POČÍTÁME S VODOU 2024

Modro-zelená infrastruktura a kvalita vody

X. ROČNÍK KONFERENCE

Možnosti modelování modro-zelené infrastruktury – pozitivní dopad na udržitelný městský rozvoj

Capabilities of modelling Blue Green Infrastructure – Showing the positive impact for a sustainable city development.

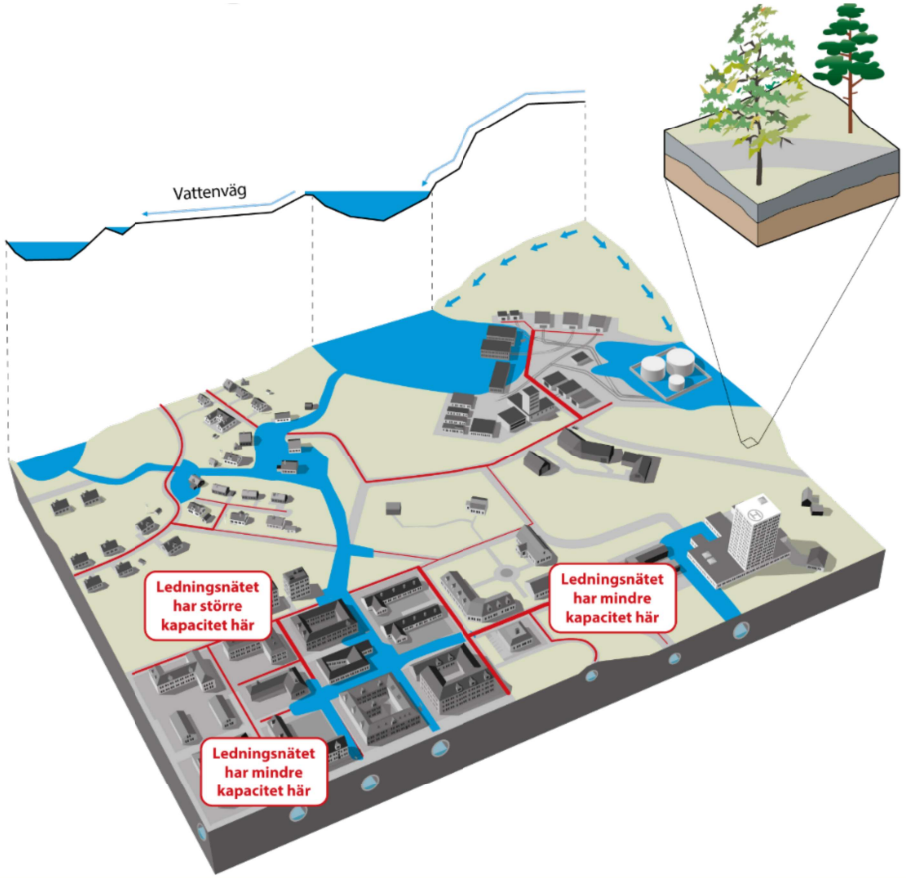
Dipl.-Ing. Christian Pohl

počítáme s vodou

konklec ekocentrum

Turning a problem into a resource

Drainage of water at the surface and in the sewer network



Input data

Elevation data

Land use

Soil Maps

Rain data

Management data

Result

Impact assessment

Structure plan

Detailed action plan

Contingency planning

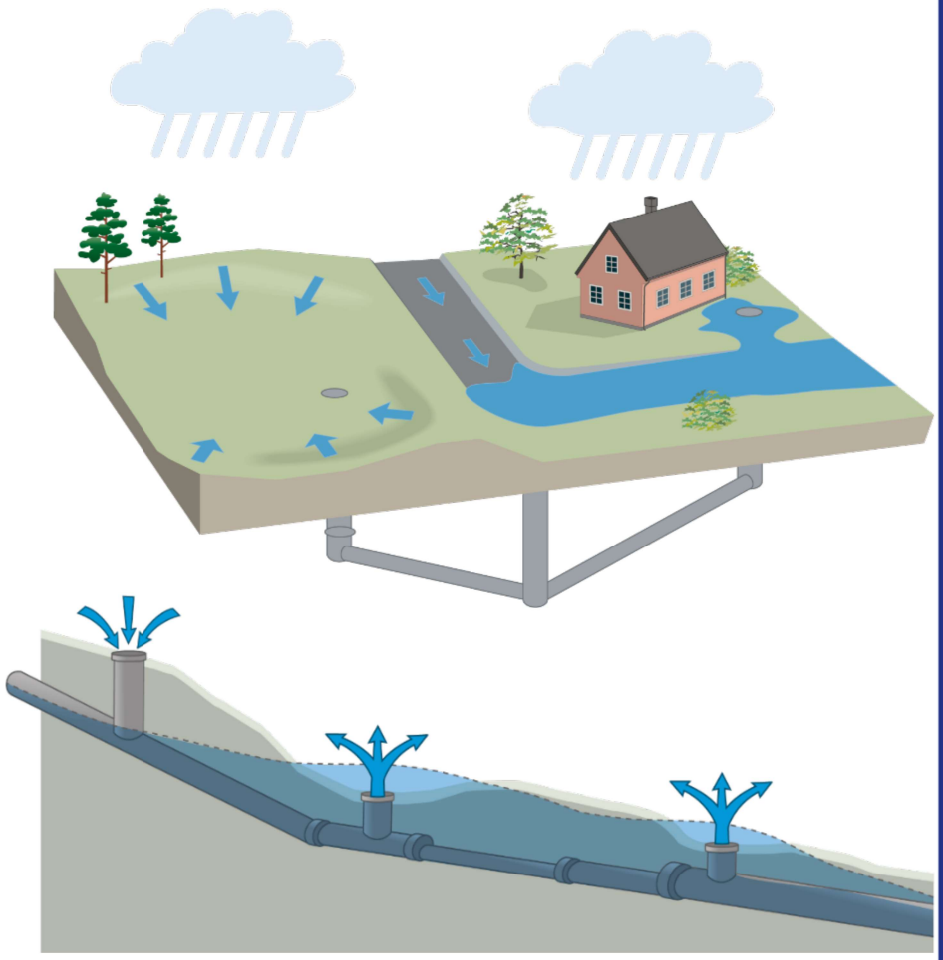
Calculation requirements

2D surface model
Hydrodynamic description of runoff on the soil surface.
Corrected elevation model for buildings and trench structures.
Dynamic infiltration based on land use and soil map.

- Resolution 4 x 4 meters.

