

Framework for sustainable landscape construction

Operating principles for implementing sustainable development in landscape construction projects

The Finnish Association of Landscape Industries

The Working Group for Sustainable landscape construction

The KESY2 project for the framework of sustainable landscape construction

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FOREWORD

The framework for sustainable landscape construction is a target programme.

The framework for sustainable landscape construction (KESY) sets goals but is not a mandatory or binding set of instructions. The framework sets the direction for operations and addresses the general goals of sustainable development while applying them to landscape industries. The model offers alternative operating guidelines and reviews the process of landscape industries from a holistic perspective.

KESY determines how the client, designer, builder and maintenance personnel can take sustainable landscape construction into account in each project.

The client will define the intent and commitment, i.e. the extent to which the KESY goals are followed, and how strictly they are adhered to during the different stages of the implementation. Moving forward, it is important to create criteria that allow for weighing up different options and comparing their values. The operating model is not yet complete, but will be updated and specified as more knowledge is gained.

The KESY operating model has been implemented in collaboration between the member societies of the Finnish Association of Landscape Industries and professionals, stakeholders and experts from the field. An extensive steering group has guided the work.

The operating model and the related tools – the guides, check-lists and document templates – have been developed in ten different workshops with more than 200 participants. The operating models and the tools could be commented on freely. The goals of the operating model and the functionality of the tools will be assessed through various KESY projects.

The KESY operating model is a major step in consideration of how we can overcome growing major challenges, such as climate change, more efficient use of resources, reducing energy consumption, preventing pollution, securing biodiversity, inclusion of people, and accessibility and diversity of comfortable living environments.

Helsinki, 24 April 2018

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Introduction

The significance of green areas and a green environment for peoples' health and well-being has been recognised for a long while. In recent years especially, the terms of green infrastructure and ecosystem services have highlighted the significance and importance of securing environmental processes and finding solutions that are based on nature.

The basic condition for sustainable development is conserving biodiversity and the functionality of ecosystems while adapting the economic and material actions of people to nature's carrying capacity in the long term ¹.

Operating in accordance with sustainable development principles is a challenge that all operators must commit to, including within the landscape industries. Many international, national and local challenges are related to landscape industries. These challenges include climate change, loss of biodiversity, loss of habitats of various organisms, urbanisation and an aging population. Due to their complex nature, these challenges require the combination of the expertise of different fields and working together. By adapting the operations in accordance with sustainable development, the changes can be slowed down and even prevented locally.

The purpose of sustainable landscape construction is to design, build and maintain the environment in a way that helps avoid, mitigate or prevent the detrimental effects of construction².

From the perspective of sustainable development, ecological sustainability is particularly important in landscape construction. In construction, we intervene in natural processes such as the water cycle, soil and vegetation areas, which are all key factors in ecosystem services. The objective is to be able to safeguard the vitality and continuance of these processes. This requires the ability to understand the bigger picture and take it into consideration in all our operations.

Shared operating model for the landscape industries

Landscape industries have been lacking clear instructions and guidelines that would allow them to implement the principles of sustainability in their work assignments. The Working Group for Sustainable landscape construction (KESY) of the Finnish Association of Landscape Industries has been working on this set of instructions and the framework since summer 2015. A background analysis was carried out in 2015–2016³, which reviewed the process of landscape industry projects from the perspectives of both the different operators and sustainable development.

In summer 2016, the project for compiling an operating model for sustainable landscape construction was launched. Its objective is to create a shared operating model for the landscape industries, which will determine sustainable operating principles, measures and practical guidelines suited to Finnish conditions for the ordering, design, construction and maintenance of landscape construction projects.

The operating model is based on similar guidelines and quality models compiled abroad, especially on the Sustainable Sites Initiative rating and certification system developed in the US (SITES)⁴. SITES was developed to promote and support ecologically sustainable landscape construction. It provides a range of

¹ Ministry of the Environment. Mitä on kestävä kehitys? 5/2017 http://www.ymparisto.fi/fi-fi/ymparisto/kestava_kehitys/mita_on_kestava_kehitys

² Sustainable Sites V2 Rating System for Sustainable Land Design and Development, 2014.

³ Tajakka, Hanna. Kestävän viherhankkeen prosessi, 2016.

https://www.vyl.fi/site/assets/files/1550/vyl_kestavan_viherhankkeen_prosessi_20160923-1.pdf

⁴ Sustainable Sites V2 Rating System for Sustainable Land Design and Development, 2014.

methods and criteria that steer the design process of ecologically sustainable landscapes at different stages of the project. The thematic division and the objectives of sustainable construction criteria, as well as some of the other operating principle content, have been compiled based on SITES. The content has been complemented and adapted to suit Finnish conditions. In addition to SITES, the European Green City, Green Flag and Green Label guidelines and other literature and material related to the topic have been utilised in the project.

During the project, the impacts of existing laws, decrees, general quality requirements and guidelines on how the principles of sustainable development are implemented in landscape construction projects have been assessed. The purpose is to influence the standards steering the work so that the sustainable development principles can be followed better than before.

The operating model's general operating principles were completed in February 2017. In addition to these, this report includes the operating principles for the operators at different process stages, i.e. the clients, designers, builders and maintenance personnel. The practical measures were specified further in 2017, and tools were created to support them. The functionality of these tools will be tested in practice in landscape construction projects in 2018–2020. The operating models and tools will be updated based on the experiences gained. Another objective is to provide online materials for the operating model of sustainable landscape construction, which will be updated, and create further training related to the topic for the use of landscape industry professionals.

The goal is to maintain the operating model continuously as more information and experiences are gained.

This report presents the operating model's materials as extensively as possible. The idea is to utilise the report as kind of a manuscript for the materials published online as well as for different thematic guides. Due to this, the report includes some overlapping and repeated content.

Change in attitudes as the goal

Based on the draft of the framework, a shared commitment to sustainable landscape construction was signed by the Finnish Association of Landscape Industries and its member societies at the Landscape and Technology Expo Viherpäivät in Jyväskylä in 2017. By signing the framework, the organisations committed to following the criteria and rules of sustainable landscape construction and encouraging the clients, developers, designers, builders, maintainers and the industry's product suppliers to follow these shared goals in their own operations.

The Finnish Association of Landscape Industries has also signed Society's Commitment to Sustainable Development. In the Commitment – with the title *The Finland we want by 2050* – public administration and other operators commit to promoting sustainable development in all their work and actions. Society's Commitment reflects the long-term intent for the future of Finland. Shared understanding of the necessity of the change is the basis for the Commitment. It is also a key tool for implementing the UN Agenda for Sustainable Development. The commitment is an agreement on the operating methods and goals for making a good life a possibility for both current and future generations.

The Finnish state and several cities, municipalities and construction industry operators have committed to various environmental strategies and programmes, such as:

- The EU's climate policy: [http://www.ym.fi/fi-fi-ymparisto/ilmasto_ja_ilma/ilmastonmuutoksen_hillitseminen/Euroopan_unionin_ilmastopolitiikka](http://www.ym.fi/fi-fi/ymparisto/ilmasto_ja_ilma/ilmastonmuutoksen_hillitseminen/Euroopan_unionin_ilmastopolitiikka)

- The Paris Climate Accords: <http://www.ym.fi/pariisi2015>
- The Energy and climate strategy: <https://tem.fi/en/energy-and-climate-strategy>
- The UN Agenda for Sustainable Development: <https://www.unric.org/fi/kestavan-kehityksen-tavoitteet>
- Finland's National Ramsar Wetlands Action Plan 2016–2020: <http://julkaisut.valtioneuvosto.fi/handle/10024/75329>
- Society's Commitment to Sustainable Development: <https://kestavakehitys.fi/en/commitment2050>
- Key targets of the Convention on Biological Diversity (conservation and sustainable use of biological diversity and fair and equitable sharing of the benefits from the use of genetic resources) <http://julkaisut.valtioneuvosto.fi/handle/10024/79871>

In addition to a commitment, an operating method following sustainable development requires, first and foremost, a change in attitude and reassessment of familiar methods. The objective is that this framework will supply tools for this reassessment and new ways of working.

Legislative and quality requirement reviews

In addition to determining the operating principles and guidelines, the project has reviewed legislation related to sustainable landscape construction and the quality requirements of construction and maintenance. The purpose has been to highlight the needs for change and the development targets related to legislation and quality requirements. These reviews have been attached to this report as a table.

The review related to legislation gives an operating principle-specific list and brief presentation of the acts and decrees valid at the time of the project's implementation which fully or partly support the goals of the criteria and facilitate the realisation of the operating principles and measures. Additionally, the operating principle-specific goals or measures on which legislation does not comment have been brought up, including when the regulation is inadequate in terms of the actual implementation. Regarding these inadequacies, the report aims to highlight wider topics that impact the realisation of an operating principle rather than legislative needs related to individual measures.

The table also features general information related to the operating principles, as well as guides and research results that are mostly freely available online. The table also specifies if the goals of the operating principle should be considered as early on as during the more extensive zoning and land use planning in order to later achieve its goals during the more detailed land use and construction planning.

The valid quality requirements related to construction and maintenance do not cohesively take into account the sustainability requirements during all work stages. The reason for this may be that the quality requirements for different work stages are prepared by different groups of experts.

In principle, all requirements for sustainable landscape construction – such as preventing dust; limiting noise disruptions; processing of stormwaters during the construction stage; preventing the discharge of detrimental substances, chemicals and other impurities into soil and water and vegetation areas; and preventing the spreading of invasive alien species and quarantine pests in the EU and nationally – should be taken considered at all work stages by applying the same principles. At the moment, these issues have been considered during certain stages while no mention of them is made during others.

The quality requirements have been set out for construction and maintenance stages. No general quality requirements have been compiled for the ordering, monitoring and design stages. For sustainable landscape construction, however, these process stages of a landscape construction project are the most

vital stages, as the measures promoting sustainable landscape construction are often implemented during these stages.

The general quality requirements for construction and maintenance often describe the functional and technical quality requirements, but no general quality requirements have been compiled for the work and site design. The instructions for some of the quality requirement items comment on the documents being drafted and their content, but these have not been described as quality requirements, and guidelines do not exist for all planning and design. However, the work and site design are central stages for implementing the principles of sustainable landscape construction. These stages influence several factors that impact the project's environmental sustainability, such as logistics, staff well-being, use of resources, the site's waste management, and recycling of materials.

The attached tables show more details on the content of the currently valid general quality requirements as well as their shortcomings in comparison with the operating principles of sustainable landscape construction presented in this framework. The following general quality requirements have been included in the comparison:

- Alueurakointi. Yleinen tehtäväluettelo 2003 (General scope of work for area maintenance contracts 2003)
- Infrarakentamisen yleiset laatuvaatimukset InfraRYL 2015–2017 (General specifications for infrastructure construction)
- Kiinteistöpalveluiden yleiset laatuvaatimukset KiinteistöRYL 2009 (General specifications for property management services)
- Rakennustöiden yleiset laatuvaatimukset. Talonrakennuksen maatyöt MaaRYL 2010 (General specifications for construction work. Earthwork for building construction)
- Viheralueiden hoito VHT '14 (Management of green areas)
- Viherrakentamisen yleinen työselostus VRT '17. (General specifications for landscape construction)

Authors and the steering group

The authors of the framework are Landscape Architect Hanna-Maria Piipponen, Hanna Tajakka MSc (Agriculture and Forestry) and Landscape Architect Emilia Weckman. Hanna-Maria Piipponen wrote her thesis at Aalto University on the SITES evaluation system, has translated most of the SITES criteria into Finnish and has also reviewed the related legislation. Hanna Tajakka has considered the criteria in relation to the quality requirements and guidelines steering Finnish construction. The KESY project was led by Landscape Architect Emilia Weckman. Seppo Närhi represented the Finnish Association of Landscape Industries in the project, has helped guide the work and has provided additional comments.

Additionally, the members of the Sustainable landscape construction workgroup called together by the Finnish Association of Landscape Industries have acted as the project's steering group. Participatory workshops have been held in connection to the project with participants from many of the industry's operators.

In 2015–2018, the following people served as the members of the Sustainable landscape construction workgroup:

- Emilia Weckman, president (the Finnish Association of Landscape Architects, MARK)
- Seppo Närhi, secretary (the Finnish Association of Landscape Industries, VYL)
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1 General operating principles for implementing sustainable development in landscape construction projects

This chapter describes the key general operating principles and measures that allow for taking sustainable development into consideration in a landscape construction project and its different stages. Chapter 2 presents the operating principles thematically.

Operators and operating principles at different stages of the project

The client has a crucial role as promoter of the sustainable development of landscape construction projects.

Without the client's intent in the matter, landscape construction projects cannot be comprehensively implemented in accordance with sustainable development objectives. The client determines the project's objectives. If the sustainable development aspects have not been recorded in the goals, they will not be produced during the design, construction or maintenance stages either. The procurement criteria must be determined and the competitive tendering performed fairly on ecological, social, ethical, cultural and financial grounds.

The body supervising the work has the task of ensuring that the sustainable development perspectives and goals required by the client are taken into account during the construction process.

In addition to the client, the designer has a major impact on the sustainable development measures of landscape construction projects. Through their choices, the designer influences factors such as the site's material selections, implementation methods, intensity of maintenance and the sustainability and costs of the site's entire lifecycle.

The selection of work practices, the machines selected and their condition, the implementation of procurements and the expertise in caring for the vegetation and substrate all have crucial role in achieving sustainable development during the construction and maintenance stages.

General operating principles during the ordering stage:

- The role and significance of ordering for the landscape construction project and its entire lifecycle are understood.
- The role and significance of design, construction and maintenance work for the landscape construction project and its entire lifecycle are understood.
- The project planning is implemented with the project's entire lifecycle in mind.
- The 'less is more' principle is considered a starting point for the project: as little construction as possible with as little disruption to the normal ecosystem activity as possible.
- The qualitative and functional goals of the landscape construction project are designed to be ecologically, socially and economically sustainable.
- The competence of landscape industries' designers, builders and maintainers and the views of the area's users are considered in project planning.
- Clear and comparable indicators for comparing quotes are determined for measuring ecological, social and economic sustainability.
- The service provider and material and product manufacturers are required to have environmentally efficient production and operating methods.

- There is enough initial information available for the basis of ordering, design, construction and maintenance, such as reviews of the area's water conditions, soil, vegetation, organisms, landscape and history.
- It is ensured that the client, designer, builder and maintainer of the landscape construction project have the necessary professional competence and experience, as well as sufficient resources.
- The ordering, design, construction and maintenance of the landscape construction project implement and adhere to the client organisation's strategies, environmental and sustainable development programmes, quality and operating system and other operating instructions of the organisation.
- Adequate and professional project steering and landscape construction supervision during the design, construction and maintenance stages are ensured.
- Information exchange between the different operators of the landscape construction project – the client, designer, builder, maintainer and users – is facilitated during the different project stages.
- Information and feedback about the success of ordering and procurement actions are collected from the other parties of the landscape construction project, i.e. the designer, builder, maintainer and users.
- The feedback received is utilised for developing the ordering and procurement operations.

General operating principles during the design stage:

- The role and significance of the design work for the landscape construction project and its entire lifecycle are understood.
- The role and significance of construction and maintenance work for the landscape construction project and its entire lifecycle are understood.
- Sufficient resources and competence are acquired for the design work.
- Sufficient initial information is gathered for the basis of design work, such as reviews of the area's water conditions, soil, vegetation, organisms, landscape and history.
- The client organisation's strategies, environmental and sustainable development programmes, quality and operating system and other operating instructions are followed in the design work.
- The design organisation's strategies, environmental and sustainable development programmes, quality and operating system and other operating instructions are followed in the design work.
- The expertise of the project's builder and the maintainer and the perspectives of the area's users are utilised for the design work and its initial plans.
- Quality, work and self-monitoring plans are compiled for the design work, which will also consider the sustainable development aspects related to the design work.
- The design work is reviewed stage by stage, i.e. a pre-handover inspection is carried out in accordance with the self-monitoring plan and general quality requirements. The results of the inspection are documented and any deviations and errors are rectified as agreed with the client.
- The site's conditions are considered in the design work and the solutions will be tailored to suit the site's conditions.
- The area's natural development and succession and their utilisation during the maintenance stage are taken into account in design work.
- A maintenance plan is compiled for the designed site which presents the maintenance instructions for the site, its structures and characteristics, as well as the continuous measures that secure the realisation of the quality and environmental goals set for the site and the site's functionality during its lifecycle.
- Information and feedback on the success of the design work are collected from the project's other parties – the client, the builder, the maintainer and the users.

- The feedback received is used for developing the design work.

