climb, hide in, or provide seating at a children's scale, allow children to engage more with public space and create a sense of belonging to the space (Danenberg et al.,2018), whilst semi-private zones, contribute to a sense of safety for both women and girls. When exercising in public space, Kilgour & Parker (2013) note that semi-private zones allow women to engage in the public space, without the fear of being perceived in a large open space. Teenage girls in public space in turn have the need for interacting in groups of varying sizes, places for sitting together face to face while protected from wind and weather, places offering the opportunity to see without being seen, spaces providing a sense of intimacy without being constrictive, and a desire for a stronger presence of art, colour and aesthetic features (Zimm, 2020).

2.5.5. Aesthetics

Aesthetics, a difficult need to address because of its uncertainty, refers to the perception of the physical environment from a beauty perspective (Gehl, 1971). The need is perceived through all human senses and therefore suggests that all are satisfied, for example through beautiful sights and sounds. However, what is good aesthetics and what is not is impossible to answer, as it varies from person to person and depends on different factors such as culture, circle, values and the part of the world you live in. A collaboration between planners/designers and residents would thus result in the most satisfactory aesthetics.

The built environment affects individuals emotionally and psychologically (Lynch, 1971). The sensory engagement of urban spaces contributes to the overall well-being of inhabitants and visitors, influencing how a place functions socially, culturally, and economically (Landry, 2006). Understanding aesthetics as a complete experience involving multiple senses supports the idea that designing for aesthetic satisfaction goes beyond visual attractiveness. The work of Kaplan and Kaplan (1989) highlights the belief that aesthetic reactions help as a guide to human behaviour and well-being, indicating the importance of creating environments that align with human needs and purposes.

To further understand this, Sadeghi and Jangjoo (2022) emphasise the significance of the 'beautiful' form and facade of buildings in shaping aesthetic perceptions. For teenage girls, there is a higher desire for a stronger presence of art, colour, tactility, and aesthetic features in urban spaces. Besides that, caution is expressed that badly maintained spaces can convey a sense of danger (Azzouz & Catterall, 2021).

Considering specific demographic preferences, elderly people desire well-maintained parks with beautiful greenery and clean surfaces (Sundevall & Jansson, 2020). Strategies such as using vegetation, mural painting, or art placement to screen or transform unpleasant views (blank walls or asphalt parking lots) It is also recommended to gently curve paths over straight ones, along with incorporating plants and flowers of varying sizes, contrasting colours, pleasing fragrances, textures, and seasonal variety for a better aesthetic experience (Loukaitou-Sideris, 2014).

2.5.6. Orientation

Orientation involves navigating individuals through different senses to steer them towards new experiences and sustain emotional security within the space (Gehl, 1971). This is achieved by varying the size of elements or strategically placing elements to form a path. It can also involve other senses such as smell, hearing and touch.

Increased visibility and openness in public spaces is important for women, which includes good lighting (Alamdari & Habib 2012), as well as clear sightlines for all users (Women's Health East, 2021). According to Sarkissian & Stenberg (2013), open space should make sense to not confuse older people. For older people to navigate more easily, information about location and pathways should be provided by visual cues like landmarks and tactile cues like handrails. When it comes to larger parks, it is good to provide some distinctive and highly visible features (e.g. a kiosk, a clock tower, a fountain, etc.) that can serve for orientation (Loukaitou-Sideris et al. 2014). Sensory cues like sound patterns and flower fragrances could also be used for wayfinding. Boverket (2008) has published regulations and general recommendations on accessibility and usability for people with limited mobility or orientation capacity in public spaces, which includes easily understood and clear walking and furniture zones, and level, firm, and non-slip walking areas. Some needs for people with disabilities, identified by Svensson

(2008), are well-lit footpaths, material contrast that marks changes in the pedestrian network, as well as no obstacles like trees or poles in the way.

2.5.7. Autonomy

Autonomy refers to the need to identify within the physical and social environment (Gehl, 1971). To identify within physical space, one must be able to mark or process the physical elements within, e.g. ownership. The same goes for the social environment, where the individual must be able to influence through participatory activities. It is a two-way situation where planners must create opportunities for these identifications and residents must take advantage of these opportunities. However, these opportunities must be suitable for most people and attractive to optimise take-up.

Spatial satisfiers for autonomy include elements that allow for a sense of ownership as well as elements which contribute to the uniqueness and identity of the space. Elements which allow for users to engage with and linger or change, such as barbeque areas or allotment gardens contribute to a sense of ownership of a space (Peters, 2016). Dynamic spaces where community members tend to linger, have a positive influence on women's perceptions of safety, enhancing the ownership of a space (Women's Health East, 2021).

For children, a sense of ownership within a public space can be instilled through the development of micro-geographies, where children are able to take part in sports activities, engage with creativity, and express emotion (Matthews, 1995). Soft landscaping and artwork contribute to the identity of a space and could contribute to more inclusive spaces through the use of artwork to facilitate representation such as queer heritage through statues and memorials (Azzouz & Catterall, 2021). The integration of active community engagement and consideration of the lived experiences of the users of the space could increase ownership and use at night (ibid). The presence of ablution facilities within public space allows for a wider range of years to be present in public spaces for prolonged times, including the elderly, people who are pregnant, and parents with young children (Sadeghi & Jangjoo, 2022).

2.5.8. Purpose

Performing activities, creating things and accomplishing something are all part of the human need in society for a richer life and are understood as purposefulness (Gehl 1971). It is necessary to keep the public engaged in leisure activities, especially given today's living conditions such as shorter working hours. When planning for purposefulness, the design of an element must be considered and allow for creative use by a low-structure design. Elements with a design for a specific use can lead to reduced public interest. While some elements can be planned within the same space, some elements require their own space. It is also important to plan these elements in accessible locations and avoid spaces that are not considered safe. Supportive, inclusive and active environments can encourage people to participate in engaging practices and thus promote a purposeful lifestyle.

Children can feel a sense of purpose through adaptable elements that foster engagement and co-creation of space (Danenberg et al., 2018). Youths on the other hand want spaces where they can go to "escape" the confinement of the adult "controlled" world (Childress, 2004). Young girls have expressed a preference for places that integrate information with public design elements – for example, art installations, viewing screens and mood lighting (Zimm, 2020). For the elderly to develop a sense of purpose, public spaces should provide features and materials that can be moved, manipulated, and changed to the extent possible (Loukaitou-Sideris et al., 2014).

3. Operationalising equity for urban planning

3.1. The toolkit for public space assessment

The overarching aim of this study is to propose a toolkit that enables the assessment of public spaces through the lens of equity. The toolkit is comprised of three steps (see Figure 3):

1. **Defining the scope**: the first step consists of selecting and mapping the public spaces to be assessed.
2. **Applying the tool**: this step consists of applying a grading tool to evaluate public spaces according to needs met, based on defined spatial satisfiers. This provides insights into the performance of an individual public space, but also into the spatial distribution of satisfiers within different public spaces. The application of the tool is based on desk study and direct observations.
3. **Engaging the public**: to complement the insights gained through the application of the tool, this step consists of carrying out participatory processes where direct input from the public can provide a richer and intersectional study of how public spaces are meeting the needs of their users. The results obtained in the second step could be a starting point for discussion. Overall, it should strive to be an equitable participatory process, tailored to the requirements of diverse focus groups.

This study has predominantly focused on developing the grading tool, or the second step of the toolkit, which is further explained in the following section.

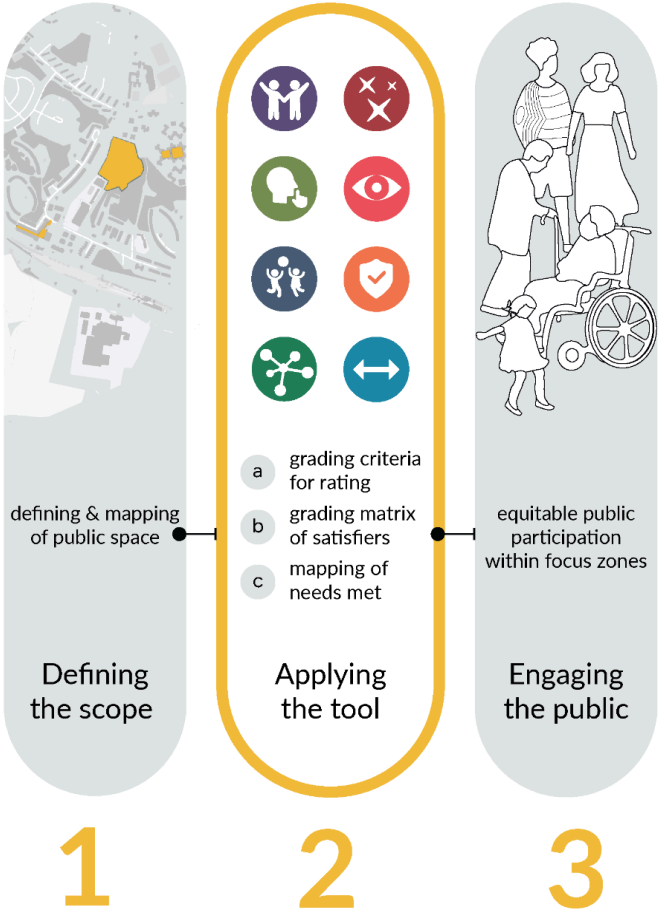


Figure 3. The three steps that make up the toolkit

3.1.1. Defining the scope

The selection provides a structured approach to defining the scope and boundaries of the project, allowing the municipality to define the scale through the selection of the number and area of public spaces to be assessed. The selection of the area or specific public spaces aids in developing an understanding of the resources required for various stages of the project, together with the identification of potential stakeholders, and the legal and regulatory considerations of each public space.

3.1.2. Grading tool for public spaces

As mentioned previously, the second step of the toolkit consists of a method to assess how a public space is meeting the needs of its users, based on spatial satisfiers. For this purpose, eight categories of needs were selected based on an extensive literature overview and largely similar to those defined by Gehl (1971). These needs are recognized to be contributors to human well-being and social sustainability. In this sense, the categories of needs defined are: contact, privacy, experiences, purpose, play, orientation, autonomy, and aesthetics (see Figure 4).

Moreover, each of the needs identified is comprised of a series of spatial satisfiers. These were defined based on extensive research about spatial requirements in public spaces by different social groups, as explained in the previous section of this report. That means the list of satisfiers to observe and grade by the tool was enriched by adding satisfiers that are necessary for specific groups, to provide a more inclusive approach to understanding how the public space is satisfying the needs of its users.

The eight categories of needs and the corresponding satisfiers are shown in Table 1, along with the grading criteria for each satisfier to facilitate comparison. Some satisfiers are rated according to the frequency (F) of associated elements present in the public space, from a scale of 0 to 3. Other groups of satisfiers are rated only by the presence of elements (P), therefore if they meet the requirement they are assigned the highest value (3), and if they do not, the lowest value (0). (see Annex B for more detailed grading criteria by category of need). Overall, all satisfiers are equally weighted. The assigned grading is then averaged by need, to provide an overview of how each public space rates in meeting them. Results are shown in tables and colour-coded maps.

The final grading table for the toolkit operationalises the theoretically identified spatial satisfiers for the needs within public space and synthesised the number of elements through the combinations of elements in accordance to their physical nature. See Annex B for a description of the grading criteria of each spatial satisfiers.

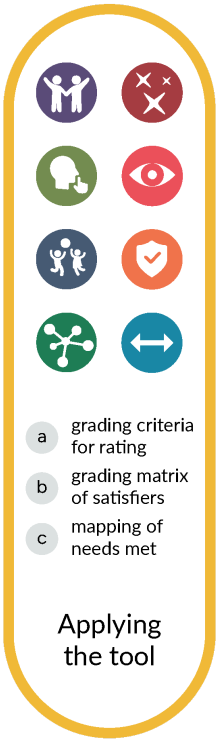
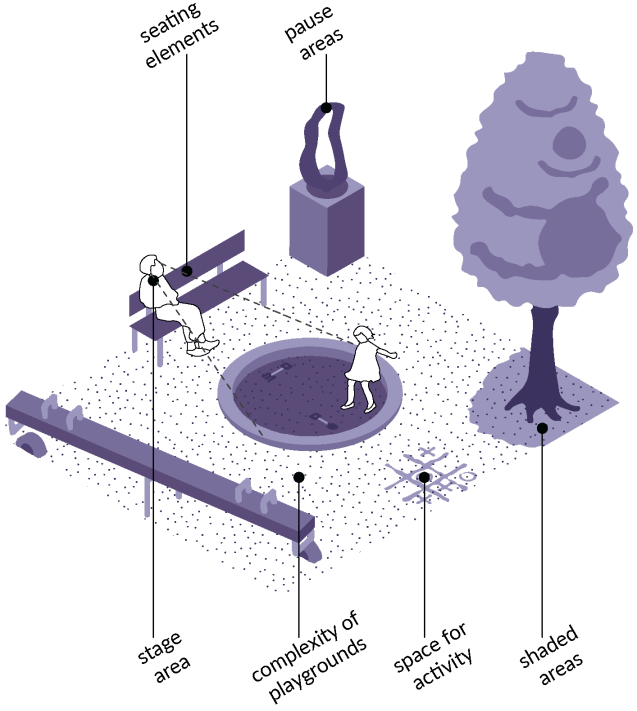
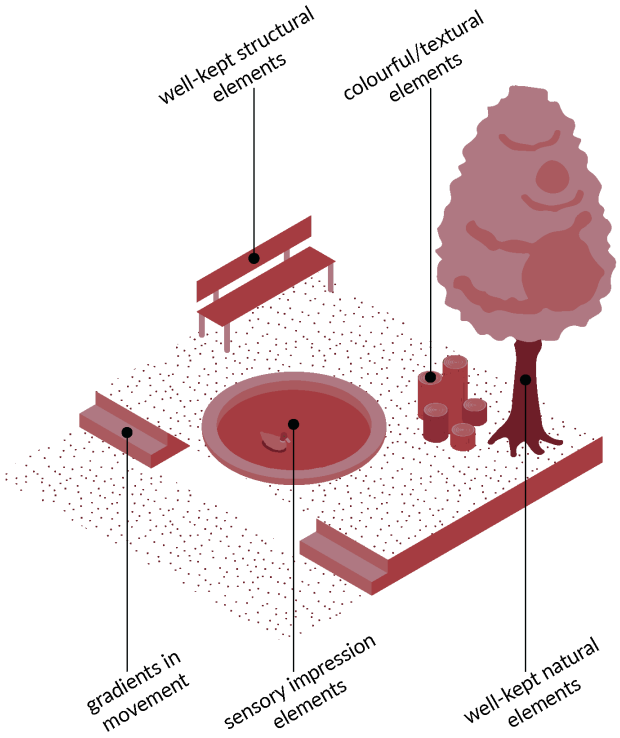


