Drainage Strategy Report

London Road,

Stroud

Jubb

PREPARED BY:	FOR:	DATE:	REFERENCE:
Jubb	Altus Homes Ltd.	April 2024	23389-DS-01

Contents

1 Project Information

1.1 Project Information

Client	Altus Homes Ltd.

1.2 Project Details

Project Name	London Road, Stroud
Location	Stroud, Gloucestershire
Jubb Project Number	23389

1.3 Report Details

Version	2
Status	First Issue
Date	April 2024

1.4 Project Authorisation

ISSUE HISTORY:

Version	Date	Detail
1	18/04/2024	First Issue
2	29/04/2024	Client details updated

AUTHORISATION:

Prepared By	Approved By
[redacted]	[redacted]

2 Introduction

2.1 Preamble

2.1.1 Jubb have been commissioned by Altus Homes to provide a drainage strategy design in support of a residential development on land to the east and west of the A419 London Road, Stroud.

2.1.2 The development site comprises two parcels of land either side of London Road, 0.27ha to the north of London Road and 0.18ha to the south and were formerly occupied by Bristol Street Motors Car Dealership.

2.1.3 Full planning permission is being sought for a development comprising up to 35 residential units, with associated vehicular access from London Road.

2.2 Scope of Report

2.2.1 This Drainage Strategy Report examines the drainage matters pertinent to the site, and in doing so demonstrates the suitability of the site for residential development.

3 Surface Water Drainage

3.1 Existing Site Arrangement

3.1.1 The site comprises a former car dealership with workshop and sales area on the southern parcel and further sales area on the northern parcel. The northern parcel previously included a fuel filling station, decommissioned in 2015-16, and pumps and canopy removed.

3.1.2 The southern site is crossed by a Severn Trent foul public sewer of 450mm diameter at an approximate depth of 3 metres. That sewer is recorded as combined from a point adjacent to the northern boundary. Details of the existing Severn Trent assets are shown in the CON29DW response included in Appendix A of this report. Correspondence, included in Appendix B with Severn Trent Water Ltd clarifies the easement requirements for that existing sewer. The residential units have been arranged with a minimum clearance of 5m from the sewer. Permeable paving is permitted over the sewer protection strip. Attenuation tanks would require a 3m separation from the existing sewer.

3.1.3 The CON29DW response demonstrates that both parcels of the site are currently served by both surface water and foul drainage connections.

3.1.4 The existing access track at the eastern edge of the northern parcel provides access to a neighbouring property. That access will remain unchanged, other than remedial surfacing but also providing access to the proposed parking area, via an undercroft in the new units. The existing track will drain as its existing condition and has been excluded from the drainage scheme.

Figure 3.1 – Site Location Plan

3.2 Runoff Destination

3.2.1 The runoff destination has been considered in accordance with Ciria publication, C753 The SuDS Manual 2015.

- Re-use of roof runoff through recycling is intended to a limited degree for irrigation purposes.
- The Ground Investigation Report prepared by Wilson Associates, ref 5125, states "Owing to the cohesive nature of the geology beneath the site, the ground conditions are considered unsuitable for the adoption of a soakaway (SUDS) drainage system". Infiltration as a means of surface water disposal is therefore discounted.
- The closest watercourse or water body to the site are the River Frome and Thames and Severn Canal, both approximately 120m to the south west of the site. Neither can be reached without crossing third party land.
- No surface water sewers are recorded in the vicinity of the site.
- Both parcels of the development site have existing surface water connections to the adjacent sewer system. The public Severn Trent sewer is shown as combined from a point on the north-western boundary of the southern development parcel. The proposal is to connect to to the sewer at that point. The northern parcel has existing surface water connections to sewers in London Rd. It is the intention to re-use those existing points of connection for surface water disposal from the north.

3.2.2 It should be noted that previous drainage survey work was unsuccessful in identifying the precise location of means of connection to existing sewers. Further investigation will be required for detailed design. Should the proposed surface water point of connection for the northern site prove unviable, there is an option for the network to cross London Road and sharing the point of discharge for the southern parcel.

3.3 Climate Change Allowance

3.3.1 The Department for Environment Food and Rural Affairs published data defines climate change allowance to be 40% for the 1% annual exceedance rainfall event, for drainage design purposes.

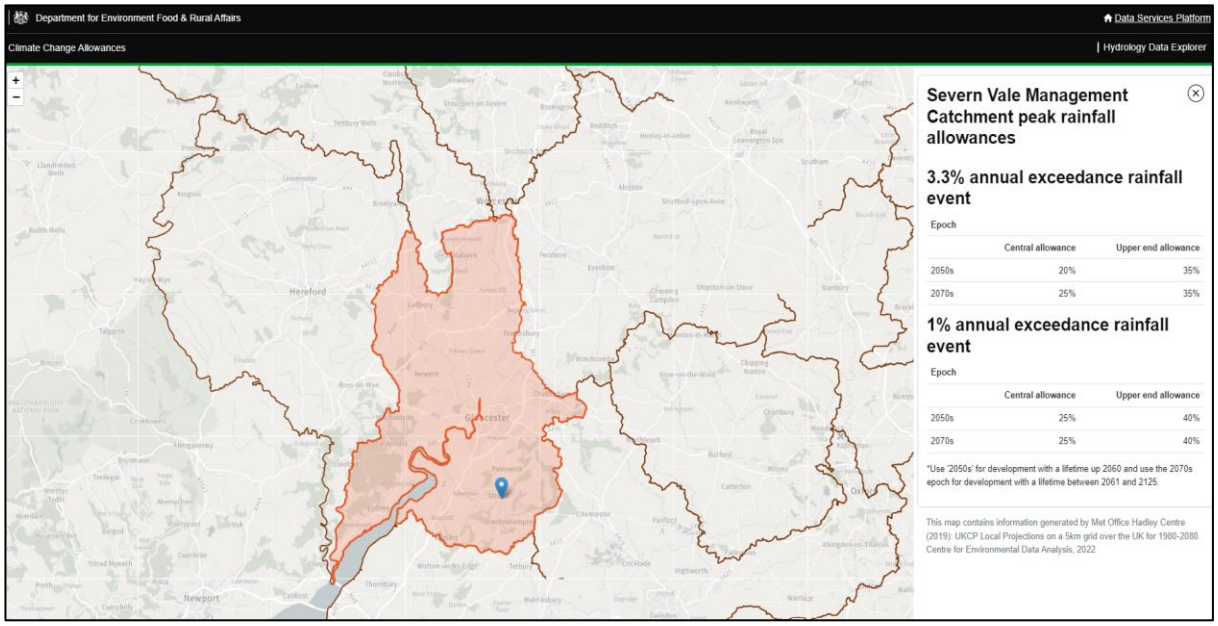


Figure 3.2 – Climate Change Allowance

3.4 Discharge Rate

3.4.1 Both parcels of the proposed development are brownfield in characteristic. The northern parcel has a total area of 0.27 ha of which 90% is currently impermeable hard paving or building footprint. The southern parcel has a total area of 0.18 ha and is entirely impermeable pavement or building footprint.

3.4.2 Greenfield runoff rate has been calculated for the site using ReFH2 rainfall data in Microdrainage Source Control. The findings were, for a rural 1yr return period, the northern site would generate a peak runoff of 0.3 l/s and the southern site a peak runoff of 0.2 l/s.

3.4.3 The selected method of flow control in the drainage design for this site is by a vortex flow control mechanism. The smallest orifice size within such a mechanism that will not present an unacceptable risk of blockage is >50mm in a protected static scenario. That minimum size limitation means that the lowest discharge rate that can be achieved is 1.2 l/s by the proposed drainage solution. Each of the two parcels are proposed to have separate points of discharge each terminating in a flow control mechanism limiting the discharge rate to 1.2 l/s.

3.4.4 Gloucestershire County Council guidance on surface water drainage states "*Sustainable Drainage Systems (SuDS) to attenuate to at least Greenfield runoff or where possible achieving betterment in the surface water runoff regime*". The proposed drainage scheme aims to restrict runoff rate as close to the greenfield runoff rate as can be achieved with the limitations of the flow control mechanism. The design discharge rate represents a considerable improvement over the brownfield condition of the pre-development state.

3.5 Attenuation Storage

3.5.1 The proposed drainage design for the two development parcels include sufficient attenuation storage to accommodate a 100yr return period rainfall event plus a climate change allowance of 40%.

3.5.2 Trafficked areas are proposed to be permeable paving with storage provided within the interstitial voids of the tanked permeable sub-base construction.

3.5.3 Roof runoff is routed through raingarden planters then to underground cellular tank storage.

3.6 Interception

3.6.1 The drainage design aims to prevent the first 5mm of rainfall event from leaving the system. Permeable paving is capable of complying with this criteria. Roof runoff is routed through raingarden planters prior to entering the drainage network, interception being achieved by evapo-transpiration.

3.7 Water Quality

3.7.1 The effect on water quality of surface water can be assess using the Ciria Simple Index Approach. This compares the Pollution Hazard Index for a runoff area to the Pollution Mitigation Index of the SuDS component employed.

3.7.2 Trafficked areas are to be of permeable paved construction. The assessment in Appendix F shows the proposed pollution mitigation provided by this construction to be suitable for the proposed use.

3.7.3 Roof Runoff is routed via raingarden planters which provide suitable pollution mitigation, as shown in Appendix F.

3.8 Amenity and Biodiversity

3.8.1 Raingarden planters will support selected planting that will enhance both amenity value of the environment increase biodiversity by encouraging wildlife.

3.8.2 The site will benefit from extensive landscaping comprising screening hedgerows and new trees. A soft and hard landscape material palette is designed for longevity and robustness but also possess high aesthetic qualities, whist also forming part of the suds strategy.

3.9 Maintenance

3.9.1 Design of individual elements of the drainage scheme are in accordance with current standards to ensure effectiveness and performance. A Maintenance Manual will be provided to the operator on handover to ensure ongoing effectiveness of the scheme. A draft of this document is included in Appendix G.

3.9.2 Responsibility for the maintenance regime will sit with either the social housing provider or a management company operating on their behalf.

4 Foul Drainage

4.1 Points of Connection

4.1.1 Potential points of connection for foul drainage exist adjacent to both parcels of the development. The northern site has an adopted foul sewer adjacent to the southern boundary, within London Road. The southern site has a foul sewer crossing through the site and existing chamber adjacent to north eastern boundary, in Arundel Mill Lane.

4.2 Design

4.2.1 Foul Drainage serving individual plots within the development are likely to be subject to adoption by Severn Trent Water Ltd, where drainage serves more than one property or crosses the plot curtilage. Foul drainage design will therefore be in accordance with DCG Sewerage Sector Guidance.

4.3 Capacity

4.3.1 Effect on capacity of the existing sewer system will be a reduction in contributing flow rate as a result of removal of the free discharge element of surface water to the sewer currently in operation.

5 Summary and Conclusions

5.1 Summary

5.1.1 Planning permission is being sought for a residential development comprising up to 35 residential units on two parcels of land either side of London Road in Stroud.

5.1.2 Consideration of the SuDS hierarchy demonstrates disposal of surface water runoff by infiltration to be unsuitable and no watercourse or surface water sewer exists within the vicinity of the site. It is proposed that the discharge is to combined sewer and via existing surface water connections.

5.1.3 The drainage design restricts discharge rate to 1.2 l/s from each of the two parcels, the lowest that can be achieved by vortex flow control, without unreasonable risk of blockage. Attenuation storage is provided with capacity for a 100yr return period rainfall event plus 40% climate change allowance.

5.1.4 The drainage design satisfies water quality criteria through the selected SuDS components. Those components also provide interception of the first 5mm of rainfall.

5.1.5 There is a positive amenity and biodiversity impact resulting from the SuDS design.

5.1.6 Suitable points of connection for foul drainage have been identified. There would be a reduction in peak flow rate to adopted combined sewers, therefore no detriment to sewer capacity.

5.2 Conclusions

5.2.1 A suitable SuDS scheme for surface water drainage has been identified and detailed.

5.2.2 Suitable points of connection to sewers for foul drainage have been established and a means of conveying to them.

5.2.3 It is therefore concluded that there are no drainage matters to prevent the proposals from being approved.

Appendix A: CON29DW Drainage Search

Drainage & Water Search (Commercial)

Search Details

Prepared for: JG Poole & Co LLP
Matter: 1034.10001
Client address: E Space South, 26 St Thomas Place Ely, Cambridgeshire, CB7 4EX

Property:
Bristol Street Ford, London Road, Stroud, GL5 2AX

Water Company:
Severn Trent Water Ltd
Severn Trent, PO Box 407, Darlington, DL1 9WD

Date Returned:	Property type:
02/05/2023	Commercial

CON29DW COMMERCIAL DRAINAGE & WATER SEARCH

SEVERN TRENT

InfoTrack Limited

Infotrack
91 Waterloo Road
London
SE1 8RT

Order Date: **Friday, 28 April 2023**
Order No: **60237114**
Customer Ref: **38703274_2d7e1167-340c-4b0d-8372-7**

Severn Trent Searches has carried out enquiries into the following property, in line with its published terms of sale upon request from InfoTrack Limited

Bristol Street Ford
London Road
Stroud
GL5 2AX

CON29DW Commercial Drainage and Water Report

The Search Report on the above property was completed on 2 May, 2023 by Marie Freer, a technician employed by Severn Trent Searches.

This report should only be used for individual property transactions where the intended use of the property is:

- not as a single, residential, domestic property: or
- not land or buildings being, or to be developed as a single, residential, domestic property

Should this report be used for any other purpose; the Company's liability, as detailed in Appendix 3 will not apply.

On receipt of this document you have accepted the Terms and Conditions (see Appendix 3).

