

February 2013

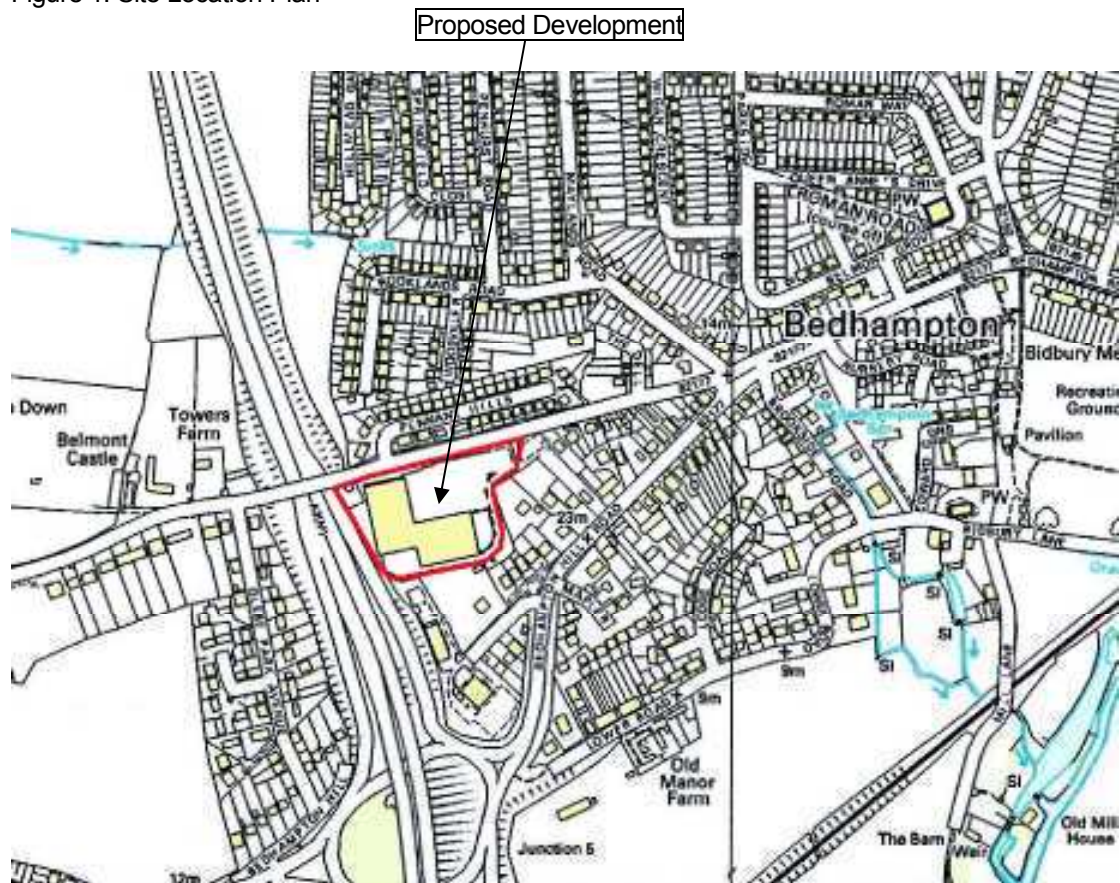
FLOOD RISK ASSESSMENT

PROPOSED DEVELOPMENT, HAVANT RETAIL PARK, PORTSDOWN HILL ROAD, BEDHAMPTON, HAMPSHIRE

1. INTRODUCTION

In January 2013, AMA Ltd were commissioned by Linden Homes Southern Ltd to undertake a Flood Risk Assessment to meet the requirements of the National Planning Policy Framework for the Proposed Development at the Havant Retail Park, Portsdown Hill Road, Hampshire (Figure 1).

Figure 1: Site Location Plan



1.1 Background

The site is currently used as a retail park with two units, one being a DIY store and the other a bowling alley. Planning permission will be sought for the demolition of these units and the redevelopment of the site for residential occupancy, with 83 units being proposed. As statutory consultees the Land Drainage Authority, Environment Agency and Southern Water will comment on the proposals.

1.1.1 Ground Conditions

A Site Investigation has been carried out. This confirmed that the site was formerly used as a chalk quarry. The north-western, south-eastern and southern boundaries were marked by near vertical chalk cliffs varying in height from approximately 2-3m up to 8-10m, remnants of the former use of the site as a chalk quarry.

