

**PROPOSED RESIDENTIAL DEVELOPMENT
BROOKS NURSERY
BARNHAM
WEST SUSSEX**

SURFACE WATER DRAINAGE STATEMENT

DAVID WILSON HOMES



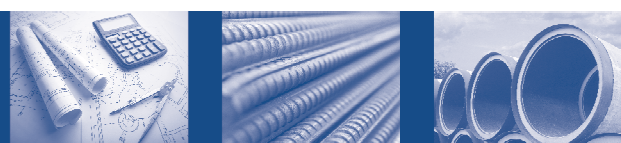
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REFERENCES:

Wilson Bailey Geotechnical & Environmental – Ground Investigation Report – J10146 (Dec 2010)

MJA Consulting – Flood Risk Assessment & Development Drainage Strategy – Rev B (May 2013)

1 Introduction

1.1 Scope

The proposed development is situated at land off Barnham Road in village of Barnham, approximately five miles north of Bognor Regis.

David Wilson Homes are proposing to develop the approximate 2.5ha site, involving the construction of 40 residential dwellings, with associated access roads, hardstanding parking areas and soft landscaping.

1.2 The purposes of this statement are:

- To confirm that a satisfactory strategy for the disposal of surface water from the proposed development is achievable in accordance with the hierarchical preference of disposal systems as set out in Approved Document H of the Building Regulations and CIRIA C697 the SUDS Manual.
- To confirm that groundwater levels will not have an adverse effect on the performance of the proposed drainage systems, and also that the development will not have an adverse effect on the quality of groundwater at the site.
- To confirm that further groundwater monitoring and infiltration testing will not be required for design of the proposed drainage system.

1.3 This statement should be read in conjunction with MJA report: **13/0305/4482 Flood Risk Assessment & Development Drainage Strategy (Rev B May 2013)**

2 Geological Information

- 2.1 An intrusive geological ground investigation was carried out by Wilson Bailey in October 2010.
10No. boreholes were carried out, the results of which indicate the general site geology as:

Topsoil (Made Ground) (0.0-0.5m BGL)

Natural topsoil was encountered across the majority of the site comprising dark brown SANDY CLAY with abundant roots occasional fine gravel.

Localised made ground was encountered in a number of locations comprising reworked topsoil with brick, tile and slate fragments.

This is considered to be consistent with the long term historical use of the site as a plant nursery.

Aeolian Deposits (Brickearth) (0.5-1.9m BGL)

Aeolian Deposits were encountered across the site comprising generally low strength orange-brown SILTY SANDY CLAY with scattered fine flint GRAVEL.

Raised Beach Deposits (1.9-4.0m BGL)

These soils were found to comprise a white and off white SILTY SAND and GRAVEL with variable amounts of flint gravel, occasional cobbles and occasional pockets of pale brown SILTY CLAYEY SAND. In a number of the boreholes the predominantly chalk derived soils were found to be underlain by a pale yellowish brown silty locally clayey sand, which was proved to the maximum depth of investigation at 4.00 m, where encountered.

London Clay Formation

The clay soils of the London Clay Formation, which are anticipated to be present beneath the site where not been encountered during the investigation to a maximum depth of 4.00 m below ground level.

The Wilson Bailey report (2010) indicates that it is conceivable however that the generally loose pale yellowish orange-brown clayey silty sand soils encountered at the base of a number of the boreholes could be associated with one of the minor interstitial layers of silty sand within the basal stratigraphy of the London Clay.

2.2 Ground Contamination

The long term historical use of the site as a plant nursery would not be expected to present a significant concern with regards to soil contamination.

No visual or olfactory evidence of soil contamination was encountered during the site investigations with subsequent laboratory soil contamination testing does not indicate the presence of elevated concentrations of a wide range of potential contaminants.

2.3 Hydrogeology

The Environment Agency's mapping website (www.maps.environmentagency.gov.uk) has classified the site as not located within a groundwater source protection zone for groundwater abstractions.