General operating principles during the construction stage:

- The role and significance of the construction work for the landscape construction project and its entire lifecycle are understood.
- The role and significance of design and maintenance work for the landscape construction project and its entire lifecycle are understood.
- Sufficient resources and competence are acquired for the construction work.
- The client organisation's strategies, environmental and sustainable development programmes, quality and operating system and other operating instructions of the client organisation are followed in the construction work.
- The construction organisation's strategies, environmental and sustainable development programmes, quality and operating system and other operating instructions are followed in the construction work.
- Quality, safety, work and self-monitoring plans that also consider the sustainable development aspects related to construction are compiled for the construction work.
- The plan for the area, the project-specific work description, the client's and the designer's instructions and the contractor's own quality, safety, work and self-monitoring plans are followed.
- Product and material procurements are carried out as planned.
- The construction work is reviewed stage by stage, i.e. a pre-handover inspection is carried out in accordance with the self-monitoring plan and general quality requirements. The results of the inspection are documented and any deviations and errors are rectified as agreed with the client.
- Information and feedback on the success of the construction work are collected from the project's other parties – the client, the designer, the maintainer and the users.
- The feedback received is utilised for developing construction work.
- Information is forwarded to maintenance services.

General operating principles during the maintenance stage:

- The role and significance of maintenance work for the landscape construction project and its entire lifecycle are understood.
- The expertise of the project's designer and the builder as well as the perspectives of the users are utilised for the maintenance work and its planning.
- Sufficient resources and competence are acquired for the maintenance work.
- The client organisation's strategies, environmental and sustainable development programmes, quality and operating system and other operating instructions of the client organisation are followed in the maintenance work.
- The maintenance organisation's own strategies, environmental and sustainable development programmes, quality and operating system and other operating instructions are followed in the maintenance work.
- Quality, safety, work and self-monitoring plans that also consider sustainable development aspects related to maintenance are compiled for the maintenance work.
- The plan for the site, the client's and the designer's instructions, and the contractor's own quality, safety, work and self-monitoring plans are followed.
- The maintenance work is reviewed stage by stage, i.e. a pre-handover inspection is carried out in accordance with the self-monitoring plan and general quality requirements. The results of the inspection are documented and any deviations and errors are rectified as agreed with the client.

- If a maintenance plan has not been compiled for the site during the design stage, it is drawn up before the start of the maintenance work. The maintenance plan presents the maintenance instructions for the site, its structures and characteristics, as well as the continuous measures that can secure the realisation of the quality and environmental goals set for the site and the site's functionality during its lifecycle.
- Information and feedback on the success of the maintenance work are collected from the project's other parties – the client, the designer, the builder and the users.
- The feedback received is utilised for developing the maintenance work.

Communication about the practices of sustainable landscape construction

Sustainable landscape construction is only possible if all parties involved are aware of the goals set for the project. This method requires a change in attitudes and the reassessment of familiar practices. Continuous information updates are also necessary.

Open communication, cooperation and inclusion of all operators as extensively as possible allows for the promotion of sustainable landscape construction and staying up-to-date, both in general terms and with the project.

OBJECTIVES

- Determining goals for information management and communication.
- Ensuring that the sustainable development related goals of the landscape construction project are achieved.
- Keeping the different parties of the landscape construction project aware of the requirements and methods of sustainable development.
- Informing clients of the industry's sustainable development principles.
- Promoting the sustainable development competence of the industry operators.
- Advancing sustainable development in the landscape industry, as well as more extensively in the construction and real estate industry.

OPERATING PRINCIPLES

General operating principles:

- Shared communication and notification policies are agreed on to ensure that operations adhere to sustainable development in landscape construction projects.
- The operating principles of sustainable development are communicated openly and extensively in the field.
- The matters and information communicated are expressed clearly.
- The different communication channels are utilised extensively and in a versatile manner.
- The success and effectiveness of communication are monitored.
- Methods for promoting the awareness of, competence in and realisation of sustainable development in landscape construction projects are developed together with the field's operators, stakeholders and communication professionals.

2 OPERATING PRINCIPLES THEMATICALLY

In addition to the general operating principles described in the previous chapter, the framework presents the operating principles of landscape construction following sustainable development through five separate themes:

- the water conditions at the site
- the site's soil and vegetation
- the raw materials, other materials and products used
- conservation of energy, air quality and environmental conservation
- human health and well-being.

In sustainable landscape construction, the site and its conditions, such as the water conditions and the soil and vegetation attributes, are a key factor.

The operating principles related to water conditions encourage those involved to secure the site's aquatic ecosystem services. They guide the placement of construction in a way that helps secure the ecological functions of floodplains and the functionality of sensitive aquatic ecosystems, for example. They also steer the rehabilitation of aquatic ecosystems and the management of stormwaters. Reducing the consumption of potable water has also been set as a goal.

Operating principles related to soil and vegetation promote the conservation of healthy soil and vegetation and the restoration and maintenance of soil. They guide those involved to protect the valuable and original vegetation, promote the use of vegetation suited to the habitat and encourage invasive species control. They also promote the conservation and increase of biomass, i.e. material of living origin.

The operating principles related to the selection of materials and products promote material efficiency and responsible use of raw materials, as well as helping support environmentally sustainable material and plant production. Recycling and reuse of materials, limiting the amount of waste generated in construction and sorting of waste are also key perspectives. Preference is given to local producers, manufacturers and materials.

Operating principles related to energy conservation and conserving the air quality and environment are focused on reducing various emissions. The objective is to reduce greenhouse gas emissions, the loss of habitats and negative impacts on the health of people and organisms. The principles also give guidance on how to mitigate the impacts of urban heat islands and reduce the energy consumption of buildings with the help of vegetation.

The operating principles related to the promotion of human health and well-being are focused in particular on social sustainability. These help safeguard the values of a cultural environment; the accessibility, safety and comfort of green areas; and equal utilisation opportunities for all users. Green areas have a key role in mental recovery and as venues for physical activities promoting health. Meeting places and supporting social interactions strengthen the sense of community. Local food production is one way to promote communality. The local economy can be supported by using local labour and materials, for example, and this helps develop the local communities and their operations.

Each theme will be reviewed in more detail through a few different perspectives. The more specific goals and operations facilitating the achievement of a sustainable development operating model are presented in connection to these. The different stages of the project – ordering, design, building and maintenance – are taken into account in the recorded operating principles.

THEME 1: Operating principles for safeguarding a site's water conditions

The operating principles related to water conditions encourage those involved to secure aquatic ecosystem services. They guide the placement of construction in a way that helps secure the ecological functions of floodplains and the functionality of sensitive aquatic ecosystems, for example. They steer the rehabilitation of aquatic ecosystems and the management of stormwaters. Reducing the consumption of potable water has also been set as a goal.

The operating principles related to the site's conditions highlight the importance of reviewing the local existing conditions and basing the design solutions, construction and maintenance on these. Determining different buffer zones and reducing detrimental effects and disruptions requires those involved to set new objectives, including during construction and maintenance. Additionally, some key actions include the pre-planning of the construction site, ensuring protections and developing the maintenance plans in accordance with sustainable development. In construction and maintenance, naturality is the objective of the measures, resulting in increased diversity and natural habitats.

1.1 Conserving floodplains from construction

OBJECTIVES

- securing the ecological functions of unbuilt floodplains, such as the ability to retain and filter water, and the habitats maintained by floodplains
- reducing the detrimental effects of land use and construction in areas with a high probability of flooding.

OPERATING PRINCIPLES AND MEASURES:

General operating principles:

- No new construction is planned for zones with a risk of flooding.
- Construction and other disruptive actions planned for floodplains are restricted.
- Infill construction or reuse of other areas than floodplains is preferred in general, thus improving the ecological state of the floodplains and reducing the risks caused by flooding.
- New activities are planned so that they retain or improve the water storage capacity and improve water quality.
- New operations and structures are planned to be flood-proof when necessary.
- The current ecological state of a floodplain is not compromised or the flood risk increased.

Operating principles/measures during the ordering stage:

- Construction and infill construction are steered away from the floodplains.
- A management plan for flood risks is compiled for the floodplains.
- Having sufficient information on the floodplains as the basis for design work and construction is ensured.
- Special focus is placed on the border zones of floodplains.

Operating principles/measures during the design stage:

- The flood risk management plan compiled for the area is followed.
- New structures will be planned to have no negative effect on the water paths or the planned site's ability to store, retain and absorb flood water.
- Natural vegetation is favoured on floodplains and restored when necessary.

- The new structures are planned and placed in a way that does not contribute to soil erosion or facilitate the migration of sediment and impurities into the receiving water along with stormwaters.

Operating principles/measures during the construction stage:

- A plan is compiled for water treatment to manage factors related to the construction site's water resources management. This plan takes into account the surface and ground waters in the worksite and its vicinity, as well as stormwaters, including water from the drainage of buildings and structures (drainage water and raw water) and wastewater (including greywater) during the construction and immediately afterwards. The objective of planning is that the worksite will not harm its surroundings, for example by increasing the suspended solids load of waterways or stormwater systems.
- The worksite and the construction actions, such as the interim storage of materials, vehicle routes, parking and the site's staff facilities, are planned in a way that ensures that they:
 - are not harmed by flooding
 - do not have a negative impact on the water paths
 - do not have a negative effect on the area's ability to store, retain and absorb flood water
 - do not contribute to soil erosion
 - do not facilitate the migration of sediment and impurities in stormwater into receiving water.
- The area's waterways are protected during construction against suspended solids loads and impurities, for example.
- Weather conditions during construction are taken into consideration, for example by protecting the worksite and the material storage facilities on the site when necessary.

Operating principles/measures during the maintenance stage:

- A plan is compiled for water treatment to manage factors related to the area's water resources management during the work, such as surface and ground water, stormwater and wastewater (e.g. washing water, water used for washing away gritting sand, etc.)
- Natural vegetation is protected on floodplains.
- Maintenance actions, such as the interim storage of materials, vehicle routes, parking, and the location of the maintenance site's staff facilities and piles of ploughed snow, are planned in a way that ensures that they:
 - are not harmed by flooding
 - do not have a negative impact on the water paths
 - do not have a negative effect on the area's ability to store, retain and absorb flood water
 - do not contribute to soil erosion
 - do not facilitate the migration of sediment and impurities in stormwater into receiving water.
- When necessary, the area's water bodies are protected during maintenance against suspended solids loads and impurities, for example.
- Weather conditions during maintenance are taken into consideration by protecting the material storage facilities on the site when necessary.

1.2 Protecting aquatic ecosystems

OBJECTIVES

- protecting the aquatic ecosystems and the habitats they maintain

- securing the ecosystem services provided by aquatic ecosystems.
- *Here, the term aquatic ecosystem refers to wetlands, other areas that are under water other than temporarily and the following water area types:*
 - *seacoast: shorelines, flood meadows, emersion coast*
 - *estuaries: bay areas*
 - *flowing waters: streams, rivers with their floodplains and buffer zones*
 - *inland waters: lakes, ponds with their bank lines and buffer zones*
 - *paludificated areas: peatlands, ponds, seasonal wetlands and ponds.*

The following areas or man-made water features are not counted as aquatic ecosystems and do not need to be considered in connection to this criterion:

- *built areas, excluding the sectors with natural wetlands, water bodies or established stormwater wetlands*
- *man-made water features, such as mining pits, canals and stormwater pools that have no natural edges or vegetation, neither in water nor on land.*
- *drainage ditches of fields and forests*
- *aquatic ecosystems that have been created unintentionally as a consequence of construction, the ecological state of which can be classified as weak.*

OPERATING PRINCIPLES AND MEASURES:

General operating principles:

- Land use is steered towards areas where construction will not interfere with the aquatic ecosystems.
- Buffer zones are determined for wetlands and the different types of water areas.
- The well-being of the aquatic ecosystems in the area and its surrounding environment are secured comprehensively.
- Restoration plans are compiled for aquatic ecosystems classified as being in a weak condition. The national instructions for restoring aquatic ecosystems are taken into account in these plans (http://www.ymparisto.fi/fi-FI/Vesi/Vesistojen_kunnostus).
- The national strategy for invasive alien species is followed in the management of alien species. Invasive species and quarantine pests harmful in the EU or nationally are listed in the [Vieraslajit.fi](http://vieraslajit.fi) invasive alien species portal.

Operating principles/measures during the ordering stage:

- Areas or sites without any aquatic ecosystems such as wetlands or other water body types are given priority in land use planning and when placing the operations.

Operating principles/measures during the design stage:

- All aquatic ecosystems in the area are reviewed during the land use planning.
- Areas or sites without any aquatic ecosystems such as wetlands or other water body types are given priority when placing the operations.

- The area is developed with the aim of minimising the detrimental impacts and disruptions on aquatic ecosystems.
- A protective buffer zone is established for aquatic ecosystems outside the planned site, but immediately bordered by the site. When selecting the plant species, the prevention of spreading invasive alien species and quarantine pest harmful in the EU or nationally (and their removal) are taken into account. Invasive species and quarantine pests harmful in the EU or nationally are listed in the Vieraslajit.fi invasive alien species portal.

Operating principles/measures during the construction stage:

- A plan is compiled for managing the area's factors related to water resources management. This plan must take into account the surface and ground waters, as well as stormwaters, including water from the drainage of buildings and structures (drainage water and raw water) and wastewater (including greywater) during the construction and immediately afterwards. The objective of the planning is that the worksite will not harm its surroundings, for example by increasing the suspended solids load of water bodies or water systems.
- The worksite and the construction actions, such as the interim storage of materials, vehicle routes, parking and the site's staff facilities, are planned in a way that ensures that they:
 - do not have a negative impact on the water paths
 - do not have a negative impact on the area's ability to store, retain and/or absorb flood and storm waters
 - do not contribute to soil erosion
 - do not facilitate the migration of sediment and impurities in stormwater into receiving water.
- The area's waterways are protected during construction against suspended solids loads and impurities, for example.
- Weather conditions during construction are taken into consideration, for example by protecting the worksite and the material storage facilities on the site when necessary.

Operating principles/measures during the maintenance stage:

- Factors related to water resources management are taken into account during the maintenance stage, such as surface and ground water, stormwater and wastewater.
- The natural vegetation of aquatic ecosystems is protected.
- The maintenance actions, such as the interim storage of materials, vehicle routes, parking and the maintenance site's staff facilities, are planned in a way that ensures that they:
 - do not have a negative impact on the water paths
 - do not have a negative impact on the area's ability to store, retain and absorb flood and storm waters
 - do not contribute to soil erosion
 - do not facilitate the migration of sediment and impurities in stormwater into receiving water.
- When necessary, the area's water bodies are protected during maintenance against suspended solids loads and impurities, for example.
- Weather conditions during maintenance are taken into consideration by, for example, protecting the material storage facilities on the site when necessary.

1.3 Restoring aquatic ecosystems

OBJECTIVES

- supporting the functionality of aquatic ecosystems
- protecting the habitats of fish and other aquatic organisms.

Changes to aquatic ecosystems are the consequences of the following measures or phenomena:

- *the built environment, such as filling, drainage, piping, canalisation, damming up, water regulation*
- *rising sea levels*
- *hydrological changes*
- *loss of original plant and animal species*
- *spreading of alien species*
- *changes in biological processes, soil mass, soil form and structure, and water quality, and emissions.*

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- The functionality and integrity of damaged, corrupted or spoiled aquatic ecosystems are restored.
- The site is rehabilitated in a way that takes into consideration the site's previous conditions, natural processes, use of natural materials and restoration of plant communities native to the area.
- The rehabilitation and maintenance measures permanently remove chemical and biological stressors that are detrimental to the aquatic ecosystems.
- The processes of organisms, rock species and minerals in the area, which contribute to aquatic ecosystems' partial or complete recovery, are restored or taken back into use.
- The national strategy for invasive alien species is followed in the management of alien species. Invasive species and quarantine pests harmful in the EU or nationally are listed in the [Vieraslajit.fi](http://vieraslajit.fi) invasive alien species portal.

Operating principles/measures during the ordering stage:

- The client's duty is to steer the design work and implementation towards restoring the vitality of aquatic ecosystems.
- The current state is reviewed to identify all the spoiled, damaged or corrupted aquatic ecosystems in the area.

Operating principles/measures during the design stage:

- A restoration plan for the aquatic ecosystem is compiled for the area, for example based on the *Attributes of restored ecosystems* instructions (see the information box on page 26).
- The remediation plan describes the original plant communities of the aquatic ecosystem to be restored, as well as the suitable aquatic species, development of water quality and the state of the shore banks and shoreline.
- The floodplains and littoral zones of rivers and streams are included in their restoration plan.
- The shorelines of lakes and ponds are included in their restoration plan.
- The restoration methods and techniques applied are congruent with the existing knowledge and methods related to the restoration of ecosystems and are suited to the aquatic ecosystem being restored and its location.

