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**Status:** Drainage Strategy Report  
**Date:** 04/06/2015  
**Revision:** A  
**Job no:** 1232  
**Prepared by:** Kelly Harrison  
**Approved by:** Andy Heyne

## 1 Introduction

This drainage strategy report has been prepared by Heyne Tillett Steel Ltd (HTS), on behalf of our client London and Regional Properties, to support a detailed planning application for the redevelopment of Marine Ices, Haverstock Hill, London NW3.

The purpose of this report is to analyse the pre and post development surface water run-off rates from the development site.

The post development surface run-off rates are to be reduced to 50% of pre development rates in accordance with the London Plan to reduce the risk of flooding within, and in the vicinity of, the site. Reduction in the post-development runoff-rates will also minimise the impact from t on the existing sewer network.

Sustainable Urban Drainage Systems (SUDS) features are to be incorporated into the post-development design so that the post-development surface water run-off rates are reduced.

Attenuation for the restricted surface water run-off will also be required for up to and including the 1 in 100 year storm event including 30% for climate change.

## 2 Development Area Summary

The total development area is 717m<sup>2</sup> with the pre development area consisting of roofs and an access road which is deemed to be entirely impermeable.

The proposed development area is proposed to also be covered with an impermeable surface.

## 3 Public Sewers

Thames Water are the local sewerage undertaker for the area which means they would typically be responsible for the operation and maintenance of infrastructure around the development site.

The public sewer has been described using asset records obtained from Thames Water. These plans have been reproduced in Appendix A.

The development site benefits from a public combined water sewer to the east along Crogsland Road and south along Haverstock Road.

The sewer along Crogsland Road is identified to be a 305 nominal diameter pipe which flows from north to south. The approximate invert level of that pipe has been taken from the average of two manholes; Manhole 2403 and 2401. Manhole 2401 is identified to have a back-drop at an invert level of 26.63m and therefore the average approximate invert level along the pipe is 27.44m.

Haverstock hill is identified to have a culvert sized at 1422 x 838 which flows from west to east. The approximate invert level of 25.00m

## 4 Pre Development Surface Water Run-off Rates

As discussed in section 2 above, the pre development area is deemed to be impermeable. Therefore, the pre-development surface water run-off rates based on the impermeable area of 717m<sup>2</sup> are as follows:

Q <sub>1</sub>	-	9.3 l/s
Q <sub>30</sub>	-	22.6 l/s
Q <sub>100</sub>	-	29.7 l/s

A copy of the pre-development discharge rate calculations can be found attached in Appendix C.



## 5 Required Post Development Surface Water Run-off Rates

The post development site is required to meet the London Plan by achieving a 50% betterment in the surface water discharge rate.

Q <sub>1</sub>	-	4.65 l/s
Q <sub>30</sub>	-	11.3 l/s
Q <sub>100</sub>	-	14.85 l/s

## 6 Climate Change

In considering flood risk to the site, it is necessary to fully consider the potential impacts of climate change for the lifetime of the development within the mitigation measures. PPG Section 7 states that 'Residential' development should be considered for a minimum of 100 years' (up to 2145).

The EA's 'Climate Change Allowances for Planners' guidance (which supports the NPPF) provides contingency allowances for potential sea level rise in Table 1 and for potential increases in peak river flow and rainfall intensity in Table 2 (it is noted that these allowances are consistent with the figures previously provided in the Technical Guidance to the NPPF and PPS25).

In accordance with Table 2 and PPG Section 7, a climate change allowance of 30% has been used within the Preliminary Drainage Strategy to allow for an increase in rainfall intensity for the lifetime of the development.

## 7 Drainage Strategy Analysis

### Design Principles for Surface Water Management

Key design principles in the following guidance documents steer the approach to managing surface water runoff at the site:

- The London Plan
- London Borough of Camden – Core Strategy
- Building Regulations hierarchy of drainage (H3);
- Interim Code of Practice for SUDS;
- CIRIA best practice guidance, including the use of the 'SUDS management train';
- Flood and Water Management Act 2010 (Part 1 – Clause 27 (1));
- Flood and Water Management Act 2010 (Part 1 – Clause 9 (1));
- 8 Surface Water Management and SuDS features

A copy of the proposed drainage strategy is produced in Appendix B.

As a result of climate change, rainfall is proposed to increase by 30%. This additional 30% of rainfall as well as the 50% bettered discharge rates requires for SuDS devices to be used on site to manage the additional volume of water.

Surface water can be managed in a number of ways in line with the SuDS hierarchy. Infiltration is not feasible due to the existence of a basement development and the anticipated ground conditions therefore is ruled out at this stage.

Attenuation measures are deemed the most feasible options for managing surface water on site.

