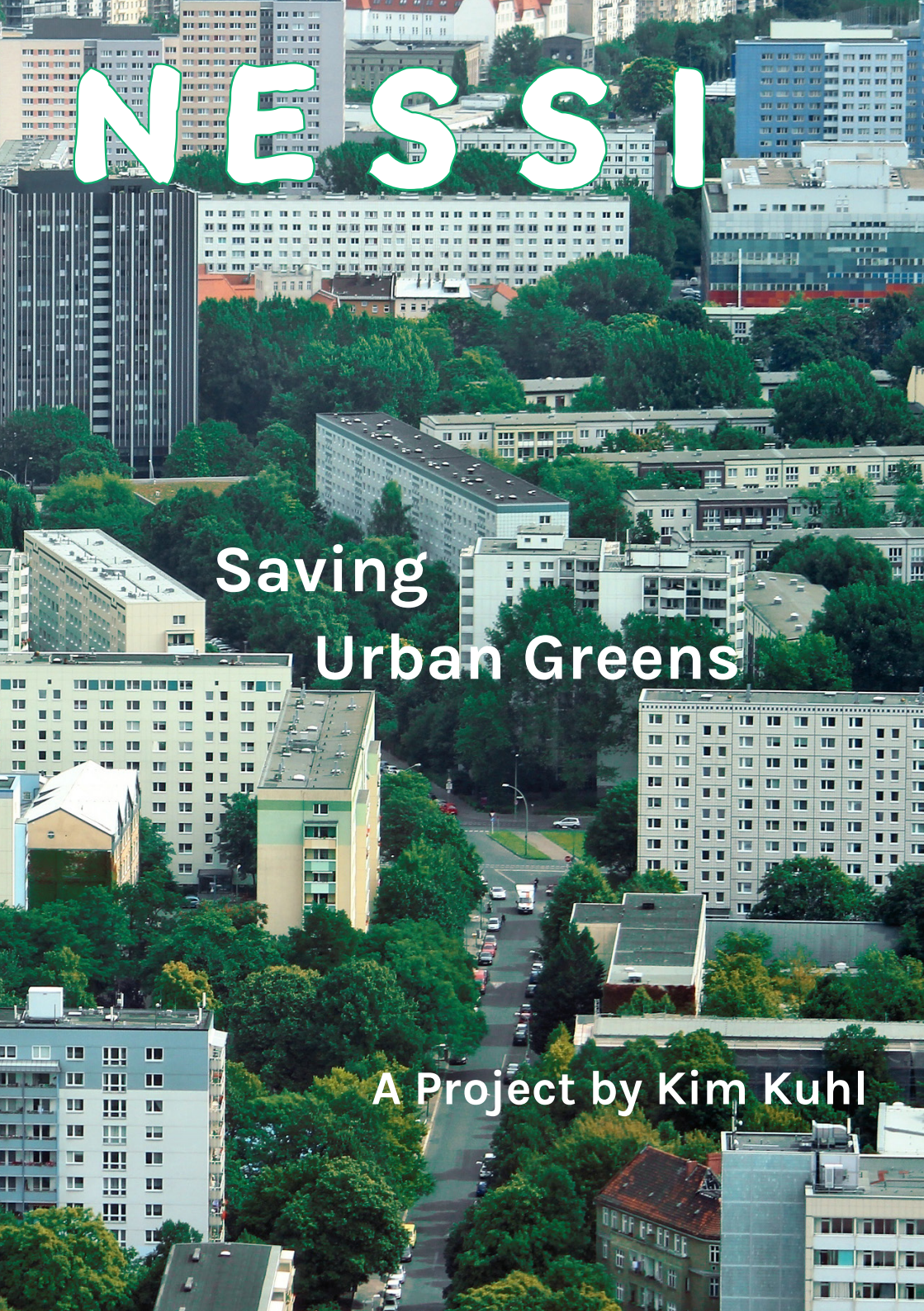
NESSI
Saving
Urban Greens
A Project by Kim Kuhl

Universität der Künste Berlin
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Strasse des 17. Juni 118, 10623 Berlin

NESSI – Saving Urban Greens

By Kim Kuhl
Semester Project: 'FIND A FACT & ACT' by
Design & Social Context – Udk Berlin, 2021

Supervised by Prof. Ineke Hans
Assistant: Maciej Chmara
Visiting Lecturers: Ottonie von Roeder, Alexandre Humbert

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FIND A FACT & ACT

A project by Design & Social Context, Udk Berlin.

The Anthropocene is a proposed geological era dating from the start of significant human impact on earth's geology and ecosystems including climate change. Man decides how rivers flow, where agricultural crops grow, and what 'untouched nature' can remain. Fossilized plant remains that have been stored in the soil for millions of years are excavated and burned en masse.

In this project we work with established facts as starting point for a project with positive impact.

How do we deal with nature?
In the anthropocene we mix it up: Farmland is sprayed with pesticides and bees find a better refuge in the city where flowers thrive without it. In cities surfaces have been paved and sealed, so that rainwater no longer finds its way to the flora and fauna that depend on it.
How can we mix with our environment in a way that it helps nature instead of hurting it? [1]

A

A collage on the project's website

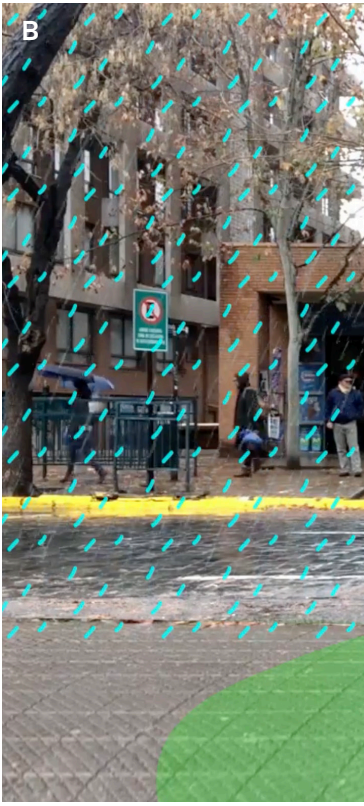
430 000 city trees are located in Berlin.

Over the last two years, 7000 of these trees have died as a consequence of drought.[2]

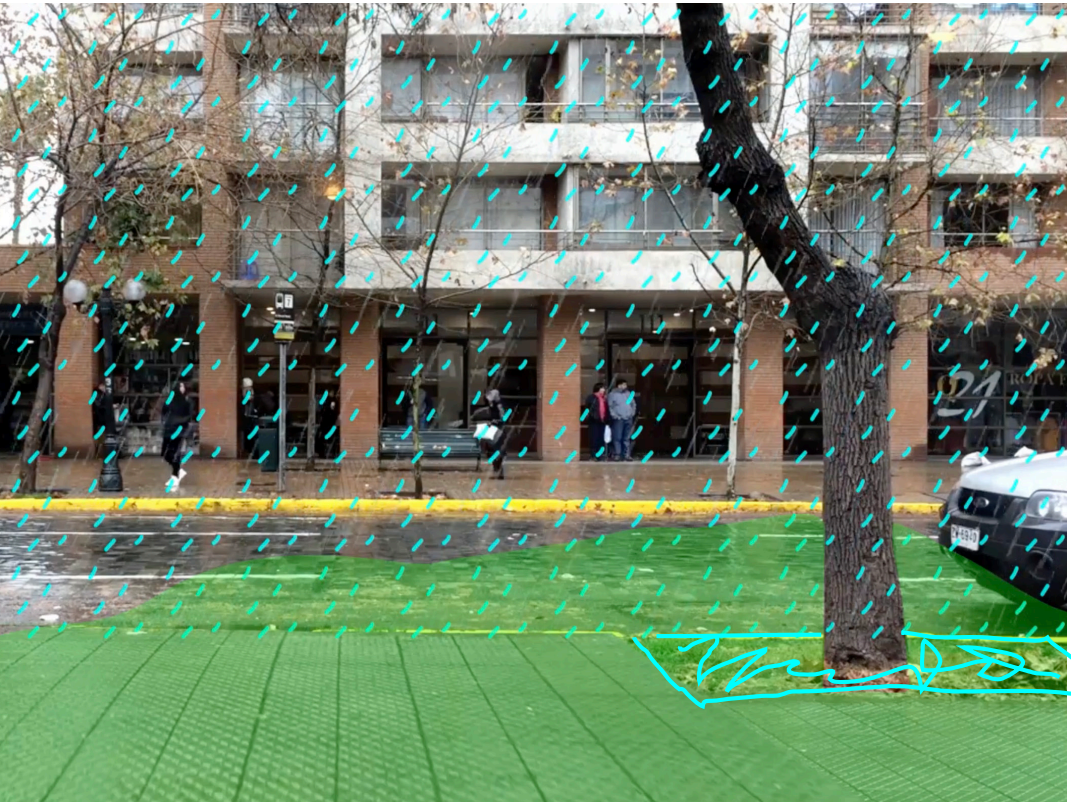
Too small tree grates are a significant reason for city tree drought. The down seeping water flows through their surface to the roots. In Berlin, tree grates typically only measure 1.50 by 1.50m. Forest trees, by comparison, have the area of their crowns irrigated when raining– this is around 10 times greater.

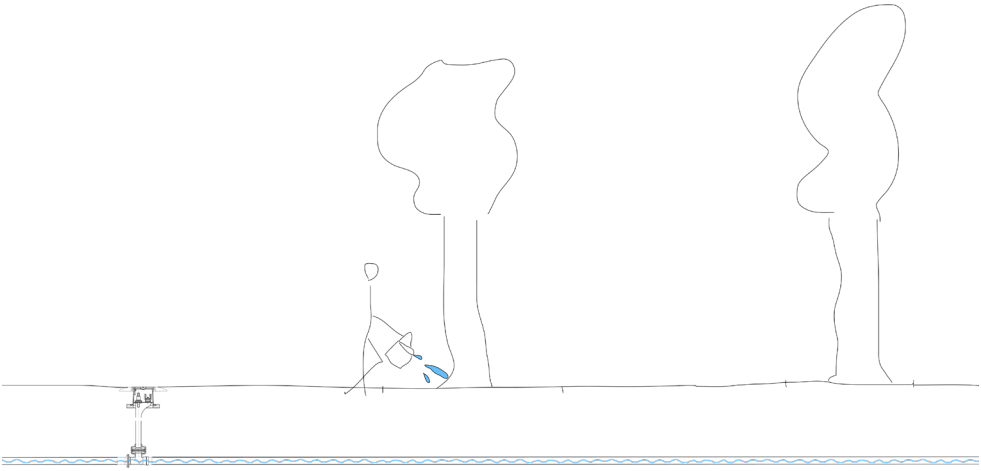
Under these circumstances, city trees, on pavements especially, are only able to store minimal water and can't photosynthesise properly. The additional burden of climate change, like more frequent heat waves, leads to decreased biomass and leaves and subsequently to the death of the trees.

