Ranking Leca Projects:
Overcoming Challenges in Hard-to-Reach Geotechnical Areas

Leca®
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Overcoming the Toughest Geotechnical Challenges with Leca LWA!

At Leca, we thrive where others hesitate! Our lightweight expanded clay aggregate (LWA) has been the game-changer in some of the most difficult-to-reach geotechnical areas—and now, we're revealing our top-ranked projects

Using our exclusive scoring system, we've ranked projects based on geotechnical difficulty, showcasing the sites where Leca® LWA has made the impossible possible.

From unstable ground to remote locations, these projects highlight our commitment to innovation, resilience, and engineering excellence.
But what makes it all possible? Our flexible and efficient delivery methods including our unique pneumatic delivery system.

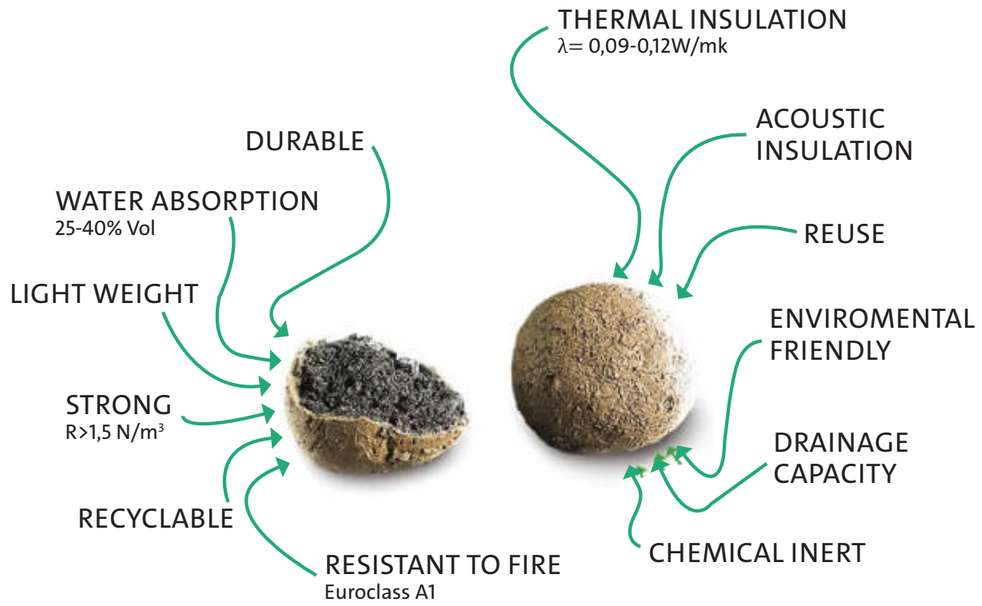
BLOWING VEHICLE – Up to 55m³ per delivery

We ensure that Leca® LWA reaches even the most challenging sites with multiple transport options:

WALKING FLOOR – Up to 70m³ per delivery
8 WHEEL RIGID – Up to 25-30m³ per delivery
ARTIC TIPPER – Up to 40-55 m³ per delivery
BLOWING VEHICLE – Up to 55m³ per delivery
CURTAIN SIDED VEHICLE – 50L Bags & 2.2m³ Bulk Bags
FLATBED WITH CRANE OFFLOAD – For 50L Bags & Bulk Bags

Overview

- **Stability** – reduces the risk of embankment landslide and deformation
- **Reduced settlements** - less damage to road structures, rail beds, pipelines and other structures
- **Reduced earth pressure** - in structural backfill against foundations, retaining walls and bridge abutments
- **Drainage** - on sports grounds, fields, slopes and roads
- **Insulation** - protection for roads surface, structure, pipelines and service mains
- **Frost stability** - in road and rail beds
- **Limited compaction** – Exerted energy during compaction is minimal with a reduction in volume of approximately 10 - 12%.
- **Low density** and ease of handling, coupled with consistent high quality, make Leca® LWA a highly competitive alternative to other lightweight materials



LIVERPOOL ALBERT DOCK – GREEN PLANTERS (DIFFICULTY RATING: 6/10)

LECA® LWA Enhances Garden Planters at Iconic Liverpool Development on the historic shores of the Albert Dock

Leca® Lightweight Aggregate (LWA) was specified for garden planters at the entrance of a new apartment development in Liverpool, located near the world-famous Albert Dock. The project aimed to create an attractive, vibrant entrance featuring colorful horticultural elements to enhance the visual appeal for residents and visitors alike.

