KLIMAKVARTER

COPENHAGEN'S FIRST CLIMATE RESILIENT NEIGHBOURHOOD

2th edition, February 2016

”We need to make Copenhagen more resilient to future cloudbursts. This will require new ideas and solutions, so we can use rainwater to create new recreational urban spaces. We need to have less asphalt and more green spaces. That is exactly what is characteristic of the projects in The Climate Resilient Neighbourhood of Østerbro. It’s a great inspiration for the rest of the city and the world.”

Morten Kabell
Mayor for Technical and Environmental Affairs

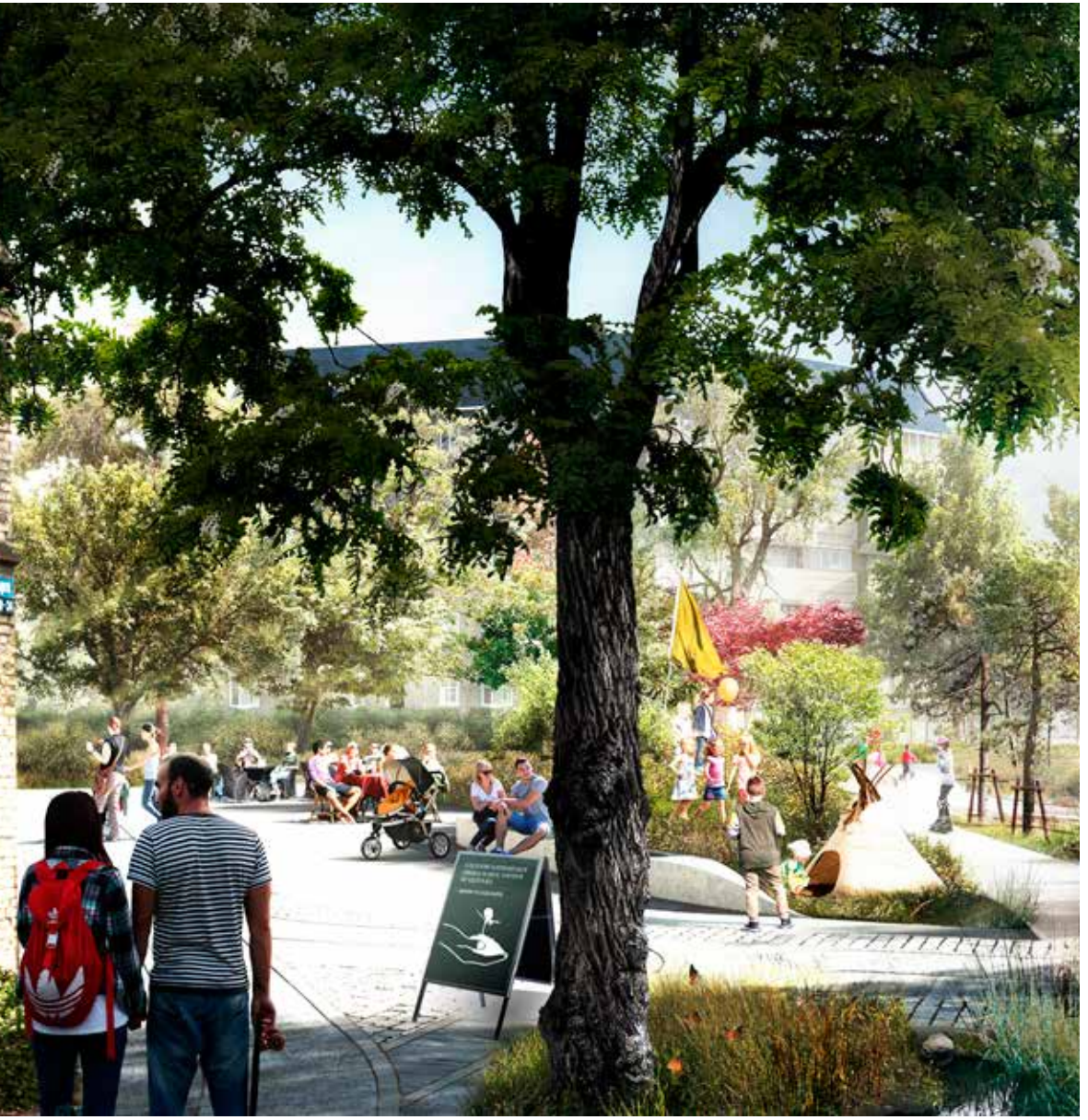
HOFOR

Udlændinge-, Integrations- og Boligministeriet

København CO2-neutral i 2025

KLIMAKVARTER

CONTENTS



COPENHAGEN'S FIRST CLIMATE RESILIENT NEIGHBOURHOOD

Green streets, green urban squares, and cloudburst streets that diverts rainwater away from the neighbourhood, these are ways in which we can avoid water damages when extreme rainfall events or cloudbursts occur. This is the vision for Copenhagen's first Climate Resilient Neighbourhood.

