

Aarsleff's guide to biodiversity on land

A guide to incorporating biodiversity initiatives into Aarsleff's building and construction projects

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It is also Aarsleff's responsibility



Protection and restoration of biodiversity and ecosystems is a priority for all of us at Aarsleff. We are not only seeing greater interest from our investors, customers and partners, but also the need for a stronger focus – in our figures and reports, as well as out in the city and nature, where we have our building and construction projects.

Therefore, we are deeply committed to making a positive contribution to biodiversity and ecosystems in our daily work and in our projects – and we hope that we can inspire others to do the same.

*Jesper Kristian Jacobsen
CEO, Aarsleff*

Introduction to this guide

This guide is for all Aarsleff employees who can influence biodiversity considerations in building and construction projects – from start to finish.

The guide is intended to raise awareness and knowledge of biodiversity throughout the Group and to spark an interest in working on these challenges. We want to show how interesting, relevant and relatively simple it can be to incorporate biodiversity considerations into building and construction projects.

This guide focuses on on-site biodiversity measures. That is, the direct biodiversity impacts of the building or construction project on the building site in question. There is an abundance of “low-hanging fruit” here – and as a contractor, we are both able to influence the developer and to make an effort ourselves.

Although the greatest impact by far on biodiversity and ecosystems occurs off-site – i.e. in connection with the extraction and transport of the project's raw materials – a broad effort is still needed. In this guide, we share inspiration on how we can take care of nature on the ground where our machines operate.

But why even spend energy and resources on the local initiatives?

One important reason is that it can benefit local species by providing more habitats, refuges, and sources of food than if we did nothing. Another thing is that we humans also benefit greatly from being near areas where we can experience nature.

Thirdly, increasing biodiversity measures in our local environments can raise our awareness of what wilder nature actually looks like and hopefully increase our interest in taking care of nature.

We are also subject to the EU requirements to document our sustainability, including the EU Corporate Sustainability Reporting Directive (CSRD), which means that we must report much more extensively on our sustainability efforts. This also applies in relation to biodiversity and ecosystems.

Aarsleff's guide to biodiversity on land has been prepared by the Group's Sustainability unit. A corresponding guide to blue biodiversity focusing on aquatic biodiversity will also be prepared.

This guide has undergone quality assurance by Rambøll.

Important principles

When working with biodiversity measures, we hope that you will keep a number of principles in mind.

- **Preserve valuable existing nature before thinking new**

A key principle is to preserve as much as possible. For example, trees can serve as habitats for a wide variety of organisms, but their growth can take many years.

- **Preserve or restore connectivity**

Focus on creating and maintaining connectivity in relation to biodiversity. It is about trying to maintain the continuous and uninterrupted existence of different species and their habitats over time. This ensures stability and gives species time and space to adapt and develop. Creating green passages between different

areas can help different species to expand. It is better to have large contiguous areas than a multitude of small, fragmented areas.

- **Stay focused on local conditions**

Every place can have its own unique blend of species and ecosystems. For example, when attempting to improve biodiversity by planting, it is important to choose native plants that fit into the local ecosystem. They are better adapted to the local environment and can effectively support local species.

- **Variation**

There are great differences in whether species prefer sunlight, shade, wet or dry environments, so you can strive to create variation with the measures you choose to take. For example, a pile of branches in the shade will

attract different species than if the same pile was in a sunny location, but both are relevant.

- **Maintenance**

It is important to keep future operational needs in mind when choosing solutions. In many cases, you can design solutions where nature takes care of itself without the need for intervention. Then nature can change in its own way and create more variety in the area, but in many cases it still requires maintenance. So remember that biodiversity measures often require operation and maintenance – both the ambitious and less demanding measures.

Examples of biodiversity measures

In the following pages you will find examples of specific measures you can propose to customers, partners and colleagues in connection with building and construction projects.

We have taken into account that different measures are not equally relevant in all phases of the building process. Therefore, we have structured our various ideas according to when they are relevant to focus on.

Many of the measures are relatively simple, so it is just a matter of getting started!

BEFORE PLANNING

- Investigate whether biodiversity considerations are part of the project
- Measure nature assets
- Preserve as much as possible
- Replace inorganic surfaces with nature
- Learn about soil conditions
- Logistics plan: Make sure that there is a good plan from the start

USE LOCAL MATERIALS

- Gravel, sand and soil piles
- Leave large stones together or individually
- Leave logs and branches
- Establish brushwood fencing and piles of branches

MORE EXTENSIVE MEASURES

- Green roofs
- Green facades
- Amphibian fencing
- Fauna passages
- Rainwater

LESS EXTENSIVE MEASURES

- Nest boxes
- Insect hotels
- Gentle trimming of trees
- Native species
- Green measures at site huts
- Nutrient-poor soil
- Berry bushes and fruit trees
- Tall grass
- Flower beds
- Planter boxes
- Fight invasive species
- Avoid pesticides and fertilizers
- Prevent waste in nature

Before planning

As a contractor, you can influence the first steps in a building and construction project, even though our primary role usually starts later in the process.

