



## **(TN9) Laying Vitrified Clay Pipes on Recycled Material**



# Technical Note Number 9

## Laying Vitrified Clay Pipes on Recycled Material

Research during 1998 and 1999 into the structural performance of clay pipes laid on a variety of recycled materials showed that these may be safely used for bedding clay pipes.

The research was carried out at Lucideon (formerly Ceram Research laboratories), supported by the Department of the Environment, Transport and the Regions under the Partners in Technology programme. The results of the work are described in Ceram Research Paper 815 <sup>1</sup>.

Examining the results obtained alongside those from the original programme of bedding research carried out at the same laboratories showed that normal bedding factors were achieved using a wide range of materials.

The materials tested included both graded and “all-in” materials, with compositions ranging from concrete to “as-received” general construction and demolition waste. The research came to a number of conclusions:

- Recycled Construction and Demolition Waste may be used for pipe bedding, specified using the classes in BRE Digest 433 <sup>2</sup> “Recycled Aggregates”.
- Recycled material is applicable to all bedding classes, N, F, B and S.
- 20 mm size aggregate may be used for all sizes of clay pipes – it is no longer necessary to use 10 mm for 100 mm diameter and 14 mm for 150 mm diameter.

Of the three classes of recycled aggregate material described in the BRE digest, the two which may be used for clay pipe bedding are Class RCA (II), concrete and Class RCA (III), concrete and brick. This means that the material for recycling can come from general construction and demolition waste and does not need to be only concrete. Specifying the recycled aggregate to Digest 433 will exclude unwanted materials, such as ashphalt, which would otherwise lead to a lack of adequate pipe support.

It should be noted that Class RCA (I), brick, cannot be used because it does not give sufficient support to the pipes, largely due to its mortar and plaster content.

In common with all granular pipe bedding material, recycled materials need a compaction fraction no greater than 0.3 in order to achieve the normal bedding factors of 1.1 for Class N, 1.5 for Class F, 1.9 for Class B and 2.2 for Class S. For the enhanced bedding factors which may be applied to vitrified clay pipes according to Water Industry Specification 4-11-02 <sup>3</sup> the recycled aggregate used must have a compaction fraction not greater than 0.2.

### References

1. Use of Recycled Aggregates as Clay Pipe Bedding, Research Paper 815, Ceram Research, 1999
2. Recycled Aggregates, BRE Digest 433, Construction Research Communications Ltd., 1998
3. Revised bedding factors for vitrified clay pipes, Water Industry Specification 4-11-02, WRC, 1988