

Leiden: Noorderkwartier- Oost



Project description

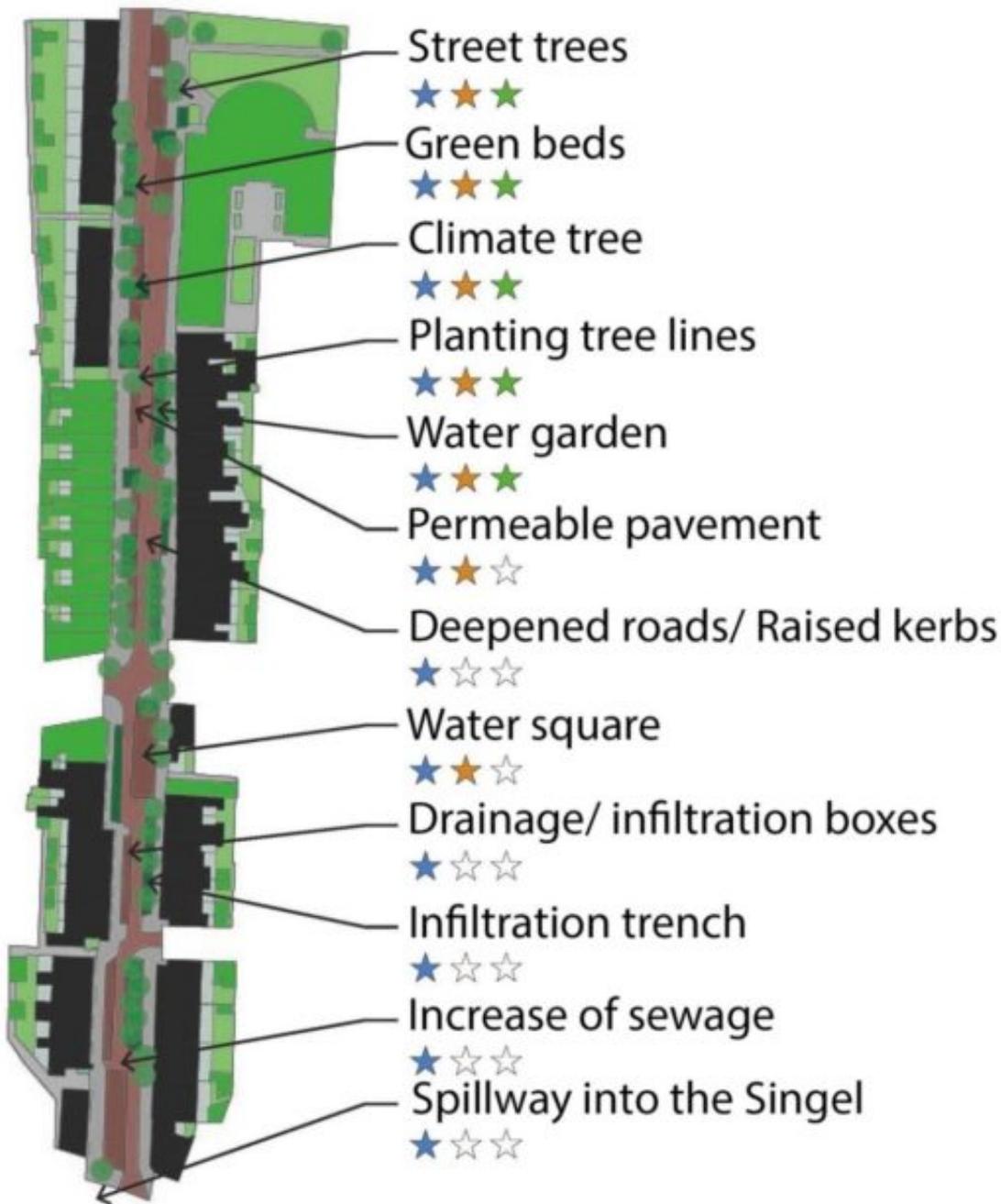
Noorderkwartier Oost is one of the three [SPONGE2020](#) Pilots in the city of Leiden. The municipality works in the [Gagoed campaign on a climate adaptive city](#). The other projects are Leiden railwaystation area and the Lakenpark.

