




Playgrounds in Perspective

An Exploration of the Swedish Schoolyard Development, Design, and Utilization

Fatima Booshi
Chalmers University of Technology
Department of Architecture & Civil Engineering 2024
Examiner: Lars Marcus
Supervisor: Job van Eldijk

CHALMERS
UNIVERSITY OF TECHNOLOGY

Playgrounds in Perspective

An Exploration of the Swedish Schoolyard Development, Design, and Utilization

Fatima Booshi

Examiner: Lars Marcus | Supervisor: Job van Eldijk

Chalmers School of Architecture | Department of Architecture and Civil Engineering | MPDSD

Urban and Rural Design and Planning | 2024

Abstract

The schoolyard is a natural part of our school system, present in all Swedish schools. Most individuals who have attended school have some kind of memory associated with it and the time they spent there. The significance of play for children's well-being and development is widely acknowledged, with evidence suggesting its positive impact on mental and physical health. Play theory asserts that play is fundamental to human behavior. It highlights play as crucial for children's language development and understanding of the world (Tanis, 2012). Among various settings, the schoolyard stands out as an ideal space to encourage children's play and activity during recess (Delidou, Matsouka & Nikolaidis, 2015. p.2).

Seven out of ten children are moving less than recommended in Sweden according to the Swedish food agency (livsmedelsverket). The study shows a difference between genders, ages, and parents' educational level. It also shows that children are more physically active during school hours compared to other times of the day (Livsmedelsverket 2016). Considering the substantial amount of time children spend at school, an outdoor school environment can effectively promote and support students' engagement in physical activities as much as it can inhibit it, if not well equipped.

Laws and regulations, as well as municipal guidelines exist to aid in the planning of outdoor spaces within schools, the main focus is around the concerning trend of shrinking schoolyards due to urbanization and policy decisions. Despite this being an important point to consider, today we can observe schools with adequately sized schoolyards that lack in other aspects. The debate surrounding regulations for schoolyard spaces has sparked political discussions, with architects and urban planners emphasizing the need for qualitative as well as quantitative considerations. This thesis delves into the historical evolution of schoolyards to understand its developments and context through time. It also examines its impact on children's play, cognitive and social development. Furthermore, it investigates how conceptual design elements can be applied in existing schoolyards in Gothenburg amidst evolving societal and environmental dynamics.

Acknowledgement

I would like to express my sincere gratitude to Lars Marcus, the examiner, for the valuable insights and constructive feedback. I am also deeply thankful to my supervisor, Job van Eldijk, for the support, encouragement, and mentorship during my master's thesis. Finally, I would like to acknowledge the support of my family, friends, and colleagues who have provided encouragement and motivation throughout this time. Thank you all for the support!

Fatima G. Booshi

Student Background

Master's Program

Architecture and Planning Beyond Sustainability, Chalmers University of Technology

Bachelor's Degree

Degree of Bachelor of Science Main field of study: Spatial planning, Blekinge Institute of Technology

Reading Instructions

The research questions in this work are answered in chronological order, beginning with the historical part, continuing to the significance of recess, and moving on to qualities contributing to a good school environment derived from the literature studies and previously answered questions. The thesis is divided into chapters, each of which addresses the questions and facilitates a multidimensional examination of the chosen topic. Theory and contextual analysis form the foundation for the design considerations. The thesis ends with a discussion and summary concluding the outcomes of the project.

Table of contents

1. Introduction

Description of study

Play is an essential requirement for children, and it should be prioritized and facilitated accordingly. Numerous studies suggest that fulfilling this need contributes significantly to a child's mental well-being. Among various settings, the schoolyard stands out as an ideal space to encourage children's physical activities during recess (Delidou, Matsouka & Nikolaidis, 2015. p.2).

Seven out of ten children are moving less than recommended in Sweden (livsmedelsverket 2016). The study conducted by livsmedelsverket shows a difference between girls and boys, ages, and parents' educational level. A more in-depth analysis shows differences in the physical activity and sedentary behavior of children between weekdays and weekends. The study indicates that children are more physically active during school hours compared to leisure time (Livsmedelsverket 2016). Considering the substantial amount of time children spend at school, the quality of schoolyards plays an important role in motivating students to be more active.

According to the ecological model, various factors, including the natural environment, interpersonal relationships, and socio-cultural influences, collectively influence children's physical activity behaviors. Thus, an outdoor school environment can effectively promote and support students' engagement. Several municipalities in Sweden have developed their own guidelines for open spaces. Such guidelines are not binding by law but can serve as support in the processing of detailed plans and building permits (Boverket 2023). Since there are no binding laws regulating the free spaces, schoolyards are gradually shrinking and being affected by escalating urbanization, densification, and policies. Consequently, this trend could significantly hinder outdoor activities as students are confined to limited space (Delidou, Matsouka & Nikolaidis, 2015. p.2).

Since Boverket (the National Board of Housing, Building and Planning), reported on reduced areas for schoolyards, this subject has been in political discussion with different opinions from different parties. The Swedish architect's association (Sveriges Arkitekter) emphasizes the need for qualitative as well as quantitative considerations to bring about necessary change (Sveriges Arkitekter 2022).

As architects and urban planners, we bear a responsibility for the choices we make affecting people's everyday lives. Further investigating the topic looking at both the history and present development of schoolyards allows us to gain valuable insights and understanding of the topic, putting further light on an issue that might be on many agendas soon.

Project context

Just over a million children attend primary school in Sweden, this makes the schoolyard one of the outdoor environments where children spend a significant time at. The Swedish National Statistics Office has studied the outdoor spaces of schools, specifically the areas where children can independently play outdoors (SCB, 2022). The study reveals significant differences between the cities in Sweden, Stockholm having the smallest schoolyards, where each student has on average 15 square meters. The largest schoolyards are found in Storuman municipality, where each student has 148 square meters on average to move around during breaks. In the past three years (2020), the average area per student has decreased by almost four-square meters (SCB, 2022) making this a current topic of discussion.

Average outdoor space per student (m2) / municipality (2020)

Västragötland, where this study was focused on, is slightly higher. The municipality of Gothenburg had in 2020 a free open space of 28.3 square meters per pupil (Experience, n.d.). According to the report, the primary reason for the shrinking schoolyards is densification, increased number of pupils, and expanding school building often intruding upon the schoolyard space.

Background

The schoolyard is a natural part of the school today, present in all Swedish schools. Most individuals who have attended school have some kind of memory associated with it and the time they spent there. The schoolyard has taken on an increasingly prominent role in public discourse and is regularly discussed in various contexts. Nevertheless, the schoolyard not only holds significance for contemporary schools but also has a long history.

With the introduction of compulsory education and the establishment of public-school systems, schoolyards became common features in schools around the world. The design and function of schoolyards has changed over the years to better suit the educational and recreational needs of children (Larsson et al., 2017 pp. 11-12). Today, the schoolyard is considered an important part of the school environment, where children engage in.

Children and young people make up one-fifth of Sweden's population (Statistiska centralbyrån, 2019). This makes them a big group in society that relies mostly on adults. In the work of creating qualitative environments within society, schools should therefore be prioritized. In terms of child development and education, there's a growing body of research emphasizing the crucial role of open and free spaces, fostering children's physical, cognitive, and socio-emotional development. Studies have highlighted the positive impacts of enough free spaces on promoting well-being among students (Sanne L. Nijhofa et al. 2018). However, there is a significant number of schoolyards that have the space but lack other qualities. Research is therefore needed to delve deeper into both the new challenges of shrinking schoolyards and the design elements that contribute to the free spaces.

Purpose & aim

The thesis focused on examining the history, evolution, and utilization of schoolyards as part of its objective, aiming to comprehend how these spaces have transformed over time and how they influence students. By delving into the development of schoolyards, the research sought to uncover their impact on students' experiences.

Furthermore, the broader goal of the thesis has been to re-focus the discussion from quantitative to qualitative considerations, investigating how to design playground spaces through division and spatiality. By doing so, broaden the narrative around and beyond the quantity of schoolyard sizes. The outcome of the research is reflected in the assessment of current schoolyards, accompanied by applications on the schoolyard derived from the research findings. The design applications are based on creating an overarching plan for how the schoolyard can be viewed for different functions optimizing the free spaces. These applications are meant to be comprehensive to be applicable to other relevant settings as well.

Delimitations

This thesis focused on the outdoor environment and the playground spaces at school. The indoor spaces have not been discussed.

Discussions about health and learning will not be from a clinical point of view, but mainly from an architectural and spatial perspective.

The applications for the design are from a conceptual point of view focusing on spatiality and zoning. A redesign of different schoolyards is suggested; but no specific design is presented.

The analysis is based on current known information and its effects within its time frame. Changes occurring after this period have not and will not be examined.

The thesis is based on the Swedish context mainly.

Thesis questions

"How has the concept of schoolyards evolved over time, considering the physical layout, development, and utilization?"

"What significance does the schoolyards have on children's play experience, learning and health?"

"What principles and qualities contribute to a schoolyard design, catering for children's needs beyond its physical size?"

The thesis questions collectively explore various aspects of schoolyards and their impact on children. Providing a comprehensive framework for examining the role of schoolyards from their historical evolution to their present-day significance and the principles guiding their design. Each question addresses a different aspect of the topic, contributing to a holistic understanding of the topic. Schoolyards are microcosms of broader societal dynamics, reflecting the values, beliefs, and power structures of their respective eras. Through the lens of schoolyard history, we gain insights into how societal attitudes towards childhood, education, and play have evolved. This understanding not only enriches our knowledge of the past but also deepens our comprehension of contemporary social issues and our place within them. By examining the historical evolution of schoolyards, we gain tools for analyzing and explaining past problems in educational settings and social dynamics. Through this analysis, we can get an understanding of context, identifying challenges and opportunities.

Theory

Based on the work of theorist Brian Sutton-Smith, play theory suggests that play is a fundamental aspect of human behavior. Designing playgrounds with this theory in mind involves creating environments that encourage different types of play, such as imaginative, physical, social, and cognitive play. Play Theory suggests that play serves as a crucial element in children's language development and their comprehension of the world around them. Through play, children engage in finding solutions, enhancing their understanding of different situations (Tanis 2012). In this project, this theory has been the starting point, where focus has been to encourage different types of play during times students occupy the schoolyard areas. Identify what kind of play opportunities there are in different schoolyards and how these can be improved and managed.

Method

The methodology used to conduct the study is divided into a theoretical and a practical part. The theoretical part includes literature studies that have been used as a method to gather information regarding the subject and has given a base of current knowledge regarding free space and playground design. The practical part includes site analysis and mapping integrated with the research to create conceptual design applications and explore ideas for schoolyard spaces

Literature studies

This method involves examining and analyzing existing literature, articles, books, research papers, and other published materials relevant to the research topic. Literature studies has been used as a method to give a base of current knowledge regarding Playground spaces.

Site Analysis

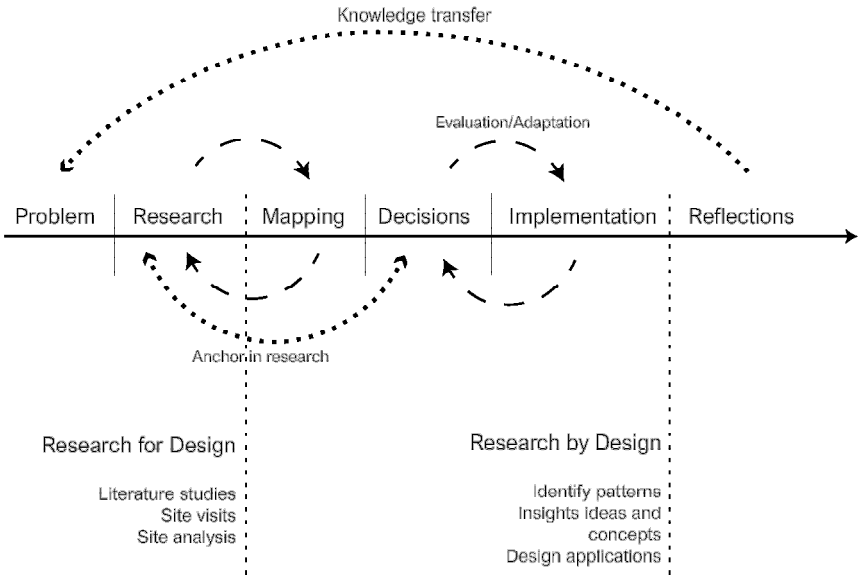
The site analysis consists of observations on site, as well as studies of maps and drawings. A site analysis has been conducted at the site locations observing the built environment's character, such as its design, structure, typology, and spatial formations. By observing, experiencing, and describing the spatial characteristics of the place, a deeper understanding of the possibilities has been gained.

Mapping

Mapping has been used to visually present the analysis and spatial data collected from the site, such as land use patterns and environmental features.

Design

To test conclusions brought up from the other methods, a design process has taken place along the thesis work. This method includes translating findings from the research while testing and analyzing them through mapping and drawings.



2. Schoolyards from the past

The chapter focuses on the history of the schoolyard, how it has evolved over time, and the influences of different eras. The chapter also deals with architectural changes, and how perceptions of children's play and learning have shaped the design of these spaces.

A reflection of time

Architecture has always had to deal with an uncertain future. Cultural, demographic, environmental and economic conditions often have a shorter lifespan than the built environment. The range of school institutions is immense, the history of schoolyards is closely intertwined with the history of education and the development of educational spaces. Most of today's school environments are solutions to needs of older forms of systems. These needs may no longer be current today, but nevertheless, we must value and take advantage of the school environments that exist. Also understand that what is created and built now will affect not only today's children, but generations of children in the future.

To go through a thousand years of school history will take quite some time, but what may be relevant in a contemporary context and for this thesis, is a brief description of some clear eras of school architecture that can be distinguished in Swedish school history. By doing so, we gain insights into how societal attitudes towards childhood, education, and play have evolved over time to enrich our knowledge of the past and gain an understanding of context, identifying challenges and opportunities today.

General primary schools (folkskolan)

Until the middle of the 19th century, school was something for the privileged in society. But through the general primary school charter in 1842, the "folkschool" became Sweden's first compulsory public education (Folkskolan, n.d.). With the transition from a farming society to an industrial one, the need for formal education to ensure that everyone could read and write increased. The public school's statute required that every parish in the countryside and every urban parish should have at least one school with a qualified teacher (Boverket, 2021)

Image 1: Svartrå folkschool a few miles east of Varberg, photographed sometime before the turn of the century 1900.

The shift in society acted as a catalyst for the increased demand for formal education. This transition may have created a need for a more literate workforce to meet the demands of industrialization. but also, that the ideas of everybody's equal rights began to take shape on a larger scale. The policy changes that led to the expansion of educational access in Sweden during the 19th century meant societal shifts and actions that were instrumental in democratizing many things, not least education, making it more accessible to a broader group of the population.

School palaces

The heavy urbanization and large migration to the cities at the end of the 19th century led to the need for investments in urban planning and buildings such as town halls, hospitals, schools, and other institutions. (Folk)schools, educational institutions and high schools were built as impressive structures, like palace buildings.

These schools were also designed with a degree of adaptability to be converted into hospitals or other general purposes when needed. In the big cities, the schools were often very large, with sometimes over 1,000 students (Boverket, 2021). During this time, the importance of education was emphasized through impressive and representative school buildings, which are still in use today. These buildings were as important to the city's skyline as churches and castles. They were characterized by a monumental style with large entrances, wide corridors, and classrooms with generous windows (Kristenson, H. 2005).

People's Home schools (Folkhemmets skola)

From the late 1930s to the 1950s, schools maintained their central role in the development of society. Social reforms were introduced to modernize Sweden and shape free and democratic citizens, with thoughts about the people's home. Functional housing, free healthcare, child allowance and free school meals were introduced to support families with children. The schools were integrated into the development of new residential areas and were part of the neighborhood center, with a more intimate character and smaller size (Boverket, 2021). The basic idea of people's homes was that Sweden would be a home for everybody. With all that entailed, including social and economic security for ordinary people.

Image 2: Krokslättsskolan. "School palace" built in 1911.

The pavilion schools of the 1960s and 70s

In 1962, the unified school was introduced with a nine-year primary school for children between the ages of seven and sixteen, which is still in use today. This period was marked by societal changes that reshaped the view of the school's role. New pedagogical directions required other types of buildings. The pavilion school was introduced with smaller units, a focus on outdoor spaces and placement in park-like environments.

During the million programs in the 1960s, new school buildings were no longer constructed vertically but were spread out over large areas so that each classroom had ground contact with different entrances to signal equality and democracy. This period was characterized by standardization and adaptation to new pedagogical methods. Many schools in new residential areas were placed next to green areas to enable car-free routes (Boverket, 2021).

Schools after the 1970s

Since the 1970s, relatively few schools have been built, most of the new buildings have mostly had a postmodernist style which developed as a reaction against the mass-produced houses of modernism. This style returned to symmetrical, detailed facades, and used more color and natural materials. The buildings would be more playful and anchored in the local area. (Bjurström, P. 2017).

The changes in school systems reflect shifts in societal values, economic conditions, and political priorities. These changes necessitate adjustments to the school system to meet the evolving needs. As people began to move from rural areas to cities, a need arose to establish new systems where children attended school regularly. With a demand for a workforce that women formed, new solutions for their previous jobs, as stay at home moms, had to be taken care of. All these factors and others have shaped the school system we have today.

Image 3: Glanshammar School, 1974

Utilization

While the concept of school dates back thousands of years, the idea of designated outdoor areas for schoolchildren is not as well established. During the 19th century, the modern concept of schoolyards, as they are known today, was born. This time an extensive restructuring of the Swedish education system was carried out and during the latter part of the 19th century, an architectural standardization of the school system took place, and educational ideals for outdoor activities were added (Larsson et al. 2017 pp. 53-54). The following describes the various purposes for which the school's outdoor environment was designated for in previous years.

A place for movement and activities

Even though thoughts about play and physical activity were further developed during the 18th century, the 19th century meant a more definitive impact for such ideas, which were manifested through systematization of gymnastics. After a growing interest in students' health and hygiene, gymnastics was established as a school subject. But it would take time before gymnastics was integrated into the school schedule, initially it was activities for the recess periods (Idrottsämnets historia, 2020) (Larsson et al., 2017 pp. 54-57).

Activities during recess in the 19th century were influenced by various factors. Material conditions, spatial considerations, geographical location, as well as children's social situations and ages. According to sources from the series "Yearbooks in Swedish Educational History" ("Årsböcker i svensk undervisningshistoria"), among the activities that took place were wheeling, handstand walking, somersaults, jumping and other acrobatic activities and the use of installed equipment such as bars, racks and ropes. Seasonal activities were popular as well, with snowball fights and ice skating being winter entertainments for students. In the summer, boys engaged in ball games, while girls amused themselves with ring games (Larsson et al., 2017 pp.130-131).

Image 4: Gymnastics in Dövstumskolan, 1916

Children's games and activities in the past seem to have largely revolved around using the body as a resource for play, whether it was playing tag or ball games. Moving around was thus almost a necessity to create the game. As described earlier, children had greater opportunities and freedom of movement in their life in general. However, with limited mobility and advanced technology, play has indeed transformed into a sedentary activity today. It is no longer as obvious to move around during play and it's

perfectly acceptable to play with each other remotely through a screen. It's therefore not surprising that fewer people are active today; it simply doesn't come as naturally anymore.

A place for education

The outdoor environment in the 19th century had great significance in various subjects that the students studied at school. It could be about anything from mathematics and stargazing to geography. Botany in the school gardens was also a major subject that largely utilized the school's outdoor environment, with investigation, collection, organization of fruit and plants. At the end of the century, guidelines were developed about how school gardens could be divided and how they could be used in education (Larsson et al., 2017 pp.67-68).

However, within botany, the connection to the schoolyard was more explicitly specified. In the 1905's curriculum, it is stated that it is favorable to establish a garden for the teaching of botany on the school grounds (Larsson et al., 2017 pp. 92-93). In comparison to the 20th century's use of the schoolyard as a place for education, especially regarding botany, is not as common anymore in today's schoolyards. Conducting education in the schoolyard seems to be linked to the teacher's or possibly the school's ambition for it. The most common form of outdoor education today is during gym class, as well as biology lessons where the forest is an important resource in this context.

On today's schoolyards, we often notice a lack of various qualities regarding space, greenery, and equipment, which limits opportunities. Another unfortunate factor is the weather in Sweden, which limits the comfort in such activities. However, this does not necessarily mean that there is no potential for improvement in this area. Botany, gardening, and planting have become increasingly popular even in schoolyards, not necessarily included in the curriculum as such, but an increased interest has been noted through various visits to schoolyards with such small installations. The question then arises whether this trend will grow and spread further to become a standard part for educational purposes.

A place for public gathering

Schoolyards also began to increasingly be used for public purposes outside of school hours. According to articles in the local press, schoolyards were utilized for various activities, such as location for fire drill exercises or as a gathering place for demonstrations, parades, and sports events (Larsson et al., 2017 pp.71). The schoolyard served as a cultural hub for people to gather and engage in.

Schoolyards as gathering spots for larger groups of people is not a strange concept, due to the size and locations of such places. Schools were also often positioned in central locations. And with most children in that community attending the same school, meant that everybody had some connection to that place. This made it a place for everybody to use and connect in. Today, it is not as community oriented as it used to be, and a lot of kids attend schools far from their homes. Students rarely spend time in the schoolyard after school hours. Many school playgrounds are thus empty during weekends and after school hours.

School gardens

The roots of school gardening in Sweden can be traced back to the founding of elementary schools in the early 19th century. Since the national regulations of 1842, the school garden has been recognized as a dedicated space for educational purposes (Larsson et al., 2017 pp.73). In 1840 a parliamentary motion was put forth, emphasizing the need for establishing a garden that would serve as an


Entré 25 öre.

Snabblöparen

Fr. Andersson

uppträder

å elementarläroverkets skolgård härstädes

i morgon lördag den 9 sept. kl. 7.10 e. m.

100 kr. utfästes till den,

som kan besegra på en timmas löpning, samt 10 kr. för den, som kan besegra på 10 hvarf.

Till talrikt besök inbjuder

högaktningsfullt

Fredrik Andersson,

snabblöpare.

OBS. Endast denna kapplöpning.

