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D3.3.1-
Project pipeline in each pilot urban area

Toolbox for selecting Nature-based Solutions (NbS)

Final Version

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PROJECT TITLE	GREENSCAPE CE NbS PTUJ # Toolbox for selecting Nature-based Solutions (NbS)
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Content

A. Introduction

1. Initial words

Nature-based Solutions (NbS) are increasingly recognized as a vital element in the development of urban green systems and the enhancement of green infrastructure due to their multifunctional benefits. These benefits include boosting biodiversity, mitigating climate change, improving human health and well-being, and promoting social cohesion.

This document presents a toolbox for defining and evaluating NbS within urban environments, with a particular focus on the potential of green open spaces.

Building on the action plan developed in the WP1, the project consortium will support pilot cities in developing the project pipeline of the most promising NbS projects and connect them with stakeholders that can support the development of the project pipeline (financial institutions, innovative community, crowdfunding initiatives etc.). The Partners should be free to use the Toolbox contents freely (some or all parts) what will enable partners generate the project pipeline of the 7 most viable potential NbS projects in each pilot area to be implemented after the project ends in order to ensure the lasting effect of the project.

This document is designed as a toolbox that will help identify and select the most appropriate NbS types in the process of implementing NbS in pilot cities. The first step in determining the appropriate NbS is to define the problem. It is also helpful to define the type of open urban area, as certain spaces in the city require certain design and the performance of certain functions, which have an impact on the definition of the type of NbS. The practical checklist (Table 1) provides a tool for determining basic information about the selected location and the problems that arise there. At the end of the document, a collection of relevant NbS examples is provided, which offer a set of NbS types linked to the basic elements of nature - soil, water, vegetation or air - in which problems are usually demonstrated.

Steps local communities in pilot cities can follow, incorporating public participation at each stage:

1. Problem and location identification,
2. Baseline identification and evaluation,
3. NbS preposition and selection,
4. NbS implementation,
5. Maintenance,
6. Monitoring.

The above steps will be detailed in “Section C: Process”.

By following this approach, local communities can comprehensively evaluate their green spaces and other structures and strategically plan for the integration of NbS to maximise ecological, social, and economic benefits.

The tool is structured to provide a detailed approach, beginning with a conceptual understanding of NbS, an overview of the present state of green open spaces, an analysis and evaluation of their

current condition, and a NbS proposition for green interventions. An important part of the approach is public participation and involvement in each step of the process.

It utilises a checklist-based approach to ensure all relevant issues are comprehensively addressed. The approach is designed in such a way that it would be possible to develop a web application based on the material.

2. What are Nature-based Solutions (NbS)?

As specified in GreenScape CE project documentation "D1.1.1 Typology and criteria for planning CCI/GI/NBS on the local level" NbS are defined by the European Commission as:

> *"Solutions that are inspired and supported by nature, which are cost-effective, simultaneously provide environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions. NbS must therefore benefit biodiversity and support the delivery of a range of ecosystem services".*
>
> *Their application is very broad and can be considered as an encompassing concept that include also other approaches such as ecosystem-based adaptation (hereinafter EbA), eco-disaster risk reduction (hereinafter eco-DRR), green infrastructure (hereinafter GI) and natural climate solutions (hereinafter NCS) (Paileit et.al., 2017). Each approach differs slightly, while NbS work towards solutions and in creating new ones on the ground. These solutions work in harmony with nature, providing a range of benefits beyond just carbon sequestration, including biodiversity conservation, water management, and enhanced ecosystem services.*
>
> *In GreenScape CE, nature-based solutions are deployed as solutions that use the power of nature to address environmental challenges of the pilot cities, and as strategies to provide guarantees for social and environmental sustainability in pilot cities. While nature-based solutions are individual multi-beneficial small or large-scale interventions, Green Infrastructure refers to the interconnected networks of all green spaces. While both NBS and GI share the overarching goal of leveraging nature to address climate change and environmental challenges, they differ in their scale and application.*

Relevant NbS are presented in Table 3: 'NbS Toolbox' of this document.

3. Typology and criteria for planning CCI/GI/NbS on the local level

Nature-based solutions encompass a range of interventions that use natural processes and ecosystem services to address various challenges, such as climate adaptation, water management, and pollution control as structured in D1.1.1 on typology and criteria for planning CCI, GI and NbS on local level. However, a distinction is made between NbS and GI:

- NbS is broader and can include **large-scale ecosystem-based interventions**, such as reforestation and wetland restoration, which target carbon sequestration and ecosystem restoration. In contrast, GI often focuses on localised, urban or peri-urban green spaces and infrastructure to enhance urban resilience and quality of life.
- NbS is more oriented towards **preserving and restoring natural ecosystems**, which, in turn,

offer a range of ecosystem services and climate benefits. GI emphasises incorporating green elements into urban environmental conditions.

Both NbS and GI play crucial roles in the fight against climate change and offer a range of benefits:

- **Carbon Sequestration:** NbS which involve practices like afforestation and reforestation. These activities effectively capture carbon dioxide from the atmosphere, playing a vital role to reduce greenhouse gas emissions.
- **Enhanced Resilience:** GI helps cities and communities become more resilient to the impacts of climate change, such as extreme weather events, floods, and heatwaves, by providing natural buffers and regulating water flows.
- **Biodiversity Conservation:** NBS fosters biodiversity by preserving and restoring natural habitats, protecting endangered species, and maintaining ecological balance.
- **Improved Air and Water Quality**: Both NbS and GI contribute to improved air quality by absorbing pollutants and reducing the urban heat island effect. They also aid in filtering and purifying water, promoting healthier ecosystems and water resources.
- **Sustainable Urban Development:** GI promotes sustainable urban planning and development, creating healthier and more livable cities with better access to green spaces and recreational areas.

Both the concepts are used in GreenScape CE to support pilot cities to choose solutions and measures. NbS and GI are already part of action plans and of the Joint Strategy that are created for all 5 pilot cities with aim on strengthening their implementation in Central Europe (hereinafter CE) cities. While the term Climate Change Initiatives (CCI) will refer to all the actions or networks mutually co-created by the GreenScape CE stakeholders through the deployment of NbS and/or GI.

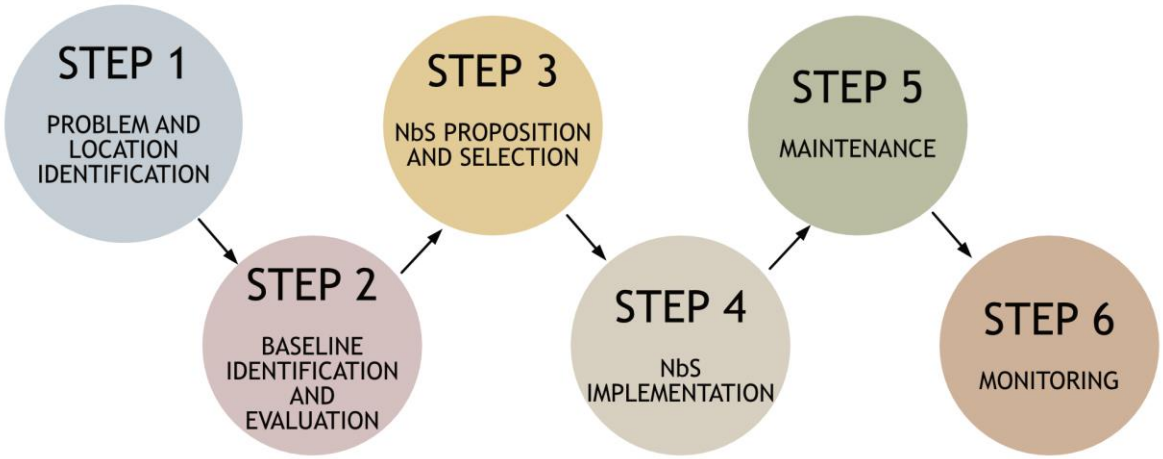
B Methodology

4. Process

Workflow

Proposed workflow for the selection of the most promising and viable NbS projects in a given city is shown in the next flow-chart and explained below. Steps are explained more in details in Part C (Process).