You can play an important role by including biodiversity measures from the very first steps of a construction project. It is about providing input on how biodiversity can be integrated into the project. This can include idea meetings during the sketch phase and by looking at financial estimates.

Investigate whether biodiversity considerations are part of the project

Investigate whether the customer and other partners have considered biodiversity in general, or whether they are interested in working with it. You can have the greatest influence on biodiversity considerations during the initial phases of projects, which ensures that they can be part of the final contract.

Helpful tips

- Explain why it is important to consider biodiversity and ecosystems. It does not have to be a highly specialised or detailed explanation.
- Tell them that you would like to explore which measures could be a good fit for the project.
- Share the various measures that you think are most relevant.
- You cannot carry out every type of measure as a contractor, but it is helpful to present ideas nonetheless.



Measure nature assets

It is a good idea to take stock of the nature assets on the building site to get an idea of what measures can provide value. This will enable you to draw up before/after scenarios to assess the benefits of different measures.

A simple way of doing this is by mapping out valuable trees on site and using resources such as miljoeportal.dk or arter.dk to check for protected habitats and species in the area.

Another approach is the “Biofaktor” tool, which is often used in Denmark to measure how green an area is. Here, for example, trees score higher than mowed grass, and asphalt gives zero points. This method is also part of the DGNB certification system.

Note that this field is rapidly evolving, so keep an eye out for new measurement methods that are being developed.

Helpful tips

- If you use the Biofaktor model, keep in mind that although the method can help to quantify the greenness of an area, a high score using the model is not necessarily correlated with high biodiversity. However, a high Biofaktor score indicates that the area is green and, in most cases, there is greater potential for life.
- If you are interested in learning more about measurement methods, you can read about Biodiversity Net Gain (BNG), which is used in the UK. This method is also used for the BREEAM certification of buildings, but a specialist is required to perform the calculations with this model.
- You can also follow the work on the project “National metode for kortlægning af bynatur” [National method for mapping urban nature] and try out bynatur.app, but note that the method should be used by professionals with experience in field work.



Preserve as much as possible

Rather than rushing to buy or develop new solutions to optimise biodiversity, it is important to start by taking a good look around the construction site.

There are easy biodiversity points to be had by preserving as much of the existing nature as possible. Trees are a good example. They can be home to many different types of life, but they often take decades to grow large. There may also be protected habitats and species in or near cities.

If possible, it also makes sense to avoid clearing the construction site completely. Deadwood or piles of stones that are not in the way of the construction project can easily be transformed into green measures that contribute to interesting biodiversity and local ecosystems.

Helpful tips

- Explore what is already present on the site.
- You can find good information about local species on the website arter.dk, and inspiration regarding types of nature at danmarksarealinformation.miljoportal.dk.
- Ask customers and other partners if they have looked into what can be preserved.
- Make concrete proposals about what can be preserved.
- Make sure to inform all relevant employees about the reasons for decisions to protect certain areas, trees, etc.



Replace inorganic surfaces with nature

Asphalt and similar inorganic surfaces do not allow for plants to grow and provide habitats for animals and insects. Replacing inorganic surfaces with different types of vegetation creates additional areas with habitats for various species.

Helpful tips

- You can consider using a surface with grass reinforcement mesh. This ensures the drainage of rainwater and provides habitats for smaller insects such as ants and beetles. The ambient temperatures will also be lower with this type of surface compared to asphalt.
- Start a dialogue with the customer about potential opportunities to incorporate vegetation in areas with inorganic surfaces.
- Offer good ideas for measures such as replacing inorganic surfaces with foliage.
- Explore whether some of the car park can be converted into green areas with vegetation. It could be that there is room between the cars or alongside the car park.



Learn more about soil conditions

Soil conditions at the site have a big impact on both the construction project and biodiversity. Therefore, it is important to conduct a thorough assessment of the soil conditions. Knowledge about the soil conditions can provide information about the most appropriate choices in terms of plants and landscaping.

You can also do something good for plants by leaving nutrient-poor soil on the surface of areas after the building and construction phase. This has a big influence on the development of biodiversity later in the operational phase. You can read more about this in the section on nutrient-poor soil.

It is also important to avoid leaving the soil too compact after completion of the project, which makes it difficult for much of the good vegetation to thrive.

Helpful tips

- Conducting a soil analysis of drilled samples from the construction site provides information about the composition and properties of the soil.
- Analysing geotechnical surveys can also provide insights on the soil conditions.
- Collecting data from existing geographic reports and drilled samples can help you to understand the soil conditions. These reports can also give an indication of how the work should be performed.



Logistics plan: Make sure that there is a good plan from the start

It is a good idea to incorporate biodiversity considerations from the very beginning. When developing a logistics plan, it is important to take various considerations into account. This does not preclude good ideas later in the process, but it can often be difficult to change plans in the middle of a project. In this way, you use the resources in the best possible way, and ensure that the customer, partners and colleagues understand the various measures.

