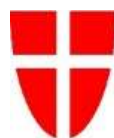


POČÍTÁME S VODOU 2024

Modro-zelená infrastruktura a kvalita vody

X ROČNÍK
• KONFERENCE



City of
Vienna

Environmental
Protection

- **Urban Heat Islands Strategy Vienna:**
 - Examples of success and challenges in
 - implementing Blue-Green Infrastructure



Tasks of the City of Vienna – Environmental Protection

Spatial Development section – Team City Climatology:

DI Jürgen Preiss (head)

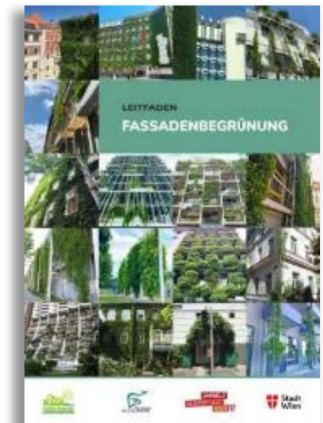
DI Max Wittkowski (climatology)

Mag.^a Eva Unger (advice)

Ing. Franz Fillafer (funding)

Main tasks & projects:

- **Urban climatology** & sustainable development – support of planning processes
- **Funding** for green buildings 0,5 Million Eur/year
- **Information work, Assistance**
- **Research collaborations** with external partners from university, NGO's, companies, associations...



Green infrastructure: aspects of water

- 1. Climatic aspects:** evidence of the cooling effects
- 2. Economical aspects:** Construction costs, maintenance
- 3. Regulation:** more obligation?
- 4. Financial Support** for greening buildings and cooling streets
- 5. Sponge City systems:** diverse systems!

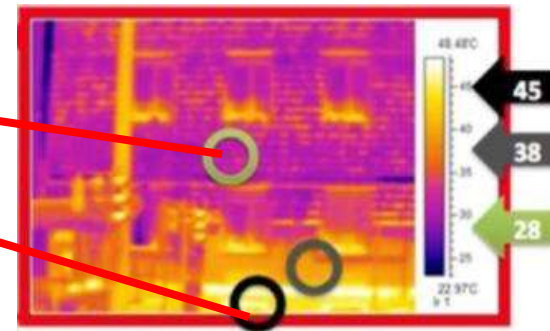
Cooling Effect of Green Infrastructure: measurable?



Measurement of heat flow:

- 50 % less heatflow (W/m^2) in summer.
- 20 % less heatflux in winter

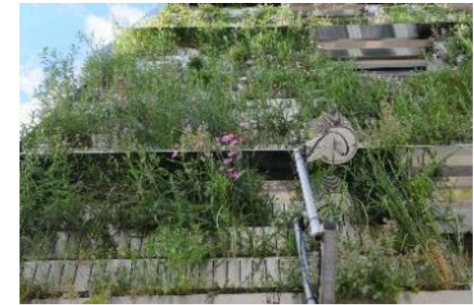
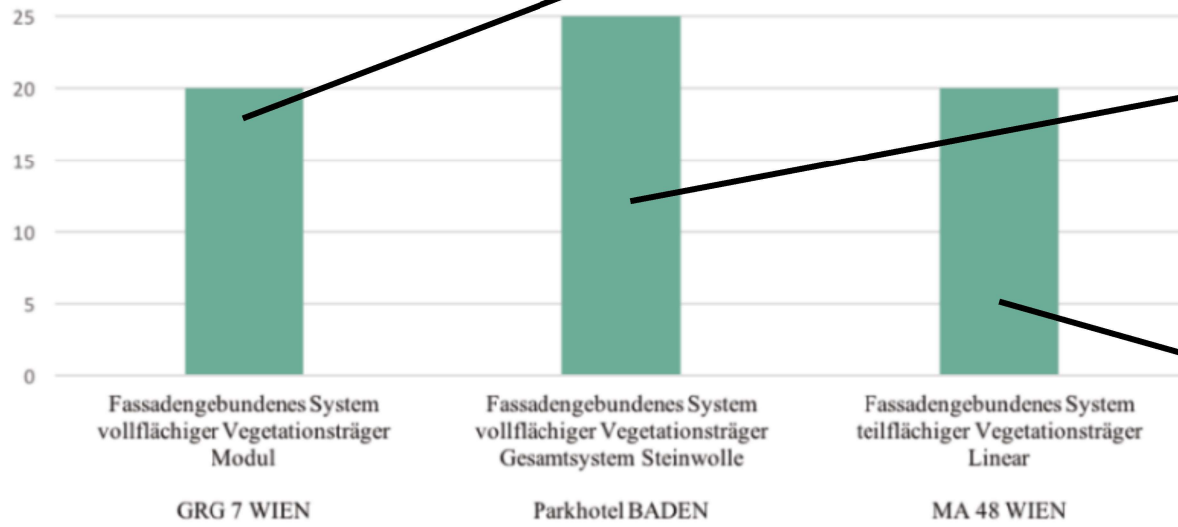
©Azra Korjenic et al, Bernhard Scharf (2012)