Surface Water is proposed to be captured on the roof of the building and is conveyed via rainwater pipes down to the first floor level and discharged into a shallow attenuation device which will store water until completely empty at a restricted discharge rate into the public sewer using the existing outfalls on site. Flow control devices can be used to restrict the discharge rate. A hydrobrake device has been used for the preliminary drainage strategy. This type of device has flow controls which are self-activating, relying on upstream hydraulic head to generate an air filled vortex within the center of the casing. This air filled core occupies the majority of the outlet restricting the flow. The vortex generates high peripheral velocities which further restrict the flow and create a back-pressure. This back-pressure restricts the flow to the periphery of the outlet orifice. A number of different flow control systems and attenuation can be used instead of the aforementioned option and this is recommended to be explored in greater detail at later stages.

There are no significant surface water flows anticipated to be captured at ground level. No surface water flows are thought to be generated at basement level.

Appendix D contains the output results for Attenuation volumes required in order to store surface water on site until it can be discharged into the public sewer. The results have been produced on industry approved software (Microdrainage) using the quick storage estimate module.

Approximately  $6.6\text{m}^3 - 19\text{m}^3$  is required; the attenuation devices will be installed at first floor level external area and for the purposes of the preliminary drainage strategy, the maximum storage amount has been used to remain conservative ( $19\text{m}^3$ ). Using a 0.3m depth attenuation tank, a total area of  $66.5\text{m}^2$  is required to provide adequate means of storage (the size also accounts for a 95% void ratio of a typical cellular storage module). The tank has been sized to accommodate the 100Yr + 30% climate change storm event. The volumes and type of attenuation device may vary during the detail design stages once storage within the network pipes and manholes have also been considered as part of the overall drainage design. This is to be explored in greater detail at later stages.

Surface water flows, once restricted through the hydrobrake device is proposed to discharge to ground level using a downpipe into a ground floor combined water drainage network where the flows would discharge under gravity into a public sewer via a new connection along Crogsland Road. There is only a requirement for a single outfall connection however this is to be assessed in greater detail at later stages. Liaison with Thames Water regarding sewer connections is to be applied for upon grant of the planning permission.

The final outfall combined sewer manhole should be fitted with a non-return flood valve to prevent surcharged public sewers from flooding the development site. This is anticipated to protect the private surface water network.

Regular maintenance of the aforementioned non-return flood valve and all other proposed SUDS devices should be carried out in line with the manufactures recommendations.

## 8 Preliminary Foul Water Drainage Strategy

Foul water generated from the site is proposed to be conveyed to the ground floor and discharged into a combined water sewer network. Foul flows are then proposed to be discharged under gravity into the public sewer via the new single connection on Crogsland Road as mentioned in the surface water management strategy.

Any foul water flows at basement level and lower should be pumped to the ground floor combined sewer network and discharged under gravity into the public sewer. The pump type and specification is to be confirmed at later stages.

The proposed foul flows into the public sewer are to be agreed with Thames Water by completing a pre-development enquiry.

## 9 Conclusion

This drainage strategy report has been prepared by Heyne Tillett Steel LLP (HTS), on behalf of our client, to support a detailed planning application for the redevelopment of Marine Ices, Haverstock Hill, London NW3.

The post development site is required to meet the London Plan by achieving a 50% betterment in the surface water discharge rate.

The surface water management strategy considers the SUDS hierarchy and as a result, attenuation is found to be the most feasible option for this type of development, providing  $19\text{m}^3$  at first floor level.

The attenuation should be designed to accommodate the 100Yr + 30% climate change storm event.

Rain water pipes should be placed as close to the location of the tank location as shown in the preliminary drainage strategy (Appendix B). This is to be confirmed at detail design stages.

The surface water management strategy demonstrates that the development can effectively manage the surface water for the design life of the building and therefore is safe in terms of surface water management.

# Appendix A

Thames Water Sewer

# Asset Location Search



Atkins Telecoms  
Stats Enquiries Team, The Hub, 5 Aztec West, Almonds,

BRISTOL  
BS32 4RZ

**Search address supplied** Haverstock Hill, London  
NW3 2BL

**Your reference** LM 33749  
**Our reference** ALS/ALS Standard/2014\_2885952  
**Search date** 13 October 2014

You are now able to order your Asset Location Search requests online by visiting  
[www.thameswater-propertysearches.co.uk](http://www.thameswater-propertysearches.co.uk)



# Asset Location Search



**Search address supplied:** Haverstock Hill, London, NW3 2BL

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 0845 070 9148, or use the address below:

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

Email: [searches@thameswater.co.uk](mailto:searches@thameswater.co.uk)  
Web: [www.thameswater-propertysearches.co.uk](http://www.thameswater-propertysearches.co.uk)

# Asset Location Search



## 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

# Asset Location Search



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.



