



MUNICIPALITY OF APELDOORN REVERSES THE PROCESS FOR CIRCULAR CYCLE PATH

JULY 2019

The Municipality of Apeldoorn wants to contribute to the transition to a circular economy. The Province of Gelderland had expressed the wish to improve the cycling infrastructure and had made funds available for this purpose. When a large amount of construction and demolition waste became available in the Apeldoorn neighbourhood De Parken, the municipality saw an opportunity to use this waste to improve the cycling infrastructure. Local partners were found in road building company Schagen Infra and concrete manufacturer Bruil. Together they designed a sustainable and circular cycle path that used 75% concrete granules from the neighbourhood De Parken.



Source: <https://www.ecotap.nl/>

Facts and figures

Organisations: Municipality of Apeldoorn, Schagen Infra BV & Bruil

Product: Cycle path of reused concrete granules on the Krimweg in Apeldoorn

Period: Start in 2017, completion in April 2019

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Ambitions and objectives

Both the Municipality of Apeldoorn and the contractors for this project have ambitions with regard to sustainability.

The municipality:

- The Municipality of Apeldoorn aims to be energy-neutral in 2020.
- In the multi-year budget 2018-2021, the municipality takes steps to accelerate the circular economy and the energy transition.
- In a European context, the Municipality of Apeldoorn presents itself as a clean-tech region where innovation plays an important role. Circular economy is a priority in the Claen-tech Agenda 055, as are energy, climate and clean-tech itself.

Contractors:

- Schagen Infra is committed to sustainability and circular entrepreneurship and they give this concrete expression in the Sustainable Development Goals.
- Concrete manufacturer Bruil has made it their mission to drastically reduce the use of scarce raw materials by 2025. They aim to achieve this by applying secondary materials, but also by looking for raw materials with a future.

When the cycle path on the Krimweg in Hoenderloo, Municipality of Apeldoorn, needed to be replaced, the municipality decided this was good opportunity to take circularity into account.

Procurement process

Preparations

The municipality lacked the know-how to draw up an innovative and circular invitation to tender. They decided to reverse the process and ask market parties to supply this knowledge in the form of a pilot.

The partners in the pilot had to be familiar with the municipality, have experience with innovations and sustainability and operate in the vicinity of Apeldoorn. Road building company Schagen Infra and concrete manufacturer Bruil fit the bill and were willing to accept the challenge.

Cycle paths are often procured according to standard specifications: thickness, width and materials have all been documented in standards that are usually copied into the specifications. For circular cycle paths, such standards hardly exist. In addition, the municipality wanted to make use of existing construction waste. This required a customized solution.

The project consists of two separate cooperation agreements. The first agreement only applied to the design stage of the circular cycle path. By cooperation, close consultation and experimenting the parties ensured that everyone's interests were served, while leaving room to innovate. In the design stage, the following guidelines were taken into account:

- The new concrete must last at least as long as regular concrete.
- The cycle path must be as circular as possible.
- The cycle path must be as sustainable as possible. This not only means using as little cement as possible, but also that the supplier

should make as few kilometres as possible and consume as little energy as possible.

- The concrete mixture must be easy to process and meet the same quality and life cycle requirements as regular concrete.
- There was a strong desire to construct the cycle path within the regular budget.

The second agreement applied to the construction of the cycle path.

Internal organisation

Based on the cost of the cycle path, the municipality would normally issue a call for tenders. However, by turning the project into a pilot, it was possible to choose another form of cooperation. This also required a different approach by the procurement department. For this project, innovation and sustainability were more important than the price, although the collaboration partners did have to find a balance between feasibility and innovation. For instance, they could have used a more sustainable concrete mix that required a very long curing time. This would have been more risky, however. Weather conditions may vary considerably and the cycle path would need to be closed and guarded during the curing process. By opting for feasibility when faced with such considerations, the project stayed within the desired budget.

Call for tenders

The municipality did not issue a call for tenders but set up the cooperation in the form of a pilot. This required the following steps: The first step was a collaboration agreement for the design of the cycle path. After the design stage, the parties were allowed to submit a quotation for the construction stage. As all parties were closely involved in the preparations and had also invested in it (by carrying out laboratory tests of concrete mixtures, for instance) they were able to come up with a fair and sharp proposal. The price fell within the

regular budget for a cycle path, which had been the municipality's objective from the start. The second step involved the works contract. If the parties would not have been able to agree on a price, the Municipality of Apeldoorn would have issued a call for tenders.

Cooperation

The *specifications* of the circular cycle path are not a blueprint for other similar projects, as the specifications are dependent on the available local materials, in this case the concrete granules from the De Parken neighbourhood. In addition, a concrete manufacturer such as Bruil is bound to the location of their factory. Builders, concrete manufacturers and concrete breakers nearly always operate exclusively locally. And both the municipality and the contractors indicate that from an efficiency and sustainability point of view there is no need to purchase such a product or service elsewhere.

