Interreg Baltic Sea Region

Co-funded by the European Union

SUSTAINABLE WATERS WaterMan

Water Recycling Toolbox

Utilisation of stormwater with the aid of “multi-dams”

Västervik Municipality

Real-world pilot replication blueprint

Interreg Baltic Sea Region

Co-funded by the European Union

SUSTAINABLE WATERS WaterMan

Introduction to the pilot measure

Utilisation of stormwater with the aid of “multi-dams”

Västervik Municipality

15 March 2023

WaterMan

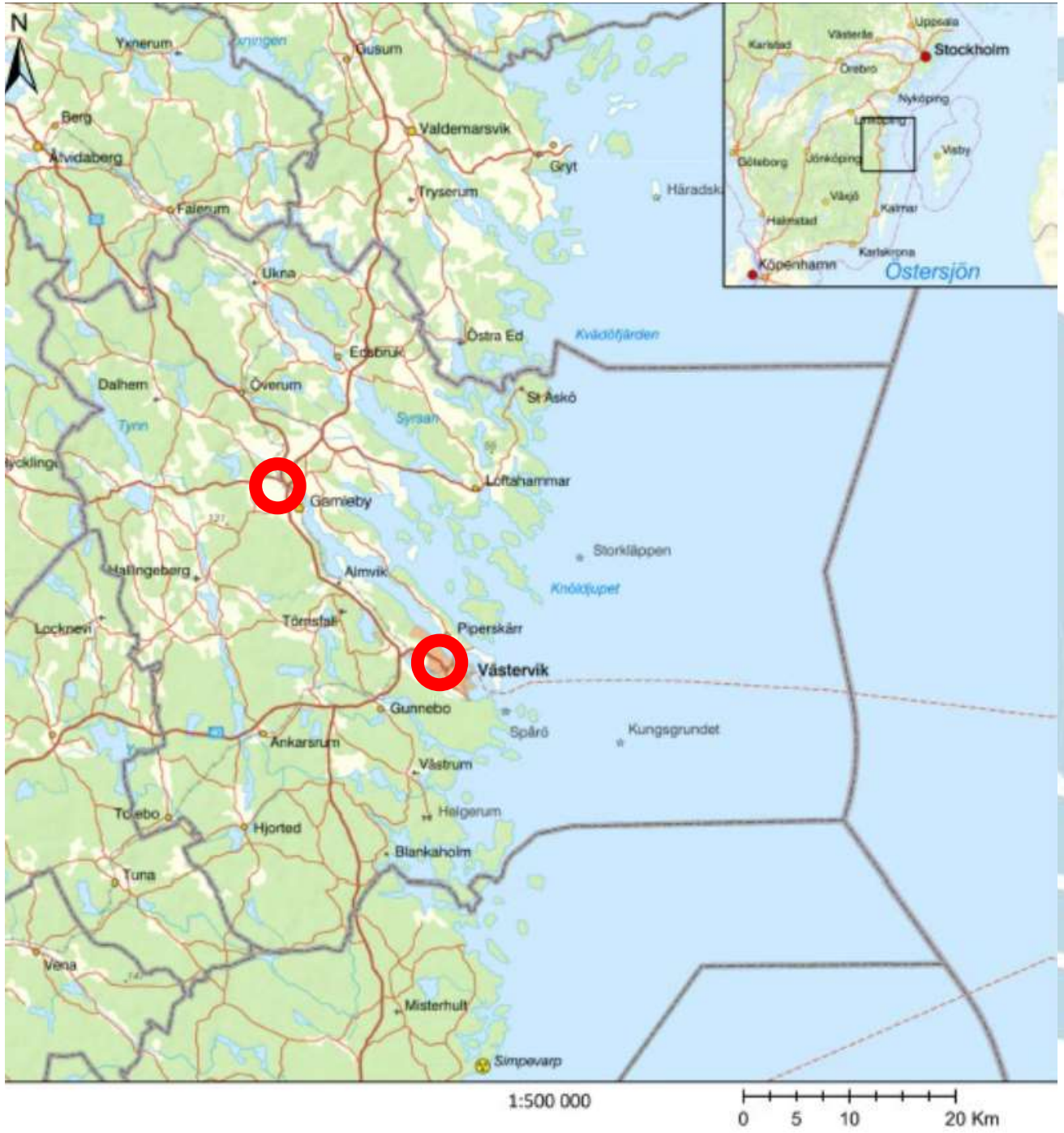
VÄSTERVIKS KOMMUN

Livskvalitet varje dag

Västervik Municipality

Gun Linberg — Strategist sustainable development
Anders Fröberg — Water cooperator
Dennis Wiström — Project manager

Pilot area(s)