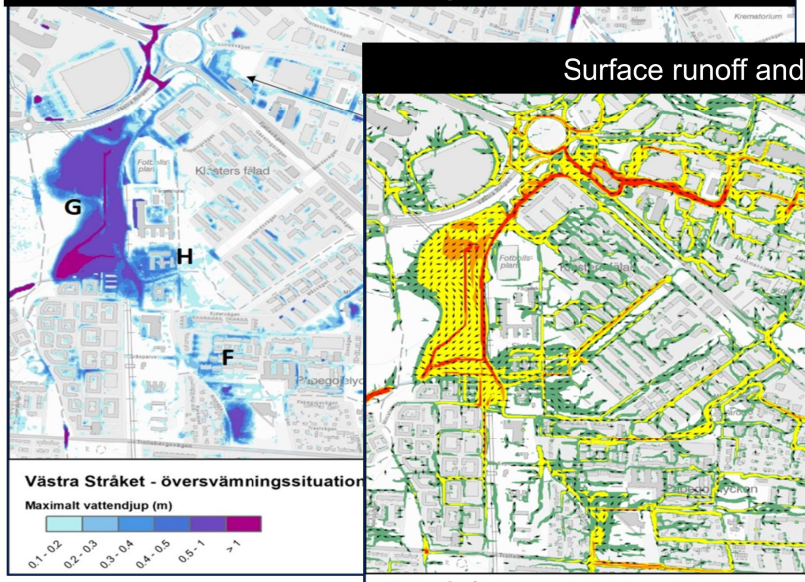
Sewer network model and coupling to 2D model
Hydraulic model that describes the flow and levels of the sewer network.
Coupling via shafts to the surface model.

- Three scenarios/calculation cases (in order)

