Room to Grow

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Master's Thesis in Architecture: Room to Learn

Chalmers University of Technology
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Examiner: Liane Thuvander
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Abstract

The purpose of this thesis is to discuss the wellbeing of school children, and the urban problem of children's disconnectedness from nature. Mental health related issues amongst school children have been on the rise in Sweden since the 1980s', and research suggests that a connection to nature is essential for the prevention of several mental health related issues, and can increase our ability to recover from stress, and boost our creativity and productivity. A connection with nature is thus a vital part of being human, but the increasing divide between the young and the natural world comes with great concerns for healthy child development.

The thesis questions how an architect can design urban learning environments to reconnect children with nature, and the aim is to critically evaluate the built learning environment and explore what a school could look like and be. Research for the thesis has been conducted through literature, interviews, site visits and mapping and interviews. A specifically chosen school in Gothenburg is the focus for exploratory development. The result is a conceptual challenge to the urban learning environment, with the hopes of offering a new approach to student health.

Nature for me is an invaluable place for recuperation and mindfulness, and just by spending time in natural environments I feel more connected to the earth I inhabit. As an aspiring architect I believe it is the role of my profession to always strive for an improvement of the environments around us, to work through spatial agency towards a resilient future. I'm convinced that a better future can be reached through strengthening society's connection to nature.

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About the Author

As a nature-enthusiastic dog lady, living on the countryside east of Gothenburg, one can often find me wandering through the richly forested and wildlife-dense area where I live. Spending time in nature is important to me, and the health benefits of integrating nature in the built environment is a topic I started looking into during my bachelor years at Chalmers. After finishing my bachelor's degree I went on to studying for a bit at the Swedish University of Agricultural Sciences (SLU), where I attended courses in environmental perception and experience. This allowed me to dig deeper into my field of interest, and since starting the master programme MPDSD at Chalmers, I've incorporated aspects of these learnings into every project, as well as developed my understanding of them even more. My future hopes are that I'll be able to continue working within this field of architecure after graduation.

Definitions

Before continuing to read through this thesis, take note of the following definitions of words and phrases used throughout this booklet.

EQUITY
In contrast to equality which divides resources equally, equity also includes differences in need and ability amongst people. Depending on socioeconomic status and race, people can require various kinds and levels of support to be ensured the same opportunity to succeed at different things in life.

JUSTICE
If equity is sustained long-term, and on a larger scale, it becomes justice. Justice is the aim to have equitable systems and individuals in a sustainable society.

LEARNING ENVIRONMENTS
Includes not just the school grounds but also the surrounding areas, spaces, and roads that children frequent each day.

NATURE
In the context of this thesis, nature is the word used to describe the 'natural' features of the earth, such as plants, insects, animals, and different landscapes. Nature does thus not include human made shapes and materials. Nature is part of the wild world.

GREENERY
In contrast to nature, the word "greenery" is used to describe human-made spaces and attributes that include plants and different landscapes.

EQUITABLE learning **environment** for healthy **CHILD** development

ACCESS to **nature** in an urban **SCHOOL** setting

environmental **JUSTICE** for **HUMANS** and **nature** alike

INCREASE community **RESILIENCE**

CHILDREN must be given **Opportunity** to **CLAIM** more **SPACE** in urban settings

Connections with **NATURE** are unconscious and **VITAL** parts of being **HUMAN**

The **role** of the **ARCHITECT** is to carry a **social** and **environmental** **RESPONSIBILITY** towards **humans** and **nature** alike

CHILDREN must become **ACTIVE SUBJECTS** in **urban** projects

SPATIAL **justice** for the **EXPERIENCE** and usage of space

environmental design to **PROMOTE** human **health** & **wellbeing**

nature in the learning environment to **BOOST** student **RESULTS**

01.

Introduction

Background

MENTAL HEALTH

The cases of mental health issues are increasing all over the world (Nyheter, Ekot, 2018), and in 2020, 7% of Swedish inhabitants, between the ages of 16-84, reportedly suffer from mental health related issues, according to Folkhälsomyndigheten (the Swedish Public Health Authority, 2020). Additionally, Försäkringskassan (the Swedish Social Insurance Administration, 2021) reports that out of all the people on sick leave in Sweden during 2020, almost 50% reported being sick because of different kinds of mental health related issues, which makes sick leave caused by mental illnesses the most common form of sick leave in Sweden today. Every fourth year, Folkhälsomyndigheten (2021) sends out a survey where school children in Sweden, of the ages 11, 13 and 15 years old, are asked to answer questions regarding their lifestyle and health. Folkhälsomyndigheten states that, based on the results of these surveys, mental health issues have continuously increased amongst children since the 1980s.

Research has shown that school results are tightly intertwined with mental health, according to Uppdrag Psykisk Hälsa (2021), and sadly the school environment sometimes contributes to health issues. In 2010, a new school law was legislated in Sweden. It states that Elevhälsan (an assembled student health operation), consisting of a school doctor, school nurse, psychologist, wellfare officer as well as staff educated in special pedagogy, should be available to all students. This student health operation should promote health by prevention and contribution to the school environment and improve student's learning capacity, development, and health. The law also states that this operation must support student's progress towards meeting the goals of the education. Unfortunately, according to Skolverket (The Education Administration, 2021) only 85% of Swedish school children graduate 9th grade with good enough grades to get accepted into gymnasiet (upper secondary school/high school). And the differences in school results between schools within Gothenburg's municipality are alarming. For example, at the school with the highest results, Göteborgs Högre Samskola which is situated in Göteborg Centrum, 98,7% reach the knowledge demand. But, at Gårdstensskolan in Angered only 28% of the 9th grade students reach the knowledge demand.

NATURE & WELLBEING

In her book "Sinnenas trädgård" Westerberg (p. 131, 2011) discusses and reflects upon how we today, for the first time in history, have more people living in cities than on the countryside. Up until the industrialism in the 19th century, human survival was closely interconnected with nature, but today we've become more and more urbanised and, in some ways, stopped living in symbiosis with nature. Since our urbanised lifestyle has only existed a fraction of the time we've spent in nature, one might imagine that this change comes with great concern for our health. According to Gayle Souter-Brown (2015) a connection with nature is an unconscious yet vital part of being human, and it is useful for the prevention of different mental health conditions. There is evidence that exposure to natural environments enhances human's abilities to recover from illnesses and stress, and we're provided with several social, psychological, and physiological benefits such as improved blood pressure, restored cognitive attention, increased self-esteem, and increased community resilience (Souter-Brown, p. 1, 2015). Mental illnesses are largely considered a societal burden because of the profound financial and social impact on individuals, community, and economies, and Souter-Brown means that environmental design can be the most cost-effective and efficient prevention and fight against mental health related issues (p. 2, 2015). Often, urbanized spaces are not very supporting environments (Souter-Brown, p. 4, 2015) and schools can benefit a lot by incorporating more nature in the learning environment. Souter-Brown argues that this can boost results of their students, which will attract more funding, more students, whilst simultaneously building a more resilient community.

The role of the architect is to always strive for an improvement of the environment, and always try to contribute to social and environmental wellbeing and understanding. Barton (p. 272, 2017) suggests that one should always have the professional and ethical stance to create places that are healthy, that it should be the default for all architects. He also contemplates on whether architects should, like doctors, swear an oath. An oath to always promote healthy urban environments for all. This somewhat radical idea is very intriguing, and a good thought for all architects to reflect upon.

GREEN CITIES

Recently, Gothenburg won a prize for being "the 4th greenest city in the world". Chris Ceder (2020) however, is critical to this, because apparently the prizes were handed out based on how green the cities looked on Google's satellite maps. According to Ceder (2020) there are many problems with this. A credible study should contain and weigh in many more factors to rightfully determine how "green" a city is. For example, does the street scene and other public areas have incorporated nature? How does the city work with nature preservation and the protection of endangered species? And what is done to improve the already disturbed nature areas in the city? Unfortunately, Ceder (2020) finds Gothenburg City lacking in many areas concerning this. Naturskyddsföreningen (the Nature Protection Association, 2021) in Gothenburg states that the city needs to become greener. By that they mean more trees and protected nature areas, less hard surfaces, and more accessible nature overall. According to Naturskyddsföreningen (2021), nature in Gothenburg is increasingly being replaced by buildings and roads, and this negative development seemingly won't stop with the new oversight plan that the city of Gothenburg is working on right now. The association urges the municipality to rethink the oversight plan and promote a more sustainable development. Naturskyddsföreningen (2021) states that the municipality has a great responsibility to halt the loss of biodiversity in the city, which at the same time would protect nature areas that are so beneficial for human recreation, restoration, and general wellbeing. To do this, they say more green connections are needed. Green connections happen when nature is uninterrupted and linked throughout the city, and easily accessible in everyday lives of the city's inhabitants. Especially important are the environments where children grow up and spend their time, for example school yards. Furthermore, they mention that by prioritizing pedestrians, bicyclist, and public transportation, as well as creating more car free zones around schools, the city of Gothenburg could contribute to a more just city.

CHILDREN'S DISCONNECTEDNESS FROM NATURE

Richard Louv (2010) indicates that the increasing divide between the young and the natural world comes with environmental, social, psychological, and spiritual implications for child development. Research revealed that most adults of today reminisce about natural outdoor areas as the most impactful environments of their childhood, meanwhile less than 50% of today's children between the ages of eight and eleven share that view (Louv, p. 33, 2010). Louv (2010) continues to explain how children today play outside less often and for shorter periods of time, they have a more restricted home range, and fewer playmates. A study from the UK discovered the average eight-year-old to have better knowledge of Pokémon characters than they did of native species in their home community (Louv, 2010). A sedentary lifestyle, spent indoors, has been linked to children developing mental health related problems (Louv, p. 32, 2010), and Louv (2010) coined the term nature-deficit disorder, which describes the human cost of alienation from nature. Diminished use of our senses, attention difficulties, and higher rates of illnesses, are some examples of these costs. He adds that this nature deficit can change the way humans behave in cities, since studies point to a relationship between absence or inaccessibility to parks or other natural environments with high crime rates, depression, and other urban maladies.