N
Yxnerum
Gusum
Berg
Valdemarsvik
Åtvidaberg
Gryt
Tryserum
Falerum
Ukna
Östra Ed
Kvädöfjärden
Edsbruk
Dalhem
Överum
St Åskö
Tyrislöt
Gamleby
Löftahammar
Storkläppen
Mallingeberg
Almvik
Knödtjupet
Lockneviken
Törnsfall
Piperskär
Västervik
Gunnebo
Spårö
Kungsgrundet
Ankarsrum
Västrum
Helgerum
Torsebo
Hjorted
Blankaholm
Tuna
Vena
Misterhult
Simpevarp
Stockholm
Uppsala
Karlstad
Västerås
Örebro
Nyköping
Linköping
Visby
Göteborg
Jönköping
Växjö
Kalmar
Halmstad
Karlskrona
Köpenhamn
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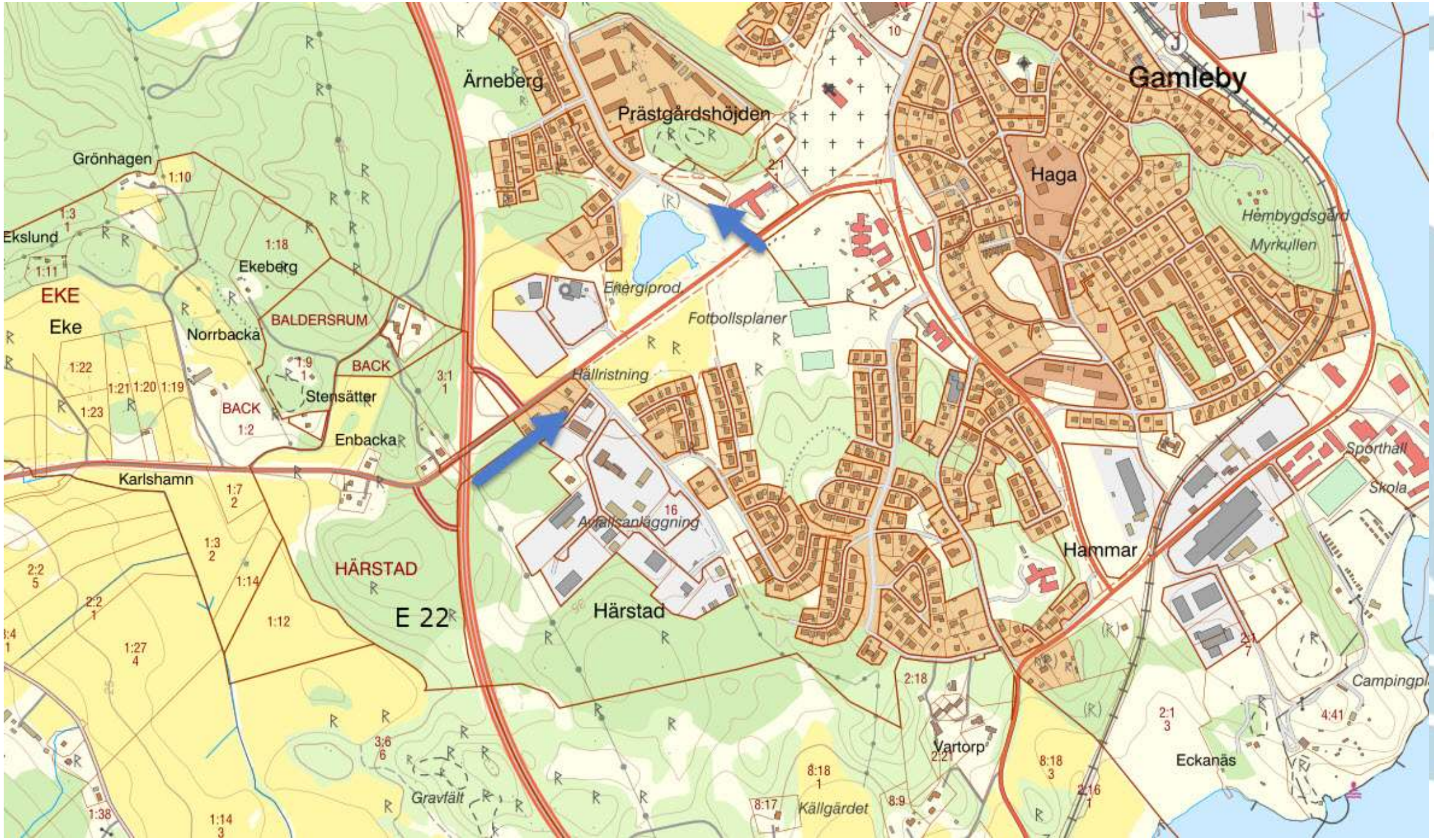
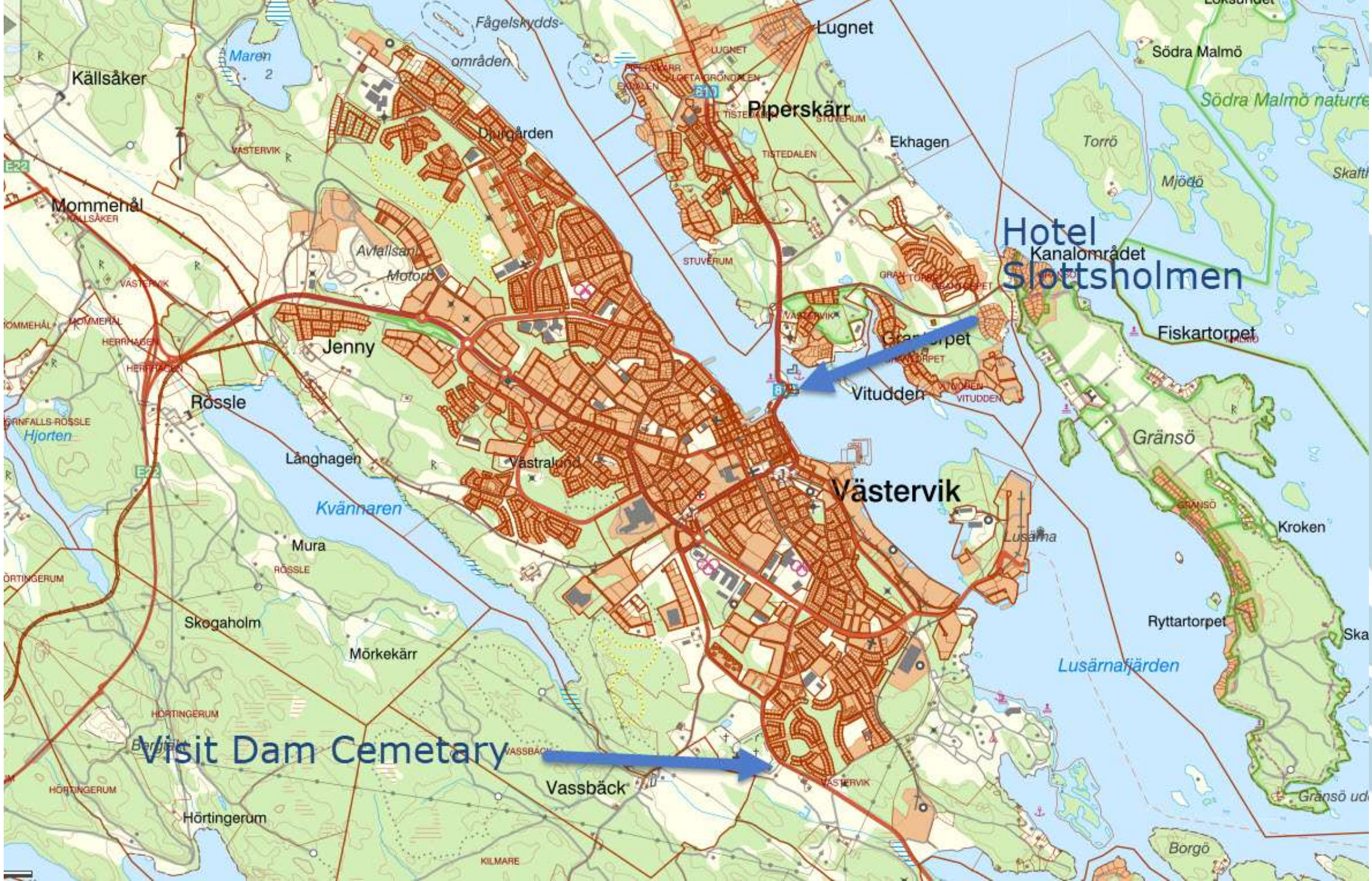

Ärneberg
Prästgårdshöjden
Gamleby
Haga
Grönhagen
Ekslund
Ekeberg
EKE
Eke
BALDERSRUM
Norrbacka
BACK
Stensätter
BACK
Enbacka
Energiprod
Fotbollsplaner
Hällristning
Hembygdsgård
Myrkullen
Sporthall
Skola
Karlshamn
HÄRSTAD
E 22
Härstad
Avfallsanläggning
Hammar
Vartorp
Eckanäs
Gravfält
Källgärdet


Hotel
Slottsholmen
Visit Dam Cemetary
Västervik
Piperskärr
Lugnet
Ekhagen
Vitudden
Fiskartorpet
Kanalområdet
Gränsö
Kroken
Ryttartorpet
Lusärnafjärden
Lusäma
Södra Malmö
Södra Malmö naturre
Torrö
Mjödö
Skaft
Djurgården
Fågelskydds-
områden
Maren
Källsåker
Mommehål
Jenny
Rössle
Hjorten
Långhagen
Västralund
Kvännaren
Mura
Skogaholm
Mörkekärr
Hörtingerum
Vassbäck
Avfallsanl.
Motorb.
Borgö
Gränsö ud
Ska

Challenges in the pilot area

Climate changes

>>>>>>> Floods and droughts

- Nutrient leakage
- Sensitive archipelago environment
- Quality and quantity of drinking water

Solutions

>>> Climate Change Adaptations

Win- Win

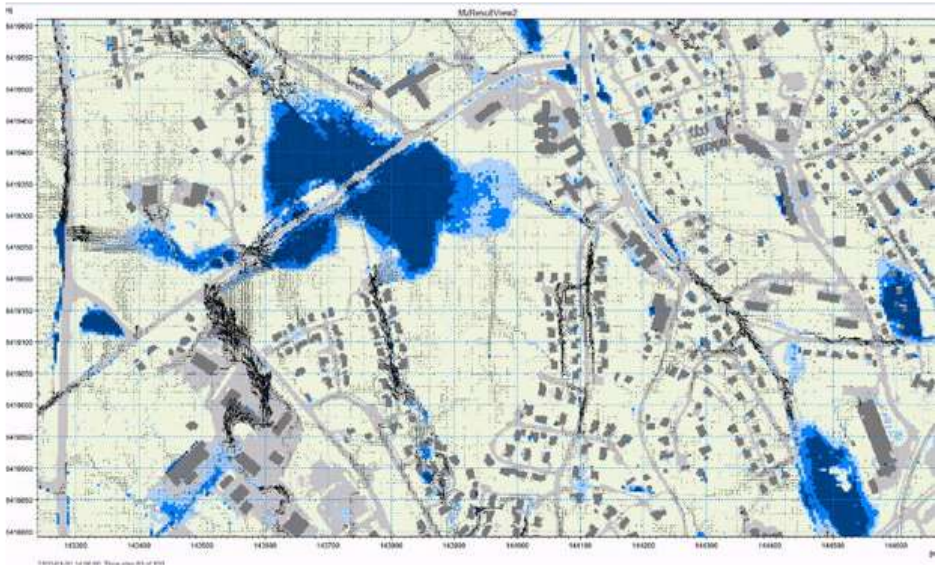
The multi-dam in Gamleby

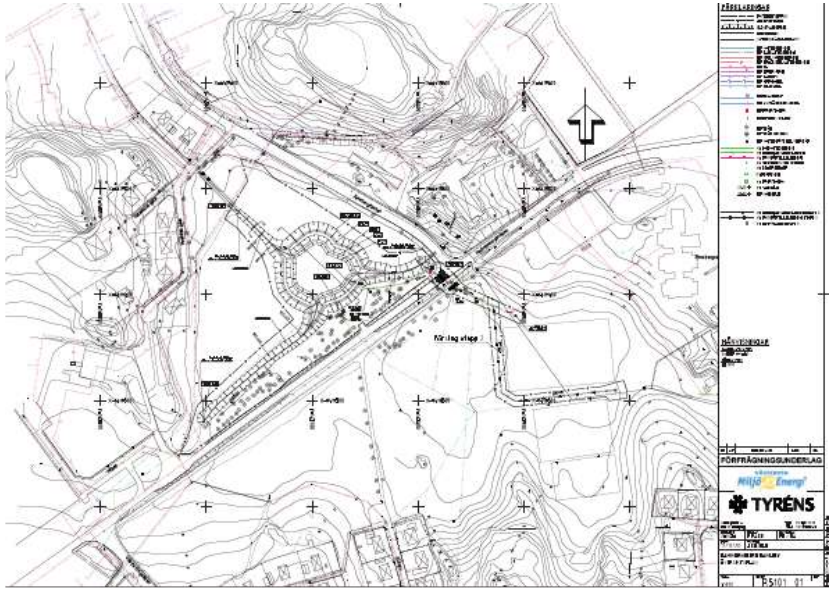
Since 2020

- For water retention
- Reduces Stormwater problems
- For reducing nutrients
- Recirculation in football fields,
  For artificial snow
- Recreation for citizens

