



Key section through roof garden



Royal College Street





# Key section through pavilion







# Key section through Third Floor terrace









Key section through roof garden



Royal College Street





# Key section through pavilion







# Key section through Third Floor terrace







# Appendix B Exceedance Event Overland Flow Plan











# Asset location search



Heyne Tillett Steel Limited LONDON EC1R 0DS

Search address supplied

60-86 **Royal College Street** London NW1 0TH

Your reference 0042 1007

Our reference ALS/ALS Standard/2019 3973568

Search date

22 March 2019

#### Keeping you up-to-date

**Notification of Price Changes** 

From 1 September 2018 Thames Water Property Searches will be increasing the price of its Asset Location Search in line with RPI at 3.23%.

For further details on the price increase please visit our website: www.thameswater-propertysearches.co.uk Please note that any orders received with a higher payment prior to the 1 September 2018 will be non-refundable.



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

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



0845 070 9148



# Asset location search

Search address supplied: 60-86, Royal College Street, London, NW1 0TH

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

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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.

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# Asset location search

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- the public water network.

#### Payment for this Search

A charge will be added to your suppliers account.



• 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

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



<u>Thames Water Utilities Ltd</u>, Property Searches, PO Box 3189, Slough SL1 4WW, DX 151280 Slough 13 T 0845 070 9148 E <u>searches@thameswater.co.uk</u> I <u>www.thameswater-propertysearches.co.uk</u> Page 5 of 12

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
491A	n/a	n/a
4802	21.26	17.29
4901B	21.24	19.17
3702	24.74	19.9
37JE	n/a	n/a
371A	n/a	n/a
37JH	n/a	n/a
3703	n/a	n/a
37AH	n/a	n/a
38CI	n/a	n/a
38CA	n/a	n/a
3814	23.94	n/a
38EI	n/a	n/a
38DF	n/a	n/a
38FD	n/a	n/a
38FE	n/a	n/a
38DI	n/a	n/a
3802	n/a	n/a
38GA	n/a	n/a
4902A	n/a	n/a
The position of the apparatus shown on	this plan is given without obligation and warranty, an	d the accuracy cannot be guaranteed. Service pipes are not
shown but their presence should be antici of mains and services must be verified and	pated. No liability of any kind whatsoever is accepted b d established on site before any works are undertaken.	y Thames Water for any error or omission. The actual position



6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

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.

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#### Other Symbols

Symbole up	-
Symbols us	sed on maps which do not rail under other general categories
🔺 I 📥	Public/Private Pumping Station
-	
*	Change of characteristic indicator (C.O.C.I.)
85	Invest Loval
ũ	Invent Lever
<1	Summit
Areas	
Lines deno	ting areas of underground surveys, etc.
	A
	Agreement
777	Operational Site
	Chamber
	Chamber
200	Tuppe
VERA	- Carrier
	Conduit Bridge
	Conduct Bridge

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

---- Foul Sewer - - Surface Water Sewer Combined Sewer Gulley Culverted Watercourse Proposed Abandoned Sewer

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Paced on the Ordnay	nee Survey Man with the S	anotion of the controllor of	FUM Stationary Office	Liconco no. 100010245	Crown Convright Becorved
Based on the Oruna			I R.W. Stationery Office.	. LICENSE 110. 100013343	CIUWII CUDVIIUIII Reserveu

I-har	Dimen		Mahar	
vater	PIPES (Operated &	Maintained by Thames Water)	valves	
Ŧ	Distribution Main: 1	The most common pipe shown on water maps.		General PurposeValv
	With few exception distribution mains.	is, domestic connections are only made to	+	Air Valve
			-*-	Pressure ControlValv
4	Trunk Main: A main treatment plant or res to another. Also a m	n carrying water from a source of supply to a servor, or from one treatment plant or reservoir ain transferring water in bulk to smaller water	X	Customer Valve
	mains used for supp	liying individual customers.	Hydran	ts
3" 53FPLY	Supply Main: A sup as a supply for a sin	ply main indicates that the water main is used gle property or group of properties.		Single Hydrant
			Meters	
5782	Fire Main: Where a p be displayed along t	pipe is used as a fire supply, the word FIRE will the pipe.		Meter
7 METERED	Metered Pipe: A me supplies water for a quantity of water pas there may be no me	tered main indicates that the pipe in question single property or group of properties and that ssing through the pipe is metered even though ter symbol shown.	End Iter Symbol indic a water main	ns ating what happens at th Blank Flange
	Transmission Tunn	nel: A very large diameter water pipe. Most		Capped End
	tunnels are buried v expected to affect th	very deep underground. These pipes are not e structural integrity of buildings shown on the	0	Emptying Pit
	map provided.			Undefined End
	-			Manifold
	process of being lai	id. More details of the proposed main and its		Customer Supplu
	reference number a	re generally included near the main.	O	Customer Supply
				Fire Supply
	MAMETER	DEPTH BELOW GROUND		
PIPE D	P IF IIIII I IIIII			
Up to 30	00mm (12*)	900mm (3')		
Up to 30	00mm (12*) - 600mm (12* - 24*)	900mm (3') 1100mm (3' 8'')		

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## **Operational Sites**

0	Booster Station
-0-	Other
-0-	Other (Proposed)
-	Pumping Station
-	Service Reservoir
	Shaft Inspection
-0-	Treatment Works
-0-	Unknown
8	Water Tower

Other Symbols

Data Logger

hat happens at the end of  $^{\perp}$ 

- Flange ed End
- ing Pit
- fined End

- mer Supply
- upply

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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#### **Terms and Conditions**

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

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

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

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

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

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

#### Ways to pay your bill

Credit Card	BACS Payment	Telephone Banking	Cheque
Call 0845 070 9148 quoting your invoice number starting CBA or ADS / OSS	Account number 90478703 Sort code 60-00-01 A remittance advice must be sent to: Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW. or email ps.billing@thameswater. co.uk	By calling your bank and quoting: Account number <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: <b>Thames Water Utilities</b> Ltd., PO Box 3189, Slough SL1 4WW or by DX to 151280 Slough 13

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

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#### 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 and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- property professionals
- 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
- monitor their compliance with the Code

#### Complaints

If you have a guery 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 the Ombudsman finds that you have suffered actual loss and/or aggravation, distress or inconvenience 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 Web site: www.tpos.co.uk Email: admin@tpos.co.uk

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

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promotes the best practise and quality standards within the industry for the benefit of consumers and

• enables consumers and property professionals to have confidence in firms which subscribe to the

ensure that products and services comply with industry registration rules and standards and relevant