Operating principles/measures during the construction stage:

- A plan is compiled for managing the area's factors related to water resources management, such as surface and ground water, stormwater and wastewater, during the construction and immediately afterwards.
- The worksite and the construction actions, such as the interim storage of materials, vehicle routes, parking and the site's staff facilities, are planned in a way that ensures that they:
 - do not have a negative impact on the water paths
 - do not have a negative impact on the area's ability to store flood and stormwaters
 - do not contribute to soil erosion
 - do not facilitate the migration of sediment and impurities in stormwater into receiving water.
- The area's waterways are protected during construction.
- Weather conditions during construction are taken into account.

Operating principles/measures during the maintenance stage:

- The natural vegetation of aquatic ecosystems is protected.
- The maintenance actions, such as the interim storage of materials, vehicle routes, parking and the maintenance site's staff facilities, are planned in a way that ensures that they:
 - do not have a negative impact on the water paths
 - do not have a negative impact on the area's ability to store flood and stormwaters
 - do not contribute to soil erosion
 - do not facilitate the migration of sediment and impurities in stormwater into receiving water.
- When necessary, the area's waterways are protected during maintenance work.
- Weather conditions during maintenance are taken into consideration.

Attributes of restored ecosystems (INFORMATION BOX)

(Based on the Society for Ecological Restoration's International Primer on Ecological Restoration) ⁵

1. A restored ecosystem contains a characteristic assemblage of the species that also support appropriate community structure. The species of the restored ecosystem also occur in the reference ecosystem.
2. The restored ecosystem consists of indigenous species to the greatest practicable extent, within the demands of the relative species abundance.
3. All factors necessary for the continued development and/or stability of the restored ecosystem are represented in the area. If one of the factors is missing, it must have the potential to become part of the ecosystem by natural means.
4. The physical environment of the restored ecosystem is capable of sustaining reproducing populations of the species necessary for its continued stability or development along the desired trajectory.
5. The restored ecosystem apparently functions normally for its ecological succession, and signs of dysfunction are absent.
6. The restored ecosystem is suitable for integration into a larger ecological matrix or landscape, in which it functions as part of the abiotic and biotic processes.
7. Potential threats to the health and integrity of the restored ecosystem from the surrounding landscape have been eliminated or reduced as much as possible.

⁵ Society for Ecological Restoration, <http://www.ser.org>

8. The restored ecosystem is sufficiently resilient to endure the normal temporary, periodic stress events in the local environment. These stress events do not threaten the integrity of the ecosystem.
9. The restored ecosystem is self-sustaining to the same degree as its reference ecosystem. The restored ecosystem has the potential to continue functioning sustainably under the existing environmental conditions.

1.4 Stormwater management

OBJECTIVES

- managing the detrimental effects of heavy rain and urban flooding
- promoting natural management of stormwaters
- reducing the amount of stormwater forming in urban areas and dense urban infrastructure and their detrimental effects on aquatic ecosystems and infrastructure
- maintaining the water balance of areas and good water quality
- designing the natural management systems of stormwaters to increase comfort and be visible and aesthetically pleasing.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- Solutions reducing stormwater are taken into use; for example, green roofs and walls and permeable pavements.
- The water balance of areas and good water quality are maintained through stormwater retention and by steering surface runoff and base runoff during the dry season.
- Stormwaters are processed naturally by utilising the local topography and the absorbing, filtering and purifying characteristics of the different soil layers, as well as plants' abilities to purify water, guide it or evaporate it. Stormwater can also be utilised in its generation site in water pools and structures or for irrigation of the vegetation areas.
- Stormwater is used to increase the area's attractiveness when received, conducted and treated in the area.
- Stormwater management systems that are visible and accessible to the area's users are implemented.
- The national strategy for invasive alien species is followed in the management of alien species. The invasive species and quarantine pests harmful in the EU or nationally are listed in the [Vieraslajit.fi](http://vieraslajit.fi) invasive alien species portal.

Operating principles/measures during the ordering stage:

- Before the project is launched, it is ensured that the zoning plan has sufficient areas for processing stormwaters and for implementing this system as visible, natural stormwater structures.
- A stormwater programme or strategy is compiled for the area, defining how to:
 - reduce the amount of surface runoff in the area
 - reduce runoff and flooding peaks
 - prevent the discharge of impurities in stormwater into the surroundings
 - increase the area's evapotranspiration and the filtering and absorption of stormwater.

- Visible stormwater structures are preferred for stormwater management and structural implementation.
- Interdisciplinary work with artists, designers and artisans, among others, is utilised for stormwater projects combining functionality and aesthetics.

Operating principles/measures during the design stage:

- The stormwater programme or strategy compiled for the area will be followed.
- Stormwater modelling, the field's research-based knowledge, innovations and experiences from pilot sites will be utilised for the design work.
- The natural stormwater structures are designed to be visible and physically approachable to the area's users.
- The area's stormwater structures are designed to be similar to natural ecosystem, by utilising water sources, original plant species and plant communities and other aquatic organisms suited to the local conditions.
- The water bodies are kept as natural as possible and are not utilised for implementing the stormwater structures.
- The stormwater systems are designed to process the impurities carried by the stormwater so that they are not carried onwards to the receiving water bodies.
- The accumulation of impurities in the stormwater forming in the area is reduced by combining different types of natural stormwater processing methods and structures in a way that suits the site.
- A stormwater treatment chain is utilised, supporting different removal mechanisms for impurities, such as stormwater:
 - evaporation
 - delaying and retention
 - absorption
 - settling process
 - filtering
 - biological binding, splitting and conversion
 - storing, e.g. in biomass.
- When selecting the stormwater management methods, attention is paid to the soil's and the vegetation's ability to delay runoff and impurities through evapotranspiration and bioremediation.
- Methods maintaining the area's natural discharge flow-through and the recharge rate of ground water are used.
- The amount and rate of stormwater runoff is reduced by collecting stormwater.
- In the design work, measures are taken to ensure that the rate and amount of effluent do not:
 - increase erosion in the receiving effluent channels
 - have a negative impact on the effluent channels' natural flow or the amount and level of ground water.
- The treated and untreated stormwater is discharged along the natural flow of the effluent channels.
- The amount of stormwater generated is reduced through means such as paving material choices.
- The amount of impermeable paving material used is reduced by replacing it with water permeable concrete, asphalt and paving stones, for example.
- Materials and products that could release impurities into the stormwater are avoided in the buildings, structures and surfaces in the area. Potential sources of impurities include:
 - copper and galvanised roofs, gutters, downspouts and cladding

- galvanised materials used for fences, poles, protective railings, signboards, etc.
- impregnated wood.
- Stormwaters on hard surfaces are conducted to vegetation areas by reserving certain vegetation areas as stormwater receiving areas in the plan.
- The retaining and absorption of stormwater is planned by utilising the vegetation and the soil in applying solutions such as:
 - retention ponds
 - rain gardens
 - ponds and other delay ponds
 - wetlands
 - filtering channels
 - green depressions
 - channels and grooves
 - ditches and stormwater channels
 - green roofs and green walls
 - tree lanes.
- The use of pipes, gutters and sewers is avoided and above-ground solutions are preferred.
- When selecting plants, preference is given to species that
 - tolerate periodic flooding and water saturation of soil as well as periodic dryness
 - tolerate or are less vulnerable to typical impurities in stormwater
 - are able to reduce the most typical impurities in stormwaters that are stressors to the receiving water bodies.
- The absorption of stormwater is maintained by revitalising or renewing the soil's absorption/water retention capacity, for example by protecting the soil against densification.
- The maintenance of the natural stormwater structures is considered in the design work with the removal of the layer of sediment at the bottom of the stormwater depressions and ponds, for example, performed sustainably and without disturbing the water body's ecological balance.

Operating principles/measures during the construction stage:

- A plan is compiled for managing the area's factors related to stormwater, such as exposing the stormwater to impurities, during the construction and immediately afterwards.
- A prevention plan for pollutant and chemical leaks and impurities is compiled for the worksite.
- The worksite and the construction actions, such as the interim storage of materials, vehicle routes, parking and the site's staff facilities, are planned in a way that ensures that they:
 - do not have a negative impact on the water paths
 - do not have a negative impact on the area's ability retain stormwater and flood water
 - do not contribute to soil erosion
 - do not facilitate the migration of sediment and impurities in stormwater into receiving water.
- The area's waterways are protected during construction.
- The amount of construction waste affecting stormwater is minimised.
- Materials in interim storage in the construction areas, such as substrates, compost products, sand, grit and other soil matter, are protected against wind and rain to prevent things such as solid matter from migrating into the worksite surroundings.
- The migration of impurities into outside the area, water systems or water bodies, or the area's ground water is prevented.
- Weather conditions during construction are taken into account.

- The use of road salt or other anti-slip agents that are detrimental to the environment is avoided in the area.
- Work machine and equipment maintenance in the area is avoided.
- Refuelling vehicles in the area is avoided.

Operating principles/measures during the maintenance stage:

- The worksite's safety plan describes the methods that help avoid and prevent emissions of impurities and chemicals in stormwater and water bodies.
- The maintenance actions, such as the interim storage of materials, vehicle routes, parking and the maintenance site's staff facilities, are planned in a way that ensures that they:
 - do not have a negative impact on the water paths
 - do not have a negative impact on the area's ability to store flood and stormwaters
 - do not contribute to soil erosion
 - do not facilitate the migration of sediment and impurities in stormwater into receiving water.
- The area's water bodies are protected during maintenance work.
- Weather conditions during maintenance are taken into consideration.
- Proactive and natural control methods and substances are used to prevent pests and invasive species.
- The use of fertilisers and the migration of nutrients into water bodies are reduced by means such as using fertilisers that release nutrients slowly.
- The materials in interim storage in the area, such as mulch, soil improvement agents, fertilisers and liming agents, are protected from rain.
- The migration of impurities into outside the area or the area's ground water is prevented.
- The use of road salt or other anti-slip agents that are detrimental to the environment is avoided in the area.
- Work machine and equipment maintenance in the area is avoided.
- Refuelling vehicles in the area is avoided.
- The stormwater structures are maintained in a way that is similar to natural ecosystem, by utilising natural water sources, original plant species and plant communities and other aquatic organisms suited to the local conditions.
- Note! Water structures intended for swimming or other human contact may require alternative processing measures, such as ozonation or heat treatment, if stormwater has been discharged into them.
-

1.5 Reducing water consumption in the maintenance of vegetation areas

OBJECTIVES

- conserving water resources, especially good quality surface and ground water reserves and potable water
- reducing the consumption of household water (potable water), natural surface water and ground water for the maintenance of vegetation areas
- reducing the use of energy, for example when transporting water
- reducing maintenance costs
- utilising stormwater for watering.

These objectives pertain to the water resources used for the maintenance of the area's established vegetation areas. Depending on the situation, the target can be to:

- *reduce watering*
- *reduce watering significantly*
- *stop watering completely in the vegetation areas.*

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- Stormwater and greywater collected and retained in the area are utilised for watering.
- When reducing water consumption to a significant degree, no potable water, natural surface water or ground water is used for watering outside the construction stage of the vegetation areas and the maintenance stage during the warranty period (but the availability and transport distances of water should be considered in areas with existing infrastructure for taking household water).
- The watering of vegetation areas is stopped completely, in which case the vegetation areas are only watered during the construction stage and warranty period.
- Water consumption is reduced significantly, or watering is stopped completely. Only the following water sources are used for watering during the construction stage:
 - recovered stormwater
 - reused water
 - recycled wastewater
 - recycled grey wastewater
 - water treated and distributed by the public sector that is specifically intended for non-household use.
- NOTE! When using water from a non-potable source, it must be ensured that it meets the requirements set for irrigation water.

Operating principles during the ordering stage:

- The designers are guided to select vegetation for the area that does not require watering after the construction stage.
- The goals and potential limitations for watering the vegetation areas and the water sources used are determined in the tendering documents for construction and maintenance work.
- Alternative water sources are presented to the construction and maintenance contractors to replace household water, natural surface water or ground water as the sources.

Operating principles/measures during the design stage:

- The stormwater programme or strategy compiled for the area will be followed.
- The structures and materials of the substrate are designed so that it will have sufficient water retention ability in relation to the vegetation chosen and the local conditions.
- The water retention ability of the soil and the substrate is improved by adding organic matter.
- Vegetation is designed to thrive on natural rainwater after the construction stage, without watering.
- The vegetation of green roofs and deck gardens in particular is designed to thrive on natural rainwater after the construction stage, without watering.
- The substrate surfaces are designed in a way that protects them from evaporation. Layers of mulch or ground cover plants are used on top of substrates.

- Planning solutions that do not require a permanent irrigation system are used.
- The temporary irrigation systems are planned so that trees, shrubs and ground cover plants have been distributed across different watering points depending on the watering needs. This allows for stopping the watering point-by-point after the plants have taken root and their growth has been ensured. Irrigation systems use efficient irrigation equipment, such as drip irrigation and devices that react to water conditions.
- The time for planting the vegetation area is planned taking the local conditions into account, ensuring that it is favourable to each plant species to reduce the water consumption during the construction stage.
- Irrigation is planned in a way that utilises the grey wastewater or recovered stormwater of local areas. The suitability of grey wastewater and/or industrial water for irrigation is ensured through a water analysis.

Operating principles/measures during the construction stage:

- The vegetation areas are planted at a time that is favourable to each plant species when considering the local conditions.
- Grey wastewater or recovered stormwater from local areas and similar water sources is utilised for irrigation. The suitability of grey wastewater and/or industrial water for irrigation is ensured through a water analysis.
- The substrates will be covered as soon as possible according to the planning documents after the substrate has been built and the vegetation planted.
- Plants are watered at a time (e.g. in the morning/evening) when water evaporation rate is the slowest.
- Plants are watered carefully when planting, using low water pressure and avoiding water running off from the plant's root area.
- Irrigation depressions are used to keep the water on the plants' root area.
- Watering equipment that efficiently guides water to the roots of plants are used, such as drip irrigation, watering spikes embedded in the ground, watering bags or an irrigation pipe.

Operating principles/measures during the maintenance stage:

- Watering will be timed based on the maintenance category, site and plant species so that drying does not harm the plant's well-being.
- The correct functioning of the irrigation systems is ensured.
- Grey wastewater, recovered stormwater, cooling water or condensed water from surrounding areas are used for irrigation. The suitability of grey wastewater and/or industrial water for irrigation is ensured through a water analysis.
- The sufficient thickness of mulch layers is ensured in accordance with the maintenance plan until the planted vegetation fully covers the substrate.
- Plants are watered at a time (e.g. in the morning/evening) when water evaporation rate is the slowest.
- Plants are watered carefully using low water pressure and avoiding water running off from the plant's root area.
- A drip irrigation system is used or other watering equipment that effectively guides the water to the roots of the plants, is employed, such as a watering spike embedded in the ground or an irrigation pipe or a watering bag.

1.6 Reducing water consumption of water pools and structures

OBJECTIVES

- conserving water resources, especially good quality surface and ground water reserves and potable water
- reducing energy consumption
- reducing maintenance costs

Depending on the situation, the goal for using potable water can be to:

- *reduce consumption*
- *reduce consumption significantly*
- *stop use completely in water pools and structures.*

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- The use of potable water in water pools and structures is avoided by using alternative water sources, such as stormwater.
- The use of natural surface waters, such as lake, river and stream water and ground water for water pools and structures is reduced.
- See the applicable parts of operating principle 1.5 Reducing water consumption in the maintenance of vegetation areas.

Operating principles/measures during the ordering stage:

- The designer is guided to consider the recycling of stormwater, grey water and other reusable water in the design of water pools and other structures.
- The designer is guided to place the water pools and structures in spots with as low an evaporation rate as possible or to use solutions with as small an evaporation surface as possible.
- The designer is guided to place the water pools and structures in spots with as little debris as possible or to use solutions where debris causes as minor disruptions or maintenance needs as possible.
- The maintainer is guided to consider the regular need for sediment removal due to the solids carried by stormwater when allocating resources to maintenance needs.

Operating principles/measures during the design stage:

- The related programme or strategy compiled for the area is followed in design work.
- Stormwater, grey water or other reusable water is designed to be used as the source for water pools and structures. The water is treated to suit its purpose: Stormwater, for example, cannot be used in wading pools.
- The water cycle of water pools and structures is designed to be as closed as possible when using potable water.
- Water pools and structures using potable water are placed in spots with as low an evaporation rate as possible or solutions with as small an evaporation surface as possible are used.
- The water pools and structures are placed in spots with as little debris as possible, or solutions are used where debris causes as minimal disruptions or maintenance needs as possible.

