InnovA58, summary in English, January 2024

(translation of the main pages of www.InnovA58.nl)

Access the interactive map of the innovation site of the living lab InnovA58 here (in Dutch).

InnovA58: a unique testing environment for sustainable innovations

We are InnovA58, a Rijkswaterstaat project. Rijkswaterstaat is the implementation agency of the Ministry of Infrastructure and Water Management in The Netherlands. It manages and develops the national roads, waterways, and other bodies of water in The Netherlands.

As an important player in the construction and maintenance of Dutch infrastructure, Rijkswaterstaat can, and wants to, make a real difference. Our ambition is also considerable: **by 2030, we aim to be working completely climate-neutral and circular to create a sustainable living environment**. InnovA58 is making a significant contribution to this goal with its **living lab consisting of four test sites along the A58 near Eindhoven, in close proximity to the Kloosters parking area.**

Faster and more targeted innovation is only possible when we truly join forces. Therefore, **we are collaborating intensively** with commercial parties, other governmental bodies and research institutions, environmental partners, and many other departments within Rijkswaterstaat.

The other subprojects of InnovA58, the widening of the A58 between Eindhoven-Tilburg and Annabosch-Galder, are experiencing delays due to the nitrogen-related issue. InnovA58 is now mainly focused on testing and accelerating sustainable innovations. Rijkswaterstaat wants to apply these successful innovations to the A58 road widening and other projects.

"We either do it sustainably, or we don't do it."

Michele Blom,
Director-General of Rijkswaterstaat, 2022

InnovA58

In addition to the (paused) road widening plans for the A58 routes Sint Annabosch-Galder and Eindhoven-Tilburg, InnovA58 is a project for innovative construction and infrastructure, as well as for a sustainable living environment.

Due to the nitrogen-related issue in the Netherlands, the road-widening plans have been delayed by several years. This has provided the opportunity to intensively test promising construction and infrastructure products and working methods in the innovation project, which can later be applied to (road) projects. For this purpose, we have set up test areas at our innovation site near the Kloosters car park on the A58 near Eindhoven.

We are innovating sustainably in collaboration with many partners in the market, other government agencies, knowledge institutions, and organized initiatives in the area.

Access the interactive map of the innovation site of the living lab InnovA58 here (in Dutch).

At the moment (January 2024) the map contains information about (corresponding to the numbers in blue above):

1. Zero emission construction site for the purpose of constructing double innovation lanes

2. Sustainable road surfaces

3. Solar panels

4. Sustainable road markings

5. Sustainable sound barriers

6. Service area

7. Pavilion

8. Weather station

9. Wooden guide rails

10. Road berms

11. Expansion joint

12. Water quality

13. Water storage

- Future

- Completed

We invite interested colleagues, commercial parties, students to visit our testing environment InnovA58 where we explain how a living lab works and what kind of innovations we are testing.

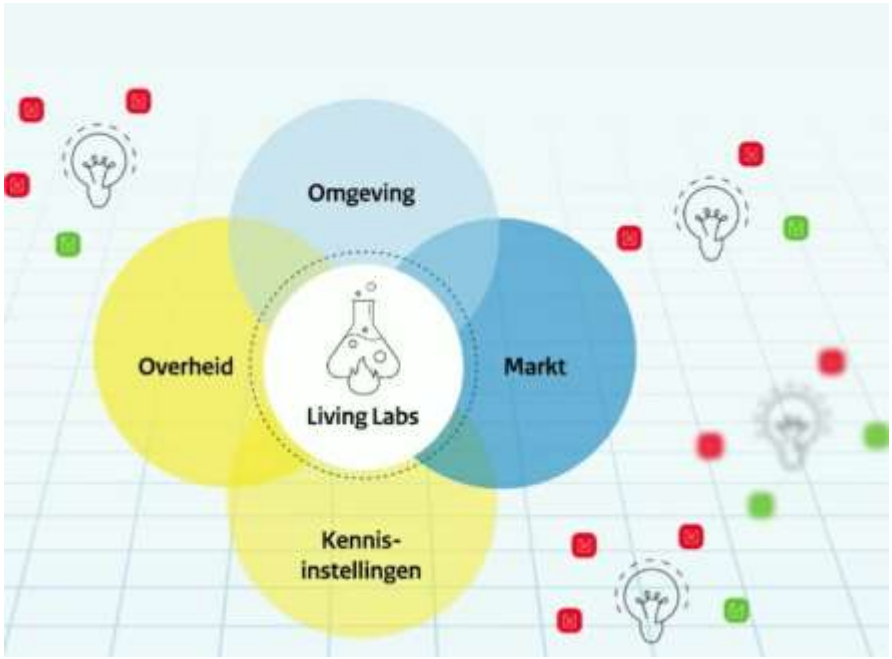
Rijkswaterstaat: a sustainable vision for 2030