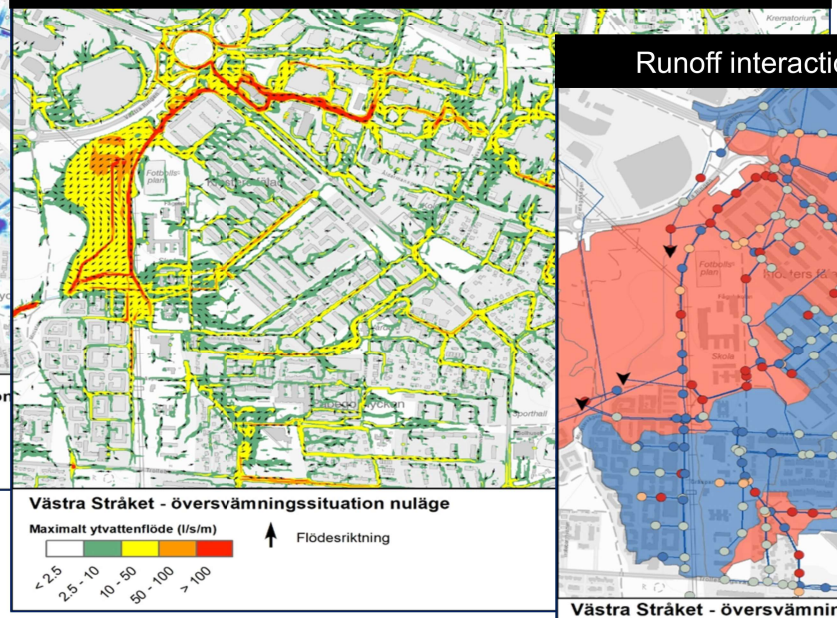


Calculation results

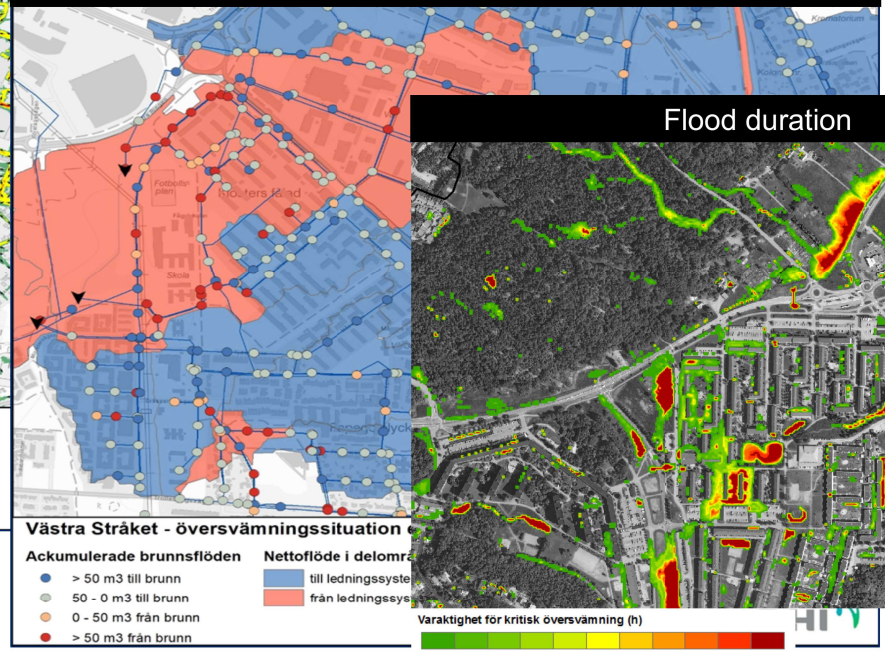
Flood spread including water depths



Surface runoff and flow direction

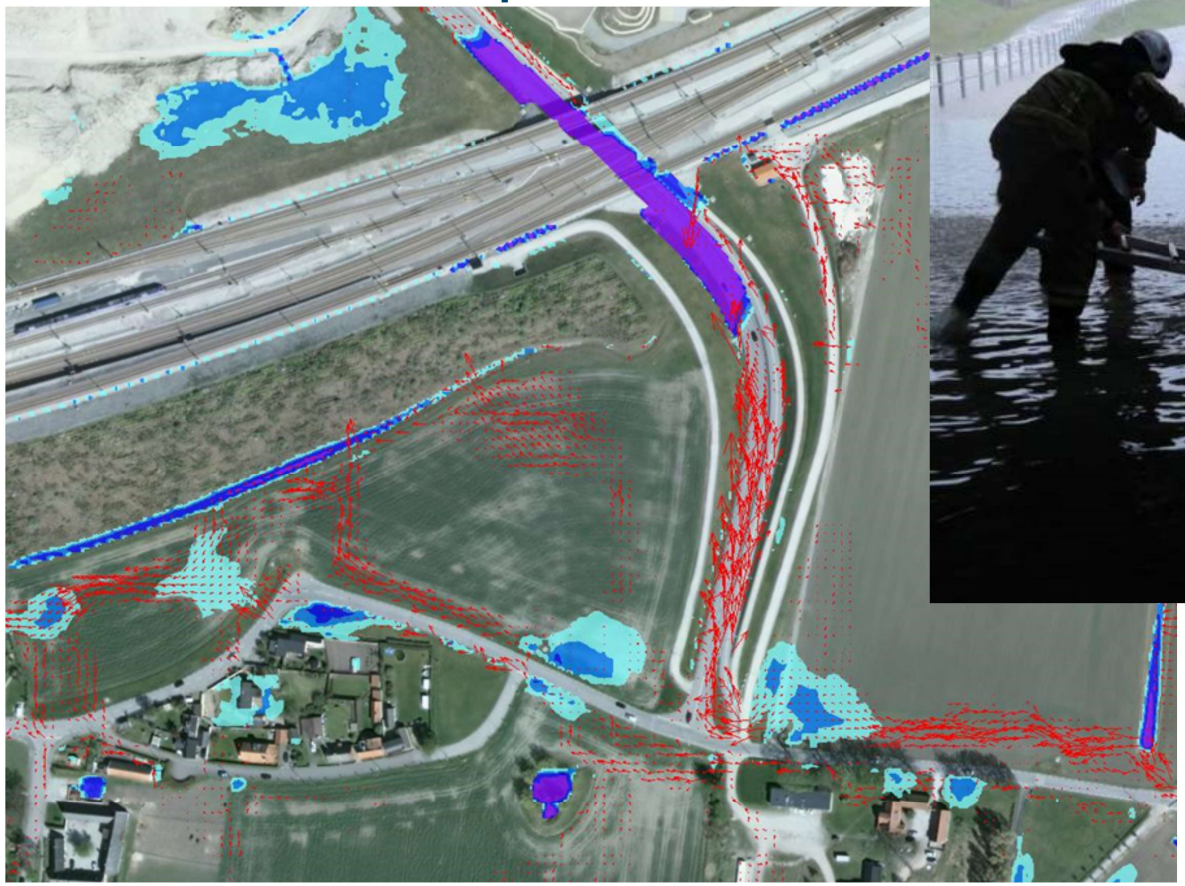


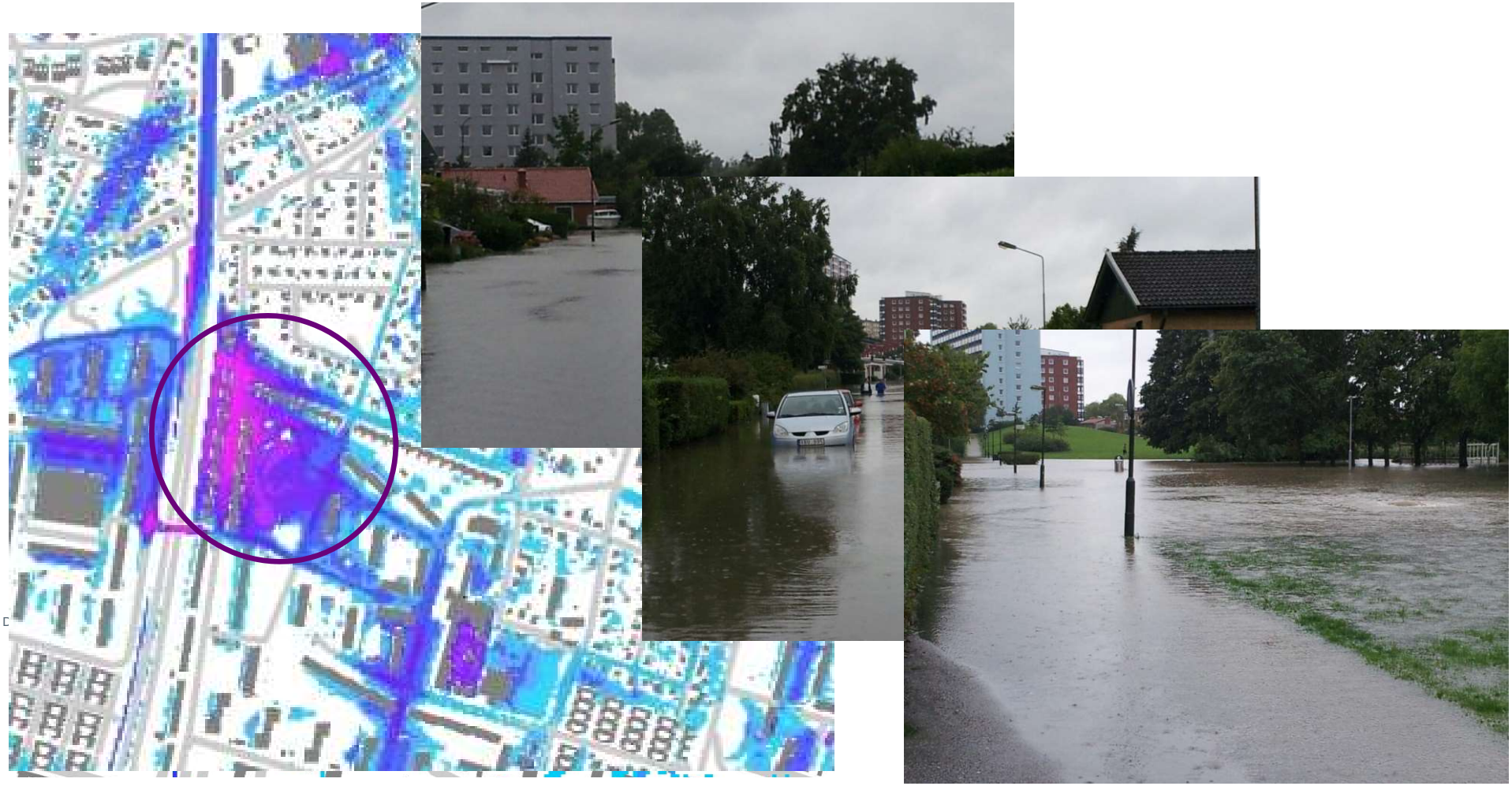
Runoff interaction between surface and sewer network

