



HAMBURG WATER CYCLE

Abwasser trennen und recyceln



EIN KONZEPT VON HAMBURG WASSER



Grauwasserrecycling bei HAMBURG WASSER

Gregor Rudolph-Schöpping

HAMBURG WATER | WaterMan Project Visit| September 19, 2024





RAINWATER

On bad weather days
land up to

19 m³

Wastewater per second in the
Hamburg sewage treatment plant.

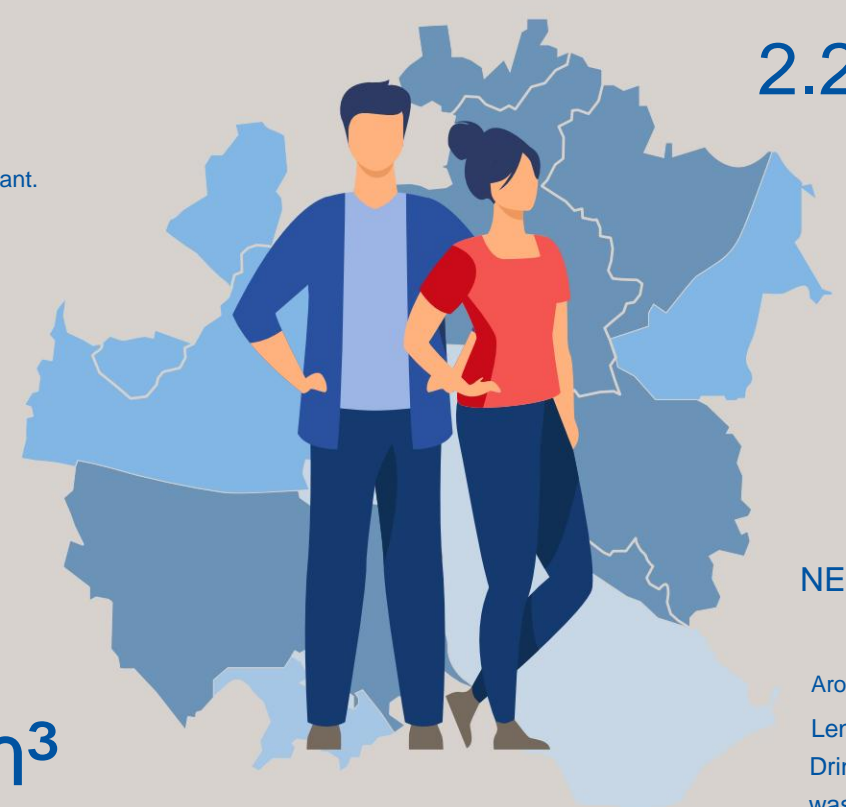
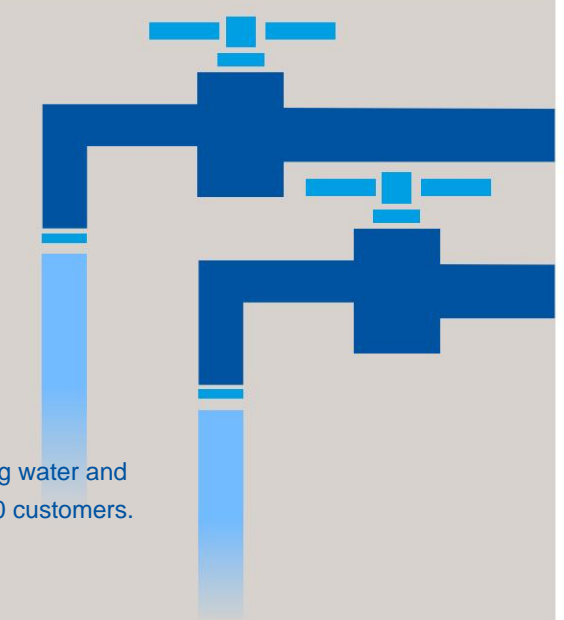


DRINKING WATER

HAMBURG WASSER
supplies daily

2.2 million

People
with the best drinking water and
serves around 800,000 customers.

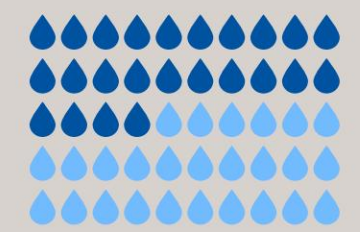


SEWAGE

At the Hamburg sewage
treatment plant,

410,000 m³

Wastewater is cleaned and
further processed.