Figure 4.
Second step of the toolkit: Applying the tool



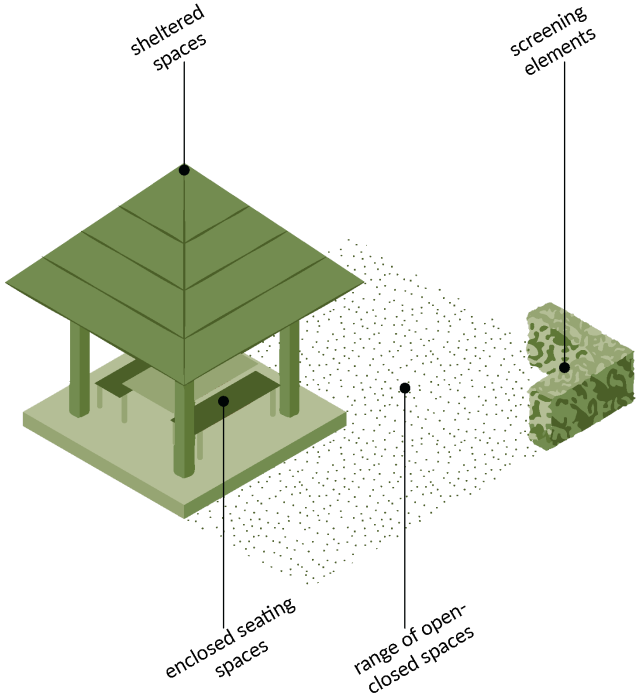
Sample spatial satisfiers for the need for **contact** in public spaces

The final grading table for contact includes six spatial satisfiers. Seating elements, regardless of the arrangement or type are graded by frequency, together with space for activity, shaded areas, and the complexity of playgrounds, where a larger number of elements that allow for differentiated types of play are graded higher. Pause- and stage areas.



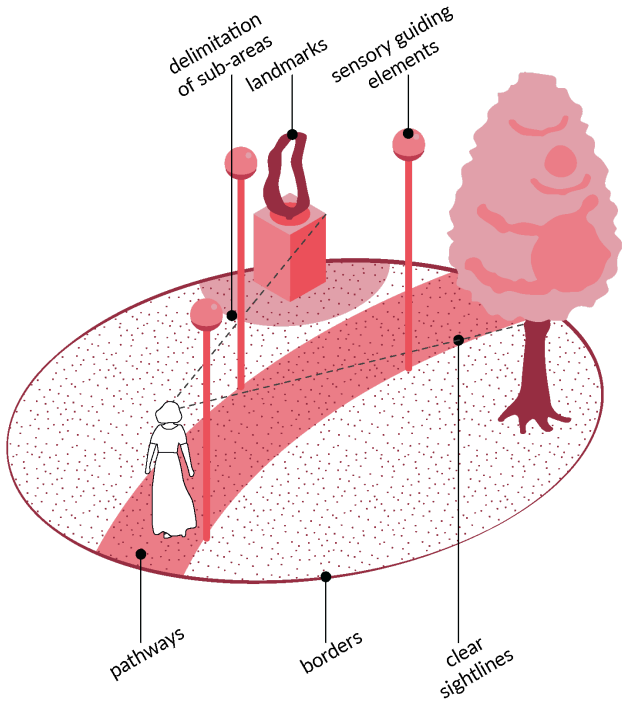
Sample spatial satisfiers for the need for **aesthetics** in public spaces

The final grading table for aesthetics considers the maintenance of public space as an important contributor to meeting the need. The maintenance of structural elements together with the maintenance of natural elements are thus included. Colourful or textural elements and sensory impressions are graded through frequency, and gradients in movement are graded on a presence basis.



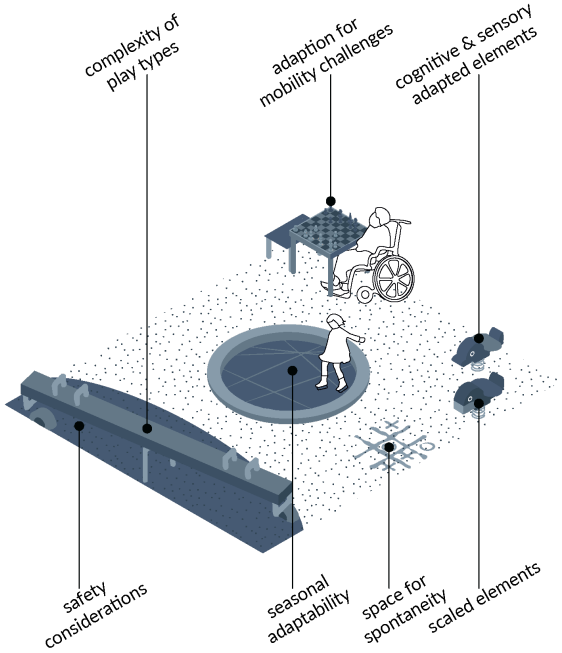
Sample spatial satisfiers for the need for **privacy** in public spaces

The final grading table for privacy looks into the presence of: screening elements, a range of open-closed spaces, sheltered spaces for children, seating elements in enclosed spaces and/or away from the noise (Annex B), while assessing the need's satisfaction in the examined public space.



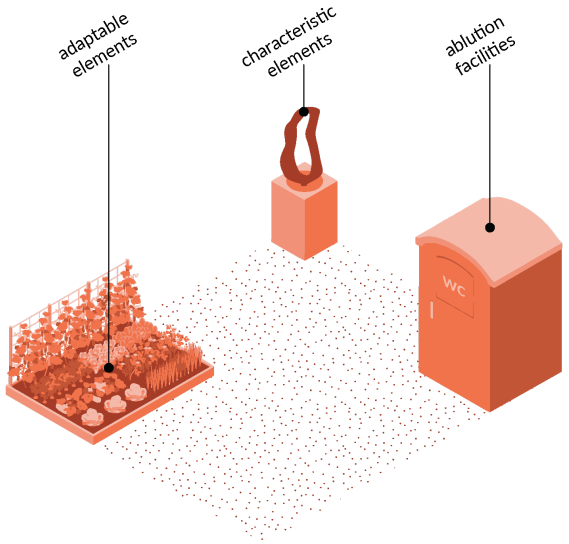
Sample spatial satisfiers for the need for **orientation** in public spaces

The final grading table for orientation consists of six spatial satisfiers. Borders are assessed as existent or not and help to determine what is public vs private. Landmarks that can help people identify a public space. Sensory guiding elements can be visual, tactile, auditory or olfactory. There should be clear sightlines for all users, from different angles and at different heights. For orientation purposes, there should be clearly defined uses of the space. e.g. areas for play and rest, as well as defined walking and furniture zones. Pathways are graded based on their qualities and should ideally be wide, flat and non-slippery pathways with lighting.



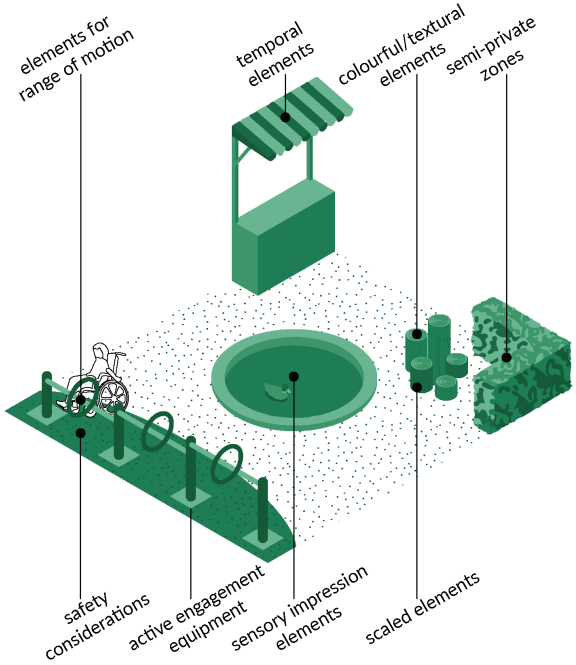
Sample spatial satisfiers for the need for **play** in public spaces

The final grading table for play is based on seven spatial satisfiers. The complexity of play types, whilst relating to the complexity of playgrounds within the need for contact, is considered through the contribution to the need for play on a frequency basis. Playful elements for cognitive and sensory disabilities and scaled elements are similarly graded based on frequency, both aspects contributing to the accessibility of play in public space. Space for spontaneous play, equipment adapted for mobility challenges, safety considerations, and seasonal adaptability are included and are graded on a presence basis.



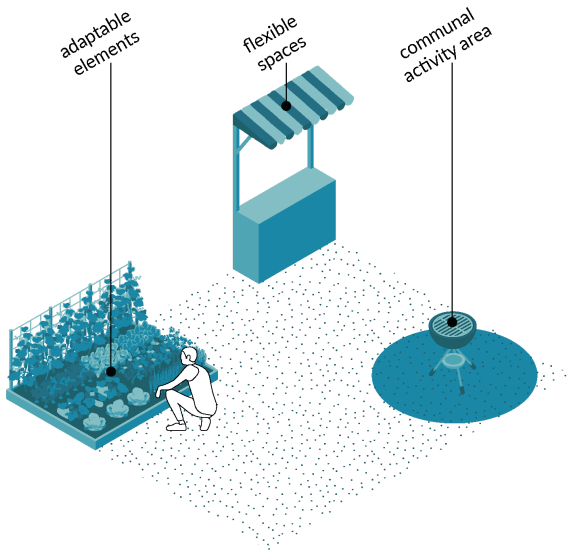
Sample spatial satisfiers for the need for **autonomy** in public spaces

The final grading table for autonomy comprises three spatial satisfiers. Characteristic elements in the ablution facilities are graded by the frequency of the elements within the public space, whilst the presence of customisable elements contributes to meet the need for autonomy, regardless of the number of customizable elements.



Sample spatial satisfiers for the need for **experience** in public spaces

The grading criteria for the need of experience comprises the largest number of spatial satisfiers. Sensory impression elements, active engagement equipment, and scaled elements are graded on a frequency basis. Both sensory impression elements and scaled elements are graded within other needs as well, but are graded within the need of experience as these elements contribute to meeting the need. Colourful or textural elements, temporal elements, elements for a range of motion, safety considerations, and semi-private zones are graded on a presence basis.



Sample spatial satisfiers for the need for **purpose** in public spaces

The final grading table for purpose is based on only the presence of spatial satisfiers, including communal activity areas, adaptable elements, and flexible spaces.

Table 1: Grading criteria for spatial satisfiers

need	spatial satisfier	GC	spatial satisfier	GC	need	spatial satisfier	GC	spatial satisfier	GC
contact	seating elements	F	pause areas	P	aesthetics	well-kept structural elements	F	well-kept natural elements	P
	space for activity	F	stage area	P		colourful or textural elements	F	gradients in movement	P
	shaded areas	F	complexity of playgrounds	F		sensory impression elements	F		
privacy	screening elements	F	range of open-closed spaces	F	autonomy	characteristic elements	F	adaptable elements	P
	shelter spaces (children)	P	noise-shielded seating elements	P		ablution facility	F		
play	complexity of play types	F	space suitable for spontaneous play	P	orientation	borders	P	landmarks	P
	scaled elements	F	seasonal adaptability	P		sensory guiding elements	F	clear sightlines	P
	cognitive & sensory disabilities playful element	F	mobility challenge adapted equipment	P		pathways	F	delimitation and definition of sub-areas	P
	safety considerations	P							
experience	sensory impression elements	F	active engagement equipment	F	purpose	communal activity area	P	adaptable elements	P
	colourful or textural elements	P	temporal elements	P		flexible spaces	P		
	elements for range of motion	P	safety considerations	P					
	semi-private zones	P	scaled elements	F					

Grading key

P	Presence	no	= 0	F	Frequency	no element	= 0
		yes	= 3			one element present	= 1
						> one element present	= 2
						variety in type of elements	= 3

The grading method is based on Multi-Criteria Analysis (MCA), although it does not strictly qualify as such. Like MCA, this method aims at supporting decision-making through preference formation based on a defined set of objectives for which measurable criteria can be established, allowing for the assessment of the extent to which objectives are achieved (Department for Communities and Local Government, 2009). The advantage of using it is that it allows for transparency in terms of preferences and evaluation methods, and it enables the inclusion of qualitative factors together with quantitative factors, without the need to assess them within the same metrics.

The grading tool provides results that draw attention to the areas that may need further attention. In general, it is suggested to focus on the investigation of lower scores. They indicate the need for further investigation of the public space in terms of satisfaction of each need based on expert knowledge together with public participation. Such investigation should take into consideration aspects such as public space's main function and its role within the network of public spaces in a given area, the social structure of the particular users of a given public space and consideration of the characteristics of those as well as the interconnectedness of public spaces' need satisfaction. Following those steps allows the use the results of a grading tool to discuss equity in terms of resource allocation throughout the municipality.

3.1.3. Engaging the public

The third step is an inherent part of the proposed toolkit. It allows for a deeper understanding of the users of public spaces through performing adequate public participation measures. While the grading tool provides valuable insights into the satisfaction of needs in different public spaces, a more comprehensive understanding of the diverse community is essential. The in-depth investigation and analysis of selected public spaces based on the results from step 2, thus requires active public participation to ensure that public spaces are equitable. Conducting surveys, workshops, or community forums can help gather input from residents of varying demographics, ensuring that the design interventions meet the specific needs and preferences of community members.