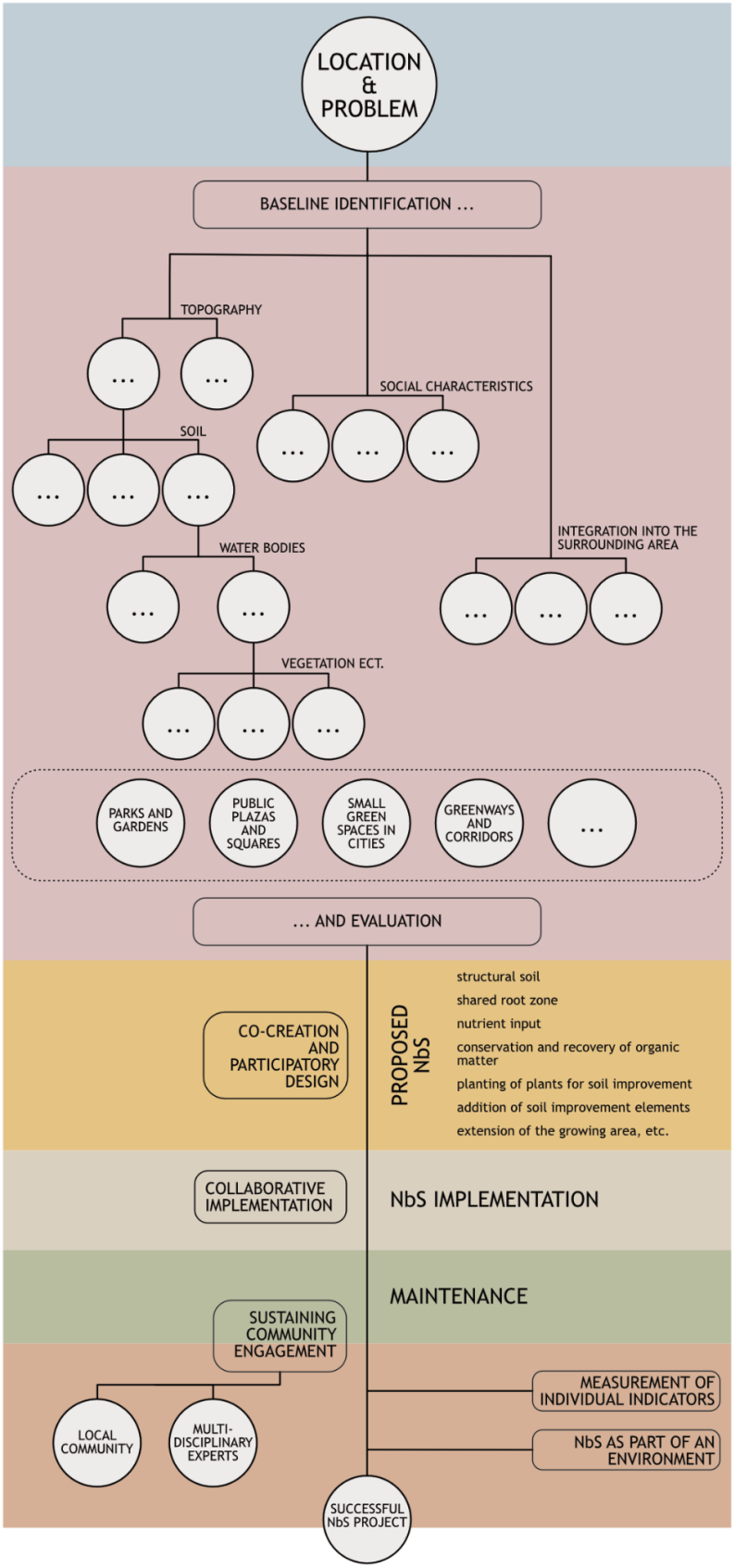
The envisage sequence of steps:



Process diagramme

Process diagram shows example of steps taken in identifying the area, defining the green open space type, describing characteristics of the area, defining problems and proposing relevant nature-based solutions.

Example of process workflow:



5. Community Involvement

Community involvement is a crucial component in the planning, development, and maintenance of NbS. Engaging local communities ensures that NbS are tailored to meet the specific needs and preferences of the people who use and benefit from them. Furthermore, involving communities from the outset fosters a sense of ownership, which can lead to better stewardship and long-term sustainability of NbS initiatives. The following outlines potential strategies and benefits for engaging local communities in each stage of NbS implementation:

- Planning Stage: Co-Creation and Participatory Design.
- Development Stage: Collaborative Implementation.
- Maintenance Stage: Sustaining Community Engagement.

Benefits of Community Involvement in NbS

By integrating community involvement throughout the planning, development, and maintenance stages, NbS can become more sustainable, effective, and beneficial for both people and the environment. This can be achieved through:

- Enhanced local knowledge and relevance: Engaging the community ensures that NbS are designed and implemented to address local needs and conditions, leading to more relevant and effective solutions.
- Increased buy-in and support: When community members are involved in decision-making and implementation, they are more likely to support and advocate for NbS initiatives.
- Improved stewardship and maintenance: Community ownership fosters a sense of responsibility and care for green spaces, resulting in better-maintained and more resilient NbS.
- Social cohesion and well-Being: Community involvement in NbS promotes social interaction, cooperation, and a sense of shared purpose, enhancing overall community well-being and resilience.

C. Process

6. Introduction

Engaging local communities in the development and implementation of solutions in pilot cities ensures that initiatives are both impactful and sustainable. Through a series of structured steps, residents are empowered to actively participate in transforming their urban spaces. This process fosters a sense of ownership, enhances the relevance of interventions, and creates opportunities for collaboration. Each stage invites public input, from identifying key issues to evaluating long-term success, ensuring that outcomes reflect community needs and priorities.

Below is a step-by-step outline that communities can follow to guide participation and drive meaningful change:

a. Problem and location identification - Define relevant problems in the area,

b. Baseline identification and evaluation- Identify the current condition and analyse and evaluate the quality of selected open space and existing infrastructure (e.g. buildings),

c. NbS proposition and selection - Select applicable NbS for the given area,

d. NbS implementation - Implementation of NbS,

e. Maintenance - keeping the NbS as intended,

f. Monitoring - evaluating the success of NbS implementation (monthly, annually).

7. Process steps

a. Problem and location Identification

Communities can approach problem and location identification in two distinct ways. They may begin by exploring relevant issues within their urban area and then proceed to select suitable open spaces or other locations (e.g., buildings) for NbS interventions. Alternatively, they may start with a pre-selected location and subsequently identify the specific issues relevant to that site.

To select the most suitable NbS for your location, it is essential to first identify the specific problems in the area that these solutions can address. NbS can help solve various environmental, social, economic and human health challenges. Table 1**: NbS Location and Problem Identification**, has been designed to assist you in recognizing the problems in your area, providing you with a clearer understanding of the local environmental conditions to guide the selection of the most appropriate NbS.

Problem identification

Assess the current state of a wider urban area or a particular green open space to identify the key problems or challenges they face. This may include issues such as poor air quality, lack of biodiversity, soil erosion, water management problems, or insufficient recreational space. Gather data to understand these problems comprehensively.

We can identify the problems in relation to individual elements in our environment such as air, soil, water and vegetation. When defining these problems we need to bear in mind that the problems cannot be clearly separated and that they are interlinked as well as we can find direct links between defined problems and human well being. Here are some problems that are more general, when problems for specific location are identified, these problems can be more detailed:

Air:

- Outdoor air pollution: In Europe, a recent report by the European Environment Agency (EEA) showed that more than half a million people living in the European Union died from health issues directly linked to toxic pollutants exposure in 2021.
- Global warming: Higher temperature especially in cities causing heat waves - urban heat island effect that leads to respiratory problems and high number of lethal outcomes of heat exposure among the elderly. A rapid and steady increase in global temperatures is causing catastrophic events all over the world – higher numbers of events as: devastating bushfire seasons, locusts swarming, heat waves in Antarctica, tropical storms, hurricanes, longer periods of drought etc.
- High levels of carbon dioxide (CO2): CO2 levels in the atmosphere are now well above 420 ppm, more than double what they were before the onset of the Industrial Revolution in the 19th century.

Soil:

- Soil pollution and soil contamination problems: mostly lead to decline of soil fertility and lower food production.
- Soil degradation: Healthy soil has a minimum of 3-6% organic matter. However, almost everywhere in the world, the content is much lower than that. When soil health will not be preserved, food security for billions of people around the world will be irreversibly compromised.
- Plastic pollution: A report by science journal, Nature, determined that currently, roughly 14 million tons of plastic make their way into the oceans every year, harming wildlife habitats and the animals that live in them. Plastic and microplastic are problematic not only for water but also for soil.
- Textile waste: Discarded clothing and textile waste, most of which is non-biodegradable, ends up in landfills, while microplastics from clothing materials such as polyester, nylon, polyamide, acrylic and other synthetic materials, is leeched into soil and nearby water sources.
- Mining: In mining regions, scientists have made note of high radioactivity levels. In addition, mineral mining, similar to other industrial mining efforts, often produces pollution that leaches into neighbouring rivers and water sources. Dust from pulverised rock is known to cause breathing problems for local communities as well.

Water:

- Flood resilience problems: Urban areas can be affected by riverine flooding, coastal flooding, and either pluvial or ground water floods or combinations. These floods can be the result of a complex combination of causes, such as meteorological and hydrological extremes, including extreme precipitation, river discharges and storm surges, and failure of flood defences.
- Melting ice caps and sea level rise: Today, sea levels are rising more than twice as quickly as they did for most of the 20th century as a result of increasing temperatures on Earth. Sea

level rise will have a devastating impact on those living in coastal regions: according to research and advocacy group Climate Central, sea level rise this century could flood coastal areas that are now home to 340 million to 480 million people, forcing them to migrate to safer areas and contributing to overpopulation and strain of resources in the areas they migrate to.

- Ocean acidification: The smallest change in the pH scale can have a significant impact on the acidity of the ocean. Ocean acidification has devastating impacts on marine ecosystems and species, its food webs, and provoke irreversible changes in habitat quality.
- Water insecurity: Rising temperatures and unsustainable farming practices have resulted in increasing water and food insecurity. Globally, more than 68 billion tonnes of top-soil is eroded every year at a rate 100 times faster than it can naturally be replenished. Laden with biocides and fertiliser, the soil ends up in waterways where it contaminates drinking water and protected areas downstream.
- Overfishing: Overfishing comes with detrimental effects on the environment, including increased algae in the water, destruction of fishing communities, ocean littering as well as extremely high rates of biodiversity loss.
- Plastic pollution.

Vegetation:

- Biodiversity loss: biodiversity is lower due to a variety of factors, but mainly land-use change, particularly the conversion of habitats, like forests, grasslands and mangroves, into agricultural systems.
- Vegetation decline: Extreme negative anomalies of vegetation growth (vegetation declines, or NEGs) have been found to be associated with climate extremes (frost, heatwave, soil drought, atmospheric drought, flood), and can indicate impaired ecosystem services.
- Deforestation: Agriculture is the leading cause of deforestation, another one of the biggest environmental problems appearing on this list. Land is cleared to raise livestock or to plant other crops that are sold, such as sugar cane and palm oil. Besides for carbon sequestration, forests help to prevent soil erosion, because the tree roots bind the soil and prevent it from washing away, which also prevents landslides.