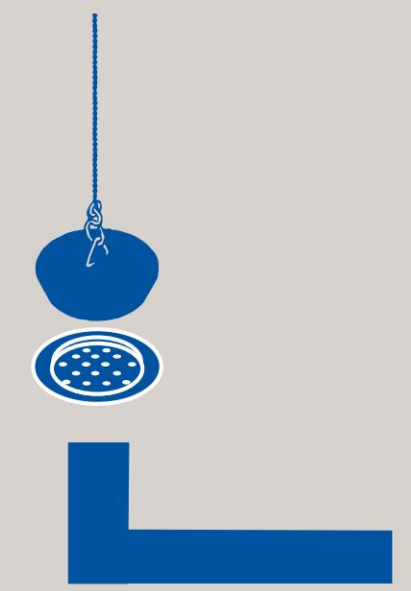


NETWORKING

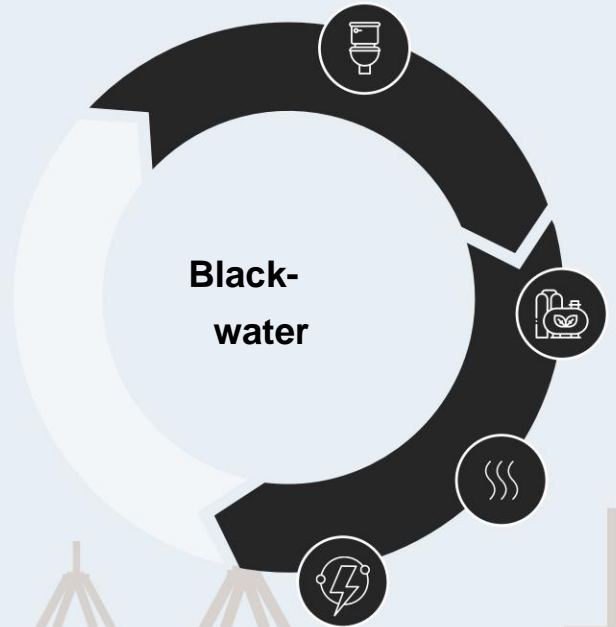
Around

11,400km

Length of the nets for
Drinking water supply and
wastewater disposal together.
This corresponds to the distance
between Hamburg and Buenos Aires.