3.2. Pilot application: Kallhäll

To demonstrate the application of this tool, the area of Kallhäll was selected as a case study. Kallhäll is an area in the municipality of Järfälla that has diverse sub-areas of different socio-economic composition. Furthermore, it has several public spaces within these sub-areas of different scale and character. This fact made it interesting to select this area as a case study to assess how these spaces are effectively contributing to satisfying the needs of their users, and how the scores are spatially distributed in comparison to socioeconomic conditions in the area and social aspects within particular public space. This allows for the assessment of equitable distribution of resources on two scales: on the scale of an area (Kallhäll) in relation to socioeconomic conditions and on the scale of neighbourhood looking into particular public space conditions.

The pilot application allowed us to verify how the toolkit performs in real life conditions and whether it allows for the assessment of equity not only in theory but also in practice. The pilot study consisted of defining the scope in Kallhäll (the first step in the toolkit) and the grading of selected public spaces (the second step in the toolkit). Due to the constraints of the project, such as time or scope, there was no possibility to perform the third step of the toolkit, which is engaging the public. Having that in mind, the conclusions presented here acknowledge its limitations and they do not allow for full equity assessment as the toolkit intends to do. However, they still allow for the reflections about equity with the situated analysis of the results.

The following section provides a more detailed description of the study area to better understand the context and later be able to situate the pilot study results in it. Later, results are presented in tables and coloured-coded maps, to provide a visual understanding of the spatial distribution of satisfiers within Kallhäll and reflected on with a comparison to the socioeconomic conditions. Additionally, an analysis of the correlation between demographics and needs' satisfaction levels is conducted to enhance the comprehensive interpretation of the pilot study findings.

4. Kallhäll pilot study

4.1. Kallhäll characteristics

Kallhäll is an area located in the northern part of Järfälla municipality, in close proximity to Lake Mälaren. The urban structure is largely surrounded by nature reserves and green outdoor areas towards the north, east, and west, together with the lake on the western edge of the municipality. Both the rail line with the Kallhäll station and the E18 motorway, make up the backbone of the mobility system and provide an adequate connection to the rest of Järfälla. A summarised description of Kallhäll is provided in Annex A through a SWOT table (strengths, weaknesses, opportunities, and threats).

Within Kallhäll there are several industrial areas, as well as residential areas of different character, from small single-family buildings with gardens to large multi-family buildings that house residents of different socio-economic groups. The five sub-areas that comprise Kallhäll, based on the Regional Statistical Areas (RegSO), are the following (illustrated in Figure 5):

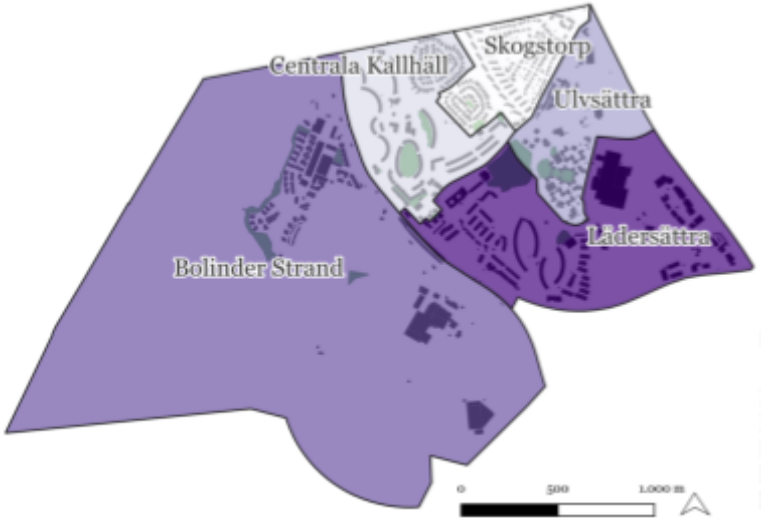


Figure 5. The (statistical) sub-areas of Kallhäll.

Bolinder Strand: is a former industrial area that has been redeveloped into a residential area in the past two decades. It consists mostly of single-family houses, multi-family buildings, and a refurbished industrial area.

Centrala Kallhäll: dating from the 1950s, the centre houses both multi-family buildings and villas. The Kallhäll commuter train station is an important node around which several activities congregate, including shops, restaurants, and cultural services.

Lädersättra: consists almost entirely of multi-family buildings, but it has varied characteristics. The dense urban structure is closest to the train station, with single-family houses along the railway and a small strip of villas just beyond, a big area of large-scale neighbourhood structure, a big area with houses in the landscape, and a large industrial area.

Skogstorp: this area consists mostly of older single-family residences, including Kallhälls villastad.

Ulvsättra: is the least built-up area of the five, and consists of more recently constructed multi-family buildings. It has three different characteristics, Termovägen with a dense urban structure, and single-family houses in green areas, but the majority is occupied by other types of activities, such as a large sports facility.

4.1.1. Socio-demographic aspects

This section provides data on the socio-demographic characteristics of the inhabitants of Kallhäll, according to the five sub-areas previously described. In this sense, the population, household constellations and forms of tenure, socio-economic index, and an analysis of socio-economic disparities are presented to have a more rounded understanding of the overall situation in the study area.

4.1.1.1. Population statistics

The population of Kallhäll was 11 781 in 2022 (SCB, 2023a). The age distribution across the five areas of Kallhäll can be seen in Figure 6. The number of residents in all age groups is the highest in Centrala Kallhäll, with the exception of 10-14 year olds, which is higher in Ulvsättra. In the age groups 25-29 and 30-34 the number of residents in Centrala Kallhäll is more than twice as large as the second largest, Lädersättra. From the graph, it is clear that a large part of the population is between 20 and 40 years old. There are most residents above 80 years in Centrala Kallhäll while there are very few in Ulvsättra.

The gender of the residents of the five areas in 2022 is displayed in Table 2. There are 5912 men and 5869 women in the entire Kallhäll, which is a difference of 43 people. The number of residents with Swedish and foreign backgrounds in 2022, respectively, are displayed in Table 3. There are significant differences between the five areas of Kallhäll. 73 % of the residents in Bolinder Strand have Swedish background whereas the share of Swedish residents is 30% in Ulvsättra.

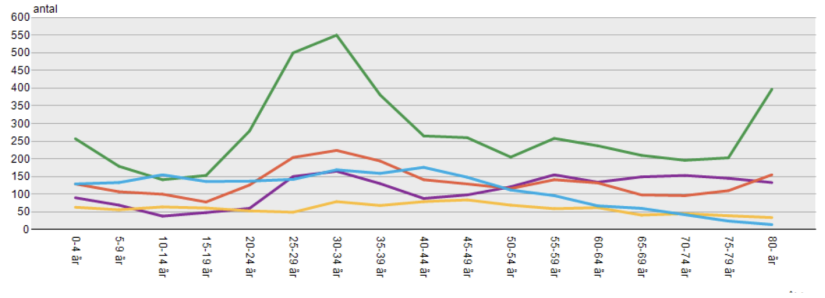
Figure 6. The age distribution of the population in the five different areas of Kallhäll in the year 2022 (SCB, 2023a)

Table 2. The gender of the residents of Kallhäll in 2022, as well as the total number of residents per area (SCB, 2023b).

	Men	**Women**	**Total**
Bolinder Strand	962	964	1926
Centrala Kallhäll	2273	2398	4671
Lädersättra	1188	1092	2280
Skogstorp	530	475	1005
Ulvsättra	959	940	1899

Table 3. The background of the residents of Kallhäll in 2022, divided into Swedish or foreign (SCB, 2023c).

	Swedish background	**Foreign background**
Bolinder Strand	1409	517
Centrala Kallhäll	2536	2135
Lädersättra	1194	1086
Skogstorp	682	323
Ulvsättra	578	1321



4.1.1.2. Socio-economic index

The Delegation against Segregation (Delmos) and Statistics Sweden (SCB) have developed a nationwide index that illustrates how different areas relate to each other in terms of socio-economic status (SCB, 2023e). The index is based on Regional Statistical Areas (RegSO) and relevant statistical indicators that are weighted together into a coherent index. The socio-economic index is a weighted index based on three indicators: the proportion of people with a low economic standard (V1), the proportion of people with pre-secondary education as the highest level of education (V2), and the proportion of people who have had financial aid for at least ten months and/or have been unemployed for longer than six months (V3). The socio-economic index and the indicators are shown in Table 6.

The index is calculated by calculating (V1+V2+V3)/3. V1, V2 and V3 are ratios converted to percentages, meaning that they assume values between 0 and 100 percent. Higher values of the index mean that the socio-economic conditions are worse in a RegSO. Some things to consider are that the population size differs between different RegSO:s which can affect the comparison, and that some RegSO:s are dominated by a high proportion of pensioners. Low economic standard refers to the proportion of people living in households whose economic standard is less than 60 percent of the median value for the country.

Region Stockholm has data on living conditions in the sub-areas of Kallhäll. Note that Central Kallhäll is divided into two areas because they correspond to Demographic Statistical Areas (DeSOs). The different factors are displayed in Table 7.

4.1.2. Analysis of socio-economic disparities in Kallhäll

Throughout Kallhäll, as in the rest of Järfälla, it is common to find growing income gaps. Disparities between income groups are evident for example, in Bolinder Strand, where the mean income is 366 100 kr which is 60% higher than in Ulvsättra, where the mean income is 222 100 kr (Region Stockholm, 2023). Indeed, the differences between Bolinder Strand and Ulvsättra are notable. According to the segregation barometer (Boverket, 2021), Bolinder Strand is an area type 5, that is, of very good socio-economic conditions. While Lädersättra, Skogstorp, and Central Kallhäll are type 4 areas (good socio-economic conditions), Ulvsättra is type 2, which is an area of socioeconomic challenges.

Another dimension to understanding these disparities is through the socio-economic index referred to previously. This shows that the share with only pre-secondary education is 4.2% in Bolinder Strand and 20.9% in Ulvsättra. The share with low economic standard is 2% in Bolinder Strand and 27% in Ulvsättra. The share with financial aid and/or long-term unemployed is 1.6% in Bolinder Strand and 7.5% in Ulvsättra. The share of foreign-born residents is 18% in Bolinder Strand and 47% in Ulvsättra (Region Stockholm, 2023). The share of 0-19 year olds is 14% in Bolinder Strand and 31% in Ulvsättra. The average living space (in m2) is 42.46% in Bolinder Strand and 28.09% in Ulvsättra, and around 35% in the three other areas of Kallhäll.

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Table 4. The socio-economic index for the five areas, and the three indicators it is based on (SCB, 2023e).

	Index	**Area type**	**Share with only pre-secondary education (20-64 years)**	**Share with low economic standard (regardless of age)**	**Share with financial aid and/or long-term unemployed (20-64 years)**
Bolinder Strand	2.6	5	4.2	2.0	1.6
Centrala Kallhäll	8.0	4	9.2	11.4	3.3
Lädersättra	7.7	4	9.6	9.4	4.1
Skogstorp	5.4	4	7.0	7.1	2.2
Ulvsättra	18.5	2	20.9	27.0	7.5

Table 5. Living condition data from Region Stockholm, from the year 2021 (Region Stockholm, 2023).

	Share of unemployed in the last year	**Share of single parents**	**Share with only pre-secondary education**	**Share of foreign born**	**Average living space (m2)**	**Mean income**	**Share of 0-19 year olds**
Bolinder Strand	0,05	0,05	0,09	0,19	42,01	366 100	0,14
Central Kallhäll (0123C1350)	0,12	0,10	0,23	0,40	35,92	259 400	0,15
Central Kallhäll (0123C1360)	0,11	0,10	0,18	0,29	37,94	281 950	0,15
Lädersättra	0,11	0,10	0,20	0,36	39,05	281 250	0,18
Skogstorp	0,09	0,10	0,17	0,24	33,26	314 400	0,25
Ulvsättra	0,20	0,20	0,34	0,48	28,30	222 100	0,30

4.2. Kallhäll's public spaces

Throughout Kallhäll, there are several open public spaces of different scales and functions: urban parks, smaller courtyards, recreational areas, outdoor gyms, pathways, allotment gardens, etc. This spatial analysis focuses on the distribution of open public spaces according to the population in the five areas that comprise Kallhäll. The results are shown in Figure 7 and Table 6. The results reveal the areas with lowest amount of public space in relation to the population are Centrala Kallhäll and Skogstorp. However, this study is only indicative of the access to public space within the immediate vicinity, and other factors must be considered, such as the access to larger public spaces that are still within walking distance for residents outside the perimeter of the sub-area it is located.

In terms of current resource allocation for public spaces in Kallhäll, according to the municipality (through correspondence), the amount of resources spent on building or refurbishing a square or a park depends on what type of public space it is (i.e. what function it should have) as well as how much visitor pressure and wear and tear is expected. Simply put, central places where a lot of people pass through or go to usually have a slightly higher standard than more distant places that not so many people use. Costs for operation and support generally vary with wear and tear and visitor pressure.

Moreover, there are places that can be experienced as a public place, but may still be placed on private land, where the municipality does not have control over either operation and maintenance or upgrading. When new public places are planned in urban development areas, both planning and design generally take place within the framework of a detailed planning process. The detailed planning process is democratic and has two opportunities for both the public, associations, businesses and authorities to submit their viewpoints. In some cases, e.g. children or other groups are involved at early stages to give input on what they want from a public place. The municipality also has more general citizen dialogues, for example regarding an entire neighbourhood, and then there are often viewpoints and requests for public places from the citizens, which they can take advantage of when developing public places.

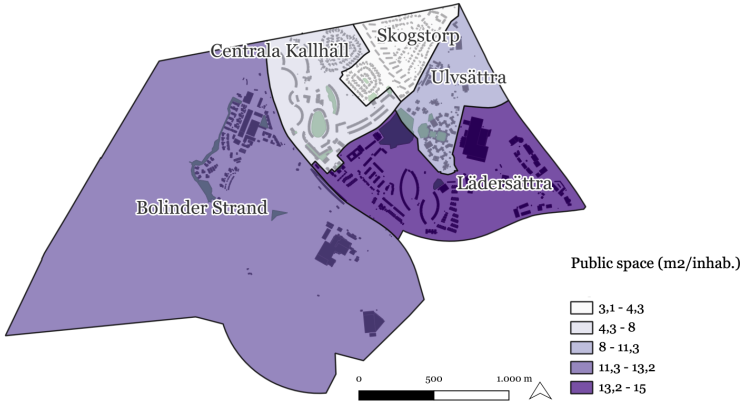


Figure 7. Square metres of public space available by demographic area in Kallhäll

Table 6. Public space area and population by demographic area in Kallhäll.