# Asset Location Search



## 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

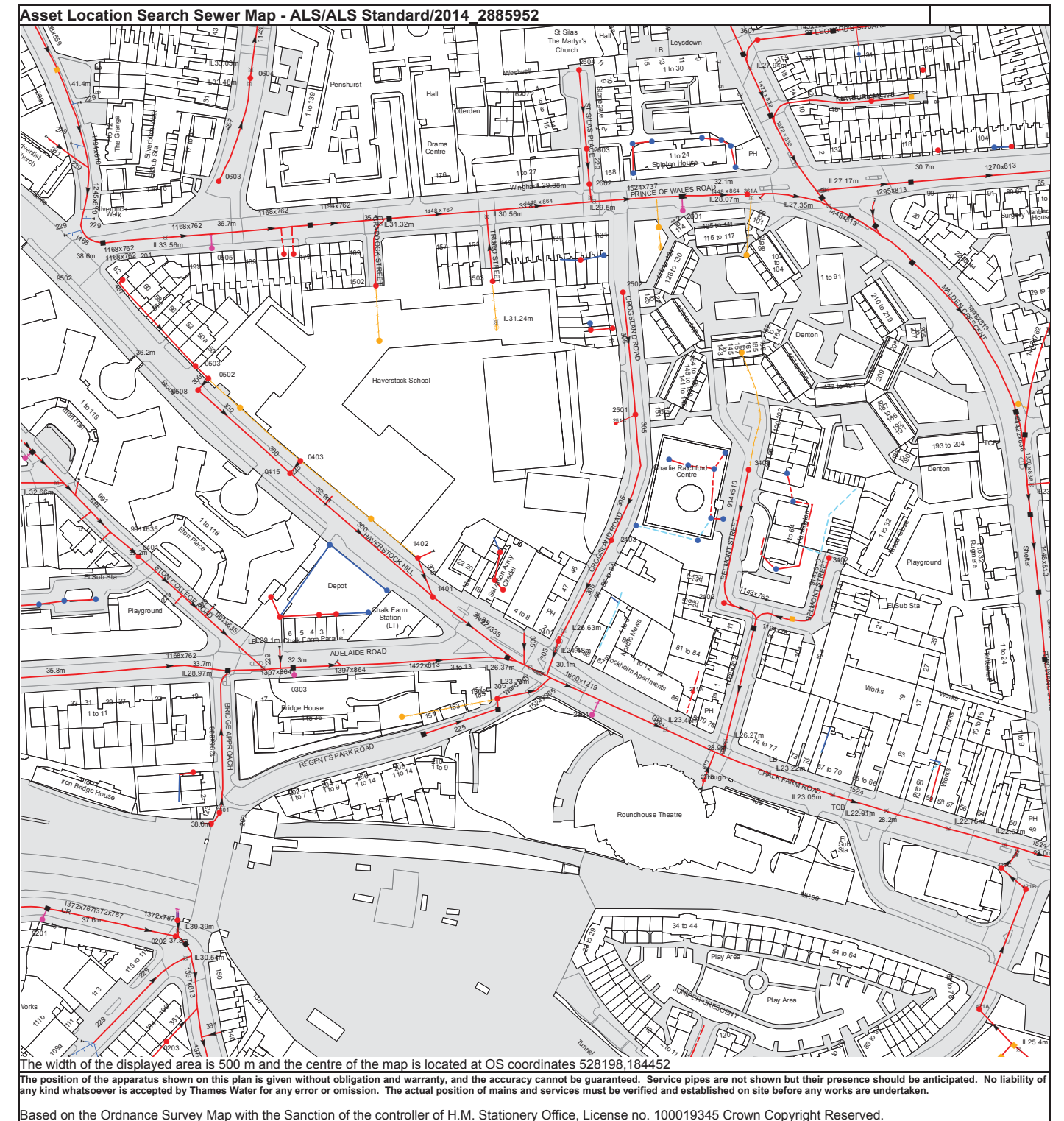
Tel: 0845 850 2777  
Email: [developer.services@thameswater.co.uk](mailto:developer.services@thameswater.co.uk)

