

Drainage & SUDs Strategy In support of Residential Development at

Land at Sunningdale, Gregory Walk, Sedlescombe, East Sussex



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Amendments

Revision	Date	Description
0	July 2019	First Issue
A	November 2019	Updated Planning Layout

References

Reference	Title
А	CIRIA Publication 753 – The SUDS Manual (2015)
В	Sewers for Adoption 7 th Edition (Wrc 2012)
С	Part H of the Building Regulations (2015)
D	The Soakaway Design Guide (KCC 2000)
E	Guide to the Sustainable Drainage Systems in East Sussex (June 2015)
F	Planning Practice Guidance (2016)



Introduction

This Drainage & SUDS Strategy has been developed in support of a planning application for the construction of 9 new residential dwellings and the retention of an existing dwelling at Land at Sunningdale, Gregory Walk, Sedlescombe, East Sussex, TN33 0QZ.

The aim of the Drainage Strategy is to incorporate and adopt Best Management Practices (BMP's) for Sustainable Urban Drainage Systems (SUD's) in accordance with Site Specific Technical Reports and Published Documents referenced in Page (ii). This document also aims to identify the methods of drainage available for the Surface Water Drainage.

A layout of the proposed scheme can be found in the appendices of this document.

Development Description and Location

The development proposal is for the erection of 9 new residential dwellings and the retention of an existing dwelling in the generous garden area of the land at Sunningdale. This land is located within the village of Sedlescombe and is in the district of Rother.

The location of the proposed site is at grid reference 578140, 117720 as shown in the location plans in the appendices.

Existing Drainage

There are public foul water sewers in the vicinity of the application site in Gregory Walk and The Street, which runs through the middle of Sedlescombe, however there are no public surface water sewers. There is a river to the South of the proposed development, the River Line which is a tributary of the River Brede. It is likely that the current situation allows the surface water that is generated from this catchment to runoff directly to the River Line.



Site Geology

The site is underlain by the Ashdown Formation as described by the British Geological Survey, typically consists of siltstones and finely grained sandstones with subordinate amounts of finely bedded mudstone. This Mudstone is arranged in rhythmic units "Cyclothems" and is commonly divided by thin pebble beds. In the East of the county, the formation tends to be more clayey in its lowermost part, whereas the uppermost 30 - 50m tend to be a sandier material.

Typically, because the Ashdown Formation is so variable it is generally deemed as unsuitable for infiltration, therefore, no soakage testing has been undertaken at this site.

Ground Water

Local geotechnical records have been checked, which indicates groundwater is approximately 15m below ground level.

The proposed development site has been checked against Environment Agency Source Protection Zones (SPZ's) for groundwater and can be confirmed that the proposed development is outside of any SPZ's. A plan of the SPZ map is contained in the appendices.

Topography

The land at Sunningdale is bounded at the Western, Southern and Eastern edges with mature hedging and trees, whereas the Northern boundary is shared with the existing homes at Gregory Walk. The River Line also runs along the Southern Boundary of the site.

The land is quite variable and generally slopes to the South West corner of the land. The site has not yet had the benefit of a full topographical survey, but would be undertaken prior to any detailed design work being undertaken.



Design Objective

The objective of the design will be to;

- a) Retain/reduce the quantity of surface water runoff leaving the development area, to equal or less than the greenfield runoff rate for all storms, up to and including the 1 in 100 year return period + 20% climate change, while still assessing the effect of the + 40% climate change.
- b) Improve the quality of surface water runoff by infiltration methods and open SUD's wherever possible.

Development Drainage Proposals

Surface Water Drainage

It is not intended that the proposed development drainage will be offered for adoption to any of the statutory authorities, however, the surface water calculations for the proposed development will be in accordance with the requirements set out in Planning Practice Guidance, East Sussex County Council SUDS publications and CIRIA 753 SUDS Manual.

Given the local geology is generally deemed unsuitable for infiltration, the strategy will focus on utilising open SUDS to retain surface water before being allowed to discharge into the River Line at the Southern Boundary of the site.

The development consists of up to 9 new residential dwellings and the retention of an existing dwelling. These dwellings will be serviced by a new access road, footway and off road parking for each of the new homes, which will increase the impermeable area at the site.

The new road and footways have been measured and generate 766.83m² of impermeable area. The new dwellings with their respective driveways generate 960.46m² of impermeable area.