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ELCUW GROUND (JON ACE WATER)         BELOW GROUND (FOUL WATER)         ABOVE GROUND (FOUL WATER)         ABOVE GROUND (FOUL WATER)         Image: Strain S	ELCW GROUND (FOUL WATER)         BELOW GROUND (FOUL WATER)         ABOVE GROUND (FOUL WATER)         ABOVE GROUND (FOUL WATER)         BELOW GROUND (FOUL WATER)         ABOVE GROUND (FOUL WATER)         WAT WATER METER SVP         GMT GAS METER         VMT WATER METER SING GAS MAIN         GC GREASE TRAP         OTG OPEN TOP GULLY         GP CABLE PIT         GP CABLE PIT         STG SEALED TOP GULLY         CP CATCHPIT         BIG.         SK SINK         WC WATER CLOSET         URINAL         RED, REDUNDANT         F.A.         F.B.         ML MID LEVEL         T.B.         TO BELOW	Performance         DECON GROUND (CONTACE WATER)           BELOW GROUND (FOUL WATER)           ABOVE GROUND (FOUL WATER)           ABOVE GROUND (FOUL WATER)           WAT         WATE WATER           WAT         WATE WATER           WAT         WATER METER           WMT         RISING GAS MAIN           GM         RISING GAS MAIN           GT         GREASE TRAP           OTC         OPEN TOP GULLY           CP         CATCHPT           BIG, BACK INLET CULLY           WHB         WASH HAND BASIN           VC         UPERATIONAL           WC         WATER CLOSET           UR         URINAL           REDUNDANT         F.A.           FROM RBELOW         F.B.           M/L         MID LEVEL           I.A.         TO ABOVE           M/L         MID LEVEL           I.A.         TO BELOW           I.A.         TO BELOW           I.A.         <	Performance     Decom Ground (contract water)       Below Ground (contract water)       ABOVE GROUND (FOUL WATER)       ABOVE GROUND (FOUL WATER)       WAT     WATE WATER METER       WMT     WATER METER       GM RISING GAS MAIN     RG       COPEN TOP GULLY       CP CATCHPT     BIG.       BACK INLET CULLY       MHB WASH HAND BASIN     Cu       COPER     VITRIFIED CLAY       WC WATER CLOSET     UPVC       UR URINAL     UPVC       UR URINAL     FFA       RED. REDUNDANT     T.A.       FA.     FROM ABOVE       H/L     HICH LEVEL       F.B.     FROM BELOW       M/L     MID LEVEL       I.A.     TO BELOW       I.A.     TO BELOW	LEGEND;	RELOW				
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TO BELOW         I// </th <th>ABOVE GROUND (SURFACE WATER)           ABOVE GROUND (FOUL WATER)           ABOVE GROUND (FOUL WATER)           PH         FIRE HYDRANT         WVP         WASTE VENT PIPE           IV         ISOLATION VALVE         RWP         RAINWATER PIPE           WMT         WATER METER         SVP         SOL VENT PIPE           WMT         WATER METER         SVP         SOL VENT PIPE           WM         RISING GAS MAIN         RG         ROAD GULLY           CM         RISING WATER MAIN         G         GOLLY           CBP         CABLE PIT         STG         SEALED TOP GULLY           CBP         CABLE PIT         STG         SEALED TOP GULLY           CH         CATCHPIT         BIG         BACK INLET GULY           MH         MANHOLE         C.I.         CAST RON           WC         WATER CLOSET         UPVC         UNPLASTICISED           VIC         WATER CLOSET         UPVC         UNPLASTICISED           VIC         WATER CLOSET         UPVC         UNPLASTICISED           VIC         URIVAL         FR.         TO ABOVE           RED.         RODINAT         F.A.         FROM BELOW           M/L         MID LEVEL</th> <th></th> <th>- BELOW</th> <th>GROUND</th> <th>(SURFACE</th> <th>WAIER)</th> <th></th>	ABOVE GROUND (SURFACE WATER)           ABOVE GROUND (FOUL WATER)           ABOVE GROUND (FOUL WATER)           PH         FIRE HYDRANT         WVP         WASTE VENT PIPE           IV         ISOLATION VALVE         RWP         RAINWATER PIPE           WMT         WATER METER         SVP         SOL VENT PIPE           WMT         WATER METER         SVP         SOL VENT PIPE           WM         RISING GAS MAIN         RG         ROAD GULLY           CM         RISING WATER MAIN         G         GOLLY           CBP         CABLE PIT         STG         SEALED TOP GULLY           CBP         CABLE PIT         STG         SEALED TOP GULLY           CH         CATCHPIT         BIG         BACK INLET GULY           MH         MANHOLE         C.I.         CAST RON           WC         WATER CLOSET         UPVC         UNPLASTICISED           VIC         WATER CLOSET         UPVC         UNPLASTICISED           VIC         WATER CLOSET         UPVC         UNPLASTICISED           VIC         URIVAL         FR.         TO ABOVE           RED.         RODINAT         F.A.         FROM BELOW           M/L         MID LEVEL		- BELOW	GROUND	(SURFACE	WAIER)	
ABOVE GROUND (SOUNCE MALE)           ABOVE GROUND (FOUL WATER)           FH         FIRE HYDRANT         WVP         WASTE VENT PIPE           IV         ISOLATION VALVE         RWP         RAINWATER PIPE           WMT         WATER METER         SVP         SOL VENT PIPE           GMT         GAS METER         VP         VENT PIPE           GM         RISING WATER MAIN         G         GOLLLY           GM         RISING WATER MAIN         G         RCADLY           GT         GREASE TRAP         OTG         OPEN TOP GULLY           CP         CATCHPIT         BIG.         BACK INLET GULLY           MH         MANHOLE         C.I.         CAST IRON           WHB         WASH HAND BASIN         Cu         COPPER           WC         WATER CLOSET         UPVC         UNPLASTICISED           UR         URINAL         PF         PITCH FIBRE           RE         RODDING EYE         PF         PITCH FIBRE           RED.         REDUNDANT         F.A.         FROM ABOVE           H/L         HIGH LEVEL         F.B.         FROM BELOW           M/L         LOW LEVEL         T.B.         TO BELOW	ABOVE GROUND (FOUL WATER)           ABOVE GROUND (FOUL WATER)           ABOVE GROUND (FOUL WATER)           WM TISOLATION VALVE         RWP           WMT WATER METER         SVP           SOL VENT PIPE           WM RISNO WATER MAIN         G           GMT GAS METER         SVP           SOL VENT PIPE           WM RISNO WATER MAIN         G           GMT GAS MAIN         RG           REAGESE TRAP         OTG           CBP CABLE PIT         STG           SEALED TOP GULLY           CH         CATCHPIT           BIG, BACK INLET GULLY           MH         MANHOLE           CL CATCHPIT         BIG, BACK INLET GULLY           MH         WASH HAND BASIN           VC CUTCHT         COPPER           SK         SINK           VC UNPLASTICISED           POLYNWIL CHLORIDE           RE         RODING EYE           PF         PITCH FIRE           RE         RODING EYE           RED.         REDUNDANT           H/L         HIGH LEVEL           F.B.         FROM BELOW           M/L         MD LEVEL           VL/L         LOW LEVEL	ABOVE GROUND (GOW ACE WATCH)           ABOVE GROUND (FOUL WATER)           PH         FIRE HYDRANT         WVP         WASTE VENT PIPE           WMT         USOLATION VALVE         RVP         RAINWATER PIPE           WMT         WATER METER         SVP         SOL VENT PIPE           WMT         WATER METER         SVP         SOL VENT PIPE           WM         RISING WATER MAIN         G         GULLY           CM         RISING GAS MAIN         RG         ROAD GULLY           CT         CREASE TRAP         OTG         OPEN TOP GULLY           CBP         CABLE PIT         STG         SEALED TOP GULLY           CH         CATCHPIT         BIG.         