### 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](mailto:developer.services@thameswater.co.uk)



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
36FD	n/a	n/a
36EB	n/a	n/a
46CJ	n/a	n/a
46CI	n/a	n/a
2601	n/a	n/a
26BH	n/a	n/a
26CA	n/a	n/a
24CH	n/a	n/a
26CB	n/a	n/a
26BF	n/a	n/a
361A	n/a	n/a
3607	n/a	n/a
3606	31.15	28.37
9401	n/a	n/a
94BI	n/a	n/a
94BJ	n/a	n/a
94CA	n/a	n/a
9502	37.1	35.88
0401	35	31.73
0503	n/a	n/a
0508	34.63	32.85
0502	34.89	33.53
0505	n/a	n/a
0603	36.8	35.2
0604	37.04	n/a
04BJ	n/a	n/a
04BH	n/a	n/a
0506	n/a	n/a
0415	33.15	30.98
0507	n/a	n/a
0403	n/a	n/a
04BG	n/a	n/a
04BI	n/a	n/a
04BF	n/a	n/a
14BF	n/a	n/a
1502	n/a	n/a
14BG	n/a	n/a
1402	n/a	n/a
1401	31.06	27.24
1503	n/a	n/a
14BB	n/a	n/a
14BA	n/a	n/a
14BC	n/a	n/a
2401	30.19	n/a
2604	33.43	32.52
25CC	n/a	n/a
2603	n/a	n/a
2602	n/a	n/a
25AJ	n/a	n/a
25BA	n/a	n/a
25CB	n/a	n/a
2403	30.82	28.25
25BB	n/a	n/a
251A	n/a	n/a
2502	32.8	30.44
26BJ	n/a	n/a
26BG	n/a	n/a
2501	31.9	29.5
24BI	n/a	n/a
26BI	n/a	n/a
24CB	n/a	n/a
24CC	n/a	n/a
231A	n/a	n/a
24BJ	n/a	n/a
231B	n/a	n/a
24CE	n/a	n/a
24CD	n/a	n/a
24CA	n/a	n/a
2402	29.91	26.52
3403	30.31	27.29
34BF	n/a	n/a
34BB	n/a	n/a
34BC	n/a	n/a
3402	29.85	26.86
421A	n/a	n/a
421C	n/a	n/a
421B	n/a	n/a
0203	n/a	n/a
0202	37.99	30.25
021A	n/a	n/a
9201	n/a	n/a
031A	n/a	n/a
0301	37.57	29.57
03BI	n/a	n/a
2301	n/a	n/a
1302	30.77	26.84
0303	n/a	n/a
361B	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
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 Sewer Map Key

## Public Sewer Types (Operated & Maintained by Thames Water)

	<b>Foul:</b> A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
	<b>Surface Water:</b> A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
	<b>Combined:</b> A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
	<b>Trunk Surface Water</b>
	<b>Trunk Foul</b>
	<b>Storm Relief</b>
	<b>Vent Pipe</b>
	<b>Bio-solids (Sludge)</b>
	<b>Proposed Thames Surface Water Sewer</b>
	<b>Proposed Thames Foul Sewer</b>
	<b>Gallery</b>
	<b>Foul Rising Main</b>
	<b>Surface Water Rising Main</b>
	<b>Sludge Rising Main</b>
	<b>Vacuum</b>

## 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.

	<b>Air Valve</b>
	<b>Dam Chase</b>
	<b>Fitting</b>
	<b>Meter</b>
	<b>Vent Column</b>

## Operational Controls

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

	<b>Control Valve</b>
	<b>Drop Pipe</b>
	<b>Ancillary</b>
	<b>Weir</b>

## 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.

	<b>Outfall</b>
	<b>Undefined End</b>
	<b>Inlet</b>

## 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.

Thames Water Utilities Ltd, Property Searches, PO Box 3189, Slough SL1 4W, DX 151280 Slough 13  
T 0845 070 9148 E searches@thameswater.co.uk I www.thameswater-propertysearches.co.uk