Helpful tips

- Make specific suggestions about what could be good to include in the contract.
- Carefully plan the introductory phases of the project, the layout of the construction site, and the logistics plan in a way that makes it possible to avoid working in specially designated areas.
- Make sure to inform all relevant colleagues about the various measures that you and they are responsible for implementing.



Use the local materials



Why transport gravel, sand, stones and soil away from the site if it can benefit the local biodiversity after the last machine has left the construction site? In the next measures we cover here, you can see some of the materials that you should consider leaving at the construction site.

Gravel, sand and soil piles

Gravel piles can create ideal environments for the insects that have loose soil as their habitat, e.g. for digging passages and laying eggs, and those which thrive in small crevices and caves. The presence of insects also attracts small mammals and birds looking for food.

Sand piles can collect solar warmth, providing an ideal habitat for the sand lizard, which is rapidly disappearing in Denmark. Many insects need warm places to survive.

Soil piles can have a number of positive impacts on biodiversity. They attract a wealth of microorganisms, insects and small animals.

It is a good idea to consider establishing various piles of gravel, sand and/or soil along motorways, rail tracks, etc.

By keeping the materials at the construction site, you also reduce transport.

Helpful tips

- Talk with the customer about whether they are interested in leaving piles of gravel, sand or soil behind after the construction and building phase.
- If so, then propose well-suited locations for these piles.
- Explore whether local materials from the construction and building phase can be used.
- Carefully plan where the materials can be stored during the construction and building phase. If there is not enough room, it may be possible to store these materials nearby.
- Calculate how much you can save on transport by keeping materials at the site. This is both relevant in terms of finances and carbon emissions.
- Ensure that all relevant employees on the project are aware of the plans.

Leave large stones together or individually

Areas with stones can benefit nature. They offer good hiding places for amphibians and reptiles, among others. Small cracks and fissures in the stones, as well as cavities between the stones, provide shelter and hiding places for insects, amphibians, small mammals and reptiles. Stones are also used by many species for sunbathing.

Helpful tips

- Working with the customer, explore potential areas where you can leave large stones individually, in heaps, or as stone dykes.
- Choose sunny locations for the benefit of cold-blooded animals that need heat to stay active.
- Carefully plan where the stones can be stored during the construction and building phase. If there is not enough room, it may be possible to store them nearby.
- Calculate how much you can save on transport by keeping materials at the site. This is both relevant in terms of finances and carbon emissions.
- Ensure that all relevant employees on the project are aware of the plans.



Leave logs and branches

Deadwood, such as hollow tree trunks and branches, creates natural habitats and supports many different species. It is an important part of nature and offers habitats, refuge and breeding places for fungi, insects, small vertebrates and especially bats. The decomposition of the wood attracts bark beetles, which in turn attract birds and small mammals. You can lay out tree trunks on the ground, but the best is to let deadwood remain in place.

Helpful tips

- If you have to cut down trees, it is worth investigating whether it makes sense to leave the deadwood at the site after the construction and building phase.
- Explore whether the wood can be stored somewhere on the site or nearby.
- Place groups of smaller tree trunks together.
- Large solitary tree trunks can also provide good hiding places.
- It can be beneficial for younger trees to be veteranised, and dense wooded sections can benefit from being thinned out, as most places lack natural dynamics.
- It is also a good idea to place tree trunks and branches in varied environments in terms of light/shadow, dry/wet, etc.
- Larger stumps can be left in place without removing them completely. In the case of trees posing a risk, consider reducing the crown and keeping the trunks in place instead of felling the entire tree.
- Calculate how much you can save on transport by keeping materials at the site. This is both relevant in terms of finances and carbon emissions.
- Ensure that all relevant employees on the project are aware of the plans.



Brushwood fencing and piles of branches

Brushwood fencing and piles of branches make a positive contribution to biodiversity by creating a natural habitat where the brushwood provides hiding and breeding places for small animals, birds and insects. This provides habitats as a basis for reproduction and survival.

Helpful tips

- Working with the customer, explore their interest in keeping branches and twigs at the building site after completion of the project.
- Carefully plan where these branches and twigs can be stored during the construction and building phase. If there is not enough room, it may be possible to store these materials nearby.
- Collect branches, leaves and twigs in piles or fences.
- Place these brushwood piles in various environments in terms of light/shadow, dry/wet, etc.
- If you need to remove piles or brushwood fencing, be aware that they may be home to breeding birds, hedgehogs and hibernating amphibians and reptiles.
- Calculate how much you can save on transport by keeping materials at the site. This is both relevant in terms of finances and carbon emissions.
- Ensure that all relevant employees on the project are aware of the plans.