Image 6: Article in a newspaper about gathering on the school playground."

educational space where children can be taught on gardening practices. One big supporter of the school gardening was Olof Eneroth, a horticulturist, systematist, pomologist and illustrator. According to his opinion, school gardening had two aims 1. to provide experiences and knowledge about gardening, 2. to develop the child's sense of beauty and aesthetics. Eneroths meant that children have basic needs to work with soil, plants and animals. The national regulations on elementary school buildings published in 1865 were supportive of Olof Eneroth ideas and advocated for teaching methods focused on practical work, outdoor education and children's initiatives (Åkerblom, 2005 pp. 229, 232).

In 1878´s updated version of the guidelines, greater emphasis was placed on the significance of the school garden. The previous provision, which allowed for the allocation of a plot of cultivated land to the teacher, was now replaced with a mandate stipulating that a designated garden area 'shall be organized in the immediate vicinity of the school building, preferably oriented towards the south (Åkerblom, 2005 pp. 233, 234). School gardens in the 19th century served as dynamic educational spaces that provided children with valuable lessons in agriculture, science, nutrition etc. They reflected a broader societal emphasis on hands-on, experiential learning and the importance of connecting children with nature and the land, teaching them valuable skills (Åkerblom, 2005 p. 240).

During the period of urbanization in the late 19th century, people's view of nature changed. Changes in societal norms prompted a shift in school gardens and gardening. Initially, the primary goal was to acquaint children with gardening for practical reasons. The ongoing urbanization in the 1900s reduced the need for people to produce their own food. Improved economic conditions further fueled the perspective that household gardening had become a skill of the past (Åkerblom, 2005 p. 238). Eventually a lot of gardens were replaced by lawns, asphalt, trees, and bushes. The term 'school garden' (skolträdgård), was replaced by 'school ground' (skolgård). No school gardens with educational purposes seemed to have survived as late as 1970 (Åkerblom, 2005 pp.241-246).

The importance of land and agriculture was significant, being a necessity for most people's livelihoods. However, as society changed and interest waned, so did the maintenance of the

school garden. There is indeed a greater interest in gardening in schools today. Still, it is nowhere near the size and significance that the school garden once had. Even though one might not want to bring back the school garden as it was before, there are opportunities to implement similarities in today's schoolyards.

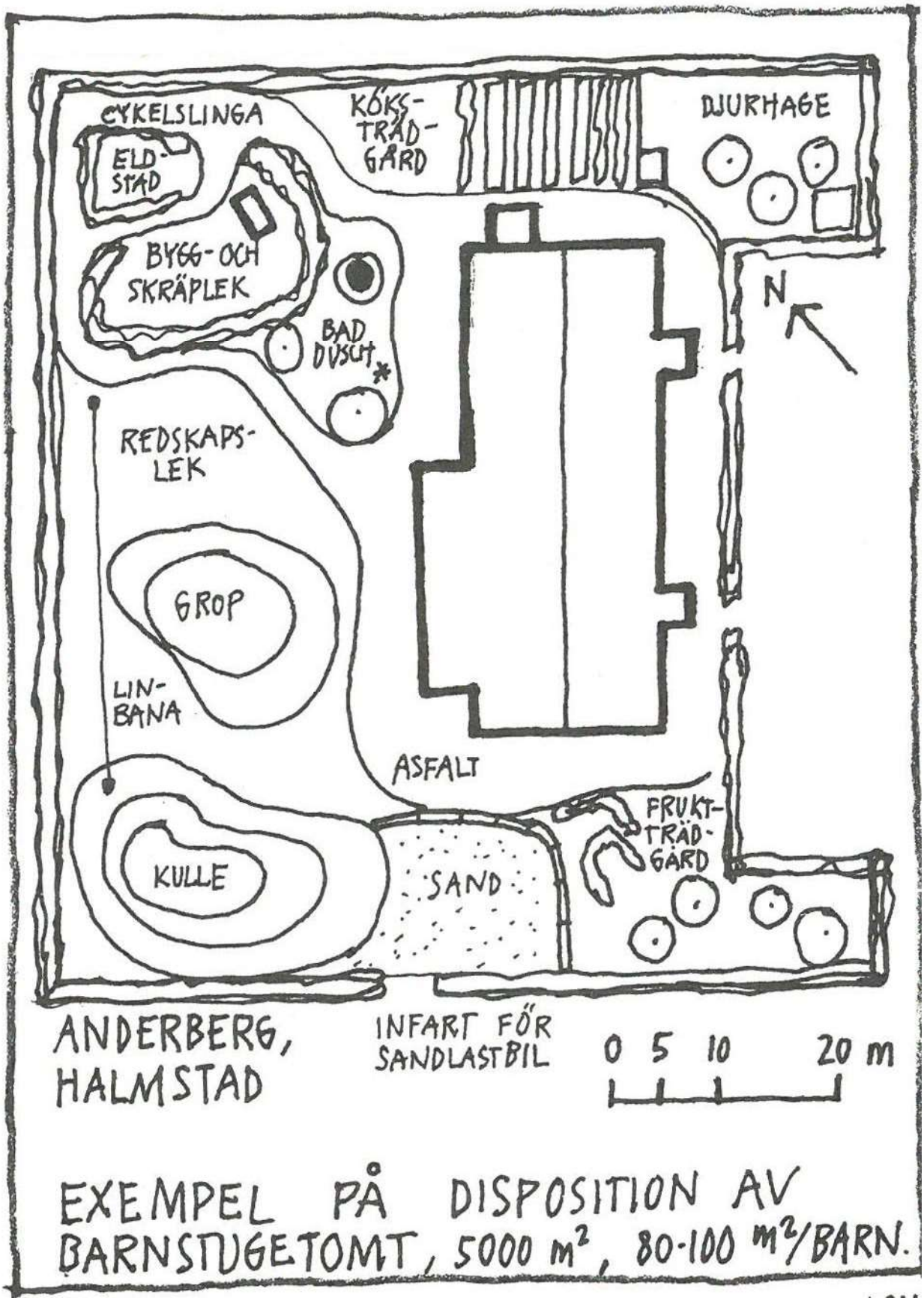


Image 8: Disposition of children's cottage plot, 1970. Illustration: Statens planverk

Layout

The design of schoolyards has evolved over time, reflecting changes in educational- societal norms, safety considerations, and environmental awareness. Through a variety of sources, including historical records, architectural plans, photographs and articles.

19th century

The 1842 Elementary School Regulations stand as a foundational document, outlining the parameters of schooling in that era. Curiously, amidst its provisions, the 1842 Elementary School Regulations do not provide any guidelines regarding the appearance of the schoolyard, besides the school garden as an educational area. However, there is a handbook expressing views on how a play area should be designed. In this handbook the author describes that there should always be a playground in front of each school building. The area should be covered with fine sand that can dry after rain and act as a soft surface in case of accidents (Larsson et al., 2017 pp.139). When the first standard drawings from 1865 came, there were no major differences from the previous ones. In these guidelines they advocate for a spacious, enclosed, and dry courtyard with planted trees. Ideas about a sheltered shed with seating for protection against bad weather were introduced (Larsson et al., 2017 pp.139). In addition to these principles, it was quite free to design the space and the school garden as one pleased. The conditions and needs of the place have naturally played a role.

20th century

In the standard drawings from 1920, the outdoor environment received significant attention compared to older documents. The schoolyard's aesthetic function demonstrates a high level of ambition concerning the outdoor surroundings. The aesthetic aspects are given a central place, with 25 different drawings created by 14 architects for school facilities (Larsson et al., 2017 pp.139). The instructions specify that recess and students' play activities are considered a significant part of the school system.

According to the guidelines, the schoolyard should be situated in a sunny location near the main entrance, firm and dry (Larsson et al., 2017 pp.143). There are recommendations of 5-10 square meters per student, with the additional requirement that the playground should be at least 20 x 20 meters (Larsson et al., 2017 pp.129-130). The schoolyard should also be surrounded by a low hedge or fence so that adjacent areas are not trampled during play time. This can be interpreted as certain areas not being designated for play and should, therefore, be kept in a tidy condition. Like older editions of the guidelines, the need for a sheltered space, as well as equipment for gymnastics, is emphasized (Larsson et al., 2017 pp.144). It is interesting that aesthetics played a larger role in 1920s, it seems like the schoolyard was meant to be both functional and beautiful. It is slightly different from what a lot of today's

schoolyards look like. We can also discern certain similarities in today's guidelines, including size and protected outdoor spaces. The schoolyard as a place for play and activity also began to take on greater significance in this context.

The guidelines issued in 1944 were concise, particularly concerning the outdoor environment. It only briefly mentions the play area, with the same instructions as before, along with a slightly expanded recommendation now ranging to 10-15 square meters per student. The guidelines also suggest including a grassy area, a 60-meter running track, and areas for jumping pits for high and long jumps. The significantly lowered ambitions for the outdoor environment could be linked to the economic depression of the 1930s followed by World War II (Larsson et al., 2017 pp.144-145).

The regulated texts from the 1940s, 1950s, and even the 1960s indicate a diminishing interest in the design of schoolyards compared to the grand plans of the 1920s. The once-strong aesthetic aspects had almost disappeared. The focus shifted increasingly towards the functional aspects of the schoolyard rather than the aesthetic. The recommendations that the schoolyard should be a space for student activities, play, and sports persisted, while the emphasis on the educational school garden and large-scale school planning was reduced. (Larsson et al., 2017 pp.145-147). The schoolyard emerges more and more as a place for play and activity. This shift can be attributed to various factors. Post-World War II, there was a growing emphasis on child development and well-being. Educational philosophies started incorporating the idea that play is an essential component of a child's learning experience. As a result, schoolyards began to be seen not just as spaces for structured activities but also as open areas that fostered unstructured play.

New in the 1955 edition of the guidelines was the recommendation to shield nearby buildings and traffic arteries through green belts with trees and bushes. The need for this screening was, of course, because of urban growth and increased numbers of cars. Parking areas were therefore

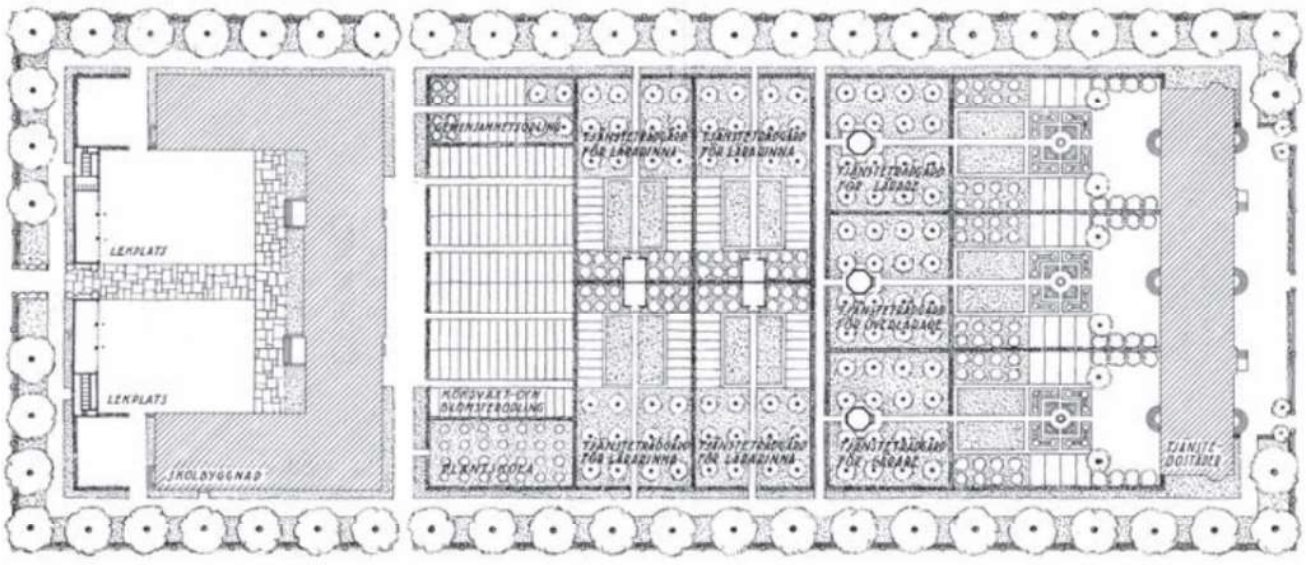


Image 9: Scaled plan for a elementary school in Central Sweden by the architects Höög & Mossing (Stockholm, 1920)

emphasized; these should have been situated near entrances but distinctly separated from play areas. Asphalt surfaces were introduced in larger school facilities, the entire play area was to be permanently surfaced with asphalt. Asphalt offered a smooth surface that was easy to maintain, suitable for ball games, and relatively cost-effective (Larsson et al., 2017 pp.146-147). However, this did receive some criticism, in late 1969 the newspaper Kamratposten published a report where schoolyards were described as asphalt deserts 'completely unsuitable for play.' Similar criticisms were directed towards the schoolyards, describing them as aesthetically inferior. Even the students seemed to dislike this ground surface (Larsson et al., 2017 pp.171). As many schools built in the 60s and 70s are still in use today, asphalt is thus a common phenomenon where it significantly dominates the surfaces.

The 1960s pavilion school caused students and teachers to go outside to get between different classrooms. Towards the end of the 60s, ideas about "open schools" with smaller rooms gathered around large open spaces came into being (Skolbyggnader i Göteborg, n.d.). This entailed a lot of movement both in the school buildings but also in the schoolyards, with students on their way to and from classrooms, dining halls, sports halls etc. The schoolyard served not only as a place for play but also as a hallway. In this stage of history, we can discern a rather similar view of play as today, where children themselves should be allowed to create their game, as opposed to structured activities.

Schools in the 1970s and 80s, and onwards, have, to a greater extent than before, invested in promoting various schoolyard activities through well-equipped playgrounds with plantings, benches, ping-pong tables, basketball hoops etc. These investments counted with the hopes of students using the schoolyards even after school hours (Skolbyggnader i Göteborg, n.d.). This is common in today's outdoor environment with a diversity of different equipment, but the quality differs from school to school and the maintenance is also a factor.

Eventually, government regulation of the school's outdoor environment gradually decreased. In a time of increased numbers of students and a need for larger school buildings, several reforms were carried out which meant that the state regulations became less extensive, and the responsibility was transferred to the municipalities. The architectural ideas in urban planning that applied at the end of the 20th century sought harmony between buildings and nature. The schoolyard is presented as a coherent and boundless environment where the whole school environment supports learning and development making the entire school the students' workplace (Larsson et al., 2017 pp.180-181). Despite this, we know that many of today's schoolyards do not live up to these requirements. From the historical perspective, we can find out about the different stages of the schoolyard with both good and bad solutions, this enlightens our understanding of where we came from, paving the way for where we are heading. Today, schoolyards continue to evolve as educators and architects seek to create environments that support a holistic development for all children. If this can be achieved is a question that only time can tell.

3. Laws, guidelines and policies

In this chapter, rules and laws governing the design and use of school playgrounds are explored, as well as the goals set to promote children's development and how these guidelines help create safe and stimulating environments for all children.

Within a web of educational governance, certain laws, guidelines and international conventions stand as pillars, anchoring the principles of equity, access and child protection. These laws are amongst others that represent the dedication to universal education and the belief that every child has the right to learn, grow, and thrive within a supportive educational environment. How we choose to design today's schoolyards must be based on these laws, policies, and guidelines that we have. In addition to the history from which we can learn, it is important to examine the requirements that must be followed, as well as the obligations and rights that children have. In a Swedish context, several laws and guidelines are applicable.

Compulsory education (Skolplikten)

Compulsory schooling means that children must, from the age of six until the ninth grade, attend school and participate in the activities organized to provide the intended education (7 kap 2, 17 och 23 §§ skollagen.). Compulsory schooling means that children are forced to stay within the school environment for at least 9 years of their lives; these obligations also entail rights. This puts a responsibility on the adults who plan and manage, not only the school system and teaching, but also the environment in which these children find themselves. The design of schoolyards is significant in promoting a positive learning environment and the well-being of students, encouraging their attendance to fulfill their compulsory education.

Convention on the Rights of the Child

The purpose of the Convention on the Rights of the Child is to guarantee all children their human rights, the convention contains 54 articles. It emphasizes the equal value of children, the right to protection against discrimination, the right to life and development, that the child must come first in matters concerning them and the right of self expression. Article 31 has a special bearing on the planning of open spaces, as it describes that the child has the right to rest, free time, play and recreation.

"The convention states recognize the child's right to rest and leisure, to play and recreation adapted to the child's age and the right to freely participate in cultural and artistic life." (barnkonventionen, n.d.)

In the context of designing schoolyards, this statement emphasizes the importance of considering children's rights to rest, leisure, play, and cultural engagement. When designing schoolyards, it's crucial to create environments that not only facilitate academic learning but also support children's holistic development, including their physical, social, emotional, and creative well-being. By incorporating elements that cater for these needs, schoolyards can become vibrant and enriching spaces

The Swedish Planning and Building Act. (PBL 2010:900)

The Swedish Planning and Building Act, PBL, plays a vital role in shaping the physical environments. In the act related to the open free spaces at schools, it specifies that there must be an open space connected to schools and preschools, Chapter 8, Section 9§.

"If the plot is to be developed with construction works that contain one or more residences or premises for leisure centers, preschools, schools or other comparable

activities, there must be a sufficiently large open space on the plot or in its vicinity that is suitable for playing and spending time outside. If there are not enough spaces to arrange both open space and parking according to the first paragraph 4, open space must be arranged in the first place." (Plan- och bygglag (2010:900), n.d.).

The size or the location of the open space is not regulated in detail in PBL; this makes the writing "on or near the site" very much open to interpretation, as well as the text "there must be a sufficiently large open space ", can be interpreted as 20, 30 and 50 square meters per child. In the Swedish Planning and Building Act (PBL), there are no further regulations regarding the requirements for schoolyards.

National goals - Sustainable development

The 2030 Agenda for Sustainable Development, adopted by the UN Members in 2015, offers a collective framework for achieving peace and prosperity for humans and the planet, for present and future generations. Central to this agenda are the 17 Sustainable Development Goals (SDGs), representing an urgent call for action (United nation n.d). Designing schoolyards in alignment with the principles and goals of the 2030 Agenda can have several important implications. These laws, however, are very broad and can be quite general. Nevertheless, it is important to narrow the relevant goals for all projects that are conducted regardless. From this thesis point of view, several of the SDG: s are relatable.

Image 10: Sustainable Development Goals

" Ensure healthy lives and promote well-being for all at all ages."

Image 11: Sustainable Development Goals

Good health is a fundamental condition for people to reach their full potential and contribute to the development of society (United nation n.d). This includes the well-being of kids in school environments. Creating and maintaining free spaces within school playgrounds can contribute to achieving this goal by promoting physical activity, and an encouraging environment for learning and social interaction. These spaces can facilitate activities, such as sports, recreational activities, and social gatherings, contributing to the good health and well-being of students.

"Ensure inclusive and equitable quality education and promote lifelong learning opportunities."

Image 12: Sustainable Development Goals

Research shows that inclusive education for all is one of the fundamental pillars for prosperity, health, and equality in any society. Education systems must meet people's needs throughout their lives – from access to preschool and primary education to ensuring that all young individuals have the opportunity for employment, and higher education (United nation n.d) Free spaces can enhance the overall quality of education by supporting the well-being and development of students, fostering an environment for learning, and encouraging participation in various educational activities.

"Make cities and human settlements inclusive, safe, resilient, and sustainable."

Image 13: Sustainable Development Goals

The provision of free spaces aligns with aspects of this goal, particularly in the context of creating sustainable and inclusive communities (United nation n.d).

Open areas or free spaces at schools contribute to the creation of community-centric spaces within school areas. These spaces serve not only the immediate school community but also act as potential community hubs during non-school hours. The establishment of free spaces within school environments can promote inclusivity, safety, and sustainable land use within the broader urban context.

4. Children´s place

In this chapter, we explore the role of the school playground as a place for children, how playgrounds can contribute to children's learning and well-being, as well as the benefits of recess

Freedom of movement

In recent decades, children's ability to move on their own has dramatically decreased. A survey from the mid-1980s studied children's ability to move and showed that almost all children between the ages of seven and nine had the opportunity to walk or cycle by themselves. Twenty years later, when the study was repeated, the number of children had dropped to two-thirds. By 2012, this number had further decreased to less than half of the children. This decrease is strongly linked to the increase in car traffic, the lack of safe cycling and walking paths, as well as parents' increased concern for the safety of their children (Boverket & Movium, 2015 p.20).

Our health depends not only on the choices we make as individuals, but also on the conditions society provides. The outdoor environment of schools, preschools and homes are central parts of one fifth of the population's everyday life. In a democratic society, responsibility needs to be taken to ensure a place for children (Svenska Dagbladet, 2019). The outdoor environment is often seen as a "free space" for children, where they have opportunities to independently create their own spatial and social contexts. It is a place where children can preserve and develop collective expressions of their culture (Mårtensson et al., 2011, p.18). Creating a child-friendly city as a whole and at school in particular, entails incorporating both a child's perspective and an understanding of their worldview. By taking the knowledge, interests, and desires of children into account in urban planning, conditions can be improved to foster a nurturing environment and provide opportunities for them to cultivate a healthy lifestyle and social connections (Boverket & Movium, 2015 p.15-17)

Since the opportunity for children's freedom of movement has decreased, more children are dependent on adults to move around. Children generally have less opportunity to create their own communities and form local groups that have traditionally been fundamental to outdoor play and social interaction (Mårtensson et al., 2011, p.19). The schoolyard environment is one of the elements still existing and therefore central to children's daily activities. The outdoor environment can offer children an important arena for their own influence and independence. Feeling seen and respected, having the opportunity to make an impression, and experiencing meaningful activities are central (Boverket & Movium, 2015 p.26).

Space for play

While work is commonly regarded as a positive activity, play, such as the activities during recess, is sometimes perceived as the opposite to that and a waste of time in comparison (Pellegrini, 2005, p.11). But play is a universal language and a way for children to interact with the world and help make reality easier to understand. Through this dynamic process, children not only comprehend the world but also connect with their surroundings and with one another. When provided with freedom, time, and space, children instinctively

engage in play, allowing them to explore and understand their environment (1177 - Så utvecklas barn av att leka, 2018)

One of the widely agreed upon criteria for characterizing play is its apparent lack of an immediate, tangible purpose. Play behaviors can resemble serious situations, but do not serve a serious purpose (Pellegrini, 2005, p.90). It is the process, not the goal of the activity that is important (1177 - Så utvecklas barn av att leka, 2018). Ellen Beate, a Professor at the Department of Physical Education and Health, QMUC describes how children use opportunities for calculated risk-taking in games, such as, exploring heights (climb, cling, jump, balance), experiencing speed (running, swinging, sliding, cycling, skating), testing common tools (carve, chop etc.), fight (contend, fight, wrestle) and try being themselves (hide, withdraw) (Friluftsfrämjandet,n.d.). These activities provide children with opportunities to push their boundaries and establish their identities (Kylin, 2004).