In this publication you can read more about the Østerbro Climate Resilient Neighbourhood. You can read about the visions for a coherent, green and climate-adapted neighbourhood, see the project drawings and find information about how the first climate adaptation projects are progressing from vision to reality.

Check out our website klimakvarter.dk for more information about the projects in the neighbourhood.

THE CLIMATE RESILIENT NEIGHBOURHOOD

◀ Visualization of the future
Skt. Kjelds Plads
Visualization: SLA

WHY CLIMATE ADAPTATION?

The climate is changing. We expect around 30% heavier rain in the future. At the same time, we will experience more extreme rainfall events, like the ones Copenhagen has experienced in recent summers.

The sewers are unable to cope with the large volumes of rainwater. We are therefore experiencing sewers overflowing, which leads to great loss and costs for the citizens of Copenhagen.

Enlarging the sewer system by conventional solutions is expensive and it would cause construction works for a large part of the city for decades without any further benefits.

◄ Climate change adaptation is a matter of making Copenhagen more resilient to the heavier rainfall in the future.
Photograph: Scanpix

Instead of expanding the sewer system the City of Copenhagen therefore wishes to future-proof the city with green climate change adaptation solutions at street level.

The projects are to lead the rainwater away from streets, homes and basements when the cloudbursts occurs, but they are also intended to create lush and attractive urban spaces to be enjoyed by the people of Copenhagen when the weather is dry. We call these solutions 'green' and 'blue' solutions.

These solutions are cheaper, easier and more flexible than conventional solutions.

The green and blue solutions are to disconnect 30% of the rainwater from the sewers in The Climate Resilient Neighbourhood.

270,000 m²

The area of roads today. Today the streets in The Climate Resilient Neighbourhood are far wider than neccessary to manage the local traffic.

50,000 m²

of green space can be created, if we arrange the streets according to present standards, where there is traffic in both directions and the same number of parking lots. By doing this we will enhance the urban life.

Improved urban space

In that way we create space for green corridors, trees, gardens and lush urban spaces. Without reducing the amount of parking lots.

The winning concept: 1/5 of the road is transformed from asphalt to green space. From the Europan competition 2012, illustration from the master plan for The Climate Resilient Neighbourhood. Illustration: Tredje Natur.

GREENER STREETS AND IMPROVED URBAN SPACE

In the following years to come Copenhagen will experience big changes due to climate change adaptation projects. In The Climate Resilient Neighbourhood we are taking the first steps. Østerbro Climate Resilient Neighbourhood shows how a district is equipped to deal with the increased water volumes in the future, and at the same time shows how to create better conditions for local urban life.