Lightweight, Practical Solution

Developed by the Vermont Group, the planters were designed to complement the modern aesthetic of the apartment complex while addressing the practical challenges posed by their construction. Leca® LWA, being only one-seventh the density of traditional crushed fill and significantly freer-draining than soil, provided an ideal lightweight substitute. This reduced the overall load on the structure and simplified handling during installation, making it a preferred solution for the project.

Overcoming Restricted Access

With over 60m³ of Leca® LWA required for the planters, the project faced logistical challenges due to limited site access. To overcome this, the material was pneumatically delivered using a Leca delivery truck, which allowed efficient and precise placement over just a few hours. This method proved essential given the varying depths of the planters, some reaching as deep as 15 feet. The flexible pneumatic piping ensured the lightweight aggregate was distributed evenly and quickly, minimizing disruption and delays.

Benefits of LECA® LWA as a Growing Medium

Leca® LWA was chosen not only for its lightweight properties but also for its effectiveness as a growing medium. Its ability to retain between 70-80% of rainfall—and up to 25% during the winter months—makes it highly water-efficient and reduces the maintenance burden for the Vermont team. Additionally, its excellent drainage and moisture retention create optimal conditions for the selected plants, ensuring healthy growth and longevity.

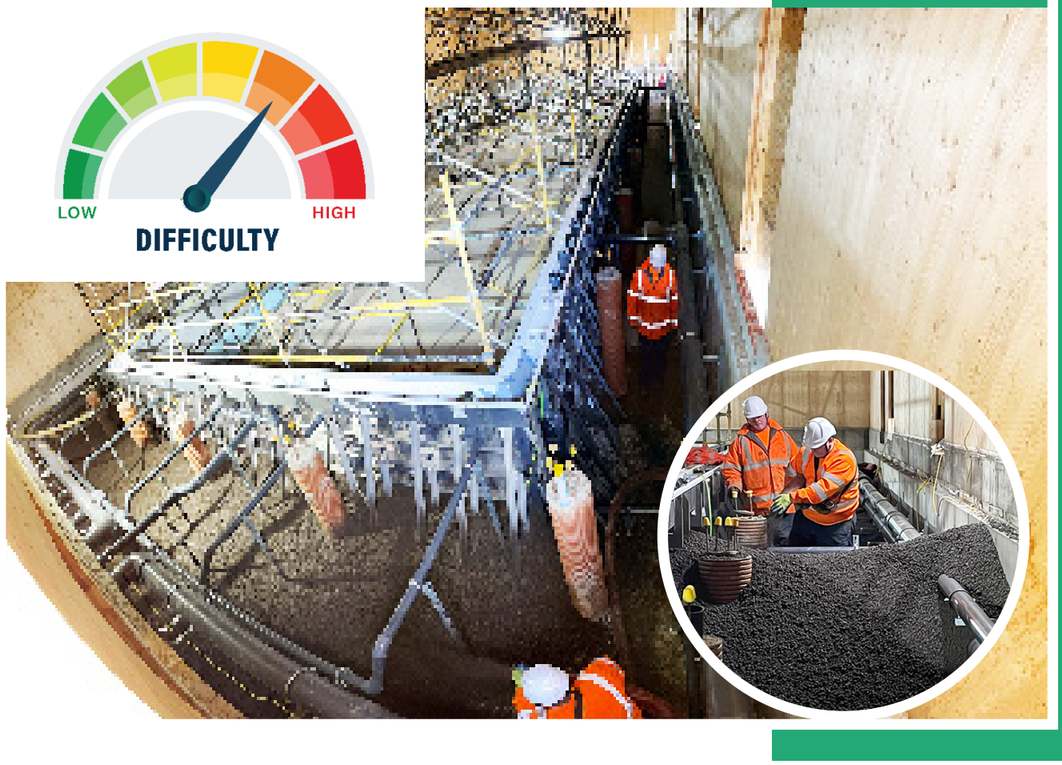
By integrating Leca® LWA into the planters, the development achieved both aesthetic and practical objectives, resulting in a stunning entrance that aligns with the high standards of this iconic Liverpool location.

