

# Technical Note

## Outline Drainage Strategy for Development Land at White House Farm, Weston Lullingfields (SA48763\_TN1)

Issue 1.1 – 29.4.2024

### 1. Introduction

- 1.1 This outline drainage strategy has been prepared by Richard Harman, who is an Incorporated Engineer and a Fellow of the Institute of Highway Engineers with over 20 years' experience.
- 1.2 This technical note accompanies a Surface Water Drainage Proforma and has been produced to provide an outline drainage strategy for the proposed housing development on land at White House Farm, Weston Lullingfields, Shrewsbury, SY4 2AA. The site location is indicated in Figure 1 below.



Figure 1: Site location as indicated on Ordnance Survey mapping – © Ordnance Survey 2023.

- 1.3 The proposed development consists of the construction of three residential dwellings on land laying to the west of an unclassified road. The dwellings are proposed to be constructed on land presently occupied by farm buildings and yard areas. The site is therefore deemed to be brownfield land.
- 1.4 The proposed development site is located in Flood Zone 1 and is therefore considered to be at a very low risk of fluvial flooding. No other flood risk issues are known for the site. An extract of the Environment Agency (EA) long term flood risk map is shown below for info, which should some minor surface water flood risk in the adjacent roads.



Figure 2: EA long term flood risk map – © EA 2023.

- 1.5 This Technical Note (including any attachments) has been prepared with care and due diligence in relation to the outline drainage strategy for the proposed residential housing development on land at Weston Lullingfields and solely for the purpose for which it is provided. Unless we provide express prior written consent, no part of this report should be reproduced, distributed or communicated to any third party. We do not accept any liability if this report is used for an alternative purpose from which it is intended, nor to any third party in respect of this report.

## 2. Desktop Study - Ground Conditions

- 2.1 A site desktop study has been undertaken to ascertain the nature of the existing underlying ground at the site. Publicly available data from the British Geological Survey (BGS) mapping services has been used to obtain details of the underlying bedrock and superficial deposits. The BGS service also includes information logged from boreholes and trial pits, these have been referenced below.
- 2.2 The BGS mapping indicates the upper superficial deposits as glaciofluvial deposits, Till - Devensian – diamicton, described as “unsorted and unstratified drift, generally overconsolidated, deposited directly by and underneath a glacier without subsequent reworking by water from the glacier. It consists of a heterogenous mixture of clay, sand, gravel, and boulders varying widely in size and shape (diamicton)” (source: BGS Lexicon of Named Rock Units). To further investigate the upper ground deposits, Cranfield Soilscales has been consulted, describing the soil as “slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils” with impeded drainage. BGS notes bedrock geology as the Bollin Mustone Member. Figure 3 shows an overview of the Soilscales map.

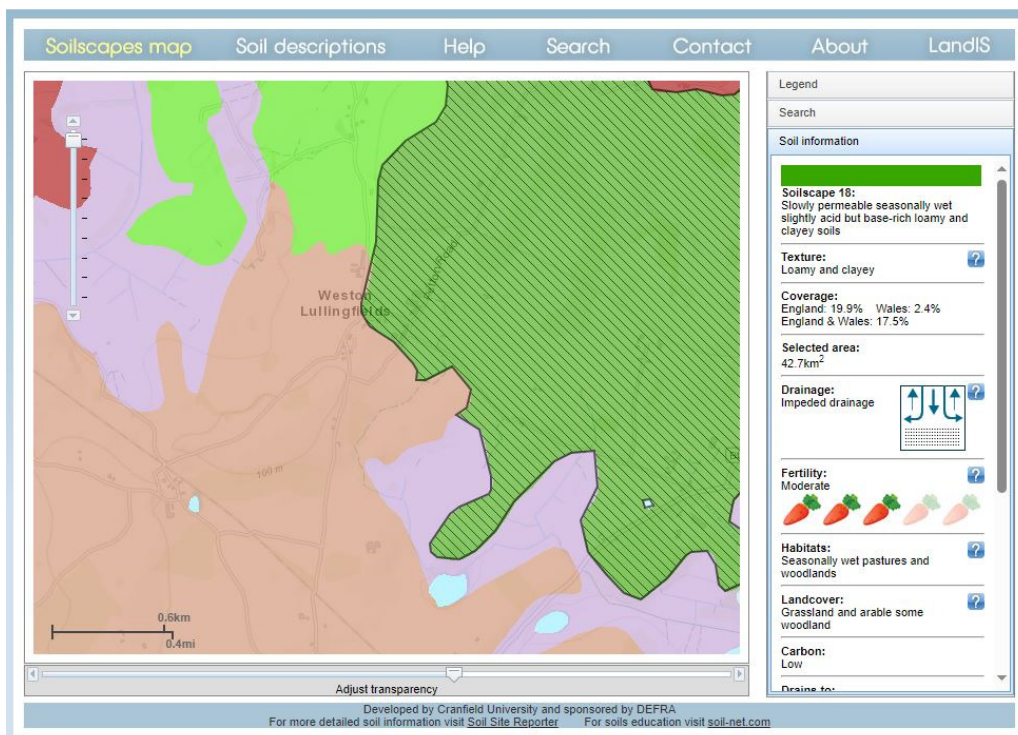


Figure 3 Cranfield University Soilscales Map. © Cranfield University 2023.

- 2.3 Borehole record referenced SJ42SW20 from BGS has been obtained, as this is located approximately 100m due north from the site. This record relates to the formation of a well and shows that the ground is underlain by stony marl (silt and clay), sand and gravel, and marl. Water was struck at 15.5m below ground level, which is therefore a good indication that groundwater is sufficiently below ground level as to not pose a flood risk or a constraint for drainage components. A copy of the borehole record is available in Appendix A.
- 2.4 From our review of the ground geology data, we consider it likely that the site ground is not suitable for infiltration drainage, due to its clay composition. However, infiltration tests in accordance with BRE digest 365 will be required at the pre-construction phase if the development is approved. An alternative means of disposing surface water will be discussed later in this note.

## 3. Surface Water Drainage

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- 3.1 Further to the desktop study, this drainage strategy has been produced to demonstrate how the drainage for the proposed development will be designed, constructed and maintained, in accordance with Chapter 14 of the NPPF to take a risk-based approach, to consider the current and future impact of climate change, in order to avoid flood risk to people and property. Note that sustainable drainage (SuDS) components will be required for the development, and these will seek to maximise opportunities for enhanced water quality, biodiversity and amenity value. The Shropshire Council Interim SuDS Guide for Developers forms the local guidance, which refers to other non-statutory SuDS guidance such as CIRIA C753. The various guidance documents advise the following surface water disposal hierarchy for surface water arising from development sites, with the most preferred options at the top of the list:
- Re-use of water
  - Into ground (Infiltration)
  - To a surface water body
  - To a surface water sewer, highway drain, or other surface water drainage system
  - To a combined sewer
- 3.2 As referenced in chapter 2, it is likely that the underlying ground will not support drainage to infiltration. However, BRE Digest 365 tests will be required at the pre-construction phase to check whether the ground will support partial infiltration and permeable surfaces. However, as this stage we deem it likely that a positive outflow to a surface water body will be required. Therefore, a controlled discharge will be needed, with attenuation. The system will be designed to accommodate a 1 in 100 year plus 40% climate change event without flooding.
- 3.3 No surveys of the existing farm drainage infrastructure are available at this stage, however we recommend that surveys are carried out prior to preparing the detailed designs. This may reveal there is an existing drainage network which can be upgraded to serve the development, but at this stage we assume that a new drain will need to be constructed to serve the development outfall. We have therefore investigated a connection and we note that the surrounding land falls away from the site to an ordinary watercourse laying approximately 220m to the south east, as shown in Figure 4. This is within the applicant's land ownership, and we therefore deem it feasible that an adoptable surface water connection can be made to this watercourse.

