

FAQ

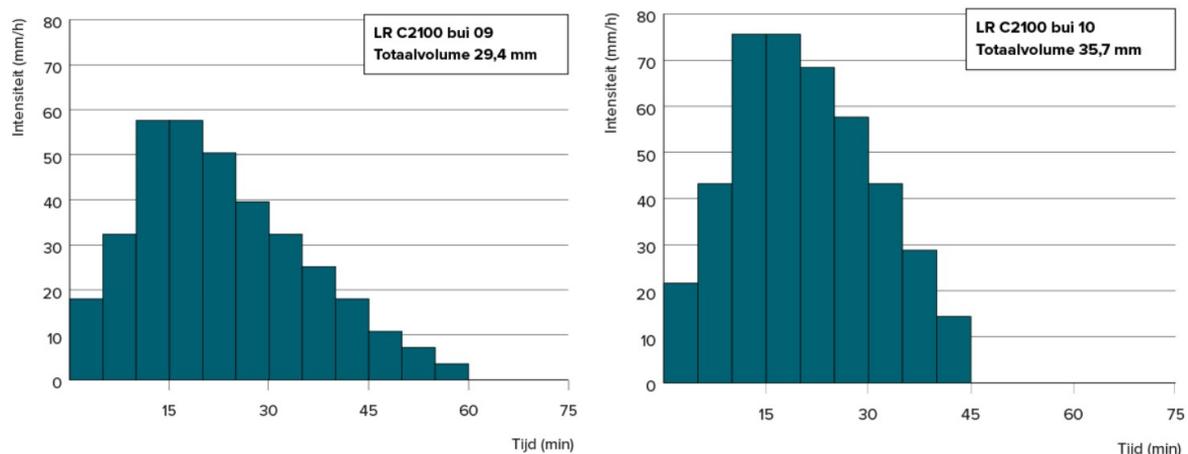
Measures for tackling water nuisance in urban areas

Update: 31-8-2021

Measures for tackling water nuisance in urban areas

Towns and cities can be affected by water nuisance from a range of sources, depending on their location: flooding from waterways, rivers or from the sea, water nuisance resulting from heavy rainfall, or a combination of the two. Rijkswaterstaat and the water authorities are responsible for the management of the primary defences (that protect our country from water from the sea, the large rivers, and the IJsselmeer and Markermeer) and the regional defences (that protect our country from water from the numerous lakes, small rivers and canals). In urban areas, water authorities are largely responsible for surface waters (canals etc.). Municipal authorities are responsible for the drainage of rainwater to the surface water: a wide range of systems are in place to collect rainwater, store it and drain it off. For these purposes, municipal authorities use the drains system in combination with interventions in public areas (bioswales¹, infiltration systems, water drainage above the ground).

In the case of urban water nuisance, a municipal authority will make an appraisal of the measures to be taken, with public support being very important. How much does a measure cost? How much damage can it prevent? How often is water in the streets acceptable? For example, many municipal authorities assume that the drains system must be able to cope with rainstorms that occur on average once every five years or once every ten years. Computer models are used to calculate how the drainage system will respond to these rainstorms (see figure below). In addition, computer models can also be used to calculate the effects of possible measures to be taken (see, for example, <https://www.deltares.nl/nl/software/d-hydro-suite/>). The expectation is that rainstorms could become more extreme as a result of climate change and, in that context, stress tests are being conducted that assume much larger amounts of rainfall.



Rainstorm guidelines Bui09 and Bui10. Source: Stichting RIONED (<https://www.riool.net>)

Examples of measures taken by towns and cities in the Netherlands to limit water nuisance:

- Separate drains system: rainwater is collected in a separate drains system and so it can be discharged directly to the surface water. This is also better for water quality because it becomes less necessary to discharge excess water from the wastewater drains to the surface water.

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- More vegetation in public areas: this furthers infiltration into the ground so that less water needs to be drained off through the drains system

³A temporary storage basin for excess rainfall where water can infiltrate into the ground easily

- Other approaches to further infiltration, such as water-permeable pavements, special infiltration strips and infiltration ditches.
- Temporary water storage: locations in public areas set aside for filling occasionally when there is heavy rain, and in that way to serve as an extra buffer for temporary water storage. These include, for example, bioswales, green areas, playgrounds or dedicated water squares. They can also be installed underground, for example in the form of permeable crates below parking spaces and bicycle racks
- More open water (temporary and permanent)
- Street design: by making changes to the profile of a street and introducing higher curbs, it is possible to use streets themselves as temporary water stores
- Floating buildings

Examples of steps that can be taken by private individuals, often with support from the municipal authority:

- Green roofs
- Green gardens
- Raising thresholds in houses, garages, etc.

Specimen projects and concrete applications

The National Water and Climate Knowledge and Innovation Programme (NKWK) has a Climate-Resilient City research line that works on knowledge development and knowledge sharing, with the focus on the climate-resilient and water-robust design of the urban environment in the Netherlands (<https://waterenklimaat.nl/nl/onderzoekslijnen/klimaatbestendige-stad/>).

All kinds of tools have been developed to help municipal authorities and individuals to develop strategies and implement measures, such as the Climate-Resilient City Toolbox (<https://kbstoolbox.nl/nl/>). An extensive overview of these tools can be found on the Climate Adaptation Knowledge Portal (<https://klimaatadaptatienederland.nl/hulpmiddelen/overzicht/>).

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The screenshot displays the 'Adaptation Support Tool 2.0' interface for 'Ast CID Alternatief 1'. On the left, a panel titled 'Urban wetland' includes a 'CHOOSE' button and three filter tabs: 'Flood-fencing', 'Wetlands', and 'Drought'. Below this is a descriptive paragraph about wetlands and a photograph of a wetland area. A central map shows an aerial view of an urban area with various colored overlays (yellow, green, purple) representing different wetland types or zones. On the right, a 'Results' panel lists several metrics: Climate (Storage capacity, Return time factor, Groundwater recharge, Evapotranspiration, Heat reduction, Cool areas), and Cost (Construction, Maintenance).

Climate-Resilient City Toolbox / Adaptation Support Tool.
Source: <https://www.deltares.nl/en/software/adaptation-support-tool-ast/>

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Amsterdam has an extensive programme for encouraging individuals to make their house, garden, street and local area rainproof: Amsterdam Rainproof (<https://www.rainproof.nl/>). It provides examples and tips to show people what they can do themselves.

Is jouw straat rainproof?



Is jouw tuin al klaar voor de volgende hoosbui?



Source: Amsterdam Rainproof, <https://www.rainproof.nl/>

The city authority in **Rotterdam** has teamed up with the water authorities concerned to develop a range of plans and strategies that show how the city can make itself resilient to the effects of climate change and heavy rainfall (Rotterdam Water Plan, Rotterdam Adaptation Strategy (RAS), Rotterdam Response) (<https://www.rotterdam.nl/wonen-leven/waterplan-2/>). One of the storage measures from the Water Plan is the Museum Park Garage Underground Water Store. It serves as a temporary store for rainwater during heavy or prolonged rain if canals and drains in the city centre can no longer accommodate the rainwater. As soon as the rain stops, water from this temporary water store is pumped out again into the drains.

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Source: Rotterdam City Authority, <https://www.rotterdam.nl/wonen-leven/waterberging-museumparkgarage>