Project information

Amount of material: 60m3 of LECA® LWA (10-20mm)

Interesting Fact: The differing depths of the planters which at its deepest reached depths of 15 feet meant that the pneumatic delivery provided through the agile pneumatic delivery piping proved to be the most effective solution.

Delivery Method: Pneumatic Delivery



PASSIVHAUS HIGH SCHOOL SWIMMING POOL (DIFFICULTY RATING: 7/10)

Leca® Lightweight Fill Powers Scotland's First Passivhaus Secondary School with Swimming Pool

Leca® Lightweight Aggregate (LWA) 10-20mm was recently specified for the swimming pool complex at Currie Community High School, part of the Scottish Government's Learning Estate Investment Programme.

Completed in Spring 2025, this development was Scotland's first Passivhaus secondary school with a swimming pool, combining energy efficiency with superior comfort.

Lightweight Solution for Complex Engineering Challenges

The school's swimming pool required a lightweight and effective solution for filling the voids around its perimeter. Leca® LWA was chosen for its natural lightweight properties, which reduce the load acting on the structure by at least 75% compared to traditional fill materials like Type 1 or GSB fill. This substantial weight reduction mitigates the risk of structural issues such as sliding, tilting, or bearing failures, making it a safer and more reliable choice for the project.

Additionally, the reduced weight minimized stress on the swimming pool's filtration pipework, ensuring long-term durability while aligning with the Passivhaus design goals.

Efficient Pneumatic Delivery

The limited access to the construction site posed logistical challenges that were efficiently addressed with Leca® LWA's pneumatic delivery system. Material was transported to the site on walking floor vehicles and stockpiled in a nearby car park, enabling quick refilling of the pneumatic delivery trucks.

A piping system, extending up to 50 meters, delivered the material through a single access point with precision. This method allowed for rapid placement, reduced manpower requirements, and minimized site disruption, offering a time- and cost-effective solution for the project.

Supporting Passivhaus Standards

As a key component of the new school's Passivhaus design, Leca® LWA contributed to the sustainability and energy efficiency of the development. Its lightweight nature complements the project's focus on reducing embodied energy and material use, aligning with the stringent requirements of Passivhaus certification.

By combining innovative engineering with a commitment to sustainability, Leca® LWA played a vital role in bringing Scotland's first Passivhaus secondary school with a swimming pool closer to reality. This project highlights how Leca® LWA can overcome complex construction challenges while supporting the broader goals of energy-efficient and environmentally conscious design.

Project information

Amount of material: 700m3 of Leca® 10-20mm

Interesting Fact: The new school is aiming to be the first Passivhaus Secondary School with a swimming pool in Scotland.

Delivery Method: Pneumatic Delivery

DERBY RAIL STATION PLATFORM DEVELOPMENT (DIFFICULTY RATING: 8/10)

Transforming Derby Station: The Role of LECA® Lightweight Aggregate in the £200M Midland Main Line Upgrade for Enhanced Rail Infrastructure and Future Electrification

On Sunday, 22 July 2018, Derby station underwent an ambitious 11-week partial closure as part of the £200 million Midland Main Line Upgrade. This major infrastructure project, operating 24/7, included the replacement of over 2km of track, the installation of 11 new sets of points, the construction of a new platform, and the demolition of existing platforms. The primary goal was to reduce journey times, improve rail performance, increase line speed, and segregate services for operational efficiency. Additionally, the upgrade prepared the station for potential future electrification.