British Geological Survey geological mapping indicated the geology of the site to comprise the Spetisbury Chalk Member of the Upper Chalk, although it is understood that following the historic quarrying operation, some filling may have taken place to form a level site. As such a variable and possibly significant thickness of Made Ground is anticipated.

1.1.2 Flood History

The site is bounded to the north by Portsdown Hill Road; to the east by houses fronting on to Portsdown Hill Road; to the south by gardens and houses fronting on to Bedhampton Hill; and to the west by a vegetated slope falling c. 3-5m down to the A3(M).

The flood risk map indicates that the site is not located within an Environment Agency fluvial/tidal flood risk zone (Figure 2). However, the likelihood of this has been investigated and is discussed in this report. In addition to this, issues of local site scale flooding and site runoff volumes have been addressed. This document is designed to fulfil these requirements in line with PPS25.

Figure 2: Environment Agency Flood Map

Proposed Development



Map Courtesy of Environment Agency

1.1.3 Hydrology

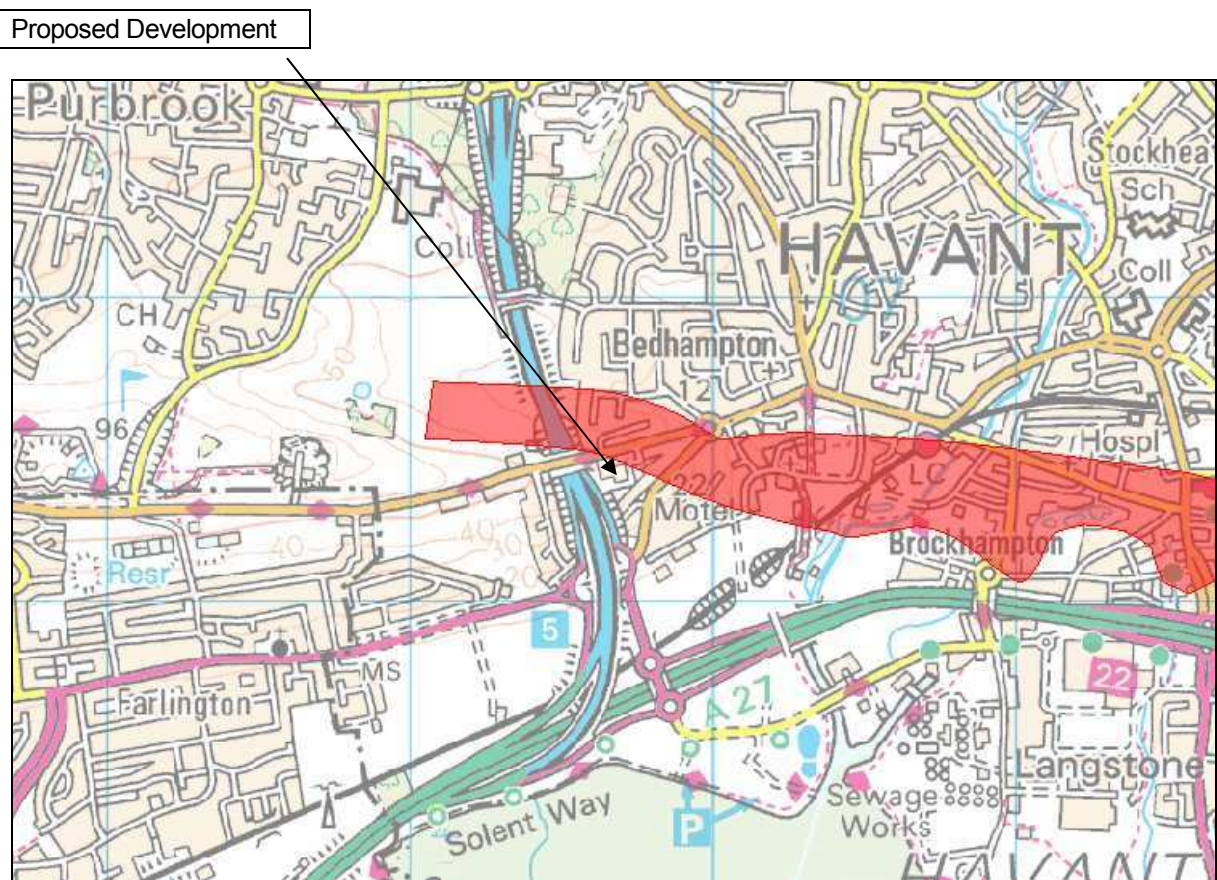
No surface water features were present on site. The closest surface water feature to the site comprised a stream 258m to the north, which flowed from west to east. In addition, Langstone

Harbour (a tidal lagoon) was located approximately 900m to the south of the site and at an elevation approximately 20m lower than the site.