Rijkswaterstaat is known for its work on national highways, bridges, dikes, rivers, other major bodies of water, locks, and tunnels. In this way we ensure a safe, liveable, and accessible Netherlands.

Because of this we are a major client in the construction and infrastructure sector. We realise that with this role comes the responsibility in our work to contribute to a green living environment, to clean air, soil, and water. This is the foundation for a healthy future where you can live, work, and travel comfortably and safely.

Rijkswaterstaat aims to be energy-neutral in 2030, generating as much energy as we consume. In addition, we are working circularly by reusing high quality construction materials, minimizing waste production, and using sustainable materials. To achieve this, we need new sustainable practices and products for the construction and infrastructure sector. We prefer to implement them sooner rather than later because time is ticking when it comes to the quality of our living environment.

Fast *and* sustainable innovation is only achievable when we join forces and collaborate with commercial parties, other government agencies, knowledge institutions, and private initiatives. Our motto is innovating faster together and with focus. InnovA58 is a project where we are putting this into practice.



The picture above shows the parties involved in living labs:

- Environment
- Market
- Knowledge institutes
- Government

InnovA58 and its test areas

Experiment, learn, apply

InnovA58 works on more than just road widening. We initiate innovations and challenge the market, along with, for example, knowledge institutions, to test promising concepts with us in practice at our innovation site.

For example, we are currently experimenting with sustainable asphalt, road markings and sound barriers at our innovation site. If successful, these innovations can be applied in other Rijkswaterstaat and our partners' projects. We are also experimenting with different ways of collaboration and procurement.

Faster and more focused innovation is possible only through collaboration. Our partners are commercial parties, the provinces, municipalities, water authorities, and knowledge institutes.

Applying road markings to the innovation lane

Living Lab

InnovA58 has a *living lab*: a development, testing, and learning environment where we investigate promising sustainable innovations in practice, adapt them, and retest them if necessary. We have an innovation site available on the A58 near Eindhoven, near the Kloosters car park.

For example, in the experimental set-up of sustainable sound barriers, we are testing with commercial parties barriers made from more sustainable materials than the usual concrete and steel. However, we are also testing whether moss can grow on these barriers to make them greener in appearance, more maintenance-friendly, and to stimulate biodiversity.

The innovation partnership with ProRail, looking at sustainable sound barriers

We are assessing the durability, slip resistance, and noise levels of sustainable road markings when vehicles drive over them. This is best tested when traffic such as cars and heavy freight drives over them 24 hours a day.

We are testing innovations that have passed the idea and first concept phases. Together with the involved partners we are striving for innovations that have the necessary qualities to also be applied to other projects.

More than just product testing

We are also testing new ways of working, collaborating, and procuring that are better suited to the current times and the societal challenges we want to address together with our partners.

This means:

- working processes, such as in the case of emission-free construction sites, must evolve.
- more frequent dialogues in procurement, as seen in the case of the service area project.
- engaging with societal partners, as demonstrated by the symbiotic pavilion.

  This is because sustainable innovation demands changes in people's attitudes, behaviours, and views on societal challenges.

We have established four test areas in and around our innovation site where all these innovations are located:

Lane area innovation test

On and around specially constructed (emission-free!) innovation lanes (entry and exit slip lanes totalling 1400 meters in length), we have been testing for example various types of sustainable asphalt, sustainable sound barriers, sustainable road signs, and sustainable road markings for several years.

