Newsletter no. 12 | May 2024
Climate Challenge Laboratory | Building 313

Nature Moves In

Theme: Biodiversity

DTU Campus Service
The Technical University of Denmark

Nature Moves In

Bonesets, ostrich fern, alder buckthorn, and buckthorn. Herbs, wood, and trees create habitats for multiple species and provide researchers with greenery to look at and something to contemplate in the Climate Challenge Laboratory.

Biodiversity has a high priority in B313, which is the official name of the Climate Challenge Laboratory. Innovative green initiatives have made their way into the courtyard and facade. It is hoped that moths, narrow-bordered five-spot burnet, small copper, and black-striped longhorn beetles move in and thrive on the damp forest floor.

Partner at 1:1 Landscape, Trine Trydeman, explains how landscape architects have made room for more species, that provide users with an experience of nature and, importantly, raise awareness about an important agenda.

At the same time, biodiversity initiatives create an opportunity to rethink how green areas should be maintained. Tom Nordbo Andreassen, section leader at CAS Operations, Parks, and Roads, and Katja Engel Zepernick, project manager at CAS Client, Planning and Project Development, explain how DTU Campus Service is working to increase biodiversity—both in the long term and in projects at DTU Lyngby Campus.

A New View of Nature

Trine Trydeman is the landscape architect behind the courtyard and the green facade of the building. Despite the small areas, measures have been taken to increase biodiversity in the area.

How have you been involved in B313?

TT: Together with Habitats, who specialize in biodiversity, we are behind the green initiatives in the project. As landscape architects, we've made the designs, but before that, Habitats identified which species inhabited the area around the construction. The project operates on a fairly small footprint, so we wanted to reach further out. We hope that wildlife from the surrounding forest edge will move into the habitats we're creating. Because it's a climate laboratory that DTU is building, everyone around the table wanted to push it as far as we could with the opportunities we've had.

What have you prioritized?

TT: The large courtyard is particularly significant because there's no requirement for fire trucks to have access, and it's not an obvious recreational area either. The courtyard is narrow and shaded since B310 and B313 are relatively tall buildings. So, we've looked at what we can do here to enhance biodiversity. Often, you work with larger areas, such as meadows that you mow a couple of times a year. But here, we've created a small forest with a moist floor. That's new.

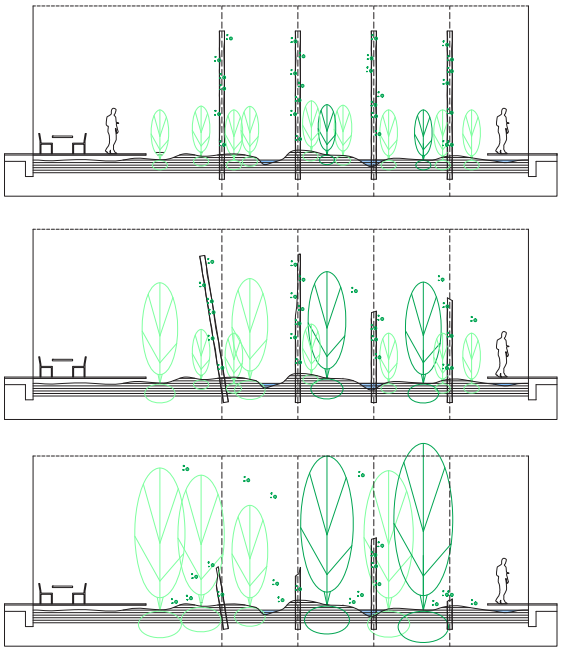
In the courtyard, we've used plants that can tolerate shade, native species, and species that can contribute to the existing fauna in the area. Lyngby Campus sits on a large gravel bed. Water runs straight through the gravel if you don't hold it back. But if we want wildlife and fauna, we also need water. That's why we've laid a membrane in the depressions of the forest floor to keep it moist and lush. Dead wood is also introduced, and we've set up some dead tree trunks. Many beetles and woodlice

> "We need to make space for more species than currently and create a good working environment for the researchers."
>
> — Trine Trydeman, partner, 1:1 Landskab

In the newsletter, Trine Trydeman, partner in 1:1 Landskab, tells how the landscape architects have created space for different species in a green environment that gives users a nature experience and creates visibility about an important agenda. 1:1 Landscape

thrive in this environment. Over time, the trunks will collapse, and small new trees have already been planted to grow. We're initiating a process.