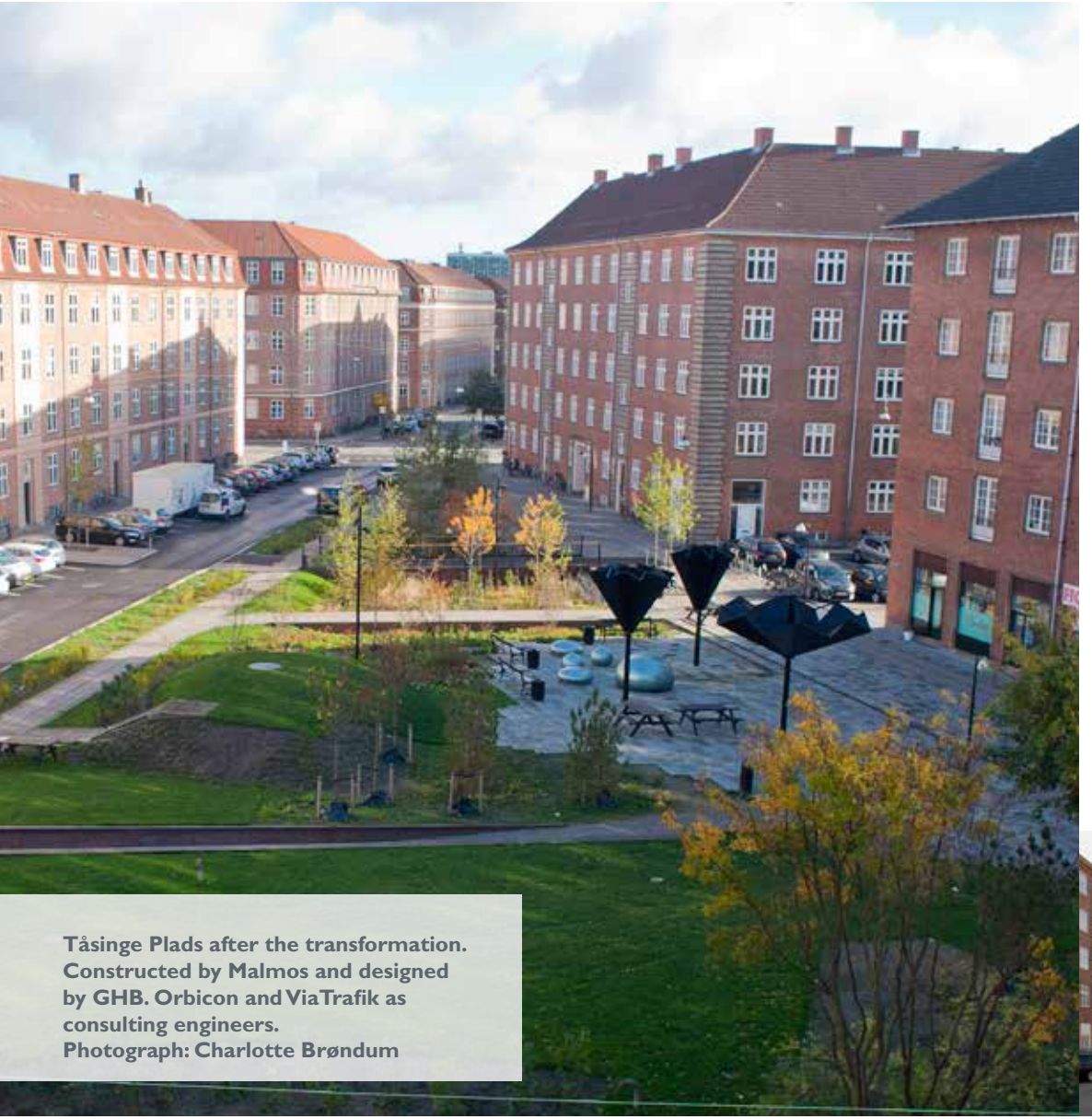
Our work is based on a green vision made by Tredje Natur. A vision represented at The Venice Biennale 2016.

We are creating a green living district in a neighbourhood with old and worn out streets with large asphalt surfaces without any function. A neighbourhood that literally has space for improvement, as it was originally laid out for wide and green avenues. But the trees were never planted, therefore the wide streets appear empty.

We are using the opportunities of the wide streets and proposing that 20% of the asphalted areas in the neighbourhood become green spaces that can be used for storm water management. In that way urban quality is also improved. The target is for 30% of the everyday rain to be managed locally on surface in order to prevent pressure on the sewers.

This vision is on the way to becoming reality. With a focus on the water through the neighbourhood, the urban spaces, streets and courtyards are all connected. In that way we ensure that rain that falls in the neighbourhood can flow through the various projects. The water which can't infiltrate through the ground will have an outlet to the next system.

This approach is unique and a model for climate change adaptation solutions in the rest of Copenhagen and the rest of the world. The Climate Resilient Neighbourhood has won several international prizes, and recently the City of New York has implemented the concept.



Tåsinge Plads after the transformation. Constructed by Malmos and designed by GHB. Orbicon and ViaTrafik as consulting engineers.
Photograph: Charlotte Brøndum

TÅSINGE PLADS
GREEN OASIS AND LOCAL MEETING POINT

Tåsinge Plads is Copenhagen's first climate change-adapted urban space. It was officially opened in December 2014. The square has been created as part of Sharing Copenhagen, where Copenhagen as the European Green Capital presented the best solutions to future environmental and climate challenges.

The square responds to a need for rainwater management and it is at the same time an investment in a better urban life.

The square is centrally located in The Climate Resilient Neighbourhood, and it has become a green oasis and a new meeting point for the inhabitants. Where there used to be a large asphalt area, there is now a large green area with water activities and a sunny slope. Altogether more than 1.000 m^2 of asphalt has been greened, with more than 50 new trees, reused cobblestones and granite stones.