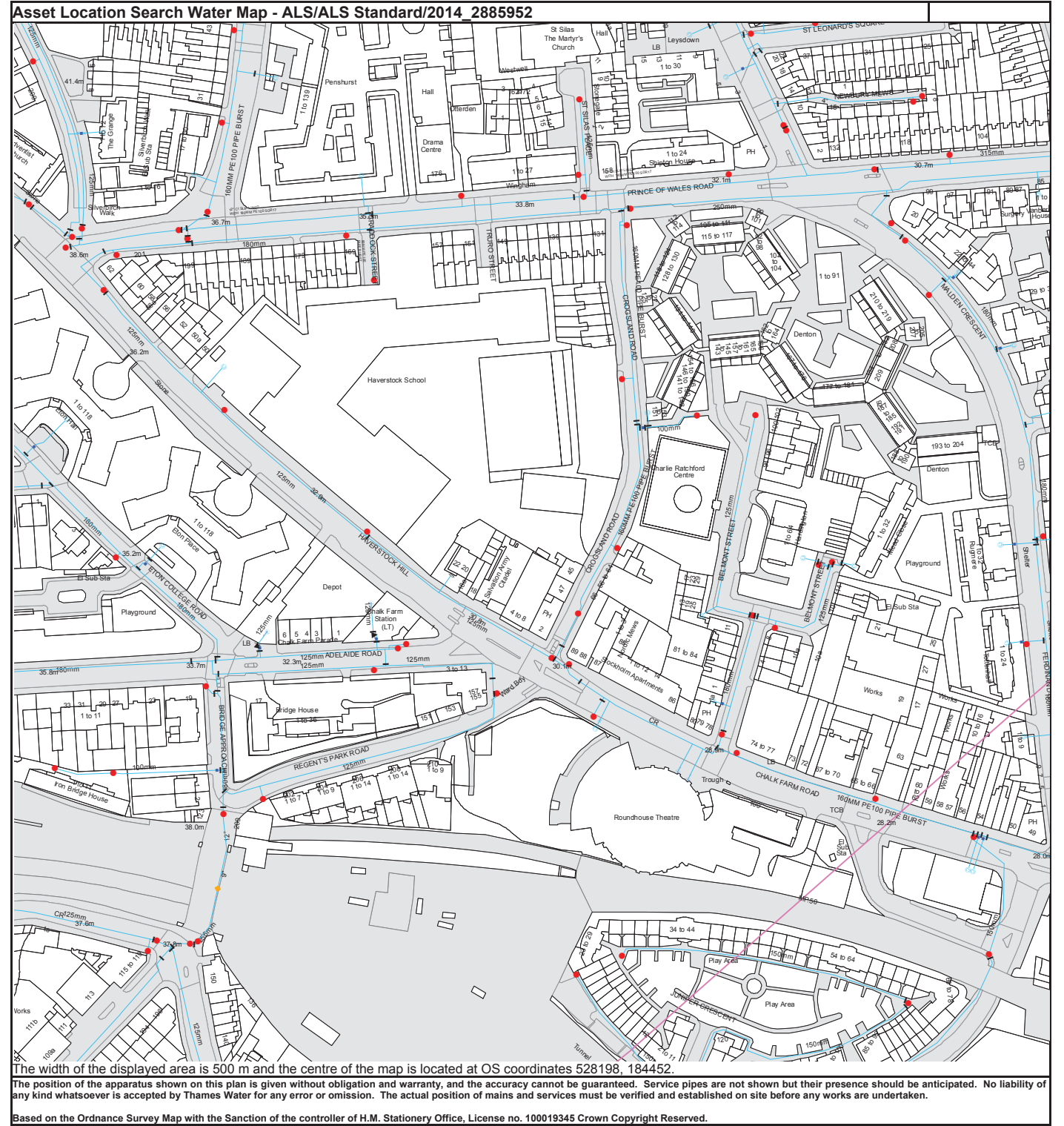
## Other Symbols

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

	<b>Public/Private Pumping Station</b>
	<b>Change of characteristic indicator (C.O.C.I.)</b>
	<b>Invert Level</b>
	<b>Summit</b>
<b>Areas</b>	<b>Lines denoting areas of underground surveys, etc.</b>
	<b>Agreement</b>
	<b>Operational Site</b>
	<b>Chamber</b>
	<b>Tunnel</b>
	<b>Conduit Bridge</b>

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

	<b>Foul Sewer</b>
	<b>Surface Water Sewer</b>
	<b>Combined Sewer</b>
	<b>Culverted Watercourse</b>
	<b>Gully</b>
	<b>Proposed</b>
	<b>Abandoned Sewer</b>





## 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.

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')

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 T 0845 070 9148 E [searches@thameswater.co.uk](mailto:searches@thameswater.co.uk) I [www.thameswater-propertysearches.co.uk](http://www.thameswater-propertysearches.co.uk)

### Operational Sites

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

### Other Symbols

- Data Logger

### 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

### 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:** Indicates 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.

- All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
- Provision of service will be in accordance with all legal requirements and published TWUL policies.
- 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.
- Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
- In case of dispute TWUL's terms and conditions shall apply.
- 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'.
- Interest will be charged in line with current Court Interest Charges, if legal action is taken.
- 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](mailto: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 him 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 <b>0845 070 9148</b> quoting your invoice number starting CBA or ADS.	Account number <b>90478703</b> Sort code <b>60-00-01</b> A remittance advice must be sent to: <b>Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.</b> or email <a href="mailto:ps.billing@thameswater.co.uk">ps.billing@thameswater.co.uk</a>	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 Water Utilities Ltd</b> ' Write your Thames Water account number on the back. Send to: <b>Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW</b> or by DX to <b>151280 Slough 13</b>

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



## Search Code

### **IMPORTANT CONSUMER PROTECTION INFORMATION**

This search has been produced by Thames Water Property Searches, Clearwater Court, Vastern Road, Reading RG1 8DB, which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

#### **The Search Code:**

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- 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.

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

#### **The Code's core principles**

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- 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

#### **Complaints**

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: [admin@tpos.co.uk](mailto:admin@tpos.co.uk)

You can get more information about the PCCB from [www.propertycodes.org.uk](http://www.propertycodes.org.uk)

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



# Appendix B

Preliminary Drainage Strategy

All drainage shall comply with the typical drainage construction details and the requirements of BS EN 752.