Purpose & Aim

The purpose of this thesis is to highlight student health, while analyzing the interaction between students and nature in the school environment. Within Gothenburg municipality there are big differences in school grade results between districts, and studies have shown grade outcomes to be tightly intertwined with that of the mental health of the student. Simultaneously there's an abundance of research suggesting many different health benefits of living more closely with nature. Unfortunately, nature has become more and more scarce in our urbanized society. This thesis digs into the disconnectedness school children have from nature and the focus is on a selected school within Gothenburg's municipality that experience low school results. By looking into how much access the students have to nature experience resources, beneficial design methods are explored and developed to increase the student-nature interaction.

The aim is to critically discuss and evaluate the built learning environment and explore what a school space could (or should!) be. Lack of access to nature is not the main reason why some schools experience low student grades. The school with the highest result in Gothenburg, Göteborgs Högre Samskola, for example does not have much access to nature at all. But they still get good results for many different, and complex, reasons. But access to, and availability of, nature is a correlating factor to good health and school grades that I as an architect have chosen to work with in this context. I can't change or solve the Swedish school system, but I can make propositions on more extensive nature-inclusive architecture that perhaps can provide a different angle on how to improve student wellbeing in places where extra help and effort is needed. The result is an exploratory design method on a quest of contemplating what a school learning environment could look like. Nothing is set in stone and the end-product (of this thesis) is artistic and playful, using a new combined framework of theory and design.

Thesis Question

"How can an architect design urban learning environments to reconnect children with nature?"

This thesis will focus on the design of the learning environment to increase children's connection to nature, and improve the wellbeing of school children. It will strive to offer a different, and perhaps radical, angle on how to achieve this. Every architect should do their best to improve the environments they design and contribute to social and environmental wellbeing. As the manifesto states in the beginning of the thesis, the role of the architect in this scenario is to give more space to children and reconnect them with nature to increase their wellbeing. In turn, this can in many ways help promote environmental wellbeing, which leads to a more equitable society and strengthened community resilience.

DESIGN

Design can be a powerful tool to influence children's lives. And according to the UN it's actually within children's rights to develop in the best possible way. Their education should help to evolve their abilities and personalities, and learn how to protect the environment (UN, 1989). It's also the right of every child to be able to play, engage in creative activities, and relax (UN, 1989). Design of the learning environment can make a big impact on whether or not these rights are being fulfilled. By combining different theories and methods, and adapting them to the purpose of this thesis, the resulting proposal is one way of focusing on the rights of children.

LEARNING ENVIRONMENT

School yards and the surrounding learning environment are the outdoor spaces that children in grundskolan (ages 6-15) get most of their nature experiences from in their everyday lives (Boverket, 2015). By making these environments richer in nature and greenery we can make a huge impact on children's lives, and create a more connected and interlinked city. And at the same time help nature out by increasing access and biodiversity.

CHILDREN'S CONNECTION TO NATURE

In this modern time children have become more and more alienated from nature which comes with great concerns for healthy child development (Louv, 2010). According to Louv (2010) a lack of interaction with nature results in psychological, spiritual, social and environmental implications leading to increasing rates of illnesses of different kinds. Beckman (2022) explains that playing in a space as stimulating as nature directly shapes and develops children's brains. They learn to explore their bodies' physical limits, develop social abilities, problem solving and risk taking assessments (Beckman, 2022). Through incorporation of nature in the learning environment children can also be influenced and develop an understanding of, and attachment to, nature. This can result in more humans growing up with an awareness for the environment.

WELLBEING

Nature affects the health of children in many ways. For example, Souter-Brown (2015) mentions how connections with nature and greenery can decrease stress and increase cognitive attention. So, in the long run the outcome of this could potentially be better school results. Also, if the wellbeing of a population increases Souter-Brown says it relieves the financial burden mental health related issues can have on society.

Method

LITERATURE STUDIES

There isn't one main source for the content of this booklet. The information gathered come from several different references (such as books, articles, and websites), and they're all chosen for their relevance to the context of this thesis. The subject is complex and demands a variety of sourced material, but all the referenced literature centers around the topics of nature and wellbeing, urbanization and children, justice, and sustainability.

RESEARCH BY DESIGN

The design process starts with a combination of methods resulting in a theoretical framework of Just Biophilic Rewilding that has been developed and applied through the proposal of this thesis.

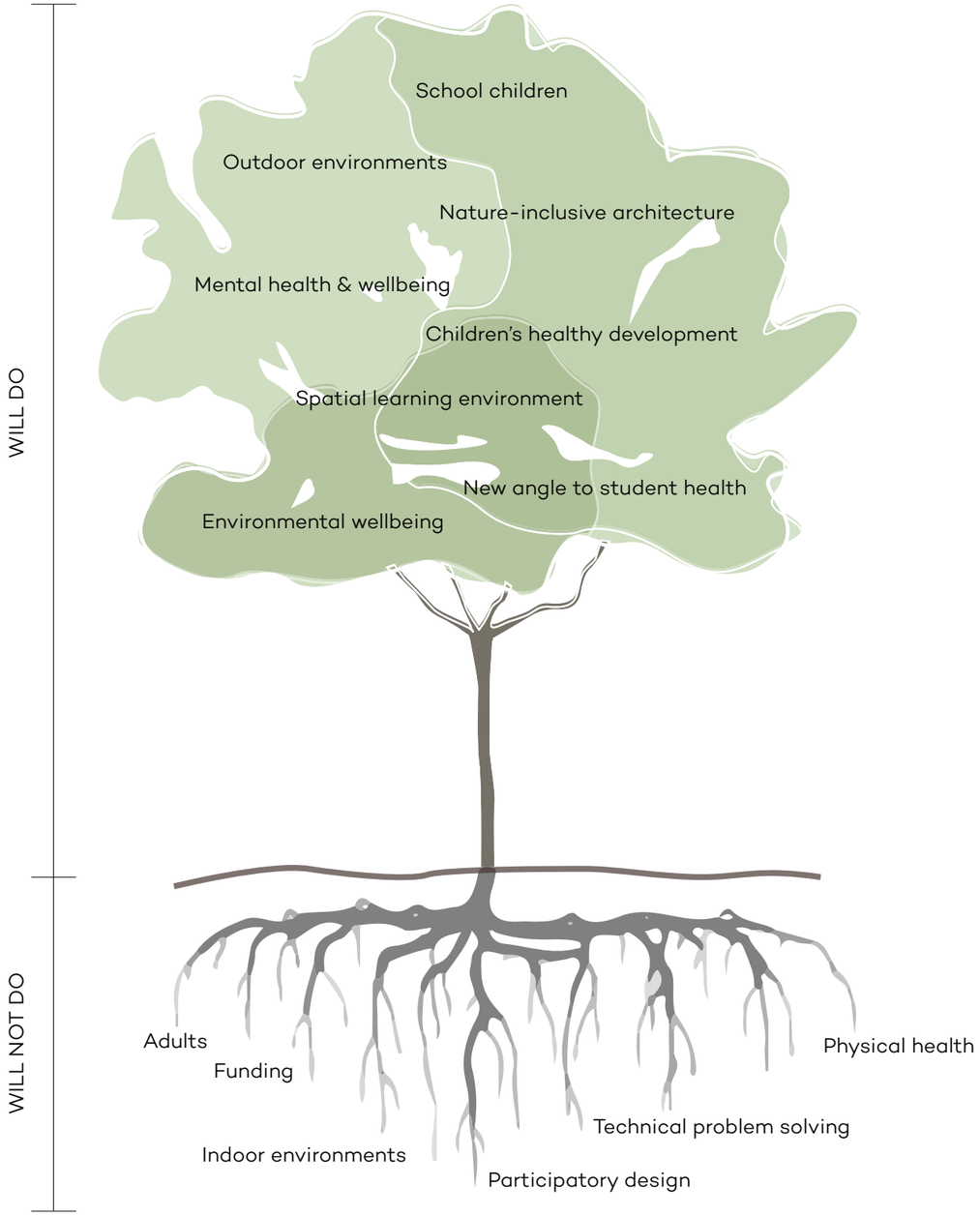
The graphical method of choice is inspired by Tatiana Bilbao's way of working with collages. Bilbao (2019) means that working with collages is exploratory and helps to continue the imagination and process of the design. Bilbao (2019) says this keeps the mind open and is great for showing conceptual ideas. This works well in combination with Just Biophilic Rewilding, since this is a method that advocates a forever ongoing and changing design.

Urbio's guide Lekotoper has been used as an aid for the design proposal, to determine what elements are beneficial to include when designing a nature-rich outdoor space for children.

FIELD WORK

Other methods conducted throughout this thesis consist of personal observations through site visits to the outdoor environments surrounding the chosen school, and mapping of the same area. To gain some additional knowledge certain people have been interviewed. The principal at the school has been asked questions regarding the everyday lives of the students, and general layout and organization of the school. One of the managers over Elevhälsan in Gothenburg municipality has been interviewed in relation to how Elevhälsan works with the physical spaces in schools. And last but not least, Emma Simonsson from Urbio Landskapsarkitekter, has contributed with her knowledge about building playgrounds in nature.

Delimitations



02.