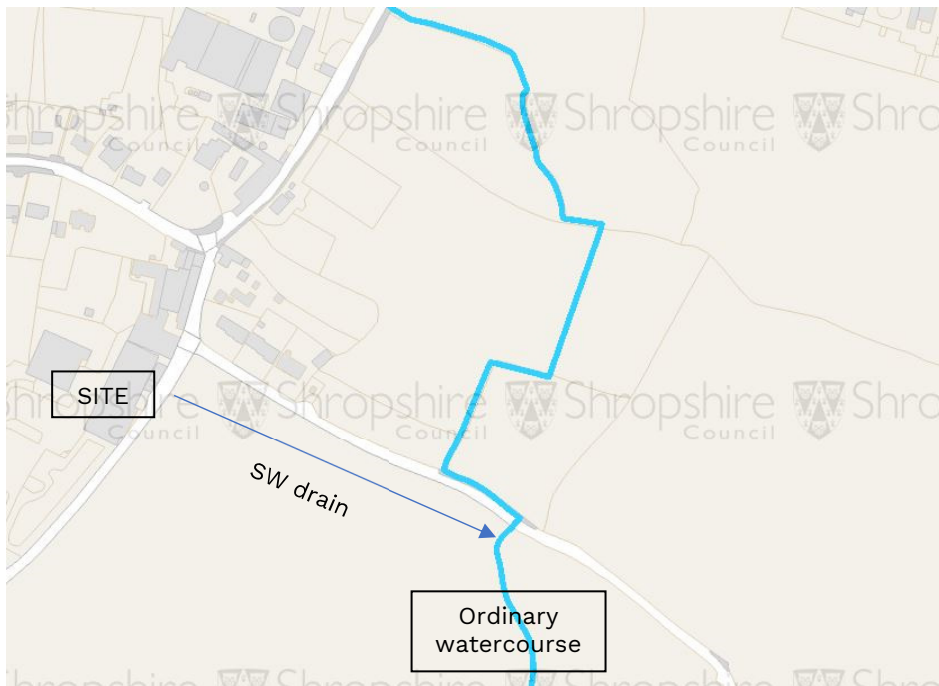


Figure 4 extract from Shropshire Council flood and water management map

- 3.4 A detailed assessment of site runoff rates will be required at the detailed design stage, which will need to include a survey of all of the existing impermeable areas. As the site is brownfield land, a detailed assessment of the existing runoff rates should be carried out using the Modified Rational Method and as an absolute minimum, the existing rates of runoff should be reduced by 50%. However, a lower rate of runoff closer to greenfield rates should be targeted, if achievable. We have therefore based this initial assessment of runoff rates for the development area using the IH124 greenfield rate. We have calculated that the proposed development impermeable areas including for 10% climate change at the plots gives a positively drained area of 870m<sup>2</sup>. Figure 4 below therefore shows the calculated greenfield rates for this area, carried out using Causeway Flow hydraulic design software.

**Pre-development discharge**

Site Makeup: Greenfield (dropdown)  
 Greenfield Method: IH124 (dropdown)  
 Positively Drained Area (ha): 0.087  
 SAAR (mm): 692  
 Soil Index: 4 (dropdown)  
 SPR: 0.47  
 Region: 4 (dropdown)  
 Betterment (%): 0  
 QBar (l/s): 0.4

Buttons: OK, Cancel, Load, Calc

Note: FEH point descriptors can be downloaded from [fehweb.ceh.ac.uk](http://fehweb.ceh.ac.uk)  
 Only XML file format can be used  
 FEH-22 is the current FEH data and this should be used for new development  
 ReFH2 legacy – Doesn't contain the new BFIHOST19 descriptor  
 ReFH2 – Contains the new BFIHOST19 descriptor

Return Period (years)	Growth Factor	Q (l/s)
1	0.85	0.4
30	1.95	0.8
100	2.48	1.0

Figure 4 greenfield runoff rate calculations using the IH124 method using Flow

3.5 The above calculated rates of runoff are below the lowest practical rate of controlled outflows, which is generally accepted as 2l/s. Therefore, we propose that the SuDS will control and attenuate flows, with a maximum outflow of 2 l/s. An estimate of the required attenuation volume has been shown in Figure 5 below.

**Storage Estimate**

Return Period (years): 100  
 Climate Change (%): 40  
 Impermeable Area (ha): 0.087  
 Peak Discharge (l/s): 2.000  
 Infiltration Coefficient (m/hr) (leave blank if no infiltration):  
 Required Storage (m³):  
 from: 36  
 to: 51  
 With infiltration (m³):  
 from:  
 to:

Buttons: OK, Cancel, Update, Calc

Figure 5 attenuation storage estimate using Flow

- 3.6 We consider that the above calculated storage volumes can be dealt with on site without additional land. The layout of the SuDS will be dealt with at the detailed design stage.
- 3.7 Note that the above assessments can be used as a guide to help inform the proposed SuDS components and layout at the detailed design stage. Note that the systems will need to be designed in accordance with the Building Regulations for England Part H, the Shropshire Council Interim SuDS Guide for Developers, and CIRIA C753 The SuDS Manual.
- 3.8 All onsite drainage and SuDS infrastructure are to be inspected and maintained in accordance with the maintenance requirements, which will be set out in the detailed drainage design. It is likely that the SuDS will be designed for adoption under a Section 104 agreement with Severn Trent, with exception to the 1 in 100 year plus climate change storage which will need to be maintained privately as the water company won't adopt this.
- 3.9 Shropshire Council's Appendix A1 – Surface Water Drainage Proforma has been completed and can be referred to in Appendix B.



## 4. Foul Drainage

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- 4.1 A utilities search has confirmed the presence of a 150mm dia Severn Trent public foul sewer to the east of the proposed development. The sewer is located under the nearby unclassified road and leads to a pumping station. A copy of the sewer records can be found in Appendix C. A gravity connection from the development to chamber referenced 7801 appears to be feasible, but further investigation of the local levels will be required at detailed design.
- 4.2 Further to the above, we are satisfied that the development can be connected to the public sewer network. We advise that a developer enquiry should be submitted to Severn Trent early in the pre-construction design phase. A Section 106 application will be required prior to connection to the existing Severn Trent Water public sewer.
- 4.3 Overall, we are satisfied that an acceptable means of drainage for the proposed development can be achieved to meet all of the prevailing planning and regulatory rules.

**Written and approved by:**  
**Richard Harman IEng FIHE**  
**Partner & Head of Engineering**





SJ42SW/a0 123540

**RECORD OF WELL (SHAFT OR BORE)**  
4281.2493

Survey use only  
**138** N. 7916  
**348**  
Licence No. 91222/16/2600

EXACT SITE OF WELL

At River. (Site No.5 on enc.plan)  
Wotton Inlincfields.

Town or Village. Shrewsbury.

County. Shropshire.

Six-inch quarter sheet 20 SE/E

For P. H. Edwards.

State whether owner, tenant, builder, contractor, consultant, etc.:— Owner.

Address (if different from above).....

Level of ground surface above sea-level (O.D.).....ft.  
If well-top is not at ground level, state how far {above: .....ft. below: .....ft.

SHAFT.....ft.; diameter.....ft.; Full details of headings (dimensions and directions)

BORE 62 ft.; diameter of bore: at top 10 1/2 ins.; at bottom 7 1/2 ins.

Full details of permanent lining tubes (position, length, diameter, plain, slotted etc.) 5" dia. liner tube to 50ft, 5" dia. slotted copper tube from 50ft to 60ft.

Water struck at depths of 51 ft. below well-top.

