Abingdon Road, Clifton Hampden

Surface Water Management Strategy

On behalf of **Thomas Homes Ltd**

Project Ref: 332110526 | Rev: A | Date: July 2022

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Document Control Sheet

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	Name	Position	Signature	Date
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Approved by:	Simon Hudson	Senior Associate	SH	July 2022
For and on behalf of Stantec UK Limited				

Revision	Date	Description	Prepared	Reviewed	Approved
-	July 2022	First Issue	PB	JS	SH
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1 Introduction

1.1 Appointment

1.1.1 Stantec UK Ltd (Stantec) have been commissioned by Thomas Homes Ltd to prepare a surface water management strategy and design for the proposed residential development located to the north and south of Abingdon Road, Clifton Hampden, Oxfordshire.

1.1.2 The purpose of this report is to identify and describe the existing site drainage, with consideration to ground conditions, geology and ground water across the site and propose a sustainable surface water drainage strategy (SWDS) for the proposed development.

1.2 Site Proposals

1.2.1 The Site is currently greenfield land, used primarily for agricultural purposes. The northern section of the site also contains the existing Village Hall and allotments. This is hereafter referred to as the Site.

1.2.2 The Site is to be developed to provide 17 residential units, a new surgery, and a re-developed village hall. Amenity space and landscaping will also be provided.

1.3 Reference Documents

1.3.1 This surface water drainage strategy has been designed and prepared with reference to documents and information sources provided and/or published by the following bodies:

a) CIRIA C753 – The SUDs Manual and SUDs Hierarchy;

b) National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG);

c) Oxfordshire County Council, the Lead Local Flood Authority (LLFA) - Local Standards and Guidance for Surface Water Drainage on Major Development in Oxfordshire (December 2021);

d) Environment Agency (EA) Standing Advice;

e) Thames Water;

f) Code for Adoption where applicable;

g) Relevant Building Regulations where applicable; and

h) Best practice.

2 Site Context

2.1 Site Description and Location

2.1.1 The Site is located on the north-western edge of the village of Clifton Hampden and is split into two parts, situated to the north and south of A415 Abingdon Road. The northern parcel is at National Grid Reference 454560E 195650N, with a postcode of OX14 3EG. The southern parcel is at National Grid Reference 454480E 195510N, with an approximate postcode of OX14 3DE. A site location plan is shown in Appendix A.

2.1.2 The total area of the Site is approximately 4.45ha. The northern section occupies an area of 3.05ha, and the southern section having an area of 1.4ha.

2.1.3 The Site is predominantly greenfield, the northern section is arable land with a mixture of active and abandoned allotments. A small portion of the northern section is occupied by the existing Village Hall. The southern section of the Site is currently used as a paddock.

2.1.4 Following the proposed development approximately 0.52ha of the northern section and 0.21ha of the southern section will become impermeable.

2.2 Flood Risk

2.2.1 The nearest watercourse to the Site is the River Thames; located approximately 150m to the south-east. Ditches that drain to the River Thames are located immediately north of the northern section and approximately 120m southwest of the southern section.

2.2.2 The Site is located entirely within Flood Zone 1, representing areas with a low probability of flooding from nearby watercourses. An extract of the *Long Term Flood Risk Map for England* (gov.uk) shows the Site in relation to adjacent Flood Zones 2 and 3, presented in Figure 2.1.

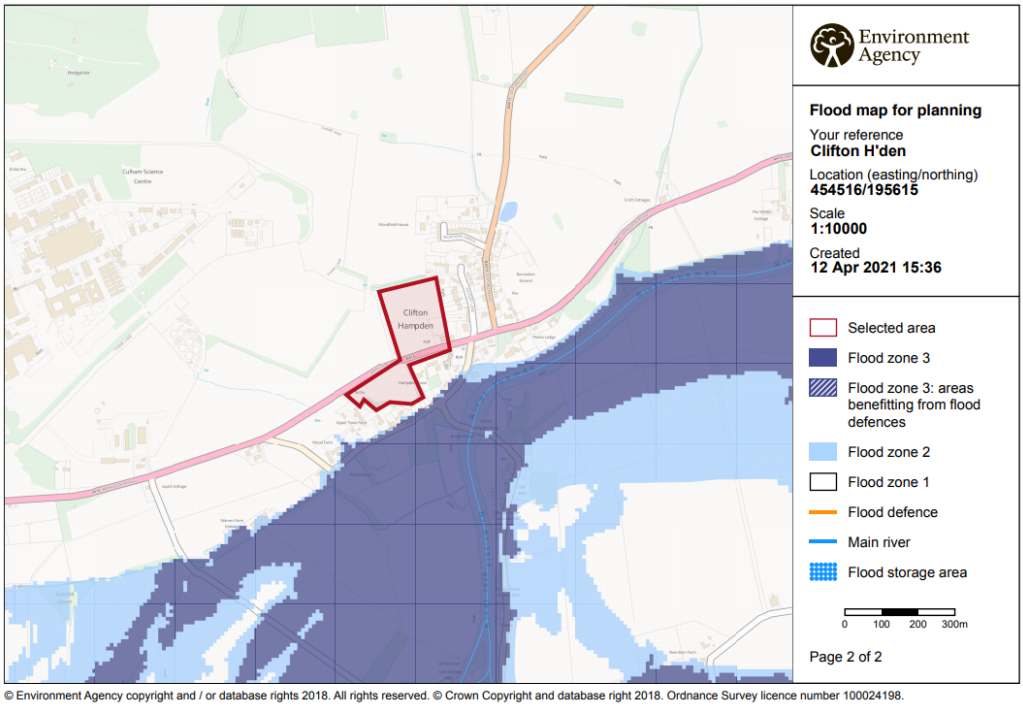


Figure 2.1: Site Locations and Flood Zones (gov.uk flood map)

2.2.3 The *Long Term Flood Risk Map for England* (gov.uk) shows the Site to be at negligible to no risk of flooding from rivers, the sea, or reservoirs. The mapping tool also shows very low risk of surface water flooding across the entire site area. The flood risk map is based on mathematical modelling, considering surfaces, topology, and existing land uses. No significant flooding occurs from the proposed surface water drainage strategy, so the risk of surface water flooding will continue to be negligible across the Site.

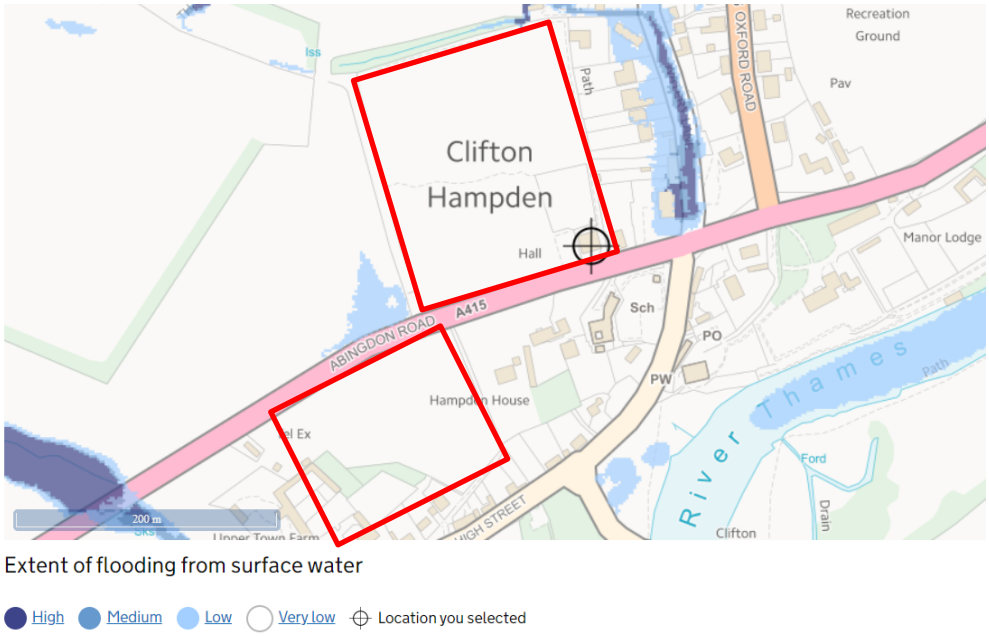


Figure 2.2: Extract of the Long Term Flood Risk Map for England (gov.uk), site outlines in red.

2.3 Site Topography

2.3.1 The northern section of the Site falls from a high point of 56.55mAOD located in the middle of the western boundary. The Site slopes towards the north-eastern and south-eastern corners, with low points around 54.00mAOD in both corners.

2.3.2 The southern section falls from the northern boundary along Abingdon Road to the southern boundary (56.30mAOD to 53.25mAOD). The southern boundary slopes steeply down to the properties along High Street.

2.4 Geology and Hydrology

2.4.1 The geological record data from the British Geological Society (BGS) show the Site lies on a boundary of differing geological deposits.

2.4.2 The northern section of the Site, including the village hall and allotments, is formed of superficial deposits of sand and gravel to the south and west. No superficial deposits were recorded to the north and east. This overlies a bedrock formation of the Lower Greensand sandstone group.

2.4.3 The southern section of the Site, currently used as a paddock, has superficial deposits of sand and gravel to the north and east. No superficial deposits were recorded to the south and west. The Site is founded on bedrock deposits of the Gault formation (clay and mudstone) to the south and west, and the Lower Greensand formation (sand and sandstone) to the north and east.

2.4.4 See Figure 2.3 for British Geological Society mapping.

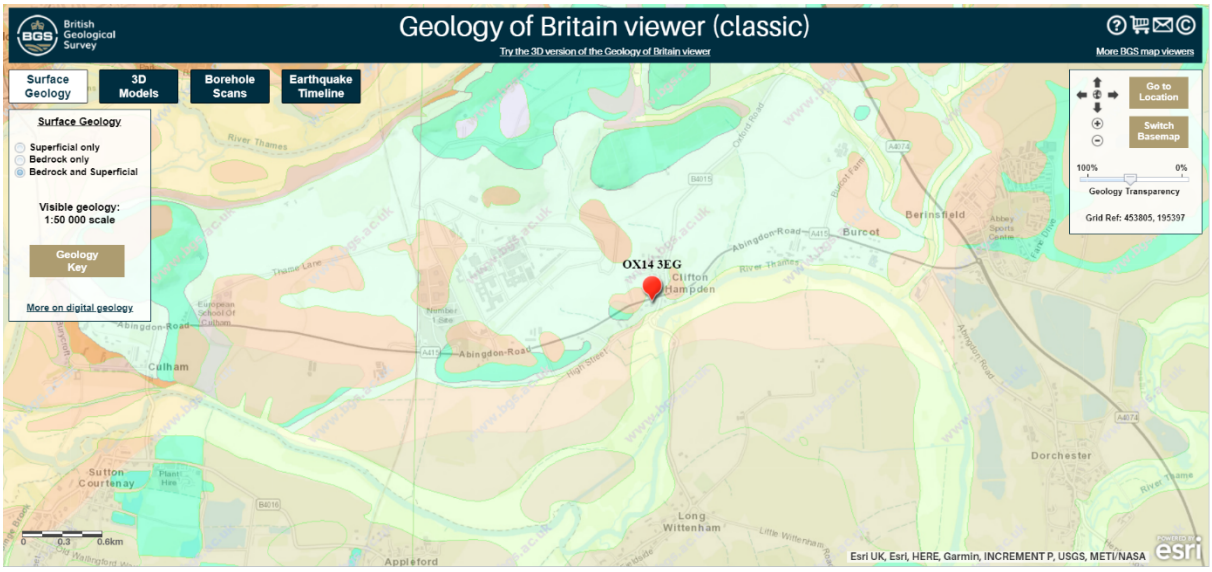


Figure 2.3: BGS Surface Geology Mapping

2.4.5 Ground Investigation Services (Southern) Ltd have performed an intrusive site investigation, including 6no. boreholes and 8no. trial pits. Infiltration tests were conducted within the eight trial pits, and the results are shown in Table 2.1, below.

Trial Pit	Location on Site	Infiltration Rate (m/s)
SA1	Northern section, north-east corner	1.76×10^{-6}
SA2	Northern section, north	1.78×10^{-6}
SA3	Northern section, east	1.30×10^{-6}
SA4	Northern section, south	1.11×10^{-5}
SA5	Southern section, west	-*
SA6	Southern section	1.07×10^{-6}
SA7	Southern section, south-east corner	3.34×10^{-6}
SA8	Southern section, centre	-*

Table 2.1: Infiltration Test Results.

*No significant change in levels within SA5 and SA8 were recorded during the test period, so no infiltration rate was calculable.

2.4.6 Groundwater monitoring carried out by Ground Investigation Services (Southern) Ltd recorded striking groundwater in the northern section at levels ranging from 0.70m to 1.57m below ground level, rising to between 0.24m and 0.62m during subsequent monitoring periods.

2.4.7 For the southern section, groundwater was not present during the first round of monitoring, with no groundwater strikes occurring up to the 3m maximum borehole depth. During subsequent monitoring periods, groundwater began to develop at depths between 1.21m and 1.81m below ground level.

2.4.8 Groundwater monitoring across the Site showed shallow groundwater levels, with seasonal fluctuation causing shallower groundwater levels during winter months.

2.5 Existing Drainage Regime

2.5.1 The Site is predominantly greenfield, with some areas of brownfield land. The northern section comprises a grassed field with sparse allotment plots. The current village hall, an electrical substation and a small car park are located to the south-east. The southern section is a grassed field with stable buildings located to the west.

2.5.2 Thames Water asset records have been obtained which indicate the presence of an existing adopted foul water rising main crossing the southern section of the Site. Thames Water asset records are included in Appendix B.

2.5.3 An existing manhole has been identified in the south-east corner of the southern section. Further investigation will need to be carried out to determine type, pipe levels and pipe diameters.

2.5.4 Soft landscaping is assumed to drain via infiltration. The discharge routes of the foul and surface water for the existing village hall are unknown. If the village hall drains to Thames Water surface water sewers it is assumed this will be via an unrestricted outfall. The ancillary car park for the village hall is assumed to utilise over-the-edge drainage, as no gullies or other primary drainage has been identified on the topographical survey.

2.5.5 A drainage / utilities survey may be necessary to confirm the points above.

2.5.6 Greenfield discharge rates for the site were calculated using Microdrainage to determine the existing surface water run-off rates from the undeveloped site. These can be seen in Table 2.2 below and the calculations provided within Appendix C.