Health benefits with physical activity

Physical activity is an overarching concept that includes various forms of body movements. All body movement that occurs through contraction of skeletal and musculature and results in increased energy consumption is counted as physical activity. The effects of physical activity on health include a range of general health-promoting benefits for the body. This underlines the importance of promoting physical activity in children's everyday life, to reduce the risk of problems long term (Boverket & Movium, 2015 p.19). The availability of outdoor environments for children and young people, together with the degree of freedom of movement and their ability to make their own decisions, are factors that can strongly influence their health and well-being (Boverket & Movium, 2015 p.18). A big part is taking place, as mentioned before, in the school environment and precisely in the schoolyards during recess.

According to extensive research, physical activity can prevent and treat more than 30 different diagnoses. It improves health, memory, mood, and physical capacity. Active people have a lower risk of type 2 diabetes, overweight/obesity, dementia, certain forms of cancer and premature death etc. It also has an impact on sleep and mood (Vårdgivarguiden, 2023). The built environment can offer opportunities for children to be active, nature often provides a larger surface and children who spend a lot of time outdoors tend to be more mobile. Schools that have an outdoor environment with lots of nature, trees, bushes, hills, and vegetation linking the playgrounds, naturally promote children's physical activity (Mårtensson 2004).

Role of Recess in Cognitive Performance

Recess also plays a role in cognitive performance, as evidenced by research findings. Studies have shown that taking breaks can have significant positive effects on various cognitive functions, including attention, memory, and problem-solving skills. A series of field experiments was conducted in the United States at a public elementary school by Pellegrini & Smith (1993) and Pellegrini et al. (1995). The experiments focused on the impact of recess timing on children's attention. The result consistently showed that children were more attentive after recess compared to before. Moreover, during the longer recess timing period, children exhibited less attentiveness compared to the shorter period (Pellegrini et al., 2005, p.15).

Cognitive performance seems to be intertwined with other benefits that have been discussed before. Firstly, taking a break from academic tasks during recess allows students to rest and recharge mentally. Meaning, just by changing tasks to something different enables the student to comprehend more information later. Secondly playful activities with social interactions during recess can reduce feelings of stress and anxiety, which can negatively impact cognitive functions. These social interactions support cognitive development by providing opportunities for perspective-taking, empathy, and understanding of social norms. And thirdly, free play during recess stimulates creativity and imagination. Children engage in imaginative games, and exploration of their environment, which promote problem-solving, critical thinking, and creativity.

Venue for Social Development

The schoolyard serves as the primary social arena for children, offering space for interaction and engagement to develop social skills (Pellegrini, 2005, p.39) such as cooperation, conflict resolution and participation. Playing together can help strengthen bonds between peers and provides opportunities for individuals to interact with people outside their usual social circle. This can promote understanding of different perspectives and cultures. It also allows for informal conversations.

The social sustainability of the school as a whole and of the schoolyard involves creating an environment where students feel included, respected, and engaged in the community. Students at the school have opportunities to foster camaraderie and community through shared activities and events.

There is a significant contrast between life inside the classroom and life in the schoolyard. In the classroom, the teacher actively oversees what happens and the emphasis is on work and learning. However, during recess the children are the ones who take the lead in shaping and determining the content. The teacher has a passive role as a “supervisor” (Lindblad, 1993). This can be a contributing factor that increases insecurities during recess resulting in bullying. Bullying and loneliness are widespread problems in Swedish schools (Loftsson, 2022) The design of the schoolyard is an important factor in countering instances where bullying can occur without the teachers or others being able to see it. By designing schoolyards that consider different play areas and activities, students can meet and interact with people from various backgrounds and learn to respect and appreciate diversity. The schoolyard should serve as a place to promote values such as empathy, tolerance, and cooperation through shared activities and play.

From this chapter, we gain a better understanding of the importance of recess and the schoolyard and thus can relate to why we have had these concepts in our schools and continue to have them. But how can we design the schoolyard to achieve these aspects? and what can we look back on historically from older principles to implement in our schoolyards today?

5.“Good” outdoor environment

This chapter discusses how children experience their school environment, through conducted studies and research. It also explores factors that can create a solid schoolyard – a place where children thrive, learn, and develop.

More than square meters

Space and spatiality include material, mental, and social dimensions, which together interact to create space. Space is not only understood by its physical properties. It cannot be interpreted solely based on how it is intended to be used, lived, or experienced. Instead, it must be understood through all these dimensions together. Planned activities, physical characteristics, individual utilization, and experience of space are all intertwined (Larsson et al., 2017 pp. 17).

People, through their actions, contribute to the creation of space. Every person has a spatial imagination and a culturally transmitted idea of how they would live in space or of what kind of space they would like to be surrounded by. Space affects people differently and is therefore not necessarily the same for everyone. Depending on how the space is perceived and lived through people's actions, different spaces can emerge in a certain place (playground@Landscape, 2023). A soccer field can be used as a space for tag by younger children, while a group of boys might play soccer and use the space for its "intended" purpose, and a group of girls might use the space to "hang out" and chat, thus using the same place as a different space.

From various surveys and investigations conducted, several features affect how the schoolyard is evaluated, received, and used by students. Research conducted by Eva Bredberg (2003, p.121) shows how the physical layout affects how children use their break time. She studied children in grades two and five and their experiences of the schoolyard in two different schools. In these schools, ball games were popular among children of various ages. The schools differed when it came to the availability of ball games. At one school, the space for the games was limited by a small asphalt surface in relation to the number of children, this made it difficult to conduct several games at the same time. In addition, a nearby parking lot made an obstacle as balls easily bounced among the cars and disturbed the game. In contrast, the other school offered a varied outdoor environment with different surfaces for several games at the same time, by offering different grass fields, gravel fields and asphalt surfaces in various places around the schoolyard.

Lene Schmidt (2004) conducted a study of four Norwegian schoolyards to better understand how the outdoor environment is used in schools and after-school facilities. She used qualitative methods, including group interviews with both children and staff. The data that was collected showed that ball games, mainly football, dominated the activities in the schoolyards, as areas for it were the most available. Football games usually appeared when other options were lacking, it seemed. Several activities took place over large areas, especially in wooded areas with varied terrain. Natural areas were particularly important to younger children, as it

allowed them to find undisturbed places to play in; But it also seemed to be important for girls and older children. Schmidt argues that her own and other research indicates the need for a diversity of sites and facilities on school grounds. As it must cater for a variety of different students.

In another study by Gitz-Johansen and others (2001, p.122) it was observed that both indoor and outdoor environments where the activities were not predetermined were preferred by children. Playgrounds that were designed often stood empty while areas with bushes, sand and forests were heavily used. Younger children preferred to play near their classrooms and depended on visual contact. This may be because large open spaces can be perceived as unsafe for younger children. Boys tended to use the room more actively and played more roughly, while girls had a more introverted play style and isolated themselves more from the room by creating their own spaces. As children have different preferences and needs, different requirements should be placed on the design of the space. It is emphasized in Bodil Lindblad (1993, p.123) research that it is important for schoolyards to be designed according to children's developmental needs. Indoor environments and other quiet areas became important as the children got older. In addition, a gender difference was observed, with girls more often preferring the indoor environment while boys preferred the outdoors. Even Lindblads reasons based on his results about the importance of a varied environment in the schoolyard for the children.

In Gunilla Lindholm (1995) studies, she notes that activity and place are intertwined, the activity affects and is affected by the place, and the place shapes and is shaped by the activity. Children do not distinguish between these two. Being in a place means doing something. In schoolyards where the children had access to a natural area, such as a forest grove, the children were more creative with their play, compared to children in schoolyards without natural land. Titti Olsson (1995a) interprets Gunilla Lindholm's research results as the need for places that stand out from the rest of the schoolyard, places where things are allowed to be untidy and where the unexpected can happen. Children don't just play in the place; they play with the place.

A recurring pattern emerges from these surveys, boys tend to gravitate towards larger, open spaces, driven by their interest in ballgames and the accessibility of such areas. This inclination is reinforced due to these places being often prioritized and provided. On the other hand, natural areas hold an allure for younger children and girls, who seek out more secluded settings for their play. This preference likely stems from a desire for exploration and imaginative play. Interestingly, this trend persists (maybe for other reasons) even as children grow older, with older children also expressing an interest in secluded environments.

A one-size-fits-all approach turns out to be insufficient and an unrealistic approach. Instead, we should learn from how we have used the schoolyard over time and what functions have proven to be beneficial. As stated, before historically, schoolyards served as places for movement, education, and public gatherings, with school gardens playing a significant role in connecting students to nature. Over time, ideas of

schoolyard design have transitioned from functional play areas to integrated designs that need to consider legal requirements, like children's rights, planning regulations, and sustainability goals. Providing equal access to a diverse range of play opportunities is essential for promoting gender equality and social inclusion. By offering spaces and activities that encourage such interactions, the schoolyard can become an important arena for these skills to be practiced, tested, and developed.

From the project's literature review, the history of schoolyard design, the benefits and needs of the schoolyard, as well as various surveys on children's activities in the schoolyard, further investigation on qualitative elements has been identified. These are divided into three categories presented below..

Conditions:

Site

The inherent qualities of the landscape and site, such as natural and cultural values, topography, and vegetation, can contribute to the outdoor environment at schools. By harnessing and developing these qualities, the schoolyards can become unique to the location and connect with the surrounding landscape. Through varied topography and utilization of the site's different levels, spatiality can be enhanced. Providing physical challenges through stairs, ramps, slopes, and low points (PlayEquip, n.d.). Children often embrace challenges and places that may be perceived as risky and adventurous; play becomes more interesting in areas with variation and excitement, where not everything is visible at first glance and imagination can be used.

Size

A particular challenge with schools in increasingly dense cities is to meet the needs of children for spacious outdoor environments. The size of outdoor spaces can have an impact on children's movements, activity, and development. However, the size of the schoolyard itself is not a guarantee for creating a good environment. But the sq m. quantity can be a factor in determining the space available to create a solid schoolyard.

If the schoolyard is too small, especially in relation to the number of students, it becomes crowded and harder to participate, difficult to create quieter areas and difficult to achieve social interaction, with space for children of different ages, genders, and disabilities. There is also a significant risk of high wear and tear on the outdoor environment (Jansson et al. 2021). Practical experience shows that there seems to be a limit for natural materials and vegetation at around 20-25 m2 per student. Below this, children's play wear on natural environments, which need to be replaced more often (Männik et al. 2018) (Thorén K. H. et al. 2019). Research shows that a school playground smaller than 3,000 square meters, regardless of the number of children, struggles to accommodate all desirable qualities (Mårtensson et al. 2009).

A schoolyard directly connected to the school building that enables children to freely access is also an important factor. Studies show that schoolchildren who have their own schoolyard play in a more active and imaginative manner than children who are directed to a nearby park (Nordström, 2014). In contrast to the Swedish law, PBL states that even if the school does not have its own space,

it is acceptable to refer to one nearby. Current trends, considering densification and lack of spaces, especially in major cities, have led to many schools being built with plans to utilize existing parks or playgrounds as schoolyards. While this may be seen as a good alternative to share spaces, it does impact how children play and how dependent they are on adults to access the designated playground.

Nature

The outdoors always entails some form of contact with nature. All kinds of outdoor environments are influenced by nature and undergo seasonal changes, weather changes, and time of day (Mårtensson et al., 2011, p. 74). However, it is not enough for children to be outdoors, it must also involve a positive nature experience which can lay the foundation for a lifelong relationship with nature (Mårtensson et al., 2011, p. 17). In families with good economic resources, children can have their daily dose of high-quality experiences both outdoors and in nature. However, in families with limited resources, children are more dependent on their living environment (Mårtensson et al., 2011, p. 19). Investing in green schoolyards would ensure natural contact in everyday life for all children, regardless of their socio-economic situation. This would also improve the function of recess as recreation and facilitate initiatives for outdoor learning. Experience shows that educators are more likely to move their activities outdoors if there are high-quality green surroundings (Mårtensson et al., 2011, p. 22). A green environment with variations contributes to making a place more interesting for children's play and learning. An important condition is the availability of an engaging outdoor environment where children have plenty of time and opportunity to explore independently, where they can freely use and reshape.

In a well-integrated outdoor environment with rich nature, play tends to obtain a flexible structure. The result is dynamic play and mental agility involving imagination (Mårtensson et al., 2011, p. 62). However, the type of adventurous outdoor

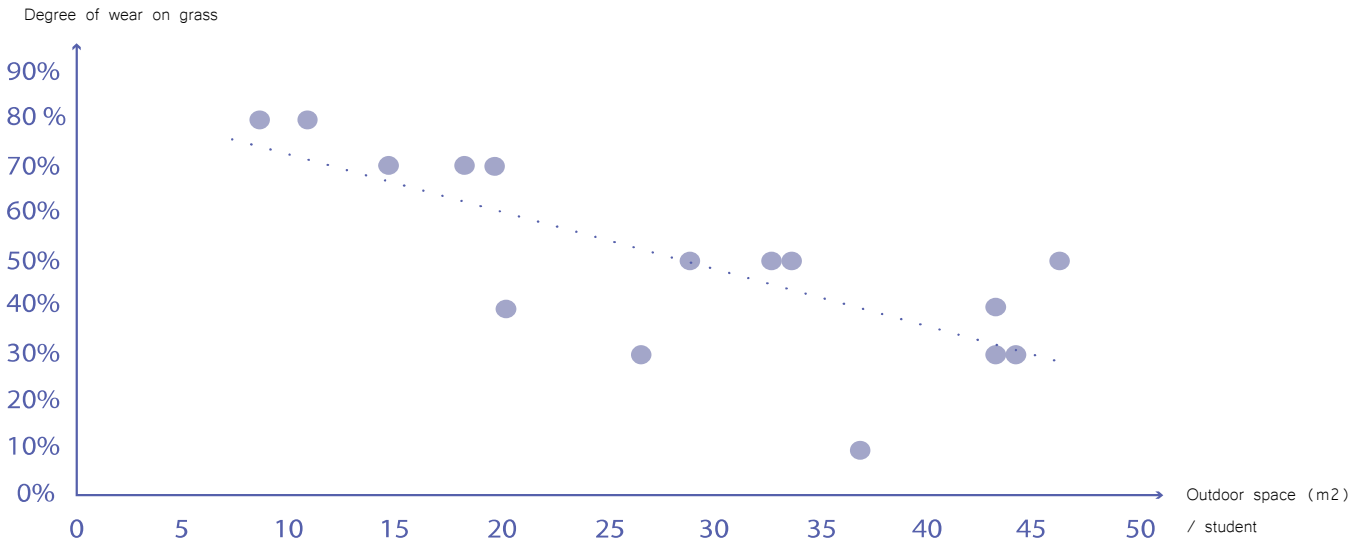


Image 14: The degree of wear decreases with increasing outdoor space per child

experience with nature is also influenced by a variety of other, more individual, factors such as previous experiences, personality, disabilities, ability to navigate and the conditions at the specific location. In efforts to make nature accessible, it is essential to find the optimal balance between providing security and familiarity, and encouraging exploration and excitement, for different groups of children (Mårtensson et al., 2011, p. 75).

Spatial formation:

Zoning

Zoning is the process of dividing a place into different defined areas with different functions and purposes. It involves organizing and structuring the area so that different activities can be carried out efficiently and with minimal disturbance. In the context of a schoolyard, zoning involves creating different areas for different activities, such as playgrounds, sports fields, teaching spots, and areas for resting. The schoolyard needs to accommodate several types of environments for different needs, ages, and genders. One way is to allocate zones with different functions, the zones can be integrated with each other and even change depending on the time and group.

The "safe zone"

The safe zone in a schoolyard is a designated area to prioritize the feeling of safety for students. Positioned in direct contact with or near the school buildings, it serves as a spot where students (especially young ones) can find refuge, support, and assistance when necessary.

Situated visibly, the safe zone should be easily accessible to all students and staff. Its location should allow for monitoring and supervision, ensuring that it remains secure. Beyond its practical functions, the safe zone serves a broader purpose within the school community. The safe zone should foster conflict resolution and peer support, encouraging students to seek assistance from staff if needed. This zone should embody the school's commitment to creating a nurturing and secure environment. The safe zone should be suitable for activities that require adult support, such as gardening, woodworking and other creative activities (Stockholms stad, 2019 p.10) Places for sitting and taking a break can also be arranged in this zone.

The "active zone"

Outside the safe vicinity, it is suitable to have spaces that stimulate movement and action. The active zone in a schoolyard should be a vibrant and dynamic space designed to promote physical activity and social interaction. Positioned within the schoolyard, often in the center where a lot of movement is taking place, the active zone should serve as a hub of flow, encouraging students to engage in various forms of exercise and play.

Characterized by its open layout and diverse amenities, the active zone should offer a wide range of opportunities for physical exertion. Play structures such as jungle gyms, slides, and swings beckon children to climb, slide, and swing. Adjacent to the play structures, open fields that provide ample space for organized sports activities such as soccer and basketball are also included in the active zone. Throughout the active zone, vegetation, elevation differences and colorful markings on the ground, outlining play areas can serve a dividing purpose as well as adding to the aesthetic appeal. These markings may include hopscotch

grids, four square courts, or lines for sports, enhancing the visual appeal of the space. Seating areas placed around the perimeter of the active zone provide respite for students and spectators alike (Stockholms stad, 2019 p.10).

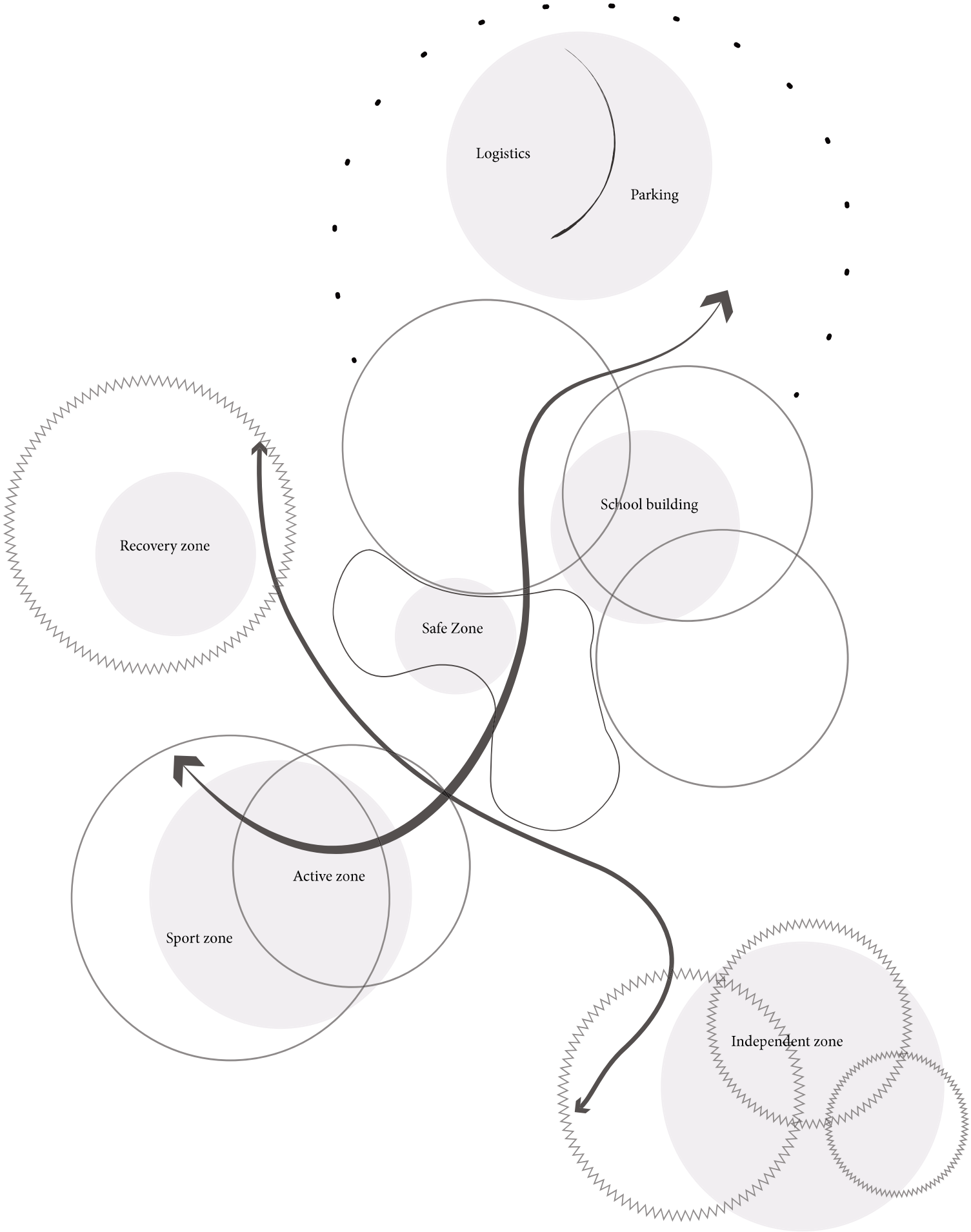
The “independent zone”

The independent zone at a schoolyard is a designated area where students have the freedom to engage in activities of their choice without direct supervision or structured guidance from teachers or others. The outer areas of the schoolyard might be where children can create their own spaces, build, and spend time “far away” from the school building. It’s often a space where children can explore their interests, socialize with peers, and exercise their independence within the boundaries set by the school.

This zone may include larger, contiguous vegetation areas, like forests, it could also be a sports field or include playground equipment, benches etc. Within the independent zone, students can decide how to spend their free time, whether it’s playing games, reading, or simply chatting with friends. While the independent zone offers students more freedom, it should still operate within the framework of school rules and safety guidelines to ensure a secure environment. Teachers and staff may periodically monitor the area to ensure students’ well-being and intervene, if necessary, but the primary focus is on allowing students to explore and enjoy their leisure time independently. Parts of this zone can also be closer to the building for children who are not comfortable in the outer edges (Boverket, 2021).