Access covers and frames shall comply with the loadings specified and to BS EN 124 and kitemarked or if recessed covers are specified then in accordance with FACTA association equivalent.

The proposed building outlines shown on this drawing are for information only. Refer to Architects plans for precise location setting out information and details.

All drainage pipework shown shall be 100mm diameter unless noted otherwise.

All underslab drainage shall be laid at gradients of 1:40 min. for foul pipework and 1:80 min. for surface water unless noted otherwise.

All underslab drainage shall be clear of foundations unless shown otherwise with long radius bends kept to a minimum and used where unavoidable.

At least one soil pipe at the head of each foul run shall be vented to the atmosphere.

All gutters shall be fitted with a leaf filter at each outlet to reduce the risk of blockage.

All rainwater downpipes shall be accessible above ground for rodding purposes.

Any part of the existing drainage system to be retained as part of the new scheme shall be cleaned and inspected by CCTV survey. Any structural defects shall be repaired or replaced as may be required using appropriate and approved methods.

Where existing access locations are to be retained the cover and frames shall be checked to ensure they are of a suitable duty for reuse and levels adjusted to suit proposed finished ground levels.

All internal access covers shall be recessed, double sealed and lockable.

Cover levels shown on this drawing are approximate and shall be adjusted to suit finished pavement levels on site by Contractor. Covers shall be orientated to suit pavement finishes where appropriate.

All private drainage pipework for foul and surface water systems have been designed on the basis of UPVC to BS EN 1401-1, unless noted otherwise.

All adoptable drainage pipework for foul and surface water systems have been designed on the basis of clayware, concrete or plastic to comply with Sewers for Adoption 6th Edition.

Concrete encasement of the pipework shall be required where the vertical clearance between two pipes crossing is less than 300mm

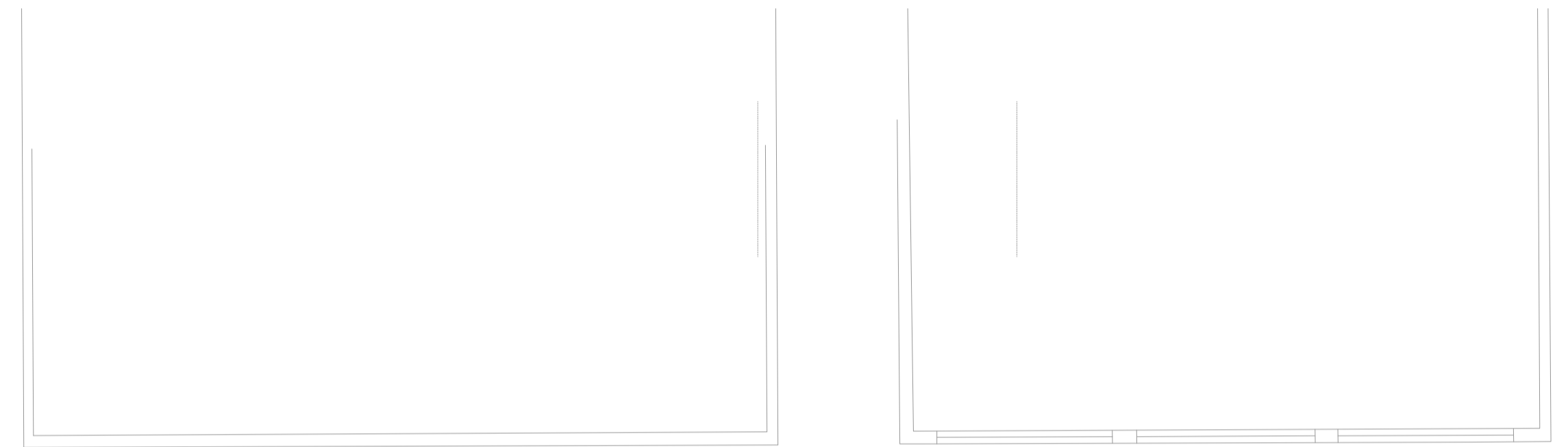
All existing drainage shall be assumed to be 'live' and shall be maintained at all times during the works. Existing drainage shall be reconnected to the new drainage system unless proven to be redundant for abandonment. All existing drainage to be abandoned shall be sealed by appropriate means.

All drainage connecting to the public sewer network shall not commence until receipt of the approval from the drainage authority and shall comply with requirements using vitrified clay pipework to BS EN 295 with plain sleeved or socketed flexible joints subject to their approval.

Where drainage works are carried out in the public highway the relevant necessary approvals and road opening notices shall be obtained from the highway authority and utility companies.