Return Period (Years)	Greenfield Run-off Rate	
	Per Hectare (l/s/ha)	Site Area (4.45ha) (l/s)
1 in 1	1.3	5.8
QBAR	1.5	6.7
1 in 30	3.4	15.1
1 in 100	4.9	21.8

Table 2.2: Greenfield Rates for the Sites.

3 Surface Water Drainage

3.1 Treatment of Existing Drainage

3.1.1 Where possible, existing drainage should be reused; however, the layout of the existing drainage on-site is not suitable to receive connections from the new site development. No evidence of SuDS features, surface water flow controls or attenuation storage have been found on-site.

3.1.2 Further investigation is recommended to identify any remaining on-site drainage that is to be abandoned and removed prior to construction. Drainage to be removed will require checking for live connections. Any existing private drainage should only have served the existing village hall, on the northern section of the Site.

3.2 Climate Change Allowances

3.2.1 In February 2016 the Environment Agency released 'Flood risk assessments: climate change allowances'[1] guidance to support the NPPF. Within this guidance it states that the appropriate allowances for increases in peak rainfall intensity for the proposed development, over the next 100 years, are the central and upper end allowances for increases in peak rainfall intensity of 20% and 40% respectively.

3.2.2 This SWMS has undertaken calculations to inform the design of flood mitigation measures based on a 40% increase in peak rainfall intensity (the upper end allowance).

3.3 Proposed Surface Water Drainage

3.3.1 Due to the unsuitability of the existing network, a new surface water drainage network is proposed for the development. Following the SuDS hierarchy as outlined in the Planning Policy Guidance[2], see Figure 3.1 below, the preferable outfall option is an infiltration system.

> Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:
>
> 1. into the ground (infiltration);
> 2. to a surface water body;
> 3. to a surface water sewer, highway drain, or another drainage system;
> 4. to a combined sewer.

Figure 3.1: Extract of Planning Policy Guidance on Flood Risk and Coastal Change.

3.3.2 Due to the high water table, especially in the wetter winter months, soakaways are not a suitable solution for the discharge of surface water run-off from this site. Additionally, the Site slopes steeply down to High Street at the southern boundary, creating the potential for seepage lines to occur above neighbouring properties if infiltration features were used in the southern portion of the Site.

[1] Environment Agency, Flood risk assessments: climate change allowances (February 2016) (https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances)

[2] Planning Policy and Guidance, Flood Risk and Coastal Change (March 2014) (https://www.gov.uk/guidance/flood-risk-and-coastal-change)

3.3.3 Therefore, the second option of the SuDS hierarchy will be used, and the surface water drainage system will outfall at the greenfield rate to an existing watercourse approximately 120m to the south-west of the Site. The watercourse drains to the River Thames to the south of the Site. Access to this watercourse has been agreed across the intervening third party land (Appendix H).

3.3.4 The majority of the hard landscaping will utilise a porous subbase to provide attenuation storage for surface water runoff. Industry standard software Microdrainage has been used to ensure the subbase will have sufficient capacity to store the runoff associated with storm events up to and including the 1 in 100 year (1% AEP) +40% event. The northern section of the Site requires a 575mm depth of subbase and the southern section 425mm.

3.3.5 Additionally, the porous subbase in the southern section utilises a 14x10x0.4m geo-cellular crate to provide additional attenuation capacity for the system. The crate will be hydraulically linked to the subbase above. The crate is intended to prevent excessive subbase depths across the site, which would require extra stone imports and deeper onsite excavation. The crate has no treatment potential, however all surface water flows entering the crate system will have undergone treatment processes upstream, via features such as filter drains and catchpits.

3.3.6 The Microdrainage calculations for the Site include a coefficient of volumetric run-off ($C_{v)}$ value to account for loss of some runoff from impermeable areas through cracks and into depressions, and by drainage onto permeable areas. Regarding C_v values the Wallingford Procedure Volume 4 states "the overall average value of C_v is about 0.75, ranging from 0.6 … to 0.9". In accordance with Oxfordshire County Council guidance, C_v values for this Site have been uplifted to 0.90 for paved areas and 0.95 for roof areas in the calculations.

3.3.7 Microdrainage calculation results are included in Appendix F.

3.3.8 Surface water will be conveyed via a piped system which will utilise perforated pipes to collect the water from the porous subbase before discharging to the existing water course at the greenfield rate (QBar).

3.3.9 The discharge rate will be restricted by a vortex flow control within a chamber located upstream of the outfall within the Site boundary.

3.3.10 As the developed area of the Site is small (impermeable area 0.73ha) it is not practical to limit the discharge rates to greenfield rates. The discharge rate for this Site will therefore be restricted to no more than 2 l/s for rainfall events up to and including the 1 in 100year + 40% climate change events.

3.3.11 Table 3.1, below, presents the calculated discharge rates for the Site across all design storm events. Full drainage calculations are included in Appendix F.

Return Period (Years)	Proposed Discharge Rate (l/s)
1 in 1	1.8
1 in 30	1.9
1 in 100	1.9
1 in 100 + 40% CC	2.0

Table 3.1: Proposed Discharge Rates for the Sites.

3.3.12 The proposed drainage strategy is presented on drawings 332110526-2001-001 and 332110526-2001-002, included in Appendix D, along with schedules on 332110526-2001-003.

3.3.13 Standard details for the drainage elements implemented within this scheme are included in Appendix E.

3.4 Flood Exceedance

3.4.1 Flood Exceedance flows are shown on drawings 332110526-2001-004 and 332110526-2001-005 (Appendix G), illustrating that any potential surface water flooding will be directed away from the building's entrances and habitable spaces.

3.5 Contamination and Treatment

3.5.1 Guidance on contamination hazard levels, and suitable treatment, is given in the SuDS Manual 2015, CIRIA C753. The two sources of pollution the surface water network of this site may experience are rainfall-borne contaminants, and those associated with the residential car parking. In accordance with Table 26.2, these are classified as resulting in *very low* and *low* pollution hazard levels respectively.

3.5.2 CIRIA C753 outlines treatment indices in Table 26.3 (CIRIA C753), to quantify the treatment potential of differing SuDS systems as compared to the pollution hazard level of Table 26.2 (CIRIA C753). This table identifies that porous paving systems provide suitable treatment for water polluted with both rainfall borne contaminants and those associated with residential car parking (very low and low pollution hazard levels. The indices method shows filter drains provide sufficient treatment to rainfall borne contaminants from roofs that wouldn't otherwise pass through the porous pavement systems.

4 Foul Water Drainage

4.1 Existing Foul Water System

4.1.1 The existing foul water network is assumed to serve the existing village hall only. An existing manhole and 2 no. foul gullies are located adjacent to the eastern elevation of the hall. This is assumed to be a combined sewer, discharging to the Thames Water foul network in Abingdon Road.

4.1.2 The existing foul water network will be abandoned following confirmation on-site.

4.1.3 Thames Water asset records are shown in Appendix B.

4.1.4 A drainage / utilities survey may be necessary to confirm the points above.

4.2 Proposed Foul Water System

4.2.1 The northern section of the Site will contain a gravity network serving all buildings, connecting to a proposed adopted sewer within the High Street. This sewer will discharge into the existing Thames Water network approximately 130m from the Site, into the 150mm diameter pipe between manhole references 7602 and 7501.

4.2.2 The southern section of the site contains a gravity network serving all buildings. Due to the level differences between both sections, a packaged foul water pumping station is proposed to serve the southern section. The discharge from the pumping station is proposed to connect into the gravity foul network of the northern section, via a new rising main.

4.2.3 The concept foul water strategy is presented on the proposed Drainage Layout drawings 332110526-2001-001 and 332110526-2001-002 (Appendix D).

5 Summary

5.1.1 Planning permission is sought for a site north-west of Clifton Hampden village, straddling Abingdon Road. The proposals will provide 17 residential units, alongside a new health surgery and improvements to the existing village hall.

5.1.2 Both portions of the site are predominantly greenfield. The northern section is arable land with a mixture of active and abandoned allotments. A small portion of the northern section is occupied by the existing Village Hall. The southern section of the Site is currently used as a paddock.

5.1.3 The existing village hall is currently served by a small foul water network that is assumed to discharge via gravity to an offsite Thames Water sewer. An existing Thames Water foul rising main is shown to cross the southern section of the site. There is no known existing surface water drainage, hardstanding is assumed to utilise over-the-edge drainage and infiltrate into the ground. Any connections to Thames Water sewers are assumed to discharge at an unrestricted rate.

5.1.4 The surface water drainage strategy for the scheme has been designed in accordance with Lead Local Flood Authority guidance. The strategy incorporates SuDS features to provide attenuation and treatment to surface water, to discharges at a maximum of 2 l/s for design rainfall events to an existing watercourse. The presented drainage strategy demonstrates that the site proposals can be drained in a sustainable manner without increasing the risk of flooding to neighbouring properties for events up to and including the 1 in 100 year (plus 40% climate change) rainfall event.

5.1.5 Flood exceedance flows show that any potential surface water flooding will be directed away from building entrances and habitable spaces.

5.1.6 This surface and foul water drainage strategy has been prepared to demonstrate that the proposed development can meet national and local requirements.

Appendix A Site Location Plan

WOODFIELD BRADY

a r c h i t e c t s

Client / Project

Thomas Homes Ltd.

SITES at CLIFTON HAMPDEN

Project Address

Drawing Title

LOCATION PLAN

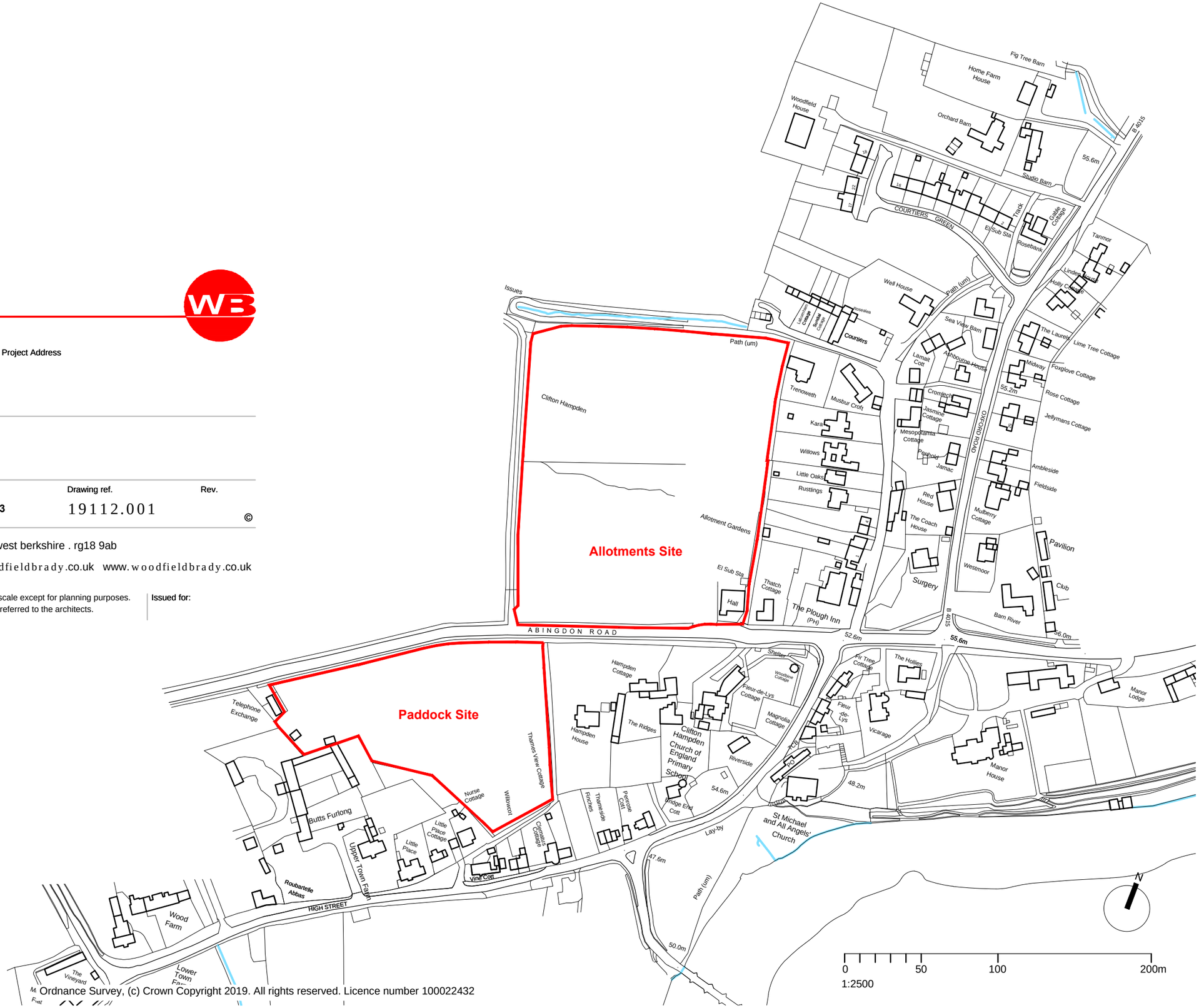
Date	Drawn	Scale / Page	Drawing ref.	Rev.
MAY '20	**KJB**	**1:2500 @ A3**	19112.001	

arlington house . arlington grange . curridge road . west berkshire . rg18 9ab

t 01635 247 100 f 01635 247 070 e mail@woodfieldbrady.co.uk www.woodfieldbrady.co.uk

All dimensions to be checked on site prior to construction. Do not scale except for planning purposes. Any discrepancy between this drawing and other information to be referred to the architects.