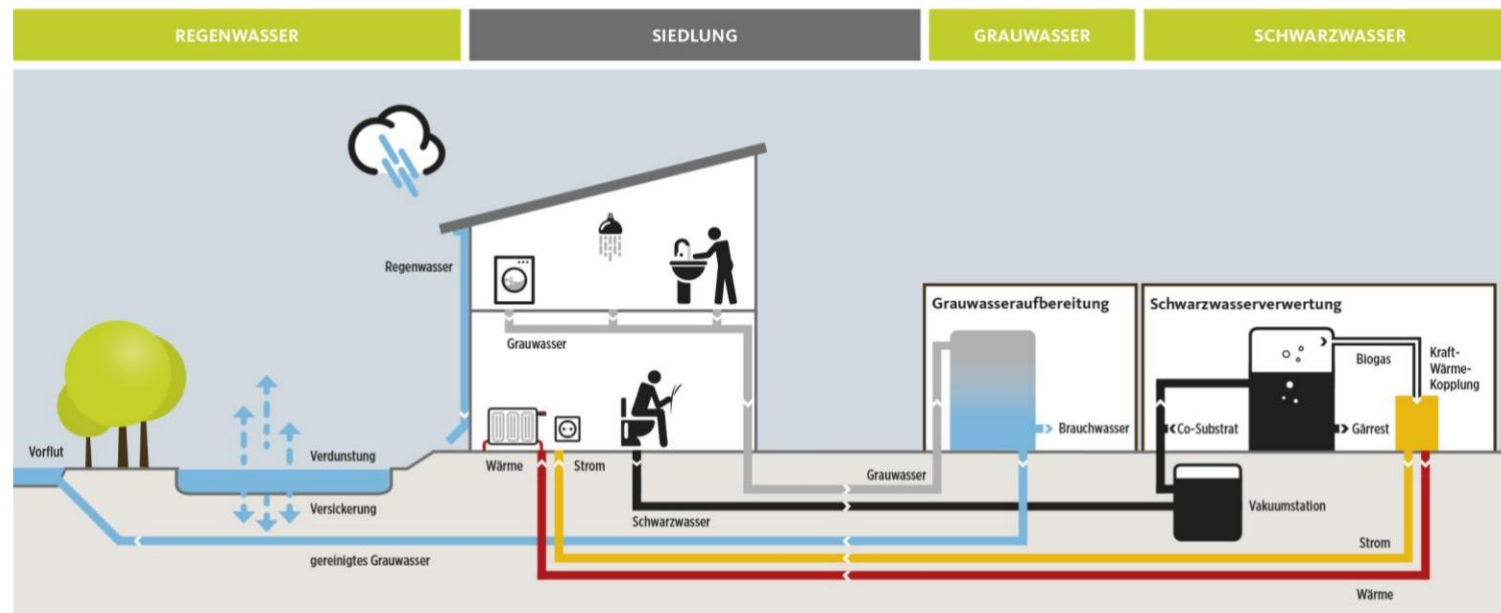
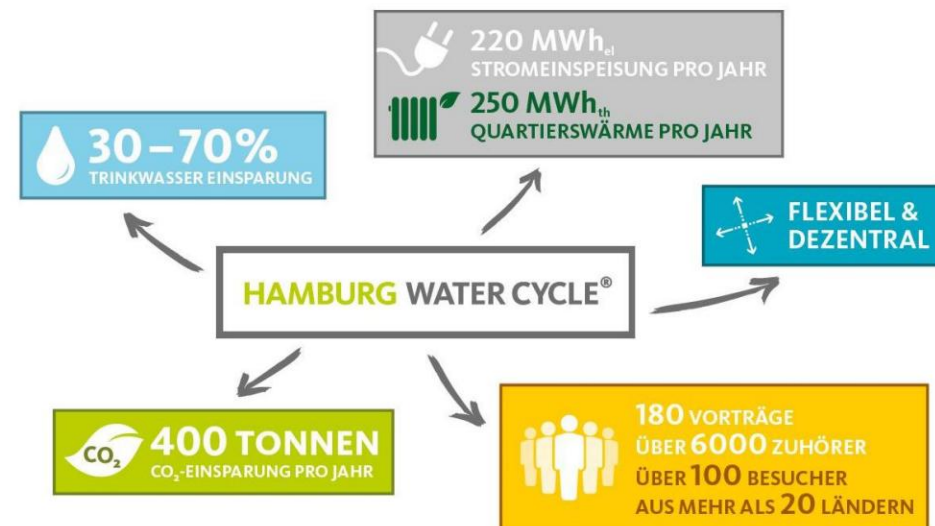