Upon completion all new drainage installation together with any existing drainage retained shall be jetted and CCTV surveyed upon completion. Contractor to ensure that the drainage system is fully operational, free of excess debris/silt and all identified faults rectified.

**HEALTH & SAFETY:** Future works shall be carried out by specialist competent and experienced contractors. All operatives shall have received full and appropriate training with appropriate qualifications for the operations they are required to undertake. All work shall be carried out in accordance with the relevant Health & Safety Regulations.



SURFACE WATER ATTENUATION TANK  
SIZED TO STORE 100Yr+30% CLIMATE  
CHANGE RAINFALL EVENT.  
CELLULAR STORAGE DIMENSION  
DEPTH - 0.3m  
WIDTH - 13.0m  
LENGTH - 5.0m  
MINIMUM STORAGE REQUIRED = 19.5m<sup>3</sup>  
IL: 34.200m

FLOW CONTROL CHAMBER  
HYDROBRAKE OR SIMILAR APPROVED  
RESTRICTED RATE: 14.85 litres/second  
DESIGN HEAD: 0.3m  
IL: 34.200m

RAIN WATER STACK TO GROUND  
FLOOR LEVEL

NEW SURFACE WATER PIPE AT  
GROUND FLOOR LEVEL

NEW COMBINED WATER  
MANHOLE AT GROUND FLOOR  
LEVEL FITTED WITH A NON  
RETURN ANTI FLOOD VALVE TO  
PREVENT THE BACKFLOW OF  
SURCHARGED PUBLIC SEWERS

NEW CONNECTION INTO THAMES  
WATER COMBINED SEWER

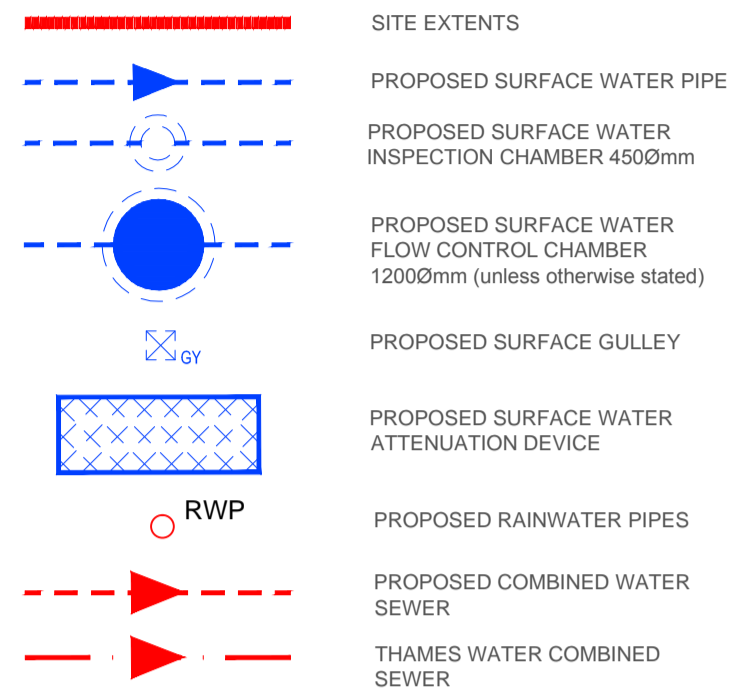
INDICATIVE LOCATION OF  
SEWER ALONG CROSSLAND  
ROAD

APPROXIMATE INVERT LEVEL  
27.440m

3050 - AS PER THAMES WATER RECORDS

- This Drawing is to be read in conjunction with all relevant Architect's Engineer's and specialists' drawings and specifications.
- Do not scale from this drawing in either paper or digital form. Use written dimensions only. To check drawing has been printed to the intended scale the above bar should be 100mm long @A1 or 50mm long @ A3.

**LEGEND**



This Drawing is for planning purposes only and is subject to change.

The drawing has been produced to illustrate a feasible option for the management of surface water for the development site. The strategy can be achieved in more than one way and other more cost effective options can be explored at detail design stages.

This drawing does not show co-ordination at this stage and therefore it should be explored in greater detail at design stages.

Surface water is not anticipated to be collected at ground and sub-ground level.

Foul water is not shown on this drawing because it is managed at ground floor. Foul water at ground level will be discharged via gravity into the public sewer.

All below ground level should be pumped up to ground level and then discharged via gravity to the public sewer.