Location identification

Selecting and identifying the specific location where NbS will be applied involves gathering essential details about the area, such as its geographical coordinates, boundaries, parcel number and relevant environmental and social context.

When selecting a location, it is recommended to consider public opinion and accessibility for residents, encourage public participation, and involve experts whenever possible. The decision should be based on available data regarding the extent and accessibility of green spaces. Additionally, consider areas with a lack of green spaces and a low percentage of tree canopy coverage, identifying locations where coverage is minimal.

In addition, consider identifying hotspots and areas where water tends to stagnate or where there is insufficient water. Focus on points within the city that experience extreme conditions, such as heat, flooding, drought, or strong winds. Explore possibilities to connect different green areas into a green system thus providing better quality of environment for inhabitants as well as more resilient green open space.

b. Baseline identification and evaluation

Identify the current condition, analyse and evaluate the quality of selected open space and existing infrastructure (e.g. buildings). This means gathering essential data and identifying physical characteristics of the location as are topography, soil, terrain, water bodies, vegetation, microclimates and stochastic events.

The checklist to describe present conditions of selected location for NbS implementation is presented in Table 1:

- Location and parcel number: Identify each green open space by its geographical location and corresponding parcel number.
- Size: Document the size of each green open space, which includes total area coverage in square metres or hectares.
- Current use: Assess the current use and functionality of each green open space (e.g., recreational, aesthetic, conservation).

Relevant information is also:

- Topography: slop, exposition, insolation,
- Soil: type, pedological profile, natural or degraded, potentially toxic etc.,
- Natural terrain,
- Water bodies,
- Vegetation,
- Microclimate.

In the process of identifying the characteristics of the location also the identification of all problems can be made. After this identification the social characteristics of selected location and integration into the surrounding area should be described. This will enable a better understanding of the location in the context of the users of the space - how the space is used, what is its function, how it is accessible to the local community, how it is designed, is the location appropriately accessible and designed regarding its function etc.? In terms of accessibility, it is also important to understand the location in the context of adjacent open spaces - where is the nearest urban open space, what are the other open spaces within 30 m and what are these open spaces, how are they used or what are their functions.

To answer some of these questions a thorough analysis and evaluation of the existing green open spaces are necessary. This involves several key parameters that can already be part of a green cadastre of some European cities. At this point these parameters are helpful in assessing the chosen location:

- Vicinity of other green open spaces: Analyse the proximity of each green open space to other green areas, considering connectivity and potential for creating green corridors.
- Usage patterns: Evaluate the frequency and nature of use of these spaces by the public, including demographic data on the users (e.g., number of people living within a 500-metre radius).
- Ecological characteristics: Assess the number of trees, shrubs, and the size of the lawn in each space to determine its ecological value and potential for enhancing biodiversity.
- Urban furniture: Inventory the presence of urban furniture (e.g., benches, trash bins, playgrounds) to assess how these spaces meet social needs and their capacity to support

further NbS implementation.

In the process of defining the social context of the urban open space definition of Types of Green Open Spaces is recommended. To classify the identified location according to the types of green open spaces it contains, use categories like parks, community gardens, green roofs, wetlands, urban forests, etc..

Urban open spaces can be classified into various types according to their function, size, design, and accessibility. Here is a common classification/typology:

- Parks and gardens,
- Public plazas and squares,
- Small green spaces /elements in cities,
- Greenways and corridors,
- Community gardens,
- Recreation areas, playgrounds, sports fields,
- Open spaces adjacent to buildings designated for public or private use,
- Cemeteries and memorials,
- Urban forests and nature reserves,
- Waterfronts and urban beaches.

Regarding new importance of NbS and GI we could include another type of open spaces in cities, which could be addressed as Green built environment and includes:

- Green roof, green-blue roof,
- Green wall/façade
- Green alley/pergolas,
- Infiltration planters and tree boxes,
- Rainwater harvesting systems,
- Temporary and/or small-scale interventions including green furniture, green living rooms, etc.

For the purpose of identifying urban open spaces, analysing, evaluating and interpreting them with a focus on improving these spaces through the implementation of the NbS, the common typology of the urban open spaces is presented in detail in Table 4**: Types of green open spaces.** These categories highlight the variety of open spaces that contribute to urban livability, offering recreation, social engagement, and environmental benefits.

c. NbS proposition and selection

After location analysis and evaluation, we identify the potentials and opportunities for implementing NbS in designated green open space. Select applicable NbS for the given area. Based on the problems identified, propose suitable NbS to address them. Consider different NbS options that can mitigate or solve the identified issues, such as planting trees for air quality improvement, creating wetlands for water management, or establishing green corridors for biodiversity enhancement. Select the most appropriate NbS tailored to the specific needs of the location.

Consider the potential for Expansion or Enhancement as to explore opportunities for expanding the

existing green areas or enhancing their ecological functions. Also explore synergies with existing infrastructure and define compatibility of proposed NbS with current urban infrastructure and potential for creating multifunctional spaces. Synergies can be achieved by using similar types of NbS in the selected location to those already present in neighbouring locations, by using similar plants, creating shared root zones, linking water reservoirs, etc.

In the Table 2**: NbS proposition** we select the most relevant possible NbS, applicable to a particular problem, which was identified in the area. Relevant NbS are selected from Table 3**: NbS Toolbox**.

Community needs to be involved in the planning, development, and maintenance of NbS as presented in chapter 5. Community involvement in the planning stage enables a co-creation and participatory design.

Co-Creation and Participatory Design

Objective: To involve local communities in the identification of needs, goals, and design preferences for NbS.

- Workshops and focus groups: Organise workshops and focus group discussions with community members, local stakeholders, environmental groups, and city officials. These sessions provide a platform for sharing ideas, understanding local needs, and co-creating designs for NbS that reflect community values and priorities.
- Community mapping exercises: Use participatory mapping techniques to allow community members to identify important green spaces, areas needing improvement, and potential sites for new NbS. This process helps capture local knowledge and insights that may not be evident through traditional data collection methods.
- Online surveys and digital platforms: Deploy online surveys to reach a broader audience, particularly those who cannot attend in-person workshops. Surveys can collect quantitative data on community preferences, needs, and suggestions for NbS interventions, providing a comprehensive understanding of public opinion.

d. NbS implementation

Implementation of NbS are context-specific actions and processes that deliberately seek to respond to identified societal challenges and are constrained or enabled by several conditions in that context. Such conditions include (but are not limited to) actors, networks, agency, knowledge, learning, institutions, legislation, power relations, policies, governance structure, and resources. In the urban NbS context, implementation is typically linked to the urban planning and policy process. It can “be viewed as a process of interaction between the setting of goals and actions geared to achieving them” (Pressman and Wildavsky, 1984: xxii). Implementation is not limited to the mere operational execution of formal policies/strategies/plans but characterized by being a complex chain of reciprocal interactions and working in iterative cycles based on a logic of plan-do-check-act (Björn Wickenberg, Kes McCormick, Johanna Alkan Olsson, 2021).

For communities in the process of NbS implementation it is important to collaborate and co-create knowledge in this way the community can build shared and enhanced understanding, actionable knowledge and informed decision making. For successful development of the NbS projects an involvement of the community on the development stage is important.

Collaborative Implementation

Objective: To actively involve community members in the implementation process to foster ownership and ensure the solutions are well-received and maintained.

- Volunteer programs: Establish volunteer programs that encourage residents to participate in planting, habitat creation, and other hands-on NbS activities. This involvement can strengthen community bonds and increase awareness about the benefits of NbS.
- Public Ddemonstration projects: Develop small-scale pilot projects or demonstration sites where community members can see NbS in action. These sites can serve as educational tools and inspire broader community support for future projects. The sites can be smaller parts of the pilot NbS projects that enable a sense of a whole NbS intervention.
- Partnerships with local organisations: Collaborate with local schools, environmental groups, and community organisations to implement NbS projects. These partnerships can provide additional resources, expertise, and volunteers, while also integrating NbS into local education and community programs.

e. Maintenance

The maintenance of an NbS requires the constant presence of a trained team of individuals whose expertise can vary - depending on the NbS itself. The aim is: keeping the NbS as intended. Successful maintenance is ensured if the community is also involved in the maintenance stage.

Sustaining Community Engagement

Objective: To ensure ongoing community participation in the maintenance and management of NbS to maximise their long-term effectiveness.

- Adopt-a-Space programs: Create “Adopt-a-Space” initiatives where local groups, businesses, or individuals take responsibility for maintaining a specific green space or NbS feature. These programs can foster a sense of pride and accountability within the community.
- Community stewardship committees: Establish community-led stewardship committees to oversee the management and maintenance of NbS. These committees can coordinate volunteers, plan events, and provide feedback to city officials on necessary improvements.
- Educational workshops and events: Host regular educational workshops and community events, such as nature walks, gardening classes, or citizen science projects, to keep the community engaged and informed about the benefits of NbS and their role in maintaining them.
- Digital tools for monitoring and feedback: Utilise digital tools, such as apps or online platforms, to facilitate community reporting on the condition of NbS and provide feedback on their effectiveness. This data can be used to make adaptive management decisions and ensure continuous improvement.

f. Monitoring

Evaluating the success of NbS implementation can be made monthly and annually. For successful monitoring, relevant measurable parameters serve as a basis against which performance and impact of NBS implementation can be assessed. The measurable parameters can be physical, chemical, or / and biological indicators - popular is tree inventory database. The measurement need to obtain data

before and after the NbS implementation. To this end, baseline data are obtained for a reference period (to obtain a representative 'average' reference year) for each of the measurable parameters, using the best available data from municipalities, monitoring studies, statistical databases, reports, research literature sources and, when applicable, through additional measurement, interviews, workshops and questionnaires.