- It is ensured that the use of alternative water sources does not have a negative effect on the receiving water bodies.
- The use and purification of stormwater is designed in a way that prevents the devices – such as pumps and nozzles – in the water pool or structures from clogging.
- The water pool and structure are designed in a way to ensure that it does not provide good breeding conditions for mosquitoes.
- Special focus is placed on planning the wintertime maintenance of the water pool and structure if they are not drained for the winter.

Operating principles/measures during the construction stage:

- The water pool and structure are constructed carefully according to the planning documents, ensuring there are no leaking sections.

Operating principles/measures during the maintenance stage:

- The perfect functionality of the water pools and structures is ensured.
- Potential leaks or other defects are reported to the client immediately.
- When allocating resources for maintenance needs, the regular need for sediment removal due to the solids carried by stormwater is considered.
- A method is used to remove solid matter that removes it effectively without harming the water pool and structure or compromising the surroundings.
- If possible, the solid matter is utilised. A secondary alternative is to deliver it for processing in accordance with the Waste Act and local regulations.
- Special focus is placed on planning and implementing the wintertime maintenance of the water pool and structure if they are not drained for the winter.

THEME 2: Operating principles for safeguarding a site’s soil and vegetation conditions

Operating principles and measures related to soil and vegetation promote the conservation of healthy soil and vegetation and the restoration and maintenance of soil. They guide those involved to protect the valuable and original vegetation, promote the use of vegetation suited to the habitat and encourage invasive species control. The operating principles also give guidance on how to mitigate the impacts of urban heat islands (urban heat island effect) and how to reduce the energy consumption of buildings with the help of vegetation. They also help promote the increase of vegetation.

The operating principles related to the site’s conditions highlight the importance of reviewing the local existing conditions and basing the design solutions, construction and maintenance on these. Reducing detrimental effects and disruptions requires setting new objectives, including during construction and maintenance. Some key actions include the planning of the construction site, ensuring protections and developing the maintenance plans in accordance with sustainable development. The objectives of these measures are finding natural solutions and increasing natural habitats.

2.1 Preservation, restoration and maintenance of soil

OBJECTIVES

- maintaining and protecting soil health
- reducing the demand for and amount of new substrate and soil matter transported to the site
- conserving the existing ecosystems and biotopes
- supporting the well-being of vegetation, biodiversity, and water storage and absorption into the soil.

OPERATING PRINCIPLES AND MEASURES

General operating principles

- Related to soil maintenance:
- Disturbing the soil is minimised.
- Buffer zones are established for protecting existing, healthy soil that is suited to the area's conditions, climate and the solutions planned.
- The size of the buffer zone is determined site-specifically while taking the attributes of the protected soil into account. The prohibited and allowed measures are determined.
- Goals are set for protecting the soil.
- Indicators and/or tracking methods are determined for measuring the realisation of targets set for soil protection.

Related to soil restoration:

- The soil's restoration needs are taken into account and disturbances to the soil due to construction are controlled.
- The soil that has been disturbed during the construction and maintenance works is restored.
- Goals are set for restoring and maintaining the soil.
- Indicators and/or tracking methods are determined for measuring the realisation of soil restoration and maintenance.
- The plans, restrictions and measures are reviewed together with the construction and maintenance service providers, ensuring that the goals for soil restoration and maintenance are understood and achieved.

Operating principles/measures during the ordering stage:

Related to soil maintenance:

- An assessment of the area's current state is carried out, locating and describing the soil in the area. An analysis of healthy soil is commissioned.
- Goals are set for the amount and quality of healthy soil.
- Indicators and/or tracking methods are determined for measuring the realisation of targets set for the soil.
- The designer is guided to plan the placement of operations and the area's construction in a way that ensures that the goals for the amount and quality of healthy soil are met.
- The designer is guided to plan and implement the construction work in a way that the measures carried out ensure that the goals for the amount and quality of healthy soil are met.
- The prohibited and allowed measures in the buffer zones are stated for design, construction and maintenance work.
- Guidance is given for protecting the soil during construction and maintenance work according to the general quality requirements.
- Whether the project is achieving the desired amount and quality of healthy soil during the design, construction and maintenance stages is monitored.
- The integrity and state of the buffer zones are monitored during the design, construction and maintenance works.
- The implementation of soil protection measures during the construction and maintenance stages is monitored.

Related to the restoration and maintenance of soil:

- The necessary soil restoration and maintenance plans are commissioned.
- Goals are set for restoring and maintaining the soil.
- Indicators and/or tracking methods are determined for measuring the realisation of soil restoration and maintenance.
- The designer is guided to plan the area's substrates and other soil-related functions in a way that ensures that the restoration and maintenance of soil are carried out in accordance with the goals set.
- The designer is guided to plan and implement the construction work so that the measures carried out ensure that the goals set for the soil restoration and maintenance during construction are met.
- The maintainer is instructed to maintain and restore the soil in accordance with the goals set.
- The origin, quality and quantity of soil matter, soil conditioners and fertilisers are monitored during the construction and maintenance work.
- The restoration and maintenance of soil is monitored during the construction and maintenance stages.

Operating principles/measures during the design stage:

- In the plans, the actions and functions requiring earthworks, such as those causing closing and compaction of the ground, are limited to areas where soil has already been disturbed due to the area's previous use.
- Construction measures in the plans are carefully limited around the areas to be built. This helps reduce the surface area of land requiring restoration after the construction measures.
- The plan sets clear limits for the sectors of the area being built.
- The soil's current condition is considered in the design work.
- Buffer zones are determined for the soil.
- Instructions are drawn up for restoring soil that may be disturbed due to construction.
- The soil restoration and maintenance plan is connected to the erosion and sediment management plans.
- The soil's need for restoration is reduced by limiting the disruptions caused by the construction work.
- The vegetation types chosen for the area are considered during soil restoration.
- Invasive alien species and quarantine pests in the area that are harmful in the EU and nationally are located and instructions are given for their removal.

Operating principles/measures during the construction stage:

Related to soil maintenance:

- The construction workers of the organisation and the subcontractors are given inductions, guidance and information for protecting the soil and taking it into consideration during construction.
- The interim storage areas, maintenance and access paths, parking areas and staff facilities are mainly placed in areas where soil has been disturbed due to previous use.
- The soil is protected in accordance with the planning documents or, if these are unavailable, in accordance with the general quality requirements.
- When protecting the buffer zones, appropriate solid fence structures or other physical barriers are preferred.
- Wastewaters and stormwaters generated during construction are prevented from entering the soil.
- Wastewaters and stormwaters during construction are treated before being conducted into soil.

Related to the restoration and maintenance of soil:

- The soil's need for restoration is reduced by limiting the disruptions caused by the construction work to as small an area as possible.
- The construction workers of the organisation and the subcontractors are given inductions, guidance and information for fencing off the areas outside the construction zones and on the goals of soil restoration and maintenance during construction work.
- The buffer zones of soil and vegetation are protected with appropriate fences.
- All excavated soil is recovered. It is reused or recycled as possible in accordance with section 3.1 Promoting material efficiency.
- The soil matter transported around or into the construction site is processed based on its origin: subsoil is used as subsoil and topsoil as topsoil. In certain cases, subsoil can be used as topsoil after conditioning/processing.
- The soil matter is improved with organic matter based on the results of the soil analysis.
- Reference soil is determined for the worksite: a healthy soil type and its layers in the area. The attributes of the reference soil are taken into account in soil restoration and maintenance. If having reference soil is not possible, the functions of soil in the area are reviewed and the soil restoration plan is compiled based on this.
- Before starting the construction work, the measures used for restoring all land areas disturbed during the construction are determined for implementation after the construction work has been completed.
- Erosion protection, such as compost mulch, embankments or other natural methods, are used in accordance with the general quality requirements to prevent erosion and sediment accumulation.
- Unnecessary compaction of soil matter is avoided.

Operating principles/measures during the maintenance stage:

- The maintenance workers of the organisation and the subcontractors are given inductions, guidance and information for protecting healthy soil and taking it into consideration during maintenance work.
- The health and condition of soil is monitored with soil analysis in accordance with the restoration plan.
- The maintenance tasks are scheduled based on the needs of the soil and the activities.
- Soil improvement agents and methods that best support the soil's organisms, water resources management, nutrient economy and gas exchange operations in the soil are used.
- Special caution is exercised when working in areas designated as buffer zones. Work equipment and methods that do not harm the soil are used. Actions such as moving around the area and transporting or storing equipment or materials cannot cause soil compaction.

2.2 Conserving the existing vegetation

OBJECTIVES

- conserving existing vegetation, plant communities and ecosystems
- promoting the regional diversity of vegetation
- maintaining healthy habitats providing ecosystem services
- maintaining and protecting soil health and functions
- restoring original plant species by planting new plants when necessary.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- Disruptions to vegetation are limited.
- Vegetation classified as valuable is protected by identifying and protecting all vegetation in the area that is categorised as valuable either locally, regionally or nationally.
- The existing plants and plant communities to be conserved are protected and/or the plant communities restored.
- Vegetation supporting the area's diversity and typical plant communities is used in design work.

Operating principles/measures during the ordering stage:

- An analysis of the planned area's current state is performed, locating and documenting the vegetation to be conserved in the area. A review of the vegetation conserved is commissioned from a specialist (a biologist).
- Goals are set for the amount and quality of conserved vegetation on the site.
- Indicators and/or tracking methods are determined for measuring the realisation of targets set for the conserved vegetation.
- The designer is guided to plan the placement of operations and the area's construction in a way that ensures that the goals for the amount and quality of conserved vegetation are met.
- The designer is guided to plan and implement the construction work in such a way that the measures carried out ensure that the goals for the amount and quality of conserved vegetation are met.
- The prohibited and allowed measures in the buffer zones are stated for design, construction and maintenance work.
- Guidance is given for protecting the conserved vegetation during construction and maintenance work according to the general quality requirements.
- Whether the project is achieving the desired amount and quality of conserved vegetation during the design, construction and maintenance stages is monitored.
- The integrity and state of the buffer zones are monitored during the design, construction and maintenance works.
- The implementation of the conserved vegetation's protection measures during the construction and maintenance stages is monitored.

Operating principles/measures during the design stage:

- The plan sets clear limits for the sectors of the area being built.
- Supplementary planting and actions requiring excavation is avoided in the root area of trees being conserved.
- The protection of the vegetation to be conserved in the planned area is designed to meet at least the general quality requirements. Preference is given to protecting groups of vegetation rather than individual plants (shrubs and herbaceous plants, does not apply to trees and plants classified as protected species).
- Damage to the area's natural plant communities caused by the construction is mitigated. Special attention is paid to plant communities that support the cohesivity, networks and diversity of the habitats in their natural state.

Operating principles/measures during the construction stage

- The construction workers of the organisation and the subcontractors are given inductions, guidance and information for protecting the conserved vegetation and taking it into consideration during construction.
- The interim storage facilities, maintenance and access paths, parking areas and staff facilities are placed in spots that are not on the root areas of the vegetation to be conserved.
- The conserved vegetation is protected in accordance with the planning documents or, if these are unavailable, in accordance with the general quality requirements.
- When protecting the buffer zones, appropriate solid fence structures or other physical barriers are used.
- Priority is given to protecting entire vegetation groups.
- Excavation and soil filling works in the root area of the conserved vegetation are avoided.
- When excavation work in a tree root area (i.e. closer than 1.5 metres from the outer edge of the canopy of the tree) has to be performed, a no-dig method, such as suction excavation, angle drilling or a pneumatic mole, is used to avoid harming the root system.
- The root system of the conserved trees is treated in accordance with the general quality requirements when cutting roots is necessary during excavation works. Root cutting is separately agreed on with the client.
- The well-being of conserved vegetation is ensured with maintenance during construction.
- Special attention is paid to the adequate water supply of the vegetation to be conserved as the surrounding construction work alters the pathways of stormwater or the structure and water conditions of the soil.
- It is ensured that the construction stage's wastewaters do not carry to the substrates of the vegetation being conserved.
- The construction stage wastewater that is detrimental to vegetation (such as the drilling water of geothermal wells) and stormwater are treated before being conducted into the vegetation areas.

Operating principles/measures during the maintenance stage

- The maintenance workers of the organisation and the subcontractors are given inductions, guidance and information for protecting the conserved vegetation and taking it into consideration during maintenance work.
- The maintenance work is scheduled based on the vegetation's needs.
- Soil improvement agents and methods that best support the soil's organisms, water resources management, nutrient economy and gas exchange operations in the soil are used.
- Methods that best support the vital functions and health of vegetation are applied.
- Special caution is exercised when working in areas designated as buffer zones. Work equipment and methods that do not harm the vegetation are used. Actions such as moving in the area or storing and transporting work equipment and materials cannot contribute to soil compaction.

2.3 Using vegetation suited to the habitat

OBJECTIVES

- promoting the diversity of Finnish indigenous plants and plants suited to the habitat
- increasing the species diversity of vegetation, the diversity of biotopes and the intraspecific genetic diversity
- ensuring the successful and species typical growth of the vegetation in its habitat
- reducing the vegetation areas' maintenance needs.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- Plant species are chosen that are natural to the area; suitable for the conditions, the climate, the planned purpose and the design solutions; and that support biodiversity.
- The plants that are used have been grown in a nursery, collected legally or recovered from the area or outside it for replanting.
- The plant species used promote the diversity of vegetation in the biocoenosis and in the area in general.
- Finnish planting material is preferred.
- Invasive native species and quarantine pests that are harmful in the EU or nationally and that can endanger the local ecosystems are avoided. The selections must be based on the Act on Managing the Risk Caused by Alien Species and the instructions related to alien species control.

Operating principles/measures during the ordering stage:

- A review is commissioned of the area's natural vegetation and vegetation suited to the ecosystem. This review is carried out by a specialist, such as a biologist.
- The designer will be guided to select plant species that suit the habitat, promote biodiversity and support the local ecosystem.
- The suitability of plant species proposed for the planned site is monitored.
- The origin, quality and quantity of the plants used are monitored during the construction work.

Operating principles/measures during the design stage:

- The reviews of the natural vegetation in the area compiled by the client or other parties are utilised to review the species suitable for the site.
- Vegetation is chosen in accordance with the biodiversity principle. (For example, the 'Santamour model', i.e. the 'ten per cent model' can be used as a guideline. It states that an area, such as a large green area, of the plants, no more than 10% should be any one plant species, 20% from any one genus or 30% from any single family.)
- The selected plant species and varieties must be able to thrive in the local growth and weather conditions.
- The growth zone and the origin of the ligneous plant species and varieties suit the planning site.
- The chosen plant species and varieties are not vulnerable to serious plant diseases or pests and are not intermediate hosts to dangerous plant diseases or pests. If the plan includes host plants of dangerous plant pests, the Finnish Food Safety Authority's instructions on the subject are to be reviewed carefully and health certificates are required for the plants.
- Multi-layered vegetation is preferred.
- The chosen plant species and varieties must offer nutrition to pollinators.

Operating principles/measures during the construction stage:

- The planting material that is used has been grown in a nursery, collected legally or recovered from the area or outside it for replanting.
- In accordance with the general quality requirements, it is ensured that:
 - the nursery is listed in the planting material register maintained by the Finnish Food Safety Authority (Evira)
 - the plants meet the requirements of the Taimiaineistolaki plant material act (1205/94 and the act on its amendment 727/00) and the regulations based on it

- sorting of the plant material follows the Finnish Association of Landscape Industries' recommendation for nursery stock specifications
- the seeds of meadow plants come from Finland or the Nordic countries
- the lawn seed mix meets the germination rate, purity and other quality requirements according for its seed class.
- During interim storage and in temporary planting areas, the vegetation is cared for in accordance with the care instructions of each plant, maintaining their health and vitality.
- The transfer and replanting of plants in a construction site are done carefully in accordance with the general quality requirements.
- Planting the vegetation and seeds and installing the pre-vegetated mats are done carefully in accordance with the general quality requirements.
- A healthy and strong start to growth is carefully ensured. The well-being of plants during the construction and warranty period is ensured with intensive care in accordance with the general quality requirements. A sufficient water supply to the vegetation is ensured.

Operating principles/measures during the maintenance stage:

- No special measures needed.

2.4 Management of alien species

OBJECTIVES

- promoting the use of species natural to the site
- promoting the conservation of local biotopes and ecosystems
- promoting plant health
- preventing the detrimental effects and risks caused by invasive species for Finnish nature, ecosystems, sustainable utilisation of natural resources, livelihoods and the well-being of society and people
- mitigating the threat and detrimental effects of invasive alien species and quarantine pests harmful to the EU or nationally that are already in Finland or that may arrive in Finland.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- No invasive alien species and quarantine pests that are harmful to the EU or nationally are brought into the area.
- Only plant species not classified as invasive alien species that are harmful to the EU or nationally in the national Vieraslaji alien species portal (www.vieraslajit.fi) are used for planting.
- The spreading of invasive alien species and quarantine pests that are harmful to the EU or nationally with planting material, wooden packaging materials, plant waste and soil is prevented.
- The plants, wooden packaging materials, plant waste and soil that have acted as spreading media are disposed of as appropriate.