The “recovery zone”

A “recovery zone” refers to an area designated for students to decompress, relax, or seek emotional support when needed. This zone is designed to provide a safe and calming environment where students can take a break from academic or social pressures and engage in calmer activities. This zone may include features such as benches, shaded areas, or quiet corners, comfortable seating, hammocks, greenery etc. The goal is to create a space that helps students manage stress, emotions, or conflicts. In areas that are surrounded by buildings, nature or other enclosures can be a suitable place for the recovery zone. This zone plays a role in promoting the mental, emotional, and physical well-being of students within the school community.



Conceptual zoning diagram

Spatial arrangement

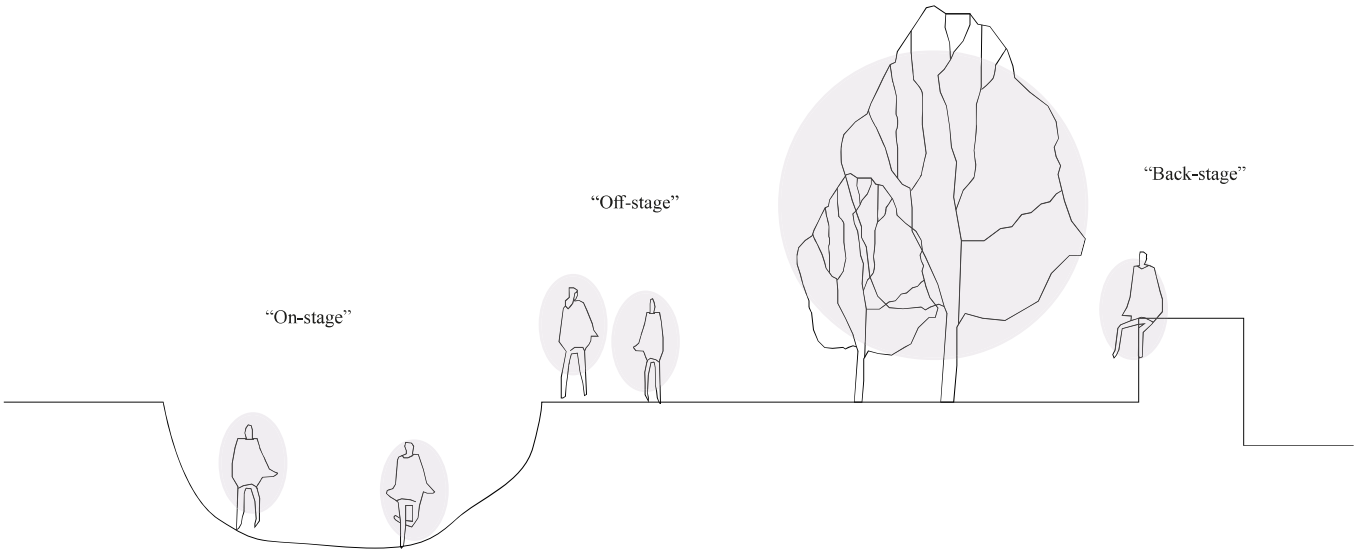
Spatial arrangement refers to the organization or configuration of objects, elements, or features within a space. It involves how things are positioned, distributed, and oriented in relation to each other within a given area or volume. Spatial arrangements are a crucial aspect that influences the functionality, aesthetics, and experience of a space. It encompasses considerations such as layout, circulation, proportions, scale, and the relationship between different zones or areas within a built environment.

“On-Stage”

On stage Spaces are prominently visible and designed to facilitate active participation and engagement. On-stage spaces in a schoolyard are designated areas where students can showcase their talents and creativity in front of their peers and teachers. These spaces serve as platforms for various performances and presentations, enhancing the cultural and social atmosphere of the school. Typically, on-stage spaces include features such as a raised platform or centered spaces and sometimes seating arrangements for spectators. These spaces are often situated in a prominent location within the schoolyard, easily accessible to students. They often include spaces such as playgrounds, sports fields, stages etc. where students can interact with others, and be seen by peers and teachers. Teachers and staff may also utilize on-stage spaces for educational purposes.

“Off-stage”

Off stage spaces are areas where students can participate as observers rather than active participants. These spaces serve various purposes, providing students with opportunities away from the spotlight of on-stage areas. These spaces may include features such as open grassy areas, benches, picnic tables and activities on the outskirts or designated viewing spots for events and performances. These areas are typically situated around the perimeter of the schoolyard or in less central locations, offering students privacy and a sense of seclusion from more active or public areas. These spaces should offer opportunities for relaxation, observation, and appreciation of others’ activities. They should also allow students to enjoy the social atmosphere without direct involvement, fostering a sense of inclusivity. Off-stage spaces



"On-stage", places where students can be seen and participate, and "off-stage", places where students can participate as a spectator and "backstage", places where students can be by themselves.

complement on-stage areas by offering students a balance between structured and unstructured activities, providing students with more introverted preferences a space in the schoolyard.

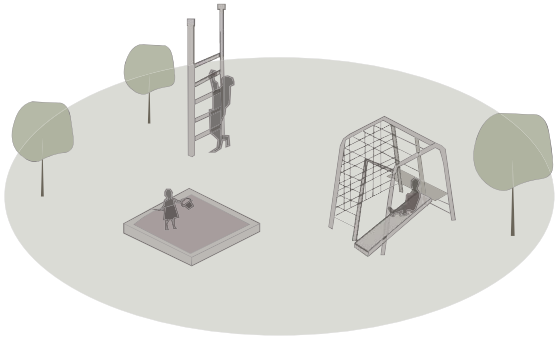
"Back-stage"

These spaces should provide students with opportunities for solitude, reflection, and personal activities away from the public eye. Whether it's a quiet corner or a secluded area, these spaces offer a sanctuary for individuals who need time alone to recharge. Furthermore, backstage areas should offer a sense of isolation from external pressures and expectations. Away from the eyes of the audience, students may feel less scrutinized and judged, allowing them to relax and express themselves more freely. These areas could include secluded corners, quiet gardens, or alcoves where students can retreat from the hustle of the schoolyard. They should serve as retreats for students seeking privacy, allowing them to recharge and focus on personal pursuits away from social pressures.

Elements:

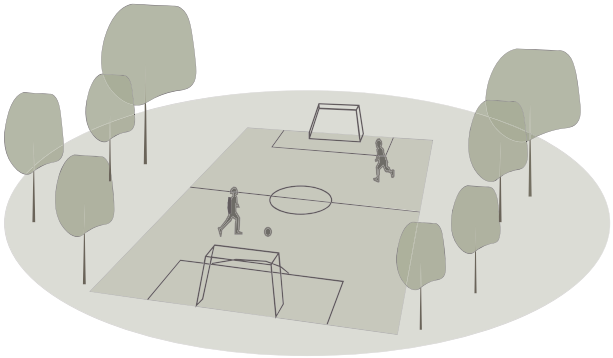
Multi-functional areas for play

Sports fields such as football, as well as fixed play equipment like swings and climbing structures, are included in this category. For this equipment it might be good to investigate the available playgrounds and sports areas nearby (Boverket 2021). Creating conditions for increased movement and participation in activities during breaks can be challenging. The goal is to encourage more students to engage in meaningful break activities and to provide opportunities for increased movement when they are not in classes. Organized activities for those who are interested could be a way



to get students moving during breaks. Students' interests and needs should guide the direction in this case.

Places where the function is not initially defined provide spaces to imagine and invent one's own use. Imaginative play fosters creativity, encouraging them to think outside the box and develop their imaginative skills This could involve stones, parts of trees, or interesting objects made of concrete or metal. A variety of different objects and places with unique characteristics offer children the opportunity to create their own space (Boverket, 2021) and decide how to use objects as they want. Abstract objects that can also work as art for the schoolyard can contribute to this.

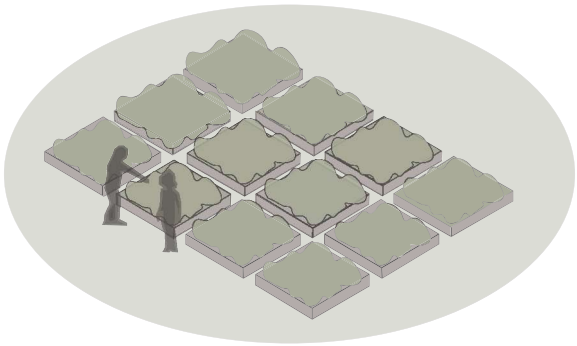


Areas for Learning

Designing places that promote outdoor learning involves creating environments that foster curiosity, exploration, and hands-on experiences. It can be beneficial to have larger gathering places, preferably several, so that multiple groups or classes can be outside at the same time (LTL, n.d. p.4, 11)

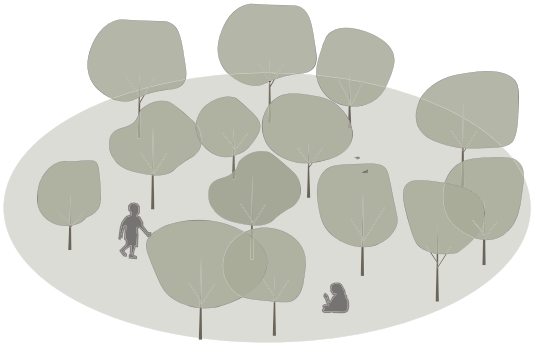
Studies show, as stated before, that outdoor learning can significantly benefit students, including reducing stress and improving focus. Schoolyards have also historically been extensively used for teaching. This trend has now returned, but the implementation in schoolyards across the country is still inadequate. For educators to be able to conduct parts of their teaching outdoors in schools, the outdoor environment needs to be designed to accommodate it. This can include:

Gathering spaces in the outdoor environment for teaching of various kinds, natural environments and loose materials to experience nature and the changing seasons up close, screen roofs provide protection against rain, sunlight, and thereby extending the season. Outdoor workshops and studios can become more conducive to educational activities when they are shielded from rain and intense sunlight, gardening opportunities can be organized for educational purposes, as well as to provide children with an understanding of their environment, local management of stormwater can be utilized for educational purposes, such as open paved channels during rainfall. Pumps, connections, and wells that can be opened and closed (Boverket, 2021).

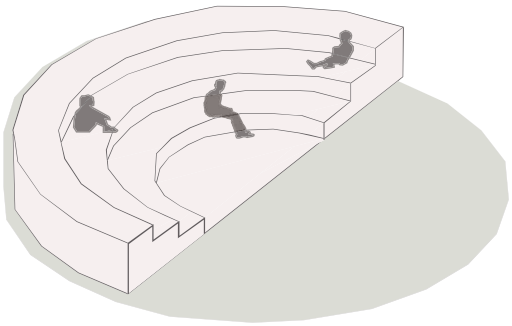


Areas for social gathering

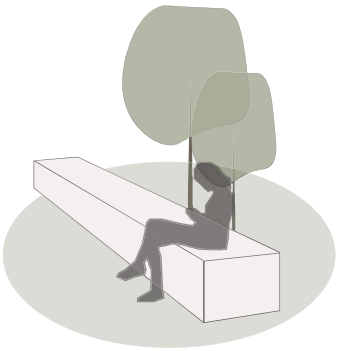
Creating areas for social development in schoolyards can benefit students' social development and skills. Comfortable



seating such as benches, bean bags, hammocks, or large rocks, allows students to choose what they find most comfortable to socialize. These areas need to provide shade and shelter, by incorporating shade structures or pergolas, making them usable in different weather conditions. Integrating interactive elements like board games painted on the ground, table tennis, giant chess or checkers boards to encourage cooperative play and creativity, adds to the social aspect of the



location. Incorporating these elements for social development at schoolyards, inviting and inclusive spaces should be created where students can relax, socialize, and develop social skills.



6.Case studies

The following chapter consists of three schoolyards that have been analyzed, examined and processed. The schools are Backegårdsschool in Bergsjön, Ryaschool in Biskopsgården and Communityschool in Gårdsten. Similarities between these schoolyards are that they are all located in the suburbs of Gothenburg, in areas that are considered to be vulnerable areas and. These schoolyards have been chosen mainly because, despite their ample size, lack in equipment and range, some more than others. They are all from the 60s and 70s, but differ in size, topography and layout, therefore different conditions and needs apply.

Backegårdsskolan

Backegårdsskolan is located in a valley in the southern part of Bergsjön, directly adjacent to green spaces and some residential areas. All buildings constructed before the 21st century have facades in gray-painted panels. The original classroom pavilion in the east consists of a long, narrow single-story structure with separate entrances to each classroom. A roof-covered walkway extends along the entire length of the building's side facing the schoolyard.

History

Backegårdsschool was built as an elementary school and was put into use for the academic year 1968-69. In the early 1990s, the school was renovated, and a new building was added to the north, while the former pavilions were merged. In 1997, another pavilion was built inside the schoolyard. The preserved prefabricated pavilion in the east with its roof-covered walkway is a typical representative of the late 1960s' simple prefabricated school buildings (Jonsson & Lindman, 2021).

Facts about the preschool

Address: Universumsgatan 39, Bergsjön, Gothenburg

Typology: 4 buildings in 1-2 floors

Location: Residential area, nature

Number of children: 270 children

Grades: 0 to 6

Facts about the schoolyard

Courtyard area: 6000 square meters accessible for children

Area per child: 23 square meters/child

Schoolyard division: schoolyard surrounded by the school buildings, green area behind the buildings on an uphill slope.

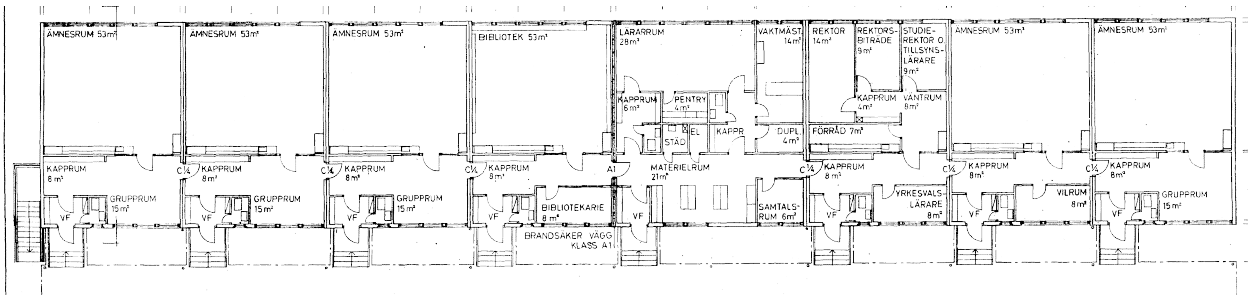
Natural ground cover: Grass

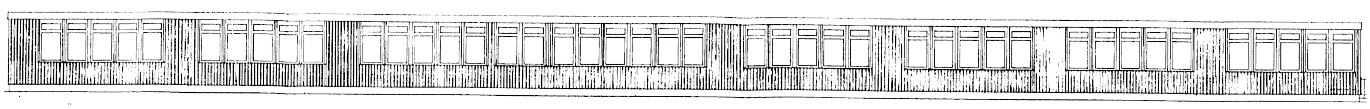
Artificial ground cover: Mostly asphalt

Terrain: Flat throughout the middle part of the yard, uphill in the northern Outskirts

Play equipment: basketball and football courts, swing, junglegym, slide.

Site analysis





Free area and connections

Backegårds schoolyard open spaces cover approximately 6000 square meters distributed across various areas. The school buildings are turned inward facing towards the schoolyard. The part of the schoolyard located at the back of the buildings is not connected as evidently, but the opening between the buildings provides connections between the areas.

Topography

The schoolyard is situated in an enclosed valley with mostly flat terrain to the south. Behind the school buildings, the west, north and east parts of the schoolyard are facing uphill.

Vegetation

The school is surrounded by nature, but in the central parts of the schoolyard there is limited vegetation. The green areas are mainly located behind the school building making them less accessible, since the entrances to the school buildings are located inwards towards the asphalted area. Most of the vegetation area is also uphill. The green space consists mostly of grass, there are limited amounts of planted trees and bushes.

Division

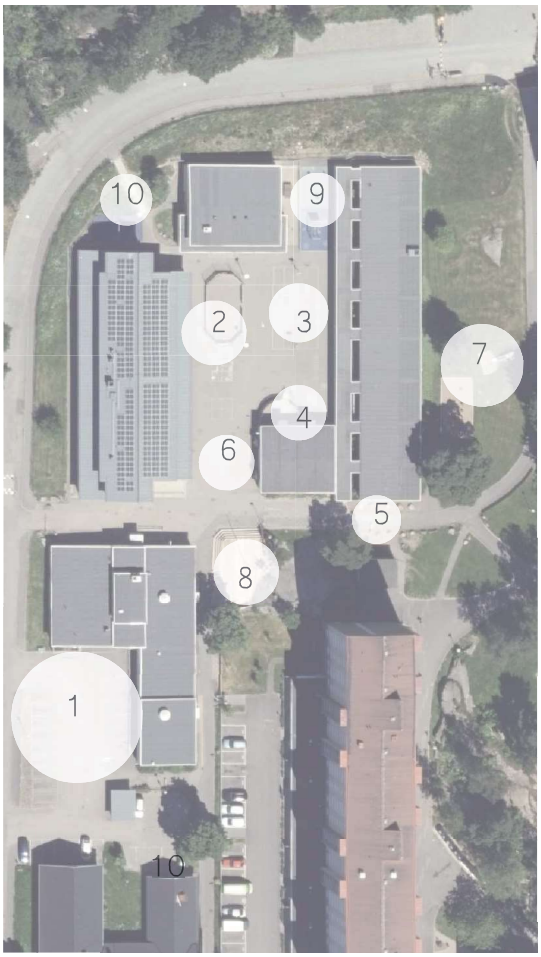
Backegårdsschool has one active zone, which is the central part of the schoolyard consisting of a basketball and soccer field; and the climbing frame. There is space under the roof connecting the building with the outdoor environment, with both indoor and outdoor visibility. The backside of the schoolyard is somewhat distant from the rest of the yard because of the building's angels and entrances. The open areas of the yard where the sports fields are located are exposed and visible. The wooden deck to the south of the yard is also a space with open and visible characteristics. Enclosed areas consist of spaces under the roof and the climbing frame. Between the western and northern buildings, there is a closed space with a large swing that is somewhat distant and enclosed between the buildings.

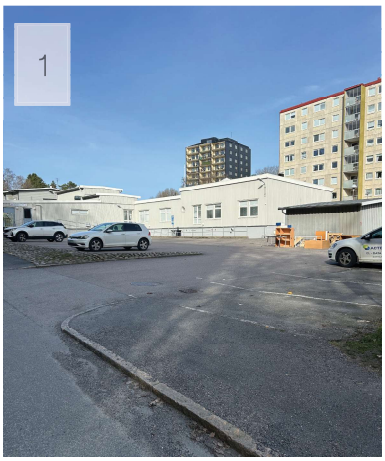
Gathering spots

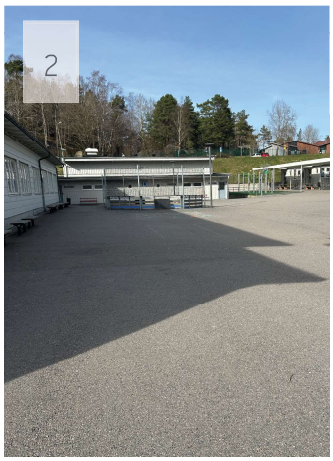
In front of the buildings, there are benches where children and young people can gather. Gathering spots also form around the activity areas in the schoolyard, such as around the sports fields or on the wooden deck.

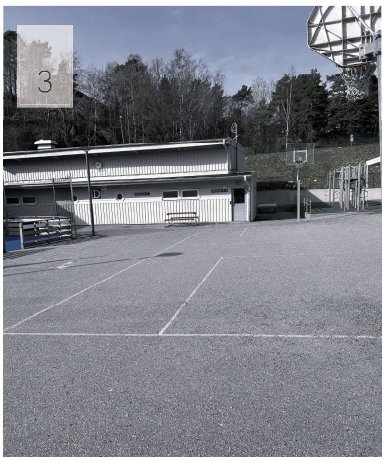
Educational activities

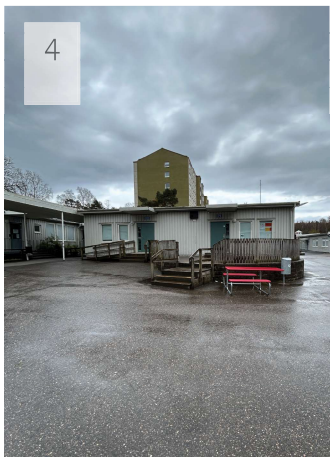
There are no apparent educational activities in the schoolyard, apart from the green areas and the physical activities that can be carried out on the fixed equipment.


