Broad Lane, Wilmington
Drainage Statement
B0309-CTO-R001

13 November 2024

B0309

Contents

Appendices:

Document Status and Signatures

Document Status		
Document Reference: B0309-CTP-R001 – Drainage Statement		
Issue Date	Version	Rev
26/06/2024	Preliminary Submission	P01
10/07/2024	Minor text clarifications	P02
13/11/2024	Site layout updated. Calculations and strategy amended to suit	P03

File location: N:\Jobs\B0250-B0499\B0309\4 - Reports and Specifications

Signed on behalf of CTP	
Prepared by:	 Stephanie McClellan – BEng (Hon) – (Graduate Civil Engineer Designate)
Reviewed by:	 Daniel Kent – BEng (Hon) – Associate Designate

1.0 Introduction

1.1 CTP Consulting Engineers have been appointed by Shed Factory Ltd (Client) to provide a Drainage Statement (DS) to support the planning application for a residential development of 9 houses at Broad Lane, Wilmington, Dartford, DA2 7AQ.

1.2 This report has been prepared to be read in conjunction with the drainage strategy drawing B0309-1500 which is included within Appendix C.

1.3 CTP has no responsibility to any other parties to whom this report may be circulated, in part or in full, and any such parties rely on the contents of this report solely at their own risk.

1.4 All copyright and other intellectual rights in and over this report and its contents shall remain vested in CTP. The 'client' and any person authorised by them is granted an irrevocable royalty free license to use and reproduce this report for all purposes relating to the property, but CTP shall not be liable for any use of the report for any purpose other than that for which it was originally prepared.

2.0 Existing Site

2.1 The proposed development is located north of Wilmington Community Church which is accessed off Broad Lane. Immediately to the west of the site lies the playing field associated with Wilmington Grammar School for Boys and to the north and east lie residential premises.

2.2 The site is centered on approximate OS Grid Reference X: 552740, Y: 172057.

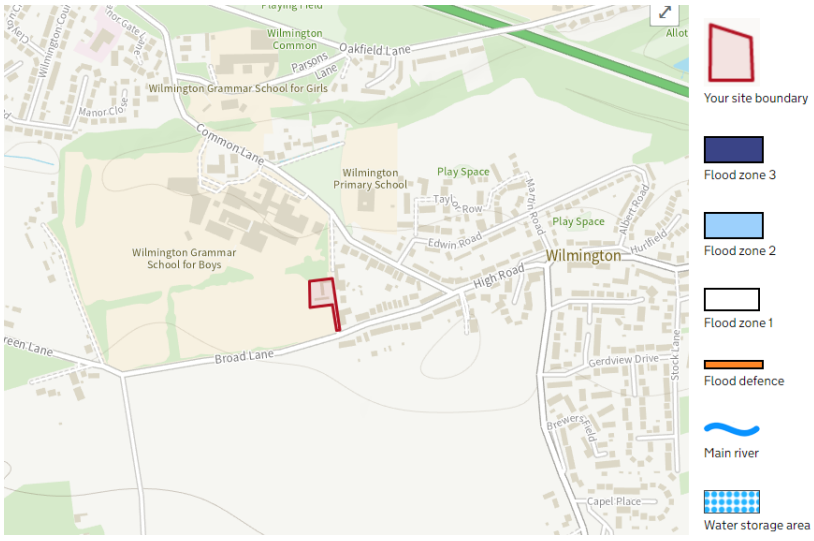
2.3 The land is considered brownfield and was previously utilised as a storage yard. The site contains a number of existing buildings (all to be demolished as part of the proposals) and is generally hard-paved.

2.4 The site falls from South to North, existing levels within the site range from 36.41mAOD on the Southern Boundary to 33.81mAOD on the northern boundary.

2.5 A topographical and utilities survey has been carried out and this is included within Appendix A.

2.6 A review of online mapping shows that there are no watercourses on or within the vicinity of the site.

2.7 Environment Agency Flood Maps (extract below) show that the entirety of the site falls within Flood Zone 1. As such, and with the site area being less than 1ha a full Flood Risk Assessment is not required.



2.8 Thames Water Asset Plans (a copy included in Appendix B) show existing foul sewers in Broad Lane to the south of the site. In addition, there is a foul network serving the residential properties to the north of the site.

2.9 There are no surface water sewers shown in the vicinity of the development.

2.10 A utilities survey has been carried out which has evidenced connections between the adjacent Church / residential properties to this foul sewer network to the north. Following the sewer transfer of 2011, it is therefore assumed that the existing foul drain within the site is considered a public foul sewer under the ownership (and maintenance responsibility) of Thames Water as this serves more than one curtilage.

2.11 As shown on the strategy drawing, a diversion of this sewer will be required subject to receipt of all necessary approvals.

2.12 Foul water from the existing buildings on site (to be demolished) are shown to connect into this foul network and this principal will be maintained.

2.13 Surface water connections from the existing building are shown, but the routes and outlets of these are inconclusive on the survey. It is assumed that these discharge either directly to ground or into the foul system as there are neither any watercourses nor surface water networks for these to connect into.