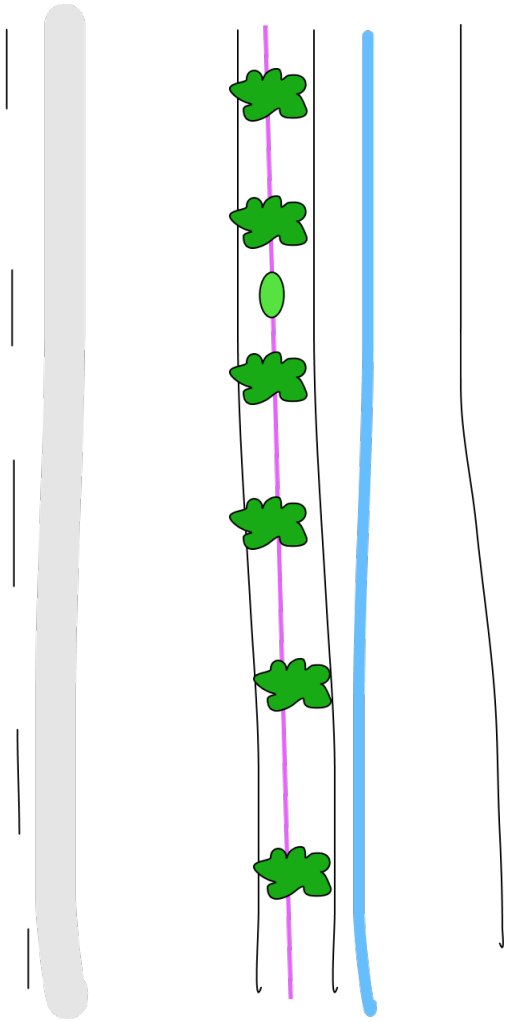
In Berlin, there is no fixed solution for watering street trees. The twelve district offices organise the watering of the street trees on their own deciding whether to carry out the additional watering themselves or by commission gardening, landscaping companies, the firebrigade or the BSR. [3]



B Comparison irrigation area between forest trees and city trees.

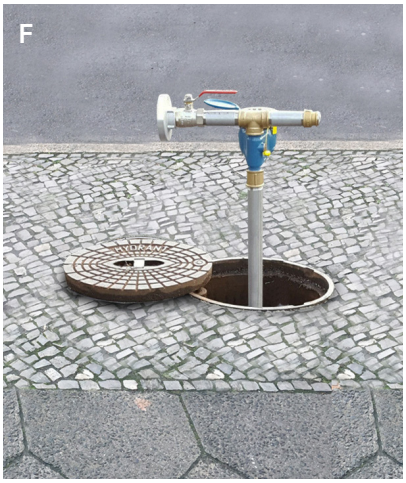




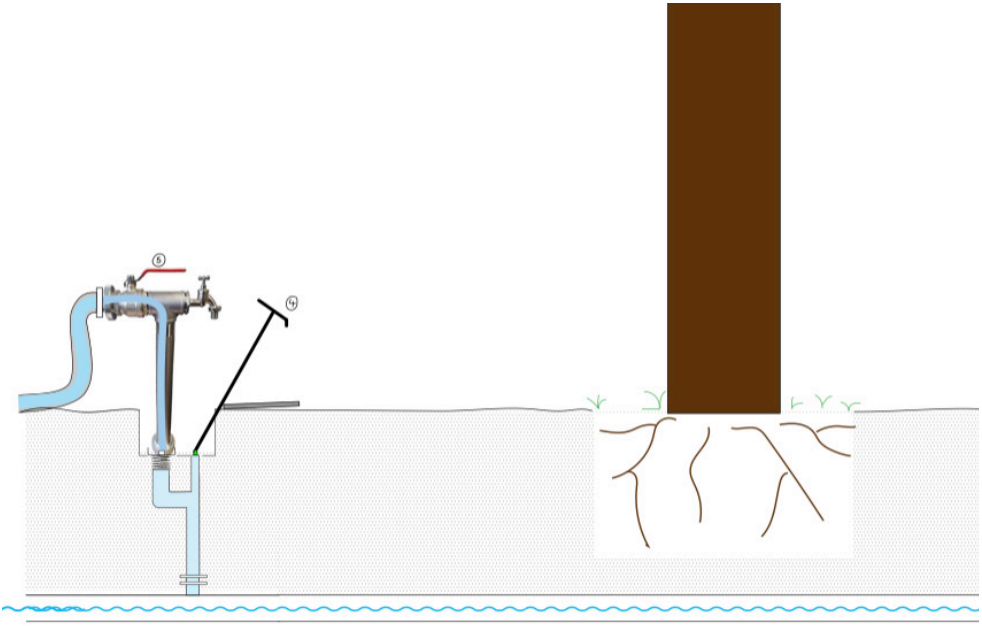


69 000 underground hydrants are located in Berlin. In dense areas, they can be found every 100 to 150m on the lower part of the pavement.[4]

Underground hydrants provide access to the supply lines and are located near the trees on pavements.

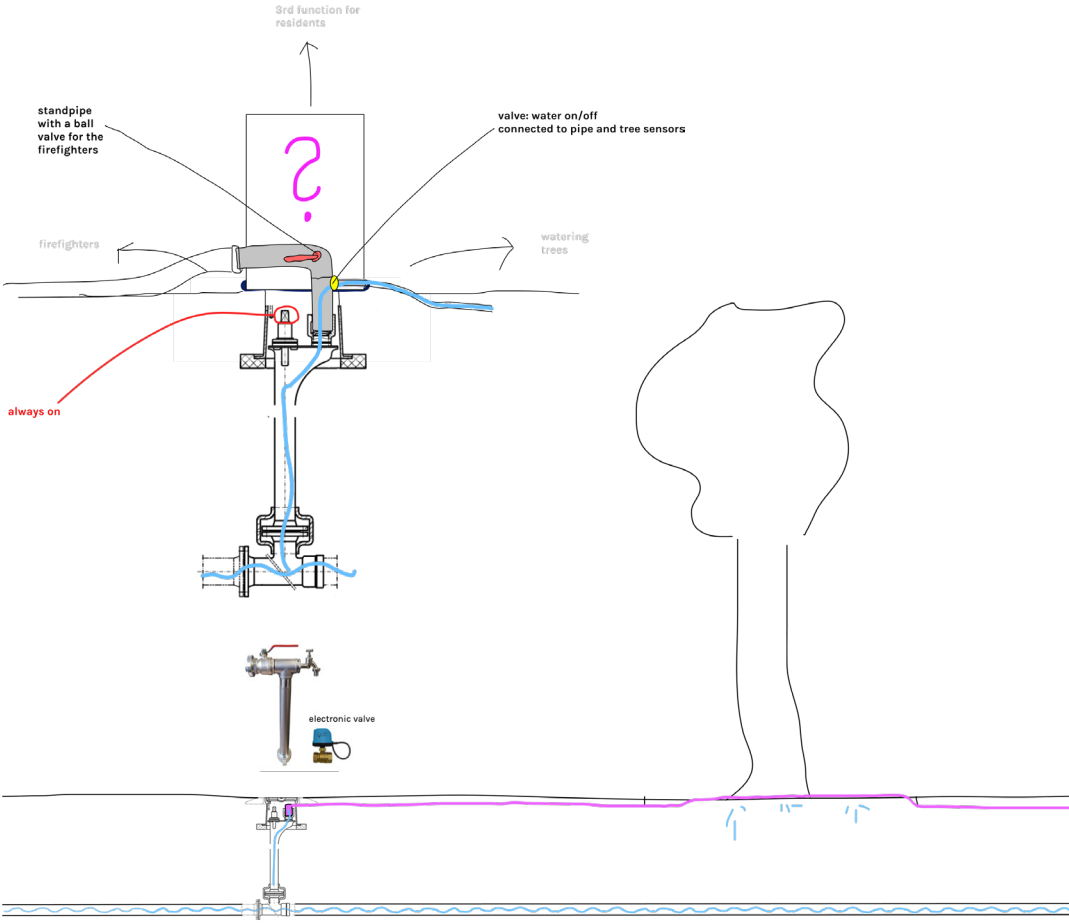


Hydrants are usually used in firefighting. A standpipe is placed in the open hydrant and the main valve is opened. then the valve on the standpipe can be opened.

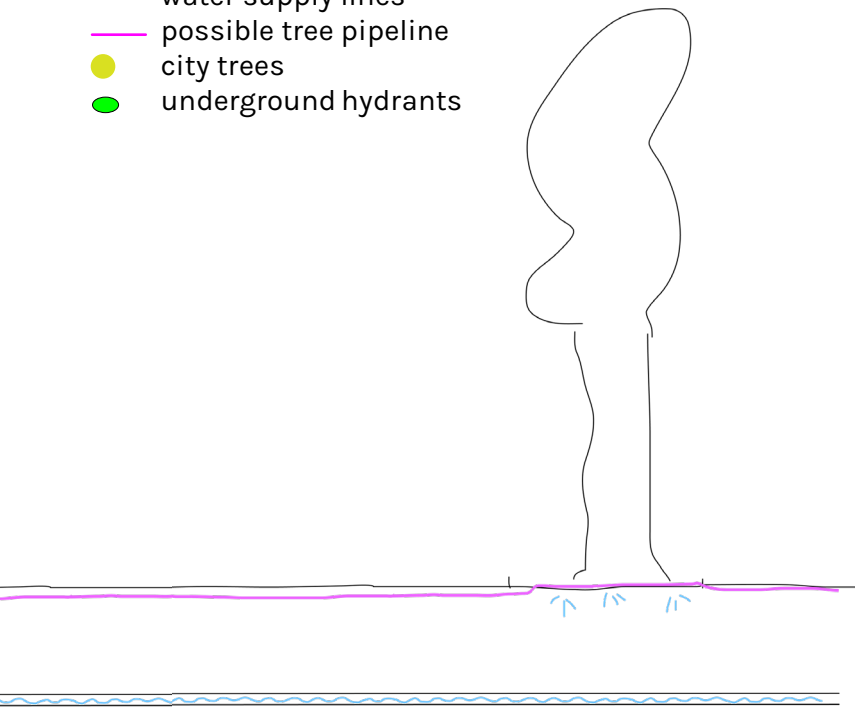


My project‘s strategy is to hack the existing system by combining the use of hydrants with the drought of trees.

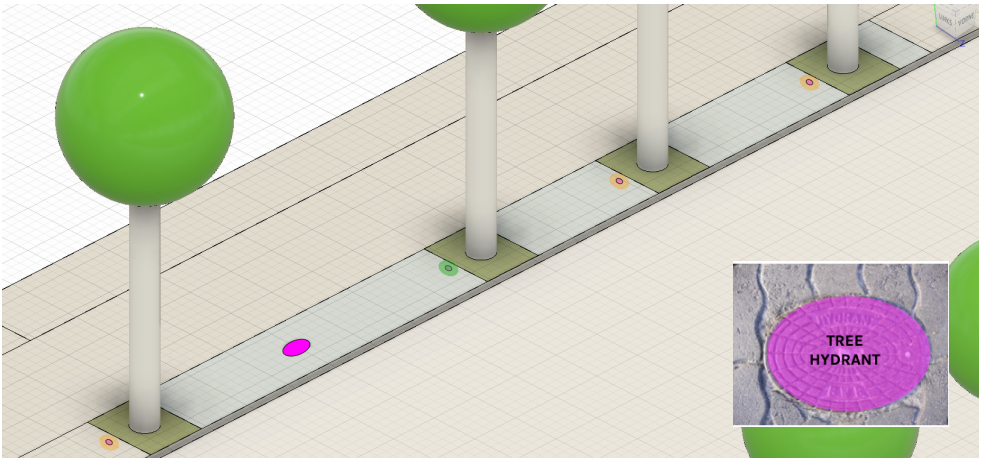
The resulting design approch is to find a solution that connects the trees on pavements with the underground hydrant.



