16 December 2015

Our ref J15308/CA/2

Jake Puddy Crownwell Design & Build Garden Flat 9 Cliff Road London NW1 9AN

Dear Jake

# RE: 31 HEATH DRIVE BASEMENT IMPACT ASSESSMENT AUDIT RESPONSE

Further to your instruction of 22<sup>nd</sup> October 2015 and following the receipt of a number of documents provided by you, we have now addressed the outstanding action points that were outlined within the Audit of Basement Impact Assessment and Flood Risk Assessment by Campbell Reith Hill, for the above site.

An application for full planning consent (ref 2015/3738/P, dated 15<sup>th</sup> July 2015) was made to the London Borough of Camden (LBC) with respect to the extension of the existing basement. Following this, a further application for listed building consent (ref 2015/3953/L, dated 24<sup>th</sup> July 2015) was made for the same proposed development. Prior to the above applications being made, a ground investigation was carried out by Sub Surface South East Ltd (report ref AJP/SE1281, dated 16<sup>th</sup> April 2015). Following the ground investigation, a Basement Impact Assessment (BIA) was carried out by UK-Hydrosciences Ltd (ref and date unknown) and was subsequently the subject of an audit by Campbell Reith Hill (ref 12066-29 rev D1, dated 18<sup>th</sup> September 2015) on behalf of LBC. Structural Design Calculations (SDC) (ref 4467, dated May 2015) have been carried out by MMP Designs and are referred to where required within this letter.

Further to the BIA audit carried out by Campbell Reith Hill, Geotechnical & Environmental Associates (GEA) has been approached by Crownwell Design & Build to address the actions raised as a result of the BIA audit and the findings are discussed within this letter report. Our observations are limited to the eight points raised by Campbell Reith Hill and this letter does not represent a review of the whole BIA submission.

In addition to the above, GEA has been commissioned to carry out a Ground Movement Assessment for the proposed basement extension and we have also logged a number of trial pits within the existing basement, the findings of which will be reported under separate cover.

The conclusions and recommendations made in this letter are limited to those that can be made on the basis of the investigation. The results of the work should be viewed in the context of the range of data sources consulted and the number of locations where the ground was sampled. No liability can be accepted for information in other data sources or conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate; no independent validation of such information has been made by GEA.

Offices in Hertfordshire (tel 01727 B24666) and Nottinghamshire (tel 01509 674888)

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# 1. Findings of Basement Impact Assessment Audit

An audit was carried out by Campbell Reith Hill on the Basement Impact Assessment and Flood Risk Assessment reports by UK-Hydrosciences Ltd and the eight action points raised are detailed in the following table.

Action Number	Туре	Description	GEA Response
1	Hydrology	Confirm qualifications of Author/Reviewer of Flood Risk Assessment.	This is included in our letter ref J15308/CA/3; 31 Heath Drive Flood Risk Assessment Audit Response
2	Stability	Confirm structural basement design has been carried out in conjunction with a Chartered Geologist.	The proposed basement has been the subject of a Ground Movement Assessment (ref J15308A dated December 2015) by GEA, which has been carried out in conjunction with a Chartered Geologist.
3	Stability	Assumed soil parameters [discussed within the SDC] are not based on cautious moderately conservative values.	See Section 2.0 (below)
4	Stability		A Ground Movement Assessment has been carried out by GEA using industry-standard software and for nearby sensitive structures, the maximum building damage category does not exceed Category 1 – Very Slight.
5	Stability		A condition survey has been recommended within the Ground Movement Assessment carried out by GEA.
6	Stability	Confirm size and depth of neighbouring and party wall foundations in order to confirm design assumptions for party wall surcharge on new retaining walls.	See Section 3.0 (below)
7	Stability	Confirmation required of any existing tunnels in the vicinity of the basement extension.	See attached LU tunnel search and Thames Water Asset Protection search which confirm that neither has any tunnels beneath the site. Furthermore, the lines of the railway tunnels are shown on OS mapping to be distant from the site.
8	Hydrogeology / Stability	Confirm proximity of the River Westbourne Sewer and whether the basement proposal will be within any exclusion zones required by the sewer.	31 Heath Drive Flood Risk Assessment Audit

# 2.0 Assessment of adopted soil parameters

The ground investigation carried out by Sub Surface South East Ltd generally encountered a moderate thickness of made ground overlying the Claygate Member of the London Clay.