3.0 Proposed Drainage Strategy

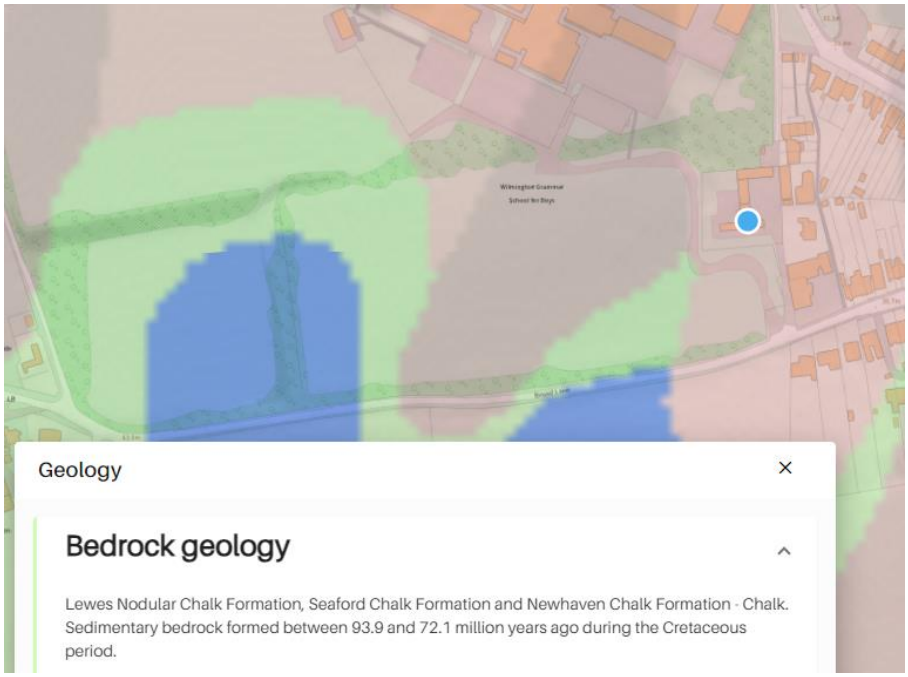
3.1 The proposed development is comprised of 9 residential dwellings with associated infrastructure including roads, parking and private garden areas.

Surface Water Strategy

3.2 In accordance with the drainage hierarchy set out in Building Regulations, surface water disposal should be considered in the following order of preference:

- Infiltration
- Watercourse
- Surface Water Sewer
- Combined Sewer

3.3 As detailed on the British Geological Survey (BGS) mapping, shown in extract below, the site is underlaid by Chalk Formation. This therefore suggests that surface water disposal via infiltration is likely to be suitable.



3.4 Whilst initial infiltration testing has been carried out, this was at a depth of 2.5m. The first test of this showed soakage at a rate of 1x10-5m/s and whilst tests 2 and 3 were inconclusive it is assumed likely that a greater infiltration rate will be achieved at depth to meet the proposed soakaway structure.

3.5 Online borehole records within the vicinity suggest that chalk depth starts around 2-2.5m depth and therefore the proposed soakaway will be situated in more suitable strata.

3.6 For the purposes of the strategy, a conservative infiltration rate has been utilised of 1x10-5m/s (0.036m/hr) and this will be confirmed with further testing at the location and actual depth of the proposed soakaway.

3.7 Should the testing indicate that the rate achieved is greater than this, the storage volume for the tank could be reduced to suit.

3.8 If further testing indicates that this rate cannot be achieved, then alternative methods for surface water disposal will need to be considered. As there are no watercourses or surface water sewers in the vicinity of the site it is likely that the surface water would connect to the existing Thames Water network on a 'combined' basis. Further investigation will be carried out on the existing surface water connections from site to determine if these currently connect into the public sewer network.

3.9 As above, the drainage strategy (within Appendix C) is based on the disposal of surface water via infiltration and is subject to confirmed infiltration tests. A single soakaway is included to provide the infiltration and a storage tank is included to provide attenuation for the 1:100 yr +45% climate change storm event. Surface water calculations for this (based on FEH data) are included within Appendix D.

3.10 The proposed surface water drainage system comprises of element of conventional pipes, permeable paving sub-base, attenuation tank and soakaway.

3.11 Areas of car parking are shown to utilise permeable paving which will provide further attenuation and water quality benefits. As soakage is unlikely to be possible at shallow levels, the permeable paving will be lined and connected to the surface water drainage network on site.

3.12 Based on the assumed infiltration rate of the site and the total impermeable area, the site requires approximately 239m3 of storage to cater for the 1:100yr plus climate change event.

3.13 The attenuation tank and the permeable paving acts to provide attenuation during critical storms. However, the permeable paving also provides an additional function of improving water quality. As surface water passes through the surfacing blocks and permeable make-up, contaminants are removed from the system.

Proposed Foul Water Drainage

3.14 From investigations it has been noted that there are existing drains on the site that serves the adjacent properties. As detailed in paragraph 2.10 above, as these connect

2 or more properties and ultimately discharge into the public sewer network, these are considered to be adopted sewers (following the private sewer transfer of 2011).

3.15 The foul water from the new residential properties has been proposed to connect into the existing foul sewers to the northwest of the site. This is shown on the drainage strategy drawing in Appendix C.

3.16 It is currently assumed that a connection to these can be made via gravity, however, this will be dependent upon the existing invert levels of the drainage network (subject to investigation). Alternatively, a pumped connection can be made to the existing foul sewer in Broad Lane to the south.

3.17 The existing foul sewer to the north is shown on surveys to be 100mm diameter, however, the asset plans indicate this to be 150mm diameter. As the new development will be adding an additional 9 units to the drain, this pipe will need to be 150mm diameter to provide appropriate capacity. As such, the pipe diameter will be investigated to confirm it is already sufficient or will need to be upgraded to be a 150mm diameter pipe. Any pipe upgrades to the public network will be subject to the receipt of necessary approvals, likely under a S104 or S185 Agreement (Water Industry Act) from Thames Water.

3.18 Connections to existing foul sewers will be subject to receipt of all necessary approvals S106 Connection Approvals (Water Industry Act) from Thames Water.

3.19 The existing foul drain (assumed to be an adopted sewer as above) passes under the proposed plot 9. As such, this will need to be diverted to suit the development proposals. A potential diversion route is shown on the strategy drawing and would be subject to receipt of all necessary approvals (S185) from Thames Water.

4.0 Maintenance Strategy

4.1 The new on-site drainage system (foul and surface water) will be privately owned and maintained. All maintenance to the drainage system will be carried out by the occupiers of the dwelling / private management company and the system will not be offered for adoption to the Water Authority. It should be noted that the existing adopted sewers on site will remain the responsibility of the Water Authority.