Groundwater was not encountered within any of the exploratory holes during the intrusive site investigation or within monitoring wells installed in selected boreholes as part of the investigation. Whilst water was recorded within one monitoring well in the range 5.55m to 6.31m bgl, it is considered that this was more likely to be perched water within the deep Made Ground rather than groundwater.

According to information provided from the Environment Agency, the site is partially located within the "Bedhampton & Havant Springs" groundwater Source Protection Zone (SPZ1 - see Figure 3). As such, any proposed scheme for the disposal of surface water drainage, should only include infiltration techniques within this area, where it can be ensured that no contaminants are also discharged (ie Highway & Car Park Drainage).

Figure 3: Environment Agency Groundwater Protection Zones Map



Map Courtesy of Environment Agency

1.1.4 Objectives

The principle aims of the FRA are:

1. To assess the risk associated with all potential flood sources;
2. To investigate the interaction between potential flood sources and the redevelopment proposals;
3. To discuss management of storm water runoff related to the potential development.

2. SITE DESCRIPTION

2.1 Location

The site is bounded to the north by Portsdown Hill Road; to the east by houses fronting on to Portsdown Hill Road; to the south by gardens and houses fronting on to Bedhampton Hill; and to the west by a vegetated slope falling c. 3-5m down to the A3(M).

2.2 Site Appearance

The site is comprised of an irregularly shaped parcel of generally flat and level land within a former chalk quarry. The site extends to approximately 2.1Ha and is accessed from Portsdown Hill Road.

The site is currently occupied by two portal-framed buildings used as a bowling alley and DIY store. External areas comprise of tarmac covered car parking to the north-east of the buildings and a concrete covered service road and yard area to the south and west of the buildings as indicated on the site survey (Appendix 1). The impermeable area of the existing site is 1.76ha (ie 84% of the gross area).

The north-western, south-eastern and southern boundaries were marked by near vertical chalk cliffs varying in height from approximately 2-3m up to 8-10m, remnants of the former use of the site as a chalk quarry. The highest portion of exposed chalk face formed the site's northern boundary.

2.2.1 Site Drainage

There are is an existing 225dia surface water drain and 150dia foul water drain that connect the site to the existing sewers in Bedhampton Hill Road to the south. There are also a number of large soakaways (3.0m diam x 4.0m deep) located in the tarmac car park to the North East of the buildings.

These drains have been indicated on the site survey (Appendix 1), together with an assessment of the size of the impermeable area discharging surface water run-off to the surface water sewer (ie 0.39ha).

An assessment of the peak discharge rates for the impermeable area discharging to the surface water sewer has been made for various storm durations (see Figure 4).

Figure 4: Existing Discharge Rates.

Storm Event	1in1 year	1in2 year	1in10year	1in30year	1in100year	1in100yr+30%
Peak Rainfall Rate	30.99 mm/hr	40.06 mm/hr	59.94 mm/hr	76.03 mm/hr	98.68 mm/hr	128.29 mm/hr
Peak Discharge Rate	33.59 l/sec	43.43 l/sec	64.98 l/sec	82.43 l/sec	106.99 l/sec	139.10 l/sec

The existing 225mm diam. surface water drain serving the site has a gradient of 1in80 giving it a capacity of approximately 50 litres/sec. Southern Water will not permit the existing maximum rate of discharge for a 1in 2 year storm to be exceeded, and therefore the volumes of surface water run-off generated by greater storm events for the proposed development will have to be stored on site.

2.3 Surrounding Area

The site is bounded to the north by Portsdown Hill Road; to the east by houses fronting on to Portsdown Hill Road; to the south by gardens and houses fronting on to Bedhampton Hill; and to the west by a vegetated slope falling c. 3-5m down to the A3(M).

The site is located on the eastern limb of Portsdown Hill, and hence the surrounding area is generally on sloping ground, falling to the north east from the northern boundary and to the south east from the southern boundary. With the western boundary being formed by the A3(M) cutting.