Area name	Public Space (m2)	Population	m2/inhabitant
Lädersättra	34,162.2	2,280	15.0
Bolinder Strand	24,632.1	1,926	12.8
Ulvsättra	19,508.1	1,899	10.3
Centrala Kallhäll	21,373.1	4,671	4.6
Skogstorp	3,107.0	1,005	3.1

The question can be asked whether this approach to the distribution of resources results in fair and equitable satisfaction of residents' needs. Its results favour centrally located public spaces that are used by higher numbers of users but do not promote intervention in areas located further away. In Kallhäll, those can be for example Ulvsättra, located further from Kallhäll Centrum, with its low socioeconomic conditions, which can make it vulnerable to having the well-being of its residents altered. As mentioned in the theoretical part of this report, various studies point out to the importance of quality of public spaces for the communities' wellbeing (e.g. Wilkinson and Pickett, 2011) thus it can be argued that the current municipal resource allocation model does not provide equity in terms of, for example, improving well-being in areas with socioeconomic challenges that would need it more than other areas, by not allocating resources for its refurbishment or other intervention. Such concern calls for more investigation and perhaps a proposition of alternative resource allocation models.

To begin the investigation, Figure 8 compares the location of public spaces within the five sub-areas in Kallhäll and their socioeconomic condition that is assigned by the segregation barometer (Boverket, 2021), coloured accordingly. It allowed for the selection of public spaces in Kallhäll for the pilot study. As seen in the map, open public spaces of various sizes are distributed among the different sub-areas. For the pilot study, four of these public spaces were selected to analyse further. The idea was to choose spaces of different characteristics and in different locations of socio-economic conditions. These are: the square in Centrala Kallhäll, Kallhällsparken in Lädersättra, the squares in Termovägen located in Ulvsättra, and Kallhällsbadet in Bolinder Strand. The next section provides a more detailed description.

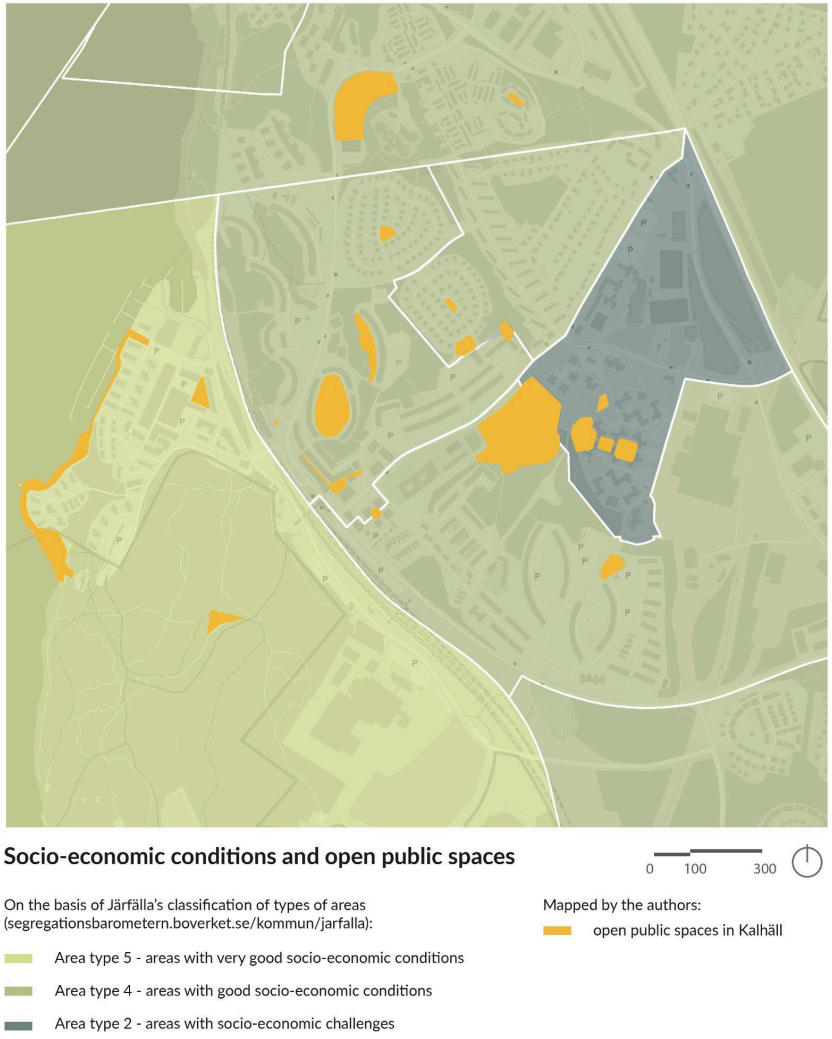


Figure 8. Open public spaces in Kallhäll, coloured according to socio-economic conditions

4.2.1. Public spaces selected for the pilot study

The first observed public space is the square in **Kallhäll Centrum**. This is an important place for passing through due to its centrality; it is adjacent to the Kallhäll train station and to a group of different activities such as restaurants, cafes, and shops. The space is surrounded by stores, the public library, a Coop supermarket, and the Folkets Hus. Due to its passing-by character, it has few spaces to stay and rest, but can accommodate temporal installations such as a vegetable market, as seen in Figure 9.

Figure 9. Images of the square in Kallhäll Centrum. Source: authors.

Kallhällsparken in Ulvsättra near the Kallhäll station, is a large park that accommodates multiple activities, including a playground, sports facilities, outdoor gym, dog park, green areas, pond, seating and barbecue areas, and walking paths (see Figure 10). Because of its central location and scale, it is considered a main public space in Kallhäll.

Kallhällsparken appears well-maintained. It has a flat and fairly open design, providing a good overview of the park although some areas covered by bushes may create obscure places, such as in the playground. The open green field is large and flat and therefore suitable for activities such as picnics and other outdoor activities. The site also provides free outdoor games and sports equipment in a public box that everyone can access via their smartphone. It is detached from the barbeque area, which is on stone ground to prevent fires, and has two grilles and some seatings by a concrete path. On the other hand, the dog park is fenced, and spacious and allows dogs to move freely while providing seating for dog owners. The outdoor gym is set on soft ground to prevent injuries and has a good range of equipment. During a site visit, one resident stated that the park was poorly lit during nighttime and therefore could feel unsafe during these conditions.

At the opposite end of the park, adjacent to Källtorpsskolan, there is a sports facility consisting of a small football pitch with artificial grass and an indoor sports centre (see Figure 11). The football field has open access, but the sports centre requires booking. It is also used by the school until 5pm during weekdays and youth associations are prioritised for booking.

Figure 10. Images of Kallhällsparken. Source: authors.

Figure 11. Images of the sports centre next to Kallhällsparken. Source: authors.

Källhällsbadet is a relevant public space as it is the only public beach in Kallhäll (Järfälla, 2021). It is located in Bolinder Strand and has a variety of features available on-site such as playground elements, a volleyball court, grill area, etc. Dogs are allowed to pass through the area but are not allowed on the beach (Järfälla, 2021). There are also canoes to rent on the beach which are accessible via an application on smartphones for a fee and are managed by an external association (Share kayak, n.d.). Images from the beach are shown in Figure 12.

Figure 12. Images of Kallhällsbadet. Source: authors.

Lastly, the square and park located in the upper and lower courtyards of the apartment blocks in **Termovägen** is a relevant public space within Ulvsättra. Several elements offer different types of activities: playground equipment, seating and resting places, tables, grill area, among others (see Figure 13). There are also notable elements that give character to the space, such as a gazebo in the upper courtyard, and a sculpture in the lower courtyard.

Figure 13. Images of the public spaces in Termovägen. Source: authors.

4.3. Pilot study results

This section presents the grading results for the pilot study, which includes the assessment of the four public spaces described above. These are presented by category of need.

4.3.1. Grading and its results per need

4.3.1.1. Contact

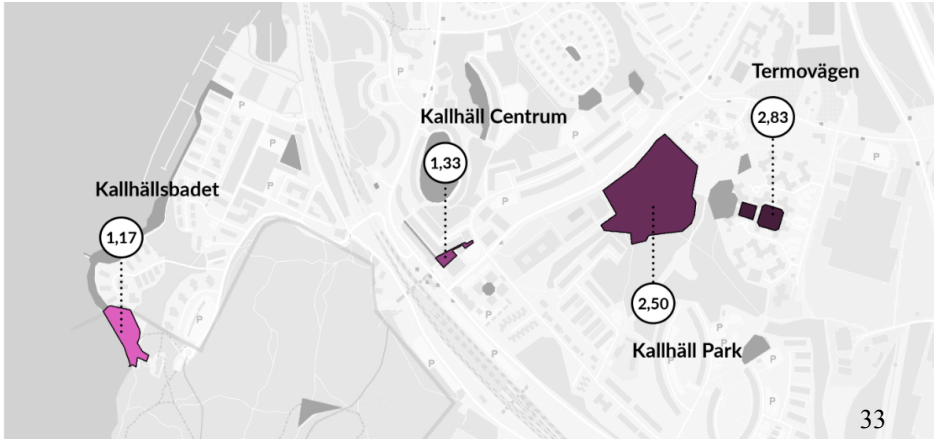
Kallhäll Centrum, has received a score of 1.33 according to the grading criteria (Annex B). It shows a moderate performance. Noteworthy is where it scored a 1 in “seating elements”, which might indicate a potential limitation in providing ample and comfortable seating options for visitors, especially since it has a centrum function. Besides that, it scores a 0 on both “space for activity” and “complexity of playgrounds”.

Kallhällsparken, on the other hand, shows an average score of 2.50. While showcasing strengths in various physical satisfiers, such as “space for activity”, “pause areas”, and “stage areas”, it is essential to recognise the lower score of 1 in “shaded areas”, even though it is a large space. This aspect suggests a potential area for improvement, as the availability of shaded spaces for the amount of people able to use the larger space contributes significantly to the comfort and usability of public areas, especially during warmer seasons. The area provides multiple playgrounds created for different age groups, thus receiving a score of 3.

Kallhällsbadet scores the lowest on average, with a 0 observed in the “pause areas” and “stage area” satisfiers. The absence of designated pause and stage areas might impact the overall experience of visitors seeking moments of relaxation or a place to gather, indicating an opportunity for improvement in this aspect. Scoring a 3 in “space for activity”, the space provides many different opportunities for activity such as swimming, barbecue, watersports and a children's playground.

Termovägen, with an average score of 2.83, stands out in the category. The higher score can be attributed to the strengths in “seating elements” that are distributed across the entire area, space for activity, and stage area. However, the score of 2 in “shaded areas” displays that there is still room for improvement, even though there are elements that provide shade & shelter.

need	physical satisfier	Kallhäll Centrum	Kallhälls-parken	Kallhälls-badet	Termo-vägen
contact	seating elements (F)	1	2	1	3
	space for activity (F)	0	3	3	3
	shaded areas (F)	1	1	1	2
	pause areas (P)	3	3	0	3
	stage area (P)	3	3	0	3
	complexity of playgrounds (F)	0	3	2	3
	average	1,33	2,50	1,17	2,83



4.3.1.2. Privacy

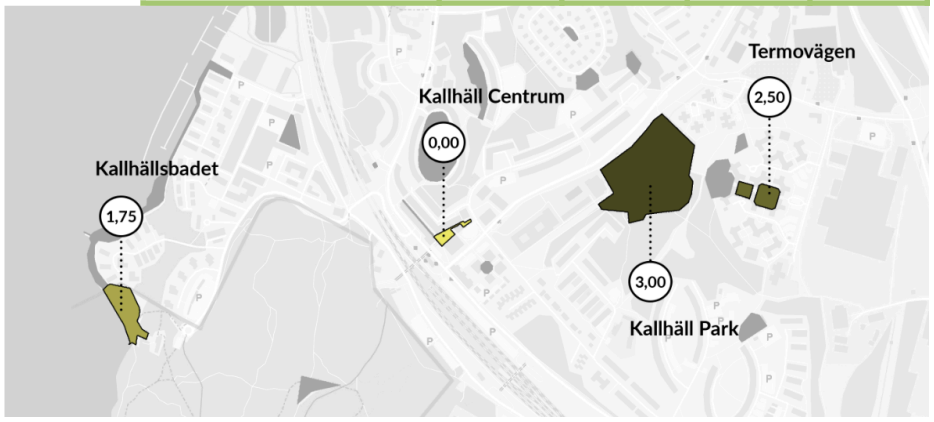
Kallhäll Centrum received a score of 0 in all physical satisfiers related to privacy, resulting in an average score of 0 because of a lack of "screening elements", "open-closed space variation", and "shelter spaces for children" in the square. The absence of these elements may contribute to reduced privacy within the area, limiting opportunities for visitors to find secluded or protected spaces. This suggests a potential need for interventions to enhance privacy features, providing visitors with more options for secluded and sheltered experiences.

Kallhällsparken on the other hand, excels in the need of privacy, with a rating of 3 across all physical satisfiers. This signifies the presence of "screening elements", a diverse "range of open-closed spaces", "shelter spaces for children", and seating elements in enclosed spaces and away from noise. Even though the size of the space contributes to the amount of elements possible, the high score indicates that Kallhällsparken offers a well-considered and diverse set of features to cater to the privacy needs of its visitors.

The privacy performance of Kallhällsbadet is mixed, with an average score of 1.75. While scoring well in some aspects such as "shelter spaces for children" and "seating elements in enclosed spaces and away from noise", the lower score of 1 provided by the treeline in "screening elements" and a 0 in the "range open-closed spaces" suggests there are no divisions in spaces. Playgrounds provide shelter for kids, and the location next to the water and away from busy roads contribute to a score of 3.