The made ground comprised dark and light orange-brown mottled gravelly sandy silty clay and gravelly sand with clinker and fragments of brick, coal and concrete and extended to a depth of 1.9 m below existing basement level. Asbestos fragments were noted within Borehole No M1 from a depth of 0.40 m.

The Claygate Member was found to comprise firm becoming stiff brown and occasional grey mottled silty clay to the full depth of the borehole, of 5.45 m. This stratum was noted as becoming stiff at around 5.0 m depth.

The SDC by MMP Design has adopted an angle of friction of  $30^{\circ}$  and what is assumed to be a bulk density of 18 kN/m<sup>3</sup> for the underlying Claygate Member, although the latter parameter was not named within the 'Soil Conditions & Foundations' section of the report. The Claygate Member is a material that is well known and extensively tested throughout the industry and on this basis, a friction

angle of around  $24^{\circ}$  to  $25^{\circ}$  is considered to be reasonable for this type of material. This should, however, be confirmed by carrying out a cable percussion borehole to an appropriate depth.

# **3.0** Trial Pit Findings

Two trial pits were excavated by others within the existing basement and also external to No 31 Heath Drive and these were subsequently logged by an engineer from GEA. The findings of the trial pits are summarised in the table below. Sketches and photographs of each pit are appended to this letter.

Trial Pit No	Structure	Foundation detail	Bearing Stratum
1	Within existing basement	Concrete footing Top 0.04 m Base not proved – foundation extended to 0.65 m depth	MADE GROUND (orange-brown clayey sand with brick, flint gravel and flint cobbles)
2	External	Three brick corbels over a concrete footing Top 1.00 m Base not proved – foundation extended to 1.40 m depth Lateral projection 260mm	MADE GROUND (orange-brown sandy clay with ash, clinker, a band of black sand and gravel of ash)

We trust the above is acceptable, please do not hesitate to contact us if you have any questions.

# Yours sincerely GEOTECHNICAL & ENVIRONMENTAL ASSOCIATES

- an ser

Caroline Anderson *Encs* 

# **Countersignatures:**

Steve Branch BSc MSc CGeol FGS FRGS MIEnvSc - engineering geologist

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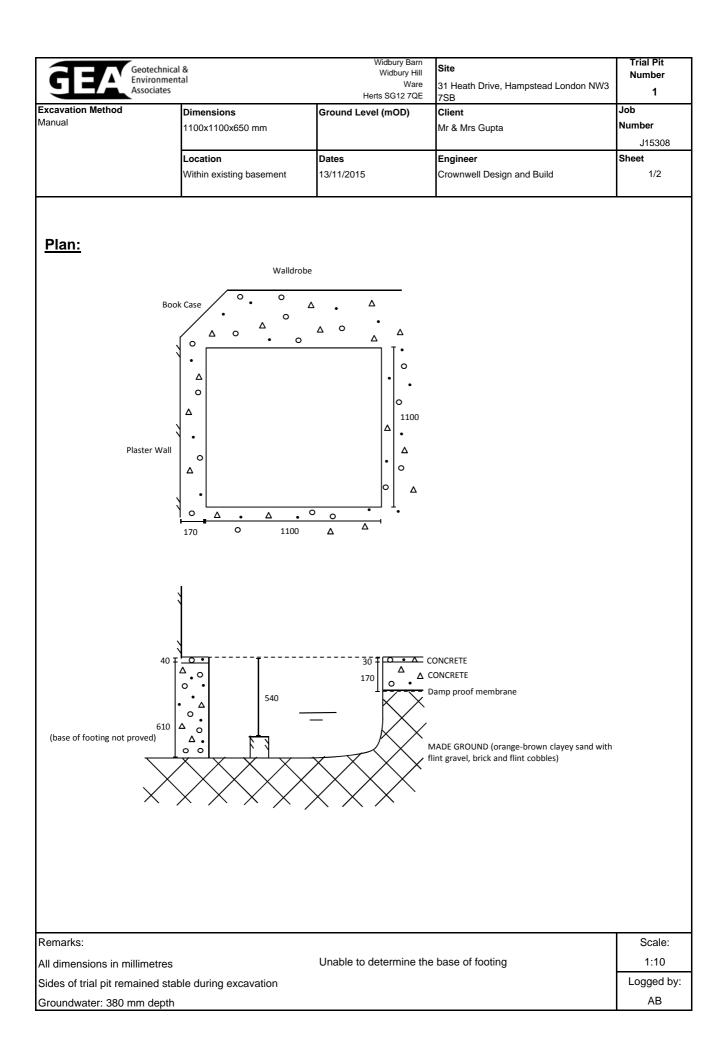
Martin Cooper BEng CEng MICE FGS - chartered engineer with ground engineering expertise