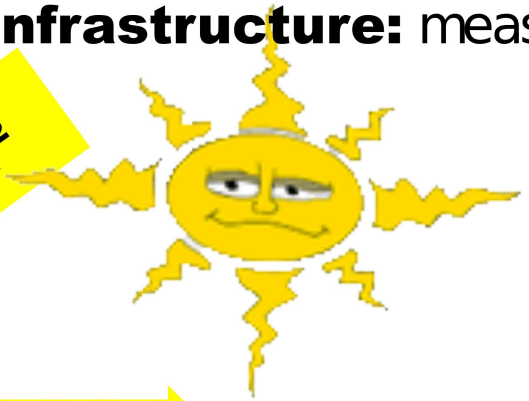
Cooling Effect of Green Infrastructure: measurable?

Reduction of heat transmission (%)

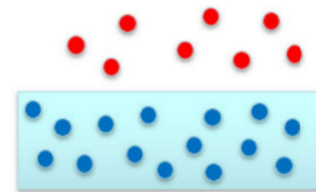
(U-Value) green facade vs im ungreen facade



Cooling Effect of Green Infrastructure: measurable?



Transpiration of 1 Liter Water you need: 2.257kj



Enormous cooling capacity

Vaporization of 1 m³ of water: 680 kWh

Drive 1,000 km (60 liters diesel) approx. 600 kWh

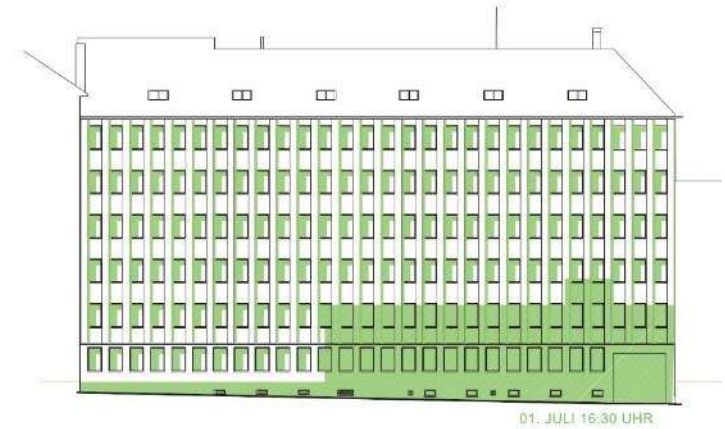
Cooling Effect of Green Infrastructure: measurable?



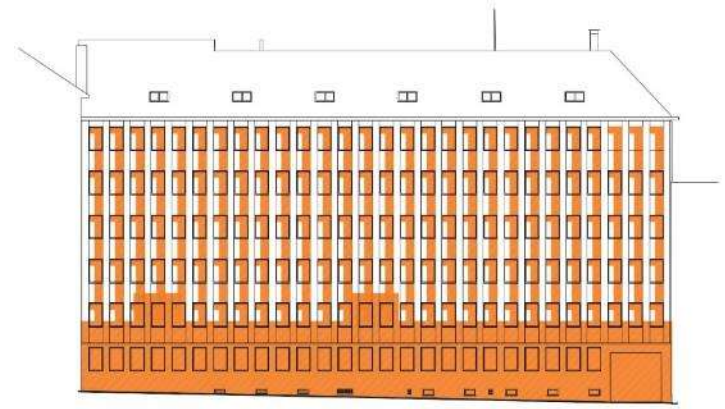
2015
© MA 22 Preiss



2024
© MA 22 Preiss



01. JULI 16:30 UHR



01. MÄRZ 12:00 UHR

3D-Model with shadow formation on the facade © Rataplan

Cooling Effect of Green Infrastructure: measurable?