Annual updates will enable tracking of changes. In the process of monitoring the community needs to be included as already stated in the chapter Sustaining Community Engagement under e. Maintenance.

The data needed when performing monitoring can be diverse as are diverse types of NbS. It is advisable to record the data in a tabular format over a defined period of time, as this ensures transparency and professionalism in monitoring.

Data capture should be done partly through built-in high-tech sensors (usually to measure soil conditions) and partly by experts. Data monitoring, analysis and interpretation of indicator data collected using appropriate technical equipment should be carried out by trained professionals. In the case of trees, the presence of a certified arborist is essential. Helpful can be a use of scorecard with indicators to measure the success of the NbS intervention:

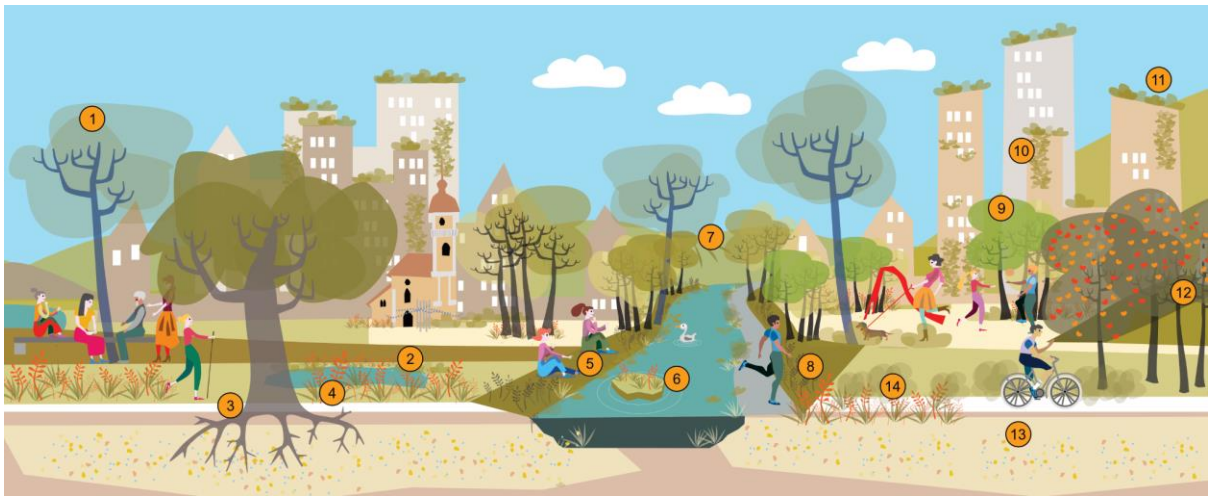
ENVIRONMENTAL COMPONENT	SUGGESTED INDICATORS
SOIL	soil structure, chemical structure, physical characteristics, soil temperature, soil pH, metals in soil, toxic substances in soil, soil moisture, soil compaction at different depths, presence of nutrients, minerals, organic matter, presence of microorganisms, extent of growing space for each plant
WATER	water quality, availability of drinking water, water levels, rainfall patterns over the year, annual rainfall, types of rainfall (rain, snow, hail), stochastic events (storm, flood) - timing, duration, impact, location of the event
AIR	particles in the air, pollutants, air movement (wind), evaporation, air temperature, air temperature trends over the day, over the year, stochastic phenomena and heat waves, noise
VEGETATION	species, variety, age, size, trunk circumference, vigour, branching and 3D shape of the root system, root penetration, presence of diseases and pests, damage to roots, bark, crown, density of foliage, exposure to solar radiation

Monitoring can be designed to measure individual indicators, but the effectiveness of NbS can also be tested by considering the broader spatial problematics:

	Low	Moderate	High
Air pollution			
Water pollution			
Water scarcity			
Flooding or storm sewer overflows			
Urban heating/heat island effect			
Coastal erosion			
Greenhouse gas emissions			
Biodiversity			
Noise pollution			
Accessibility of recreational (green) space			
Social cohesion			
Social justice			
Urban regeneration			
Outdoor educational opportunities			
Creation of new green business opportunities			

Evidence of NbS effectiveness to combat the negative impacts of climate change and urbanisation can be captured through a comprehensive monitoring and impact assessment. The most difficult element of designing a monitoring scheme is determining a realistic potential scale of impact to effectively direct monitoring and measurement efforts. It is therefore advisable to combine different ways of measuring the effectiveness of NbS - from individual indicators to considering NbS as part of a broader space, and to involve different experts as well as the local community. It is also recommended that NbS owners work with a group of multi-disciplinary experts, and review similar NbS installations elsewhere, to develop a tailored monitoring scheme specific to local needs.

SCHEMATIC EXAMPLE OF IMPLEMENTATION OF NBS IN URBAN STRUCTURE



USED TYPES OF NbS:

1 URBAN/STREET TREE

2 BIOREMEDIATION POND

3 ROOT BRIDGE

4 PERENNIALS UNDER TREES

5 RENATURALISATION OF WATERCOURSES

6 FLOATING ISLAND

7 VEGETATION BARRIER

8 SLOPE REVEGETATION

9 CLOSED CANOPY

10 GREEN WALL

11 GREEN ROOF

12 URBAN ORCHARD

13 SHARED ROOT ZONE

14 POLLINATORS FRIENDLY PLANTS

D. Annexes

Table 1: NbS Locations and Problems Identification

TABLE 1: GREEN OPEN SPACE: PROBLEMS IDENTIFICATION			
CHARACTERISTICS / FEATURES		**LOCATION DATA**	**IDENTIFICATED PROBLEMS / example**
GENERAL INFORMATION			
Name			
Type			
Geographical location			
Parcel Number			
Size (m2, ha)			
Ownership			
Public infrastructure			
PHYSICAL CHARACTERISTICS			
Topography	Slope (in %)		Too steep, bigger possibility of soil creep, susceptibility to landslides, erosion
	Exposition (north, south, east, west)		Northern exposition - shade, frost Southern exposition - overheating, high insolation
	insolation		Extreme heath
Soil	Type of soil		Clay - water retention sandy soils - water runoff, nutrient deficiency
	pedological profile (structure)		Compacted soils, impermeable soils
	natural / degraded		If degraded possible: Compacted soils, impermeable soils, pollution, toxic chemical load
	Chemical composition		Possible pollution, toxic chemical load, nutrient deficiency

TABLE 1: GREEN OPEN SPACE: PROBLEMS IDENTIFICATION			
CHARACTERISTICS / FEATURES		**LOCATION DATA**	**IDENTIFICATED PROBLEMS / example**
Natural terrain or disturbed terrain			altered structure, poor soil bearing capacity, bigger possibility of soil creep, erosion
Water bodies	Urban stream / river / channel		regulated watercourse, no / weak biodiversity, water run off
	Lake, pond		pollution, toxic chemical load, nutrient overload
	wetland		Degraded, weak biodiversity, pollution
	Reservoirs		If none - water runoff, no water retention
	Bay / gulf		Degraded, weak biodiversity, pollution
Vegetation	Type: Trees, shrubs, climbing plants, perennials etc. (number of plants)		
	species		non-native species, not adapted to changing climatic conditions
	Dimensions of the plant		
	Age of the plant		
	Vitaliy of plant (trunk circumference, vigour, branching and root system, presence of diseases and pests, damage to roots, bark, canopy)		damage due to dimension: Overextended Branches, Crowding and Competition, Imbalanced Growth, Root Damage from Space Constraints / damage due to age: Structural Weakness, Root Decline, Decreased Vigour, Diseases and Pests, Hollowing or Cavities / Deadwood, Splitting Bark or Cracks, Reduced Canopy Density
	Functions of plants (Shading, Polinators etc.)		is unable to carry out its function
	Canopy cover (%)		canopy cover is under 20 %, between 20-40%, over 40%.
	Environmental Stress and Adaptation		Limited Space for Growth, Overgrowth and Pruning Challenges, Sunlight and Nutrient Competition
Microclimate	precipitation patterns over the year		heavy rainfall, hail, sleet,prolonged periods of rain, long periods without rainfall
	air microclimates, pollutants		high or low moisture content, polluted atmosphere, prolonged fog
	air temperature trends over the day and over the year		temperature extremes
	air movement (wind)		strong winds, gale-force winds

TABLE 1: GREEN OPEN SPACE: PROBLEMS IDENTIFICATION			
CHARACTERISTICS / FEATURES		**LOCATION DATA**	**IDENTIFICATED PROBLEMS / example**
Stochastic events, extreme weather events	storm, flood, heat waves, strong winds		storm, flood, heat waves, strong winds etc.
SOCIAL CHARACTERISTICS			
	Current Use		a function which is a burden on the environment, prevents plants from thriving, causes pollution, is socially inappropriate
	Accessibility		more than 500 m away
	Aesthetic		the appearance of the area is inadequate
INTEGRATION INTO THE SURROUNDING AREA			
	Distance to the nearest urban open space		No other urban scapes in surrounding area in 500m
	Number of urban open spaces in radius 30 m		No other urban scapes in surrounding area
	Type and functions of nearest urban open spaces (in radius 30 m)		No other urban scapes in surrounding area

With the introduction of NbS the condition of the selected area, the living conditions of the nearby living inhabitants, the resilience to climatic stresses will be improved and current problems solved.

