7 Action plans (examples)

7.1 Introduction

This chapter presents the action plans for the Kloostersland (NL) and Leuven (BE) areas, focusing on improving the water balance in the area through community engagement. The plans identify possible opportunities and emphasise a collaborative approach, involving various stakeholders and ensuring that the solutions are tailored to the specific needs and context of the areas. The plans highlight the importance of long-term thinking and local value creation and describe what should be the focus in each phase of the process.

7.2 Action plan Kloostersland

The action plan for Kloostersland follows the steps described in chapter 3 Pragmatic steps in involving the community. The (1) identification and (2) exchange steps have been carried out during the RRR-project and the (3) design, (4) implementation and (5) maintain, sustain and use steps are envisioned for the “Sponge Roads”-project (Interreg NWE proposal).

The results of the identification and exchange steps are laid down in the deliverables D.1.4.1 (Illustrated Fact-sheets on two use cases) and D.1.4.2 (Two documented, exemplary sessions with stakeholders) of the RRR-project. These documents respectively describe the context of the Kloostersland area and its stakeholder setting.

We have identified a number of opportunities that we would like to further investigate and work out with the stakeholders in the area.

Opportunities around the highway and canal

- Rijkswaterstaat (RWS) has three infrastructures in the area: (1) the highway A58, (2) the rest area/innovation site Kloosters and (3) the Wilhelmina Canal.
  Water from the highway and rest area can be collected, treated and buffered for several purposes:
  1. Local use on site, e.g. toilet flushing in the Innovation Pavilion/fuel station, road cleaning/cooling and washing solar panels (solar park near the highway).
  2. Pumped into the canal for transport to users along the canal (e.g. sports fields, concrete production, car wash) or pumped, the other way around, from the canal to the uses mentioned under 1, 3 and 4.
  3. Pumped onto the heath for (1) training of Defence personnel and (2) infiltration. Defence wants to practice crossing waterways with vehicles.
  4. A new to be developed distribution system for grey water for a sustainable neighbourhood in Oirschot, being built near the highway and canal.

- Additionally (not too distant from Kloosters), Rijkswaterstaat has a highway tunnel (A2) near the village of Best, where they have to pump (ground)water to prevent the highway from flooding. The water can be used by the farmers and industry (e.g. ASML) in the surroundings and/or pumped into the Wilhelmina Canal and serve similar purposes as mentioned above. Currently, this water is simply discharged onto a ditch and lost. The canal could even be used as a (water)transport between the two locations.
- The Wilhelmina Canal streams along the village centre of Oirschot and can be used as a heat source in winter or as a cold source in summer, reducing the consumption of natural gas and its contribution to climate change. Furthermore, by adjusting the water level in the canal, it can be used for water storage.
- We would like to explore the potential for transporting much more goods by water, reducing the need for (heavy) road transport on the A58, decreasing roadwater pollution and emissions, potentially reducing the need for an extra lane. For example, the use of autonomous water drones or electric boats could be an efficient way to transport goods via the Wilhelmina Canal between Tilburg and Eindhoven.
- Between the canal and the highway near Kloosters, there is a solar park that could be combined with a water buffer underneath the panels, potentially improving their performance due to the cooling effect.
- Spraying water above or on the road surface can help capture air pollution (particulate matter and nitrogen) and cool the roads, extending the lifespan of the asphalt. Conversely, the quality of roadwater runoff can be improved by sweeping or vacuuming the lanes before a rainstorm. These measures can be tested on the innovation lane at Kloosters.
- In summer, the heat from the road surface (and from solar panels, PVT-type) can be used as a heat source for the new sustainable neighbourhood mentioned earlier.

Opportunities in the village centres

- From Kloosters, an infrastructure can be established via the provincial road to the village centre(s). At a central point in the village, residents can tap water for gardens and ponds, without installing another expensive fine-grained distribution system.
- Similarly, in parts of the villages, the rainwater sewer has been separated from the wastewater. This water can be collected, treated, and made available again locally.
- More green spaces and water in the village centre can help mitigate heat. The municipality can use the water to irrigate (new) plantings in municipal gardens and

refill ponds around the village.

- Residents can also consider collectively purchasing systems for collecting, treating and storing rain and shower water for later use in gardens and for toilet flushing.