Engineering Objectives and Achievements

The reconfiguration of track and signalling within Derby station and its surrounding area aimed to simplify and modernize the rail network. By delivering a more efficient and reliable layout, the project significantly enhanced capacity and ensured compliance with modern standards. The work also enabled better infrastructure adaptability, providing a foundation for future technological upgrades.

Project information

Amount of material: 1700m3

Interesting Fact: Lightweight fill was used behind the riser walls in order to reduce loads applied.

Delivery Method: Pneumatic Delivery

Main Contractor: Galliford Try Infrastructure

Leca® LWA was selected as a critical material for its lightweight properties and ease of installation. Leca® LWA was used behind riser walls to reduce loads applied to the platform structures, ensuring stability and longevity. Additionally, the lightweight fill material was applied in areas requiring small foundations to support electrical cabinets on the platforms, with the cabinets themselves placed directly on the Leca® LWA.

Efficient Material Delivery and Installation

A total of over 1,700m³ of Leca® LWA was delivered to the site and installed using pneumatic blowing technology. This method was essential due to the limited access points and the operational constraints of maintaining partial station functionality during the project. The pneumatic system enabled material to be delivered and installed from a distance of up to 70 meters, ensuring rapid and precise placement. This efficiency minimized disruption and allowed the team to meet the demanding project schedule.

Civil Engineering Benefits of LECA® LWA

- **Load Reduction**: The lightweight properties of Leca® LWA reduced the applied load on platform riser walls and small foundations, minimizing the risk of structural failure.
- **Ease of Installation**: The material's flowability and ability to be pneumatically delivered made it ideal for use in tight, inaccessible areas, saving time and labor.
- **Speed and Accessibility:** The pneumatic delivery system allowed for quick material placement, which was crucial in a high-pressure project with limited access and time constraints.
- **Adaptability for Electrical Infrastructure:** Leca® LWA provided a stable base for electrical cabinets, addressing the specific requirements of modern rail infrastructure.

Conclusion

The use of Leca® LWA in the Derby station upgrade demonstrates its value as a versatile and efficient material for challenging rail infrastructure projects. By addressing load challenges, improving installation efficiency, and supporting future adaptability, Leca® LWA contributed significantly to the successful delivery of this complex civil engineering endeavor. This project highlights the importance of innovative materials and methods in modern rail infrastructure development.

RETAINING WALL DEVELOPMENT MANCHESTER (DIFFICULTY RATING: 8/10)

Innovative Use of LECA® Lightweight Fill for Retaining Wall Development: Enhancing Slope Stability, Flood Prevention, and Sustainable Water Management in Manchester's Residential Area

Leca® Lightweight Fill was specified for a retaining wall project in Manchester, addressing both structural and water management challenges. This innovative solution was chosen for its ability to reduce vertical pressure, enhance slope stability, and effectively manage water runoff, offering a sustainable and efficient design for the development.

Engineering Objectives

The primary purpose of the retaining wall was to provide robust support for a steep embankment in a residential area, mitigating the risk of landslides and ensuring long-term structural integrity. The inclusion of Leca® Lightweight Fill enabled the wall to handle vertical loads while simultaneously acting as a flood prevention measure.

Leca® Lightweight Fill's highly porous structure and inter-grain voids provided a unique advantage in managing water runoff through the principle of water detention. This property allows the material to delay and regulate water flow, reducing the peak intensity of runoff during and after heavy storms. By detaining water and releasing it gradually, the risk of flooding was significantly minimized, ensuring the safety of the surrounding area during severe weather events.