TEST CONDITIONS

Rest level of water 14 1/2 ft. above well-top. Suction at 60 ft. Yield on 40 hours' test pumping at 720 galls. per hr with depression to 48 ft. below well-top.  
Recovery to rest-level in 3 hours Capacity of pump 720 g.p.h. Date of measurements Sep. '56.

NORMAL CONDITIONS

DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:  
Make and/or type Sump 12B25. Motive power Electricity.  
Capacity.....gallons per hour. Suction at 47 1/2 ft.  
Amount pumped.....galls. per day. Estimated consumption.....galls. per week.  
Well made by Wyatt Bros. (Wh/ch) Ltd., Wayland Works, Whitechurch, Shropshire. Date of well 25/7/56.  
Information from " " " "

ADDITIONAL NOTES

ANALYSIS (please attach copy if available)

Bottom 2ft filled in with gravel.

Sited by D on 6" Salsp 20 SE/E. rd 11/56

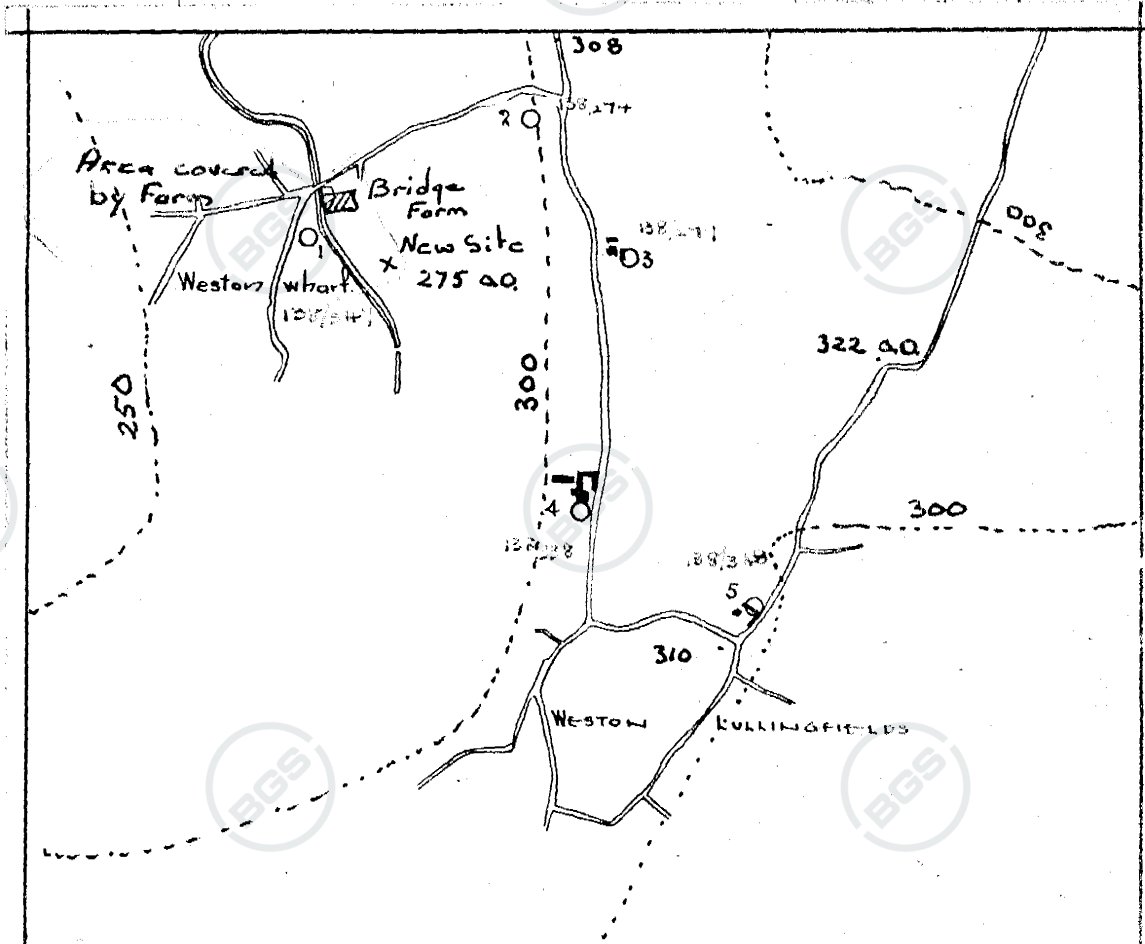
LOG OF STRATA OVERLEAF.

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.	Section 6.	Date Received	1" O.S. Map No.	Site marked on 1" Map	(use symbol on 6" Map)
		30.11.56			

(1527) D4574/W137583 12,000 R. 24. 10.55 G.P. 1956

N.E.R. 4281.2493      SJ 42SW 20

(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA  If measurements start below ground surface, state how far ...	THICKNESS		DEPTH	
		Feet	Inches	Feet	Inches
Soil.		2	0	2	0
Stony Marl.		49	0	51	0
Sand and Gravel.		9	0	60	0
Marl.		2	0	62	0



SIX-INCH SHROPSHIRE SHEET 205E

W. G. ...  
 Date 20/11/56  
 Scale 6" to 1 mile      82327  
 Traced by C.V.      Drawn by [Signature]



SHEET SJ 42 NV  
SHEET SJ 42 SW

138

348

SJ 42SW/20

SITE OF LICENCED WORK



PLAN ANNEXED TO LICENCE ISSUED  
UNDER SECTION 14 OF THE WATER ACT 1945

TO Mr. P. H. Edwards.

ON 4<sup>th</sup> FEB 1950 IN RESPECT OF  
Sinking of a 5 inch diameter borehole  
to a depth of 100 feet.

AT Rises, Weston Lullingfields,  
in the Parish of Baschurch,  
in the Rural District of Ellesmere,  
Shropshire.

Ministry of Housing and Local Government  
Reference No. 91222/16/2652.

Scale 1:10,560 or 6 Inches to 1 Mile

Crown Copyright Reserved





18/248  
SJ 42/28  
For Survey use only  
N. 7916  
138  
348  
Licence No. 91222/16/2682

**RECORD OF WELL (SHAFT OR BORE)**

NGR SJ 4280 2492

At Rises. (Site No.5 on enc.plan)

Weston Lullingfields.

Town or Village Shrewsbury.

County Shropshire.

Six-inch quarter sheet 20 SE/E

For P. H. Edwards.

State whether owner, tenant, builder, contractor, consultant, etc.:— Owner.

Address (if different from above)

Level of ground surface above sea-level (O.D.).....ft.

If well-top is not at ground level, state how far {above: .. below; .....ft.

SHAFT.....ft.; diameter.....ft.; Full details of headings (dimensions and directions)

BORE 62.....ft.; diameter of bore: at top 10 1/2.....ins.; at bottom 7 1/2.....ins.

Full details of permanent lining tubes (position, length, diameter, plain, slotted etc.) 5" Dia. liner tube to 50ft, 5" dia. slotted copper tube from 50ft to 60ft.

Water struck at depths of 51.....ft. below well-top.

Rest level of water 14 1/2.....ft. ~~above~~ below well-top. Suction at 60.....ft. Yield on 40.....hours' test pumping at 720.....galls. per hr with depression to 48.....ft. below well-top.

Recovery to rest-level in 3.....~~mins~~ hours Capacity of pump 720.....g.p.h. Date of measurements Sep. '56.

DESCRIPTION OF PERMANENT PUMPING EQUIPMENT:

Make and/or type Sumo 12P25. Motive power Electricity.

Capacity.....gallons per hour. Suction at 47 1/2.....ft.

Amount pumped.....galls. per day. Estimated consumption.....galls. per week.

Well made by Wyatt Bros. (Wh/ch) Ltd., Weyland Works, Whitchurch, Shropshire. Date of well 25/7/56.

Information from " " " " " "

ADDITIONAL NOTES

ANALYSIS (please attach copy if available)

Bottom 2ft filled in with gravel.