From 1st October 2011 ownership of private sewers and lateral drains changed in accordance with The Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011. The contents of this search

For further information please visit: www.severntrentsearches.com/category/sewer-transfer/

In the event of any queries about the preparation of this Search Report, enquiries should be directed to:

[redacted]

Or the Customer Service Manager, Severn Trent Searches at the address below.

Severn Trent Searches
PO Box 10155
Nottingham
NG1 9HQ
[redacted]

or

Severn Trent Searches
DX 723860
Nottingham 43

For further information about our products and services please visit:
www.severntrentsearches.com

DWSN COMPLIANT

DRAINAGE + WATER SEARCHES NETWORK
DWSN

SEVERN TRENT

ORDER SUMMARY

02 May 2023

Bristol Street Ford, London Road, Stroud, GL5 2AX

	Question	Answer
Maps		
1.1	Where relevant, please include a copy of an extract from the public sewer map.	**Map Provided**
1.2	Where relevant, please include a copy of an extract from the map of waterworks.	**Map Provided**
Drainage		
2.1	Does foul water from the property drain to a public sewer?	**Yes**
2.2	Does surface water from the property drain to a public sewer?	**Yes**
2.3	Is a surface water drainage charge payable?	**See Details**
2.4	Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?	**Yes**
2.4.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the boundaries of the property?	**No**
2.5	Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?	**Yes**
2.5.1	Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?	**No**
2.6	Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	**No**
2.7	Has a Sewerage Undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?	**No**
2.8	Is the building which is or forms part of the property at risk of internal flooding due to overloaded public sewers?	**No**
2.9	Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.	**See Details**
Water		
3.1	Is the property connected to mains water supply?	**Yes**
3.2	Are there any water mains, resource mains or discharge pipes within the boundaries of the property?	**Yes**
3.3	Is any water main or service pipe serving, or which is proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?	**No**
3.4	Is the property at risk of receiving low water pressure or flow?	**No**
3.5	What is the classification of the water supply for the property?	**See Details**
3.6	Is there a meter installed at this property?	**Yes**
3.7	Please include details of the location of any water meter serving the property.	**See Details**
Charging		
4.1.1	Who is responsible for providing the sewerage services for the property?	**See Answer**
4.1.2	Who is responsible for providing the water services for the property?	**See Answer**
4.2	Who bills the property for sewerage services?	**See Details**
4.3	Who bills the property for water services?	**See Details**
Additional		
5.1	Is there a Consent to discharge Trade Effluent under S118 of the Water Industry Act, 1991 into the public sewer?	**No Consent**
6.1	Is there a wayleave/easement agreement giving the Sewerage and/or Water Undertaker the right to lay or maintain assets or right of access to pass through private land in order to reach the Company's assets?	**Currently Unavailable**
6.2	On the copy extract from the public sewer map, please show manhole cover, depth and invert levels where the information is available.	**Currently Unavailable**

Severn Trent Water Limited, Severn Trent Centre, 2 St John's Street, Coventry, CV1 2LZ

Date of Issue: **2 May 2023**

SEWER RECORD Bristol Street Ford, London Road, Stroud, GL5 2AX

Severn Trent Water Limited, Severn Trent Centre, 2 St John's Street, Coventry, CV1 2LZ

Date of Issue: **2 May 2023**

WATER RECORD Bristol Street Ford, London Road, Stroud, GL5 2AX

Severn Trent Water Limited, Severn Trent Centre, 2 St John's Street, Coventry, CV1 2LZ

MAP KEYS

Sewer Record

- Public Combined Gravity Sewer
- Public Foul Gravity Sewer
- Public Surface Water Gravity Sewer
- Combined Use Pressurised Sewer
- Foul Use Pressurised Sewer
- Surface Water Pressurised Sewer
- Abandoned Gravity Sewer
- Private Gravity Sewer
- Section 104 Gravity Sewer
- Transferred Gravity Sewer
- Highway Drain (Not STW)
- Vent Column
- Waste Water Storage
- Culverted Watercourse (Not STW)
- Protective Strip
- Sewage Pumping Facility
- Sewage Facility Connection Inlet / Outlet
- Hyrdrobrake
- Lamphole
- Outfall
- Overflow
- Penstock
- Petrol Interceptor
- STW Sewage Treatment Works
- Sewer Blockage
- Sewer Collapse
- Sewer Chemical Injection Point
- Sewer Junction
- Sewerage Air Valve
- Sewerage Hatch Box Point
- Sewerage Isolation Valve
- Soakaway
- Surface Water Manhole
- Blind Shaft
- Combined Use Manhole
- DS Disposal Site
- Flushing Chamber
- Foul Use Manhole
- Grease Trap
- Head Node

Notes

The majority of private gravity sewers and lateral drains shown in magenta transferred into public ownership in October 2011, providing they met the relevant criteria. Please note that private pressurised sewers and drains within the boundary of the property they serve remain private.
Sewers shown in green which remain the subject of an adoption agreement under Section 102 or 104 of the Water Industry Act (1991) are not the responsibility of the Sewerage Undertaker.
Please refer to response to Question 2.6 in search report to check current status of the sewers.
All Sewers that have been transferred to the Sewerage Undertaker after 1st October 2011, which they have a record of but have not surveyed and confirmed, are shown in orange.
Please note, the full extent and route of these sewers may not be plotted on the sewer map.
By October 1st 2016 any private pumping station and associated apparatus serving a lateral drain or sewer which was operational before July 1st 2011 will have transferred over to the Sewerage Undertaker's responsibility and become a public asset (subject to any appeals).

Water Record

- Distribution Main
- Trunk Main (local/primary)
- Strategic Main
- Fire Supply Main
- Fire Main
- Non-Domestic Customer Service Pipe
- Domestic Customer Service Pipe
- Abandoned Main
- Elevated Main
- Aqueduct
- Duct
- Pre-1937 Properties
- SSSI Area
- Protective Strip
- Pumping Facility
- Booster Facility
- Potable Water Storage
- Water Tower
- Well / Borehole
- Intake
- Water Treatment Works / Chamber
- Draw-off Tower
- Bowser Point
- Water Facility Connection
- Pipe Support Structure
- Open Pipe
- Discharge
- End Cap
- Water Isolation Valve (Closed)
- Water Isolation Valve (Open)
- Water Isolation Valve (Partially Open)
- Water Air Valve
- Pressure Reducing Valve
- Pressure Sustaining Valve
- Non-Return Valve
- Float Valve
- Hydrant (Single/Double)
- Washout (Single/Double)
- Bulk Meter
- Water Hatch Box
- Pressure Tapping
- Insertion Flow Meter Point
- Change in Characteristic
- Marker Post
- Cable Junction
- Anode
- Boundary Box
- Stop Tap
- Cross Piece
- Strainer
- Listening Post
- Revenue Meter
- B Housing, Building
- K Housing, Kiosk
- Housing, Other
- Quality Sample Point

For a detailed glossary of the above terminology please visit: www.severntrentsearches.com/glossary

Question 1.1 Q1.1

Where relevant, please include a copy of an extract from the public sewer map.

Map Provided

A copy of an extract from the public sewer map is included in which the location of the property is identified.

Guidance Notes

Pipes that are shown on the public sewer map as sewers, disposal mains or lateral drains are defined as those for which the Sewerage Undertaker holds statutory responsibility under the Water Industry Act 1991. The Sewerage Undertaker is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only. Sewers or lateral drains indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an "as constructed" record. It is recommended that these details are checked with the developer. Please note that following the private sewer transfer on October 1st 2011 there may be additional public assets other than those indicated on the map. Particular attention should be paid to public pumping stations (indicated on the plan by a black triangle) which will have associated pressurised sewers serving the pumping station which may not be plotted on the sewer plan even if they have transferred into public ownership. Assets other than public sewers, disposal mains or lateral drains may be shown on the copy extract, for information.

Question 1.2 Q1.2

Where relevant, please include a copy of an extract from the map of waterworks.

Map Provided

A copy of an extract from the map of waterworks is included in which the location of the property is identified.

Guidance Notes

Pipes that are shown on the map of waterworks as water mains, resource mains or discharge pipes are defined as those for which a Water Undertaker holds statutory responsibility under the Water Industry Act 1991. Assets other than water mains, resource mains or discharge pipes may be shown on the plan, for information only. Water Undertakers are not responsible for private water mains or private service pipes connecting the property to the public water main and do not hold details of these. These may pass through land outside of the control of the seller, or may be shared with adjacent properties. The buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal. The extract of the map of waterworks shows water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Question 2.1 Q2.1

Does foul water from the property drain to a public sewer?

Records indicate that foul water from the property does drain to a public sewer. **Yes**

Guidance Notes

The connection status of the property is based on information held on the records by the responsible water company. Sewerage Undertakers are not responsible for any private drains and private sewers that do not connect the property to the public sewerage system, and do not hold details of these. The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility with other users, if the property is served by a private sewer which also serves other properties but does not connect into the public system. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal.

Question 2.2 Q2.2

Does surface water from the property drain to a public sewer?

Records indicate that surface water from the property does drain to a public sewer. **Yes**

Guidance Notes

The connection status of the property is based on information held on the records by the responsible water company. Sewerage Undertakers are not responsible for private drains and private sewers that do not connect the property to the public sewerage system and do not hold details of these. The property owner will normally have sole responsibility for private drains serving the property and may have shared responsibility, with other users, if the property is served by a private sewer which also serves other properties but does not connect into the public sewerage system. These may pass through land outside of the control of the seller and the buyer may wish to investigate whether separate rights or easements are needed for their inspection, repair or renewal. In some cases, Sewerage Undertaker records do not distinguish between foul and surface water connections to the public sewerage system. If on inspection the buyer finds that the property is not connected for surface water drainage, the property may be eligible for a rebate of the surface water drainage charge. Details can be obtained from the sewerage retailer.

Question 2.3 Q2.3

Is a surface water drainage charge payable?

Records indicate that a surface water drainage charge is applicable at this property. **See Details**

Guidance Notes

Any applicable surface water charge may be raised by the current sewerage retailer. However, if upon inspection the property owner believes that surface water does not drain to the public sewerage system, application can be made to the sewerage retailer to end surface water charges.

Question 2.4 Q2.4

Does the public sewer map indicate any public sewer, disposal main or lateral drain within the boundaries of the property?

Yes

The public sewer map included indicates that there is a public sewer, disposal main, lateral drain or other public sewer asset within or close to the boundaries of the property. Please note, from 1st October 2011 it is likely there is additional lateral drains and/or public sewers which are not recorded on the public sewer map but which may prevent or restrict development of the property. Please see Appendix 3 for details.

Guidance Notes

The approximate boundary of the property has been determined by reference to the Ordnance Survey record. Please note that following the private sewer transfer on October 1st 2011 the majority of private sewers and lateral drains connected to the public network as of 1st July 2011 transferred into public ownership and therefore there may be additional public assets within or close to the boundary which may not be shown on the public sewer plan. Please see Appendix 3 for further details. The presence of public asset running within the boundary of the property may restrict further development. If there are any plans to develop the property further enquiries should be made to the sewerage undertaker's Build Over department. The sewerage undertaker has a legal right of access to carry out work on its assets, subject to notice. This may result in employees of the Company or its contractors needing to enter the property to carry out work.

Question 2.4.1 Q2.4.1

Does the public sewer map indicate any public pumping station or any other ancillary apparatus within the boundaries of the property?

No

The public sewer map does not indicate a public pumping station or other ancillary apparatus within the boundaries of the property. However, as of 1st October 2016, any pumping station that was contructed prior to 1st July 2011 and serves more than one property will become the responsibility of the sewerage undertaker. Although the sewerage undertaker has no record of any pumping station at this property there may be pumping stations which meet the adoption criteria which they are not aware of and are not recorded on the public sewer map.

Guidance Notes

The approximate boundary of the property has been determined by reference to the Ordnance Survey record. Please note that privately owned pumping stations built prior to 1st July 2011 which serve more than one property and pump to the existing public sewer are eligible for transfer into public ownership as of 1st October 2016. Pumping stations that serve a single property but sit outside the curtilage of that property will also be eligible for transfer. Please see Appendix 3 for further details. Any other ancillary apparatus is shown on the public sewer map and is referenced on the map key. A full glossary is also available on our website at www.severntrentsearches.com/glossary/

Question 2.5 Q2.5

Does the public sewer map indicate any public sewer within 30.48 metres (100 feet) of any buildings within the property?

Yes

The public sewer map included indicates that there is a public foul sewer or public sewer asset within 30.48 metres (100 feet) of a building within the property.

Guidance Notes

The public sewer map shows the location of public sewers. Please note that from 1st October 2011, private sewers and lateral drains connected to the public network as of 1st July 2011 transferred into public ownership and from that date there may be public sewers closer to the property than those shown on the map. The presence of a public foul sewer within 30.48 metres (100 feet) of the building(s) within the property can result in the Local Authority requiring a property to be connected to the public foul sewer. The measure is estimated from the Ordnance Survey record, between the building(s) within the boundary of the property and the nearest public foul sewer.

Question 2.5.1 Q2.5.1

Does the public sewer map indicate any public pumping station or any other ancillary apparatus within 50 metres of any buildings within the property?

No

The public sewer map does not indicate a public pumping station or other ancillary apparatus within 50m of a building within the property. However, following the transfer of some private pumping stations into public ownership, from 1st October 2016 there may be public pumping stations which are not marked on the public sewer map.

Guidance Notes

The public sewer map shows the location of public pumping stations, pressurised mains and other ancillary apparatus. Please note that privately owned pumping stations built prior to 1st July 2011 which serve more than one property and pump to the existing public sewer are eligible for transfer into public ownership as of 1st October 2016. Pumping stations that serve a single property but sit outside the curtilage of that property will also be eligible for transfer. Pumping stations also have pressurised sewers associated with them and these may not be plotted on the public sewer map if the sewerage undertaker is unaware of the pumping station. The presence of a pumping station, pressurised rising main or other ancillary apparatus may restrict further development. Please see Appendix 3 for further details. Any other ancillary apparatus is shown on the public sewer map and is referenced on the map key. A full glossary is also available on our website at www.severntrentsearches.com/glossary/.