Opportunities in the rural area

- The water balance in the rural area can be improved by redesigning the landscape and storing more water. Large open landscapes can be separated by hedges to break the wind and reduce evaporation. Farmers and nature organisations in the area can create ponds. Farmers can cultivate crops that require less water or retain water better. In this way, irrigation with groundwater or surface water can be reduced.
- On the heath in Oirschot, increasing biodiversity and planting more deciduous trees instead of conifers can help reduce evaporation. Traditional ponds can be restored.
- During the wet winter period, water from the canal can be applied to the land to infiltrate and replenish the groundwater, letting in excess water from the Meuse.
- In summer, if buffers are full, excess roadwater runoff from heavy rain can (after treatment) be released into ditches in the area, ensuring they reach their desired water levels, controlled by weirs.

Not all of these opportunities will resonate or be feasible, supported and embraced by the local community. They should therefore be viewed as inspirational and a starting point, rather than as fixed or absolute. We now have to look for local people that have their roots in the community (ambassadors) and build a network of people that are willing to take up the project. An independent creative person or team should identify the most promising cases and arouse interest and involvement from relevant local stakeholders, while in the mean time thinking about viable value cases and means of financing. Initiators should have good relations with citizens and institutions, but also have an independent role. They must bridge the gap between different interests and organisations.

Designing and co-creating

As soon as we have gathered stakeholders around a number of promising cases, we will start designing and co-creating as a group, guided by an independent team balancing the (potentially different) interests. For this, the location of the Innovation Pavilion at Kloosters is extremely suitable, due to its inspiring environment. It is also an environment (network) with a lot of knowledge about symbiotic, nature-inclusive, and sustainable building, where we can involve the right expertise, if needed.

A project must create value for all parties involved in a balanced way and contribute to the liveability of the environment. Local values are the starting point for the design. Therefore,

it is essential to involve people with knowledge of the local culture and history. What is considered important in the local community? What are the direct benefits? Are the facilities accessible to everyone? Are there broader social benefits? It is essential that the design strengthens the local fabric.

We want to make as much use as possible of local materials and production chains (involve local companies already in the design phase), which may also impose limitations on the design. However, it contributes to the long-term reliability and maintainability of the systems when leveraging local resources. It further strengthens local ownership and local influence and allows the local community to take responsibility.

Implementation

For implementation, a project team will be established preferably involving persons from different stakeholders, directly or as participants of a steering group, providing both execution power and governance to the project. The project team may evolve from the design team, but it will require other skills and must be carefully composed. The team should take the (preliminary) design and transform it into a sound value case. This involves further detailing the design, carrying out feasibility studies, requesting quotations, arranging finances, looking for locations, preparing concept contracts, setup a (legal) organisation, etcetera.

When everything is prepared, a final go/no-go decision has to be made by all parties involved. After this approval, a detailed project plan can be developed, including activities, timelines, budgets, and resource allocation. Locations can be acquired, suppliers and builders can be contracted, implementation can start and the process should be monitored and steered.

Maintain, sustain and use

In this phase, our focus will be on effectively managing the infrastructure, maintaining relationships with stakeholders, and identifying opportunities for further growth and innovation. We believe that being open to feedback from the community is crucial, as it can provide valuable insights and ideas for improvement. The perspective can be broader than the specific projects that have been realised. It may be possible to leverage and combine existing projects, infrastructures and networks to create greater value.

7.3 Action plan Leuven

The action plan for Leuven (Heverlee) focuses on improving water balance in a dense urban and ecological interface zone, where stormwater from highways intersects with Natura2000-protected forests, urban infrastructure, and community initiatives. While research and stakeholder collaboration are at an earlier stage than in Kloostersland, initial interactions reveal promising opportunities and the need for integrated, context-sensitive solutions.

Following the structure described in chapter 3 Pragmatic steps in involving the community, this plan builds on the identification and initial exchange steps completed during the RRR-project and sets the course for future co-design, implementation, and maintenance activities.

Identification and exchange

Over the course of the RRR-project, initial sessions with different stakeholders were held:

- Agentschap Wegen en Verkeer (AWV) as road authority is focused on the urgent need to renovate the ageing bridge over the Naamsesteenweg (Heverlee). While water-related issues are fairly new territory for them, they acknowledge the importance of incorporating sustainable runoff strategies into their future practices.
- The City of Leuven is motivated by its ambition to become a green, climate-adaptive city and wants to avoid water damage through stronger stormwater control. It uses the permitting process to incentivise sustainable runoff management.
- The Agentschap Natuur en Bos (Forest Agency) and Province are primarily concerned with safeguarding the adjacent Heverleebos Natura2000 area from polluted runoff.
- Project Walden acts as a community platform, representing local residents with a strong interest in restoring historical watercourses to enhance biodiversity, ecosystem services, and quality of life.