Issued for:



Appendix B Thames Water Asset Records

Asset location search

Property Searches

Peter Brett Associates
First Floor, Southern House
1 Cambridge Terrace
OXFORD
OX1 1RR

Search address supplied

Village Hall
Abingdon Road
Clifton Hampden
Abingdon
OX14 3EG

Your reference Clifton Hampden

Our reference ALS/ALS Standard/2021_4385746

Search date 22 March 2021

Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0800 009 4540

Asset location search

Property Searches

Search address supplied: Village Hall, Abingdon Road, Clifton Hampden, Abingdon, OX14 3EG

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Asset location search

Thames Water Property Searches

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company 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.
- Any private sewers or lateral drains which are 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 these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and

pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public 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.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

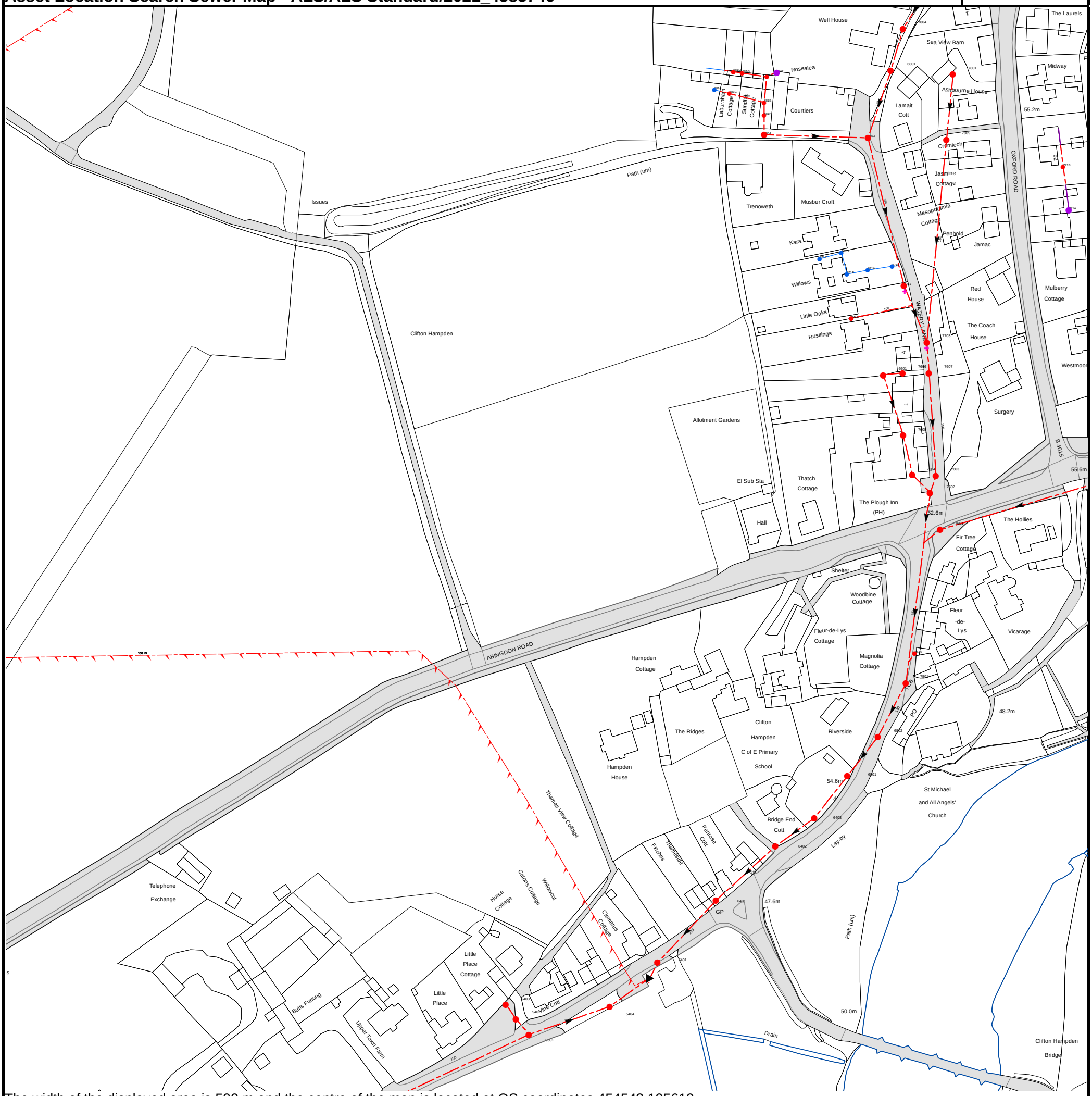
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2021_4385746



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 454543,195619

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
681E	n/a	n/a
6402	n/a	n/a
681F	n/a	n/a
6403	n/a	n/a
671C	n/a	n/a
671D	n/a	n/a
671F	n/a	n/a
6501	n/a	n/a
671A	n/a	n/a
6803	n/a	n/a
6502	n/a	n/a
6601	n/a	n/a
6801	n/a	n/a
671B	n/a	n/a
7606	n/a	n/a
7804	n/a	n/a
7605	n/a	n/a
7701	n/a	n/a
7501	n/a	n/a
7604	n/a	n/a
751A	n/a	n/a
5403	n/a	n/a
5402	n/a	n/a
5301	n/a	n/a
5404	n/a	n/a
5401	n/a	n/a
681A	n/a	n/a
6401	n/a	n/a
681C	n/a	n/a
681D	n/a	n/a
681G	n/a	n/a
681B	n/a	n/a
681H	n/a	n/a
6804	n/a	n/a
7703	n/a	n/a
7607	n/a	n/a
7602	n/a	n/a
7603	n/a	n/a
7601	n/a	n/a
7805	n/a	n/a
7801	n/a	n/a
7609	n/a	n/a
671G	n/a	n/a
671I	n/a	n/a
771A	n/a	n/a
771B	n/a	n/a

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.

2) All measurements on the plans are metric.

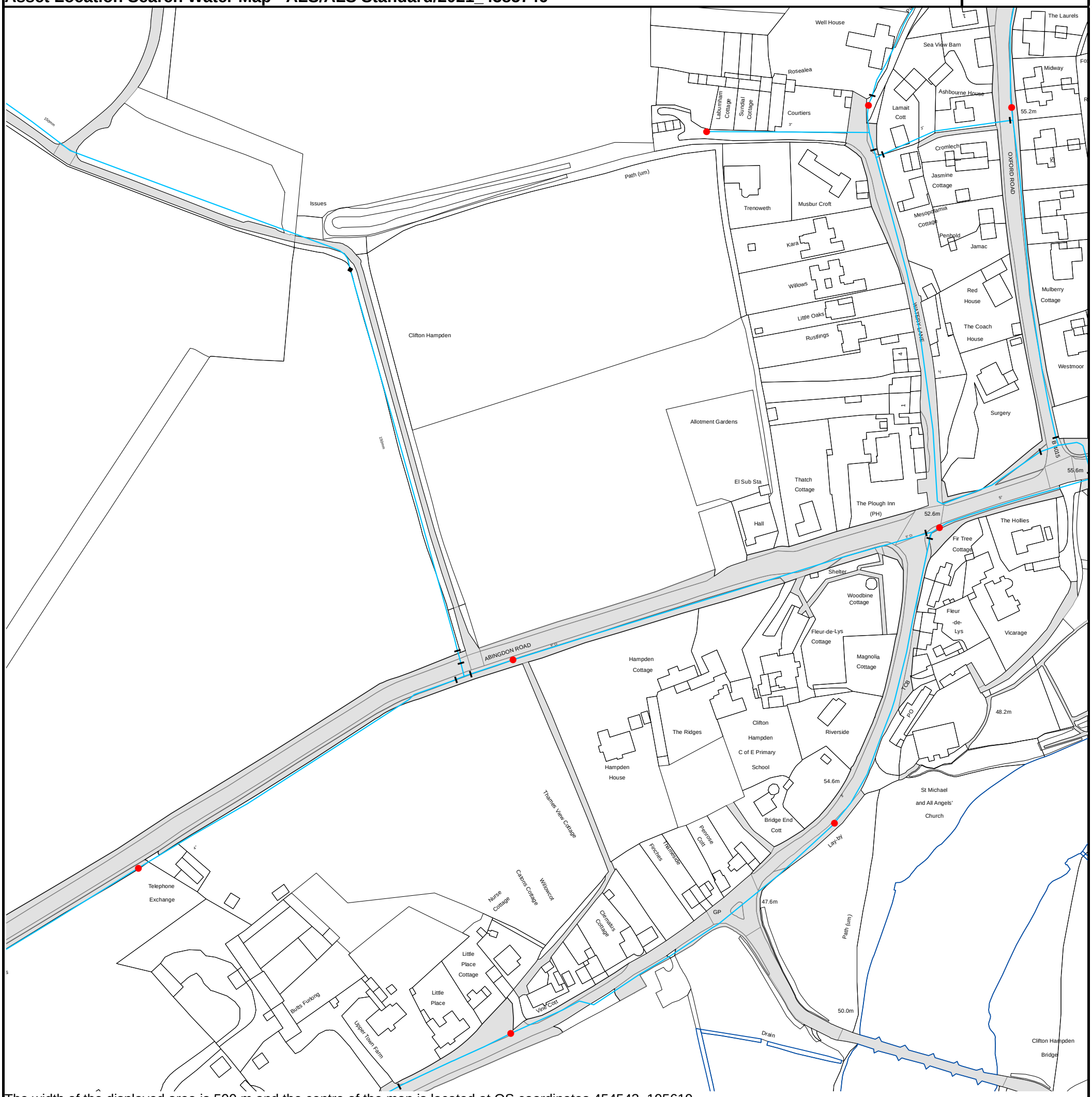
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.

4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.

5) 'na' or '0' on a manhole level indicates that data is unavailable.

6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Searches on 0800 009 4540.

Asset Location Search Water Map - ALS/ALS Standard/2021_4385746



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 454543, 195619.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0800 009 4540** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Thames Water Utilities Ltd Registered in England & Wales No. 2366661 Registered Office Clearwater Court, Vastern Rd, Reading, Berks, RG1 8DB.

Appendix C Greenfield Run-off Rates

ICP SUDS Mean Annual Flood

Input

Return Period (years) 1 SAAR (mm) 600 Urban 0.000
Area (ha) 1.000 Soil 0.300 Region Number Region 6

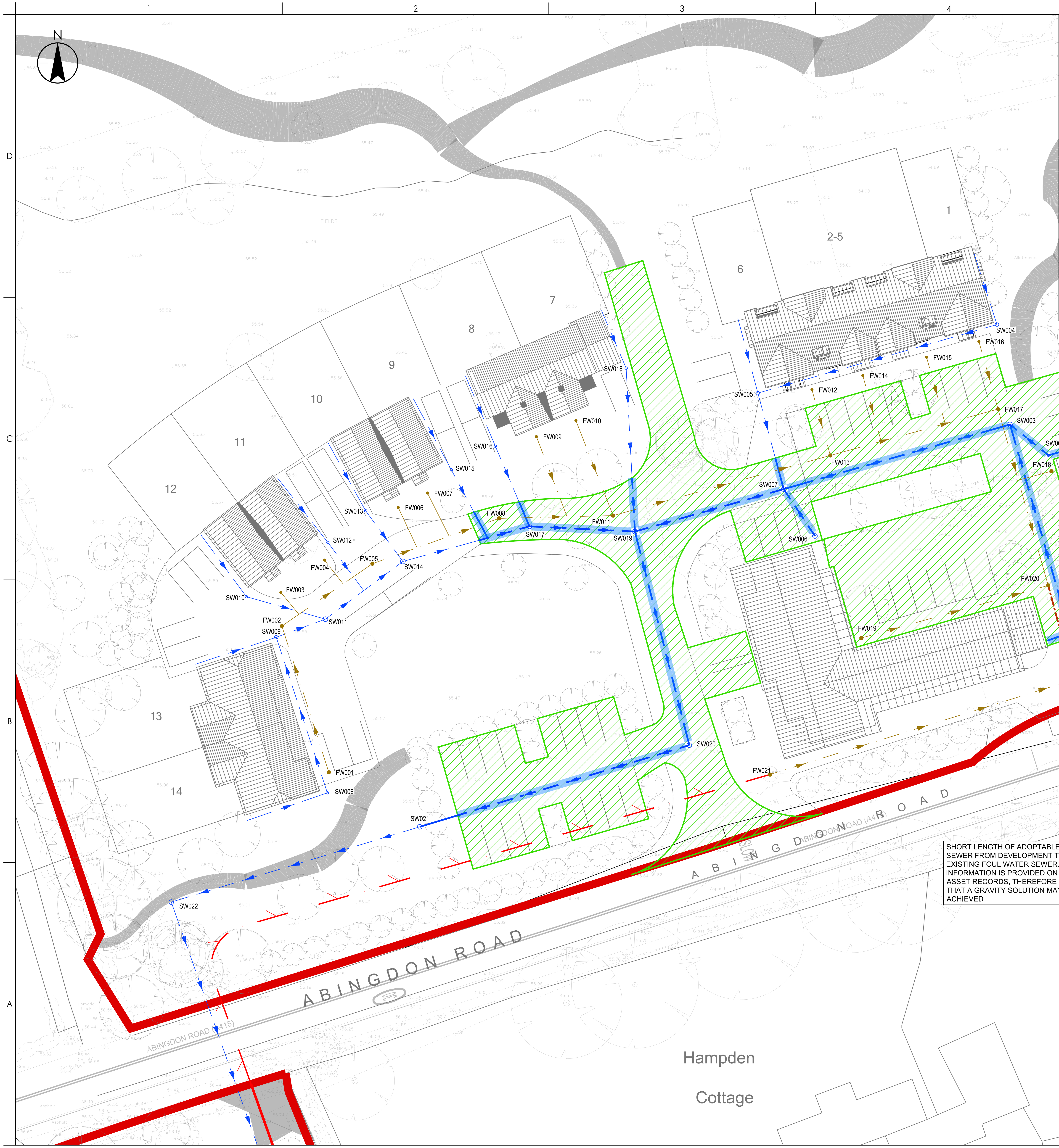
Results l/s

QBAR Rural 1.5
QBAR Urban 1.5

Q1 year 1.3

Q1 year 1.3
Q30 years 3.4
Q100 years 4.9

Appendix D Proposed Drainage Layout



KEY:

SITE BOUNDARY

PROPOSED DRAINAGE KEY:

- POROUS SUB-BASE WITH 0.575m SUBBASE DEPTH
- POROUS SUB-BASE WITH 0.425M SUBBASE DEPTH
- 14m x 10m x 0.4m GEOCELLULAR CRATE STORAGE
- SURFACE WATER SEWER
- SURFACE WATER FILTER DRAIN
- SURFACE WATER MANHOLE
- FOUL WATER MANHOLE
- FOUL WATER PUMPING STATION
- FOUL WATER RISING MAIN
- FOUL WATER SEWER
- FOUL WATER SEWER TO BE ADOPTED

EXISTING DRAINAGE KEY:

- FOUL WATER SEWER
- FOUL WATER RISING MAIN
- FOUL WATER PUMPING STATION

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8. SITE LAYOUT OBTAINED FROM WOODFIELD BRADY ARCHITECTS DATED JUNE 20 DRAWING REFERENCE 19112.003
9. CONCEPT DRAINAGE LAYOUT BASED ON THE ASSUMPTION THAT FINISHED ROAD LEVELS WILL BE SET APPROXIMATELY 250mm ABOVE EXISTING GROUND LEVELS
10. FLOWS DISCHARGING TO EXISTING WATERCOURSE OR DRAINAGE NETWORK, SURFACE WATER RUN-OFF WILL BE E ATTENUATED UP TO AND INCLUDING THE 1 IN 100 YEAR PLUS 40% CLIMATE CHANGE RAINFALL EVENT
11. SURFACE WATER RUN-OFF WILL BE LIMITED TO THE GREENFIELD RATE = 2 l/s
12. EXISTING VILLAGE HALL TO BE RETAINED IN THE SE CORNER OF THE NORTHERN SITE
13. DETAILED LEVELS DESIGN AND DRAINAGE LAYOUT SUBJECT TO ARCHITECTS CONFIRMATION OF DRAINAGE CONNECTION POINTS
14. CONNECTION TO EXISTING FOUL AND SURFACE WATER DRAINAGE NETWORKS SUBJECT TO CCTV SURVEY

Issued/Revision		By	Appd	YYYY.MM.DD
P03	GREENFIELD RATE UPDATED	VT	SH	2023.11.02
P02	FOR PLANNING	VT	SH	2022.07.07
P01	FIRST ISSUE	VT	SH	2021.08.18

Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
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CLIFTON HAMPDEN

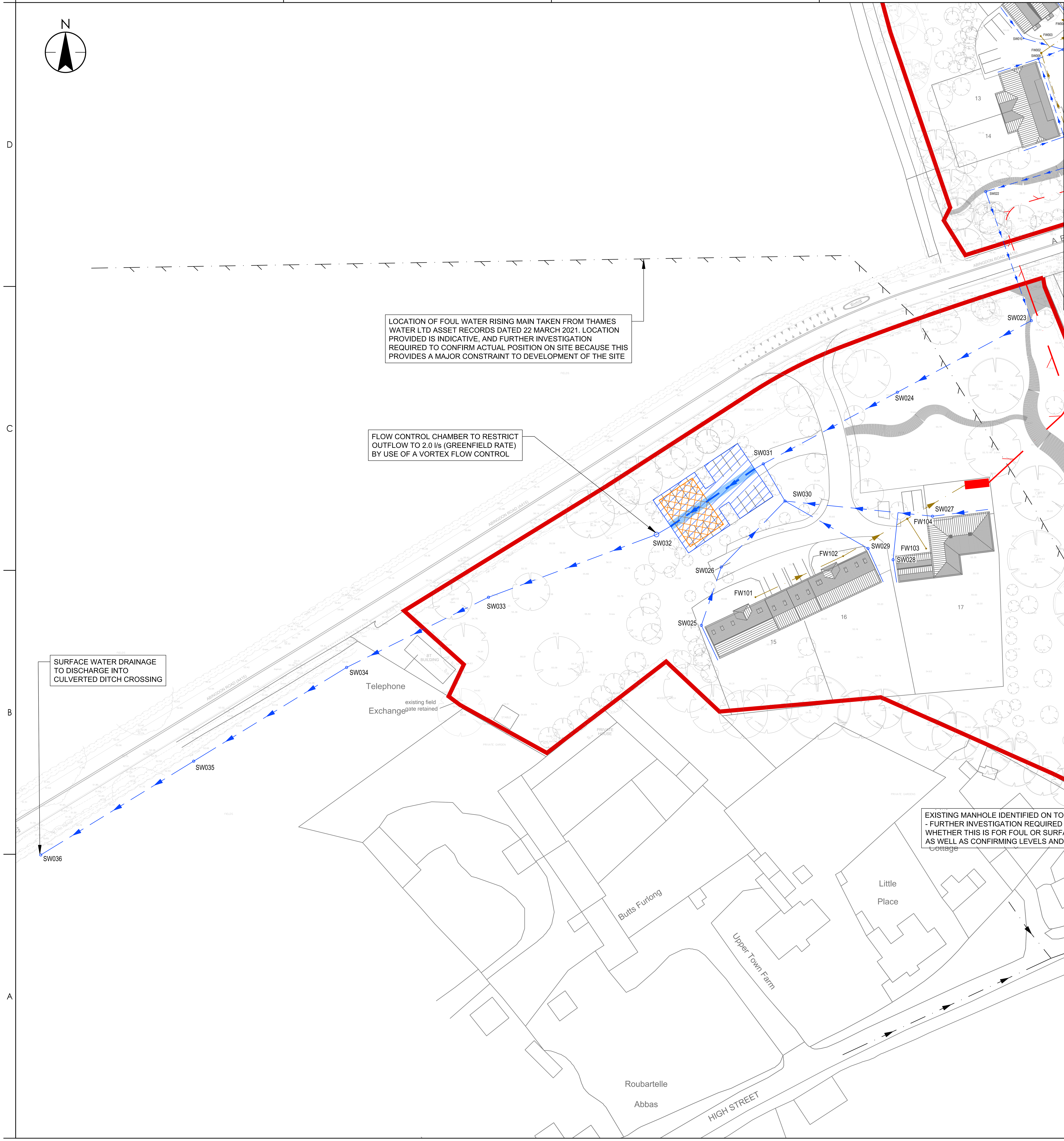
Title

PROPOSED DRAINAGE LAYOUT

SHEET 1 OF 2

Project No.	Scale
332110526	1:250 @ A1

Revision	Drawing No.
P03	332110526-2001-001



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Title

PROPOSED DRAINAGE STRATEGY

SHEET 2 OF 2

Project No. 332110526

Scale 1:500 @ A1

Revision P03

Drawing No. 332110526-2001-002

SURFACE WATER MANHOLE SCHEDULE

MH NO.	CL	IL	DEPTH	PIPEØ OUT	COVER TYPE	MANHOLE SIZE	MANHOLE TYPE
SW001	54.65	54.05	0.60m	225Ø	D400	600Ø	PLASTIC CATCHPIT
SW002	54.80	53.93	0.87m	100Ø	D400	315Ø	PLASTIC CATCHPIT
SW003	54.70	53.87	0.83m	225Ø	D400	600Ø	PLASTIC CATCHPIT
SW004	55.20	54.11	1.09m	100Ø	B125	450Ø	PLASTIC CATCHPIT
SW005	55.20	53.80	1.40m	150Ø	B125	450Ø	PLASTIC CATCHPIT
SW006	70.70	69.30	1.40m	150Ø	D400	450Ø	PLASTIC CATCHPIT
SW007	55.28	53.67	1.61m	225Ø	D400	600Ø	PLASTIC CATCHPIT
SW008	55.60	54.09	1.51m	100Ø	B125	315Ø	PLASTIC CATCHPIT
SW009	55.60	53.87	1.73m	150Ø	D400	450Ø	PLASTIC CATCHPIT
SW010	55.55	53.92	1.63m	100Ø	D400	315Ø	PLASTIC CATCHPIT
SW011	55.55	53.82	1.73m	225Ø	D400	600Ø	PLASTIC CATCHPIT
SW012	55.55	53.87	1.68m	100Ø	B125	315Ø	PLASTIC CATCHPIT
SW013	55.55	53.82	1.73m	100Ø	B125	315Ø	PLASTIC CATCHPIT
SW014	55.50	53.74	1.76m	225Ø	D400	600Ø	PLASTIC CATCHPIT
SW015	55.55	53.76	1.79m	100Ø	B125	315Ø	PLASTIC CATCHPIT
SW016	55.45	53.74	1.71m	100Ø	B125	315Ø	PLASTIC CATCHPIT
SW017	55.40	53.63	1.77m	225Ø	D400	600Ø	PLASTIC CATCHPIT
SW018	55.45	53.75	1.70m	100Ø	B125	315Ø	PLASTIC CATCHPIT
SW019	55.30	53.54	1.76m	225Ø	D400	600Ø	PLASTIC CATCHPIT
SW020	55.50	53.35	2.15m	225Ø	D400	600Ø	PLASTIC CATCHPIT
SW021	55.50	53.11	2.39m	225Ø	B125	600Ø	PLASTIC CATCHPIT
SW022	56.45	52.89	3.56m	225Ø	B125	600Ø	PLASTIC CATCHPIT
SW023	55.80	52.66	3.14m	225Ø	B125	600Ø	PLASTIC CATCHPIT
SW024	55.73	52.46	3.27m	225Ø	B125	600Ø	PLASTIC CATCHPIT
SW025	55.25	52.82	2.43m	225Ø	B125	600Ø	PLASTIC CATCHPIT
SW026	55.88	52.67	3.21m	150Ø	D400	450Ø	PLASTIC CATCHPIT
SW027	55.20	52.62	2.58m	100Ø	B125	315Ø	PLASTIC CATCHPIT
SW028	55.20	52.61	2.59m	225Ø	B125	600Ø	PLASTIC CATCHPIT
SW029	55.25	52.56	2.69m	225Ø	B125	600Ø	PLASTIC CATCHPIT
SW030	55.65	52.46	3.19m	150Ø	B125	450Ø	PLASTIC CATCHPIT
SW031	55.95	52.14	3.81m	225Ø	D400	600Ø	PLASTIC CATCHPIT
SW032	56.10	51.92	4.18m	225Ø	B125	1200Ø	PCC CHAMBER
SW033	54.95	51.62	3.33m	225Ø	D400	600Ø	PLASTIC CATCHPIT
SW034	54.54	51.35	3.19m	225Ø	D400	600Ø	PLASTIC CATCHPIT
SW035	52.60	51.05	1.55m	225Ø	D400	600Ø	PLASTIC CATCHPIT
SW036	50.80	50.15	0.65m	225Ø	D400	600Ø	PLASTIC CATCHPIT

FOUL WATER MANHOLE SCHEDULE

MH NO.	CL	IL	DEPTH	PIPEØ OUT	COVER TYPE	MANHOLE SIZE	MANHOLE TYPE
FW001	55.60	55.00	0.60m	150Ø	D400	450Ø	PLASTIC IC
FW002	55.60	54.75	0.85m	150Ø	D400	450Ø	PLASTIC IC
FW003	55.55	54.77	0.78m	100Ø	B125	315Ø	PLASTIC IC
FW004	55.55	54.73	0.82m	100Ø	B125	315Ø	PLASTIC IC
FW005	55.50	54.65	0.85m	150Ø	D400	450Ø	PLASTIC IC
FW006	55.43	54.68	0.75m	100Ø	B125	315Ø	PLASTIC IC
FW007	55.44	54.65	0.79m	100Ø	B125	315Ø	PLASTIC IC
FW008	55.40	54.53	0.87m	150Ø	D400	450Ø	PLASTIC IC
FW009	55.45	54.61	0.84m	100Ø	B125	315Ø	PLASTIC IC
FW010	55.45	54.59	0.86m	100Ø	B125	315Ø	PLASTIC IC
FW011	55.30	54.43	0.87m	150Ø	D400	450Ø	PLASTIC IC
FW012	55.20	54.34	0.86m	100Ø	B125	315Ø	PLASTIC IC
FW013	55.03	54.24	0.79m	150Ø	D400	450Ø	PLASTIC IC
FW014	55.20	54.30	0.90m	100Ø	B125	315Ø	PLASTIC IC
FW015	55.20	54.24	0.96m	100Ø	B125	315Ø	PLASTIC IC
FW016	55.20	54.20	1.00m	100Ø	B125	315Ø	PLASTIC IC
FW017	54.70	54.09	0.61m	150Ø	D400	450Ø	PLASTIC IC
FW018	54.80	54.07	0.73m	150Ø	D400	450Ø	PLASTIC IC
FW019	55.00	54.09	0.91m	150Ø	D400	450Ø	PLASTIC IC
FW020	54.70	53.93	0.77m	150Ø	D400	450Ø	PLASTIC IC
FW021	55.10	54.11	0.99m	150Ø	B125	450Ø	PLASTIC IC
FW022	54.65	53.84	0.81m	150Ø	B125	450Ø	PLASTIC IC
FW023	54.50	53.78	0.72m	150Ø	D400	450Ø	PLASTIC IC
FW101	55.25	54.65	0.60m	100Ø	B125	315Ø	PLASTIC IC
FW102	55.25	54.40	0.85m	100Ø	B125	315Ø	PLASTIC IC
FW103	55.65	54.32	1.33m	150Ø	D400	450Ø	PLASTIC IC
FW104	55.20	54.25	0.95m	100Ø	D400	315Ø	PLASTIC IC
FW105	55.20	54.18	1.02m	150Ø	D400	450Ø	PLASTIC IC

COVER LEVELS AND INVERT LEVELS ARE INDICATIVE ONLY.
DETAILED LEVELS DESIGN AND DRAINAGE LAYOUT SUBJECT TO
ARCHITECTS CONFIRMATION OF DRAINAGE CONNECTION POINTS