BACK INLET GULY           MH         MANHOLE         C.I.         CAST RON           WH         WASH HAND BASIN         Cu         COPPER           SK         SINK         V.C.         VIRITED CLAY           WC         WATER CLOSET         UPVC         UPLASTIC/SED           UR         URINAL         PF         PITCH FIBRE           RED.         RODDING EVE         F.B.         FROM BELOW           M/L         MID LEVEL         F.B.         FROM BELOW	ABOVE GROUND (GOW ACE WATCH)           ABOVE GROUND (FOUL WATER)           PH         FIRE HYDRANT         WVP         WASTE VENT PIPE           WM         ISOLATION VALVE         RVP         RAINWATER PIPE           WM         RISING WATER         SVP         SOL VENT PIPE           WM         RISING GAS MAIN         RG         ROAD GULLY           GM         RISING GAS MAIN         RG         ROAD GULLY           GT         GREASE TRAP         OTG         OPEN TOP GULLY           CBP         CABLE PIT         STG         SEALED TOP GULLY           CGP         CATCHPIT         BIG.         BACK INLET GULLY           MH         MANHOLE         C.I.         CAST RON         VC           WH         WASH HAND BASIN         Cu.         COPPER         VX           WC         WATER CLOSET         UPVC         UVPLASTICISED         POLVYNN'L CHURDRE           RE         RODDINA TY         F.A.         TROM ABOVE         PLAH         HGH LEVEL         F.B.         FROM BELOW           M/L         MID LEVEL         T.B.         TO BELOW         L/L         L/L         L/L           IV/L         LOW LEVEL         T.B.         BY         APE		ABOVE	GROUND	(SURFACE	WATER)	
FH     FIRE HYDRANT     WVP     WASTE VENT PIPE       IV     ISOLATION VALVE     RWP     RAINWATER PIPE       WMT     WATER METER     SVP     SOL VENT PIPE       GMT     GAS METER     VP     VENT PIPE       WM     RISING WATER MAIN     G     GULLY       GM     RISING GAS MAIN     RG     ROAD GULLY       GT     GREASE TRAP     OTG     OPEN TOP GULLY       CP     CABLE PIT     STG     SEALED TOP GULLY       CP     CATCHPIT     BIG.     BACK INLET GULLY       MH     MANHOLE     C.I.     CAST IRON       WHB     WASH HAND BASIN     Cu     COPPER       SK     SINK     V.C.     VIRIFED CLAY       WC     WATER CLOSET     UPVC     UNPLASTCISED       UR     URINAL     POLYMINIC CHLORIDE       RE     RODDING EVE     F.A.     FROM ABOVE       H/L     HIGH LEVEL     T.A.     TO ABOVE       H/L     HID LEVEL     F.B.     FROM BELOW       M/L     LOW LEVEL     T.B.     TO BELOW	FH     FIRE HYDRANT     WVP     WASTE VENT PIPE       IV     ISOLATION VALVE     RWP     RAINWATER PIPE       GMT     GAS METER     VP     VENT PIPE       GMT     GAS METER     VENT PIPE     VENT PIPE       GMT     GAS METER     VENT PIPE     VENT PIPE       GMT     GAS METER     GAS METER     VENT PIPE       GMT     GAS METER     GAS METER     GODE     GULY       GBT     GAELE PIT     STG     SEALED TOP GULLY       CBP     CAGLE PIT     STG     SEALED TOP GULLY       CBP     CAGLE PIT     STG     SEALED TOP GULLY       WHB     WASH HAND BASIN     Cu     COPPER     CU       VC     WATER CLOSET     UPV     UNPLASTICISED     POLVINTUCHLORIDE       RED     REDONDANT     T.A.     TO ABOVE     POLVINTUCHLORIDE       M/L     HIGH LEVEL     T.B.     TO BELOW       L/L     LOW LEVEL     T.B.     TO BELOW <th>PH     FIRE HYDRANT     WVP     WASTE VENT PIPE       IV     ISOLATION VALVE     RWP     RAINWATER PIPE       WMT     GAS METER     SVP     SOL VENT PIPE       GMT     GAS METER     VP     VENT PIPE       WM     RISING WATER MAIN     G     GULLY       GM     RISING WATER MAIN     G     GULLY       CM     RISING GAS MAIN     RG     ROAD GULLY       CBP     CABLE PIT     STG     SEALED TOP GULLY       CP     CATCHPIT     BIG     BACK INLET GULLY       WH     MANHOLE     C.I.     CAST RON       WHB     WASH HAND BASIN     Cu     COPPER       WC     WATER CLOSET     UPC     UNPLASTICISED       UR     URINAL     PP     POLYINTL CHLORIDE       RE     RODDING EYE     PF     PTICH FIRE       RED.     REDUNDANT     T.A.     TO ABOVE       H/L     HICH LEVEL     T.B.     TO BELOW       L/L     LOW LEVEL     T.B.     TO BELOW</th> <td>FH     FRE HYDRANT     WVP     WASTE VENT PIPE       IV     ISOLATION VALVE     RWP     RAINWATER PIPE       GMT     GAS METER     SVP     SOL VENT PIPE       GMT     GAS METER     VP     VENT PIPE       GMT     GAS METER     VP     VENT PIPE       GMT     GAS METER     VP     VENT PIPE       GMT     GAS MAIN     RG     GOLULY       GM     RISING GAS MAIN     RG     ROAD GULLY       CBP     CABLE PIT     STG     SEALED TOP GULLY       CP     CATCHPIT     BIG     BACK INLET GULY       MH     MANHOLE     C.I.     CAST RON       WHB     WASH HAND BASIN     Cu     COPPER       VC     WATER CLOSET     UPVC     UNPLASTICISED       VR     WITER CLOSET     UPVC     UNPLASTICISED       VR     WATER CLOSET     UPVC     UNPLASTICISED       VR     WATER CLOSET     UPVC     UNPLASTICISED       VR     WATER CLOSET     PP     PTICH FIRE       RED     RODDING EVE     F.B.     FROM BOVE       M/L     MIO LEVEL     F.B.     FROM BELOW       M/L     MIO LEVEL     T.B.     TO BELOW       IV/L     LOW LEVEL     DESCRIPTION</td> <td></td> <td>ABOVE</td> <td>GROUND</td> <td>(FOUL WAT</td> <td>ER)</td> <td></td>	PH     FIRE HYDRANT     WVP     WASTE VENT PIPE       IV     ISOLATION VALVE     RWP     RAINWATER PIPE       WMT     GAS METER     SVP     SOL VENT PIPE       GMT     GAS METER     VP     VENT PIPE       WM     RISING WATER MAIN     G     GULLY       GM     RISING WATER MAIN     G     GULLY       CM     RISING GAS MAIN     RG     ROAD GULLY       CBP     CABLE PIT     STG     SEALED TOP GULLY       CP     CATCHPIT     BIG     BACK INLET GULLY       WH     MANHOLE     C.I.     CAST RON       WHB     WASH HAND BASIN     Cu     COPPER       WC     WATER CLOSET     UPC     UNPLASTICISED       UR     URINAL     PP     POLYINTL CHLORIDE       RE     RODDING EYE     PF     PTICH FIRE       RED.     REDUNDANT     T.A.     TO ABOVE       H/L     HICH LEVEL     T.B.     TO BELOW       L/L     LOW LEVEL     T.B.     TO BELOW	FH     FRE HYDRANT     WVP     WASTE VENT PIPE       IV     ISOLATION VALVE     RWP     RAINWATER PIPE       GMT     GAS METER     SVP     SOL VENT PIPE       GMT     GAS METER     VP     VENT PIPE       GMT     GAS METER     VP     VENT PIPE       GMT     GAS METER     VP     VENT PIPE       GMT     GAS MAIN     RG     GOLULY       GM     RISING GAS MAIN     RG     ROAD GULLY       CBP     CABLE PIT     STG     SEALED TOP GULLY       CP     CATCHPIT     BIG     BACK INLET GULY       MH     MANHOLE     C.I.     CAST RON       WHB     WASH HAND BASIN     Cu     COPPER       VC     WATER CLOSET     UPVC     UNPLASTICISED       VR     WITER CLOSET     UPVC     UNPLASTICISED       VR     WATER CLOSET     UPVC     UNPLASTICISED       VR     WATER CLOSET     UPVC     UNPLASTICISED       VR     WATER CLOSET     PP     PTICH FIRE       RED     RODDING EVE     F.B.     FROM BOVE       M/L     MIO LEVEL     F.B.     FROM BELOW       M/L     MIO LEVEL     T.B.     TO BELOW       IV/L     LOW LEVEL     DESCRIPTION		ABOVE	GROUND	(FOUL WAT	ER)	
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# GREATER **LONDON** AUTHORITY