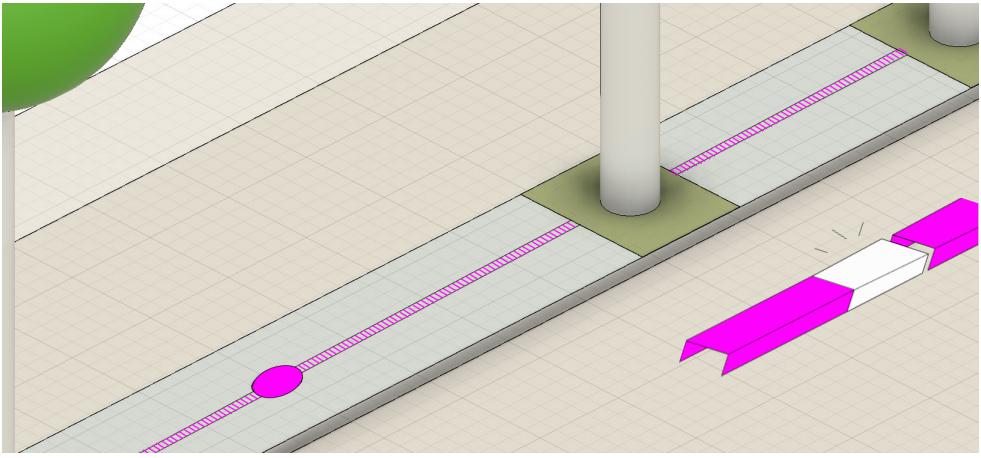
water supply lines
possible tree pipeline
city trees
underground hydrants



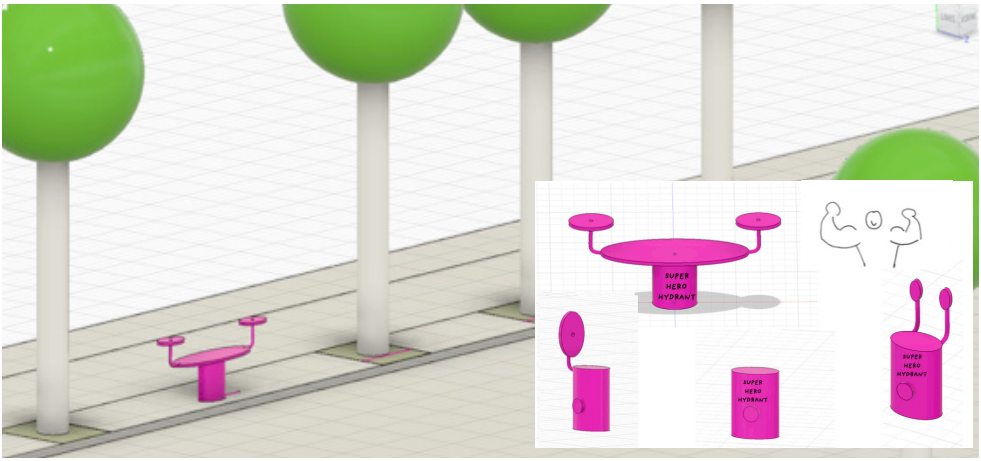
idea 1: tree traffic light
underground pipe, trees and hydrants are marked: hydrant with new hydrant cap, trees with LEDs



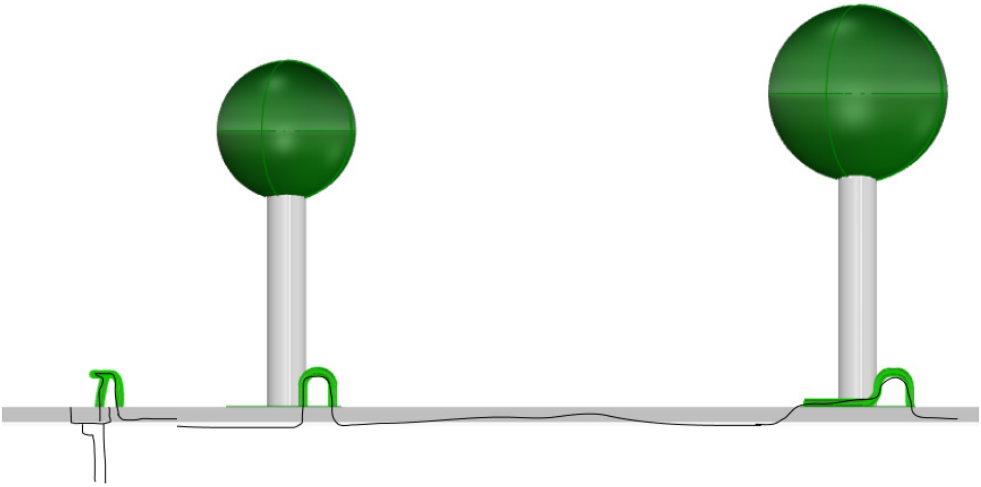
idea 2: Baumgitter tubes
visible line from hydrant to trees, modular connection system of elements like grids and lamps

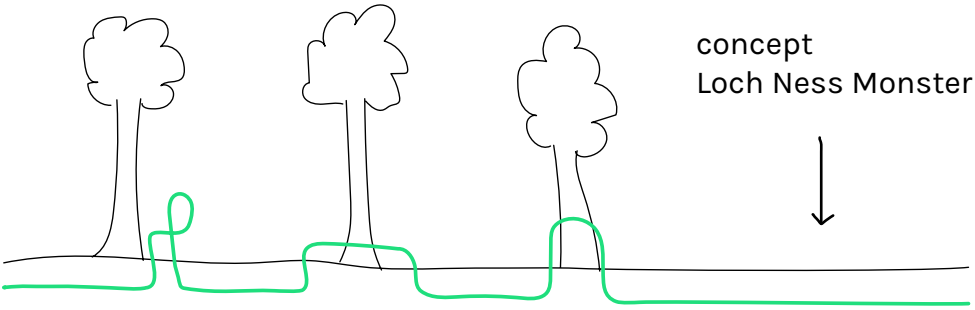


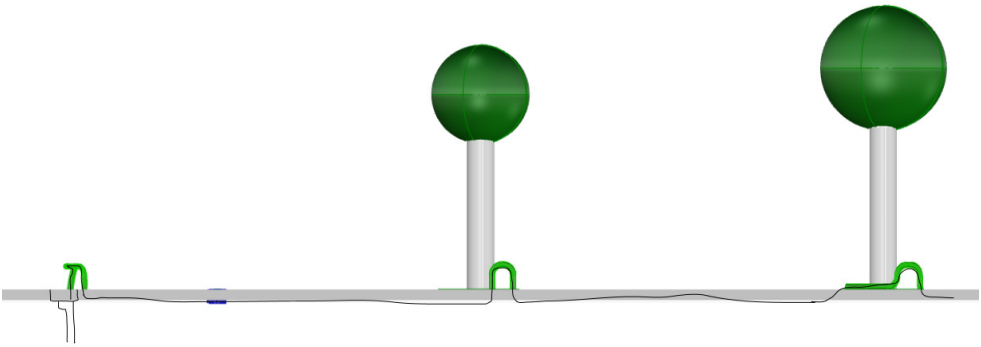
idea 3: Super hero hydrant
underground pipe, mark the objects with heroic attitude objects, super hero hydrants saving the trees



idea 4: Loch Ness monster
pipe that winds up and down. trees and hydrants are marked with objects, alle objects are designed with the same pipe?



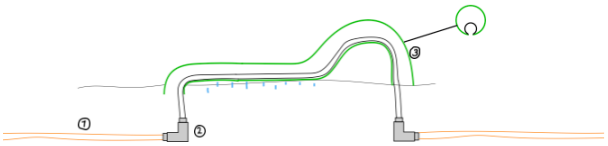


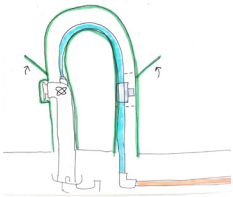


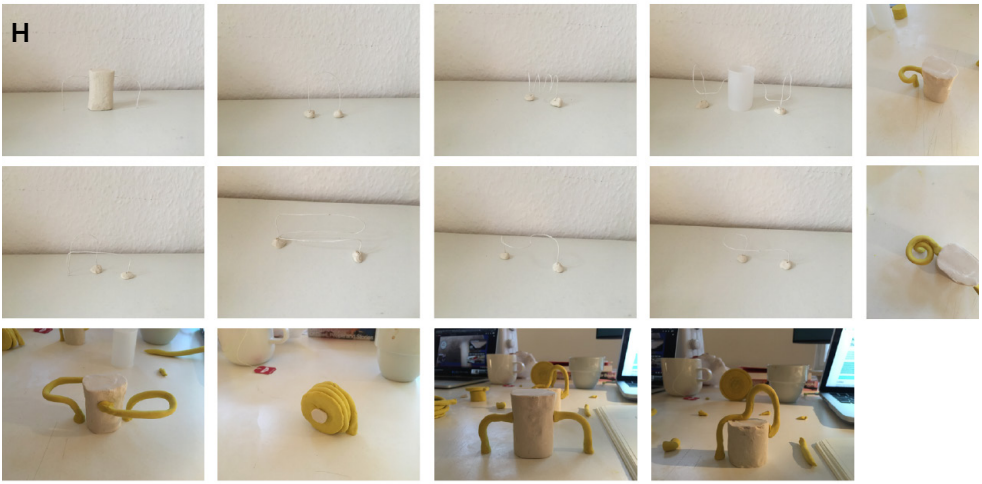
bicycle rack

stool

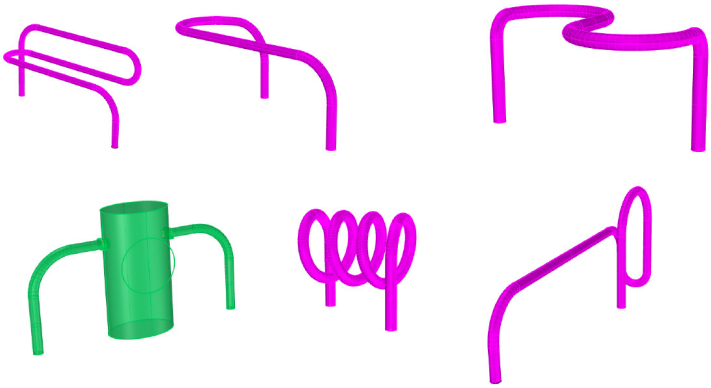
tree protection /
bench

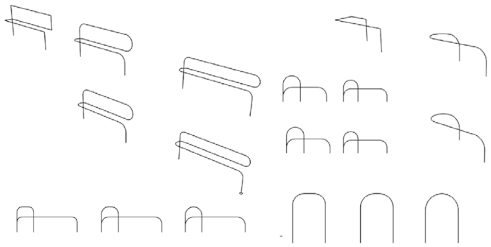






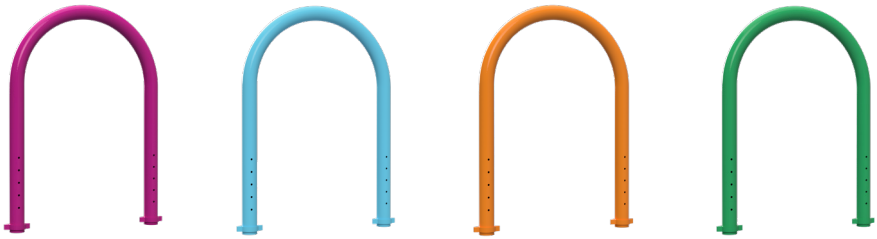
G+H form finding with wire and modelling clay