Operating principles/measures during the ordering stage:

- Invasive alien species and quarantine pests found in the area are assessed. A specialist, such as a biologist, is used for the work.

- A maintenance plan is compiled for preventing and managing any known invasive alien species that are harmful to the EU or nationally and quarantine pests in the area.
- Instructions are given for the appropriate disposal of plants and materials serving as the hosts of invasive alien species that are harmful to the EU or nationally or are quarantine pests.
- The designer is guided to select plant species that are not classified as invasive alien species that are harmful to the EU or nationally or as quarantine pests and that do not act as hosts of such.
- The plant selections presented in the plan are monitored.
- The origin and health of the plants and the origin and appropriateness of the wooden packaging materials are monitored during the construction work.
- The prevention methods for the invasive alien species that are harmful to the EU or nationally and quarantine pests, and their effectiveness, are monitored during the maintenance stage.
- Monitoring and instruction are provided on applying the correct method for the disposal of plants, wooden packaging materials, plant waste and soil serving as spreading platforms of alien species that are harmful to the EU or nationally and of quarantine pests.

Operating principles/measures during the design stage:

- The designers of the organisation and the consultants are taught and guided to identify invasive alien species classified as harmful in the EU or nationally and quarantine pests.
- The area's residents are taught and guided to identify invasive alien species classified as harmful in the EU or nationally and quarantine pests.
- A maintenance plan is compiled, presenting the long-term measures for managing all invasive alien plant and animal species that can be found in the area and that are classified as harmful in the EU or nationally at the time of the design stage.
- This maintenance plan will present:
 - the methods used for identifying and monitoring the invasive alien species harmful to the EU and nationally and quarantine pests found in the area.
 - the methods used for preventing the spread of invasive alien species harmful to the EU and nationally and quarantine pests.
- Cooperation with local bodies – the local government and state agencies, the Finnish Association for Nature Conservation, researchers, experts, consultants and school institutes – is utilised for compiling the maintenance plan.
- Plant species that are not classified as invasive alien species that are harmful to the EU or nationally or as quarantine pests and that do not act as hosts of such are selected for the plan. Special attention is paid to the plant selections of areas near wetlands, water bodies and areas in their natural state.
- The aim is to use Finnish plant species that support the biodiversity of Finnish nature.

Operating principles/measures during the construction stage:

- The construction workers of the organisation and the subcontractors are taught and guided to:
 - identify invasive alien species that are harmful to the EU or nationally and quarantine pests
 - properly remove and dispose of the invasive alien species that are harmful to the EU or nationally and the quarantine pests
 - properly remove and dispose of the plants, wooden packaging material, plant waste and soil serving as the spreading media of the invasive alien species that are harmful to the EU or nationally and the quarantine pests
 - properly clean the work machinery, equipment and transport fleet used for the processing.

- When receiving the materials, special attention is paid to the health and quality of planting materials, substrates and other soil, as well as to the quality and suitability of the wooden packaging materials.
- Soil containing invasive alien species that are harmful to the EU or nationally or their plant parts, roots, larvae or eggs is not used.
- Any observations of invasive alien species that are harmful to the EU or nationally and quarantine pests are reported to the client and the local Centre for Economic Development, Transport and the Environment.
- Quarantine pests are also reported to the Finnish Food Safety Authority (Evira).
- The invasive alien species that are harmful to the EU or nationally and the quarantine pests are removed and disposed of in accordance with the instructions given by the client, the local government's environmental authorities and the Centre for Economic Development, Transport and the Environment.
- Quarantine pests are removed and disposed of in accordance with the instructions of the Finnish Food Safety Authority (Evira).
- The work machinery, equipment and transport vehicles used for processing soil matter containing invasive alien species that are harmful to the EU or nationally are cleaned carefully before being used for another purpose. The washing water is prevented from entering the environment.
- Special caution is exercised when removing invasive alien species that are harmful to the EU or nationally or quarantine pests from the buffer zones of soil or vegetation. The measures/operating principles described in section 2.1 are followed.
- Recommendations and instructions are available via the invasive alien species portal Vieraslajit.fi: <https://www.vieraslajit.fi/fi/ohjeita-ja-oppaita>

Operating principles/measures during the maintenance stage:

- The maintenance workers of the organisation and the subcontractors are taught and guided to:
 - identify invasive alien species that are harmful to the EU or nationally and quarantine pests
 - properly remove and dispose of the invasive alien species that are harmful to the EU or nationally and the quarantine pests
 - properly remove and dispose of the plants, wooden packaging material, plant waste and soil serving as the spreading media of the invasive alien species that are harmful to the EU or nationally and the quarantine pests
 - properly clean the work machinery, equipment and transport vehicles used for the processing.
- Any observations of invasive alien species that are harmful to the EU or nationally and quarantine pests are reported to the client and the local Centre for Economic Development, Transport and the Environment.
- Quarantine pests are also reported to the Finnish Food Safety Authority (Evira).
- The invasive alien species are removed and disposed of in accordance with the instructions given by the client, the local government's environmental authorities and the Centre for Economic Development, Transport and the Environment.
- Quarantine pests are removed and disposed of in accordance with the instructions of the Finnish Food Safety Authority (Evira).
- Instructions are compiled for preventing the spreading of invasive alien species that are harmful to the EU or nationally and quarantine pests through machinery, for example.
- The work machinery, equipment and transport vehicles used for processing soil matter and plant waste containing invasive alien species that are harmful to the EU or nationally or quarantine pests

are cleaned carefully before being used for another purpose. The washing water is prevented from entering the environment.

- Special caution is exercised when removing invasive alien species that are harmful to the EU or nationally or quarantine pests from the buffer zones of soil or vegetation. The measures/operating principles described in section 2.1 are followed.

2.5. Increasing vegetation

OBJECTIVES

- increasing the amount of vegetation suitable for the area
- increasing the species diversity of vegetation and its total biomass
- supporting the ecosystem services produced by plants through the increase
- increasing the diversity of biotopes, number of plant species and the intraspecies genetic diversity.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- Objectives are set for increasing vegetation.
- The green factor tool (green factor/green calculator) can be used to set the goals.
- Methods are developed for assessing the biomass of vegetation (e.g. density index review).
- The tracking methods for assessing the amount and quality of plant biomass are determined.
- Goals are set for increasing the biomass of vegetation, and indicators and/or tracking methods are put in place for tracking the amount of biomass.

Operating principles/measures during the ordering stage:

- The existing amount of vegetation in the area is determined.
- The designer is guided to increase vegetation.
- The designer is guided to use plant species that are natural to the area, suitable for the conditions, the climate, the planned purpose and the design solutions, and support biodiversity.
- The designer will be guided to plan the vegetation areas and select plant species so that they increase the biomass of vegetation.
- The maintainer will be instructed to maintain and restore the vegetation areas in a way that facilitates the production of plant biomass for the area.
- The realisation of targets set for the production of plant biomass in the plan is tracked.
- The realisation of targets set for the production of plant biomass in the maintenance is tracked.

Operating principles/measures during the design stage:

- The sites will be planned in a way that protects the existing vegetation suitable for the location from being disturbed, if possible.
- The amount of vegetation is increased in the design. However, excessive planting must be avoided and plants should not be added carelessly just to increase biomass.
- Plant species are added that are natural to the area; suitable for the conditions, the climate, the planned purpose and the design solutions; and support biodiversity.
- Green walls and green roofs are also utilised to increase biomass.
- When selecting the plants for the ground cover and shrub layers, their adaptation to the changes in lighting conditions as the trees grow is taken into account.

- Pedestrian pathways, roofs, parking areas and other unplanted areas can also be supplemented with trees, green roofs or other structures covered with vegetation, such as pergolas.
- In addition to biomass, the vegetation structures' ability to process the stormwaters generated in the area is considered.

Operating principles/measures during the construction stage:

- The vegetation marked in the plans as being conserved is preserved and the vegetation areas properly protected during the construction.
- The plant sizes and numbers decided by the designer are followed.

Operating principles/measures during the maintenance stage:

- The maintenance and restoration measures for vegetation are planned so that the goals set for the quantity and quality of biomass and ecosystem services are met.
- The health and condition of vegetation are monitored.
- The maintenance tasks are scheduled based on the needs of the vegetation and the local activities.
- Soil improvement agents and methods that best support the soil's organisms, structure, water resources management, nutrient economy, air and gas exchange operations are used, such natural fertilisers and organic matter.
- Methods that best support the vital functions and health of vegetation are applied.

THEME 3: Operating principles for the sustainable production, selection and recycling of the raw materials, other materials and products used

The operating principles related to the production, selection and recycling of raw materials, materials and products used promote material efficiency and responsible use of raw materials, and help support environmentally sustainable material and plant production. Additionally, recycling and/or reuse of materials, limiting the amount of waste generated in construction and sorting of waste are also among the key measures.

The operating principles are focused on setting the targets in relation to the existing baseline – for example for reducing emissions, energy or water consumption or the amount of waste generated. Communicating these goals to partners and other operators and supporting the actions aligning with the goals of sustainable development set new challenges for all participants and parties involved in landscape construction. The key principle is to give priority to parties that have taken the sustainability values and environmental perspectives into account in their production and have also documented them. The importance of local operations and the security, healthiness and fairness of production are also highlighted.

3.1 Promoting material efficiency

OBJECTIVES

- conserving virgin natural resources in particular
- promoting efficient utilisation of materials
- increasing the recovery and/or reuse of materials and products
- reducing the generation and harmfulness of waste
- more efficient sorting and recycling of waste
- promoting the principle of 'Zero Waste to Landfill'
- reducing the amount of usable material ending up in landfill
- reducing the use of new materials and products
- using high-quality and durable products and materials
- reducing the energy consumption of logistics
- reducing transport costs
- reducing greenhouse gas emissions
- boosting the nutrient cycle.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- Current waste-related legislation is followed. The waste treatment follows the waste hierarchy of the EU waste management law, for example, i.e. adheres to the following order of priority:
 1. amount of waste and reducing its harmfulness
 2. preparing for reuse
 3. recycling
 4. utilisation as energy or other utilisation
 5. final processing.

- Configurable solutions are applied, with structures and materials that are easy to dismantle, sort and recycle.
- Materials, products and structures containing recycled parts and/or designed to be recycled are used.
- The recycling or reuse of materials generated during restoration and demolition work is increased, including vegetation, stone and soil matter, fixtures and equipment.
- The lifecycle is lengthened with proper and adequate maintenance of the area.
- The lifecycle of structures and infrastructure is improved by utilising the existing underground and above-ground structures in the area, such as building foundations, walls and paved areas, in their current condition.
- Materials, products and vegetation marked for removal are recycled and/or reused as applicable.
- Goals are set for the configurability and repair needs of products to be reused.
- A project specific goal is set for the utilisation of materials designated to be removed.
- A project specific goal is set for the use of materials, products and structures containing recycled parts.
- The waste streams of the construction and maintenance site are managed systematically, by conducting them through sorting to material recycling and reuse and/or recycling, either on-site or in a new site.
- The existing structures and coverings are utilised, restored and reused.
- Mass balance is maintained on the site.
- The rock, soil and plant matter and other organic matter from the site are utilised in different ways to prevent waste. These are primarily utilised on the site where they were generated.
- Surplus matter is recycled as wood chips, compost, erosion protection material, filling soil or other material or as a recycled part of a structure, either on the site or at another site.
- Work is carried out in cooperation with the material and product suppliers and other local operators in order to:
 - develop the materials, products and product parts being recycled
 - gain access to materials, products and structures containing recycled parts
 - reuse and/or recycle the materials, products and vegetation being removed
 - develop the sorting and recycling of construction and maintenance waste.
- The goals for the reuse and/or recycling of materials can be set with the help of the *Sustainable Sites* programme, for example:
 - *Twenty per cent of materials (including plants) designated for removal are reused, but at least ten per cent of the total amount of material used for the project.*
- Indicators are developed for assessing and comparing the lifecycle, carbon footprint, water footprint and energy efficiency of materials and products used for landscape construction.
- A 'recycling market' or a similar system is developed for materials and products, which informs the operators in the field about the recycled materials and products.

Operating principles/measures during the ordering stage:

- A review is commissioned of the structures, materials, products or their elements – such as vegetation, boulders, soil matter, fixtures and equipment – on the planned site that can be recycled and/or reused.
- A maintenance plan is commissioned, presenting the operating principles and suitable methods for replacing elements that are in poor condition or damaged.
- Goals are set for the reuse and recycling of the existing materials and products, on either the planned site or other sites.

- Goals are set for the use of recycled materials and products and sustainably produced materials and products on the site.
- Indicators and/or tracking methods are determined for measuring the achievement of the goals set for:
 - the reuse and recycling of existing materials and products.
 - the use of recycled materials and products and the use of sustainably produced materials and products.
- A waste stream review is commissioned for the site, assessing how much recyclable material is generated on the site during its construction, maintenance and use.
- Goals are set for reducing, sorting and recycling of the waste generated on the site.
- Indicators and/or tracking methods are determined for measuring the reduction, sorting and recycling of waste generated on the site and the achievement of the goals set.

Instructions for the designer:

- The designer is guided to plan the materials and products in a way that ensures that the existing materials and products are reused and/or recovered and recycled, and that the use of recycled materials and products and sustainably produced materials and products are achieved in accordance with the goals set for them.
- The designer is guided to plan the site in a way that allows for the reuse and recycling of the site's existing materials, products and structures in accordance with the goals set for them.

Instructions for the builder:

- The builder is instructed to plan the material and product procurements so that they ensure the use of recycled materials and products and sustainably produced materials and products in accordance with the goals set for them.
- The builder is guided to implement demolition and construction work in a way that allows the reuse and/or recycling of the existing materials and products.
- The builder is instructed to reduce the amount of waste at the construction site, sort the waste generated efficiently and recycle the waste materials generated in the construction work.
- The builder and maintainer are guided to reserve sufficient facilities for interim storage of soil, rock and plant matter during construction and maintenance.

Instructions for maintenance:

- The maintainer will be instructed to recycle and, if possible, reuse the waste generated due to maintenance work, such as soil and rock matter and plant waste.
- The maintainer is guided to choose sustainably produced materials and products as well as recycled products and materials.
- The maintainer is instructed to reduce the amount of waste generated at the maintenance site, sort the waste efficiently and recycle the waste materials.
- The reuse and/or recovery and recycling of materials and products and the achievement of goals set for the use of recycled products and sustainably used materials and products are monitored during the design, construction and maintenance stages.
- The reuse and/or recovery of the structures to be conserved and the achievement of goals set for them are monitored during the design, construction and maintenance stages.
- The reduction, sorting and recycling of waste generated on the site and the achievement of goals set for them are monitored during the design, construction and maintenance stages.

Operating principles/measures during the design stage:

- The existing materials, products and structures on the site are utilised.
- Mass balance is adhered to in the design work.
- The structures are designed for easy dismantling without damaging the materials or the immediate surroundings. For example:
 - The mounting solutions used are easy to dismantle, such as bolts and screws, and solutions that are hard to dismantle (plaster, glue, welded joints, nails) are avoided.
 - Friction or other mechanical connectors based on compressive, lateral or vertical force are used (such as plaster-free support walls, stepping stones seamed with sand).
 - However, the impacts of the previous solutions on maintenance should be assessed.
- Sustainable and high-quality products and materials with long lifecycles are preferred.
- Recycled materials and products as well as sustainably produced materials and products are used for the plan.
- Materials and products without any materials, surface treatments or other treatments that would prevent their recycling in accordance with modern industrial practices are used for the plans.
- The area's existing structures are utilised in the plan.
- Instructions for protecting, cleaning, repairing and finishing the existing and conserved structures are included in work descriptions.
- Instructions for the removal, interim storage, protection and transport of materials, products and vegetation determined for removal or reuse and/or recycling are included in the work descriptions to prevent damage to them during the work.
- Methods for maintaining the existing structures so that their new purpose and safety are maintained throughout their entire lifecycle are included in the maintenance plan.
- The soil, rock and plant matter and other organic matter on the planned site are utilised in the plan.
- Instructions for the utilisation of the existing plant and other organic matter in maintenance work, such as for soil improvement and covering substrate, are recorded in the maintenance plan.
- Instructions for collecting recyclable material, such as glass, metal, paper and plastic, at the maintenance site are recorded in the maintenance plan.