	Project / Site Name (including sub- catchment / stage / phase where appropriate)	Royal College Street
	Address & post code	60-86 Royal College Street, NW1 0TH
	OS Grid ref (Easting Northing)	E 529389
S	US UNUTEL (Lasting, Northing)	N 183873
etaile	LPA reference (if applicable)	
1. Project & Site D	Brief description of proposed work	Demo of existing MOT centre to build hospital.
	Total site Area	1190 m <sup>2</sup>
	Total existing impervious area	1190 m <sup>2</sup>
	Total proposed impervious area	760 m <sup>2</sup>
	Is the site in a surface water flood risk catchment (ref. local Surface Water Management Plan)?	no
	Existing drainage connection type and location	combined outfall to combined trunk sewer in Royal College Street
	Designer Name	K Wylie
	Designer Position	Engineer
	Designer Company	Heyne Tillet Steel

	2a. Infiltration Feasibility	
	Superficial geology classification	
	Bedrock geology classification	
	Site infiltration rate	N/A
	Depth to groundwater level	2.48
	Is infiltration feasible?	
	2b. Drainage Hierarchy	
ements		
ange	1 store rainwater for later use	
rge Arr	2 use infiltration techniques, such surfaces in non-clay areas	as porous
d Discha	3 attenuate rainwater in ponds or features for gradual release	open water
roposed	4 attenuate rainwater by storing ir sealed water features for gradual r	n tanks or elease
2. P	5 discharge rainwater direct to a w	atercourse
	6 discharge rainwater to a surface sewer/drain	water
	7 discharge rainwater to the comb	ined sewer.
	2c. Proposed Discharge Details	
	Proposed discharge location	Thames Wat
	Has the owner/regulator of the discharge location been consulted?	Yes - TV



	Made Ground	
	London Clay	
Ά	m/s	
18	m belov	w ground level
	No	
	Feasible (Y/N)	Proposed (Y/N)
	Y	Y
	N	Ν
r	N	N
	Y	Y
	Ν	Ν
	Ν	Ν
	Y	Y
atei	r sewer in Roya	I College Stree

W have confirmed capacity



# GREATER **LONDON** AUTHORITY

	3a. Discharge Rat	tes & Required St	orage		
		Greenfield (GF) runoff rate (l/s)	Existing discharge rate (I/s)	Required storage for GF rate (m <sup>3</sup> )	Proposed discharge rate (I/s)
	Qbar	0.5	$\ge$	$\ge$	$\ge$
	1 in 1	0.43	10.7	18	2.1
	1 in 30	1.16	26.4	33	2.8
	1 in 100	1.6	34.2	42	3.1
	1 in 100 + CC		$\geq$	64	3.7
	Climate change a	llowance used	40%		
rategy	3b. Principal Met Control	hod of Flow	Blue roofs		
e St	3c. Proposed Sul	S Measures			
inag			Catchment	Plan area	Storage
g			area $(m^2)$	$(m^{2})$	vol. $(m^3)$
ā			0.1 0 0. (111 )	. ,	( /
з. D	Rainwater harves	ting	see report		0
3. DI	Rainwater harves Infiltration systen	ting ns	see report		0
3. DI	Rainwater harves Infiltration systen Green roofs	ting ns	see report 0 700	430	0 0 50.2
3. DI	Rainwater harves Infiltration systen Green roofs Blue roofs	ting ns	see report 0 700 450	430	0 0 50.2 25.2
3. DI	Rainwater harves Infiltration systen Green roofs Blue roofs Filter strips	ting ns	see report 0 700 450 0	430 325 0	0 0 50.2 25.2 0
3. DI	Rainwater harves Infiltration systen Green roofs Blue roofs Filter strips Filter drains	ting ns	see report 0 700 450 0	430 325 0 0	0 0 50.2 25.2 0 0
3. DI	Rainwater harves Infiltration system Green roofs Blue roofs Filter strips Filter drains Bioretention / tre	ting ns ee pits	see report 0 700 450 0 0 0	430 325 0 0 0	0 0 50.2 25.2 0 0 0
3. DI	Rainwater harves Infiltration system Green roofs Blue roofs Filter strips Filter drains Bioretention / tre Pervious paveme	ting ns ee pits nts	see report 0 700 450 0 0 0 0	430 325 0 0 0 0	0 0 50.2 25.2 0 0 0 0
3. DI	Rainwater harves Infiltration system Green roofs Blue roofs Filter strips Filter drains Bioretention / tre Pervious paveme Swales	ting ns ee pits nts	see report 0 700 450 0 0 0 0 0 0	430 325 0 0 0 0 0 0	0 0 50.2 25.2 0 0 0 0 0
3. DI	Rainwater harves Infiltration system Green roofs Blue roofs Filter strips Filter drains Bioretention / tre Pervious paveme Swales Basins/ponds	ting ns ee pits nts	see report 0 700 450 0 0 0 0 0 0 0 0 0	430 325 0 0 0 0 0 0 0 0	0 0 50.2 25.2 0 0 0 0 0 0 0
3. DI	Rainwater harves Infiltration system Green roofs Blue roofs Filter strips Filter drains Bioretention / tre Pervious paveme Swales Basins/ponds Attenuation tanks	ting ns ee pits nts s	see report 0 700 450 0 0 0 0 0 0 0 0 0 0 0 0 0	430 325 0 0 0 0 0 0 0	0 0 50.2 25.2 0 0 0 0 0 0 0 0 0