These catchments can be seen on the Drainage Strategy drawing. The Drainage Strategy drawing also shows the indicative surface water network for the development, directing the development water to a new attenuation area. This attenuation will function on the basis of being a dry basin



above underground attenuation crates. It is intended that the dry basin will only fill in the critical storm scenario for the climate change adjusted 1 in 100 year storm.

The 1 in 1 year greenfield runoff for the site has been calculated at 2.2l/s and therefore the discharge from the planned attenuation will be designed to accommodate this limited discharge.

The attenuation at the South West boundary, being the dry basin and underground geocellular storage is currently planned at 130m³ which for the 40% climate change event would require further storage to be found on site, which can be easily be accommodated in a permeable paving system in the private driveways and other system storage.

The system has currently been designed in a particular way, as invert levels with the drainage will need to remain flexible until the precise location and depth of a strategic water main crossing the site has been confirmed. Once this information has been gathered along with a full topographical survey, the final design can be confirmed.

Foul Water Drainage

There are public foul sewers in Gregory Walk, however the details of these sewers have not yet been confirmed. It is not possible to confirm the foul water drainage strategy without the provision of a topographical survey to review against public sewer asset plans, however it would be sensible to assume a small package pumping station may be required.

Residual Flood Risk

This development has not been formally assessed in a site specific flood risk assessment as the site sits entirely within Environment Agency Flood Zone 1. This is confirmed in the Flood Maps for Planning, contained in the appendices. Although there is no formal flood risk assessment for this site, this Drainage strategy takes the principles normally identified within a flood risk assessment, to incorporate them within the detailed design, focusing on reduction and mitigation of flood risk for both on and off site.



Surface Water Drainage systems have been designed to cater for and up to the 1 in 100 year return period, plus 20% and 40% climate change, retaining the surface water on site in accordance with LLFA requirements and Industry Guidance.

Local groundwater levels have been assessed and considered a low risk of groundwater flooding, as the groundwater is estimated at around 15m BGL.

Future Maintenance

Maintenance regimes of the various drainage methods will vary, depending on the development proposals and surroundings. However, a general guide to the maintenance of the various methods of drainage have been provided below;

Maintenance of Ponds & Wetland

There will a newly designated dry basin, which will be situated at the South West of the Proposed development.

The dry basin has been designed as an attenuation area, however is not intended to hold water permanently all year round, only coming into operation in the +20% and +40% climate change adjusted critical storms for the 1 in 100 year event. It will always have adequate storage for the full range of designed storms.

The new area will have attenuation with sloping banks at a 1:3 gradient to allow safer access and egress for maintenance when required.

The banks of the new area shall be laid to grass (seeded) to prevent any future potential scour. The growth of selected grasses and other plant life will encourage future biodiversity potential.

All maintenance operations are to be carried out in accordance with the tabulated recommendations.



The ongoing maintenance activities for these ponds are tabulated below in Table 1.

Table 1 – Pond & Wetland Maintenance Activities – By the appointed Management Company

Maintenance Activity	ance Activity Remedial Action		псу
Inspect perimeter for	Remove litter and debris with	Pre-completion	Monthly
Litter and debris	appropriate tools and dispose to		
	the appropriate facility.	Post completion	Quarterly
		 up to 1 year 	
		On-going	Annually or as required
Inspect vegetation for	Re-seed where necessary and cut	Pre-completion	Half Yearly
even growth and	back meadow grass etc outside	Post completion	Half Yearly
retained height.	of bird nesting seasons.	 up to 1 year 	
		On-going	Half Yearly
Inspect channel and	Repair any affected areas by	Pre-completion	Quarterly
discharge points for	replacing any lost soil and re-	Post completion	Quarterly
erosion.	turfing where necessary.	 up to 1 year 	
		On-going	Annually or as required
Inspect outlet pipes	Remove any excess sediment	Pre-completion	Monthly
and culverts for	from the pipes/culverts with	Post completion	Quarterly
sediment build-up.	drainage rods and/or professional	 up to 1 year 	
	jetting techniques.	On-going	Annually or as required
Inspect main water	Remove excess sediment build up	Pre-completion	Monthly
body for sediment	when pool volume is reduced by	Post completion	Quarterly
build up.	up to 20%. Clearance is normally	 up to 1 year 	
	every 10 – 20 years.	On-going	Annually or as required

Maintenance of Gullies and Catch pits

To ensure the long-term effectiveness of the surface water collection asset, the sediment that accumulates within the sump of the conventional gully pot or catch pit must periodically be removed to prevent it from entering the rest of the network. The frequency of this maintenance operation will vary depending on the density of the site, vegetation, design of the drainage system, other permeable areas and if the site is pre or post construction.