Question 2.6 Q2.6

Are any sewers or lateral drains serving, or which are proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?

No

The property is part of an established development and is not subject to an adoption agreement.

Guidance Notes

The majority of private sewers and lateral drains subject to adoption agreements were transferred into public ownership from 1st October 2011 and there may therefore be additional public sewers other than those shown on the plan. Further details can be found in Appendix 2. Buyers should consult with the current owner to ascertain the extent of their liability for privately held assets.

Question 2.7 Q2.7

Has a Sewerage Undertaker approved or been consulted about any plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain?

No

There are no records in relation to any approval or consultation about plans to erect a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain. However, the Sewerage Undertaker might not be aware of a building or extension on the property over or in the vicinity of a public sewer, disposal main or drain.

Guidance Notes

Buildings or extensions erected over a public sewer, disposal main or lateral drain in contravention of building controls or which conflict with the provisions of the Water Industry Act 1991, may have to be removed or altered. Please note that from 1st October 2011 the majority of private sewers and lateral drains connected to the public network as of 1st July 2011 transferred into public ownership and there may therefore be formerly private sewers and lateral drains which will have been built over. Please visit www.severntrentsearches.com/category/sewer-transfer for further information.

Question 2.8 Q2.8

Is the building which is or forms part of the property at risk of internal flooding due to overloaded public sewers?

No

The property is not recorded as being at risk of internal flooding due to overloaded public sewers.

Guidance Notes

A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded. "Internal flooding" from public sewers is defined as flooding which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes. "At Risk" properties are those that the Sewerage Undertaker is required to include in the Regulatory Register that is reported annually to the Water Services Regulation Authority. These are defined as properties that have suffered or are likely to suffer internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Sewerage Undertaker's reporting procedure. Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the "At Risk" register. Please note that from 1st October 2011 the majority of private sewers and lateral drains connected to the public network as of 1st July 2011 transferred into public ownership. Details of formerly private sewers at risk from internal flooding are not recorded in the Regulatory Register and will not be added until a flooding occurrence. There may therefore be public sewers at risk from internal flooding that are not recorded on the "At Risk" register.

Question 2.9 Q2.9

Please state the distance from the property to the nearest boundary of the nearest sewage treatment works.

See Details

The nearest sewage treatment works is 6.342 KM to the South of the property. The name of the nearest sewage treatment works is Avening.

Guidance Notes

The nearest sewage treatment works will not always be the sewage treatment works serving the catchments within which the property is situated. The Sewerage Undertakers records were inspected to determine the nearest sewage treatment works. It should be noted therefore that there may be private sewage treatment works closer than the one detailed above that have not been identified.

Question 3.1 Q3.1

Is the property connected to mains water supply?

Records indicate that the property is connected to mains water supply. **Yes**

Question 3.2 Q3.2

Are there any water mains, resource mains or discharge pipes within the boundaries of the property?

Yes

The map of waterworks indicates that there are water mains, resource mains or discharge pipes within or close to the boundaries of the property.

Guidance Notes

The approximate boundary of the property has been determined by reference to the Ordnance Survey record. The presence of a public water main, resource main or discharge pipe within the boundary of the property may restrict further development within it. Water Undertakers have a statutory right of access to carry out work on their assets, subject to notice. This may result in employees of the Company or its contractors needing to enter the property to carry out work.

Question 3.3 Q3.3

Is any water main or service pipe serving, or which is proposed to serve the property, the subject of an existing adoption agreement or an application for such an agreement?

No

Records confirm that water mains or service pipes serving the property are not the subject of an existing adoption agreement or an application for such an agreement.

Guidance Notes

Where the property is part of a very recent or ongoing development and the water mains and service pipes are not the subject of an adoption application, buyers should consult with the developer to confirm that the Water Undertaker will be asked to provide a water supply to the development or to ascertain the extent of any private water supply system for which they will hold maintenance and renewal liabilities.

Question 3.4 Q3.4

Is the property at risk of receiving low water pressure or flow?

Records confirm that the property is not recorded on a register kept by the Water Undertaker as being at risk of receiving low water pressure or flow.	**No**

Guidance Notes

'Low water pressure' means water pressure below the regulatory reference level which is the minimum pressure when demand on the system is not abnormal. Water Undertakers are required to include in the Regulatory Register that is reported annually to the Water Services Regulation Authority properties receiving pressure below the reference level, provided that allowable exclusions do not apply (i.e. events which can cause pressure to temporarily fall below the reference level).Water Companies are required to include in the Regulatory Register that is reported annually to the Director General of Water Services properties receiving pressure below the reference level, provided that allowable exclusions do not apply (i.e. events which can cause pressure to temporarily fall below the reference level). The reference level of service is a flow of 9 litres/minute at a pressure of 10 metres head on the customer's side of the main stop tap (mst). The reference level of service must be applied on the customer's side of a meter or any other company fittings that are on the customer's side of the main stop tap. The reference level applies to a single property. Where more than one property is served by a common service pipe, the flow assumed in the reference level must be appropriately increased to take account of the total number of properties served. For two properties, a flow of 18 litres/minute at a pressure of 10 metres head on the customer's side of the mst is appropriate. For three or more properties the appropriate flow should be calculated from the standard loadings provided in BS806-3 or Institute of Plumbing handbook.Allowable exclusions: The Company is required to include in the Regulatory Register properties receiving pressure below the reference level, provided that allowable exclusions listed below do not apply. Abnormal demand: This exclusion is intended to cover abnormal peaks in demand and not the daily, weekly or monthly peaks in demand which are normally expected. Companies should exclude from the reported DG2 figures properties which are affected by low pressure only on those days with the highest peak demands. During the report year Companies may exclude, for each property, up to five days of low pressure caused by peak demand. Planned maintenance: Companies should not report under DG2 low pressures caused by planned maintenance. It is not intended that Companies identify the number of properties affected in each instance. However, Companies must maintain sufficiently accurate records to verify that low pressure incidents that are excluded from DG2 because of planned maintenance are actually caused by maintenance. One-off incidents: This exclusion covers a number of causes of low pressure, mains bursts, failures of Company equipment (such as PRVs or booster pumps), firefighting and action by a third party. However, if problems of this type affect a property frequently, they cannot be classed as one-off events and further investigation will be required before they can be excluded.

Question 3.5 Q3.5

What is the classification of the water supply for the property?

The water supplied to the property has an average water hardness of 114.70 mg/l calcium which is defined as Hard by Severn Trent Water. **See Details**

Guidance Notes

Neither hard nor soft water is considered to pose any risk to health. Hardness comes from naturally occurring calcium and magnesium mineral salts which are dissolved from the rocks through which rain water flows. Hardness is expressed as the equivalent amount of calcium carbonate in parts per million (mg/l). Hard water causes scaling in hot water systems, kettles, electric irons and domestic appliances. Scaling of heating elements may shorten their life and may make appliances less efficient. More information is available on the water undertaker's website.

Water hardness can be expressed in various indices for example the hardness settings for dishwashers are commonly expressed in Clark's degrees, but check with the manufacturer as there are also other units. The following table explains how to convert mg/l calcium and mg/l calcium carbonate classifications.

TO CONVERT FROM:	TO CLARK DEGREES	TO FRENCH DEGREES	TO GERMAN DEGREES
mg/l calcium	multiply by 0.18	multiply by 0.25	multiply by 0.14
mg/l calcium carbonate	multiply by 0.07	multiply by 0.10	multiply by 0.056

Question 3.6 Q3.6

Is there a meter installed at this property?

Records indicate that there is a meter installed at this property. **Yes**

Question 3.7 Q3.7

Please include details of the location of any water meter serving the property.

Records indicate that the property is served by a water meter, which is located outside of the building which is or forms part of the property, and in particular is located; **See Details**

BB FRONT RIGHT BB*BY STEPS*, Serial Number:14M077820, Size:22mm.

(Note: the meter location has been downloaded from the meter reader records and is provided as general guidance).

For further information regarding the water meter serving this property please contact:

Severn Trent Water
PO Box 5310
Coventry
CV3 6SD

[redacted]
For Billing Enquiries only
For Metering Enquiries only
For Search Enquiries only

http://www.stwater.co.uk

Guidance Notes

The meter location has been downloaded directly from the water undertaker's records. These are entered on site by meter readers, and a number of abbreviations are used. A glossary of commonly used abbreviations is available on our website at www.severntrentsearches.com/meter-location-glossary

Question 4.1.1 Q4.1.1

Who is responsible for providing the sewerage services for the property?

The Sewerage Undertakers for the area are: **See Answer**

Severn Trent Water
PO Box 5310
Coventry
CV3 6SD

[redacted]
For Billing Enquiries only
For Metering Enquiries only
For Search Enquiries only

http://www.stwater.co.uk

Question 4.1.2 Q4.1.2

Who is responsible for providing the water services for the property?

The Water Undertakers for the area are: **See Answer**

Severn Trent Water
PO Box 5310
Coventry
CV3 6SD

[redacted] For Billing Enquiries only
For Metering Enquiries only
For Search Enquiries only

http://www.stwater.co.uk

Question 4.2 Q4.2

Who bills the property for sewerage services?

For details of who is currently billing the sewerage services for this property please contact the current owner. For a list of all potential retailers of sewerage services for the property please visit www.open-water.org.uk **See Details**

Question 4.3 Q4.3

Who bills the property for water services?

For details of who is currently billing the water services for this property please contact the current owner. For a list of all potential retailers of water services for the property please visit www.open-water.org.uk **See Details**

Question 5.1 Q5.1

Is there a Consent to discharge Trade Effluent under S118 of the Water Industry Act, 1991 into the public sewer?

No Consent

There is no Consent to Discharge Trade Effluent at this address. However, your client should be reminded that it is an offence under S129 of the Water Industry Act of Discharge Trade Effluent without Consent. If you have any queries please contact the sewerage undertaker.

Guidance Notes

Disputes between an occupier of a Trade Premises and the Sewerage Undertaker can be referred to the Director General of Water Services (OFWAT) on telephone number 0121 625 1300. Trade Effluent is defined by S141 of the Water Industry Act as "any liquid, with or without particles of matter in suspension in the liquid, which is wholly or in part produced in the course of any trade or industry carried on at trade premises" but does not include "domestic sewerage". As defined by the same Act as "any premises used or intended to be used for carrying on any trade or industry". Any Consent to Discharge Trade Effluent is used under S118 of the Water Industry Act 1991 and will be subject to certain conditions. Disputes between an occupier of a Trade Premises and the Sewerage Undertaker can be referred to the Director General of Water Service (OFWAT) on telephone number 0121 625 1300.

Question 6.1 Q6.1

Is there a wayleave/easement agreement giving the Sewerage and/or Water Undertaker the right to lay or maintain assets or right of access to pass through private land in order to reach the Company's assets?

Currently Unavailable

Unfortunately, we are currently unable to provide this information within our report. We are looking to include this data in our future reports and have started a project to access and compile the necessary information to answer this question.

Question 6.2 Q6.2

On the copy extract from the public sewer map, please show manhole cover, depth and invert levels where the information is available.

Currently Unavailable

Unfortunately, we are currently unable to provide this information in our reports. If you require invert levels, please contact us at [redacted] and we will provide this information separately.

Glossary for Commercial Drainage and Water Search

Definition of terms:
'the 1991 Act' means the Water Industry Act 1991;
'the 2000 Regulations' means the Water Supply (Water Quality) Regulations 2000;
'the 2001 Regulations' means the Water Supply (Water Quality) Regulations 2001;
'adoption agreement' means an agreement made or to be made under Section 51A(1) or 104(1) of the 1991 Act;
'bond' means a surety granted by a developer who is a party to an adoption agreement;
'bond waiver' means an agreement with a developer for the provision of a form of financial security as a substitute for a bond;
'calendar year' means the twelve months ending 31st December;
'discharge pipe' means a pipe which discharges are made or are to be made under Section 165(1) of the 1991 Act;
'disposal main' means (subject to section 219(2) of the 1991 Act) any outfall pipe or other pipe which - (a) is a pipe for the conveyance of effluent to or from any sewage disposal works, whether of a Sewerage Undertaker or of any other person; and (b) is not a public sewer;
'drain' means (subject to Section 219(2) of the 1991 Act) a drain used for the drainage of one building or of any buildings or yards appurtenant to buildings within the same curtilage;
'effluent' means any liquid, including particles of matter and other substance in suspension in the liquid;
'financial year' means the twelve months ending with 31st March;
'lateral drain' means - (a) that part of a drain which runs from the curtilage of a building (or buildings or yards within the same curtilage) to the sewer with which the drain communicates or is to communicate; or (b) (if different and the context so requires) the part of a drain identified in a declaration of vesting made under Section 102 of the 1991 Act or in an agreement made under Section 104 of that Act;
'licensed water supplier' means a company which is the holder for the time being of a water supply license under Section 17A(1) of the 1991 Act;
'maintenance period' means the period so specified in an adoption agreement as a period of time - (a) from the date of issue of a certificate by a Sewerage Undertaker to the effect that a developer has built (or substantially built) a private sewer or lateral drain to that Undertakers satisfaction; and (b) until the date that private sewer or lateral drain is vested in the Sewerage Undertaker;
'map of waterworks' means the map made available under Section 198(3) of the 1991 Act in relation to the information specified in subsection (1A);
'private sewer' means a pipe or pipes which drain foul or surface water, or both, from premises, and are not vested in a Sewerage Undertaker;
'public sewer' means, subject to Section 106(1A) of the 1991 Act, a sewer for the time being vested in a Sewerage Undertaker in its capacity as such, whether vested in that Undertaker - (a) by virtue of a scheme under Schedule 2 to the Water Act 1989; (b) by virtue of a scheme under Schedule 2 to the 1991 Act; (c) under Section 179 of the 1991 Act; or (d) otherwise;
'public sewer map' means the map made available under Section 199(5) of the 1991 Act;
'resource main' means (subject to Section 219(2) of the 1991 Act) any pipe, not being a trunk main, which is or is to be used for the purpose of- (a) conveying water from one source of supply to another, from a source of supply to a regulating reservoir or from a regulating reservoir to a source of supply; or (b) giving or taking a supply of water in bulk;
'sewerage services' includes the collection and disposal of foul and surface water and any other services which are required to be provided by a Sewerage Undertaker for the purpose of carrying out its functions;
'Sewerage Undertaker' means the company appointed to be the Sewerage Undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated;
'surface water' includes water from roofs and other impermeable surfaces within the curtilage of the property;
'trade effluent' any liquid, either with or without suspended particles, which is wholly or partly produced in the course of any trade or industry carried on at trade premises. It does not include domestic sewage.
'water main' means (subject to Section 219(2) of the 1991 Act) any pipe, not being a pipe for the time being vested in a person other than the Water Undertaker, which is used or to be used by a Water Undertaker or licensed water supplier for the purpose of making a general supply of water available to customers or potential customers of the Undertaker or supplier, as distinct from for the purpose of providing a supply to particular customers;
'water meter' means any apparatus for measuring or showing the volume of water supplied to, or of effluent discharged from any premises;
'water supplier' means the company supplying water in the water supply zone, whether a Water Undertaker or licensed water supplier;
'water supply zone' in relation to a calender year, means the names and areas designated by a Water Undertaker within its area of supply that are to be its water supply zones for that year;
'Water Undertaker' means the company appointed to be the Water Undertaker under Section 6(1) of the 1991 Act for the area in which the property is or will be situated.