The project area, Noorderkwartier-Oost, camps with flooding when heavy precipitation occurs. In addition to a changing climate, the pilot also deals with subsiding soil- and rising groundwater levels. (Omgevingsvisie2040, 2017) This causes the project area to occasionally flood as a result of the limited infiltration possibility. Noorderkwartier-Oost at its current state relies solely on its sewer to manage excess rainwater. Only 13% of all rainfall can infiltrate in the soil.

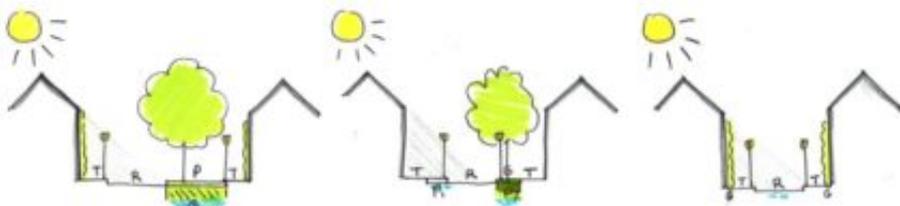


To reduce flooding during heavy showers, a list of possible climate adaptive measures is drafted. The purpose of this pilot is to gain insight into the efficiency and applicability of measures to limit flooding in Noorderkwartier-Oost. In addition to climate adaptive measures, this report will also give a scope and analysis of the project area and provide a literature-based advice on how the municipality should approach the residents to accept and embrace the necessity of change.

Concluding from the research on climate adaptive measures, a combination of measures which reinforce one another is more effective than a focus on one major innovative measure. The most effective measure to deal with floods is to deepen the street profile and reintroduce raised pavement. The most effective method to deal with the urban heat island effect is to implement green facades, trees and green gardens. Adding plant boxes in combination with trees add a small amount of additional heat reducing effect, but increase the awareness of inhabitants.



The image above shows an example of where climate adaptive measures can be implemented on street level. This image will be used as further guidance for the other streets in the project area. Expert meetings and literature resulted in three street profiles principles (Bosma, 2018);



- Green water- storage street (left image); this street profile is meant for streets with more than average width. The width of the street enables urban planners to divide the spaces more efficient which subsequently leads to a more effective implementation of climate adaptive measures. With green water-storage streets, one must think about water infiltration and storage in urban flow through planters/ normal planters, water storage under infrastructure such as parking lots etcetera. The width of the streets enables urban planners to think more creative. Only two streets in the

project area can be labelled as potential green water-storage streets;

- Julianastraat
- Lusthoflaan

- Water storage street (middle image);

This street profile is meant for streets with an average width. The width of these streets allow the implementation of green climate adaptive measures to reduce heat. However, the green measures will have little effect towards flooding because of the limited available space. Rainwater will be stored on and under the surface of the street with the help of raised sidewalks/ pavement.

- Water transporting street (right image);

This street profile is meant for streets with less than average width. These streets have limited space available for water infiltration or retention. Measures in these streets will mainly focus on transporting the rainwater to nearby drainages and the Singel. In addition to the transport of rainwater, raised curbs force rainwater to temporarily store on the surface and prevent homes from flooding.

During the research it became clear the municipality only had influence on 45% of Noorderkwartier-Oost (public space). The other 55% of the project area is owned by residents and housing corporations in the form of homes and gardens. This is both a challenge and an opportunity. If the municipality can persuade residents and housing corporations to implement measures in their gardens and homes the project area would benefit substantially.

As explained in the previous paragraph, the relationship between citizens and local governments has changed over the years. With this phenomenon comes the term 'Stakeholder participation'. We speak of this term in situations where citizens, neighbourhood partners and entrepreneurs are invited by the city council to think along, talk with or decide on municipal policy or its implementation. In addition to being invited by the municipality, we also speak of stakeholder participation when stakeholders take initiatives. Stakeholder participation by taking initiative is rising in popularity in municipalities. The support created when the municipality involves citizens and stakeholders, increases the success rate for civil servants and their plans.