Key Concepts

Children's Rights

Below is gathered information about what is said about children's rights in relation to the topic of this thesis. First is an outtake from a global perspective, then what Sweden, from a national to municipal level, says about what a school learning environment should provide for children. This is important to see how they compare and how they are similar in their views. The concepts described below are all based on what's best for the child, and how society should relate to this in a school learning situation. However, these criterias are unfortunately not always fulfilled.

UN CONVENTION ON THE RIGHTS OF THE CHILD

3 How the decisions of adults affect children. All adults should do what's best for children.

6 Governments must make sure that children develop in the best possible way.

29 Children's education should help them fully develop their personalities, talents, and abilities. It should help them to live peacefully and protect the environment.

31 Every child has the right to rest, relax, play and to take part in creative activities.

UN (1989)

BOVERKET

The school yard is the outdoor space that children have the most access to in their everyday lives.

Playgrounds, parks, nature areas, apartment block courtyards, and school roads create, together with the school yard, an infrastructure for children's connection to nature.

The schoolyard should meet and satisfy many different needs and fulfil complex functions that are essential for children's development.

The school yard must have space for self-administered play and movement, and opportunities to explore, create, and leave tracks in the school yard environment.

Boverket (2015)

GRUNDSKOLEFÖRVALTNINGEN

A school yard environment should...

... have a lot of natural materials
... have stimulating environments
... be accessible and usable
... be creatively and pedagogically designed
... support different directed activities since children from 12 years of age no longer play fantasy games
... have various plants on ground level
... have green living walls and rooftops
... have trees of different shapes and sizes
... have a variety of bushes
... have hard surfaces
... have water installations

Göteborgs Stad (2022)

ELEVHÄLSAN

Elevhälsan (the Student Health Organisation) consists of medical, psychological, social, and special-pedagogical aid, and should first and foremost be preventative and promote student wellbeing.

The organisation should contribute to learning environments that promote development, health, and the student's ability to learn, so that the goals of the education can be met. It's Elevhälsan's responsibility to make sure that schools aid in creating good and safe childhoods.

The staff included in Elevhälsan must have the appropriate education for the purpose, and there have been some divided opinions on whether more competences should be included in the organisation.

Skolverket (2022)

Elevhälsan seemingly doesn't have a lot of focus on the spatial qualities of the learning environment. They're mostly focused on social and medical support, which is of course very important. Staffan Lennmalm, one of the managers for Elevhälsan in Gothenburg municipality, says that the physical environment in schools is mostly changed based on decreasing noise, changing seating arrangements and removal of too much stimuli (personal communication, 2022, November 2nd). He mentions that they try to work on long term improvements but the municipality is so large that it can be difficult to meet every school's specific needs. When there is a plan for some kind of transformational process at a school, they employ specific competences in that specific individual project (Lennmalm, 2022), meaning that they don't have a definite way of working with the physical environment.

TAKE AWAY

All these different instances mention and describe one or several of the following;

- Children should be allowed to claim space.
- It's the responsibility of adults to make sure that children get to develop in supportive and healthy environments.
- A school yard should be accessible, stimulating and support healthy child development
- Education and learning space is important for children's connection to nature
- The organization at swedish schools should work to prevent health issues and promote wellbeing

These points are all very relevant and similar to the manifesto of this thesis. By taking on the role of an architect and designing the learning environment to give more space to children, reconnecting them with nature, and thus promoting healthy development and wellbeing.

JUST SPACES THEORY

Mistra Urban Futures was a research center (active between 2010-2019) that identified three steps towards a just city and promotes using transdisciplinary co-production to recognize and solve injustices by learning from one another, but also learning with one another. According to Mikael Cullberg (p. 13, 2016), the uneven development of the intense urbanization that is happening right now is creating more social tensions between different communities and authorities. Justice is a concept that can be understood differently by different stakeholders, and in each individual context the strategies for realizing a just city must vary. Beth Perry (2016) states that to create a more inclusive city, profound urban transformations must be co-created through participation with several levels of society. She means that citizens must become active subjects in different projects, rather than objects. Rike Sitas and Warren Smit (2016) adds that it's also important to address the issue of inequitable physical access to the city.

University City District (UCD) in Philadelphia, creates (through partnerships with other actors) different opportunities, improvement of economic vitality and quality of life in the University City area. They work to revitalize the community by promoting innovation, addressing crime and public safety, bringing life to commercial corridors, and connecting low-income residents to careers. They strive to develop deliberate tactics to prioritize and ensure inclusive and just spaces.

Mistra Urban Futures
3 steps towards a just city

ACCESS	the means of reaching and being able to access services and facilities, job opportunities, education, housing etc.
GREEN	resource conservation and utilization, consumption patterns, environmental degradation, public transport and pedestranisation schemes
FAIRNESS	wellfare support, local management, institutional capacity, public infrastructure, resources & distribution, geographical conditions, land control

Mistra Urban Futures (2016)

UCD:s
5 realms of justice in public space

Distributive	Who has physical access (by walking, bike, transit, and private vehicle) to a public space or network of spaces?
Procedural	How do people feel about their influence over the design, operations, and programming of a public space?
Interactional	What makes people feel welcome or unwanted in a public space?
Representational	Do people feel their experience and history is represented in a space?
Care	How do people demonstrate their care for the space and each other?

University City District (2021)

BIOPHILIA & BIOPHILIC DESIGN

In his book Biophilia (1986) Edward O. Wilson describes biophilia as "the innate tendency to focus on life and lifelike processes". He means that even from infancy we humans start to distinguish between inanimate objects and life, and this instinct can drive us not only to understand and value other organisms better, but in the end also place greater value on ourselves. According to Kellert & Calabrese (2015) biophilic design is a method that strives to create environments that promote human health and wellbeing, but also seeks to sustain healthy natural systems. Modern building construction tends to disrupt the natural world, but application of biophilic design should support an ecologically robust and sustainable natural community.

According to Kellert & Calabrese (2015), biophilic design has some main principles in order to render the most effective outcome. There should be repeated and sustained engagement with nature to encourage an emotional attachment to particular settings and places. Positive interactions between people and nature should be promoted to encourage an expanded sense of relationship and responsibility for both human and natural communities. Overall, the focus should be on human adaptations to the natural world that, over time, have advanced people's health, fitness and wellbeing.

REWILDING

According to the organization Rewilding Europe (2022), rewilding is about trusting in that nature knows best when it comes to its own survival and self-governance. The organization mentions how humans can create the right conditions for this by, for example, giving space to allow natural forest regeneration, and reintroducing lost key native species. After that we should take a step back and let nature be. Furthermore, they write that rewilding is also about reconnecting society with wilder nature, and how people will benefit from rewilding just as much. Because when nature is healthy, humans are healthier too. Rewilding Europe (2022) believes that nature makes us humans feel good and keeps us physically and mentally well, and the rewilding of nature can also build a shared sense of pride when we feel connected to our planet. The organization points out that this process takes space and time, and there's no finished final product of rewilding. It's a continuous nature-driven process that, step by step, brings about a wilder world.

Rewilding Britain (2022) states that Rewilding is, quite frankly, hope for the future. Because if we let it, nature has the power to heal itself, and also to heal us, which is what rewilding is all about. To restore the relationship and reconnect humans with the natural world is of utmost importance to establish a balance and hit the reset button for a chance to mitigate effects of climate change (Rewilding Britain, 2022).
The organization means that, through rewilding, we can find a way to work and live more sustainably and healthily, while providing a positive legacy for future generations. On their website they urge society to "... think big and act wild" (Rewilding Britain, 2022).

TAKE AWAY

The main take-aways from these theories that are relevant to this thesis:

Just Theory:
- The concept of justice differs from case to case
- Physical access (e.g. to good education and nature) is one of the keys to a more just city
- Support wellbeing
- Interactions in public spaces
- Care for public spaces

Biophilia:
- A connection to environments in nature can promote health and wellbeing
- Interlinked nature
- Experiences and interactions in and with nature
- Human innate response to nature
- Emotional attachment

Rewilding:
- Targeted assistance is sometimes essential
- Leave nature to tend to itself
- Spending time in nature increases connection to the wilder world
- Healthy nature = healthier humans

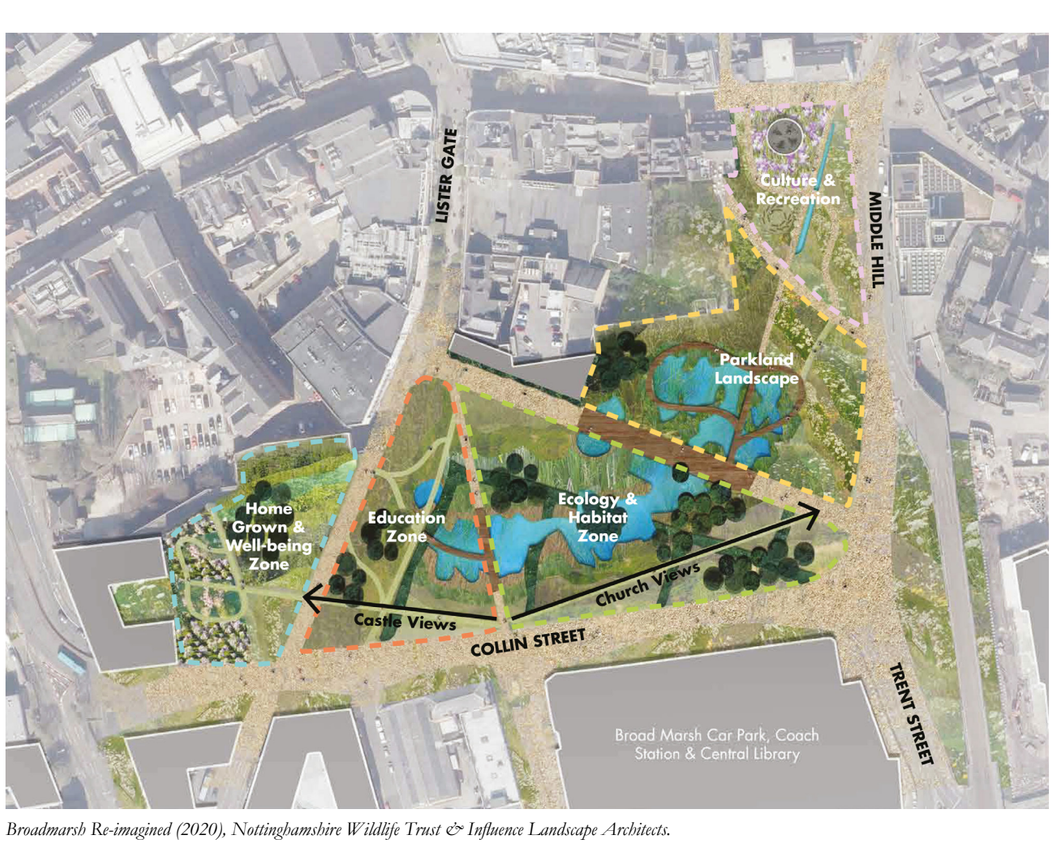
What all these theories have in common is that all three can take time and must therefore be planned for the long run.

