



## ROAD EMBANKMENT | CARDIFF INTERNATIONAL SPORTS VILLAGE



Leca® LWA provided contractors for groundworks at the site of a new international sports village with a lightweight solution for a new road embankment over a former refuse tip subject to settlement.

The £700 million Cardiff International Sports Village was built on a former harbour and industrial site contaminated by hydrocarbons and deep in domestic refuse.

Consultant engineers Arup, who earlier developed a remediation strategy for the whole 35 hectare site, were engaged by Laing O'Rourke, main contractors for the £15 million infrastructure project, to devise a scheme for the construction of new roads at the former landfill site.

An embankment on top of land composed of soft alluvial clay with a layer of tipped domestic refuse above was required for a new slip road linking to an existing high-level carriageway. By using Leca® LWA, Laing O'Rourke were able to limit the depth of excavation required, avoid heave on the surrounding ground and ensure that future settlement was within the limits determined in the strategy developed by Arup. The existing ground was excavated to a depth of one metre, prior to the installation of some 12,000m<sup>3</sup> of Leca® LWA to replace the excavated material and to raise the core of the new embankment within earth bunds.

## FACTS

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**Amount of material:** 5,000m<sup>3</sup> of [LECA ®LWA \(10-20mm\)](#)

**Interesting Fact:** The £700 million Cardiff International Sports Village was built on a former harbour and industrial site contaminated by hydrocarbons and deep in domestic refuse.

**Main Contractor:** Laing O'Rourke

The material was delivered in 5,000m<sup>3</sup> capacity ships to nearby Newport, then transported in 50m<sup>3</sup> high-sided tippers for loose tipping on site. Because of its light weight, Leca® LWA – one seventh that of traditional fill with an average dry bulk density after compaction of just 310 kg/ m<sup>3</sup> - movements of the 50m<sup>3</sup> delivery tippers were significantly reduced.

Prior to installing the first 150mm layer of Leca® LWA, a gas membrane was installed along with venting to ensure efficient release of ground gases from the former tip. Geogrid was then laid prior to tipping of a further 300mm of Leca® LWA, which was compacted and covered by another layer of geotextile to contribute to good stability of the embankment over the soft ground.





Further one metre layers of Leca® LWA compacted by 4 passes of a tracked vehicle, were then laid to the required level, followed by a layer of geogrid and the various road construction layers.

The cross section of the embankment varies along its length to produce a pattern of imposed loadings. These will mean acceptable settlement for both total and differential values.

Maximum settlement is predicted in the range 150-200 mm with differential settlement to gradients of 1 in 50 or less, for the long term design life of the road.

Completed in 2010, Cardiff International Sports Village transformed the site in Cardiff Bay to provide sports, leisure, commercial and residential and arts facilities.