4.2 To ensure the continual operation of the SUD's features, it is important that the system is regularly inspected and maintained. It is suggested that the maintenance will be carried out in accordance with the below schedules (as taken from CIRIA C753):

Operation and Maintenance Requirements Permeable Paving

TABLE 20.15 Operation and maintenance requirements for pervious pavements

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
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 50 mm 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, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Operation and Maintenance Requirements Attenuation Tank

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/ or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Operation and Maintenance Requirements for soakaways

TABLE 13.1 Operation and maintenance requirements for soakaways

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

5.0 Conclusion / Summary

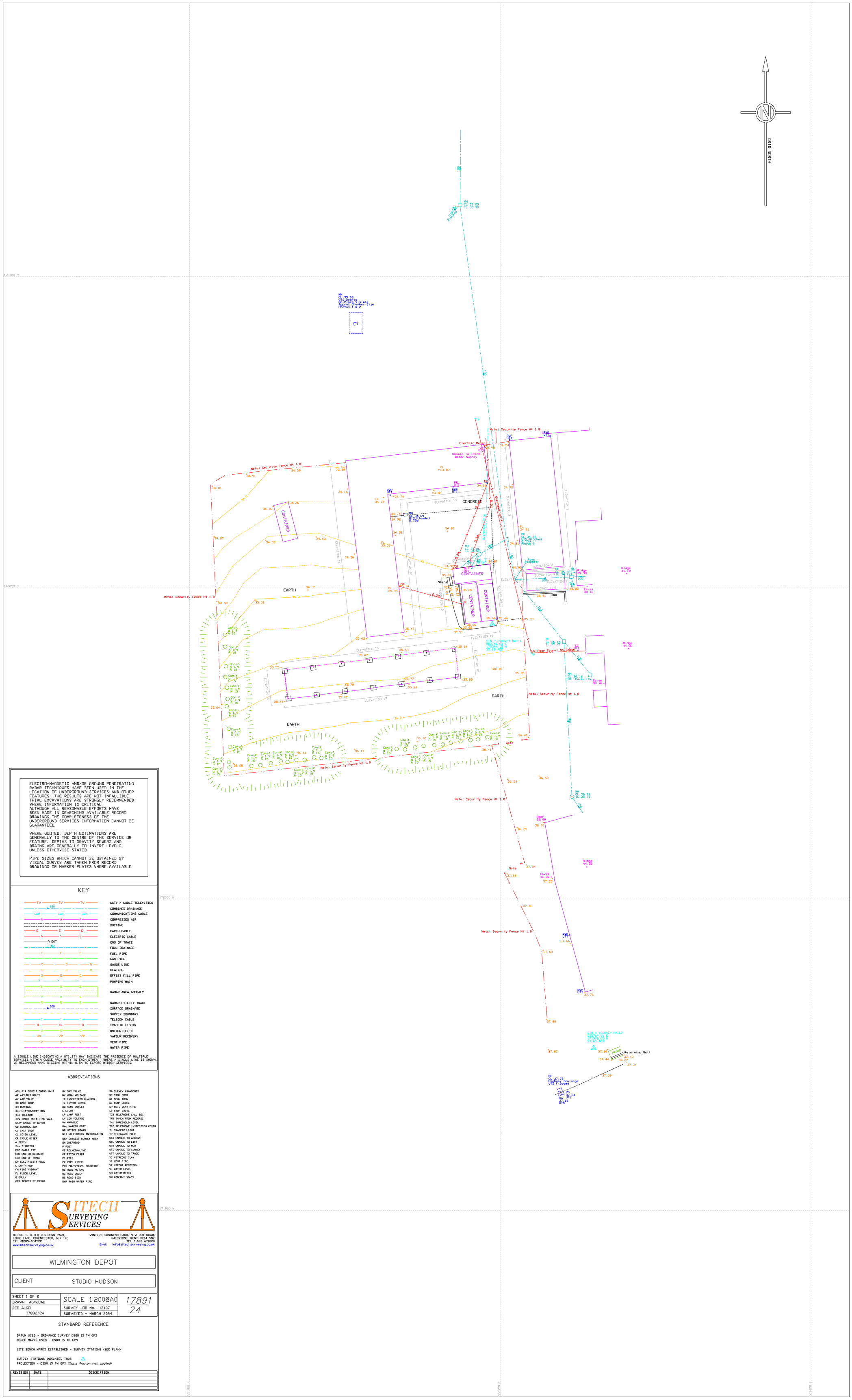
5.1 The existing adopted drainage on site will be maintained and will remain the responsibility of the Water Authority. Where required to suit the development proposals, this will be diverted in accordance with the necessary approvals / agreements with Thames Water. The new drainage system will remain in private ownership.

5.2 Surface water for the proposed development will be dealt with via infiltration methods and the disposal of surface water will not lead to an increase in flood risk or discharge rates / volumes when compared to the pre-development scenario.

5.3 Foul water from the development will connect into the existing public sewer network crossing the site.

5.4 All final drainage routes and connection locations will be carried out in accordance with approvals, consents and agreements with the Water Authority (Thames Water) which will be sought during the detailed design and prior to construction.

Appendix A – Topographical Survey



ELECTRO-MAGNETIC AND/OR GROUND PENETRATING RADAR TECHNIQUES HAVE BEEN USED IN THE LOCATION OF UNDERGROUND SERVICES AND OTHER FEATURES. THE RESULTS ARE NOT INFALLIBLE TRIAL EXCAVATIONS ARE STRONGLY RECOMMENDED WHERE INFORMATION IS CRITICAL. ALTHOUGH ALL REASONABLE EFFORTS HAVE BEEN MADE IN SEARCHING AVAILABLE RECORD DRAWINGS, THE COMPLETENESS OF THE UNDERGROUND SERVICES INFORMATION CANNOT BE GUARANTEED.

WHERE QUOTED, DEPTH ESTIMATIONS ARE GENERALLY TO THE CENTRE OF THE SERVICE OR FEATURE. DEPTHS TO GRAVITY SEWERS AND DRAINS ARE GENERALLY TO INVERT LEVELS UNLESS OTHERWISE STATED.