Use for irrigation and artificiell snow

Planning and construction





Actions planned in Gamleby

Complementary measures to develop the multi-dam in Gamleby for water recirculation

- Use for irrigation in a wider area
- Use in cemetery
- Station for technical water

Actions planned in Västervik

- Analyses to find the right places for multifunctional dams in Västervik
- Pre-study for construction of multi-dam in Västervik for water recirculation
- Development of existing dam (Örserum)
- Station for technical water

Actions in Västervik

Use of stormwater

Sport fields

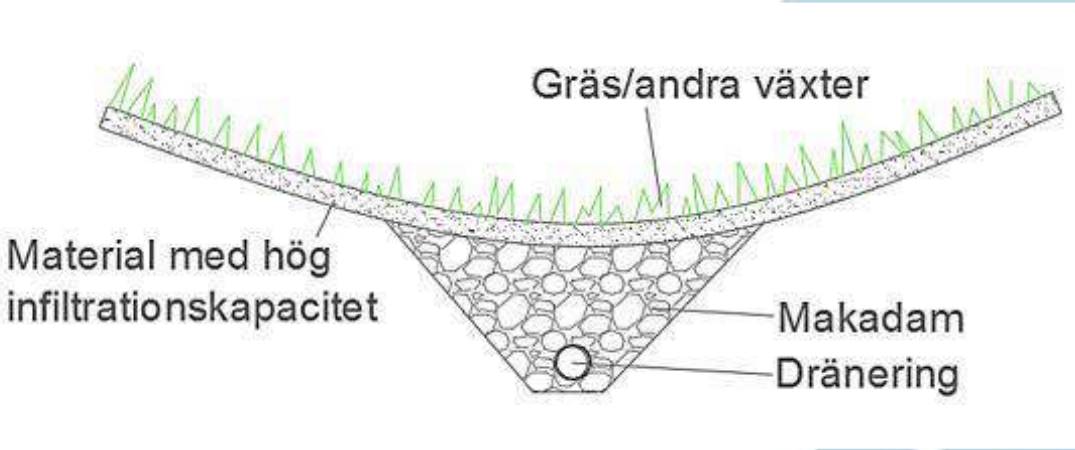
Arrange stations for technical water from multi-dams in Västervik.

Enable businesses to replenish technical water for use where the requirements for the purity of the water are not so high.

Irrigation, Cleaning (houses roof, facade etc), technical/industrial use

Need for pretreatment

Open stormwater treatment
Ditches, vegetation, filter



Biochar

Biochar filters, pretreatment
- water purification,
- carbon storage
- Water delaying

Installation of biochar filter diches and use of in parks (tree planting) and recreation areas.

Gun Linberg Strategist sustainable development
Anders Fröberg Water cooperator
Dennis Wiström Project manager

Interreg Baltic Sea Region

Co-funded by the European Union

SUSTAINABLE WATERS WaterMan

1st Peer-review session

Utilisation of stormwater with the aid of “multi-dams”

Västervik Municipality

5 Sept 2023

WaterMan

VÄSTERVIKS KOMMUN

Västervik Municipality

Livskvalitet varje dag

Anders Fröberg Water coordinator, Strategist

Drought and floods

Waterrestrictions
Almost every summer
2023 Very dry period until juli


VÄSTERVIK 16 juni 2023 11:11 19

Nu kommer bevattningsförbudet

› "Vi behöver alla hjälpas åt att spara på dricksvattnet"

Andreas Johansson Christer Andersson

MILJÖ 9 juni 2023 19:40

Nu drar kommunerna åt vattenkranarna

Tobias Österberg/TT

VÄSTERVIK 21 juli 2023 16:00 13

Fotbollsplaner bevattnas med vatten från Kvännaren

› Kan fortsätta vattna trots förbud ✔ Västerviksbor har undrat

Anna Persdotter

VÄSTERVIK 5 juli 2023 21:00 6

Så får Carina odlingarna att leva – trots bevattningsförbudet

› Första gurkan skördad: "Det är speciellt att äta det man odlat själv"

Floods in august 2023


VÄDER 25 aug. 2023 17:15

SMHI-varningar: Skyfallsliknande regn

TT

VÄDER 24 aug. 2023 09:00

MSB utreder sommarens översvämningar

TT

Strategy Stormwater and Drinking water

Sustainable and open stormwater treatment
Sustainable supply of drinking water

- Action plan 2020-2030
- Measures in private gardens, streets, parking areas, industrial areas
- Measures in new projects
  No drinking water for irrigation (municipality owned)

The multi-dam in Gamleby

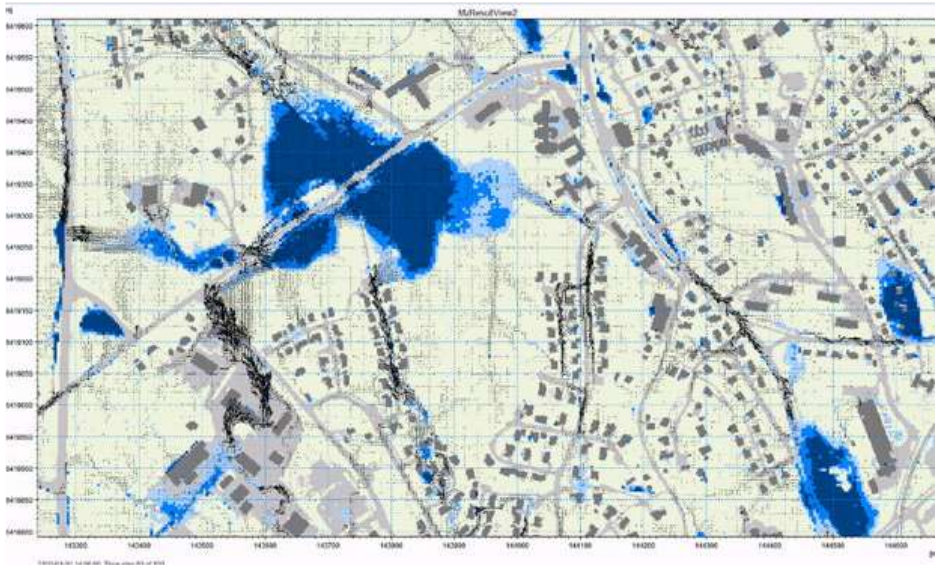
Since 2020

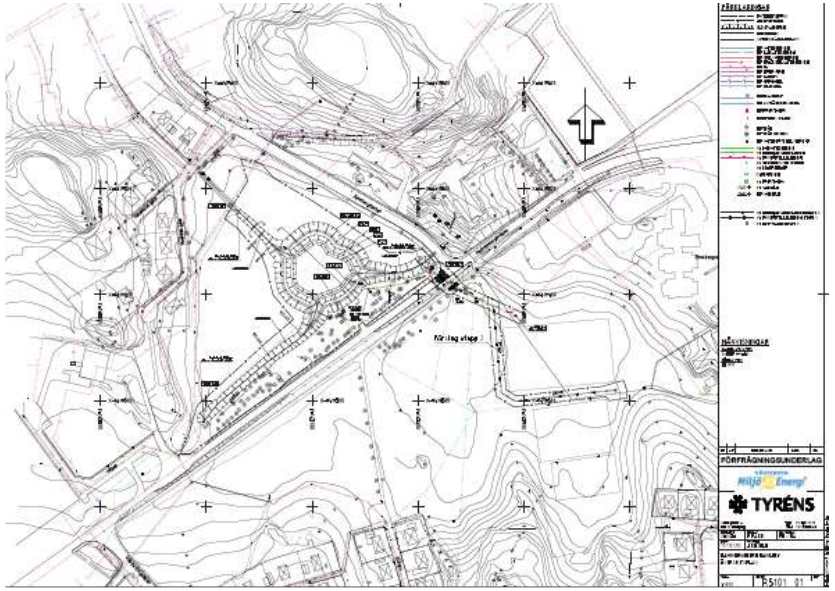
- For water retention
- Reduces Stormwater problems
- For reducing nutrients
- Recirculation in football fields,
  For artificial snow
- Recreation for citizens

