

BUILD

A MAGAZINE FROM LECA



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BUILD is a magazine published by Leca International
Cover: Highway 6 was one of the main transport routes from Southeast and Eastern Finland



Flash Facts

Ilona Miszczak Appointed CEO of Leca International

On 1st June 2025, Ilona Miszczak took on the role of Chief Executive Officer at Leca International.

With more than 20 years of experience in the building materials sector, primarily at Saint-Gobain Glass, she brings strong expertise in innovation, specification, and sustainability.

Her vision is to strengthen Leca’s position in light-weight aggregates, combining industrial operations with a clear sustainability focus.

Ilona highlighted the unique opportunity to build on Leca’s heritage in nature-based products while driving future growth through customer-focused, low-carbon solutions.





Seminar in Portugal Highlights Sustainability and Resilience in Geotechnical Solutions

On 1st October 2025, Leca Portugal and the National Laboratory for Civil Engineering (LNEC) organised the seminar “Expanded Clay: Sustainability and Resilience in Geotechnical Solutions.”

The event brought together 110 participants, including leading experts, professionals, and enthusiasts from the construction and engineering sectors. It featured seven speakers — four from Portugal, two from Spain, and one from Finland — who shared their knowledge and experience through insightful presentations and case studies.

The seminar explored the innovative use of Leca® lightweight expanded clay aggregates in geotechnical applications, highlighting their contribution to creating more durable, efficient, and environmentally responsible solutions.

Beyond the technical exchange, the event was a true celebration of collaboration and shared purpose — uniting voices from across the industry in the pursuit of sustainable and resilient infrastructure.

Special thanks were extended to the institutional partners for their trust and collaboration, to the speakers for sharing their valuable expertise, and to all participants whose engagement made the event a success.



New Stretch Hood with 30% Recycled Content

At our site in Germany, we are continuously developing our packaging and logistics solutions. A new stretch hood for our packaged goods ensures improved product visibility and more stable pallets, while maintaining the same weather protection properties.

With a recycled content of 30%, it combines proven functionality with more efficient use of resources.





Project completed. Image courtesy of Teixeira Duarte, Engenharia e Construções SA.

BAYVIEW: THE HYPERMARKET REBORN AND INTEGRATED INTO THE URBAN FABRIC OF CASCAIS

The Auchan Bayview project in Cascais combines architecture, landscape, and sustainability, standing out for its harmonious integration into the terrain and the use of Leca® solutions that enhance the project’s efficiency and environmental performance.

Located on the eastern edge of Cascais, at the entrance to the town, the Auchan Bayview development forms part of the broader Bayview urban regeneration plan, covering an area of around 30,000 m². The central concept behind this intervention was clear from the outset: to integrate the new structure into its surroundings, minimising the usual visual and environmental impact of projects of this scale.

PROJECT INFORMATION

Client: Grand bay residences – sicafi, sa / auchan retail Portugal

Architecture: Fragmentos

Landscape architecture: Francisco Caldeira Cabral and Elsa Severino

Main contractor: Teixeira Duarte, Engenharia e Construções SA

Leca® LBF Installer: TD / Gameiro e Rodrigues

Landscape Execution: SOGRAMA

Leca® Solutions: 30.000 m² to Drainage layer in the green roof and Leca® LBF lightweight concrete in floor fillings

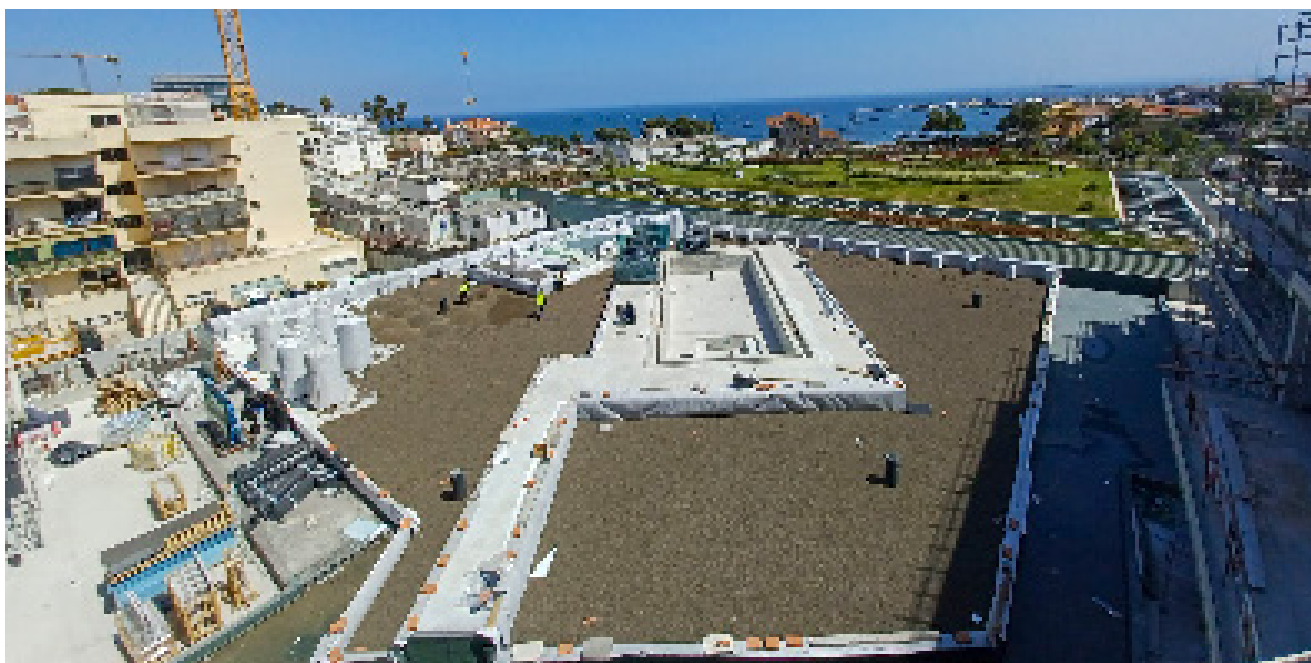


The arrangement of the building volumes follows the site's natural topography, giving the construction a "submerged" appearance, almost blending into the landscape. The structure was set back from Avenida Marginal, creating space for a large pedestrian square framed by greenery that extends up to the rooftop gardens. These rooftop gardens are more than decorative—they serve as true communal areas, shaped like an amphitheatre, offering panoramic views over the urban landscape.

The car park and loading/unloading zones were placed underground, freeing the ground level for pedestrian use and improving access. Above ground, the building extends over three floors housing retail and service areas. Natural light fills these spaces through wide windows and skylights. On the upper level lies the Food Court, with a glazed south-facing façade and terraces overlooking the Bay of Cascais. This configuration reinterprets the atmosphere of traditional street commerce—a type of retail

that opens outward and connects with its surroundings, rather than closing in on itself.

One of the greatest challenges of this project was to keep the hypermarket in full operation throughout all phases of demolition and reconstruction. Even as parts of the old structure were dismantled, customer access and service continued uninterrupted, thanks to meticulously planned logistics ensuring continuous activity.