2.3.1 Local Drainage Network

There are existing foul and surface water sewers in Portsdown Hill Road and Bedhampton Hill Road. These run in an easterly direction, with the surface water sewers eventually discharging to an existing culverted watercourse 250m east of the site. There are also foul and surface water sewers in Bedhampton Hill Road which serve the existing site that run in a westerly direction towards the A3(M). All these sewers are indicated on Southern Water's drainage records (Appendix 2).

It is understood that the surface water sewers cater for the surface water run-off from the existing highway and residential properties. Although it is possible some properties may also discharge to soakaways.

2.4 Description Of Redevelopment

The site is currently used as a small retail park, it is intended that the existing buildings and hard surfaces will be demolished/removed and the site redeveloped for residential use (83 units). The existing access off Portsdown Hill Road will remain unaltered to serve the proposed development. Proposed ground levels will remain as existing, which are generally lower than the surrounding area, particularly on the northern boundary with Portsdown Hill Road, where there is an 8-10m difference in levels.

An indicative site layout has been prepared as indicated on the Drainage Strategy Drawing.no.LIND38-sk1 (Appendix 3). The impermeable area will decrease from 2.0ha to approximately 1.20ha.

3. EXTERNAL FLOOD SOURCES

Current guidance recommends that a FRA must investigate all potential sources of flood risk that may affect each particular site. A number of site-specific mechanisms exist: however, many of these are not relevant to this site. Table 2 summarises the range of potential flood sources, pathways and the possibility of relevance to the site itself and immediately surrounding area.

Table 2: Summary of potential flood sources

Flood Type	Source	Pathway	Consider Further
Fluvial	Watercourse serving the Bedhampton & Havant Springs	None	No - large level difference.
Tidal	None	None	No
Overland Flow	Portsdown Hill Road	Surface Water Run-off in exceptional storm events.	Yes
Drainage	Public Sewer	Blockage/overwhelmed capacity	Yes
Groundwater	Chalk Sub-Strata	Rising Water Table	Yes

3.1 Overland Flow

As the site is situated in a former quarry, levels are generally lower than the surrounding area, particularly on the northern boundary with Portsdown Hill Road, where the difference in level is up to 10m. However overland flows on Portsdown Hill Road will be contained within the carriageway by the kerb line, and the gradient of the road is such that any surface water run-off will bypass the site entrance and travel eastwards.

Although the back gardens of the existing properties on the southern boundary are higher than the site, they generally fall to the south and therefore will not be the source of any overland flow. Similarly the A3(M) on the western boundary is lower than the site and will also not be the source of any overland flows that may affect the site.

3.2 Drainage

Southern Water maintains a database that records reported incidents of sewer flooding. There have been no recorded instances of flooding the site as a result of their sewers being overwhelmed.

3.3 Groundwater

As part of the intrusive investigation undertaken by GESL, groundwater data was available. This confirmed that groundwater was not found in any boreholes up to a depth of 5.0m. Therefore groundwater is unlikely to represent a risk.

4. FLOOD MITIGATION AND MANAGEMENT

The assessment undertaken in Section 3 identified overland flow, off-site drainage and groundwater as a potential source of flood risk to the proposed development. However, it was demonstrated that there is no risk of flooding from these sources.

5. SITE GENERATED FLOOD RISK

5.1 Drainage Strategy

5.1.1 Surface Water Drainage

As the site prior to development discharged to soakaways and an existing surface water sewer, a drainage strategy has been prepared on the same basis - Drawing.no.LIND38-sk1 (Appendix 3). As already discussed in this report and to ensure that there will be no risk of flooding as a consequence of redeveloping the site, the strategy takes into account the following issues:

- 1). The discharge to the existing surface water sewer should not exceed the existing peak discharge rates. On-site storage should therefore be provided as necessary, so that larger storm events can be catered for, (ie up to 1in100yr storm +30% allowance for climate change).
- 2). In the section of the site which falls within the "Bedhampton & Havant Springs" groundwater Source Protection Zone, no highway drainage should discharge to soakaways.
- 3). As the site is a former quarry, there are areas where a considerable amount of fill material is encountered. Soakaways should not be located in these areas, so it will therefore be necessary to carry out a comprehensive site investigation to confirm the profile and depth of the underlying chalk, before a detailed design can be prepared. This investigation should also include soakaway tests, so the size and depth of soakaways can be determined to cater for 1in 100yr storms + 30% allowance for climate change.