PIPE SIZES WHICH CANNOT BE OBTAINED BY VISUAL SURVEY ARE TAKEN FROM RECORD DRAWINGS OR MARKER PLATES WHERE AVAILABLE.

KEY

- CCTV / CABLE TELEVISION
- COMBINED DRAINAGE
- COMMUNICATIONS CABLE
- COMPRESSED AIR
- DUCTING
- EARTH CABLE
- ELECTRIC CABLE
- END OF TRACE
- FOUL DRAINAGE
- FUEL PIPE
- GAS PIPE
- GAUGE LINE
- HEATING
- OFFSET FILL PIPE
- PUMPING MAIN
- RADAR AREA ANOMALY
- RADAR UTILITY TRACE
- SURFACE DRAINAGE
- SURVEY BOUNDARY
- TELECOM CABLE
- TRAFFIC LIGHTS
- UNIDENTIFIED
- VAPOUR RECOVERY
- VENT PIPE
- WATER PIPE

A SINGLE LINE INDICATING A UTILITY MAY INDICATE THE PRESENCE OF MULTIPLE SERVICES WITHIN CLOSE PROXIMITY TO EACH OTHER. WHERE A SINGLE LINE IS SHOWN, WE RECOMMEND HAND DIGGING WITHIN 0.5m TO EXPOSE HIDDEN SERVICES.

ABBREVIATIONS

ACU AIR CONDITIONING UNIT	GV GAS VALVE	SA SURVEY ABANDONED
AR ASSUMED ROUTE	HV HIGH VOLTAGE	SC STOP COCK
AV AIR VALVE	IC INSPECTION CHAMBER	SI SPUN IRON
BD BACK DROP	IL INVERT LEVEL	SL SUMP LEVEL
BH BOREHOLE	KO KERB OUTLET	SP SOIL VENT PIPE
Bin LITTER/GRIT BIN	L LIGHT	SV STOP VALVE
Bol BOLLARD	LP LAMP POST	TCB TELEPHONE CALL BOX
BRW BRICK RETAINING WALL	LV LOW VOLTAGE	TFR TAKEN FROM RECORDS
CATV CABLE TV COVER	MH MANHOLE	Thl THRESHOLD LEVEL
CB CONTROL BOX	Mkr MARKER POST	TIC TELEPHONE INSPECTION COVER
CI CAST IRON	NB NOTICE BOARD	TL TRAFFIC LIGHT
CL COVER LEVEL	NFI NO FURTHER INFORMATION	TP TELEGRAPH POLE
CR CABLE RISER	OSA OUTSIDE SURVEY AREA	UTA UNABLE TO ACCESS
d DEPTH	OH OVERHEAD	UTL UNABLE TO LIFT
Dia DIAMETER	P POST	UTR UNABLE TO ROD
ECP CABLE PIT	PE POLYETHALINE	UTS UNABLE TO SURVEY
EDR END OF RECORDS	PF PITCH FIBER	UTT UNABLE TO TRACE
EOT END OF TRACE	PI PILE	VC VITREOUS CLAY
EP ELECTRICITY POLE	PR PIPE RISER	VP VENT PIPE
E EARTH ROD	PVC POLYVYINYL CHLORIDE	VR VAPOUR RECOVERY
FH FIRE HYDRANT	RE RODDING EYE	WL WATER LEVEL
FL FLOOR LEVEL	RG ROAD GULLY	WM WATER METER
G GULLY	RS ROAD SIGN	WO WASHOUT VALVE
GPR TRACED BY RADAR	RWP RAIN WATER PIPE	

SITECH SURVEYING SERVICES

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www.sitechsurveying.co.uk

VINTERS BUSINESS PARK, NEW CUT ROAD,
MAIDSTONE, KENT, ME14 5NZ
TEL 01622 678900
Email info@sitechsurveying.co.uk

WILMINGTON DEPOT

CLIENT STUDIO HUDSON

SHEET 1 OF 2	SCALE 1:200@A0	17891 24
DRAWN AutoCAD		
SEE ALSO 17892/24	SURVEY JOB No. 13407	
	SURVEYED - MARCH 2024	

STANDARD REFERENCE

DATUM USED - ORDNANCE SURVEY OSGM 15 TM GPS
BENCH MARKS USED - OSBM 15 TM GPS

SITE BENCH MARKS ESTABLISHED - SURVEY STATIONS (SEE PLAN)

SURVEY STATIONS INDICATED THUS △
PROJECTION - OSBM 15 TM GPS (Scale factor not applied)

REVISION	DATE	DESCRIPTION

Appendix B – Thames Water Asset Plans

Asset Location Search

Property Searches

Colin Toms & Partners
Suffolk House
154High Street
SEVENOAKS
TN13 1XE

Search address supplied Wilmington Christian Fellowship
Broad Lane
Dartford
DA2 7AQ

Your reference B0309

Our reference ALS/ALS Standard/2024_4966465

Search date 25 March 2024

Notification of Price Changes

From 1st April 2024 Thames Water Property Searches will be increasing the prices of its CON29DW Residential and Commercial searches along with the Asset Location Search. Costs will rise in line with RPI as per previous years, which is sat at 6%.

Customers will be emailed with the new prices by February 28th 2024.

Any orders received with a higher payment prior to the 1st April 2024 will be non-refundable. For further details on the price increase please visit our website at www.thameswater-propertysearches.co.uk.

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

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

0800 009 4540

Asset Location Search

Property Searches

Search address supplied: Wilmington Christian Fellowship, Broad Lane, Dartford, DA2 7AQ

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 search provides 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

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/2024_4966465

The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 552736,172024

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
7901	36.3	34.46
8005	35.05	33.77
8002	35.76	34.78
8004	34.91	34.06
8003	34.73	34.18
8101	30.76	28.82
8103	32.2	n/a
7001	34.18	33.36
8023	31.49	30.72
8109	32.44	31.91

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.