In this Report, references to a pipe, including references to a main, a drain or a sewer, shall include references to a tunnel or conduit which serves or is to serve as the pipe in question and to any accessories for the pipe.

Explanation of the main Map Keys

For an explanation of the full key, please visit www.severntrentsearches.com/glossary

Water Record		
Distribution Main		A local water main that distributes water supplies to premises within a geographical area
Trunk Main		A water main that provides water supplies to distribution mains or transfers water between water sources, water treatment works and reservoirs
Abandoned Main		A water main no longer in use that formerly supplied water and is still in existence
Aqueduct		A large diameter pipe that carries water from a water supply source to a water treatment works or reservoir
Protective Strip		A strip of land over the line of a water main within which no buildings should be placed or ground levels altered in order to protect the integrity of and access to the pipe
Discharge		A point where water can be flushed from a water supply system into a watercourse
Fire Main		A pipe that supplies water into an area to enable connections to be made solely for the purpose of extinguishing fires
Water Facility Connection		Inlet to a water pumping facility or outlet from a water pumping facility

Sewer Record		
Public Combined Gravity Sewer		A public sewer that is in the ownership and control of the Sewerage Undertaker that drains by gravity and receives both foul and surface water flows from more than one property.
Public Foul Gravity Sewer		A public sewer that is in the ownership and control of the Sewerage Undertaker that drains by gravity and receives foul water flows from more than one property.
Public Surface Water Gravity Sewer		A public sewer that is in the ownership and control of the Sewerage Undertaker that drains by gravity and receives surface water flows from more than one
Abandoned Gravity Sewer		A sewer no longer in use that formerly received drainage by gravity and is still in existence.
Combined Use Pressurised Sewer		A public sewer that is in the ownership and control of the Sewerage Undertaker through which both foul and surface water flows are pumped and receives drainage from more than one property
Foul Use Pressurised Sewer		A public sewer that is in the ownership and control of the Sewerage Undertaker through which foul water flows are pumped and receives drainage from more than one property.
Foul Use Manhole		A vertical access shaft from ground level to a foul sewer to allow cleaning, inspection, connections and repairs
Sewage Pumping Facility		This is usually an underground facility which may be accommodated in an above ground building and pumps from a low-lying area to a higher one. Foul sewage and/or surface water flows from a sewerage system by gravity into the pumping station and the flows are then pumped into another sewerage system or to a sewage works.

Guidance Notes

General protection of sewers and water mains
The Water Industry Act 1991 gives rights to the Water Companies in respect of pipes which are their responsibility but which are situated in private land. These rights which are usually in respect of sewers or water mains; permit the Water Company to carry out future works on such pipes such as general repair and maintenance.

Permitted activities/uses within the strip of land above such pipes
This strip of land, generally known as 'the sterilized strip', has statutory protection and its width varies according to the size and depth of the pipe in question.

Acceptable:
• Use of the strip of land for agricultural or garden purposes or as an open space
• Placing of fences over the line of the pipe which are of an easily removable nature
• Placing of sewers, drains, cables or wires within the strip of land, subject to prior consultation
• Construction of roads or access across the strip of land, subject to prior consultation

Unacceptable:
• Construction of any permanent building, wall or structure even for agricultural purposes or garden purpose expect in certain circumstances where our formal consent is given (please see below)
• Use the strip of land for any purpose which may endanger or damage the pipe
• Removal of any earth supporting the pipe
• Planting of trees or shrubs within the strip of land
• Alteration to the level of the strip of land whether by excavation or tipping of any materials
• Covering any apparatus on the surface of the strip of land e.g. manholes, air valves etc
• Making access to the pipe more difficult/expensive e.g. by special or ornamental surfacing

Building over public sewers
The sewerage undertaker is responsible for public sewers within its area and many public sewers cross private land. The sewerage undertaker must ensure that no development is carried out which may damage a public sewer, cause risk of flooding or restrict future access for maintenance. Build over approval is required from the sewerage undertaker if any building work is intended close to or over a public sewer asset. Building close to or over a public sewer without having obtained the formal approval of the sewerage undertaker is illegal and it may also jeopardise the future sale of the property. The sewerage undertaker may have different processes in place for domestic and commercial build over projects . If you are unsure whether your project will affect a public sewer and what type of agreement you need , you can find out by contacting the relevant department below.

Please note that public water mains cannot be built over. You should seek guidance from the water undertaker's asset protection department if your plans involve building close to or working near a public water main.

Company	Contact	Email	Telephone Number	Opening times
Severn Trent Water	Domestic build overs Commercial build overs Developer Enquiries	[redacted]		Monday to Thursday 9:00am-5:00pm Friday 9:00am-4:30pm
Hafren Dyfrdwy	Domestic build overs Commercial build overs Developer Enquiries	[redacted]		Monday to Thursday 8:30am-5:00pm Friday 8:30am-4:30pm

Rights to discharge Trade Effluent

All industrial waste waters (trade effluents) are subject to a discharge consent system under either the Water Resources Act 1991 or the Water Industry Act 1991.

Three categories of waste waters are can be discharged from commercial premises:

Domestic Sewage - effluent from staff toilets, wash hand basins, showers, and kitchen areas. This is also sometimes known as foul drainage and will usually be kept separate from the trade effluent whilst on the company site , although it is mixed once it reaches the main sewerage system. The charge for this is usually included as part of a water bill.

Trade Effluent - effluent from all processes on the site, including all rinse water, washing water and any other discharge related to the process (even if it is clean water). The local water company charge for this if it goes to sewer. Occasionally, effluent is discharged directly into a river or other water course: in this instance, the Environment Agency make a charge. Trade effluent is legally defined as "any liquid, either with or without suspended particles, which is wholly or partly produced in the course of any trade or industry carried on at trade premises". It does not include domestic sewage.

Rainwater - rainwater from roofs, carparks and other outside areas discharges into a surface drainage system. This is separate from the foul drainage system and is regulated by the Environment Agency rather than the water company . Rainwater is either channelled to surface drains located in roads adjacent to the property or is sometimes discharged directly to a river or stream. There is not normally a charge for discharge of rainwater, although companies do have a duty to ensure it is not contaminated by oils or any other substance.

Consent to discharge

The Water Industry Act gives companies the right to discharge to a public sewer but only with the prior consent or agreement of the water company.
Water companies maintain the sewerage system, provide treatment for the waste, and dispose of the final treated effluent. To allow them to do this effectively, they can impose special restrictions on an effluent before allowing the discharge . These restrictions depend upon the type of treatment provided by the water company, the size of connecting sewers and the capacity of the waste water treatment works (WWTW). They can also include:

- the nature or composition of the effluent
- the maximum daily volume allowed
- the maximum rate of flow
- the sewer into which the effluent is discharged.

A number of other factors may also be included in a consent to discharge , eg the temperature or pH of the effluent. Certain substances are prohibited from being disposed of in this way.
In addition to the type and quality of the effluent, the Water Industry Act also gives the water companies the right to charge for carrying, treating and disposing of the waste.

Severn Trent Searches: Commercial Drainage and Water Search Complaint Procedure

As a minimum standard Severn Trent Searches, PO Box 10155, Nottingham, NG1 9HQ:

Will endeavour to resolve any telephone contact or complaint at the time of the call. However, if that isn't possible, we will investigate and research the matter in detail and provide a written response within 5 working days of receipt of your complaint.

Depending on the scale of investigation required, we will keep you informed of the progress and update you with new timescales if necessary.

If we fail to give you a written substantive response within 5 working days Severn Trent Searches will compensate our client the original fee paid for a Severn Trent CON29DW Drainage and Water enquiry, regardless of the outcome of your complaint.

If we find your complaint to be justified, or we have made any errors that substantially change the outcome in your search result, we will automatically refund the search fee to the ordering party. We will provide them with a revised search and also undertake the necessary action, as within our control, to put things right as soon as practically possible. Customers will be kept informed of the progress of any action required.

If the search takes us longer than 10 working days to complete and we have not communicated the reasons for the delay we will provide the search free of charge.

A complaint will normally be dealt with fully within 20 working days of the date of its receipt. If there are valid reasons for the consideration taking longer you will be kept fully informed in writing or via telephone or email, as you prefer, and receive a proposed solution or final response at the very latest within 40 working days.

If you are still not satisfied with our response or action we will refer the matter to a Senior Manager/ Company Director for resolution. At your request we will liaise with a representative acting on your behalf.

If you are not satisfied with the resolution offered in the final response or the timescale * within which the final response or proposed solution was issued, you may refer the complaint to The Property Ombudsman scheme (TPOs), contact details below. We will co-operate fully with the independent adjudicator during the consideration of a complaint by the TPOs and comply with any decision.

*40 working days

Complaints should be sent to:
Customer Services
Severn Trent Searches
PO Box 10155, Nottingham, NG1 9HQ.
[redacted]

TPOs can be contacted at:
The Property Ombudsman scheme
Milford House, 43 - 55 Milford Street,
Salisbury, Wiltshire, SP1 2PB.
[redacted]
Website: www.tpos.co.uk

Appendix 2

Private sewer transfer - notes for property owners and conveyancers

The transfer

The private sewer transfer occurred in October 2011, and was designed to bring the majority of private sewers in England and Wales into public ownership.

Drains, lateral drains and sewers - definitions
A drain is a disposal pipe serving a single property or properties (such as flats) within a single curtilage. A lateral drain is any section of that drain which extends beyond the curtilage of the property. A sewer is a disposal pipe serving two or more separate properties. Full legal definitions of these terms can be found in the glossary.

Assets transferred into public ownership
The majority of all sewers and lateral drains that were connected to the public system prior to 1st July 2011 transferred into public ownership on 1st October 2011. Water companies were given five years to identify and adopt private pumping stations and associated apparatus, ending in October 2016.

Assets not transferred into public ownership
Some assets were excluded from the transfer, including:
Any assets not connected prior to 1st July 2011. These will transfer under a secondary scheme at a later date.
Drains within the boundary of the property they serve.
Sewers on Crown Land (such as prisons) where notice has been received from the relevant authority that the sewers should be exempt.
Sewers owned by Railway Authorities.
Sewers and drains which do not discharge to the public system, such as Sustainable Drainage Systems.
Drainage systems contained within a single property curtilage (e.g. retail parks, caravan parks).
Private Pumping stations and associated pressurised mains which serve one property.
Sewers where the owner successfully appeals to OFWAT to retain ownership (see below).
Private treatment works, septic tanks and cesspits.

Appeals
Any owner of a private sewer, lateral drain or pumping station had the right to appeal of OFWAT to retain ownership. These had to be lodged before 30th September 2011* OFWAT then determined whether the asset in question should be exempt from the transfer. During the appeal process, assets remained private.

*Appeals process differs slightly for pumping stations, Visit OFWAT's website for more details (ofwat.gov.uk).

Procedures for new sewers

The Flood and Water Management Act 2010
Once Section 42 of the Flood and Water Management Act 2010 comes into force, adoption of all new sewers which connect to the public network will be mandatory. A new national Mandatory Build Standard will also be introduced specifying the standards to which new sewers must be built.

Issues for property owners

Liability
Since the transfer, the majority of property owners have a greatly reduced liability for repairs to the drainage system. Should the search indicate the property is not connected to mains drainage or that there are no public assets nearby, it is recommended that further investigations be made into the drainage arrangements, as the property owner may have a substantial liability.

Sewers within property boundaries
The transfer resulted in a greater number of public sewers and lateral drains within property boundaries, many of which are not plotted on the Public Sewer Map. Property owners need to be aware that Severn Trent Water have statutory rights of access to land where their assets are located should they need to access the mains.
There are also formerly private sewers which have been built over without the Sewerage Undertaker's consent. Providing normal planning procedures were followed, this should not present any significant issues, although property owners need to be aware that theSewerage Undertaker may need to access the sewer.

Developing Properties
Building over or close to a public asset requires the consent from Severn Trent Water. This includes transferred private sewers and lateral drains within property boundaries. Full details can be found on the Severn Trent Water website.