A holistic concept

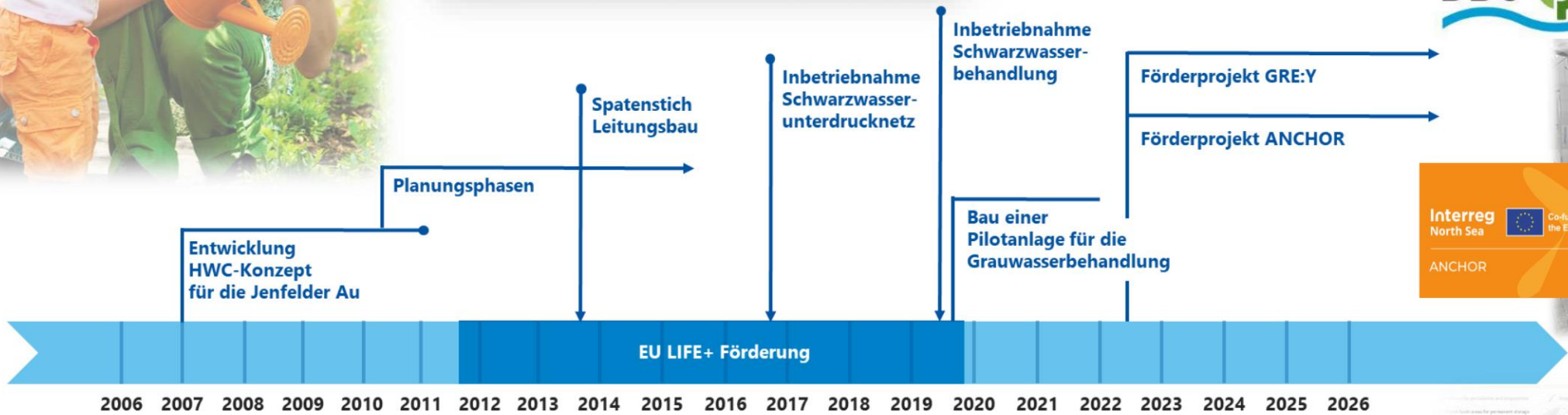


HAMBURG WATER Cycle® in the Jenfelder Au

- New urban quarter on former 35 ha military site
- Approximately 2000 residents connected to the HWC
- EU-wide largest area with material flow separation using vacuum technology for Blackwater
- Unprecedented in this size in Germany
- Implementation from 2013 to the end of 2023; commissioning in 2019
- Technical center for further development of recycling routes



Project development HWC® in the Jenfelder Au



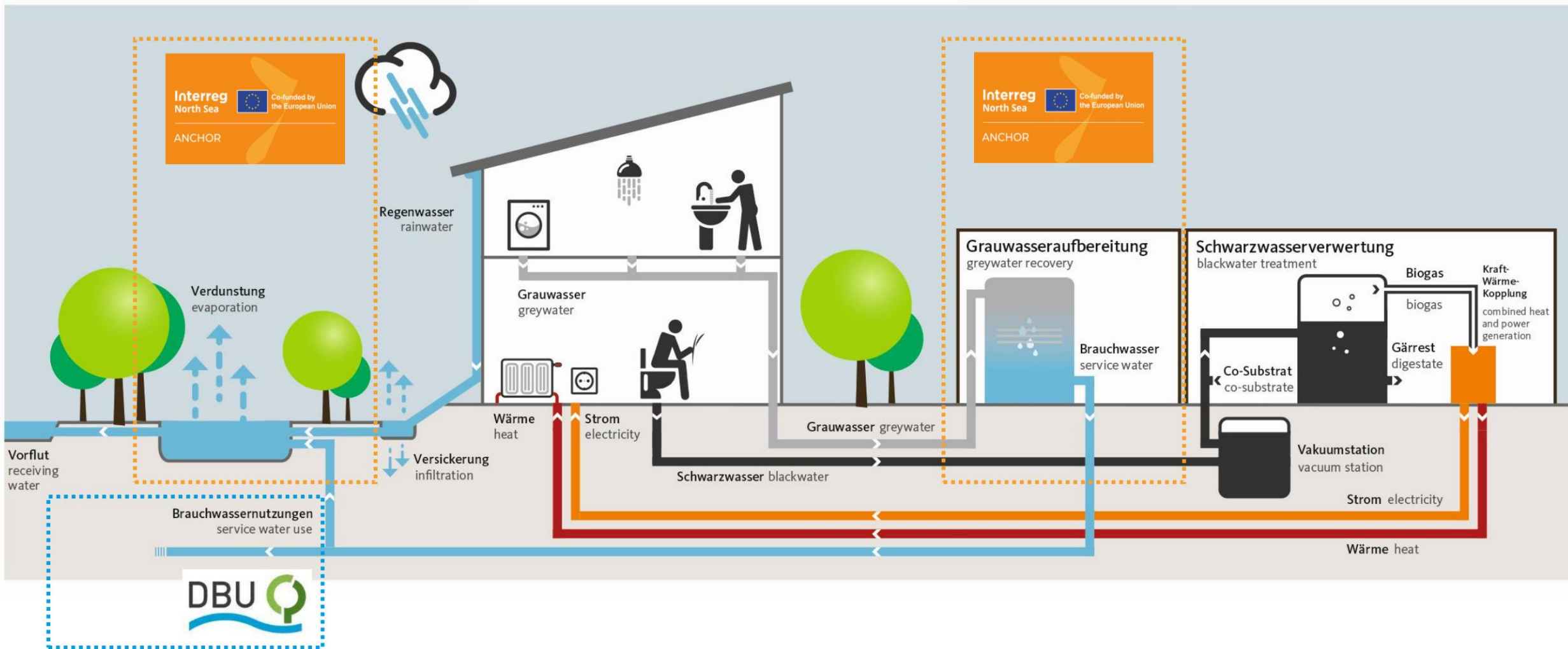
Project development HWC® in the Jenfelder Au