Sited by O on 6" Galop 20 SE/E. 17/11/56

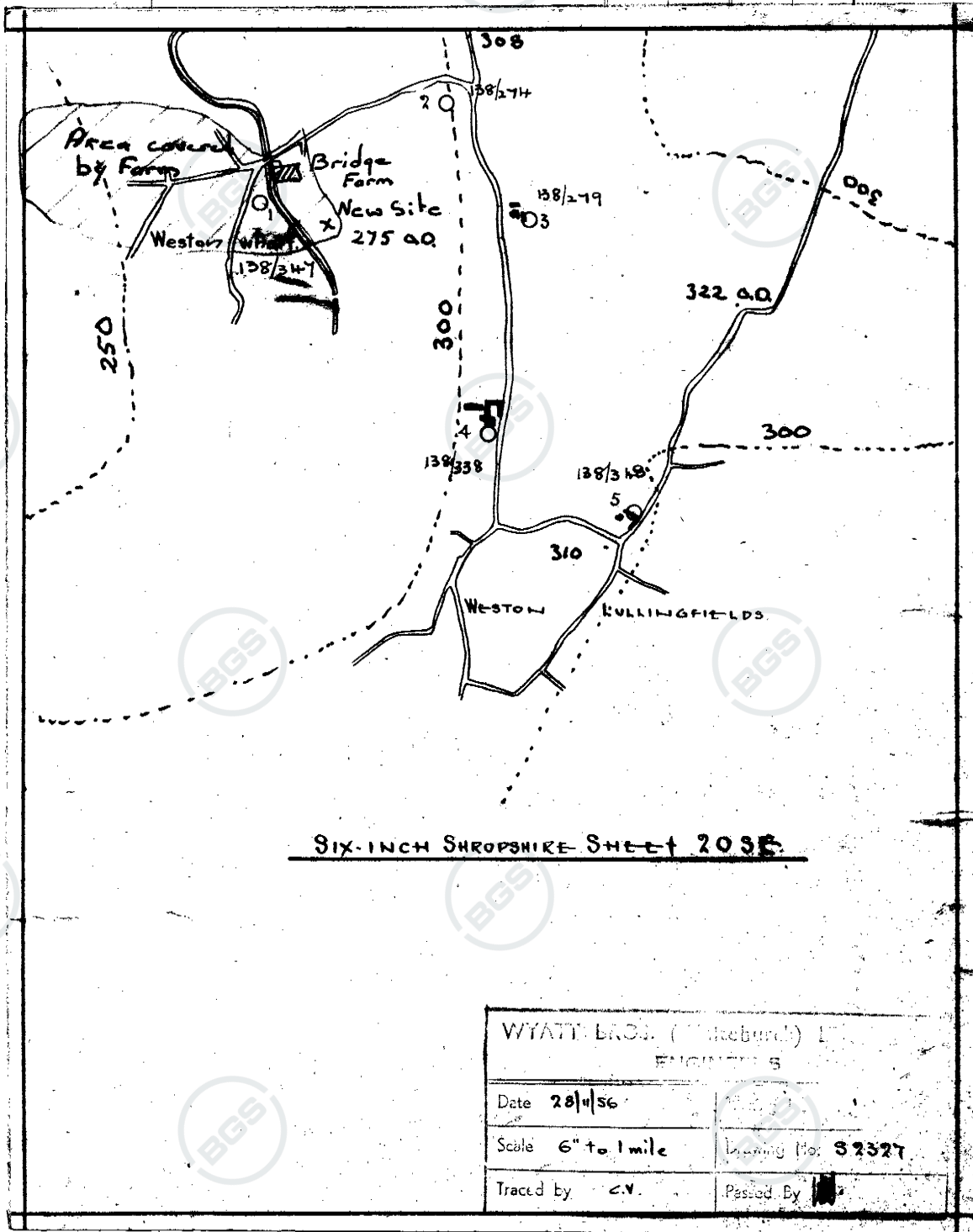
LOG OF STRATA OVERLEAF.

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.	Section 6.	Date Received	1" O.S. Map No.	Site marked on 1" Map	(use symbol on 6" Map)
		30.11.56		○	○

(1527) D4574/W137583 12,000 8/54 J.C.&S. Gp669



(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA If measurements start below ground surface, state how far ..	THICKNESS		DEPTH	
		Feet	Inches	Feet	Inches
	Soil.	2	0	2	0
	Stony Marl.	49	0	51	0
	Sand and Gravel.	9	0	60	0
	Marl.	2	0	62	0





SJ 42/28

91222/16/2652

138 / 348

MINISTRY OF HOUSING AND LOCAL GOVERNMENT

WATER ACT, 1945

LICENCE

to construct works in the area defined in the Cheshire and North Shropshire Area (Conservation of Water) Order 1949 made under section 14 (1) of the Water Act, 1945.

-----  
THE MINISTER OF HOUSING AND LOCAL GOVERNMENT, on the application of Mr. P. H. Edwards, Rises, Weston Lallingfields, Shropshire, and in pursuance of his powers under section 14 (6) of the Water Act, 1945, hereby licenses the said Mr. P. H. Edwards to execute the work of sinking a borehole five inches in diameter to a depth of 100 feet at Rises, Weston Lallingfields, in the parish of Baschurch, in the rural district of Ellesmere, Shropshire, the situation of which is more particularly shown in the plan annexed hereto and thereon marked @, subject to the condition that the maximum daily quantity of water which shall be abstracted from the said borehole shall be 2,000 gallons.

GIVEN under the Official Seal of the Minister of Housing and Local Government this ..... day of ..... 1956.

2 - FEB 1956

J. H. STREET

Assistant Secretary,

Ministry of Housing and Local Government.

L.S.

xx 20. APR. 1956

The attention of the licensee is drawn to subsection (8), (9), (10) and (12) of Section 14 of the Water Act, 1945, which are as follows:-

- 14(8) Any person who contravenes any of the foregoing provisions of this section or any requirements imposed thereunder or any condition attached to a licence granted for the purposes of subsection (3) or subsection (5) of this section shall be guilty of an offence against this Act.
- (9) No person shall in any area to which this section applies -
- (a) cause or allow any underground water to run to waste from any well, borehole or other work except for the purpose of testing the extent or quality of the supply or cleaning, sterilising, examining or repairing the well, borehole or other work; or
  - (b) abstract from any well, borehole, or other work water in excess of his reasonable requirements;

Provided that, where underground water interferes or threatens to interfere with the execution or operation of any underground works (whether waterworks or not), it shall not be an offence under this subsection to cause or allow the water to run to waste so far as may be necessary to enable the works to be executed or operated, if no other method of disposing of the water is reasonably practicable.

- (10) A person who contravenes any provision of the last foregoing subsection shall, in respect of each offence, be liable on summary conviction to a fine not exceeding ten pounds and the court may, on the conviction of any person, order that the well, borehole or other work shall be effectively sealed or may make such other order as appears to the court to be necessary to prevent waste of water.

If any person fails to comply with any such order of the court, the court may (without prejudice to the imposition of any penalty for contempt of court), on the application of any local authority within whose county or district the well, borehole or other work is situated or of any statutory water undertakers affected or likely to be affected by the waste, authorise the authority or undertakers to take such steps as may be necessary to execute the order, and any expense incurred in taking any such steps shall be recoverable as a civil debt from the person convicted.

- (12) Any officer of a local authority whose county or district is comprised wholly or partly in an area to which this section applies, and any officer of any statutory water undertakers likely to be affected by any failure to enforce the provisions of this section in any such area, being an officer authorised for the purpose by the local authority or undertakers concerned shall, on producing, if so required, some duly authenticated document showing his authority, have a right at all reasonable hours -
- (a) to enter any premises in the area for the purpose of ascertaining whether there is, or has been, on or in connection with the premises any contravention of the provisions of this section; or
  - (b) to enter any premises in which the authority or undertakers have been authorised to execute an order of the court made under subsection (10) of this section, for the purpose of executing that order;

and the section of this Act relating to entry of premises shall apply to any such right of entry.