What to do if there is a blockage in the Sewer within the property boundary
If there is a problem with a pipe within the property boundary, the occupier should call Severn Trent Water on 0800 783 4444. The Sewerage Undertaker will then decide whether this is a private matter or if they are responsible. The Sewerage Undertaker may charge the homeowner for clearing a blockage etc for which they are not responsible. Any works needed would be agreed beforehand.

Changes to Drainage and Water searches

Section 104 sites
The transfer applied to sites undergoing adoption under Section 104 of the Water Industry Act (1991). However, some assets on these sites, such as pumping stations, sewers connected after July 2011 and surface water sewers not connecting to the public system, were not included in the transfer. In these circumstances the search will continue to show a Section 104 agreement in place.

Sewers and lateral drains within property boundaries
Because private sewers were not previously required to be recorded on the public sewer records there are circumstances when we are unable to confirm the location of transferred sewers. On these occasions, the CON29DW report will advise as to whether there is likely to be a public asset within the boundary.

Proximity of sewers to the property
The majority of properties - particularly within urban areas - will have public sewers within 100 feet (30.48 metres). In the case of transferred assets not being shown on public sewer record, there will be occasions when we are unable to confirm this. In these circumstances we will advise whether there are likely to be assets in close proximity to the property. The absence of nearby public sewers could result in a property owner having a substantial liability for repairs to the drainage system.

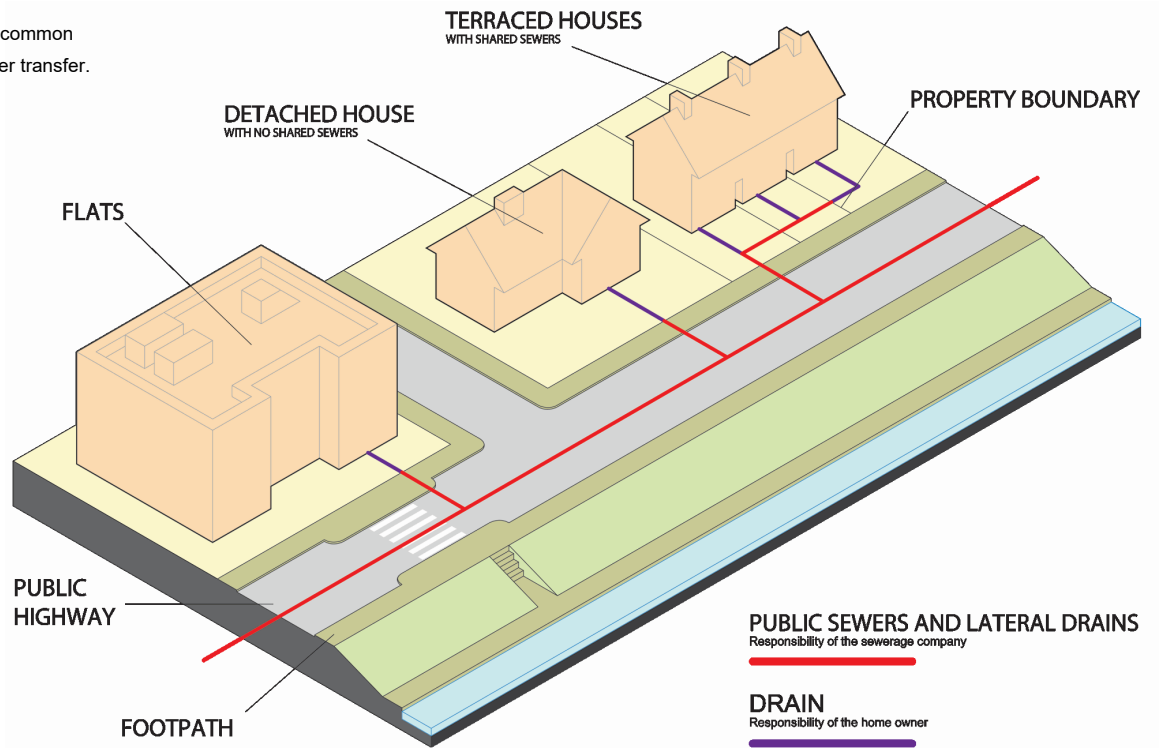
Building over public sewers
A number of formerly private sewers have been built over and are now the responsibility of Severn Trent Water . Although the search will highlight whether there has been a build over enquiry to Severn Trent Water , this will only apply to sewers which were public at the time of development.

Sewer flooding
Whilst the search will still report the risk of sewer flooding to a property, following the transfer there is the possibility of sewer flooding from transferred sewers which will not have been previously recorded. The register will be updated as and when there is an occurrence.

Pumping Stations
The search indicates whether a transferred pumping station is located either within a property boundary, or within 50 metres of the property. Transferred pumping stations - which will not always have been built to Severn Trent Water's standards - initially require regular inspection and maintenance, which may prove disruptive. On occasion, there may be private pumping stations of which we are unaware. In these instances, please contact Severn Trent Water on 0800 783 444 or email privatepumpingstations@severntrent.co.uk

Typical Examples

This diagram reflects some common scenarios following the sewer transfer.



Terraced Properties
It is common for terraced properties to have a public sewer passing within the property boundary. There are some exceptions, such as an end terrace upstream of neightbouring properties, as the section of drain will only serve that one property and so will remain private. Besides the situation shown in the diagram, a common alternative arrangement is for terraced houses to be served by a shared sewer to the rear which may also run in passageways between properties to join the main sewer in the highway.

Semi-detached
The majority of semi-detached properties are connected to the public sewer via a shared connection. The section of drain which serves both properties is now public. Typically, the public sewer will be within the boundary of the property which is downstream on the drainage system as most sewers work on a gravity system.

Detached Properties
It is common for most detached properties to be connected to the public sewer via a direct connection. Therefore, for many detached properties it is unlikely that assets within the boundary of the property will have transferred. But the individual drainage arrangements at a specific property should be checked if details are required.

Flats/Apartments
Any shared drainage systems within a property curtilage remain private. This means with flats, only drains and sewers outside the boundary have transferred.

Appendix 3 CON29DW COMMERCIAL DRAINAGE AND WATER SEARCH TERMS & CONDITIONS

These Terms govern the basis on which the Report is supplied and the basis upon which the Customer and the Client have relied upon the Report.

Definitions

'Apparatus' means the sewers, disposal mains or lateral drains, water mains, resource mains or discharge pipes and associated infrastructure for which an Undertaker holds statutory responsibility under the Water Industry Act 1991 shown on the map attached to the Report;

'Client' means the person who is the intended recipient of the Report with an actual or potential interest in the Property.

'Company' means Severn Trent Property Solutions, the company producing the Report.

'Customer' means the person placing the Order, either on its own behalf as Client, or, as an agent for or a reseller to a Client.

'Order' means any request completed by the Customer requesting the Report in accordance with the Company's order procedure.

'Report' means the drainage and/or water report prepared by the Company in respect of the Property.

'Partner Undertakers' means Severn Trent Water Ltd, Hafren Dyfrdwy Ltd or South Staffordshire Water Plc.

'Person' means any individual, firm, body corporate, unincorporated association or partnership.

'Property' means the address or location supplied by the Customer in the Order which satisfies one or more of the requirements set out in paragraph 2.1.

'Purpose' shall have the meaning set out in paragraph 2.2.

'Terms' means these CON29DW Commercial Drainage and Water Search Terms and Conditions.

'Third Party Undertaker' means any Undertaker other than a Partner Undertaker.

'Undertaker' means a Sewerage and/or Water Undertaker (both as defined in the Water Industry Act 1991) providing water and sewerage services.

1. Agreement

1.1 The Company agrees to supply the Report to the Customer and, if applicable, the Customer shall provide the Report to the Client, subject to these Terms to the exclusion of all other terms and conditions including any terms and conditions which the Customer and/or Client purports to apply under any Order, confirmation of Order or any other document. The scope and limitations of the Report are described in paragraph 2 of these Terms.

1.2 Where the Customer is not the Client, then the Customer shall ensure that these Terms are brought to the attention of the Client on or prior to the Customer placing the Order and that the Terms are provided with any copy of the Report provided by the Customer to the Client. The Customer is responsible for making sure that the Client is aware of the limitations and exclusions that are contained in these Terms and must draw the Client's attention to any disclaimers set out in the Report.

1.3 The Customer agrees that the placing of an Order for a Report indicates its acceptance of these Terms.

1.4 Where the Customer is placing an Order on behalf of a Client, it warrants and represents to the Company that it is authorised to accept these Terms on behalf of the Client and to bind the Client to these Terms.

2. The Report

2.1 This report should only be used for individual property transactions where the intended use of the property is:

2.1.1. not as a single, residential, domestic property: or

2.1.2. not land or buildings being, or to be developed as a single, residential, domestic property

2.2 The Report is produced solely for use by the Client for the intended purpose of the Report (the "**Purpose**"). The Purpose is the identification of the location and connection of existing drainage (save that which is identified in clause 2.3.7) and/or water services at the Property in relation to the individual commercial property transaction in respect of the Property which is in the contemplation of the Client at the time of ordering the Report the Company shall not be liable in any circumstances in connection with the Report if it is used for any other purpose.

2.3 Whilst the Company will use its reasonable care and skill in producing the Report, it is provided to the Customer on the basis that the Customer and the Client acknowledge and agree to the following:-

2.3.1 the information contained in the Report details only the location and connection of existing drainage and/or water services at the Property at the date stated in the Report;

2.3.2 the Company's obligation in respect of the Report is to correctly reproduce and compile the information provided by the Partner Undertakers and any Third Party Information (in accordance with paragraph 3.8);

2.3.3 the Report does not give details about the actual state or condition of the Property or the existing drainage and/or water services nor should it be used or taken to indicate actual suitability or unsuitability of the Property for any particular purpose, or relied upon for determining saleability or value, or used as a substitute for any physical investigation or inspection. Further advice and information from appropriate experts and professionals should always be obtained if the Customer or the Client requires;

2.3.4 the information contained in the Report is dependent upon the accuracy of the information supplied by the Customer or Client including, but not limited to the address of the Property and any plan of the Property;

2.3.5 the statements in the Report marked as 'Guidance Notes' are intended to be general statements and advice in addition to the report on the Property. The Company cannot ensure that any such guidance notes are accurate, complete or valid and accepts no liability for such general statements and advice provided; and

2.3.6 the position and depth of any Apparatus shown on any maps attached to the Report is approximate, and is intended as a general guide only and no warranty as to its correctness is given or implied and the Company shall have no liability for any inaccuracy in respect of the position of the Apparatus shown on any map. The exact positions and depths should be obtained by excavation trial holes and the maps must not be relied on in the event of excavation or other works made in the vicinity of the Apparatus.

2.3.7 subject to the terms of this agreement, the Company is not liable to the Customer or the Client where the report does not provide details about the private sewers, drains, lateral drains, pumping stations and any asociated apparatus that have transferred into the Undertaker and/or Partnership Undertaker's and/or the Third Party Undertaker's ownership as a direct result of the 'The Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011' and which are not shown on the public sewer record at the point at which the search was completed.

2.4 The Client and/or Customer shall notify the Company as soon as is practicable if it becomes aware of any defect or inaccuracy in the Report.

3. Limitation of Liability

3.1 The Company does not exclude its liability (if any) to the Customer and/or the Client:

3.1.1 for personal injury or death resulting from the Company's negligence;

3.1.2 for any matter for which it would be illegal for the Company to exclude or to attempt to exclude its liability; or

3.1.3 for fraud.

3.2 Subject to paragraph 3.1 the Company accepts no responsibility for and excludes its liability (whether for breach of contract, negligence or any other tort, under statute or statutory duty, restitution or otherwise at all) for:

3.2.1 any inaccuracy or error in the Report based on incomplete or inaccurate information supplied by the Customer and/or the Client;

3.2.2 any use of the Report by the Customer for any purpose other than the Purpose;

3.2.3 any inaccuracy or error in information provided by any Third Party Undertaker;

3.2.4 any error in a Report, which is based on any error or inaccuracy in a public register; or

3.2.5 any change in the location and connection of existing drainage and/or water services at the Property after the date stated in the Report.

3.3 Except as provided in paragraph 3.1 and paragraph 3.4 the Company's entire liability in respect of all causes of action arising by reason of or in connection with the Report (whether for breach of contract, negligence or any other tort, under statute or statutory duty or restitution or otherwise at all) shall not exceed £10,000,000.

3.4 Except as provided in paragraph 3.1, the Company will be under no liability to the Customer and/or the Client whatsoever (whether in contract, tort (including negligence), breach of statutory duty, restitution or otherwise) for any indirect or consequential loss (both of which terms include, without limitation, pure economic loss, loss of profits, loss of business, depletion of goodwill and like loss) howsoever caused arising out of or in connection with these Terms and/or the provision of the Report.

3.5 Except as set out in paragraph 3.1, the Company hereby excludes to the fullest extent permissible in law, all conditions, warranties and stipulations, express (other than those set out in these Terms) or implied, statutory, customary or otherwise which, but for such exclusion, would or might subsist in favour of the Customer and/or the Client.

3.6 The Company shall not be in breach of these Terms or otherwise liable to the Customer and/or the Client for any failure to provide or delay in providing the Report to the extent that such failure or delay is due to a event or circumstance beyond the reasonable control of the Company including but not limited to any delay, failure of or defect in any machine, processing system or transmission link or any failure or default of a supplier or sub-contractor of the Company or any provider of any third party Information except to the extent that such failure or delay is caused by the negligence of the Company.

3.7 Where the Customer sells this Report to a Client under its own name or as a reseller of the Company (other than in the case of a bona fide legal adviser recharging the cost of the Report as a disbursement) the Company shall not in any circumstances (whether for breach of contract, negligence or any other tort, under statute or statutory duty, restitution or otherwise at all) be liable to the Customer for any loss (whether direct, indirect or consequential loss (all three of which terms include without limitation, pure economic loss, loss of profit, loss of business, depletion of goodwill and like loss)) or damage whatsoever caused in respect of the Report or any use of the Report or reliance placed upon it and the Customer shall indemnify and keep indemnified the Company in respect of any claim by the Client that the Company may incur or suffer.