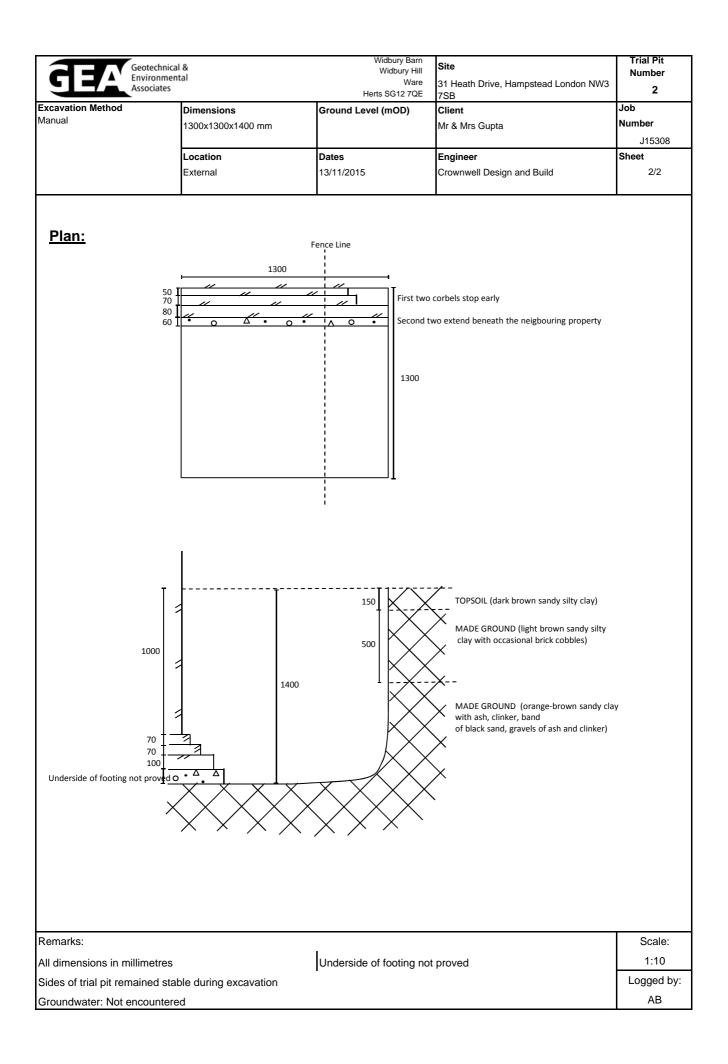
John Bran .

John Evans MSc FGS CGeol - hydrogeologist

2 WY Em

Rupert Evans MSc CEnv CWEM MCIWEM AIEMA – surface water expert





# Transport for London London Underground



London Underground Infrastructure Protection

3<sup>rd</sup> Floor Albany House 55 Broadway London SW1H 0BD

www.tfl.gov.uk/tube

Your ref: J15308 Our ref: 20403-SI-1-151215

Susan Connor Geotechnical and Environmental Associates SusanConnor@gea-ltd.co.uk

15 December 2015

Dear Susan,

# 31 Heath Drive London NW3

Thank you for your communication of 10<sup>th</sup> December 2015.

I can confirm that London Underground has no assets within 50 metres of your site as shown on the plan you provided.

If I can be of further assistance, please contact me.