Inspiration

BROADMARSH RE-IMAGINED
By Nottinghamshire Wildlife Trust

The Nottinghamshire Wildlife trust has proposed a new vision for the empty Broadmarsh shopping center in Nottingham city center, United Kingdom. Weston (2020) reports that the Wildlife Trust, who has long wanted to develop green corridors to connect to the forest north of the city, wants to transform the property into an urban rewilding project consisting of wetlands, wildflower meadows and pocket woodlands, measuring up to 2.5 hectares. The trust cooperated with Influence Landscape Architects on the designs which, according to Weston (2020), could set a precedent for how to handle the increasing amount of vacant retail space in cities. Sara Boland (2020), the managing director of Influence, means that the proposed design for Broadmarsh challenges the conventional idea of what an urban park looks like. Open spaces in cities are often manicured and a bit formal according to Boland (2020), so the idea here is to include more rewilding, restoring, and protection of nature.

This has been chosen as an inspiration for the thesis due to its way of reintroducing nature and rewilding an urban space that can be of better use this way. They've designed a park with nature's best interest in mind, and how humans can visit and gain from the interaction as well, by having different zones for education, wellbeing and recreation, among others. The design is not overly "designed", but still looks natural, as if the space looked like this all along.



Broadmarsh Re-imagined (2020), Nottinghamshire Wildlife Trust & Influence Landscape Architects.

LEKOTOPER: Naturmiljöer för lek
By Örebro municipality & Urbio

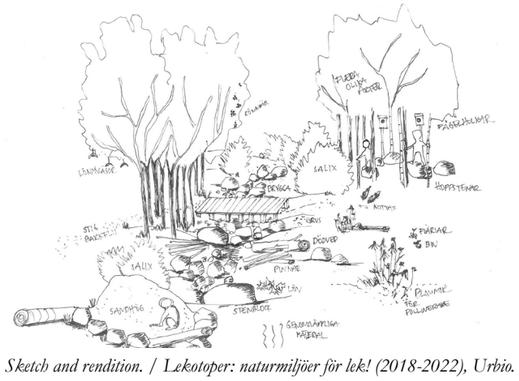
Örebro's municipality decided to start focusing more on children's play environments and have, together with cooperational partners, explored how children play in nature environments. Mimmi Beckman (2022) at Örebro's park unit says that they asked themselves three fundamental questions; What is play, really? How important is play for children's development? What signifies a good play environment? She explains that children's brains are formed and developed during play, because that's how they explore and learn how the world works, and that through play, children also evolve their social capacity, problem solving abilities and risk taking assessment. Beckman (2022) means that it's very important for children to have access to spaces that are exciting and activate their senses, gives space for fantasy to flow, and spaces that they can influence, change and make their own. Rich environments therefore have better prerequisites for developing play, while poor and frugal play environments instead limit children's play (Beckman, 2022).

Lekotoper (roughly translated to play-topias) are places where play and landscape are combined. Richly nature-like environments create opportunities for play firstly by nature-based inventions, rather than common playground equipment. Different elements in the landscape create rooms, spaces and props for the children to utilize. The goal is to research how urban ecosystems and spaces for play can co-exist, through planning and design. (Urbio, 2022). Emma Simonsson (2022), landscape architect at Urbio, explains that nature environments are often "un-coded" and don't tell children what they're supposed to do. She mentions that Lekotoper is an environment rich in details that children can interact with in multiple ways, and can either be created through enhancement of already existing natural environments, or be created from scratch. Simonsson (2022) hopes that Lekotoper can expand the common notion of playgrounds and become part of a new standard for how play areas are designed today.

Beckman (2022) thinks it's important to remind ourselves of what the purpose of a playground really is, and design with children's best interests in mind. Short term, children's play is about fun and feeling good, and in the long run it's about children's ability to learn and develop in a healthy way (Beckman, 2022). She adds that since we know how important play is for children's development it should be a priority to give them space and access to rich and stimulating environments.

Ideas from this project has been applied in Ormesta, Örebro municipality, and Urbio are working on an informative guide on Lekotoper and a component-catalog, which could act as an aid for other instances in society to create richer, greener and more nature-like play environments.

This has been chosen as an inspiration for the thesis due to how in depth it covers why it's important for children to grow up in nature- and greenery-rich environments. They provide a lot of knowledge on how to transform outdoor spaces into different kinds of qualitative play areas, and the design process of the proposal in this thesis has made use of these advice and examples.



Sketch and rendition. / Lekotoper: naturmiljöer för lek! (2018-2022), Urbio.

INTERVIEW; Emma Simonsson, URBIO.

Emma Simonsson (personal communication, 2022, November 28th) says she's very inspired by nature and the "nature-like/nature-adjacent", and how the relationship between design and interpretation of nature can take shape. By creating the guide Lekotoper she, and her coworkers, wanted to give people concrete examples to work with, and present both small and big spatialities. Simonsson (2022) explains that landscape designed play areas don't always have to be small and enclosed, but can be a wide variety of spaces. She adds that it's also important to include different kinds of nature and greenery to promote several ecosystem services.

The project in Örebro municipality was very educational for Simonsson (2022). She says it gave her more experience on how one feels and appreciates the spatiality, the translation from sketch/drawing to real life. Especially how big or small spaces feel, how deep or tall, and how close objects are to each other. Simonsson (2022) explains that normal building processes are quite formal and can be very rigorous, so it's difficult to include nature-like components in building permits. Often these have to be drawn out on site. She adds that it's also difficult to mimic nature's irregularity and when we build too straight lines etc we lose the nature-likeness. Fortunately, Örebro municipality understands this, according to Simonsson (2022), and was very flexible when building the Ormesta park project. She says the project has gotten a lot of positive feedback, especially on how sturdy the spaces are and how well they invite play.



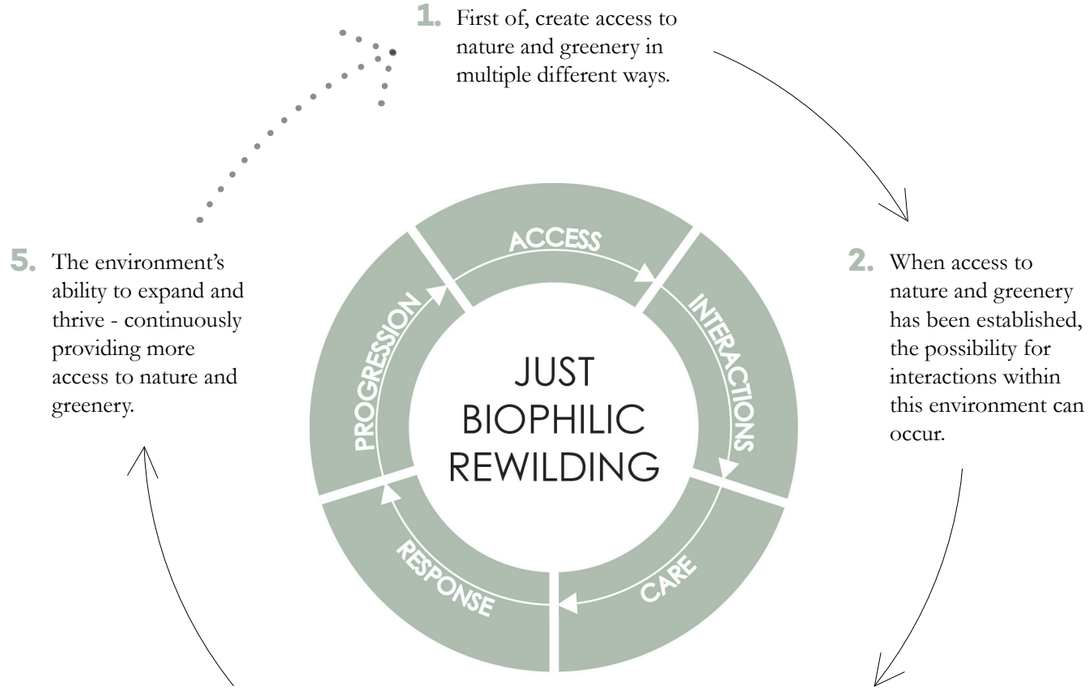

Some outtakes from the Ormesta park project in Örebro municipality. / Lekotoper: naturmiljöer för lek! (2018-2022), Urbio.

Ormesta park project in Örebro municipality. / Lekotoper: naturmiljöer för lek! (2018-2022), Urbio.