5.1.2 Foul Water Drainage

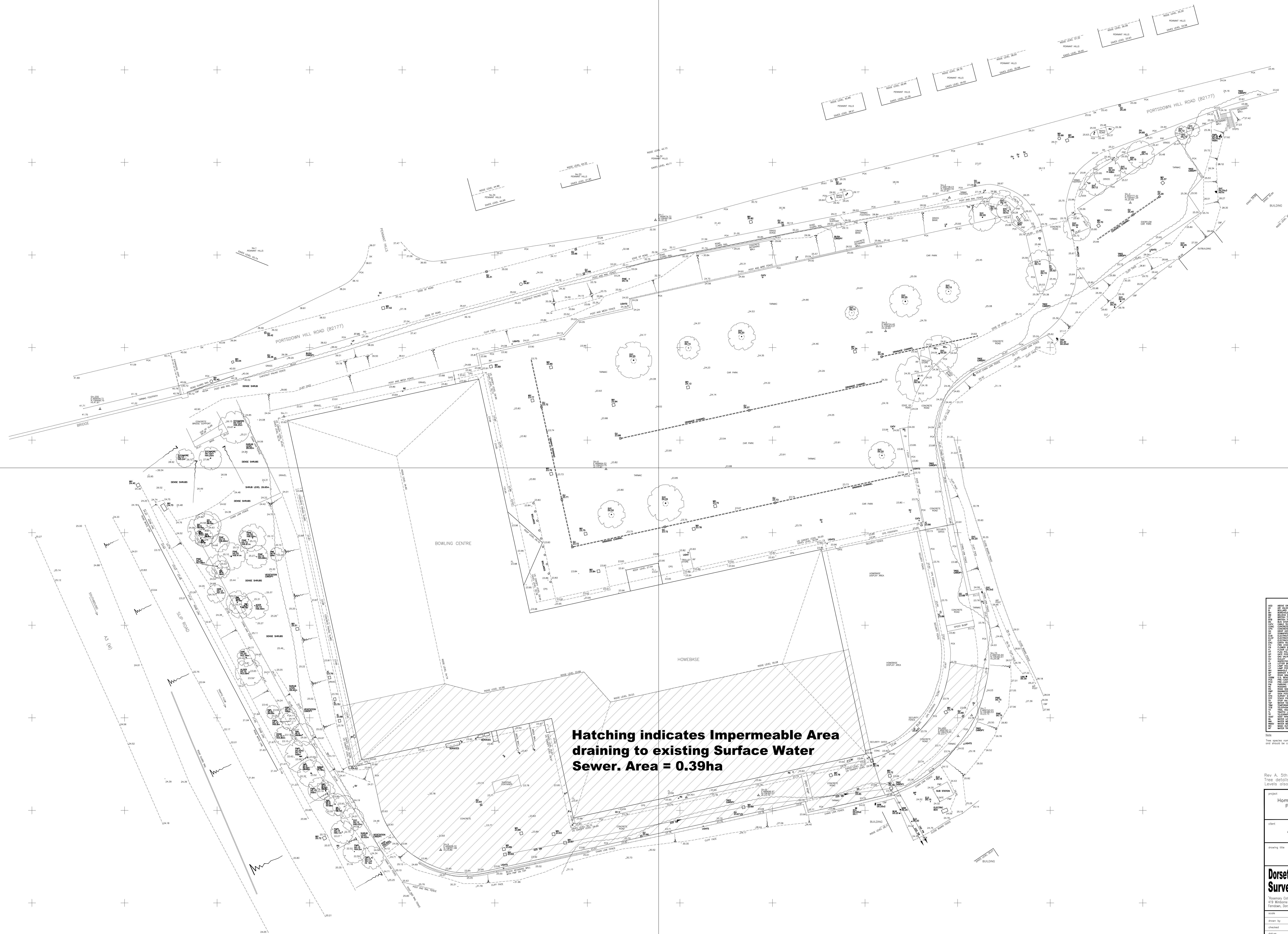
The drainage strategy dwg.no.LIND38-sk1 (see Appendix 3) indicates that the foul drainage generated from the proposed development will discharge to the existing foul drain on the southern boundary of the site which in turn discharges to the existing sewer in Bedhampton Hill Road. Southern Water have advised that their sewers downstream of this drainage connection does not have sufficient capacity to serve the proposed development. To this end they have been asked to carry out a Level 2 Capacity Check to determine the improvements required to their existing network, so that capacity can be provided. At the time of writing this report no response has been received.