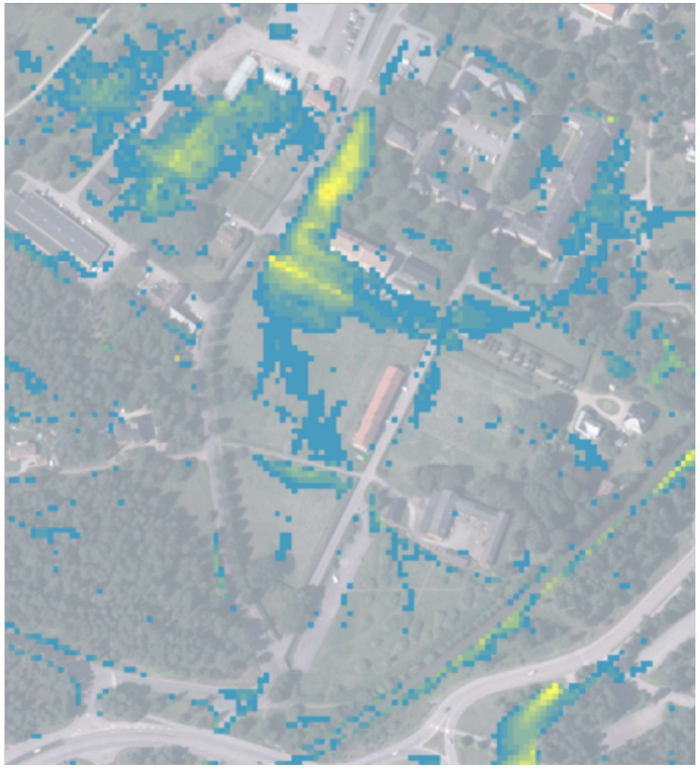


Flood duration

Cloudburst examples







Heavy rain hazard map

Aerial view of heavy rain 2014-08-21

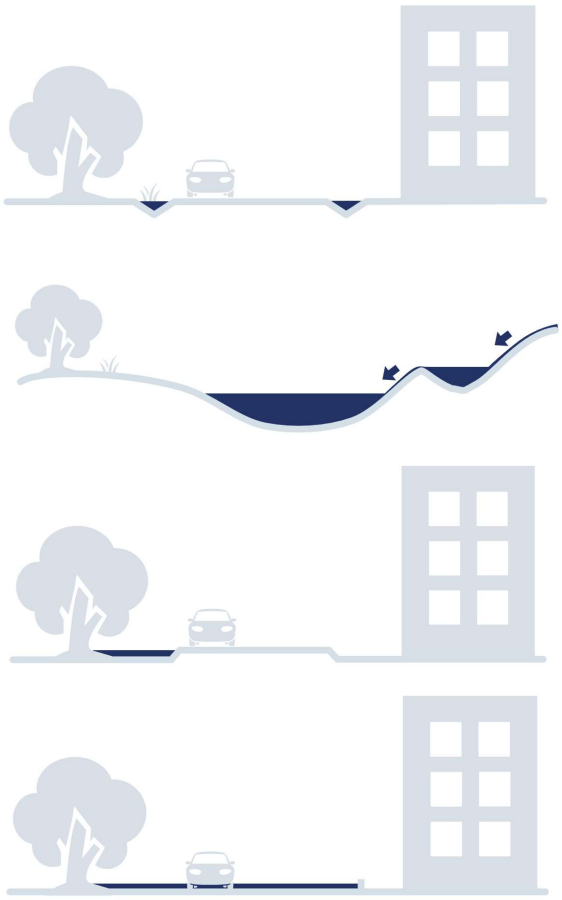
Type Actions

Heavy Rain-LID
Safely drain water downwards

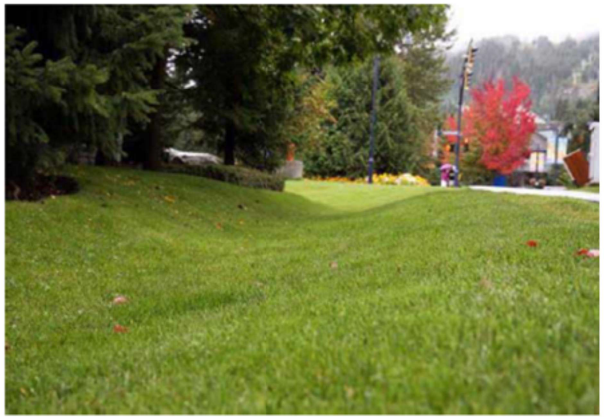
Heavy rain surface
Surface for storing water during heavy rain

Control
Addition to strengthen the other two

Property protection
Protection of individual companies/buildings

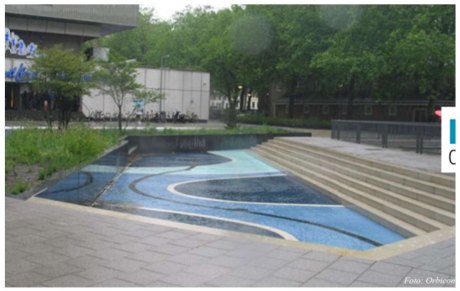


Examples of LID's to reduce heavy rain damage



Åpen overvannshåndtering ved 21. st Paso Robles. Foto: SVR Bistro

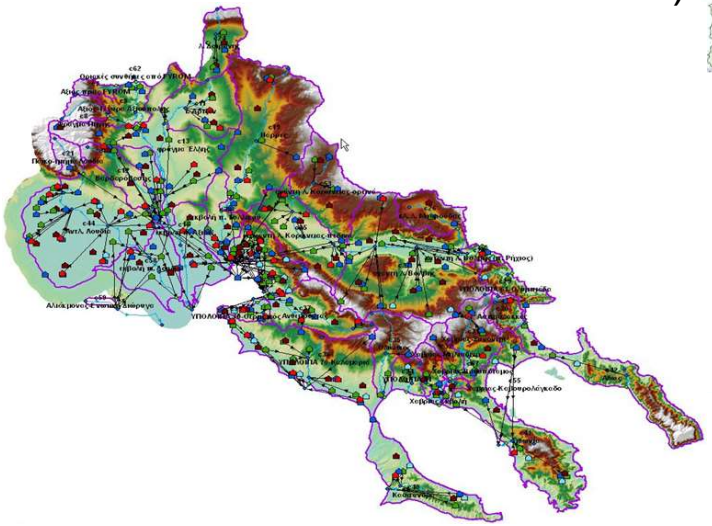
Examples of surfaces adapted to heavy rain



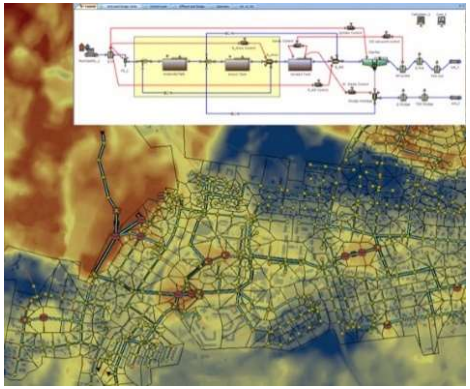
GREEN INFRASTRUCTURE – WATER-SENSITIVE URBAN DESIGN (WSUD)

MIKE+ enables the consideration of mature and advanced WSUD functionalities for the preservation and design of natural terrain surfaces.