Attention is also drawn to Section 7 of the Act which requires that any person who proposes to sink, for the purpose of searching for or abstracting water, a well or borehole intending to reach a depth of more than 50 feet below the surface shall, inter alia, before he begins to do so give notice to the Geological Survey and shall keep a journal of the progress of the work, and send a complete copy of it to the Survey. For more detailed and precise information on this subject, the licensee is referred to the pamphlet "Notification of New Wells and Boreholes for Water", obtainable from the Director, Geological Survey and Museum, Exhibition Road, South Kensington, S.W.7.

SHEET SJ 42 NW  
SHEET SJ 42 SW

138  
348

SITE OF LICENCED WORK



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Ministry of Housing and Local Government  
Reference No. 91222/16/2652.

L.S.

Scale 1:10,560 or 6 Inches to 1 Mile



138/348.  
SJ42/28

SJ 42 SW  
SJ 4280 2492 .  
309 ft AOD.

In use.  
Supplies c 3500 gpd.  
No dipping access.

The Rise,  
Weston Lullingfields,  
Shrewsbury,  
Shropshire.

11.480 VC



SJ42/28 138/348

Soil

2 ft 0 ins

Boulder Clay (?)

to 51 ft 0 ins

Glacial Sand and gravel

to 60 ft 0 ins

Keuper Marl (?)

to 62 ft 0 ins

AB 1/80



## Appendix A2 - Surface Water Drainage Proforma Statement for Category C and D applications (see Appendix F for full descriptions)

This form should be used on planning applications which include any of the following:

- 9 or less dwellings
- Manufacture or retail with a floor space less than 1000 sqm
- All development sites less than 1 hectare in Flood Zone 1

**Applicant Name: R D Lea**

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**Planning Application Name: Land at Weston Lullingfiels**

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**Development Address & Post Code: Weston Lullingfields, Shrewsbury, SY4 2AA**

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<b>Application Type (Please circle)</b>	<b>Outline</b>	<b>Full</b>
<b>Is the site developed or greenfield? (Please circle)</b>	<b>Developed</b>	<b>Greenfield</b>
<b>Total Site Area served by drainage system (excluding open space) (Ha)*</b>	<b>0.087 Ha</b>	

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In order to provide the level of surface water drainage detail required for small major development sites the applicant, or those working on their behalf, must complete the following proforma to be submitted in support of an application.

The proforma should be considered alongside other supporting SuDS Guidance but focuses on ensuring flood risk is not made worse elsewhere. The SuDS solution must operate effectively for the lifetime of the development, taking into account climate change. This proforma is not exhaustive, so feel free to provide any additional supporting information. This submission will be used as a basis for our response to a consultation from the Local Planning Authority.



## 1. Existing Site

Evidence Required	Evidence Supplied
Site location plan	Refer to submission
Detailed site layout plan at an identified scale with a north arrow (minimum 1:500)	Refer to submission
Topographical survey of the site, including cross sections of any adjacent watercourses for an appropriate distance upstream and downstream of the proposed discharge point	N/A
Simplified Flood Risk Assessment for single building developments in Flood Zones 2 and 3	N/A
Full Flood Risk Assessment for multiple buildings in Flood Zones 2 and 3	N/A
Plan showing the proximity of Flood Zones 2 and 3 where development is in Flood Zone 1	Site area located within Flood Zone 1
Plan showing proximity of surface water / pluvial flooding where development is in Flood Zone 1	Refer to outline drainage strategy

## 2. Impermeable Area

Area	Existing	Proposed	Difference (Proposed – Existing)
<b>Impermeable Area (ha)</b> <b>Areas to be shown on a plan</b>	TBC at detailed design	0.087ha	
Urban Creep	N/A	10% included above	
<b>Total Impermeable Area</b>		0.087ha	

### 3. Surface Water Discharge

Strategy	Evidence Supplied
Infiltration calculations to BRE 365 to cater for a 1% AEP plus CC event or 10% AEP event with exceedance flood routing details	To be confirmed during detailed design, BRE tests to be carried out
To watercourse	Likely discharge to watercourse. Existing drains to be surveyed.
To surface water sewer. with permission for connection	N/A
To Combined Sewer / Foul with permission for connection	N/A
Layout plan showing where the sustainable drainage infrastructure will be located on site.	Technical detail to be provided at next design stage
Calculation demonstrating sufficient capacity in existing piped outfall	To be assessed at detailed design stage
Proposed surface water calculation	Refer to technical note
Drainage proposal demonstrating the SuDs hierarchy	Refer to technical note

#### **4. Infiltration**

<b>Evidence Required</b>	<b>Evidence Supplied</b>
Are infiltration rates above $1 \times 10^{-6}$ m/s.	To be confirmed during detailed design, BRE tests to be carried out
Type of infiltration system to be used	To be confirmed during detailed design, BRE tests to be carried out
Depth to high water table	To be confirmed during detailed design, BRE tests to be carried out
State the distance between a proposed infiltration device base and the water table (GW) level	To be confirmed during detailed design, BRE tests to be carried out
Is the site within a known Source Protection Zones (SPZ)?	No
Is the site free of contaminated? If no, consider advice from others on whether infiltration can happen	No contamination issues expected from known historical land uses
Soakaways design in accordance with BRE Digest 365 to cater for a 1% AEP storm event plus 40% climate change. Alternative soakaway designed for the 10% AEP storm event together with details of flood routing to show what would happen in an 'exceedance event' above the 10% AEP storm event.	To be confirmed during detailed design, BRE tests to be carried out

## 5. Peak Discharge Rates

	Existing Rates (l/s)	Proposed Rates (l/s)	Difference (l/s) (Proposed-Existing)
Greenfield QBAR	TBC	TBC	TBC
1 in 1 year	TBC	TBC	TBC
1 in 30 year	TBC	TBC	TBC
1 in 100 year	TBC	TBC	TBC
1 in 100 year plus 40% climate change	TBC	2.0 l/a	TBC

## 6. 6 hour Peak Discharge Volumes

Return Period	Existing Volume (m <sup>3</sup> )	Proposed Volume (m <sup>3</sup> )	Difference (m <sup>3</sup> ) (Proposed-Existing)
1 in 1 year	TBC	TBC	TBC
1 in 30 year	TBC	TBC	TBC
1 in 100 year	TBC	TBC	TBC
1 in 100 year plus 40% climate change	TBC	TBC	TBC

## 7. Attenuation Volume

Return Period	Proposed Volume (m <sup>3</sup> )
1 in 1 year	TBC
1 in 30 year	TBC
1 in 100 year	TBC
1 in 100 year plus 40% climate change	TBC

Flow Control	Evidence Supplied
What type of control device is being proposed?	Further technical detail to be provided at next design stage. Likely to be a vortex type flow control device.