Table 2: NbS proposition

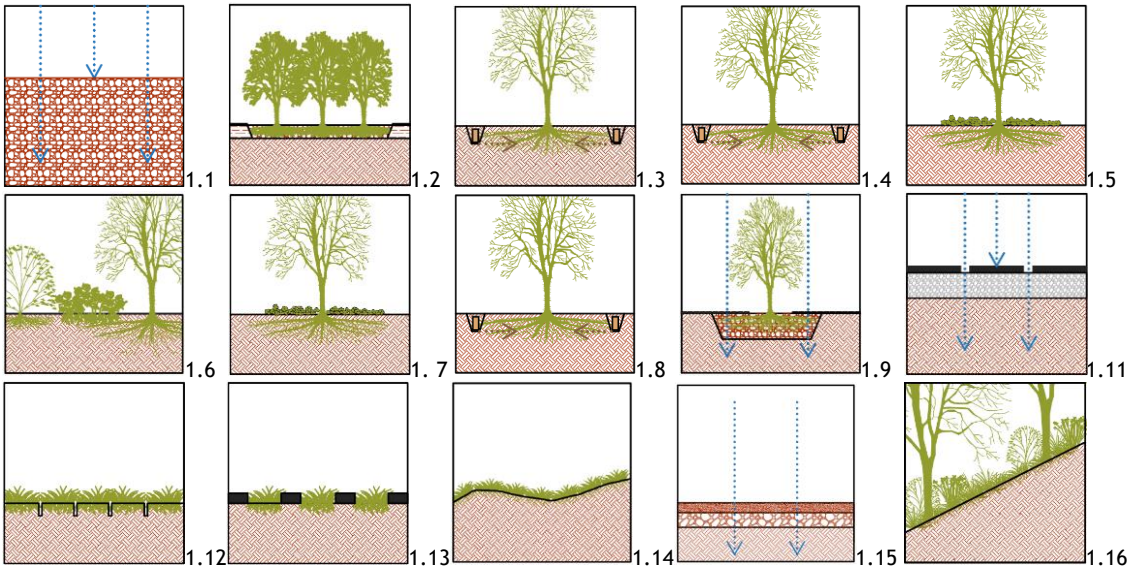
Note: We suggest relevant NbS from the NbS Toolbox presented in Table 3.

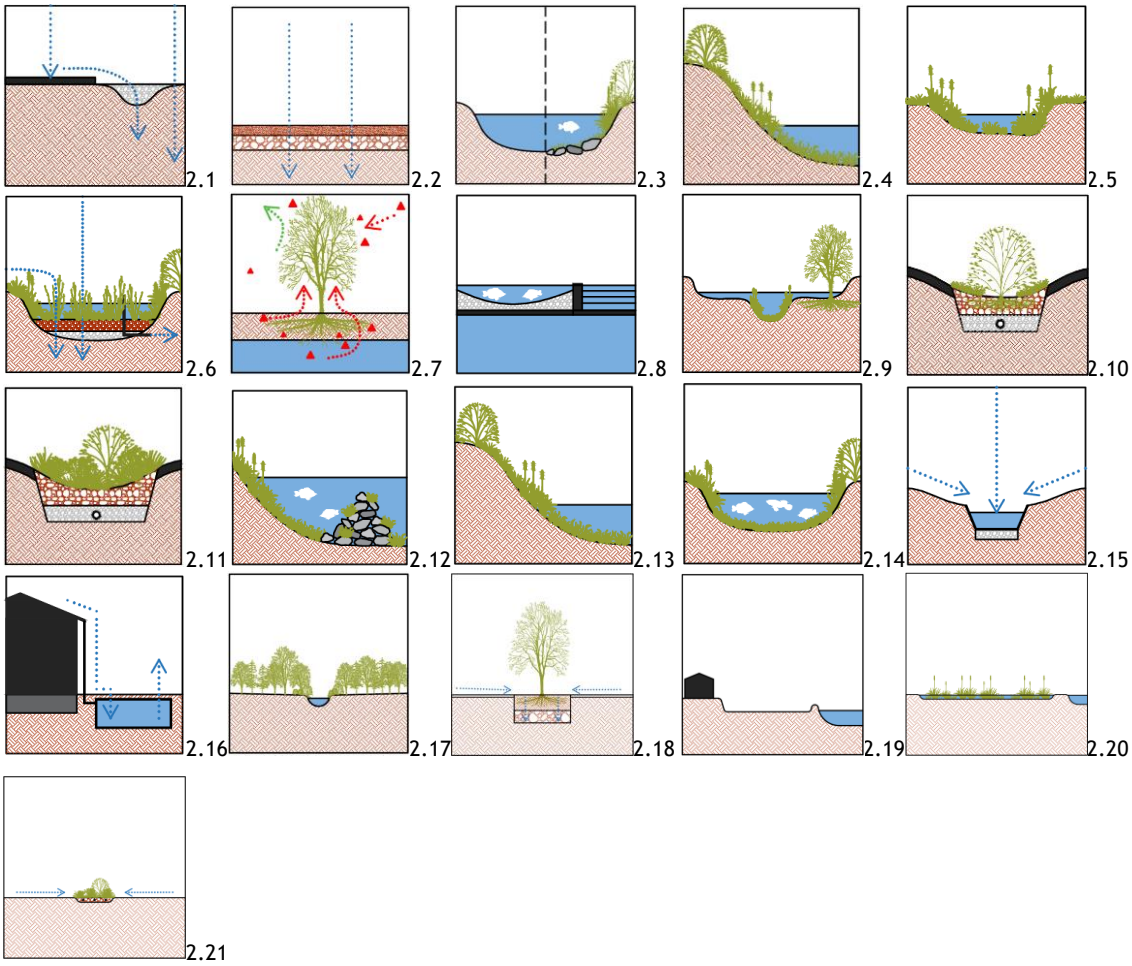
URBAN OPEN SPACE IDENTIFICATION CARD	IDENTIFIED PROBLEMS	POSSIBLE NbS SOLUTIONS
PHYSICAL CHARACTERISTICS		
Topography	Too steep, bigger possibility of soil creep, susceptibility to landslides, erosion	1.14 MICRORELIEF
	Northern exposition - shade, frost Southern exposition - overheating, high insolation	3.5 PLANT DIVERSITY
	Extreme heath	3.14 VEGETATED PERGOLA 3.16 CLOSED CANOPY 4.2 WATER SPRINKLERS
Soil	Clay - water retention sandy soils - water runoff, nutrient deficiency	1.3 NUTRIENT INPUT 2.1 DRAINAGE SYSTEMS
	Compacted soils, impermeable soils	1.1 STRUCTURAL SOIL
	If degraded possible: Compacted soils, impermeable soils, pollution, toxic chemical load	1.6 PLANTING OF PLANTS FOR SOIL IMPROVEMENT 1.7 CONSERVATION OF ORGANIC MATTER ON SITE 1.8 ADDITION OF SOIL IMPROVEMENT ELEMENTS
	Possible pollution, toxic chemical load, nutrient deficiency	1.6 PLANTING OF PLANTS FOR SOIL IMPROVEMENT
Natural terrain or disturbed terrain	altered structure, poor soil bearing capacity, bigger possibility of soil creep, erosion	1.1 STRUCTURAL SOIL 1.4 ORGANIC-MINERAL COMPLEX APPLICATION
Water bodies	regulated watercourse, no / weak biodiversity, water run off	2.3 REVITALISATION OF STREAMS 2.4 RENATURALISATION OF WATERCOURSES
	pollution, toxic chemical load, nutrient overload	2.4 RENATURALISATION OF WATERCOURSES 2.7 PHYTOREMEDIATION
	Degraded, weak biodiversity, pollution	2.7 PHYTOREMEDIATION 2.21 INFILTRATION STRIPS
	If none - water runoff, no water retention	2.10 BIOSWALE / RAINWATER DITCH / BIO DITCH 2.11 RAIN GARDEN / RAINGARDEN 2.19 DETENTION BASINS

URBAN OPEN SPACE IDENTIFICATION CARD	IDENTIFIED PROBLEMS	POSSIBLE NbS SOLUTIONS
	Degraded, weak biodiversity, pollution	2.2 FILTRATION 2.7 PHYTOREMEDIATION
Vegetation	non-native species, not adapted to changing climatic conditions	3.5 PLANT DIVERSITY 3.6 PLANTS TOLERANT TO HIGHER TEMPERATURES
	damage due to dimension: Overextended Branches, Crowding and Competition, Imbalanced Growth, Root Damage from Space Constraints damage due to age: Structural Weakness, Root Decline, Decreased Vigour, Diseases and Pests, Hollowing or Cavities Deadwood, Splitting Bark or Cracks, Reduced Canopy Density	1.3 NUTRIENT INPUT 1.4 ORGANIC-MINERAL COMPLEX APPLICATION 1.5 CONSERVATION AND RECOVERY OF ORGANIC MATTER 1.6 PLANTING OF PLANTS FOR SOIL IMPROVEMENT 1.7 CONSERVATION OF ORGANIC MATTER ON SITE 1.8 ADDITION OF SOIL IMPROVEMENT ELEMENTS 1.9 EXTENSION OF THE GROWING AREA
	is unable to carry out its function	1.3 NUTRIENT INPUT 1.4 ORGANIC-MINERAL COMPLEX APPLICATION
	Cover of the canopy is under 20 %	4.3 MAINTAINING A CERTAIN PROPORTION OF VEGETATION COVER IN THE URBAN FABRIC 3.14 VEGETATED PERGOLA
	Limited Space for Growth, Overgrowth and Pruning Challenges, Sunlight and Nutrient Competition	1.1 STRUCTURAL SOIL 1.2 SHARED ROOT ZONE
Microclimate	heavy rainfall, hail, sleet,prolonged periods of rain, long periods without rainfall	3.8 VEGETATION BARRIER 3.16 CLOSED CANOPY
	high or low moisture content, polluted atmosphere, prolonged fog	3.21 STREET TREES 3.19 ECO-CORRIDOR
	temperature extremes	3.5 PLANT DIVERSITY 3.6 PLANTS TOLERANT TO HIGHER TEMPERATURES
	strong winds, gale-force winds	3.8 VEGETATION BARRIER 4.4 CLUMPS OF TALLER VEGETATION AS A WIND BARRIER