Service area innovation test

We are renovating the Kloosters car park to make it a contemporary place to stop with modern, innovative facilities for road users. Fastned and Shell will remain.

Symbiotic pavilion innovation test

In collaboration with a group of societal partners (Het Collectief), we are facilitating the construction of a nature-inclusive pavilion next to the Kloosters car park. Nature as a source of inspiration is central to this project. Once the pavilion is completed,
these partners will use it as a place for inspiration and work where sustainability takes centre stage.

Water storage innovation test

We experiment on a technical, organizational, and economic level with the collection of freshwater (from the A58). The water will be analysed, purified, and stored. This water can then be used in the surrounding area during dry periods. To realize this experiment, we are collaborating internationally. We got an european INTERREG subsidy.

Innovation is more than...

At our InnovA58 innovation site, Rijkswaterstaat is testing various visible product innovations, from asphalt to sound barriers. However, we are also working on a broader scale of innovations. This is because successful and sustainable innovation requires more. Innovation is also a matter of mindset, courage, willingness to do things differently, anticipating ‘that things do not always go as expected’, being open to learning and collaboration, persistence, knowledge sharing, trust, updating
old working methods, and flexibility. Ultimately, our goal is that successfully tested sustainable innovations become accepted and widely applied products and practices.

Start of the test phase innovation lane in partnership with Gebr. van Kessel, July 2022

At InnovA58, we are gaining various (successful) innovation experiences on:

- **process innovations**, such as emission-free construction, circular design, and nature-inclusive construction.
- **social innovations**. These are mainly related to people’s behaviour in projects, such as being open to non-standard working methods and able to show courage, daring to innovate.
- **collaborative innovations**, such as different forms of contracting, cooperation with other government bodies and societal partners.

Celebrating success together: start of the sound barrier test phase in partnership with ProRail, 6 July 2023

Innovation requires a culture of creativity, experimentation, and learning, with attention to changes in the market and proactive responses to trends and needs in our field of work and in society. **Also read the article in which Wies Vonck, project leader of the living lab InnovA58, provides more insights into this (in Dutch).**

SmartwayZ.NL is *the* innovative mobility program in the south of the Netherlands. With various projects in the provinces of North Brabant and Limburg, it aims to improve accessibility and promote innovations and sustainable travel behaviour. The approach is area-focused, and there is close collaboration with partners in the region.

Collaboration with InnovA58

The SmartwayZ.NL (available in Dutch and English) mobility program includes various infrastructure challenges in North Brabant and Limburg. These are located in the Breda-Venlo corridor (A58, A2, A67), the A2 Weert-Eindhoven, the N279 Veghel-Asten, and the Southeast Brabant area. The approach varies from smart mobility solutions to widening motorways and tackling transportation hubs.

In this overview (available in Dutch), you can find ongoing, completed, and new projects of SmartwayZ.NL for the south of the Netherlands. A planned merging freight traffic pilot is included in InnovA58 (see page 9 of the overview in the link). InnovA58 shares its experiences and innovations within SmartwayZ.NL.

Innovations

Rijkswaterstaat is involved in the construction, management and maintenance of roads and waterways, major Dutch bodies of water, bridges, viaducts, and dikes. We are working hard on our societal challenges in mobility, safety, climate, and energy. To do this, we need to innovate faster and with focus. InnovA58 is an example of a living lab that is helping us with this goal. Our aim is to apply successful innovations in multiple (Rijkswaterstaat) projects.

InnovA58: collaborative experimentation, learning, and application

InnovA58 is a *living lab*, a unique testing and innovation centre of Rijkswaterstaat.

Why is it unique?

- We have many different innovations in **one location** (next to the A58 near Eindhoven);
- We test **outdoors**, in everyday weather and traffic conditions.
- Sustainable innovation is always done collaboratively; we share knowledge and work on **new forms of cooperation and procurement**
  .

Innovation lane test (constructed in an emission-free manner)

In 2021/2022, VolkerWessels subsidiary Gebr. Van Kessel constructed the innovation lane in an emission-free manner. This project serves as a showcase for sustainable and circular applications within the groundwork, road and hydraulic engineering sector, including foundations, asphalt, road markings, and street furniture.