The shops in the building of Solgården were previously hidden behind rows of parked cars. But today it is possible to see the shops from the new vibrant square. The residents around the square take part in a residents' association which will form activities on the square in the future.

◀ Tåsinge Plads before the transformation.

Visualization of the future Skt. Kjelds Plads.
Visualization: SLA

SKT. KJELDS PLADS
THE GREEN HEART OF THE NEIGHBOURHOOD

Skt. Kjelds Plads is a large roundabout, which serves as a traffical centre in the neighbourhood. Here the roads meet in a roundabout with trees. The roundabout is 13 metres wide. Today many cars drive too fast, why residents are cut off from using the green space in the middle of the square.

Our vision is to transform Skt. Kjelds Plads into a living green urban space with room for nature, insects and butterflies but most important a space for residents in the neighbourhood. There still has to be space for traffic, but nature has to be allowed to spread to a greater extent and become the special characteristic feature of the square.

Because of its central location and enormous size of 8,000 m^2, Skt. Kjelds Plads has potential to set an example for how we adapt our urban spaces to climate change in Copenhagen. It should serve as an inspiration at home and abroad, and give the neighbourhood a new green character.

The square is designed by SLA Architects in cooperation with ALECTIA, and is expected to be completed by the spring of 2018.

A local monitoring group of residents and businesses is following the project closely, and is in dialogue with the architects on the design of the project.

◀ Skt. Kjelds Plads before the transformation.

Vision of Bryggervangen,
corner at Landskronagade.
Visualization: SLA

◄ Bryggervangen today

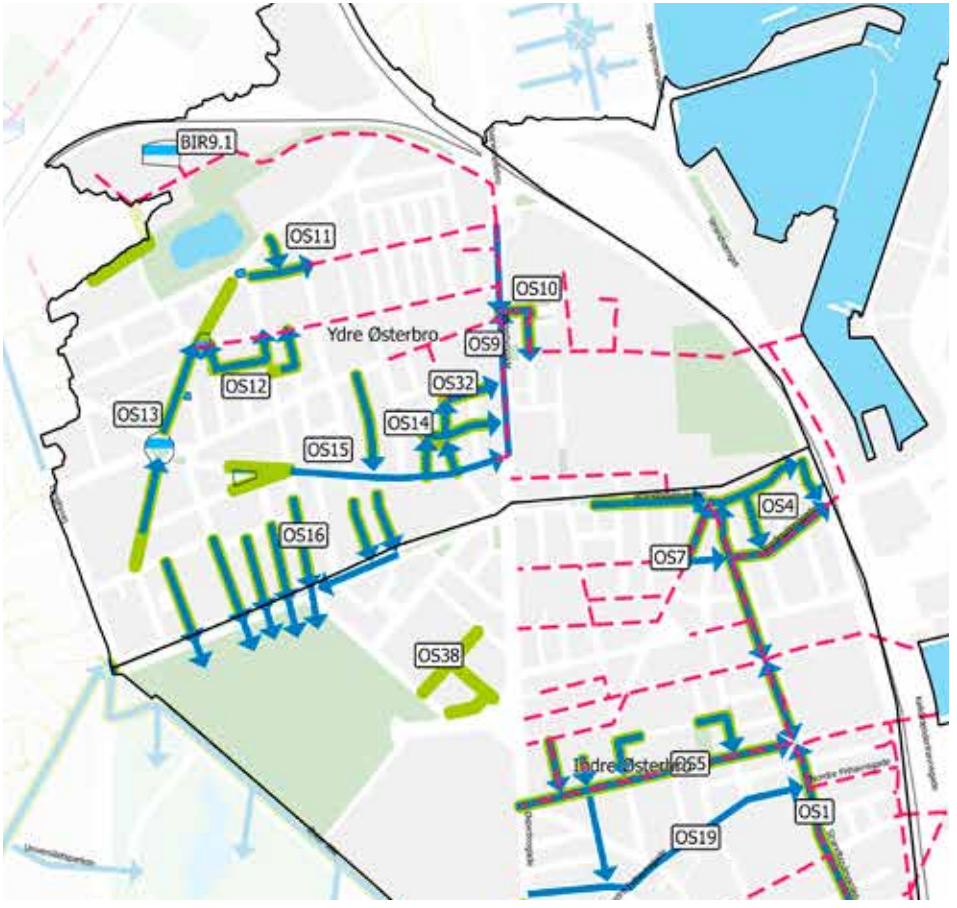
BRYGGERVANGEN
''THE GREEN CORRIDOR''

The vision for Bryggervangen is to create a "green corridor" - a continuous green space that links Fælledparken and Kildevældsparken and acts as a infiltration and detention area for rainwater. We took the first steps in transforming Bryggervangen in 2014, when we supported the establishment of a climate adapted green "entrance" at Bryggervangen 56.