10
9
2
3
7
4
6
5
8
1
10


1


2


3


4


5


6

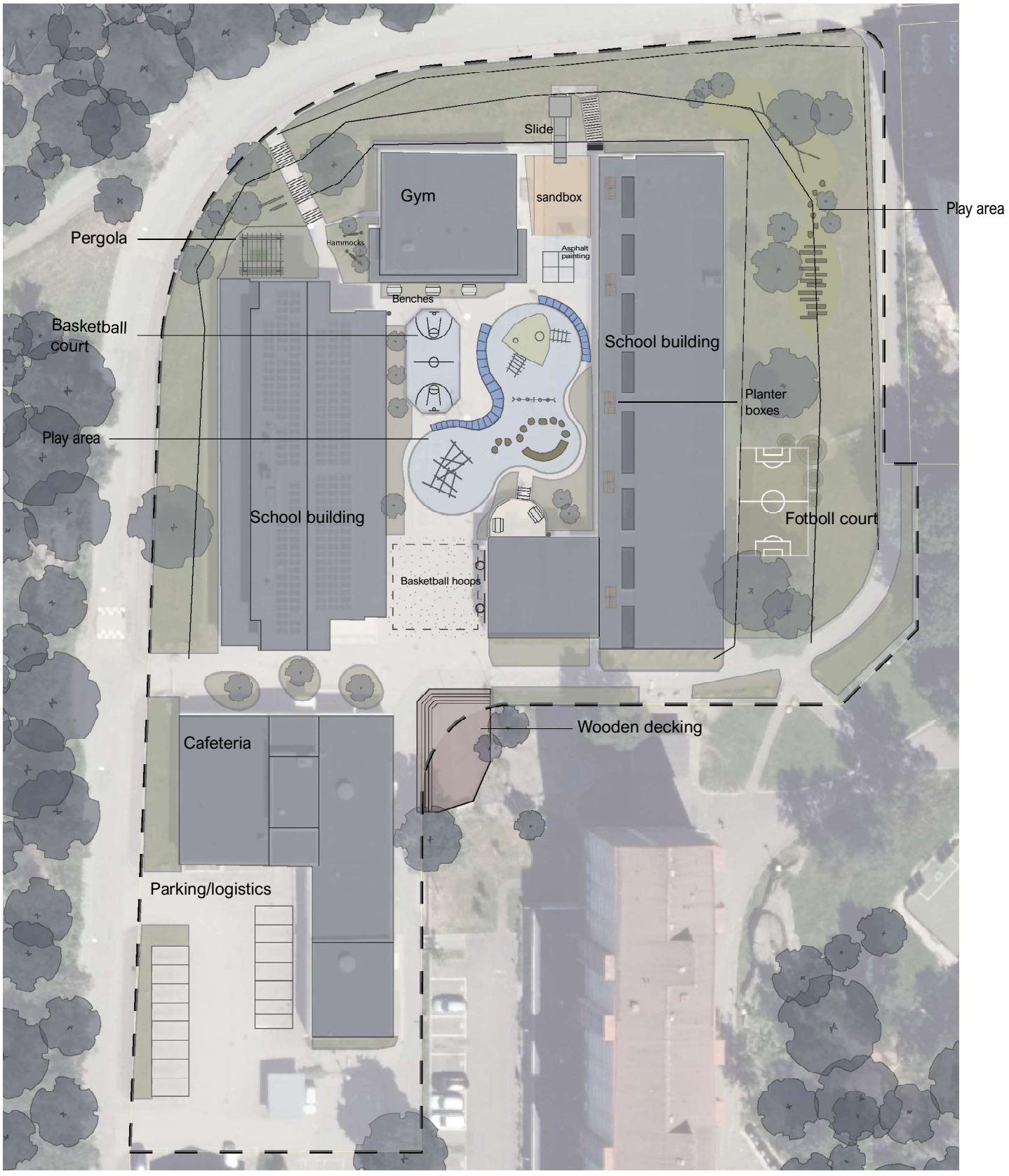

7


8

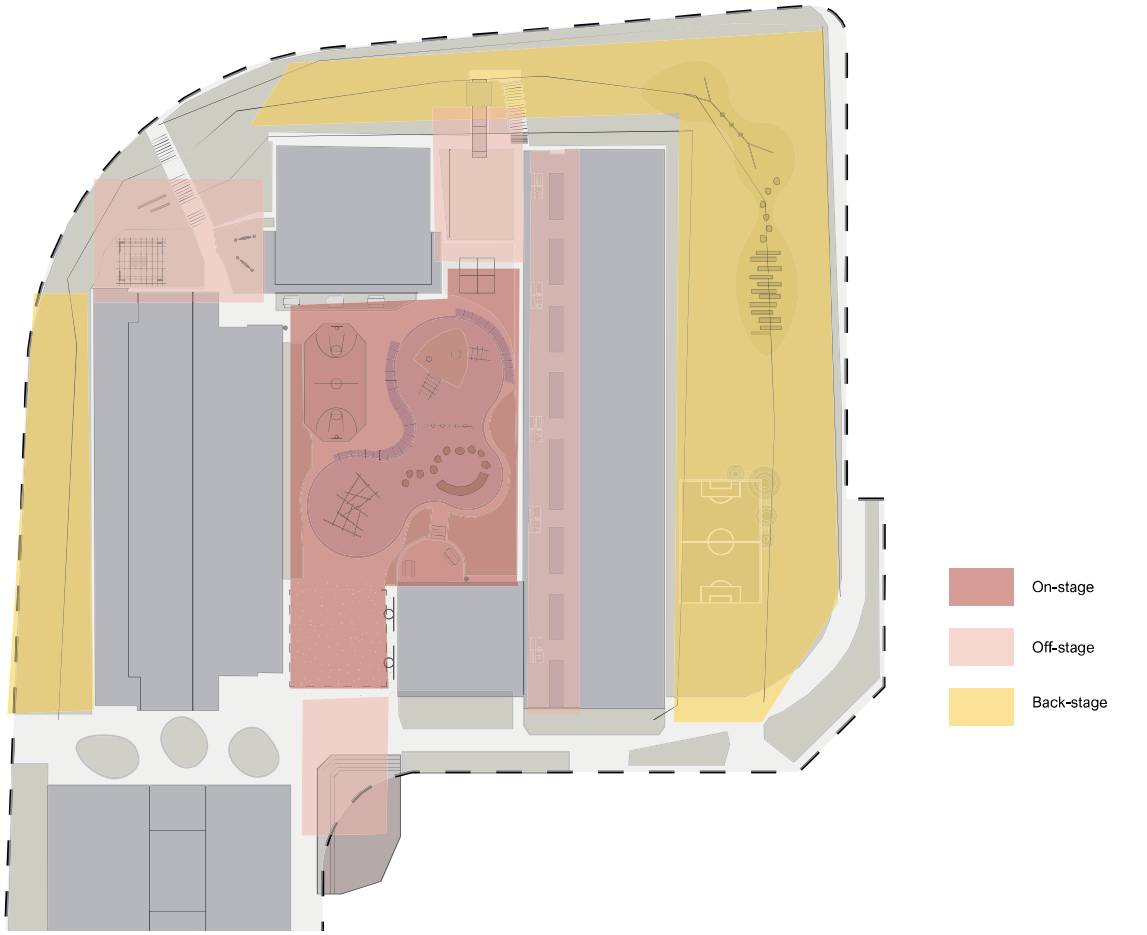

9

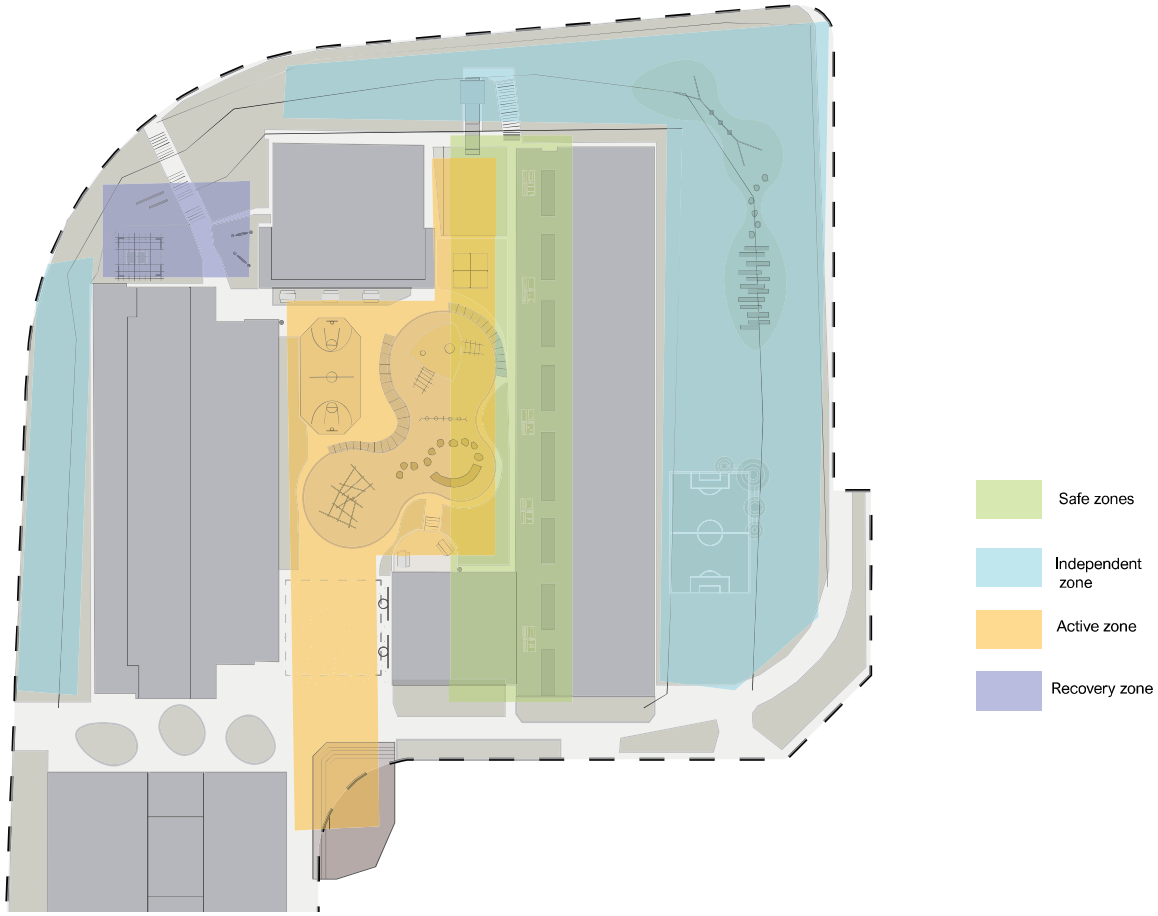

10

Applications



Zoning and spatiality





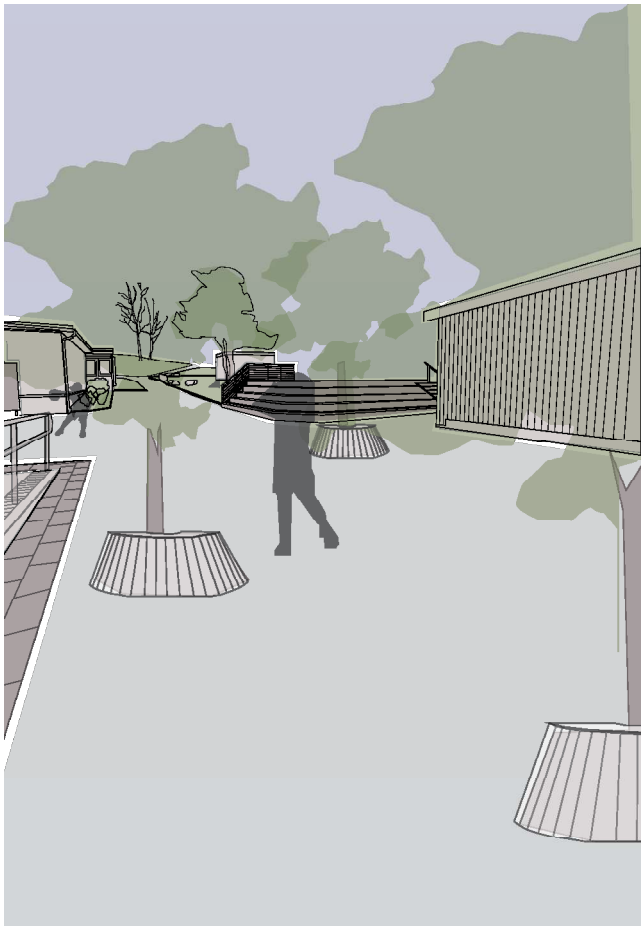
To awaken children's desire to develop and challenge themselves, to dare and to experiment, the environments are suggested to be adapted for different types of play, with both quieter and more physical elements.

The outdoor environment is divided into different zones for different activities, with the safe zones located under the roof directly adjacent to the school building. The area, which can be interpreted as an "off-stage" area, includes seating areas and plantings as well as open stormwater management for children to observe and learn about. Furthermore, there is the active zone, which is the central part of the schoolyard. In this area, the existing basketball court is suggested to be moved to the west and replaced with a playground for various types of play such as climbing, crawling, and swinging. The play area, relocated from its current location (east side of the yard behind the school building), aims to create variation in the space instead of just asphalt while providing better visibility due to the direction of the school buildings.

The downhill slope north of the playground is utilized by placing a slide there and connecting it to the new play area. The basketball hoops between the school buildings are retained, where even the walls of the school buildings can be used. Further south, there is currently a wooden deck that is also retained and can be used as a stage, a gathering space, or as an area for outdoor lessons. The active zone has areas with both "on-stage" and "off-stage" spots that integrate with each other.

The soccer field is advantageously moved to the flat southeast part where a grass field exists, located on the independent side behind the school building. On the same side but on the uphill slope, a play area with obstacles is added, taking advantage of an unused area and the topography to partly create a space where children have the opportunity for free play where imagination can flow, and partly an area where children can be by themselves. Planting trees helps create an interesting space while providing shade and greater opportunities for play and building huts. This area is interpreted as a backstage area, but the soccer field can be transformed into an "on-stage" area during high activity with spectators.

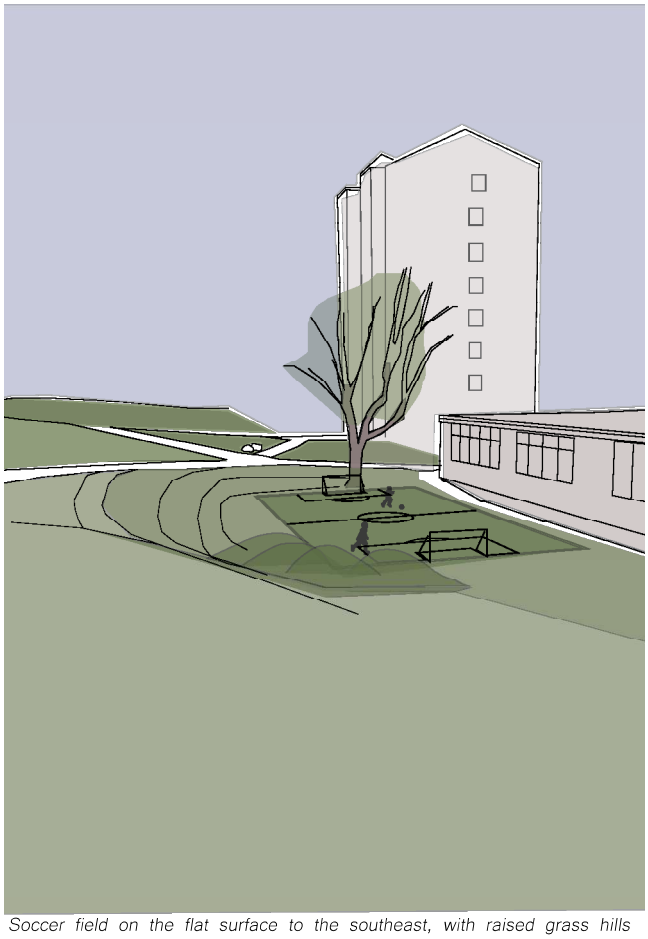
A dynamic and freely flowing play is enhanced by a variety of quiet areas, places for rest and recovery in enclosed spaces, and creative corners. Northwest of the schoolyard, enclosed by the topography with an elevation to the north and the school buildings, a recovery zone is created where students can be a bit more secluded in a calm environment with pergolas, hammocks, and grassy spots. Activities such as a ping pong table can be added. This place is also considered as an "off-stage" area due to its character. The western part of the schoolyard behind the school building remains unchanged and can be freely used by students. Additional vegetation can be planted to further separate the yard from the car traffic that occurs on that side. The existing qualities of the yard with the existing trees are preserved.



Entrance to the school from the west

Planters boxes under the roof

Secluded area for social interaction with pergolas, hammocks, and grassy spots.



Soccer field on the flat surface to the southeast, with raised grass hills

Ryaskolan

Ryaskolan is located in the western part of Södra Biskopsgården. The school is surrounded mainly by areas with terraced houses and apartment buildings. The school site slopes towards the south. The buildings are grouped around a central schoolyard dominated by a monumental staircase that extends along most of the elongated main building. This building is 2-3 stories high with one long side facing the schoolyard. The slope of the plot necessitates that all buildings are constructed in terraced terrain. South of this lies the sports hall with a section towards the slope in the south.

History

Ryaschool was built as a middle and high school in 1962-64 by architect Jan Wallinder. The original school consisted of three buildings constructed partly underground, all built with concrete frames and red brick facades. The schoolyard's broad grand staircase has a value to the overall impression. Ryaskolan is co-planned as an integral part of the neighborhood unit in Södra Biskopsgården. It is a representative of the modernist-influenced schools of the early 1960s (Jonsson & Lindman, 2021).

Facts about the preschool

Address: Erik Väderhatts Gata 11, Biskopsgården, Gothenburg

Typology: Main building 2-3 floors and 3 other buildings 1-2 floors

Location: Among terraced houses and apartment buildings, nature

Number of children: 600

Grades: 0 to 9 (0-6 from 2024)

Facts about the schoolyard

Total area of the yard: 13 000 square meters accessible for children

Free area per child: 22 square meters/child

Schoolyard division: Main schoolyard surrounded by the buildings, smaller open areas between the buildings.

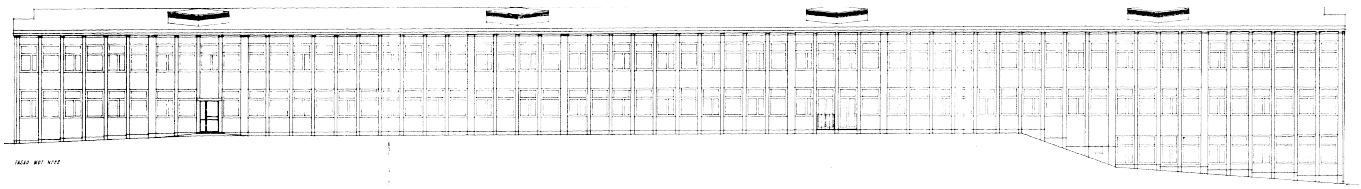
Natural ground covering: green areas in the schoolyard edges, some shrubs, and tree plantings.

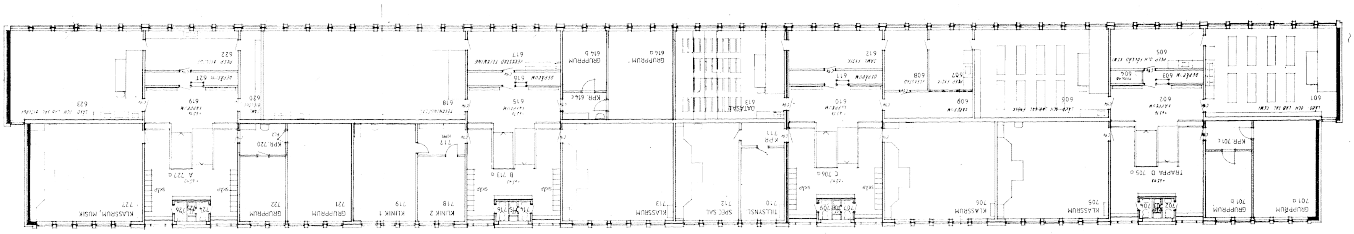
Artificial ground covering: Mostly asphalt

Terrain: Sloping southward

Play equipment: Basketball and football court, slide, swings, ping pong table.

Site analysis





Free area and connections

Ryaskolan has a large schoolyard with connections from various directions. The schoolyard slopes southward, creating connections at different levels. Most of the school buildings face inward, with entrances and exits leading to and from the yard.

Topography

The schoolyard slopes downward towards the south, and the level differences are addressed through various downhill slopes as well as stairs.

Vegetation

There is generally a lack of vegetation in the schoolyard. But north of the schoolyard, where a small playground for younger students is located, there are denser tree plantings. Beyond that, green areas are present on the outskirts of the school.

Division

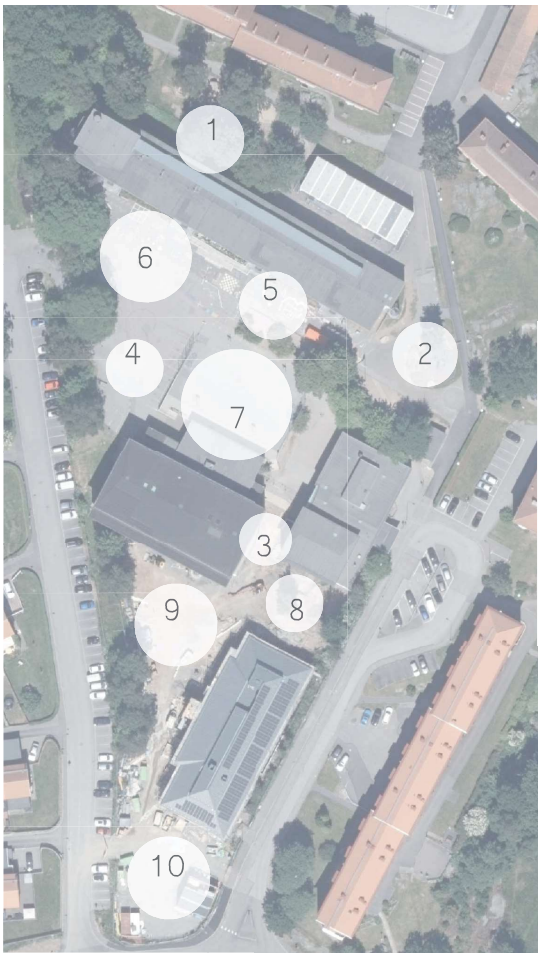
The northern side of the yard, which is intimate with proximity to the school building, is most evident and constitutes a clearly divided part of the schoolyard. The active zone is most obvious in front of the main building, consisting of a large and open area with basketball courts nearby. The equipped part of the yard on the southern side behind the two secondary school buildings forms a somewhat more private area. Due to the lack of activities in the large part of the schoolyard, this area currently serves as a place with a lot of activity as most of the children spend their time there due to lack of other options. Private areas are not clear but may occur in the spaces between the school buildings, where enclosed “rooms” provide privacy and less visibility. Furthermore, the schoolyard is relatively open, with the difference in elevation being the most significant division of the schoolyard into two distinct areas.

Gathering spots

Gathering spots can occur in various locations, besides the spontaneous gatherings that can happen anywhere. Primarily, it's the ball courts and at the few play equipment at the schoolyard. Apart from that, there are few seating areas around the school.

Educational activities

There are no apparent educational activities in the schoolyard.