The InnovA58 project team, in collaboration with colleagues from Rijkswaterstaat's Corporate Innovation Program (CIP), completed the innovation lane in 2021/2022. Gebr. Van Kessel, a VolkerWessels subsidiary, constructed this innovation lane without emissions.

Together with various chain partners and KWS Infra Eindhoven, Gebr. Van Kessel applied a comprehensive package of circular products and their own innovations.

The experiences gained here will contribute to the development and application of innovations in the planned A58 road expansion *and* other road projects.

The entry and exit slip lanes to the service area each have two lanes and stretch for over 1400 meters. Practical, efficient, and unique in Europe, these are the only test lanes accessible to regular traffic. Here, practical innovation tests are possible at a location along the motorway that is easily accessible for both researchers and interested parties.

'*Working together on reducing CO2' is the motto of the emission-free construction of the innovation lanes*

The challenge: minimal CO^2 emissions

Rijkswaterstaat challenged the market to construct the innovation lane without emissions. Gebr. Van Kessel achieved a score of 10 in reducing CO^2 emissions during its execution. This was based on the 'Tank to wheel' principle, which considers the emissions of the vehicles used during the construction of the innovation lane. We are working towards climate-neutral and circular motorways, aligning with Rijkswaterstaat's Construction and Construction Logistics transition path.

Contractor Gebr. Van Kessel implemented various innovations in circular road furniture, sustainable foundation solutions, low-temperature asphalt types, and circular solutions in road markings and road furniture.

During the execution, only equipment running on electricity or 'clean' fuel was used. This included the world's first electric asphalt spreader, recently invested in by KWS Infra, which was employed in this project. In this way, we gained valuable experience in sustainable construction on a small scale.

Gebr. van Kessel illustrates in a colourful brochure (in Dutch) how the emission-free construction of the innovation lanes is carried out and which innovations they applied in this project. Additionally, Gebr. Van Kessel's website, www.samenco2wegwerken.nu (in Dutch), associated with this project, features a CO^2 dashboard, news, and videos.

Rijkswaterstaat tests four types of asphalt

Under the *Sustainable Road Surfacing transition path*, RWS is using a part of the innovation lanes to test four different types of asphalt. These are produced using natural or circular materials, with a focus on finding durable road surfaces that last as long as possible.

On, along, or near the road

The premise of the innovation lane test is that we test, monitor, and advance innovations for construction & infrastructure and for a sustainable living environment over several years. We do this as much as possible on, alongside, or near the road, in harmony with the surroundings. This allows us to gain experience in testing and implementing innovations in practice, increasing the likelihood of successful, structural applications. Our goal is to implement some of these innovations in the actual A58 road expansion project, InnovA58 Eindhoven-Tilburg, and/or in other road projects.

Both Rijkswaterstaat and Gebr. van Kessel (a division of KWS) are testing various types of road surface on the innovation lanes.

Asphalt - RWS test

The slip road to the Kloosters service area consists of two innovation lanes designed for testing sustainable construction and infrastructure innovations. Rijkswaterstaat is testing different types of sustainable asphalt on this section.

Asphalt - Gebr. van Kessel test

Gebr. van Kessel is testing sustainable asphalt on the eastern section of the innovation lanes that they constructed emission-free. These are the lanes used by traffic when exiting the service area.

During the construction Gebr. van Kessel used, among other things, the first electric asphalt spreading machine of its kind. They are also experimenting with the foundation under the asphalt.

Illustrations road surfaces

Both Rijkswaterstaat and Gebr. van Kessel (a division of KWS) are testing sustainable road markings on the innovation lanes.

Rijkswaterstaat's road markings

The slip road to the Kloosters parking area consists of two innovation lanes designed to test sustainable construction and infrastructure innovations under everyday conditions. Rijkswaterstaat is testing 10 different types of road markings from a total of four suppliers on these two lanes: BRTC, Coateq, 3M, and Veluvine.