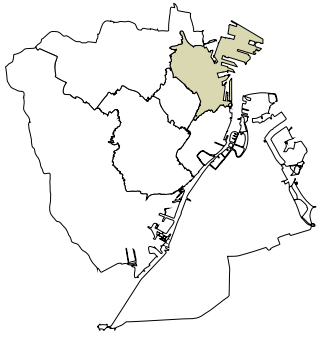
Bryggervangen is a street that is characteristic of many street areas in the neighbourhood. There are large unused asphalt surfaces which can be transformed into green space and in that way enhance nature experiences and urban quality. At the same time, the green spaces can function as retention areas. When it rains heavily, the rainwater will flow into the green spaces, and in this way enhance the urban picture.

We will arrange the street of Bryggervangen more effectively, so there is space for urban life rather than cars. We will not remove parking spaces but will make the street narrow in order to slow down the traffic to the benefit of residents and the neighbourhood as a whole. At the corners where there is a large amount of space where green spaces can spread and become lush meeting points.

Bryggervangen and Skt. Kjelds Plads are being constructed as a one project, and is designed by SLA Architects, consulting engineers ALECTIA and Jens Rørbeck.



WATER CATCHMENT AREA
OF ØSTERBRO



DESCRIPTIONS

- Cloudburst roads
- Retention roads
- Retention roads
- Green roads
- Cloudburst roads

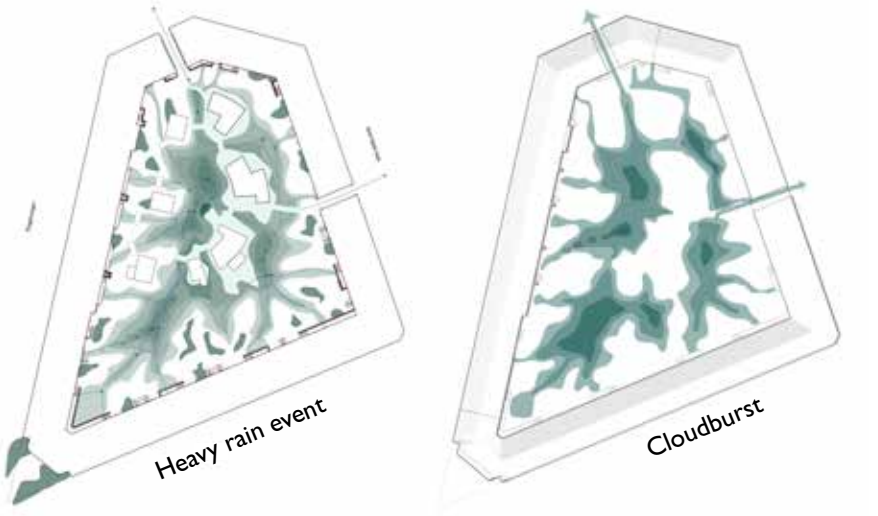
CLOUDBURST ROADS
GREEN STREETS

We are establishing cloudburst roads in The Climate Resilient Neighbourhood. A cloudburst road is a public road that, in the situation of a heavy rain event, also acts as a channel, diverting rainwater safely away from the buildings.

In The Climate Resilient Neighbourhood, the first cloudburst roads will carry the water in Landskronagade and Tåsingegade towards Østerbrogade, where it is collected and in the end discharged into the harbour through an underground cloudburst pipe. In the longer term, Nygårdsvej and Kildevældsgade will also become cloudburst roads.

When the rainwater is transported from the high-lying areas (upstream) of the neighbourhood, around Tåsinge Plads, Skt. Kjelds Plads and Bryggervangen through the neighbourhood and out into the harbour, the risk of flooding is reduced in the low-lying areas (downstream) of the neighbourhood around "Komponist kvarteret" and the Øresund Hospital.

◀ The water flow to the harbour, Fælledparken or other receiving bodies of water. The vision is to protect the entire neighbourhood against the consequences of cloudbursts by arranging green urban spaces for detention and infiltration of storm water and cloudburst roads, conveying the masses of water to areas where it doesn't cause damage.