Yours sincerely

# Shahina Inayathusein

Information Manager Email: locationenquiries@tube.tfl.gov.uk Direct line: 020 7918 0016

> London Underground Limited trading as London Underground whose registered office is 55 Broadway London SW1H 0BD

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Geotechnical & Environmental Associates

WARE SG12 7QE

Search address supplied 31 Heath Drive London NW3 7SB

Your reference

J15308

Our reference

ALS/ALS Standard/2015\_3214831

Search date

10 December 2015

You are now able to order your Asset Location Search requests online by visiting www.thameswater-propertysearches.co.uk



Thames Water Utilities Ltd, Property Searches, PO Box 3189, Slough SL1 4W, DX 151280 Slough 13 T0845 070 9148Esearches@thameswater.co.uk I www.thameswater-propertysearches.co.uk



Search address supplied: 31, Heath Drive, London, NW3 7SB

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 0845 070 9148, or use the address below:

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

Email: <u>searches@thameswater.co.uk</u> Web: <u>www.thameswater-propertysearches.co.uk</u>

<u>Thames Water Utilities Ltd</u>, Property Searches, PO Box 3189, Slough SL1 4W, DX 151280 Slough 13 T0845 070 9148<u>Esearches@thameswater.co.uk</u> I <u>www.thameswater-propertysearches.co.uk</u>



# 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

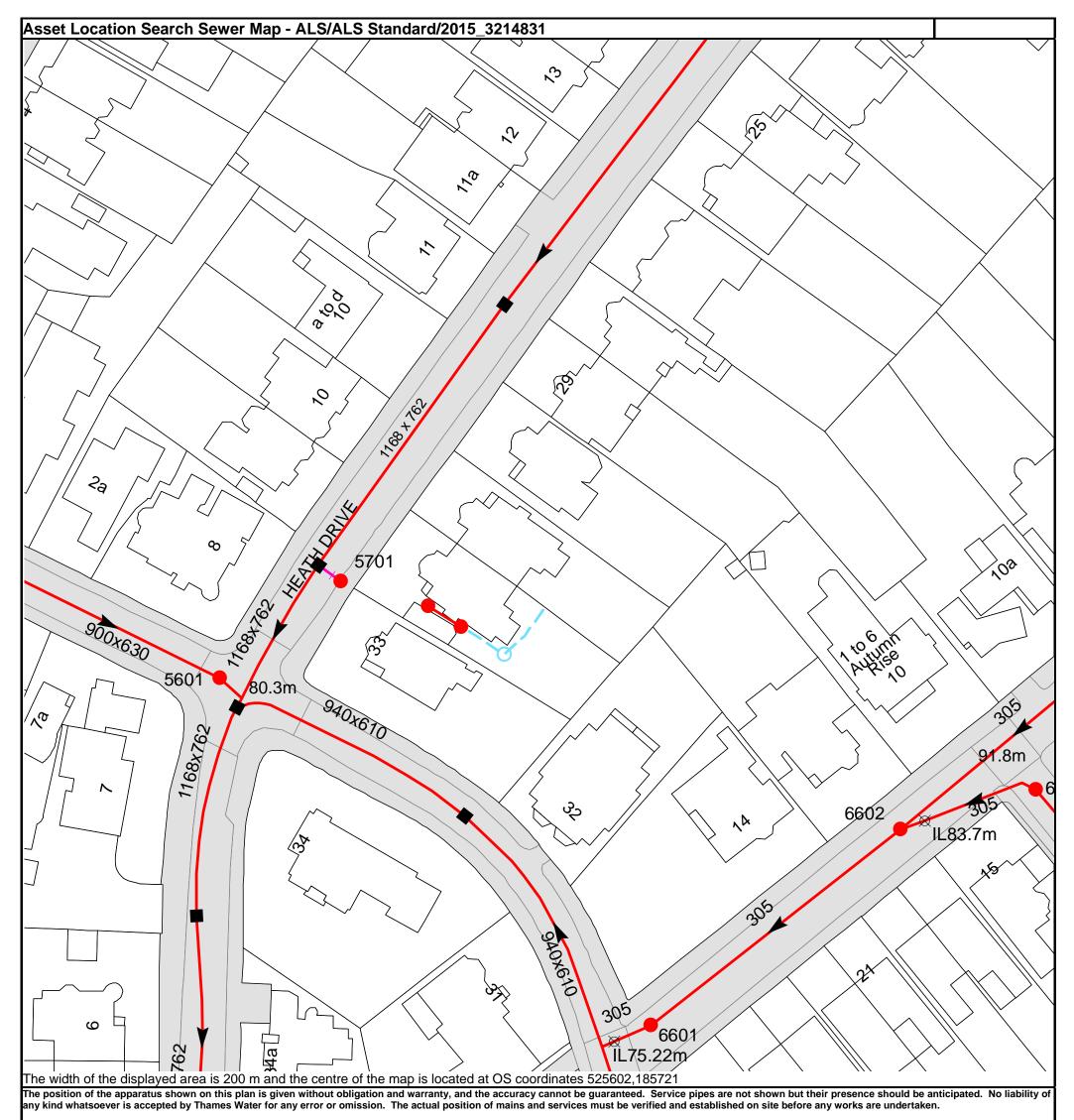
Tel: 0845 850 2777 Email: developer.services@thameswater.co.uk