Application of Leca® Solutions for Sustainable Construction

Two Leca® solutions were implemented in this project, reinforcing its sustainable and efficient character.

Leca® lightweight aggregates were used in the drainage layer of the green roofs, ensuring effective water runoff while retaining moisture that is gradually released back into the substrate, keeping it humid for longer and optimising maintenance.

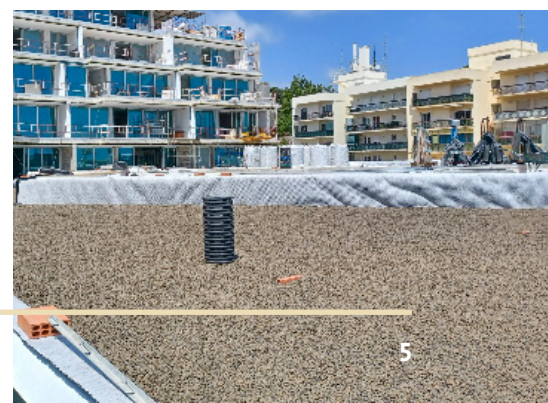
This drainage layer also provides additional thermal insulation to the building's roof.

Leca® LBF lightweight concrete was applied in the floor fillings of the building and surrounding leisure areas, offering a stable, durable solution that is quick to apply and dry, with a significant reduction in load.

As highlighted by Engineer Miguel Rogeiro from Teixeira Duarte, Engenharia e Construções SA, "it is a very practical and effective solution

that ensures high productivity, combining ease of planning with fast execution."

The Auchan Bayview / Bayview project stands as a benchmark of how contemporary architecture, urban regeneration, and sustainable solutions can coexist and enhance the built environment.





AMANDA BORNEKE

Specialist in Circular Economy at Sweco

Photographer: Anna W. Thorbjörnsson.



Amanda Borneke, Sustainability Expert and Consultant at Sweco, on demolition, reuse, and why compliments work better than hard-hat rules

We Must Dare to Demolish – with Circular Mentality

Amanda has demolition in her blood – glamour in her backbone – and sustainability in her whole heart. She coaches companies to adopt circular thinking and inspires the construction sector to dare to think differently. We met her for a conversation about waste, leading change – and how she ended up being named Alumnus of the Year at Linköping University.

FROM CONSTRUCTION SHEDS TO SUSTAINABILITY FRONT FIGURE

“I’m probably a perfect mix of my parents,” Amanda laughs. “My dad is a contractor, mother is a

hairdresser. So here I am – the glamorous sustainability consultant for the construction industry.”

Her path into construction started with demolition. But it wasn’t by chance – it was a choice. Amanda wanted to work with sustainability, but not in a closed bubble of like-minded people. She wanted to put herself where the resistance was strongest. “I enjoy working against the grain, making things happen where it’s not obvious. Where there’s friction.”

Already in her first job, she saw something that disturbed her: the sheer volume of waste. Fifty thousand tons a week in a single project.

“I remember that moment. I

couldn’t wrap my head around the scale – and it was just one project. It just felt wrong.”

MACHINES IN FOCUS – WASTE IN THE SHADOWS

When Amanda began working with sustainability in demolition, the focus was on eco-friendly machines and work on quality, environment, and occupational health and safety. But no one talked about material flows – or the actual amount of waste being generated.

“When I saw all the waste this industry produces, I was horrified.”

That’s when the ideas started flowing.

"I began digging into how you can coach an industry to understand that there is no such thing as 'end of life.'"

The demolition company she worked for already had a reuse concept, and Amanda started exploring how the work could be communicated to clients in new ways.

"When I started in demolition, my boss and I agreed that part of my time would be spent at a desk – but I also had to spend time out in the field. I wanted hands-on experience to be able to make a difference on site."

It worked well, but Amanda wanted more. Soon she wasn't just coaching the demolition industry – but the entire construction sector.

WOODPECKERS AND HELMETS – LEADERSHIP IN PRACTICE

Amanda often lectures on communication and leadership. One of her favorite pet peeves is what she calls "the woodpeckers" – people who try to lead by pecking at others' mistakes.

"It doesn't work to just say 'you're wrong.' You have to inspire people to want to do right."

She recalls her time as safety manager at 60 worksites. Helmets were worn – or not – depending on who was around.

"I only focused on those who wore the helmet correctly. I complimented them: 'You look great in that, this is professional.' And you know what? After two days even the most stubborn guys had their helmets on. They wanted to belong to a group where safety was success and the right way forward."

Amanda laughs. But she's serious. "It's leadership built on respect. And it works – especially when you don't fit the norm yourself. Then you have to lead with something other than being a woodpecker."

"CIRCULARITY ISN'T NEW – WE'VE JUST FORGOTTEN"

When we talk about shifting to more circular construction, Amanda keeps coming back to mindset.

"The industry thinks it's something new. But we've been wasting like this only for the last 200 years. Just look two generations back – it was obvious to repair, save, reuse."

Some sectors are more advanced in reuse and resource management. Amanda points to municipalities, which have long experience turning food waste into biofertilizer or biogas.

"In construction, I'd say brick, flooring, and natural stone have come

furthest in large-scale reuse – but we need it for more materials."

FROM OBSTACLES TO OPPORTUNITIES – WITH CREATIVITY AS A TOOL

Why is reuse so rare in construction? "Because projects aren't designed for it from the start. The entire process is linear."

But it can change – if reuse is included early in the process, and if we bring more creativity into the process.

"I think we need more creativity across the board."

Beyond the benefits of greater reuse, Amanda also sees creativity as a source of extra energy in the work.

"I've heard architects say it's a creative challenge not to be able to choose what materials they'll design with."



WHEN DEMOLITION MEETS REUSE – AND SYNCHRONISE

It's clear that Amanda is a seasoned speaker. Her stories are vivid, energetic – and often unexpected. Like when she is asked about one of the proudest moments of her career: being named Alumnus of the Year at Linköping University.

"I was completely overwhelmed. There was dinner with the entire board, an orchestra, and two students had even written a song about me. I sat there crying."

But something else stuck even more. "The university has a Walk of Fame. And now there's a metal plate with alumni names – mine is next to Sweden's Speaker of Parliament Andreas Norlén and State Epidemiologist Anders Tegnell. It's surreal."

And what did the motivation say? "That I demolish walls – but also reuse them. That describes me perfectly."

THE FUTURE? IT'S CIRCULAR – ON ANOTHER FREQUENCY

Amanda often illustrates circularity today by thinking of it as radio channels: the construction industry and circularity are tuned to entirely different frequencies.

"It's like circularity is a radio channel people haven't tuned into yet. We talk about the same things, but with different words, different channels, different logic. And so we miss each other."

And if she gets to play with the idea of reuse as a radio channel, there's only one name for Amanda's station:

"Trash Talk! A channel where we talk waste – with warmth, humor, and nerdy joy. Each episode could take a new perspective – economics, aesthetics, technology, politics. We need more conversations, not more scolding or lecturing."

Amanda makes a strong impact and drives change with her rhetoric and



Photographer: Anna W. Thorbjörnsson.

the energy is obvious. If she could give advice to her younger self, it would be: have patience – change takes time.

