

Water Resilient Cities

WRC in Mechelen (Belgium)

General overview



Location



Location



Partners in the Mechelen project

- City of Mechelen

Historically important city of art, railroad,...

80 000 inhabitants

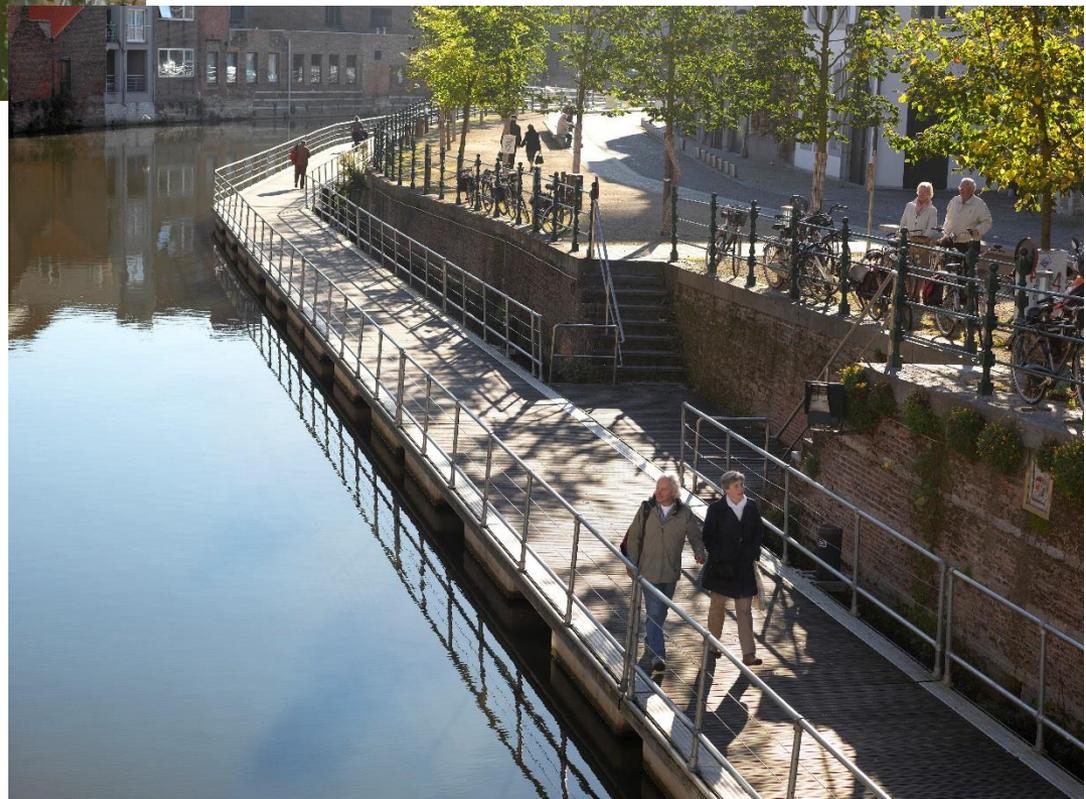
Former capital of the low countries

- De Vlaamse Waterweg

=“The Flemish Waterway”

= Flemish Water board Authority

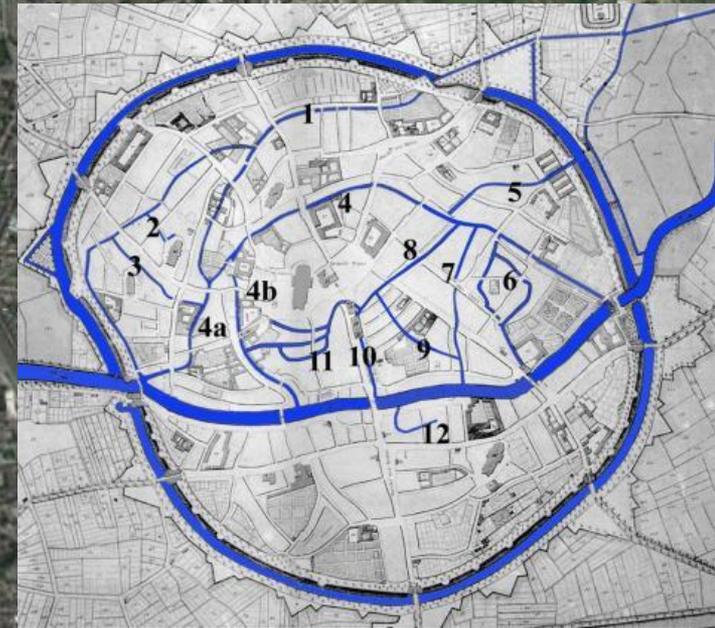
Former name: Waterwegen en Zeekanaal



 De Vlaamse
Waterweg ^{nv}

 
MECHELEN

Until early 20th century



Tidal river **trough** the city centre
Normal water levels from 2-5m above sea level (asl)
(city centre 5-7m asl)
Small rivers ('vlietjes'-brooks) in the centre for shipping and drainage