All maintenance operations are to be carried out in accordance with the manufacturer's recommendations.



The ongoing maintenance activities for this system are tabulated below in Table 2.

Table 2 – Gully and Catch Pit Maintenance – By the appointed Management Company.

Maintenance Activity	Remedial Action	Inspection Frequency	
Inspect Gullies and	Gullies and Clear any sediment or detritus found		Monthly
Catch-pits	in the chamber/s. If sediment has		
	built up within the pipe network, this	Post completion –	Quarterly
	should be cleared with rodding	up to 1 year	
	equipment or professional jetting	On-going	Annually
	techniques.		

Maintenance of Geocellular Storage

To ensure the long term effectiveness of the storage asset, the sediment that accumulates within the SUDS system must periodically be removed to prevent it from entering the chamber and slowing the infiltration of the system. The frequency of this maintenance operation will vary depending on the density of the site, vegetation, design of the drainage system, other permeable areas and if the site is pre or post construction.

All maintenance operations are to be carried out in accordance with the manufacturer's recommendations.

The ongoing maintenance activities for this system are tabulated below in Table 3.

Table 3 – Soakaway/Attenuation Maintenance by the appointed Management Company

Maintenance Activity	Remedial Action	Inspection Frequency	
Inspect Catch-pits	Clear any sediment or detritus found	Pre-completion	Monthly
	in the chamber/s. If sediment has		
	built up within the pipe network, this	Post completion –	Quarterly
	should be cleared with rodding	up to 1 year	
	equipment or professional jetting	On-going	Annually
	techniques.		



Appendices

- Site Location Plans
- Source Protection Zone Map
- Geoindex Map
- Flood Maps for Planning
- Development Proposals
- Drainage Strategy Layout
- Calculations

MAGîC

Location Plan



MAGiC

SPZ Map



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Ture A
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X
PS
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Cottage
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Farmhouse
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- Etx
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Legend

Source Protection Zones merged (England)

- Zone I Inner Protection Zone
- Zone I Subsurface Activity
- Zone II Outer Protection Zone
- Zone II Subsurface Activity
- Zone III Total Catchment
- Zone III Subsurface Activity
- Zone of Special Interest

Projection = OSGB36			
xmin = 572200	0	0.35	0.7
ymin = 114700			
xmax = 583300	-	km	
ymax = 121100			
Map produced by MAGI	C on 8 July,	2019.	
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originating organisatio	n. Please re	fer to the r	netadata for
details as information r	nay be illust	rative or re	presentative
rather than definitive a	t this stage		

Bedrock Geology





Contains OS data © Crown Copyright and database right 2018

GeoIndex Onshore Data Sources: NERC, Natural England, English Heritage and Ordnance Survey

Map Key

Bedrock geology 1:50,000 scale

- ASHDOWN FORMATION SANDSTONE, SILTSTONE AND MUDSTONE
- TUNBRIDGE WELLS SAND FORMATION SILTSTONE, MUDSTONE AND SANDSTONE
- GREYS LIMESTONES MEMBER MUDSTONE AND LIMESTONE, INTERBEDDED
- WADHURST CLAY FORMATION MUDSTONE
- BLUES LIMESTONES MUDSTONE AND LIMESTONE, INTERBEDDED
- ASHDOWN FORMATION MUDSTONE
 - PURBECK GROUP MUDSTONE, SANDSTONE AND LIMESTONE
- WADHURST CLAY FORMATION SANDSTONE
- TUNBRIDGE WELLS SAND FORMATION MUDSTONE AND SILTSTONE



Flood map for planning

Your reference Sunningdale Location (easting/northing) **578140/117720**

Created 4 Jul 2019 7:46

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

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04/07/2019 GOV.UK Long term flood risk information

Learn more about flood risk

Select the type of flood risk information you're interested in. The map will then update.

You can <u>learn more about the ways we describe flood risk</u>. Alternatively select a legend item or feature from the map for an explanation of that flood risk.

'Detailed view' shows more technical information.

All information, particularly the likelihood of surface water flooding, is a general indicator of an area's flood risk. As such it is not suitable for identifying whether an individual property will flood. This service uses computer models to assess an area's long term flood risk from rivers, the sea, surface water and some groundwater. It does not include flood risk from sources such as blocked drains and burst pipes.



