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**Institute of
Hydrology**



**Preliminary Hydrological Impact
Assessment
Shipnells Farm - Caversham**

INSTITUTE OF HYDROLOGY

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INTRODUCTION

The INSTITUTE OF HYDROLOGY has been commissioned by Denis Wilson & Partners, acting on behalf of the developers Higgs & Hill Homes Ltd, to provide a preliminary assessment of the hydrological impact of development at Shipnells Farm, Caversham, Berkshire. In particular, this review examines the possible impact of cut and fill operations associated with road building upon soil moisture and groundwater. Possible changes in the hydrological regime were to be assessed with regard to their potential effect upon vegetation on the site.

Any cut and fill excavation can potentially lower groundwater levels in the up-slope direction, disrupt the downslope flow of shallow soil moisture and groundwater and raise the water table and/or reduce infiltration in the down-slope direction. The Shipnells Farm site was examined for these possible effects.

This preliminary assessment is based upon the review of available literature, records from the National Borehole Archive, data from a geotechnical investigation undertaken by Albury Site Investigations Ltd. and a brief site visit.

LOCATION

Shipnells Farm is located approximately two kilometres north of the River Thames on the outskirts of Reading, Berkshire. The site is a dry valley with the majority of the proposed development taking place on the valley sides with the valley floor retained as a public open space.

GEOLOGY

The Shipnells Farm site is a dry valley incised into the Cretaceous Upper Chalk. The Upper Chalk is overlain by two river gravels of Pleistocene and Recent age. The Older River Gravels (undifferentiated) are present on the upper valley sides, and the Younger River Gravels (undifferentiated) occur along the valley floor.

The Upper Chalk reaches a maximum thickness of 65-75m. The basal bed consists of cream-coloured, fossiliferous limestone containing green-coated nodules of slightly phosphatic chalk. This layer is overlain by soft, irregularly bedded white chalk which contains numerous layers of nodular brown to black flint.

The Upper Chalk is highly permeable with the water table lying up to ten metres below the valley floor. There are no nearby boreholes to provide an indication of detailed measurements to the water table. There are no springs within the area. Rainfall onto the Chalk will move rapidly along fissures in an essentially vertical direction.

A majority of the cut and fill sites are excavated into the Chalk. In particular in the vicinity of Trial Pits No's. 11, 13, 14 and 20, 21, 22, 28.

These excavations are unlikely to have an impact upon the normal vertical movement of water through these strata. The exposure of deeper levels of Chalk to the atmosphere will allow increased evaporation and évapo-transpiration from a narrow zone of soil and bedrock adjacent to the exposed walls. This zone of greater water loss will be approximately 2-3m wide and is unlikely to have any appreciable impact upon vegetation outside this immediate area. Vegetation within 1-2m of these excavations will suffer additional stress during extended periods of drought. It is probable that physical destruction of root systems during excavation will cause greater damage at these distance.

The Older River Gravels, formerly the Plateau Gravels, comprise the terraces of the River Thames which lie topographically above the more recent Younger River Gravels. They occur at various levels ranging from 54m to 155m above O.D. and they cap the sides of the valleys at Shipnells Farm. Regionally the gravels are up to 16.8m thick and are characterised by a gravel fraction which contains material such as quartzite, vein quartz and igneous rocks probably derived from the Bunter Pebble Beds of the Midlands.

It is probable that these gravels will be excavated in cut and fill sites to the east of Trial Pit No.22.

The data from the geotechnical report suggests that at Shipnells Farm these gravels are coarse, poorly sorted and probably moderate to higher permeable. There is no evidence in the geotechnical data to suggest the presence of impermeable clay layers, and therefore no reason to expect any perched water table within the gravels. The absence of any springs or water logged areas on the hill slopes would support this conclusion. In the absence of any discrete clay layers it can be expected that the infiltration of rainfall will be predominantly vertical through these gravels.

Several of the cut and fill sites will be excavated into these Older Gravels. As with the Chalk the only impact upon soil moisture, shallow subsurface movement or the water table will be in a narrow belt of increased evaporation adjacent to the excavation. In the slightly denser gravels this zone is likely to be less than that to be expected within the Chalk.

The Younger River Gravels occur extensively in the valleys of the Thames, Kennet and Lodden and are overlain by alluvium along the present Thames flood plain. The deposits commonly contain about 60 per cent gravel fraction. These Younger River Gravels are up

to 4.0m thick along the length of the valley bottom at Shipnells Farm. Data for the site suggests that this unit will be moderately to highly permeable. There are no excavations within this unit.