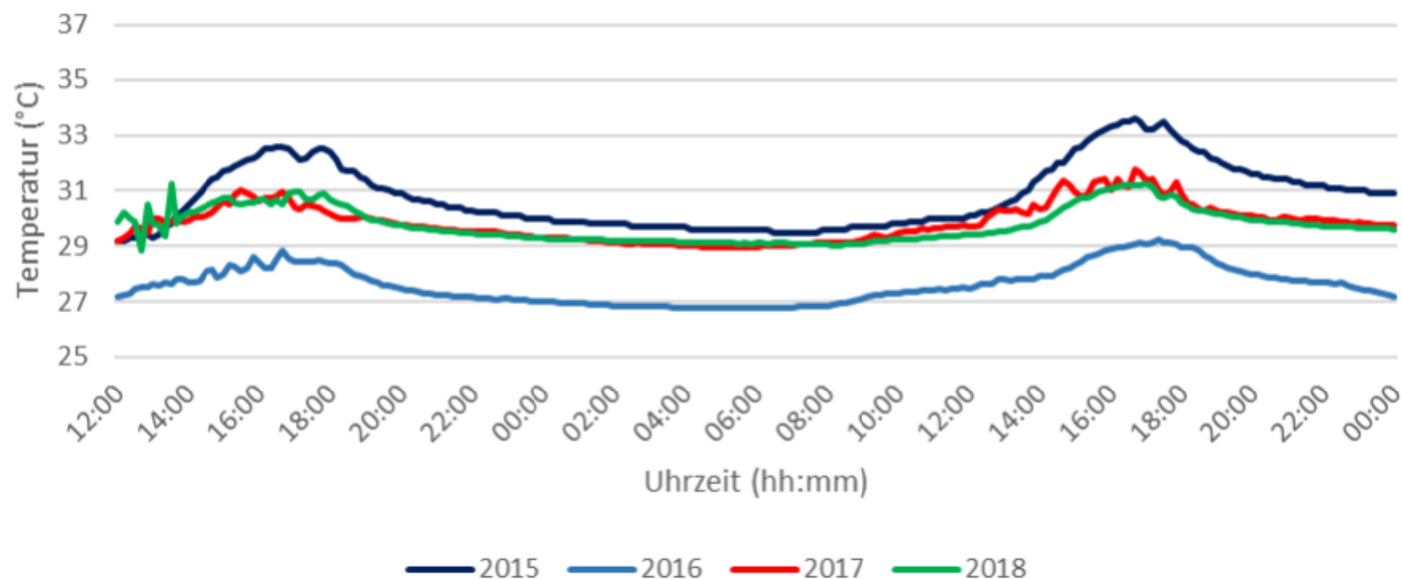


6., Grabnergasse 4-6 – Vienna Water ©Preiss



Measuring areas and sensors in/around the room BZ.13 ©Korjenic et al

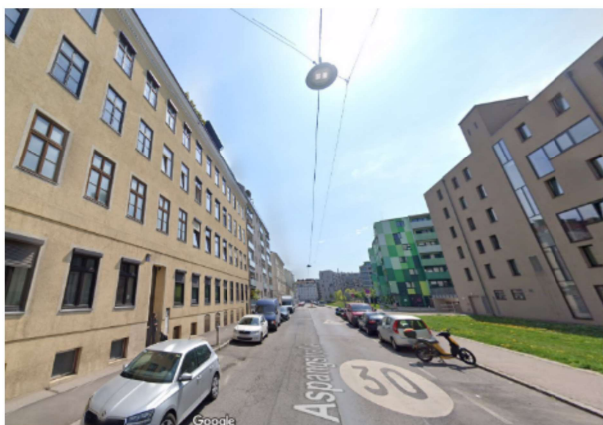
Cooling Effect of Green Infrastructure: measurable?