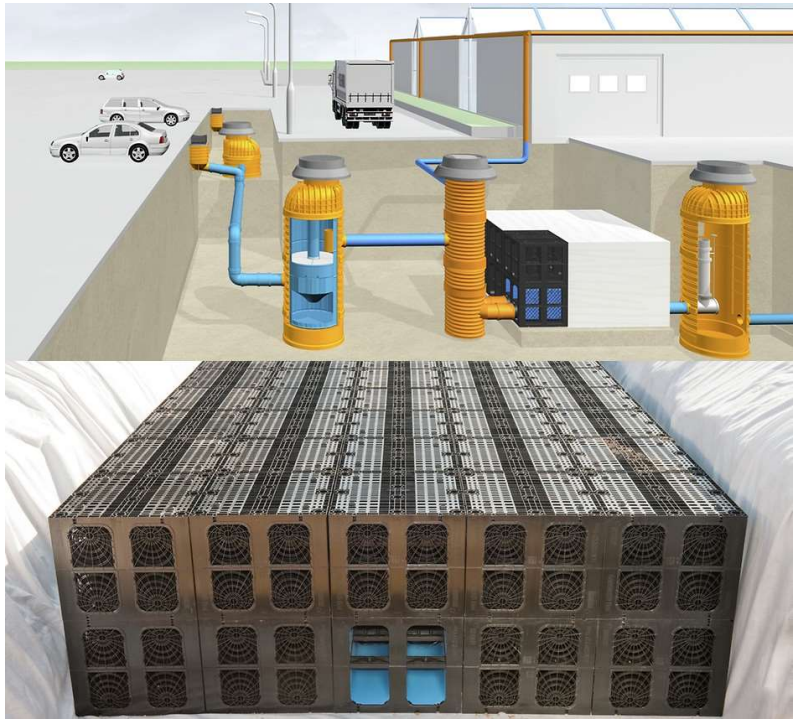
1. At the level of the screening level (overall observation area: watershed/catchment area)