### **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: 0845 850 2777 Email: developer.services@thameswater.co.uk

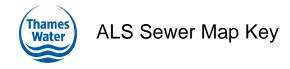


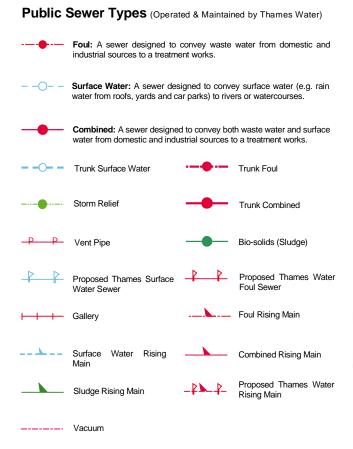
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Manhole Reference	Manhole Cover Level	Manhole Invert Level
5601	79.9	76.07
5701	n/a	n/a
57BG	n/a	n/a
57BF	n/a	n/a
57BE	n/a	n/a
6601	84.61	76.78
6602	89.56	83.55
6603	91.27	84.07

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.





# 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

Meter

X

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O 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

Outfall

Inlet

Undefined End

member of Property Insight on 0845 070 9148.

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.

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

# **Other Symbols**

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

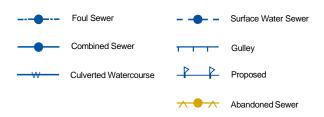
- ▲ / ▲ Public/Private Pumping Station
- \* Change of characteristic indicator (C.O.C.I.)
- Ø Invert Level
- Summit