6. CONCLUSIONS AND RECOMMENDATIONS.

The following conclusions and recommendations can be made:

- The site is not located within an area considered to be at risk from fluvial flooding.
- Overland flow from Porton Hill Road through the site was identified as a potential flood risk to the proposed development. However, overland flows on Portsdown Hill Road will be contained within the carriageway by the kerb line, and the gradient of the road is such that any surface water run-off will bypass the site entrance and travel eastwards. Overland flow will not therefore be a potential flood risk.
- The site investigation did not encounter any ground water to a depth of 5.0m, groundwater will therefore not be a potential flood risk.
- The north eastern part of the site falls within the "Bedhampton & Havant Springs" groundwater Source Protection Zone. The proposed drainage scheme should be designed, so that no highway drainage discharges to soakaways in this area.
- As a former quarry, the site contains varying depths of fill material over the natural chalk sub-strata. The profile and depth of the underlying chalk must be confirmed, so that the location of proposed soakaways can be determined. No soakaways should be located in fill material unless they are founded in the underlying chalk.
- Soakaway tests should be carried out to confirm the soakage potential of the underlying chalk. The size and depth of soakaways should be designed so that they can cater for a 1in100yr storm +30% allowance for climate change.
- The existing surface water connection on the southern boundary of the site will be re-used for the disposal of surface water from those areas where soakaways are not an option. The existing maximum rate of discharge for a 1in2 year storm should not be exceeded as the existing 225dia. connection does not have sufficient capacity. Detailed calculations of on-site storage requirements should be undertaken, so that the existing maximum rate of discharge is not exceeded for a 1in100yr storm +30% allowance for climate change.
- Foul drainage from the proposed development will discharge to the existing foul sewer in Bedhampton Hill Road via the existing 150dia. connection. The existing foul sewer network downstream of the proposed development will be upgraded in accordance Southern Water's requirements to cater for the additional foul water generated by the proposed development.

Appendix 1
Site Survey



**Hatching indicates Impermeable Area
draining to existing Surface Water
Sewer. Area = 0.39ha**

[illegible]

Note
Tree species named on this plan are for general information only and should be confirmed by a taxonomist prior to any design.

Rev A. 5th November 2012 JP/MT
Tree details added along western edge of site.
Levels also added.

project	Homebase & AMP Bowling Portsmouth Hill Road Havant		
client	Ankers & Rawlings		
drawing title	Land Survey		
Copyright 2012 ©			
 Dorset Land Surveying "Roostery Cottage" #19 Windrose Road (East) Farnham, Dorset BH20 1JL Last Owners Gail & Graham GDS Engineering Design Planning, Building, Interior Design, Surveying, Project Coordination, Project Management, Project Close Monitoring  T. (01202) 894841 F. (01202) 896343 office@dorsetland.co.uk			
scale	1:200	paper size	A1
drawn by	MT	date	2nd Feb. 2012
checked	JP	grid	OS2836
datum	OS9002		
drawing number	5530	revision	A

Appendix 2
Drainage Records



If pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility for accuracy. All dimensions should be determined on site.