Termovägen, has an average score of 2.5. While it excels in "screening elements" and "shelter spaces for children" with a score of 3, the lower score of 1 in the "range of open-closed spaces", where "screening elements" provide a sense of enclosure but edges of public space (buildings) provide a constant feeling of being observed.

need	physical satisfier	Kallhäll Centrum	Kallhälls-parken	Kallhälls - badet	Termo-vägen
privacy	screening elements (F)	0	3	1	3
	range of open-closed spaces (F)	0	3	0	1
	shelter spaces (children) (P)	0	3	3	3
	seating elements in enclosed spaces and/or away from noise (P)	0	3	3	3
	average	0	3	1,75	2,5



4.3.1.3. Play

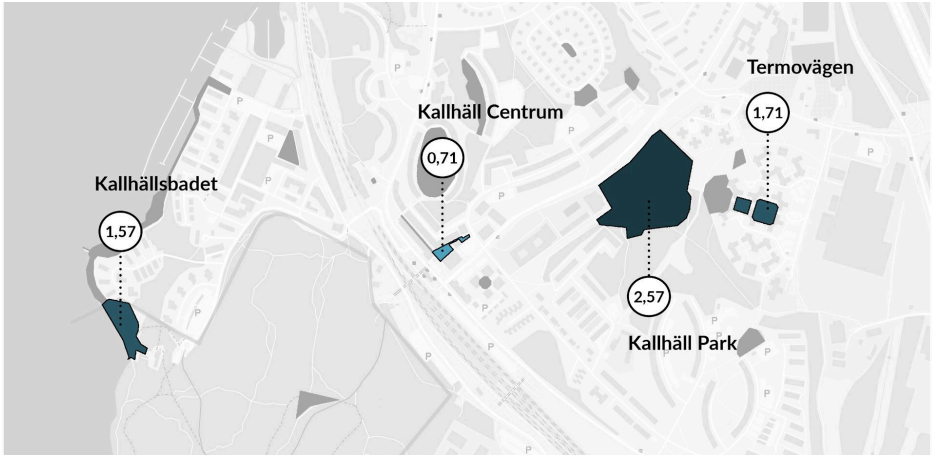
Kallhäll Centrum, with an average score of 0.71, has a lower performance than the other spaces in providing for play-related needs due to the lack of play structures or features in the square. Caused by the scarcity of play elements, this results in four satisfiers scoring a 0. But, the open space also creates “space suitable for spontaneous play”, resulting in scoring 3.

Kallhällsparken stands out with an overall score of 2.57, indicating a strong performance in catering to play-related needs. The size and location of the park contribute to the amount of diverse play equipment and possibilities combined with the open space, resulting in all but one category scoring a 3. The observed “seasonal adaptability” such as ice skating scores a 0. The pond could have offered a possibility for ice skating, but it is designed for a single purpose and lacks safe access.

Kallhällsbadet, with an average score of 1.57, demonstrates a moderate performance in meeting play-related needs. The space scores a 0 for “seasonal adaptability” due to it being a more nature-oriented space. “play equipment adapted for mobility challenges” also sees a score of 0. Enhancing these aspects could contribute to a more inclusive and versatile play experience within Kallhällsbadet.

Termovägen, with an average score of 1.71, falls in the mid-range for meeting play-related needs. While the space is nature-based, the provided play elements satisfy the need for play to score a 3. The scores of 0 in “seasonal adaptability”, “play equipment adapted for mobility challenges” and “playful elements for cognitive and sensory disabilities” indicate that the nature-oriented space seems to be withholding it from becoming overstimulating, and negatively influences the correct provision for those satisfies.

need	physical satisfier	Kallhäll Centrum	Kallhälls-parken	Kallhälls-badet	Termo-vägen
play	complexity of play types (F)	0	3	3	3
	space suitable for spontaneous play (P)	3	3	3	3
	seasonal adaptability (P)	0	0	0	0
	play equipment adapted for mobility challenges (P)	0	3	0	0
	playful elements for cognitive and sensory disabilities (F)	1	3	1	0
	safety considerations (P)	0	3	1	3
	scaled elements (F)	1	3	3	3
	average	0,71	2,57	1,57	1,71



4.3.1.4. Experiences

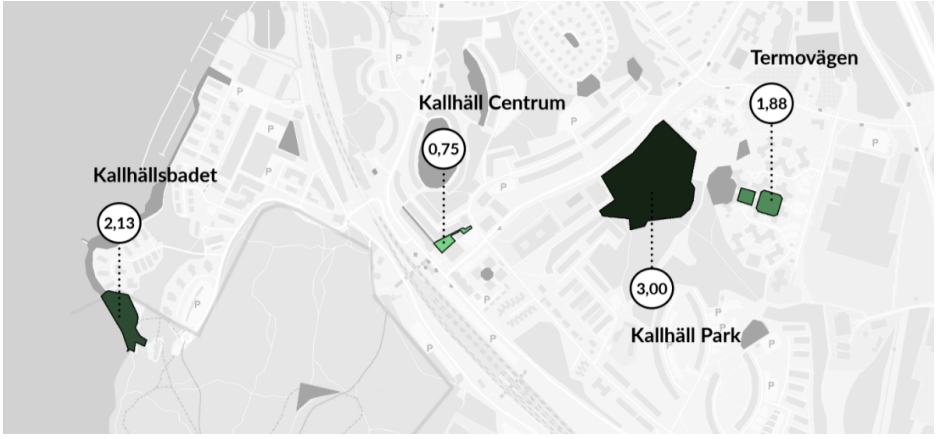
Various potential areas for enhancement emerge in Kallhäll Centrum, a score of 0.75, displays a low performance in providing for experiential needs compared to the other spaces. “Temporal elements” such as the small market on the square, raise the score for that satisfier to 3. The location of the space and its function as a centre result in a vibrant area and serves as a sensory impression element in the space. The sound of the running water of the fountain assists with that as well.

Kallhällsparken scores high with an average of 3, showing a strong performance in catering to experiential needs. The high scores that are observed highlight the park's success in providing a rich and engaging sensory experience for visitors due to the number of elements present in the park. Additionally, the pond and the amount of trees surrounding the space, provide a variation in “sensory impression elements”

Kallhällsbadet, with an average score of 2.13, scores well in the experience, due to the natural elements stimulating the sensory impression. The low scores of 0 in “temporal elements” and “elements for range of motion” are due to the nature-oriented location as discussed before, since it lacks the elements required for it the two satisfiers.

Termovägen, with an average score of 1.88, falls in the mid-range for meeting experiential needs. While scoring well in sensory impression elements and safety considerations, the lower scores in colourful or textural elements and semi-private zones indicate areas where enhancements could be considered. Termovägen has limited space to provide for all needs equally, but scores surprisingly well in most. The lack of space becomes coherent when “elements for range of motion” and “semi-private zones” are observed, scoring a 0.

need	physical satisfier	Kallhäll Centrum	Kallhälls-parken	Kallhälls - badet	Termo-vägen
experiences	sensory impression elements (F)	3	3	3	3
	colourful or textural elements (P)	0	3	3	0
	temporal elements (P)	3	3	0	3
	active engagement equipment (F)	0	3	3	3
	elements for range of motion (P)	0	3	0	0
	safety considerations (P)	0	3	3	3
	semi-private zones (P)	0	3	3	0
	scaled elements (F)	0	3	2	3
	average	0,75	3	2,13	1,88



4.3.1.5. Aesthetics

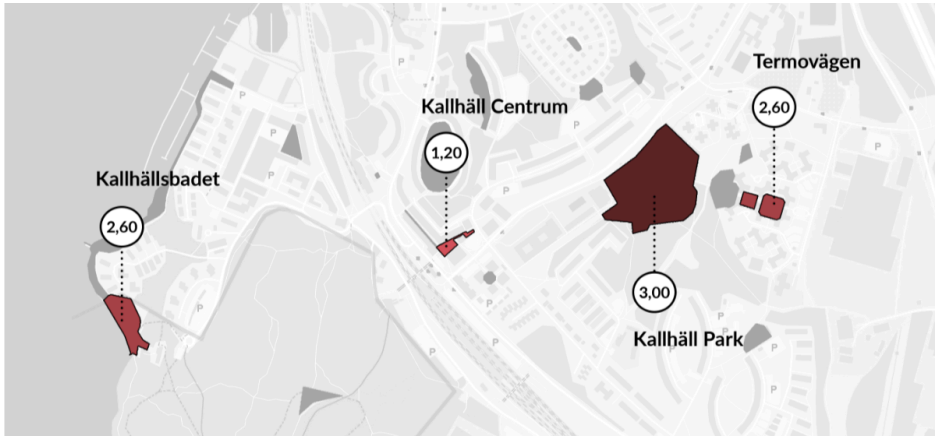
According to the grading criteria (Annex B), Kallhäll Centrum was graded 1 in “well-kept structural elements” as benches, trash bins and street lighting in the public space are usable. It was graded 3 in “well-kept natural elements” due to having trees and potted flowers maintained. It scored 1 in “colourful or textural elements” because there is almost no variation in pavement colour and pattern. Also planted trees are the same species which provides only one type of texture and visual experience due to uniform foliage structure. Kallhäll Centrum scored 0 in “gradients in movement” as its surface is flat and does not provide any aesthetically pleasing three-dimensional experiences. In the “sensory dimension elements” category it scored 1 as there could only be found a fountain that in the summer can provide visual stimulation. The overall average of the results is 1,2 out of 3.

Kallhällsparken scored 3 in the “well-kept structural elements” category due to all its equipment being well-maintained and working. In “well-kept natural elements” it scored 3 as all the greenery is well maintained. The park scored 3 in the category of “colourful or textural elements” because there is variation in build features such as different paving with multiple types of material used. Moreover, both built and natural elements were used to create variations in texture and colour throughout the year such as differentiated plant species. In the category of “gradients in movement” the park scored 3 as there are present slopes that enhance the three-dimensional experience of the space. It scored 3 in “sensory impression elements” because there are more than three sensory dimensions satisfied, as the present trees, bushes and waterbody provide visual, acoustic, olfactory and tactile stimulation. The final result average is 3 out of 3.

Kallhällsbadet scored 2 in “well-kept structural elements” as its playground amenities are not only usable but also well-maintained. In “well-kept natural elements” it scored 3 as there is no wild greenery disturbing the place’s aesthetics. For “colourful or textural elements” the beach scored 2 because there are multiple types of surfacing present: grass and sand. The “gradients in movement” was graded 3 because the changes in elevation are present as the beach is placed in the lowering of the terrain. In “sensory impression elements” Kallhällsbadet scored 3 because the waterbody, sand of the beach and surrounding trees satisfy visual, acoustic, olfactory and tactile impressions. The overall average is 2,6 out of 3.

Termovägen scored 3 in “well-kept structural elements” because all its structural elements such as benches, chairs, and playground equipment are new, well-maintained and working properly. In “well-kept natural elements” it also scored 3 as the bushes and trees are trimmed and taken care of. As for the “colourful or textural elements” Termovägen scored 2 because the variation in surfaces and materials can be observed in the design of the paving and the choice of equipment. The “gradients in movement” scored 3 as there is a level difference between conjugated inner squares that were assessed as one central public space for Termovägen. In the category of “sensory impression elements” the squares scored 2 due to having trees and bushes that stimulate sensory impressions. Final result for Termovägen is 2,6 out of 3.

need	physical satisfier	Kallhäll Centrum	Kallhälls-parken	Kallhälls - badet	Termo-vägen
aesthetics	well-kept structural elements (F)	1	3	2	3
	well-kept natural elements (P)	3	3	3	3
	colourful or textural elements (F)	1	3	2	2
	gradients in movement (P)	0	3	3	3
	sensory impression elements (F)	1	3	3	2
	average	1,2	3,00	2,6	2,6



4.3.1.6. Orientation

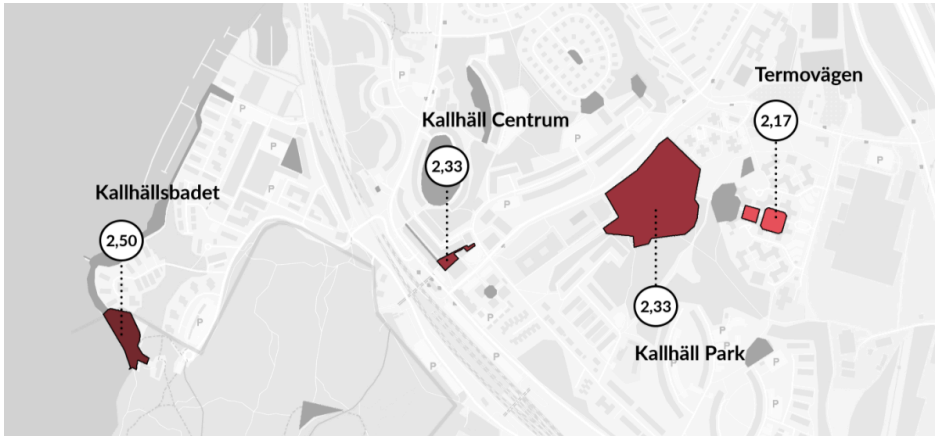
According to the grading criteria (Annex B), Kallhäll Centrum was graded 3 in the “borders” category as the square is clearly limited by surrounding buildings. “Landmarks” are also graded 3 as there is Folkets Hus and a footbridge over train tracks that facilitate orientation. In the category of “sensory guiding elements” the square scored 2 due to having two types of sensory guiding elements: pavement texture and building structure. For “clear sightlines” Kallhäll Centrum was graded 3 as the surrounding building structure forms clear visual guidance towards external landmarks and nothing is blocking the view making it easy for users of different heights to stay oriented in the space. In the category of “delimitation and definition of sub-areas” it was graded 0 as there are no sub-areas within the square which is mainly a pass-through space. For the “pathways” the square scored 3 because its paving made out of concrete is flat and non-slippery with good lighting. The overall score for Kallhäll Centrum is 2,33.

Kallhällsparken scored 3 for “borders” as the vegetation and pathways create a clear definition of the park’s borders. In the case of “landmarks” , the park was graded 3 as there is a waterbody, playground, outdoor gym and open lawn that facilitate orientation by being functional landmarks. “Sensory guiding elements” were graded 2 there are two types of sensory guiding elements: paths and lighting. In the category of “clear sightlines” the park scored 0 as trees and bushes block the sightlines in most of the parts of the park. In the case of “delimitation and definition of sub-areas” it was graded 3 because there are multiple sub-areas such as waterbody, playground, outdoor gym, the lawn, that are delimited by spatial organisation, bushes and trees. The “pathways” were graded 3 because they are wide and clearly defined with a non-slippery surface (concrete) and they are accompanied by lighting. The final result for the park is 2,33.