REGENWASSER
RAINWATER

WOHNQUARTIER
RESIDENTIAL DISTRICT

GRAUWASSER
GREYWATER

SCHWARZWASSER
BLACKWATER



02 Neue Entwicklungen im Grauwasserkreislauf



Quality of purified grey water – DWA leaflet

parameter	DWA-M 277	Flow values Ultrafiltration Pilot plant (MW 11/21-07/22)
Turbidity	< 2 NTU	< 0.07 NTU
BSB5	< 5 mg/L	2.6 mg/L
PH value	6.5 – 9.5	7.25 - 8.22
Total Coliforms	10,000 /100mL	nn – 170 /100 mL
E. coli	< 1,000 /100mL	nn – 6 /100 mL
P. aeruginosa	<100 /100mL	nn – 1 /100 mL

www.dwa.de



DWA-Regelwerk

Merkblatt DWA-M 277

Hinweise zur Auslegung von Anlagen zur Behandlung und Nutzung von Grauwasser und Grauwasserteilströmen

Greywater pilot plant meets all criteria (technical and qualitative) for use class C2 according to DWA M 277 leaflet, so that toilet flushing and **greywater pilot plant** irrigation are unproblematic

all criteria (technical and

C2

Toilet flushing private

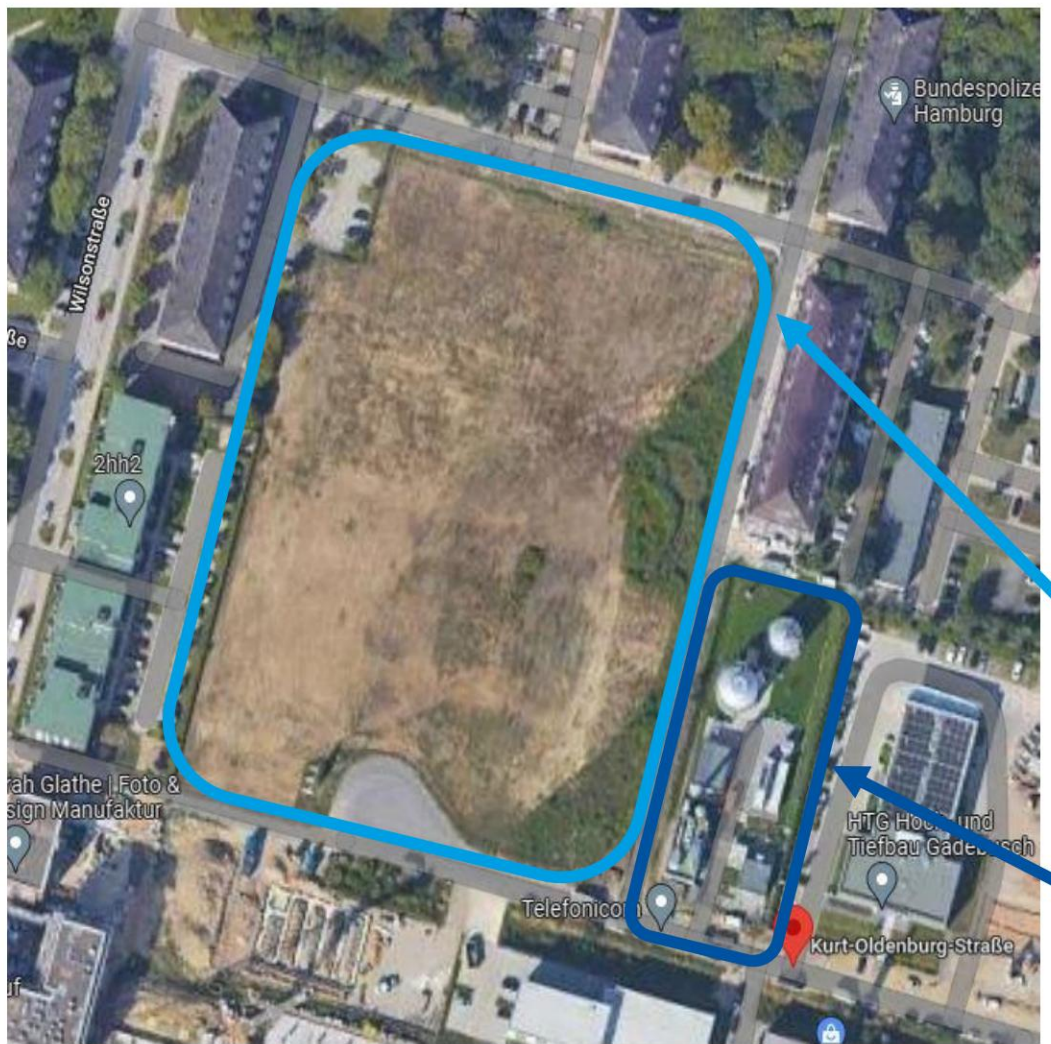
Private irrigation
Lawn, ornamental plants