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	VT	CA	SH	2021.08.18

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THOMAS HOMES

CLIFTON HAMPDEN

Title
DRAINAGE MANHOLE SCHEDULES

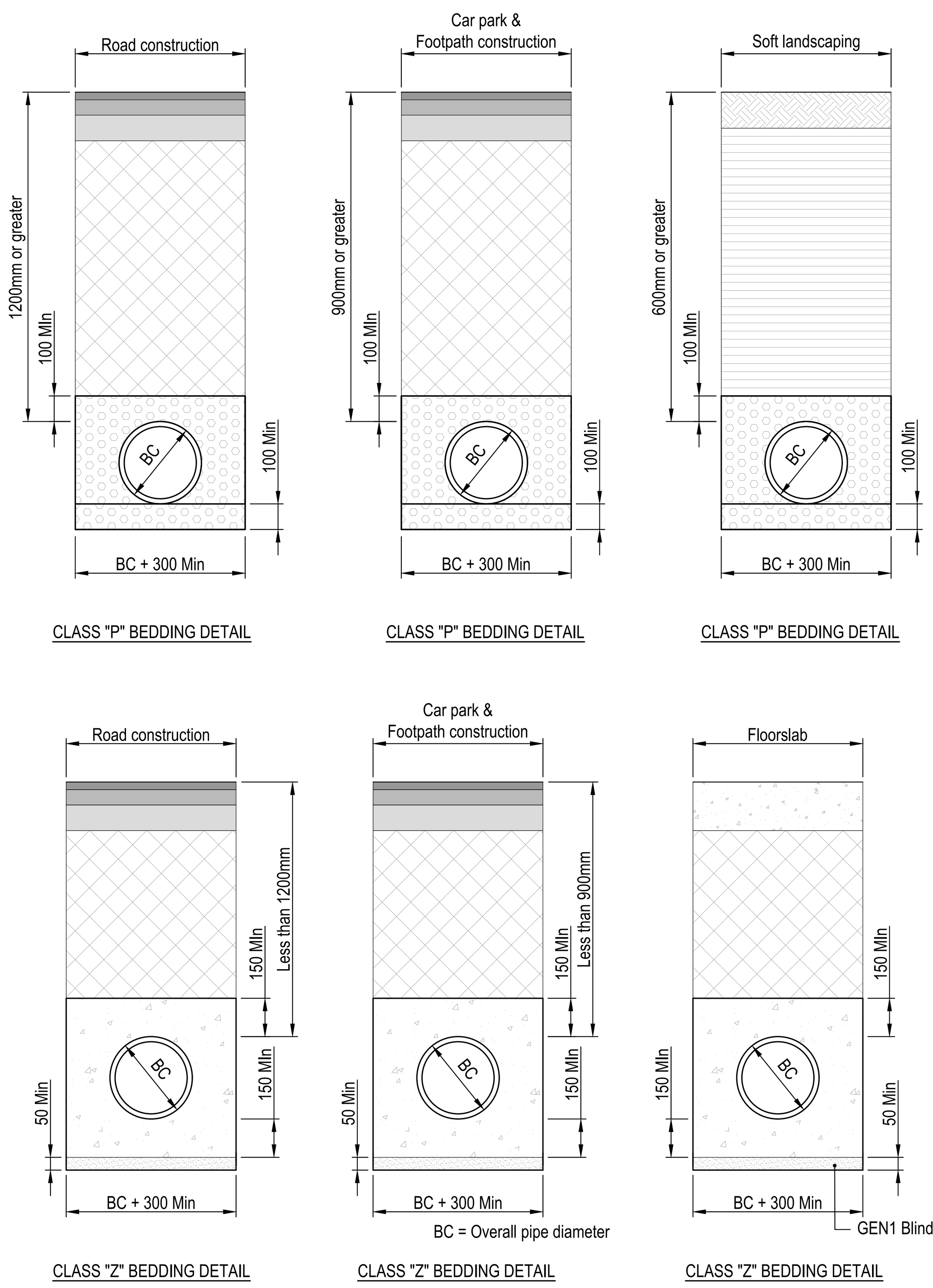
Project No.
332110526

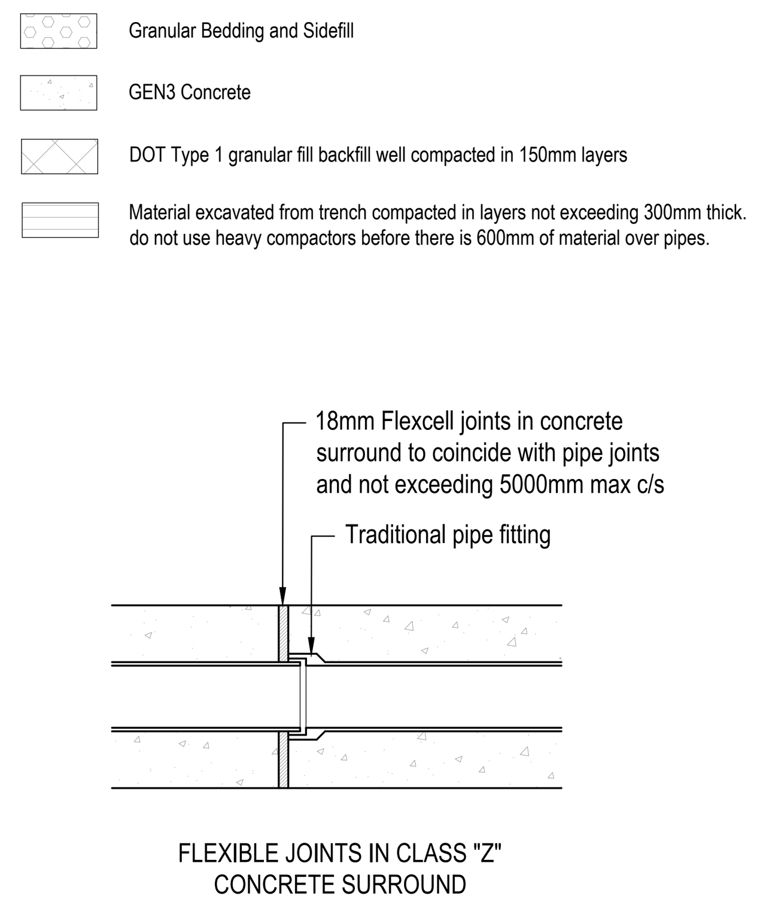
Scale
A2

Revision
P02

Drawing No.
332110526-2001-003

Appendix E Drainage Standard Details





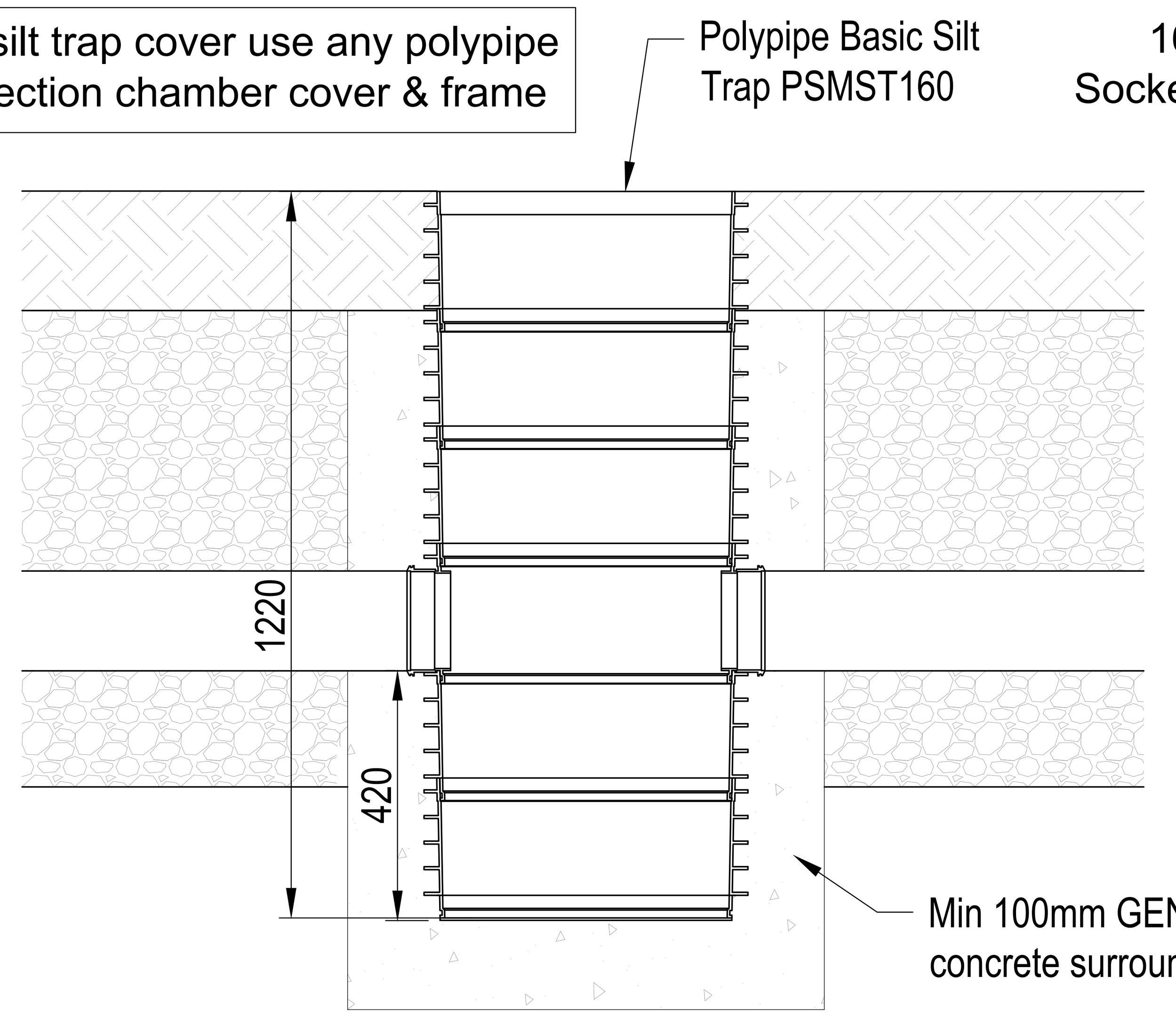
Extract from Table A2 WIS 4-08-02

Processed granular bedding and sidefill materials for flexible pipes

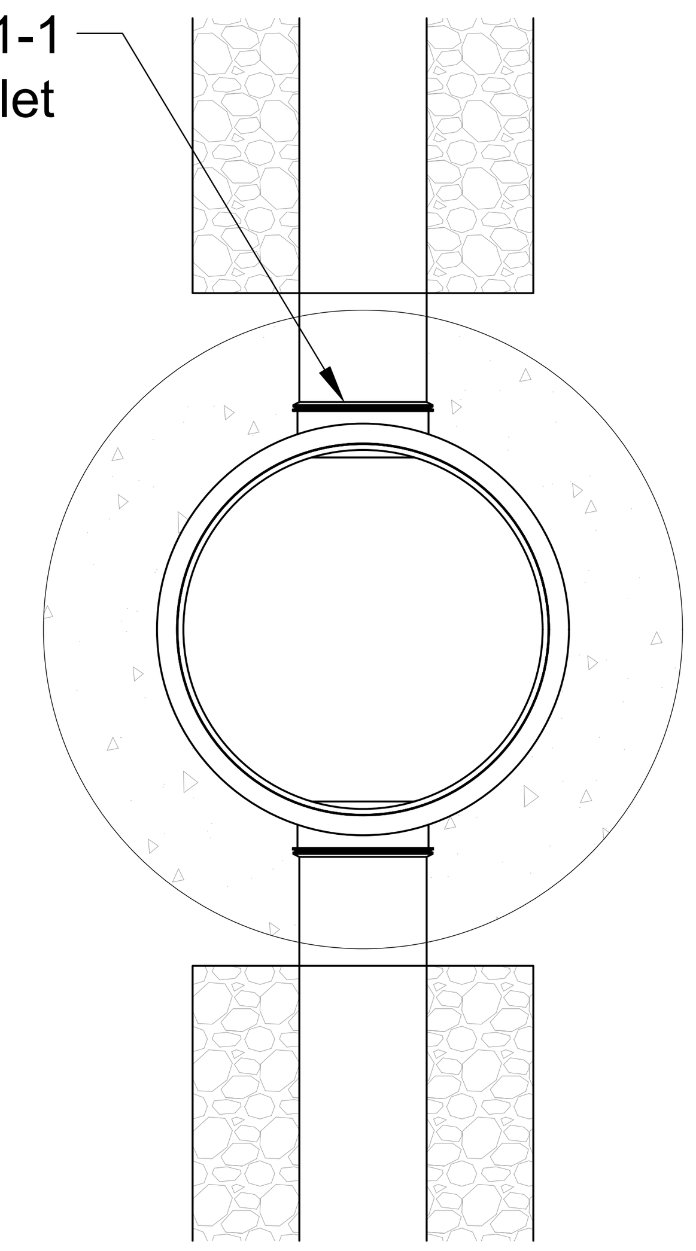
PIPE NOMINAL BORE (mm)	NOMINAL MAXIMUM PARTICLE SIZE (mm)	MATERIALS SPECIFIED IN BRITISH STANDARDS
100	10	10mm nominal single-size
Over 100 to 500	15	10 or 14mm nominal single-size or 14mm to 5mm graded
Over 150 to 300	20	10, 14 or 20mm nominal single-size or 14mm to 5mm graded or 20mm to 5mm graded
Over 300 to 550	20	14 or 20mm nominal single-size or 14mm to 5mm graded or 20mm to 5mm graded
Over 550	40	14, 20 or 40mm nominal single-size or 14mm to 5mm graded or 20mm to 5mm graded or 40mm to 5mm graded