Which species have you created a habitat for?
TT: It's species like moths, black redstart, six-spot and five-spot burnet, small copper, and black-striped longhorn beetles. These are some of the species in the area. At the same time, we've looked at what kind of vegetation we believe can thrive in that climate. It's important that we ensure the plants grow well in the given soil conditions so that the employees inside the building can look out onto a lush garden space.
There are always two aspects. We need to make



TIME PERSPECTIVE. In the courtyard, DTU has set up tree trunks and planted new trees. Over time, the trunks fall to the ground and become part of the forest bed, while the newly planted trees define the look of the garden. The diagram shows the idea in year 1 (top), year 15 (middle) and year 25 (bottom). Illustration: 1:1 Landscape

SPECIES IN THE COURTYARD

Trees and shrubs: Red Alder, Downy Birch, Holly, European bird cherry, Pedunculate oak, Alder buckthorn, Common yew, Rowan, Black Currant, Guelder-rose

Herbs: Wood Crane's-bill, Ostrich Fern, Wood Sorrel, Pendulous sedge, Meadowsweet, Moneywort, Yellow loosestrife, Hart's tongue fern, Marsh marigold, Greater tussock-sedge, Hemp-agrimony, Wood clubrush, Yellow Iris, Ramsons, Wood Anemone, Honeysuckle

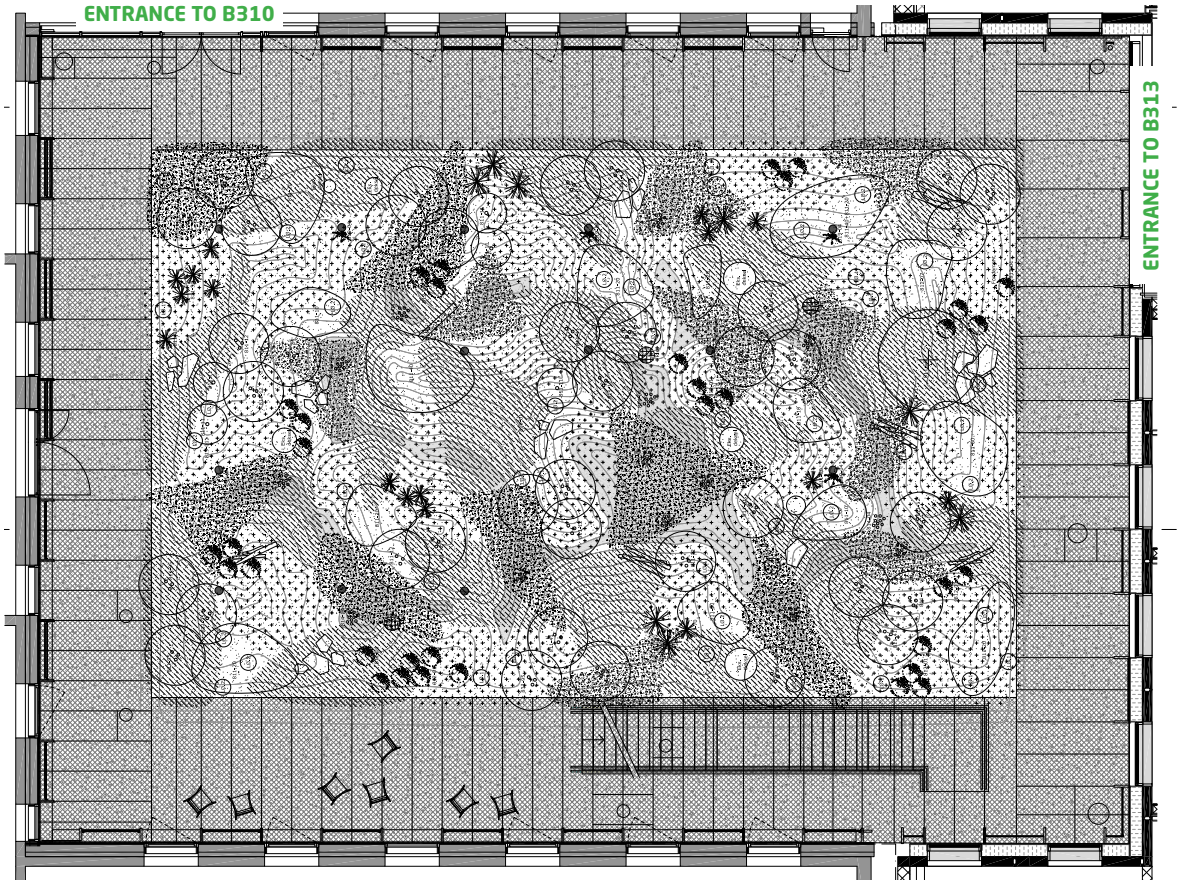
> " It will be a messy space and a beautiful space that can spark thoughts and give the eyes a break from screens and hard materials. Hopefully, it will be a distinct experience."
>
> — Trine Trydeman, partner, 1:1 Landskab

room for more species than there are currently, and there's an experiential value for people. This is particularly important here to create a good working environment. We're working with a concept called *biophilic design*, which expresses a general love for nature.