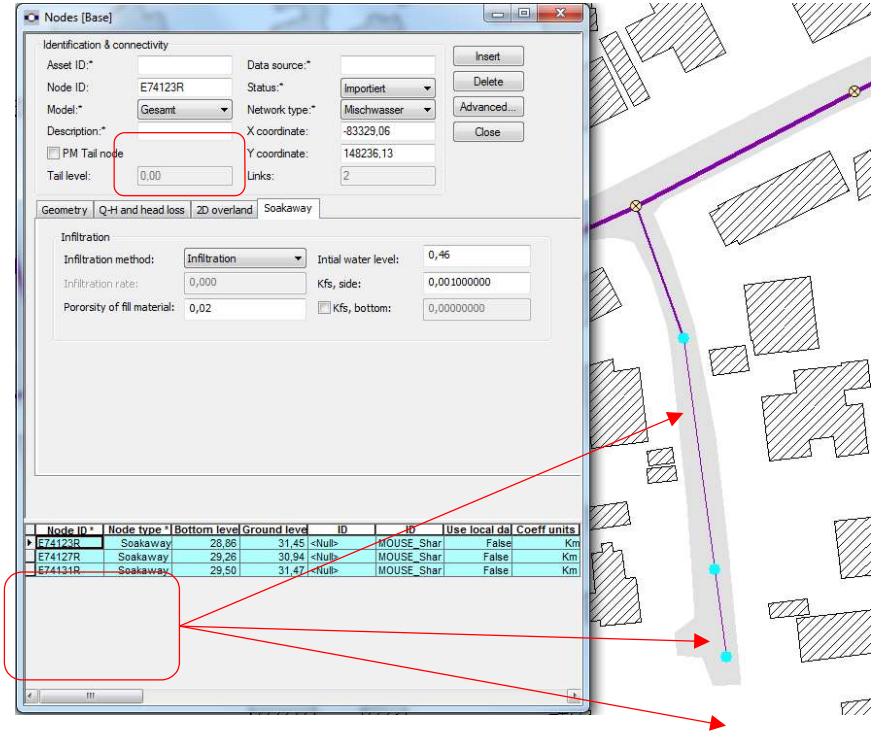


2. In the detailed hydraulic Calculation (pipeline network based)



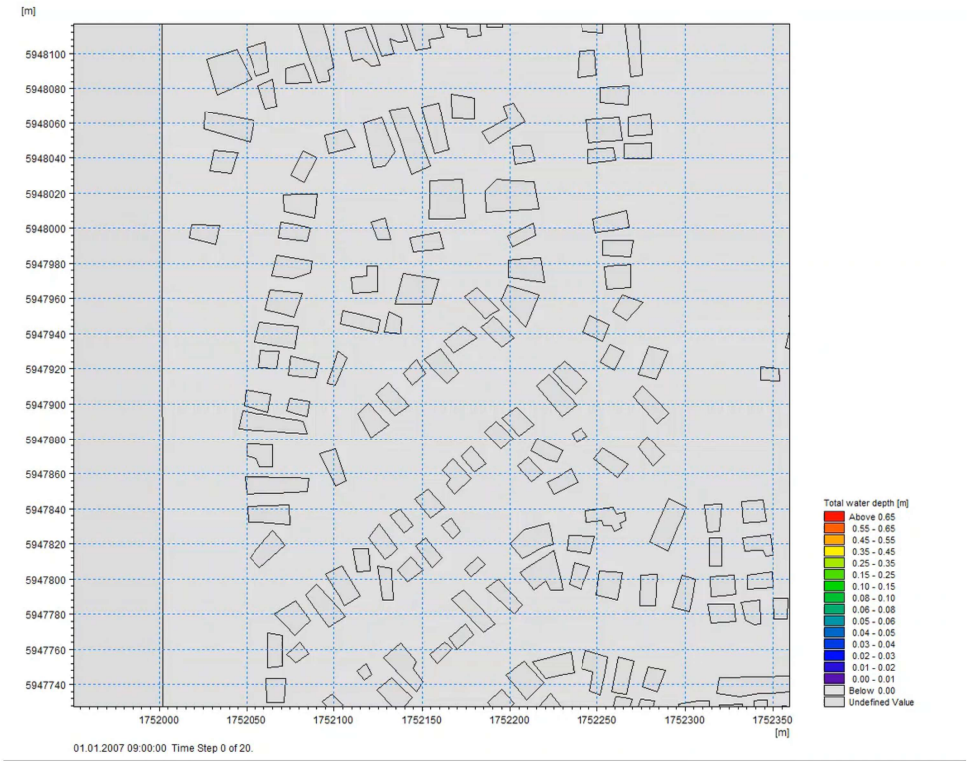
Sickerrigole - REHAU Lösungen RAUSIKKO

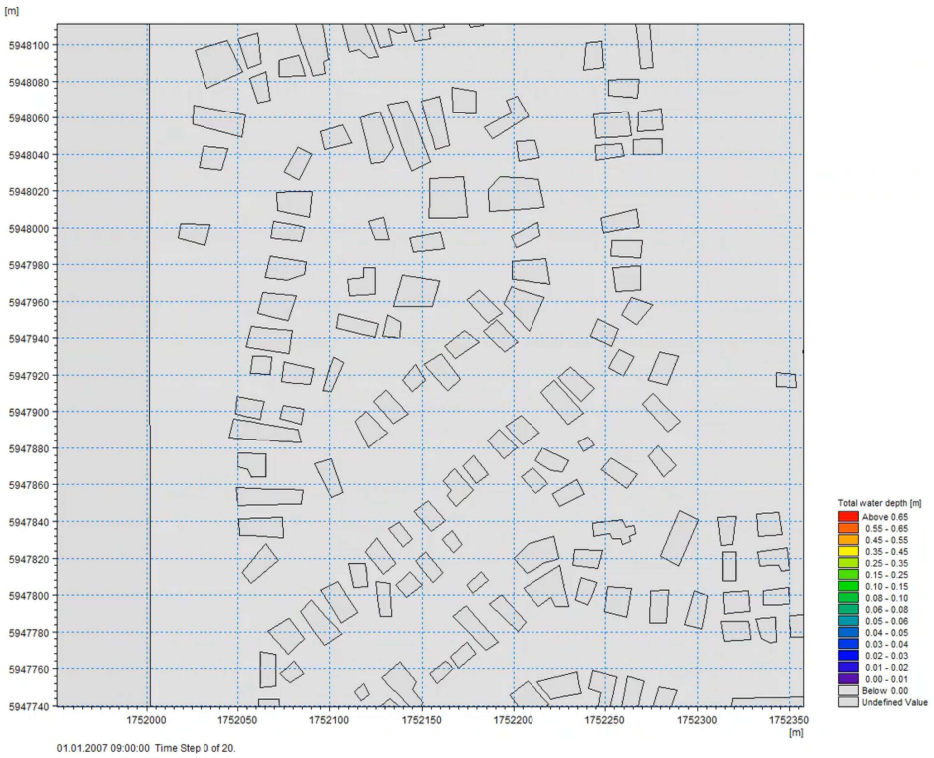




Quelle: https://www.rehau.com/de-de/architekten-planer/tiefbau/abwasser-wasserwirtschaft/regenwasserbewirtschaftung

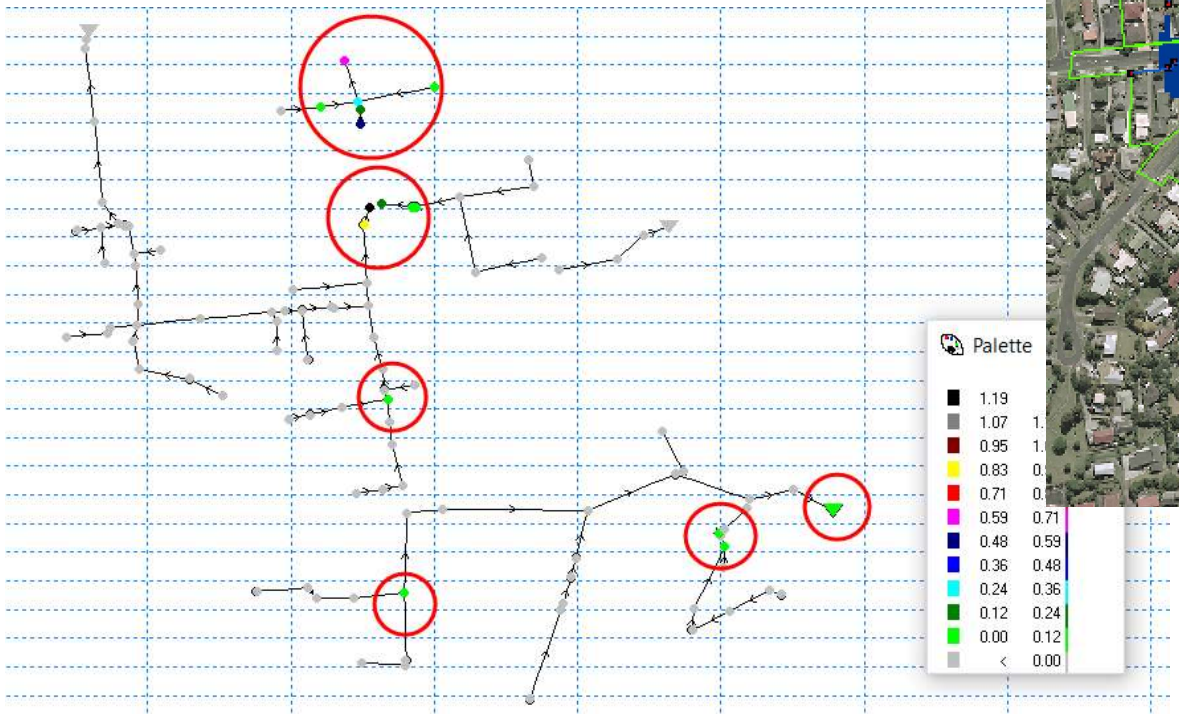
Proof of efficacy with MIKE+





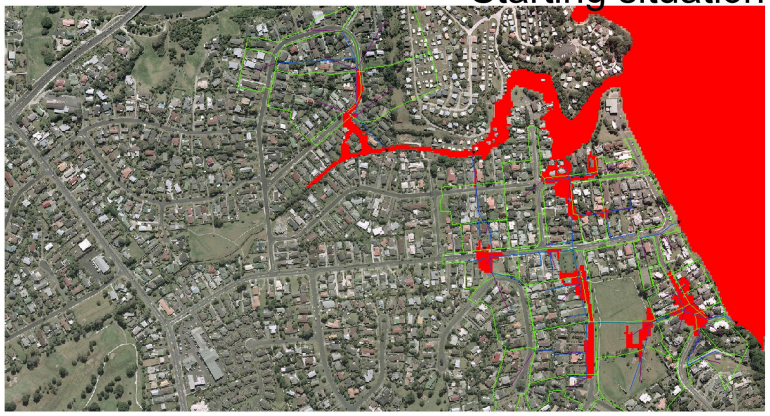
without Green Infrastructure Elements / withGreen Infrastructure Elements