She also highlights the importance of surrounding yourself with the right people. People who say YES, who dare to think big.

"When I said I wanted to lecture at Friends Arena about reuse, some said I was crazy. Sweco was the first workplace where my managers instead said: 'Friends? You'll manage that within a year – aim bigger! How about the Excel arena in London?'"

2025 turned out to be a milestone year. Amanda has now spoken about her "woodpeckers" at the Excel Arena in London. In August, it was also announced that she is a finalist for the Grand Engineering Prize in the Sustainability category, to be awarded on Engineering Day 2025 in Sweden. We'll continue to follow Amanda closely to see where her wings take her next!





M25 JUNCTION 28 UPGRADE: SOLVING SETTLEMENT CHALLENGES WITH LECA® LIGHTWEIGHT AGGREGATE (LWA)

Leca® Lightweight Aggregate supports major geotechnical works at M25 Junction 28, helping manage settlement risk, reduce load on structures, and deliver sustainable performance in one of the UK's busiest motorway upgrades.

Project Overview

M25 Junction 28 is a key interchange, linking the M25 motorway with the A12 and A1023 to Brentwood. Handling up to 7,500 vehicles per hour at peak times, congestion leads to delays and poor air quality. With a projected 30% traffic increase by 2037, National Highways launched an upgrade to boost capacity.



Over 5,600m³ of Leca LWA supported the culvert extension before earthworks began.

Key improvements include:

A new two-lane loop road for M25 northbound to A12 eastbound traffic

Construction of three new bridges (Alder Wood, Duck Wood, Grove) and the Grove Farm Underpass

Realignment of the A12 eastbound off-slip road via Maylands Bridge over the Ingrebourne River Modifying the intersection of Common Edge Road and School Road.

Widening of the M25 anti-clockwise carriageway

Implementation & Results

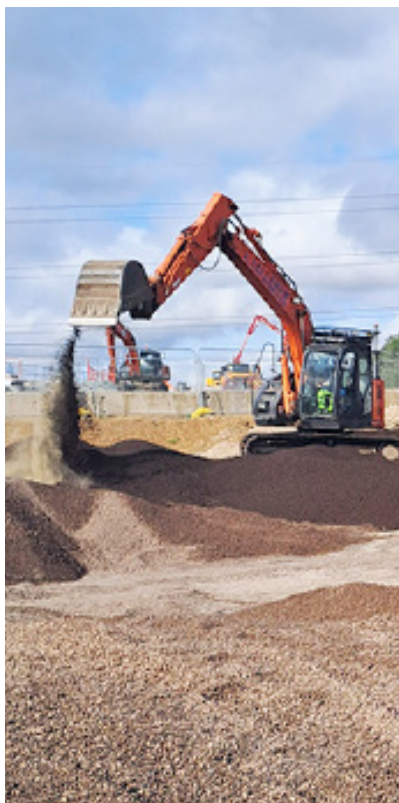
Over 5,600m³ of Leca LWA was placed around the precast culvert extension before earthworks and road formation. Efficient logistics via Walking Floor Trucks ensured timely delivery, with up to 70m³ per load.

“Approximately 5000m³ of LecaLWA was placed around the precast units before the required earthworks and road formation could be constructed over the top to connect onto the junction.”

Grace Jackson, GRAHAM Section Engineer.



M25 Junction 28 connects the M25 with the A12 and A1023 to Brentwood.



Timely delivery achieved using Walking Floor trucks (70m³/load).

GRAHAM Contracts Director Dave Brown emphasized the collaborative nature of the project:

“We are pleased to have begun work on the M25 junction 28 upgrade. National Highways is a valued and longstanding client, and this scheme will play a major role in improving journey times for thousands of motorists.”

National Highways Project Manager Zachary Pepper highlighted the long-term benefits: “We would like to thank the construction team and the supply chain for the complex planning and significant progress of this much needed improvement scheme. These upgrades will improve capacity and driver safety and reduce congestion around the junction by improving the connectivity between the M25 and A12.”

GRAHAM Engineering Manager, Jonathan Graham also noted previous successful applications of Leca® LWA:

“We have previously used Leca LWA in situations where loadings from backfill had to be kept to a minimum (e.g. Poynton Relief Road, Reading RBT).”

“We would have no hesitation in using Leca LWA should a suitable scenario present itself. Indeed, given its benefits regarding reduction in loads, it is actively considered in respect of piled solutions or where consolidation is otherwise anticipated to exceed permissible limits.”

Conclusion

The integration of Leca LWA at M25 Junction 28 has demonstrated the value of lightweight fill solutions in addressing complex geotechnical challenges. The material’s ease of placement, lightweight properties, and supply efficiency ensured that project milestones were met while maintaining structural integrity.

With a proven record on previous projects, Leca LWA continues to be a preferred choice for highway infrastructure improvements where load management is a key factor.

PROJECT INFORMATION

Project: M25 motorway

Main contractor:
GRAHAM CIVIL ENGINEERING

Delivery: Walking Floor

Leca product:
5,600m³ Leca LWA (10-20mm)

Interesting Fact:
Over 5,600m³ of Leca® LWA was placed around the precast culvert extension before earthworks and road formation.



Leca LWA was selected for its reduced weight, minimal water absorption and excellent drainage capacity

MODERN RIVERSIDE PARKING IN OŚWIĘCIM – CREATING ACCESSIBILITY IN THE CITY CENTRE

In June 2025, residents and visitors of Oświęcim gained access to a new, modern parking facility located along the Soła River boulevards. The investment, part of a broader revitalisation programme, combines functionality, comfort, and aesthetics to enhance the city's most popular recreational area.



Concept and Design Assumptions

The project was created to meet the growing demand for parking near the boulevards while maintaining harmony with the city's landscape. Architects focused on blending transport infrastructure with greenery and small architectural elements to create a cohesive and inviting space.

Functionality

The two-level facility offers 142 parking spaces, including spots for people with disabilities and electric vehicle charging stations. It also features bike racks, a service point, an elevator, and public restrooms. Built into the slope of Berka Joselewicza Street, the structure integrates seamlessly into the surroundings. Its green roof serves as terraces and outdoor seating areas for events.



The new two-storey parking facility offers 142 parking spaces, electric vehicle charging stations, safe zones for cyclists, complete with bike racks and a service point.



Innovative use of Leca LWA

The two-level facility offers 142 To form the sloped green terraces, light-weight Leca® LWA was used. This solution reduced structural load while providing excellent drainage and durability. Material deliveries were precisely scheduled and placed directly onto the roof using pump-equipped trucks, making installation quick and efficient.

Benefits for the city

The parking facility is a model of sustainable urban design – functional, visually appealing, and environmentally conscious. Thanks to this project, the Soła River boulevards have become an even more attractive destination for relaxation and recreation.

Leca LWA was pneumatically delivered directly onto the roof structure.

PROJECT INFORMATION

Project: Underground Parking Facility

Location: Oświęcim, Bulwary Street

Investor: City of Oświęcim

Contractor: Geotechnika Jerzy Rzeźniczak

Contractor: Building Enterprise Sp. z o.o.