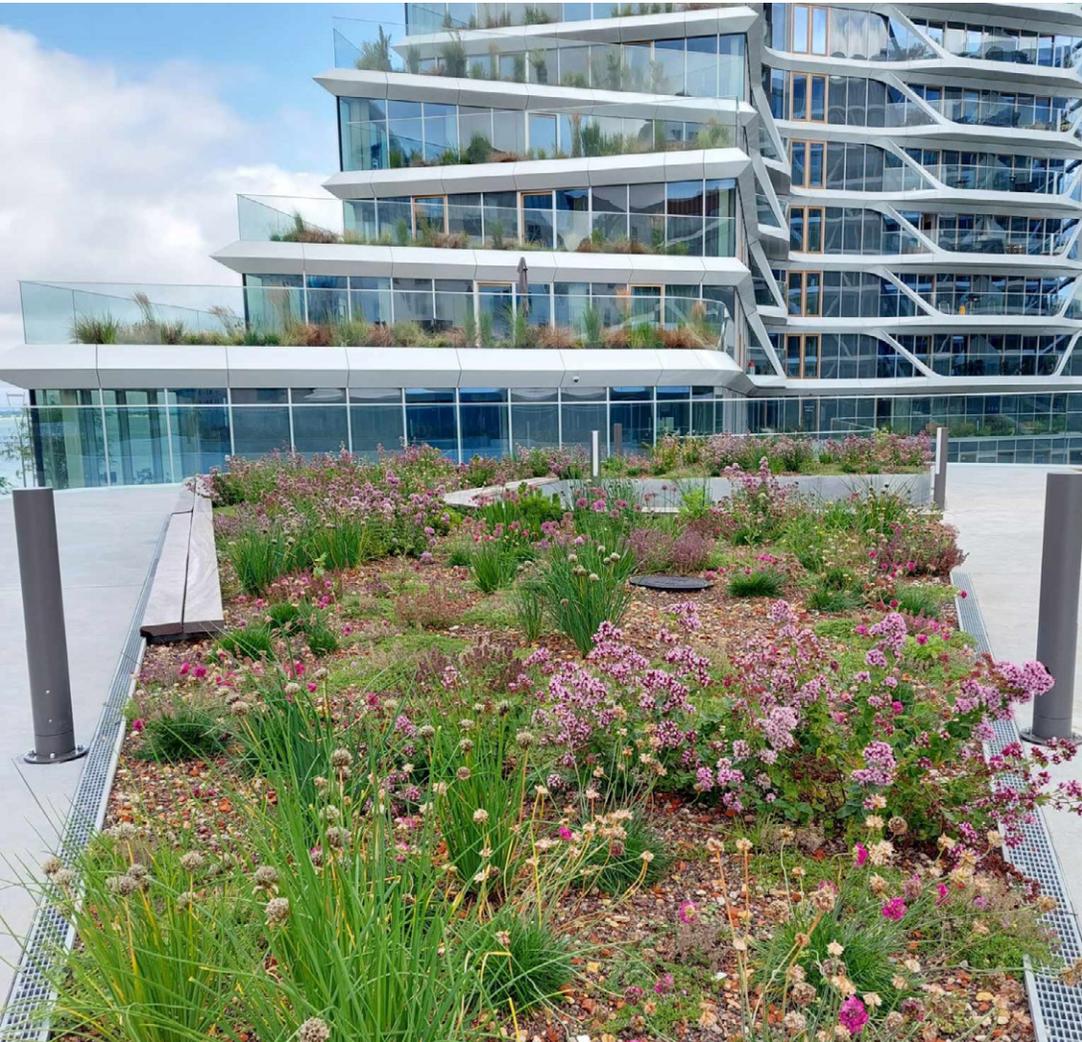
Brushwood fence in Lystrup

This large brushwood fence was established at Æblevænget in Lystrup in connection with a large-scale tree trimming project.

Landscaper: Dan Jord.



More extensive measures



Some biodiversity measures are more demanding than others. In this section, you will be presented with some of the measures that will probably require the customer to help cover the increased costs associated with the measure.

Green roofs

Every square metre counts, and roof areas offer an excellent opportunity to create new green areas, especially in densely developed areas. They can reduce the load on sewage systems and provide a cooling effect on buildings. The green living roofs are also popular refuges for insects and birds, and they can provide relaxing environments for us humans as well.

Rooftop terraces at Lighthouse

One of Dan Jord's projects was the establishment of a public rooftop terrace and private rooftop terraces of various sizes at Lighthouse in the city of Aarhus.

Developer: Anpartsselskabet Lighthouse United. Contractor: Per Aarsleff A/S. Landscaping: Dan Jord A/S

Helpful tips

- Ask your customers and other partners if they have considered establishing green roof areas.
- Remember that the building's structure must be able to withstand the heavy roof.
- Consider, for example, a grass/herb roof, turf roof, stonewort roof or moss-sedum roof. Note that flowering herbs will have the greatest positive impact on biodiversity, but they also require the most substrate.
- Consider establishing a biotope roof using, for example, deadwood, stones and gravel.
- You can consider large roof areas or, for example, bicycle sheds.
- Insects can fly surprisingly high, so even roofs on tall buildings are worth considering.
- Remember that rooftop gardens require operational resources, so the customers must understand that there is a subsequent operational task associated with a green roof.

