

DRAINAGE SPECIFICATION NOTES to be used in conjunction with Arc Design Solutions plans and specification, and MDSP plans, all as amended.

DEVELOPMENT at 20 & 22 Somersall Lane, Chesterfield

Design to be approved by Building Inspector and Yorkshire Water.

Design to:

Approved Document H – Drainage and waste disposal 2015.

Sewers for Adoption 2018.

Yorkshire Water Supplementary guidance notes.

All fittings and pipes to be BBA approved or SFA approved.

Surface water and foul water drains to be in separate systems onsite.

Mitigation for potential heave resulting in the possible future removal of trees on the site should be incorporated into the design. Minimum gradients are to be avoided and additional clearance made for drains passing where passing through walls below ground level.

1. Foul Drainage

1.1 Layout:

Outlet design flow rate 3.5 l/sec for 3 dwellings on drain. Use 110mm pipe & fittings.

Provide foul drain layout as detailed on plan MD-808-23-b Drainage A3, and to the invert levels given in MD-808-23 Drain Inverts.

1.2 Connection

Make direct connection on existing pipe just before existing combined access chamber (F CH1). The onward drain run is already a public sewer as it handles the combined drainage output from 22 Somersall Lane (due for demolition) and 22A.

Cap off redundant combined drain at top of site in the garden of 20 Somersall Lane.

2. Rainwater Drainage

2.1 Soil

Site soil sampling shows heavy clay subsoil overlaying mudstone and sandstone. The ground is of very low permeability and is therefore not suitable for soakaways. Soil report available if required.

Rear patios are to drain to the gardens.

2.2 Guttering

Plot 1 Effective roof area	$164\text{m}^2 \times 1.29$ $= 212\text{m}^2$
For 115mm gutter, number of outlets required	$212 / 53$ $= 4\text{no. } 68\text{mm outlets (min)}$
Plot 2 Effective roof area	$175\text{m}^2 \times 1.29$ $= 226\text{m}^2$
For 115mm gutter, number of outlets required	$226 / 53$ $= 5\text{no. } 68\text{mm outlets (min)}$
Plot 2 Effective roof area	$171\text{m}^2 \times 1.29$ $= 221\text{m}^2$
For 115mm gutter, number of outlets required	$221 / 53$ $= 5\text{no. } 68\text{mm outlets (min)}$

It is recommended that each rainwater downpipe on is fitted with a 200L water butt with diverter where possible.

2.3 Planning design conditions

Where other means of surface water discharge have been discounted, planning permission condition 10 states :

...the means of discharging to the public sewer network at a rate agreed by the LPA in consultation with the statutory sewerage undertaker.

2.4 Existing flow rates

The existing site has 2 separate connections to combined drains.

The existing design surface water output of the site is as follows:

20 Somersall Lane	165m ²
22 Somersall Lane	175m ²
Driveway to no. 20	91m ²
Driveway to no. 22	95m ²
Total drained area	526m ²
Design rainfall intensity for gutter at location	0.020 l/s/m ²
Design rainfall intensity for paved areas at location	0.014 l/s/m ²
Flow rate from buildings	0.020 x (165 + 175) = 6.8l/s
Flow rate from paved areas	0.014 x (91 + 95) = 2.6l/s
Current surface water flow to combined drains	= 9.4l/s

2.4 Design flow rate

The largest improvement to the drainage arrangements will be the connection to the surface water sewer (across the road), which will remove up to 9.4l/s of surface water from the combined sewer load.

According to YW mapping, the surface water sewer is a 225mm PVC pipe.

Considering a betterment value of 30% for the surface water outfall rate from the site would give a restricted design flow rate of **6l/s**.

Buildings area	510m ²
Front driveway plot 1	144m ²
Front driveway plots 2 & 3	252m ²
Total paved area	396m ²
Total drained area	906m ²

Design rainfall intensity for gutter at location 0.020 l/s/m²

Design rainfall intensity for paved areas at location 0.014 l/s/m²

Please see attached IH124 calculations detailing the requirement for **26m³** attenuation facility to meet the design criteria.

Provide Polypipe Polystorm (for trafficked and loaded locations) attenuation facility, or similar approved, as detailed in the attached manufacturer's literature.

Storage volume per Polystorm crate = 0.19m³

No. of crates required 26m³ / 0.19m³
= 137

Crate dimensions 0.4m (h) x 0.5m (w) x 1m (l)

Minimum cover over crate tops for paved areas = 0.5m

Driveway level 113.35m approx..

Connection level at storage location 112m approx..