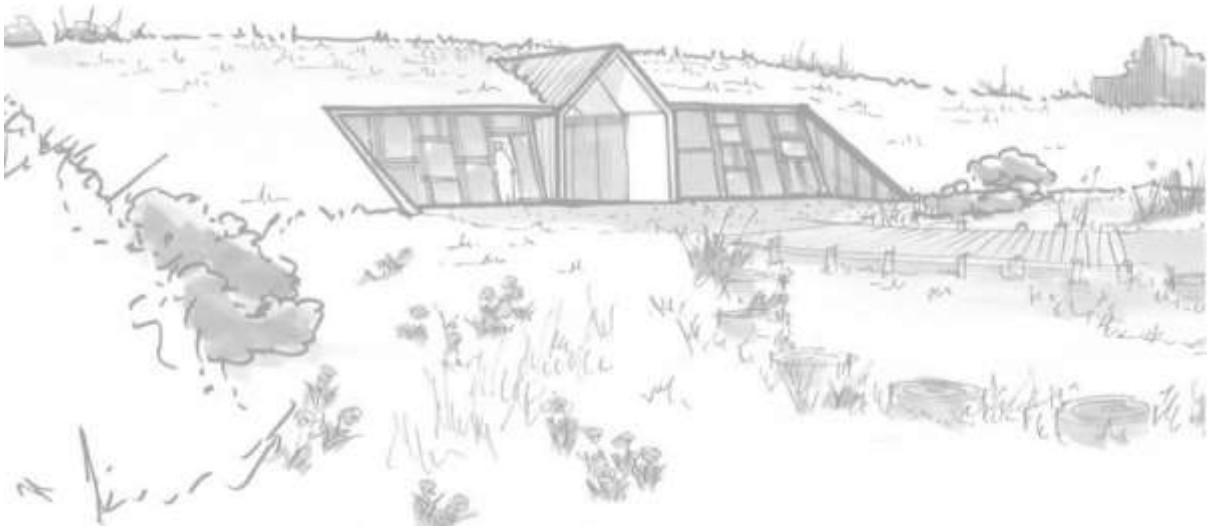
Gebr. van Kessel's road markings (KWS)

The sustainable road markings on the eastern innovation lanes (from the parking area back onto the A58 highway towards Eindhoven) are part of the innovations being tested by Gebr. van Kessel. The commercial party involved is NWM.

Illustrations

Road furniture: lighting and signs

Gebr. van Kessel (KWS) is conducting tests on sustainable road furniture on the eastern section of the emission-free innovation lanes they constructed. These lanes are the ones that traffic drives over when exiting the service area. This testing involves street lighting and traffic signs.



The symbiotic pavilion is just one of the four innovation tests within InnovA58. We are collaborating with societal partners and commercial entities in this endeavour. For Rijkswaterstaat this is a novel and innovative approach to collaboration.

Building symbiotically

In the near future an innovation pavilion will be constructed at the Kloosters car park and service station on the A58. Through this pavilion, we will showcase the progress of innovations in sustainability and road construction to the public.

Symbiotic building places nature at the forefront. The pavilion will serve as an example of what is achievable in the realms of sustainability, collaboration, and nature-inspired design within the built environment.

Killing two birds with one stone

In this project, we are innovating on two fronts: technically and socially.

In symbiosis with the environment, a pavilion is being designed, constructed, operated, and dismantled with the aim of creating added value for the local ecosystem. This represents the technical aspect.

The social innovation lies in achieving this through a new, equitable form of collaboration with partners within a collective. Within this collective, architects, material experts, and builders work together on an equal footing.

Rijkswaterstaat has assumed the role of facilitator within this framework and is thus one of the partners. For instance, it has made the pavilion possible by providing physical space at Kloosters. Additionally, it is contributing its expertise, as are the other partners.

The guiding principles of the collective are the six life principles. This innovative approach to collaboration is known as 'symbiotic building.' The objective is to generate added value for the local ecosystem, such as by supporting the local biodiversity and promoting water retention in the soil. Waterschap De Dommel and the province of Noord-Brabant are also part of this collective effort.