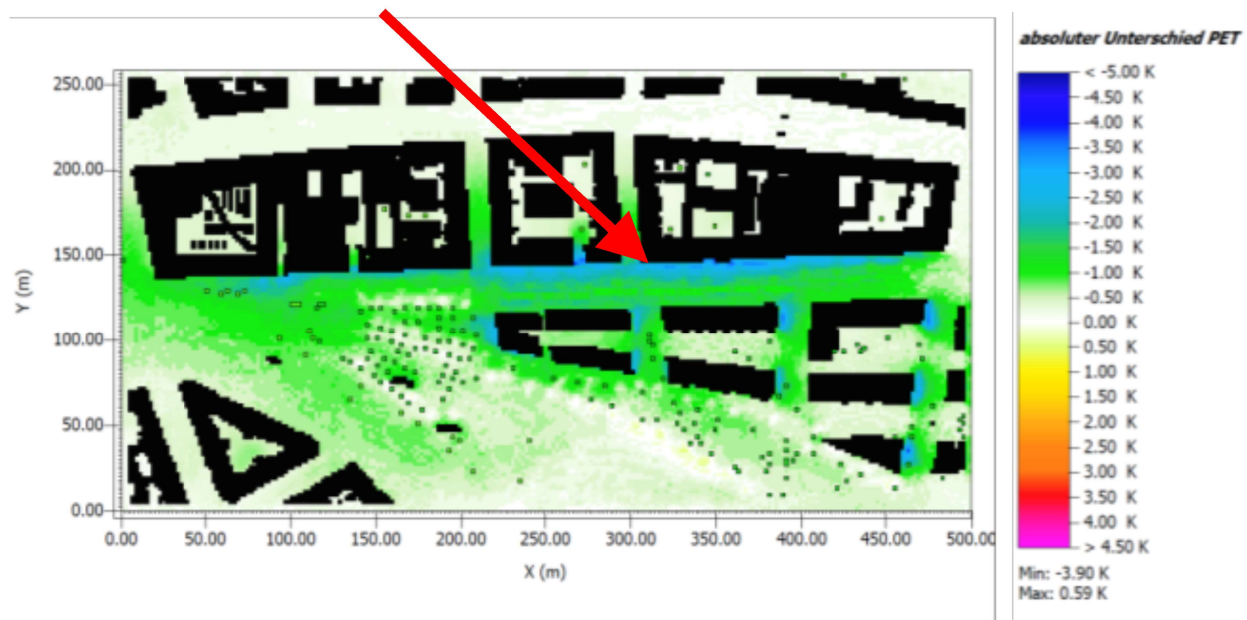
Indoor temperatures from two of the hottest days of 2015/16/17/18

© Korjenic et al, in behalf of Vienna Water

Proof of climate: Microclimate simulation work Case Study „Greening Aspang“ 3., Apangstraße:



Difference -3 °C at 10 pm



(source: ENVI-MET 2017).

© Betül Bretschneider

Economical aspects of green facades



5., Einsiedlergasse
MA 48 - Wastemanagement ©MA 48

Costs green facade:

Construction:	500 € / m ²
Maintenance:	10 € / m ² a
Irrigation (on hot days):	3-4 liters/m ²

Benefits:

- Substitution of airconditioning systems
- Cooling the environment
- Biodiversity
- Noise protection
- Weather Protection
- ...



© Preiss

Costs glass facades with shading slats:

Construction without control:	450 € / m ²
With control:	1.000 €/m ²
Maintenance (cleaning):	10 € / m ² a

Benefits:

- ?



Economical aspects of green facades: Maintenance is indispensable!

2017



2019

Important aspects:

- Condition of plants
- Growth
- **Irrigation**
- Nutrients
- Weight
- Invasive species
- Condition of Construction

Aug 2019: Irrigation failure at
MA 48 - Wastemanagement Department



202
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počítáme
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POČÍTÁME S VODOU 2024