Leca product: 2,280 m³ of Leca® LWA (8–20mm)



Soil replacement with Leca LWA to relieve and stabilise a subsided road embankment

WHEN THE EMBANKMENT GAVE WAY: STABILISATION WITH LECA[®] LIGHTWEIGHT AGGREGATE ON THE B 432 IN AHRENSBÖK

In the Ahrensböck area, the federal road B 432 showed clear signs of settlement – the load-bearing layers had subsided over time, and the course of the carriageway was no longer permanently stable. The cause lay within the embankment itself: insufficiently load-bearing subsoil and a lack of relief in the upper structure.

The decision was made to carry out a complete soil replacement in the affected section – with the aim of stabilising the embankment in the long term while simultaneously relieving the subsoil. The solution: lightweight construction with Leca LWA.



Leca LWA was enclosed in a geotextile

Soil replacement with Leca® LWA – efficient and relieving

Firstly, the existing embankment was excavated to a depth of around three metres. The new structure was then installed step by step in accordance with the “Guideline on the use of expanded clay as a lightweight construction material in earthworks for road construction”:

30 cm crushed stone base layer, enclosed in a combination grid, load distribution EP

3 layers of 60 cm Leca LWA each, enclosed in geotextile (fleece)

90 cm superstructure (frost protection + 26 cm asphalt)

The Leca LWA was installed layer by layer directly into the excavation, with appropriate compaction. The geotextiles served as separation and filter layers to prevent material mixing and settlement.

Technical benefits in focus

The use of Leca LWA significantly relieved the embankment body whilst maintaining high stability. The low bulk density of the material reduces stresses on the subsoil and effectively counteracts settlement issues. At the same time, Leca LWA provides the necessary load-bearing capacity for the layer structure in road construction.

The advantage for planning and execution: fast installation, easy on-site handling, and a clear system structure. The material could be processed directly in accordance with the regulations without elaborate special solutions.

Conclusion

The project demonstrates how, with a well-thought-out structure and the targeted use of Leca LWA, even critical infrastructure sections can be stabilised in the long term – economically proficient, technically sound, and compliant with regulations.

PROJECT INFORMATION

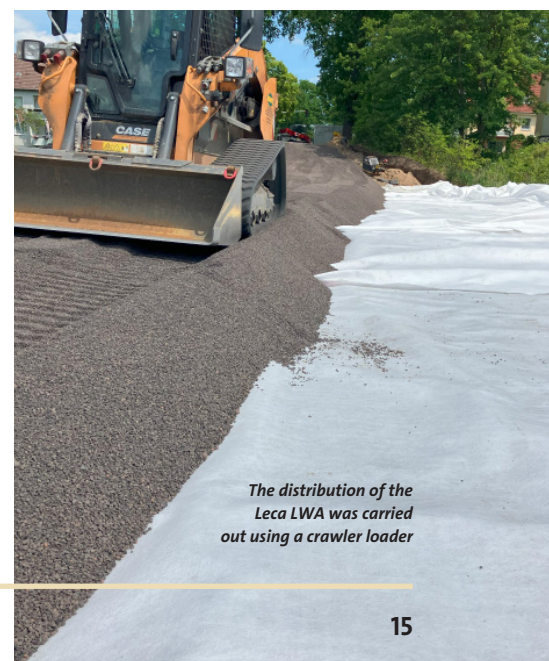
Project: Road renewal of federal road B 432

Location: Ahrensböök, Schleswig-Holstein

Client: State Road Construction and Transport Authority of Schleswig-Holstein

Contractor: STRABAG AG

Product: 3,460 m³ LECA® GEO 4–8 mm, crushed



The distribution of the Leca LWA was carried out using a crawler loader



LECA® LWA DELIVERS FROST PROTECTION FOR CRITICAL INFRASTRUCTURE IN HÅLOGALANDSVEIEN TUNNELS

Hålogalandsveien stands as one of Northern Norway's largest and most ambitious transport infrastructure projects, aiming to enhance regional connectivity and road safety. This public-private partnership (PPP) includes the construction of 82 km of new European highway, featuring 7 tunnels (27 km) and 22 bridges, all designed to endure the challenges of Norway's rugged terrain and harsh climate.

PROJECT INFORMATION

Project: OPS E10 Hålogalandsveien

Client: Skanska Norge & Hæhre Entreprenør

Location: E10 / Rv 85, Tjeldsund – Gullsfjordbotn – Langvassbukt, Norway

Construction period: 2023–2028

Blowing LWA for frost protection inside the Brattfjelltunnel



Project team on site in the Brattfjelltunnel, where LWA is used for frost protection and drainage

Leca's Contribution to Tunnel Engineering

Leca Norway played a key role in the project, supplying Leca® Lightweight Aggregate to several sections in collaboration with contractors Skanska and Hæhre.

The material was selected for its unique combination of thermal performance, lightweight structure, and drainage capacity, addressing several specific engineering challenges:

This solution contributes to:

- Frost insulation for water and sewer pipes
- Thermal protection around manholes
- Lightweight backfill in zones with low overburden tolerance
- Frost protection in tunnel portals and rock-cut excavations

Innovative Delivery in Challenging Environments

Inside the Gullsfjord Tunnel, Leca LWA was applied using a pneumatic "blowing" technique, allowing the

aggregate to be quickly and precisely placed around the pipelines within narrow trench spaces. This method proved highly efficient under the tight spatial constraints of tunnel work.

In the Brattfjell Tunnel, Leca LWA was delivered directly to Hæhre's site and used as insulation around both pipes and manholes. The combination of low density and thermal performance made Leca LWA an optimal solution for installations exposed to cold and variable underground conditions.

Benefits of Leca® Lightweight Aggregate in Tunnel Applications

Accelerated construction pace – ideal for high-momentum infrastructure projects

Natural and sustainable material – reusable and environmentally friendly

Superior frost protection and drainage – engineered for Nordic climates

Load reduction – less stress on pipes and structural elements in confined backfill areas

Conclusion

Leca's involvement in the Hålogalandsveien tunnels highlights the versatility and reliability of Leca LWA in complex infrastructure projects. Its performance in providing frost protection, reducing load, and accelerating workflow contributed significantly to meeting tight timelines and environmental conditions.

This project reinforces Leca's reputation as a trusted partner in geotechnical and structural engineering, delivering proven results across challenging northern landscapes.



Team effort Leca International, Hæhre Entreprenør and K. Simonsen AS working together on the Hålogalandsveien project



Aerial view of the construction site at Korja.

HIGHWAY 6 KORJA SECTION: EFFICIENT LOGISTICS AND LOWER EMISSIONS

Highway 6 was one of the main transport routes from Southeast and Eastern Finland to the Helsinki metropolitan area and the coastal ports. Destia renewed the ageing road bridge crossing the railway west of Kouvola, in the Korja area, where traffic had faced a significant bottleneck. The road was improved over a two-kilometre stretch on a new alignment to the west of the existing route.