## 8. Exceedance Flow

Exceedance	Evidence Supplied
Have exceedance flows been checked to ensure that surface water flows do not <i>result the flooding of more vulnerable areas within the development site or contribute to surface water flooding of any area outside of the development site?</i>	Refer to technical note, further technical detail to be provided at next design stage

## 9. Management Train

Measure	Y / N	Consideration Reason
Swales		TBC
Permeable paving		TBC
Rain gardens		TBC
Green roofs		TBC
Other		TBC

## 10. Management and Maintenance of SuDs

Measure	Evidence Supplied
<p>How is the entire drainage system to be maintained in perpetuity?</p> <ul style="list-style-type: none"> <li>• Clear details of the maintenance proposals of all elements of the proposed drainage system.</li> <li>• Provide a management plan to describe the SUDS scheme</li> <li>• Specification notes that describe how work is to be undertaken</li> <li>• A maintenance schedule describes what work is to be done and when it is to be done using frequency</li> <li>• A site plan showing maintenance area, control points and outfalls. Responsibility for the management and maintenance of each element of the SUDS scheme will also need to be detailed within the Management Plan</li> </ul>	<p>Further technical detail to be provided at next design stage</p>
<p>Please confirm the owners/adopters of the entire drainage systems throughout the development. Please list all the owners.</p> <ul style="list-style-type: none"> <li>• If these are multiple owners then a drawing illustrating exactly what features will be within each owner's remit must be submitted with this Proforma. Please give details of each feature and how it will be managed in accordance with the details in the management plan.</li> </ul>	<p>Further technical detail to be provided at next design stage</p>
<p>Please provide details demonstrating that any third party agreements required using land outside the application site have been secured.</p>	<p>N/A</p>



## 11 Foul Drainage for Non Mains Connections

Non Mains Foul Connection	Evidence Supplied
Details and sizing of the existing package treatment plant or septic tank in accordance with 'British Water Flows and Loads 4'	N/A – Mains sewer connection
Details and sizing of the proposed Package treatment plan or septic tank in accordance with 'British Water Flows and Loads 4'	
Details of percolation tests and design of the drainage fields in accordance with The Building Regulation part H2'	
Evidence that package treatment plant discharge is to a watercourse that normally has flow throughout the year.	
Submission of the Foul Drainage Assessment Form (FDA1 Form).	



The above form should be completed using evidence from information which should be appended to this form (including from the site plans). It should serve as a summary of the drainage proposals and should clearly show that the proposed rate and volume as a result of development will not be increasing. If there is an increase in rate or volume, the rate or volume section should be completed to set out how the additional rate/volume is being dealt with.

This form is completed using factual information and can be used as a summary of the surface water drainage strategy on this site.

Form Completed By: Richard Harman

Qualification of person responsible for signing off this pro-forma: IEng FIHE

Company: Berrys

On behalf of (Client's details) R D Lea

Date: 29.04.24

## Design Principles

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### Local Standards

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#### **Local Standard A – Phased Development and Drainage Strategies**

*For phased developments, the LLFA will expect planning applications to be accompanied by a Drainage Strategy which takes a strategic approach to drainage provision across the entire site and incorporates adequate provision for SuDS within each phase.*

#### **Local Standard B – Pollution Prevention and Control**

*The LLFA will expect the SuDS to demonstrate how pollutants are prevented or controlled as part of the SuDS scheme. This should include consideration of the sensitivity of receiving waterbodies and particular attention should be given to the first 5mm of rainfall ('first flush' that mobilises the most pollutants).*

#### **Local Standard C – Conformity with the SuDS Management Train Principles**

*The LLFA will expect the SuDS design to demonstrate how the principles of the SuDS Management Train have been taken into account*

#### **Local Standard O – Multiple Benefits**

*The LLFA will expect the SuDS design to demonstrate, where appropriate, how environmental site constraints have been considered and how the features design will provide multiple benefits e.g. landscape enhancement, biodiversity, recreation, amenity, leisure and the enhancement of historical features.*

#### **Local Standard Q – Connection to Highway Drainage Network**

*A connection to the existing highway drainage network will not be permitted unless the system downstream of the connection is put up for adoption by STW up to the point where this interacts with the existing public network or where it discharges to a surface water outfall or a connection to the existing highway drainage network will not be permitted until model evidence has been submitted to show that any connection will not cause flooding to the public highway.*

*Any costs associated with this process including design fees, the physical upgrading of the highway drain to an adoptable standard, or those associated with the fee for adoption will be borne by the applicant.*

### **Local Standard R – Network Modelling Software Requirements**

*The design this should be submitted in MicroDrainage (.mdx) format.*

#### **Design Parameters**

*The rainfall data must be based on the most up to date FEH*

*The maximum rainfall intensity should be set to 100*

*The volumetric runoff coefficient should always be 1.0*

#### **Simulation Parameters**

*The Areal Reduction Factor should always be set to 1*

*The MADD Factor must be set to 0*

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## **Peak Flow Control**

### **Applicable National Standards**

**S2** *For greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 100% Annual Exceedance Probability rainfall event and the 1% Annual Exceedance Probability rainfall event should never exceed the peak greenfield runoff rate for the same event.*

**S3** *For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 100% Annual Exceedance Probability rainfall event and the 1% Annual Exceedance Probability rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.*

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## Volume Control

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### Applicable National Standards

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**S4** Where reasonably practicable, for greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1% Annual Exceedance Probability, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.

**S5** Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1% Annual Exceedance Probability, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

**S6** Where it is not reasonably practicable to constrain the volume of runoff to any drain, sewer or surface water body in accordance with S4 or S5 above, the runoff volume must be discharged at a rate that does not adversely affect flood risk.

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### Local Standards

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#### **Local Standard E – Climate Change**

The LLFA will expect SuDS design to include an allowance for a 40%\* increase in rainfall for a 1% Annual Exceedance Probability rainfall event in order to accommodate the 2016 Upper End climate change predictions. (\*note that guidance may be subject to change and therefore the most up to date information should be referenced / clarification sought from the LLFA)

#### **Local Standard F – Urban Creep**

The LLFA will expect the SuDS design to include an allowance for an increase in impermeable area to accommodate urban creep as set out in the SuDS Handbook.

#### **Local Standard G – Emergency Overflows**

The LLFA will expect an emergency overflow to be provided for piped and storage features above the predicted water level in a 1% Annual Exceedance Probability rainfall event, with an allowance for climate change

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### **Local Standard H – Freeboard Levels**

*The LLFA will expect all surface water storage ponds to provide a 300mm freeboard above the predicted water level arising from a 1% Annual Exceedance Probability rainfall event inclusive of an allowance for climate change. Care must be taken to ensure that excavations do not take place below the ground water level.*

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## **Flood Risk Within the Development**

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### **Applicable National Standards**

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**S7** *The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 3.3% Annual Exceedance Probability rainfall event.*

**S8** *The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1% Annual Exceedance Probability rainfall event in any part of: a building (including a basement); or in any utility plant susceptible to water (e.g. pumping station or electricity substation) within the development.*

**S9** *The design of the site must ensure that, so far as is reasonably practicable, flows resulting from rainfall in excess of a 1% Annual Exceedance Probability rainfall event are managed in exceedance routes that minimise the risks to people and property.*

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### **Local Standards**

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#### **Local Standard D – Exceedance Flows**

*The LLFA will expect exceedance flows, originating from both within and outside of the development site, must be directed through areas where the risks to both people and property are minimised.*

It should be demonstrated that exceedance flows up to the 1% Annual Exceedance Probability (AEP) plus climate change will not result in the surface water flooding of more vulnerable areas within the development site or contribute to surface water flooding of any area outside of the development site.

Exceedance flow paths should be provided to ensure that any such flows are managed on site. The discharge of any such flows across the adjacent land would not be permitted and would mean that the surface water drainage system is not being used.