- No further treatment

Use for irrigation and artificiell snow

Planning and construction





Actions planned in Gamleby

Complementary measures to develop the multi-dam in Gamleby for water recirculation

- Use for irrigation in a wider area
- Use in cemetery
- Station for technical water

Actions 2023-2024 in Gamleby

- Plan for maintenance
- Pump for circulation
- Use for irrigation in a larger area
- Plantations and trees in city, plantations cemetery

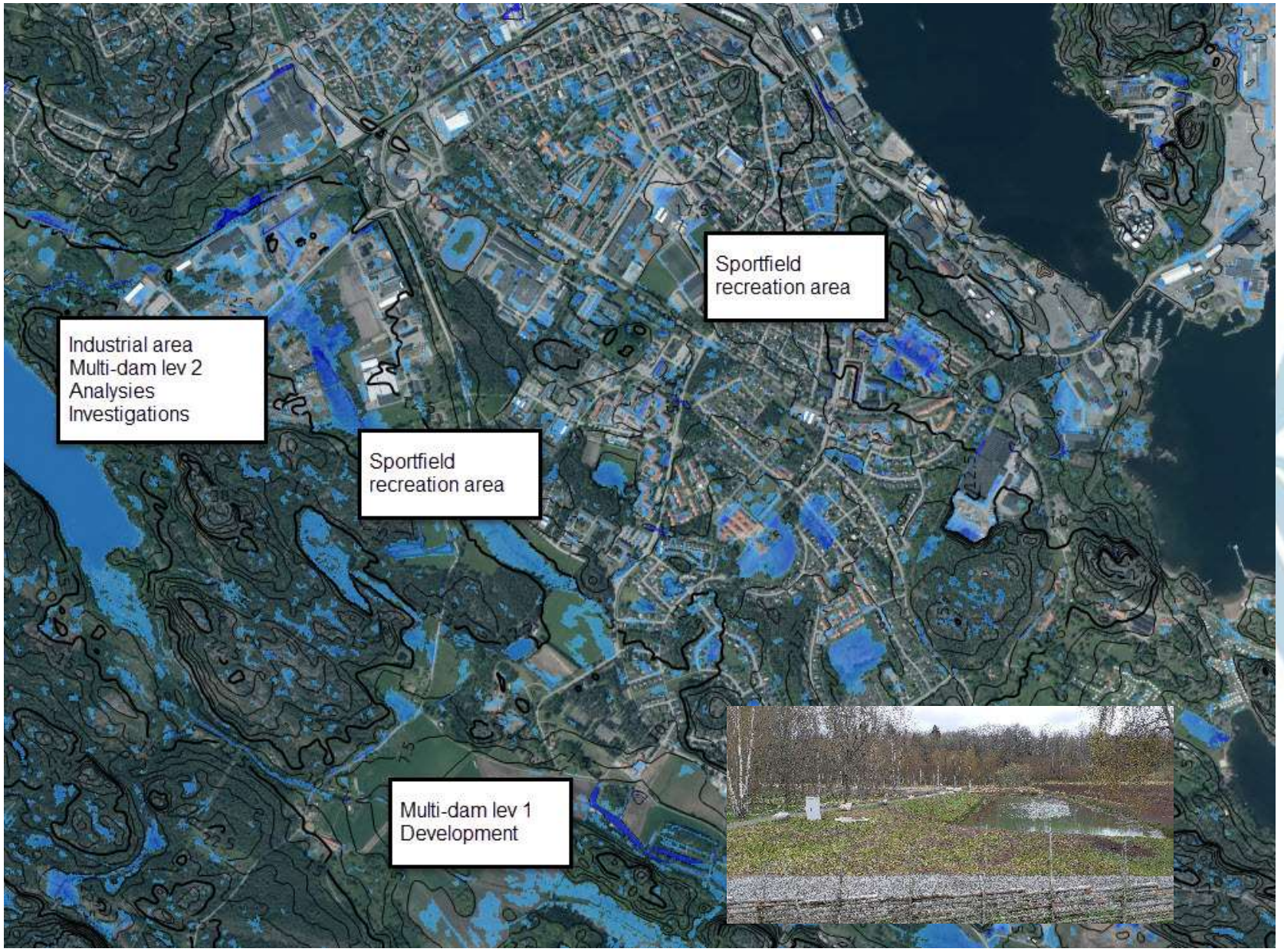
- Station for technical water, tap point

Actions in Västervik

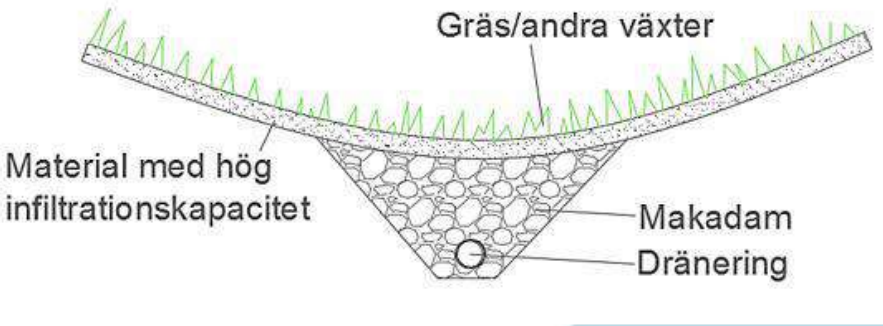
- Analyses of heavy rains in Västervik and to find the right places for multifunctional dams in 2023-2024 procurement 2023
- Prestudy for multi-dam level 2

- Development of existing dam (Örserum) 2024
- Station for technical water, tap point

Actions in Västervik



Pretreatment



Use of contained stormwater

- Not for private cultivation or agriculture
- Not from heavy polluted areas
- We are monitoring pollutants
- If business are interested it should be possible to use for cleaning etc.

Water reuse scheme

- Stormwater to multi-dam
- Natural treatment, sedimentation etc
- Level 1 for irrigation (and snow)
- Level 2 Business for cleaning etc
  Extended treatment if nescesary

Requirements

- Local environment agency
  No requirements
- We are monitoring
  Nutrients, bacterias, heavy metals

Analysresultat

Metodbeteckning	*Analys/Undersökning av*	*Resultat*	*Mätosäkerhet*	*Enhet*
SS-EN 1484 utg 1	DOC	14	±2.1	mg/l
SS-EN ISO 7887:2012C mod	Färg	40	±4	mg/l Pt
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SS-EN 1484 utg 1	TOC	13	±2.0	mg/l
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ISO 15923-1:2013 F	Fosfatfosfor, PO4-P, filtr.	<0.01	±0.005	mg/l
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Kvicksilver är uppslutet med HNO3. Analys av metaller: provet är uppslutet med HNO3 (mikrovågsugn) SS EN ISO 15587-2.

Stakeholders

- Municipal Water company Västervik Miljö & Energí
- Municipal housing company Västervik Bostads AB
- Local environment agency
- User of water for irrigation

1st Peer & expert review session: Recommendations & conclusions

- It would be good to check what kind of industries are close to the possible location of the 2nd gen multi-dams in Vastervik, and what pollutants are related to them. You are intending to mix “normal” urban stormwater runoff with industrial runoff. So the types of industries that are in place likely affect the quality of the retained water – and may determine the treatment needs.
- It may be beneficial to check the potential end-users of the water from the 2nd multi-dam in Vastervik and their interests & needs in more depth right at an early stage, in particular with regard to interest in & required quality of “technical water”. This would allow to tailor the water quality of the retained water to their needs, by designing the 2nd gen multi-dams accordingly (e.g. delaying / sedimentation treatment of the water.
- It could be advisable to cross-check in Swedish environmental law / with environmental authorities if you need an environmental impact screening for the new 2nd multi-dams in Vastervik. If its catchment area is larger than 50 ha – it may be required (as it is the case in LT – but maybe that´s only a LT specificity).
- Keep in mind that the evaluation of the pilot measure should focus not only on appraising the effectiveness of water retention (and treatment, if applicable), but also the reuse of the retained water by end-users. This needs to be considered in the work schedule.