Challenges on a Steep Embankment

The steep embankment in this residential location presented unique challenges, including access restrictions that made the use of conventional materials impractical. The engineers required a material that could not only perform under these conditions but also be delivered efficiently without disrupting the local community. Leca® Lightweight Fill met these requirements, offering a lightweight and versatile solution.

Efficient Pneumatic Delivery

Due to the site's steep incline and limited access points, the material was pneumatically delivered using LECA's advanced delivery truck. This allowed the material to be blown into place through a 5" hose at a rate of 1m³ per minute over a distance of up to 50 meters. This precise delivery method reduced the need for additional handling equipment and minimized manpower requirements, offering significant time savings for the project.

Project information

Amount of material: 48m3 of Leca ®LWA (10-20mm)

Interesting Fact: This project was developed to provide robust support for a new retaining wall, reducing vertical pressure in the area, whilst providing an effective water management system

DRAINAGE SOLUTION FOR A STEEP EMBANKMENT (DIFFICULTY RATING: 8/10)

LECA® LWA: A Lightweight Drainage Solution for Steep Embankment Remediation in Newport

LECA recently partnered with WSP and Alun Griffiths Contractors to deliver a lightweight and effective drainage solution for the remediation of a steep embankment alongside the A4042 in Newport, Wales. This challenging project, commissioned by the South Wales Government, required innovative engineering to overcome limited site access, heavy traffic, and a delicate underground drainage system.

Engineering Challenges and Objectives

The steep embankment, adjacent to the busy A4042 highway, presented several engineering challenges:

1. **Access Limitations**: Due to the busy highway, stockpiling materials on-site was impossible, necessitating a delivery system that could overcome logistical constraints.
2. **Delicate Infrastructure**: The underground filter drain system, with 225mm piping, required lightweight backfill to avoid excessive weight and potential damage.
3. **Steep Terrain:** Material needed to be delivered to a high tier of the embankment, requiring a delivery method that could achieve precise placement.

Leca® Lightweight Aggregate (LWA) was selected for its lightweight properties, ease of installation, and ability to provide effective drainage and structural support.

Pneumatic Delivery for Efficient Placement

Leca® LWA was pneumatically delivered to the site, a method that proved essential for this project. The pneumatic delivery system could reach distances of up to 50m, enabling the material to be precisely blown to the higher tiers of the embankment. This eliminated the need for stockpiling and reduced disruption to traffic.

The single-lane closure, limited to off-peak hours between 9:30 AM and 3:30 PM, allowed the highway to remain open during peak times, minimizing inconvenience to commuters. The pneumatic system not only expedited the installation process but also reduced manpower requirements, providing a time- and cost-efficient solution.

Protecting the Delicate Drainage System

One of the key concerns was the potential for alternative materials to impose excessive weight on the 225mm filter drain pipes, which could lead to structural failure or inadequate support.

LECA® LWA addressed this concern effectively, offering:

-Lightweight Properties: Reducing the load on the underground pipes and preventing settlement issues.
- **Efficient Compaction**: Leca® LWA was installed in 600mm layers, with minimal passes of a vibrating plate compactor required to achieve the desired level of compaction.
- Water Management: Leca® LWA provided superior drainage, supporting the filter system and ensuring long-term performance.

Compliance and Design Adaptations

Since Leca® LWA did not initially meet the MCDHW Specification for Highways Work, a departure document was required. Leca's technical team worked swiftly to ensure compliance, leveraging its own standard departure documentation to streamline approvals.

A geotextile capping layer was installed over the Leca® LWA to prevent uplift buoyancy during heavy rain, ensuring stability and durability of the drainage system.

Project Outcome

The project was completed on time, within the design requirements, and without significant disruption to traffic.