Challenging ground conditions

The project proved particularly demanding due to the difficult ground conditions. It was carried out under a design–build–develop contract, in which Destia was responsible for both construction and design, as well as the development phase in cooperation with the Finnish Transport Infrastructure Agency. This model enabled Destia’s geotechnical engineers and the site team to select the most suitable solutions for the circumstances.

According to Site Manager Juho Kolehmainen, the project was exceptional in that a wide variety of ground reinforcement methods were used over a relatively short distance. In total, 6,000 m³ of soil had to be replaced, and 140,000 m³ of embankment material was brought in from outside the site. The structures included 7,600 m² of pile slabs, 30,000 metres of reinforced concrete piles, and 20,000 metres of column stabilisation.



Leca LWA layer 1.3–3.3 m, enclosed in geotextile.

Extensive Leca® lightweight fill structures

“As the bedrock lay deep, lightweight fills were required, and Leca® lightweight aggregate (LWA) was a natural choice of material. It was well-known on site and proved extremely cost-efficient,” Kolehmainen explained. The Kuusankoski factory of Leca Finland Oy was located nearby, which reduced transport costs and helped keep the project on schedule.

The project team also paid attention to CO₂ emissions from construction, and the use of Leca LWA reduced emissions compared with alternative solutions. The short transport distance further decreased the project’s carbon footprint.

“It was great that we were able to use Leca LWA made from domestic clay in such demanding infrastructure ground reinforcement,” Kolehmainen added.

The thickness of the Leca LWA fill, enclosed in a geotextile, varied between 1.3 and 3.3 metres, topped with crushed stone layers.



Leca LWA was compacted with a crawler excavator.

PROJECT INFORMATION

Project: Highway 6, Koria section
Location: Kouvola, Finland
Design–Build–Develop: Destia Oy
Leca product: Leca® LWA 4–32 mm

Carefully planned Leca® LWA deliveries

Deliveries of Leca LWA to the site began in early July and continued for four weeks. Logistics were carefully planned to ensure smooth operation alongside a busy road section.

“On most days, one truckload was enough. The load was spread while the truck returned for the next delivery,” Kolehmainen said.

Leca Finland’s infrastructure and landscaping specialist, Susanna Wallenius, supervised the deliveries on site and praised their efficiency. “Site safety and traffic flow were well thought through. Highway 6 was closed in both directions during the delivery, the truck reversed in, tipped its load, and the road was reopened immediately afterwards,” she noted.

On schedule towards completion

By late summer 2024, the bridge deck concreting was underway, the major embankments had been completed, and the Leca LWA fills were nearly finished.

“We preloaded the structures over the winter, and the remaining fills were completed in spring 2025,” Kolehmainen said.

In total, around 7,000 m³ of Leca LWA was installed as lightweight fill. The entire project was scheduled for completion during the summer of 2025.



E45 EXPANSION: BUILDING THE HIGHWAY OF THE FUTURE — THE LIGHT WAY

Along Denmark's main north–south transport corridor, the Danish Road Directorate is expanding the E45 motorway from four to six lanes. The section between the cities of Vejle and Skanderborg is one of the country's largest infrastructure projects — and on a six-kilometre stretch between Vestvejen and Silkeborgvej, Leca® lightweight aggregate (LWA) plays a key role in the construction.

Efficient infrastructure for the future

The project includes widening the carriageways, constructing six new structures and installing noise barriers. The goal is clear: to reduce congestion, improve traffic safety and enhance accessibility on one of Denmark's most important transport routes. When completed in 2025, the upgraded motorway will ensure shorter travel times and smoother journeys for both freight and private traffic.

The engineer's choice: Leca® LWA

As lead consultant for the Danish Road Directorate, Ramboll designed the project and deliberately chose to include Leca® lightweight aggregate in the road structure.

"Leca® lightweight aggregate was selected for two reasons," explains Mads Valentin Jensen, Engineer at Ramboll.

"Firstly, parts of the route contain soft soil layers where replacement would not be cost-effective. By using lightweight fill, we can reduce the load and keep settlements manageable — without waiting years for preloading. Secondly, lighter backfill reduces earth pressure behind retaining walls, allowing for shorter sheet piles, fewer ground anchors and less steel — without compromising on stability or safety."

Lighter build — Stronger result

By using 3,780 m³ of Leca® lightweight aggregate, the project achieves a more efficient and economical construction process. The result is a durable, future-proof road structure that combines technical performance with sustainable material use — supporting the overall goal of building tomorrow's motorway in a smarter, lighter way.



Delivery of Leca® lightweight aggregate for the E45 expansion. The material arrives ready for placement, ensuring an efficient construction process.



Leca® lightweight aggregate being placed on the E45 motorway — reducing load and earth pressure in the road structure.

Part of a larger vision

The stretch between Vestvejen and Silkeborgvej is one of several stages in the ongoing expansion of the E45, strengthening the connection along the Jutland peninsula from north to south. Leca is proud to contribute to the Danish Road Directorate's vision of a more efficient and sustainable infrastructure — for today and for the generations to come.

PROJECT INFORMATION

Project: E45, Highway

Client: Danish Road Directorate

Consulting: Ramboll

Contractor: MT Højgaard

Leca product: 3,780 m³ of Leca® LWA

IVÁN ARBÓS SEGURA AND FÉLIX MARTÍNEZ RODRÍGUEZ



Interview with Civil Engineer Iván Arbós Segura (Quality, Environmental Management and R&D&I Technician for the Eastern Region at FCC Construcción) and Mining Engineer Félix Martínez Rodríguez (Head of the Works Department and director of the FCC Construcción team dedicated to public works for Barcelona City Council).

FCC Construcción is an international company with 125 years of experience in designing and building civil engineering and residential and non-residential projects. It is strongly positioned in transport, health and sports infrastructure and is a pioneer in innovative solutions that reduce the environmental impact of construction. Its commitment to sustainability dates back to its origins, and more than 25 years ago it created the Sustainability and Innovation Department, where civil engineer Iván Arbós currently works. We discussed some recent projects in which Arlita® has been used as a versatile and efficient solution for reducing environmental impact, joined by Félix Martínez, mining engineer and head of the Urban Works Department.

Iván Arbós has extensive experience in the Sustainability and Innovation Department and oversees quality and environmental supervision in all processes, works and projects in the company's Eastern Zone (Catalonia, Aragon, Valencia, Murcia and the Balearic Islands). We asked him about his role and the main strategies being implemented to meet the 2050 sustainability targets guiding current processes at FCC Construcción.

Iván Arbós: My career at FCC Construcción began in 2001 and has spanned my entire professional life. I first carried out quality and environmental duties as a site technician and later became site manager. My main expertise is civil engineering, especially road, structure and tunnel projects. Since 2016, I have managed the Quality and Environment Department for the entire eastern region of Spain.

My responsibilities also include implementing advances from R&D&I projects and training colleagues, so



staying up to date with improvements in environmental management is essential. FCC Construcción applies the highest standards of responsible environmental impact management, with work focused on circular economy, waste management and reducing water stress and carbon footprint. The introduction of lightweight aggregates such as Arlita® has opened a valuable field of analysis and research, enabling initiatives of great relevance for our works, studies and the company's Innovation Department.