Interreg Baltic Sea Region

Co-funded by the European Union

SUSTAINABLE WATERS
WaterMan

Absorption report

Utilisation of stormwater with the aid of “multi-dams”

Västervik Municipality

07 November 2023

WaterMan Västervik Municipality Bornholm 7-9/11

VÄSTERVIKS KOMMUN

Livskvalitet varje dag

Anders Fröberg — Water coordinator, Strategist
Akke Karlsson — Coach Sustainable development
Ingela Karlsson — Engineer Municipal Water and Wastewater

Changes after discussions in Ringsted

- Involving stakeholders
  Local agency for environment protection, VBAB, VMEAB
- More focus on reuse of stormwater, useable water
  and what we learned of using stormwater
- Analyses risk of pollutants in the area for multidam level 2
- Checking with regional agency for environment
- More specific plan of actions and measures

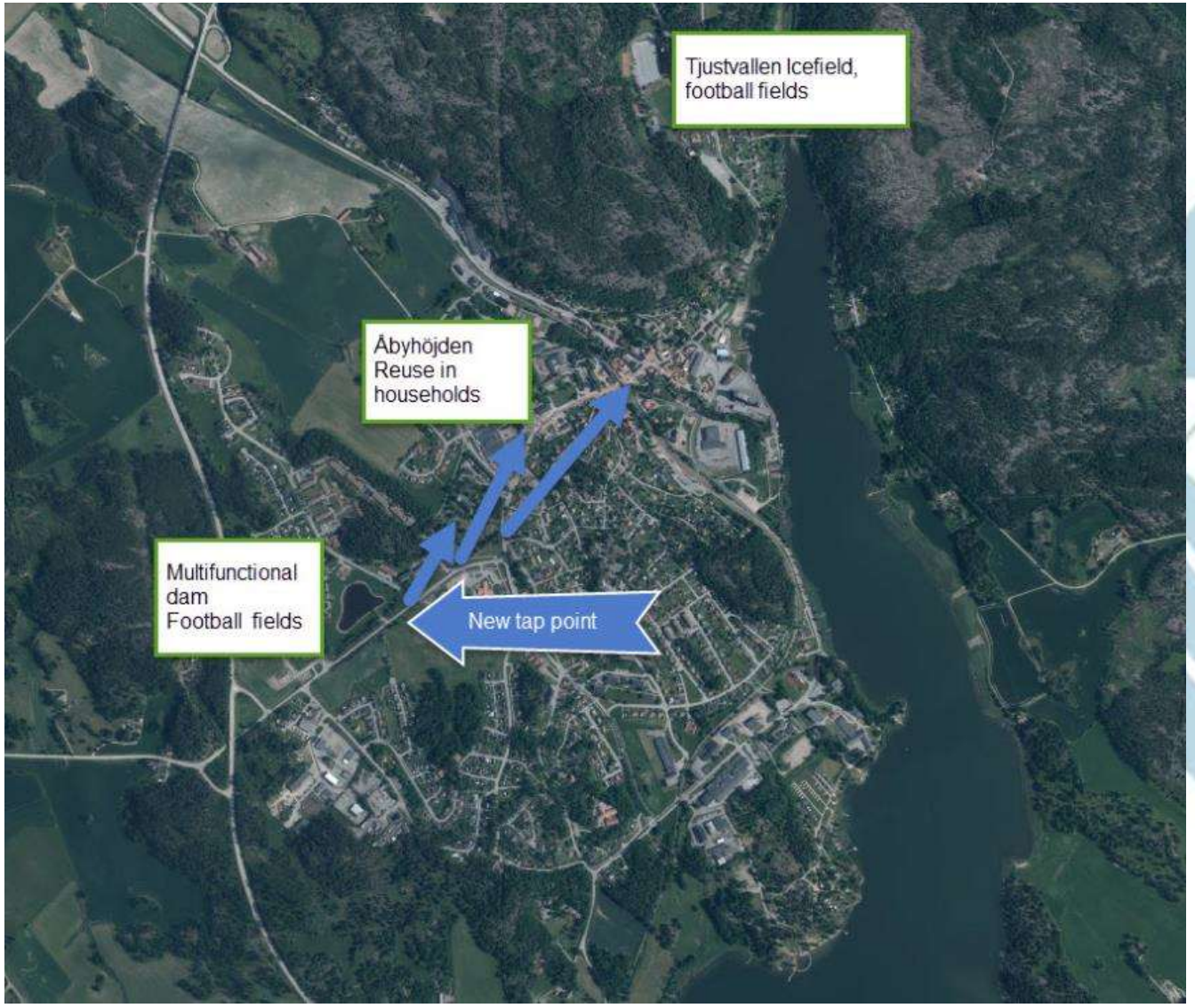
Actions in Gamleby and Västervik

Plans Gamleby

Measure	When	Status	Comments	Costs
Tap point Use in wider area	2023	x		
Follow-up double pipes	2023-2024	Ongoing	Recirculation in recidential area	
Analyses waterquality	2023-2025	Ongoing		
Circulation, stormwater	2024-2025		Tjustvallen Irrigation and	

Gamleby

Complementary measures to develop the multi-dam in Gamleby

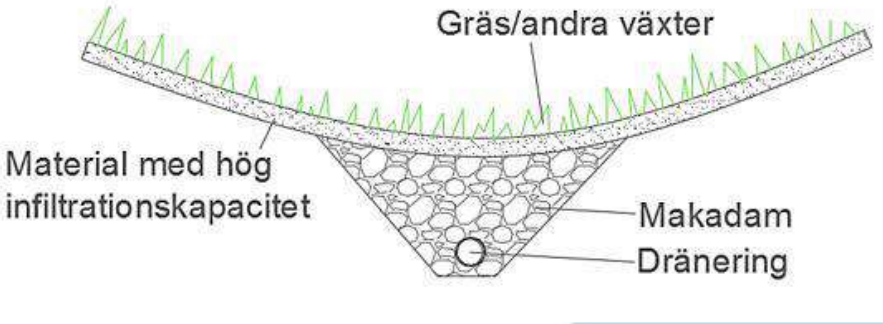


Plans Västervik

Measure	When	Status	Comments	Costs
Tap point Use in wider area	2024	Ongoing	Place located	
Stormwater in to the irrigationsystem	2024			
Pre treatment	2025		Design, procurement 2024	
Analyses Multidam level 2	2024		Where, how	
Interest users?	2024-2025	Ongoing		
Analyses waterquality	2023-2025	Ongoing		

Actions in Västervik

Pretreatment



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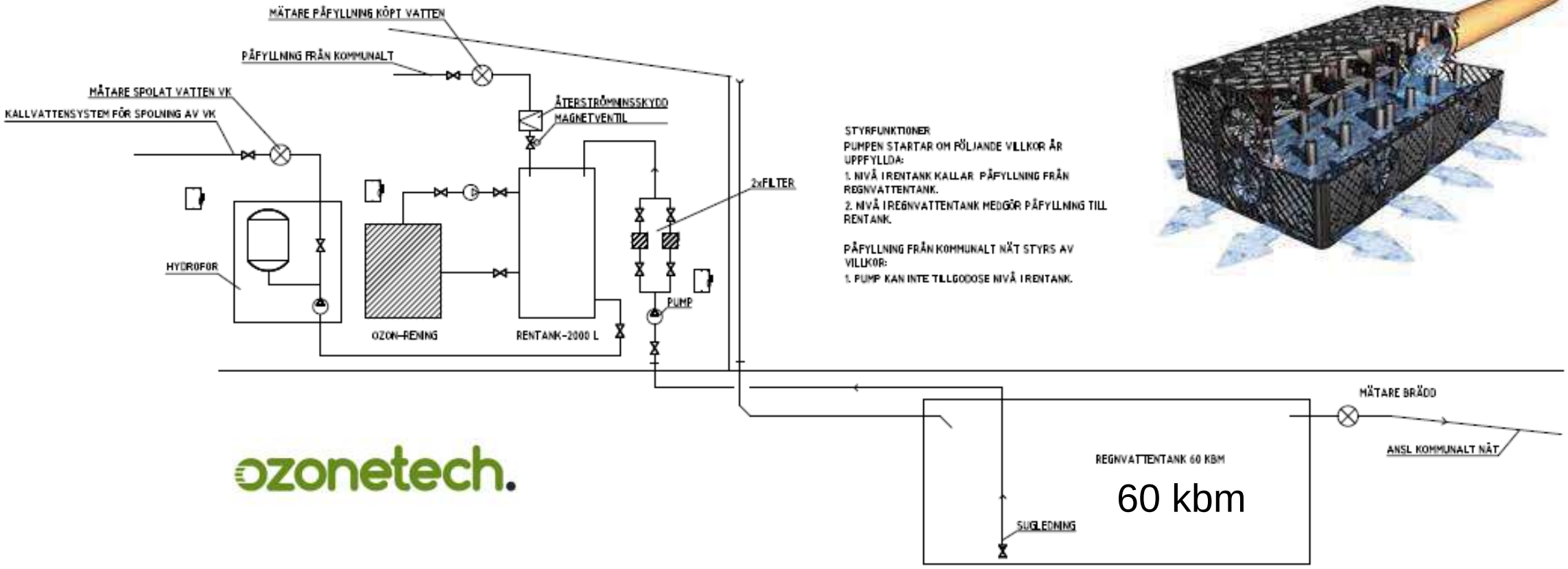
Kvicksilver är uppslutet med HNO3. Analys av metaller: provet är uppslutet med HNO3 (mikrovågsugn) SS EN ISO 15587-2.