Can you elaborate on that?
TT: Yes, overall, we need to work towards bringing more nature into the city. If we're going to save biodiversity, we need to do it on a much larger scale. A project like this (where the green areas are relatively small) is very much about visibility – and about creating a different expression than what we're used to. There's quite a bit of monoculture at DTU. So, the courtyard becomes a rather different expression. We've placed the dead tree trunks in a row in a grid. That speaks to the expression on which DTU is built, a very stringent precision architecture. Wild nature grows up between the trunks. That contrast is quite interesting.

It's going to be a new aesthetic. What are your thoughts on that?
TT: As landscape architects, we have to ensure that it's always a good space for those who will use it, while at the same time, we need to surprise and create a special atmosphere. Throughout the year, you can look out onto a green courtyard with different foliage and colors. It will be a messy space and a beautiful space that can spark thoughts and give the eyes a break from screens and hard materials. Hopefully, it will be a distinct experience. We try every time to create a space with a particular character. Here, we're working very explicitly with the relationship between nature and culture. Visually, the dead tree trunks set something in motion. You might be a little surprised that they're dead and still arranged in a grid, while trees and plants grow around them.

What about maintenance? Are they allowed to clean up there? Or should they leave it be?
TT: There's a natural decomposition process, but maintenance is allowed to clean up. Some things need to be removed for something else to grow. So, some dead material has to be moved regularly.



A BIOTOP. The courtyard is in the shade most of the time. Here, the landscape architects have created a garden that mimics a lush forest floor, just like the Rand Forest around Lyngby Campus. The various species of trees, shrubs, herbs and climbing plants must create good living conditions for fauna and result in a green environment that researchers and students in B310 and B313 can enjoy all year round. Illustration: 1:1 Landscape

In addition to the courtyard, you've designed a green facade in the atrium. What's the idea behind that?
TT: In the green facades, we've worked with planters protruding from the building. Here, we ensure diversity on the different levels. Habitats created an image of a waterfall flowing through different habitats. In practice, we collect water from the roof into a pipe, which we then lead down through the planters. The water flows into the bottom of the planter, and the plants can absorb it. Plastic trays are placed at the bottom of the planters, and when they fill up to a certain height, the water overflows and continues down into the next planter. When it rains, water runs down through this pipe system and fills up the planters. When it doesn't rain much, only the top planters get water. The lower habitats are more drought-tolerant than the upper ones. We hope that the rainwater is sufficient, but in dry periods, we've ensured that the planters can be watered if needed.

Okay, where the shade has framed the courtyard, it's the path of water that sets the frame for what kind of nature can exist in the green facade?
TT: Exactly. It's a whole different mix we can create here. It has to be much more drought-tolerant because we're providing harsh conditions for these plants. They don't have any subsoil to absorb and draw water from, and not much soil to stand in either. So, they need to be plants that can withstand both wind and drought. These include species like bloody crane's-bill, trefoil, oregano, elderberry, small hawthorn, and holly. It's not just an herb layer; there will also be some woody plants in it. But we also need to ensure that it doesn't become too heavy or too large.

Are there any places where you would have liked to push the sustainability agenda even further?
TT: We had proposed a project on the roof. There's a large area that is perfect for creating a habitat. Biodiversity is very much about untouched areas, so the less we humans are involved, the better. Here, there was an opportunity to create a 10-15 cm growth layer. We could have also conducted experiments, set up a camera, and monitored what happened. We thought that could have been quite interesting. And it would have completed the project if we used all the places where it was possible. I think everyone thought it was a good idea, but some economic and operational considerations made it not