Private irrigation
Crops

Private textile laundry

Public toilet flushing

GRE-Y: Industrial park and depot in the immediate vicinity



Property
ASTOR Business Park



Depot
HAMBURG WATER

GRE-Y: DBU project for combined grey and rainwater recycling in the Jenfelder Au district



4/2023 - 3/2026

Practice partner: ADOLF WEBER

170 t € funding amount (HSE 109 t €)



Summary

- Demonstration projects:
Combined **grey and Rainwater use** in the Practice
- Testing of **permanent operation** for the developed Process engineering
- **Basis** for dimensioning and operation of **large-scale Attachment**

Goals

- Stabilization of the local Water balance
- Reduction of storage space for Domestic water

Blackwater



Grey water



Rainwater



Partner projects in Europe*

DeSaH 




Anammox procedure


H+ Oceanhamnen / RECO LAB 



Old port and industrial area


Stockholm Royal Seaport 


Buiksloterham  waternet
waterschap amstel gooi en vecht
gemeente amsterdam



Treatment facilities on a floating pontoon

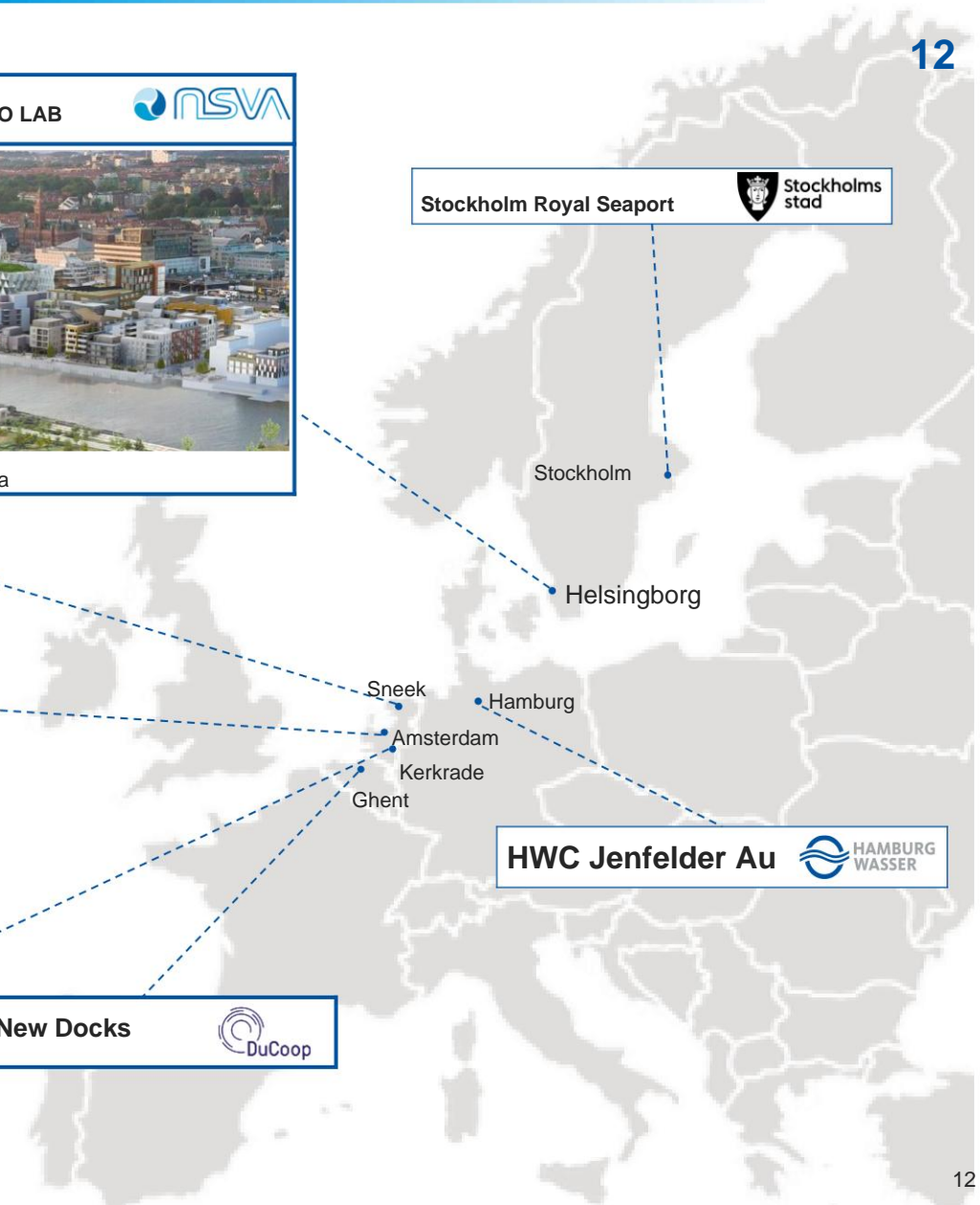
HWC Jenfelder Au 

SUPERLOCAL 



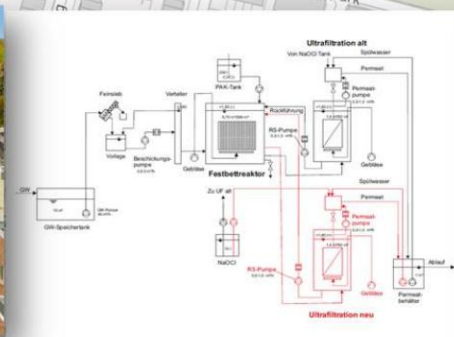
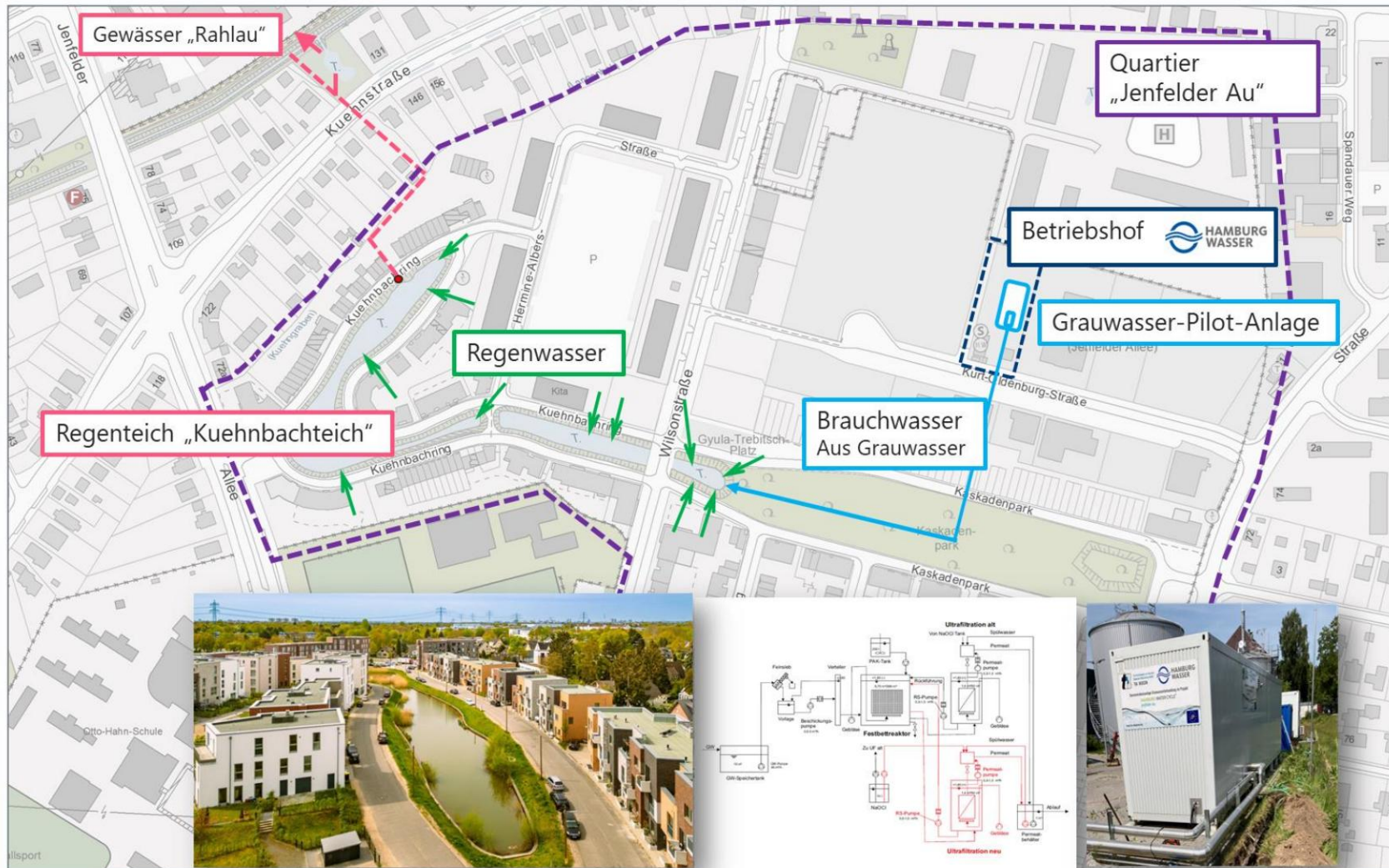
Greywater treatment for laundromats and car washes