1
6
5
4
2
7
3
9
8
10


1

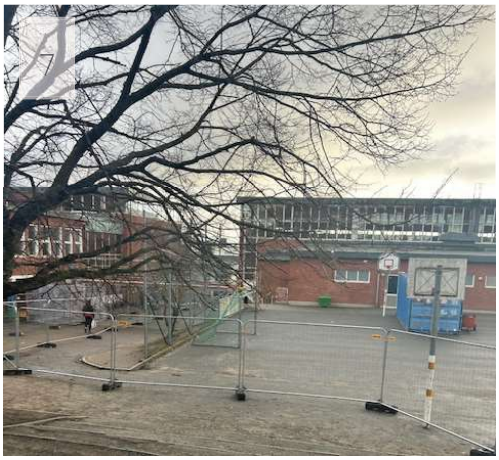

2

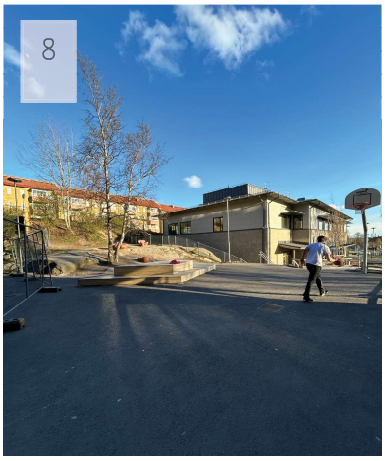

3


4


5


6

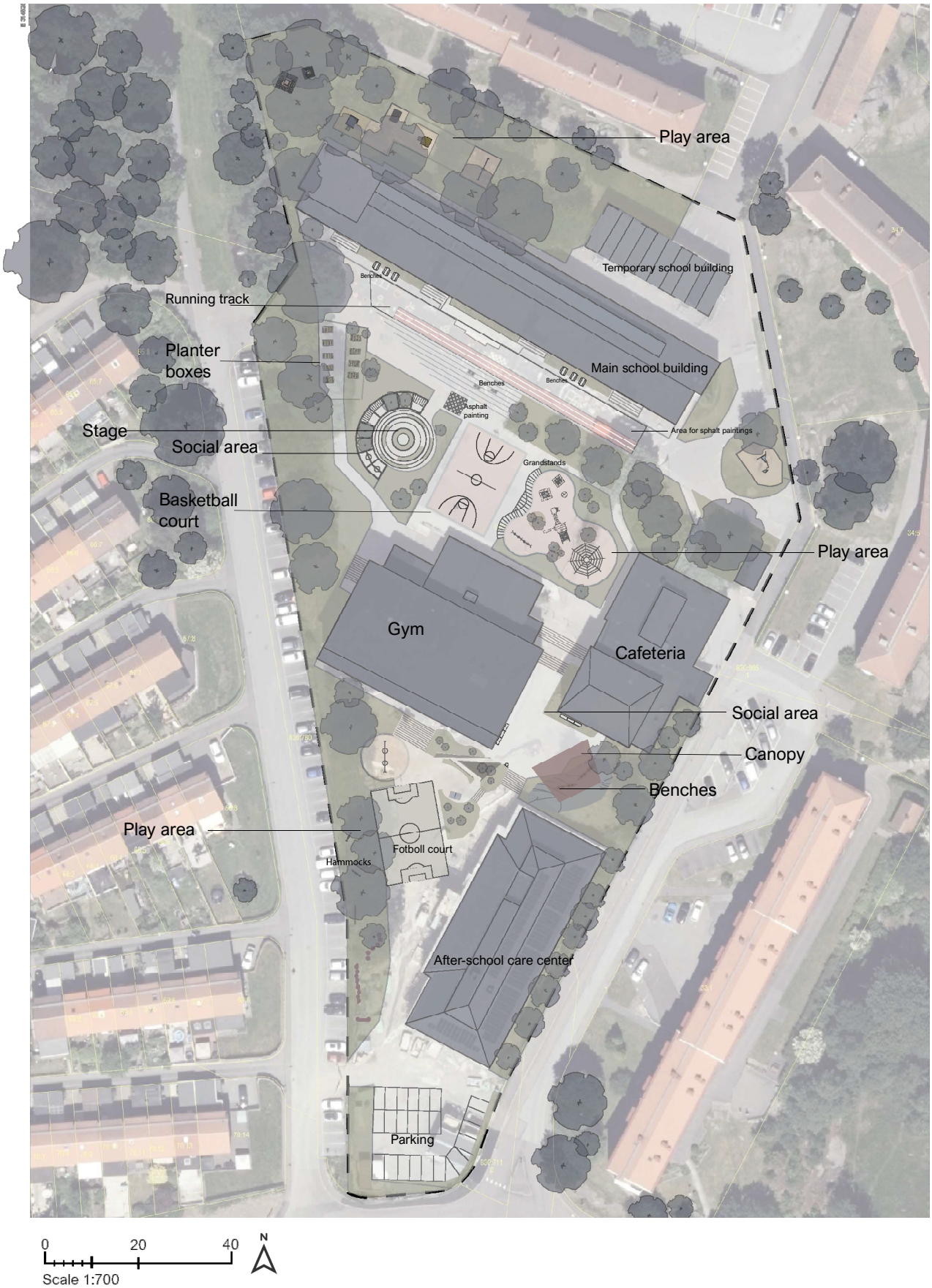

7


8

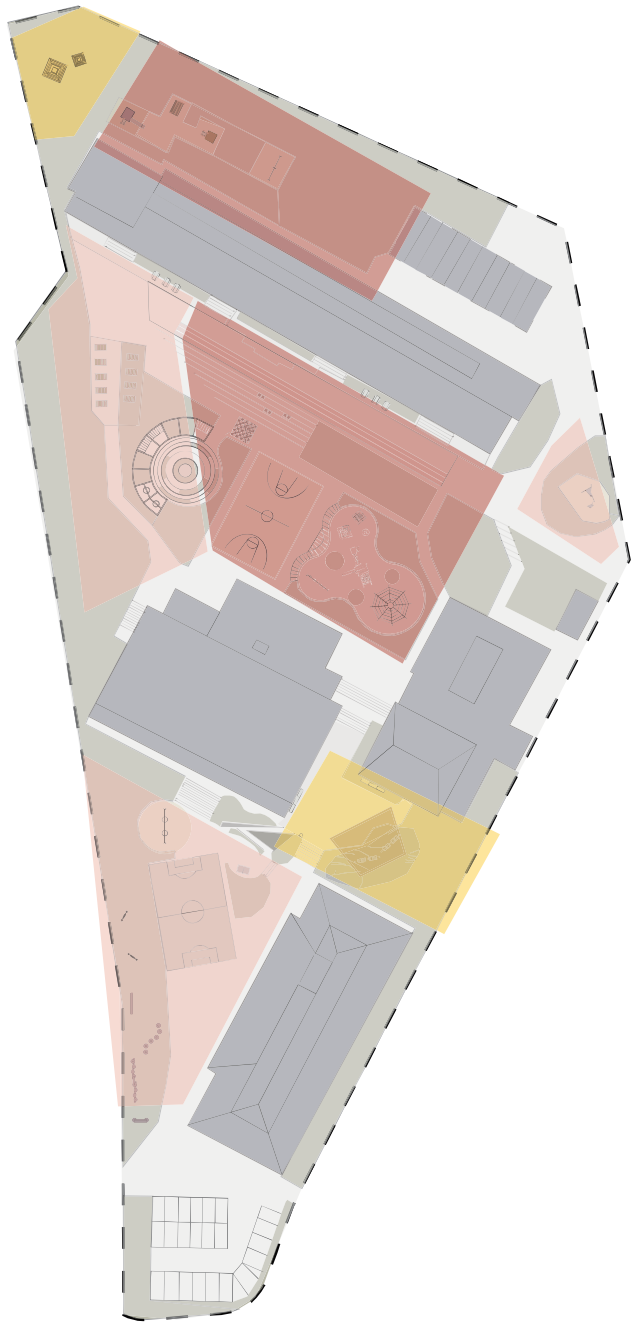

9


10

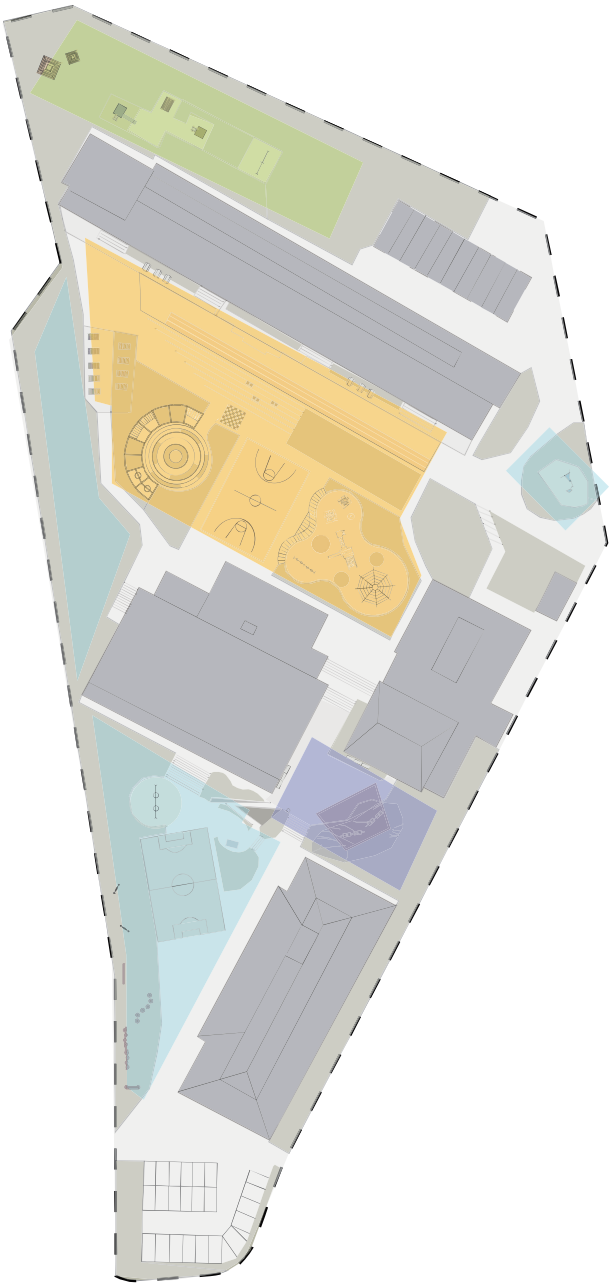
Applications



Zoning and spatiality



On-stage
Off-stage
Back-stage



Safe zones
Independent zone
Active zone
Recovery zone

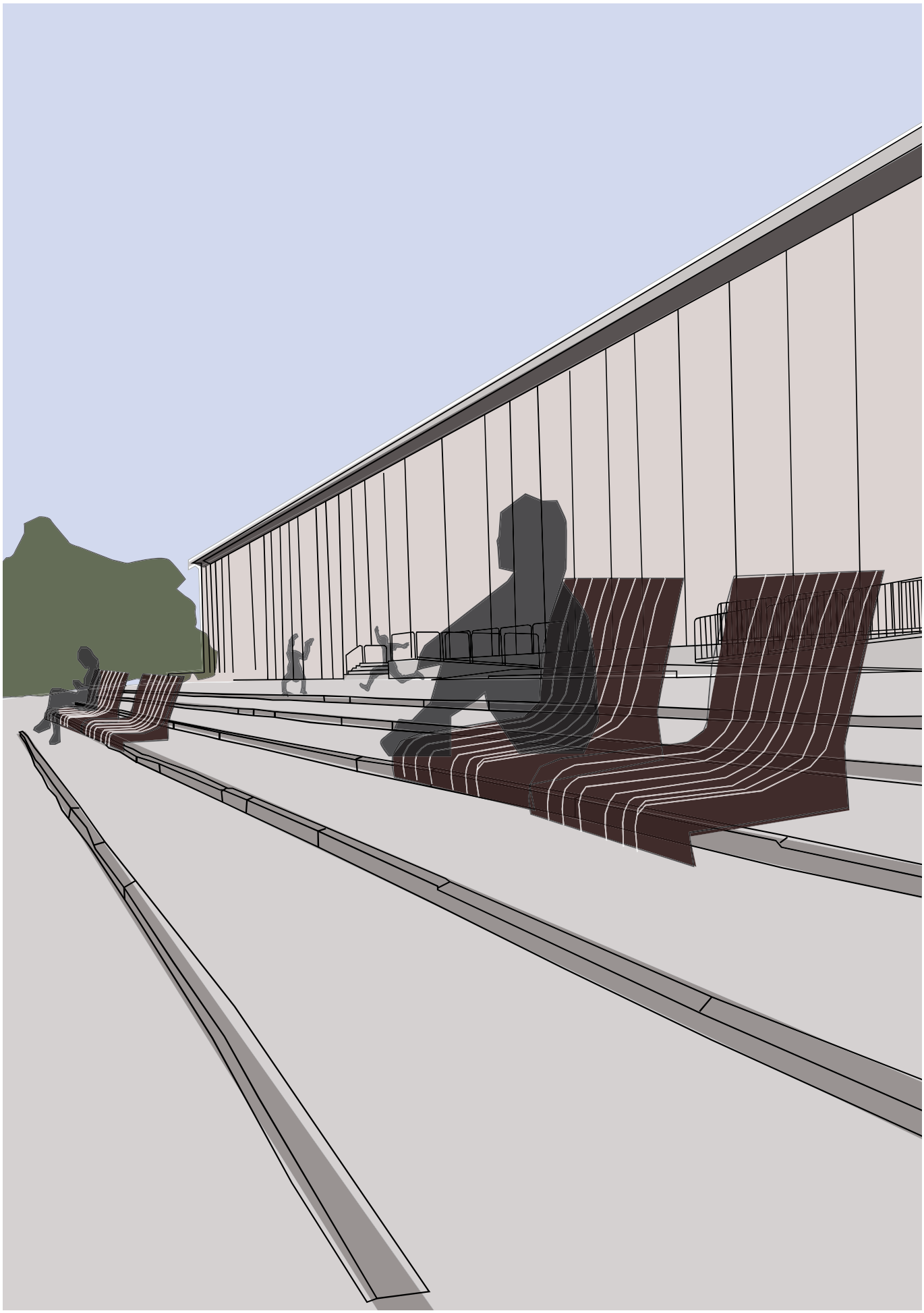
For this schoolyard as well, the concept has been based on the different parts and functions that allow children to express themselves through their various abilities and to be involved in their environment. Ryaschool is relatively large and has many different areas around the school premises between the school buildings. North of the schoolyard is an existing small play area integrated into the green space and surrounded by trees and nature. This part is retained and upgraded with huts and small houses to utilize the forest part on the west side and make it possible for play in the woods. This area is safe considering its direct connection to the school building. This area is mostly occupied by younger children at the school.

In the middle and in the central part of the schoolyard in front of the main building, there is currently a large, asphalted area with two interconnected basketball courts. These are replaced with a basketball court combined with a large play area with different types of activities for different ages. Between the playground and the basketball court, a grandstand is placed that can be used for various purposes, including as a spectator stand for basketball games, but also for resting or as a space for breaks, etc.

On the other side of the basketball court, a pergola is suggested with integrated greenery where benches and hanging armchairs are arranged. In front of this construction, an area with painted patterns on the asphalt is suggested, which can be used as a stage. Along the edges, areas for planting, etc., are suggested. In front of the main building and on the distinctive staircase, there is space for asphalt painting, while a running track is designated to utilize the long stretch. Low seating is placed on the stairs, overlooking the schoolyard. This entire central area constitutes an active zone with a lot of "on-stage" activity. At the same time, there are areas that represent "off-stage" opportunities for those who prefer to be present but only in the periphery.

To the south of the yard and between the school buildings, there is a secluded area with a "back-stage" character, featuring a basketball hoop and space for quieter gatherings. A shelter with benches anchored in the rock is suggested to make the space suitable for both quieter ball games and social interaction and recovery, mainly for older children.

To the south of the schoolyard, there is currently a converted area with a soccer field, a large swing, and space for table tennis, etc. This area is retained as it provides additional space for students to use and make their own. The area is currently heavily used due to a lack of alternatives but will likely transform into a more private "off-stage" area when other parts of the schoolyard are upgraded.



Low seating on the stairs, overlooking the schoolyard.

Under the pergola with integrated greenery

Communityskolan

The school facility is located on a terrace in western Gårdsten, with a direct connection to Dalen, a large central green area. The facility consists of two buildings positioned at an angle, connected by a roofed walkway that marks each building's main entrance. Both buildings are constructed on one level (the building with the cafeteria is partly underground towards the northeast.

History

The school was constructed as a primary and middle school by the architects Torsten Hansson and Per Persson and was put into use in 1971. The school was built with a central corridor and separate entrances for each class. In 1978, the entrances to the classroom building were expanded with eight small sheds with a connecting roof between them. The school can be understood as part of the entire “million program” that shaped Gårdsten. The low, contrasting scale is important in the environment between the high-rise buildings and the open green areas. Communityskolan is a representative of schools built in the late 1960s and early 1970s. During the million programs in the 1960s, which were low, scattered, with different entrances to signal equality and democracy (Jonsson & Lindman, 2021).

Facts about the preschool

Address: Kanelgatan 38, Angered, Gothenburg

Typology: 2 buildings in 1 floor linked by a roof

Location: Residential area, nature

Number of children: 260 children

Grades: 0 Free area and connections

Communityskolan has a solid but sprawling schoolyard. The yard is connected to the school building from almost all sides with entrances from both sides of the main building.

Facts about the schoolyard

Courtyard area: 7500 square meters accessible for children

Area per child: 29 square meters / child

Schoolyard division: Continuous courtyard on each side of the building, fenced on the elevation on the western side and downhill slope in the east side.

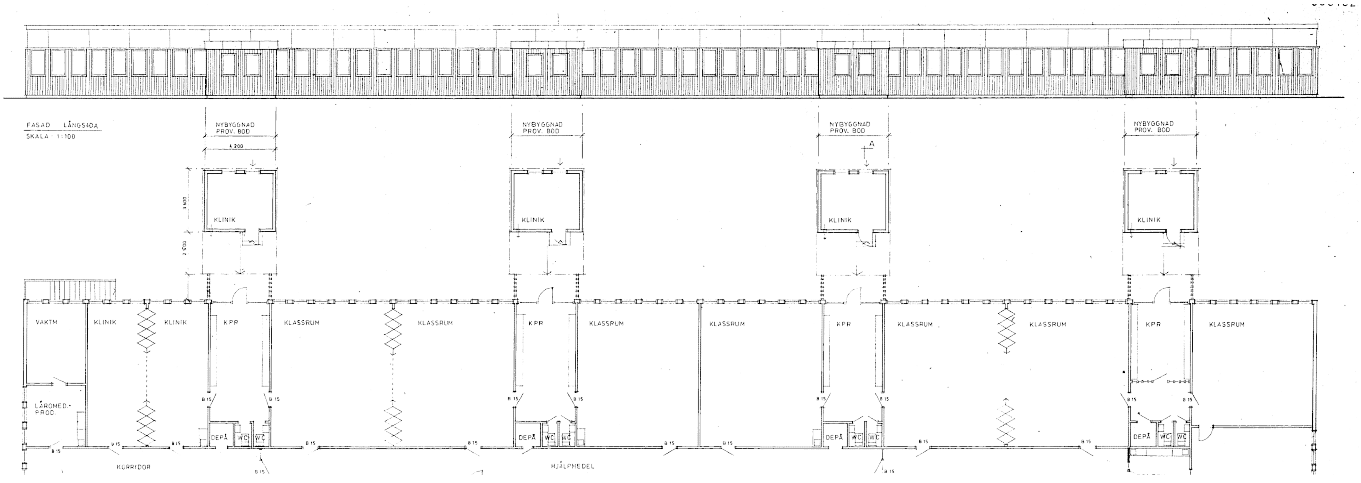
Natural ground cover: grass on the east slope, some bushes and tree plantings

Artificial ground cover: Mostly asphalt

Terrain: Flat throughout the main yard, with an elevated section on the western side and downhill slope in the east

Play equipment: basketball court, sandboxes, unusable play equipment.

Site analysis



Free area and connections

Communityskolan has a solid but sprawling schoolyard. The yard is connected to the school building from almost all sides with entrances from both sides of the main building.

Topography

The topography of the schoolyard is mostly flat, with a section elevated on the west side and a slope on the east side.

Vegetation

The vegetation in the schoolyard is limited to the slopes, where there are grass and tree plantings. In addition to that, there are green areas in the school's surroundings. The schoolyard has access to a small contiguous green area on the northern side. However, this area is located at the back of the school building, adjacent to the parking lot, which means that there is limited secure access to the area.

Division

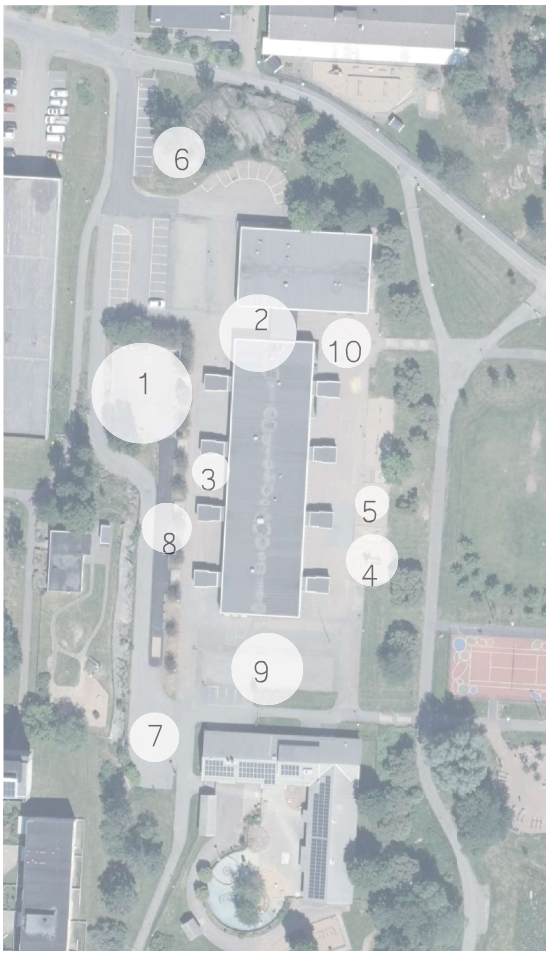
Communityskolan has different zones in the schoolyard but with limited resources, meaning that the zones can be identified but their full potential is not quite realized. Between each extension building, there are areas with seating etc. and a roof connecting the two school buildings together. An active zone is more difficult to define as the school building is in the middle of the schoolyard. This creates a flow around the entire school, not concentrated in one central area. The basketball court to the west and the sandboxes to the east are often occupied. The largest areas that can be discerned are the spaces between the extension buildings, where a somewhat enclosed area forms. More private areas are harder to define – the schoolyard is quite open, and there are no obvious private areas with limited visibility.