Asset Location Search - Sewer Key

Public Sewer Types (Operated and maintained by Thames Water)

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

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

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

- Storm Sewer
- Sludge Sewer
- Foul Trunk Sewer
- Surface Trunk Sewer
- Combined Trunk Sewer
- Foul Rising Main
- Surface Water Rising Main
- Combined Rising Main
- Vacuum
- Thames Water Proposed
- Vent Pipe
- Gallery

Other Sewer Types (Not operated and maintained by Thames Water)

- Sewer
- Culverted Watercourse
- Proposed
- Decommissioned Sewer
- Content of this drainage network is currently unknown
- Ownership of this drainage network is currently unknown

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
- Meter
- Dam Chase
- Vent
- Fitting

Operational Controls

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

- Ancillary
- Drop Pipe
- Control Valve
- 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.

- Inlet
- Outfall
- Undefined End

Other Symbols

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

- Change of Characteristic Indicator
- Public / Private Pumping Station
- Invert Level
- Summit

Areas

Lines denoting areas of underground surveys, etc.

- Agreement
- Chamber
- Operational Site

Ducts or Crossings

- Casement

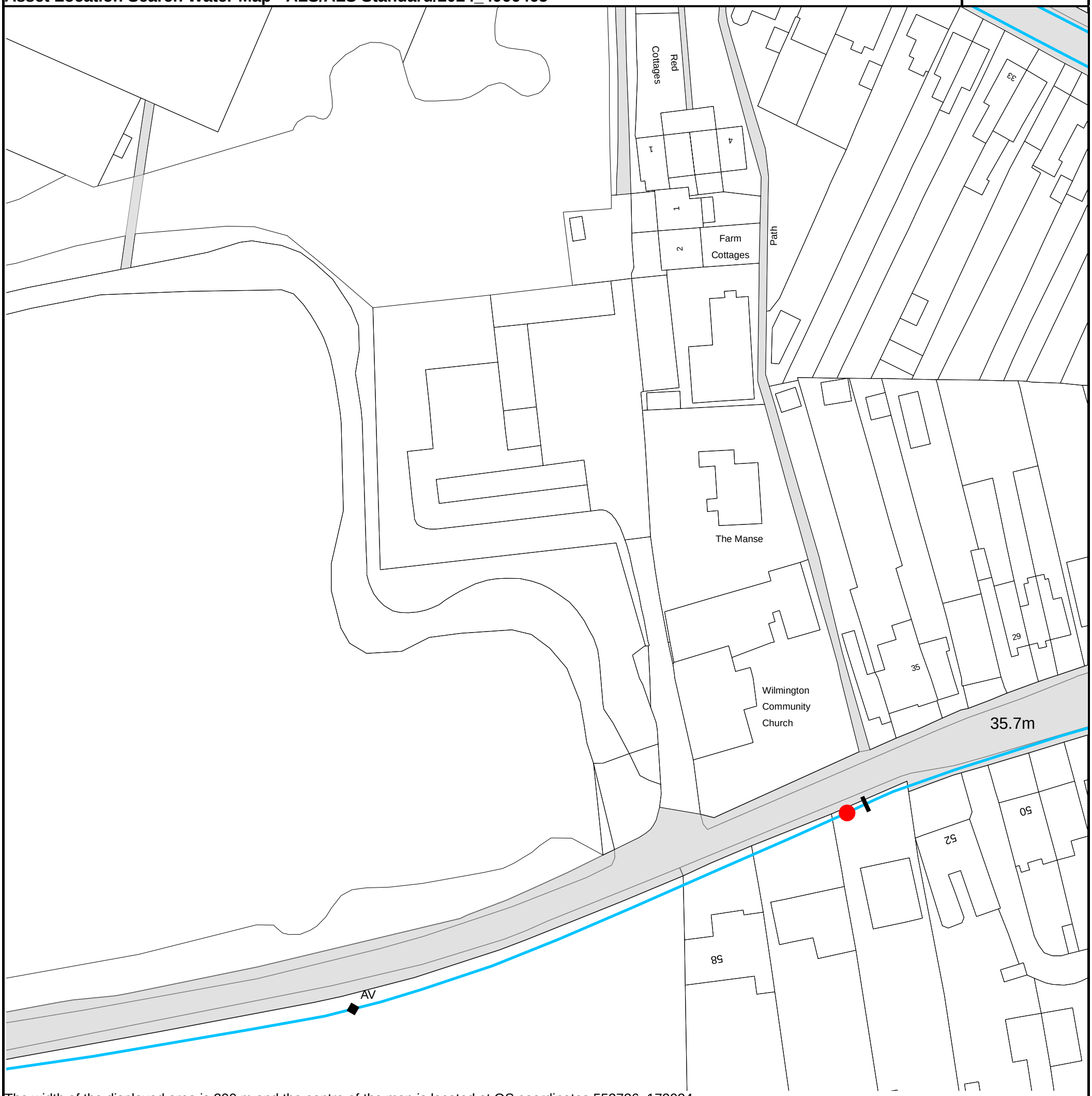
Ducts may contain high voltage cables. Please check with Thames Water.

- Conduit Bridge
- Subway
- Tunnel

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plan are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate the 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 indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimeters. 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, please contact Property Searches on 0800 009 4540.

Asset Location Search Water Map - ALS/ALS Standard/2024_4966465



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 552736, 172024.

Asset Location Search - Water Key

Water Pipes (Operated & Maintained by Thames Water)

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

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.

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

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

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.

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')

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

Casement: Ducts may contain high voltage cables. Please check with Thames Water.

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.

Payment 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 within 14 days of the 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. 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'.
5. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
6. 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 still not satisfied with the outcome provided, we will refer the matter to a Senior Manager for resolution who will provide you with a response.