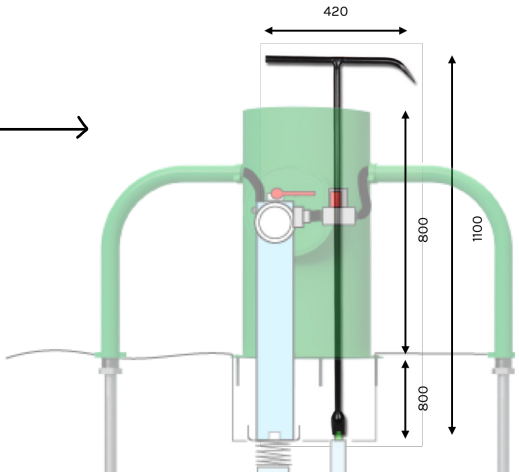


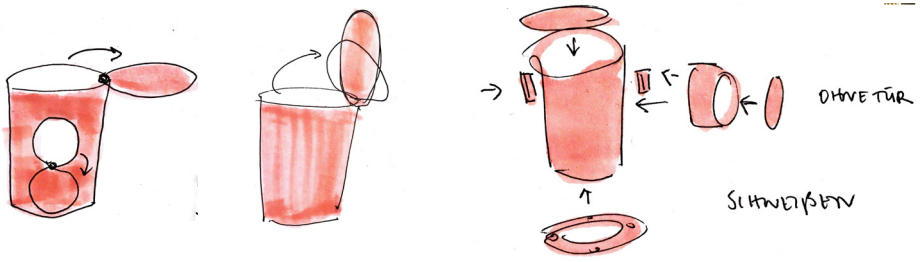
deciding on objects that offer usage possibilities for seating and for bikes

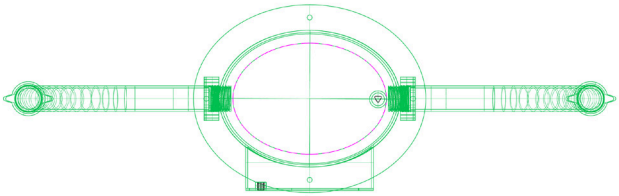
color decision

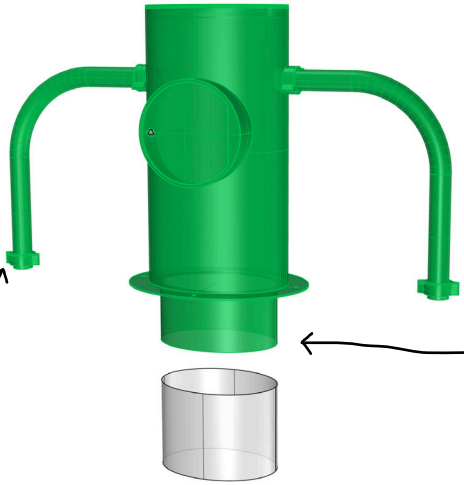


hydrant object must be able to be opened up to switch the whole system on an off at main valve with hydrant key /for maintenance

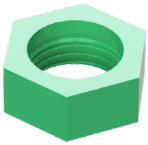




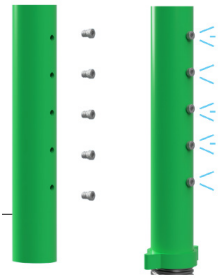




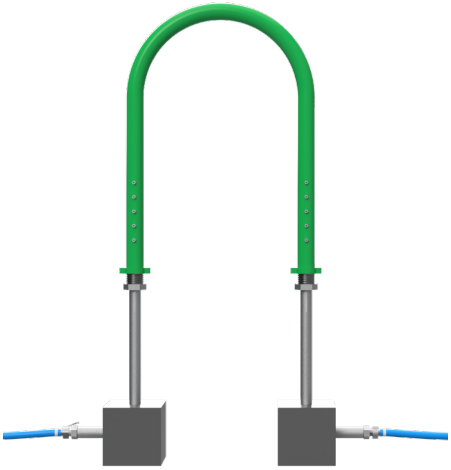
foot that fits the open hydrant to stabilize when installed.

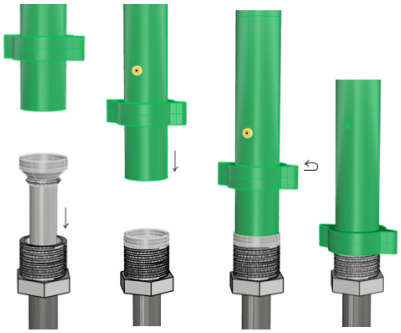


bigger union nut without wings

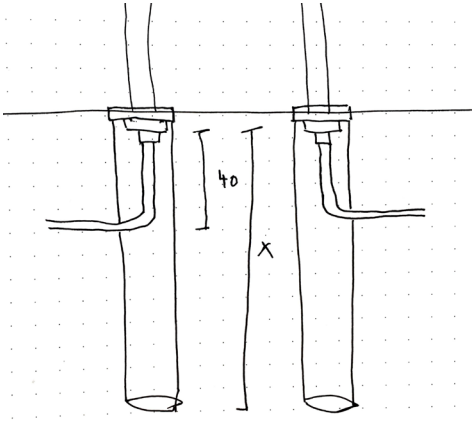


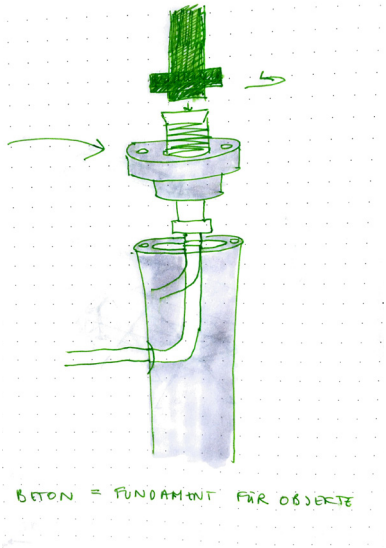
only one nozzle per leg!