URBAN OPEN SPACE IDENTIFICATION CARD	IDENTIFIED PROBLEMS	POSSIBLE NbS SOLUTIONS
Stochastic events, extreme weather events	storm, flood, heat waves, strong winds etc.	2.12 ARTIFICIAL STRUCTURES IN THE WATER FOR FLOW ATTENUATION 2.17 PROVISION OF A WIDE BELT FOR THE COURSE OF RIVERS
SOCIAL CHARACTERISTICS		
	a function which is a burden on the environment, prevents plants from thriving, causes pollution, is socially inappropriate	3.2 GREEN SPACE MAINTENANCE PLANNING 3.16 CLOSED CANOPY 3.17 COMMUNITY GARDENS / URBAN AGRICULTURE
	more than 500 m away	3.9 GREEN WALL 3.10 VEGETATION ON/NEAR THE FAÇADE - GROWING AREA FROM THE SOIL VEGETATION 3.11 VEGETATION ON/NEAR THE FAÇADE - GROWING AREA FROM THE TROUGHS 3.12 VEGETATION ON THE FAÇADE - TROUGHS 3.13 GREEN ROOF 3.14 VEGETATED PERGOLA
	the appearance of the area is inadequate	3.20 BALCONY GARDENS 3.21 STREET TREES
INTEGRATION INTO THE SURROUNDING AREA		
	No other urban scapes in surrounding area in 500m	3.9 GREEN WALL 3.10 VEGETATION ON/NEAR THE FAÇADE - GROWING AREA FROM THE SOIL VEGETATION 3.11 VEGETATION ON/NEAR THE FAÇADE - GROWING AREA FROM THE TROUGHS 3.12 VEGETATION ON THE FAÇADE - TROUGHS 3.13 GREEN ROOF 3.14 VEGETATED PERGOLA 3.20 BALCONY GARDENS 3.21 STREET TREES
	No other urban scapes in surrounding area	
	No other urban scapes in surrounding area	

Table 3: NbS Toolbox

NbS
1 SOIL / GROUND 1.1 STRUCTURAL SOIL 1.2 SHARED ROOT ZONE 1.3 NUTRIENT INPUT 1.4 ORGANIC-MINERAL COMPLEX APPLICATION 1.5 CONSERVATION AND RECOVERY OF ORGANIC MATTER 1.6 PLANTING OF PLANTS FOR SOIL IMPROVEMENT 1.7 CONSERVATION OF ORGANIC MATTER ON SITE 1.8 ADDITION OF SOIL IMPROVEMENT ELEMENTS 1.9 EXTENSION OF THE GROWING AREA 1.10 IMPROVING THE GROWING AREA 1.11 PERMEABLE / PERMEABLE PAVEMENT / PERMEABLE SOIL 1.12 SOIL AIRING 1.13 RUSTERS 1.14 MICRORELIEF 1.15 SOIL STRUCTURES THAT PURIFY RAINWATER 1.16 SLOPE REVEGETATION 
2 WATER 2.1 DRAINAGE SYSTEMS 2.2 FILTRATION 2.3 REVITALISATION OF STREAMS 2.4 RENATURALISATION OF WATERCOURSES 2.5 CONSTRUCTED WETLAND 2.6 BIOREMEDIATION POND

NbS
2.7 PHYTOREMEDIATION 2.8 FISH STEPS 2.9 FLOODPLAIN PARK 2.10 BIOSWALE / RAINWATER DITCH / BIO DITCH 2.11 RAIN GARDEN / RAINGARDEN 2.12 ARTIFICIAL STRUCTURES IN THE WATER FOR FLOW ATTENUATION 2.13 COOLING OF THE WATER - PERIPHERAL VEGETATION, FLOW, OTHER SPECIES OF FAUNA AND FLORA 2.14 NATURAL FISH FARMS 2.15 SURFACE WATER RESERVOIRS 2.16 UNDERGROUND WATER RESERVOIRS 2.17 PROVISION OF A WIDE BELT FOR THE COURSE OF RIVERS 2.18 TREE BOX FILTERS 2.19 DETENTION BASINS 2.20 CONSTRUCTED WETLANDS 2.21 INFILTRATION STRIPS  2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 2.10 2.11 2.12 2.13 2.14 2.15 2.16 2.17 2.18 2.19 2.20 2.21
3 VEGETATION 3.1 FLOATING ISLAND 3.2 GREEN SPACE MAINTENANCE PLANNING

NbS

3.3 ROOT BRIDGE

3.4 PERENNIALS UNDER TREES

3.5 PLANT DIVERSITY

3.6 PLANTS TOLERANT TO HIGHER TEMPERATURES

3.7 POLLINATORS

3.8 VEGETATION BARRIER

3.9 GREEN WALL

3.10 VEGETATION ON/NEAR THE FAÇADE - GROWING AREA FROM THE SOIL VEGETATION

3.11 VEGETATION ON/NEAR THE FAÇADE - GROWING AREA FROM THE TROUGHS

3.12 VEGETATION ON THE FAÇADE - TROUGHS

3.13 GREEN ROOF

3.14 VEGETATED PERGOLA

3.15 HIGH BED SYSTEM

3.16 CLOSED CANOPY

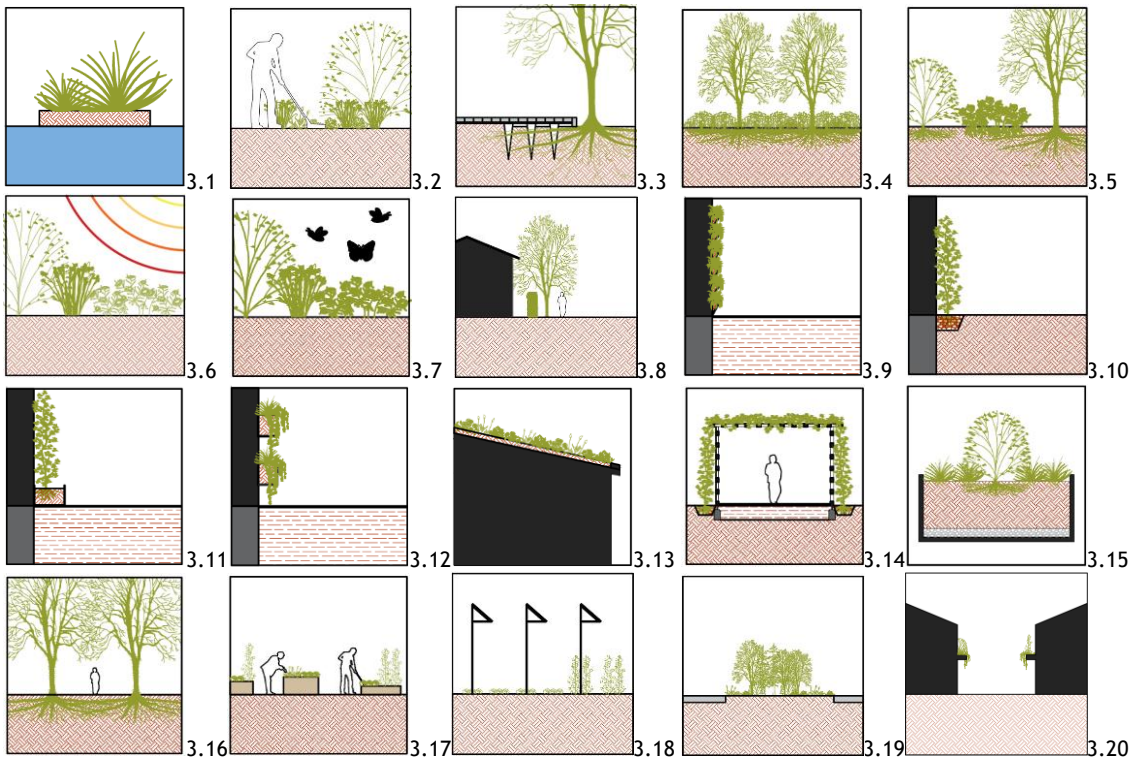
3.17 COMMUNITY GARDENS / URBAN AGRICULTURE

3.18 AGRO-VOLTAICS

3.19 ECO-CORRIDOR

3.20 BALCONY GARDENS

3.21 STREET TREES



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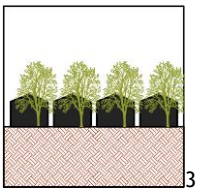
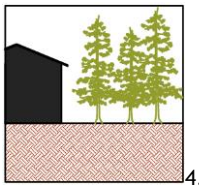
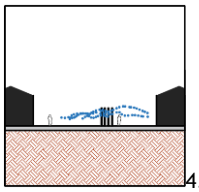
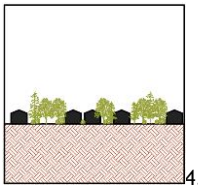
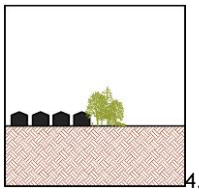
 3.21
4. AIR 4.1 SELECTION OF CONIFERS IN THE TREE STANDS OF CITIES 4.2 WATER SPRINKLERS 4.3 MAINTAINING A CERTAIN PROPORTION OF VEGETATION COVER IN THE URBAN FABRIC 4.4 CLUMPS OF TALLER VEGETATION AS A WIND BARRIER  4.1  4.2  4.3  4.4