The life creates conditions which improve life. Translation of the elements of the circle:

Adapt to changing circumstances

- Incorporate diversity
- Conserve functionality with self-renewal
- Realize resilience by variation, redundancy and decentralisation

Be well attuned to your local environment

- Make use of the cyclic processes
- Use readily available materials and energy
- Use feedback loops
- Develop cooperative relations

Use sustainable chemistry

- Break down products into benign components
- Build selectively with a small number of elements
- Put chemistry in water

Efficiently deal with raw materials (materials and energy)

- Use low energy processes
- Use multifunctional design
- Recycle all materials
- Let form follow function

Integrate development with growth

- Use self-organisation
- Build bottom-up
- Combine modular and nested elements

Evolve to survive

- Use tried and tested strategies
- Integrate the unexpected
- Rearrange information

Translation of what is written in the dark grey circle:

Sun light, water and gravity

Dynamic and non-equilibrium

Limits and boundaries

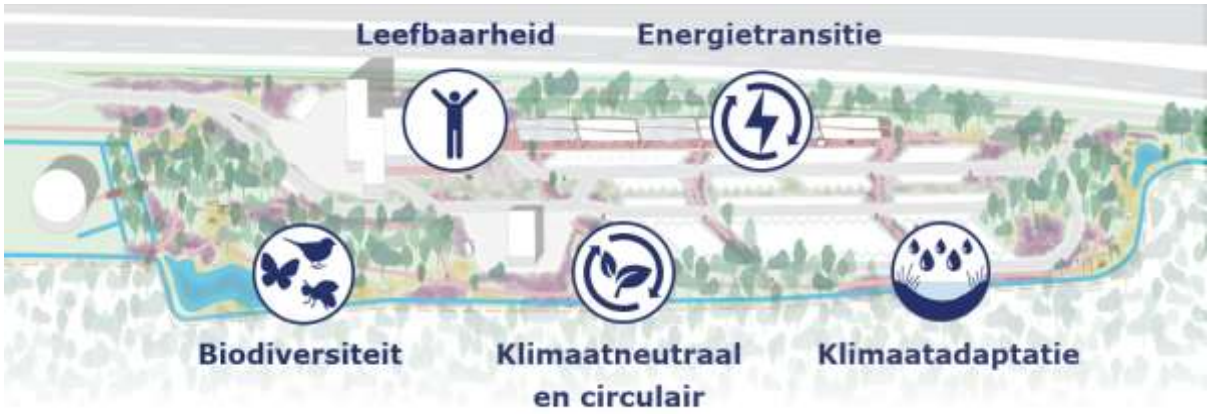
Exclusive processes

Defining characteristics of the earth

Source: Life's principles. Biomimicry Design Lens: een visuele gids. Biomimicry 3.8, 2015

Should you have any inquiries, please feel free to contact us at symbiotischbouwen@rws.nl.

Service area 2.0 innovation test



Themes:

Biodiversity – Liveability - Climate neutral and circular- Energy transition - Climate adaptation

Rijkswaterstaat has tasked Boskalis Nederland to collaborate with them in transforming the Kloosters parking area on the A58 near Eindhoven into a modern service area for road users. Following the design phase in 2023, the execution will commence in the spring of 2024.

The Shell service station and FastNed will remain operational.

The focus during the tender process was on the market's innovation capabilities and creativity. Boskalis Nederland stood out in terms of sustainability. Their design and execution incorporate themes such as liveability, energy transition, biodiversity, climate adaptation, and climate-neutral & circular practices.

Read the press release (in Dutch) about the contract awarded to Boskalis Nederland.

This website will be kept up to date on the design and execution phases of the Kloosters service area.

Water storage innovation test

Climate change is leading to alternating periods of excessive rainfall and prolonged droughts. In the Netherlands, there is ongoing experimentation with water storage to use during dry spells, and InnovA58 is no exception.

In the Netherlands, water shortages and excess water occur at different times. We aim to experiment on technical, organizational, and economic fronts with the storage of fresh water (from the A58). Subsequently, this water needs to be analysed, purified, and stored for use in the local area during dry periods.

Interreg Europe Co-funded by the European Union

To realize this experiment, we are collaborating internationally and have also gained an INTERREG subsidy application (in Dutch).

In addition, during the construction of the innovation lanes, Gebr. van Kessel (KWS) implemented the innovative Aquabase. This system captures rainwater and stores it beneath the road surface.