Reuse of rainwater for flushing Åbyhöjden



ozonetech.

- Tap point for technical water

Reuse of stormwater today

Actions in Västervik

- Analyses to find the right places for multifunctional dam level 2.
- Prestudy

Development of existing dam (Örserum)

- Tap point (station for technical water)
- Stormwater to the irrigation system at the football fields
- Pre treatment Open stormwater treatment

Interreg Baltic Sea Region

Co-funded by the European Union

SUSTAINABLE WATERS WaterMan

2nd Peer-review session

Utilisation of stormwater with the aid of “multi-dams”

Västervik Municipality

7 November 2024

VÄSTERVIKS KOMMUN

WaterMan Project
Västervik Pilot
Reuse of Stormwater

Livskvalitet varje dag

email, meetings

Berlin 5-7 november

Users today

- Irrigation sportfields (and artificiell snow)
  Municipality, VBAB, Associations (sport) >10000 kbm

- Irrigation in parks - trees, plantations
  Municipality, Entrepreneurs, Cemeteries 1000 kbm

- Privat houses
- Use of collected water for toilet flushing
  Public housing company

Methods for involving the users

- Contact with the users
  Motivation, Show appreciation
- Interviews
- Advice
- Evaluation
  Follow-up document

Meet the users on site

Focus group Irrigation sportfields and parks

- Mostly individuel contact
- Spreads information i the group
  Municipality, Maintenance parks, public housing company, involved associations (sports)

How does it work

- Evaluation together
- How does it work, problems
- Contacts, how to avoid problems
- Improvements

Evaluation file

Users of contained stormwater								
Västervik och Gamleby								
	2023			2024				
	VBAB (Erneberg)	Kanonaden Ga	AMA Gamleby	VBAB (Erneberg	Kanonaden Gam	Kyrkan Gamleb	VBAB Åbylund	Kyrkan Västervik
Contact	Markus R	Jörgen	Jörgen	Markus R	Jörgen	Mathias L	David	Göran
From tap point	Yes	Yes		Yes	Yes	Yes		
kbm	>1000	16	30		16	8		>1000
Local collection							Yes	
How is transport from tap point working		Ok			Ok	Ok		
Practical problems tap point		No			No	No		
Function of the used water, problem quality	Ok			Ok		Ok	Ok	Ok
Practical propblems irrigation/etc	No	Sacks mainten		Drainage	Sacks mainten	No		
Improvements suggestions	Drainage can be better			Drainage			First flush filter (pc	Aeration
Other use than irrigation							Toilet flushing	
Comments	First flush			First flush		App fungerar		Drip irrigation proble

So far

- The water is ok
- Transport from tap point is working for parks
- Maintenance is important

How to reach, involve and motivate new users

- Information
  How to pick up water, offer advice, be open that it is reused stormwater
- Information in focus groups
  email, meetings
- More than Onne channel
  Water company, local authority, advicer, business service
- Demands in building permit
  Stormwater measures (delay)

Potential users

- Use for fire water
  Municipality
- Housing companies
  Mostly irrigation but also rough cleaning
- Entrepreneurs
  Rough cleaning,in/outside, streets, roof, pipes
- Industries? District heating plants?
  Process water

Use the dry periods

- Waterrestrictions

VÄSTERVIK 16 juni 2023 11:11 19

Nu kommer bevattningsförbudet

› "Vi behöver alla hjälpas åt att spara på dricksvattnet"

Andreas Johansson Christer Andersson

MILJÖ 9 juni 2023 19:40

Nu drar kommunerna åt vattenkranarna

Tobias Österberg/TT

NATUR 10 aug. 2023 07:00

Risk för vattenbrist – trots Hans

Cecilia Klintö/TT

VÄSTERVIK 21 juli 2023 16:00 13

Fotbollsplaner bevattnas med vatten från Kvännaren

› Kan fortsätta vattna trots förbud ✔ Västerviksbor har undrat

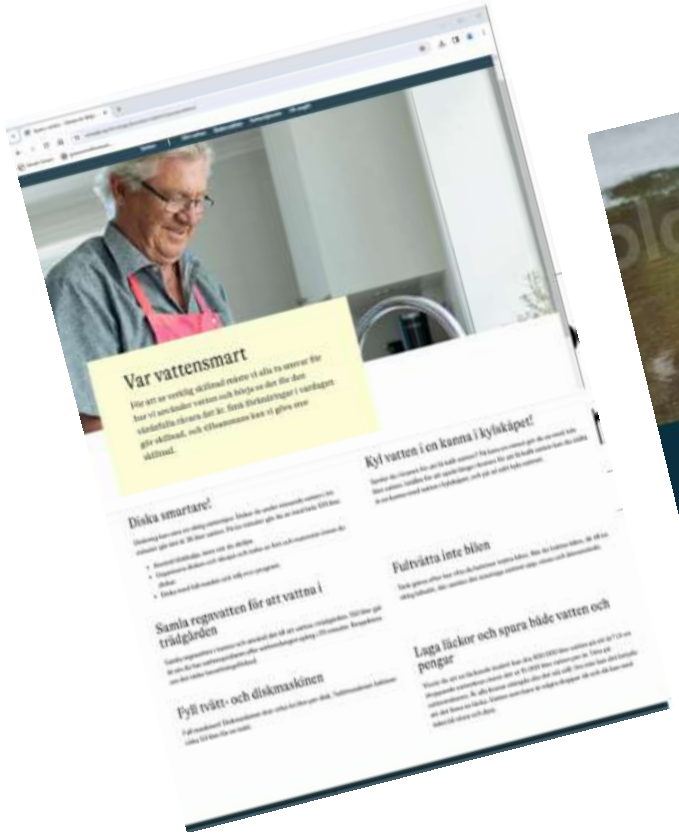
Anna Persdotter

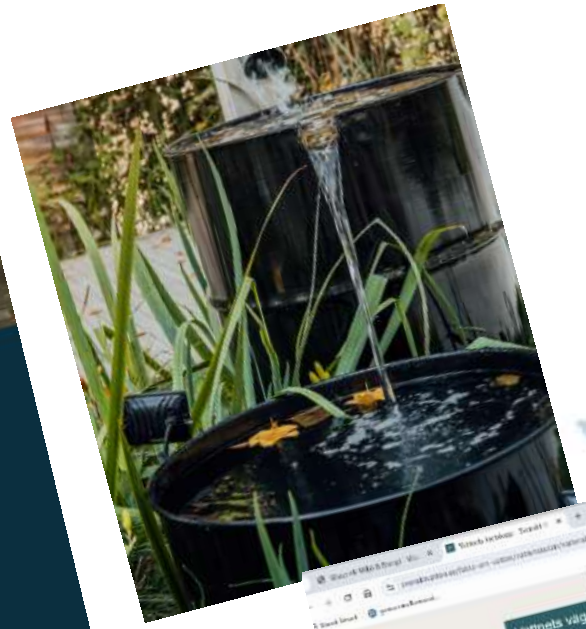
VÄSTERVIK 5 juli 2023 21:00 6

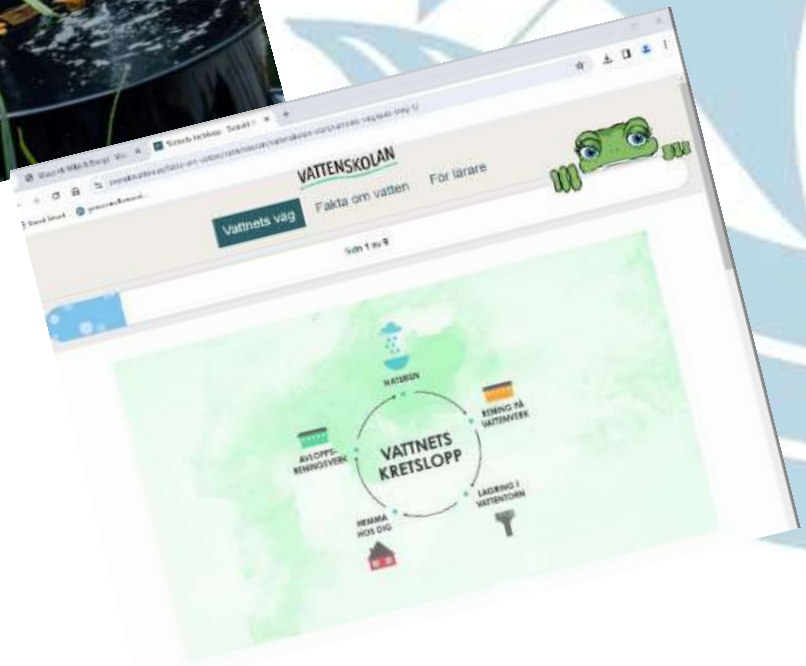
Så får Carina odlingarna att leva – trots bevattningsförbudet