Table 4: Types of green open spaces

Table 4: TYPES OF GREEN OPEN SPACES		
TYPES OF GREEN OPEN SPACES		**CHARACTERISTICS AND FEATURES / example**
1 PARKS AND GARDENS	CITY PARK	1-3 ha or more, depending on the size of the settlement; 1 urban park in settlements with more than 3,000 inhabitants, on at least 85% natural terrain land; accessibility from the area of housing and jobs to the nearest urban park is a 15-minute (900 m) walk
	MINI PARKS AND POCKET PARKS	A pocket park (also known as a parkette, mini-park, vest-pocket park or vesty park) is a small park accessible to the general public, is smaller than 0.5 hectares (1 acre) in size, can have less then 5% natural terrain land.
	NEIGHBORHOOD PARKS	500 m2-1 ha, depending on settlement size, density and number of inhabitants Min. 1 local park in all settlements with more than 100 inhabitants. Max. walking distance from housing and employment areas to the nearest local park is 5 min (300 m); pedestrian and cycle access routes from the wider area shall be provided, on at least 75% natural terrain land.
	LOCAL PARKS	500 m2-1 ha, depending on settlement size, density and number of inhabitants Min. 1 local park in all settlements with more than 100 inhabitants. Max. walking distance from housing and employment areas to the nearest local park is 5 min (300 m); pedestrian and cycle access routes from the wider area shall be provided, on at least 75% natural terrain land.
2 PUBLIC PLAZAS AND SQUARES	TOWN SQUARES	A town square (also a plaza, public square or urban square) is an open public space commonly found in the heart of a traditional town, and which is used for community gatherings. Size depends on the settlement sheme.
	URBAN/CIVIC PLAZAS	An open space for public use defined by surrounding buildings or streets, size less than 1 acre. Actual size could be dependent on programmatic requirements and context. Possible Activities seating, group gatherings, shopping, dining, organized activities, special events.
3 SMALL GREEN SPACES/ELEMENTS IN CITIES	SMALL SQUARE	An open space for public use defined by surrounding buildings or streets, size usually less than 1 acre. Actual size could be dependent on programmatic requirements and context. Possible Activities seating, group gatherings, shopping, dining, organized activities, special events.
	URBAN TREE	A tree in a town or city.
	POP-UP PARK	A parklet or pop-up parks are small green spaces that provide somewhere for people to sit, chat and

Table 4: TYPES OF GREEN OPEN SPACES		
TYPES OF GREEN OPEN SPACES		**CHARACTERISTICS AND FEATURES / example**
		relax – and because they make streets more pleasant for walking and cycling, they can help encourage people to get out and about. They vary greatly in both size and composition and can be permanent or temporary
	TRAFFIC ISLAND	A small raised area in the middle of a road which provides a safe place for pedestrians to stand and marks a division between two opposing streams of traffic.
4 GREENWAYS AND CORRIDORS	LINEAR PARKS	They are usually made up of vegetation strips consisting of trees and/or shrubs and may also include a watercourse, pedestrian and/or cycle links and other infrastructure facilities. minimum size. The width of the route depends on the spatial characteristics and capacity; in the case of an articulated route, the green belt with planting on flat terrain shall be a minimum width of 5 m; in the case of the provision of space for new tree-lined routes alongside infrastructure facilities, the green belt shall be a minimum width of 1,5 m. Flat terrain Min. 85 %.
	AVENUE OF TREES / TREE-LINED STREET	Within settlements, tree gardens are planned tree trajectories that usually accompany communication routes (paths, roads) and form spatial axes. There are four basic forms of avenues: single sided avenue (one line of trees on one side of the axis), single sided avenue (one line of trees on each side of the axis), double sided avenue (two lines of trees on one side of the axis), and double-sided avenue (two lines of trees on each side of the axis). Avenues should be laid out in accordance with the general guidelines and standards and other guidelines for site preparation, planting, selection of tree species, selection and quality of seedlings and so on.
	URBAN WATERCOURSES	In these areas, provision shall be made for recreational facilities in the coastal zone within the settlements (recreational paths, resting places, installation of other elements and equipment, access to the water, etc.). In the development of beaches and bathing areas, attention shall be paid to the design of the contact with the water. Natural materials shall be used as a priority, with a predominant proportion of lawn areas in the coastal area. The design should consider the possibility of using sustainable solutions and multifunctional uses of space. minimum size The width of the layout depends on the spatial characteristics and the possibilities of flat terrain Min. 85 %.
	RIVERFRONT GREENWAYS	
	NATURE TRAILS	Typically consisting of vegetation strips of trees and/or shrubs, they may also include a watercourse, pedestrian and/or cycle links and other infrastructure facilities. Minimum size - The width of the route depends on the spatial characteristics and capacity; in the case of an articulated route, the green belt with planting on flat ground shall be a minimum width of 5 m; in the case of the provision of space for new tree-lined routes

Table 4: TYPES OF GREEN OPEN SPACES		
TYPES OF GREEN OPEN SPACES		**CHARACTERISTICS AND FEATURES / example**
		adjacent to infrastructure facilities, the green belt shall be a minimum width of 1.5 m. Flat ground Min. 85%.
	PEDESTRIAN PATH	Pedestrian walkways are being developed as pavements, separated pedestrian links, mixed pedestrian and cycling areas and, in residential neighbourhoods with low motorised traffic speeds, increasingly as part of the shared circulation space. Due to the linear nature of the links, green spaces along them are usually arranged in the form of (articulated) lawns and tree-lined routes. To ensure visibility and safety, planting between individual traffic areas shall use lower plants with a maximum finished height of 0.7 m and trees with a canopy of at least 2.5 m from the ground.
5 COMMUNITY GARDENS	URBAN AGRICULTURE PLOTS	Multifunctional urban agriculture areas are agricultural areas within or on the edge of settlements which, because of their proximity to settlements and their landscape features, also have a special importance and attractiveness for the recreational activities of their inhabitants. These are usually private areas, which are also publicly accessible in some specially landscaped parts. In these areas, forms of recreation can be provided through existing infrastructure (e.g. field thoroughfares), and the planning of new infrastructure is coordinated with landowners.
	ALLOTMENT GARDENS	There is usually a uniform, green periphery that gives the area a unified character and distinctive character. The uniform design of the planned elements, such as tool sheds, rainwater harvesting tanks, composting facilities, etc., should be integrated into the design of the area. In the areas planned for allotments, it is essential to check the suitability of the soil (pollution, heavy metals, other parameters) beforehand for food production. Rainwater harvesting tanks should be provided for watering allotments. Minimum size for the definition of a stand-alone type of green space: 800 m2 (20 units for gardening plus common areas; min. size of each rental garden is 20 m2; min. size of common areas is 100 m2). Garden areas may also form part of other green space zoning areas.
6 RECREATION AREAS, PLAYGROUNDS AND SPORTS FIELDS	PUBLIC PLAYGROUNDS FOR CHILDREN AND YOUNG PEOPLE	High quality design and integrity; particular emphasis should be placed on the design of the school access and entrance area, as well as on the educational aspects and the school's non-formal curriculum. Ensuring well-being, psycho-physical development and a healthy environment. Ensuring that the school's outdoor space is well connected to the school building, especially outdoor classrooms and other facilities related to the school curriculum, in a way that is easy to use. Security should be ensured primarily through a design approach rather than by fencing off the space. Ensuring equal accessibility and use also for people with functional and other disabilities. Ensuring adequate protection against noise and pollution and adequate climatic

Table 4: TYPES OF GREEN OPEN SPACES		
TYPES OF GREEN OPEN SPACES		**CHARACTERISTICS AND FEATURES / example**
		conditions for children to be outdoors (shade, wind protection). The layout should also provide at least one large area of enclosed green space (min. 500 m2). Minimum size of the external space of the school shall be determined in accordance with the applicable school planning rules. The proportion of green areas on flat terrain shall normally comprise at least 65 % of the usable external land.
	CHILD CARE/NURSERY OUTDOOR SPACES	High quality and integrity. The focus is on educational aspects and play, ensuring children's well-being, psycho-physical development and a healthy environment. Ensuring a good connection between the outdoor space and the building. The possibility of direct access to a suitably landscaped outdoor space from individual playrooms is recommended. The outdoor area of kindergartens shall include, in addition to the children's playground, other amenities related to the kindergarten's operation, courtyards and accesses, and all associated green and park areas. Areas for children's play and other activities shall be safely separated from functional access and circulation areas and routes. The layout should also provide at least one large area of enclosed green space (minimum 500 m2). As for minimum size the provisions of other applicable regulations governing kindergartens should be considered, min. 15 m2 of play area per child. Proportion of green areas in the rough terrain shall normally comprise at least 65 % of the playground area
	SCHOOL OUTDOOR SPACES	High quality design and integrity; particular emphasis should be placed on the design of the school access and entrance area, as well as on the educational aspects and the school's non-formal curriculum. Ensuring well-being, psycho-physical development and a healthy environment. Ensuring that the school's outdoor space is well connected to the school building, especially outdoor classrooms and other facilities related to the school curriculum, in a way that is easy to use. Security should be ensured primarily through a design approach rather than by fencing off the space. Ensuring equal accessibility and use also for people with functional and other disabilities. Ensuring adequate protection against noise and pollution and adequate climatic conditions for children to be outdoors (shade, wind protection). The layout should also provide at least one large area of enclosed green space (min. 500 m2). Minimum size of the external space of the school shall be determined in accordance with the applicable school planning rules. The proportion of green areas on flat terrain shall normally comprise at least 65 % of the usable external land.
	CAMPUS OUTDOOR SPACES	High quality design and integrity; particular emphasis should be placed on the design of the school access and entrance area, as well as on the educational aspects and the school's non-formal curriculum. Ensuring well-being, psycho-physical development and a healthy environment. Ensuring that the school's outdoor space is well connected to