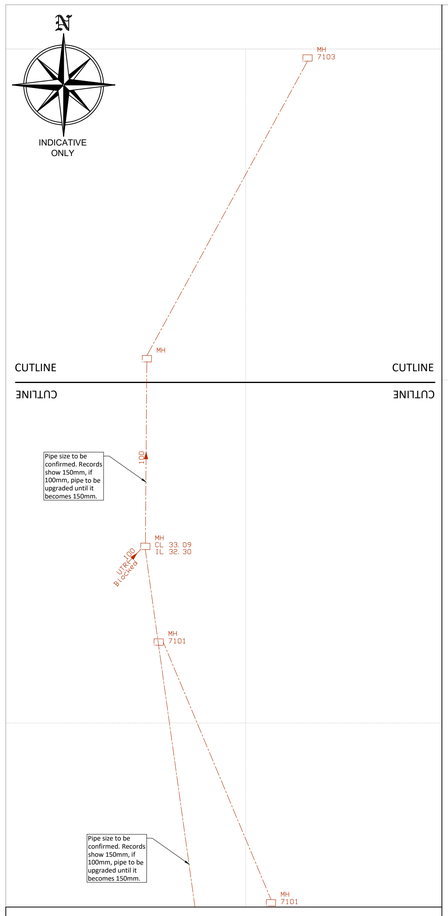
If you are still dissatisfied with our final response, and in certain circumstances such as you are buying a residential property or commercial property within certain parameters, The Property Ombudsman will investigate your case and give an independent view. The Ombudsman can award compensation of up to £25,000 to you if he finds that you have suffered actual financial loss and/or aggravation, distress, or inconvenience because of your search not keeping to the Code. Further information can be obtained by visiting www.tpos.co.uk or by sending an email to admin@tpos.co.uk.

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 0300 034 2222 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**
Please Call **0800 009 4540** quoting your invoice number starting CBA or ADS	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

Appendix C – Drainage Strategy Drawing



Engineering Layout Key	
CL xx.xx IL xx.xx EXS xxØ - 1:xxx	Existing Surface Water Sewer
	Surface / Foul Private 300Ø Plastic Access Chamber (up 100Ø pipe)
	Surface / Foul Private 450Ø PPIC (Up to 150Ø pipe)
	1200Ø PCC Manhole
	Public Foul Sewer Diversion
CL 00.00 CL 00.00 100Ø @ 1:80	Private Foul Water Sewer
CL 00.00 CL 00.00 xxxØ @ 1:xx	Private Surface Water Sewer
	Existing sewer to be abandoned
RG	Private Road Gully
	Attenuation Tank
	Easement
MH	Existing Public Foul Sewer to remain
	Foul Adoptabe 450Ø PPIC (Up to 150Ø pipe)

Surface Water Calculations

Assumed Infiltration rate of $1x10^{-5}$m/s or $3.6x10^{-2}$m/hr

Proposed Impermeable area = 2030m²

Minimum Storage Requirement of 239m³ base of infiltration rate of 0.036 m/hr

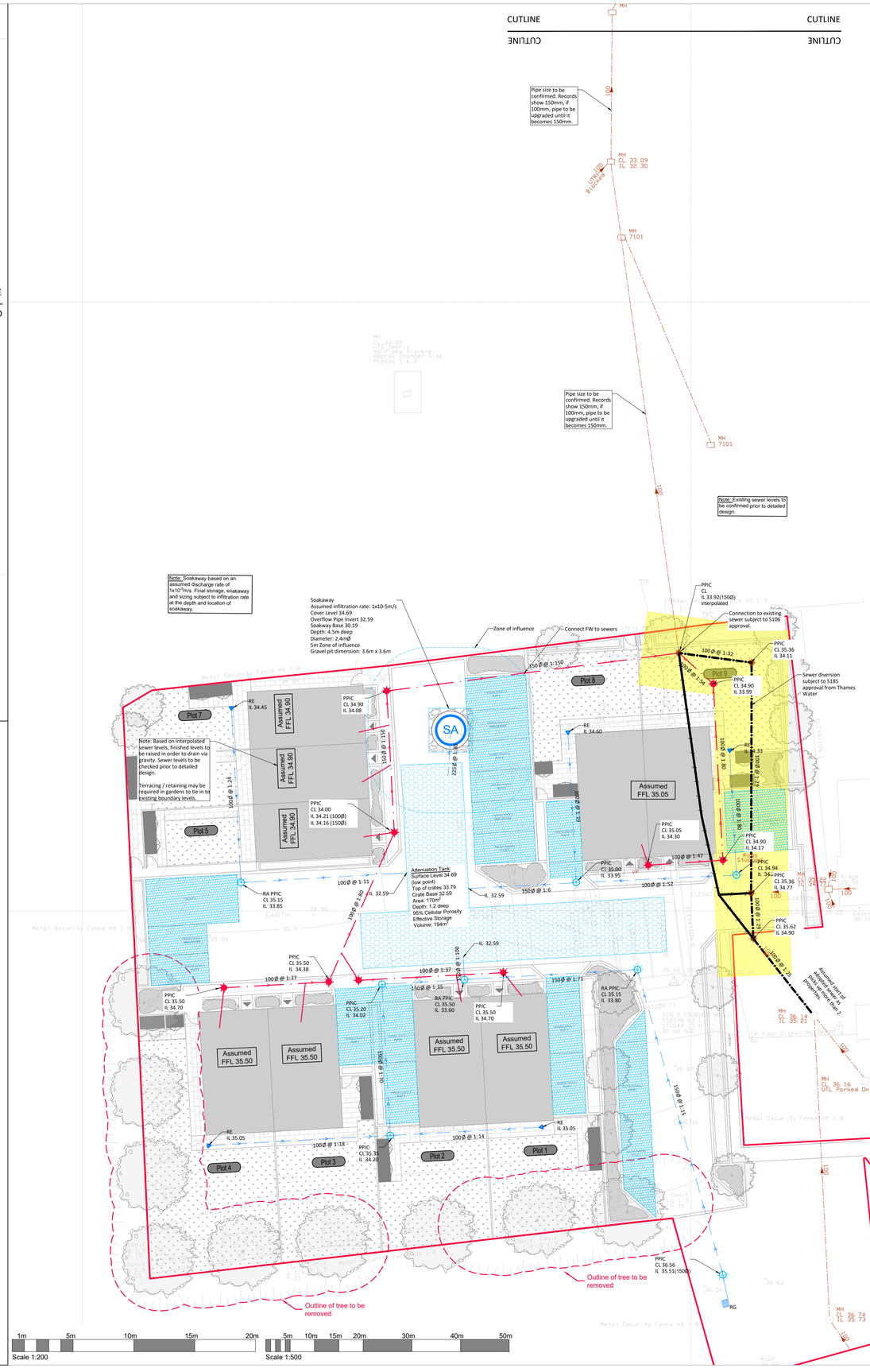
Storage option
Permeable paving-
Permeable paving area = 290m²
Assume subbase depth of 0.55m @ 30% Voids
Storage capacity = 0.3x290x0.55 = 48m³