How does FCC Construcción ensure that sustainability is present in every phase of the project, from the selection of materials to the design, construction and execution processes?

Iván Arbós: FCC Construcción is an international company with a strong leadership position in infrastructure design and construction. I work in the environment department under the Sustainability and Innovation Directorate, which manages all environmental aspects. Over the last 25 years, we have developed protocols to regulate environmental impact and are pioneers in sustainability processes.

We were the first Spanish construction company to have our GHG emissions report certified by AENOR, and since 2012 we have held the 'Medio Ambiente CO2 verificado' carbon footprint certificate. This year we also published our first water footprint report, a milestone in Spain. Our sustainability strategy includes short-, medium- and long-term objectives based on environmental, social and governance principles.

And in the specific case of construction projects, what control systems are used to measure the impact and carbon footprint of projects?

Iván Arbós: All projects follow a strict, top-level quality control and environmental impact system, with special emphasis on carbon footprint. Several aspects are recorded—waste management, energy consumption, materials, distances, transport and origins. This data is collected monthly and reported every four months to calculate the company's overall footprint. Greenhouse gas emissions are calculated by multiplying this activity data by GHG emission factors from official sources (MITERD, DEFRA and others), updated centrally.

In waste management, reduction targets are set on construction sites and recovery is promoted in all types of work. This is especially evident in building projects with BREEAM, LEED or VERDE labels, which progressively achieve better ratings for our customers.

How have circular economy processes affected civil engineering works? Has greater efficiency been achieved in the use of resources, waste minimisation and material reuse?

Iván Arbós: There is growing awareness of the environmental impact of the construction sector, especially in processes linked to the circular economy. In recent years, several strategies have been adopted to control this impact, particularly in waste management. One example is Order APM 1007/2017, which established the framework for recovering excavated natural materials. This regulation, along with the drive toward sustainability, has virtually eliminated the use of construction landfills for stone and similar materials, promoting the recovery of surplus materials through reuse, recycling and reintroduction into the production cycle.

This approach also influences projects from their initial stages, as tender specifications and research departments increasingly prioritise optimising waste management, reducing emissions and quantifying the impact of materials, with the aim of proposing projects with longer life cycles and greater energy efficiency.

FCC Construcción has also set specific sustainability targets: achieving 90% recovery of land and implementing Zero Waste in all construction projects by 2026, and by 2050 recovering 100% of generated waste and using 90% responsible, recycled or recyclable materials.

The recently completed Santander Street Bridge project in Barcelona was an initiative by Barcelona City Council to renovate infrastructure that had become inadequate for current traffic flows and did not cater for pedestrians or cyclists. Improving mobility in this area had been a recurring demand from local residents, as it is a very important connection point between the Sant Andreu neighbourhood and the Sant Martí district, historically separated by the railway tracks.

Félix Martínez Rodríguez, Head of the Urban Works Department and director of the team responsible for carrying out public works for Barcelona City Council, explains the importance of introducing innovative solutions such as Arlita® in urban projects such as the Santander Street Bridge, where we are now.

Félix Martínez: This project has significant social impact, as it not only improves the road for vehicles but also adds two bicycle lanes and a wide pedestrian pavement. The technical design department decided to attach two side walkways to

Continued on next page



the original structure, using the existing reinforced concrete supports to widen and lengthen the bridge and adapt the slope to pedestrian regulations. This solution greatly reduced stone waste by avoiding major demolition, but presented structural challenges due to the geotechnical complexity of the terrain in Barcelona, requiring a retaining wall for the filling and road widening.

The proposal was optimised by using Arlita® as filling material in an embankment reinforced with geogrid, which acted as strapping. For lateral containment, instead of conventional MSE walls, structural elements with an aesthetic similar to gabions were used, acting as concrete scales similar to retaining faces in traditional reinforced earth systems.

This innovative solution was possible thanks to technical collaboration with the Arlita® team and incorporated several impact-reduction measures mentioned by Iván, such as ease of installation, low water requirements and transport efficiency due to the material's low weight, contributing to a significant reduction in carbon footprint during execution.

How do innovative materials such as Arlita® contribute to achieving the company's environmental and operational sustainability goals, especially in urban-scale infrastructure projects?

Iván Arbós: The use of Arlita® has a direct impact on reducing emissions due to its efficiency in transport and application on site. As it is an inert material and performs well in terms of water absorption, its use helps to reduce the water footprint of construction. Furthermore, it can be easily reintegrated into the proj-

ect cycle, avoiding the generation of waste in the event of excess or revisions, and facilitates reuse and recycling, as it is a material with high recovery potential. The installation process, which in this case involved dumping, facilitated access, which is generally very complex in urban construction sites, and thus also allowed us to optimise the planned times.

In the Via Laietana renovation project, an intervention in the heart of Barcelona, the project is designed to prioritise pedestrian traffic and sustainable mobility. In this particular experience, with such a marked impact on urban life, how has the use of Arlita® helped with the execution? In what way?

Iván Arbós: In the renovation of Via Laietana (Barcelona), one of the main challenges of the project was the coexistence of the works in a very significant and historic spot for the city. It is an area close to all the attractions of Barcelona's old town and with high traffic. Therefore, work was carried out in phases to maintain the flow of traffic and minimise the impact on road use. In terms of the environmental integration of the project, the impact on pedestrians has been reduced compared to the initial forecast by using materials that allow for more efficient procedures. In this case, Arlita® was pumped into the existing service tunnels, which made the work more efficient compared to other types of procedures, such as manual dumping, which would have required more working days.

Félix Martínez: This was a challenging urban project due to the amount of pre-existing heritage features underground, including old sewers and water pipes, as well as electricity, telephone and communications connections. All this made

the intervention complex, requiring versatile solutions that could be applied quickly and with little impact. Arlita® was used to protect the underground connections during the widening of the pavements and roadway. The use of Arlita® provided benefits on two levels: firstly, its easy application using the pumping method, which is a convenient and efficient way to apply the product in areas that are difficult to access, such as the historic centre of Barcelona; and secondly, protecting these old infrastructures and allowing the work to be carried out without generating additional thrust. This was particularly relevant in the case of neighbouring structures, such as the underground tunnel, where the reduction in thrust due to the low density of the material made it possible to optimise the construction process.

In my experience, Arlita® has always been used to lighten loads, precisely because of its low density. As a filling material, it is a highly efficient and technologically innovative solution.

Finally, we are very interested in knowing your perception of the future in terms of the technical possibilities of new materials, lightweight aggregates, etc. in the implementation of sustainability principles in the construction sector. What are the main challenges and opportunities when it comes to integrating sustainable solutions while maintaining technical and economic viability?

Iván Arbós: The opportunities to lead this transformation are high, as there is still room for improvement on the progress made over the last ten years. Our sector has always been in the spotlight for its environmental impact, but we have made great strides in modifying and adapting processes. Not only are



the results in waste recovery tangible, but we have also managed to reduce emissions, reuse materials and decrease water and energy consumption. The use of low-carbon materials has had a positive impact in these areas. The value chain has seen significant reductions in emissions thanks to these materials. We have implemented strict controls on water use and are working to improve emissions with strategic targets for 2026 and, in the medium term, for 2050.