PLASTIC PIPE BEDDING DETAIL
SCALE 1:20

NOTE: For silt trap cover use any polypipe 460Ø inspection chamber cover & frame

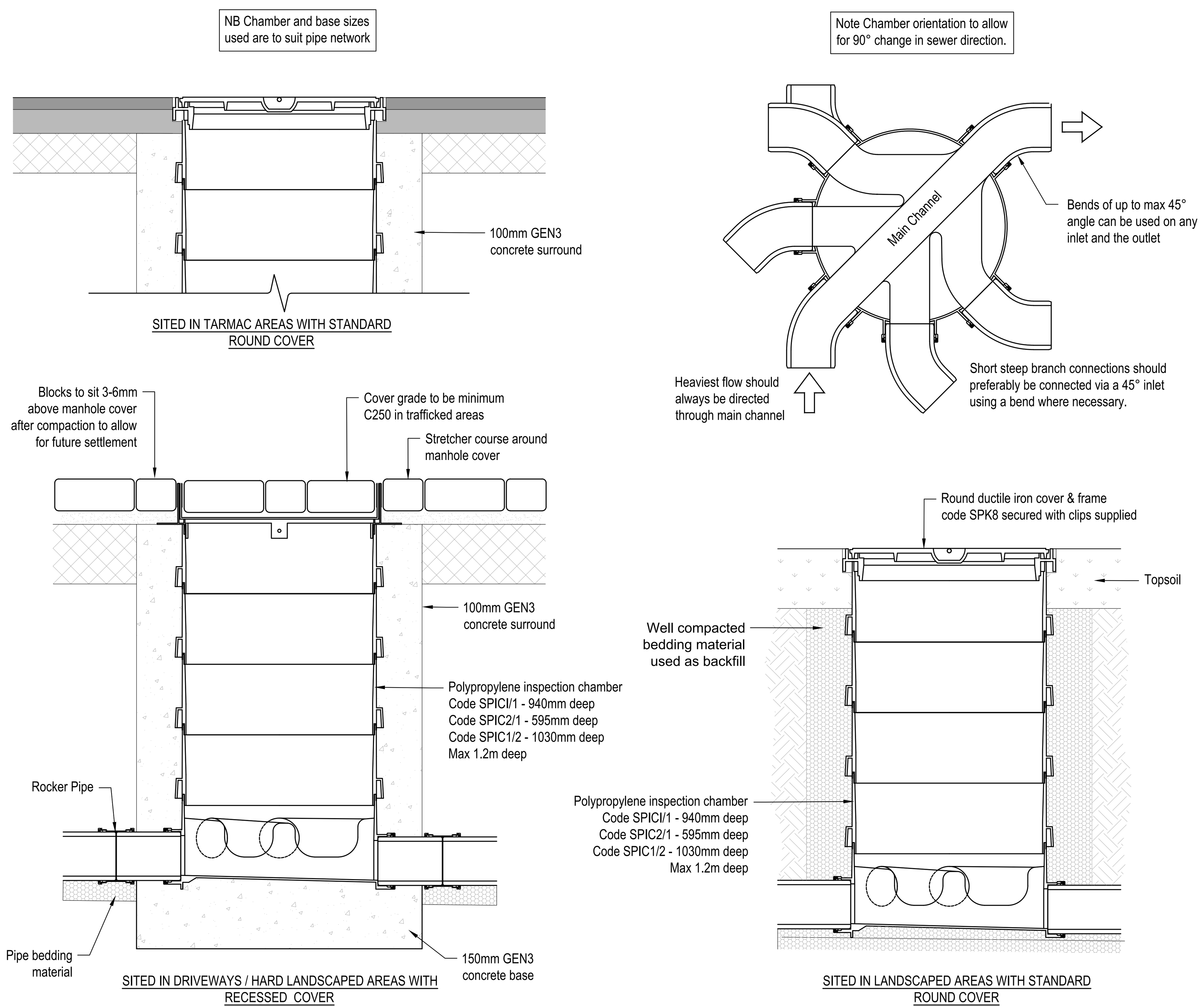


TYPICAL SECTION

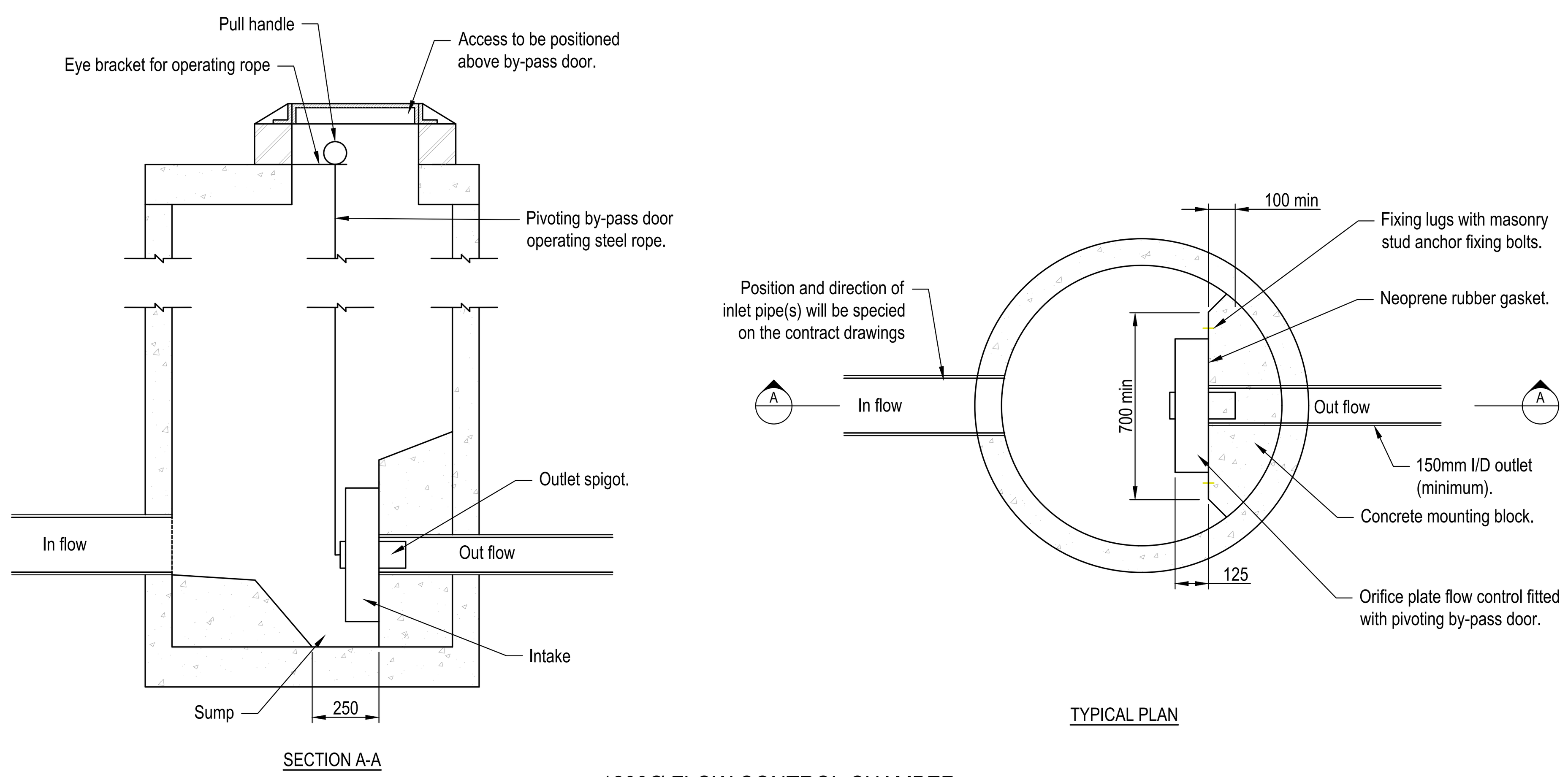


TYPICAL PLAN

PLASTIC CATCHPIT DETAIL
SCALE 1:10



PLASTIC INSPECTION CHAMBER DETAIL
SCALE 1:10



1200Ø FLOW CONTROL CHAMBER
SCALE 1:20

Stantec

Stantec UK Limited
OXFORD
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Tel: +44 1865 410 000
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Notes

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P01 FIRST ISSUE	PB	SH	2022.07.07

Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
PB	JS	SH	2022.07.07

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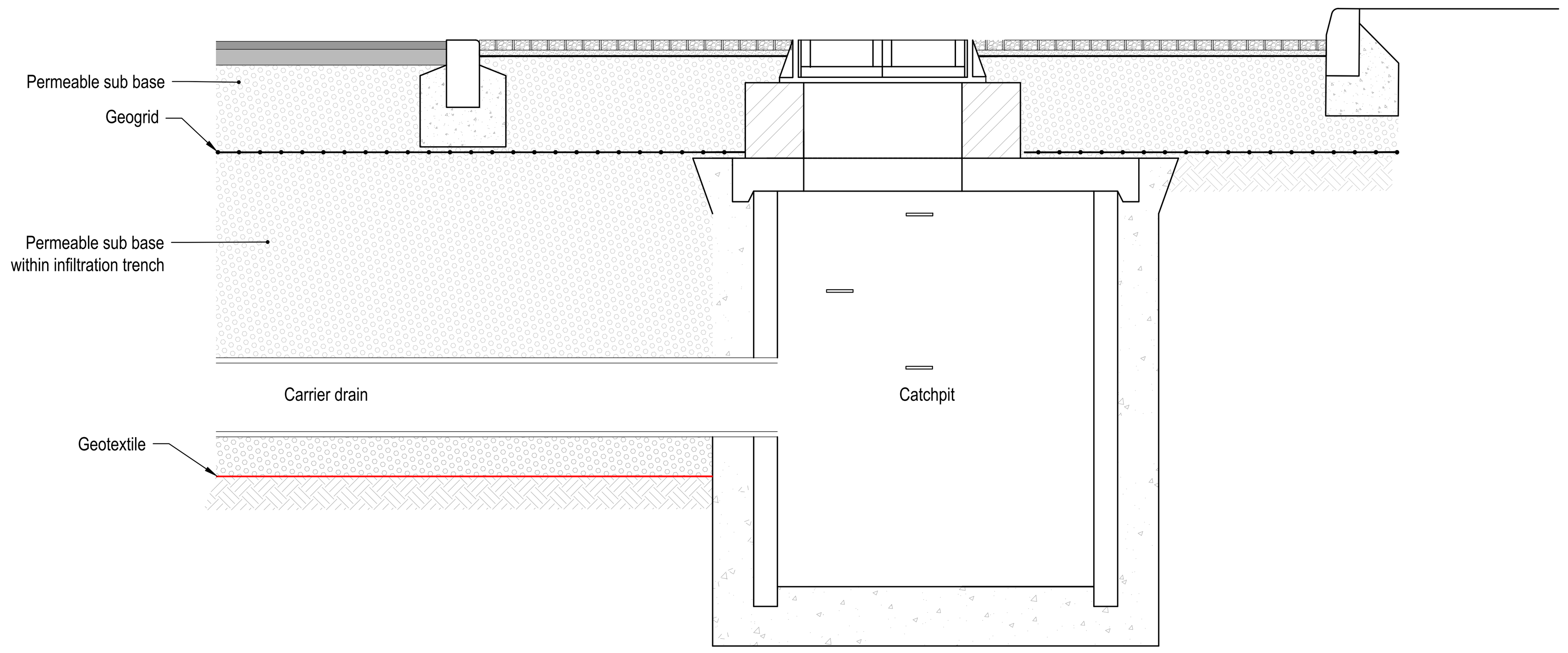
CLIFTON HAMPDEN

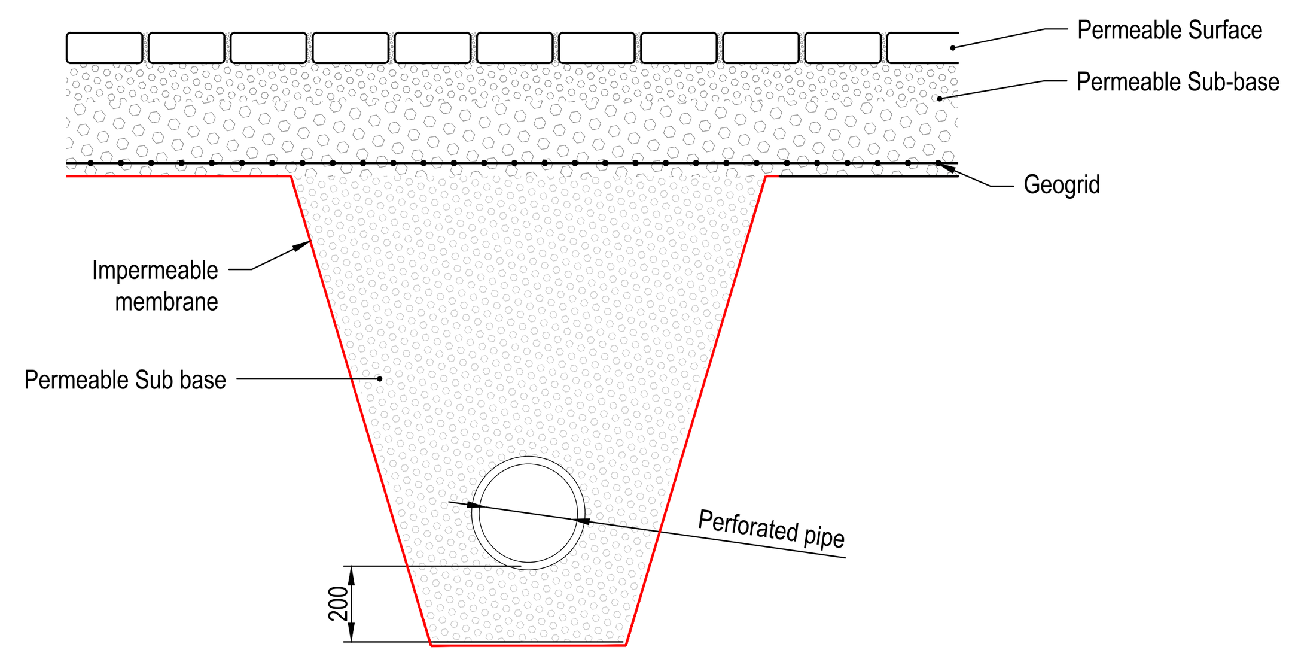
Title
STANDARD DETAILS

SHEET 1 OF 2

Project No. 332110526
Scale AS SHOWN @ A1
Revision P01
Drawing No. 332110526-2001-006



TYPICAL LONG SECTION THROUGH CARRIER DRAIN



TYPICAL SECTION

FILTER DRAIN UNDER POROUS BLOCK PAVING DETAIL

SCALE 1:20

Stantec

Stantec UK Limited
OXFORD
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OX1 1RR
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www.stantec.com/uk

Notes

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THOMAS HOMES

CLIFTON HAMPDEN

Title
STANDARD DETAILS

SHEET 2 OF 2

Project No. 332110526

Scale AS SHOWN @ A1

Revision **P01**

Drawing No. **332110526-2001-007**

Appendix F Microdrainage Calculation Results

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.600
Maximum Rainfall (mm/hr)	550	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	0.500
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.024	4-8	0.290	8-12	0.273

Total Area Contributing (ha) = 0.587

Total Pipe Volume (m³) = 27.069

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	12.756	0.090	141.7	0.050	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.001	16.554	0.110	150.5	0.009	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.002	13.377	0.065	205.8	0.038	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	49.514	0.330	150.0	0.159	4.00	0.0	0.600	o	225	Pipe/Conduit	
1.003	28.820	0.192	150.1	0.161	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.004	20.419	0.136	150.1	0.027	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.005	16.483	0.110	149.8	0.031	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.006	31.466	0.210	149.8	0.000	0.00	0.0	0.600	o	225	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	174.28	4.19	53.820	0.050	0.0	0.0	0.0	1.10	43.6	23.5
1.001	170.76	4.45	53.730	0.058	0.0	0.0	0.0	1.06	42.3	27.0
1.002	167.60	4.70	53.620	0.097	0.0	0.0	0.0	0.91	36.1«	43.9
2.000	166.65	4.77	53.870	0.159	0.0	0.0	0.0	1.07	42.3«	71.6
1.003	161.28	5.23	53.540	0.417	0.0	0.0	0.0	1.06	42.3«	182.0
1.004	157.73	5.55	53.350	0.444	0.0	0.0	0.0	1.06	42.3«	189.5
1.005	155.01	5.80	53.200	0.474	0.0	0.0	0.0	1.07	42.4«	199.1
1.006	150.14	6.30	53.110	0.474	0.0	0.0	0.0	1.07	42.4«	199.1

