

PRELIMINARY DRAINAGE STRATEGY REPORT**UPON****LAND OFF****COBGATE, WHAPLODE,****LINCOLNSHIRE, PE12 6UL****PROJECT No: SW 20-142****DOCUMENT REF: SW 20-142-REP-02**

Mr Adrian Brotherton
Highgrove Homes (Spalding) Ltd.,
Ashgrove Lodge,
Austendyke Road,
Weston Hills,
PE12 6B



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1. INTRODUCTION

Under the instruction of Mr Adrian Brotherton of Highgrove Homes, the following preliminary assessment of the drainage possibilities has been prepared for a proposed residential development of 9 dwellings off Cobgate, Whaplode.

The object of this report is to comment upon the available drainage options for the site and present a suitable preliminary strategy.

It confines itself to the general drainage features in order to illustrate that the site has the potential to be drained in accordance with current policies.

The proposed project consists of the construction of 9 new well sized and well-spaced bungalows at a currently unoccupied site to the South of existing dwellings on Cobgate, Whaplode, Lincolnshire. The dwellings are to be sold on open market for individual private ownership.

The project site is bound on the North by existing dwellings, the East and West by adjoining private gardens and the south by an agricultural field.

A proposed site layout is contained within appendix A.

This report has been prepared for the named client above and should not be relied upon by any other parties, except the client and their specialist third party advisors, without the express written permission of Shields Wilson Limited.

2. Site features

The area of the development is known to be underlain by granular materials, with fine sand and slightly silty sand anticipated to be underlying to depth.

Investigations have been undertaken and are recorded within our report SW20-142-REP-01.

These investigations demonstrated that the site is underlain by fine sands as such we expect that infiltration drainage techniques will be suitable for the site. Exploration logs are included within appendix B.

The proposed site contains a number of different proposed hard surface areas, as listed,

Roofs

Length of adopted highway entering the site

Shared private driveways

Private car parking spaces

Percolation tests have not been taken, however with the sandy granular material encountered infiltration rates are anticipated to be between 5×10^{-6} to 5×10^{-5} .

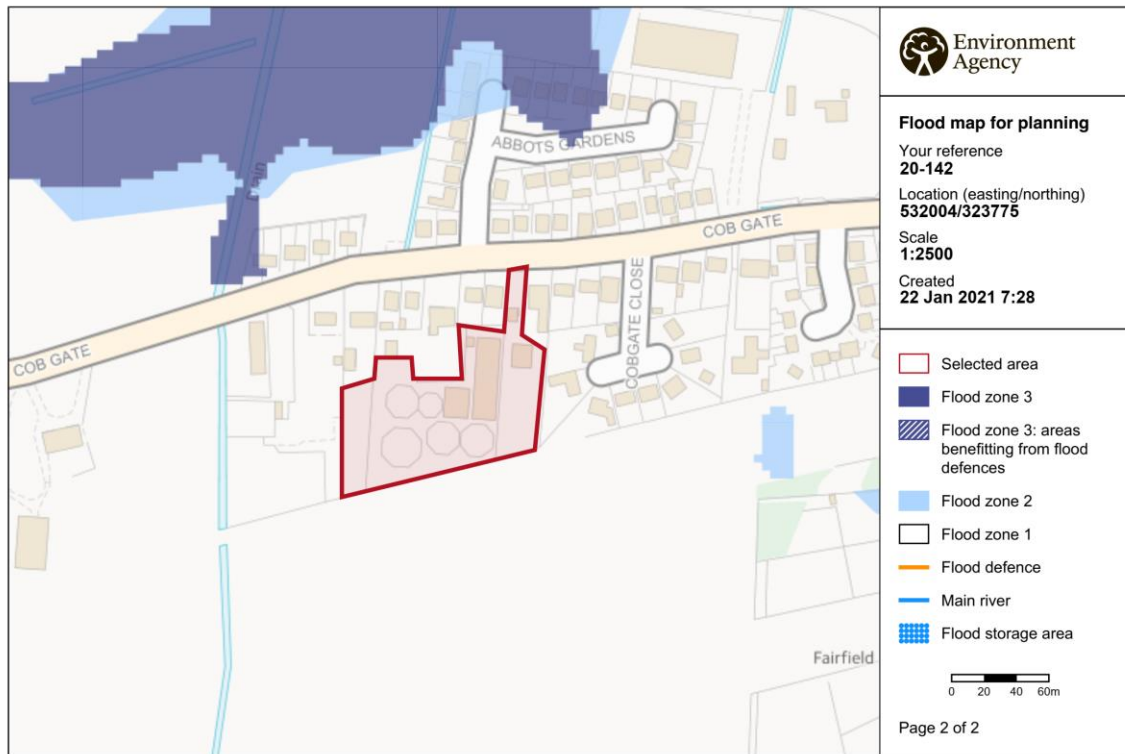
There is an existing Anglian Water Foul water sewer contained within Cobgate running East to West. The sewer sits at a depth of 3.21m below ground level with an Invert level of 0.25m AOD.