Nowadays

Lower Dyle

Ship lock

Bypass Dyle (non navigable)

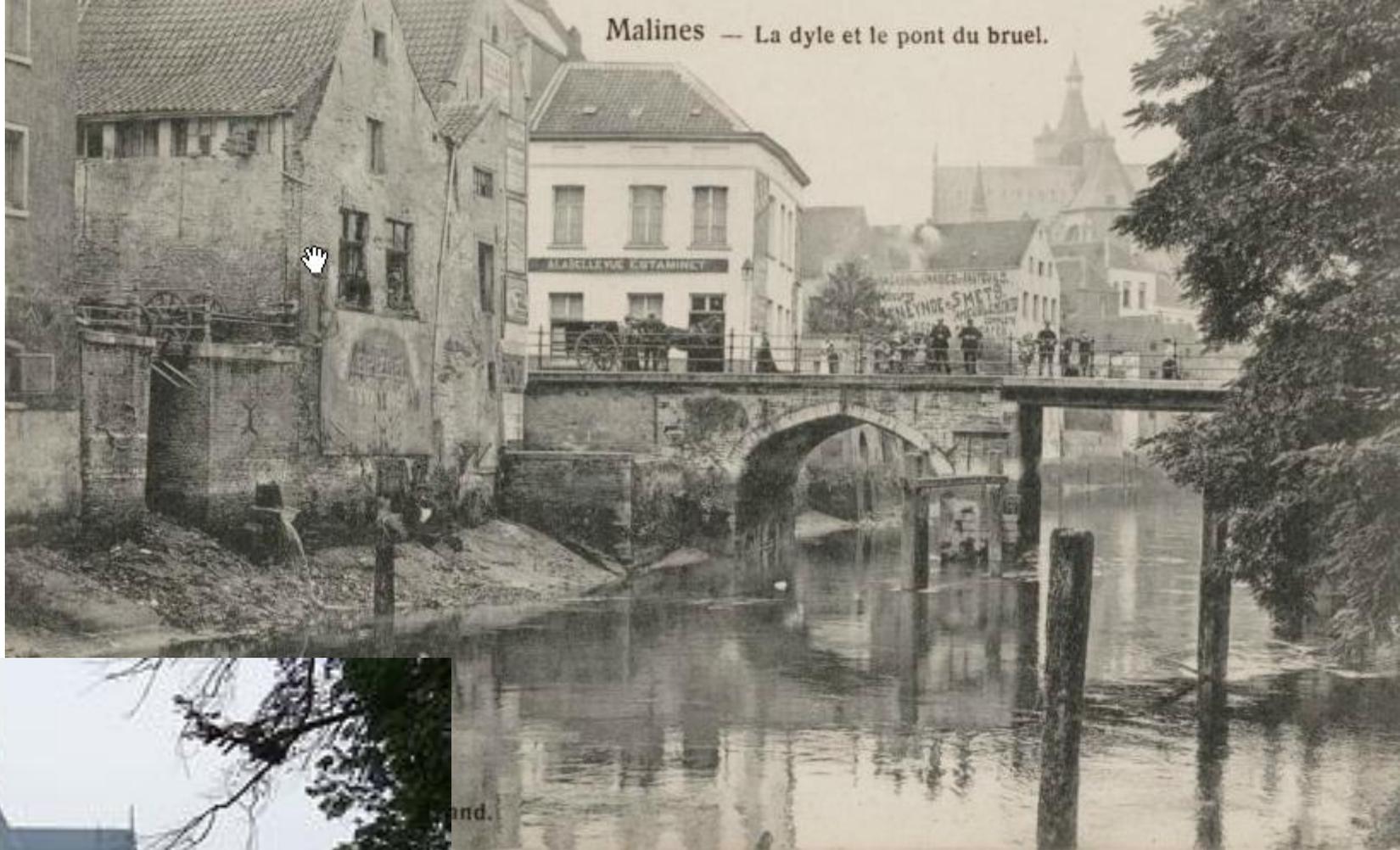
Inner Dyle

Dam

Upper Dyle

Tidal river **around** the city
Normal water levels around the city from 1-6m asl
(sea rising, straightening of rivers...)
Storm Level 8m asl
Controlled river in city centre (4,25 m asl fixed level)
'Vlietjes' disappeared (but restoring!)
→ Interreg Water in historic city centres 2003-2007
Still ships in the city until 1350 ton!

Malines — La dyle et le pont du bruel.







Investments

3 Locations

- 1: Optimisation of river Dijle as a buffer (city-wide)
- 2: Re-opening Brook ('vliet') at Zakstraat
- 3: Re-opening Dijle at Zandpoortvest



Investment 1: Optimization of Dijke as a buffer

Optimization of Dijle as buffer



Optimization of Dijle as buffer

River Dijle

- Potential: buffer in the middle of the city
- Challenges: condition and private ownership of quay walls
- Solutions: restoring quay walls and involving private owners (awareness + support) + adapt sewer system



Optimization of Dijle as buffer

Stakeholders

- De Vlaamse Waterweg as the water board authority of river Dijle and responsible for public quays
 - City of Mechelen as responsible for the sewer system, brooks, communication and participation
 - Owners of buildings next to the rivers
- Complex participation process

Optimization of Dijke as Buffer

Opportunity:

Planned redevelopment of Keerdok-Eandis site

- Hotel
- 800 apartments and houses
- Living next to the water
- Parking
- Park



Optimization of Dijke as Buffer

- Location next to Bypass-Dijke and between Inner-Dijke and Bypass-Dijke
 - Complex tidal and non-tidal situation
- What with the water on this site? Study of possible and sustainable solutions

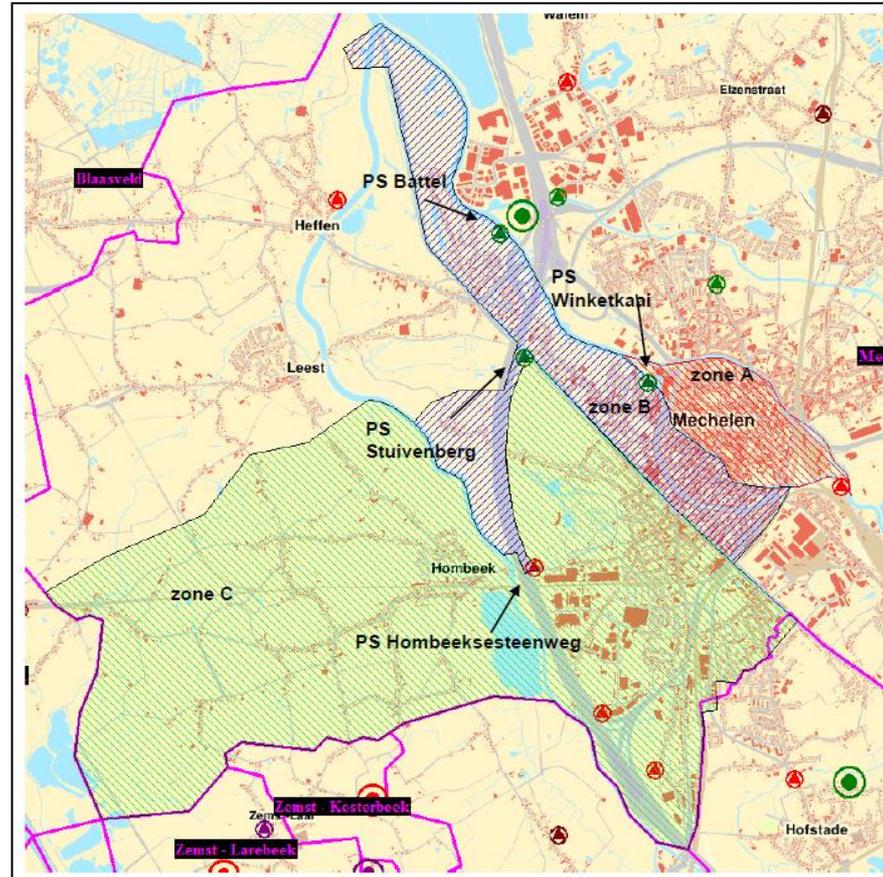
Optimization of Dijle as buffer

Current status

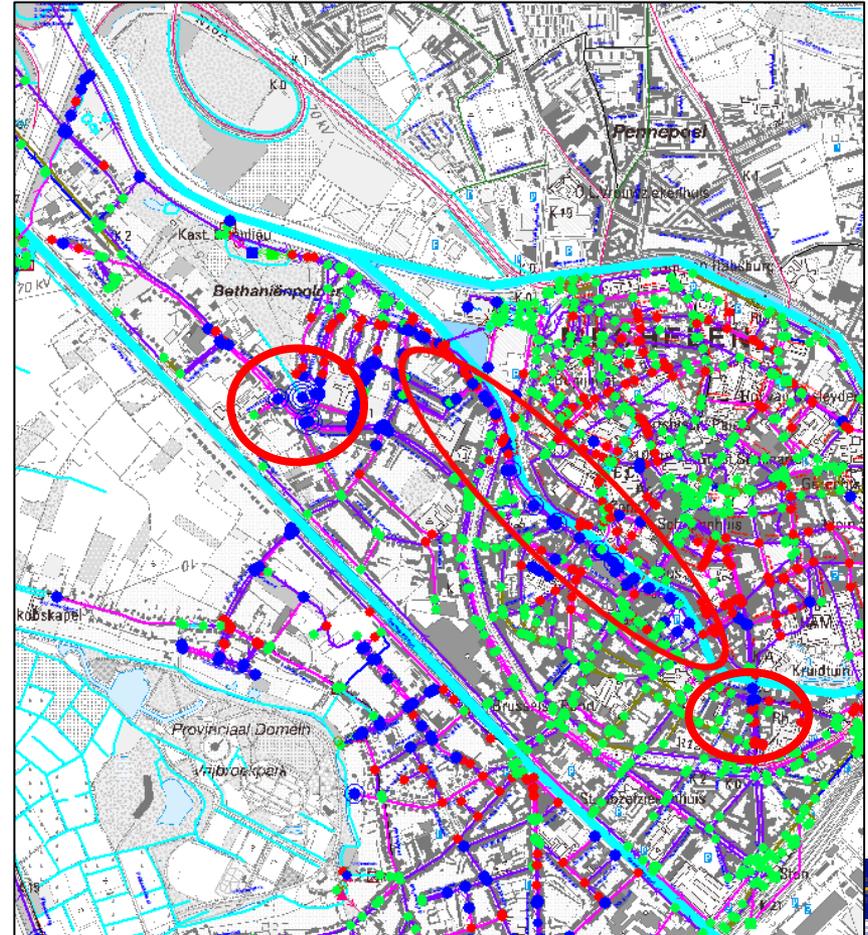
- Study of stability of public quays is going on since a long time
- Extra inspections are planned + promo campaign for awareness
- Development of action plan to involve civilians to restore their wall's

→ Technical info, legal conditions and communication

Hydronautic study of city centre and Mechelen Zuid - Hombeek



Flooding areas in city centre

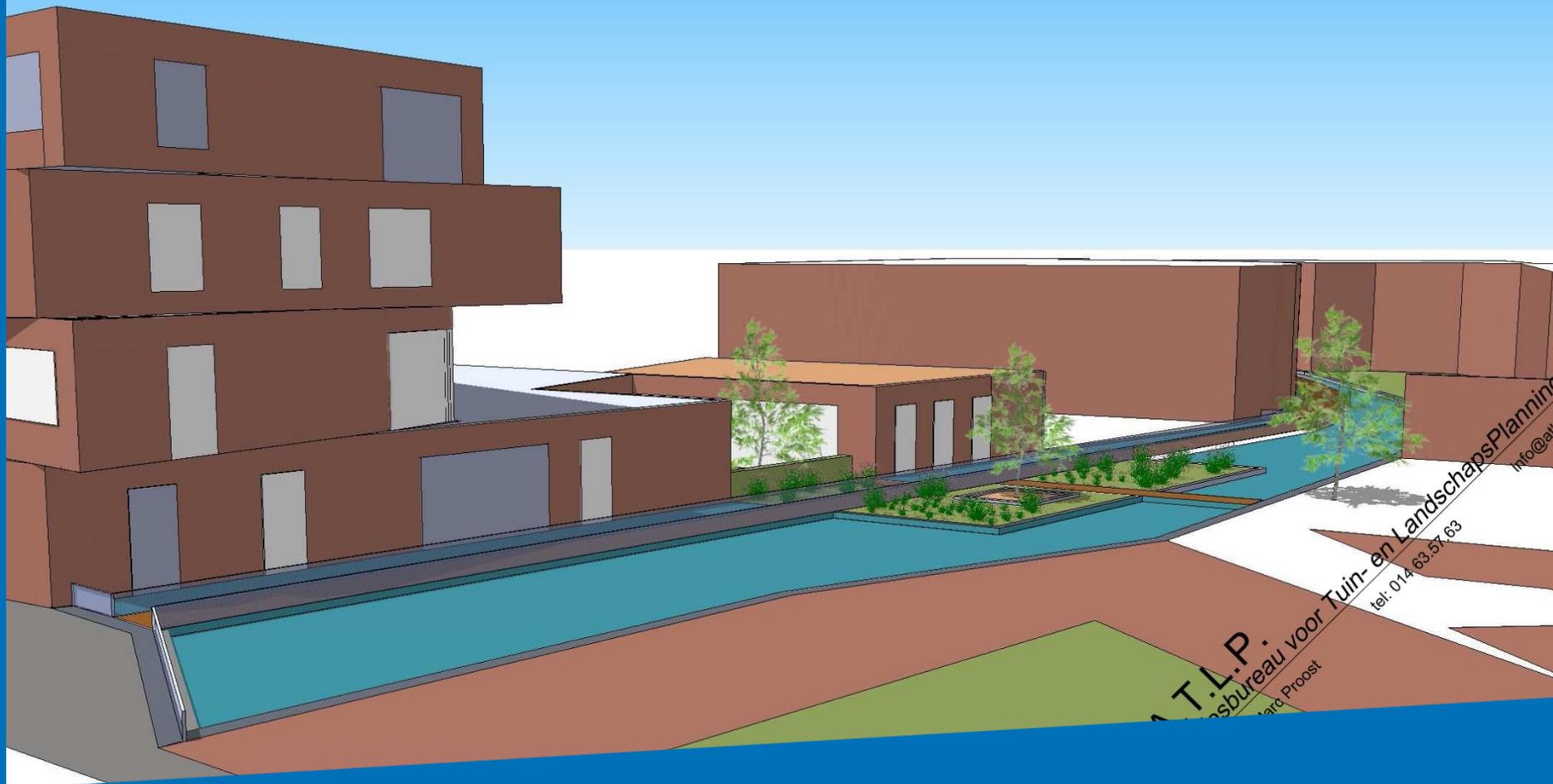


Conclusions

- Need to solve flooding problems and to optimise drainage system
- Existing sewerage system in Mechelen is not dimensioned for the new normalised storms, collectors are too small for a 20-yearly shower
 - flooding problems by heavy weather
- Possible solutions:
 - (emergency) overflows to river(s) / rain drainage system where possible
 - roll out a rain drainage system
 - build buffer basins/ settling basins

Where the river Dijle comes in as an overflow and buffer basin opportunity

- To build a rain drainage system parallel to the river in the south of the inner city (Adegemstraat – Onze Lieve Vrouwestraat), connecting to the river
- Realise extra emergency overflows from the existing sewerage system to the Dijle
- Problem remains that Dijle is a tidal river and overflow is not possible when high tides



Investment 2: Re-opening brook at Zakstraat

Re-opening brook at Zakstraat



Re-opening brook at Zakstraat

- 8th brook to be re-opened in Mechelen
- Goals are:
 - to use the re-opened brook as a rain water buffer when heavy rain falls
 - to connect city houses to separate rain water buffers /collectors
 - to improve public space introducing water in the city centre
 - to realise the missing link between Vliet Rik Wouterstuin en Vliet hotel Muntstraat

Re-opening brook at Zakstraat

First re-opening project: Melaan



Re-opening brook at Melaan



Melaan (2004)
car parking

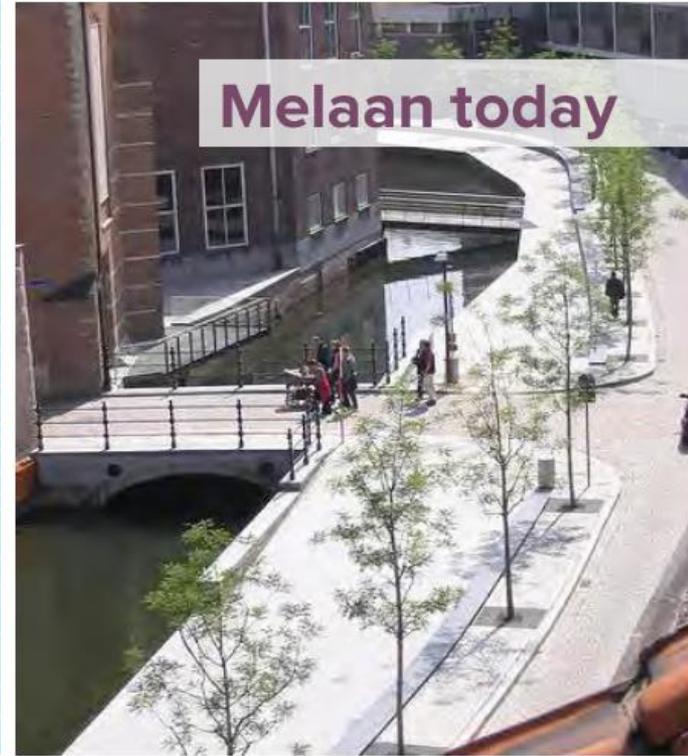
Re-opening brook at Zakstraat

- Constraints Melaan project:
 - Acquisition of terrain
 - Historically mixed underground system:
brook = sewerage + rain water drainage
> problem disconnecting both (private owners also don't have a separate system if their houses are not renovated after 1994)
 - Historic quay walls: sufficiently present to re-use?
 - Re-interpretation or reconstruction?
 - Connection to the river Dijle

Re-opening brook at Melaan

- Solutions Melaan project:
 - Bypass collector created for sewerage
 - Rain water collected in Melaan fills the re-opened brook: open rain water buffer in (controlled) connection with the river Dijle
 - If water is low: possibility to add river water with pump
 - Historic quay walls are re-used
 - Low promenade next to the water, modern design with high quality materials

Re-opening brook at Melaan



After re-opening Melaan...

- Re-opening Lange Heergracht



After re-opening Melaan...

- Solution Lange Heergracht:
 - Bypass collector created for sewerage
 - Rain water collected in Lange Heergracht and Paardenstraatje fills the re-opened brook: open rain water buffer basin
 - Aeration system installed to keep water clean
 - No connection with the river Dijle, re-connected (overflow) to mixed sewerage system towards Van Hoeystraat (= next project)
 - New quay walls are created in historic place
 - High promenade next to the water, modern design with high quality materials

After re-opening Melaan...

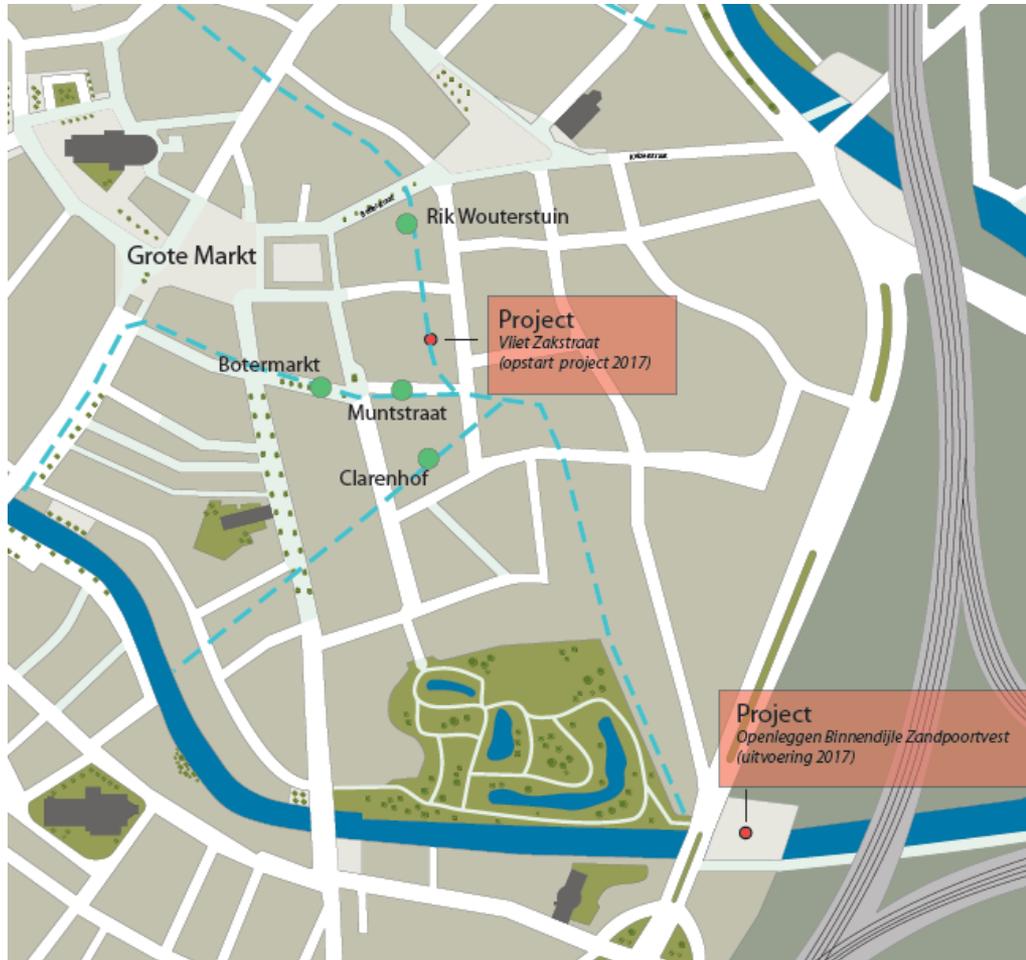
- Re-opening Zelestraat



After re-opening Melaan...

- Solution Zelestraat:
 - Existing brook remains beneath the open water in Zelestraat,
 - Existing collector remains beneath the open water at the other side of Katelijnestraat
 - Rain water collected in 2 private projects/ PPS fills the re-opened brook: open rain water buffer basin
 - Aeration system installed to keep water clean
 - Water circulation system added to keep water clean
 - No direct connection with the river Dijle, reconnected (overflow) to mixed sewerage system
 - New quay walls are created as close as possible to the historic brook
 - High promenade next to the water, modern design with high quality materials

Re-opening brook at Zakstraat



- Sequence of several parts of different connected brooks to be reopened

Re-opening brook at Zakstraat

- Previous re-opening project: private house at 35, Bafferstraat



Re-opening brook at Zakstraat

- Previous re-opening project: 'Rik Wouters' garden



Re-opening brook at Zakstraat

- Solutions ‘Rik Wouters’ garden:
 - Existing collector remains beneath the open water
 - Rain water collected from private houses in Rik Woutersstraat fills the re-opened brook: open rain water buffer basin
 - No aeration system installed to keep water clean, but a swamp area with circulation system to keep water clean
 - No direct connection with the river Dijle, reconnected (overflow) to mixed sewerage system
 - New quay walls are created as close as possible to the historic brook
 - Combination of promenade and garden area next to the water, modern design with high quality materials

Re-opening brook at Zakstraat

- Previous re-opening project: Somers Zaden



Re-opening brook at Zakstraat

- Aims:
 - To connect both ‘Rik Wouters’ garden and Vliet ‘Somers Zaden’
 - To realise a inner city promenade from Bafferstraat to Zakstraat to Muntstraat
 - To re-use as much as possible of the historic quay walls
- Currently:
 - Competition to assign a designer for the project ongoing

Re-opening brook at Zakstraat

- Previous re-opening project: Muntstraat



Re-opening brook at Zakstraat

- Previous re-opening project: Public – Private project Clarenhof



Re-opening brook at Zakstraat

- Previous re-opening project: Botermarkt



Re-opening Dijle at Zandpoortvest





Investment 3: Re-opening Dijle at Zandpoortvest

Re-opening Dijle at Zandpoortvest

Situation early 2017

An aerial photograph of a city street intersection in early 2017. A large parking lot filled with cars is in the foreground. A multi-story brick building with a glass roof is on the left. A road with a bus and a truck is on the right. A white diagonal line is drawn across the parking lot. Text is overlaid on the line.

Culvert 8m wide x 6m high
110m long

Re-opening Dijle at Zandpoortvest

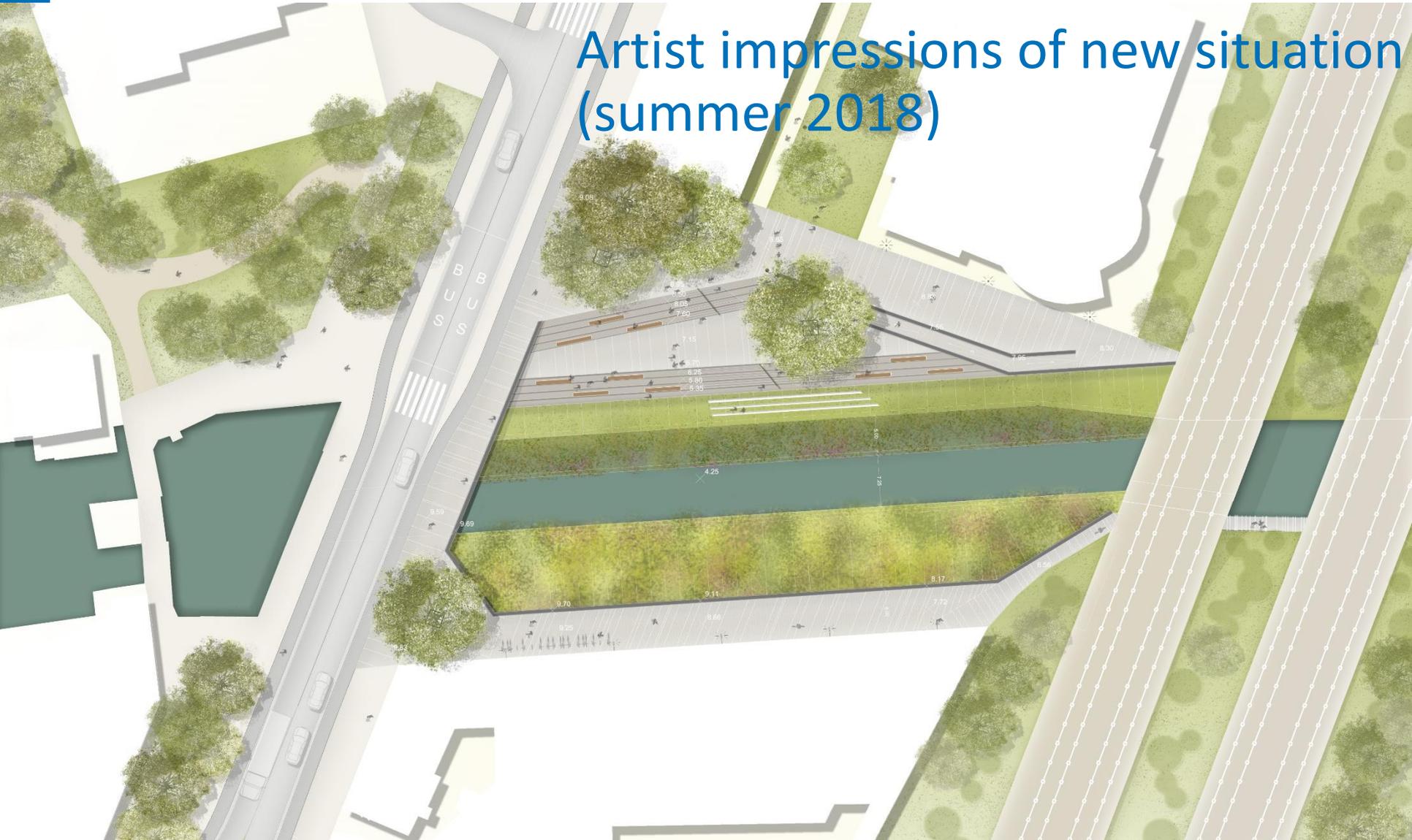


Construction of culvert in 1978

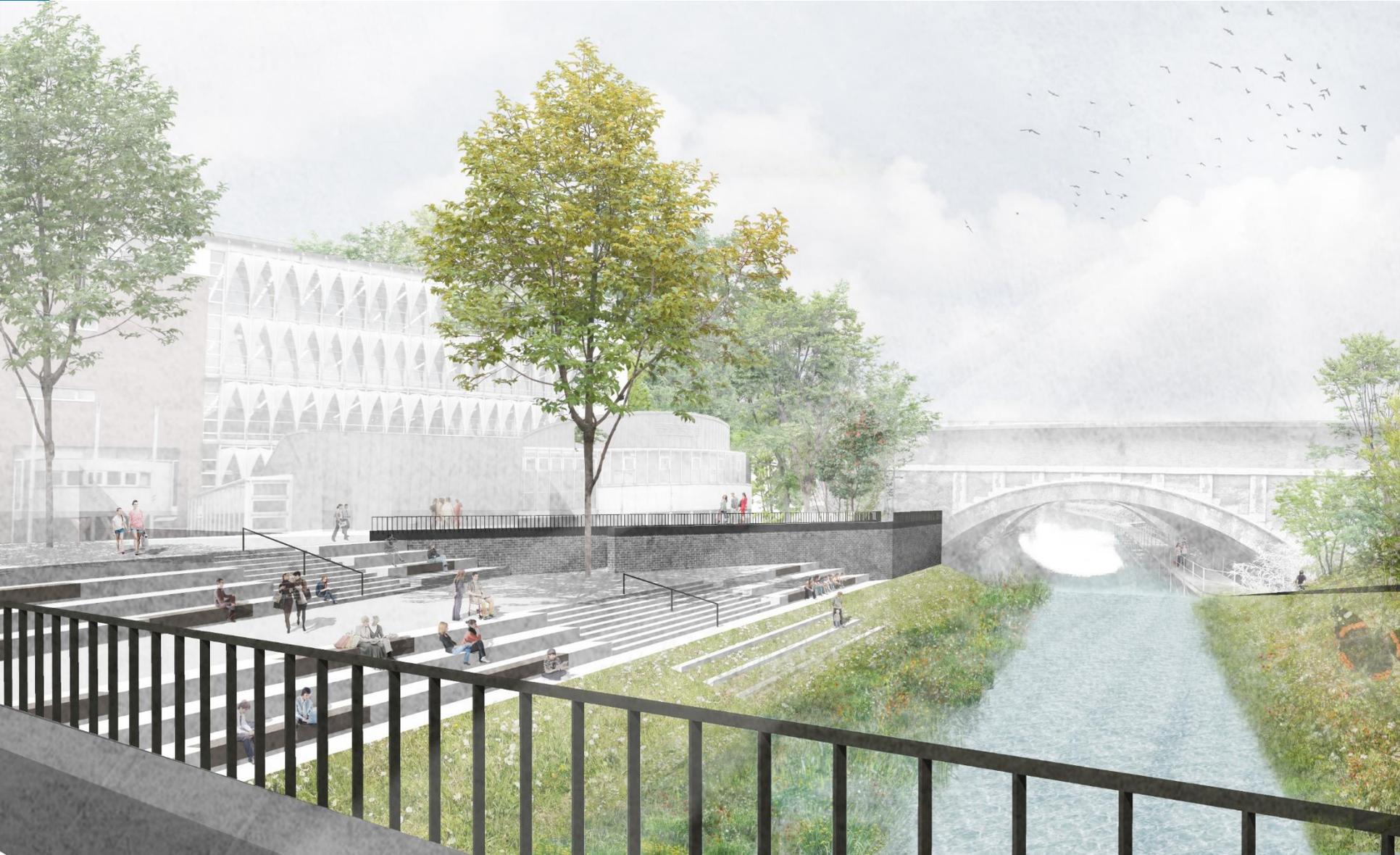


Re-opening Dijle at Zandpoortvest

Artist impressions of new situation
(summer 2018)



Re-opening Dijle at Zandpoortvest



Re-opening Dijle at Zandpoortvest



Re-opening Dijle at Zandpoortvest

- Construction-works started 3 april 2017
- Finish foreseen summer 2018

Re-opening Dijle at Zandpoortvest

Demolition of pavement and culvert



Re-opening Dijle at Zandpoortvest

Secans Piling and temporary fill-up of river
Dijle