3.8 Where the Property falls within a geographical area where two or more different Undertakers provide water and sewerage services, the Company shall use extracts from reports provided by Third Party Undertakers in respect of the part of the Property that falls within the provision of services by Third Party Undertakers and such information shall not be produced specifically for the Company ("**Third Party Information"**). Liability for accuracy of the Third Party Information used for the purpose of the Report will remain with that Third Party Undertaker and is subject to the Third Party Undertakers' terms and conditions of supply of such reports. The Company gives no warranty as to the correctness, accuracy or completeness of the Third Party Information and provided that the Company reproduces the Third Party Information in the Report correctly, the Company excludes all liability (whether for breach of contract, negligence or any other tort, under statute or statutory duty, restitution or otherwise) for any Third Party Information.

3.9 If the Customer and/or Client is acting as a consumer in purchasing the Report, then in respect of the party dealing as a consumer (the "**Consumer**"), the provisions of paragraphs, 3.3 to 3.5 shall not be deemed to apply and subject to paragraph 3.1, the Company shall only be liable to the Consumer for losses which the Consumer suffers as a result of the Company not providing the Report in accordance with these Terms. The Company is not responsible to the Consumer for any losses which it may incur which were not a foreseeable consequence of the Company breaching these Terms, including if the Consumer and the Company could not have contemplated those losses before or when the parties entered into these Terms. The Company's liability to the Consumer shall not in any circumstances include any business losses that it may incur, including but not limited to lost data, lost profits or business interruption.

4. Copyright and Confidentiality

4.1 The Customer acknowledges and where the Customer is not the Client, the Customer shall procure that the Client acknowledges that the Report is confidential to the Customer and/or the Client and may only be used by the Customer and/or the Client for the Purpose and the proper performance of these Terms.

4.2 The copyright and any other intellectual property rights in the Report shall remain the property of the Company. No intellectual or other property rights are transferred or licensed to the Customer or the Client except to the extent expressly provided in these Terms. The maps contained in the Report are protected by Crown Copyright and must not be used for any purpose not anticipated by the Report.

4.3 The Customer and the Client are entitled to make copies of the Report for the Purpose but may only copy Ordnance Survey mapping or data contained in or attached to the Report if it has an appropriate licence from the originating source of that mapping or data.

4.4 The Customer agrees and where the Customer is not the Client, the Customer shall procure that the Client agrees, (in respect of both the original and any copies made) to respect and not to alter any trademark, copyright notice or other property marking which appears on the Report.

4.5 The Customer agrees and where the Customer is not the Client, the Customer shall procure that the Client agrees to indemnify and keep indemnified the Company against any losses, costs, claims and damage suffered by the Company as a result of any breach by either of them of the terms of paragraphs 4.1 to 4.4 inclusive.

4.6 The obligation to procure the compliance of the Client to the obligations set out in this paragraph 4 and in paragraph 6.5 shall not apply to Customers who are bona fide legal advisers recharging the cost of the Report to the Client as a disbursement.

5. Payment

5.1 Unless otherwise stated all prices are inclusive of VAT. The Customer shall pay the price of the Report specified by the Company, without any set off, deduction or counterclaim. Unless the Customer or Client has an account with the Company for payment for Reports, the Company must receive payments for Reports in full before the Report is produced. For Customers or Clients with accounts, payment terms will be as agreed with the Company.

5.2 Where the Property consists of a site with four or more separate metered or un-metered water supplies, additional fees may be charged as notified to the Customer by the Company.

6. General

6.1 If any provision of these Terms is or becomes invalid or unenforceable, it will be taken to be removed from the rest of these terms to the extent that it is invalid or unenforceable. No other provision of these terms shall be affected.

6.2 Any failure by the Company to enforce any breach of the Terms shall not be deemed to be a waiver of any future breach of the Terms by the Customer or Client.

6.3 These Terms shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts.

6.4 Nothing in these Terms shall in any way restrict the Customer or Client's statutory or any other rights of access to the information contained in the Report.

6.5 The Company and the Customer agree and where the Customer is not the Client, the Customer shall procure that the Client agrees that these Terms contain all the terms which the Company and the Customer and/or the Client have agreed in relation to the subject matter of these Terms and supersede any prior written or oral agreements, representations or understandings between any of them in relation to such subject matter. Nothing in this paragraph 6.5 will exclude any liability which one party would otherwise have to another party in respect of any statements made fraudulently.

6.6 The Company may assign, delegate, licence, hold on trust or sub-contract all or any part of its rights and obligations under these Terms.

Severn Trent Searches is a trading name of Severn Trent Property Solutions. Registered in England and Wales no.2562471 Registered office, Severn Trent Centre, 2 St John's Street, Coventry, CV1 2LZ.

Additional Connection Details – 60237114

Records indicate that additional properties are connected to Severn Trent Water's assets, the details of which are listed below:

Parcel 1: **Bristol Street Ford, Valley Garage, London Road, Stroud, GL5 2AX.**

The Connection details for Parcel 1 are included in the main search above

---

Parcel 2: **Bristol Street Ford, Valley Garage, London Road, Stroud, GL5 2AX.**

- Does foul water from the property drain to a public sewer? **Yes**
- Does surface water from the property drain to a public sewer? **Yes**
- Is a surface water drainage charge payable? **Yes**
- Is the property connected to mains water supply? **Yes**
- Please include details of the location of any water meter serving the property. **See Details**

Location: Chamber, outside service department **Serial Number: 20LU079177** **Meter Size:** 15mm

(The meter location has been downloaded from the meter reader records and is provided as general guidance.)

For details of who is currently billing this property for the services shown above please contact the current owner. For a full list of all potential retailers of sewerage and water services please visit www.open-water.org.uk.

For any queries on household properties please contact Severn Trent Water's billing department on [redacted]

For further information regarding the water meter serving this property please contact:

Severn Trent Water
Sherbourne House
St Martins Road
Coventry
CV3 6SD

Appendix B: Correspondence with Severn Trent Water

[redacted]

ST Classification: OFFICIAL PERSONAL

Dear [redacted]

Thank you for your email.

Please see our required clearances per pipe diameter:

- Up to and including 299mm diameter - We require 3m no build zone/protective strip, either side of the pipe (6m across the diameter).
- Sewers from 300mm diameter to 999mm diameter - We require 5m no build zone/protective strip, either side of the pipe (10m across the diameter).
- 1000mm diameter or greater - We require 7.5m no build zone/protective strip, either side of the pipe (15m across the diameter).

Given the size of the pipe, while we may be able to relax the 5m strip slightly, each property within the 5m strip would require a Build Over agreement, assuming they would be sold separately, with a copy placed with each respective Deeds.

We would have no objections to the use of permeable paving in the vicinity or over the public sewer. While no formal agreement (ie no Build Over application) would be needed as they are not 'permanent structures' attenuation tanks cannot be directly over a public sewer. Ultimately the required clearance would usually depend on the depth of the pipe, and with the depth here being 3m, we would request a similar clearance either side.

No formal inspection would be required for the Build Over process, with the CCTV reports being sufficient in demonstrating condition of the pipe.

Kind regards

[redacted]
Asset Protection
Severn Trent Water

[redacted]

Dear Sirs,

We are preparing design for a proposed new residential development at the above location. The development comprises two parcels, one to the north and the other to the south of London Road, as shown on the attached drawing 004.

The southern site is crossed by an existing 450mm dia foul sewer at a depth of approximately 3m. That sewer is currently built over by a garage workshop. The development layout seeks to improve that situation by demolishing the existing buildings and avoid any build over within the proposed new layout.

No advice is given in the attached CON29DW search on the easement applied to this sewer. Could you advise what easement width would be applied to the length of sewer crossing the southern parcel of this development please? The neighbouring existing residential development in Bishops Close appears to have the building line set 3m from the sewer, immediately upstream of our site.

The new development will require surface water design to incorporate SuDS features. Ground Investigation suggests that ground conditions will not be suitable for the use of infiltration for disposal of surface water runoff. We will therefore need to consider onsite mechanisms for interception, water quality treatment and attenuation. Could you confirm the suitability of permeable paving in proximity to the existing sewer or if a service corridor would be required? Also, what restrictions on location of attenuation storage tanks would there be?

The build process will include the demolition of the existing structure over the existing sewer. We would anticipate the need for a CCTV condition survey before and after the demolition works. Would there be any further monitoring or inspection required by yourselves during the works?

Any queries please do not hesitate to contact myself.

Kind regards

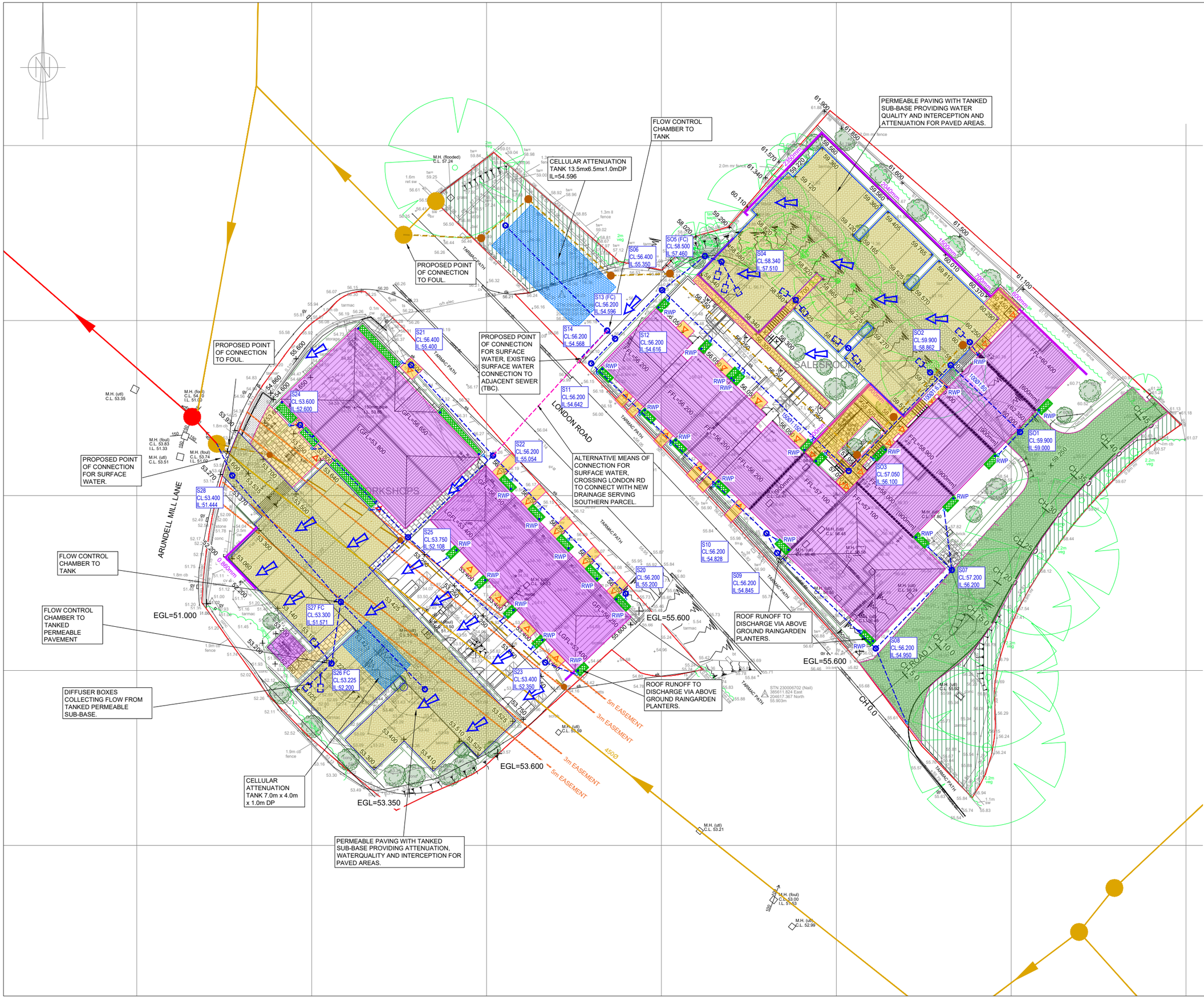
[redacted]
CEng MICE

Associate Director

[redacted]

2A Oak Tree Court, Mulberry Drive, Cardiff Gate Business Park, Cardiff CF23 8RS | [redacted]
www.jubb.uk.com

Appendix C: Proposed Drainage Layout



NOTES:

1. THIS DRAWING IS FOR PLANNING SUBMISSION ONLY.
2. PROPOSED FOUL AND SURFACE WATER NETWORK SHOWN INDICATIVELY, DETAILS TO BE CONFIRMED AT DETAILED DESIGN.
3. DRAINAGE STRATEGY IS SUBJECT TO APPROVAL FROM THE LLFA, SEVERN TRENT WATER AND ENVIRONMENT AGENCY.
4. ALL PRIVATE DRAINAGE WILL BE CONSTRUCTED IN LINE WITH BUILDING REGULATIONS PART H.
5. ALL ADOPTED DRAINAGE WILL BE CONSTRUCTED INLINE WITH STW REQUIREMENTS.
6. KERBING SURROUNDING SuDS FEATURES IS TO BE INSTALLED TO ENSURE ADEQUATE DRAINAGE OF THE SURROUNDING IMPERMEABLE AREAS. KERBS ARE TO BE FLUSH, OR WHERE UPSTANDS ARE REQUIRED, THE KERBS ARE TO BE SPACED TO FACILITATE DRAINAGE.
7. ROOT BARRIERS ARE TO BE INSTALLED WHERE SEWERS ARE WITHIN 1.5m OF PROPOSED/ EXISTING TREES.
8. PIPE MATERIAL AND SPECIFICATION TO BE AGREED BETWEEN THE CONTRACTOR AND STW PRIOR TO COMMENCING WORK.
9. ALL TRAFFICKED COVERS AND GRATINGS TO BE TO D400 LOAD CLASSIFICATION AND B125 FOR NON-TRAFFICKED.
10. PROPOSED CONNECTION TO FOUL SEWER SUBJECT TO STW APPROVAL.
11. EXISTING DRAINAGE TO BE REMOVED AND DIVERTED WITHIN THE PROPOSED BUILDING FOOTPRINT.
12. SURFACE WATER DISCHARGE REQUIRES LLFA AND STW APPROVAL.
13. FOUL DESIGN CONNECTS ONTO THE EXISTING SEWER WITHIN THE SITE AND WILL FORM THE POINT OF CONNECTION FOR THE PROPOSED BUILDINGS. CONNECTION REQUIRES A S106 AGREEMENT WITH STW.