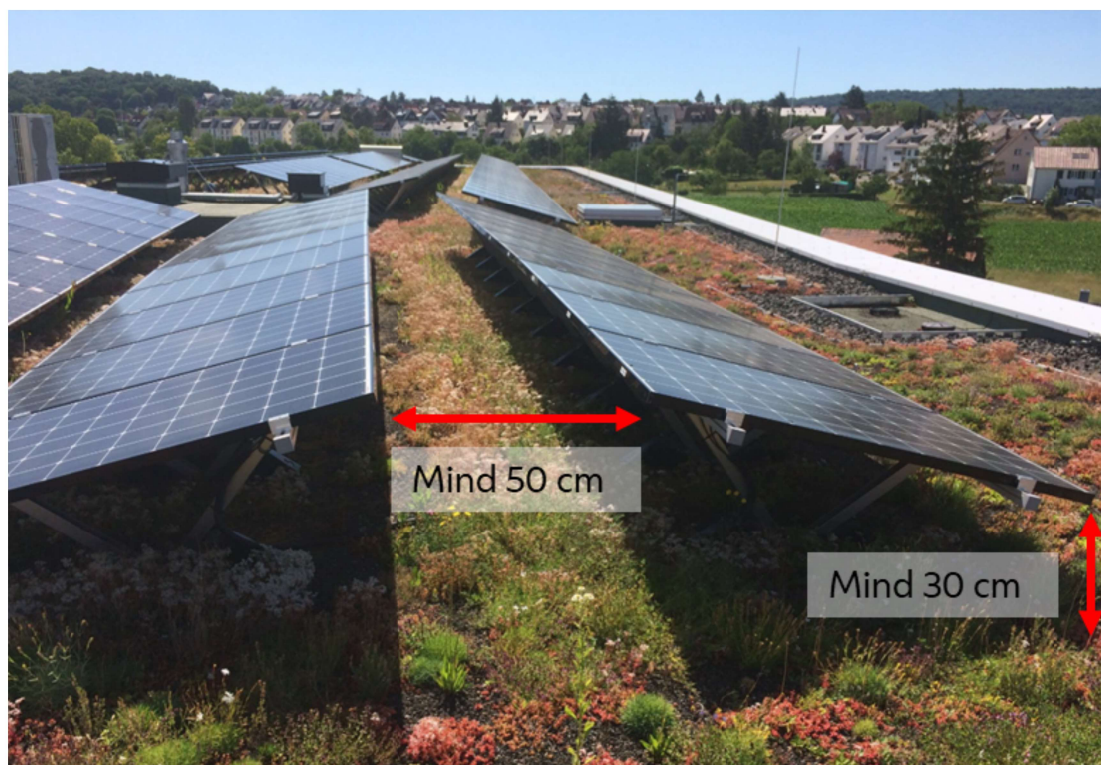
Modro-zelená infrastruktura a kvalita vody
Praha, 7. listopadu 2024

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Economical aspect: Maintenance is indispensable!



Typical green roof / PV Failure:
massively increased maintenance effort,
or not feasible
Shading leads to loss of yield



Module lower edge to substrate surface ≥ 30 cm
(ÖNORM L 1131 suggestion)

© Bauder, modified

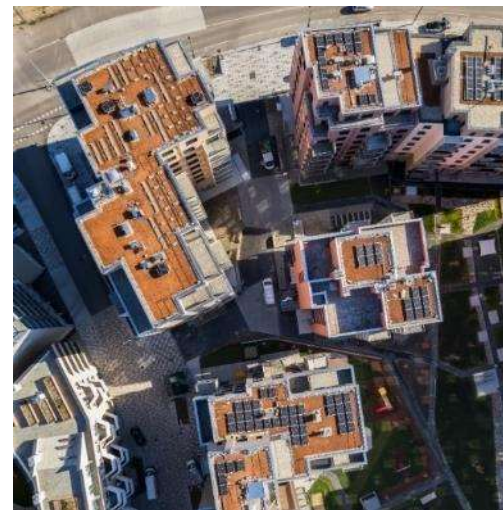
Regulation of Green Infrastructure

Vienna Building Regulation §5.(1) k):

Mandatory **green roofs and facades** in the documents:

“ The **roofs** of buildings of more than 12 m² are to be designed as flat roofs and **intensive green** according to the standard”.

„For new buildings with a fixed building height [7.5 m up to 21 m].... **Facades** at least to the extent of 20% of the relevant front **have to be designed as green facades** according to the standard”



Regulation of Green Infrastructure

Vienna Building Regulation §79.(6):

Areas to be landscaped (Gardens) must

- remain **unsealed** (at least 2/3)
- and have **ground-based greenery**.

Vienna Building Regulation § 99 (1):

Rainwater must be drained away or fed into the natural water cycle or used in another way.

Exceptions: no suitable natural conditions or economically or technically disproportionate effort.



Financial support

Promotion guideline 2024-26

- **Roof greenings:** 30.000 €, 5 € / m² cm substrate
- **Facade greenings street side:** 10.000 €, 150 € / m²
- **Facade on private property:** 5.000 €, 75 € / m²
- **De-sealing and greening:** 10.000 €, 200 € / m²
- **Assistance by Umweltberatung Wien, GrünStattGrau:** environmental advice association, awareness rising activities, hotline for greening buildings questions
- **Lebenswerte Klimamusterstadt:** 20 Millions / year for districts



Ground-based greenery:
Parthenocissus qu.
“Inserta” on climbing
ropes, sponge city
principle.
1., Tuchlauben 17