▲ **The diagrams show the collection of rainwater on ground, Future Green Courtyard at Skt. Kjelds Plads.**

◄ **Future Green Courtyards utulise rainwater as a ressource in order to create a lush atmosphere. Visualization: Arkitema**

FUTURE GREEN COURTYARDS

In The Climate Resilient Neighbourhood we use rainwater as a resource to create green courtyards and improve the conditions for social life.

In the the Future Green Courtyards, rainwater from the courtyards and roofs is collected and utilised as a resource to create greener courtyards. This provides better growing conditions for grass, plants and trees. The courtyards are known as the Future Green Courtyards with local rain water management. In the future we will manage and utilise the rainwater at the spot instead of conveying it to the sewers.

Future Green Courtyard with local storm water management is a renewal project where three courtyards are transformed. The goal is to develop rainwater solutions which can be replicated to other courtyards in Copenhagen.

Courtyards make up a third of the total surface area in the neighbourhood. The courtyards have great climate change adaptation potential, and provide many opportunities to link local storm water management with improved life quality for the people of Copenhagen. At the same time, the rainwater can enhance biodiversity.

The Future Green Courtyard at Skt. Kjelds Plads and the the courtyard at Askøgade are demonstration projects in The Climate Resilient Neighbourhood Østerbro.

CLIMATE RESILIENT BLOCK

The Climate Resilient Block, which is located in the Østerbro Climate Resilient Neighbourhood, has been designated as a demonstration project for innovative scalable solutions. The project aims at finding sustainable climate and energy solutions for buildings.

An innovative solution has been developed for the building in the form of a new facade which integrates insulation with technical solutions as a new ventilation system. The new solutions offer the residents home improvement with greater incoming light or balcony doors. The building facade will have vegetated walls, bricks or other surface materials. The facade will contribute the environment by both reducing the energy consumption and improving the quality of housing.

The Climate Resilient Block is a project where both building and green spaces are renovated and climate change solutions are adapted. Rain water is managed on the plot through retention basins and areas suitable for infiltration. The collected rainwater is also used for washing laundry and for watering the green spaces.

Today the block consists of many smaller courtyards. These will be merged together into a common courtyard with better settings for people to relax and play, more light and green spaces. The diversity of the courtyards is retained, but they are linked together by a depressed surface which will be filled with water when it rains and serve as a recreational space when it is dry.

◄ Example of the multifunctional courtyard in The Climate Resilient Block. Visualization: Henning Larsen Architects

THE CITIZENS' OWN CLIMATE PROJECTS

The residents of The Climate Resilient Neighbourhood take part in climate change adaptation with their own green projects. Local enthusiasts create planting beds, rain beds and green roofs in the neighbourhood.

The Urban Renewal Office of The Climate Resilient Neighbourhood provides finacial support (grants) and knowledge to projects initiated by locals.

An example is the urban garden at Bryggervangen 12-16, where the residents have joined forces to create an urban garden made of 30 planting beds. The beds contains schrubs, perenials and small trees. The garden also has a small terrace. The urban garden collects rainwater from 90 square metres of roof area on Bryggervangen and the water is utilised for watering the plants.

At Bryggervangen 56, committed residents have transformed a big asphalted area in front of the building into a luxuriant green space.

At Askøgade the residents have created a green oasis with planting beds, with raspberry bushes, perenials, strawberries and herbs.

Since the renewal project started in 2011, citizens have applied for funding (grants) in order to create their own green projects and create greener streets, courtyards and local meeting points.

Actions taken by the residents make an important contribution to a better and greener urban life.

◀ The residents at Bryggervangen 12-16 have built their own urban garden, which is watered by rainwater. Photograph: TagTomat

CLIMATE RESILIENT NEIGHBOURGHOOD
A GREEN IDENTITY

A few years ago, the area north of Fælledparken was a nameless and overlooked area of Østerbro.

The identity of the area is changing because of notable projects such as the new Tåsinge Plads and the ØsterGRO rooftop farm.

The Climate Resilient Neighbourhood Østerbro is known as the place where climate adaptation projects are tried out are characteristic of the neighbourhood.

People abroad have also discovered The Climate Resilient Neighbourhood, and foreign delegations regularly visit for inspiration visits, which enhances local pride. Since it started, the project has won a number of international prizes, most recently in 2015, when The Climate Resilient Neighbourhood was placed in "Cities100" - a list of the 100 best sustainable urban solutions, published by the C40 network of the world's leading cities.