LEGEND

- SURFACE WATER DRAIN
- RAINGARDEN PLANTERS
- PERMEABLE PAVING
- CELLULAR TANK
- RWP RAINWATER DOWNPIPE
- DISTRIBUTION BOX
- SURFACE WATER GULLY
- FOUL DRAINAGE
- EXCEEDANCE FLOW
- EXISTING SEWER EASEMENT

Rev	Date	Description	By	Apvd
P3	16.04.24	Exceedance flow added	EH	EH
P2	15.03.24	Updated layout	EH	EH
P1	16.11.23	Preliminary issue	EH	EH

PROJECT:
LONDON ROAD
STROUD

TITLE:
DRAINAGE STRATEGY

CLIENT:
PIPER GROUP

SCALE@A1:
1:200

PROJECT REF:
23389

DRAWING No: JUBB-XX-XX-DR-C-0500

REV: P03

Revision Referencing
P = Preliminary A = Approval T = Tender C = Construction

Jubb
Bristol, Cardiff, Plymouth, Winchester
St James Court, St James Parade, Bristol BS1 3LH
jubb.uk.com

Appendix D: Drainage Calculations - Greenfield Runoff Rate

ReFH2 Rural Runoff Peak Flows

Input

Return Period (Years)	2
FEH Rainfall Version	2013
Site Location	GB 385550 204600 SO 85550 04600
Data Type	Catchment
Season	Summer
Country	England/Wales/Northern Ireland
Area (ha)	0.130
SAAR (mm)	845
BFIHOST	0.709
FARL	0.958
SPRHOST	23.570
URBEXT (2000)	0.0211

Results

Return Period (Years)	Rural (l/s)	Urban (l/s)
User	0.3	0.3
Q1	0.3	0.3
Q2	0.3	0.3
Q5	0.4	0.4
Q10	0.5	0.5
Q30	0.7	0.7
Q50	0.8	0.8
Q75	0.9	0.9
Q100	1.0	1.0
Q200	1.2	1.2
Q1000	1.8	1.8

ReFH2 Rural Runoff Peak Flows

Input

Return Period (Years)	2
FEH Rainfall Version	2013
Site Location	GB 385550 204600 SO 85550 04600
Data Type	Catchment
Season	Summer
Country	England/Wales/Northern Ireland
Area (ha)	0.118
SAAR (mm)	845
BFIHOST	0.709
FARL	0.958
SPRHOST	23.570
URBEXT (2000)	0.0211

Results

Return Period (Years)	Rural (l/s)	Urban (l/s)
User	0.3	0.3
Q1	0.2	0.2
Q2	0.3	0.3
Q5	0.4	0.4
Q10	0.5	0.5
Q30	0.6	0.7
Q50	0.7	0.8
Q75	0.8	0.8
Q100	0.9	0.9
Q200	1.1	1.1
Q1000	1.6	1.6

Appendix E: Drainage Calculations Network Simulations

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	11.020	0.138	79.9	0.018	6.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	16.820	2.712	6.2	0.005	0.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	29.717	0.198	150.0	0.016	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	3.000	0.050	60.0	0.057	6.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	3.700	2.110	1.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	7.740	0.052	148.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	12.500	1.200	10.4	0.011	6.00	0.0	0.600	o	100	Pipe/Conduit	
3.001	15.700	0.105	150.0	0.028	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.002	2.560	0.017	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.003	27.900	0.186	150.0	0.013	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.004	3.900	0.026	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	1.300	0.020	65.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.005	4.200	0.028	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.006	1.000	0.007	142.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	6.21	59.000	0.018	0.0	0.0	1.0	0.86	6.8	3.4
1.001	50.00	6.30	58.862	0.023	0.0	0.0	1.2	3.13	24.5	4.4
1.002	50.00	6.91	56.100	0.039	0.0	0.0	2.1	0.82	14.5	7.4
2.000	50.00	6.04	57.510	0.057	0.0	0.0	3.1	1.30	23.0	10.8
2.001	50.00	6.05	57.460	0.057	0.0	0.0	3.1	7.67	135.6	10.8
1.003	50.00	7.07	55.350	0.096	0.0	0.0	5.2	0.82	14.5«	18.2
3.000	50.00	6.09	56.200	0.011	0.0	0.0	0.6	2.41	18.9	2.1
3.001	50.00	6.41	54.950	0.039	0.0	0.0	2.1	0.82	14.5	7.4
3.002	50.00	6.46	54.845	0.039	0.0	0.0	2.1	0.82	14.5	7.4
3.003	50.00	7.03	54.828	0.052	0.0	0.0	2.8	0.82	14.5	9.9
3.004	50.00	7.11	54.642	0.052	0.0	0.0	2.8	0.82	14.5	9.9
1.004	50.00	7.12	54.616	0.148	0.0	0.0	8.0	1.25	22.1«	28.1
1.005	50.00	7.21	54.596	0.148	0.0	0.0	8.0	0.82	14.5«	28.1
1.006	50.00	7.23	54.568	0.148	0.0	0.0	8.0	0.84	14.8«	28.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S01	59.900	0.900	Open Manhole	1200	1.000	59.000	100				
S02	59.900	1.038	Open Manhole	1200	1.001	58.862	100	1.000	58.862	100	
S03	57.050	0.950	Open Manhole	1200	1.002	56.100	150	1.001	56.150	100	
S04	58.340	0.830	Open Manhole	1200	2.000	57.510	150				
SO5 (FC)	58.500	1.040	Open Manhole	1200	2.001	57.460	150	2.000	57.460	150	
S06	56.400	1.050	Open Manhole	1200	1.003	55.350	150	1.002	55.902	150	552
								2.001	55.350	150	
S07	57.200	1.000	Open Manhole	1200	3.000	56.200	100				
S08	56.200	1.250	Open Manhole	1200	3.001	54.950	150	3.000	55.000	100	
S09	56.200	1.355	Open Manhole	1200	3.002	54.845	150	3.001	54.845	150	
S10	56.200	1.372	Open Manhole	1200	3.003	54.828	150	3.002	54.828	150	
S11	56.200	1.558	Open Manhole	1200	3.004	54.642	150	3.003	54.642	150	
S12	56.200	1.584	Open Manhole	1200	1.004	54.616	150	1.003	55.298	150	682
								3.004	54.616	150	
S13 (FC)	56.200	1.604	Open Manhole	1200	1.005	54.596	150	1.004	54.596	150	
S14	56.200	1.632	Open Manhole	1200	1.006	54.568	150	1.005	54.568	150	
	56.200	1.639	Open Manhole	1200		OUTFALL		1.006	54.561	150	

No coordinates have been specified, layout information cannot be produced.

Online Controls for Storm

Orifice Manhole: SO5 (FC), DS/PN: 2.001, Volume (m³): 1.2

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 57.460

Hydro-Brake® Optimum Manhole: S13 (FC), DS/PN: 1.005, Volume (m³): 1.8

Unit Reference	MD-SHE-0051-1200-1000-1200
Design Head (m)	1.000
Design Flow (l/s)	1.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	51
Invert Level (m)	54.596
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	1.2
Flush-Flo™	0.228	1.0
Kick-Flo®	0.458	0.8
Mean Flow over Head Range	-	1.0

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.9	1.200	1.3	3.000	2.0	7.000	2.9
0.200	1.0	1.400	1.4	3.500	2.1	7.500	3.0
0.300	1.0	1.600	1.5	4.000	2.2	8.000	3.1
0.400	0.9	1.800	1.6	4.500	2.4	8.500	3.2
0.500	0.9	2.000	1.6	5.000	2.5	9.000	3.3
0.600	1.0	2.200	1.7	5.500	2.6	9.500	3.4
0.800	1.1	2.400	1.8	6.000	2.7		
1.000	1.2	2.600	1.8	6.500	2.8		

Storage Structures for Storm

Porous Car Park Manhole: S04, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	15.8
Membrane Percolation (mm/hr)	1000	Length (m)	30.0
Max Percolation (l/s)	131.7	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	57.510	Cap Volume Depth (m)	0.600

Cellular Storage Manhole: S13 (FC), DS/PN: 1.005

Invert Level (m)	54.596	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	87.7	50.0	1.010	0.0	78.4
1.000	87.7	78.3			

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 385550 204600 SO 85550 04600
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.000	S01	15 minute 2 year Winter I+0%	59.900	59.044	-0.056	0.000	0.40
1.001	S02	15 minute 2 year Winter I+0%	59.900	58.886	-0.076	0.000	0.14
1.002	S03	15 minute 2 year Winter I+0%	57.050	56.164	-0.086	0.000	0.37
2.000	S04	240 minute 2 year Winter I+0%	58.340	57.783	0.123	0.000	0.11
2.001	SO5 (FC)	240 minute 2 year Winter I+0%	58.500	57.800	0.190	0.000	0.01
1.003	S06	15 minute 2 year Winter I+0%	56.400	55.418	-0.082	0.000	0.42
3.000	S07	15 minute 2 year Winter I+0%	57.200	56.220	-0.080	0.000	0.09
3.001	S08	15 minute 2 year Winter I+0%	56.200	55.015	-0.085	0.000	0.38
3.002	S09	15 minute 2 year Winter I+0%	56.200	54.918	-0.078	0.000	0.47
3.003	S10	15 minute 2 year Winter I+0%	56.200	54.902	-0.076	0.000	0.48
3.004	S11	480 minute 2 year Winter I+0%	56.200	54.795	0.003	0.000	0.10
1.004	S12	480 minute 2 year Winter I+0%	56.200	54.795	0.029	0.000	0.24
1.005	S13 (FC)	480 minute 2 year Winter I+0%	56.200	54.794	0.048	0.000	0.09
1.006	S14	480 minute 2 year Winter I+0%	56.200	54.599	-0.119	0.000	0.09

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S01		2.5	OK
1.001	S02		3.2	OK
1.002	S03		5.2	OK
2.000	S04		1.5	SURCHARGED
2.001	SO5 (FC)		0.7	SURCHARGED
1.003	S06		5.3	OK
3.000	S07		1.6	OK
3.001	S08		5.1	OK
3.002	S09		5.1	OK
3.003	S10		6.7	OK
3.004	S11		1.1	SURCHARGED
1.004	S12		2.6	SURCHARGED
1.005	S13 (FC)		1.0	SURCHARGED
1.006	S14		1.0	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 385550 204600 SO 85550 04600
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.000	S01	15 minute 30 year Winter I+0%	59.900	59.075	-0.025	0.000	0.92
1.001	S02	15 minute 30 year Winter I+0%	59.900	58.901	-0.061	0.000	0.32
1.002	S03	15 minute 30 year Winter I+0%	57.050	56.218	-0.032	0.000	0.96
2.000	S04	240 minute 30 year Winter I+0%	58.340	57.994	0.334	0.000	0.14
2.001	SO5 (FC)	360 minute 30 year Winter I+0%	58.500	58.023	0.413	0.000	0.01
1.003	S06	15 minute 30 year Winter I+0%	56.400	55.504	0.004	0.000	1.10
3.000	S07	15 minute 30 year Winter I+0%	57.200	56.230	-0.070	0.000	0.20
3.001	S08	15 minute 30 year Winter I+0%	56.200	55.227	0.127	0.000	0.88
3.002	S09	15 minute 30 year Winter I+0%	56.200	55.158	0.162	0.000	0.98
3.003	S10	15 minute 30 year Winter I+0%	56.200	55.141	0.162	0.000	0.98
3.004	S11	960 minute 30 year Winter I+0%	56.200	55.079	0.287	0.000	0.12
1.004	S12	960 minute 30 year Winter I+0%	56.200	55.079	0.313	0.000	0.28
1.005	S13 (FC)	960 minute 30 year Winter I+0%	56.200	55.078	0.332	0.000	0.09
1.006	S14	240 minute 30 year Summer I+0%	56.200	54.599	-0.119	0.000	0.09

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S01		5.8	OK
1.001	S02		7.5	OK
1.002	S03		13.3	OK
2.000	S04		1.9	SURCHARGED
2.001	SO5 (FC)		0.9	SURCHARGED
1.003	S06		13.8	SURCHARGED
3.000	S07		3.6	OK
3.001	S08		11.8	SURCHARGED
3.002	S09		10.6	SURCHARGED
3.003	S10		13.5	SURCHARGED
3.004	S11		1.3	SURCHARGED
1.004	S12		3.0	SURCHARGED
1.005	S13 (FC)		1.0	SURCHARGED
1.006	S14		1.0	OK