Network Design Table for Storm

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
1.007	33.872	0.226	149.9	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.008	55.984	0.315	177.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	23.107	0.395	58.5	0.013	4.00	0.0	0.600	o	150	Pipe/Conduit	
4.000	31.381	0.316	99.3	0.018	4.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	24.351	0.162	150.3	0.019	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.009	35.211	0.220	160.1	0.024	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.010	16.423	0.130	126.3	0.037	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.011	39.436	0.219	180.1	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.012	75.152	0.550	136.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.013	60.662	1.011	60.0	0.000	0.00	0.0	0.600	o	375	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)
1.007	145.30	6.83	52.900	0.474	0.0	0.0	0.0	1.07	42.4«	199.1
1.008	137.51	7.78	52.660	0.474	0.0	0.0	0.0	0.98	38.9«	199.1
3.000	172.93	4.29	55.200	0.013	0.0	0.0	0.0	1.32	23.3	6.1
4.000	169.91	4.52	55.230	0.018	0.0	0.0	0.0	1.01	17.8	8.5
3.001	165.11	4.90	52.410	0.051	0.0	0.0	0.0	1.06	42.3	22.7
1.009	134.02	8.25	52.270	0.550	0.0	0.0	0.0	1.24	87.7«	199.5
1.010	131.88	8.56	52.050	0.587	0.0	0.0	0.0	0.89	15.8«	209.6
1.011	127.28	9.24	51.920	0.587	0.0	0.0	0.0	0.97	38.6«	209.6
1.012	120.26	10.36	51.700	0.587	0.0	0.0	0.0	1.12	44.4«	209.6
1.013	117.79	10.79	51.000	0.587	0.0	0.0	0.0	2.34	258.8	209.6

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)
1	55.500	1.680	Open Manhole	1200	1.000	53.820	225				
2	55.500	1.770	Open Manhole	1200	1.001	53.730	225	1.000	53.730	225	
2	55.500	1.880	Open Manhole	1200	1.002	53.620	225	1.001	53.620	225	
2	55.500	1.630	Open Manhole	1200	2.000	53.870	225				
2	55.500	1.960	Open Manhole	1200	1.003	53.540	225	1.002	53.555	225	15
								2.000	53.540	225	
3	55.500	2.152	Open Manhole	1200	1.004	53.350	225	1.003	53.348	225	
4	55.500	2.300	Open Manhole	1200	1.005	53.200	225	1.004	53.214	225	14
5	55.500	2.410	Open Manhole	1200	1.006	53.110	225	1.005	53.090	225	
6	55.500	2.600	Open Manhole	1200	1.007	52.900	225	1.006	52.900	225	
7	55.800	3.140	Open Manhole	1200	1.008	52.660	225	1.007	52.674	225	14
8	55.800	0.600	Open Manhole	1200	3.000	55.200	150				
10	55.800	0.570	Open Manhole	1200	4.000	55.230	150				
9	55.800	3.390	Open Manhole	1200	3.001	52.410	225	3.000	54.805	150	2320
								4.000	54.914	150	2429
8	55.800	3.552	Open Manhole	1200	1.009	52.270	300	1.008	52.345	225	
								3.001	52.248	225	
9	55.800	3.750	Open Manhole	1200	1.010	52.050	150	1.009	52.050	300	
10	55.800	3.880	Open Manhole	1200	1.011	51.920	225	1.010	51.920	150	
11	54.950	3.250	Open Manhole	1200	1.012	51.700	225	1.011	51.701	225	1
12	53.050	2.050	Open Manhole	1350	1.013	51.000	375	1.012	51.150	225	
	51.500	1.511	Open Manhole	0		OUTFALL		1.013	49.989	375	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	454536.389	195623.526	454536.389	195623.526	Required	
2	454546.489	195631.317	454546.489	195631.317	Required	
2	454562.468	195635.644	454562.468	195635.644	Required	
2	454623.653	195648.359	454623.653	195648.359	Required	
2	454575.844	195635.479	454575.844	195635.479	Required	
3	454582.806	195607.512	454582.806	195607.512	Required	
4	454563.195	195601.826	454563.195	195601.826	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
5	454547.413	195597.068	454547.413	195597.068	Required	
6	454517.242	195588.133	454517.242	195588.133	Required	
7	454528.266	195556.105	454528.266	195556.105	Required	
8	454503.433	195506.555	454503.433	195506.555	Required	
10	454450.982	195493.907	454450.982	195493.907	Required	
9	454480.388	195504.862	454480.388	195504.862	Required	
8	454479.180	195529.183	454479.180	195529.183	Required	
9	454448.313	195512.241	454448.313	195512.241	Required	
10	454434.040	195504.118	454434.040	195504.118	Required	
11	454396.210	195492.978	454396.210	195492.978	Required	
12	454332.212	195453.582	454332.212	195453.582	Required	
	454280.515	195421.844			No Entry	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	1	55.500	53.820	1.455	Open Manhole	1200
1.001	o	225	2	55.500	53.730	1.545	Open Manhole	1200
1.002	o	225	2	55.500	53.620	1.655	Open Manhole	1200
2.000	o	225	2	55.500	53.870	1.405	Open Manhole	1200
1.003	o	225	2	55.500	53.540	1.735	Open Manhole	1200
1.004	o	225	3	55.500	53.350	1.925	Open Manhole	1200
1.005	o	225	4	55.500	53.200	2.075	Open Manhole	1200
1.006	o	225	5	55.500	53.110	2.165	Open Manhole	1200
1.007	o	225	6	55.500	52.900	2.375	Open Manhole	1200
1.008	o	225	7	55.800	52.660	2.915	Open Manhole	1200
3.000	o	150	8	55.800	55.200	0.450	Open Manhole	1200
4.000	o	150	10	55.800	55.230	0.420	Open Manhole	1200
3.001	o	225	9	55.800	52.410	3.165	Open Manhole	1200
1.009	o	300	8	55.800	52.270	3.230	Open Manhole	1200
1.010	o	150	9	55.800	52.050	3.600	Open Manhole	1200
1.011	o	225	10	55.800	51.920	3.655	Open Manhole	1200
1.012	o	225	11	54.950	51.700	3.025	Open Manhole	1200
1.013	o	375	12	53.050	51.000	1.675	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	12.756	141.7	2	55.500	53.730	1.545	Open Manhole	1200
1.001	16.554	150.5	2	55.500	53.620	1.655	Open Manhole	1200
1.002	13.377	205.8	2	55.500	53.555	1.720	Open Manhole	1200
2.000	49.514	150.0	2	55.500	53.540	1.735	Open Manhole	1200
1.003	28.820	150.1	3	55.500	53.348	1.927	Open Manhole	1200
1.004	20.419	150.1	4	55.500	53.214	2.061	Open Manhole	1200
1.005	16.483	149.8	5	55.500	53.090	2.185	Open Manhole	1200
1.006	31.466	149.8	6	55.500	52.900	2.375	Open Manhole	1200
1.007	33.872	149.9	7	55.800	52.674	2.901	Open Manhole	1200
1.008	55.984	177.7	8	55.800	52.345	3.230	Open Manhole	1200
3.000	23.107	58.5	9	55.800	54.805	0.845	Open Manhole	1200
4.000	31.381	99.3	9	55.800	54.914	0.736	Open Manhole	1200
3.001	24.351	150.3	8	55.800	52.248	3.327	Open Manhole	1200
1.009	35.211	160.1	9	55.800	52.050	3.450	Open Manhole	1200
1.010	16.423	126.3	10	55.800	51.920	3.730	Open Manhole	1200
1.011	39.436	180.1	11	54.950	51.701	3.024	Open Manhole	1200
1.012	75.152	136.6	12	53.050	51.150	1.675	Open Manhole	1350
1.013	60.662	60.0		51.500	49.989	1.136	Open Manhole	0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	95	0.022	0.020	0.020
	User	-	90	0.033	0.029	0.050
1.001	User	-	90	0.010	0.009	0.009
1.002	User	-	95	0.012	0.011	0.011
	User	-	90	0.006	0.006	0.017
	User	-	90	0.012	0.011	0.027
	User	-	95	0.012	0.011	0.038
2.000	User	-	95	0.072	0.069	0.069
	User	-	95	0.032	0.030	0.099
	User	-	90	0.066	0.059	0.159
1.003	User	-	92	0.035	0.032	0.032
	User	-	93	0.055	0.051	0.083
	User	-	90	0.069	0.062	0.145
	User	-	90	0.015	0.013	0.158
	User	-	90	0.004	0.003	0.161
1.004	User	-	90	0.028	0.025	0.025
	User	-	90	0.002	0.002	0.027
1.005	User	-	90	0.034	0.031	0.031
1.006	-	-	100	0.000	0.000	0.000
1.007	-	-	100	0.000	0.000	0.000
1.008	-	-	100	0.000	0.000	0.000
3.000	User	-	90	0.015	0.013	0.013
4.000	User	-	90	0.020	0.018	0.018
3.001	User	-	90	0.022	0.019	0.019
1.009	User	-	90	0.023	0.021	0.021
	User	-	90	0.004	0.004	0.024
1.010	User	-	90	0.042	0.037	0.037
1.011	-	-	100	0.000	0.000	0.000
1.012	-	-	100	0.000	0.000	0.000
1.013	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.641	0.587	0.587

Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
1.000	1	225	1.455	1.545	Unclassified	1200	0	1.455	Unclassified
1.001	2	225	1.545	1.655	Unclassified	1200	0	1.545	Unclassified
1.002	2	225	1.655	1.720	Unclassified	1200	0	1.655	Unclassified
2.000	2	225	1.405	1.735	Unclassified	1200	0	1.405	Unclassified
1.003	2	225	1.735	1.927	Unclassified	1200	0	1.735	Unclassified
1.004	3	225	1.925	2.061	Unclassified	1200	0	1.925	Unclassified
1.005	4	225	2.075	2.185	Unclassified	1200	0	2.075	Unclassified
1.006	5	225	2.165	2.375	Unclassified	1200	0	2.165	Unclassified
1.007	6	225	2.375	2.901	Unclassified	1200	0	2.375	Unclassified
1.008	7	225	2.915	3.230	Unclassified	1200	0	2.915	Unclassified
3.000	8	150	0.450	0.845	Unclassified	1200	0	0.450	Unclassified
4.000	10	150	0.420	0.736	Unclassified	1200	0	0.420	Unclassified
3.001	9	225	3.165	3.327	Unclassified	1200	0	3.165	Unclassified
1.009	8	300	3.230	3.450	Unclassified	1200	0	3.230	Unclassified
1.010	9	150	3.600	3.730	Unclassified	1200	0	3.600	Unclassified
1.011	10	225	3.024	3.655	Unclassified	1200	0	3.655	Unclassified
1.012	11	225	1.675	3.025	Unclassified	1200	0	3.025	Unclassified
1.013	12	375	1.136	1.675	Unclassified	1350	0	1.675	Unclassified

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.013		51.500	49.989	50.150	0	0

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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.400		

Online Controls for Storm

Hydro-Brake® Optimum Manhole: 10, DS/PN: 1.011, Volume (m³): 4.7

Unit Reference	MD-SHE-0050-2100-3880-2100
Design Head (m)	3.880
Design Flow (l/s)	2.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	50
Invert Level (m)	51.920
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	3.880	2.1	Kick-Flo®	0.443	0.8
Flush-Flo™	0.217	1.0	Mean Flow over Head Range	-	1.5

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)	Depth (m)	Flow (l/s)
0.100	0.9	0.800	1.0	2.000	1.5	4.000	2.1	7.000	2.8
0.200	1.0	1.000	1.1	2.200	1.6	4.500	2.2	7.500	2.8
0.300	0.9	1.200	1.2	2.400	1.7	5.000	2.4	8.000	2.9
0.400	0.9	1.400	1.3	2.600	1.7	5.500	2.5	8.500	3.0
0.500	0.8	1.600	1.4	3.000	1.9	6.000	2.6	9.000	3.1
0.600	0.9	1.800	1.5	3.500	2.0	6.500	2.7	9.500	3.2

Storage Structures for Storm

Porous Car Park Manhole: 2, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	186.0
Max Percolation (l/s)	258.3	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	54.895	Membrane Depth (mm)	0

Porous Car Park Manhole: 2, DS/PN: 1.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	110.0
Max Percolation (l/s)	152.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	54.795	Membrane Depth (mm)	0

Porous Car Park Manhole: 3, DS/PN: 1.004

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	52.0
Max Percolation (l/s)	72.2	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	54.795	Membrane Depth (mm)	0

Porous Car Park Manhole: 4, DS/PN: 1.005

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	16.0
Membrane Percolation (mm/hr)	1000	Length (m)	21.1
Max Percolation (l/s)	93.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	54.795	Membrane Depth (mm)	0

Complex Manhole: 9, DS/PN: 1.010

Cellular Storage

Invert Level (m)	54.970	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)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	140.0	140.0	0.400	140.0	159.2	0.401	0.0	159.2

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	16.0
Membrane Percolation (mm/hr)	1000	Length (m)	23.6
Max Percolation (l/s)	104.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	55.370	Membrane Depth (mm)	0

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
1.000	1	0.500
1.001	2	0.500
1.002	2	0.500
2.000	2	0.500
1.003	2	0.500
1.004	3	0.500
1.005	4	0.500
1.006	5	0.500
1.007	6	0.500
1.008	7	0.500
3.000	8	0.500
4.000	10	0.500
3.001	9	0.500
1.009	8	0.500
1.010	9	0.500
1.011	10	0.500
1.012	11	0.500
1.013	12	0.500

1 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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	1.000		
Cv (Winter)	1.000		

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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	1	960 Summer	1	+0%	1/30 Summer				54.900	0.855	0.000
1.001	2	960 Summer	1	+0%	1/15 Summer				54.900	0.945	0.000
1.002	2	960 Summer	1	+0%	1/15 Summer				54.899	1.054	0.000
2.000	2	960 Summer	1	+0%	1/30 Summer				54.900	0.805	0.000
1.003	2	960 Summer	1	+0%	1/15 Summer				54.899	1.134	0.000
1.004	3	960 Summer	1	+0%	1/15 Summer				54.896	1.321	0.000
1.005	4	960 Summer	1	+0%	1/15 Summer				54.893	1.468	0.000
1.006	5	960 Summer	1	+0%	1/15 Summer				54.890	1.555	0.000
1.007	6	960 Summer	1	+0%	1/15 Summer				54.886	1.761	0.000
1.008	7	960 Summer	1	+0%	1/15 Summer				54.882	1.997	0.000
3.000	8	15 Summer	1	+0%					55.234	-0.116	0.000
4.000	10	15 Summer	1	+0%					55.277	-0.103	0.000
3.001	9	180 Summer	1	+0%	1/15 Summer				54.889	2.254	0.000
1.009	8	180 Summer	1	+0%	1/15 Summer				54.884	2.314	0.000
1.010	9	180 Summer	1	+0%	1/15 Summer				54.884	2.684	0.000
1.011	10	180 Summer	1	+0%	1/15 Summer				54.877	2.732	0.000
1.012	11	180 Summer	1	+0%					51.730	-0.195	0.000
1.013	12	180 Summer	1	+0%					51.014	-0.361	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.02			0.9	SURCHARGED	
1.001	2	0.03			1.0	SURCHARGED	
1.002	2	0.05			1.7	SURCHARGED	
2.000	2	0.07		133	2.9	SURCHARGED	

