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The Climate Crisis Could Pave the Way for a “Softer” Copenhagen

By now, it is commonly known that the combination of the melting ice caps and more frequent storms, in time, will raise sea levels and eventually leave many coastal cities submerged. Rainwater, seawater, and groundwater are all huge resources. But if we don't act wisely, they will constitute a giant threat. In Denmark, almost all major cities are located by the sea – including the capital of Copenhagen – a city that must be protected from the consequences of climate change. The question is then: Do we secure our capital through nature-based solutions such as a blue-green “bracelet” surrounding the city? Or do we create large quantities of new developments placed in Øresund, on the sea in front of Copenhagen?

RIKKE JUUL GRAM

The number of bad examples of how our world might transform into something horrendous with the development of storm surge and flood proofing measures, is growing. Therefore, we must make sure the protection strategies are based on both beauty and reason.

Around the world we see the rise of traditional “hard” protective measures such as walls and ever taller dikes and other barriers barricading cities against the climate crisis.

To avoid this development from also becoming a reality in Denmark we must ‘hurry up slowly’ in developing a holistic approach to climate adaptation planning. If we don’t plan carefully, we might have to live in a deep Dutch bathtub of dikes where large quantities of rainwater

from the hinterland will struggle to find its way to the sea. Rising groundwater levels can be pumped away with machines. But what do we do when electricity fails?

The good news is that far more gentle and sustainable methods for climate adaptation exist. Methods inspired and supported by nature, that also provide added value such as urban development in harmony with nature.

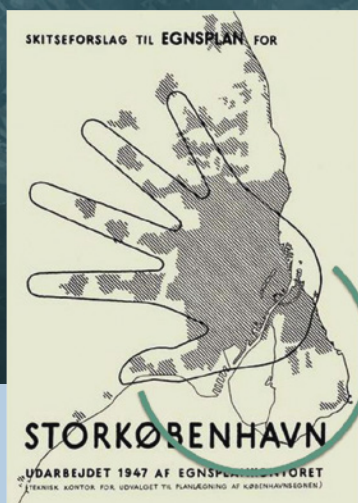
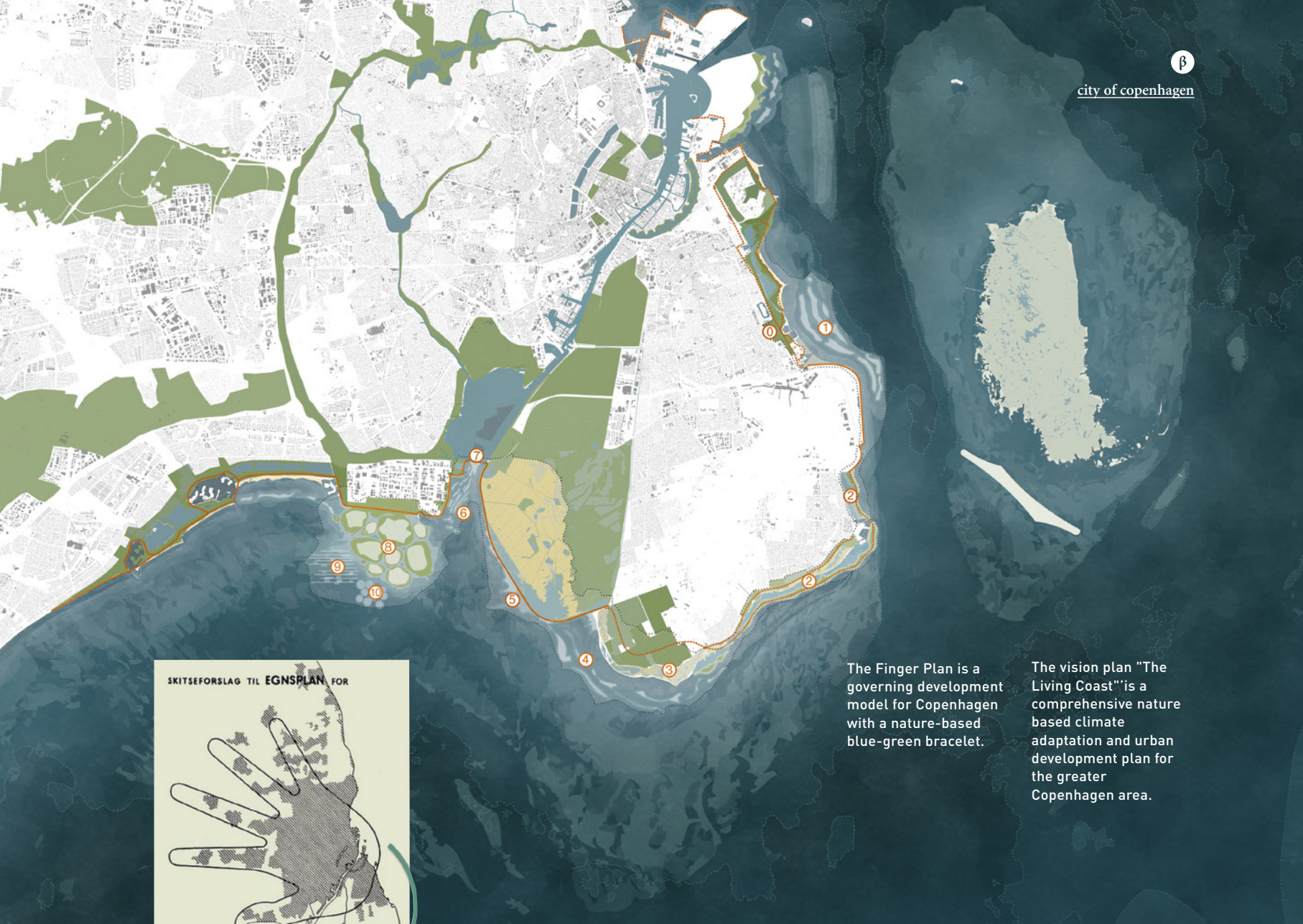
‘Build with Nature’