The Anglian water asset maps is contained within Appendix C.

The site generally sits at a level of just under 3.3m AOD as shown by the topo of the existing sites contained within Appendix D. Proposed finished floor levels are 3.45m AOD.

3. Flood Risk

The proposed development site is approximately 9,600m² in total area, and stands within flood zone 1 on the Environment Agency flood maps for planning.



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As the site is within Flood zone 1 and is below 1 Ha in area a site specific Flood risk would not be required for support of a planning application.

4. SuDS considerations

The Standards for Sustainable Drainage states that generally the aim should be to discharge surface water runoff as high up the following hierarchy of drainage options as reasonably practicable:

1. Into the ground, Infiltration
2. To a surface water body.
3. To a surface water sewer or highway drain.
4. To a combined sewer.

The following table outlines considerations given for the proposed development following the hierarchy of SuDS within the CIRIA SuDS manual

SUDS Technique	Commentary	Suitability
Infiltration by Soakaway	The underlying soil conditions indicate it should be possible to incorporate disposal of the surface water runoff into infiltration features.	Yes
Green Roofs	Green roofs are not considered suitable for traditional style dwellings, and considered uneconomical for market housing.	No
Permeable Paving	There is a large area of shared private drive and private parking within the site as well as other parking areas around the site which could be constructed using a permeable block paving.	Yes
Attenuation and discharge to surface water sewer	There is area under the private drive area, or under the adopted highway which could be used for underground storage should it be required.	Yes
Swales	A reasonable economical block plan for this site is considered not able to accommodate swales. The limited available width for the access road provides insufficient space to incorporate a	No
Detention Basins	Given the small area of the development and the proposed block plan the use of a basin is not deemed practical on this project.	No
Ponds & Wetlands	Given the small area of the development and the proposed block plan the use of ponds and wetlands are not deemed practical on this project.	No

As the site should infiltrate well, this should be utilised as the main method of surface water run off disposal for the private areas of the proposed development.

LCC Highways will not adopt soakaway features within South Lincolnshire. From site walkover it appears a highway drain is present within Cobgate as gullies are present and are currently draining this existing length of highway.

5. Drainage proposals

The surface water run-off from the roofs, should be discharged into suitably sized garden soakaways, individual where possible respecting structure and boundary spacing rules or shared.

Example individual soakaway calculations in accordance with BRE digest 365 are contained within Appendix E.

The private drive and parking space areas should be constructed utilising a permeable paving system and the surface water runoff will infiltrate directly.

In detailed design it is anticipated that it will be explored to discharge the run-off from the length of adopted highway into the existing LCC highway drainage system. A suitable discharge rate will need to be agreed and it may be necessary to provide some sort of flow control and attenuation under the length of adopted highway.

Should attenuation be required we would anticipate it being in the form of oversized pipes under the adopted highway.