SPECIES IN THE NORTHWEST FACADE

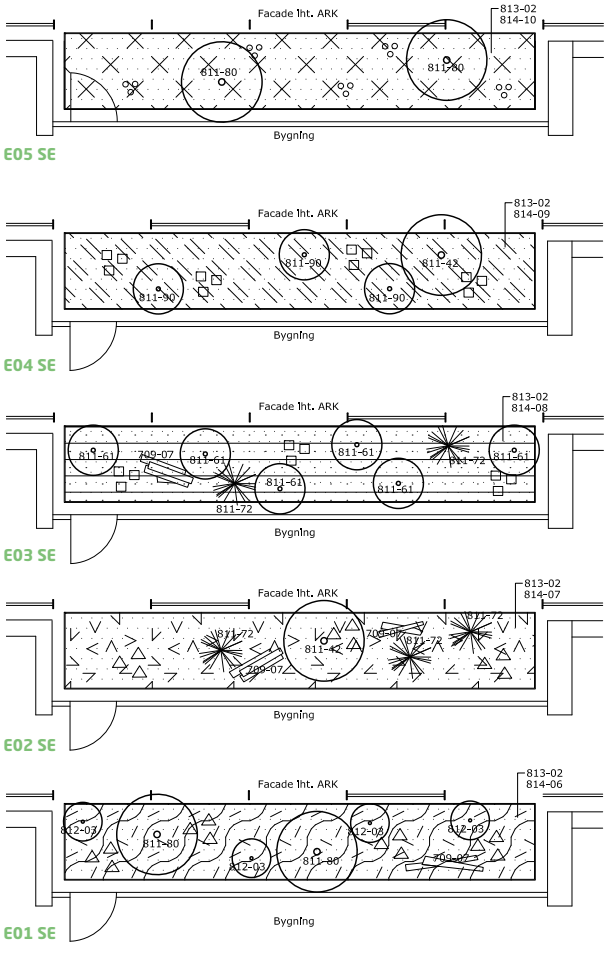
Trees and shrubs: Hawthorn, European buckthorn, European bird cherry, Alder buckthorn, Common Yew

Herbs: Columbine, Ostrich Fern, Woodland Tulip, Pendulous sedge, Sweet woodruff, Wood Crane's-bill, Wood Sorrel, Wood Anemone, Red Catchfly, Hard Fern, Great Woodrush, Ramsons, Honey Suckle, Red grass, Nettle-leaved Bellflower, Hart's tongue fern, Honeysuckle

SPECIES IN THE SOUTHEAST FACADE

Trees and shrubs: Elder, Hawthorn

Herbs: Common Yarrow, Common Cat's-foot, Quaking-grass, Dropwort, Musk mallow, Bloody crane's-bill, Common bird's-foot trefoil, Wild Marjoram, Sweet vernal grass, Field scabious, Sticky catchfly, Heath speedwell, Peach-Leaved Bellflower, St John's Wort, Great woodrush, Ostrich fern , Red Catchfly, Ivy, Hemp-agrimony, Woodland Tulip



FACADES. The green facades become a visible signature for B313 and gain experiential value for the users inside. Rainwater is channeled from the roof through planters and down to the ground. Species are chosen based on whether the facade faces north or south and according to location, as more water is expected on the upper floors than the lower ones. Illustration: 1:1 Landscape.

feasible.

Green Breakthrough on Campus
At DTU Lyngby Campus, project manager Katja Engel Zepernick and section leader Tom Nordbo Andreassen are working to increase biodiversity. This entails new ways of maintenance, more dialogues with users, and a new expression over time.

How are you involved in the work on biodiversity?
TA: I lead Parks and Roads, which maintains and operates all the green areas at DTU. So, when B313 is completed, it's us who will take over the operation of the courtyard and the facade.

KEZ: I am a project manager for landscape projects and strategic development projects. I have, among other things, written guidelines for biodiversity and am now part of a working group to implement biodiversity at DTU together with Parks and Roads.

How do you work with biodiversity at Lyngby Campus?
KEZ: We have an incredibly beautiful campus, very green. Many people at DTU love the campus. But it's also very manicured and monocultural, which isn't great for biodiversity. So, we're working on how to preserve the cultural heritage of the campus and the large landscape areas while increasing biodiversity. The courtyard in B313 complements our work on biodiversity at DTU Lyngby Campus. The surrounding forest edge, which encircles DTU, is one of the places where we can quickly increase biodiversity, including adding dead tree trunks and more species. In the biodiversity guidelines, we've committed to working with at least 90 percent native species.

Tom Nordbo Andreassen (image left), section leader, Parc and Road, and Katja Engel Zepernick (image right), project manager, Plan and project development, both work in Campus Service with increasing the biodiversity at Lyngby Campus. Photo: DTU

BIODIVERSITY ON CAMPUS

DTU focuses on biodiversity and greater natural content on the university's campuses. The campus has drawn up a number of guidelines for initiatives that can promote biological diversity on campus. The overall character of the landscape and the distinctive landscape features must be preserved, while DTU increases biodiversity. A greater natural content must be included in the whole, which is characteristic of the landscape on the DTU Lyngby Campus.