Green facades

Planted facades have many of the same benefits as green roofs. They can help to cool a building in the summer, serve as insulation during winter, and provide a completely different aesthetic look. They can also contribute with food and nests for birds and insects, and absorb rainwater.

Helpful tips

- Ask customers and other partners if they have considered establishing green facades.
- Remember to consider the type of soil used. What is the best match for the types of plants you are considering?
- Consider the height, weight and colour of the plants.
- Keep in mind that much vegetation is often unappealing in appearance during winter, and the customer must also be informed of this.
- You can also integrate insect hotels and nest boxes in the green walls. Explore the need for support, trimming and tying.
- Determine the correct placement in relation to shadow and sunlight.
- If possible, use native species. For example, you can use native climbing/creeping plants such as ivy or honeysuckle.



Amphibian fencing

It is important to protect animals as much as possible during the construction and building phase. This can be done, for example, by establishing amphibian fencing to guide amphibians and other small animals safely around the construction and building site. Amphibian fencing can also make sense as a permanent installation to guide amphibians and small animals under, over or along roads and railways. All amphibians in Denmark are protected, and eight of them are strictly protected – you know them as salamanders, frogs or toads.

Helpful tips

- Explore whether there is a frequent occurrence of migratory amphibians in the area of the construction and building site. Registrations of species can be found at www.arter.dk.
- Note that waterholes and wetlands may be protected habitats, and they may also be found in the cities – see miljoeportalen.dk.
- As all species of amphibians are protected, special laws apply to the areas that they use as habitat.
- The tender documents should state whether the project involves a protected area with amphibians.
- You can find more information on amphibian fencing design in the Danish Road Directorate's publication "Hegning langs veje – anlæg og planlægning" (Fencing along roads – construction and planning). It is recommended that the amphibian fencing has an overhang, so that amphibians do not climb up and over the fencing.
- Familiarise yourself with the guidelines on periods for erecting fencing and fence design.

Amphibian fencing along Baltic Pipeline in Jutland

When Per Aarsleff A/S, in a joint venture with two German companies, built the Baltic Pipeline in Jutland, various measures were taken to protect amphibians, bats and birds. Here you can see amphibian fencing that is being erected in connection with the construction of the gas pipeline.

Developer: Energinet. Contractor: Per Aarsleff A/S



Fauna passages

When animals cross roads and railways, it is dangerous for both animals and humans. It is difficult to avoid completely, but greater access to fauna passages can help animals move more freely between habitats. It is especially important to prevent the isolation of animal populations.

Bridging

Fauna bridge A broad spectrum of species can traverse bridges over traffic corridors. It is important to make the bridges wide enough so that there is room for various species and a sense of a coherent landscape. In some cases, it may be enough with a rope bridge for martens, squirrels, etc.

Passageways

Landscape bridge Landscape bridges can give a wide range of species important access to passage under traffic corridors. This is especially relevant for species linked to streams and wetlands. Some landscape bridges are designed for larger deer species.

Tunnelling Tunnels of various sizes under traffic corridors can provide passageways for a variety of species. Some caveats are that it is not possible to create vegetation through the passageway and that they are less effective than landscape bridges. Tunnels that are too long have a minimal effect.

Helpful tips

- Working with the customer, explore potential fauna passages, if these have not already been incorporated into the construction projects.
- Note that it is important to consider a wide range of local considerations relating to location, size, etc.
- The examples we've described are often large construction projects in themselves and therefore cost intensive.
- Fauna passages can also be passages such as streams and connected tree canopies.

Fauna passage in Tvis

This fauna passage is an example of a passageway under a motorway overpass, giving animals and nature the ability to live as uninterrupted as possible after construction of the motorway.
Turnkey contractor: Aarsleff. Developer: The Danish Road Directorate. Consultant: ISC.



Rainwater

Many rainwater solutions not only have the potential to handle rainwater, but can also provide benefits for local biodiversity. If the rainwater is diverted to waterholes, for example, they can serve as habitats for a diversity of plants, insects, amphibians, birds and other organisms that seek wet environments. Thus you will have created habitats for many species and improved resilience against flooding.

Examples of rainwater solutions:

- Drainage basins
- Green roofs
- Permeable surfaces
- Waterholes and rainwater lakes
- Restoration of natural streams

Helpful tips

- Working with the customer or other partners, explore whether they have considered diverting rainwater and the possibility of creating habitats for various species that seek wet areas.
- Investigate whether there are good locations for collection of diverted rainwater.
- If there is a landscaping architect on the project, it is often their task to look into local drainage of rainwater.
- Be careful to avoid creating slippery and steep edges around wetlands, as it may be difficult for animals to get out of the waterhole again.
- Remember to think in terms of amphibian-friendly design. They need flat edges around waterholes, and that the waterhole is shallow and in direct sunlight.
- Do not put fish or crayfish in the waterholes, as they eat amphibian fry.

Søpark with rainwater as the common denominator

Here is Låsby Søpark (Låsby Lake Park), where the entire facility is designed as a rainwater buffer with multiple connected lakes. It is now a recreational park with a variety of activities and good opportunities for relaxation and exercise.