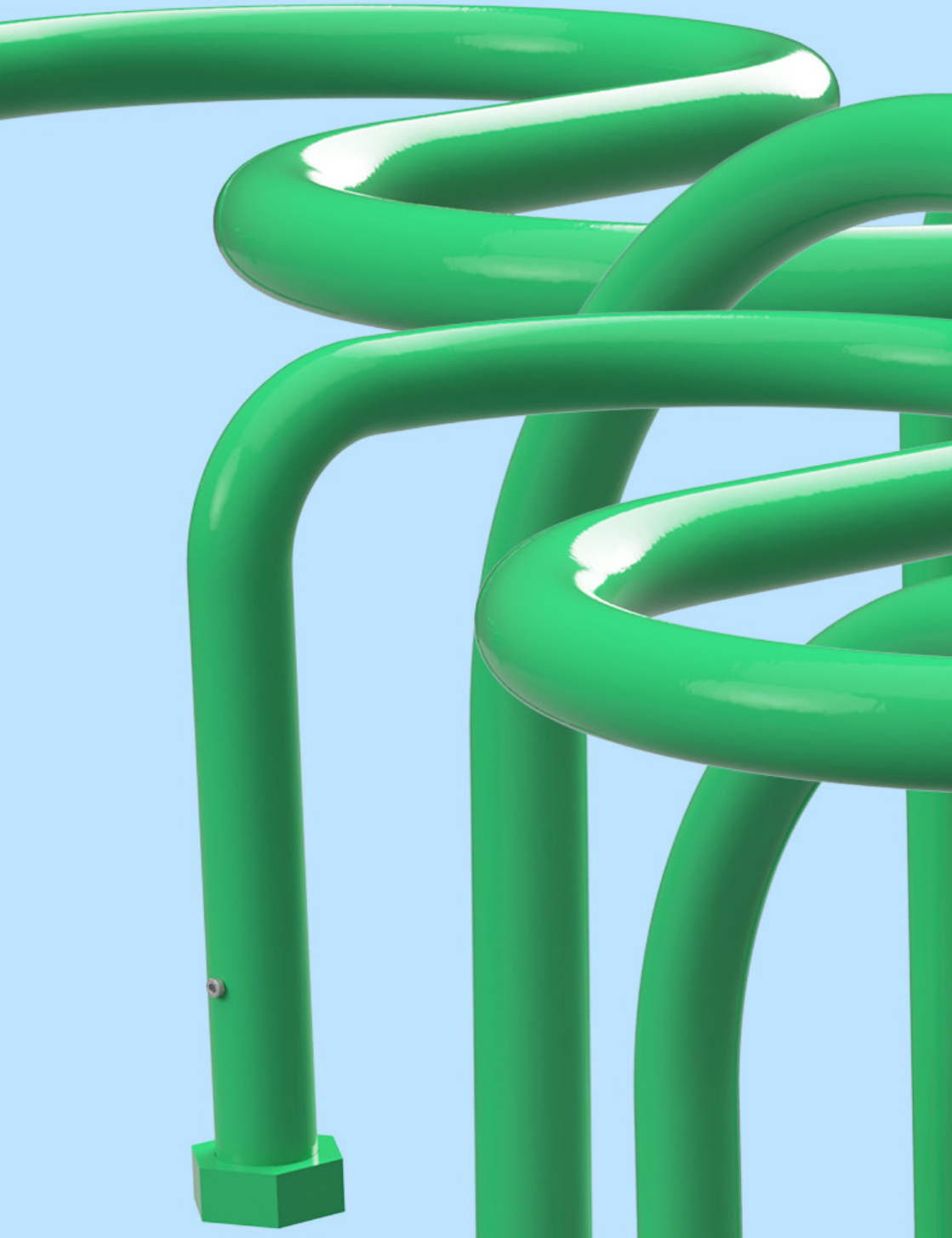


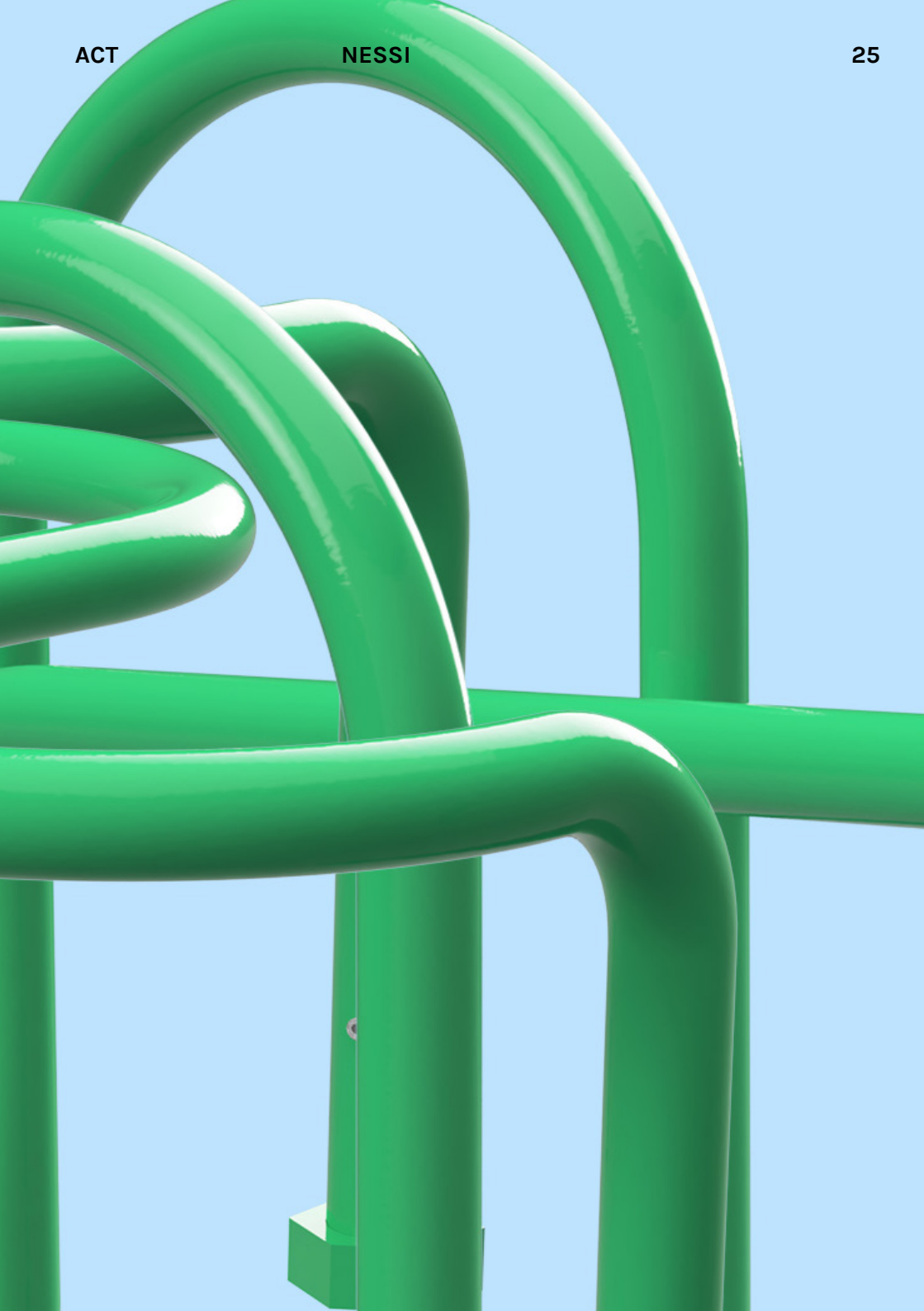


edited underground construction:
steel tube as foundation





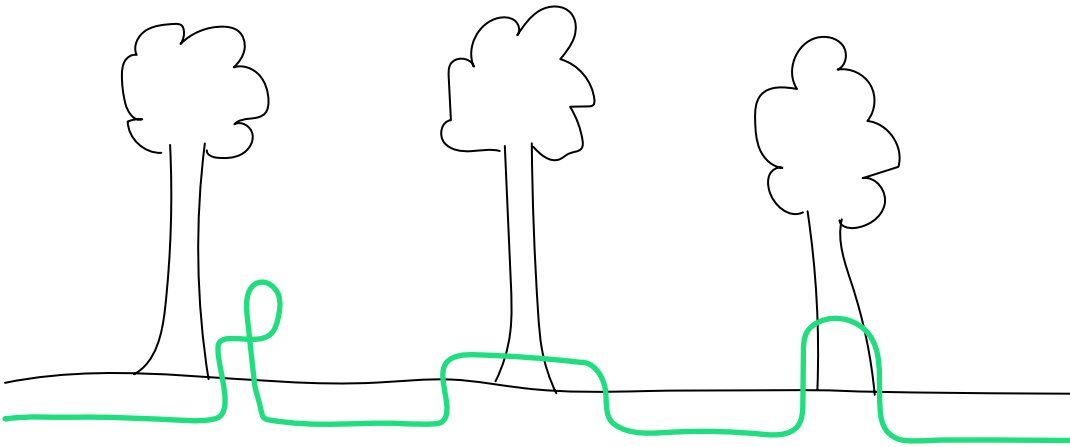




ACT:
NESSI – Saving Urban Greens

Can’t we give our trees a hand?

NESSI contributes to the saving of urban greens tackling the draught of city trees with a simple irrigation system on pavements that makes use of the existing infrastructure of hydrants.



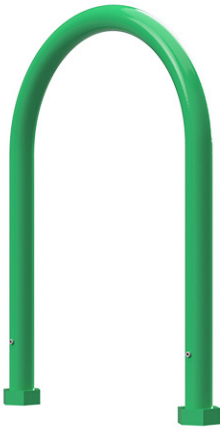
Recap:
In Berlin, 430 000 city trees are located. Over the last two years, 7000 of these trees have died as a consequence of drought.

Too small tree grates are a significant reason for city tree drought. The down seeping water flows through the surface to the roots. In Berlin, tree grates typically only measure 1.50 by 1.50m. Forest trees, by comparison, have the area of their crowns irrigated when raining– this is around 10 times greater.
Under these circumstances, city trees, on pavements especially, are only able to store minimal water and can't photosynthesise properly. The additional burden of climate change, like more frequent heat waves, leads to decreased biomass and leaves and subsequently to the death of the trees.

At the same time, there is a functioning water cycle system under Berlin's pavements. **Underground hydrants provide access to the supply lines and are located next to the trees.** To stay fit, the city's water cycle system and hydrants should be used regularly.

object 0: NESSI

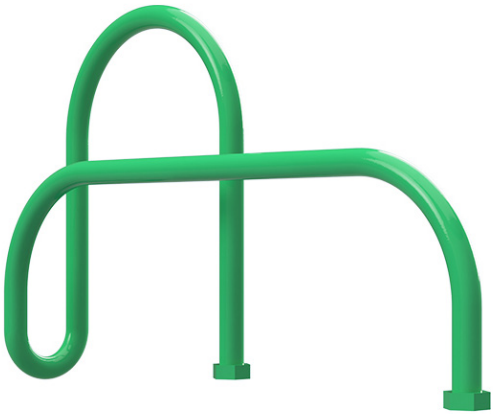
object 1: bike rack



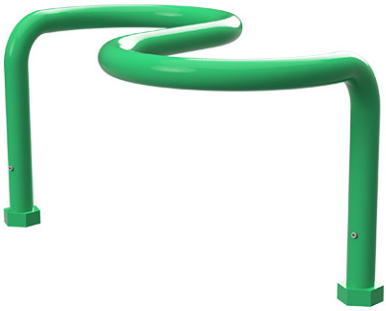
The NESSI objects are a series of four.

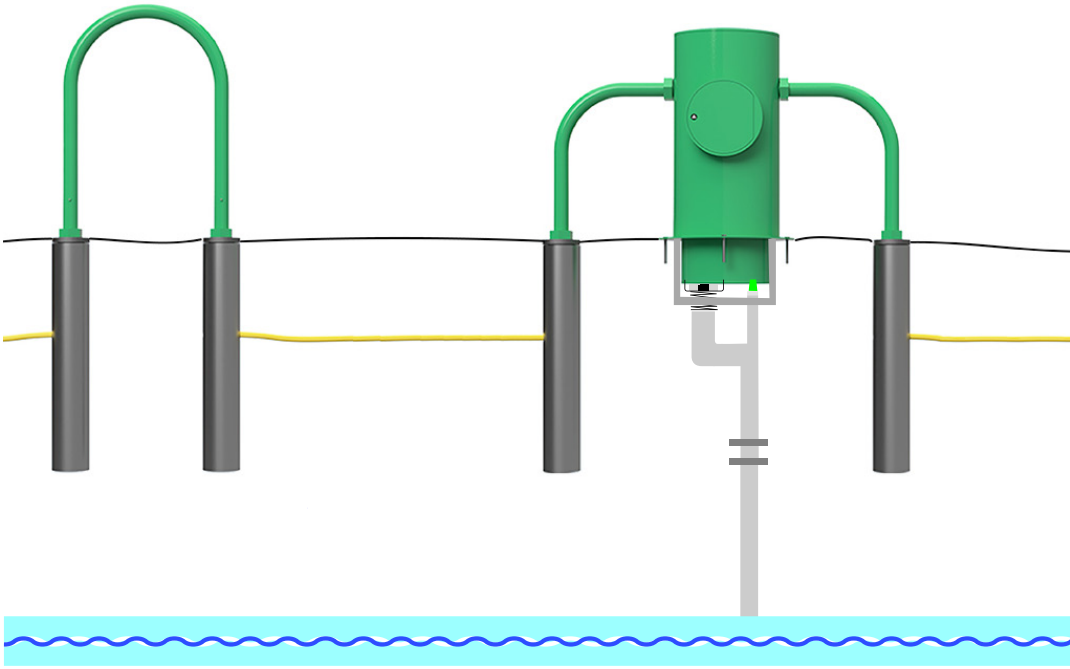
Each object is designed to provide irrigation aswell as usage possibilities for residents.

object 2: bench



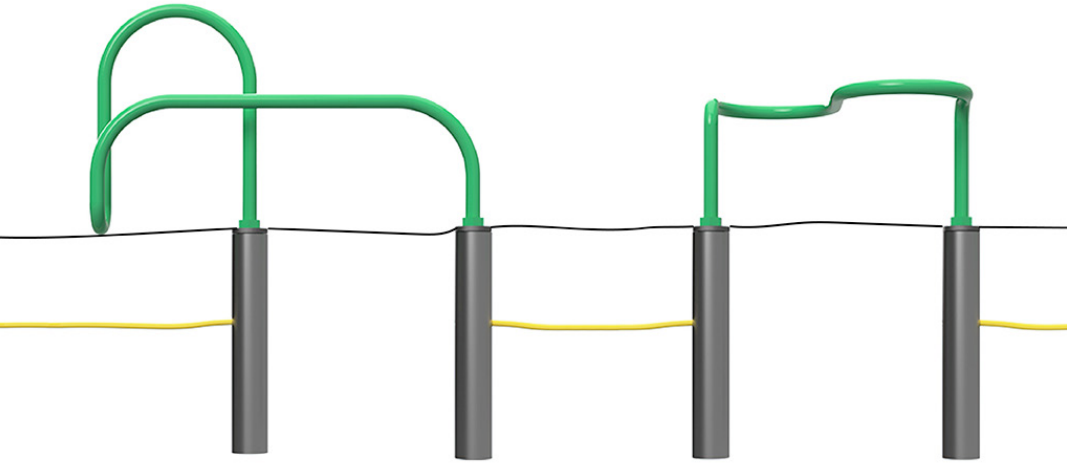
object 3: loveseat





NESSI hacks the existing system of pavement hydrants that have direct access to the water supply lines.
To share the water, NESSI docks to a hydrant and winds its way through Berlin's streets from bottom to top.

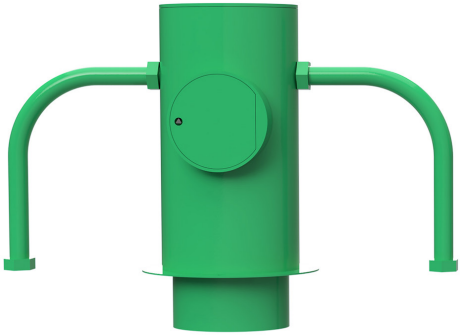
The NESSI irrigation system is divided into an underground and an above-ground part – From the hydrant, water is directed automatically to the trees through NESSI's pipeline that lies under the pavement and pops up by the trees.



The principle used is an automated irrigation system from horticulture. It can be adjusted via an irrigation computer located in the object above the Hydrant. The adjusted setting determines when and how much the trees should be watered.

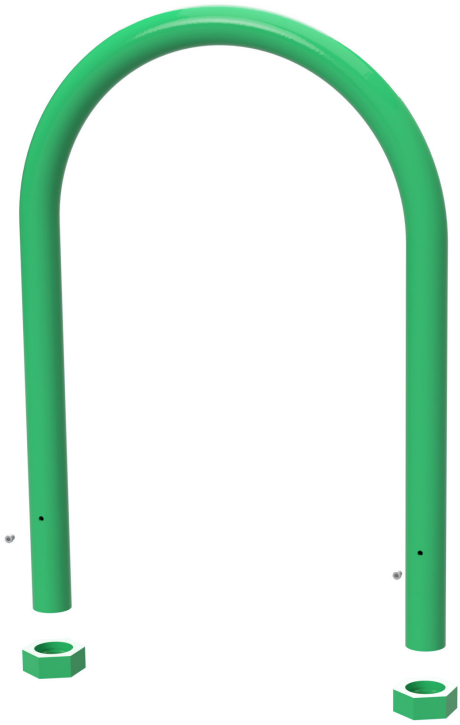
NESSI waters therfor optimized, regularly and self sufficiently.