Pipes are constructed of Bonded Asbestos Cement

Other (UNK) materials may include Bonded Asbestos Cement

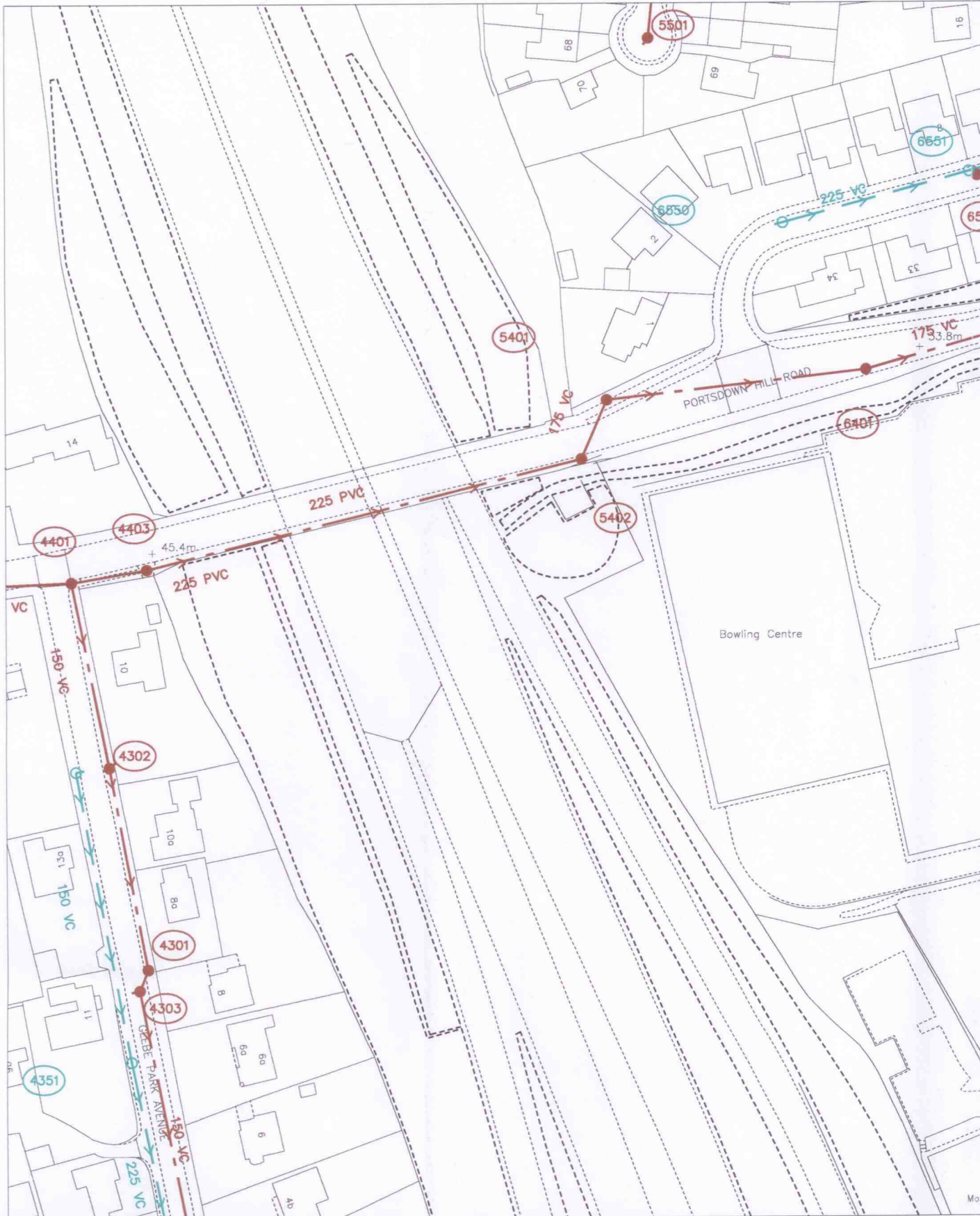
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SEWER RECORDS

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O.S. REF.