Contractor: Dan Jord. Developer: Skanderborg Municipality.



Less extensive measures



Many biodiversity measures on local construction sites are not necessarily cost intensive. In this section, you can find examples of what we call “less extensive measures”.

Nest boxes come in a variety of designs and can provide birds and bats with the optimal breeding conditions. They are especially relevant in areas without natural breeding and resting areas such as old trees, cracked bark and hollow trunks.

Nest boxes

You can install nest boxes to give the area's birds and bats better conditions. These boxes can improve local biodiversity by providing habitats for birds and bats, which can have positive effects for a wide range of species.

When correctly designed and installed, they can also provide protection against ground-dwelling predators.

Bird nests at Fydenspark

In connection with a complete renovation of Frydenspark in Amager, the construction team grew concerned about the impacts of the project when a flock of common swift saw the residential area as a breeding ground. The common swift is a protected bird species, so in collaboration with a bird expert, nesting boxes were installed on the scaffolding and permanent nesting boxes were installed on the gables of 14 buildings.

Contractor: Hansson og Knudsen, Developer: DAB, Consultant: Dominia

Avoid waste in nature

It negatively impacts nature when we leave waste behind in nature. Therefore, it is important to make sure that waste does not fly away during the building and construction phase, but that you place it in our waste containers. It is also important to ensure access to rubbish bins for residents and passersby in public areas, because it negatively impacts the environment when we leave waste in nature – and also in the city. Cigarette butts and chewing gum can poison and choke the animals that eat them. Small mammals and reptiles can become trapped in bottles, and larger animals can cut themselves on shards of glass.

Helpful tips

- Make sure that waste is placed in waste containers and does not fly away while carrying out projects.
- Explore whether bins or other options for disposing of waste have been considered in the projects.
- Make suggestions about good locations for rubbish bins in the various common areas.



Insect hotels

Insect hotels can attract and provide shelter for various species. They provide habitats and space for eggs and larvae of bees and other important insects. It is best to make them using natural materials such as wood, bamboo, clay or other elements, and with various spaces where insects can lay eggs, hibernate or seek shelter.

Helpful tips

- It is important to place the hotels in the right locations, for example near flower beds, fruit trees and other areas with naturally occurring insects.
- Different species have different needs, so it is important to decide which species you want to design the insect hotel for. Bees must live in dry locations with direct sunlight, while other insects prefer moist areas on the ground surface.
- Insect hotels can be anything from a frame with a lot of different compartments to a simple wooden log with holes drilled into it.
- Avoid maintenance – many insects have immobile/low-mobility life stages (eggs/larvae), and the generations often overlap. Maintenance can disrupt entire generations.
- Note that materials such as plastic do not provide breathability and the natural feel that insects often prefer.



Gentle trimming of trees

It is important to treat trees with care, as they are a habitat and source of food for many different species. They have many important roles and functions that influence the environment, people and ecosystems. This includes carbon storage, protection against natural disasters, and the release of oxygen. Thus it is important to trim trees in a way that maintains or improves their health. You can read more about conservation of natural assets such as trees in the section on conservation of nature.

Helpful tips

- Working with the customer, check whether trees need to be trimmed and, if so, make sure to do so as gently as possible.
- Start by assessing why the tree needs to be trimmed. Is it necessary to remove dead or diseased branches, reduce the size, or create better air circulation?
- It is often best to trim deciduous trees during the winter when the tree is dormant. Evergreen trees can be trimmed all year round, but avoid trimming in extreme heat or cold.
- Avoid over-trimming – do not remove more than 25% of the tree's foliage during one season, as this can harm the health of the tree.
- Preserve especially old trees, but sometimes it can make sense to engage in the practice of "veteranisation". This involves imitating nature's damages and defects on the trees (artificial aging).
- You can also consider making standing deadwood from semi-old trees.



Native species

To promote biodiversity through planting, you should strive to use native plants that are adapted to the local ecosystem. Native species are preferable because other local species thrive best with plants they already know. Native plants for the area are better adapted to the local environment and are good for supporting local species.

However, it is not always easy to find seeds for native plants, and sometimes the customer might want a different aesthetic expression that requires non-native plants. Although native species have the most positive impact on biodiversity, it does not hurt to add non-native species as long as they are not invasive.

Helpful tips

- Make the vegetation varied to attract different insects, birds and small animals.
- Also choose herbs with different flowering periods to establish a continuous source of food.
- If you want to help native plants, you can make patches of bare soil and see if they emerge on their own.
- In some places it is a good idea to sow or transplant native plants if they are not found in the local surroundings.
- You can collect and sow high quality seeds from local nature areas.
- A guide to choosing trees and bushes can be found at plantevalg.dk.
- Native plant species that are beneficial to biodiversity can be found in DCE's Plant Catalogue. (Teknisk rapport fra DCE - Nationalt Center for Miljø og Energi nr. 193).



Measures next to site huts

Biodiversity measures next to site huts can improve the aesthetic look of the construction site for the benefit of those working at the site and other stakeholders in the immediate area. It is a proven fact that access to plants has a positive effect on people.