Starting situation

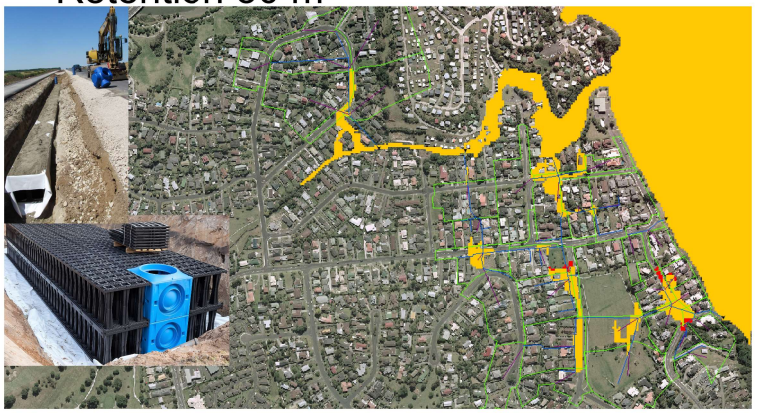


Comparison of flood plains

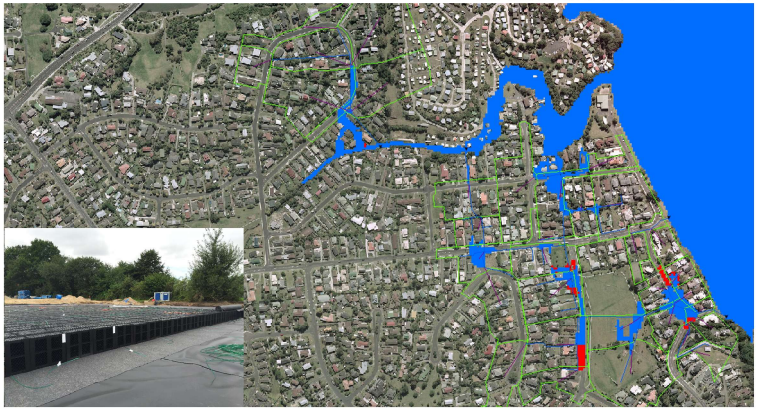
Starting situation



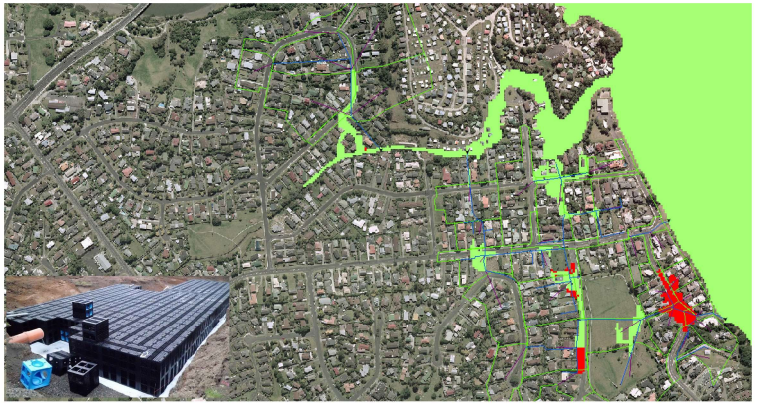
Retention 50 m³



Retention 250 m³

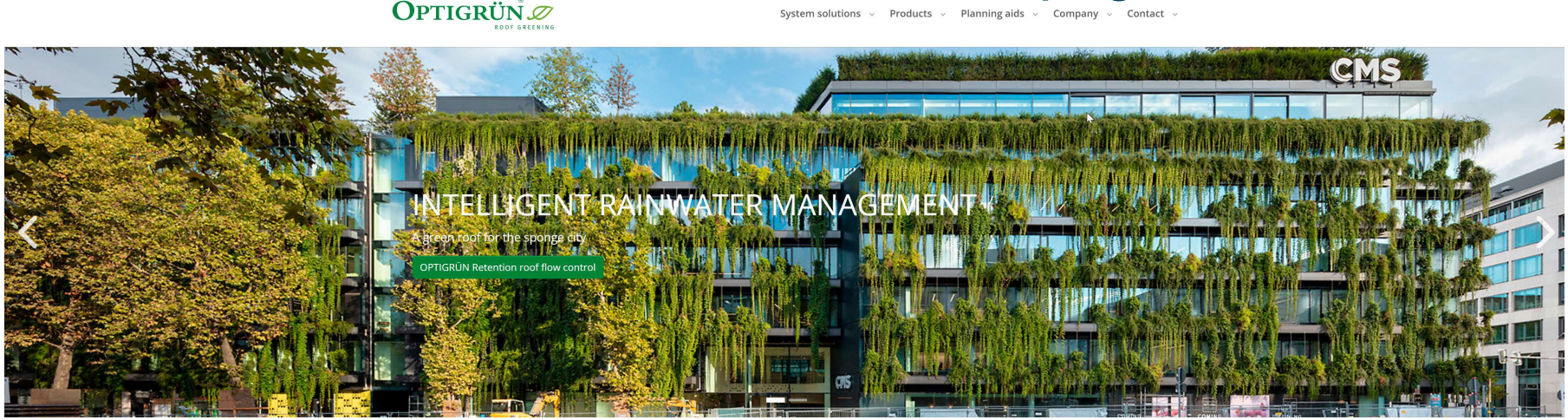


Retention 500 m³



Shape variations in installation / high flexibility

DHI Tool for Green Roof Solutions from Optigrün



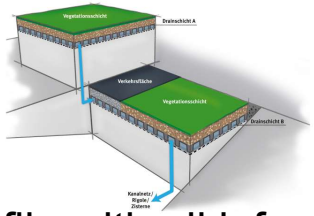
OPTIGRÜN INTERNATIONAL AG
GREEN ROOFS FROM THE MARKET LEADER

We - Optigrün international AG - have around 160 employees and our company headquarters in Krauchenwies-Göggingen in the district of Sigmaringen in southern Germany. Optigrün also has branches and agencies in other European countries. Together with around 140 partner companies in the Optigrün network, as well as other customers from the gardening and landscaping sector and the building materials trade, we green a total of over 5 million square meters of roof surface worldwide every year. In this way, we sustainably promote nature-oriented urban development, the quality of life in urban areas and the improvement of the carbon footprint. We can proudly claim that we are the market-leading system provider for green roofs and green buildings in Europe.

Optigrün stands for passionate service orientation and a high level of consulting. Architects, planners, contractors and building owners benefit from our expertise in various types of green roofs. As an owner-managed family business, we are one of the pioneers in the field of roof and building greening and can look back on over 50 years of experience. We have a reputation for finding suitable solutions even for unusual and particularly difficult challenges

Source: https://www.optigruen.com/

MIKE SHE Water Balance Calculation

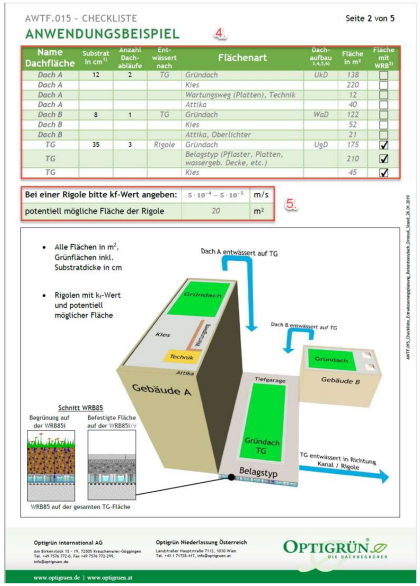


Result – Final report (automated)

RWS REGENWASSERSIMULATION

OPTIGRÜN DIE DACHBEGRÜNER

pdf file with all information of green roof


AWTF.015 - CHECKLISTE

Seite 2 von 5

ANWENDUNGSBEISPIEL 4

Name Dachfläche	Substrat in cm	Anzahl Dach-abläufe	Ent-wässert nach	Flächenart	Dach-aufbau	Fläche in m²	Fläche mit WRB
Dach A	12	2	TG	Gründach	UKD	138	☐
Dach A				Kies		220	☐
Dach A				Wartungsweg (Platten), Technik		12	☐
Dach A				Attika		40	☐
Dach B	8	1	TG	Gründach	WaD	122	☐
Dach B				Kies		52	☐
Dach B				Attika, Oberlichter		21	☐
TG	35	3	Rigole	Gründach	UgD	175	☑
TG				Belagstyp (Pflaster, Platten, wassergeb. Decke, etc.)		210	☑
TG				Kies		45	☑