Planning: Stefan Schmid

Financial support for GI on buildings

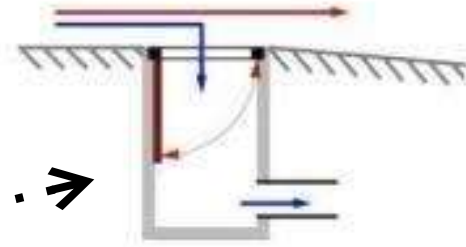
Promotions 2019-2023 in € brutto

Type of greening	Funding	Production costs	Coverage costs
Green roofs, extensive	93.870	720.787	0,13
Green roofs, intensive	106.605	525.893	0,20
FBG ground-based	32.985	73.663	0,45
FBG ground-based, street	10.200	19.821	0,51
FBG trough-bound, street	51.692	791.786	0,07
FBG trough-bound	32.363	198.879	0,16
Inner courtyard greening	364.867	1.061.839	0,34
Total	692.581	3.392.668	0,20

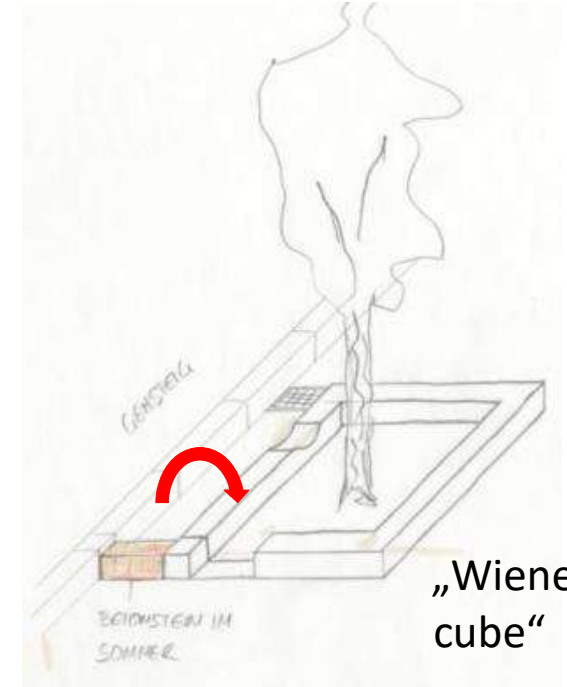
→ **≥0,30**

Goal for 2024-26

Challenge: sponge City systems- the beginning



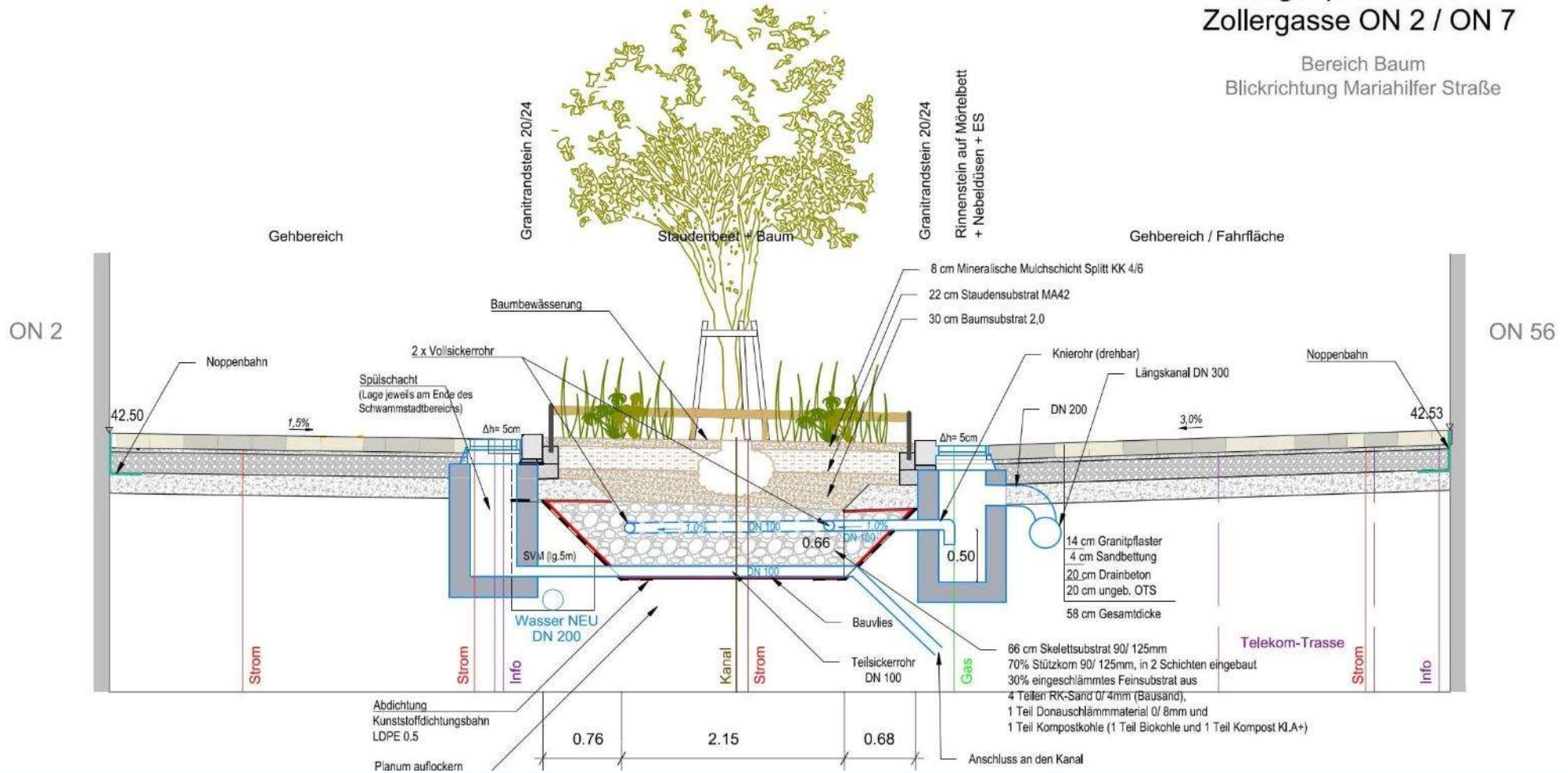
Wiener
Sewer inlet flap



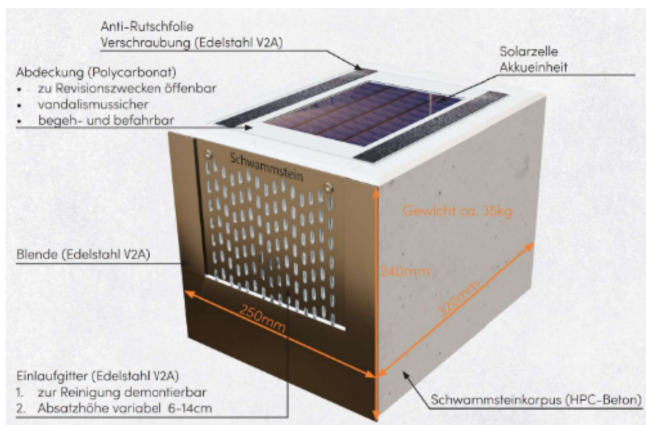
Challenge: sponge City systems - advanced

Regelquerschnitt 1
Zollergasse ON 2 / ON 7

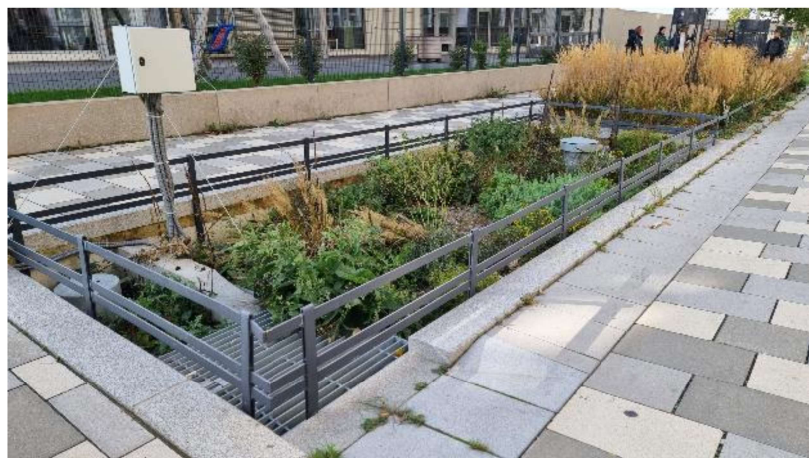
Bereich Baum
Blickrichtung Mariahilfer Straße