With the nature-based solutions, ‘Build with Nature’, we can benefit from the dynamics of the landscape as a primary tool in protecting coastal cities, such as Copenhagen. ‘Building

with nature’ is a gentle and sustainable method, using nature’s own structures and dynamics as the driving force. A method that also adds qualities to the city such as new nature, greater biodiversity, new recreational potential along the coastline, as well as strengthened green connections to the hinterland.

Zone-thinking instead of lines and borders

Firstly, storm surge protection and coastal development in Copenhagen should not only be seen as a safety line, but instead as a broad and dynamic zone that covers both sea and land areas and extends across municipal and property boundaries. The nature-based solutions require holistic



The Finger Plan is a governing development model for Copenhagen with a nature-based blue-green bracelet.

The vision plan "The Living Coast" is a comprehensive nature based climate adaptation and urban development plan for the greater Copenhagen area.

thinking – making sure that cost effectiveness, land development, and retraction of developed sites are considered together with nature development and nature protection, rising groundwater levels, rainwater flows, sea flow conditions, hydrology, sediment transports, recreational connections, and the securing of our infrastructure. Zone-thinking gives nature-based climate adaptation measures the necessary space to develop with flexibility and over time – as water volumes increase into an unknown future.

'The Living Coast'

Four municipalities – Dragør, Copenhagen, Hvidovre and Tårnby – have already joined

forces on a grand vision for a comprehensive coastal protection plan for Copenhagen, where climate adaptation is ensured through an organic and nature-based approach.

At five sites along the southern coast of Copenhagen the vision illustrates how, based on site-specific conditions, climate proofing of a modern city's critical infrastructure can go hand in hand with the strengthening of cultural history and local natural values – all the while being in close dialogue with the citizens. The five sites showcase nature-based solutions such as nature restorations, storm surge protection through eelgrass meadows, underwater stone reefs, flattened slope protection, protruding forelands, sand feeding, con-

trol of sediment transport and withdrawn dikes. By implementing nature-based methods we can protect Copenhagen against the rising water while at the same time, improving the city for everyone's benefit. The premise is the desire to give time and space to building with, instead of against, the forces of nature and thereby extracting the full potential of climate adaptation. On the coast, nature-based solutions can be combined with the creation of new experiences and improved accessibility, while taking the area's vulnerable natural values into account.

An important part of the story is that outdoor and nature tourism are already a billion-dollar industry, creating great economic value.



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|-----------------------------------------------|----------------------------------------------|
| 1. Kastrup Beach (0 and 1 in the vision plan) | 4. Vestamager Dike (5 in the vision plan) |
| 2. Dragør Nord (2 in the vision plan) | 5. Kalveboderne (6 and 7 in the vision plan) |
| 3. Aflandshage (3 in the vision plan) | |

So, by adding more nature, we are also creating new possibilities – especially taking into account the proximity to a large city.

Lynetteholm – the right answer to the wrong question

The vision of 'The Living Coast' is a counter image to a completely different plan for the flood proofing and storm surge protection of Copenhagen being implemented at this moment in time. Elsewhere in this edition of TOPOS, you will find descriptions of 'Lynetteholm' – a project which, unlike 'The Living Coast', is well on its way towards realization.