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.003	2	0.12		419	4.6	SURCHARGED	
1.004	3	0.11		437	4.4	SURCHARGED	
1.005	4	0.11		419	4.3	SURCHARGED	
1.006	5	0.10			4.0	SURCHARGED	
1.007	6	0.09			3.4	SURCHARGED	
1.008	7	0.07			2.8	SURCHARGED	
3.000	8	0.12			2.6	OK	
4.000	10	0.21			3.7	OK	
3.001	9	0.06			2.3	SURCHARGED	
1.009	8	0.06			4.5	SURCHARGED	
1.010	9	0.23			3.4	SURCHARGED	
1.011	10	0.05			1.8	SURCHARGED	
1.012	11	0.04			1.8	OK	
1.013	12	0.01			1.8	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	1.000		
Cv (Winter)	1.000		

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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	1	960 Winter	30	+0%	1/30 Summer				55.124	1.079	0.000
1.001	2	960 Winter	30	+0%	1/15 Summer				55.124	1.169	0.000
1.002	2	960 Winter	30	+0%	1/15 Summer				55.123	1.278	0.000
2.000	2	960 Winter	30	+0%	1/30 Summer				55.124	1.029	0.000
1.003	2	960 Winter	30	+0%	1/15 Summer				55.123	1.358	0.000
1.004	3	960 Winter	30	+0%	1/15 Summer				55.119	1.544	0.000
1.005	4	960 Winter	30	+0%	1/15 Summer				55.116	1.691	0.000
1.006	5	960 Winter	30	+0%	1/15 Summer				55.113	1.778	0.000
1.007	6	960 Winter	30	+0%	1/15 Summer				55.109	1.984	0.000
1.008	7	960 Winter	30	+0%	1/15 Summer				55.105	2.220	0.000
3.000	8	15 Summer	30	+0%					55.255	-0.095	0.000
4.000	10	15 Summer	30	+0%					55.307	-0.073	0.000
3.001	9	960 Winter	30	+0%	1/15 Summer				55.100	2.465	0.000
1.009	8	960 Winter	30	+0%	1/15 Summer				55.100	2.530	0.000
1.010	9	960 Winter	30	+0%	1/15 Summer				55.098	2.898	0.000
1.011	10	720 Summer	30	+0%	1/15 Summer				55.096	2.951	0.000
1.012	11	960 Winter	30	+0%					51.730	-0.195	0.000
1.013	12	960 Winter	30	+0%					51.014	-0.361	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.03			1.3	SURCHARGED	
1.001	2	0.04			1.5	SURCHARGED	
1.002	2	0.08			2.4	SURCHARGED	
2.000	2	0.08		820	3.4	SURCHARGED	
1.003	2	0.10			3.9	SURCHARGED	
1.004	3	0.09			3.5	SURCHARGED	
1.005	4	0.09			3.3	SURCHARGED	

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.006	5	0.08			3.2	SURCHARGED	
1.007	6	0.07			2.8	SURCHARGED	
1.008	7	0.06			2.2	SURCHARGED	
3.000	8	0.29			6.4	OK	
4.000	10	0.53			9.0	OK	
3.001	9	0.03			1.3	SURCHARGED	
1.009	8	0.03			2.7	SURCHARGED	
1.010	9	0.15		608	2.2	SURCHARGED	
1.011	10	0.05			1.9	SURCHARGED	
1.012	11	0.04			1.9	OK	
1.013	12	0.01			1.9	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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	1.000		
Cv (Winter)	1.000		

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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
1.000	1	960 Winter	100	+0%	1/30 Summer				55.244	1.199	0.000
1.001	2	960 Winter	100	+0%	1/15 Summer				55.243	1.288	0.000
1.002	2	960 Winter	100	+0%	1/15 Summer				55.243	1.398	0.000
2.000	2	960 Winter	100	+0%	1/30 Summer				55.244	1.149	0.000
1.003	2	960 Winter	100	+0%	1/15 Summer				55.242	1.477	0.000
1.004	3	960 Winter	100	+0%	1/15 Summer				55.239	1.664	0.000
1.005	4	960 Winter	100	+0%	1/15 Summer				55.236	1.811	0.000
1.006	5	960 Winter	100	+0%	1/15 Summer				55.233	1.898	0.000
1.007	6	960 Winter	100	+0%	1/15 Summer				55.229	2.104	0.000
1.008	7	960 Winter	100	+0%	1/15 Summer				55.224	2.339	0.000
3.000	8	15 Summer	100	+0%					55.263	-0.087	0.000
4.000	10	15 Summer	100	+0%					55.321	-0.059	0.000
3.001	9	960 Winter	100	+0%	1/15 Summer				55.219	2.584	0.000
1.009	8	960 Winter	100	+0%	1/15 Summer				55.219	2.649	0.000
1.010	9	960 Winter	100	+0%	1/15 Summer				55.217	3.017	0.000
1.011	10	960 Summer	100	+0%	1/15 Summer				55.215	3.070	0.000
1.012	11	960 Winter	100	+0%					51.730	-0.195	0.000
1.013	12	960 Winter	100	+0%					51.014	-0.361	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.04			1.6	FLOOD RISK	
1.001	2	0.05			1.9	FLOOD RISK	
1.002	2	0.10			3.1	FLOOD RISK	
2.000	2	0.09			3.6	FLOOD RISK	

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.003	2	0.10			4.0	FLOOD RISK	
1.004	3	0.08			3.2	FLOOD RISK	
1.005	4	0.08			3.2	FLOOD RISK	
1.006	5	0.08			3.1	FLOOD RISK	
1.007	6	0.07			2.7	FLOOD RISK	
1.008	7	0.07			2.5	SURCHARGED	
3.000	8	0.37			8.3	OK	
4.000	10	0.68			11.7	OK	
3.001	9	0.04			1.7	SURCHARGED	
1.009	8	0.04			3.4	SURCHARGED	
1.010	9	0.15			2.2	SURCHARGED	
1.011	10	0.05			1.9	SURCHARGED	
1.012	11	0.04			1.9	OK	
1.013	12	0.01			1.9	OK	

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 Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FSR	M5-60 (mm)	20.000
Region	England and Wales	Ratio R	0.400
Cv (Summer)	1.000		
Cv (Winter)	1.000		

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, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	40

WARNING: Half Drain Time has not been calculated as the structure is too full.

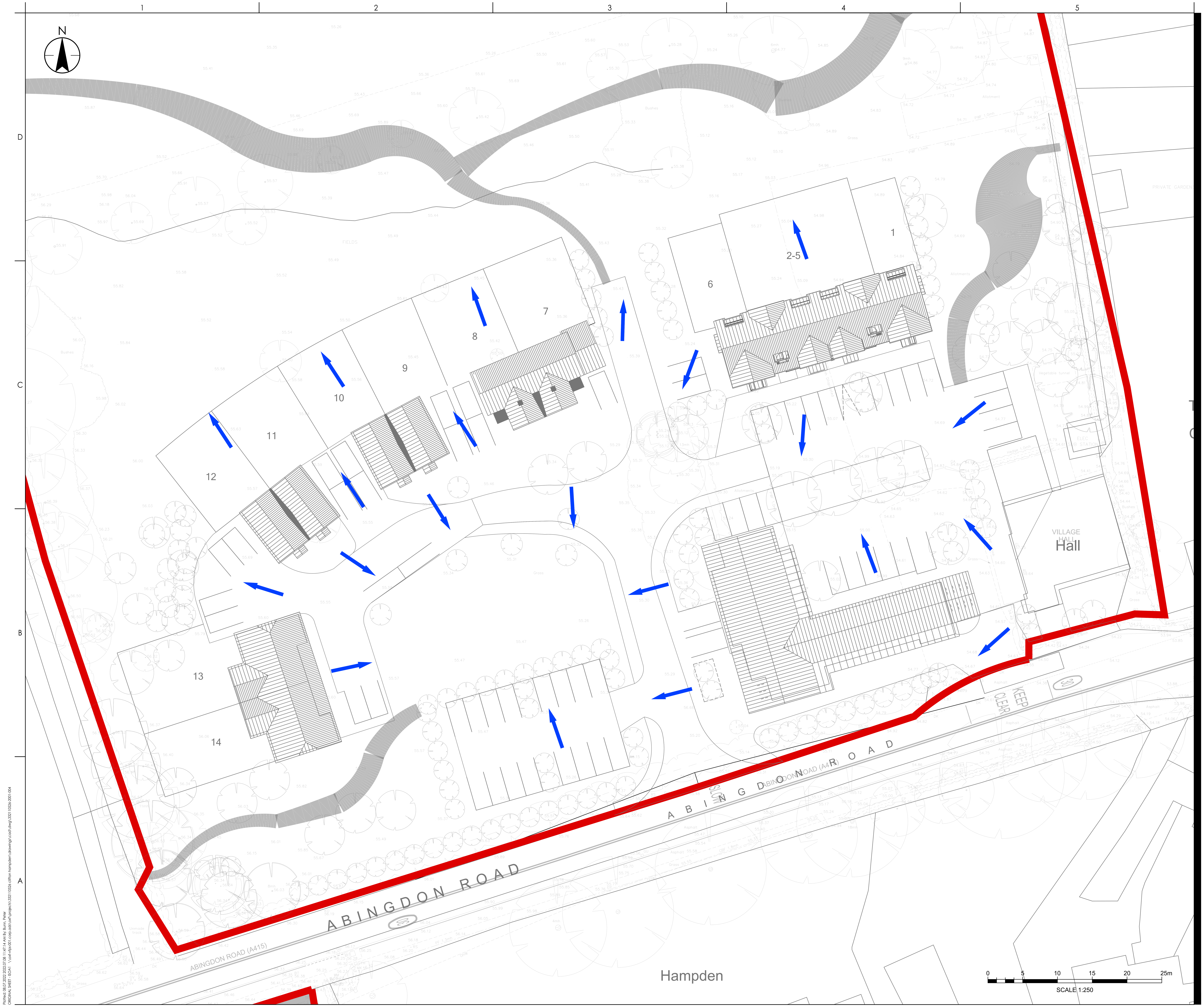
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	1	15 Summer	100	+40%	100/15 Summer	100/15 Summer			55.500	1.455
1.001	2	1440 Winter	100	+40%	100/15 Summer				55.474	1.519
1.002	2	1440 Winter	100	+40%	100/15 Summer				55.473	1.628
2.000	2	1440 Winter	100	+40%	100/15 Summer				55.475	1.380
1.003	2	1440 Winter	100	+40%	100/15 Summer				55.473	1.708
1.004	3	1440 Winter	100	+40%	100/15 Summer				55.469	1.894
1.005	4	1440 Winter	100	+40%	100/15 Summer				55.466	2.041
1.006	5	1440 Winter	100	+40%	100/15 Summer				55.463	2.128
1.007	6	1440 Winter	100	+40%	100/15 Summer				55.459	2.334
1.008	7	1440 Winter	100	+40%	100/15 Summer				55.455	2.570
3.000	8	1440 Winter	100	+40%	100/360 Summer				55.449	0.099
4.000	10	1440 Winter	100	+40%	100/15 Summer				55.449	0.069
3.001	9	1440 Winter	100	+40%	100/15 Summer				55.449	2.814
1.009	8	1440 Winter	100	+40%	100/15 Summer				55.449	2.879
1.010	9	1440 Winter	100	+40%	100/15 Summer				55.447	3.247
1.011	10	960 Summer	100	+40%	100/15 Summer				55.438	3.293
1.012	11	1440 Winter	100	+40%					51.731	-0.194
1.013	12	1440 Winter	100	+40%					51.015	-0.360

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.489	0.97			36.3	FLOOD	2
1.001	2	0.000	0.05			1.9	FLOOD RISK	
1.002	2	0.000	0.10			3.2	FLOOD RISK	
2.000	2	0.000	0.07			2.7	FLOOD RISK	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.003	2	0.000	0.09			3.6	FLOOD RISK	
1.004	3	0.000	0.07			2.7	FLOOD RISK	
1.005	4	0.000	0.08			2.8	FLOOD RISK	
1.006	5	0.000	0.07			2.8	FLOOD RISK	
1.007	6	0.000	0.07			2.7	FLOOD RISK	
1.008	7	0.000	0.07			2.5	SURCHARGED	
3.000	8	0.000	0.02			0.4	SURCHARGED	
4.000	10	0.000	0.04			0.6	SURCHARGED	
3.001	9	0.000	0.04			1.6	SURCHARGED	
1.009	8	0.000	0.05			3.8	SURCHARGED	
1.010	9	0.000	0.14			2.1	SURCHARGED	
1.011	10	0.000	0.05			2.0	SURCHARGED	
1.012	11	0.000	0.05			2.0	OK	
1.013	12	0.000	0.01			2.0	OK	

Appendix G Flood Exceedance Routes



Stantec

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Notes

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

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KEY:

SITE BOUNDARY

DIRECTION OF FLOW

Issued/Revision	By	Appd	YYYY.MM.DD
P01 FIRST ISSUE	PB	SH	2022.07.07

Dwn.	Dsgn.	Chkd.	YYYY.MM.DD
PB	JS	SH	2022.07.07

Issue Status

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Client/Project Logo

Thomas HOMES

Client/Project
THOMAS HOMES

CLIFTON HAMPDEN

Title
FLOOD EXCEEDANCE ROUTING

SHEET 1 OF 2

Project No.	Scale
332110526	1:250 @ A1

Revision	Drawing No.
P01	332110526-2001-004

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Thomas HOMES

Client/Project
THOMAS HOMES

CLIFTON HAMPDEN

Title
FLOOD EXCEEDANCE ROUTING

SHEET 2 OF 2

Project No.
332110526

Scale
1:250 @ A1

Revision
P01

Drawing No.
332110526-2001-005

Appendix H Land Owners Consent

Bunn, Peter

From: gileshlbaxter@btinternet.com
Sent: 14 July 2022 16:30
To: Chris Brotherton
Subject: Burcot and Clifton Hampden Neighbourhood Development Order

Dear Chris

Please take this email as confirmation that we are content to enter into an Easement permitting discharge of surface water resulting from the NDO development at an appropriate rate into the drainage pipe running across our field.

Giles and Victoria Baxter

Lower Town Farmhouse
High Street
Clifton Hampden
OX14 3EQ