	4a. Discharge & Drainage Strategy	Рс
	Infiltration feasibility (2a) – geotechnical factual and interpretive reports, including infiltration results	
	Drainage hierarchy (2b)	
n	Proposed discharge details (2c) – utility plans, correspondence / approval from owner/regulator of discharge location	
ormatio	Discharge rates & storage (3a) – detailed hydrologic and hydraulic calculations	
rting Inf	Proposed SuDS measures & specifications (3b)	
odo	4b. Other Supporting Details	Рс
Sup	Detailed Development Layout	
4.	Detailed drainage design drawings.	
	including exceedance flow routes	
	including exceedance flow routes Detailed landscaping plans	
	including exceedance flow routes Detailed landscaping plans Maintenance strategy	
	including exceedance flow routes Detailed landscaping plans Maintenance strategy Demonstration of how the proposed SuDS measures improve:	
	including exceedance flow routes Detailed landscaping plans Maintenance strategy Demonstration of how the proposed SuDS measures improve: a) water quality of the runoff?	
	including exceedance flow routes Detailed landscaping plans Maintenance strategy Demonstration of how the proposed SuDS measures improve: a) water quality of the runoff? b) biodiversity?	



age/section of drainage report

section 3.5

section 5.1

section 5.1

section 5.1, appendix G

section 5.1

age/section of drainage report

Appendix A

figure 5, Appendix B

Appendix A

Section 5.3

Section 5.1

section 5.1

section 5.1

## Advice Note on contents of a Surface Water Drainage Statement

## London Borough of Camden

## 1. Introduction

- 1.1 The Government has strengthened planning policy on the provision of sustainable drainage and new consultation arrangements for 'major' planning applications will come into force from 6 April 2015 as defined in the Written Ministerial Statement (18<sup>th</sup> Dec 2014).
- 1.2 The new requirements make Lead Local Flood Authorises statutory consultees with respect to flood risk and SuDS for all major applications. Previously the Environment Agency had that statutory responsibility for sites above 1ha in flood zone 1.
- 1.3 Therefore all 'major' planning applications submitted from 6 April 2015 are required demonstrate compliance with this policy and we'd encourage this is shown in a Surface Water Drainage Statement.
- 1.4 The purpose of this advice note is to set out what information should be included in such statements.

## 2. Requirements

- 2.1 It is essential that the type of Sustainable Drainage System (SuDS) for a site, along with details of its extent and position, is identified within the planning application to clearly demonstrate that the proposed SuDS can be accommodated within the development.
- 2.2 It will now not be acceptable to leave the design of SuDs to a later stage to be dealt with by planning conditions.
- 2.3 The NPPF paragraph 103 requires that developments do not increase flood risk elsewhere, and gives priority to the use of SuDS. Major developments must include SuDS for the management of run-off, unless demonstrated to be inappropriate. The proposed minimum standards of operation must be appropriate and as such, a **maintenance plan** should be included within the Surface Water Drainage Statement, clearly demonstrating that the SuDS have been designed to ensure that the maintenance and operation requirements are economically proportionate Planning Practice Guidance suggests that this should be considered by reference to the costs that would be incurred by consumers for the use of an effective drainage system connecting directly to a public sewer.
- 2.4 Camden Council will use planning conditions or obligations to ensure that there are clear arrangements in place for ongoing maintenance over the lifetime of the development.
- 2.5 Within Camden, SuDS systems must be designed in accordance with London Plan policy 5.13. This requires that developments should utilise sustainable urban drainage systems (SUDS) unless there are practical reasons for not doing so, and should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible in line with the following **drainage hierarchy**:

1 store rainwater for later use 2 use infiltration techniques, such as porous surfaces in non-clay areas 3 attenuate rainwater in ponds or open water features for gradual release 4 attenuate rainwater by storing in tanks or sealed water features for gradual release 5 discharge rainwater direct to a watercourse 6 discharge rainwater to a surface water sewer/drain 7 discharge rainwater to the combined sewer.

- 2.6 The hierarchy above seeks to ensure that surface water run-off is controlled as near to its source as possible to mimic natural drainage systems and retain water on or near to the site, in contrast to traditional drainage approaches, which tend to pipe water off-site as quickly as possible.
- 2.7 Before disposal of surface water to the public sewer is considered all other options set out in the drainage hierarchy should be exhausted. When no other practicable alternative exists to dispose of surface water other than the public sewer, the Water Company or its agents should confirm that there is adequate spare capacity in the existing system taking future development requirements into account.
- 2.8 Best practice guidance within the non-statutory technical standards for the design, maintenance and operation of sustainable drainage systems will also need to be followed. Runoff volumes from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event.
- 2.9 <u>Camden Development Policy 23</u> (Water) requires developments to reduce pressure on combined sewer network and the risk of flooding by limiting the rate of run-off through sustainable urban drainage systems. This policy also requires that developments in areas known to be at risk of surface water flooding are designed to cope with being flooded. Camden's SFRA surface water flood maps, updated SFRA figures 6 (LFRZs), and 4e (increased susceptibility to elevated groundwater), as well as the Environment Agency updated flood maps for surface water (ufmfsw), should be referred to when determining whether developments are in an area at risk of flooding.
- 2.10 Camden Planning Guidance 3 (CPG3) requires developments to achieve a greenfield run off rate once SuDS have been installed. Where it can be demonstrated that this is not feasible, a minimum 50% reduction in run off rate across the development is required. Further guidance on how to reduce the risk of flooding can be found in CPG3 paragraphs 11.4-11.8.
- 2.11 Where an application is part of a larger site which already has planning permission it is essential that the new proposal does not compromise the drainage scheme already approved.

## 3. Further information and guidance

- 3.1 Applicants are strongly advised to discuss their proposals with the Lead Local Flood Authority at the pre-application stage to ensure that an acceptable SuDS scheme is submitted.
- 3.2 For general clarification of these requirements please Camden's Local Planning Authority or Lead Local Flood Authority

# Surface Water Drainage Pro-forma for new developments

This pro-forma accompanies our advice note on surface water drainage. Developers should complete this form and submit it to the Local Planning Authority, referencing from where in their submission documents this information is taken. The pro-forma is supported by the <u>Defra/EA guidance on Rainfall Runoff Management</u> and uses the storage calculator on <u>www.UKsuds.com</u>. This pro-forma is based on current industry best practice and focuses on ensuring surface water drainage proposals meet national and local policy requirements. The pro-forma should be considered alongside other supporting SuDS Guidance.