Gathering spots

Gathering can occur in various locations in the schoolyard, besides the spontaneous gatherings that can happen anywhere. Primarily, it's the basketball court with a few benches along the sides. Apart from that, there are limited seating areas in the schoolyard.

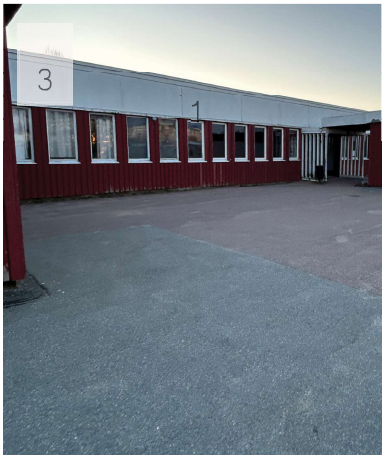
Educational activities

There are no apparent educational activities in the schoolyard.


6
2
10
1
3
5
8
4
9
7


1


2

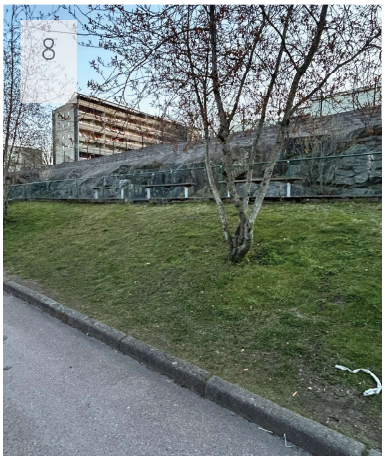

3

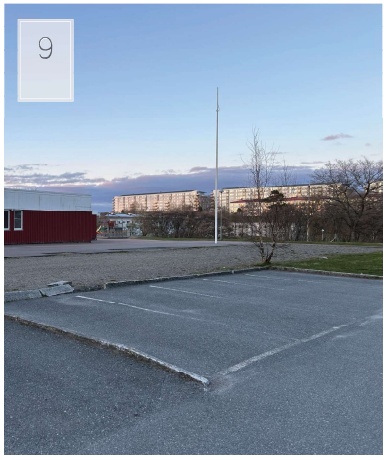

4


5


6

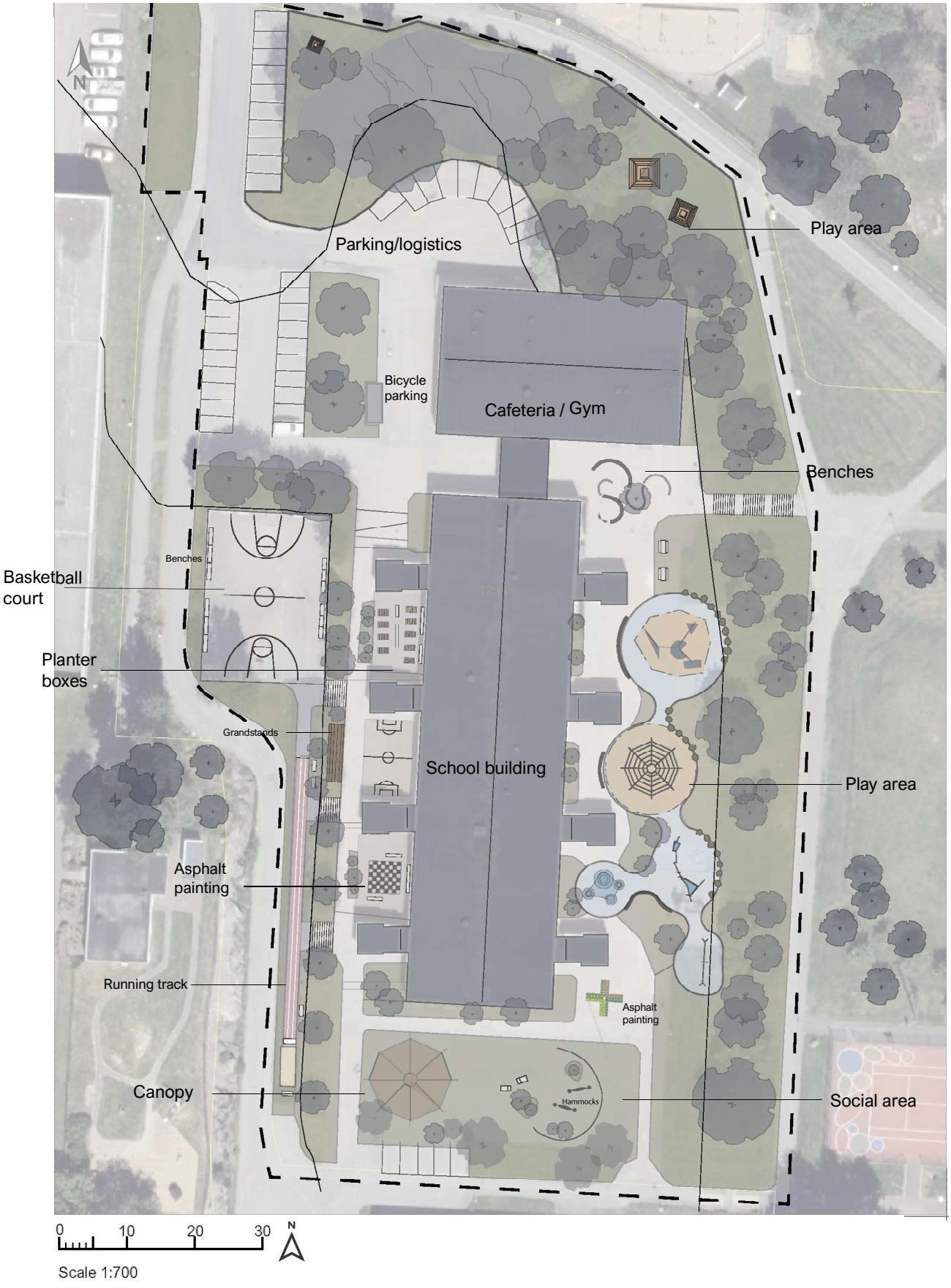

7


8

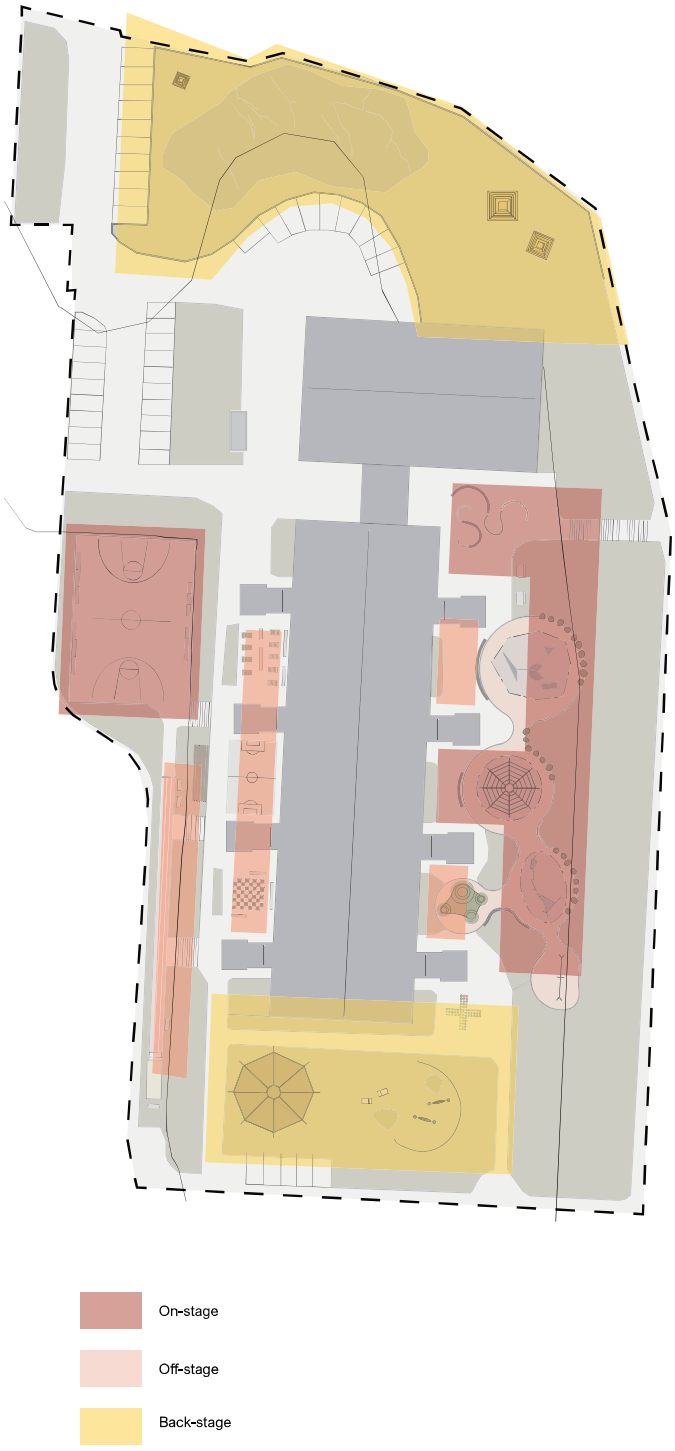

9

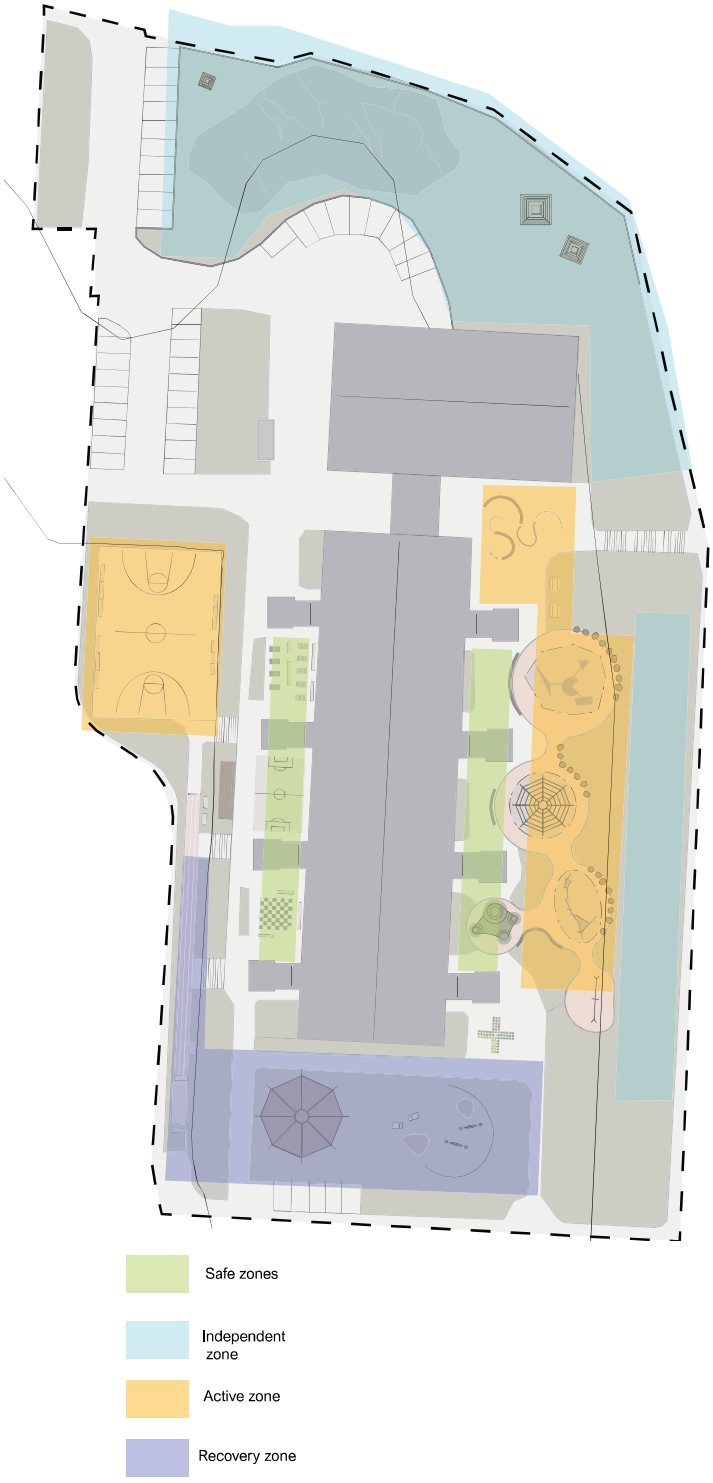

10

Applications



Zoning and spatiality



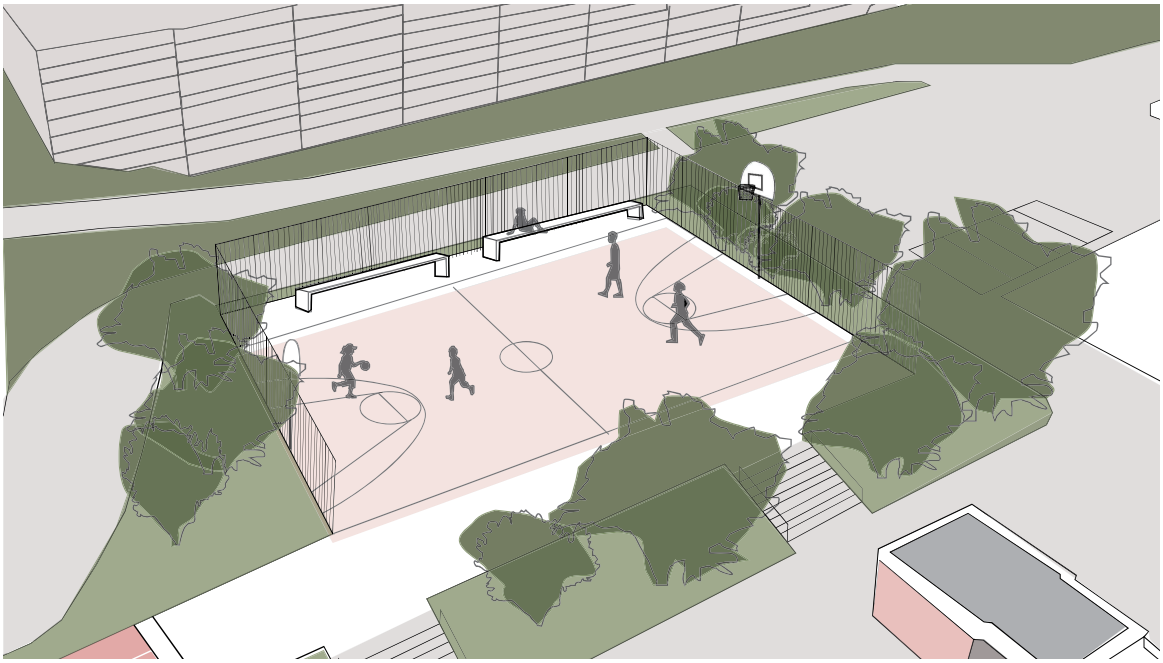


The overall goal in designing the schoolyard has been to meet the children's need to be activated and move, since this schoolyard doesn't provide that. Special emphasis has been placed on ensuring the children's opportunities to move in various ways during their time at school, regardless of their different conditions.

Communityskolan initially has a rather deficient schoolyard with almost no defined areas or equipment. In the suggested layout, the outdoor environment is divided into different zones for different activities, where the safe zones emerge between the buildings and constitute an area for each grade or group of students. The areas, which can be interpreted as both "on-stage" and "off-stage," consist of a mix of different activities such as smaller soccer fields, asphalt paintings, and playground equipment combined with benches and seating areas.

Furthermore, there is the active zone, the most readable "on-stage" area, which is the central part of the schoolyard on the eastern side of the school. In this area, the existing sandboxes are suggested to be reshaped and connected to form a larger play area with various activities such as climbing, crawling, swinging, etc. On the southern side of the field, which is secluded from the rest of the schoolyard and constitutes a "back-stage" spot, is a recreational area with a combination of seating and lying, as well as a canopy and grass with tree planting for separation and shade.

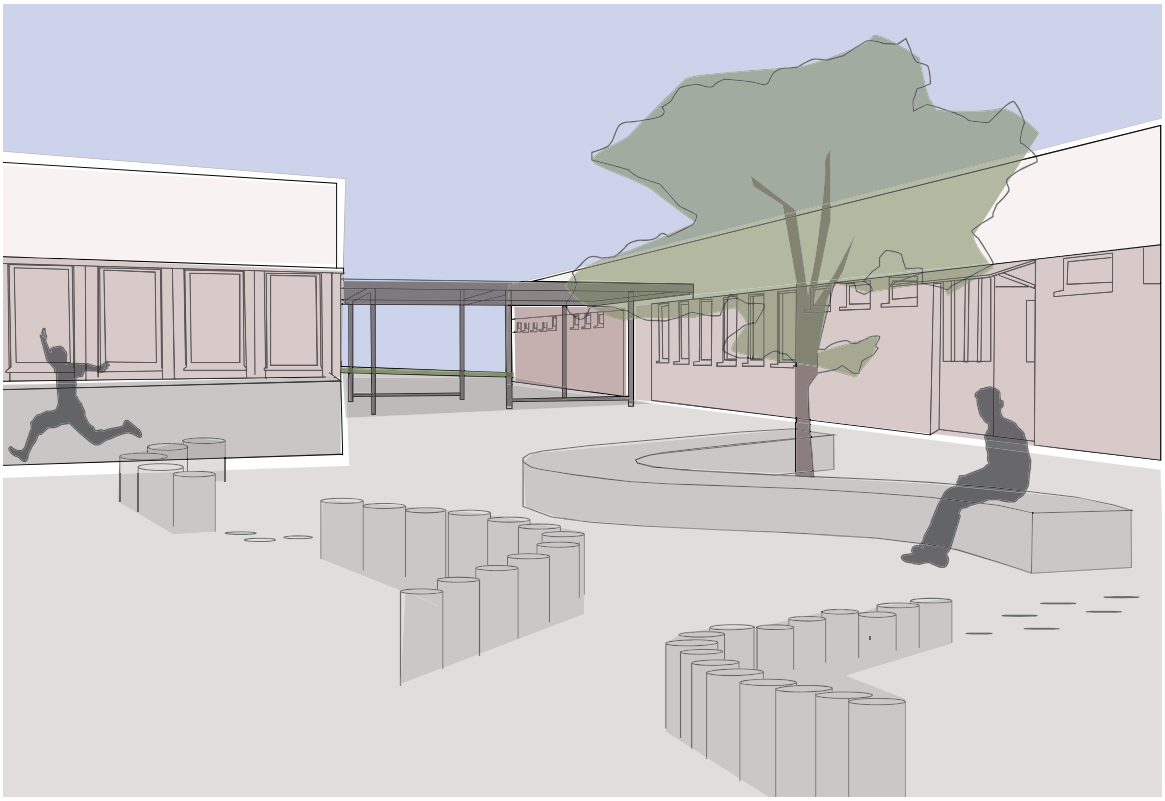
On the elevated part of the schoolyard west of the building, the basketball court remains with added seating spots for spectators, while the existing sandbox southwest of the court is used to create a running track combined with long jump opportunities. The area can be used by students during breaks but also during gym class, etc. North of the court, in the “forest” area that is almost unused today, fencing is suggested added to the parts bordering the car road, while small houses for play are added. Otherwise, the area is left for students to explore and create as they please, constituting an independent area as it is located away from the school buildings.



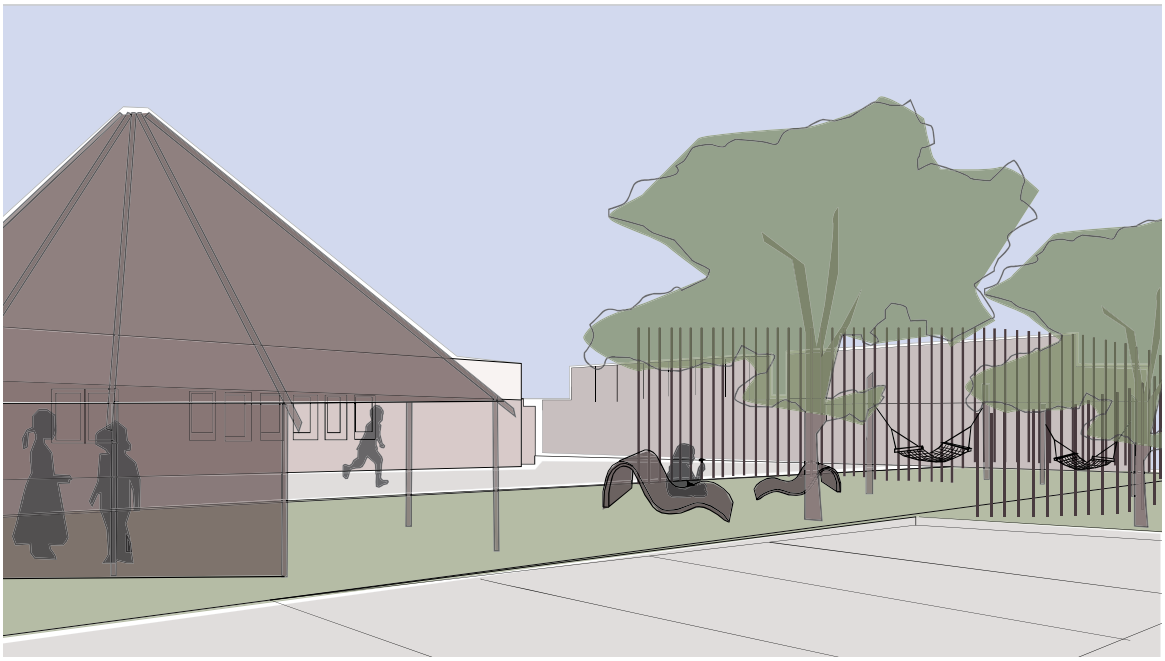
Basketball court remains with added benches for spectators,

Adjacent to the gym building and close to the cafeteria, a place for “hanging out” and social interaction is created. The place can be used as a meeting spot and outdoor dining area due to its location and the flow of people passing to and from the different parts of the school.