Just Biophilic Rewilding

To address the topic of the thesis, the three concepts of Just Theory, Biophilic Design and Rewilding, have been combined into one framework, Just Biophilic Rewilding (JBR). The concept of justice varies from case to case, and needs to be adapted differently to every project. Justice in this thesis stands for access to nature in a learning environment that creates and promotes opportunities for healthy child development. This can revitalize and bring life into the city, increase wellbeing, encourage interactions and care for the space, and in the long run promote community resilience and equity. Biophilic design promotes health and wellbeing through strengthening connections to natural environments and interlinking nature and greenery. Different kinds of experiences and interactions in (and with) nature is important to gain the human innate response to nature and emotional attachment to it. It is essential to provide targeted assistance to rewild and reintroduce nature in areas deprived of it. Thereafter it should be left to tend to itself as much as possible but humans are encouraged to spend time in nature to increase connection to the wilder world. The process of everything mentioned above takes time and can be ever-changing.

The JBR diagram in and of itself can be applied to any group of any age in society. However, in this thesis the focus remains on school children (grundskolebarn) between the ages of 6-15 years old. As the manifesto in the beginning of the thesis states, the role of the architect is to give more space to children by reconnecting them with nature and increasing their wellbeing. Which in turn promotes environmental wellbeing, leading to a more equitable society and community resilience. These values also align with the take away from the pages on children's rights in this thesis. The different steps of the JBR diagram therefore work well within what is the right of every child.



THE 5 STEPS ARE LINEAR IN IMPLEMENTATION BUT CIRCULAR IN CONTINUATION.

1 — 2 — 3 — 4 — 5

ACCESS
Access to easily available areas of nature and greenery that are interlinked and promote health and wellbeing, while also providing access to opportunities for learning, growing, and developing healthily. Nature's own access to spread out and connect with more nature and greenery, as well as children's opportunities to claim space.

INTERACTIONS
The possibility for different kinds of interactions to take place in (and with) a natural and/or green environment that is welcoming and stimulating. Playing, exploring nature, spending time with each other, spending time alone with nature, observing nature, simply just passing through nature, etc.

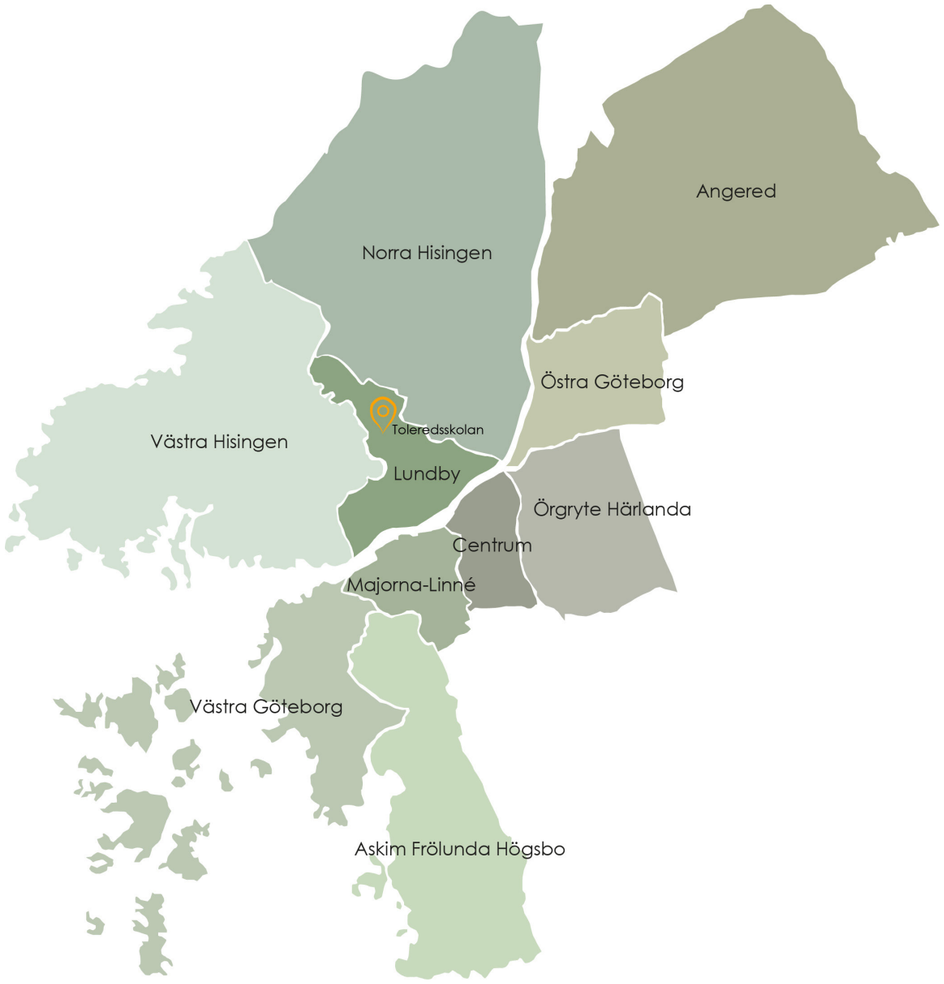
CARE
Providing opportunities to engage and participate with, and care for, spaces in nature and greenery. When humans create a connection and emotional attachment to nature and greenery, environmental awareness and responsibility can increase.

RESPONSE
The innate human response as a result of being in nature - increased wellbeing, better learning capacities, recreation and self-esteem, more effective restoration. A better connection, understanding and awareness of nature can also be achieved. In the long run we can accomplish better community resilience.

PROGRESSION
Let nature rely on and tend to itself, but lend assistance to help nature thrive in its own way. Long-term planning is essential as well as the understanding that there will never be one finished product/result. The environment shouldn't be overly designed and should leave space for the site to expand and shape itself, as well as allow influence from different factors and participants to transform the project.

03.

Toleredsskolan



Map showing Gothenburg and it's 10 districts. Toleredsskolan is situated within the Lundby district.

Why This School?

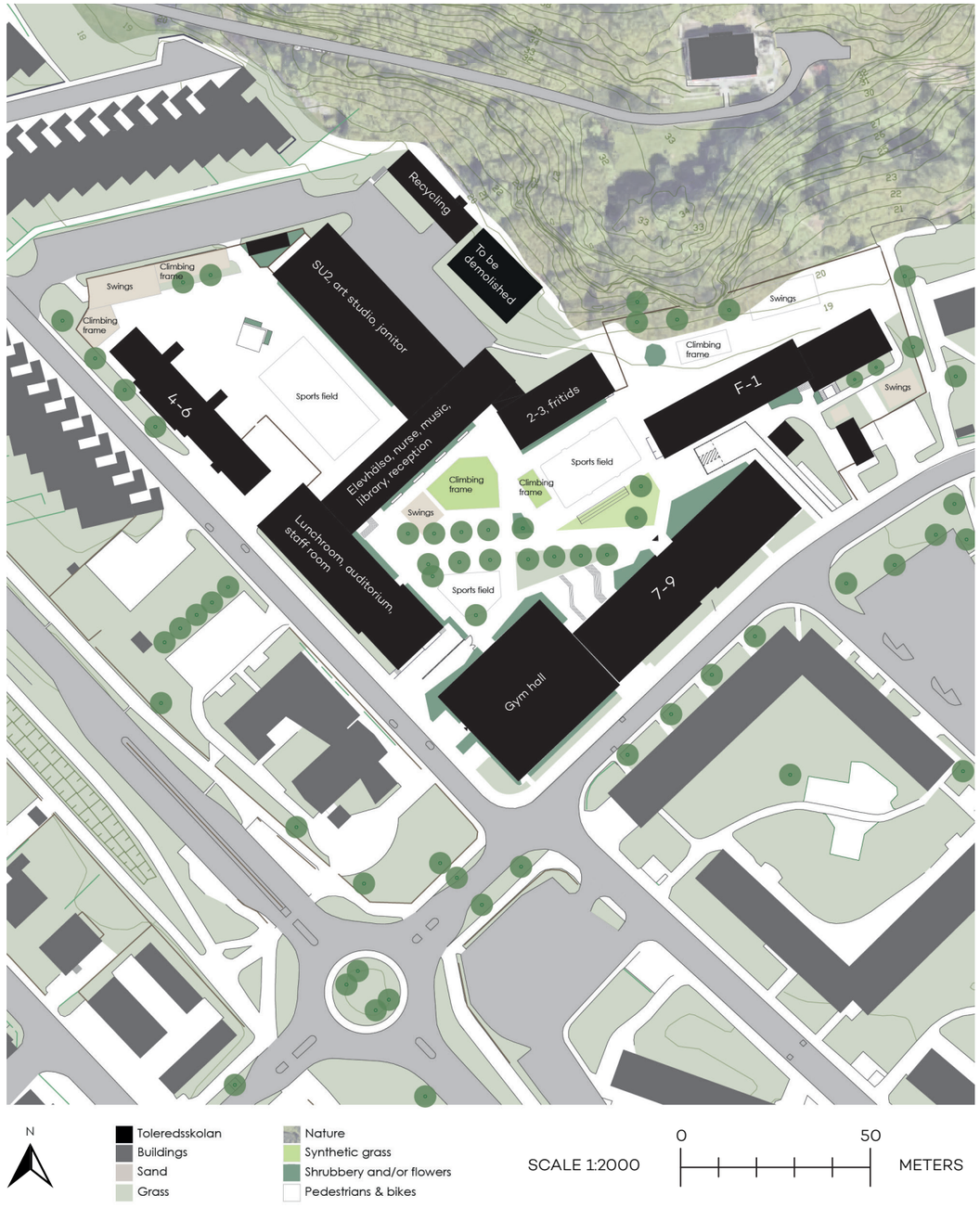
Several criteria have been formulated for what kind of school to choose as an example for this thesis to build a proposal around.