## 1. Site Details

Site	Royal College Street	
Address & post code or LPA reference	60-86 Royal College Street, NW1 0TH	
Grid reference	529389, 183873	
Is the existing site developed or Greenfield?	Brownfield	
Is the development in a LFRZ or in an area known to be at risk of surface or ground water flooding? If yes, please demonstrate how this is managed, in line with DP23?	No – see body report of FRA	
Total Site Area served by drainage system (excluding <u>open space) (Ha)*</u>	0.119ha	

\* The Greenfield runoff off rate from the development which is to be used for assessing the requirements for limiting discharge flow rates and attenuation storage from a site should be calculated for the area that forms the drainage network for the site whatever size of site and type of drainage technique. Please refer to the Rainfall Runoff Management document or CIRIA manual for detail on this.

# 2. Impermeable Area

	Existing	Proposed	Difference	Notes for developers
			(Proposed-Existing)	
Impermeable area (ha)	0.119	0.0760	-0.043 (this is area of proposed green roofing)	If the proposed amount of impermeable surface is gre will increase. Section 6 must be filled in. If proposed in existing, then section 6 can be skipped and section 7
Drainage Method (infiltration/sewer/watercourse)	Sewer	Sewer	N/A	If different from the existing, please fill in section 3. If the proposed is not, discharge volumes may increase

# **3. Proposing to Discharge Surface Water via**

	Yes	No	Evidence that this is possible	Notes for developers
Existing and proposed MicroDrainage calculations	yes		Rainfall intensities from Microdrainage have been given for existing calculations using Modified Rational Method. This calculation is included within body of FRA report (section 4.3). For proposed Microdrainage was not used as blue roofs were sized by a specialist for accuracy. Blue roof calculations including storage volume and runoff rates are included in FRA (Figure 5 and Appendix G).	Please provide MicroDrainage calculations of ex volumes in accordance with a recognised methor infiltration test (see line below) if infiltration is proposed.
Infiltration		no	Not possible. Site is underlain by clay. Also building footprint takes up entire site boundary	e.g. soakage tests. Section 6 (infiltration) must b
To watercourse		no	No, nearest watercourse is over 100m away so not possible	e.g. Is there a watercourse nearby?
To surface water sewer	yes		Discharge to combined sewer. Capacity confirmation included within FRA appendix H.	Confirmation from sewer provider that sufficient of
Combination of above	Î	no		e.g. part infiltration part discharge to sewer or w
Has the drainage proposal had regard to the SuDS hierarchy?	yes		Yes, included within FRA (section 5).	Evidence must be provided to demonstrate that strategy has had regard to the SuDS hierarchy a
Layout plan showing where the sustainable drainage infrastructure will be	yes		Yes, included within FRA (figure 5)	Please provide plan reference numbers showing where the sustainable drainage infrastructure w development is to be constructed in phases this should be sho confirmation
iocaleu on sile.				constructed and can operate independently and development.

eater, then runoff rates and volumes mpermeability is equal or less than filled in. existing drainage is by infiltration and e. Fill in section 6.

xisting and proposed run-off rates and

odology or the results of a full

e filled in if infiltration is proposed.

capacity exists for this connection.

atercourse. Provide evidence above. the proposed Sustainable Drainage as outlined in Section 2.5 above.

g the details of the site layout showing ill be located on the site. If the

own on a separate plan and

e proposal for each phase can be l is not reliant on any later phase of UNCLASSIFIED

4. Peak Discharge Rates – This is the maximum flow rate at which storm water runoff leaves the site during a particular storm event.

	Existing Rates (I/s)	Proposed Rates (I/s)	Difference (I/s) (Proposed- Existing)	% Difference (difference /existing x 100)	Notes for developers
Greenfield QBAR	0.5	N/A	N/A	N/A	QBAR is approx. 1 in 2 storm event. Provide this if Sec
1 in 1	10.7	2.1	8.6	80%	Proposed discharge rates (with mitigation) should aim
1 in 30	26.4	2.8	23.6	89%	for all corresponding storm events. As a minimum, pea
1in 100	34.2	3.1	31.1	91%	by 50% from the existing sites for all corresponding rai
1 in 100 plus climate change	47.9	3.7	44.2	92%	The proposed 1 in 100 +CC peak discharge rate (with equivalent to greenfield rates. As a minimum, propose must be reduced by 50% from the existing 1 in 100 run

5. Calculate additional volumes for storage – The total volume of water leaving the development site. New hard surfaces potentially restrict the amount of stormwater that can go to the ground, so this needs to be controlled so not to make flood risk worse to properties downstream.

	Greenfield runoff volume	Existing Volume (m <sup>3</sup> )	Proposed Volume (m <sup>3</sup> )	Difference (m <sup>3</sup> ) (Proposed-Existing)	Notes for developers
	(m°)				
1 in 1					Proposed discharge volumes (with mitigation) sh
1 in 30					reasonably practicable to the greenfield runoff ve
1in 100 6 hour					minimum should be no greater than existing volu
					increase in volume increases flood risk elsewher
					must be filled in.
1 in 100 6 hour plus climate change		104m3	78m3 *reduction comes from proposed area of green roofs. Assumed 30% PIMP	-26m3	The proposed 1 in 100 +CC discharge volume s is reasonably practicable to the greenfield runoff minimum, to mitigate for climate change the prop site must be no greater than the existing 1 in 100 under climate change.

ction 6 (QBAR) is proposed. to be equivalent to greenfield rates

ak discharge rates must be reduced

infall events.

mitigation) should aim to be d 1 in 100 +CC peak discharge rate noff rate sites.

nould be constrained to a value as close as is olume wherever practicable and as a umes for all corresponding storm events. Any re. Where volumes are increased section 6

hould be constrained to a value as close as volume wherever practicable. As a posed 1 in 100 +CC volume discharge from

) storm event. If not, flood risk increases

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6. Calculate attenuation storage – Attenuation storage is provided to enable the rate of runoff from the site into the receiving watercourse to be limited to an acceptable rate to protect against erosion and flooding downstream. The attenuation storage volume is a function of the degree of development relative to the greenfield discharge rate.

	Notes for developers
Storage Attenuation volume (Flow rate control) required to	Volume of water to attenuate on site if dischar
meet greenfield run off rates (m <sup>3</sup> )	Can't be used where discharge volumes are
Storage Attenuation volume (Flow rate control) required to	Volume of water to attenuate on site if dischar
reduce rates by 50% (m <sup>3</sup> )	existing rates. Can't be used where dischar
Storage Attenuation volume (Flow rate control) required to	Volume of water to attenuate on site if dischar
meet [OTHER RUN OFF RATE (as close to greenfield rate as	above – please state in 1 <sup>st</sup> column what rate
possible] (m <sup>3</sup> )	previously developed sites, runoff rates sho
	calculated greenfield rate. Can't be used wh
	increasing
Storage Attenuation volume (Flow rate control) required to	Volume of water to attenuate on site if dischar
retain rates as existing (m <sup>°</sup> )	used where discharge volumes are increasi
Percentage of attenuation volume stored above ground,	Percentage of attenuation volume which wil
	swales/ponds/basins/green roofs etc. If 0, p

## 7. How is Storm Water stored on site?

Storage is required for the additional volume from site but also for holding back water to slow down the rate from the site. This is known as attenuation storage and long term storage. The idea is that the additional volume does not get into the watercourses, or if it does it is at an exceptionally low rate. You can either infiltrate the stored water back to ground, or if this isn't possible hold it back with on site storage. Firstly, can infiltration work on site?