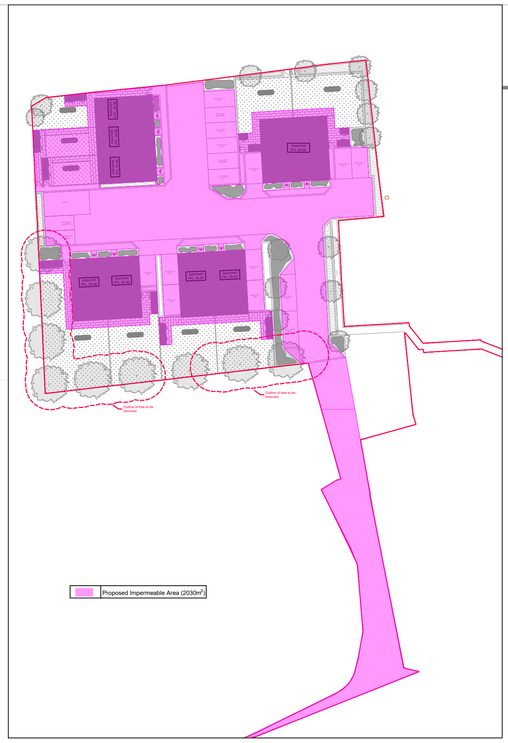
Tank
Assume area of 170m² @ 95% voids
Assume tank depth of 1.2m

Storage capacity = 170x1.2x0.95 = 194m³

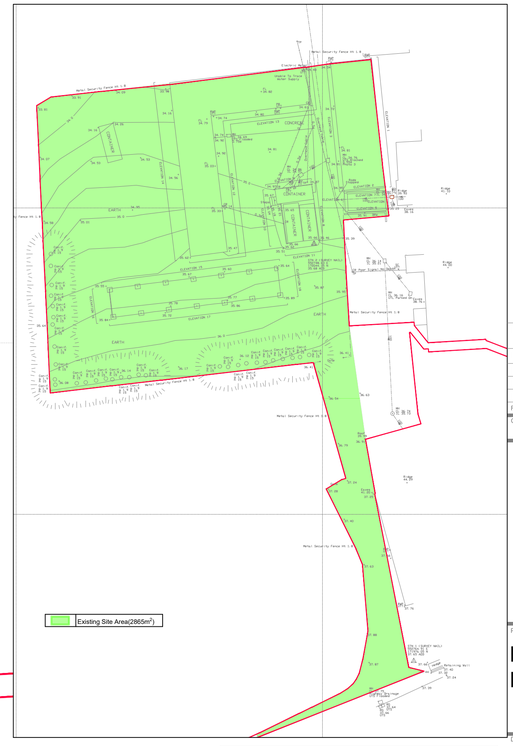
Total Storage for site

Overall Available storage = 48 + 194 = 242m³





Proposed Impermeable Area
1:500



Existing Site Area
1:500

CDM 2015 RESIDUAL RISKS

1.Existing Services
2.Working adjacent to existing properties
3.
4.

The above residual risks are for non-standard hazards. It is assumed that a competent contractor familiar with the construction of this type of work will be appointed who will be aware of the standard hazards.

NOTES

1. DO NOT SCALE THIS DRAWING. WORK TO FIGURED DIMENSIONS ONLY. ALL DIMENSIONS ARE IN MILLIMETRES (mm) UNLESS NOTED OTHERWISE.
2. This drawing is to be read in conjunction with all relevant Architect's, Engineer's and Specialist's drawings and their respective Specifications.
3. All work to comply with the relevant British Standards, Codes of Practice and the Building Regulations.
4. Any discrepancies between all working drawings, specifications and schedules of all disciplines to be immediately notified to CTP for clarification/correction prior to construction of relevant structure.

Notes

1. All details shown indicatively only. subject to detail design.
2. Drainage connection locations/depths assumed subject to confirmation of existing drainage.
3. Gullies shown indicatively. further surface water drainage may be required dependant on final level design.
4. RWP/SWP connections not shown.
5. Pipe sizes, depths. chamber types, attenuation volumes shown based on assumptions, subject to detailed design.

PRELIMINARY

Revision	Amendments	Date	Rev'd	Ch'd
P5	Update to suit layout. Impermeable area and storage calculations amended to suit	13.11.24	DK	DK
P4	Update to suit layout	08.07.24	DK	DK
P3	Update to suit layout	25.06.24	SM	DK
P2	Update with Thames Water Information	02.04.24	SM	DK
P1	Preliminary issue	27.03.24	SM	DK

Created by: SM | Date Created: MAR 2024 | Discipline: CIVIL

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www.ctp-llp.com

Project Title:
Former Landscape Services Depot, Wilmington

Drawing Title:
Drainage Strategy

Drawing Number: B0309-1500
Scale: 1:200 @A1 Unless Noted Otherwise
Revision: - P5