It is a less significant measure for local biodiversity, but nevertheless it can show that creative efforts are being made to find space for vegetation in many different places.

Helpful tips

- Make the vegetation varied to attract different insects, birds and small animals.
- Explore whether space can be designate for planter boxes or plant walls.
- Explore whether you can use recycled materials to make the plant wall.





Helpful tips

- You can remove the top layer of soil. There are often many nutrients in the top layer of the soil.
- Add gravel or sand on top of the soil. This can reduce the amount of nutrients.
- Avoid adding nutrient-rich soil after the construction phase if you want to maintain the nutrient-poor quality.
- If performing excavation, use the deeper soil as the top layer, as it has less nutrients than the existing topsoil. In some cases, there may be gravel or sand layers deeper underground that are well-suited for creating nutrient-poor habitats.

Nutrient-poor soil

It sounds a bit counterintuitive, but nutrient-poor soil can be beneficial for biodiversity in many ways. Nutrient-poor soil can prevent dominant species from taking up too much space and make room for a greater diversity of plants. It can contribute to the formation of different habitats, including areas with limited vegetation, open landscapes and varied microenvironments. Many species will benefit from the variety of conditions in the different habitats. Nutrient-poor areas can also be important habitats for rare or endangered species that thrive in these particular conditions.

Berry bushes and fruit trees

Berry bushes and trees are good for attracting a wide variety of butterfly species and wild bees. Birds also benefit from berry bushes and fruit trees, which are a source of food and fluid during dry and cold months. Birds, hedgehogs and other animals also utilise the berry bushes as hiding places. We humans can also harvest berries and fruit, so in this way, incorporating fruit trees and bushes into the project provides both recreational and biodiversity value.

Helpful tips

- Explore whether there is space for berry bushes and fruit trees. When it comes to berry bushes, you can consider raspberry bushes, blackberry bushes or a variety of other species. When it comes to fruit trees, you can plant everything from Mirabelle plums to apples, pears, plums, etc.
- Examples of fruit trees and bushes that are beneficial for biodiversity include blackthorn, wild cherry, rowan, elder and hawthorn. They have many flowers, which benefit insects and provide a wealth of fruit for wildlife. It is best to vary the composition of fruit trees and bushes, as they flower and grow fruit at different times, which helps to maintain a continuous source of food for wildlife.
- You can find good ideas for native plant species that benefit biodiversity in DCE's Plant Catalogue (Teknisk rapport fra DCE - Nationalt Center for Miljø og Energi nr. 193).



Tall grass

Tall grass provides a variety of habitats and food sources than cut grass, but in Denmark we have lots of grassy areas, so areas with flowering plants instead of grass are preferable if possible. If this is not possible, mowing 1-2 times a year is preferable – ideally in the autumn and early spring. Clippings should also be removed from the area to prevent the accumulation of nutrients. Wild, Danish, insect-friendly flowers thrive best in areas where grass has difficulty growing – so you make good conditions for insects by making life miserable for the grass.

It is important to remain patient, because the wild flowers might not start appearing right away. In urban and industrial environments, it can be a good idea to demarcate wild areas with a natural border, making it appear more intentional to the human eye.

Helpful tips

- Explore whether the site has grassy areas that can be allowed to grow.
- It can be beneficial to establish varied terrain, maintain mowed paths, and mow the grass in mosaic patterns.
- Make sure to plan the logistics to avoid these areas, if possible.
- Make sure that those working at the site are informed that the grassy area is to be preserved.
- The purpose of this measure must be made clear in these communications.
- Remember that not everyone appreciates areas where plants are allowed to grow wild. It can quickly look uncontrolled, so it can be a good idea to show that the wild growth is intentional. To address this problem, you can make paths alongside the grass that is allowed to grow.
- The grass must not be fertilized or sprayed.



Flower beds

Flower beds provide food for a wide range of insects such as bees, butterflies and other pollinators that are attracted to the flowers' nectar and pollen. Smaller insects and spiders can also find good habitats and hiding places among the flowers and on the ground.

Helpful tips

- Working with the customer, explore whether there is space for flower beds and then choose a suitable location.
- It is fine if the flower bed is on bare soil so that the flowers do not have to compete with hardy grass.
- Choose a wide range of native flowers to attract a range of different insects and other animals.
- Choosing plants that flower at different times of the year will provide food and habitats all year round, which is important for supporting different species.
- Avoid the use of pesticides, which can have negative impacts on insects and other organisms.
- Choose seed mixes from trusted sources. Plants must be native and should fit into the local ecosystem.

Flower beds at SHIP in Aarhus

A series of landscape spaces have been established around the SHIP development in Aarhus, of which more than 2,000 square metres are open to the public. The outdoor areas have various recreational qualities. Shown here is an area with an ornamental flower bed.

Developer: Olav de Linde. Consultant: Arkitema. Landscaper: Dan Jord.