CONCLUSIONS

Based upon the data that has been examined it has been concluded that there is little likelihood of the proposed cut and fill excavations having any significant impact upon the trees and shrubs on the site.

06/02/1992

References:

1. Squirrell, H.C., 1978. The Sand and Gravel resources of the Country around Sonning and Henley, Berkshire, Oxfordshire and Buckinghamshire. Mineral Assessment Report 32. Inst. Geol. Sci.
2. Albury Site Investigation Ltd, 1991. Shipnells Farm Report.

Figures

1. Geology
2. Isopach Contours of Gravel Deposits
3. Proposed Cut and Fill

GEOLOGY

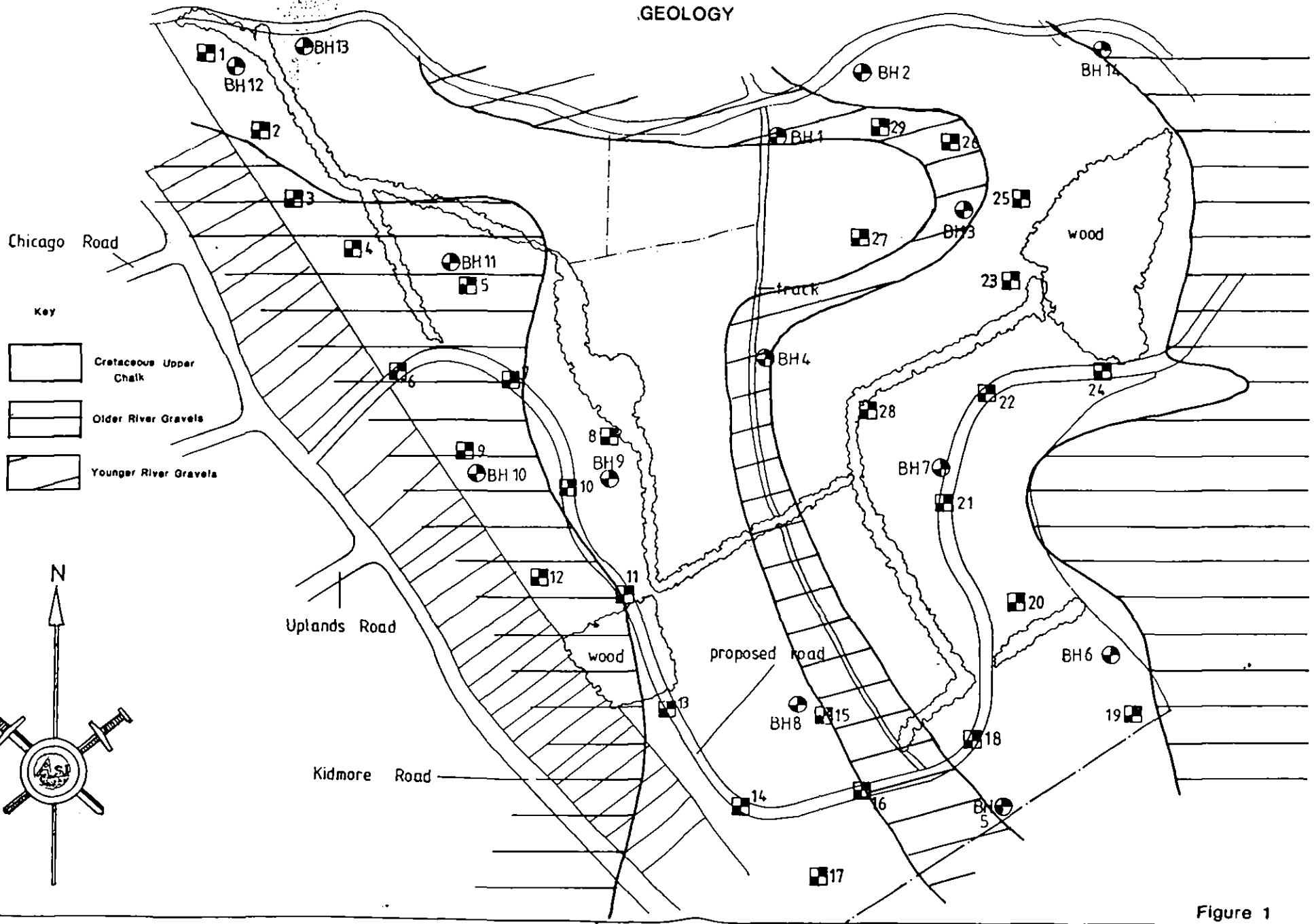


Figure 1

Scale n.t.s
 Drg No: 9701/A/1

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Contract
 SHIPNELLS FARM, CAVERSHAM
 Trialpit location plan