- It has to be situated in an urban environment.
- It should cover a wide age group of school children since the concept of Just Biophilic Rewilding should be applicable in different ways to all ages.
- The school should experience low success rates based on its 9th grader's school results. This can indicate mental health related issues and a lack of student wellbeing.
- The school has recently undergone, or is undergoing, transformational changes to the school environment. This is important to be able to cast a critical eye on modern school design and reflections regarding learning environments.
- The school yard should be scarce of nature and greenery and there should be nature areas nearby the school to analyze how the school relates to these.
- Are there any barriers surrounding the school? In urban environments there is often a lot of traffic, infrastructure and different buildings and properties that might hinder access and availability.

TOLEREDSSKOLAN

Age groups:	F1-9 (6 to 15 year olds)
School results:	In 2020, only 64.6% of the 9th graders at Toleredsskolan reached the knowledge demand.
Spatial transformation:	The school yard is right now undergoing a transformation and one of the school buildings has been demolished and built anew.
Nature:	The school is situated right next to a nature area, but the school grounds themselves are lacking in nature and stimulating greenery.
Barriers:	There are several barriers around the school. *(see mapping on next spread)*

Mapping



Like mentioned under "Background" in the introduction chapter, Gothenburg looks very "green" on satellite maps, but if one takes a closer look it soon becomes clear that many spaces in the city don't have a lot of incorporated nature nor greenery. What looks green between buildings on satellite maps is mostly grass surfaces and some trees here and there. The school is also surrounded by several barriers. To the north there's a steep little forested mountain that is not easily accessible. Between the school and the mountain, a private villa and garden makes it difficult for the school children to play and make the most use out of the forest at the foot of the mountain. Car roads surround the school in the other directions, and close by the heavily trafficked road Björlandavägen cuts off easy access across, both for humans and nature alike. Official bike lanes are mostly placed alongside Björlandavägen as well as all bus stops.

Location Photos

Northeastern school yard / synthetic grass football field.

Northeastern school yard / synthetic grass football field and bike stands.

Northeastern school yard / climbing frame, sand box, two trees.

Behind the school / forest edge.

Northwestern school yard, front side / Grass, swings, sand box and trees.

Northwestern school yard, front side / Swing, sand boxes, seating, trees.

Northwestern school yard / Trees, seating area, fenced greenery and slip and slide.

Northwestern school yard / Gravel.

Passage between northwestern and south school yard.

South school yard / Basket ball court.

South school yard / Fenced greenery.

South school yard / Seating area, fenced greenery.

South school yard / Climbing frames, synthetic grass, seating and trees.

Surrounding areas / School building, street and apartment blocks.

Surrounding areas / Street and apartment blocks.

Surrounding areas / School building, street and apartment blocks.

Surrounding areas / Bike lane, roundabout, church building.

Surrounding areas / Parking space, school in the background.

Surrounding areas / Street and school building to the right.

Surrounding areas / Street and row houses.

Surrounding areas / Big grass field.

Surrounding areas / Inner court yard.

Surrounding areas / Nature area/forest.

Surrounding areas / Nature area/forest.

Surrounding areas / Walking path in nature area/forest.

Surrounding areas / Walking path by Slätta damm.

Analysis

Even though there's nature areas close by the school, these are not visible from the school yards and most of the windows. The mountain can be seen above the rooftops, and the only area of nature available on the school grounds is a small piece of the forest at the foot of the mountain behind the school. The school yards themselves consist of mostly hard surfaces. The north west yard only has two trees, some bushes alongside one of the facades, and two flower bed boxes. Other than that all there is is asphalt, sand and a synthetic grass football field. The southmost yard, the biggest one, underwent a transformation during 2022. Before the transformation the whole yard was made up of asphalt. Today it has gotten several big flower bed boxes, more trees and bushes, and one patch of real grass. Except for the grass patch, the ground surfaces consist of asphalt, bricks, and synthetic grass. They've added several climbing frames, swings, and seating areas, as well as a one big and one small basketball court. The northeastern school yard is meant for the youngest children in the school. This outdoor space is mostly made up of gravel. There's a little bit of grass, five trees in total and one fenced area of bushes. There's a slip and slide and climbing frames, plus swings on either side of the building.

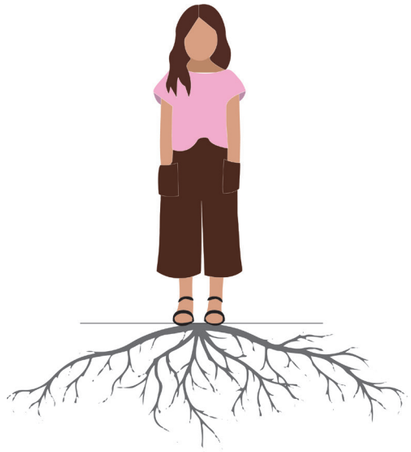
The streets surrounding the school are void of significant greenery or nature. There's mostly patches of grass and maybe a tree or a bush here or there. The inner courtyards of the apartment blocks in the area are not very stimulating, consisting mostly of grass lawns and a few trees and bushes in the center of the yard.

According to Ingela Bertheden (personal communication, 2022, October 26th), principal at Toleredsskolan, some classes, like NO ("nature oriented" subjects such as biology, physics and chemistry), arts class and physical education are held outdoors when it fits the purpose of the class. But other than that, almost all education is held indoors. Bertheden (2022) also mentions that students sometimes leave the school during breaks to visit the nearby nature area.

Toleredsskolan does not check many of the boxes of what Grundskoleförvaltningen says a school yard should offer. The takeout from the Children's Rights pages in this thesis is that a school yard should be stimulating and is of great importance for children's connection to nature, but this is not very prevalent in the environment at the school today, and it barely lives up to any of the aspects in the Just Biophilic Rewilding diagram. Nature is not easily accessible to reach, neither is greenery since there's not a lot of it to be found. This means that very little interactions take place within natural and/or green spaces, leading to there not being many chances to care, connect and form emotional attachments to nature in this learning environment. What the students don't get to experience much of therefore is the wellbeing response of spending time in environments rich in nature and greenery. This means that the values of the thesis' manifesto aren't achieved either.

04.

Proposal



Increase connection and emotional attachment to nature by letting children grow their own roots in their own school environment.

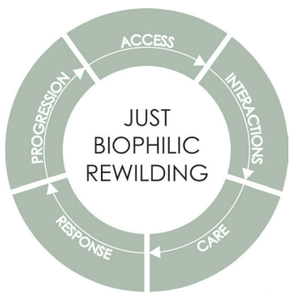
Introduction

There are many improvements that need to be made for the built learning environment at Toleredsskolan. Unfortunately, many students of the school don't reach the knowledge demands when finishing 9th grade. One probable factor to this could be reduced wellbeing among the school children, and this can contribute to an inequitable society and decreased community resilience. By linking the learning environment to the nature area north of the school, as well as reintroducing nature and adding greenery, the students at Toleredsskolan could be reconnected with nature. This, in turn, can aid in increased student wellbeing as well as environmental wellbeing. Pedestrians and bicyclists should be prioritized over car traffic, and the space for free movement for children needs to increase. With the aid of the guide tool "Lekotoper" a variety of greenery, as well as rewilded areas, have been added to achieve the different aspects of the Just Biophilic Rewilding diagram. The proposal should also leave space for further development and continuous changes in the environment. The school children should be able to leave tracks and affect their own space. Thus, every single space shouldn't be designed beforehand.

Concept sketch Toleredsskolan learning environment.

JBR Design Strategies

The design strategies of Just Biophilic Rewilding are conceptual and playful collages that express the author's imagination of what the new learning environments could look like around Toleredsskolan. By working with collages it is easy to explore and continue the imaginative process of the design. There's one collage for each step of Just Biophilic Rewilding, and each collage has key words and feelings that describe them and how they're connected to that particular step. Important elements for every step are also expressed in the imagery of the collages. The images/objects representing the different elements have later on been incorporated into design components in the plan drawing proposal, or they are visualizing the wellbeing effects science suggests nature to have on humans (for example in the response collage).



Walking through nature and grenery (not around it)

Nature and greenery right outside the door/window

Being able to influence the space around you

Everyday life and its' interactions

The possibility of leaving footprints in the learning environment

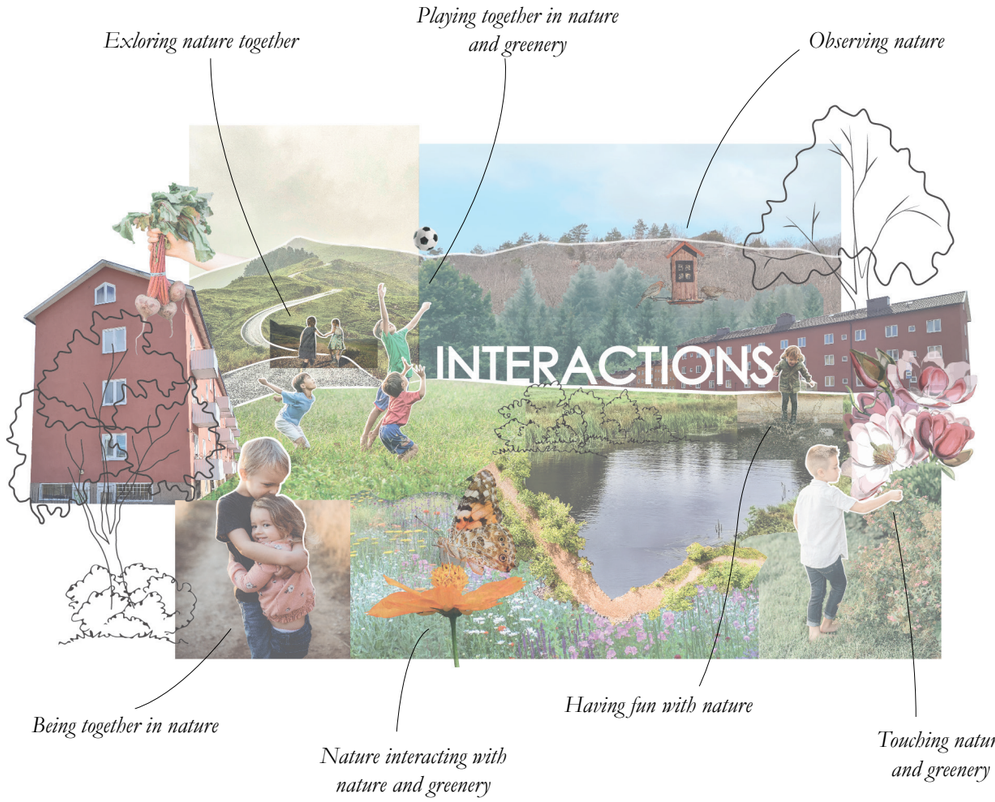
Different ways to play, grow and develop in nature and greenery

