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Appendix D

Delta Simons Soakage Viability

delta-simons
environmental consultants

VIABILITY OF SOAKAWAYS AS A METHOD OF DRAINAGE
Station Road, Buxton
Delta-Simons Project Number: 10-3263.02
Dated: 26th May 2011

1.0 Authorisation

Delta-Simons Environmental Consultants Limited (Delta-Simons) has been requested by Pinnacle Consulting Engineers Ltd on behalf of Tesco Stores Ltd (the 'Client') to undertake a desk-based exercise to assess the viability of soakaways as a method of drainage for a proposed new Tesco store located off Station Road, Buxton (hereafter referred to as the 'Site').

2.0 Work Undertaken

Delta-Simons undertook a review of the published geology sourced from the British Geological Survey (BGS) in the context of our experience of ground conditions in the locality of the Site. This included a consideration of the characteristics of the geology of the area. At this stage it is understood that no infiltration testing or intrusive investigation has been undertaken at the Site.

3.0 Geological Sequence

On the basis of the published geological data inspected, and our experience of ground conditions in this area, the geological sequence is generally anticipated to be:

A capping layer of MADE GROUND directly overlying the bedrock geology of the BOWLAND SHALE FORMATION mudstone/shale.

From the BGS archive and project reports, the Made Ground extends from between 0.9 m to approximately 5 m, and comprises predominantly cohesive with some granular soils associated with past industrial use.

The BGS records also show that unmapped alluvium deposits may be beneath the Made Ground at the Site in places. The alluvium comprises substantially clay soils and soft sand which may be organic.

The Bowland Shale is a dark grey, fissile, blocky, weakly calcareous mudstone, with subordinate sequences of interbedded limestone and sandstone and fossiliferous bands. The weathered upper profile of the Bowland Shale is recorded as a stiff clay in boreholes, becoming fresh and intact shale/mudstone after 8 - 9m below the surface. The fracture detail in the Bowland Shale is not recorded in the data observed, but interbedded limestones and sandstones are potentially the main source rocks for the minor aquifer rather than fracture flow in the main shale.

The groundwater conditions cannot be reliably ascertained from published sources. It is reasonable to assume that there is a shallow depth to the top of the groundwater due to the presence of alluvium. Made Ground beneath the Site may represent land raise to mitigate flood risk.

Project reports show that perched groundwater was encountered at between 0.7 and 3.8 m bgl in the windowless sampler boreholes. Deeper groundwater strikes were encountered at between 10.5 and 12.0 m bgl in rotary boreholes. Long term monitoring found standing groundwater within the deeper monitoring wells at between 6 and 6.7 m bgl. In two shallow borehole standpipes, one was dry and the other found groundwater at 3.5 m bgl.

4.0 Site Soakaway Viability

The table presented below assesses both of the main geological strata and their likely suitability for a soakaway as a means of drainage for the Site.

Geology	Comments	Viability for Soakaway Drainage
Groundwater	Shallow groundwater is present, assumed to be unfavourable especially at time of heavy rainfall when soakaway performance would be affected.	**Very Low**
Made Ground	The Made Ground at the Site extends between 0.9 to approximately 5 m depth, and is considered likely to comprise mostly cohesive soil. Granular Made Ground can give good rates of soakage, but significant variation can occur over short distances which makes reliance on sparse data not robust. Typically Made Ground is unstable, rendering excavation difficult for engineering purposes and the long term stability of drainage infrastructure may be compromised. The risk of leaching of mobile pollutants within the matrix can also make this solution unviable.	**Very Low**
Alluvium	Unmapped alluvium underlying the Made Ground is likely to be frequently cohesive, and offer very low permeability and soakage potential.	**Very Low**
Bowland Shale	The weathered shale beneath the alluvium is described as clay in boreholes and any relic fractures are likely to be indistinct and closed. A low material and mass permeability is predicted as a result. Intact shale likely to have low permeability and no regular, reliable open fracture/fissure pattern. Poor material and mass soakage values would be expected. Bands of limestone and sandstone could have locally high permeability, but this cannot be relied upon to be viable.	**Very Low to Low**

Based upon the above, it is considered at this stage that the overall viability of soakaways as a method of drainage at the Site is **very low**.

5.0 Project Contacts

Name	Position	Telephone	Mobile	Email
Alex Ferguson	Projects Director	01522 882568	07771 945196	alex.ferguson@deltasimons.com
James Harrison	Associate Director	01603 699113	07881 935124	james.harrison@deltasimons.com