The New Docks 



* This is a selection of projects in Europe that implement integrated material flow systems.

ANCHOR: Anthropocene nutrient and water management for holistic resilience and recovery



Summary

Goal: Exchange with partners regarding technical issues. Options, operational experience, governance structures and transferability.

Idea: Grey water treatment and use also together with rainwater, nutrient utilization, heat recovery, vacuum technology for black water collection.

Implementation of Kühn measure

2024: Investment of around 500t € to build a service water pipeline with the aim of Testing the ecological upgrading of the Kühnbachteich in dry periods

ANCHORS: 4/2023 - 3/2026

Funding body: Interreg

North Sea Region (EU)

Total costs: €4,302 t (of which HW €947 t)

03 AUSBLICK



HWC® in sustainable urban development

HAMBURG WATER CYCLE®

Integrating material flows

IMPLEMENTATION VARIANTS



2008 - 2011



Demonstration and Learning object at Gut Karlshöhe

„Vakuumtechnologie zur Stoffstromtrennung“



2010 - 2030



HAMBURG WATER Cycle® in the Jenfelder Au district

„Grüne Energie aus schwarzem Wasser“

HWC® as an established

Element in the Hamburg Infrastructure landscape

Future



Integration of HWC in sustainable urban development

Large-scale implementation in new development areas

Important findings on greywater quality:



Grey water is **not free** of pollutants or low in pollutants



Greywater contributes to significant loads of some trace substances (e.g. diclofenac, benzotriazole).



Prevention of pollutants at source (production, sale, use) is mandatory, otherwise

(1) Failure to achieve the objectives of the National Water Strategy, as no treatment using natural solutions is possible

(2) Failure to achieve climate protection targets and Endangering the objectives of the EU Green Deal due to increased necessary purification and the associated significant increase in the CO2 footprint



Example Diclofenac

Anteil Fracht [%]	
Grauwasser	Schwarzwasser
89,6	10,4



Why grey water recycling through HAMBURG WASSER?



- Buffer peak emissions during heat waves
- **Greater effect on**
Drinking water substitution
- Protect groundwater resources
- **Prevent competition for use**
- Process reliability and efficient operation by public operators
- **Ensuring service water quality and Epidemic hygiene**
- ensure preventive qualitative groundwater protection (grey water pollution by Pollutants)
- **Integrated infrastructure planning under**
Consideration of domestic water use



Sustainable public services – our mission, our future.

Dagny.wienes@hamburgwasser.de

Narne.jordan@hamburgwasser.de

Wenke.schoenfelder@hamburgwasser.de

Nice to have a conversation!