› Första gurkan skördad: "Det är speciellt att äta det man odlat själv"

Information
Encurage/inspire to save and reuse water







VÄSTERVIK Miljö Energi

Webpage, broschures, social media, newsletters

Interreg Baltic Sea Region

Co-funded by the European Union

SUSTAINABLE WATERS WaterMan

Status updates

Utilisation of stormwater with the aid of “multi-dams”

Västervik Municipality

30 April 2025

VÄSTERVIKS KOMMUN

WaterMan Project
Västervik Pilot

Livskvalitet varje dag

Actions nov 2024 to may 2025

Tjustvallen
”minimulti” step 2

- Planning, design
  dec 2024
- Procurement
  april 2025
- Construction
  may 2025

Pumps, plumbing, control

Local show room Municipality hall

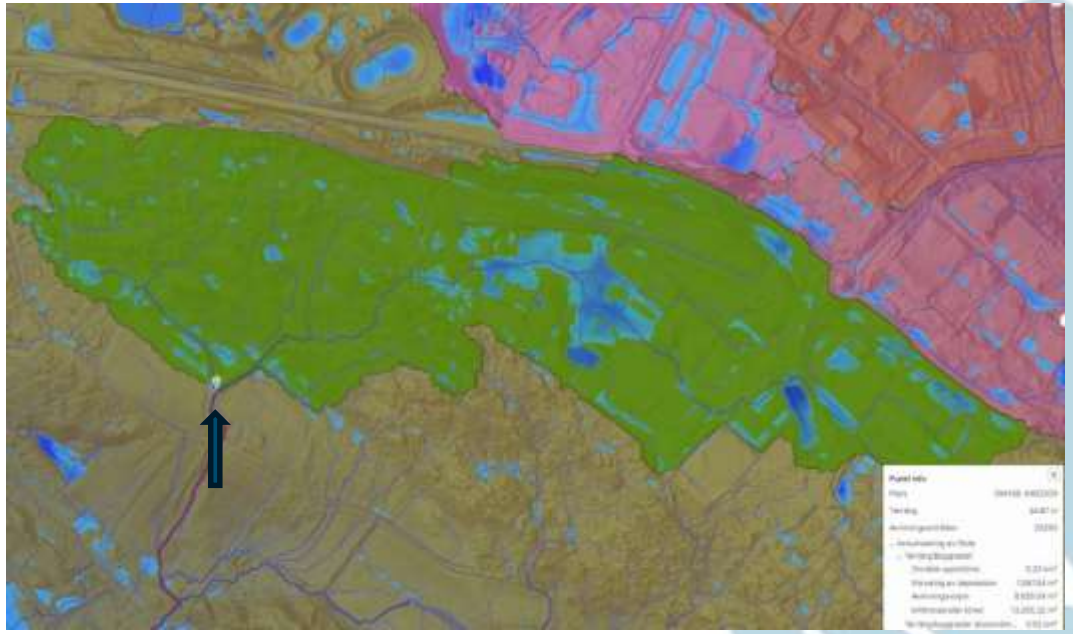
- Planning, design dec 2024
- Procurement april 2025

”Minimultidam” in Jenny Västervik

- Preparatory works, design nov-dec 2024
  - Procurement dec 2024
  - Construction Jan-febr 2025

Climate adaption

- Problems when heavy rains
- Stormwater from 30 ha
  hardened surface
- Water retention
- Close to user (riding center)



From the construction

- Retention of 1500 kbm

Feasability studies Karstorp Västervik

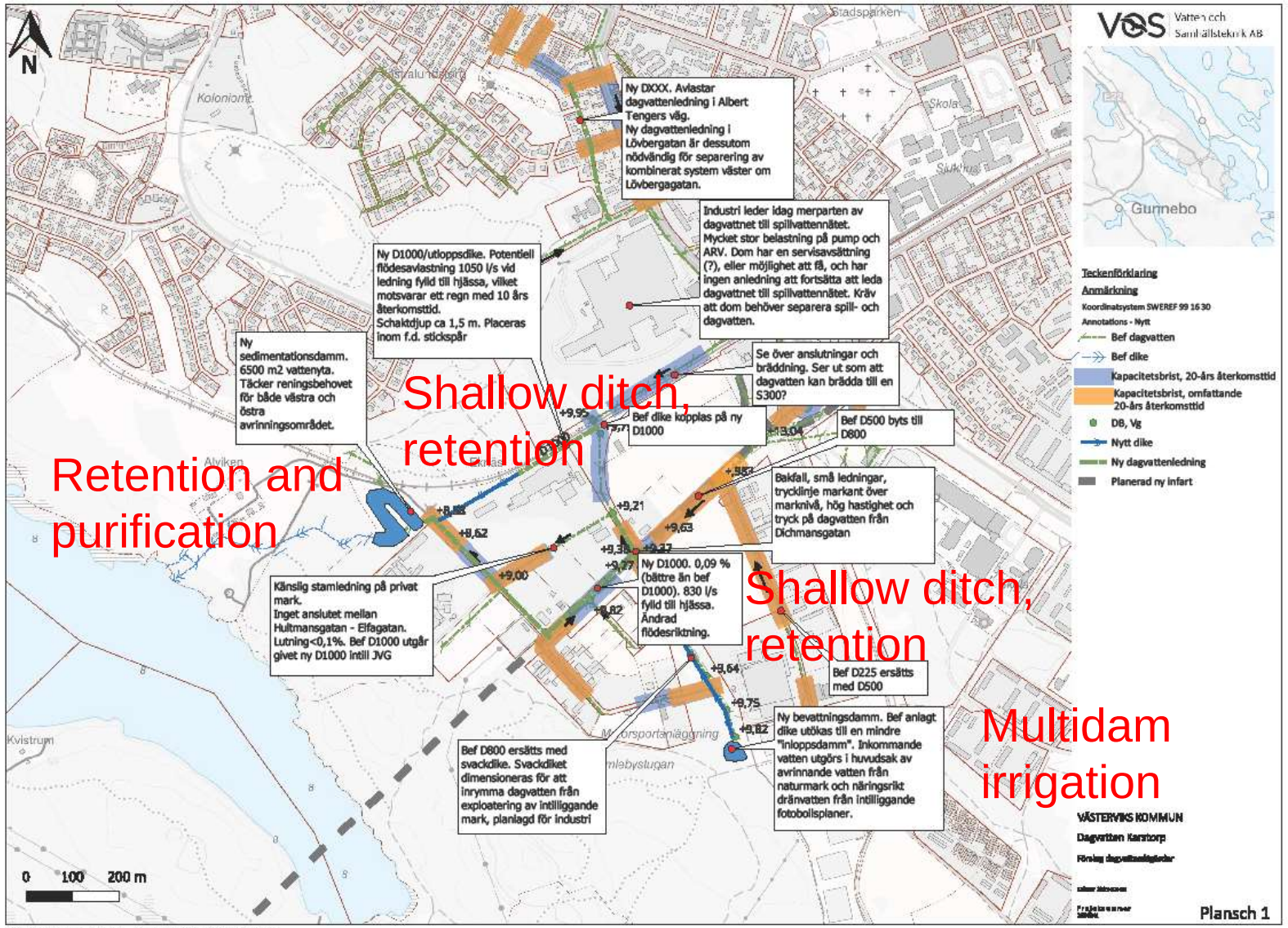
- Climate adaption, water retention
- Better water quality, purification
- Visible surface water instead of pipes
- Reuse of water

- How to solve many problems at the same time

Problems and possibillities

- Catchment area
  200 ha
  ¼ of the storm water city of Västervik
- Floods, problems with capacity
- Heavily loaded lake
- Nearby users
  football fields, fire department, business/functions