The *process*, however, can be used as a blueprint or example for other projects. It is important to carefully determine which parties you need and to involve them in good time. Also, openness and transparency are essential for a successful pilot project. There are many uncertainties and risks that can only be managed if parties are able to communicate timely and effectively. Getting to know each other's language and culture turned out to be a lengthy process. It is important, therefore, to take the time to follow the process that is required for an innovative project such as this. It is not so much about the time needed to effectively implement the project, but about the fact that considerations, experiments and decision-making take longer than usual. According to Van Es, this extra investment is outweighed by the result. Besides, the costs of hiring an external engineering company to write the specifications for a circular cycle path would have been higher.

Results

At first, the intention was to use a mixture of 100% concrete granules. This ambition was adjusted to create a higher quality concrete and ensure the feasibility of the project. The finished cycle path has the following features:

- 75% of the gravel has been replaced by concrete granules.
- The cycle path includes two test sections, one with 100 percent concrete granules and the other with an alternative after-treatment to reinforce the top layer. This should make the cycle path more resistant to freezing and thawing.
- The cycle path has been widened to improve the cycle infrastructure. This was done at the request of the Province of Gelderland, which also partly funded the widening.

If the innovations applied in the test sections prove to be successful, future cycle paths can be made even more sustainable by more widespread application of these new technologies. If problems occur with the test sections, only small parts of the cycle path need to be replaced. So the risk is small, while the results are very valuable for future development. An innovative element with regard to road construction is the fact that the parties looked beyond the mere sustainability of the concrete mix. Apart from the production of the mixture, they also took into account transportation of the mixture to the construction site, the energy consumption of the building equipment and the maintenance of the cycle path after completion. All of these aspects affected the composition of the mixture. Adding a little more cement, for example, may increase the quality of the concrete and reduce the costs of management and maintenance over the next twenty years.

Even if the parties had not been able to reach an agreement for the construction stage, the project would have been very useful for the market parties. They were given an opportunity to further develop their own product and become leading players in the market.

Contract management

Thanks to the intense preparation, drawing up the works contract proved to be relatively straightforward. Much of the preliminary work had already been done and the design was a joint development by all parties. However, the quality of the new cycle path cannot be determined yet. It is hard to say how the concrete will perform over a twenty-year period. To cover future risks to some extent, the contract with builder Schagen Infra includes several conditions:

- A substantially longer guarantee of 10 years on wear resistance, traction and flatness;
- Simple monitoring on wear resistance, traction and flatness.

Concrete technology is complex and in constant evolution, which makes it difficult to set up a uniform measuring system. MVO Nederland, the Dutch centre of excellence for CSR, is currently working to develop such a monitoring method for future application.

Lessons learned

- The openness and transparency that characterised the collaboration, ensured that each party was fully committed to creating a product that would be as sustainable and circular as possible.
- A collaboration agreement is crucial to consolidate the mutual trust between the parties. It creates the openness and transparency that is a prerequisite for radical innovation.
- The concrete-breaker was not a party to the collaboration agreement. It turned out that they were not able to supply the exact product that the collaboration partners required. For a new

project it might therefore be an option to include this party at an earlier stage.

- Innovative concrete technology is too complex and volatile for the contracting party to capture in detailed specifications. Challenge the market with an open request that expresses a clear ambition with regard to the level of sustainability and innovation.
- Concrete manufacturer Bruil is one of the last links in the value chain, but they experienced several benefits as a result of their early involvement in the project. The parties were allowed ample time for the project, which enabled the manufacturer to do research and experiment with various mixtures. Builder Schagen Infra was closely involved in this process, as they would have to be able to process the mixture. This ensured optimal alignment and cooperation, and resulted in a high-quality innovative product.
- The most important lesson for the Municipality of Apeldoorn was how to carry out a procurement project that challenges the market to innovate. The concrete mixture that was used is not necessarily the best new circular mixture and depends to a large extent on the available materials. The municipality can, however, initiate a collaboration based on openness and transparency that leads to an innovative product design.

Tips

- Dare to take a risk, just do it!
- Find reliable parties that you know can and will stick their necks out.
- Make sure you know where the gaps in your knowledge are.
- Don't rush into constructing circular roads all over the city, but choose straightforward projects with limited risks.
- Don't allow the knowledge you gained from the project to be lost, but share it within your organisation.
- Include a clear and ambitious definition of circularity in your call for tenders. This helps the supplier to provide a solution that meets the objectives of the contracting party.
- Take the time to experiment, explore and communicate, and to deal with unforeseen circumstances.
- Change your approach to budgets: budget for multiple years instead of a single year. The initial investment for an innovative project may be higher, while the maintenance costs could be lower.