Existing trees on the site are preserved as they add significant architectural and ecological value. Otherwise, the design is based on the site's existing character, the buildings, and the seasonal interplay of vegetation.



A meeting spot / outdoor dining area



Secluded area with a combination of seating, as well as a canopy and grass with trees for separation and shade.

7.Discussion

I began this project with a reflection on how inadequate my own schoolyard was when I was a child in elementary school. As children, my friends and I could still find things to do and keep ourselves busy during breaks. Children need to play, and their need for play allows them to adapt to their environment regardless of conditions, perhaps as a survival strategy. We've seen, without drawing too many comparisons, children in wartime conditions who, despite hardship, find space for play. Despite children's adaptability, there are rights that everyone, but particularly children, have and that we must fulfill. One of these rights is the schoolyard as a place for all children.

The thesis focused on examining the history and utilization of schoolyards as part of its objective and its benefits on students' health. It has been very interesting to read and understand the historical development and how the schoolyard has been affected by various changes in society at large. The schoolyard becomes a place that reflects its present time. Because of today's many inadequate schoolyards that exist, this project ended up being a re-focus of the discussion from the number of square meters to how other spatial elements and features can be used to create a favorable and engaging school outdoor environment with different qualities.

The schoolyard as a place for children has remained as it always was, but its function has changed along with the evolving needs. Historically, the schoolyard served a homogeneous group of people with similar needs, whereas now it caters to a heterogeneous group of children with diverse needs. The case studies chosen for this project are all located in "vulnerable areas", according to the police, and means that these areas have different types of challenges, including socio-economic ones. In places with socio-economic challenges it is even more important that schools provide children with well planned an equipt schoolyards. Children in these areas may have limited resources to engage in after school activities that other children may be able to, due to lack of opportunity or economic reasons. For children in disadvantaged areas, where other social venues might be lacking, the schoolyard becomes an important arena for the social front. The fact is that despite children's right to a solid schoolyard, maintenance is lacking. From the visits to a number of schoolyards for this work, there seems to be a difference between schoolyards in Gothenburg. The schools differ in terms of equipment and quality. Schools located in suburbs with socioeconomic challenges tend to have less equipped schoolyards in comparison to other areas. Which leads to children having varying qualities of schoolyards that they often cannot influence.

What I tried in this work is to focus on how the division of the schoolyard can affect the supply and how different places can meet the children's different needs, with the means available in the existing fields. At the same time, how existing qualities can be utilized and reviewed. Spatiality has an impact on how we see, relate, and use a space. People contribute to the creation of space through their actions. An empty asphalt surface can surely be transformed into something else with the help of imagination and play ability. However, if there are only empty asphalt surfaces, a certain group of students will surely dominate the area with a certain type of activity, as discussed in the work earlier. The problem arises when other students do not get to take space and decide what activities they want to have on this empty surface. Perhaps these children must wait until the area is no longer occupied or adapt to how the space has been defined by the dominant or "strong" group in the schoolyard. Including zoning and spatiality in the design are

therefore important in creating inclusive schoolyards. It is not enough to install equipment but rather to reflect and define the reason for why it is situated in this area of the space. By defining the areas, one can ensure that different places can be dedicated to different activities and characteristics. In this way, children can choose the "room" they want to be in and make it their own. However, this should not be an argument for reducing the size of the schoolyards even more. It is in a combination of freespace division, zoning, maintenance that we can create a solid schoolyard.

As this work has emphasized, beginning with the play theory and later diving into its multifaceted benefits, several studies highlight the significance of the physical layout and environment of schoolyards in shaping children's play experiences. Factors such as the availability of space for different activities, the presence of natural elements, and the diversity of facilities impact how children utilize and perceive the schoolyard. For instance, the same place being used for different purposes. Crucial to acknowledge is that children's needs and preferences vary based on factors such as age, gender, and individual differences. Therefore, a one-size-fits-all approach is inadequate. Instead, a nuanced understanding of children's diverse interests and requirements is necessary. The conceptual and overarching aspects are a starting point in how a schoolyard is evaluated. It is these aspects that have been focused on and developed in this work. Firstly, the inherent qualities of the landscape and site, such as topography and vegetation, should be harnessed to develop schoolyards that connect with the surrounding landscape. Secondly, the size, this aspect can affect spatial arrangement but is not the definitive quality that a schoolyard can offer. Moving on to different zoning, and spatial arrangements like On- off- and backstage spaces. These aspects have certain characteristics which create variations. Lastly, the different elements that can increase opportunities for different types of activities and engagements. These design guidelines have been formulated from looking at how we have historically used the schoolyard, the advantages and disadvantages of this development, as well as the benefits and guidelines that already exist today.

The purpose of this work has not been to come up with a manual for how a schoolyard should be designed. But a comprehensive historical perspective of the subject with a focus on the architecture and how these have influenced our view of schoolyard design today. Secondly, a broader view of how we should review our schoolyards in relation to how these affect children and what qualitative elements we should take advantage of. Lastly, research by design process in which the process of designing has been used as a method to develop general guidelines for schoolyards that are applicable to different kinds of places.

In this study, only a small aspect has been examined, and one could make the analysis even broader and more detailed. Given the societal development we see today, competition for land will increase, especially in large cities. This means increasing limitations in space. With such a development, the demands to adapt children's outdoor environments to new challenges also increase. As an architect and planner, it is important to continuously develop competence in the subject and include it in the planning phase as well as in the subsequent management. By continuously evaluating and adapting the design we can create functional schoolyards that support a positive learning environment for all children in Sweden.

8.References

Barrett, P. et al.,"The Impact of School Infrastructure on Learning – a synthesis of evidence", The World Bank, 2019.

Bjurström, P. (2017). "Sextio år av skolbyggande. Idé och verklighet." I: de Laval, S. (red). "Skolans nya rum – en antologi om samspelet mellan pedagogik och arkitektur". Arkus. Klippan.

Bredberg, Eva. (2003). "Mitt bästa gömställe ligger där borta" om några barns upp- levelser av sin skolgård. Lärarhögskolan i Stockholm. Institutionen för samhälle, kultur och lärande.

Boverket (2020). Strategiska ställningstaganden och vägval. https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/skolors-miljo/strategiska-vagval/ [2023-11-29]

Boverket (2021). Utemiljöns funktioner och struktur gestaltas utifrån verksamhetens behov. https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/skolors-miljo/byggnaden-och-utemiljon/utemiljons-struktur/ [2023-11-29]

Boverket (2021). Lärmiljöer utomhus. https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/skolors-miljo/byggnaden-och-utemiljon/fysisk-larmiljo/larmiljoer-utomhus/ Hämtad 2024-04-01.

Boverket (2023). Friyta för lek och utevistelse för förskolor och skolor. https://www.boverket.se/sv/PBL-kunskapsbanken/regler-om-byggande/krav-pa-byggnadsverk-tomter-mm/krav-pa-tomter/friyta-for-lek-och-utevistelse-for-forskolor-och-skolor/ [2023-11-29]

Boverket (2022). Vägledning om förskolors och skolors fysiska miljö. https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/skolors-miljo/ [2023-11-29]

Boverket (2021). Lärmiljöernas arkitektur speglar sin samtid – i går, i dag och i morgon. https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/skolors-miljo/strategiska-vagval/larmiljoer/ Hämtad 2024-02-28.

Boverket (2021). Barn och ungas delaktighet. https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/skolors-miljo/strategiska-vagval/barn-och-ungas-delaktighet/ Hämtad 2024-02-28.

Boverket (2022). Skolgårdarnas ytor fortsätter att minska. https://www.boverket.se/sv/samhallsplanering/stadsutveckling/barns-och-ungas-utemiljo/nationell-kartlaggning-visar-att-skolgardarna-krymper/ Hämtad 2024-02-28.

Boverket (2020). Storlekens betydelse – för och nackdelar med stora eller små enheter. https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/skolors-miljo/strategiska-vagval/storlekens-betydelse/ Hämtad 2024-02-28.

Boverket (2021). Ta tillvara tomtens förutsättningar. https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/skolors-miljo/byggnaden-och-utemiljon/utemiljons-struktur/tomtens-forutsattningar/ Hämtad 2024-02-28.

Boverket (2021). Utemiljöns zoner. https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/skolors-miljo/byggnaden-och-utemiljon/utemiljons-struktur/utemiljons-zoner/ Hämtad 2024-02-28.

Boverket (2021). Utemiljöns funktioner och innehåll. https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/skolors-miljo/byggnaden-och-utemiljon/utemiljons-struktur/utemiljons-funktioner/ Hämtad 2024-02-28.

Boverket (2021). Orienterbarhet i utemiljön. https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/skolors-miljo/byggnaden-och-utemiljon/utemiljons-struktur/orienterbarhet-i-utemiljon/ Hämtad 2024-02-28.

Boverket (2021). Trygghetsskapande gestaltning i utemiljön. https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/skolors-miljo/byggnaden-och-utemiljon/utemiljons-struktur/trygghetsskapande-gestaltning-i-utemiljon/ Hämtad 2024-02-28.

Boverket och Movium. (2015). Gör plats för barn och unga!: En vägledning för planering. Karlskrona: Boverket.

Experience Builder System. (n.d.) Experience. https://experience.arcgis.com/experience/dea3783b0b034b97b8998ddb9a7bf3b4

Friluftsfrämjandet. (n.d.). Vad säger forskningen om barns rörelse? https://www.friluftsframjandet.se/detta-gor-vi/forskolor-och-skolor/pedagogiken/vad-sager-forskningen-om-barns-rorelse/

Gitz-Johansen, Thomas, Kampmann, Jan & Kirkeby, Inge Mette. (2001). Samspil mellem børn og skolens fysiske ramme. Danmark: Rum, Form Funktion

Göteborgs stadsmuseum (n.d.). Skolbyggnader i Göteborg. https://goteborgsstadsmuseum.se/kulturmiljo/artiklar/skolbyggnader-i-goteborg/
Historia – Barnkrubban. (n.d.). Barnkrubban – Adolf Fredriks och Gustav Vasa Barnkrubba. http://barnkrubban.se/historik/
Jansson et al. 2021. Rum för skolans utemiljö – Fördjupad analys kring yta för utemiljö på skola och förskola. Sveriges Lantbruksuniversitet, Institutionen för landskapsarkitektur, planering och förvaltning. (Opublicerad).

Jonsson, K., & Lindman, M. (2021). Kunskapsbyggen: Kulturhistorisk inventering av Göteborgs skolhus från åren 1950-2000. Kulturmiljörapport, 2021(8), Göteborgs Stadsmuseum, Göteborgs stad.

Jungmark, L., & Åkerblom, P. (2015). Skolgården: Förvaltning och utveckling av förskole- och skolgårdar. Stockholm, Sverige: Sveriges Kommuner och Landsting.

Kristenson, H. (2005). "Skolhuset – idé och form". Bokförlaget Signum. Lund.

Kylin, M. (2004). Från koja till plan. Om barnperspektiv på utemiljön i planeringssammanhang. Alnarp: Sveriges

Lantbruksuniversitet.
Playground@Landscape. (2023).The schoolyard as an exercise-oriented social space in all-day schools https://playground-landscape.com/en/article/2695-the-schoolyard-as-an-exercise-oriented-social-space-in-all-day-schools.html

Larsson, A., Norlin, B., & Rönnlund, M. (2017). Den svenska skolgårdens historia: Skolans utemiljö som pedagogiskt och socialt rum. Falun: ScandBook.
Learning through Landscape. (n.d). The Good School Playground Guide: Developing School Playgrounds to Support the Curriculum and Nurture Happy, Healthy Children.

Lindholm, Gunilla. (1995). Skolgården - vuxnas bilder - barnets miljö. Stad & Land nr 129: 1995. Institutionen för landskapsplanering Alnarp, SLU.

Lindblad, Bodil (1993). Skolgården - barnens frirum, studie av en skolgårdsmiljö betraktad ur ett utvecklingspsykologiskt perspektiv. SB:58. Gävle: Meyer Information & Förlag.

Livsmedelsverket (2016). Så mycket rör sig ungdomar i Sverige. https://www.livsmedelsverket.se/globalassets/publikationsdatabas/rapporter/2020/2020-riksmaten-ungdom-del-3-fysisk-aktivitet.pdf

Loftsson, M. (2022). Mobbningens förekomst: Tre barn utsatta i varje klass

Mårtensson, F, (2004). The Landscape in children's play: A study of outdoor play in preschools (avhandling) Alnarp SLU, Agraria 464

Mårtensson, F., C. Boldemann, M. Söderström, M. Blennow, J-E. Englund, och P. Grahn, (2009). "Outdoor Environmenta Assessment of Attention Promoting Settings for preschool children – part of salutogenic concept." I: Health and place 15, nr 4: 1149-1157.
Mårtensson, F., Jensen, E. L., Söderström, M., & Öhman, J. (2011). Den nyttiga utevistelsen? Forskningsperspektiv på naturkontaktens betydelse för barns hälsa och miljöengagemang. Bromma: Naturvårdsverket.

Mårtensson, F., Jensen, E. L., Söderström, M., & Öhman, J. (2011). Den nyttiga utevistelsen? Forskningsperspektiv på naturkontaktens betydelse för barns hälsa och miljöengagemang. Stockholm, Sverige: Naturvårdsverket.

(Männik, M.-L., Philipson, K., & Linnros, F. (2018). Förskolegårdens friyta i förhållande till naturliga material. White research lab WRL 2017:26.)

Nilson, L., & Nordenknekt, M. (n.d). Verktyg för utformning av framtidens skolmiljöer [Rapport].

Nordström, M. Med eller utan skolgård - gör det någon skillnad? I: de Laval, S. (red). (2014). Skolans och förskolans utemiljöer – kunskap och inspiration till stöd vid planering av barns utemiljö. s.39-44. Stockholm: Skolhusgruppen.

Norman, D. (n.d) What is participatory design? https://www.interaction-design.org/literature/topics/participatory-design

Pellegrini, A. D. (2005). Recess: Its Role in Education and Development (Developing Mind). Lawrence Erlbaum Associates.
Pellegrini, A. D., & Bohn, C. M. (2005). The Role of Recess in Children's Cognitive Performance and School Adjustment. Educational Researcher, 34(1), 13–19. https://doi.org/10.3102/0013189X034001013

Polisen. (2023). Utsatta områden. https://polisen.se/om-polisen/polisens-arbete/utsatta-omraden/ Hämtad 2024-05-05

Åkerblom, P. (2005). Footprints of School Gardens in Sweden. Uppsala: Department of Landscape Planning Ultuna, Swedish University of Agricultural Sciences (SLU)

PlayEquip (n.d.). Designing the Perfect School Playground I Harness Creativity and Learning.https://playequip.com/designing-the-perfect-school-playground-a-blueprint-for-creativity-and-learning/

Recess guardians, N. R. (2022, March 25). Recess and Cognitive Development. Copy RG Site. https://www.recessguardians.org/post/recess-and-cognitive-development

Sanne L. Nijhofa, Christiaan H. Vinkersb,c, Stefan M. van Geelend, Sasja N. Duijffd, E.J. Marijke Achterberge, Janjaap van der Netf, Remco C. Veltkampg, Martha A. Grootenhuish, Elise M. van de Puttea, Manon H.J. Hillegersi, Anneke W. van der Brugj, Corette J. Wierengak, Manon J.N.L. Bendersl, Rutger C.M.E. Engelsm, C. Kors van der Entj, Louk J.M.J. Vanderschurene, Heidi M.B. Lesschere. (2018). Healthy play, better coping: The importance of play for the development of children in health and disease. doi: https://doi.org/10.1016/j.neubiorev.2018.09.024

Schmidt, Lene. (2004). Skolegården, jungel eller luftegård? En studie av nærmiljøanlegg, barn og fysisk aktivitet i skolegården. Norsk institutt for by- och regionforskning. NBR-rapport 2004:1.

Skollokaler Örnsköldsvik (2020). Idrottsämnets historia. https://skollokalprojektet2014.wordpress.com/2020/11/04/idrottsamnets-historia/#:~:text=Det%20var%20i%20folkskolestadgan%20från,om%20det%20ens%20fanns%20några.

Skolverket. (2023). Skolplikt och rätt till utbildning. https://www.skolverket.se/regler-och-ansvar/ansvar-i-skolfragor/skolplikt-och-ratt-till-utbildning

SO-rummet (n.d.).Folkskolan. https://www.so-rummet.se/kategorier/folkskolan
Statistikmyndigheten (2022). Folkmängd i riket, län och kommuner 31 december 2022 och befolkningsförändring 2022. https://www.scb.se/hitta-statistik/statistik-efter-amne/befolkning/befolkningens-sammansattning/befolkningsstatistik/pong/tabell-och-diagram/folkmangd-och-befolkningsforandringar---helarsstatistik/folkmangd-i-riket-lan-och-kommuner-31-december-2022-och-befolkningsforandringar-2022/ [2023-11-29]

Statistikmyndigheten (2020). Friyta per kommun. https://experience.arcgis.com/experience/dea3783b0b034b97b8998ddb9a7bf3b4 [2023-11-29]

Statistics Sweden (2022), Primary and secondary schools and the outdoor school environment

Stockholms stad. (2019). Måldokument för skolgårdar.

Svenska Dagbladet. (2019). ”Barnen måste få plats på riktigt i städerna” | SvD Debatt. SvD.se. https://www.svd.se/a/e1bjVO/barnen-maste-fa-plats-pa-riktigt-i-staderna

Sveriges Arkitekter, (2022). Arkitektens valenkät, fråga 8:Friytor. https://arkitekten.se/nyheter/arkitektens-valenkat-fraga-8-friytor/.

Sveriges Kommuner och Regioner, (2018). ”Om sambandet mellan skolstorlek och utbildningsresultat.”
Sveriges riksdag. (2010). Start Plan- och bygglag (2010:900) .https://www.riksdagen.se/sv/dokument-och-lagar/dokument/svensk-forfattningssamling/plan--och-bygglag-2010900_sfs-2010-900/

Tanis, D. J. (2012). Exploring play/playfulness and learning in the adult and higher education classroom. Sverige Arkitekter. Arkitektens valenkät, fråga 8: Friytor

Thorén, K. H., Nordbø, E. C. A., Nordh, H., & Ottesen, I. Ø. (2019). Uteområder i barnehager og skoler – Hvordan sikre kvalitet i utformingen. Norges Miljø- og biovitenskapelige universitet, Fakultet for landskap og samfunn.

UNICEF Sverige (n.d.). Läs hela barnkonventionen. - FN:s barnrättsorganisation | unicef.se. https://unicef.se/barnkonventionen/las-texten

United Nations (n.d) The 17 Goals. https://sdgs.un.org/goals [2023-11-29]

United Nations (n.d) Ensure healthy lives and promote well-being for all at all ages. https://sdgs.un.org/goals/goal3 [2023-11-29]

United Nations (n.d) Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. https://sdgs.un.org/goals/goal4 [2023-11-29]

United Nations (n.d) Make cities and humans settlements inclusive, safe, resilient, and sustainable. https://sdgs.un.org/goals/goal11 [2023-11-29]

United Nations Childrens Fund (UNICEF) (2018). Shaping urbanization for Children: A handbook on child-responsive urban planning.

NSW Government, (2023). Universal Design for Learning. https://education.nsw.gov.au/teaching-and-learning/curriculum/planning-programming-and-assessing-k-12/about-universal-design-for-learning

Vårdgivarguiden (2023). Fysisk aktivitet https://vardgivarguiden.se/fysiskaktivitet

1177 (2018). Så utvecklas barn av att leka.https://www.1177.se/barn--gravid/sa-vaxer-och-utvecklas-barn/lek-och-sagor/sa-utvecklas-barn-av-att-leka/

Images

Image 1.Popularhistoria.se. (2020). Skolstart: Den svenska folkskolans historia [Online image]. Retrieved from: https://popularhistoria.se/samhalle/utbildning/skolstart-den-svenska-folkskolans-historia

Image 2.DigitaltMuseum. (2014). Krokslätts skolan: Skolpalats byggt 1911 [Online image]. Retrieved from: https://digitaltmuseum.se/011014632692/krokslattsskolan-skolpalats-byggt-1911

Image 3.DigitaltMuseum. (1974). Skolgård vid Glanshammars skola [Online image]. Retrieved from: https://digitaltmuseum.se/021011395661 8/skolgard-vid-glanshammars-skola-1974

Image 4.Stadsarkivet Örebro. (2016). Idrottkroppochhälsa. [Online image]. Retrieved from: https://extra.orebro.se/stadsarkivet/berattelserurarkiven/berattelserurarkiven/idrottkroppochhalsa.5.242f1fb1556288bfbf459f7.html

Image 5.Popularhistoria.se. (2002). Fysisk fostran. [Online image]. Retrieved from: https://popularhistoria.se/vardagsliv/hygien-halsa/fysisk-fostran

Image 6.Larsson, A., Norlin, B., & Rönnlund, M. (2017). Den svenska skolgårdens historia: Skolans utemiljö som pedagogiskt och socialt rum. Falun [Book image]

Image 7. Undervisningshistoria.se. (2018). Trädgården som bildningsmonster och pedagogisk modell under 1800-talet. [Online image]. Retrieved from: https://undervisningshistoria.se/tradgarden-som-bildningsmonster-och-pedagogisk-modell-under-1800-talet/

Image 8. Statens planverk. (1972). ”Bostadens grannskap, råd och anvisningar för planering. Rapport 24 remisshandling”. Allmänna förlaget. Stockholm. Retrieved from: https://www.boverket.se/sv/samhallsplanering/arkitektur-och-gestaltad-livsmiljo/arbetssatt/skolors-miljo/strategiska-vagval/larmiljoer/

Image 9. Åkerblom, P. (2005). Footprints of School Gardens in Sweden. Uppsala: Department of Landscape Planning Ultuna, Swedish University of Agricultural Sciences (SLU). [Article image].

Image 10-13. United Nations (n.d). Sustainable Development Goals. Communications materials.[Online image]. Retrieved from: https://www.un.org/sustainabledevelopment/

Image 14. (Männik, M.-L., Philipson, K., & Linnros, F. (2018). Förskolegårdens friyta i förhållande till naturliga material. White research lab WRL 2017:26.) [Diagram]

CHALMERS
UNIVERSITY OF TECHNOLOGY