Proposal from consultant



Next step Karstorp
Several solutions

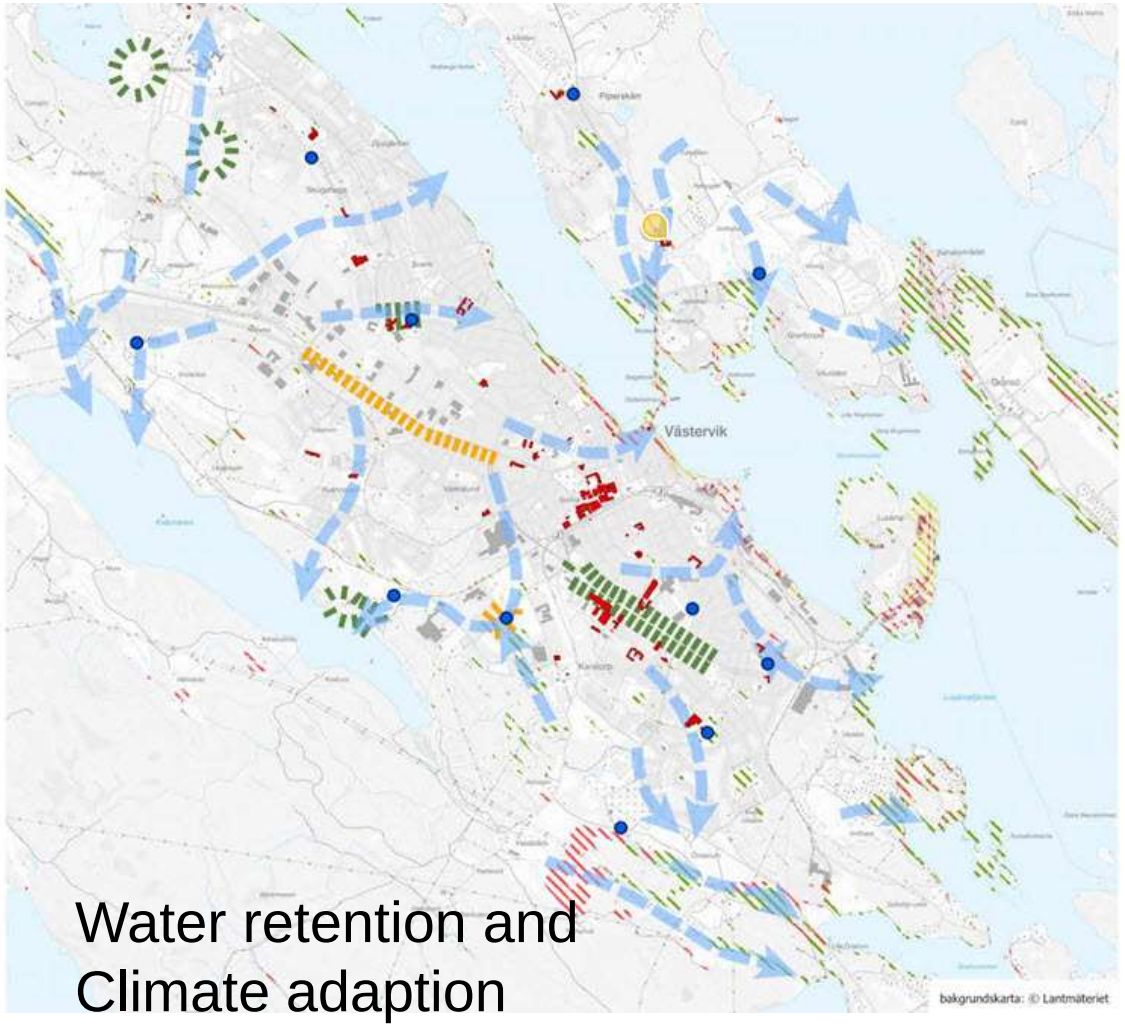
- Prioritization, preparatory works,design may-june 2025
- Procurement aug 2025
- Construction sept-oct 2025

Analyses Västervik

- Analyses heavy rains
- Prioritation possible areas for retention
- Analyses intrested users of storm water

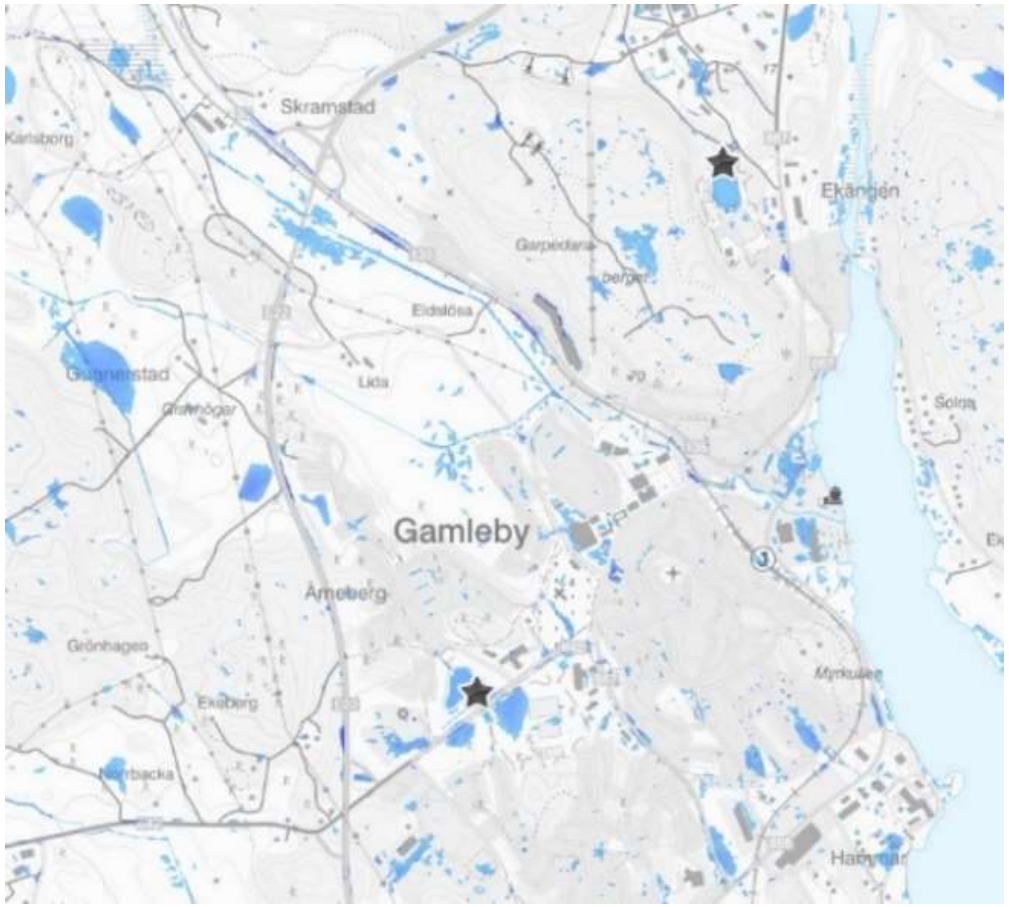
Analyses - Water retention and winwin solutions

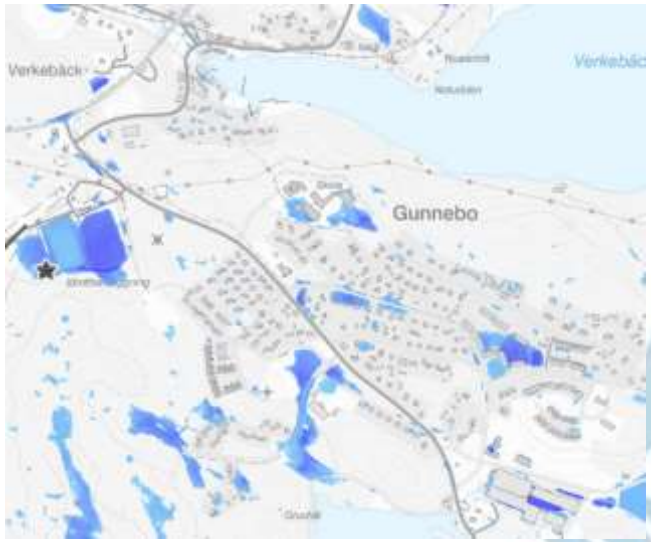
Proposed location Multidam



Water retention and
Climate adaption

Gamleby, Gunnebo, Överum





Interreg Baltic Sea Region

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SUSTAINABLE WATERS
WaterMan

Access the „BSR Water Recycling Toolbox" here.
https://www.eurobalt.org/waterrecyclingtoolbox/

The „BSR Water Recycling Toolbox" was elaborated as part of the project "WaterMan - Promoting water reuse in the Baltic Sea Region through capacity building at local level", The project is co-financed by the European Union (European Regional Development Fund) and implemented within the Interreg Baltic Sea Region Programme. More information:

eurobalt.org/WaterRecyclingToolbox
interreg-baltic.eu/project/waterman

WaterMan promotes a region-specific approach to water recycling, which intends to use the alternation of too much and too little water that has become typical in the Baltic Sea Region to make the local water supply more resilient, and supports municipalities & water companies in adapting their strategies.