For all these reasons, we believe that there is still a long way to go in the challenge of decarbonisation, but also that we are moving in the right direction: the two projects mentioned above are examples of how to combine technical difficulty with efficient environmental management, improving on the original technical solutions.

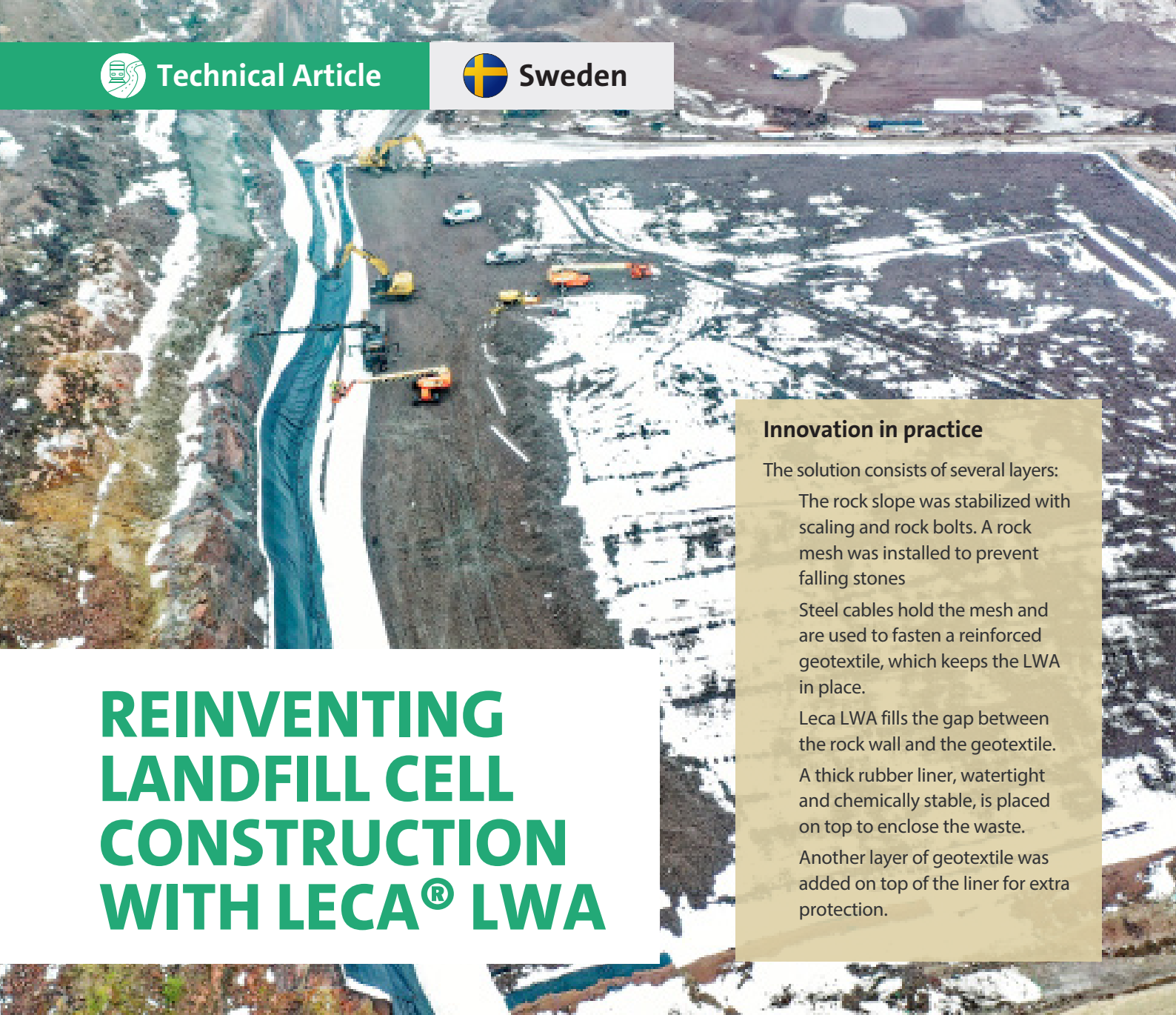


People in the picture from left to right. Teresa Hernández Argany, Félix Martínez Rodríguez and Iván Arbós Segura

Interview conducted by Mónica Cruz Guáqueta, architect, for Leca.

Date: 08/05/2025





REINVENTING LANDFILL CELL CONSTRUCTION WITH LECA® LWA

Innovation in practice

The solution consists of several layers:

The rock slope was stabilized with scaling and rock bolts. A rock mesh was installed to prevent falling stones

Steel cables hold the mesh and are used to fasten a reinforced geotextile, which keeps the LWA in place.

Leca LWA fills the gap between the rock wall and the geotextile.

A thick rubber liner, watertight and chemically stable, is placed on top to enclose the waste.

Another layer of geotextile was added on top of the liner for extra protection.

Overview of the Häradsudden site, where the containment system is being built along the rock wall.

Skanska has been quarrying rock at Häradsudden for many years. Now, Ragn-Sells has taken over the site and is repurposing the pit to build a new hazardous waste landfill. The new use of the land places strict environmental demands on the containment system. A tailor-made solution with Leca lightweight aggregate (LWA) not only provided stability, but also reduced CO₂ emissions and increased the landfill cell's volume.

Ragn-Sells' new hazardous waste landfill was inaugurated in May 2024. When constructing such a facility, it is essential to protect the surrounding nature and waterways so that the waste can remain underground without impacting the environment. A

dense, long-term, and sustainable solution is crucial—often achieved with concrete. But the construction now in place is entirely new, developed specifically for this project—and built without concrete.

So far: Carbon Dioxide Reduction of 1,500 Tons

Blasting rock to extract stone is not done gently. The blasting leaves the rock face with loose blocks, sharp edges, and irregular surfaces. Before construction began, Rikard Gothäll from Firma Terra was brought in to assess the safety of the rock wall.

“We came in to ensure that the rock face was safe to work next to. I asked Ragn-Sells what they planned to build, and they said a concrete wall around the landfill. That sounded expensive. So, we started exploring alternatives to eliminate the need for



concrete,” says Rikard.

Hazardous waste in a landfill must be enclosed in a thick membrane, in this case a rubber liner. If the liner rests directly against the jagged rock, it risks tearing. Concrete was initially considered to create a smooth layer between the rock and the liner. But Rikard’s knowledge of lightweight aggregate opened up another possibility.

“I had used lightweight aggregate before to fill around buildings, so I knew the material well. Here, there was no building to fill against, which was a new challenge. But thanks to great collaboration, we developed a solution where we could remove the concrete entirely and instead use LWA as fill against the rock.”

The creative solution paid off: eliminating concrete reduced CO₂ emissions by 1,500 tons.

Leca LWA was pneumatically blown directly into the gap. Once in place, it filled the space, following the contours of the rock, remained stable, and created a smooth surface—so the rubber liner was no longer at risk of tearing.

“When we filled behind the structure with the LWA, the result was like a huge beanbag against the rock! No sharp edges—it was completely smooth. Like a big bag, but six meters high and reinforced,” says



Completed section of the containment structure along the former quarry, ready for the next stage.