#### 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)



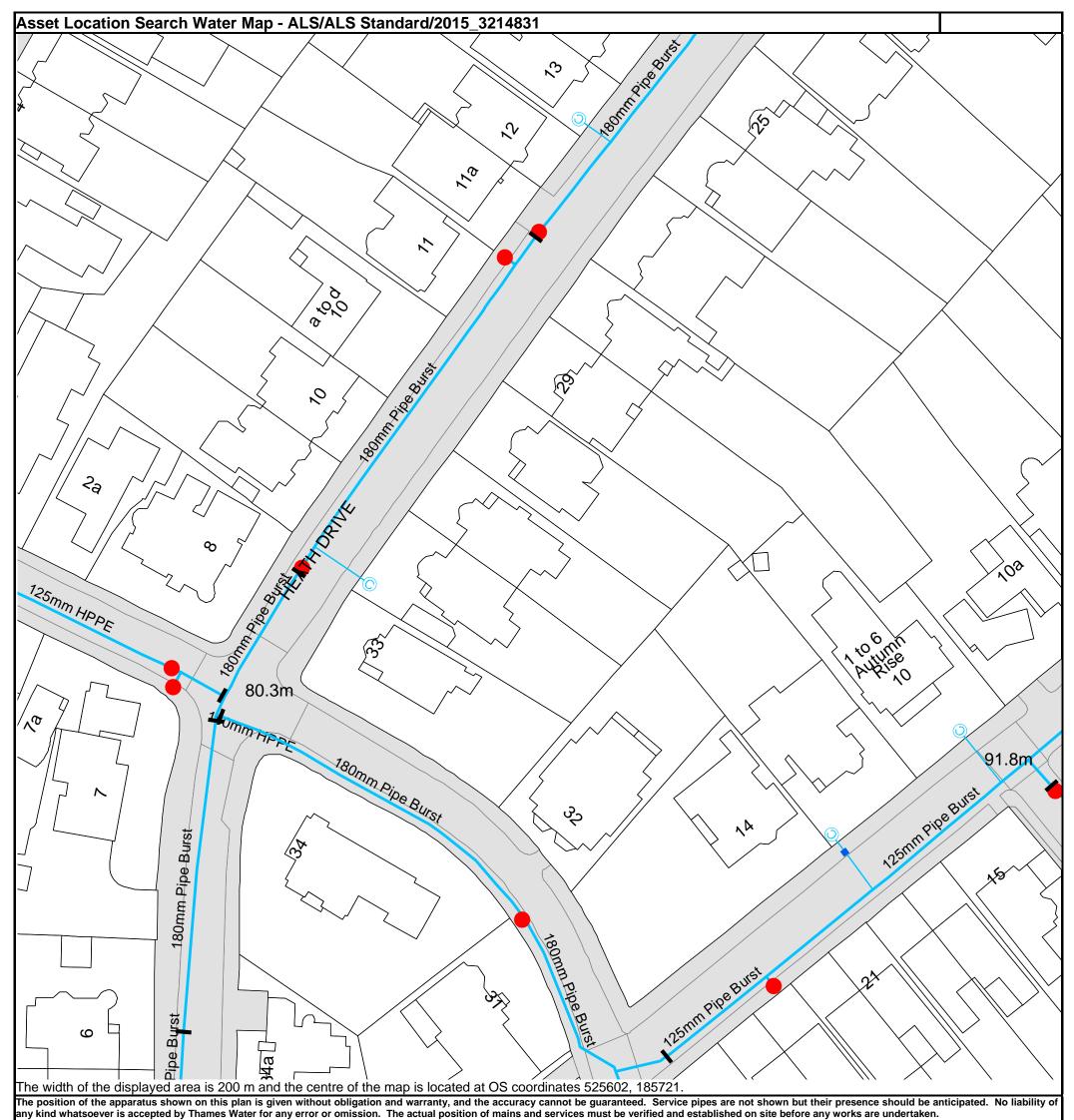
#### Notes:

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

2) All measurements on the plans are metric.

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

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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.

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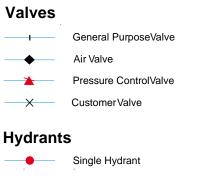


# ALS Water Map Key

# Water Pipes (Operated & Maintained by Thames Water)

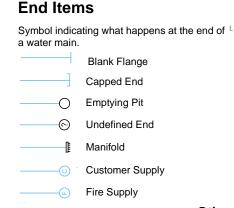
- Distribution Main: The most common pipe shown on water maps.
   With few exceptions, domestic connections are only made to distribution mains.
- Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main 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 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')	



# Meters

# \_ \_ \_ \_



# **Operational Sites**



# **Other Symbols**

Data Logger

#### 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.

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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.

Credit Card	BACS Payment	Telephone Banking	Cheque
Call <b>0845 070 9148</b> 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 <b>90478703</b> Sort code <b>60-00-01</b> and your invoice number	Made payable to ' <b>Thames</b> 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

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- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practise and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

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Firms which subscribe to the Search Code will:

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- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that products and services comply with industry registration rules and standards and relevant laws
- monitor their compliance with the Code

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If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if he finds that you have suffered actual loss as a result of your search provider failing to keep to the Code.

# Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

## **TPOs Contact Details**

The Property Ombudsman scheme Milford House 43-55 Milford Street Salisbury Wiltshire SP1 2BP Tel: 01722 333306 Fax: 01722 332296 Email: <u>admin@tpos.co.uk</u>

You can get more information about the PCCB from www.propertycodes.org.uk

# PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE