



## LONGTHORPE A47 FOOTBRIDGE



Leca LWA (Lightweight Aggregate) was recently specified for the new 30m Longthorpe A47 footbridge which was developed to replace an old bridge structure (originally built in the 1970's), which approached the end of its life. The new bridge development is located just five meters from the site of the old bridge –

making this development an ambitious engineering feat.

The new structure was part of a £250 million package of National Highways projects who appointed GRAHAM for the development – with the aim of improving the safety on the A47 between Peterborough and Great Yarmouth. The new footbridge was designed to be more accessible for cyclists, pedestrians, and wheelchair users.

Graham Site Agent, Tom Higgins provided an overview on this ambitious project, “This was a Footbridge replacement scheme with demolition of the existing structure that was below current standards and needed significant improvements, with a new footbridge to be constructed with ramps.”

## FACTS

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**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:** 8-Wheel Tippers/ Pneumatic Delivery

**Main Contractor:** GRAHAM

The old arched concrete footbridge was planned to be demolished following a failure to meet current industry standards and the demolition was planned in following the completion of the new structure to allow the continued operation of the existing footbridge for the local community.

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The A47 footbridge required new reinforced retaining walls and pre-cast concrete bridge beams. This included two abutment walls where over 1500m<sup>3</sup> of Leca LWA was specified - incorporating shallow access ramps for easier accessibility for the local residents.

Leca LWA was specified to minimise the differential settlement between piled bridge abutments and the backfill to the abutment. The reduced earth pressure allowed for substantial savings in the design for the retaining walls – this included savings on the number of trucks required to site when compared to Type 1 fill/ GSB Type fill which typically requires 4 times more trucks when compared to Leca LWA. This is due to the lightweight nature of Leca LWA. The natural lightweight nature of Leca LWA also kept additional surcharge at a minimum, preventing the potential of overloading the existing embankment for both the East and West retaining walls.



GRAHAM Site Agent, Tom Higgins highlights the engineering problems faced on the project which required a solution, “We needed a solution that didn’t require significant excavations (initially the traditional method of backfill saw a preliminary design of a foundation 3m deep), site constraints made storage of materials tight and we needed to reduce weight of the overall structure. Furthermore, Leca LWA can also be pneumatically blown - this provided the significant benefit of minimising the requirements for crane hire”

When used against retaining walls, Leca LWA will reduce the weight acting on the rear of the structure by at least 75%, in comparison to traditional fill materials. This reduction in weight can avoid potential sliding, overturning, slip and tilting or bearing failures and enables savings by increasing spacing between buttressing walls and reducing structural dimensions.



Throughout the project - GRAHAM worked to minimise disruption, this included two full weekend road closures – including the shutdown of the A47 for the bridge beam delivery and demolition phase.

Furthermore, for retaining wall design, Leca LWA provided several advantages over alternative fill material (including Type 1 Fill and GSB Type Fill) as a structural backfill. It is inert, durable and easy to place and compact and this provided an accelerated rate of installation with natural compaction – where Leca LWA when tipped will typically find its place as a fill thanks to its rounded spherical shape – and then typically 4 passes with a compactor is required for suitable compaction.

The Leca LWA was installed with Geogrid support from Tensar®. The Tensar® geogrid was used in conjunction with Leca LWA to form a composite reinforced soil retaining wall. This helped to save program time for the bridge construction.

The new 30m A47 footbridge was opened in March 2023.

Andrew Harmon, Contracts Manager at GRAHAM commented: “We’re proud that National Highways appointed GRAHAM to deliver these essential improvements to the major road network. GRAHAM strives to make a difference to communities, and the new footbridge will improve accessibility in the area, making it safer for everyone to cross the A47.”