# Retention pond in Chêne Bougerie, Switzerland

### Year of issue

2025

### Summary

Located in Chêne-Bougeries (Geneva canton), this 1995 retention pond demonstrates NWRM in a dense urban plot. The small biotope (~300 m²) stores about 450 m³ on-site and contributes ~279 m³ at the 3.1-ha catchment scale, reducing storm runoff and flood risk. Design details include a lined basin (plastic membrane over sand; clay subsoil), a 1.2-m earth embankment with two overflows (primary outlet limiting discharge to ~48 L/s; emergency crest), and a ~150-m open swale collecting parcel runoff. The pond maintains permanent water (~0.5 m; max depth ~1.6 m); the safety overflow reportedly activated only once, and the basin has not dried out. Works were completed in ~2–3 months (1995) for ≈ CHF 60,000. Maintenance is shared by adjacent owners (annual vegetation removal). Reported benefits include habitat for amphibians, fish and odonates and a reduction in mosquito nuisance. Subsequent ecological survey work in Geneva (2015 sampling; 2018 publication) confirms continued use by amphibians at Étang Vieux-Clos. The approach aligns with the canton’s ongoing strategy to manage stormwater “à ciel ouvert”, with new retention/biotope projects under development nearby.

### Photo Gallery



### Location

46.197778, 6.187778

### Project

NWRM

### National ID

Switzerland_03

### Sector

Hydromorphology

### Installation Date

1995

### Contact

Anais Hanus, ACTeon

## Overview

### Location of the project

At the junction of Chemin du Vieux-Clos and Chemin de Vert-Pré, Conches (Chêne-Bougeries); small valley bottom.

### Country

Switzerland

### NUTS2 Code

Ticino

### Sponge measures implemented in the case study

Ponds and scrapes

### Objectives

Attenuate storm peaks by ~450 m³ storage (BV retention ~279 m³), cap outflow ~48 L/s, and maintain ≥ 0.5 m permanent water to support aquatic biota; dimensioned for T=10 years events.

### Involved partners

| Authority type | Authority name | Authority role | Comments |
|---|---|---|---|
| Other | Chêne Bougerie town | Initiation of the measure | — |
| — | — | Financing | Architects |
| Private property owners | Solfor SA | Determination of design details of the measure | Architects |
| Private property owners | Jacquet SA | Implementation | Engineers |

## Site Information

### Climate Zone

Cool temperate moist

### Precipitation

942.00 mm

### Temperature (°C)

10.10 °C

### Runoff

54.00 mm

### Runoff coefficient

0.25

### Elevation range

422

### Slope range

1-2%

### Vegetation class

Within the pond: reeds (roseaux), water lilies (nénuphars) and other aquatic macrophytes; along the ~150 m open swale, reed-rich, moisture-loving vegetation.

### WFD Ecological status

Moderate

### WFD Chemical status

Good

### Water quality status

Urban Seymaz: historic channelization & limited space, urban runoff, and recurrent pollution episodes; biological quality historically poor, renaturation ongoing.

## Design and Implementation

### Project scale

Micro

### Project scale specifications

a single on-plot retention biotope within a villa subdivision (~3.2 ha parcel; BV ~30,800 m²)

### Project area

3,2 ha

### Area subject to Land use change or Management/Practice change (ha)

0.03 ha

### Size

300.00

### Size unit

m2

### Favourable preconditions

A natural 3 ha depression/valley (NW–SE), clay subsoil (quasi-impermeable), and an undersized existing collector favored an on-site retention biotope over costly pipe upgrades.

## Financing

### Total cost

65126.00 €

### Costs operation maintenance

49000.00 €

### Financing authorities

| Type of funding | Comments |
|---|---|
| Local funds | — |
| Private funds | Private owners finance vegetation maintenance |

## Policy and Governance

### Policy description

Privately owned parcels with an internal regulation and shared maintenance; built after rezoning to villa zone (1990s) to mitigate runoff from urbanization. Aligns with canton policy promoting parcel-level stormwater retention and current “à ciel ouvert” strategy.

### Land ownership

Private villa-plot owners at Conches. The pond/biotope spans parcels with an internal owners’ regulation; upkeep costs are shared pro-rata.

### Policy targets

Increase Water Storage

Improved Biodiversity

Oher Societal Benefits

### Part of a wider plan

Oui

### Wider plan

| Wider plan type | Wider plan focus | Name |
|---|---|---|
| National | Water | federal law on water protection, 24 january 1991 |
| Local | Water | Cantonal law on water (L 2 05) |

### Public consultation

Non

### Has contractual arrangements

Non

## Impacts and Monitoring

### Impact Assessment Methodology

### Performance impact assessment method

Unknown

### Performance impact estimation information

null

### Socio-economic Impacts

### Direct benefits information

The pond reduce runoff in the area and the damages it can generate

### Ancillary benefits information

The pond provides a "natural" area which can be used as recreative area for neighboring private owners. It also contributed to reduce mosquitos density.

## Biophysical impacts: Hydrology

### Information on retained water

Peak-flow attenuation and temporary storage (~450 m³ on-site; ~279 m³ at BV scale), controlled discharge (~48 L/s), and creation of a small hydromorphic biotope; infiltration limited by clay.

### Increased water storage

90.00

### Increased water storage unit

m3/ha

### Information on increased water storage

279m3 can be retained at the watershed scale (3,1ha)

### Ecosystem water supply

0

## Biophysical impacts: Biodiversity

### Improved biodiversity

Oui

### Information on improved biodiversity

The pond provide habitat for fauna and flora, including aquatic flora

## Biophysical impacts: Water & Soil Quality

### Water quality overall improvements

Not relevant for this application

### Soil quality overall improvements

Not relevant for this application

## Biophysical impacts: Others

### Ecosystem impact climate regulation

No information available

# Lessons Learned

### Key lessons

Example of how to retain water in urban areas.
Its success lead to the easy implementation of new water management projects in the city, for example a new retention pond project was presented to the public in 2025.

### Barriers

| Barrier type | Barrier role | Comments |
|---|---|---|
| Expected maintenance needs | Secondary barrier | Private owners are responsible for maintaining vegetation on their plots |

### Drivers

| Driver type | Driver role | Comments |
|---|---|---|
| Other | Main driver | The main driver which led to consider the measure was the new status of the land which became available to be constructed; water management became a major issue. |
| Other | Main driver | The measure was estimated cheaper than another project (re-build existing infrastructures) |
| Legal obligations | Main driver | The federal law on water protection requests rain water infiltration in urban areas through retention measures |
| Organisation committed to it | Secondary driver | Geneva Canton elaboraed recommandations regarding water retention in urban areas |

### Success factors

| Success factor type | Success factor role | Comments |
|---|---|---|
| Attitude of relevant stakeholders | Main factor | Since private owners are responsible for maintaining vegetation on their plots, the measure efficiency partly depends on their attitude |
| Legal obligations | Secondary factor | Legal obligations can lead stakeholders to implemnt measures to retain water in urban areas |

### Transferability

Highly transferable to low-gradient suburban plots. Key cautions: ensure legal servitudes/owner agreements, safe overflow paths, vector control by predators (avoid stagnant edges), and clear O&M.

# Sources

## Sources

Chemin du Vieux-clos: étang de rétention et biotope