Measures during the construction stage:

- The calculations for material and product consumption are done carefully, avoiding any extra procurements.
- Recyclable or recycled materials and products are prioritised in procurements.
- Sustainably produced materials and products are procured.
- The demolition and construction work are implemented in a way that allows for the reuse and recycling of the existing materials and products.
- The materials and products are transported, placed in interim storage and protected in accordance with their needs and the general quality requirements.
- Use of materials is planned carefully to avoid material loss.
- Waste generated during the construction work is reused and recycled.
- The material and product changes that are made at the construction site and deviate from the original construction plans are recorded in the planning documents.
- The demolition and construction works are carried out in a way that allows for the reuse and/or recycling of the existing structures.
- The existing structures on the worksite are protected during demolition work in accordance with the general quality requirements.

- The structures to be conserved are cleaned, repaired and finished so that they become a permanent part of the new landscape construction and are safe for their new purpose of use.
- The demolition and construction works are carried out in a way that allows reuse of the materials, products and vegetation designated for removal and reuse and/or recycling.
- Materials, products and vegetation designated for reuse and/or recycling are placed in interim storage, protected and transported away so that they are not damaged during the work.
- Operators receiving vegetation, soil matter or other materials and products from construction sites for storage during the work and/or for delivery for further processing are reviewed.
- The actions of sorting and reuse/recycling of soil, rock and plant matter and other waste generated during the construction work are planned.
- Employees and subcontractors are taught how to sort and recycle the matter and waste generated at the worksite in accordance with authority regulations.
- The matter and waste generated are sorted carefully.
- Contaminated soil matter, diseased vegetation and invasive alien species harmful to the EU and nationally, and quarantine pests are disposed of properly.
- The recycled matter is used for soil improvement in accordance with the soil analysis results, general quality requirements and authority regulations.
- Excess soil and rock matter are used as landfill for substrates or other structures built at the site, in accordance with the general quality requirements and authority regulations.
- Excess usable matter from the construction site is delivered to be utilised at another site or taken to the local material market or another recycling centre for other operators to use.

Operating principles/measures during the maintenance stage:

- The maintenance work is carried out as required by the materials, products and structures, in a timely manner and frequently enough.
- The necessary repairs to materials, products and structures are done as soon as possible after observing the defect.
- If repairing damage is not possible right away, temporary solutions are used to prevent the damage from spreading.
- The calculations for material and product consumption are done carefully, avoiding any extra procurements.
- Recyclable or recycled materials and products are prioritised in procurements.
- Sustainably produced materials and products are procured.
- The actions of sorting and reuse/recycling of soil, rock and plant matter and other waste generated during the maintenance work are planned.
- The material and product use is planned carefully to avoid material loss.
- The waste generated during maintenance, such as soil and rock matter and plant waste, is recycled.
- Employees and subcontractors are oriented in how to sort and recycle the matter and waste generated at the worksite.
- The matter and waste generated are sorted carefully.
- Contaminated soil matter, diseased vegetation and invasive alien species harmful to the EU and nationally, and quarantine pests are disposed of properly.
- The collection containers for recycled materials are placed next to/near the waste containers.
- The recycled matter is used for soil improvement and covering substrate in accordance with the soil analysis results, general quality requirements and authority regulations.
- Excess usable matter from the maintenance site is delivered to be utilised at another site or taken to the local material market or another recycling centre for other operators to use.

- Excess plant waste and other organic matter are composted in accordance with authority regulations.
- The size and functionality of areas reserved for recycling are optimised.
- The plant cutting waste is recycled into mulch and compost.
- A waste stream analysis is compiled for assessing how much recyclable plant matter the site generates.
- Targets are set for recycling plant cutting waste, for example according to the Sustainable Sites programme:
 - *The objective is to compost or recycle 100 per cent of all plant cutting waste.*
- It is ensured that the maintenance plan has an operational model for composting and for collecting cutting waste on site.
 - All plant matter generated during maintenance is composted.
 - The lawn is mowed with a shredding lawn mower.

3.2 Promoting the sustainable production of raw materials, other materials and products

OBJECTIVES

- promoting responsible use of raw materials
- supporting ecologically sustainable material production
- reducing the use of virgin raw materials
- promoting the use of recycled raw materials
- protecting ecosystems
- respecting cultural and communal values
- developing land use measures
- supporting ecological sustainability in plant production
- reducing detrimental impacts on ecosystems
- protecting endangered and rare tree species and their sites
- reducing the energy consumption of logistics
- increasing the demand for local and regional materials and products
- supporting the regional identity by using local resources.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- Materials and products manufactured with recycled raw materials are preferred.
- Priority is given to material and product manufacturers and suppliers who:
 - publicly present the environmental perspectives of their operations and the procurement criteria for raw materials
 - apply particularly sustainable acquisition methods for their raw materials
 - use raw materials sustainably
 - highlight ecologically sustainable production methods publicly
 - have achieved significant improvements in their ecologically sustainable production methods.
- Preference is given to manufacturers that apply production methods that increase energy efficiency and reduce the consumption of natural resources, generation of waste and detrimental effects of production on human health and the environment.

- The material and product manufacturers are asked to prove their production methods are ecological.
- Material and product manufacturers are encouraged to use ecological production methods by procuring ecologically sustainable materials and products.
- Local or national planting matter producers that use ecologically sustainable production methods are reviewed.
- Use of materials made from endangered tree species is prohibited.
- Wooden materials or products made from protected or endangered tree species are not used, including elements such as structures, equipment, casting moulds, construction scaffolding or protective or safety structures containing wooden parts. Tree species meeting the following criteria MUST NOT be used:
 - Endangered species protected by the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) (species listed in species annex I).
 - Species in danger of becoming endangered protected by the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) (species listed in species annex II). Further information: <https://www.vmparisto.fi/en/permits-and-obligations/trade-endangered-species-cites>
 - Species on the red list of the International Union for Conservation of Nature (IUCN), with one of the following classifications: EW, Extinct in the Wild; CR, Critically Endangered; or EN, Endangered. See also the 'Red List for Finnish species'. Further information: <https://www.iucn.org/about>
<https://www.vmparisto.fi/en/nature-waters-and-seas/natural-diversity/diversity-species/threat-level-assessments-species>
 - Other endangered tree species can be used if a widely approved third party has acquired a forest certification for sustainable forestry for the wood product.
- Only wood materials and products manufactured from sustainably grown trees with an environmental certificate (PEFC or FSC). Further information:

<https://pefc.fi/english/>

<https://fi.fsc.org/fi-fi/tietoa-fscst/suomen-fsc>
- Suppliers using raw materials from sustainably grown forests for their wood products are reviewed.
- If possible, wooden materials and products made from virgin wood are replaced with similar products made from composite wood, recycled plastic or recycled wood material.
- When using composite wood, the material's environmental perspectives need to be reviewed.
- Regional operators are reviewed to establish which of them are able to supply plants, soil matter and other materials and products for landscape construction, including recovered, reused and/or recycled materials and products or ones that include recycled parts.
- It is ensured that the products provided by retailers and suppliers have been acquired locally (for products that are supplied locally).
- Development work is done together with the manufacturers of materials and products in matters such as:
 - sustainable procurement and use of raw materials in materials and product manufacturing
 - ecologically sustainable materials and products.
- Material and product suppliers and manufacturers are reviewed to find out which are committed to production or supply operations that follow the principles of sustainable development and which publicly report on the environmental aspects of their operations.

- It is reviewed which material and product suppliers and manufacturers are continuously developing and improving the sustainability of their production methods.
- Indicators are developed for assessing and comparing the lifecycle, carbon footprint, water footprint and energy efficiency of materials and products used for landscape construction, as well as those aspects of their production.

Operating principles related to supporting ecologically sustainable material production:

- Preference is given to material and product manufacturers who openly present their ecologically sustainable production methods.
- Finnish evaluation methods and indicators are developed for assessing material producers and ecologically sustainable production methods. The lifecycle, eco efficiency, carbon footprint and water footprint of materials, products and production methods are all evaluated.
- It is recommended that an environmental declaration, such as the *Environmental Product Declaration* (EPD) be used for the products. Further information:
<https://www.environdec.com/What-is-an-EPD/>
<https://cer.rts.fi/en/>
- The *Sustainable Sites* initiative applies the following criteria:
The goal is to obtain 25 per cent of the total applicable materials cost from businesses that complete one of the following actions:
 - *report annual environmental performance via the Global Reporting Initiative (GRI) or equivalent,*
 - *conduct and publish a peer-reviewed full life-cycle assessment (LCA) and/or an environmental product declaration (EPD) or Material Input Per Service Unit (MIPS) for the product,*
 - *set and publicly announce specific goals to reduce, by at least 25 percent (per unit product or equivalent basis) over a five-year period, the company's performance metrics in the following areas:*
 - *use of energy, water, and chemicals*
 - *releases of key pollutants to air and water*
 - *disposal of hazardous and non-hazardous wastes.*
- Priority is given to materials and product manufacturers that have achieved significant improvements in their ecologically sustainable production methods.
- Criteria are developed for assessing the production methods of material manufacturers. *The Sustainable Sites initiative's goals is that 25 per cent of the total applicable materials cost are obtained from businesses that employ and document at least three of the five improvements of ecologically sustainable production* (see the information box).

IMPROVEMENTS TO ECOLOGICALLY SUSTAINABLE PRODUCTION (info box)

Reducing emissions

At least 50 per cent reduction compared to the base level in the company's direct environmental

impacts: hazardous air pollutants, toxic water pollutants, generation of hazardous and non-hazardous waste.

Reducing greenhouse gas emissions

A 25 per cent reduction in carbon dioxide or other greenhouse gas emissions compared to the base level

Reducing energy consumption

The manufacturing process per unit of product consumes less energy than the industry average. Information about the energy consumption of gardening production is available through the Finnish Glasshouse Growers' Association or the Central Union of Agricultural Producers and Forest Owners, for example.

Using renewable sources of energy

A proportion of the company's energy needs are met with renewable sources of energy produced in the business region.

Reducing the use of potable water

The consumption of potable water is reduced. Natural water, such as stream and lake water and/or collected stormwater are preferred.

Operating principles related to supporting sustainable plant production:

- Preference is given to planting material producers who openly present their ecologically sustainable production methods.
- Producers of planting material who apply the Laaturaha-ohjeisto⁶ guidelines and adhere to them are prioritised.
- Preference is given to producers who have achieved significant improvements in ecologically sustainable methods of planting material production. (See the information box).

ECOLOGICALLY SUSTAINABLE METHODS OF PLANT PRODUCTION: (info box)

1. Reducing the use of potable water and groundwater sources: Non-potable water (e.g. captured stormwater, recycled grey water, reclaimed/ treated wastewater, water treated and conveyed by a public agency specifically for non-potable uses) is used for the majority of the annual total irrigation water consumption.
2. Reducing runoff from irrigation: Irrigation runoff water on site is retained and recycled on the site.
3. Use of sustainable substrate and growing media: Ecologically sustainable growing media options are used (recycled nutrients, compost, with as low peat content as possible). Fertilising is based on the nutrient needs of the plants grown and a soil analysis. Additionally, vegetation covers/green manuring are used, as well as slow-release fertilisers, composted soil, livestock manure or other organic alternatives.
4. Recycling organic matter: Vegetation trimmings on site are composted or recycled for use in the operations or for sale.
5. Recycling and reclaiming/reuse of waste: The accumulated waste stream is recovered and/or reused, recycled or composted.
6. Utilising integrated pest management, IPM: IPM methods are applied in production.
7. Preventing the use and spreading of invasive alien species harmful to the EU and nationally and quarantine pests: It is proven that invasive alien species harmful to the EU and nationally and

⁶ Kotimaiset Kasvikset ry: Laaturaha-ohjeisto, 2017 version.

quarantine pests are controlled in the production area and their spread to the environment has been prevented.

8. Reducing energy consumption: Energy use is below the industry average.
9. Using renewable sources of energy: Some of the energy needs of production are met with renewable sources of energy in the production area (biowaste, solar energy or similar). Possibilities for increasing the use of renewable energy are researched, with the aim of getting at least 10 per cent of energy from renewable sources.
10. Providing safe and fair working conditions: The company has determined the operating principles, based on which open dialogue is carried out with the nursery employees on matters related to their working conditions, such as safety and job satisfaction.

- Regional sources are reviewed to discover which of them are able to supply plants, soil matter and other materials and products for landscape construction, including recovered, reused and/or recycled materials and products or ones that include recycled components.
- It is ensured that plant retailers and suppliers have sourced their products locally.

Operating principles/measures during the ordering stage:

- Goals are set for the responsible and sustainable raw material use of the materials and products used in the project and for their production.
- Indicators and/or tracking methods are determined for measuring the responsibility and sustainability of raw material procurement and material and product manufacturing.
- Goals are set for the origin, delivery distance and/or energy use of logistics, and carbon dioxide and other harmful emissions of the materials and products used in the project.
- Indicators and/or tracking methods are determined for measuring the materials' origin, delivery distance, the energy use of logistics, and carbon dioxide and other harmful emissions.
- The designer is guided to select materials and products
 - with ecologically and socially sustainably procured and produced raw materials
 - that have been produced ecologically
 - that have been produced locally/regionally and/or are logistically green choices.
- The builder and/or maintainer is guided to procure materials and products
 - with ecologically and socially sustainably procured and produced raw materials
 - that have been produced ecologically
 - that have been produced locally/regionally and/or are logistically green choices.
- The responsibility and sustainability of the procurement of the materials and product raw materials used in the project is monitored during the design, construction and maintenance stages.
- The ecological approach of the materials and products used in the project is monitored during the design, construction and maintenance stages.
- The origin, delivery distance, the energy use of logistics, and carbon dioxide and other harmful emissions of the materials and products used in the project are monitored during the design, construction and maintenance stages.

Regarding wooden materials and products:

- Goals are set for the tree species and origin of wooden materials and products used in the project.
- Indicators and/or tracking methods are determined for measuring the origin of wood materials and products.

- The designer is guided to use wood materials and products made from sustainably grown wood with an environmental certification (*PEFC – Programme for the Endorsement of Forest Certification* or *FSC – Forest Stewardship Council*).
- The designer is also guided to replace, if possible, wooden materials and products made from virgin wood in the plan with similar products made from composite wood, recycled plastic or recycled wood material. When using composite wood, the material's environmental perspectives need to be reviewed.
- The builder is instructed to procure only wood materials and products manufactured from sustainably grown trees with an environmental certificate (PEFC or FSC).
- The maintainer is instructed to procure only wood materials and products manufactured from sustainably grown trees with an environmental certificate (PEFC or FSC) for any repair work.
- The tree species, origin, growth method and environmental certification labels of the wood materials and products used in the project are monitored during the design, construction and maintenance stages.

Operating principles/measures during the design stage:

- Materials and products used in the plan:
 - have ecologically and socially sustainably procured and produced raw materials
 - have been produced ecologically and socially sustainably
 - have manufacturers that are actively developing improved business practices and reducing detrimental effects on human health and the environment
 - have been produced locally/regionally or are logistically green choices.
- Wooden materials and products made from sustainably grown wood with an environmental certificate (PEFC or FSC) are used in the plan.
- If possible, wooden materials and products in the plan made from virgin wood are replaced with similar products made from composite wood, recycled plastic or recycled wood material.

Operating principles/measures during the construction stage:

- Materials and products with ecologically and socially sustainably procured and produced raw materials are procured.
- Locally/regionally produced materials and products or materials and products with environmentally friendly logistics processes are procured.
- Wood materials and products manufactured from sustainably grown trees with an environmental certificate (PEFC or FSC) are procured.
- Recycled timber is used if possible, for example for casting moulds, scaffoldings or safety and protective structures.

Operating principles/measures during the maintenance stage:

- Maintenance materials and products with ecologically and socially sustainably procured and produced raw materials are procured.
- Locally/regionally produced materials and products or materials and products with environmentally friendly logistics processes are used for repair works.
- Wood materials and products manufactured from sustainably grown trees with an environmental certificate (PEFC or FSC) are used for repair works.
- Recycled timber is used if possible.

THEME 4: Operating principles for promoting the conservation of energy, air quality and environmental conservation

The operating principles and measures related to promoting energy conservation, air quality and environmental protection focus on reducing various types of emissions. The objective is to reduce greenhouse gas emissions, the loss of habitats and negative impacts on the health of people and organisms.

The operating principles are in particular related to making operations more efficient, introducing alternative forms of energy production and adopting more environmentally friendly practices.