Rikard.

Using Leca LWA also reduced the amount of fill material needed. A concrete layer would have required a three-meter thickness at the base and up to six meters at the top. With the Leca solution, the liner could be anchored closer to the rock wall - creating 15% more volume in the landfill cell than originally planned.

A lightweight solution built to last

The lightweight aggregate structure currently rises six meters up the rock wall. The landfill will be filled gradually. Once the waste reaches six meters, another six meters of containment structure will be added, continuing until the cell is full.

“We considered using sand instead. It might have been cheaper, but because sand is heavier, we could only have built one meter at a time. That would mean alternating layers of waste and sand, meter by meter. Since Leca LWA is lighter, we could build six meters at once, which made the process far more efficient,” Rikard explains

Companies willing to innovate together

The containment system was completely custom-designed and made possible by bold clients, innovative contractors, and strong collaboration.

“This was a unique type of construction, but Ragn-Sells was an exceptionally brave client, willing to think outside the box. Their focus on sustainability was very clear.”

The companies involved included Firma Terra, responsible for rock stabilization and securing the structure; Gnesta Bergbyggare AB as contractor; and Structor, who designed the containment system. Rikard highlights the teamwork as a key success factor:

“Most collaborations work well, but this was something special. The contractor was fantastic at getting things done and making sure everything was right. When you do something no one has done before, you need the right people around you—and we had that on this project.”



Leca® LWA tightly packed and safeguarded within the engineered liner system.

PROJECT INFORMATION

Project: Rock quarry converted into hazardous waste landfill

Client: Ragn-Sells

Companies involved: Structor, Firma Terra, Gnesta Bergbyggare AB

Location: Häradsudden, Norrköping

Leca product: Leca Infra 10/20

Delivery: Pneumatic blowing



LECA® LIGHTWEIGHT AGGREGATE IN STORMWATER MANAGEMENT



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Heidi Vilminko
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Sustainable stormwater management is a key element of responsible construction, both in existing urban areas and on construction sites. Leca lightweight aggregate (LWA) solutions are suitable for both.

Stormwater management – reducing volume and improving quality

Flooding, climate change and ageing infrastructure are drawing increasing attention to stormwater management in the built environment. Requirements now extend beyond drainage and conveyance to also improving water quality and reducing environmental loads.

An effective stormwater solution makes use of natural mechanisms in multiple ways (Table 1). The volume and flow of stormwater can be managed through infiltration, filtration and detention. Leca LWA is particularly suitable for infiltration and filtration structures. In addition to quantitative control, these solutions achieve very high purification results.

Mechanism	Example principle
Stormwater filtration	Stormwater volumes are reduced by infiltration into the soil or a separate infiltration structure. At the same time, suspended solids are retained in surface layers of the soil.
Mechanism	Stormwater is detained and treated by directing it through a filter medium such as Leca LWA. The properties of the filter medium can be tailored to improve performance, for example using Filtralite products.
Stormwater detention	Flow is reduced by storing water in a basin or channel. The reduced flow allows solids to settle to the bottom. Detention can be achieved with a flow control manhole, culvert pipe or filter dam.

Case examples from Finland

Practical experience from across Finland demonstrates the effectiveness of Leca LWA-based stormwater management. Typical applications include biofiltration basins, filter dams and filter wells. Laboratory tests have confirmed high performance. Filtration trials using Leca LWA and Filtralite® filter media products have achieved over 90% removal of suspended solids, phosphorus and metals from stormwater.

Bioretention basin in Hennala, Lahti

In Hennala, Lahti, stormwater is treated with a system consisting of a sedimentation basin, biofiltration area, wetland pond and connecting ditches. Leca LWA and phosphorus-binding Filtralite® P are used as filter media in the biofiltration structure. The system plays a major role in reducing pollutant loads, as it treats stormwater from Lahti city centre. Its performance is monitored regularly through water sampling. The system has been shown to significantly improve water quality, producing outflow cleaner than the receiving Porvoonjoki river.



Leca LWA placed in the dam core, easy to replace.

Wetland in Ryydynpohja, Tampere

In Tampere's Ryydynpohja wetland, a filter dam was constructed using Filtralite® NR 10–20 to improve purification efficiency. The design objective was a filter solution where the medium could be replaced without dismantling the structure. The dam was built from gabion baskets filled with the filter medium. Filtralite® NR 10–20 was selected for its large particle size (8–20 mm) and ease of handling. The filter medium can be removed by vacuum truck after lifting off cover panels and replaced with new material.

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Stormwater filter dam in Nikkilä, Lahti

A similar filter dam was completed in summer 2025 in Ala-Nikkilä, Lahti. The filter medium, Filtralite® NR 10–20, is installed within a gabion frame partially covered with concrete matting to prevent slope erosion. The structure is topped with profiled sheet metal.

The full system in Nikkilä consists of a pretreatment basin, wetland pond and filtration basin. Stormwater from a busy commercial and traffic area is treated through this chain before entering a local urban stream. The staged treatment improves retention of pollutants, slows down flows and simplifies maintenance. Over time, the structure will blend into the surrounding meadow landscape.



Completed dam filters water before discharge.

Stormwater management on construction sites

Stormwater generated on construction sites is increasingly recognised as an essential element of sustainable building practice. Requirements for site water treatment have tightened in recent years, and the largest Finnish cities demand concrete actions.

Unlike permanent systems in built areas, site solutions are often temporary and adapted to project schedules and site conditions. This creates opportunities for new solutions but requires proactive planning by designers and contractors. Solutions are expected to be mobile, cost-efficient and scalable to different site sizes.

The main goal on construction sites is stormwater treatment. The filtration properties of Leca LWA support this effectively. In addition, the light weight, uniform quality, easy installation and versatility of Leca LWA products enable both temporary and permanent applications.

Treatment methods used on sites often include filter dams and containerised treatment units. On small sites, a treatment container may be sufficient. Larger sites typically require a chain of methods combining detention and filtration.

Filter chamber in Kerava

In 2024, a filter chamber was installed in Kerava using Filtralite® P as the filter medium. Research carried out in autumn 2024 showed that the structure removed up to 96% of suspended solids from stormwater. The efficiency was particularly high under heavy load conditions. This solution now continues to treat water from the completed urban area.



Filter dam integrated into a wider treatment chain.



In Nikkilä, the filter dam completes treatment.



Filter chamber combines sedimentation and Filtralite P filtration.

Conclusion

These examples demonstrate that stormwater management solutions based on Leca LWA are effective and widely applicable across different environments. The case studies represent diverse land uses, from construction sites to busy transport corridors and urban or industrial areas, where efficient conveyance and pollutant load reduction are required.

Field experience confirms that Leca LWA performs reliably under varied climate conditions. Climate change adaptation is driving demand for innovative and sustainable stormwater solutions across Europe. Stormwater management contributes to both sustainable development and the objectives of the EU Water Framework Directive.

Laboratory and field results show that Leca LWA offers multiple advantages for water management. Its light weight, easy handling, consistent quality and recyclability support scalable solutions for projects of all sizes.



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