KEY WORDS

immersed in nature - interlinked nature & greenery - healthy development - opportunities - everyday life

FEELINGS

being of importance - being seen and prioritized - connected to nature



KEY WORDS

in & with nature - welcoming - stimulating - explore - observe - touch - feel - play

FEELING

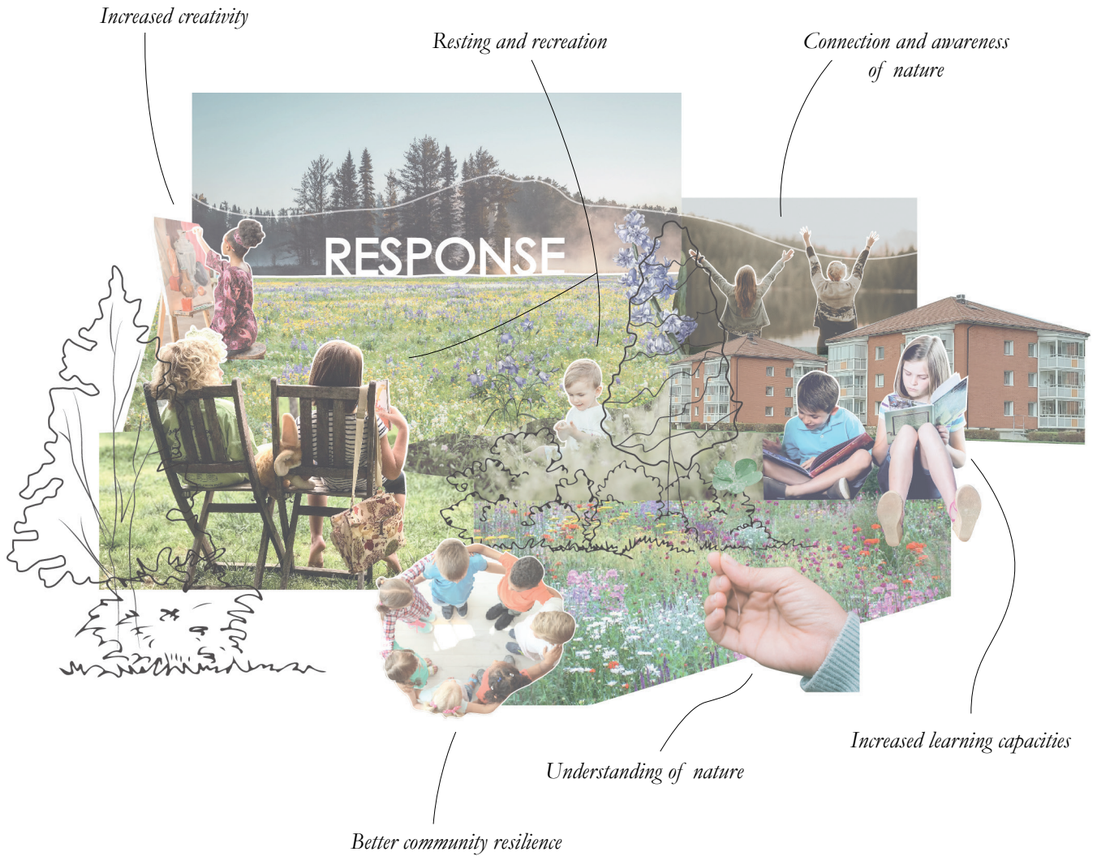
fun - happiness - connections - friendships

KEY WORDS

engage & participate - learn - together - community - identity - awareness

FEELING

love - responsibility - stewardship - attachment

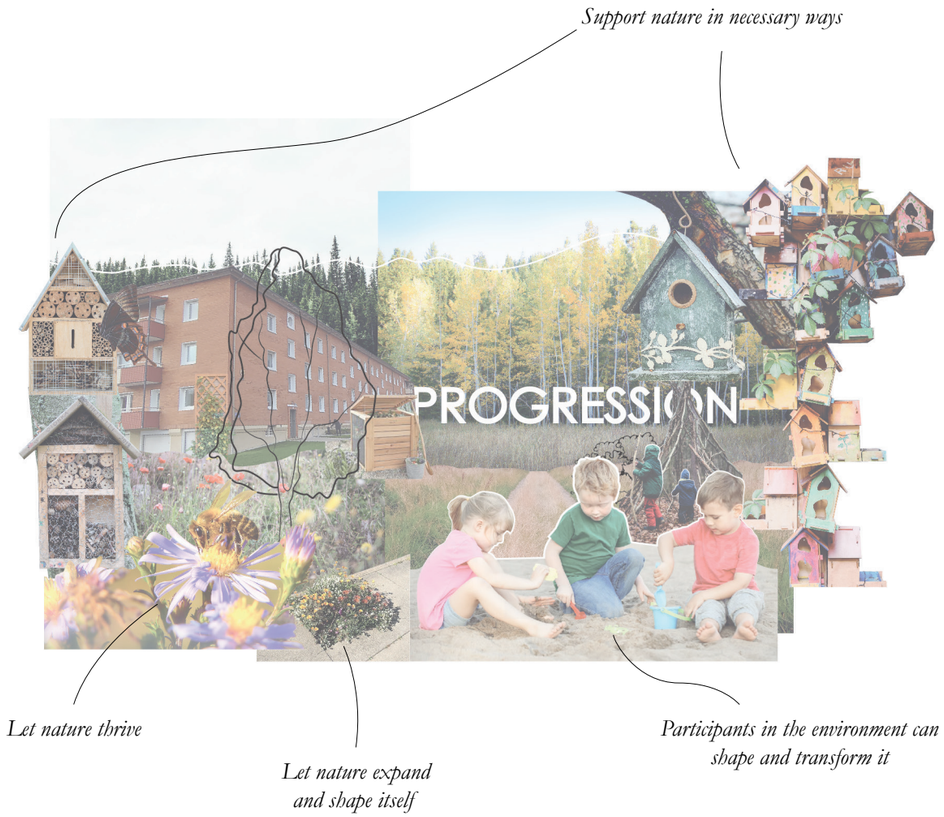


KEY WORDS

health - wellbeing - restoration - recreation - learning

FEELING

peaceful - happiness - creativity - self-esteem



KEY WORDS

self-reliance - support - thrive - influence - change - grow

FEELING

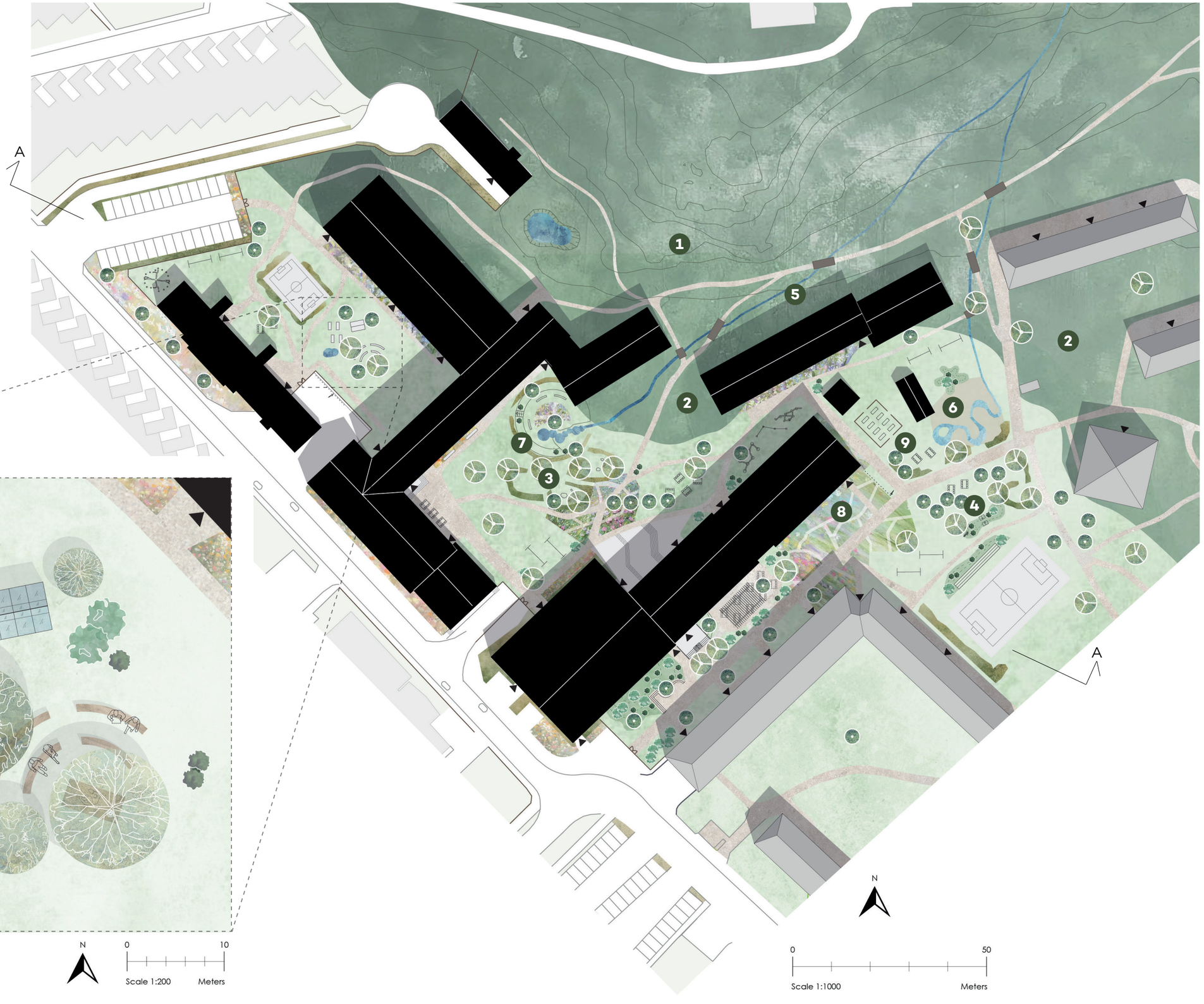
strong - wild - infinite - alive - inclusion