HYDRANT



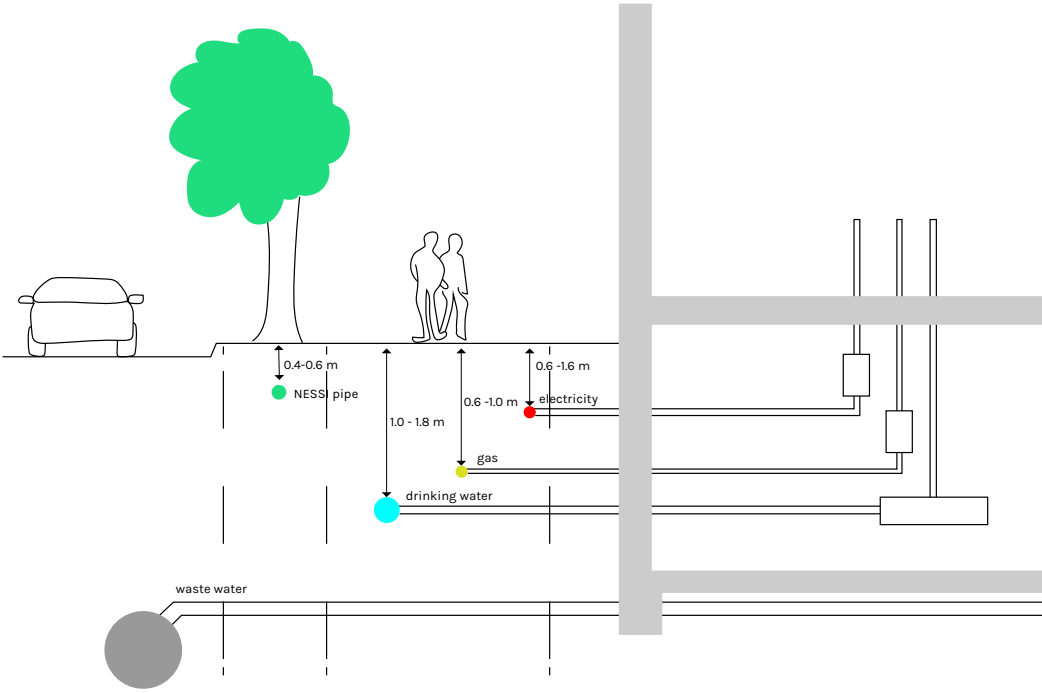
Depending where NESSI is located (end or middle of the street) and whether NESSI irrigates in two directions or only in one direction, two or one arm(s) are attached.

NESSI keeps hydrants always well flushed and therefor in good condition.
The object is designed to give enough space for irrigation technology and to continue providing easy access for firefighters when needed.



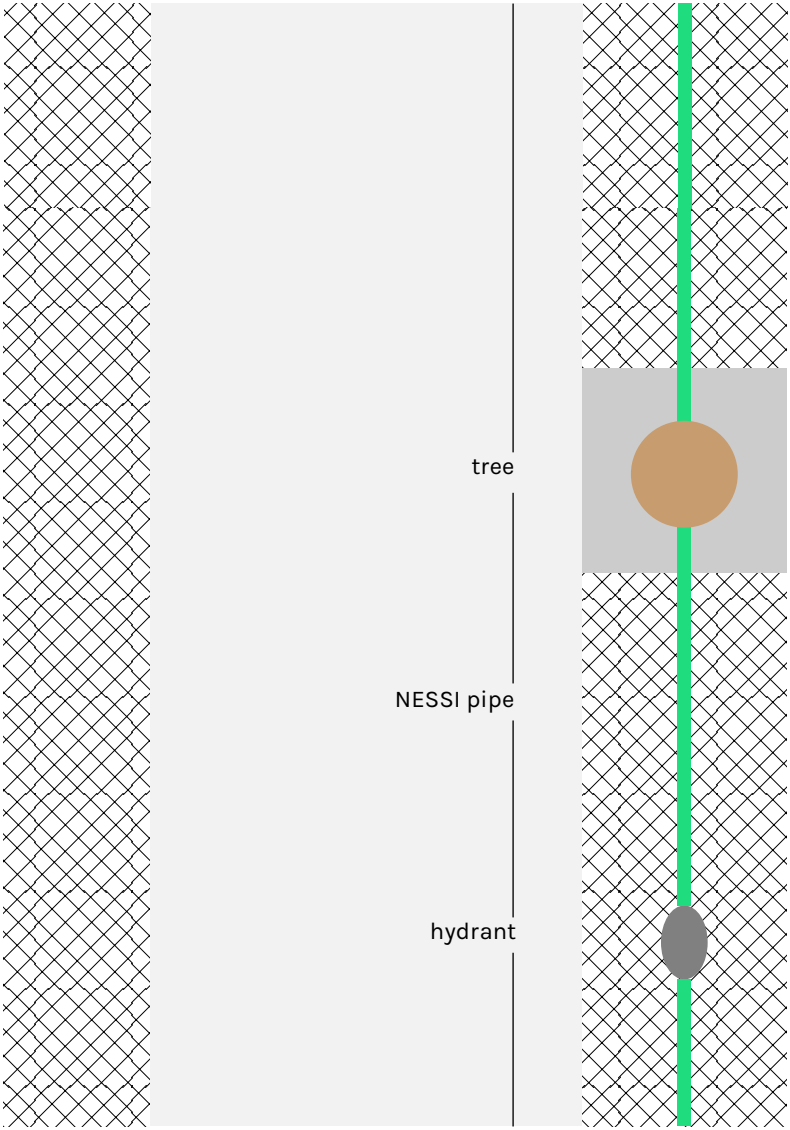
The trees are irrigated above ground via nozzles by the NESSI objects.

Being irrigated with the same principle of an automatic irrigation system from horticulture, the system can be adjusted via an irrigation computer. The setting determines when and how much the trees should be watered.

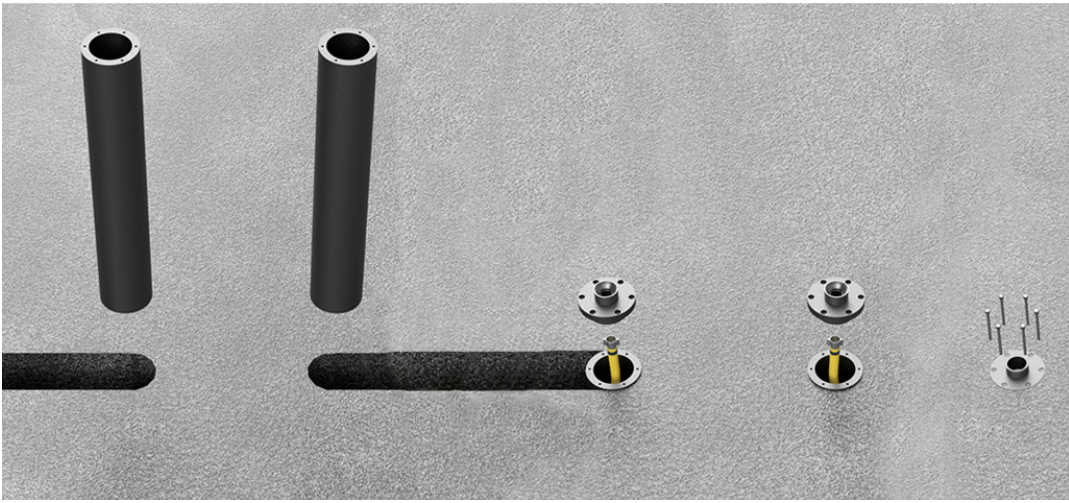


In Berlin, it is hard to lay a new pipe infrastructure from a certain depth since there are already many pipelines installed and it means extensive road work.
NESSI works with the typical berlin pavement that is found in most of the side streets in Berlin. Usually, it is divided in 3 parts of which the upper and the lower one are laid with small paving stones that are easy to remove and lay again.

The NESSI pipeline is laid at a depth of only 40 -60 cm. Without extensive road works, a pipeline can be laid here. NESSI‘s pipeline is located under the lower strip of the pavement where the hydrants are located,too.
For not breaking from the pressure, the NESSI pipeline is a flexible hose.



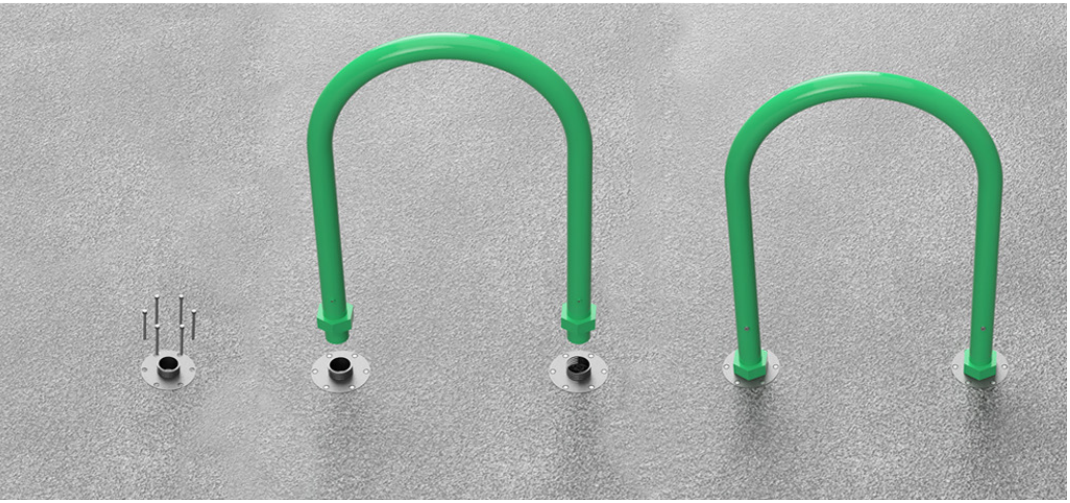
Oberstreifen	Mittelstreifen	Unterstreifen
small pavement stones	granite slabs / asphalt	small pavement stones



To install, the NESSI system is divided into an underground and an above-ground operation.

Underground

First, the foundation pipes are sunk into the ground. From there, a narrow pit is dug into the pavement from the hydrant along the row of trees. To do this, the small paving stones of the typical 'Unterstreifen‘ of Berlin pavements are taken out and a flexible hose is laid in at a depth of 40-60 cm and led upwards through a hole in the foundation pipe. There, they are connected to the lid of the foundation pipe. In the end, the same stones are put back to close the pit again.