Bei einer Rigole bitte kf-Wert angeben: 5 · 10⁻⁴ – 5 · 10⁻⁵ m/s

potentiell mögliche Fläche der Rigole 20 m² 5

- Alle Flächen in m², Grünflächen inkl. Substratdicke in cm
- Rigolen mit k_f-Wert und potentiell möglicher Fläche

Optigrün international AG

Optigrün Niederlassung Österreich

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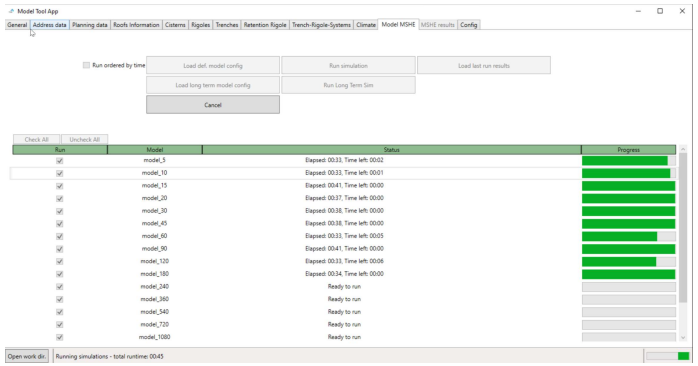
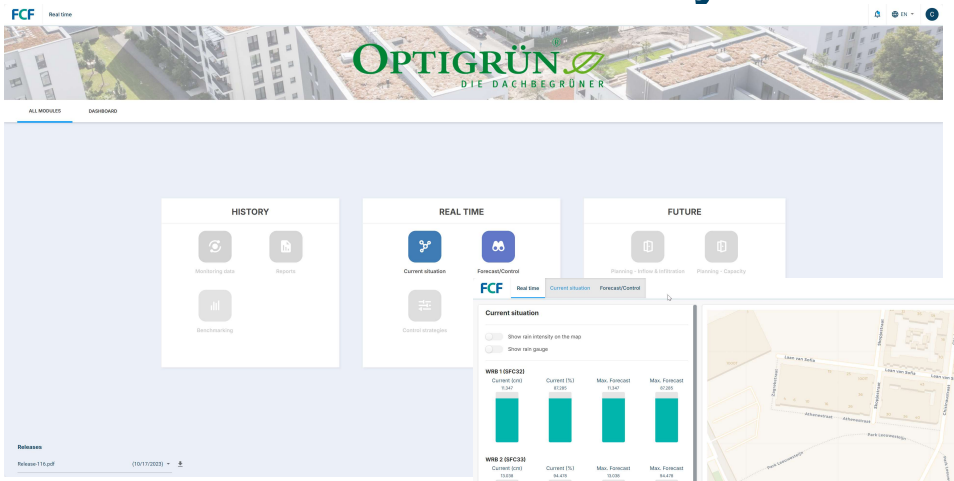


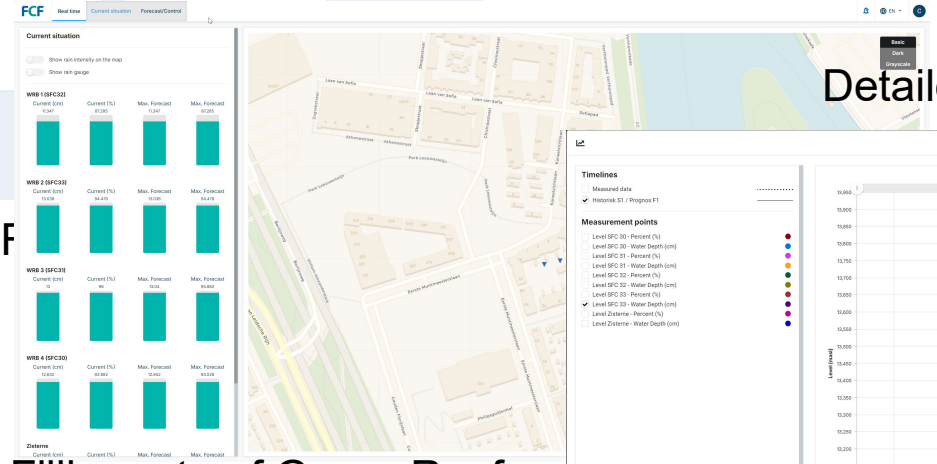
GUI with all relevant data
– calculation tool in MIKE SHE

Optigrün Objekt Nr.:
Datum: 12.01.2021

Control via Future City Flow and MIKE Operations Forecast

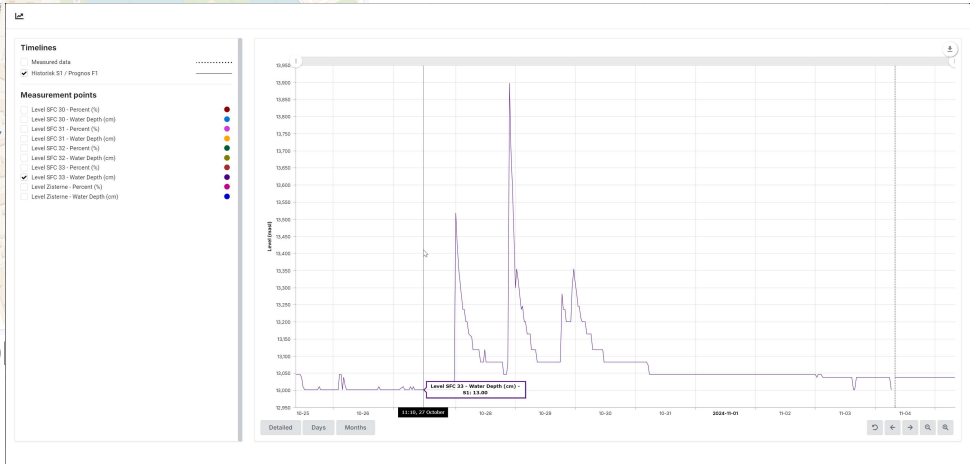


Installation overview in F
3 time cales



Filling rate of Green Roof co

Detailed WL – observed/predicted



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POČÍTÁME S VODOU 2024

Modro-zelená infrastruktura a kvalita vody

X. ROČNÍK KONFERENCE

- Děkuji / Thank you ☺
- Christian Pohl
- cpo@dhigroup.com

počítáme s vodou

Hlavní partner

Partneři

Podporující organizace

Mediální partneři