*When considering exceedance routes, particular attention should be paid to*

- i. The position of walls, bunds and other obstructions that may direct water but must not cause ponding*
- ii. The location and form of buildings (e.g. terraces and linked detached properties) that must not impede flows or cause ponding*
- iii. The finished floor levels relative to surrounding ground*

#### **Local Standard I – Watercourse Floodplains**

*The LLFA will expect the floodplains of ordinary watercourses to be mapped to an appropriate level of detail considering the nature of the application (i.e. detailed flood modelling should be undertaken to support full planning applications). The layout of the development will then take a sequential approach, siting the least vulnerable parts of that development in the highest flood risk areas.*

#### **Local Standard J – Retention of Natural Drainage Features**

*The LLFA will expect natural drainage features on a site should be maintained and enhanced. Culverting of open watercourses will not normally be permitted except where essential to allow highways and / or other infrastructure to cross. In such cases culverts should be designed in accordance with CIRIA's Culvert design and operation guide, (C689).*

*Where a culverted watercourse crosses a development site, it should be reverted back to open channel. In such a case the natural conditions deemed to have existed prior to the culverting taking place should be re-instated.*

#### **Local Standard K – Impact of Downstream Water Levels**

*If high water levels within a receiving watercourse into which a SuDS scheme discharges are anticipated, the LLFA will expect that they will not adversely affect the function of that SuDS system.*

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## Structural Integrity

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### Applicable National Standards

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**S10** Components must be designed to ensure structural integrity of the drainage system and any adjacent structures or infrastructure under anticipated loading conditions over the design life of the development taking into account the requirement for reasonable levels of maintenance.

**S11** The materials, including products, components, fittings or naturally occurring materials, which are specified by the designer must be of a suitable nature and quality for their intended use.

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## Designing for Maintenance Considerations

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### Applicable National Standards

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**S12** Pumping should only be used to facilitate drainage for those parts of the site where it is not reasonably practicable to drain water by gravity. See local Standard N

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### Local Standards

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#### **Local Standard L – Maintenance Requirements**

The LLFA will expect SuDS to be designed so that they are easy to maintain. Proper use of the SuDS management train, including surface features, is one way to achieve this.

The developer must set out who will maintain the system, how the maintenance will be funded and provide a maintenance and operation manual.

#### **Local Standard M – Minimising the Risk of Blockages**

The LLFA will expect the SuDS design to minimise the risk of blockage as far as is reasonably possible e.g. by using suitable pipe sizes and making underground assets as visible and accessible as possible.

#### **Local Standard N – Use of Pumped Systems**

Shropshire Council do not permit the use of surface water pumps on new development.

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*Development should always be directed to areas where a gravity connection to a suitable outfall can be provided. Areas that cannot be drained by gravity should remain as Public Open Space.*

*Any proposed foul pumping stations should be built to an adoptable standard and put up for adoption by STW.*

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## **Construction**

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### **Applicable National Standards**

**S13** *The mode of construction of any communication with an existing sewer or drainage system must be such that the making of the communication would not be prejudicial to the structural integrity and functionality of the sewerage or drainage system.*

**S14** *Damage to the drainage system resulting from associated construction activities must be minimised and must be rectified before the drainage system is considered to be completed.*

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## **Foul Drainage for Non Mains Connections**

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### **Local Standards**

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#### **Local Standard P – Disposal of Foul Water**

*The proposed method of foul water sewage disposal should be identified and submitted for approval, along with details of any agreements with the local water authority and the foul water drainage system should comply with the Building Regulations H2.*

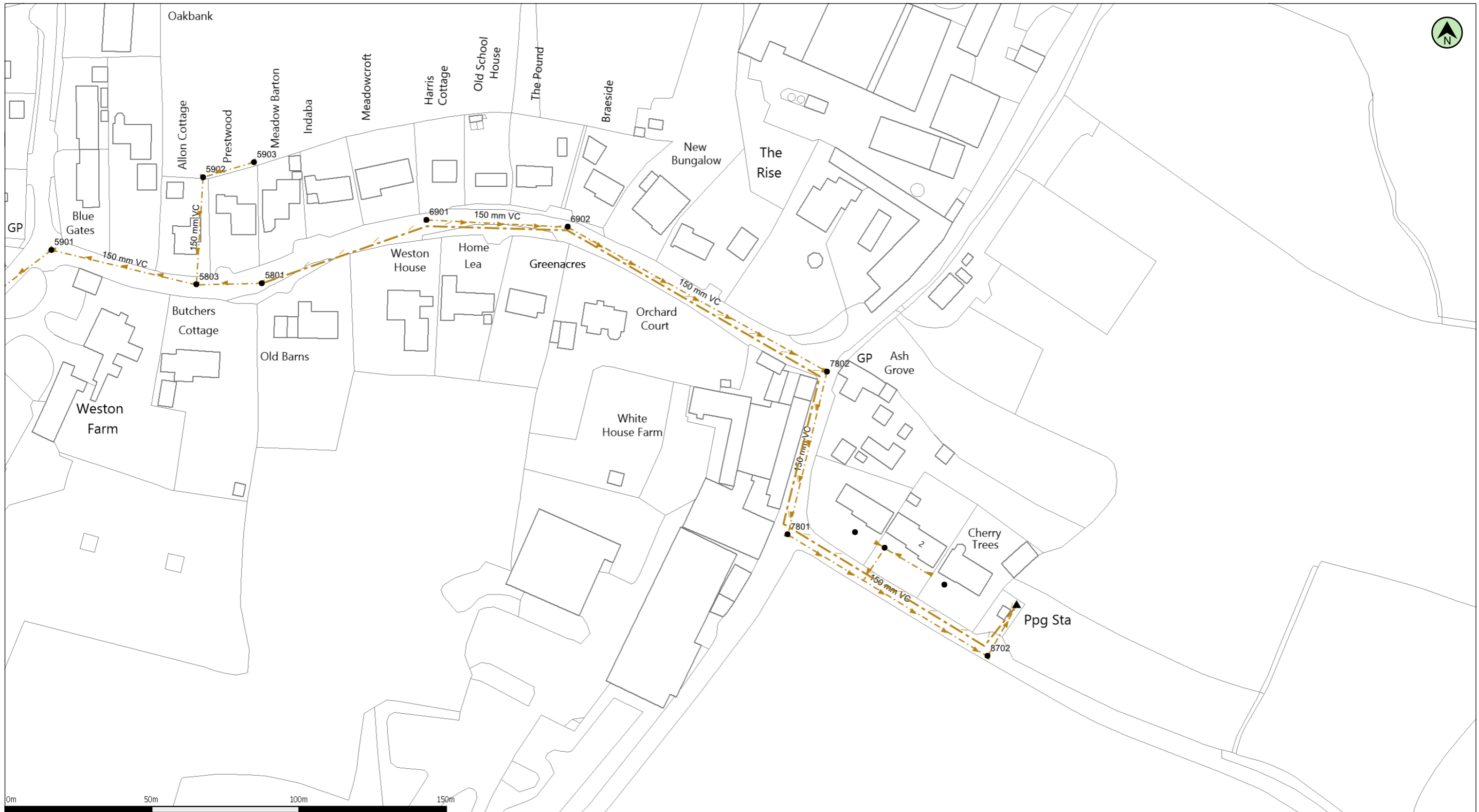
*If main foul sewer is not available for connection, full details and sizing of the proposed septic tank/ package sewage treatment plant including percolation tests for the drainage field soakaways should be submitted for approval including the Foul Drainage Assessment Form (FDA1 Form). British Water 'Flows and Loads: 4' should be used to determine the number of persons for the proposed development and the sizing of the septic tank/ package sewage treatment plant and drainage fields should be designed to cater for correct number of persons and in accordance with the Building Regulations H2. These documents should also be used if other form of treatment on site is proposed*

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## Appendix C – Severn Trent Water Sewer Records

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Date: 30/11/23

Scale: 1:1250

Map Centre: 342737,324854

Data updated: 14/11/23

Our Ref: 1335838 - 1

Wastewater Plan A3

Do not scale off this map. The plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of SEVERN TRENT WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems. Reproduction by permission of Ordnance Survey on behalf of HMSO. ©Crown Copyright and database rights 2023 All rights reserved. Ordnance Survey licence number 100031673. Document users other than SEVERN TRENT WATER business users are advised that this document is provided for reference purpose only and is subject to copyright, therefore, no further copies should be made from it.