This stakeholder landscape reflects a diverse set of motivations: infrastructure urgency, regulatory vision, ecological protection, and community-based restoration. Future co-creation should continue to balance these needs through shared goals and concrete, low-barrier entry points.

Preliminary scoping suggests a mix of immediate and medium-term opportunities for improved runoff handling, re-use and community value creation.

Opportunities around the highway and bridge

- Enhancing existing retention basins by introducing sedimentation traps and vegetated treatment zones to reduce pollutant loads before overflow.
- Use treated runoff for irrigation of nearby community gardens, the grounds of a local school, large student residence, and public green spaces.
- Ground infiltration systems on the north side of the highway, further away from Natura2000 zones, could allow for seasonal or event-based recharge of groundwater.
- Diverted runoff could potentially serve industrial areas further down the highway or the military domain at the Hertogstraat, especially for non-potable uses such as landscape irrigation or washing facilities.

Opportunities for broader system improvements

- Decentralised solutions such as bioswales (wadi), rain gardens, and infiltration trenches along roadsides and public areas can help absorb peak flows and promote resilience.
- Participatory monitoring involving local actors (Project Walden, KU Leuven, IMEC) can build capacity and ensure adaptive management.
- Educational partnerships with the school and student communities can turn stormwater infrastructure into living labs or educational spaces.

Designing and co-creating

While there is no central "innovation pavilion" as in Kloostersland, Leuven’s strength lies in its dense knowledge network and community engagement. Institutions like KU Leuven and IMEC can serve as innovation partners, particularly in water quality monitoring, circular resource use, and system modelling.

Project Walden provides a trusted link to local residents and an established platform for ecological restoration. They can continue to organize co-design sessions, hosted either within municipal spaces or at educational facilities.

A neutral facilitator or coordination team (embedded researchers or creative intermediaries) can guide the group, ensuring that outcomes meet diverse goals; from fast-tracking permits to long-term ecological integrity.

As in Kloostersland, design should prioritise:

- Local relevance and accessibility
- Synergies with existing sustainability goals
- Value creation for multiple user groups
- Use of local materials and expertise

Implementation

After defining promising value cases through co-creation, a project team should be assembled—drawing from relevant public agencies, research institutions and community partners.

Key implementation steps include:

- Upgrading and optimising retention basins
- Installing pilot infiltration sites and decentralised buffers
- Creating joint-use cases for treated runoff (e.g. irrigation at the school or community garden)
- Developing data-sharing agreements for monitoring and maintenance
- Preparing funding applications to programs such as Interreg, LIFE, Horizon Europe, or the Flemish Blue Deal

Because the regulatory framework currently exempts road authorities from local rainwater ordinances, the project may also serve as a test bed for policy innovation, exploring new forms of collaboration and shared responsibility between city and agencies.

Maintain, sustain and use

Long-term success depends on continued stakeholder alignment and shared stewardship.

Governance structures may take the form of:

- A joint task force or forum involving AWV, the City of Leuven, and key community partners
- Integration of infrastructure upkeep into regular city and AWV maintenance plans
- Community-led monitoring and interpretation via educational institutions or Project Walden

Ongoing feedback and monitoring (both technical and social) will be critical in scaling successful measures and refining the needed governance. In the long run, this pilot can inform a replicable framework for integrated runoff management in other Flemish cities, especially those facing similar urban-ecological tensions.

7.4 Discussion

The action plans for Kloostersland and Leuven show how local context shapes the pathway to better water management, but also reveal common principles that can guide replication in other sites.

Common ground

- Both action plans combine technical, ecological, and social solutions.
- They explore runoff reuse and buffering to ease pressure on sewers and support local needs.
- Both emphasise stakeholder co-creation and design based on local values.

Key differences

- Kloostersland is further along, with concrete use cases and a central innovation site.
- Leuven is earlier in the process, but could benefit from strong institutional partners (e.g. KU Leuven, Project Walden).
- Ecological constraints (e.g. Natura2000 forest) seem more prominent in Leuven, requiring stricter water quality controls.
- Policy leverage differs: Leuven uses permitting to push sustainability, while Kloostersland builds on infrastructure synergies.

Replication

Despite differences, the phased approach (identify–exchange–design–implement–maintain) and the focus on local co-benefits make both action plans adaptable to other regions. Core aspects such as coupling technical and spatial interventions, and exploring new governance models can be adapted to other regions or sites facing similar runoff and reuse challenges.

Insights from both action plans feed into the broader integrated pathway work described in the next chapter, but also into other knowledge dissemination activities of the RRR-project.

Tools, templates and process learnings have been made available as deliverables and via the RRR-website to be shared across regions to accelerate climate-adaptive water management across Europe.