Accuracy of surface water flood risk information

View the flood risk information for another location

04/07/2019 GOV.UK Long term flood risk information

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Accuracy of surface water flood risk information

View the flood risk information for another location







Calculated by:	
Site name:	Land at Sunningdale
Site location:	Sedlescombe

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Greenfield runoff estimation for sites

www.uksuds.com | Greenfield runoff tool

Site coordinates

Latitude:	50.93139° N
Longitude:	0.53353° E
Reference:	
Date:	2019-07-04 19:39

Methodology	IH124						
Site characteristics							
Total site area (ha)			0.4520				
Methodology							
Qbar estimation metho	bd	Calculate fro	om SPR ar	nd SAAR			
SPR estimation method Calculate fro			om SOIL type				
Default Edited							
SOIL type			4	4			
HOST class							
SPR/SPRHOST	0.47	0.47					
Hydrological characteristics Default Edited							
SAAR (mm)			808	808			
Hydrological region	7	7					
Growth curve factor: 1	0.85	0.85					
Growth curve factor: 3	2.3	2.3					
Growth curve factor: 1	3.19	3.19					

Notes:

(1) Is Q_{BAR} < 2.0 l/s/ha?

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consents are usually set at 5.0l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set in which case blockage work must be addressed by using appropriate drainage elements. (3) Is SPR/SPRHOST ≤ 0.3 ?

Greenfield runoff rates L Default Edited Qbar (l/s) 2.58 2.58 1 in 1 year (l/s) 2.19 2.19 1 in 30 years (l/s) 5.94 5.94 1 in 100 years (l/s) 8.23 8.23

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This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at http://uksuds.com/terms-and-conditions.htm. The outputs from this tool have been used to estimate storage volume requirements. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for use of this data in the design or operational characteristics of any drainage scheme.

Land at Sunningdale, Sedlescombe

	Controlled	2.2	I/s			
	Total Imper	meable Area	1729	m^2		
	Runoff Coef	ficient	1			
Storage Calculations for 1 in 30 year r					return perio	d
Storm Rainfall Area m^2 Peak Flow					Adjusted	Storage
	Duration	Intensity		l/s	Peak Flow	Required
		mm/h				m^3
	15	99.71	1729	47.92681	45.72681	41.15413
	30	63.52	1729	30.53165	28.33165	50.99697
	60	39.88	1729	19.1688	16.9688	61.08768
	120	23.82	1729	11.44937	9.249369	66.59546
240 13.96 172				6.710042	4.510042	64.9446
	360	10.27	1729	4.936399	2.736399	59.10621
	600	6.71	1729	3.225242	1.025242	36.90871
	1440	2.98	1729	1.432373	-0.76763	-66.323
						_
	Controlled	Discharge/S	oakage Rate	2	2.2	l/s
	Total Imper	meable Area	1729	m^2		
Runoff Coefficient					1	
Storage Calculations for 1 in 100 year return period					rn period + 2	20% CC
	Storm	Rainfall	Adjusted	Storage		
Duration Intensity					Dook Flow	Required

Storm	Rainfall	Area m^2	Peak Flow	Adjusted	Storage
Duration	Intensity		l/s	Peak Flow	Required
	mm/h				m^3
15	160.48	1729	77.13664	74.93664	67.44297
30	103.6	1729	49.79658	47.59658	85.67385
60	63	1729	30.28171	28.08171	101.0941
120	37.04	1729	17.80372	15.60372	112.3468
240	21.47	1729	10.31981	8.119813	116.9253
360	15.58	1729	7.488714	5.288714	114.2362
600	10.14	1729	4.873913	2.673913	96.26086
1440	5.11	1729	2.456183	0.256183	22.1342

Controlled	Discharge/S	2.2	l/s					
Total Imper	meable Are	1729	m^2					
Runoff Coe	fficient	1						
Storage Calculations for 1 in 100 year return period + 40% CC								
Storm	Rainfall	Area m^2	Peak Flow	Adjusted	Storage			
Duration	Intensity		l/s	Peak Flow	Required			
	mm/h				m^3			
15	187.22	1729	89.98954	87.78954	79.01059			
30	120.86	1729	58.09281	55.89281	100.6071			
60	73.5	1729	35.32866	33.12866	119.2632			
120	43.22	1729	20.77421	18.57421	133.7343			
240	25.05	1729	12.04058	9.840583	141.7044			
360	18.17	1729	8.733629	6.533629	141.1264			
600	11.83	1729	5.686231	3.486231	125.5043			
1440	5.96	1729	2.864746	0.664746	57.43401			