Table 4: TYPES OF GREEN OPEN SPACES		
TYPES OF GREEN OPEN SPACES		**CHARACTERISTICS AND FEATURES / example**
		the school building, especially outdoor classrooms and other facilities related to the school curriculum, in a way that is easy to use. Security should be ensured primarily through a design approach rather than by fencing off the space. Ensuring equal accessibility and use also for people with functional and other disabilities. Ensuring adequate protection against noise and pollution and adequate climatic conditions for children to be outdoors (shade, wind protection). The layout should also provide at least one large area of enclosed green space (min. 500 m2). Minimum size of the external space of the school shall be determined in accordance with the applicable school planning rules. The proportion of green areas on flat terrain shall normally comprise at least 65 % of the usable external land.
	GREEN SPACES IN RECREATION AREAS	Adaptation to the landscape characteristics and qualities of the area is important in their management. Interventions shall be selective and primarily aimed at accommodating particular types of recreational activities and achieving appropriate functional organisation and integration of sub-spaces. They shall normally be located along public passenger transport corridors but may also be linked to natural hinterland. Parking areas should be greened (see section 5.2.15.e). minimum size 5 ha rough terrain Min. 80 %
	SPORTS AND RECREATION PARKS	
	FOOTBALL/BASKETBALL… COURTS	
7 OPEN SPACES ADJACENT TO BUILDINGS DESIGNATED FOR PUBLIC OR PRIVATE USE	GREEN SPACES IN AREAS WITH MULTI-DWELLING BUILDINGS	Green spaces in residential streets are usually arranged in the form of articulated and buffered lawns, green islands and tree lines. They often also follow guidelines for the uniform design of front gardens and for the priority of hedgerows. To ensure visibility and safety, planting in the streets themselves shall use lower plants with a maximum finished height of 0,7 m and trees with a canopy of at least 2,5 m from the ground. Minimum size Not specified; depending on the specific characteristics of the area Minimum width of the green area 0,7 m, minimum width of the green belt with tree 1,5 m; trees with a canopy at least 2,5 m from the ground; care must be taken to preserve transparency when planting beds at junctions and roundabouts; planting in the central part of roundabouts shall be arranged in accordance with the applicable roundabout rules. Canopy coverage should consider the extent depending on the type of street.
	OUTDOOR SPACES IN HOUSING FOR ELDERLY	Provision of quality outdoor space for the residents (socialising, walking, resting, observing, programmes, visiting space, therapeutic garden, outdoor fitness, chess, etc.) and active and passive use of these areas. The use of appropriate plant species is important (non-use of toxic plant species, avoidance of allergenic plant species). It makes sense to ensure that these semi-public spaces can be linked to the surrounding area (public green spaces, pedestrian paths, etc.). The development of adjacent public spaces can complement the wider area adjacent to these facilities in a programmatic way (e.g. through the location of an outdoor fitness area). Minimum size Min. 200 m2 of total enclosed

Table 4: TYPES OF GREEN OPEN SPACES		
TYPES OF GREEN OPEN SPACES		**CHARACTERISTICS AND FEATURES / example**
		green space and min. 5-8 m2 of open living space per bed (depending on the local context), considering the provisions of the applicable regulations. Proportion of green spaces in FZP min. 30%; may be less if there are park areas in close proximity (within 100 m) that are accessible to the elderly, in areas with RZS min. 40%.
	HOSPITAL OUTDOOR SPACES	The outside areas of hospitals can be open and accessible to all or, in special cases, enclosed (e.g. in psychiatric clinics). When using plant material, it is imperative to avoid allergenic plant species. Ensuring good quality views from rooms into the natural environment. Areas for socialising with visitors, walking with patients as well as outdoor therapies (therapeutic garden, fitness equipment). In children's hospitals, appropriate play areas should also be provided. Minimum size Min. 300 m2 of total green area (size of a small local park) Proportion of green areas in FZP min. 25 %, in areas with RZS min. 35 %.
	GREEN SPACES ADJACENT TO OTHER PUBLIC BUILDINGS	Design adapted to the content of the building, may be representative, with particular emphasis on the entrance area, but also at least partly intended to be usable; emphasis also on views from the building. Important integrated design of all external spaces including access, parking, refuse collection areas, lighting, etc., and appropriate functional organisation and quality of individual sub-spaces. Natural shade (preferably tree canopies) must be provided in the layout of the seating and play areas. Parking areas must be greened (see section 5.2.15.e). Minimum size Min. 30 m2 of green area Min. 20 % of green areas in the FZP, min. 30 % in the areas with RZS
	GREEN SPACES WITHIN TOURISM AREAS	Green spaces in tourism areas are designed according to the type of tourism (specific needs for the use of green spaces), the character of the area and the local context. In their design, it is important to integrate all outdoor spaces and to create an identity that is consistent with the local context and landscape characteristics of the area. Minimum size Min. 300 m2 of total enclosed green space in smaller centres and next to larger accommodation facilities (hotels), if there is no other large public green space within 300 m. In larger tourism areas (over 3 ha), a part of the area shall be set aside for a larger common green space - park of min. 1000 m2.
8 CEMETERIES AND MEMORIALS	URBAN CEMETERIES	Priority is given to park cemeteries, which have a high proportion of landscape elements and where the lawn of the burial plots replaces the sandy areas that are otherwise a feature of traditional cemeteries. The design shall emphasise integrity and quality and shall ensure an appropriate functional structure, good orientation in space, protection against undesirable influences (noise, smell, visual disturbance, etc.), appropriate character and symbolic significance, accessibility for
	MEMORIAL PARKS	

Table 4: TYPES OF GREEN OPEN SPACES		
TYPES OF GREEN OPEN SPACES		**CHARACTERISTICS AND FEATURES / example**
		all, with particular emphasis on the handicapped, and ample opportunities for visitors to rest. Rest areas should be micro climatically favourable, comfortable and offer privacy. Particular attention should be paid in the design to the special characteristics and symbolic significance of the site (space of remembrance), accessibility regime, possible protection status, etc. Parking areas should be greened (see section 5.2.15.e).
9 URBAN FORESTS AND NATURE RESERVES	URBAN WOODLANDS	Urban forests are forests with a strong recreational function, usually located within or on the edge of a settlement area, and which are of particular importance for the quality of life and leisure of the inhabitants due to their proximity and accessibility. They are publicly accessible (and usually owned by the city) and are maintained and managed for the visit and use of residents. Urban forests offer forms of recreation that do not require the construction of large or special infrastructure facilities
	NATURE CONSERVATION AREAS	Protected areas or conservation areas are locations which receive protection because of their recognized natural or cultural values.
10 WATERFRONTS AND URBAN BEACHES	RIVERFRONT PROMENADES	A wide path for walking on, built next to a sea, lake, or river.
	URBAN BEACHES	Urban beaches are designed by inserting a beach atmosphere into an urban area that would otherwise be a typical cityscape. There are many variations of urban beaches.
	LAKESIDE PARKS	Park designed by the lake.
11 GREEN BUILT ENVIRONMENTS	GREEN ROOF, GREEN-BLUE ROOF	Green spaces as part of buildings - green roofs and vertical greening - are a type of green space that is usually part of a building. Green roofs are usually flat roofs of buildings covered with vegetation and can be extensive to intensive. Green roofs are recommended on all buildings with flat roofs. The level of amenity and maintenance, accessibility and design guidelines shall be determined in the design of the building. Green roofs may also be arranged as green terraces, which are intensively greened outdoor living areas.
	GREEN WALL/FAÇADE	Vertical greenery is vegetated or covered walls or vertical planes of plants that bound and/or articulate a space or are a façade element. The design guidelines and level of maintenance shall be determined in the design of the building.
	GREEN ALLEY/PERGOLAS	Is most commonly an linear green structure - with trees or vertical post or pillars that usually support cross-beams and a sturdy open lattice forming a shaded walkway, passageway, or sitting area.

Table 4: TYPES OF GREEN OPEN SPACES		
TYPES OF GREEN OPEN SPACES		**CHARACTERISTICS AND FEATURES / example**
	INFILTRATION PLANTERS AND TREE BOXES	Tree boxes are a green infrastructure stormwater control measure that are designed to collect the first flush of stormwater and treat it prior to discharge into the storm sewer system or to the subsoil. The structure is a pre-manufactured concrete box which is installed in-ground, filled with soil media and typically planted with native, non-invasive tree or shrub. The tree box functions as a compact bioretention system, which is a green infrastructure or low impact development stormwater control best management practice (BMP). In urban or built-out areas where space is limited, tree boxes can fit within a small existing footprint and as retrofit projects.
	RAINWATER HARVESTING SYSTEMS	Rainwater harvesting is the process of collecting the rainfall from your roof and storing it to use for other things around the home. You can use harvested rainwater just for the garden and keep a water butt outside, or you can have a tank with a pump and filter system.
	TEMPORARY AND/OR SMALL-SCALE INTERVENTIONS INCLUDING GREEN FURNITURE, GREEN LIVING ROOMS, ETC	Different interventions.

Following the questionnaire, it is possible to analyse and evaluate the open urban spaces in which the implementation of NbS could be made. With this questionnaire the problems on the selected site will be determined which will help to determine which of the potential NbS projects are most suitable for the selected urban open spaces identified.