Helpful tips

- Working with the customer, explore whether there is space for planter boxes and then choose a suitable location.
- By choosing a wide range of plants for planter boxes, such as flowering plants, bushes and smaller trees, you can attract various species of insects and birds.
- Plants that are in contact with the ground are preferred, if possible, as they require less maintenance.
- It is fine if planter boxes are large. The bigger, the better, in fact.
- Avoid the use of pesticides, which can have negative impacts on insects and other organisms. This will attract a wider variety of animals.
- Use plants with different flowering times. This will ensure food and habitats all year round.
- Remember to plan according to local conditions such as climate, soil type and sunlight conditions.

Planter boxes

Planter boxes with flowers or other vegetation can be beneficial for insects such as bees, butterflies and other pollinators, which contributes to overall pollination of plants.

The hollow spaces between plant roots, soil and other organic materials in planter boxes can provide habitats and hiding places for small animals, including insects, spiders and microorganisms. Insects that are attracted by planter boxes can in turn attract small birds that feed on insects and larvae, thus creating a healthy food chain.

Fight invasive species

Invasive species are not native to Denmark and have a way of life that outcompetes native species – and they can make survival difficult for other animals and plants that are native to the region. Unfortunately, the number of invasive species is growing, but you can help in the fight against them.

Widespread invasive species include goldenrods species, *rosa rugosa*, and giant hogweed.

Helpful tips

- Explore whether invasive species are present before the project commences.
- Working with the developer, check whether the removal of invasive species can be written into the project.
- Be especially careful not to spread the seeds or vegetatively propagating parts of plants so that these species do not spread.
- Machines and equipment must be regularly cleaned when working in areas with the unwanted plants and animals.
- Registrations of invasive species can be found at arter.dk.
- The EU list and the national list, as well as a report on invasive species can be found here: <https://mst.dk/erhverv/rig-natur/artsforvaltning/invasive-arter/de-invasive-arter>



Avoid pesticides and fertilizers

When we use pesticides, fewer insects are able to thrive in nature. Frequent use can also result in pests and weeds becoming resistant, and continuing use after this will create a harmful cycle for biodiversity, where the lowest links in the food chain disappear: bees, butterflies and other naturally occurring insects. This impacts bird populations and larger animals. Pesticides can also impact the groundwater and drinking water. Therefore, it is a good idea to think before using pesticides.

You should also try to avoid using fertilizers, which is damaging to biodiversity in multiple ways. For example, fertilizers can result in overgrowth of certain plant species at the expense of others, thus reducing the diversity of plant species.

Helpful tips

- Explore whether you can avoid the use of chemical pesticides and other substances.
- Building biological diversity and integrity will typically prevent a single species from taking over, and therefore it will not be necessary to use chemical herbicides or pesticides.
- Explore whether you can use biological control with natural predators of pests, or pesticides made of naturally occurring organisms such as bacteria, viruses and fungi.
- You can also choose a varied mix of vegetation, including resistant plants.



Glossary

Biodiversity

Biodiversity is about the diversity of living organisms in all environments, both on land and in water, as well as the ecological dynamics between the organisms. Biodiversity includes variation within and among species, as well as a diversity of ecosystems (UN).

Ecosystems

An ecosystem comprises a defined area in nature where organisms can live in conjunction with their surrounding environment. The earth can be considered a single ecosystem, but it could just as well be a forest, a sea, or a bucket full of rainwater and old leaves in the garden (Danish Environmental Protection Agency).

On-site biodiversity

On-site is about the impact of building and construction on biodiversity at the specific site.

Off-site biodiversity

Off-site is about the biodiversity impacts of the building or construction project deriving from the production of materials and energy used for the building or project.

CSRD

Biodiversity is now becoming an integrated part of the annual accounts for large companies in the EU, where biodiversity impacts must be documented. This also means that the large companies will need small and medium-sized companies to start dealing with the subject.

ESRS E4

The specific reporting area on biodiversity in CSRD is called ESRS-4. There are a total of 12 ESRS standards in CSRD.

Epilogue

The biodiversity crisis is often overshadowed by the climate crisis when it comes to attention and prioritisation. But the drastic decline of nature is at least as serious and acute as climate change. Furthermore, the two crises are intrinsically linked and interdependent. The climate provides the living conditions for organisms – and the life and death of organisms impacts the climate.

Talking about biodiversity and ecosystems can quickly seem abstract, but in reality it is very simple. Fulfilling our needs for clean water, air and food depends on healthy biodiversity – for example, the ability of bees and other insects to pollinate plants so that we have access to food. People are fundamentally dependent on the condition of nature – including here in Denmark.

And we know that construction and building projects impact biodiversity. We dig up soil and vegetation so that we can build, and the use of building materials impacts nature. We intervene in the prevailing natural order of things when we build a new bridge, a town hall, or other projects, as well as when we extract natural resources for building materials.

Therefore, we at Aarsleff have a responsibility to mitigate the negative impacts we may cause on biodiversity and ecosystems. We embrace this responsibility.

Aarsleff's guide to biodiversity on land