			Notes for developers
Infiltration	State the Site's Geology and known Source Protection Zones (SPZ)	Infiltration not viable, underlain by clay and building footprint extends to site boundary.	Avoid infiltrating in made ground. and refer to Environment Agency protection zones (SPZ)
	Are infiltration rates suitable?		Infiltration rates should be no lower than
	State the distance between a proposed infiltration device base and the ground water (GW) level		Need 1m (min) between the base table to protect Groundwater qual infiltration devices. Avoid infiltration

ging at a greenfield run off rate.

increasing

ging at a 50% reduction from

ge volumes are increasing ging at a rate different from the

e this volume corresponds to. On

uld not be more than three times the ere discharge volumes are

ging at existing rates. Can't be

ng I be held above ground in

ease demonstrate why.

Infiltration rates are highly variable website to identify and source

1x10 <sup>-6</sup> m/s.

of the infiltration device & the water ity & ensure GW doesn't enter on where this isn't possible.

	Were infiltration rates obtained by desk study or infiltration test?		Infiltration rates can be estimated the planning system if a back up
	Is the site contaminated? If yes, consider advice from others on whether infiltration can happen.		Advice on contaminated Land in supporting documents <u>webpage</u> through land that is contaminated provide bespoke advice in planni sites that should be considered.
In light of the above, is infiltration feasible?	Yes/No? If the answer is No, please identify how the storm water will be stored prior to release	No. Site is attenuated using blue and blue green roofs at roof and terrace levels.	If infiltration is not feasible how w The applicant should then consid section.

# **Storage requirements**

The developer must confirm that either of the two methods for dealing with the amount of water that needs to be stored on site.

**Option 1 Simple** – Store both the additional volume and attenuation volume in order to make a final discharge from site at the greenfield run off rate. This is preferred if no infiltration can be made on site. This very simply satisfies the runoff rates and volume criteria.

**Option 2 Complex** – If some of the additional volume of water can be infiltrated back into the ground, the remainder can be discharged at a very low rate of 2 l/sec/hectare. A combined storage calculation using the partial permissible rate of 2 l/sec/hectare and the attenuation rate used to slow the runoff from site.

		Notes for developers
Please confirm what option has been chosen and how much	Option $1 - 108n3$ storage is provide through blue roofs.	The developer at this stage sho
storage is required on site.		are on site and how it will be ac

d from desk studies at most stages of attenuation scheme is provided..

Camden can be found on our Water should not be infiltrated d. The Environment Agency may ing consultations for contaminated

vill the additional volume be stored?. der the following options in the next

ould have an idea of the site xplain what the storage requirements chieved.

## 8. Please confirm

		Notes for developers
Which Drainage Systems measures have been used, including green roofs?	Blue and blue green roofs	SUDS can be adapted for mos isn't feasible e.g. impermeable
		allows treatment but not infiltra
Drainage system can contain in the 1 in 30 storm event	Yes, blue roots have been designed to contain the 1 in 100 $\pm 40\%$ CC event	This a requirement for sewers
without flooding		where drainage system is not a
Will the drainage system contain the 1 in 100 +CC storm	yes	National standards require that
event? If no please demonstrate how buildings and utility		that flooding does not occur du
plants will be protected.		susceptible to water (e.g. pumr
		within the development.
Any flooding between the 1 in 30 & 1 in 100 plus climate	N/A	Safely: not causing property flo
change storm events will be safely contained on site.		users i.e. no deeper than 300m
		must drain away at section 6 ra
How will avagadance events be estared on site without		where runoff volumes are not in
increasing flood risks (both on site and outside the	will be routed away from building. Long term flood risk	users i.e. no deeper than 300m
	maps show no surface water flooding on the road adjacent	
development)?	to the site for the 1 in 1000 year event so such an event is	must drain away at section 6 ra
	considered very unikery.	where runoff volumes are not in
		Exceedance events are defined
		+CC event.
How are rates being restricted (vortex control, orifice etc)	Outlet size (effectively an orifice)	Detail of now the flow control s
Please confirm the owners/adopters of the entire drainage	Occupier to own and maintain private drainage	If these are multiple owners the
systems throughout the development. Please list all the	e e apreir es e vin ana mantam private aramager	features will be within each own
owners.		this Proforma.
How is the entire drainage system to be maintained?		If the features are to be mainta
		in answer to the above question
		is to be maintained by others the
		feature and the maintenance se
		Clear details of the maintenance
		proposed drainage system mus
		demonstrate that maintenance
		increased flooding problems in
		increased hooding problems in

t situations even where infiltration liners beneath some SUDS devices tion. See CIRIA SUDS Manual C697.

for adoption & is good practice even adopted.

the drainage system is designed so ring a 1 in 100 year rainfall event in g a basement); or in any utility plant ping station or electricity substation)

boding or posing a hazard to site nm on roads/footpaths. Flood waters ates. Existing rates can be used ncreased.

ooding or posing a hazard to site nm on roads/footpaths. Flood waters

ates. Existing rates can be used ncreased.

d as those larger than the 1 in 100

ystems have been designed to avoid aintenance should be provided.

en a drawing illustrating exactly what ner's remit must be submitted with

ined directly by the owners as stated n please answer yes to this question mance schedule for each feature. If it nan above please give details of each chedule.

ce proposals of all elements of the st be provided. Details must

and operation requirements are

orly maintained drainage can lead to the future.

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9. Evidence Please identify where the details quoted in the sections above were taken from. i.e. Plans, reports etc. Please also provide relevant drawings that need to accompany your proforma, in particular exceedance routes and ownership and location of SuDS (maintenance access strips etc

Pro-forma Section	Document reference where details quoted above are taken from	Page Number
Section 2	FRA section 5.1	
Section 3	FRA section 5.1, appendices G and H	
Section 4	FRA section 5.1, appendix E	
Section 5	FRA section 5.1	
Section 6	FRA section 5.1	
Section 7	FRA section 5.1	
Section 8	FRA section 5.1, 5.3	

The above form should be completed using evidence from the Flood Risk Assessment and site plans. It should serve as a summary sheet of the drainage proposals and should clearly show that the proposed rate and volume as a result of development will not be increasing. If there is an increase in rate or volume, the rate or volume section should be completed to set out how the additional rate/volume is being dealt with.

This form is completed using factual information from the Flood Risk Assessment and Site Plans and can be used as a summary of the surface water drainage strategy on this site.

Form Completed By..... Qualification of person responsible for signing off this pro-forma .....