Kallhällsbadet was graded 3 in “borders” category due to its clear delimitation by treeline and shoreline. In the “landmarks” category it also scored 3 because the visible waterfront provides clear orientation in the area. For “sensory guiding elements” the beach was assessed for 2 due to having two types of elements that enable sensory guidance: water and pathways. “Clear sightlines” were graded 3 because there are no obstacles in the view that would disturb the orientation capability. In Kallhällsbadet there is clear delimitation of its sub-areas by treeline and playground boundaries so “delimitation and definition of sub-areas” was graded 3. As for “pathways” the beach scored 1 because existing pathways are clearly defined but lack width and their surface (gravel) is inaccessible. The overall score for the Kallhällsbadet is 2,5.

Termovägen centre is clearly defined by surrounding buildings so it scored 3 in “borders”. As for the “landmarks” it scored also 3 due to the presence of a centrally placed gazebo. In the category of “sensory guiding elements” Termovägen scored 2 because there are two types of such elements: paths and lighting. “Clear sightlines” were graded 0 even though the building structure forms defined sightlines but they ended with identical buildings which confuses terms of orientation. The functional sub-areas and conjugated inner squares are delimited by buildings, paving forms and materials and bushes, so in the category of “delimitation and definition of sub-are” Termovägen scored 3. In terms of “pathways” it scored 2 due to having clearly defined, wide pathways. The overall result for the space is 2,17.

need	physical satisfier	Kallhäll Centrum	Kallhälls-parken	Kallhälls - badet	Termo-vägen
orientation	borders (P)	3	3	3	3
	landmarks (P)	3	3	3	3
	sensory guiding elements (F)	2	2	2	2
	clear sightlines (P)	3	0	3	0
	delimitation and definition of sub-areas (P)	0	3	3	3
	pathways (F)	3	3	1	2
	average	2,33	2,33	2,50	2,17



4.3.1.7. Autonomy

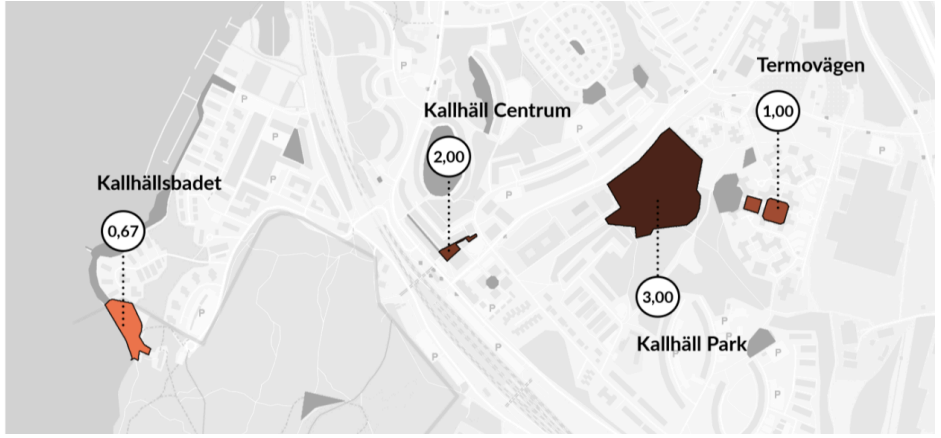
According to the grading criteria (Annex B), Kallhäll Centrum was graded 0 in “adaptable elements” as there are none. For the “characteristic elements” it scored 3 as there are more than two different characteristic elements: artwork, fountain and Folks Hus. In the category of accessible “ablution facility” it scored 3 because there is a public toilet in the library at the square with a changing station. The final score for Kallhäll Centrum is 2 out of 3.

Kallhällsparken scored 3 in the category of “adaptable elements” due to having mobile urban furniture. “Characteristic elements” were graded 3 because there are plaques, garden elements and characteristic equipment (e.g. equipment rental box). “Ablution facility” category was graded 3 because there is a public toilet accessible in the park that has a changing station.

Kallhällsbadet was graded 0 in the category of “adaptable elements” because there are none. In terms of “characteristic elements” a whole area being the only public beach in Kallhäll is a unique characteristic in a way. As for the “ablution facility” there is one in the building of the Kallhällsbaden. The final score for the beach is 0,67.

Termovägen was graded 0 in the category of “adaptable elements” because there are none. There are more than two different characteristic elements: gazebo and artworks in the form of statues and fountains. There are no ablution facilities available so in this category, it scored 0. The overall score for Termovägen is 1.

need	physical satisfier	Kallhäll Centrum	Kallhälls-parken	Kallhälls-badet	Termo-vägen
autonomy	adaptable elements (P)	0	3	0	0
	characteristic elements (F)	3	3	1	3
	ablution facility (F)	3	3	1	0
	average	2	3	0,67	1



4.3.1.8. Purpose

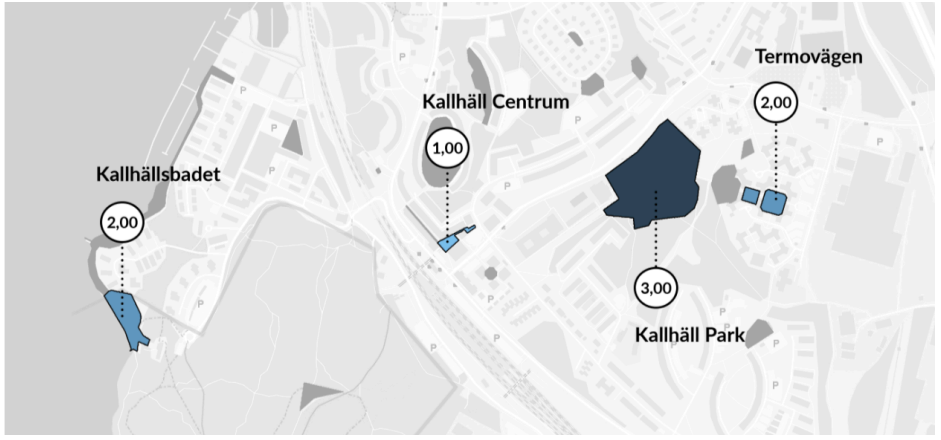
According to the grading criteria (Annex B), Kallhäll Centrum was graded 0 in the categories of presence of "communal activity area" and "adaptable elements". However, in the category of "flexible space" it scored 3 because its open area can accommodate activities such as temporary markets or seasonal events and exhibitions. The final score for the square is 1.

Kallhällsparken scored 3 in "communal activity area" as there is a communal garden. In terms of "adaptable elements" it also scored 3 because there are elements that allow change and influence such as the communal garden. In terms of "flexible space" it also scored 3 due to having vast open space of grass that can be an area to accommodate seasonal events. Its overall score is 3.

Kallhällsbadet scored 3 in the category of "communal activity area" because there is a grill area and a volleyball court. As for "adaptable elements" it scored 0 as there are none. For the category of "flexible spaces" it scored 3 because the lawn, the beach and the water can be used to accommodate different seasonal and occasional activities and events. The final score is 2.

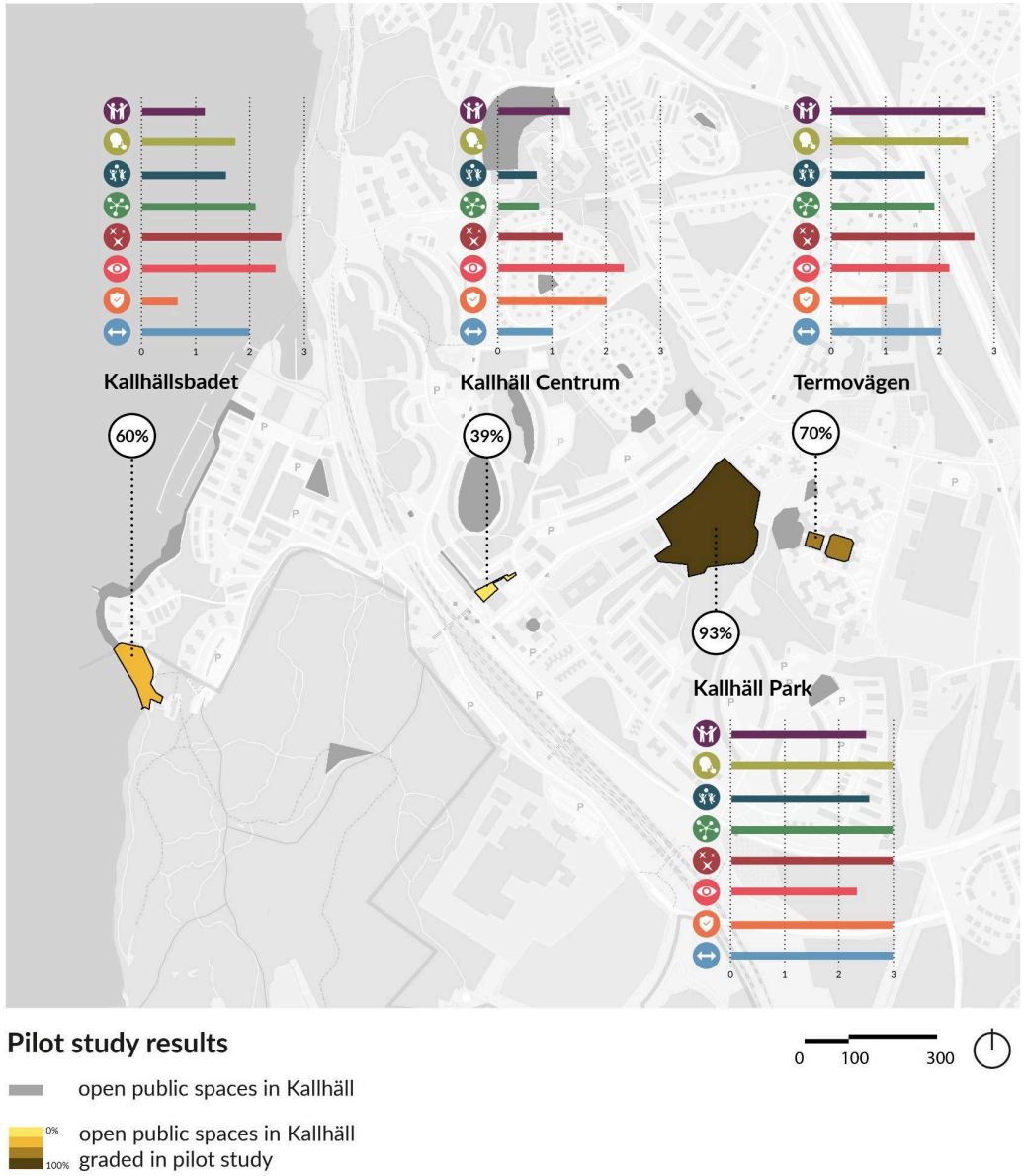
Termovägen was graded 3 in the category of "communal activity area" because there is a BBQ area accessible to everyone to organise and gather as a community. In terms of "adaptable elements" it scored 0 as there are none. For "flexible spaces" the area scored 3 because there is an open space in the centre that can accommodate spontaneous communal activity. The final score is 2.

need	physical satisfier	Kallhäll Centrum	Kallhälls-parken	Kallhälls-badet	Termo-vägen
purpose	communal activity area (P)	0	3	3	3
	adaptable elements (P)	0	3	0	0
	flexible spaces (P)	3	3	3	3
	average	1,0	3,0	2,0	2,0



4.3.2. Overall grading results

The overall grading results are presented in the map below. The map shows the percentage of satisfaction of needs in each of the examined public spaces in Kallhäll. According to the grading tool proposed in this project, Kallhäll Centrum scores the lowest (39% of needs satisfaction) from all four assessed public spaces. On the other hand, Kallhällsparken scores the highest (93% of needs satisfaction) in the proposed grading scheme with full satisfaction of almost each need. Between those two extremes, the public space in Termovägen residential area scored 70% of needs satisfaction and Kallhällsbadet scored 60%.



5. Discussion

5.1. Analysis of the results

The overall grading results draw attention to Kallhäll Centrum. Although it is the most central public space from all four chosen in the pilot study and therefore, according to the correspondence with the municipality, it should receive the greatest focus in terms of resource allocation, the square scored the lowest. New sculpture-like benches and other elements suggest that the square in fact did get municipal attention in recent years. However, the results of this grading tool show that the place is lacking the most in its capability to satisfy users' needs. It may lead to the conclusion that different ways of allocating resources within the municipality are needed. As for now, the overall grading results lead to conclude that the main square in Kallhäll may need more resources from the municipality in terms of time devoted for further analysis of the square's condition or investment in design intervention in the area.

5.1.1. Situating grading results

Results of the grading tool should always be considered in the context of a specific public space. The scores assigned do not provide a universal answer, their meaning for the analysis of the results depends on the context within which it is considered. Looking into specificity of the given public space is one of the dimensions in which assessing equity can be done in the process of toolkit application. Data gathered in the site study of Kallhäll allow for situated analysis of the results of the grading tool application.

5.1.1.1. Kallhäll Centrum

Recognizing the role of Kallhäll Centrum as a main square and a transit hub, it's important to consider its unique purpose. While it may not score high in certain categories, such as *Privacy*, its centrality suggests that it serves as a critical hub for a wide range of residents. Understanding the demographics of the nearby population, particularly the elderly (see Figure 6), highlights the necessity of catering to diverse groups. Complementary public spaces nearby may be able to address specific needs like privacy but they might be difficult to reach for certain people. For instance, other public spaces satisfying the need for *Privacy* can be difficult to reach physically or mentally for elderly residents living nearby Kallhäll Centrum. It may be so due to, for example, distance that is difficult to cover for those residents, as having physical limitations is associated with older age. So it is of importance that the overall urban landscape is inclusive and accommodating to all residents. However, the analysis of users of a particular public space, their lifestyles and expectations of a public space should be carried out to eliminate the risk of speculation.

5.1.1.2. Termovägen

Considering the large share of residents who are parents and children in Ulvsättra (Figure 6 and Table 5), the low score for *Play* in Termovägen is concerning. As those residents constitute a large share of the potential public space users, it is important to adjust spatial design to address their necessities. In this case, that would mean designing the public space that is the closest to their housing, so the public space is of primary use on an everyday basis, so children can easily access it and use the equipment meant for them. Additionally, it is important also for parents to have a space close to their homes to go out and play with their children. Especially for single parents that constitute a large share of Ulvsättra residents (Table 5). Potentially, they may have more time constraints throughout the day thus the proximity of public space is even more important in their case, to provide equitable accessibility to the benefits of outdoor facilities.