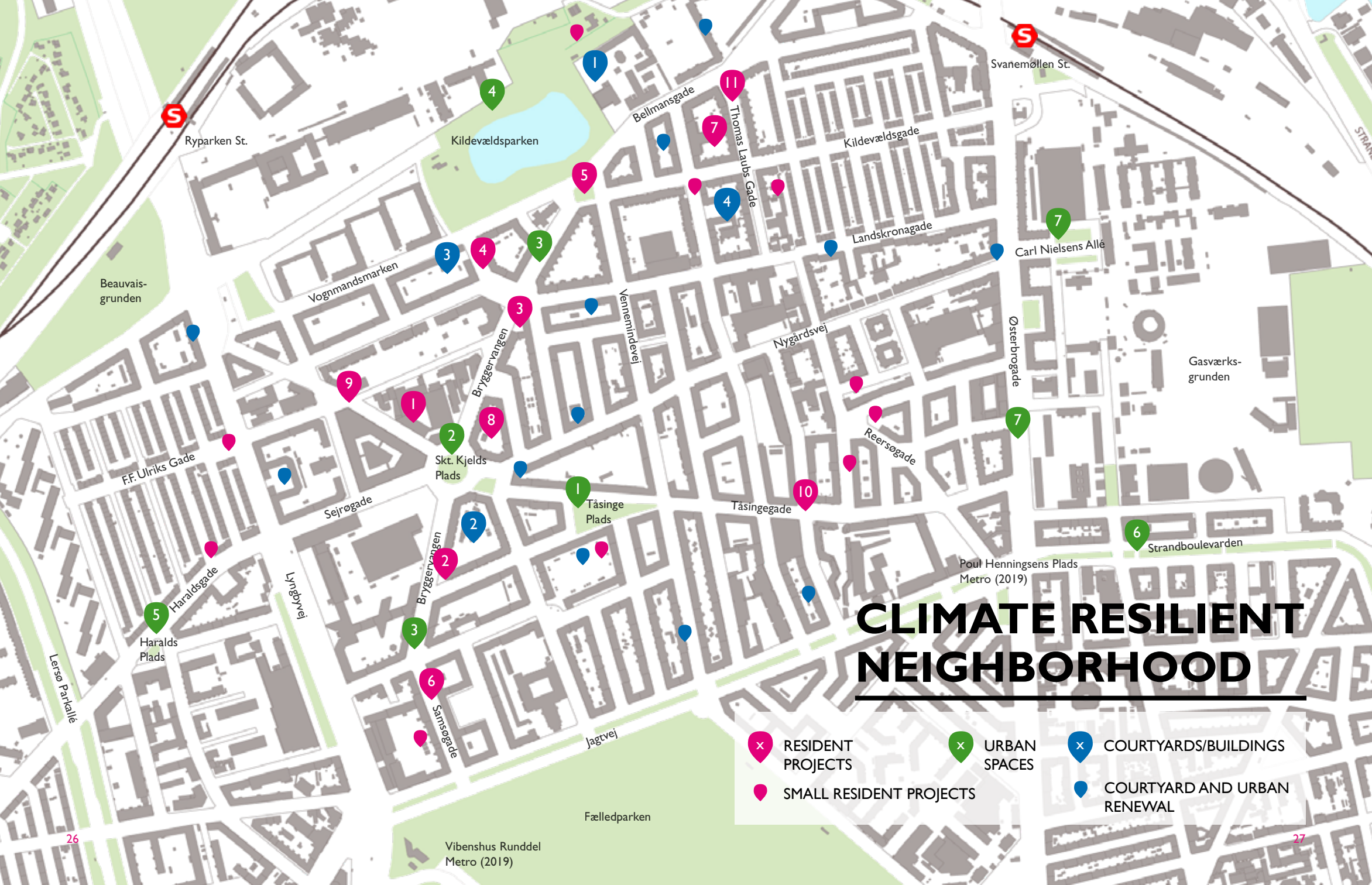
In 2014 and 2015 countless foreign delegations and Danish municipality, firms, schools, etc. visited The Climate Resilient Neighbourhood to see the inspirational green projects in climate change adaptation.

Today it is possible to discover small green oases and temporary urban gardens in The Climate Resilient Neighbourhood. In the future, Bryggervangen will become the backbone of the neighbourhood, where Skt. Kjelds Plads will serve as the green heart of the neighbourhood, giving the neighborhood identity in a physical form.