Available storage height 113.35m – 0.5m – 112m
= 0.85m

Use **2 crates high storage** (0.8m)

Crate per level 137 / 2
= 69

Use **70 crates per level**

Area required 69 x (0.5m x 1m)
= 35m²

Possible arrangement: 8w (4m) x 9d (9m) x 2h (0.8m)

2.5 Layout

Provide surface water layout as detailed on plan MD-808-23-b Drainage Plan A3, and to the invert levels given in MD-808-23 Drain Inverts.

Any 450mm inspection chambers deeper than 1.2m to be fitted with opening reducer to 300mm x 300mm.

Provide 6l/s flow control device to the outlet pipe in SW chamber 1.

All levels and inverts to be checked by the contractor. Any variations from the plan to be agreed with Merlin Design prior to construction.

2.6 Connection

Make saddle connection to 225mm surface water sewer in Somersall Lane as shown on plan.

S106 application to follow.

MDSP October 2023

Calculated by:	James Hodgson
Site name:	20 22 Somersall Lane
Site location:	

Site Details

Latitude:	53.22958° N
Longitude:	1.47135° W
Reference:	1801452683
Date:	Oct 05 2023 13:58

This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is not to be used for detailed design of drainage systems. It is recommended that hydraulic modelling software is used to calculate volume requirements and design details before finalising the design of the drainage scheme.

Site characteristics

Total site area (ha):	0.184
Significant public open space (ha):	0
Area positively drained (ha):	0.184
Impermeable area (ha):	0.092
Percentage of drained area that is impermeable (%):	50
Impervious area drained via infiltration (ha):	0
Return period for infiltration system design (year):	10
Impervious area drained to rainwater harvesting (ha):	0
Return period for rainwater harvesting system (year):	10
Compliance factor for rainwater harvesting system (%):	66
Net site area for storage volume design (ha):	0.18
Net impermeable area for storage volume design (ha):	0.1
Pervious area contribution to runoff (%):	30

* where rainwater harvesting or infiltration has been used for managing surface water runoff such that the effective impermeable area is less than 50% of the 'area positively drained', the 'net site area' and the estimates of Q_{BAR} and other flow rates will have been reduced accordingly.

Methodology

esti	IH124
Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	3	3
SPR:	0.37	0.37

Hydrological characteristics

	Default	Edited
Rainfall 100 yrs 6 hrs:	--	70
Rainfall 100 yrs 12 hrs:	--	95.76
FEH / FSR conversion factor:	1.14	1.14
SAAR (mm):	797	797
M5-60 Rainfall Depth (mm):	20	20
'r' Ratio M5-60/M5-2 day:	0.3	0.3
Hydrological region:	3	3
Growth curve factor 1 year:	0.86	0.86
Growth curve factor 10 year:	1.45	1.45
Growth curve factor 30 year:	1.75	1.75
Growth curve factor 100 years:	2.08	2.08
Q_{BAR} for total site area (l/s):	0.62	0.62