The Foul water will be collected from around the plots in private drains discharging via. Laterals to an adopted Foul water sewer running along the proposed length of adopted road where it will discharge into the existing Anglian water public Foul sewer in Cobgate.

The proposed on site foul system will require a maximum of 1.9m of fall overall, therefore an approx. min. IL at the existing cobgate sewer is 0.85 AOD, which is above the existing sewer as such a connection is possible under gravity drainage.

6. Management & Maintenance

The proposed development is private housing as such the external surfaces and drainage surrounding the plots will belong to the dwelling owners and be under their responsibility and maintenance. The private drive will be portioned and the sections approximately in front of each dwelling will belong to the dwelling owner, thus putting the responsibility for maintenance of this section to a private dwelling owner.

The proposed length of adopted Highway accessing the site will be offered for adoption to LCC Highways and therefore be under their responsibility and maintenance.

The proposed adopted Foul Sewer running along the length of adopted highway will be offered for adoption to Anglian water

For and on behalf of **SHIELDS WILSON LIMITED**

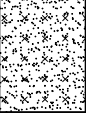
A P Wilson CEng MStructE

22nd January 2021

APPENDIX A



APPENDIX B

SHIELDS WILSON e: info@shieldswilson.co.uk t: 01775 729252 STRUCTURAL AND CIVIL ENGINEERING				Project No. SW20-142		Log Ref TP01		
				Exploration Method Excavator				
				Site Coordinates TF 320237				
Location Proposed Development, Cobgate, Whaplode, Spalding, Lincolnshire				Carried Out For Highgrove Homes		Date Undertaken 16/12/20		
						Logged By APW		
<u>Description</u>	Reduced Level	Legend	Depth (Thick)	<u>Samples</u>			Test Required	Mackintosh Probe
				Depth	Sample Reference	Sample Type No.		
Silty Top Soil.			0.300m					
Light Brown Medium Dense Sandy Silt.			(0.700m) 1.000m					
Light Brown Slightly Grey Moist Silty Sand.			(0.700m) 1.700m					
Light Brown Slightly Grey Moist Silty Sand – Now Wet			(1.050m) 2.250m					
<u>Remarks</u> Borehole Terminated @ 2.25m Below Ground Level. Water Strike @ 1.7m BGL. Sides Collapsing From 1.4m BGL.								

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SHIELDS WILSON e: info@shieldswilson.co.uk t: 01775 729252 STRUCTURAL AND CIVIL ENGINEERING				Project No. SW20-142		Log Ref TP02		
Location Proposed Development, Cobgate, Whaplode, Spalding, Lincolnshire				Exploration Method Excavator		Date Undertaken 16/12/20 Logged By APW		
				Site Coordinates TF 320237				
Carried Out For Highgrove Homes								
<u>Description</u>	Reduced Level	Legend	Depth (Thick)	<u>Samples</u>			Test Required	Mackintosh Probe
				Depth	Sample Reference	Sample Type No.		
Top Soil.			0.400m					
Light Brown Yellowy Silty Dense Sand.			(0.900m) 1.300m					
Light Brown Greyey Moist Medium Dense Sand.			(0.700m) 2.000m					
Light Brown Greyey Moist Medium Dense Sand. – Water Strike.			(0.350m) 2.350m					
Remarks Borehole Terminated @ 2.35m Below Ground Level Due To Sides of Excavation Collapsing. Water Strike @ 2.0m BGL.								