Lynetteholm is a huge artificial peninsula, located in the sea 'Øresund', by the entrance to the Copenhagen harbor, on the eastern side of the city. The artificial island is to function as "a plug", protecting against rising sea levels. Lynetteholm will be completed in 2070, and enthusiastic politicians have called the island a 'Kinder Surprise' of urban planning. The 'surprise' is that flood proofing with a landfill construction in the Copenhagen inner harbor, can also form the basis for a new and much needed ring road circling Copenhagen (creating more traffic, not less!). The funding is to come from new compact urban districts on Lynetteholm, housing thousands of new residents. But Lynetteholm is not based on sustainable and resource efficient planning. While constructing Lynetteholm approx. 72 trucks filled with construction materials will drive across the entire city every single hour of every single day. For 30 years.

To the great concern of our Swedish neighbors, significant areas of the Øresund seabed will be affected – the seriousness of the environmental consequences are still being debated. Nobody knows which qualities the new massive urban district on Lynetteholm will have, be-

cause no one is yet designing it. But the new urban district is consuming an enormous number of resources, even before its birth, which is crucial to the economic balance of the project.

Contrary to the nature-based climate adaptation measures, Lynetteholm does not answer the question of how the climate crisis could pave the way for protective measures that also serve as a contribution to nature, and create new recreational opportunities for the citizens. Instead, Lynetteholm is a planning concept developed to ensure an increased tax base for the municipality of Copenhagen. All the while, neighboring municipalities that have both the necessary space and infrastructure – will not share in this growth.

It is a sad development. Especially considering that more obvious possibilities for the development of the capital, in line with the basic structural and historical narrative of the city, exist.

Strengthen the suburbs – and live closer to nature

For several obvious reasons, a development of Greater Copenhagen towards the West is a far more sustainable long-term strategy. Instead of expanding the city into the sea at a time where we talk about coastline retraction, we ought to consider how to make the suburbs more attractive, basing the development on existing natural values and cultural heritage. A climate adaptation and development plan for the entire area of Greater Copenhagen must build on the qualities and possibilities that already exist.

We ought to understand Greater Copenhagen as one region, where the flow of water, cultural heritage, the coastline and all the associated attractions, make up the foundation for an overall future urban development strategy that encompasses the entire region. Especially consider-

ing that trends indicate that future residents will seek light, fresh air and a connection to vibrant landscapes – even in the metropolitan area.

The Finger Plan has overseen potential

The Finger Plan is one of the most important governing development models for Copenhagen. Since the original Finger Plan was first drawn up in 1947, the city has been organized based on an overall regional structure where urban development is concentrated along five city ‘fingers’, centered on commuter rail lines reaching West, extending from the ‘palm’, that is the dense urban fabric of central Copenhagen in the East. In between the fingers, green “wedges” are kept exempt from urban development to provide land for agriculture and recreational purposes.

For more than 70 years The Finger Plan has made up the overall framework for development in the metropolitan area.

Where The Finger Plan looked inland, it is now the meeting of sea, coast and landscape that needs a helping hand. The green wedges of The Finger Plan must be better utilized, and a comprehensive plan for the entire capital area should densify and expand the city towards the West, making access to the blue-green nature areas, the light and fresh air more alluring.

The Finger Plan needs a blue-green bracelet

In addition, the historic land fortification ‘Vestvolden’, which extends west of Copenhagen as a 15 kilometer rampart, and its extension Nordre Oversvømmelse, are obvious tools for future planning of the city towards the west. The ramparts are suitable for climate adaptation, as recreational areas, and as a tool to densify the city – in the capacity of being neighbor to an improved, new urban development.

What was once a fortification is today one of the city’s most important green open spaces with green ramparts, blue floodplains, a function as flood proofing area, and as an important recreational and biodiversity corridor. There is great potential in being able to offer a new, wide palette of habitat types and recreational opportunities, which in addition connect Vestvolden and its extension Nordre Oversvømmelse with Lynetteholm, Nordhavn (The North Harbor) forming a blue-green circle around the capital.

Rather than moving the center of Copenhagen further out to sea, the development of the city’s western fortress ring can form a ‘blue-green bracelet’ consisting of climate adaptation measures and access to new nature – in line with the vision project ‘The Living Coast’. Lynetteholm can easily be inscribed in this story – simply in the form of sandbanks and stone-reefs.

The future of Greater Copenhagen is about creating a good relationship between land and sea, and about the balance between protection and usage. Where the Finger Plan structured the meeting between gray and green structures, nature-based solutions are about creating a balance between gray and blue structures – facilitated by nature.

The Finger Plan needs a bracelet of blue and green natural pearls: a blue-green development zone protecting and connecting the municipalities of Greater Copenhagen. A bracelet constituting a circle where the city finds its way back to the water.

Along the route, new landmarks and nature-destinations could be created in conjunction with coastal development. The nature-based solutions contribute to new opportunities for biodiversity, new recreational qualities, and new functions. At the same time, they eliminate the sharp opposition between city and countryside, between water, nature, and culture.