Design criteria

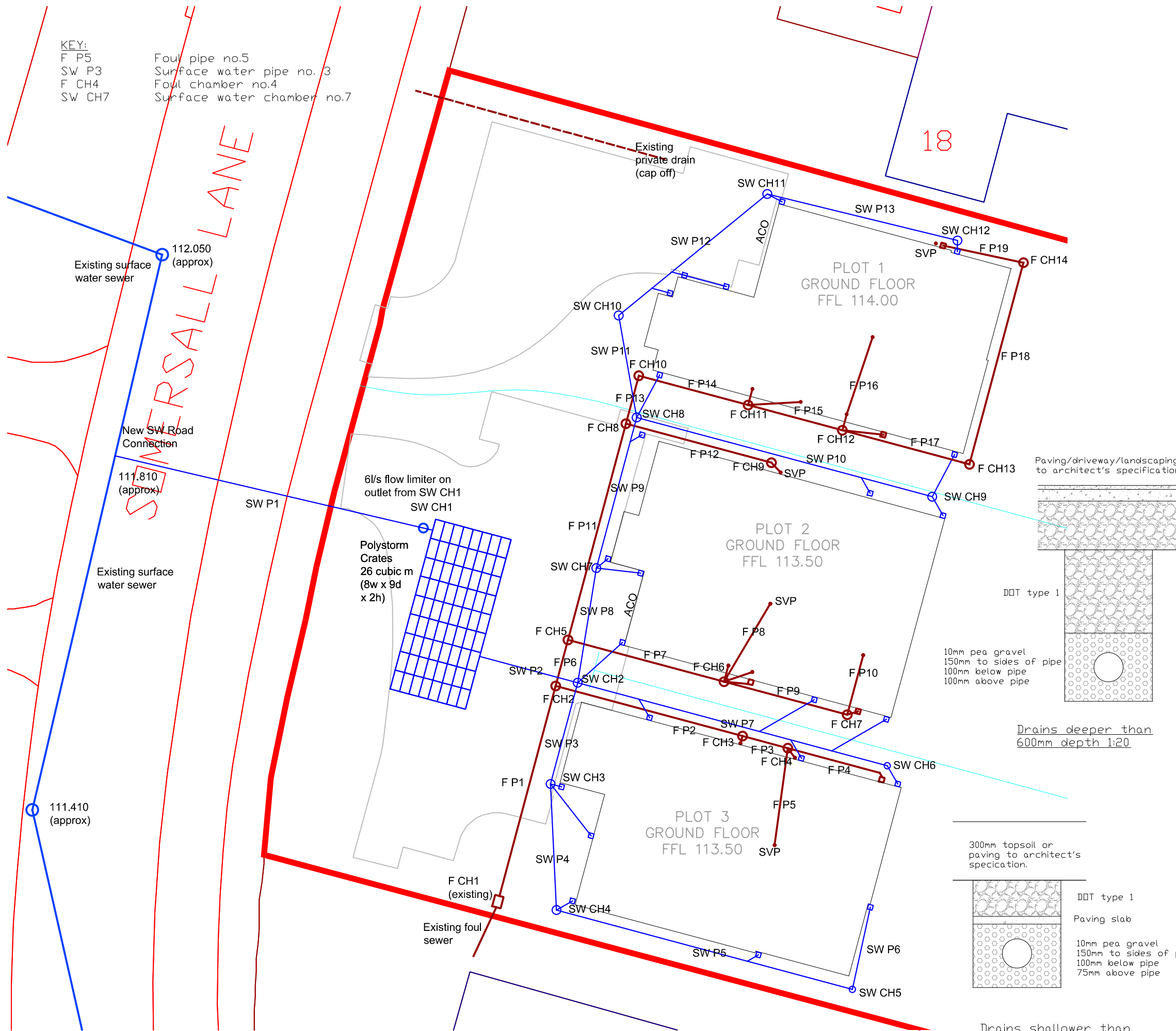
Climate change allowance factor:	1.4
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Urban creep allowance factor:	1.1	Q_{BAR} for net site area (l/s):	0.62	0.62
Volume control approach	Use long term storage			
Interception rainfall depth (mm):	5			
Minimum flow rate (l/s):	6			

Site discharge rates	Estimated storage volumes	
	Default	Edited
1 in 1 year (l/s):	6	6
1 in 30 years (l/s):	6	6
1 in 100 year (l/s):	6	6
	Default	Edited
Attenuation storage 1/100 years (m ³):	26	26
Long term storage 1/100 years (m ³):	0	0
Total storage 1/100 years (m ³):	26	26

This report was produced using the storage estimation tool developed by HRWallingford 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 the use of these data in the design or operational characteristics of any drainage scheme.

KEY:
 F P5 Foul pipe no.5
 SW P3 Surface water pipe no. 3
 F CH4 Foul chamber no.4
 SW CH7 Surface water chamber no.7



Drain Plan 1:200

Plan is to be read in accordance with ARC Design Solutions plans and specification, and MDSP drainage design.

Drains to be lintelled where they pass through walls. Drains to remain flexible and should be isolated from foundations.

320mm and 460mm inspection chambers to be to standards shown in Figs. B18 and B19 in 'Sewers for Adoption 2018'. Any chamber exceeding 1.2m depth is to be fitted with a reducing ring to prevent falls into the sewer.

Surface water discharge to sewer to be limited to a rate of 6l/s.

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If in doubt, please ask.

MERLIN DESIGN and SURVEY PARTNERSHIP

CHARTERED SURVEYORS

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Associate: James W.M. Hodgson MEng (Hons)

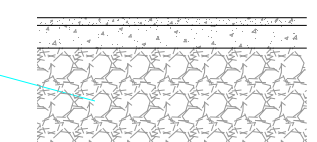
CLIENT	Mr I Hughes
PROJECT	New Dwellings
LOCATION	20 22 Somersall Lane Chesterfield S40 3LA

SCALE	1:20, 1:200 @ A3
DATE	19th December 2023
DRG No.	MD-808-23-b (Drains) Rev. B

All dimensions and levels to be checked on site by contractor and verified to client/agent. Use only figured dimensions.



Paving/driveway/landscaping to architect's specification.

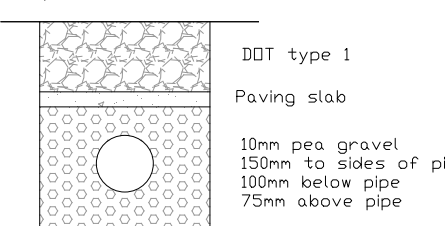


DDT type 1

10mm pea gravel
150mm to sides of pipe
100mm below pipe
100mm above pipe

Drains deeper than 600mm depth 1:20

300mm topsoil or paving to architect's specification.



Drains shallower than 600mm depth 1:20