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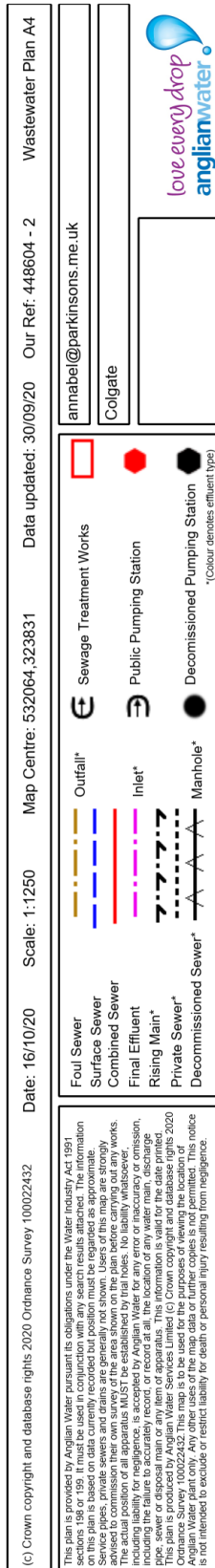
SHIELDS WILSON e: info@shieldswilson.co.uk t: 01775 729252 STRUCTURAL AND CIVIL ENGINEERING				Project No. SW20-142		Log Ref TP03		
				Exploration Method Excavator				
				Site Coordinates TF 320237				
Location Proposed Development, Cobgate, Whaplode, Spalding, Lincolnshire				Carried Out For Highgrove Homes		Date Undertaken 16/12/20		
						Logged By APW		
<u>Description</u>	Reduced Level	Legend	Depth (Thick)	<u>Samples</u>			Test Required	Mackintosh Probe
				Depth	Sample Reference	Sample Type No.		
Top Soil.			0.400m					
Light Brown Silty Dense Sand.			(0.700m) 2.000m					0.75m BGL 73 Blows For 300mm Of Movement 1.05m BGL 110 Blows For 300mm Of Movement
Light Brown Grey Moist Sand.			(0.350m) 2.500m					
<u>Remarks</u> Borehole Terminated @ 2.50m Below Ground Level Due To Water Entering The Excavation.								

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SHIELDS WILSON e: info@shieldswilson.co.uk t: 01775 729252 STRUCTURAL AND CIVIL ENGINEERING				Project No. SW20-142		Log Ref TP04		
				Exploration Method Excavator		Site Coordinates TF 320237		
Location Proposed Development, Cobgate, Whaplode, Spalding, Lincolnshire				Carried Out For Highgrove Homes		Date Undertaken 16/12/20		
						Logged By APW		
<u>Description</u>	Reduced Level	Legend	Depth (Thick)	<u>Samples</u>			Test Required	Mackintosh Probe
				Depth	Sample Reference	Sample Type No.		
Top Soil.			0.400m					
Light Brown Silty Sand Medium Dense.			(1.200m) 1.600m					
Moist Brown Slightly Grey Silty Sand.			(0.800m) 2.400m					
<u>Remarks</u> Borehole Terminated @ 2.40m Below Ground Level Due To Water Entering The Excavation Causing The Sides of the Excavation To Bulge.								