Get further information about the Climate Resilient Neighborhood at:

KLIMAKVARTER.DK

◀ The ØsterGRO rooftop farm has become part of the identity of the neighbourhood.
Photograph: Charlotte Brøndum



CLIMATE RESILIENT NEIGHBORHOOD

- RESIDENT PROJECTS
- SMALL RESIDENT PROJECTS
- URBAN SPACES
- COURTYARDS/BUILDINGS
- COURTYARD AND URBAN RENEWAL

PROJECTS

1 TÅSINGE PLADS

The Climate Resilient Neighbourhood's first urban space adapted to climate change. Here rainwater from an area of more than 7,000 m^2 is managed, while a multifunctional green urban space is created for the neighbourhood.

2 SKT. KJELDS PLADS

A green square full of character, the future gathering point of the neighbourhood, and at the same time a pilot project in climate change adaptation. The project is expected to be completed in 2018.

3 BRYGGERVANGEN

A green connecting link, where raingardens, swales etc. provide experience of nature in the centre of the city. The project is expected to be completed in 2018.

4 KILDEVÆLDSPARKEN

Frisporet is a new activity space north of Kildevældsparken. The focus is on nature, play and discovery. In addition, there is a park for dogs and new playing fields.

5 HARALDS PLADS

Haralds Plads was renovated in the autumn of 2015. A large green bed with perenials and schrubs has been created and benches have been installed, including urban furniture for skating.

6 STRANDBOULEVARDEN

Strandboulevarden will in the future become a blue and green street that both protects the area against flooding and creates a liveful and green space.

7 ØSTERBROGADE / CARL N. ALLÉ

The streets ensure that the rainwater is transported to the harbour and at the same time green spaces is developed.

1 KILDEVÆLD CULTURE CENTRE

A new place for people to meet in Østerbro. The Kildevæld Culture Centre is expected to be completed in 2018.

2 FUTURE GREEN COURTYARD AT SKT. KJELDS PLADS

A pilot project on rainwater management in courtyard spaces.
Expected to be completed in 2016.

3 FUTURE GREEN COURTYARD AT ASKØGADE

A pilot project in rainwater management in courtyard spaces.
Expected to be completed in 2017.

4 CLIMATE RESILIENT BLOCK

A sustainable project where rainwater management, and rainwater collection and energy optimisation of buildings.

COURTYARD AND URBAN RENEWAL PROJECTS

Larger courtyards and urban renewal projects in The Climate Resilient Neighbourhood, supported by the City of Copenhagen.

RESIDENT PROJECTS

1 ØSTERGRO

The first rooftop farm in Denmark. Here organic vegetables are grown, hens are kept and beehives are tended. The rooftop farm is run by the founders, members and volunteers.

2 BRYGGERVANGEN 12

Temporary and mobile urban garden with self-watering raised planting beds. Citizen involvement, climate change adaptation in a fine combination.

3 BRYGGERVANGEN 56

Green urban space with a raingarden, herbaceous banks and cherry trees now covers what was before asphalt.

4 ASKØGADE

Open gardens with raised planting beds and space to spend time together, replacing unused and fenced-off lawns.

5 LAND-ART in front of Kildevældskirken (church)

Temporary artwork made of tree truncks from Skt. Kjelds Plads, contribute to biodiversity and the experience of nature.

6 SAMSØEGADE

The Jagtgården cooperative will renovate the street and is working on an ambitious model, making the street greener and disconnecting rainwater from the sewer.

7 GREEN ROOF

Green roofs in the courtyard of Thomas Laubsgade contribute to increased biodiversity and retention of rainwater, so it doesn't impose pressure on the sewers.

8 SENSORY GARDEN

In the block of Bryggervangen 34-40 a peaceful sensory garden is being established in the courtyard with herbs and perenials. Expected to be completed in the spring of 2016.

9 ÆBELØGADE

In Æbeløgade, traffic safety and climate change adaptation are combined in traffic islands consisting of green beds.

10 TÅSINGEGADE

Tåsingegade has been chosen as a cloudburst street. The properties on the street have formed a street association to influence the development of the street.

11 THOMAS LAUBS GADE

Green street renovation at a private street. The street has been established with trees and extra parking space.

SMALL RESIDENT PROJECTS

Examples of inovative resident projects in The Climate Resilient Neighbourhood: Rain gardens, planting beds and green roofs, a bicycle workshop and a noise barrier.

Read more about the projects, at
KLIMAKVARTER.DK

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