Learning Environment

The project site has a valuable asset in the already existing nature area (Hisingsparken) to the north. This can be expanded further south and down into the built environment, through rewilding. Thus, tying nature more close to the learning environment. Hisingsparken is situated higher than the environment around the school, and the lake Slätta Damm is approximately 13 meters higher in elevation, which results in water coming down from the park. The big open grass field situated east of the school often becomes very saturated with water because of this. To make use of the water in a better way, several creeks are made to transport water down into the learning environment and collect it. Giving quality and character to the space, rather than being a nuisance. There's not a lot of already existing vegetation in the learning environment, but where it exists it also gets to stay. The spaces that aren't rewilded are filled with different forms of greenery. Car roads have been removed to instead prioritize pedestrians and bicyclists, and giving more space to the school yard to expand into a neighborhood immersed in nature and greenery.

OUTDOOR CLASSROOM

To help make the outdoor environment more available for outdoor teaching, a classroom of sorts has been designed and added to the space in the western yard. Seating has been arranged in an arch around a little stage, with trees providing shade from the sun. In connection to the outdoor classroom a greenhouse and vegetable boxes are located, contributing with more teaching opportunities. School subjects such as NO (nature oriented subjects) perhaps have the most obvious benefits from being taught outside in a natural environment, for example learning about the biology of plants and the physics of water. But all school subjects can, to some degree, benefit from being taught outside, where the wellbeing effects of spending time in nature and greenery can help student productivity and creativity. The outdoor classroom is created to pull teachers and students out of the standard indoor classroom, and instead provide the opportunity to spend more time with nature and greenery.



LEKOTOPER

Included in the plan are several different types of environments inspired by suggestions from the guide Lekotoper (Urbio, 2022). Below and to the right are explanations to these different spaces as well as numbering found to match the plan drawing on the previous page.

1

LEAF TREE FOREST

The canopies create a ceiling and the straight tree trunks provide visibility. In this project this environment is part of the rewilding area.

2

THE MAGICAL FOREST

Lower growing trees with more character and branches that grow in different directions and allow for climbing. This is also part of the rewilding area in this project.

3

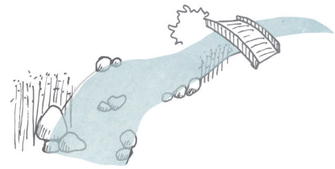
SHRUBBERY

Creating rooms with trees and bushes as walls and rooftops. Invites calm play and has a cozy secluded atmosphere.

4

HILLS

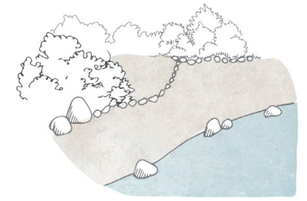
A challenging environment that can promote more movement with height differences, different density of shrubbery and several small paths.



5

CREEKS & PONDS

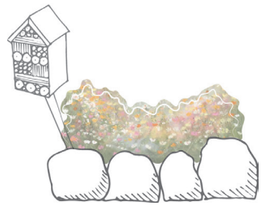
Water is typically very welcoming for play and can be shaped in many different ways, which also creates opportunity for a variety of games.



6

SAND OCEAN

Like a sandbox, only bigger, and gets additional value when placed near water.



7

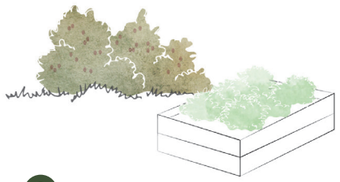
SENSE GARDEN

A space rich in detail and sensory exploration. A space with serenity for rest and recuperation.

8

MEADOW

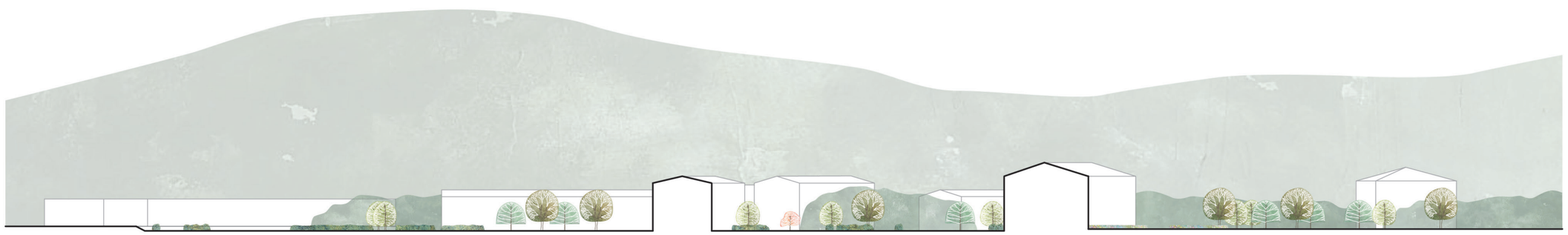
A wilder space where nature gets to roam free. Certain paths through the meadow can be maintained and kept clear. This is also part of the rewilding area in this project.



9

CULTIVATING

A mixture of fruit trees, berry bushes, and vegetable boxes. Promotes work-play by children learning how to take care of this environment.



0 50

Scale 1:1000 Meters

SECTION A-A, *Illustrating the nature & greenery connection between the school yards.*

05.

Discussion

"Health as a state of being happens when
where we live, work, play and
go to school is healthy"

(Gayle Souter-Brown)

"Room to Grow" is a thesis with the purpose to analyze, and the aim to critically discuss, the built learning environment and school children's connection to nature, and ultimately explore what a school space could (or should!) be. The result is a conceptual challenge to the urban learning environment, with the hopes of offering a new approach to student health, by bringing more nature and greenery into the outside environments and extending the school yard through nature-rich spaces.

As the manifesto states; architects carry a social and environmental responsibility towards humans and nature alike. By reconnecting and giving children more space with nature, their wellbeing can increase. Improved health and an increased understanding of nature could also promote environmental wellbeing and might result in a more equitable society and community resilience. An architect can design urban learning environments, and reconnect children with nature, through a combination of different resources and methods. In this particular thesis, this is done with the framework of Just Biophilic Design and its design strategies, but also through incorporating resource material from the guide Lekotoper. By putting this material into contrast with the analysis of the project site, a proposal has been designed. The proposal is meant to leave room for further development and be flexible in need for changes. It is meant to challenge the norm of school yards and might deviate from standard regulations in order to raise contemplations on what actually is the goal of a learning environment and who it is that we're building for.

To create an urban environment completely emerged in nature and greenery comes with certain difficulties. By removing car traffic, accessibility for delivery trucks, emergency vehicles and special needs transportation, is made less obvious and straightforward. Some apartment buildings that are placed closest to the school now have their main entrances within the new school yard, which might create tension between residents and the school. Rewilding nature close to buildings might create maintenance problems, and for example meadows might not thrive in busy pedestrian areas. There's also the issue of the amount of costs for maintenance of the entire environment. Standard regulations regarding accessibility for functional varieties and security in school yards and playgrounds can also be a bit tricky to achieve in every space.

This thesis could develop even more by going into depth regarding the school buildings themselves, with specific outlooks and sightlines, as well as bringing nature and greenery inside of the buildings. Although, the intention for this thesis was rather to draw school children out from the classrooms, and create spaces for them to spend time outside in the fresh air. Also, transdisciplinary collaboration is something that would benefit a project like this. To be able to go more into depth regarding specific plant species and ecosystem services would, for example, add an additional dimension of environmental wellbeing. Furthermore, participatory processes should happen in every project that concerns its citizens, and in this case it would be valuable to work together with the school children and have them co-design their own environment.

But, what I have done in creating Just Biophilic Rewilding is to contribute with a new take on how to tackle these kinds of environments. A work process that in a creative way can shape playful spaces in nature and greenery. I have highlighted what is important when designing spaces for children and why reconnection to nature is important, and I do believe this could be of valuable consideration of implementation for instances like Elevhälsan and Grundskoleförvaltningen.

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