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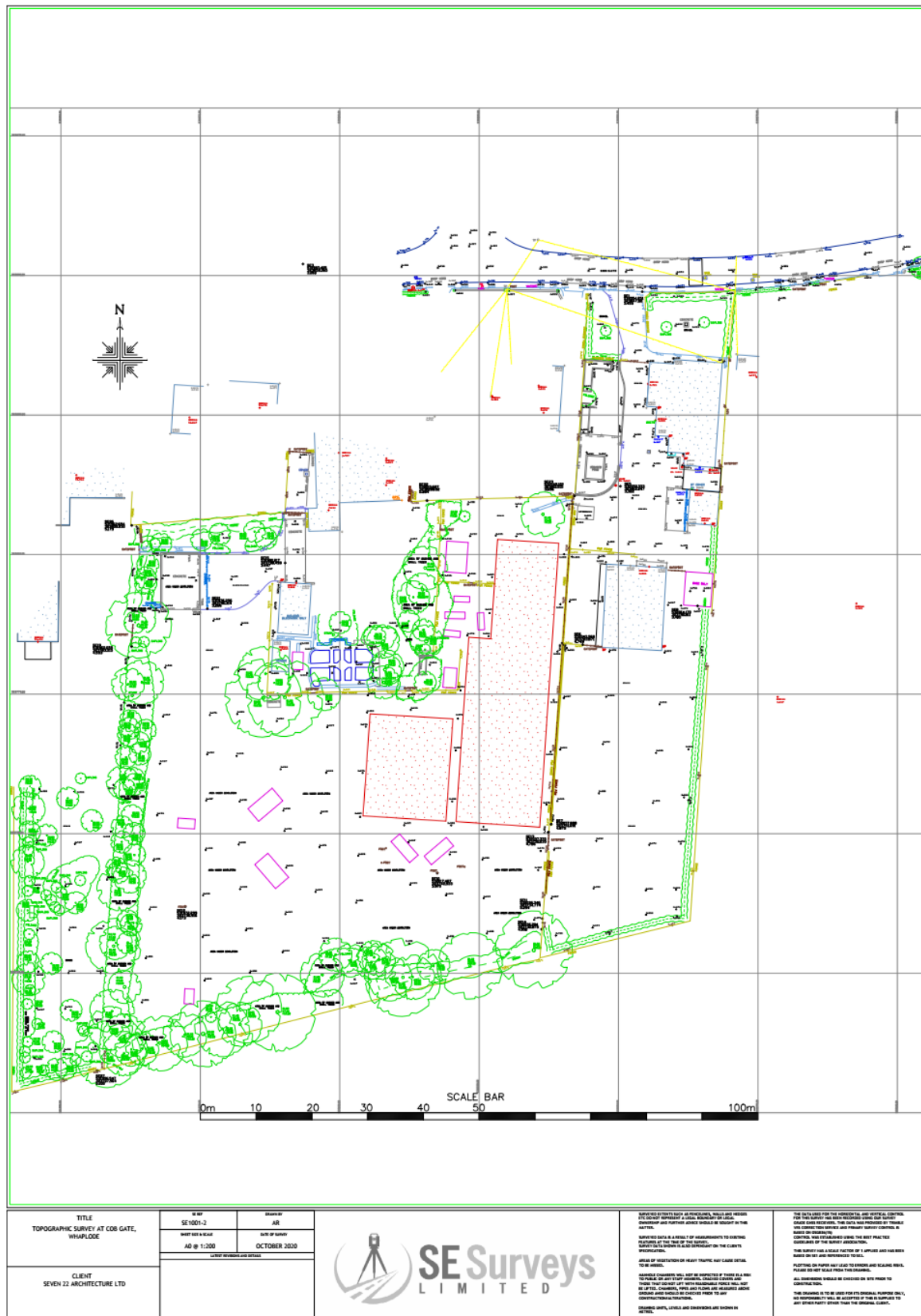
APPENDIX C



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APPENDIX D



APPENDIX E

<u>Job Details</u>		SW20-142 - Residential development, Cobgate Whaplode			
<u>Title</u>		Individual Plot			
<u>Calculated Infiltration Rate (m/s)</u>		0.000001			
<u>Design Rainfall - R</u>		<u>Soakaway Dimensions</u>			
M5-60	Z1	Polystorm crates		Number	Total Lengths
0.02	1	Width	0.5	6	3
M10-D	Z2	Length	1	3	3
0.02	1.24	Depth	0.4	1	0.4
R =	0.0248	m	Half Effective 0.2		
<u>Inflow To Soakaway</u>		<u>Internal Surface Area Not Including Base (50% depth)</u>			
Area (m ²) x R		11.4 m ²			
110	0.0248	<u>Storage Volume</u>			
Inflow =		3.6 m ³			
2.728 m ³					
<u>Outflow From Soakaway</u>					
Internal SA (50%)		Infiltration Rate	Storm Duration (s)		
5.7		0.000001	60	60	3600
Outflow =					
0.02052 m ³					
<u>Storage Required</u>		Soakaway Has Been Designed For A			
Inflow -	Outflow	10 Year Storm Of 60 Minute Duration			
2.728	0.02052	2.70748			
<u>Storage Volume With 30% Free (Required)</u>					
3.519724					
<u>Actual Storage Volume</u>		NB. Actual Storage Volume Needs To Be			
3.6		Greater Than Storage Volume + 30%			