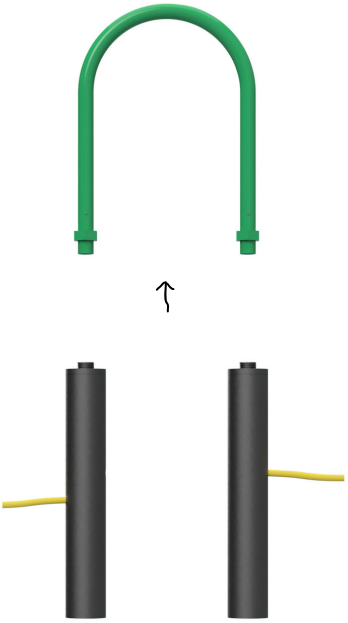


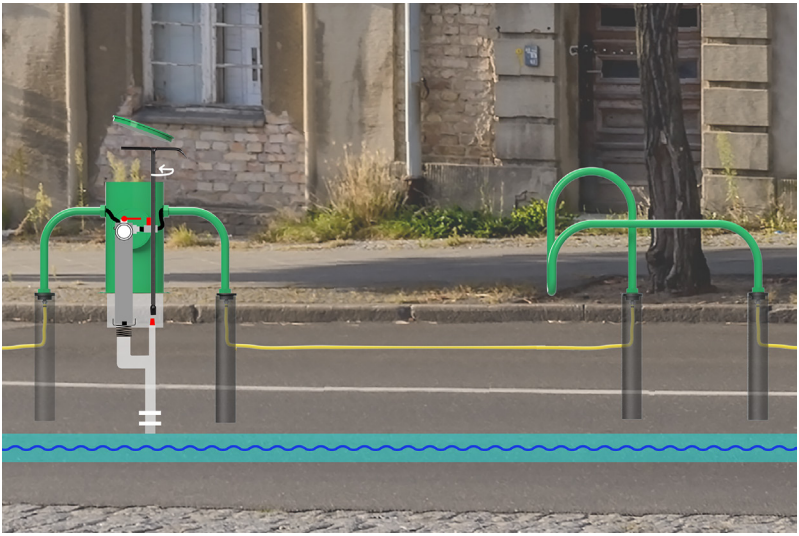
Above-ground

The NESSI objects are now mounted on the lids lying in the floor.

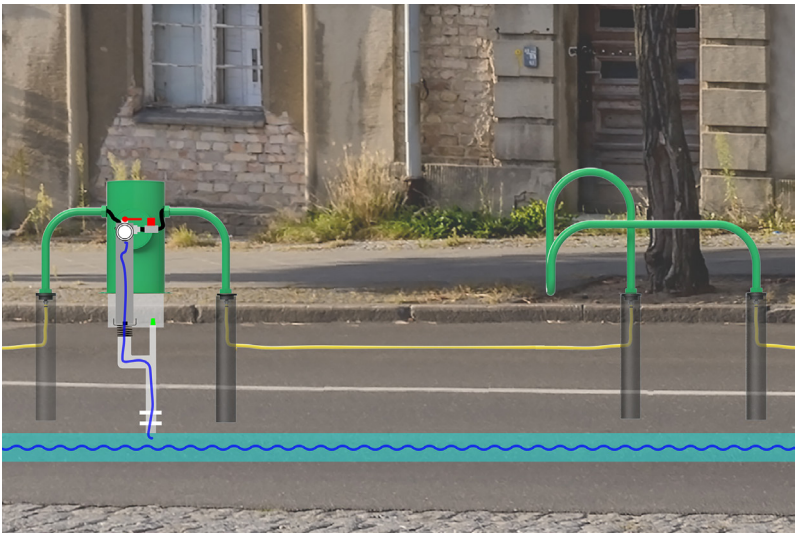
This system makes it easy to mount and change the objects easily without having to dig up the ground again.

Since NESSI is placed in public space, one have to think about accidental or purposeful damage.

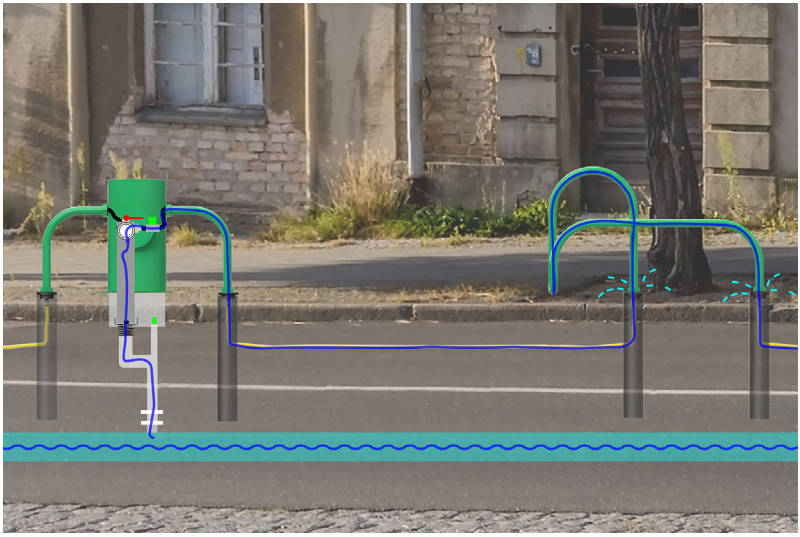




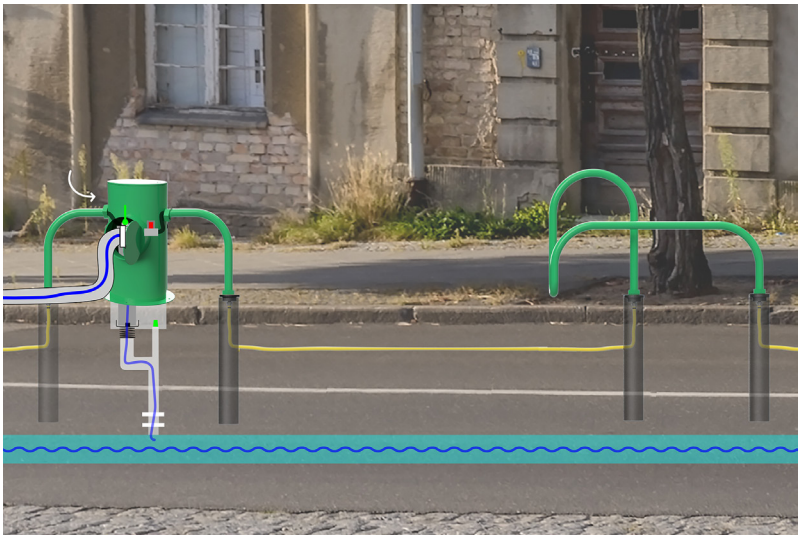
Turning-on/off main valve with hydrant wrench to start/ stop water supply from the hydrant.
Scenario: Installation, dismantling, maintenance



Running system, upper valve off, tree watering off.
Scenario: Trees are watered enough



Running system, upper valve on, tree watering on.
Scenario: Trees need to get watered.



Opening door, connecting fire brigade hose, turning ball valve on the standpipe on to lead the water to the hose.
Scenario: Firefighting by firebrigade

Production steps
object 0

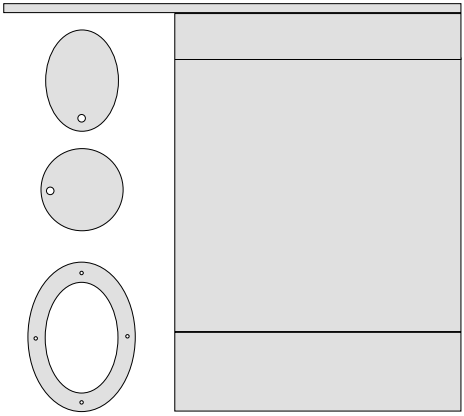
1. cutting steel sheets
   4 mm sheets

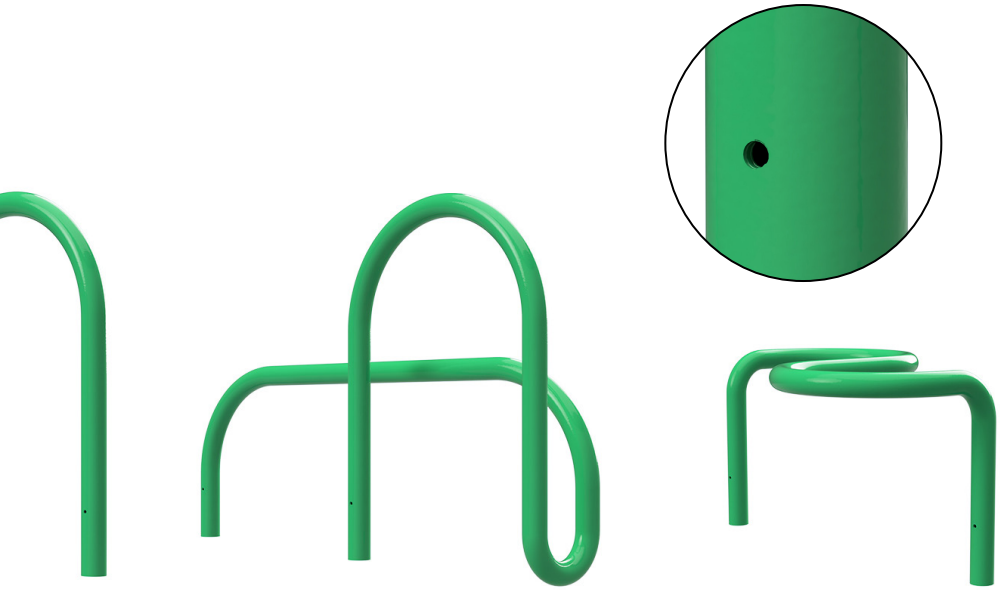
2. bending and welding cutted
   steel sheets

3. add threads

4. powder coating
   PANTONE 16-6240 TCX

5. add locks
   fitting for triangular wrench key





Production steps
arms object 0 + object 1 - 3

1. Bending steel tubes
   60.3 mm x 3.2 mm

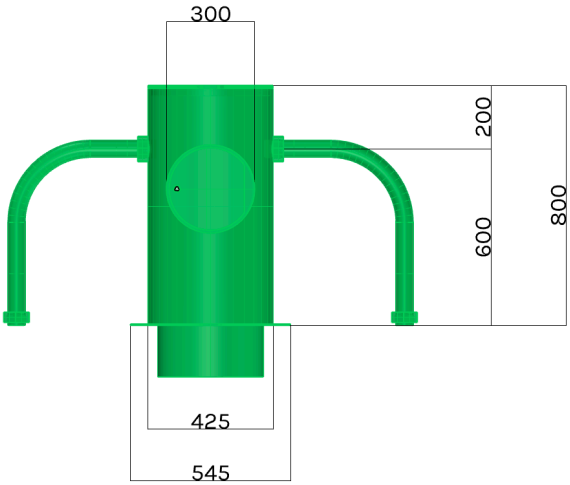
s: 3.2 mm
d: 60.3 mm

2. Screwing holes for nozzles

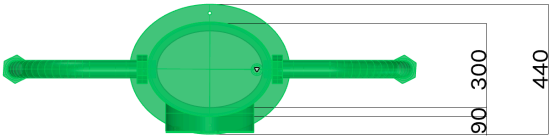
3. powder coating
   PANTONE 16-6240 TCX