Challenge: sponge City systems- sophisticated



© <https://www.schwammstein.at/>

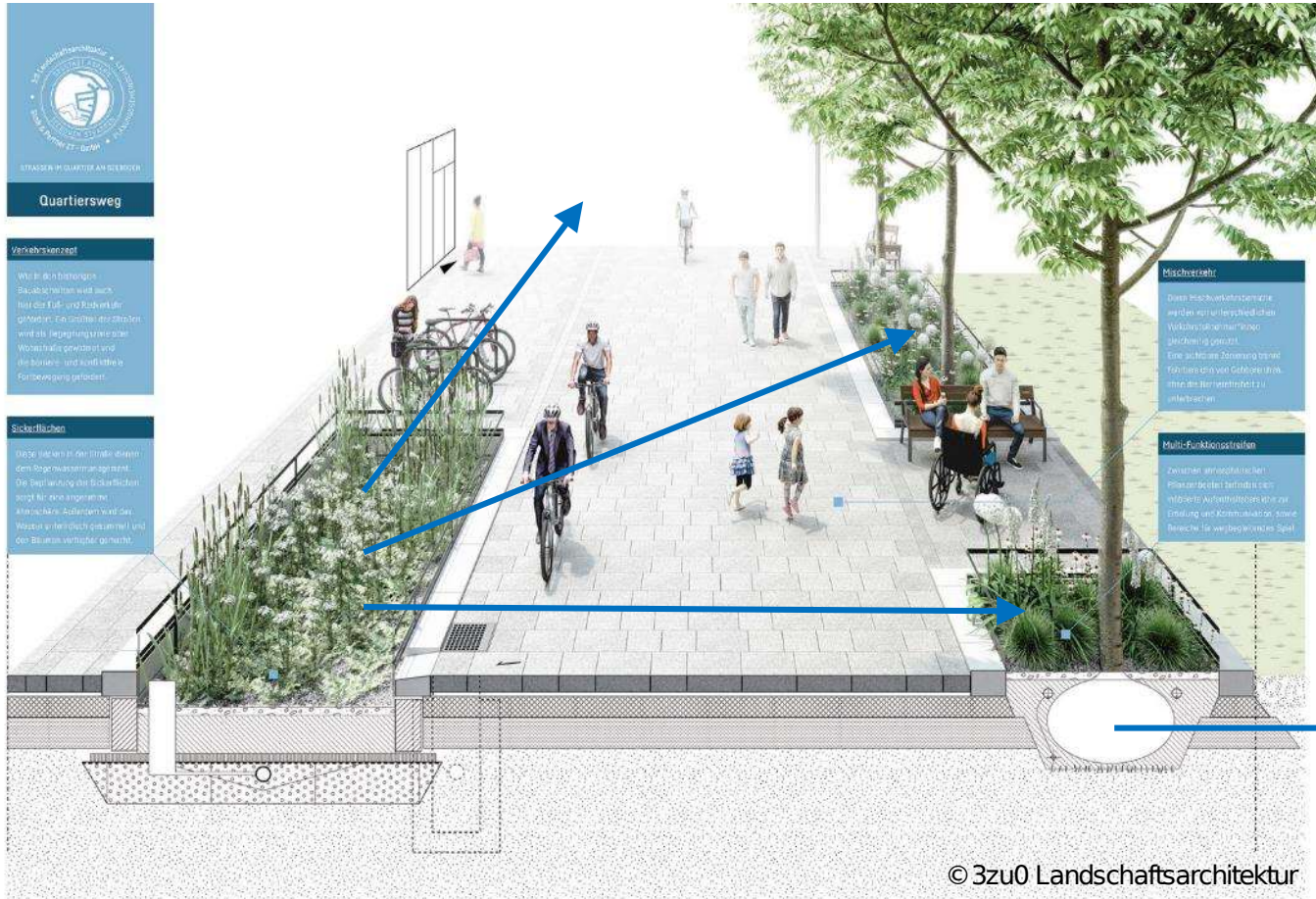


© Preiss

Sponge Stone, Infiltration Basins:

- Dual systems!
- Corresponding!
- Manual or electronic control!
- Ongoing research: maximum flow, Catchment areas, flushing surge investigation
- Implementation of LoRaWAN: for better Control and connection to the Tree watering

Challenge: sponge City systems- sophisticated



Challenge: sponge City systems - economical & for discussion



MEZINÁRODNÍ KONFERENCE

Praha, 7. listopadu 2024

www.pocitamesvodou.cz

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City of
Vienna

Environmental
Protection

• Děkuji / Thank you 😊



Hlavní partner



Partneři



Podporující organizace



Mediační partneři



STATNÍ FOND
ŽIVOTNÍHO PROSTŘEDÍ
ČESKÉ REPUBLIKY



Ministerstvo životního prostředí



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