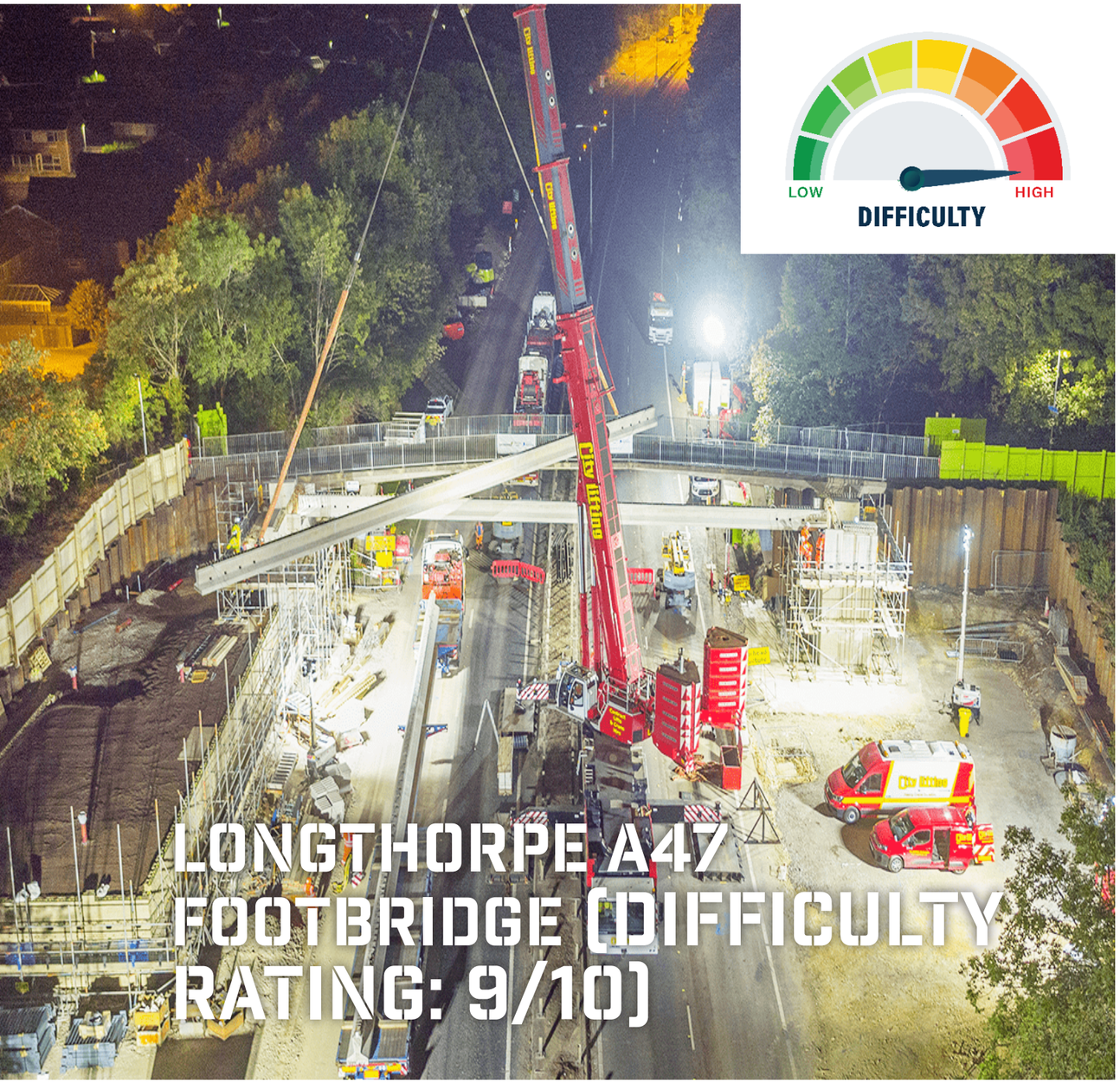
Project information

Product: Leca® LWA (10-20mm)

Interesting Fact: Ground remediation issues were faced and a lightweight and robust solution was required to provide a fill for a delicate embankment which faced serious groundwork issues.

Delivery Method: Leca® LWA was pneumatically delivered to the site, a method that proved essential for this project.

Main Contractor: Alun Griffiths Contractors



LONGTHORPE A47 FOOTBRIDGE (DIFFICULTY RATING: 9/10)

The new 30m A47 Longthorpe footbridge, opened in March 2023, replaced an aging 1970s structure nearing the end of its lifespan.

Located just five meters from the original site, the project was a challenging engineering undertaking aimed at improving safety and accessibility on the A47 between Peterborough and Great Yarmouth. Delivered by GRAHAM as part of National Highways' £250 million improvement package, the bridge features enhanced accessibility for cyclists, pedestrians, and wheelchair users.

Engineering Highlights

The old arched concrete footbridge was demolished after the new structure's completion, ensuring minimal disruption for the community. The project required extensive upgrades, including new reinforced retaining walls and precast concrete bridge beams.

Over 1,500m³ of Leca® Lightweight Aggregate (LWA) was used to construct shallow ramps, ensuring accessibility

and minimizing differential settlement between piled bridge abutments and backfill. The lightweight nature of Leca® LWA reduced earth pressure, cutting the number of required truck deliveries to a quarter compared to traditional fill materials.

Site constraints, including limited storage space and weight restrictions on the embankment, made Leca® LWA an ideal solution. Its lightweight properties allowed for cost-efficient designs, minimized excavation depth, and reduced the risk of structural failures such as sliding or tilting. Additionally, Leca® LWA's ability to be pneumatically blown streamlined construction, reducing the need for crane hire.

Efficient Construction and Minimal Disruption

To limit disruptions, GRAHAM implemented two weekend closures of the A47 during critical phases, including beam delivery and demolition. The use of Leca® LWA with Tensar® geogrid further accelerated the retaining wall construction, forming a composite reinforced soil wall that saved valuable time.

Community Impact

Andrew Harmon, Contracts Manager at GRAHAM, stated, "We're proud National Highways entrusted us with delivering these essential improvements. The new footbridge enhances accessibility and safety, benefiting the community for years to come."

Project information

Material: 1500m3 of Leca® LWA (10-20mm)

Interesting Fact: Leca® LWA was specified to minimise the differential settlement between piled bridge abutments and the backfill to the abutment.

Delivery Method: Walking Floor

Main Contractor: GRAHAM

TOBACCO WAREHOUSE APPARTMENT| LIVERPOOL

DIFFICULTY LEVEL: 10/10

LECA® LWA: A RAPID LIGHTWEIGHT SOLUTION FOR A HISTORIC BUILDING WITH RESTRICTED ACCESS TO COURTYYARD

The Stanley Dock Tobacco Warehouse is a grade II listed building and is the world's largest brick warehouse. It is adjacent to the Stanley Dock, in Liverpool, England. Standing 125 feet high, the building was, at the time of its construction in 1901, claimed to be the world's largest building in terms of floor space and the number of bricks used for the building.

The warehouse has been recently developed into luxury apartments. For the new development, a new shared communal area has been developed which will be a shared area for all the residents. This will incorporate new planters and create an attractive communal area.

For the groundwork development, polystyrene and crushed concrete (MOT/6f2) aggregate was originally proposed. But it was through the research into the groundwork properties of Leca® LWA and the ability to be pneumatically delivered in a confined space that the specification changed to Leca® LWA's lightweight expanded clay aggregate.

Restricted Access to Courtyard

The key factors for the use of the Leca® LWA was the lightweight nature of the material which would impose minimal impact on the ground, provide natural compaction and could be delivered in a difficult to access courtyard, which could utilise the ability of LECA LWA to be pneumatically delivered. For the delivery for this project, the development fully utilised the 50m piping system over a 10m wall obstacle and delivered over 250m3 of LECA LWA.

Over 250m3 of Leca® Lightweight Aggregate (10-20mm) was delivered through using 5 x deliveries onto a delicate and difficult to access residential area. This particular project would have required an additional eleven deliveries to carry the crushed concrete. Thus cutting back on Co2 emissions, cost and protecting the surrounding environment as a result.

Through using our pneumatic blowing delivery for this project, capable of carrying on average 55m3 per load. The vehicle was able to blow distance of up to 50 metres – this allowed the Leca® Lightweight Aggregate material to reach the central courtyard with ease - allowing greater flexibility and aiding environmental consideration to a variety of access and constructional challenges.

Project information

Amount of material: 250m3 of Leca® LWA (10-20mm)

Interesting Fact: For the groundwork for the communal area, polystyrene and crushed concrete (MOT/6f2) aggregate was originally proposed.

Delivery Method: Pneumatic Delivery

HARTHOPE VIADUCT | WEST COAST MAINLINE

DIFFICULTY LEVEL: 10/10

LECA® LWA: A RAPID LIGHTWEIGHT SOLUTION FOR VOID FILLING IN RAILWAY VIADUCT REHABILITATION

When contractors urgently needed a lightweight solution for unexpected large voids within the structure of a landmark railway viaduct, Leca® Lightweight Expanded Clay Aggregate (LWA) emerged as the ideal choice.

These unforeseen voids were discovered behind the abutments of a historic Victorian bridge during a major £8 million replacement project at Harthope Viaduct, located on the West Coast Main Line near Moffat, Dumfries & Galloway.

With only five days remaining before possession, Skanska UK Civil Engineering, working on behalf of Network Rail West Coast Main Line, was faced with a critical challenge: sourcing and installing a lightweight infill material capable of filling the voids within just two days—all without imposing excessive loads on the existing 1848 bridge abutments.

Project Requirements and Engineering Constraints

The project presented several key engineering challenges:

1. Weight Constraints – The infill material needed to have a unit weight of less than 12 kN/m³ to prevent additional stress on the aging bridge abutments.

2. Vertical Placement – The material had to be easily positioned at a vertical height of 12 metres, ensuring efficient infill placement into the voids.

3. Structural Stability – The voids resulted from the gradual collapse of stone arch covers originally constructed behind the bridge abutments, requiring a solution that would provide long-term stability.

4. Time-Sensitive Execution – The installation process needed to be completed within 48 hours to meet the project deadline.

Leca® LWA: The Optimal Geotechnical Solution

Leca® Lightweight Expanded Clay Aggregate (LWA) was selected as the optimal material due to its unique geotechnical properties:

- **Ultra-Lightweight Composition** – At a unit weight of just 5 kN/m³, Leca® LWA fell well within the client's engineering specification of <12 kN/m³, ensuring minimal structural impact.

- **Ease of Handling and Placement** – The lightweight aggregate was quickly transported and positioned directly into the voids, overcoming the logistical challenges posed by the viaduct's height.

- **Enhanced Stability and Load Distribution** – Leca® LWA provided a stable, free-draining, and durable solution that would not exert excessive pressure on the aging structure.

- **Time Efficiency –** The rapid installation process allowed the project to stay on schedule, preventing costly delays.

Conclusion

The successful integration of Leca® LWA into the Harthope Viaduct rehabilitation project highlights its effectiveness as a lightweight solution for critical void filling applications in railway engineering. Its combination of low weight, ease of handling, and structural benefits makes it an ideal material for projects where weight restrictions and time constraints are paramount.

For contractors and engineers facing similar geotechnical challenges, Leca® LWA offers a proven, reliable, and cost-effective solution to address voids, embankment stabilization, and structural rehabilitation with minimal disruption.

Project information

Amount of material: 2000m3 of LECA LWA (10-20mm)

Interesting Fact: With only five days remaining before possession, contractors Skanska UK Civil Engineering, of Doncaster, working on behalf of Network Rail West Coast Main Line, had to source and install a lightweight product capable of filling the voids without imposing undue loadings on the existing bridge abutments in just 2 days.

Delivery Method: Pneumatic Delivery

Main Contractor: Skanska UK

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