2.4 Groundwater

Groundwater level monitoring was carried out within the 10No. boreholes in October 2010. Groundwater inflows were encountered in a number of the exploratory boreholes at depths of between 1.40m and 2.00m BGL, with a number of the boreholes encountering soils that were noted as consistently damp below a depth of about 2.00 m below ground level.

Subsequent monitoring of standpipes indicates groundwater to be present at a depth of between 1.30 m and 2.15 m, with the variation of the groundwater levels indicating a groundwater flow direction towards the south.

2.5 Soil Permeability

Soakage testing has not been carried out as part of the ground investigations.

However, the high clay content within the superficial soils would not provide an effective infiltration medium.

The effective depth of any such soakaway devices will also be significantly limited by the high groundwater levels encountered across the site.

The base of any Infiltration devices must be 1m above the seasonally high water table which would rule out the use of soakaways, infiltration basins and porous pavements to discharge surface water to ground.

Therefore an outfall to a watercourse or connection to a public sewer will be required.

3 Surface Water Drainage Strategy

- 3.1 The National Planning Policy Framework requires that new developments do not exacerbate flood risks elsewhere, which means there is a need to control drainage and runoff to ensure there are no increases in overland flow as a result of the development. Sustainable Drainage Systems (SuDS) will be incorporated into the surface water drainage strategy to mitigate the additional runoff and reduce flood risk to downstream areas. The philosophy of the SuDS will be to replicate as closely as possible the natural drainage regime from a site before development, reducing the impact on receiving watercourses and sewers.
- 3.2 The Building Regulations Document H (2002) and the CIRIA SUDS Manual C697 (2007) detail a hierarchy of potential methods of disposing of surface water from a site:
- An adequate soakaway or some other adequate infiltration system, or where that is not practicable,
 - A watercourse, or where that is not practicable,
 - A sewer
- 3.3 Following a review of the site geology and groundwater levels, the clay soils that underlie this development will not have a suitable permeability to enable sufficient infiltration. The effective depth of any such soakaway devices would also be significantly restricted by the high groundwater levels encountered across the site.
- 3.4 The nearest suitable watercourse is located at the southern boundary of the site. It is proposed that the surface water generated from this development be attenuated within a balancing pond, discharging into the existing watercourse at a controlled rate.
- 3.5 The pond will be sized to manage the 1 in 100year storm event, plus an extra allowance of 30% for the potential predicted increase in peak rainfall up to 2115. The allowable discharge rate from the attenuation pond into watercourse will be restricted to a maximum rate equivalent to the calculated existing Greenfield runoff rate (QBar - mean annual runoff rate derived from IH124 methodology).
- 3.6 This method of disposal improves the quality of the storm water runoff, whilst maintaining the existing natural drainage regime and maintaining the predevelopment rates of runoff.
- 3.7 As this site has a potentially high groundwater table, the pond is to be fully lined with an impermeable liner to prevent the exchange of water between the pond and groundwater. This will not only prevent the ingress of groundwater but will prevent any pollutants within the runoff leaching into the groundwater below the site.
- 3.8 All sewers and manholes will be constructed to the latest industry standard design criteria ensuring robust structural integrity. This will ensure that the proposed sewers on the development will not present a flood risk through ingress of groundwater or contamination risk through leakages to groundwater.

4 Conclusion

- 4.1.1 Within the ARUN District Council Planning Permission – Decision Notice EG/29/13, reference is made within condition No.16 that:
“The design should follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulation and the recommendations of the SUDS Manual produced by CIRIA.”
- 4.1.2 This hierarchal approach has been followed and is highlighted with paragraphs 3.2 & 3.3.
- 4.2.1 Within the ARUN District Council Planning Permission – Decision Notice EG/29/13, reference is made within condition No.16 that:
“Winter groundwater monitoring to establish highest annual ground water levels and percolation testing to BRE 365, will be required to support the design of any infiltration drainage.”
- 4.2.2 The clay soil conditions and high groundwater table encountered at this site has ruled out the use of infiltration as a means of surface water drainage, refer to paragraph 2.5 & 3.3. Therefore the need for further groundwater monitoring and infiltration testing will not be required.

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