Production steps
union nut

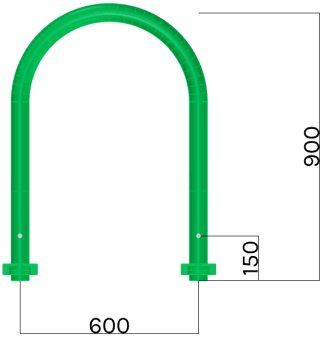
1. powder coating



object 0: NESSI
front



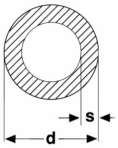
top



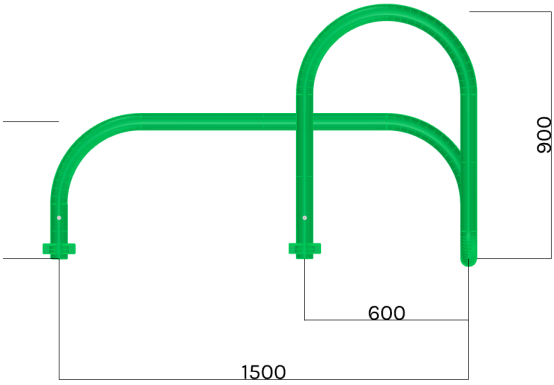
object 1: bike rack
front

pipes:

s: 3.2 mm
d: 60.3 mm

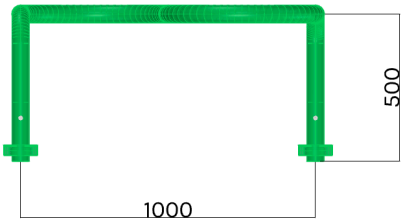


object 2: bench
front



top

object 3: loveseat
front



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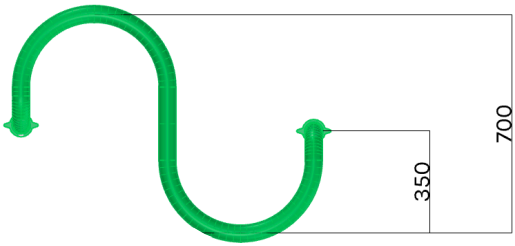
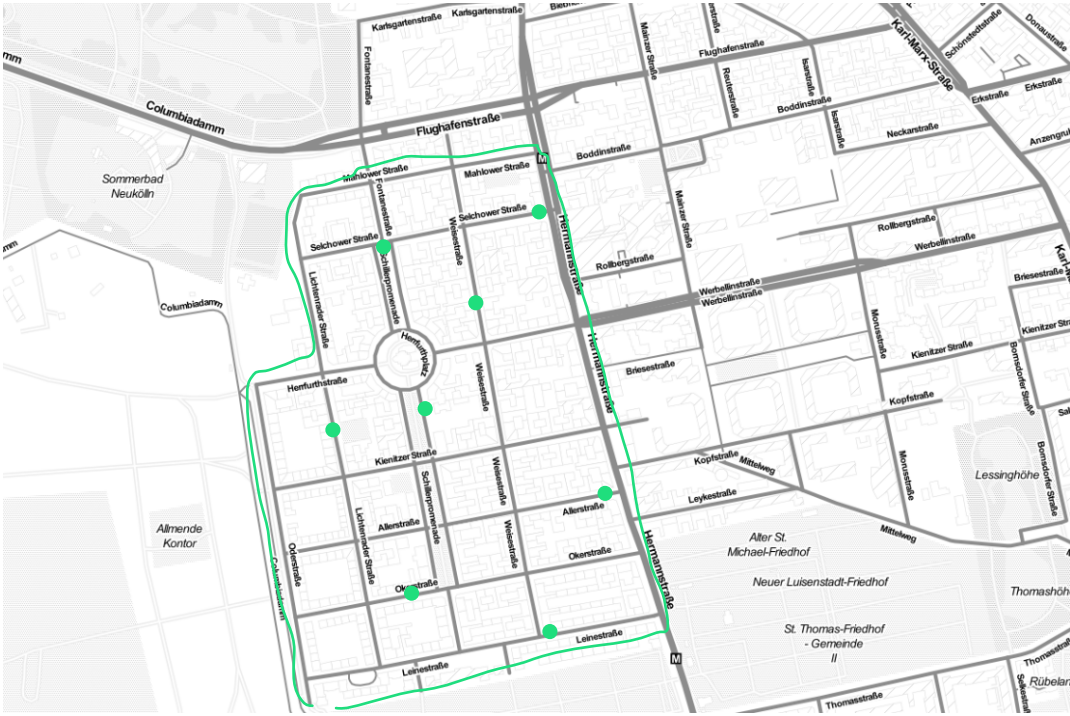


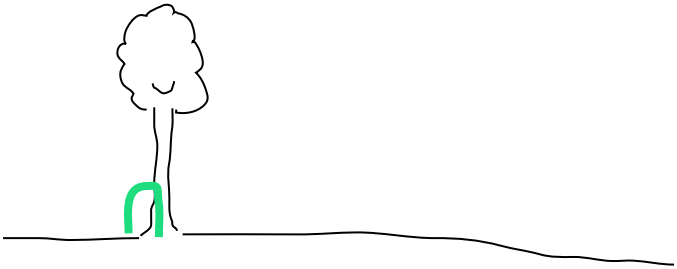
„Verpakt“:

Since NESSI works with the existing infrastructure of hydrants, the system is dependent on the location and condition of the hydrant.
69 000 underground hydrants are located in Berlin. In dense areas, they can be found every 100 to 150m on the lower part of the pavement.

NESSI can be embedded in any street where the location of the hydrant, and therefor the location of the first NESSI object doesn‘t disturb public life, like in driveways for example.

As an example, these Hydrants fit in Schillerkiez, Berlin Neukölln:





NESSI as an irrigation system for city trees can be an **imortant support for young trees in the first two years of growth.**
NESSI could be embed where new trees are planted in urban space.


N

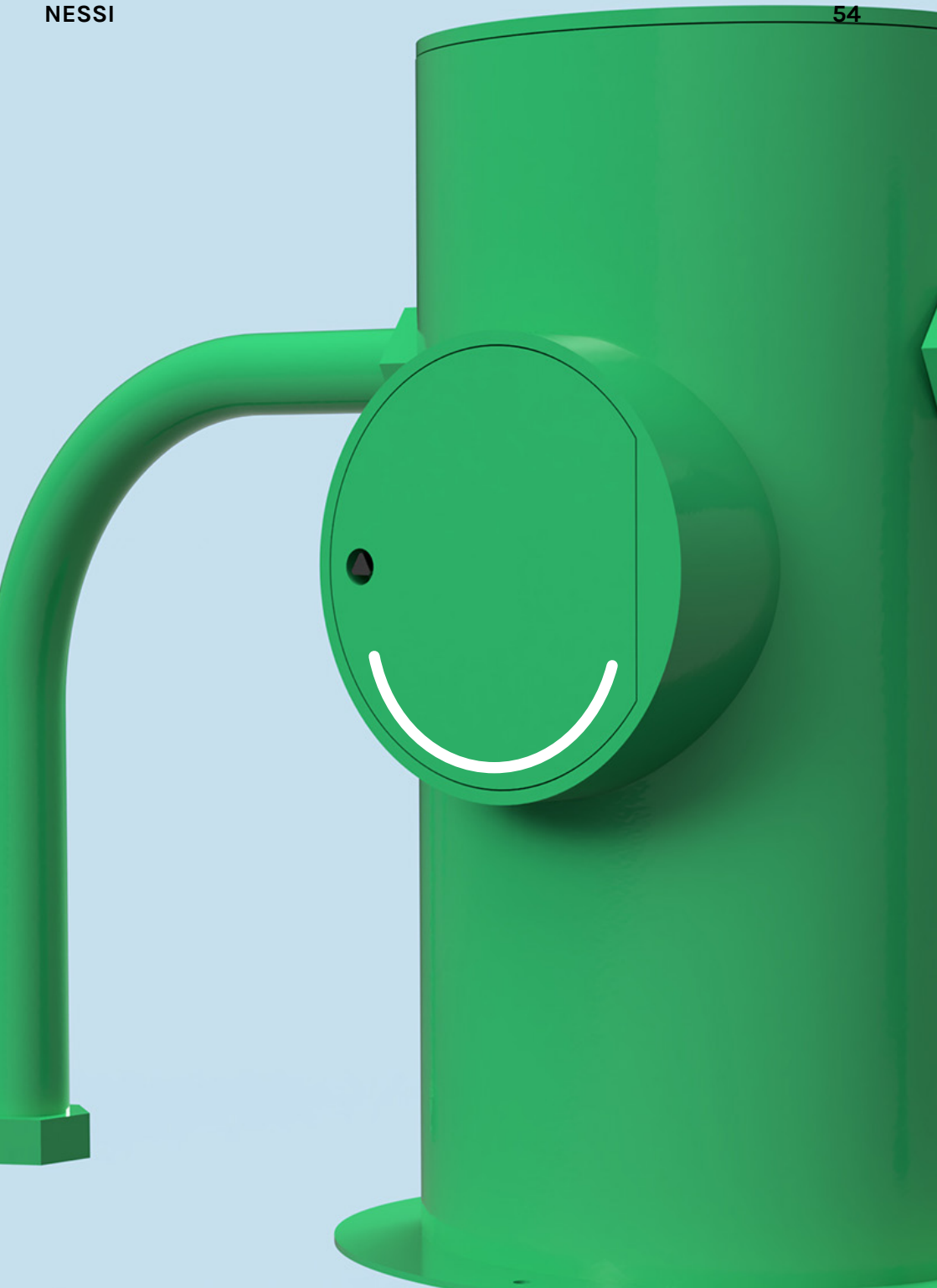
NESSI‘s Impact:
Saving Urban Greens

"There is an enormous public demand for cities to have a high-quality and sufficiently dimensioned green infrastructure as greens counteract the urban heat-island effect and provide fresh air particularly to dense areas." [5]

Watering city trees with small water reservoirs optimized, regularly and self sufficiently, NESSI gives our trees a hand, keeps them healthy and is contributing to the saving of urban greens.

Especially in phases of growth, NESSI can be a support for urban greens.

Additional impact: Making use of the existing infrastructure of hydrants, NESSI keeps hydrants always well flushed and therefor in good condition.



A	**p. 6**	design.udk-berlin.de/wp-content/uploads/2020/10/2000x1500-find-a-fact-and-act-1-regen-3-1.jpg
B	**p. 8**	Screenshot from video: bearbeitet.
C	**p. 10**	own picture
D	**p. 10**	Screenshot from: www.giessdenkiez.de/, bearbeitet.
E	**p. 11**	www.feuerwehr-herbrechtingen.de/img/imgberichte/2006/210506/100_0789.jpg
F	**p. 11**	own picture
G	**p. 17**	own picture
H	**p. 17**	own picture
I	**p. 22**	own picture
J	**p. 30**	www.shutterstock.com/de/purchase/success?orderId=CS-0A4E9-A608, bearbeitet.
K	**p. 34**	own picture, bearbeitet.
L	**p. 37**	own picture, bearbeitet.
M	**p. 50**	Screenshot from: https://www.google.com/maps/, bearbeitet.
N	**p. 52 cover**	www.shutterstock.com/de/image-photo/berlin-germany-capital-city-residential-architecture-492564643, bearbeitet.

1 **p. 6** Online: www.design.udk-berlin.de/lehrangebot/find-a-fact-act/

2 **p. 8** Online: www.tagesspiegel.de/berlin/trockenheit-bedroht-stadtgruen-wie-sich-strassenbaeume-retten-lassen-und-was-das-kostet/25766292.html

3 **p. 8** Online: www.berlin.de/pflanzenschutzamt/stadtgruen/beratung/bewaesserungsempfehlung-fuer-stadtbaeume/

4 **p. 10** Online: de.wikipedia.org/wiki/Hydrant

5 **p. 53** 21BB Model Region Berlin Brandenburg, Barbara Hoidm und Wilfried Wang, 2020, p.23

'NESSI – Saving Urban Greens'

A project by Design & Social Context

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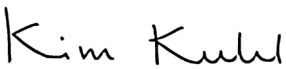
I, Kim Kuhl, declare that I have done this work independently, using only the sources and aids indicated.



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NESSI – Saving Urban Greens