Public Foul Gravity/Lateral Drain	→ → → →	Highway Drain	→ → → →	Manhole Foul	●
Public Combined Gravity/Lateral Drain	→ → → →	Overflow Pipe	→ → → →	Manhole Surface	○
Public Surface Water Gravity/Lateral Drain	→ → → →	Disposal Pipe	→ → → →	Abandoned Pipe	× × × × × ×
Pressure Foul	→ → → →	Culverted Water Course	→ → → →	Chamber	■
Pressure Combined	→ → → →	Pumping Station	▲ ▲ ▲ ▲	Section 104 sewers are shown in green	
Pressure Surface Water	→ → → →	Fitting	■	Private sewers are shown in magenta	

richard.harman@berrys.uk.com

Weston Lullingfields



## GENERAL CONDITIONS AND PRECAUTIONS TO BE TAKEN WHEN CARRYING OUT WORK ADJACENT TO SEVERN TRENT WATER'S APPARATUS

Please ensure that a copy of these conditions is passed to your representative and/or your contractor on site. If any damage is caused to Severn Trent Water Limited (STW) apparatus (defined below), the person, contractor or subcontractor responsible must inform STW immediately on:

**0800 783 4444 (24 hours)**

- a) These general conditions and precautions apply to the public sewerage, water distribution and cables in ducts including (but not limited to) sewers which are the subject of an Agreement under Section 104 of the Water Industry Act 1991 (a legal agreement between a developer and STW, where a developer agrees to build sewers to an agreed standard, which STW will then adopt); mains installed in accordance with an agreement for the self-construction of water mains entered into with STW and the assets described at condition b) of these general conditions and precautions. Such apparatus is referred to as "STW Apparatus" in these general conditions and precautions.
- b) Please be aware that due to The Private Sewers Transfer Regulations June 2011, the number of public sewers has increased, but many of these are not shown on the public sewer record. However, some idea of their positions may be obtained from the position of inspection covers and their existence must be anticipated.
- c) On request, STW will issue a copy of the plan showing the approximate locations of STW Apparatus although in certain instances a charge will be made. The position of private drains, private sewers and water service pipes to properties are not normally shown but their presence must be anticipated. This plan and the information supplied with it is furnished as a general guide only and STW does not guarantee its accuracy.
- d) STW does not update these plans on a regular basis. Therefore the position and depth of STW Apparatus may change and this plan is issued subject to any such change. Before any works are carried out, you should confirm whether any changes to the plan have been made since it was issued.
- e) The plan must not be relied upon in the event of excavations or other works in the vicinity of STW Apparatus. It is your responsibility to ascertain the precise location of any STW Apparatus prior to undertaking any development or other works (including but not limited to excavations).
- f) No person or company shall be relieved from liability for loss and/or damage caused to STW Apparatus by reason of the actual position and/or depths of STW Apparatus being different from those shown on the plan.

In order to achieve safe working conditions adjacent to any STW Apparatus the following should be observed:

1. All STW Apparatus should be located by hand digging prior to the use of mechanical excavators.
2. All information set out in any plans received from us, or given by our staff at the site of the works, about the position and depth of the mains, is approximate. Every possible precaution should be taken to avoid damage to STW Apparatus. You or your contractor must ensure the safety of STW Apparatus and will be responsible for the cost of repairing any loss and/or damage caused (including without limitation replacement parts).
3. Water mains are normally laid at a depth of 900mm. No records are kept of customer service pipes which are normally laid at a depth of 750mm; but some idea of their positions may be obtained from the position of stop tap covers and their existence must be anticipated.
4. During construction work, where heavy plant will cross the line of STW Apparatus, specific crossing points must be agreed with STW and suitably reinforced where required. These crossing points should be clearly marked and crossing of the line of STW Apparatus at other locations must be prevented.
5. Where it is proposed to carry out piling or boring within 20 metres of any STW Apparatus, STW should be consulted to enable any affected STW Apparatus to be surveyed prior to the works commencing.
6. Where excavation of trenches adjacent to any STW Apparatus affects its support, the STW Apparatus must be supported to the satisfaction of STW. Water mains and some sewers are pressurised and can fail if excavation removes support to thrust blocks to bends and other fittings.
7. Where a trench is excavated crossing or parallel to the line of any STW Apparatus, the backfill should be adequately compacted to prevent any settlement which could subsequently cause damage to the STW Apparatus. In special cases, it may be necessary to provide permanent support to STW Apparatus which has been exposed over a length of the excavation before backfilling and reinstatement is carried out. There should be no concrete backfill in contact with the STW Apparatus.
8. No other apparatus should be laid along the line of STW Apparatus irrespective of clearance. Above ground apparatus must not be located within a minimum of 3 metres either side of the centre line of STW Apparatus for smaller sized pipes and 6 metres either side for larger sized pipes without prior approval. No manhole or chamber shall be built over or around any STW Apparatus.
9. A minimum radial clearance of 300 millimetres should be allowed between any plant or equipment being installed and existing STW Apparatus. We reserve the right to increase this distance where strategic assets are affected.
10. Where any STW Apparatus coated with a special wrapping is damaged, even to a minor extent, STW must be notified and the trench left open until the damage has been inspected and the necessary repairs have been carried out. In the case of any material damage to any STW Apparatus causing leakage, weakening of the mechanical strength of the pipe or corrosion-protection damage, the necessary remedial work will be recharged to you.
11. It may be necessary to adjust the finished level of any surface boxes which may fall within your proposed construction. Please ensure that these are not damaged, buried or otherwise rendered inaccessible as a result of the works and that all stop taps, valves, hydrants, etc. remain accessible and operable. Minor reduction in existing levels may result in conflict with STW Apparatus such as valve spindles or tops of hydrants housed under the surface boxes. Checks should be made during site investigations to ascertain the level of such STW Apparatus in order to determine any necessary alterations in advance of the works.
12. With regard to any proposed resurfacing works, you are required to contact STW on the number given above to arrange a site inspection to establish the condition of any STW Apparatus in the nature of surface boxes or manhole covers and frames affected by the works. STW will then advise on any measures to be taken, in the event of this a proportionate charge will be made.
13. You are advised that STW will not agree to either the erection of posts, directly over or within 1.0 metre of valves and hydrants,

14. No explosives are to be used in the vicinity of any STW Apparatus without prior consultation with STW.

#### **TREE PLANTING RESTRICTIONS**

There are many problems with the location of trees adjacent to sewers, water mains and other STW Apparatus and these can lead to the loss of trees and hence amenity to the area which many people may have become used to. It is best if the problem is not created in the first place. Set out below are the recommendations for tree planting in close proximity to public sewers, water mains and other STW Apparatus.

15. Please ensure that, in relation to STW Apparatus, the mature root systems and canopies of any tree planted do not and will not encroach within the recommended distances specified in the notes below.

16. Both Poplar and Willow trees have extensive root systems and should not be planted within 12 metres of a sewer, water main or other STW Apparatus.

17. The following trees and those of similar size, be they deciduous or evergreen, should not be planted within 6 metres of a sewer, water main or other STW Apparatus. E.g. Ash, Beech, Birch, most Conifers, Elm, Horse Chestnut, Lime, Oak, Sycamore, Apple and Pear. Asset Protection Statements Updated May 2014

18. STW personnel require a clear path to conduct surveys etc. No shrubs or bushes should be planted within 2 metre of the centre line of a sewer, water main or other STW Apparatus.

19. In certain circumstances, both STW and landowners may wish to plant shrubs/bushes in close proximity to a sewer, water main or other STW Apparatus for screening purposes. The following are shallow rooting and are suitable for this purpose: Blackthorn, Broom, Cotoneaster, Elder, Hazel, Laurel, Privet, Quickthorn, Snowberry, and most ornamental flowering shrubs.