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We're working on how to preserve the cultural heritage of the campus and the large landscape areas while increasing biodiversity. We want more dead trees and stick piles, but it's also something we need to get used to seeing."

— Katja Zepernick, Project manager, Campus Service

Is it new for DTU to have a small forest ecosystem on campus?
KEZ: Yes, it's quite new. On campus, we have many oak trees, but not an expression with a forest floor within a garden space. We want more dead trees and stick piles, but it's also something we need to get used to seeing. The campus is very neat and orderly. It can be a bit jarring to the eye if you're used to everything looking neatly trimmed. The gardeners have tried to start in some areas on campus. From that, we've learned that we need to communicate clearly to everyone what we're doing. We need to tell users that the campus may appear untidier, but it's to increase biodiversity.

TA: Communication is very important. There are a lot of people who have eyes on what's happening out in the terrain and in the courtyards around DTU. Therefore, it's also important to inform users in B313 and B310 about the intention of the courtyard, that it's supposed to resemble a forest floor and not appear as a well-kept garden space. Otherwise, we'll receive a lot of error reports in our system.
We typically get inquiries about forgetting to tidy up, remove a pile of branches, or mow the grass. I also receive a lot of inquiries from users who can't open the window because bees fly in. Some areas have vegetation that isn't maintained much, providing a lot of insect life in the summer. We need to get people

used to the fact that there are insects. They feel bothered by them.

Does the project in B313 prompt you to operate differently?

TA: It definitely provides an opportunity for us to learn to operate differently than we have in the past. In my industry, for many years, we've maintained green areas with the aim of making them look well-kept and tidy. Now we need to choose new methods and maintain them at different times. The courtyard needs to be maintained so it still looks untouched after the gardener has done maintenance on it. So, the gardeners who will tackle the task need to have a different perspective than what they've been trained in.The green facade being installed on the building is also a completely new element at DTU. It's something we need to learn so it appears as intended.

Yes, how does the gardener know when it's maintained in a way that it thrives and lives?

TA: In the courtyard, where the idea is for it to remain untouched and natural, we need to consider the plants that are planted there. Should we let the strong ones survive and let the weak ones die out? Or should we make an effort so that the weak plants are still there in five years? If so, we also need to consider whether we should fertilize to promote the growth of weak plants rather than the strong ones. If we don't fertilize, it may look completely different in five years than the day we take it over.

The desire for it to look lush all year round also greatly influences how the area is maintained. If we let the tree growth take over the entire courtyard, there will be so much shade that the undergrowth cannot grow. Then it becomes a barren landscape under the trees in winter. There are many factors we need to consider. Also, in terms of how we want it to look in five years and how we want it to look in ten years. And who we want to live there.

Could one imagine monitoring the courtyard, for example, every six months?

TA: It would be interesting to follow the development. Also, whether it is completely different species moving in than the ones we had imagined.

FORREST. Campus Service works to increase biodiversity in the marginal forest that surrounds Lyngby Campus. Photo: DTU

That can happen too. Nature isn't so easy to control.

How does the green facade interact with the campus landscape?
KEZ: Traditionally, we've worked with the landscape as a green frame that ties everything together. In relation to that idea, the landscape project in B313 stands out a bit. But we also want to work with green facades. DTU has facades with Boston ivy, and we also want new green buildings.

TA: Yes, it's a completely new element at DTU. There are no other buildings with a green facade with plants. If it becomes a success, it's possible that we'll become excited about it. It can also contribute to us getting more insects, probably a larger contribution than our Boston ivy, which of course blooms. There are insects in it, but it probably doesn't provide so much.

There are several different plants on the green facade. It provides some other opportunities for the insects.
With the initiatives you're working on now, how do you think the campus will look in five or ten years?
TA: Ideally, there should be more understory under the oak trees at the edge of the forest. And also, more growth of wild vegetation on the sunny side of the understory. We also hope that we won't have as much mowed grass as we do today. We also want to extend the edge of the forest further into the campus area. So, the lawns become part of the forest.

KZ: There should still be areas where you can sit down, but we have a lot of manicured grass areas. We would like to transform some of those places into something that benefits biodiversity and provides different sensory experiences with more diverse planting.

CROSS PASSAGE. B313 lies next to a cross passage, which is one of the eight landscape typologies on Lyngby Campus. The landscape around the building will be laid out as an extension of the landscape between the B310 and Matematiktorvet. Photo/illustration: Seriously Fun/DTU

Basisinfo

Project status
Accommodation is in process. The courtyard has been established and the first plants have been moved in.

Timeplan
Spring 2024 — Summer 2024

Construction on site — Users move-in

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