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Drawn by: goswama

Scale: 1:1250

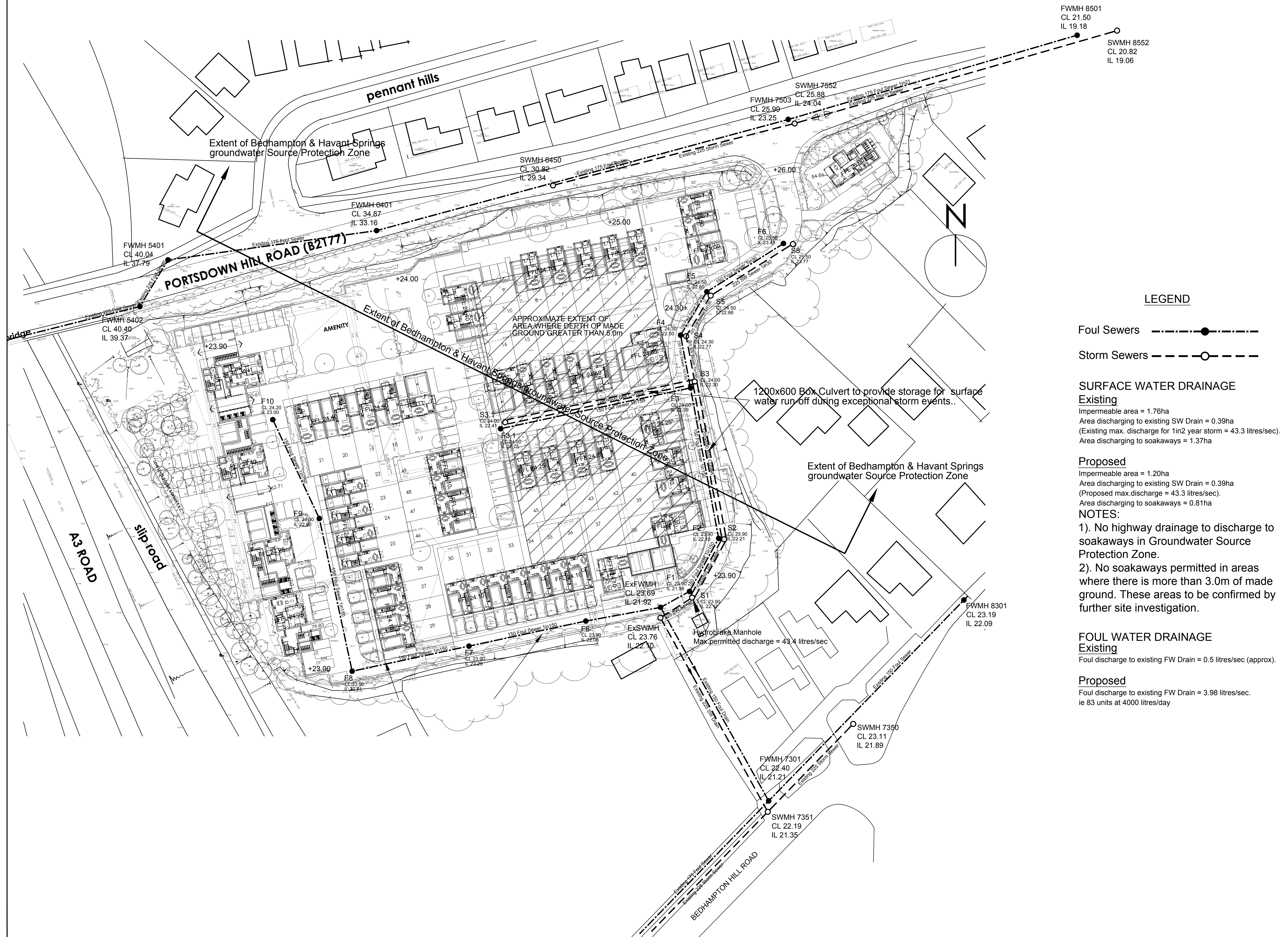
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Appendix 3
Drainage Strategy



LEGEND

Foul Sewers ———●———

Storm Sewers ———○———

SURFACE WATER DRAINAGE

Existing

Impermeable area = 1.76ha
Area discharging to existing SW Drain = 0.39ha
(Existing max. discharge for 1in2 year storm = 43.3 litres/sec).
Area discharging to soakaways = 1.37ha

Proposed

Impermeable area = 1.20ha
Area discharging to existing SW Drain = 0.39ha
(Proposed max. discharge = 43.3 litres/sec).
Area discharging to soakaways = 0.81ha

NOTES:

- 1). No highway drainage to discharge to soakaways in Groundwater Source Protection Zone.
- 2). No soakaways permitted in areas where there is more than 3.0m of made ground. These areas to be confirmed by further site investigation.

FOUL WATER DRAINAGE

Existing

Foul discharge to existing FW Drain = 0.5 litres/sec (approx).

Proposed

Foul discharge to existing FW Drain = 3.98 litres/sec.
ie 83 units at 4000 litres/day

PRELIMINARY

B. Redrawn to accommodate new layout. Groundwater Source Protection Zone indicated. 25-01-13

A. Foul and surface water drainage strategy amended following site investigation and drainage survey. 14-06-12

Project: LINDEN HOMES RESIDENTIAL DEVELOPMENT HAVANT RETAIL PARK BEDHAMPTON		
Title: DRAINAGE STRATEGY		
Date: jan 12	Scales: 1:500@A1	Drawn: ajm
Drawing Number: LIND38-sk1	Rev: B	