Looking into detailed scoring for *Play* in Termovägen, it can be observed that it is resulting from lack of adaptation of play equipment for mobility challenges, lack of playful elements for cognitive and sensory disabilities and lack of seasonal adaptability. Perhaps more attention should be paid to

adapting the equipment to suit residents with certain limitations to create more inclusive space. Moreover, improvement for seasonal adaptability should also be considered to ensure the public space can be used smoothly and joyfully throughout the year.

Despite being recently redeveloped, Termovägen scores low in *Autonomy*, which may emphasise the impact of physical design on residents' sense of independence. The suggestion to provide more autonomy in public spaces to the residents supports the idea of reevaluating the urban planning of the area. This may involve creating spaces that encourage community engagement, fostering a sense of ownership and autonomy among residents. Balancing the need for autonomy with community cohesion is crucial to ensuring that the urban layout supports both individual preferences and a sense of belonging. The goal is to create a balanced distribution of resources and facilities to meet the diverse needs of the community across different neighbourhoods. Even though the Termovägen recent redevelopment included public participation, the current low score raises the question about a required follow-up participation process regarding the outcomes of the redevelopment to reveal possible concerns on the grading tool limitations.

5.1.1.3. Kallhällsbadet

The medium score of Kallhällsbadet should be complemented by the study of neighbouring public spaces within Bolinder Strand. The study may reveal the aspects in which Kallhällsbadet should or should not be enhanced. As for now, it may be concerning that the space scores low in *Autonomy* and *Contact,* because it means its spatial arrangement does not allow for those needs to be satisfied. As newly built apartment blocks constitute a large share of Bolinder Strand, it makes the district a still growing area with the potential future public spaces to be developed. Because of that, it is important to build social connections by satisfying the needs for *Contact* and *Autonomy* within Bolinder Strand's public spaces. As other public spaces may not be developed yet in this area, it may turn out that Kallhällsbadet does not have to offer the satisfaction of those needs, because they can be compromised within future public spaces in Bolinder Strand. It creates an opportunity for them to focus on catering to the satisfaction of those needs in particular, if Kallhällsbadet remains in the current spatial organisation.

To draw any further conclusions about the importance of satisfaction of the need for *Autonomy* and *Contact* in Kallhällsbadet, the specific users of that public space should be identified. Due to its remote location and unique function within Kallhäll - being the only public beach in Kallhäll (Järfälla, 2021) - it is not clear if the space is used mainly by the closest residents or if it is important for a wider range of users of Kallhäll or Järfälla. Therefore, it can not be stated if it is satisfactory if other public spaces in Bolinder Strand have a capacity to compromise satisfaction of those needs or whether they are satisfied in other parts of Kallhäll, hence it can not be said with current knowledge if Kallhällsbadet should be redeveloped to cater for those needs. Following the study with public participation is required to investigate actual local conditions and identify its users.

5.1.1.4. Kallhällsparken

Highest scoring in almost every category suggests that Kallhällsparken is a public space that satisfies most of the residents' needs and that it is an inclusive space, accommodating design solutions that address differentiated social groups. The design emphasis put on Kallhällsparken resulted in its high scoring in terms of need satisfaction. However, the situation of having one central public space satisfying all the needs and secondary public spaces satisfying only some of them may not be the most equitable situation. It raises concerns about the accessibility of that primary, central public space: is it within walking distance for everyone? Are the ways to reach it accessible? Those aspects should be further investigated for the analysis of the equity of the current spatial distribution of public spaces in Kallhäll.

5.1.2. Interconnectedness of public spaces

In the Kallhäll pilot study, the proximity of high-scoring public spaces to the lowest-scoring one raises questions about the interconnectedness of these areas. Some of the satisfaction of the needs can be compromised by neighbouring public spaces. For example, regarding the public space character, it can be imagined that privacy is not sought in the main square of Kallhäll but would rather be looked for in Kallhällsparken. Considering the scores of Kallhäll Centrum for *Privacy,* which is 0 out of 3, and Kallhällsparken's in the same category (3 out of 3), it can be argued that Kallhäll Centrum should not be subjected to spatial changes providing more privacy as it can be satisfied in the nearby park.

Moreover, other scores should also be discussed in relation to neighbouring public spaces within the area. For example, Kallhällsbadet's low score in *Autonomy* or *Contact* may be a reason to evaluate other public spaces in Bolinder Strand to see how they are satisfying those needs. The results may show that satisfaction of the needs of *Autonomy* and *Contact* can be done in other public spaces in the area and municipal attention on Kallhällsbadet should not be focused on those in the first place.

Understanding these links is vital for creating a cohesive urban landscape. It might also allow collaborative efforts between municipal departments responsible for each area to ensure a holistic approach to urban spaces, considering the broader context of the entire community. This approach can lead to more efficient resource allocation and comprehensive improvements that benefit the entire Kallhäll.

5.1.3. Comparison to the areas' socio-economic conditions

Another dimension to analyse equity in the toolkit application is to compare the public spaces' overall scores with the socioeconomic condition they are located within. As explained in the theoretical section of this report, the quality of public spaces is important for the well-being of the communities. The high quality of public space can be understood as its high score in the proposed grading tool. Improving the score can be done through targeted interventions. This leads to the conclusion that in order to ensure equitable treatment, public spaces in the areas considered socioeconomically disadvantaged should be allocated more resources to improve living conditions for its users.

In the pilot study, it can be observed that public spaces in Ulvsättra score the highest in satisfaction of needs. The area is considered to be an " area with socioeconomic challenges" (SCB, 2023e) and Termovägen as well as a part of Kallhällsparken are located there. Termovägen has been recently renovated, the design process involved residents and the positive impacts of that action are visible in the overall grading results. It can be considered a spatially equitable situation due to the municipality having allocated resources within an area of lower socioeconomic status.

More focus put on public spaces located within areas with lower socioeconomic status means less focus put on the public spaces located within areas with higher socioeconomic status. This is visible in the overall grading results as Kallhäll Centrum scoring the lowest is located within an "area with good socioeconomic condition" (ibid) and Kallhällsbadet having the second lowest score is located within an "area with very good socioeconomic conditions" (ibid). In the perspective of the entire Kallhäll, this situation can be determined as spatially equitable.

5.2. Limitations of the toolkit

5.2.1. Grading criteria

The grading of needs is based on either the frequency of elements found within the public space or whether an element is present within a space, regardless of the number of the same element found within the space. Considering contact as a need, the toolkit grades seating elements on a frequency basis, where one element equals one point, two types of elements equals two points, and more than two elements, regardless of whether the types of elements repeat, equals three points. The grading criteria could however be adjusted to award points only to the number of differentiated seating types. This would shift the tool to prioritise different types of contact through different seating types above the number of seating elements. Shaded areas are graded similarly to seating elements. The valuation of shade within the tool thus considers the number of shading elements but does not consider the percentage of coverage throughout the day or across seasons, nor does it consider the contribution of shading elements to aesthetics.

In grading the spatial satisfiers of needs, merits are awarded to the presence of elements rather than the absence thereof. Considering the need for privacy, the presence of seating elements within enclosed spaces or spaces which are screened from noise allows for conversations to take place in open public spaces with higher noise pollution, such as next to a high-traffic road or railway line. The tool attributes value to individual noise screening elements within the space, even if the public space in itself is exposed to higher, but not harmful, noise levels. The absence of noise is thus not taken into account for the extent of the space but could be considered a positive contributor to privacy and experience in public space. Within the need for experience, the grading of sensory impression elements does not take into account the absence of certain negative sensory impressions, such as noise or odour pollution.

Similarly, the presence of a certain element within a space is only considered for the positive contribution that the elements may have in the space, and does not take into account the possible negative effects that an element or lack of element may have within the space. Considering the need for play, the selected spatial satisfiers aim to account for the need for play in children, youth, and adults, the tool allows for a high rating of complexity of play types and space suitable for spontaneous play, even if the need for play is not met for all age groups. Another limitation is the spatial satisfier of seasonal adaptability which lowered the graded score for all of the selected open public spaces in the Kallhäll pilot study. This occurred as it was not evident that the present elements could be adapted throughout the year. Whilst the tool aims to aid in a quick overview of open public spaces, the assessment of seasonal adaptability of the public space requires a longer-term investigation which analyses the space and elements during various seasons. This also applies to the need for orientation, where sensory guiding elements that consist of water are most likely only effective in the warmer months since water freezes in the winter and is not flowing then. A change in ground level is also not addressed in the grading criteria for orientation, except for flat pathways, but affects the orientability. This can be seen in the case of Termovägen, where the change in level between the two parts within the public space cannot be navigated by a wheelchair user in the same way as a non-wheelchair user, as the two spaces are only connected via a stairway. However, the overall grading of the space was not affected by poor universal accessibility.

The necessity for public participation can be seen in the case of the need for privacy, where screening elements are considered to contribute to privacy in open public spaces within the application of the tool. The influence of screening elements on a sense of safety in public space is however not included in the tool but should be taken into account during the third step of the toolkit. This similarly applies to the need for aesthetics in open public space. Whilst it is considered universal by Gehl (1971), the spatial satisfiers that meet the need for aesthetics are however subjective. The spatial satisfiers for aesthetics thus look to the maintenance of both structural and natural elements above normative aesthetic canons (Piazzoni et al., 2022). The aesthetics of open public does however contribute to the need for autonomy, but the grading of the aesthetics of the space in itself cannot be objectively graded within the tool, thus requiring public participation to establish the aesthetics that align with the identity of specific user groups. Whilst the grading tool aimed to apply an intersectional lens to the selected spatial satisfiers, factors such as socio-economic and cultural differences were not considered in the determination of the satisfiers, as specific elements that meet the defined needs could not be pinpointed through literature studies. The engagement of users who are affected by these conditions is thus required.

5.2.2. Public participation

The toolkit aims to assess public spaces through the lens of equity. The success of the toolkit however relies on the application of the toolkit as a whole, as the third step, public inclusion and participation, is critical in moving toward spatial justice and in achieving public space equity (Cuff, 2023). The incomplete application of the toolkit could present a false indication of equity, further contributing to the inequitable distribution of public space resources. Similar caution should be taken in the uncritical application of spatial satisfiers. As noted, whilst the needs within public space are considered universal (Gehl, 1971), spatial satisfiers are geographically and culturally situated (Fuchs et al, 2021). The assumption that the selected spatial satisfiers within each need presented in the pilot toolkit are universally applicable, thus risks being exclusionary. The participatory process in itself is not without difficulties, taking into account that some public space users may be reluctant or unable to participate, thus calling for recognition beyond participation (Chaudhary et al., 2018). Furthermore, it is important to realise that conditions and identities within urban areas may change over time and equitable public spaces might not meet the needs of all users over time. Therefore, it is suggested to continuously assess, through public participation, to maintain an up-to-date equitable distribution of resources.

5.2.3. Contextuality of resources

While the psychological needs in public spaces as identified by Gehl (1971) are universal, the satisfiers for these needs differ between geographical and cultural contexts. Some sources that were used for identifying the needs and spatial satisfiers are based on data from countries that have different conditions than Sweden. For instance, the spatial satisfiers for the need of women in public spaces might differ between Sweden and Iran, where the research of Alamdari & Habib (2012) was conducted. The context to which the tool is applied in the pilot study was taken into account in developing the grading matrix. Literature studies were however not situated within the immediate context of Järfälla, to include references from a wider European context. Additionally, some of the sources used for identifying the needs and spatial satisfiers focus on parks instead of open public spaces. Parks are one type of open public space but the two cannot be considered interchangeable since open public space includes other types of spaces as well. This can of course also affect the accuracy of the identified satisfiers, as well as the results.

5.3. Implications of the toolkit

5.3.1. The potential benefits for the municipality

The application of the toolkit can represent a first but necessary step towards understanding equity and provide a solid foundation of this concept for the municipality to work with. Equity is a complex concept, and the purpose of this toolkit is to facilitate a way in which municipality workers can measure, assess, and compare spatial aspects in a more structured and comprehensive way. The tool is flexible, so it can be adjusted according to the requirements of the municipality.

The intended goal is that the results obtained by the use of this tool provide useful insights into what the municipality should focus its attention on, redesigning spaces to be more equitable. This can be done through tailored strategies to improve them according to what citizens need. In this sense, it can also contribute to advancing toward social sustainability.

Moreover, the toolkit not only provides an understanding of how existing public spaces can be improved but also comprises a framework on how to design future public spaces that are equitable, leading to more efficient decision-making and resource allocation.

The long-term goal is that the notion of equity transcends the assessment of public spaces and that principles of equity become seamlessly integrated within every facet of the municipality's approach. This entails holding a holistic perspective that extends beyond specific projects and encompasses the municipality's overall decision-making processes, policies, and initiatives. This transformative approach aims to create lasting positive impacts, ensuring that considerations of equity become an inherent and integral aspect of the municipality's ethos.

In general, a potential outcome of a fairer resource allocation can translate into better public spaces that contribute to the well-being of the communities that use them (Cattell et al., 2008). Other significant benefits can be the engagement of the public with their spaces which can potentially improve the sense of belonging and overall social cohesion (Saghati, 2015). Moreover, good-quality public spaces can lead to economic benefits such as an increase in land value (Carmona et al., 2004). However, these social and economic benefits are a priori assumptions that would require further investigation.

5.3.2. Actors, interests, & conflict anticipation

One consideration that would make this a more well-rounded study is identifying the multiple stakeholders that are involved in the public spaces being studied, and that might have various interests that can support or hinder future interventions.

This could be initially drafted during the desktop study in the first steps of the toolkit application. For instance, it is important to consider who are the actors responsible for the management of these public spaces, who are the financial stakeholders that can support the design interventions, and who are the actors that play a role in the maintenance of these spaces.

In this sense, it can be helpful to identify relevant actors and provide a clearer picture of the main interests to anticipate potential conflicts, which can later guide the process of creating strategies to intervene in the spaces that require it and ensure their long-term success.

6. Conclusion

The project has developed a comprehensive toolkit for assessing public spaces through the lens of equity. The choice to focus on equity stems from the income gaps and disparities observed in Kallhäll, where socio-economic conditions vary significantly between the areas Bolinder Strand and Ulvsättra. Our toolkit addresses equity in multiple dimensions, serving as the foundation for discussions on fair resource distribution within municipalities. By examining spatial satisfiers, the toolkit ensures an inclusive method that considers the diverse needs of different social groups, thus striving for spatial equity.