4.1 Reducing energy consumption and promoting new forms of energy production

OBJECTIVES

- minimising energy consumption
- more efficient use of energy
- reducing greenhouse gas emissions
- decreasing the costs of energy consumption
- promoting the use of new, efficient energy sources
- reducing the use of fossil fuels
- improving air quality.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- Energy consumption is reduced and the use of work machines and equipment using energy is made more efficient.
- The use of machinery running on fuel is minimised on landscape construction sites.
- Energy efficient lighting, water pumps and other technical devices are used on the landscape construction site.
- Preference is given to products, devices and machines that utilise solar or wind power.
- A site-specific solar, wind or geothermal power plant is connected to the landscape construction site to power the equipment requiring electricity.
- Green energy produced by solar, wind or hydro power supplied by energy companies is used as the energy source for the site.
- New, more energy-efficient products, devices and machinery for the purposes of landscape construction are developed together with the product, device and machine manufacturers and energy experts.
- Goal levels are set for reducing energy consumption.
- The *Sustainable Sites* initiative applies the following criteria:
The goal for reducing energy consumption is to produce up to 100 per cent, but at least 50 per cent of the site's annual outdoor energy consumption with renewable sources of energy, or, if this is not possible, a long-term deal with an environmentally friendly energy producer (as acknowledged by the state or a similar authority) is established.

Operating principles/measures during the ordering stage:

- Goals are set for energy-efficiency and use of energy sources.
- The designer is guided to select energy efficient lighting and other permanent technical devices for the site.
- The contractor and maintainer are instructed to use energy efficient machines and equipment.
- The maintenance plan is required to have the information on the maintenance, repairs and replacement of materials, products, devices and structures (for example regarding the energy efficiency of lighting, irrigation and heating systems).
- The contractor's and maintainer's achievement of the goals set is monitored.

Operating principles/measures during the design stage:

- Design solutions are made that support the previously determined sustainable development goals and follow the general operating principles.
- The maintenance plan includes information on the maintenance, repairs and replacement of materials, products, devices and structures (for example regarding the energy efficiency of lighting, irrigation and heating systems).

Operating principles/measures during the construction stage:

- Work with machinery is planned well to avoid unnecessary driving.
- Energy efficient work machinery and devices are used.

Operating principles/measures during the maintenance stage:

- Work with machinery is planned well to avoid unnecessary driving.
- Energy efficient work machinery and devices are used.
- It is ensured that the maintenance plan has taken into account the maintenance, repairs and replacement of materials, products, devices and structures (for example regarding the energy efficiency of lighting, irrigation and heating systems).

4.2 Protecting air quality

OBJECTIVES

- improving air quality.
- reducing greenhouse gas emissions
- promoting human health
- reducing dust problems.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- Limit values are determined for the site's greenhouse gas emissions during the construction and maintenance stage.
- Limit values are determined for the machine and device emissions.
- The use of machines and devices running on fuel is reduced. Manual or electrical machines and devices are used primarily.
- Work methods are developed together with the field's operators to reduce greenhouse gas emissions and other emissions decreasing air quality.
- Goal levels are set for reducing emissions. These can be modelled based on the criteria of the *Sustainable Sites* initiative, for example:

The goal is a 50 per cent reduction in hydrocarbon and nitrogen oxide emissions and a 75 per cent reduction in carbon monoxide emissions from baseline conditions.

Operating principles/measures during the ordering stage:

- Goals are set for protecting air quality.
- The designer is guided to compile a plan that considers the goals set for protecting air quality (for example with regards to the maintenance level of vegetation areas).
- The contractor and maintainer are instructed to use primarily manual or electrical work machines and devices.
- Contractors who take into account the protection targets for air quality are prioritised.
- Preference is given to contractors with machines and devices that
 - have been maintained regularly and often enough
 - are low-emission
 - use clean fuels, recycled fuel when possible or run on electricity
 - utilise new technology
 - have a tracking system for their utilisation rate.
- The contractor's and maintainer's achievement of the goals set for the protection of air quality is monitored.

Operating principles/measures during the design stage:

- The site is designed in a way that allows for minimising the use of machines and devices using petrol as their fuel.
- Low-maintenance plant species or species that can be cared for with manual devices/tools are chosen.
- It is ensured that the maintenance plan takes into account the principle of scheduled maintenance, determines limit values for the emissions of machines and devices and mainly utilises manual equipment and devices running on electricity.
- When possible, lawn areas are covered with ground cover plants or shrubs. Large lawn areas can be transformed into meadows or restored to their natural state.

Operating principles/measures during the construction stage:

- Work with machinery is planned well to avoid unnecessary driving.
- Idle running of machines and equipment is avoided.
- Dust formation and wind erosion of soil and rock matter are prevented.
- Devices/work equipment/machinery with minimised emissions that meet the valid standards are used.
- Forming of dust during construction work is prevented (for example in relation to concrete and natural stone work or sawing of timber).
- Machine and devices are used that:
 - have been maintained regularly and often enough
 - are low-emission
 - use clean fuels, recycled fuel when possible or run on electricity
 - utilise new technology
 - have a tracking system for their utilisation rate.

Operating principles/measures during the maintenance stage:

- Work with machinery is planned well to avoid unnecessary driving.

- Idle running of machines and equipment is avoided.
- Formation of dust is prevented during maintenance work.
- Devices/work equipment/machinery with minimised emissions that meet the currently valid standards are used. The use of two-stroke engines in particular should be reduced (e.g. leaf blowers, string trimmers).
- Regarding the scheduling of maintenance, motorised devices are only used when there are no users on the site or when the utilisation rate is the lowest. The aim here is to avoid exposing the users to air pollutants.
- Machine and devices are used that:
 - have been maintained regularly and often enough
 - are low-emission
 - use clean fuels, recycled fuel when possible or run on electricity
 - utilise new technology
 - have a tracking system for their utilisation rate.

4.3 Promoting safe chemical use

OBJECTIVES

- reducing the use of chemicals detrimental to the environment
- reducing the detrimental effect of chemicals on the environment and people
- promoting environmental friendliness in work to develop chemicals
- promoting chemical-free construction and maintenance methods
- reducing the detrimental effects of chemicals on health and the environment and promoting the use of safer options.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- Landscape construction sites are implemented in a way that allows as minimal use of chemicals as possible during the construction and maintenance stages. Buffer zones where no chemical plant protection products and fertilisers are allowed can be utilised, for example.
- Limit values are determined for the use of chemicals, such as chemical plant protection products, fertilisers, anti-freeze agents and other construction and maintenance chemicals.
- The need to use chemicals is determined based on monitoring and needs assessments.
- The operating and safety instructions for storing, transporting, using and disposing of chemical substances are taught and followed.
- Methods are developed in cooperation with the field's operators for reducing or replacing the use of chemicals in landscape construction projects.
- Products with a certification system (standards and environmental labels) promoting safer use of chemicals are preferred.
- Product groups are ranked based on their risks they pose to people and the environment.

Operating principles/measures during the ordering stage:

- Targets are set for the safe use of chemicals, and tracking methods are created for monitoring to ensure that the goals achieved.
- A maintenance plan is commissioned, which determines the potential buffer zones for vegetation and the framework for biological and mechanical maintenance methods.

- The maintenance plan is reviewed to ensure that it has an operating model for determining biological and mechanical maintenance methods for the ecologically sensitive areas and human habitats near the site.
- The builder and maintainer are instructed to promote and follow the goals and operating principles of safe chemical use.
- The builder's and maintainer's achievement of the goals and operating principles is monitored.

Operating principles/measures during the design stage:

- Excessive homogeneity of plant species is avoided and a diverse selection of species is chosen to prevent pest epidemics.
- Plant species well suited to the area's conditions are used.
- A maintenance plan is compiled for choosing the best maintenance measures for protecting the health of vegetation and setting out a chemical-free operating model for maintenance.
- Surface treatment of materials is avoided (e.g. colour and polish, paints and similar additives). (See the info box)

AVOID SURFACE TREATMENTS AND ADDITIVES IN FOLLOWING PRODUCTS AND MATERIALS: (info box)

- terraces, railings, fences, grilles and lattices (wooden or other material)
- pipes, hoses and irrigation components
- wires, cables and electrical devices
- lighting devices
- membranes, sealants and geotextiles
- filtering cloths
- insulation boards and foams
- paints and coatings
- binding agents, sealants, elastomers (such as flexible plastics), water insulation, sealing tapes and expansion joint sealants and fillers
- synthetic surface treatment materials and similar products (such as rubber granules and artificial turf).

Operating principles/measures during the construction stage:

- The goals and operating principles set for safe chemical use are followed.
- Employees and contractors using chemicals must have the necessary plant protection qualification, ensuring they are trained on the safe and careful handling of chemicals and personal protection.
- The devices and equipment used for spreading chemicals are maintained, calibrated and adjusted carefully.
- The chemicals are spread carefully and only in the area planned for treatment.
- The safety data sheets of chemicals are always available for the employees to view.

Operating principles/measures during the maintenance stage:

- The goals and operating principles set for the safe use of chemicals are followed.
- The maintenance plan compiled for the area is adhered to.
- Integrated plant protection is used for preventing plant pests.

- Employees and contractors using chemicals must have the necessary plant protection qualification, ensuring they are trained on the safe and careful handling of chemicals and personal protection. It is also recommended that the people planning the maintenance operations and giving advice on the matter have the same qualification.
- The devices and equipment used for spreading chemicals are maintained, calibrated and adjusted carefully.
- The chemicals are spread carefully and only in the area planned for treatment.
- The safety data sheets of chemicals are always available for the employees to view.
- If using plant species that have become sensitised to pest infestations, those involved ensure they can identify the life stages of said pest. This information will be added to the site's monitoring schedule.

4.5 Improving the microclimate in the urban environment

OBJECTIVES

- having a positive effect on the microclimate and living conditions of people and natural species
- reducing the urban heat island phenomenon.

OPERATING PRINCIPLES AND MEASURES

General operating principles

- Shade is added with the help of vegetation.
- Versatile use of vegetation is increased, along with the size of the vegetation areas.
- Solutions, methods and materials that improve the microclimate are chosen, especially near traffic routes.
- Solutions, methods and materials, such as green walls, green roofs and vines that reduce binding heat in the building facades are chosen.
- The use of impermeable built surfaces (paved roads and areas) is reduced.
- Materials are used that reflect the sun's radiation instead of binding the heat.

Operating principles/measures during the ordering stage:

- The area's light and shade conditions are reviewed.
- The surface area of vegetation is reviewed in comparison with the surface area of paved surfaces and roofs.
- Goals are set for the utilisation method, placement and quantity of vegetation areas in the designed area in order to improve the microclimate.
- Goals are set for the utilisation method, placement and quantity of vegetation areas in the designed area, as well as their proportion of all paved and roof surface areas, to help mitigate the impact of urban heat islands.
- Indicators/tracking methods are determined for measuring/monitoring how well the goals set for the utilisation, placement, quantity and proportion of vegetation areas are achieved.
- The diverse use of vegetation is increased by utilising the expertise of landscape designers and landscape architects in the construction design phase of the project.
- The designer is guided to plan the area so that the utilisation method, placement, quantity and proportion of vegetation areas of all paved and roof surface areas meet the goals set for them.
- The designer is instructed to choose materials that do not bind heat radiation.
- The maintainer is guided to maintain and restore the vegetation areas in a way that helps them mitigate the impacts of urban heat islands and provide shade in accordance with the targets set.

- The achievement of goals set for the utilisation method, placement and quantity of vegetation areas in the plans, as well as their proportion of all paved and roof surface areas, is monitored.
- The achievement of goals set for maintenance of the condition and for the shading effect is monitored.

Operating principles/measures during the design stage:

- Paved areas, such as parking areas, playgrounds, recreational areas and plazas, are designed by utilising existing and planted vegetation so that it offers at least partial shade to these areas.
- The use of impermeable built surfaces (paved roads, pedestrian pathways and parking areas) is reduced.
- The vegetation to be planted is selected so that the desired shading effect can be achieved within ten years since the planting.
- Planting boxes or other planting areas are designed for paved areas.
- Structures offering shade and covered by vegetation are planned for paved areas, such as pergolas, green walls and roofs, hedges, shrubbery and rows of trees.
- Architectonic elements or structures providing shade are planned for paved areas.
- The materials chosen for the shading structure reflect the sun's radiation well.
- Energy technology producing renewable forms of energy, such as solar heaters, solar panels or wind power plants, are combined with the structures providing shade.
- The parking areas are placed below a deck or other structure that adheres to the recommended measures listed above.
- Goals are set for the solar reflectance value.
(The reflectance can be assessed with the help of the solar reflectance index, SRI, and/or with the weighted reflectance average, solar reflectance, SR.)

The *Sustainable Sites* initiative applies the following criteria:

- *The goal is a Solar Reflectance of at least 0.33 at installation, or a three-year aged SR value of at least 0.28.*
- *The goal for the Solar Reflectance of the paving materials used in the area is at least 0.33 at installation, or a three-year aged SR value of at least 0.28.*
- *Paved areas are designed so that at least 50 per cent of the paving material is permeable.*
- Some of the roof structures are implemented as green roofs supporting biodiversity.
- The maintenance plan takes the following into account:
 - The vegetation is maintained and restored in a way that ensures the best possible shading effect in accordance with the stage of its lifecycle.
 - The shading structures, coatings and other surface materials are cleaned regularly to maintain their reflectivity during the structure's lifecycle.

Operating principles/measures during the construction stage:

- No special measures/operating principles.

Operating principles/measures during the maintenance stage:

- The shading structures, coatings and other surface materials are cleaned regularly to maintain their reflectivity.
- The shading vegetation is maintained and restored so that the shading effect continues to meet the goals set.

4.6 Reducing the energy consumption of buildings through vegetation

OBJECTIVES

- reducing the buildings' cooling needs in summer
- reducing the buildings' heating needs during cold periods
- reducing energy consumption and its costs.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- Vegetation or vegetated structures are used to provide sun shade and wind protection to the buildings.
- Goal levels are set for saving energy. The *Sustainable Sites* initiative applies the following criteria:
 - *Vegetation or vegetated structures are used to reduce total annual building energy use for heating and cooling by at least 5 per cent.*
 - *Vegetation or vegetated structures are used to shade 100 per cent of the exposed surface area of all HVAC units within 10 years of installation. At least 30 per cent, with a goal level of 60 per cent of the surface area of west, southwest, southeast, and east building façades are shaded, as well as 30 per cent of the total roof area.*
- Trees and dense shrubs are used to protect the building from wind. More detailed instructions are to be drawn up for designing wind protection. The *Sustainable Sites* initiative applies the following criteria:
 - *At least one row of trees and dense shrubs that extends for the full length of the building's façades facing the prevailing winter wind is formed.*
 - *The goal is to have two or more rows of trees and dense shrubs protecting the building against the prevailing winter wind. The rows of trees and shrubs are planted in a staggered formation, with rows planted 3.5 to 6 meters apart, extending at least 15 meters longer than the building's façade.*
The windbreak must:
 - *Be at least 18 meters and no more than 60 meters from the building walls facing the prevailing winter wind (the windbreak provides ideal wind protection at distances two to five times the mature height of the trees).*
 - *Not cast shadows on the building.*
 - *Use densely branched trees or dense shrubs, or a combination of these. Be branched to the ground in a row or rows to increase the density of the windbreak*
 - *Use spacing guidelines presented in the instructions in the section Links and further details to provide vegetation density that is adequate to protect the building. The spacing between rows and within rows should allow for proper use of suitable maintenance equipment.*

Operating principles/measures during the ordering stage:

- Goals are set for the utilisation method, placement and quantity of vegetation areas in the designed area in order to reduce the energy consumption of the building in the area.
- Indicators/tracking methods are determined for measuring/monitoring how well the goals set for the utilisation method, placement and quantity of vegetation areas are achieved.
- The designer is guided to plan the area so that the utilisation method, placement and quantity of vegetation areas meet the goals set for them.
- The designer is guided to choose vegetation that is suitable for use as a windbreaker.
- The maintainer will be instructed to maintain and restore the vegetation areas in a way that allows them to provide a windbreaker effect in accordance with the goals set.
- The achievement of goals set for the utilisation method, placement and quantity of vegetation areas in the plans is monitored.
- The achievement of goals set for maintenance of the condition and windbreaker effect of vegetation is monitored.

Operating principles/measures during the design stage:

- A local plant specialist is consulted during the design work regarding plant species that would offer the best possible benefits in the local conditions.
- Trees and shrubs that offer other benefits to the area in addition to energy conservation, such as nutrients or habitats for other natural species or screening, are chosen for the area.
- Deciduous trees are chosen as planted trees, as they allow sunshine through during the winter and offer shade in the summer.
- Windbreaker plants are planted in a staggered formation, in rows of trees and shrubs.
- The spacing between the rows and the plants should allow for proper maintenance of the trees and shrubs using suitable maintenance equipment.

Operating principles/measures during the construction stage:

- No special measures/operating principles.