ISOPACH CONTOURS OF GRAVEL DEPOSITS

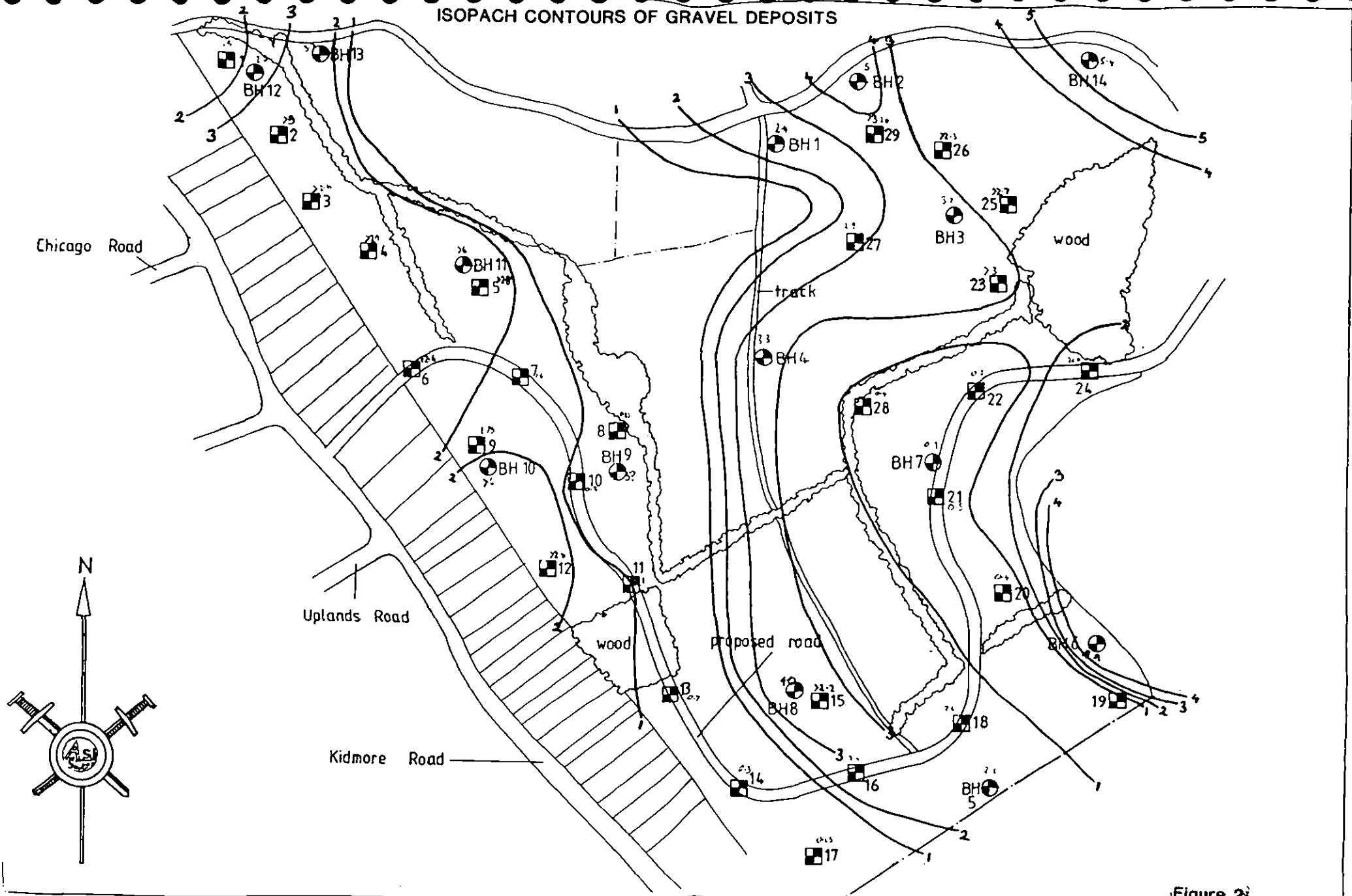


Figure 2

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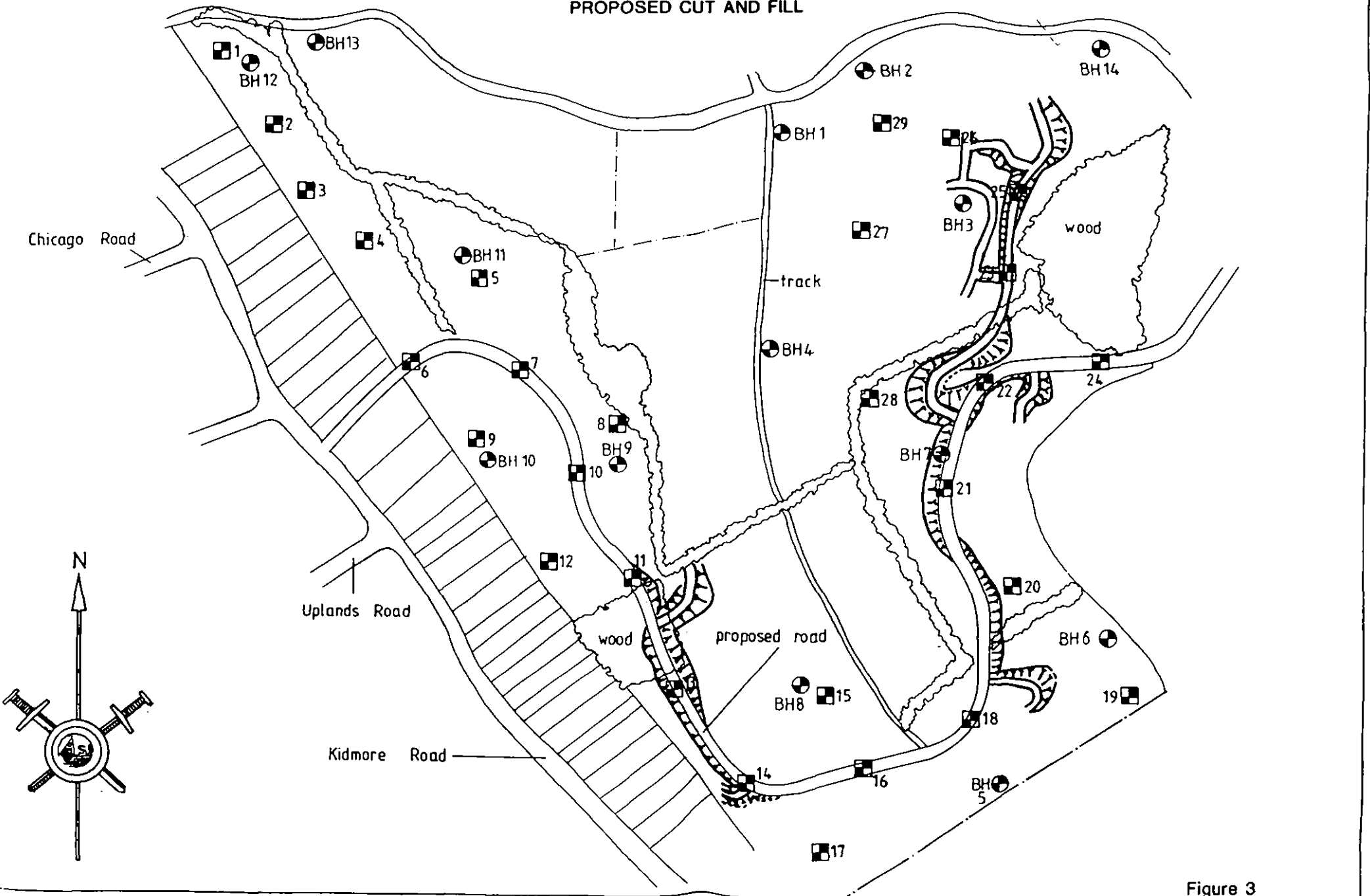
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SHIPNELLS FARM, CAVERSHAM
Trialpit location plan

Scale n.t.s

Dwg No 9701/A/1

PROPOSED CUT AND FILL



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 Trial pit location plan

Figure 3
 Scale n.t.s
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