Our methodology incorporates a multi-step process, including the definition of the scope and application of the grading tool, along with public engagement. The theoretical approach draws from Järfälla municipality's social sustainability model and spatial justice theories, leading to a needs-based assessment of open public spaces. The grading tool assesses eight categories of needs, each with specific spatial satisfiers, providing a nuanced understanding of how public spaces meet users' requirements.

The analysis of results not only highlights areas that may need further attention but also emphasises the importance of investigating lower scores to ensure thorough satisfaction of each need. The overall grading results shed light on Kallhäll Centrum, revealing potential shortcomings in its capability to satisfy users' needs despite being a central public space. This prompts the municipality to reconsider resource allocation strategies, advocating for a more equitable distribution based on concrete data derived from the toolkit.

Ultimately, the toolkit could contribute to the broader discourse on equity by offering municipalities a practical tool to initiate equitable resource allocation and informed decision-making. By assessing equity on both an overall level, considering socio-economic conditions, and on a specific level for each need, the toolkit provides a comprehensive view that facilitates a more nuanced understanding of spatial equity. Our project encourages municipalities, including Järfälla, to use the toolkit to guide planning strategies, allocate resources equitably, and create public spaces that contribute positively to social sustainability and the well-being of all residents.

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8. Annex

Annex A. SWOT Analysis of the study area

Based on the inventory of prevailing conditions and site visits, the main strengths, weaknesses, opportunities and threats (SWOT) faced in the study area were identified and presented in Table X.

Table A.1 SWOT Analysis - Kallhäll.

Category/ theme	STRENGTHS	WEAKNESSES	OPPORTUNITIES	THREATS
Geographical location	Proximity to Stockholm and Barkarby shopping centre	Placed outside of Jakobsberg and Barkarby makes it less attractive for public/private investment	Set to be developed into another regional centre in Järfälla	"Left behind" because less investments are made in the area
Socio-demographic	Ethnically diverse population. Ulvsättra might be getting removed from vulnerable areas according to the police list.	Large socio-economic disparities between Bolinder Strand and Ulvsättra.	Could become a role model for improving socioeconomically challenged areas	Conditions associated with social segregation may lead to serious issues (eg rise in crime)
Mobility	Good rail connection due to the Kallhäll train station. Good internal connection (vehicular/public transportation) within Kallhäll (excluding Bolinder Strand)	Bolinder Strand is more isolated in both transit and public transportation. Car dependency.	The presence of the train station an advantage for Kallhäll if it is to become a regional centre	Bolinder Strand isolation. Continued car dependency if no action is made to revert this trend
Built environment (typologies)	Good variety of types of tenure and housing.	Siloed building typologies & lack of spatial identity. Choice of area to live in can be limited by availability of rental apartments	Can provide diverse living conditions: enables housing career in Kallhäll, so it fights the "happiness paradox"	Lack of direction for character in further development

Economic drivers	Big employers have settled. Employees rely on services in the area, and the area benefits from the big businesses. Mutually beneficial relationship with those big actors. Bolinder Strand planned development.	Areas such as Ulvsättra are more economically disadvantaged compared to other residential areas, which influences its lower value.	Bolinder Strand development may attract more high-end commerce. New local economic activities in Bolinder Strand could contribute to creating a sense of identity in the place.	Development of the centre might pose a threat to the affordability of the region. Big employers might negatively influence developments - These are important, powerful actors. Development of a local economic centre in Bolinder Strand could make it exclusionary to other residents of the Kallhäll area.
Service and amenities	Presence of many public spaces of different character. Placed closely on one axis - gives continuity.	The distances of the most relevant public spaces can be too far for some people to stop by comfortably. Some amenities are of private use, putting other residential areas that do not have this at disadvantage. Unequal access due to physical barriers (boundaries) including roads and train tracks to amenities, including shoreline.	Opportunities for further engagement with nature reserves. Development of Bolinder Strand for equitable services and amenities. Expansion and improvement of amenities as the area of influence will become larger as a future regional centre.	Some public spaces are "left behind" as less resources are being allocated by municipality the further the place is and the less people use it (proximity and usage). Exclusionary services and amenities (economic, sense of belonging, proximity, etc) of Bolinder Strand (in line with gentrification- without the displacement part). Change in budget allocation for communal services & culture tied to political agenda; could affect resource provision to maintain them
Natural environment	Natural reserve, lake, parks. Areas of high environmental value and landscape quality that provide leisure places for humans and habitats for non-human species	New developments (such as industrial) inevitably reduce the amount of natural areas	Preserving natural areas is fundamental to provide natural habitat for non-humans species	Natural reserve areas should be carefully protected so they are not taken over by large industrial developments

Annex B. Grading criteria by need

Contact

Satisfier	Grading type	Criteria
Seating elements (e.g., benches, cluster seatings, naturalized seatings, etc.)	F (0-3)	0 - none 1- one type 2- two types 3 - more than two
Space for activity (e.g., playgrounds, meadows, barbecue areas, public games, etc.)	F (0-3)	0 - none 1 - one type 2 - two types 3- more than two
Shaded areas (e.g., pavilion, greenary, roof, etc.)	F (0-3)	0 - none 1 - one type 2 - two types 3- more than two
Pause areas (e.g., fountains, statue, etc.)	P (Y / N)	
Stage areas	P (Y / N)	
Complexity of playgrounds (e.g., swing, climbing frame, trampoline, slide, seesaw, sandbox, etc.)	F (0-3)	0 - none 1 - single playtype 2- two playtypes 3 - more than two playtypes

Privacy

Satisfier	Grading type	Criteria
Screening elements (e.g. pergolas, greenery, walls, etc.)	F (0-3)	0 - none 1 - one type 2 - two types 3- more than two
Range of open - closed spaces	F (0-3)	0 - none 1 - there are some enclosed spaces 2 - enclosed spaces allow seeing without being seen (an overview) 3 - enclosed spaces have potential for hanging out and/or exploration and/or sense of intimacy
Sheltered spaces (for children)	P (Y / N)	
Seating elements in enclosed spaces and/or away from the noise (e.g. noise of the street)	P (Y / N)	

Play

Satisfier	Grading type	Criteria
Complexity of play types (e.g. playground, sport equipment, boule court, water play, tables to play games, coloured markings, etc.)	F (0-3)	0- no element 1- at least one type 2- two types of elements 3- more than two types
Space suitable for spontaneous play (places where it's possible to run, hide, play games, skate, dance, etc.)	P (Y / N)	
Seasonal adaptability (e.g. a football field in warmer months is adapted to ice-skating rink in the winter)	P (Y / N)	
Play equipment adapted for mobility challenges (Enough space (width and height) for adults to assist children, possibility to reach the equipment in a wheelchair (ramps and/or lack of obstacles))	P (Y / N)	
Playful elements for cognitive and sensory disabilities (e.g. high-contrast colourful play equipment; physical textures such as water or textured surfaces; auditory movement motivators, etc).	F (0-3)	0- no element. 1- at least one sensory stimulating experience 2- two sensory stimulating experiences. 3- more than two different sensory stimulating experiences.
Safety considerations (e.g. soft-fall flooring around equipment)	P (Y / N)	
Scaled elements	F (0-3)	0- none
(e.g. elements to jump, climb, hide, sit, for children)		1- one element at children's scale 2-two or more elements at children's scale 3- three or more elements at varying scale

Autonomy

Satisfier	Grading type	Criteria
Customisable elements (Elements that allow customisation and adaptability, e.g. mobile urban furniture).	P (Y / N)	
Characteristic elements (Recognizable elements that contribute to the uniqueness or distinctiveness of the place. e.g. landmarks, flowers, garden elements, artwork, plaques, etc)	F (0-3)	0- no elements 1- at least one 2 - two characteristic elements 3 - more than two different characteristic elements
Ablution facility (e.g.portable/permanent toilet facilities)	F (0-3)	0 - none 1 - exist 2 - universally accessible 3 - universally accessible with changing station

Experiences

Satisfier	Grading type	Criteria
Sensory impression elements (e.g. elements allowing sensory impression: sight, smell, hearing, touch, taste)	F (0-3)	sensory impression elements 0 - none 1- one element 2- more than one element 3- two or more elements that allow for different sensory impressions.
Colourful or textural elements (e.g. elements that capture attention for children)	P (Y / N)	
Temporal elements (importance of 'soft' interventions in public space: temporary events and activities, such as music OR temporary elements that capture attention. Assess room for soft intervention)	P (Y / N)	
Active engagement equipment (e.g. swings, gym)	F (0-3)	0 - none 1- one piece of equipment 2- two or more pieces of equipment 3- two or more pieces of equipment that allow for different active engagement
Elements for range of motion (exercise equipment for balance, functional movement and activities, joint range of motion and mobility & walking paths vs running tracks)	P (Y / N)	
Safety considerations (e.g. soft-fall flooring around equipment)	P (Y / N)	
Semi-private zones (e.g. semi-private zones for exercise / contained spaces for girls)	P (Y / N)	
Scaled elements (e.g. elements to jump, climb, hide, sit, for children)	F (0-3)	0- none 1- one element at children's scale 2-two or more elements at children's scale 3- three or more elements at varying scale

Purpose

Satisfier	Grading type	Criteria
Communal activity areas (eg. communal garden, BBQ area.)	P (Y / N)	
Adaptable elements (e.g. elements allowing change and influence of public space)	P (Y / N)	
Flexible spaces (e.g. Spaces that can accomodate different activities: temporary markets, seasonal events, exhibitions, etc)	P (Y / N)	

Aesthetics

Satisfier	Grading type	Criteria
Well-kept structural elements	F (0-3)	0 - Poorly maintained 1 - Essential elements (e.g. benches) are usable 2 - Essential elements are well maintained 3 - All structural elements are maintained & working
Well-kept natural elements	P (Y / N)	Green elements such as bushes are periodically trimmed to prevent wild growth
Colourful or textural elements (Different types of surfacing underfoot and the qualities of built features and foliage, which, even if not actually touched, can be experienced.)	F (0-3)	0 - no varying surface 1 - Minimal effort in variational built features 2 - Multiple types of materials present 3 - Using natural & built textures to create variation
Gradients in movement (Changes in elevation are to be gradual in order for three-dimensionality created by slopes and tiers to be enjoyed)	P (Y / N)	
Sensory impression elements (e.g. smell of vegetation (either flourishing or decaying); opportunuties for convesation without being drowned out by other noises from surrounding street or voices nearby; water producing white noise and visual motion of flow)	F (0-3)	0 - Plain and non stimulating space 1 - At least one sensory element present 2 - two sensory elements 3 - More than three sensory dimensions
		available

Orientation

Satisfier	Grading type	Criteria
Borders (borders to delimit the public space, what is public vs private)	P (Y / N)	
Landmarks (element that helps people to navigate and identify a public space, e.g. a kiosk, a clock-tower, a fountain or a statue)	P (Y / N)	
Sensory guiding elements (e.g. different types of sensory guiding element such as visual, tactile, auditory or olfactory)	F (0-3)	0 - no element 1 - one type of element 2 - two types elements 3 - more than two types of elements
Clear sightlines (from different angles, for all users, who might be of different heights. Not a lot of obstacles blocking the sightlines in the space, avoid mid-height shrubbery)	P (Y / N)	
Delimitation and definition of sub-areas (clearly defined uses of the space. e.g. areas for play and rest, walking and furniture zones, clustering of furniture for easier navigation)	P (Y / N)	
Pathways	F (0-3)	

Annex C. Grading results

need	physical satisfier	Kallhäll Centrum	Kallhälls-parken	Kallhälls-badet	Termo-vägen
contact	seating elements (F)	1	2	1	3
	space for activity (F)	0	3	3	3
	shaded areas (F)	1	1	1	2
	pause areas (P)	3	3	0	3
	stage area (P)	3	3	0	3
	complexity of playgrounds (F)	0	3	2	3
	average	1,33	2,50	1,17	2,83
privacy	screening elements (F)	0	3	1	3
	range of open-closed spaces (F)	0	3	0	1
	shelter spaces (children) (P)	0	3	3	3
	seating elements in enclosed spaces and/or away from noise (P)	0	3	3	3
	average	0	3	1,75	2,5
play	complexity of play types (F)	0	3	3	3
	space suitable for spontaneous play (P)	3	3	3	3
	seasonal adaptability (P)	0	0	0	0
	play equipment adapted for mobility challenges (P)	0	3	0	0
	playful elements for cognitive and sensory disabilities (F)	1	3	1	0
	safety considerations (P)	0	3	1	3
	scaled elements (F)	1	3	3	3
	average	0,71	2,57	1,57	1,71
experiences	sensory impression elements (F)	3	3	3	3
	colourful or textural elements (P)	0	3	3	0
	temporal elements (P)	3	3	0	3
	active engagement equipment (F)	0	3	3	3
	elements for range of motion (P)	0	3	0	0

	safety considerations (P)	0	3	3	3
	semi-private zones (P)	0	3	3	0
	scaled elements (F)	0	3	2	3
	average	0,75	3	2,13	1,88
aesthetics	well-kept structural elements (F)	1	3	2	3
	well-kept natural elements (P)	3	3	3	3
	colourful or textural elements (F)	1	3	2	2
	gradients in movement (P)	0	3	3	3
	sensory impression elements (F)	1	3	3	2
	average	1,2	3,00	2,6	2,6
orientation	borders (P)	3	3	3	3
	landmarks (P)	3	3	3	3
	sensory guiding elements (F)	2	2	2	2
	clear sightlines (P)	3	0	3	0
	delimitation and definition of sub-areas (P)	0	3	3	3
	pathways (F)	3	3	1	2
	average	2,33	2,33	2,50	2,17
autonomy	adaptable elements (P)	0	3	0	0
	characteristic elements (F)	3	3	1	3
	ablution facility (F)	3	3	1	0
	average	2	3	0,67	1
purpose	communal activity area (P)	0	3	3	3
	adaptable elements (P)	0	3	0	0
	flexible spaces (P)	3	3	3	3
	average	1,0	3,0	2,0	2,0
	percentage of needs met	**38,9**	**93,4**	**59,9**	**69,5**