Appendix D – Surface Water Drainage Calculations

Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 1650 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	34.302	4.112	0.3	133.6	133.9	29.0	O K
30 min Summer	34.097	3.907	0.3	124.8	125.1	27.6	O K
60 min Summer	33.538	3.348	0.2	96.6	96.8	23.6	O K
120 min Summer	33.102	2.912	0.2	66.8	67.0	20.5	O K
180 min Summer	32.944	2.754	0.2	52.0	52.2	19.4	O K
240 min Summer	32.886	2.696	0.2	43.1	43.3	19.0	O K
360 min Summer	32.831	2.641	0.2	31.7	31.9	18.6	O K
480 min Summer	32.798	2.608	0.2	25.1	25.3	18.4	O K
600 min Summer	32.777	2.587	0.2	20.9	21.1	18.3	O K
720 min Summer	32.759	2.569	0.2	17.9	18.0	18.1	O K
960 min Summer	32.731	2.541	0.2	13.9	14.1	17.9	O K
1440 min Summer	32.707	2.517	0.2	9.8	9.9	17.8	O K
2160 min Summer	32.690	2.500	0.2	6.8	7.0	17.6	O K
2880 min Summer	32.677	2.487	0.2	5.3	5.5	17.5	O K
4320 min Summer	32.663	2.473	0.2	3.7	3.9	17.4	O K
5760 min Summer	32.654	2.464	0.2	2.9	3.1	17.4	O K
7200 min Summer	32.648	2.458	0.2	2.5	2.6	17.3	O K
8640 min Summer	32.644	2.454	0.2	2.1	2.3	17.3	O K
10080 min Summer	32.641	2.451	0.2	1.9	2.0	17.3	O K
15 min Winter	34.375	4.185	0.3	136.6	137.0	29.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	174.195	0.0	49.1	11
30 min Summer	113.564	0.0	69.1	19
60 min Summer	70.725	0.0	90.0	34
120 min Summer	43.395	0.0	114.0	64
180 min Summer	32.487	0.0	129.6	94
240 min Summer	26.285	0.0	140.8	122
360 min Summer	19.207	0.0	155.0	182
480 min Summer	15.234	0.0	164.0	242
600 min Summer	12.668	0.0	170.2	300
720 min Summer	10.866	0.0	174.7	360
960 min Summer	8.489	0.0	180.7	480
1440 min Summer	5.947	0.0	186.8	722
2160 min Summer	4.187	0.0	192.3	1072
2880 min Summer	3.281	0.0	195.8	1460
4320 min Summer	2.346	0.0	199.8	2124
5760 min Summer	1.862	0.0	201.5	2856
7200 min Summer	1.563	0.0	201.7	3560
8640 min Summer	1.361	0.0	201.3	4400
10080 min Summer	1.216	0.0	200.9	4952
15 min Winter	174.195	0.0	57.0	11

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	33.916	3.726	0.3	116.4	116.7	26.3	O K
60 min Winter	33.286	3.096	0.2	80.7	80.9	21.8	O K
120 min Winter	32.937	2.747	0.2	51.1	51.3	19.4	O K
180 min Winter	32.865	2.675	0.2	38.7	38.8	18.9	O K
240 min Winter	32.829	2.639	0.2	31.3	31.4	18.6	O K
360 min Winter	32.787	2.597	0.2	22.8	23.0	18.3	O K
480 min Winter	32.760	2.570	0.2	18.1	18.3	18.1	O K
600 min Winter	32.739	2.549	0.2	15.1	15.2	18.0	O K
720 min Winter	32.724	2.534	0.2	12.9	13.1	17.9	O K
960 min Winter	32.709	2.519	0.2	10.0	10.2	17.8	O K
1440 min Winter	32.692	2.502	0.2	7.0	7.2	17.6	O K
2160 min Winter	32.673	2.483	0.2	4.9	5.0	17.5	O K
2880 min Winter	32.663	2.473	0.2	3.8	4.0	17.4	O K
4320 min Winter	32.651	2.461	0.2	2.7	2.8	17.4	O K
5760 min Winter	32.644	2.454	0.2	2.1	2.3	17.3	O K
7200 min Winter	32.639	2.449	0.2	1.7	1.9	17.3	O K
8640 min Winter	32.635	2.445	0.2	1.5	1.7	17.3	O K
10080 min Winter	32.632	2.442	0.2	1.3	1.5	17.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
30 min Winter	113.564	0.0	79.4	19
60 min Winter	70.725	0.0	103.0	34
120 min Winter	43.395	0.0	129.8	64
180 min Winter	32.487	0.0	147.4	92
240 min Winter	26.285	0.0	160.0	124
360 min Winter	19.207	0.0	176.1	182
480 min Winter	15.234	0.0	186.3	242
600 min Winter	12.668	0.0	193.3	302
720 min Winter	10.866	0.0	198.6	364
960 min Winter	8.489	0.0	205.6	478
1440 min Winter	5.947	0.0	212.9	734
2160 min Winter	4.187	0.0	219.9	1092
2880 min Winter	3.281	0.0	224.7	1416
4320 min Winter	2.346	0.0	230.9	2132
5760 min Winter	1.862	0.0	234.6	2944
7200 min Winter	1.563	0.0	236.6	3544
8640 min Winter	1.361	0.0	237.9	4376
10080 min Winter	1.216	0.0	239.0	4952

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 552741 172050 TQ 52741 72050
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+45

Time Area Diagram

Total Area (ha) 0.203

Time (mins) From:	To:	Area (ha)
0	4	0.203

Model Details

Storage is Online Cover Level (m) 34.690

Lined Soakaway Structure

Infiltration Coefficient Base (m/hr)	0.00000	Ring Diameter (m)	2.40
Infiltration Coefficient Side (m/hr)	0.03600	Pit Multiplier	1.5
Safety Factor	2.0	Number Required	1
Porosity	0.30	Cap Volume Depth (m)	0.000
Invert Level (m)	30.190	Cap Infiltration Depth (m)	0.000

Pipe Overflow Control

Diameter (m)	0.225	Entry Loss Coefficient	0.500
Slope (1:X)	80.0	Coefficient of Contraction	0.600
Length (m)	5.000	Upstream Invert Level (m)	32.590
Roughness k (mm)	0.600		