Operating principles/measures during the maintenance stage:

- Windbreaker vegetation is maintained and restored so that the protective effect can be achieved and maintained in accordance with the goals set for it.

THEME 5: Operating principles for promoting the health and well-being of people

The operating principles and measures related to the promotion of human health and well-being are focused in particular on social sustainability. These help safeguard the values of a cultural environment; the accessibility, safety and comfort of outdoor areas; equal utilisation opportunities for all users; and implementation of outdoor facilities promoting physical activity. Outdoor areas have a key role in mental restoration and as venues for physical activities promoting health. Meeting places and supporting social interactions strengthen the sense of community. Local food production is one way to promote communality, for example. Using local labour and materials supports and promotes local communities and their operations.

The operating principles are related to identifying needs and solutions, inclusion of local communities and experts, and developing new operating methods.

5.1 Preserving and maintaining cultural environments

OBJECTIVES

- strengthening the importance, effectiveness and identity of cultural environments
- conserving and maintaining culturally and historically valuable buildings, structures and construction sites in the area as well as cultural landscapes
- promoting the recognition of local culture and history
- promoting the use of culturally historical sites.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- Cultural landscapes located fully or partly in the planned area are identified and conserved, especially if they are classified as having cultural history value and belong in any of the following categories:
 - nationally valuable landscape areas (Government Decision, 1995)
 - built cultural heritage sites of national significance (RKY 2009)
 - regionally valuable cultural environments and landscape areas
 - locally valuable cultural environments and landscape areas
 - traditional landscapes
 - National Urban Parks
 - national landscapes.
- Cultural environments are maintained as living, representative sites according to their purpose of use.
- The cultural environments are maintained in accordance with their values, the site's purpose of use and the public image.
- Work on identifying and conserving areas and sites of cultural history and taking them into consideration in design work, construction and maintenance will be carried out together with the local government, regional councils, the Ministry of the Environment and the Finnish Heritage Agency.

- Local residents, associations, companies, schools, daycare centres, senior services and other operators are included in the conservation, development and maintenance work of sites with cultural and historical value.
- Cultural environment sites are utilised for teaching and education purposes.

Operating principles during the ordering stage:

- An assessment is commissioned on the planning site's areas with cultural and historical value, such as buildings, structures, vegetation and landscapes.
- Goals are set for conserving and maintaining the existing sites of cultural and historical value.
- Indicators and/or tracking methods are determined for measuring the goals set for conserving and maintaining sites with cultural and historical value.
- A maintenance plan is commissioned for maintaining and conserving the areas and sites with cultural and historical value in the area.
- The design work is guided so that the existing sites with cultural and historic value and their conservation are taken into account in the plan and the goals set for them are met.
- The builder is guided to implement the construction work without damaging the existing sites with cultural and historical value during the work.
- The maintainer is guided to implement maintenance work while conserving the values of the existing sites with cultural and historical value and strengthening the site's public image and purpose of use.
- The conservation of the existing sites with cultural and historical value and the achievement of goals set for them are monitored during the design, construction and maintenance stages.

Operating principles/measures during the design stage:

- The plans consider the existing buildings, structures, built sites, vegetation and landscapes that are classified as having cultural and historical value in one of the following categories:
 - nationally valuable landscape areas
 - nationally valuable built heritage sites
 - regionally valuable landscape areas
 - regionally valuable built heritage sites
 - locally valuable landscape areas
 - locally valuable built heritage sites
 - Ancient Relics Register.

Other potential, unregistered valuable sites are also considered.

- Instructions for processing and protecting the existing buildings, structures and vegetation with cultural and historical value during construction work are included in the work description.
- Methods for maintaining the existing buildings, structures, built sites, vegetation and landscapes with cultural and historical value in a way that maintains their values and strengthens the site's public image and purpose of use throughout its entire lifecycle are recorded in the maintenance plan.

Operating principles/measures during the construction stage:

- The construction work is implemented without damaging the existing sites with cultural and historical value during the work.

Operating principles/measures during the maintenance stage:

- The maintenance work is implemented while conserving the values of the existing sites with cultural and historical value and strengthening the site's public image and purpose of use.
- Traditional maintenance methods, working methods and materials are used when possible.

5.2 Improving the accessibility, safety and user comfort of green areas and other public outdoor facilities

OBJECTIVES

- promoting the accessibility of green areas and other public outdoor facilities
- promoting the equitable opportunities for different user groups to utilise public outdoor facilities
- increasing the use of public outdoor facilities
- improving the safety of public outdoor facilities
- improving the user comfort of public outdoor facilities.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- Public outdoor facilities providing equal outdoor recreation opportunities for all user groups are planned.
- All users are provided with free, accessible entry in the area as extensively as possible.
- Green areas and other public outdoor facilities are placed in a way that makes them easily accessible to different user groups by walking, cycling or public transport.
- The pedestrian and cycling routes and public transport connections into the areas are improved.
- Special attention is paid to the area's safety from the perspective of different user groups and considering the different times of days and seasons.
- The areas are developed and the equal opportunities for utilisation promoted in cooperation with the local residents, land-owners, service providers, societies, businesses, schools, daycare centres, senior services and other operators and user groups.
- Economic and social benefits offered to local communities are increased. Events, scheduled programmes, services and amenities with free access are held in the area.
- The areas are used as a versatile venue by, for example, offering local operators the chance to utilise the green areas and other public outdoor facilities for organising events.

Operating principles/measures during the ordering stage:

- When necessary, a review will be commissioned of the area's accessibility, safety and user comfort as the basis for design work.
- Goals are set for improving and promoting the areas' accessibility, safety and user comfort and tracking methods are determined for monitoring whether the goals are achieved.
- The designer is instructed to take into account the goals set for accessibility, safety and user comfort.
- The builder and maintainer are instructed to take into account the goals set for accessibility, safety and user comfort.
- The designer, builder and maintainer will be monitored in achieving these goals.
- The local communities operating in the area are reviewed and worked with actively to identify development needs and alternatives for sharing or developing the area's social and economic advantages.

Operating principles/measures during the design stage:

- The planning principles for an accessible and equitable environment are utilised and a plan is compiled so that all users have equal opportunities to access and enjoy the site and its amenities.
- Solutions are identified for improving the area's spatial readability and understandability of its purpose of use.
- The solutions and measures chosen have no negative impact on the area's sensitive attributes.
- In the design solutions, preference is given to alternatives that benefit and include as many users as possible, including local residents.
- Elements increasing accessibility, safety and orientation in the area are included in the design work. (See Information box)

MEASURES INCREASING THE ACCESSIBILITY, SAFETY AND USABILITY OF AN AREA (info box)

1. Site access and usability are provided as required by accessibility standards and recommendations.
2. The safety of the site is improved by implementing the components below:
 - clear, defined spaces and access control
 - placing functions in central locations, and providing good lighting in the areas with these functions for good visibility
 - good visibility and sufficient lighting along exit and entrance routes and walking paths
 - clear visibility in the area and good lines of sight
 - a variety of options for access
 - site design elements that improve the effectiveness of security efforts.
3. An environment is created that makes it easy and intuitive for users to orient themselves without a map and navigate from place to place. The orientation and navigation are facilitated by implementing the components below:
 - clear entrances and gateways
 - viewpoints and lines of sight
 - landmarks
 - junction points or nodes
 - hierarchy of pedestrian and vehicular traffic
 - distinct areas and regions
 - orientation devices and systems
 - maps and brochures.

Further information: Suraku <http://www.hel.fi/www/helsinkikaikille/fi/ohjeita-suunnitteluun/esteettoman-rakentamisen-ohjeet>

Operating principles/measures during the construction stage:

- The construction is implemented in a way that ensures it does not prevent achieving the accessibility, safety and user comfort goals set for the area or its connected area.

Operating principles/measures during the maintenance stage:

- The maintenance is planned and implemented in a way that ensures it does not prevent achieving the accessibility, safety and user comfort goals set for the area or its connected area.

5.3 Promoting physical, mental and social well-being

OBJECTIVES

- promoting people's mental recovery
- promoting people's physical activity
- promoting human health
- encouraging people to use the outdoor areas for exercising and outdoor recreation
- increasing opportunities for social interaction
- strengthening the sense of community.

OPERATING PRINCIPLES AND MEASURES

General operating principles:

- A sufficient amount of outdoor space attracting people to participate in outdoor recreation, exercising and socialising are planned and implemented.
- A sufficient amount of outdoor space that is aesthetically pleasing and can also be experienced through the senses of smell, hearing and touch is produced.
- Enough quiet and calm spaces are also designed for the outdoor areas for relaxation.
- The versatile use of areas is facilitated during different times and seasons.
- The areas are developed in cooperation with the local residents, societies, businesses, schools, daycare centres, senior services and other operators and user groups.
- The outdoor areas are used as a versatile venue by, for example, offering local operators the change to utilise them for organising events.

Operating principles/measures during the ordering stage:

- The goals for providing and developing outdoor areas promoting physical, mental and social well-being are determined, as well as tracking methods for achieving the goals set.
- A review of the sufficiency and development needs of outdoor areas promoting physical, mental and social well-being is commissioned.
- The designer of outdoor areas is guided to consider the objectives and operating principles promoting physical, mental and social well-being.
- The designer's achievement of said goals is monitored.

Operating principles/measures during the design stage:

- Attention is paid to the comfort, aesthetics and pleasing views of outdoor areas around or in immediate vicinity of buildings.
- The access from buildings, especially nursing and service homes, hospitals and other treatment facilities, to the outdoor areas is facilitated by implementing accessible entrances. The accessibility of the pathways is also considered.
- Places for outdoor activities and sports equipment are placed in the outdoor areas.
- Services and amenities supporting the users during their visit to the outdoor area are provided, such as a water point, parking spots for bikes and public toilet facilities.
- Meeting places are added in the outdoor areas, allowing people to meet each other, eat, work or play.
- Quiet areas that would best benefit the mental restoration of the area's users are reviewed during the pre-planning stage. When selecting these areas, factors such as trees providing shade, the views and landmarks and potential stress factors in the area or outside it are considered.
- Stakeholders and users are included in the design work to identify the needs of the area and its users as well as suitable methods for promoting mental well-being.

- The social needs of different user groups are considered. Seating, games, and spaces specifically designed for children are planned, such as thematic playgrounds.
- The *Sustainable Sites* initiative gives the following guidelines for designing the areas, for example:
 - *A variety of smaller, mentally restorative spaces conveniently located throughout a site are designed rather than one large space. If possible, consider integrating these outdoor spaces with interior public spaces to enhance the connection to nature throughout.*
 - *The outdoor mental restoration spaces are placed away from distractions, such as noise from mechanical systems, building and facility operations, and traffic. To minimize noise, multiple solutions are incorporated, such as quieter pavement, dense foliage, earth berms, and barriers or screens.*
 - *To create a sense of enclosure, seating areas are defined with low walls, fences, vegetation, or topography. Walls, fences, and vegetation can also break, guide or deflect the wind.*
 - *A variety of seating options are provided within defined spaces. Comfortable, moveable seating is placed both in sun and shade.*
 - *The site is designed with protective windbreaks and sources of shade where necessary. Vegetation, green walls, or barriers are used in design work to minimize or buffer excessive wind, sunlight, traffic, or unsightly features.*
 - *Amenities or vegetation that enhance a multi-sensory aesthetic experience are considered in the design, such as a grove of trees, water features, scents from flowers or foliage, tactile variation, or art.*
 - *Seating, games, and spaces specifically designed for children are provided, such as thematic playgrounds.*
 - *When looking for areas that may encourage social connection, attention is paid to trees providing shade or views.*
 - *The goal is to provide outdoor spaces in the site encouraging social connection, which include:*
 - *Seating for a minimum of 10 percent of the total site users. It accommodates a variety of group sizes and is appropriate to the site's purpose of use.*
 - *Design elements that have a beneficial effect on the site's microclimate (e.g., sun, shade, wind).*
 - *Amenities, services, or activity spaces (e.g., games, wireless access, food concessions, picnic or dining areas, outdoor auditoriums, playgrounds, farmers' markets).*
 - *Movable seating is preferred if possible. Seating areas are defined with low walls or vegetation. Seating is provided both in sunny and shaded areas.*

Operating principles/measures during the construction stage:

- Construction measures causing noise, dust or other disturbances are scheduled outside the busiest hours of use when possible.

Operating principles/measures during the maintenance stage:

- Maintenance measures causing noise, dust or other disturbances are scheduled outside the busiest hours of use when possible.

5.4 Promoting local food production

OBJECTIVES

- promoting human health and well-being

- increasing the sense of community
- increasing awareness of food production
- increasing awareness of nutrition.

OPERATING PRINCIPLES

General operating principles:

- Outdoor areas that allow for areas to be defined for food production are produced.
- The allotment areas are developed in cooperation with the local residents, societies, businesses, schools, daycare centres, senior services and other operators and user groups.
- The allotment gardeners are provided with advice and information in cooperation with professional gardeners, advisory organisations, material suppliers and other cooperation partners.
- The area's suitability for food production is reviewed.
- Goals are set for the food production and its extent.
- When organising allotments, the following aspects can be used as objectives, for example:
 - At least 10 per cent of the area's vegetated surface area is used for food production.
 - The harvest is distributed or sold to the area's users and/or the local government/city when possible (for example via markets or to restaurants, schools, hospitals).
 - The food production area is used for educational purposes (daycare centres, schools).

Operating principles/measures during the ordering stage:

- Objectives are set for the design work and development of outdoor areas promoting food production and tracking methods are determined for the achievement of goals.
- A review will be commissioned for the sufficiency and development needs of areas promoting food production.
- The designer is guided to consider the objectives and operating principles promoting food production.
- The designer's achievement of these goals is monitored.

Operating principles/measures during the design stage:

- Suitability of the area and its surroundings for food production is assessed.
- The area's history of use is reviewed to determine the potential soil impurities that may have detrimental effects on the healthiness of the food grown. The necessary analyses for the soil's and substrate's suitability for food production are ordered.
- The maintenance measures for implementing the food production sustainably are presented in the maintenance plan.
- Different gardening methods (greenhouses, planting boxes and pots) are utilised, facilitating the use of alternative spaces and reducing the health risks caused by potentially contaminated and unrestored batches of soil.

Operating principles/measures during the construction stage:

- No special operating principles or measures.

Operating principles/measures during the maintenance stage:

- Organic methods are used for gardening.
- The consumption of potable water for watering the food production areas is reduced by collecting rainwater.

- The consumption of potable water is reduced by using other ecological methods for collecting irrigation water.
- The need for watering and soil tillage is reduced by using mulch on the roots of the cultivated plants.
- The lawn cutting waste generated in the area is utilised in composting.

5.5 Supporting the local economy

OBJECTIVES

- supporting local communities economically and socially
- increasing the demand for locally and regionally produced materials, products and services
- increasing employment in the area
- supporting the regional identity by using local resources.

OPERATING PRINCIPLES

General operating principles:

- The products and services of local designers, builders, maintenance workers, and material and product manufacturers and suppliers are used for landscape construction projects.
- Existing and new materials, products and services are developed in cooperation with the local design, construction and maintenance companies as well as materials and product manufacturers.
- The labour market is developed in cooperation with local entrepreneurs, educational institutions, trade unions, employment authorities and organisations offering employment services by promoting the hiring of new labour force for landscape construction projects, among other actions.
- Measures that benefit as many local residents as possible are chosen, not just those directed at the primary user groups.

Operating principles during the ordering stage:

- A review is carried out of local and regional companies and associations, and goals are set for supporting local economy.
- The designers, builders and maintenance workers are guided to act in accordance with certain goals, and the achievement of these goals is monitored.
- Local companies are prioritised in procurements.
- Goals are set for the utilisation of local labour and businesses. The *Sustainable Sites* initiative applies the following criteria:
 - *Local individuals are employed for 75 per cent of new hires during the construction phase.*
 - *On-the-job training is supported by hiring students as interns or apprentices.*
 - *Ten per cent or more of the construction budget for the planned area is used for material procurements or construction services sourced from locally owned and operated businesses.*

Operating principles/measures during the design stage:

- Local subconsultants, professionals and students are employed for the site's design work.
- Local materials and products are used in the plan.

Operating principles/measures during the construction stage:

- Local subcontractors, professionals and students are employed for the site's construction work.
- The materials and products are procured from local manufacturers and suppliers.

Operating principles/measures during the maintenance stage:

- Local subcontractors, professionals and students are employed for the site's maintenance work.
- The materials and products are procured from local manufacturers and suppliers.

TERMS (separate document)

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IUCN The International Union for Conservation of Nature <https://www.iucn.org/about>

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PEFC Forest certification <https://pefc.fi/sertifiointi/>

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APPENDICES (separate files)