Sound barriers: 10 units in 3 projects

Along the InnovA58 innovation lane, Rijkswaterstaat is facilitating research into sustainable sound barriers. Sound barriers can be sustainable in terms of the materials used, the production process, transportation, and their impact on the environment.

Various types of sound barriers from different suppliers and partners are currently installed along the InnovA58 innovation lane near the Kloosters car park.

Moss-concrete sound barriers

We have been testing **moss-concrete sound barriers** at the innovation site in collaboration with TU Delft, Rutte Groep, and ABT Engineers since December 2022. For more information about the parties involved and their roles, please refer to the press release published at the start of the testing phase (in Dutch). In the article ‘Moss, what can we do with it?’, Professor Jenk Jonker explains the background to this scientific research into moss-concrete sound barriers (in Dutch).

Partners in the moss-concrete sound barrier project

Applying a moss mixture to the sound barriers

Eight types of sound barriers are being tested in an **innovation partnership with ProRail,** six of which are located at the InnovA58 innovation site. This innovation partnership involves a procurement process where commercial parties are challenged to develop solutions jointly with the client to solve a problem or achieve an ambition. In this case, Rijkswaterstaat and ProRail share the ambition to work circularly by 2030. A maximum of four suppliers will be tasked with actually installing their barriers in a project.

There are two special aspects to an innovation partnership:
1. a financial contribution to research and development of new products, and
2. the promise to the supplier that these products will be actually purchased after the successful completion of the project. In this case, the top four sound barriers will ultimately be applied along the ProRail tracks for the first time.

The following suppliers are involved in this innovative partnership. Click on a name to see a fact sheet with specifications of the respective sound barrier (in Dutch):

• Geowall	NETICS, Holland Scherm, Van Oord
• Terrestrial	part of FormWorkRobotics
• BW2biobased	
• Biobased Sound Barrier	Schreuder
• RMP Sound Barriers	Reanco Benelux BV
• WHIS® Panel	4silence
• Soundsafe Movable	GSF-Rail Infra B.V., test location elsewhere
• DuBlok	Heijmans, test location elsewhere

Hollandscherm sound barrier

The test setup of sustainable sound barriers by Hollandscherm is an initiative of **Gebr. van Kessel (a subsidiary of KWS**), as part of their innovative tests on the innovation lanes.

Obstacle-free solar panels

Rijkswaterstaat is investigating the possibility of laying solar panels horizontally in road berms without the need for installing a crash barrier. We refer to this as ‘obstacle-free solar panels’.

Solar panels cannot simply be placed in the berm without crash barriers. Safety is always priority number 1, so this idea obviously has strict (safety) requirements. At Kloosters we are testing ‘obstacle-free’ solar panels.

Issues that we must pay attention to with a safe solar system are, for example, crashes, capacity, light reflection, risk of slipping, and drainage. On the basis of these points, a number of promising solar systems emerged that have been tested by InnovA58.

In July 2023 this test was completed and the solar panels were removed.

Weather station (data innovation)

Rijkswaterstaat, the KNMI (the Royal Netherlands Meteorological Institute), and other road authorities are collaborating to better respond to changing and extreme weather conditions using precise weather information. As of the summer of 2023 they have made use of highly advanced weather stations, with the first one located at InnovA58.

Rijkswaterstaat, the KNMI, and other road authorities are closely cooperating to improve their ability to respond to changing and extreme weather conditions with precise weather information.

When the Ice Alert System (GMS in Dutch) was due for an upgrade, it was time for a tendering process that ultimately required the practical testing of a Finnish-made weather station. This testing took place at InnovA58, allowing for weather measurements to monitor sustainable innovative asphalt types.

The new weather station is highly advanced and the first of its kind in the Netherlands. From mid-2023, a total of 360 new weather stations will be

deployed throughout the Netherlands. The weather station currently located on the innovation site will remain there permanently.

Alex van den Hoek is Senior Advisor for Weather-Related Systems at Rijkswaterstaat (RWS) and closely involved in testing and procuring the new type of weather station in collaboration with partners. He enthusiastically shares insights about this project and its possibilities in this interview (in Dutch).