SITE AREA: 717m<sup>2</sup>

RETURN PERIOD	PRE-DEVELOPMENT RUN-OFF RATE
100 Yr 30min	29.7 l/s
30 Yr 30min	22.6 l/s
1 Yr 30min	9.3 l/s

P1	02.06.15	SK	SK	ISSUED FOR PLANNING
Rev	Date	By	Eng	Amendments

**HEYNE  
TILLET  
STEEL** **STRUCTURAL  
ENGINEERS**  
hts.uk.com

Job Name  
MARINE ICES


Drawing Title  
PRELIMINARY DRAINAGE STRATEGY

Purpose of Issue PLANNING Scale at A1 1:100

Drawing No. 1232-600 Rev. P1

# Appendix C

Pre-development Run-off Rates

Heyne Tillett Steel		Page 1
4 Pear Tree Court London EC1R 0DS	Marine ICES Pre.Development Run-off 100year	
Date 03.06.15 File	Designed by SKanadia Checked by MSymonds	
XP Solutions	Network 2015.1	

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	Add Flow / Climate Change (%)	0
M5-60 (mm)	21.000	Minimum Backdrop Height (m)	0.200
Ratio R	0.436	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	5	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits


Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline 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)	21.000	Storm Duration (mins)	30
Ratio R	0.436		

Heyne Tillett Steel		Page 2
4 Pear Tree Court London EC1R 0DS	Marine ICES Pre.Development Run-off 100year	
Date 03.06.15 File	Designed by SKanadia Checked by MSymonds	
XP Solutions	Network 2015.1	

Summary of Results for 30 minute 100 year Summer (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF  
Analysis Timestep Fine Inertia Status OFF  
DTS Status ON

PN	US/MH Name	US/CL (m)	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
			Level (m)	Depth (m)	Volume (m <sup>3</sup> )				
1.000	1	10.000	5.124	-0.226	0.000	0.27	29.6	OK	
1.001	2	10.000	5.025	-0.225	0.000	0.28	29.7	OK	

Heyne Tillett Steel		Page 1
4 Pear Tree Court London EC1R 0DS	Marine ICES Pre.Development Run-off 1year	
Date 03.06.15 File	Designed by SKanadia Checked by MSymonds	
XP Solutions	Network 2015.1	

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	Add Flow / Climate Change (%)	0
M5-60 (mm)	21.000	Minimum Backdrop Height (m)	0.200
Ratio R	0.436	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	5	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits


Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Storm Duration (mins)	30
Ratio R	0.436		


Heyne Tillett Steel		Page 2
4 Pear Tree Court London EC1R 0DS	Marine ICES Pre.Development Run-off 1year	
Date 03.06.15 File	Designed by SKanadia Checked by MSymonds	
XP Solutions	Network 2015.1	

Summary of Results for 30 minute 1 year Summer (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF  
Analysis Timestep Fine Inertia Status OFF  
DTS Status ON

PN	US/MH Name	US/CL (m)	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
			Level (m)	Depth (m)	Volume (m <sup>3</sup> )				
1.000	1	10.000	5.069	-0.281	0.000	0.09	9.3	OK	
1.001	2	10.000	4.969	-0.281	0.000	0.09	9.3	OK	



Heyne Tillett Steel		Page 1
4 Pear Tree Court London EC1R 0DS	Marine ICES Pre.Development Run-off 30year	
Date 03.06.15 File	Designed by SKanadia Checked by MSymonds	
XP Solutions	Network 2015.1	

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	Add Flow / Climate Change (%)	0
M5-60 (mm)	21.000	Minimum Backdrop Height (m)	0.200
Ratio R	0.436	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	5	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits


Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m <sup>3</sup> /ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	60
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	21.000	Storm Duration (mins)	30
Ratio R	0.436		

Heyne Tillett Steel		Page 2
4 Pear Tree Court London EC1R 0DS	Marine ICES Pre.Development Run-off 30year	
Date 03.06.15 File	Designed by SKanadia Checked by MSymonds	
XP Solutions	Network 2015.1	

Summary of Results for 30 minute 30 year Summer (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF  
Analysis Timestep Fine Inertia Status OFF  
DTS Status ON

PN	US/MH Name	US/CL (m)	Water Surcharged Flooded			Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
			Level (m)	Depth (m)	Volume (m <sup>3</sup> )				
1.000	1	10.000	5.108	-0.242	0.000	0.21	22.6	OK	
1.001	2	10.000	5.009	-0.241	0.000	0.21	22.6	OK	

# Appendix D

Attenuation Estimate

Quick Storage Estimate

Micro Drainage

**Variables**

FSR Rainfall  Cv (Summer)   
 Return Period (years)  Cv (Winter)   
 Region  Impemeable Area (ha)   
 M5-60 (mm)  Maximum Allowable Discharge (l/s)   
 Ratio R  Infiltration Coefficient (m/hr)    
 Safety Factor   
 Climate Change (%)

Analyse OK Cancel Help

Quick Storage Estimate

Micro Drainage

**Results**

**Global Variables require approximate storage of between 6.6 m<sup>3</sup> and 19 m<sup>3</sup>.**

**These values are estimates only and should not be used for design purposes.**

Analyse OK Cancel Help

Enter Climate Change between -100 and 600

