

Why

During periods of peak flow, particularly in the wetter winter months, (too) much water flows through a watercourse. Adaptive abstraction makes it possible to divert surface water at precisely these times and store it as a strategic water reserve for drier periods. In this way, a single source is used to tackle two challenges simultaneously: reducing the risk of flooding during high flow rates and building up a buffer against drought.

The technology is innovative because, at present, surface water is mainly only utilised during periods of prolonged drought. By deliberately capturing water at high flow rates in winter, groundwater extraction is avoided, drought is counteracted, and dependence on expensive tanker transport or mains water is reduced. The construction of the catchment and buffer basin also offers opportunities to enhance the landscape and promote greater biodiversity and a richer experience in agricultural areas.

What

Adaptive surface water abstraction consists of a fixed, permanent connection to a watercourse, linked to a control system that adjusts the rate of abstraction in line with the flow rate in the stream. The system usually comprises four components:

- An abstraction point with an overflow threshold (e.g. a tilting weir) that only diverts water once a minimum water level in the stream is exceeded
- An intake or receiving basin with a pump sump, which temporarily stores the diverted water;
- A treatment process that treats the water – if necessary – to a usable standard;
- A storage basin where the (treated) water is stored until required.

The 'adaptive' nature lies in the control mechanism: water is only abstracted when the water level in the watercourse is high enough and the storage basins are low. The overflow threshold takes into account a minimum water column in the stream, ensuring that abstraction is impossible during dry periods and that there is no negative impact on hydrobiology. Water is preferably abstracted in winter (better water quality); abstraction in summer is only permitted if there is sufficient flow and good water quality (monitoring is possible for EC and pH).

In the Itterflow demonstration project, up to 40,000 m³ of water can be abstracted, stored and distributed annually.

How

Construction

Intake point and flow control

The intake point is constructed as a separate intake facility with a permanent connection to the watercourse. An overflow weir (or tilting weir) determines the water level at which water is permitted to overflow into the receiving basin. The receiving basin contains a pumping station that pumps the water to the storage basin. The weir height and pump control are determined on the basis of hydraulic modelling of the watercourse.

Buffer and storage basins

In stream valleys of high landscape value, the storage basin can be integrated into the landscape and ecosystem (shallow basin with limited embankment height, gentle slopes with vegetation). The dimensions are determined by the water requirements of the users and the catchment potential of the stream.

Treatment system

To enable the safe use of surface water in greenhouse cultivation with recirculation of drainage water, a treatment system is provided, which can be housed in a (movable) shipping container. In the Itterflow project, this consists of:

- a pressure-driven sand filter for the removal of suspended solids;
- a granular activated carbon filter for the adsorption of organic micropollutants and pesticides;
- a UV reactor as the final disinfection stage

The treatment system should preferably be slightly oversized (e.g. with a larger activated carbon bed) and controlled by frequency modulation rather than simply on/off.

Monitoring

Continuous monitoring of pH and EC upstream enables the overflow threshold to be closed in good time in the event of an emergency. In addition, samples are taken regularly from the surface water (receiving basin, WADI) and from the water in the storage basins, and the treatment plant is extensively monitored to ensure its effectiveness. Monitoring wells can provide insight into the stream water level and groundwater level.

Layout

The construction of the catchment and buffer basin presents an opportunity to enhance the landscape: nature-friendly banks, native vegetation and an ecologically designed basin will increase biodiversity and make the agricultural area more enjoyable to experience. Coordinate the design with the water authority and any

adjacent landowners. Draw up a management plan for the banks, the weir and the treatment plant.

Cost

Target price

The cost depends heavily on the scale, the treatment techniques chosen and the landscape objectives. The estimate below is based on the Itterflow demonstration project, which has a catchment capacity of up to 40,000 m³ per year, and is purely indicative.

Investment item (indicative, estimate for 2025)	Cost price
Water collection system: collection basin, pump chamber, pressure pipe to buffer tank	± 185.000 €
Ecological buffer basin with pumping wells, drainage and pipework	± 414.000 €
Water treatment system (sand filter + activated carbon filter + UV) in a shipping container	± 185.000 €
Design, monitoring, support and performance measurement	± 114.000 €
Total project cost (indicative)	± 900.000 €

In addition to the investment, there are operational costs (energy for pumping and treatment, replacement of filter media, maintenance, monitoring). In a simplified feasibility study, the project was estimated to incur operational costs of around 75,000 € per year.

Subsidy

- VLIF support for productive investments in water abstraction, storage and treatment;
- VLIF project support for non-productive investments in landscape and water;
- The Flemish Blue Deal and European programmes (e.g. Interreg, LIFE) as a supplement.

Please note the distinction between sources of funding to avoid double funding, and the de minimis thresholds for state aid to agricultural holdings.

Benefits

Economic

- Reduces reliance on mains water or tanker deliveries as a supplementary source;
- Builds up a robust water reserve of its own, which enhances operational reliability during dry years;

- Through a partnership, several businesses share the infrastructure and the costs, making the investment more manageable for each business;

Ecological

- Reduces flood risk by regulating water levels during high flow rates (local effect, highly site-dependent);
- Avoids groundwater extraction and tanker transport;
- Creates opportunities for nature conservation, landscape enhancement and greater biodiversity around the buffer basin;
- Contributes to a more robust stream and water system at the regional level.

What to look out for

Legislation

Pitfalls

- Water abstraction must always be tailored to the water requirements of the businesses, the potential treatment capacity, and the availability and quality of surface water. There is no 'one-size-fits-all' approach to sizing;
- Surface water quality is variable: ensure continuous monitoring (EC, pH) and a mechanism to immediately halt abstraction in the event of an emergency;
- Specific pathogens (e.g. *Ralstonia*) require special attention; where necessary, provide for temporary storage and additional disinfection, and design the treatment system with a safety margin; seek support from water companies where necessary;
- The impact on flood risk can often be limited locally due to restricted pumping rates;
- This is an investment- and knowledge-intensive technique: ensure adequate support is in place, particularly in the early years.

Relevant legislation and permits

- An environmental permit is required for the changes to the topography involved in the construction of the receiving basin and buffer basin;
- Authorisation from the water authority is required for works on and water abstraction from the watercourse; consult the competent authorities (including the Integrated Water Policy Department and VMM) in advance regarding the design and abstraction rules;

Sources

- [Water-Land-Schap \(VLM\)](#)
- [Praktijkvoorbeeld Itterflow – Mechelse Groenteregio](#)

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