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 385550 204600 SO 85550 04600
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.000	S01	15 minute 100 year Winter I+40%	59.900	59.299	0.199	0.000	1.57
1.001	S02	15 minute 100 year Winter I+40%	59.900	58.915	-0.047	0.000	0.53
1.002	S03	15 minute 100 year Winter I+40%	57.050	56.535	0.285	0.000	1.56
2.000	S04	360 minute 100 year Winter I+40%	58.340	58.273	0.613	0.000	0.19
2.001	SO5 (FC)	360 minute 100 year Winter I+40%	58.500	58.305	0.695	0.000	0.01
1.003	S06	15 minute 100 year Winter I+40%	56.400	55.609	0.109	0.000	1.80
3.000	S07	15 minute 100 year Winter I+40%	57.200	56.242	-0.058	0.000	0.36
3.001	S08	15 minute 100 year Winter I+40%	56.200	55.966	0.866	0.000	1.42
3.002	S09	15 minute 100 year Winter I+40%	56.200	55.801	0.806	0.000	1.56
3.003	S10	15 minute 100 year Winter I+40%	56.200	55.733	0.755	0.000	1.51
3.004	S11	960 minute 100 year Winter I+40%	56.200	55.587	0.795	0.000	0.20
1.004	S12	960 minute 100 year Winter I+40%	56.200	55.587	0.821	0.000	0.45
1.005	S13 (FC)	960 minute 100 year Winter I+40%	56.200	55.586	0.840	0.000	0.11
1.006	S14	960 minute 100 year Winter I+40%	56.200	54.601	-0.117	0.000	0.11

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S01		9.9	SURCHARGED
1.001	S02		12.5	OK
1.002	S03		21.7	SURCHARGED
2.000	S04		2.7	FLOOD RISK
2.001	SO5 (FC)		1.2	FLOOD RISK
1.003	S06		22.6	SURCHARGED
3.000	S07		6.5	OK
3.001	S08		19.0	FLOOD RISK
3.002	S09		16.9	SURCHARGED
3.003	S10		20.9	SURCHARGED
3.004	S11		2.2	SURCHARGED
1.004	S12		4.9	SURCHARGED
1.005	S13 (FC)		1.2	SURCHARGED
1.006	S14		1.2	OK

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	21.895	0.146	150.0	0.010	6.00	0.0	0.600	o	100	Pipe/Conduit	
2.000	13.967	0.093	150.0	0.012	6.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	13.477	2.896	4.7	0.001	0.00	0.0	0.600	o	100	Pipe/Conduit	
3.000	21.239	0.242	87.8	0.010	6.00	0.0	0.600	o	150	Pipe/Conduit	
4.000	21.778	0.442	49.3	0.012	6.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	10.668	0.537	19.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
5.000	1.000	0.050	20.0	0.060	6.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	5.638	0.450	12.5	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	19.047	0.127	150.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	4.040	0.027	149.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	6.58	55.200	0.010	0.0	0.0	0.5	0.63	4.9	1.9
2.000	50.00	6.37	55.400	0.012	0.0	0.0	0.6	0.63	4.9	2.3
1.001	50.00	6.65	55.054	0.023	0.0	0.0	1.2	3.61	28.4	4.4
3.000	50.00	6.33	52.350	0.010	0.0	0.0	0.5	1.07	19.0	1.9
4.000	50.00	6.33	52.600	0.012	0.0	0.0	0.6	1.10	8.6	2.3
1.002	50.00	6.72	52.108	0.045	0.0	0.0	2.4	2.27	40.1	8.5
5.000	50.00	6.01	52.200	0.060	0.0	0.0	3.2	2.26	40.0	11.4
5.001	50.00	6.04	52.150	0.060	0.0	0.0	3.2	2.86	50.6	11.4
1.003	50.00	7.11	51.571	0.105	0.0	0.0	5.7	0.82	14.5«	19.9
1.004	50.00	7.19	51.444	0.105	0.0	0.0	5.7	0.82	14.5«	19.9

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 385550 204600 SO 85550 04600
Data Type	Catchment
Summer Storms	Yes
Winter Storms	No
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

Online Controls for Storm

Orifice Manhole: S26 FC, DS/PN: 5.001, Volume (m³): 1.2

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 52.150

Hydro-Brake® Optimum Manhole: S27 FC, DS/PN: 1.003, Volume (m³): 2.2

Unit Reference	MD-SHE-0051-1200-1000-1200
Design Head (m)	1.000
Design Flow (l/s)	1.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	51
Invert Level (m)	51.571
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	1.2
Flush-Flo™	0.228	1.0
Kick-Flo®	0.458	0.8
Mean Flow over Head Range	-	1.0

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.9	1.200	1.3	3.000	2.0	7.000	2.9
0.200	1.0	1.400	1.4	3.500	2.1	7.500	3.0
0.300	1.0	1.600	1.5	4.000	2.2	8.000	3.1
0.400	0.9	1.800	1.6	4.500	2.4	8.500	3.2
0.500	0.9	2.000	1.6	5.000	2.5	9.000	3.3
0.600	1.0	2.200	1.7	5.500	2.6	9.500	3.4
0.800	1.1	2.400	1.8	6.000	2.7		
1.000	1.2	2.600	1.8	6.500	2.8		

Storage Structures for Storm

Porous Car Park Manhole: DB, DS/PN: 5.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	26.5
Membrane Percolation (mm/hr)	1000	Length (m)	20.0
Max Percolation (l/s)	147.2	Slope (1:X)	30.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	52.200	Cap Volume Depth (m)	0.600

Cellular Storage Manhole: S27 FC, DS/PN: 1.003

Invert Level (m)	51.571	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	28.0	0.0	1.001	0.0	0.0
1.000	28.0	0.0			

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 385550 204600 SO 85550 04600
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.000	S20	15 minute 2 year Winter I+0%	56.200	55.237	-0.063	0.000	0.29
2.000	S21	15 minute 2 year Winter I+0%	56.400	55.442	-0.058	0.000	0.36
1.001	S22	15 minute 2 year Winter I+0%	56.200	55.077	-0.077	0.000	0.12
3.000	S23	15 minute 2 year Winter I+0%	53.400	52.378	-0.122	0.000	0.08
4.000	S24	15 minute 2 year Winter I+0%	53.600	52.630	-0.070	0.000	0.20
1.002	S25	15 minute 2 year Winter I+0%	53.750	52.150	-0.108	0.000	0.17
5.000	DB	360 minute 2 year Winter I+0%	53.025	52.395	0.045	0.000	0.06
5.001	S26 FC	240 minute 2 year Winter I+0%	53.225	52.405	0.105	0.000	0.02
1.003	S27 FC	240 minute 2 year Winter I+0%	53.300	51.760	0.039	0.000	0.08
1.004	S28	240 minute 2 year Winter I+0%	53.500	51.475	-0.119	0.000	0.09

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S20		1.4	OK
2.000	S21		1.7	OK
1.001	S22		3.2	OK
3.000	S23		1.4	OK
4.000	S24		1.7	OK
1.002	S25		6.2	OK
5.000	DB		0.9	SURCHARGED
5.001	S26 FC		0.6	SURCHARGED
1.003	S27 FC		1.0	SURCHARGED
1.004	S28		1.0	OK

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 385550 204600 SO 85550 04600
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.000	S20	15 minute 30 year Winter I+0%	56.200	55.261	-0.039	0.000	0.67
2.000	S21	15 minute 30 year Winter I+0%	56.400	55.470	-0.030	0.000	0.83
1.001	S22	15 minute 30 year Winter I+0%	56.200	55.090	-0.064	0.000	0.27
3.000	S23	15 minute 30 year Winter I+0%	53.400	52.393	-0.107	0.000	0.18
4.000	S24	15 minute 30 year Winter I+0%	53.600	52.648	-0.052	0.000	0.46
1.002	S25	15 minute 30 year Winter I+0%	53.750	52.174	-0.084	0.000	0.40
5.000	DB	360 minute 30 year Winter I+0%	53.025	52.537	0.187	0.000	0.07
5.001	S26 FC	360 minute 30 year Winter I+0%	53.225	52.549	0.249	0.000	0.02
1.003	S27 FC	480 minute 30 year Winter I+0%	53.300	52.158	0.437	0.000	0.08
1.004	S28	15 minute 30 year Summer I+0%	53.500	51.475	-0.119	0.000	0.09

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S20		3.2	OK
2.000	S21		3.9	OK
1.001	S22		7.4	OK
3.000	S23		3.2	OK
4.000	S24		3.9	OK
1.002	S25		14.4	OK
5.000	DB		1.0	SURCHARGED
5.001	S26 FC		0.8	SURCHARGED
1.003	S27 FC		1.0	SURCHARGED
1.004	S28		1.0	OK

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	2
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 385550 204600 SO 85550 04600
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	OFF
Inertia Status	OFF

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
1.000	S20	15 minute 100 year Winter I+40%	56.200	55.353	0.053	0.000	1.17
2.000	S21	15 minute 100 year Winter I+40%	56.400	55.601	0.101	0.000	1.45
1.001	S22	15 minute 100 year Winter I+40%	56.200	55.103	-0.051	0.000	0.48
3.000	S23	480 minute 100 year Winter I+40%	53.400	52.571	0.071	0.000	0.04
4.000	S24	15 minute 100 year Winter I+40%	53.600	52.671	-0.029	0.000	0.85
1.002	S25	480 minute 100 year Winter I+40%	53.750	52.570	0.312	0.000	0.10
5.000	DB	480 minute 100 year Winter I+40%	53.025	52.745	0.395	0.000	0.08
5.001	S26 FC	480 minute 100 year Winter I+40%	53.225	52.753	0.453	0.000	0.02
1.003	S27 FC	480 minute 100 year Winter I+40%	53.300	52.568	0.847	0.000	0.09
1.004	S28	480 minute 100 year Winter I+40%	53.500	51.477	-0.117	0.000	0.11

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S20		5.6	SURCHARGED
2.000	S21		6.8	SURCHARGED
1.001	S22		12.8	OK
3.000	S23		0.8	SURCHARGED
4.000	S24		7.1	OK
1.002	S25		3.5	SURCHARGED
5.000	DB		1.1	FLOOD RISK
5.001	S26 FC		0.8	SURCHARGED
1.003	S27 FC		1.2	SURCHARGED
1.004	S28		1.2	OK

Appendix F: Simple Index Approach, Pollution Mitigation

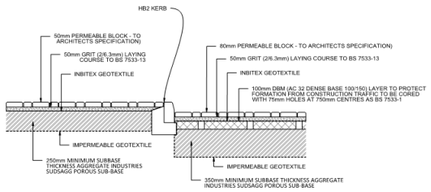
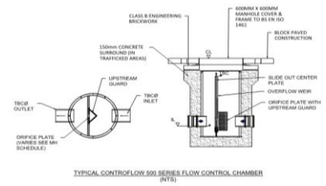
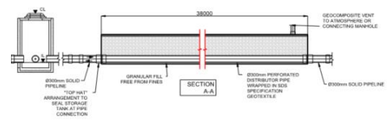
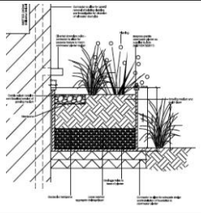
Simple Index Approach For Pollution Mitigation Assessment				
Roof Drainage Elements				
		Pollution Hazard Indices		
Runoff Area Land Use	Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Residential Roof	Very Low	0.2	0.2	0.05
		Pollution Mitigation Indices		
SuDS Component		Total Suspended Solids	Metals	Hydrocarbons
Raingarden Planter		0.8	0.8	0.8
Sufficiency of Pollution Mitigation Indices		Sufficient	Sufficient	Sufficient

Simple Index Approach For Pollution Mitigation Assessment				
Trafficked Area Drainage Elements				
		Pollution Hazard Indices		
Runoff Area Land Use	Hazard Level	Total Suspended Solids	Metals	Hydrocarbons
Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)	Low	0.5	0.4	0.4
		Pollution Mitigation Indices		
SuDS Component		Total Suspended Solids	Metals	Hydrocarbons
Pervious pavement (where the pavement is not designed as an infiltration component)		0.7	0.6	0.7
Sufficiency of Pollution Mitigation Indices		Sufficient	Sufficient	Sufficient

Appendix G: SuDS Maintenance Regime

London Road, Stroud.

SuDs Maintenance Schedule

SuDs Feature	Typical Detail	Quantity	Maintenance Requirements	Maintenance Action	Frequency
1. Permeable Paving		**North 473m2 South 535m2**	Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Bi Annual
			Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
				Removal of weeds or management using glyphospate applied directly into the weeds by an applicator rather than spraying	As required - once per year on less frequently used pavements
			Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving.	As required
				Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material.	As required
				Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
			Monitoring	Initial Inspection	Monthly for three months after installation
				Inspect for evidence of poor operation and/or weed growth - if required, take remedial action	Three monthly, 48hrs after large storms in first 6 months
				Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
				Monitor inspection chambers	Annually
2. Flow Control Chamber	 TYPICAL CONTROFLOW 500 SERIES FLOW CONTROL CHAMBER (NTS)	**4No.**	Regular Maintenance	Visual Inspection	3 monthly and after heavy rainfall
				Inspect for litter, debris and sediment build up at inlets/outlets/sump	Annually (and following poor performance)
			Occasional Maintenance	Cleaning of chamber and sump	Annually (and following poor performance)
			Remedial Actions	Repair/rehabilitate inlets and outlets	As required
3. Cellular Tank		**2No.**	Regular Maintenance	Visual Inspection	6 monthly and after heavy rainfall
				Inspect for litter, debris and sediment build up at chambers	Annually (and following poor performance)
			Occasional Maintenance	Cleaning of outlet/inlet	Annually (and following poor performance)
			Remedial Actions	Repair/rehabilitate inlet/outlet	As required
			Regular Maintenance	Visual Inspection	3 monthly and after heavy rainfall
				Inspect for litter, debris and sediment build up	3 monthly and after heavy rainfall
4. Raingarden Planter		**North 16No. South 15No.**	Occasional Maintenance	Cleaning of planted medium, clearance of debris	Anually, if required
			Remedial Actions	Replace planted medium and replant	Anually, if required