Company
On behalf of (Client's details)
Date:





StormFlow	Stormwat	er Manage	ement	Software			
Project:	Royal	College S	treet				
Client:	HTS						
Location:	Londo	n					
Catchment	t Details:				Storage Details:		
Option 1 -	Roof 1				Length	35 m	
Buildings		40	m²	x 95 %	Bed Slope	Horizontal	
Dense surfac	cing		m²	x 90 %	Width	1 m	
					Crossfall	None	
Effective Are	а	38	m²		Depth	0.085 m	
					Porosity	95 %	
					Slope Efficiency	100 %	
Rainfall De	etails - FSR I	Method:			Outflow Details:		
Return Perio	d	100 ye	ars		Design Flow	0.2 l/s	
Climate Cha	nge Factor	40 %			Attenuation Control	Orifice Plate	
r value		0.44			Orifice Diameter	20 mm	
M5-60		20.7 m	m		Number of Outlets	1	
Summer Sto	rm Profile				Flow per Outlet	0.2 l/s	
Duration	Intensit mm	y mm/h		Required storage(m <sup>3</sup> )	Results:		
30 min	47.9	95.7		1.615	Outcome	Pass	
45 min	54.2	72.3		1.737	Critical Storm Duratio	n 1.78 hrs	
60 min	58.7	58.7		1.788	Critical Rainfall Rate	38 mm/h	
2 hours	69.7	34.8		1.826	Hmax	0.055 m	
6 hours	86.8	14.5		1.576	Time to half empty	1.3 hrs	
24 hours	112.1	4.7		0.779	Volume Required	1.829 m <sup>3</sup>	
	Tank II	tilisation (		me)	J Tank F	Rehaviour In the De	sign Storm
% used					100 % used		
0	Du	24 ration (ho	urs)		48 0	2 Time (hours)	4
Compony		nvironmer		taction Crows			
Company:	ine El		nai Pro		Marrington MAE 110		
	vvarrir Tel: 01	1925-6529	11ess F 180 Er	nail: consultant	request@epg-ltd.co.uk		
02/10/2019	10:26:	17					Page 1

Project:       Royal College Street         Client:       HTS         Jocation:       London         Catchment Details:       Ength         Danes surfacing       m² x 90 %         Sifective Area       118.75 m²         Strinfail Details - FSR Method:       Storage Details:         Rainfail Details - FSR Method:       Bed Slope         Rainfail Details - FSR Method:       Storage(n)         Stromer Storm Profile       Outflow Details:         Duration       Intensity       Required         String Storm Storm Profile       0.44         Mid-60       20.7 mm         Summer Storm Profile       Duration         Duration       Intensity         Results:       Outcome         Pass       Critical Storm Duration         Shours       68.1       41.5         Storage Duration (hours)       Tank Utilisation (All storms)         Tank Utilisation (All storms)       Tank Behaviour In the Design Storm         Volume Required       7.125 m²         Company:       The Environmental Protection Group         Warrington Business Park, Long Lane, Warrington, WAS 1/1G         The Utilisation (hours)       Time (hours)         Time (hours)       Time (hours)	StormFlov	V Stormwate	er Managen	nent Software			
Client:       HTS         .cocation:       London         Zatchment Details:	Project:	Royal	College Stre	eet			
London         Storage Details: Option 1 - Roof 2 Middings         Storage Details: Length         To 5 m           Subdings         125 m <sup>2</sup> x 95 % Dense surfacing         m <sup>3</sup> x 90 %         Storage Details: Length         To 5 m           Effective Area         118.75 m <sup>2</sup> Density         95 %         Density         95 %           Simulation         118.75 m <sup>2</sup> Density         95 %         Density         95 %           Simulation         00 years         Diffice Densities         Depth         0.3 l/s           Summer Storm Profile         00 years         Diffice Damates         20 mm           Duration         Intensity mm/h         Required storage(m <sup>2</sup> )         10 min 47.9         95.7         5.424           Storus         86.8         14.5         6.956         Critical Storm Duration         2.82 hrs           Contract Storm Profile         Duration (All storms)         Trank Utilisation (All storms)         Trank Behaviour In the Design Storm           100         24         4.8         Duration (hours)         Trank Behaviour In the Design Storm           101         12         12         4.7         5.211         Trank Delayingt (Markington Kall storms)           101         12         12         4.8         12         15	Client:	HTS					
Catchment Details:       Storage Details:         Option 1 - Roof 2       Image: Storage Details:       Length       75 m         Sense surfacing       m² x 90 %       Image: Storage Details:       Length       75 m         Sense surfacing       m² x 90 %       Image: Storage Details:       Length       75 m         Effective Area       118.75 m²       Image: Storage Details:       Length       75 m         Effective Area       118.75 m²       Image: Storage Details:       Length       1 m         Cressfall       None       Depth       0.15 m       Porosity       95 %         Storage Details:       Despin Flow       0.3 l/s       Attenuation Control       Orifice Plate         Storage Store       20 rm       Number of Outlets       1       Hores Outlets       1         Storage Details:       Design Flow       0.3 l/s       Attenuation Control       Orifice Plate       Orifice Diameter       20 mm         Storage 86.7       5.424       15 min       5.7       5.424       Outcome       Pass       Critical Rainel Rate       26 mm/h       Hmax       0.1 m         Storage 86.8       14.5       6.956       Critical Rainel Rate       26 mm/h       Hmax       0.1 m       Tank Utilisation (Atl storms)	Location:	Londo	n				
Option 1 - Roof 2         Suidings       125       m <sup>3</sup> x 95 %         Sense surfacing       m <sup>3</sup> x 90 %         Effective Area       118.75       m <sup>3</sup> Effective Area       118.75       m <sup>3</sup> Staffall Details - FSR Method:       Depth       0.15         Rainfall Details - FSR Method:       Depth       0.15         Stimate Change Factor       40 %       Office Plate         Value       0.44       M5-60       20.7 mm         Summer Storm Profile       Duration       Intensity       Required         Storms 86.7       58.7       6.423       10         Stours       86.8       14.5       6.956         24 hours       12.1       4.7       5.211       Outcome       Pass         Outration       Critical Storm Duration       2.8 brs       Critical Storm Duration       2.8 brs         Volume Required       7.12 5.71       5.424       4.8       0.1 m       Time to half empty       3.6 hrs         Volume Required       7.12 5.7       5.424       5.956       5.956       5.956       5.956         100       Tank Utilisation (All storms)       Tank Utilisation (All storms)       Tank Behaviour In the Design Storm	Catchmen	t Details:			Storage Details:		
Julidings       125       m² x 95 %       Bed Slope       Horizontal         Dense surfacing       m² x 90 %       Crossfall       None         Effective Area       118.75       m²       Depth       0.15 m         Stainfall Details - FSR Method:       Depth       0.15 m       Depth       0.15 m         Rainfall Details - FSR Method:       Toto years       Depth       0.15 m       Depth       0.15 m         Stainfall Details - FSR Method:       Toto years       Outflow Details:       Depth       0.16 m       Depth       0.16 m         Summer Storm Profile       Duration       Intensity       Required       100 vears       100 mm       Number of Outlets       1       Pow per Outlet       0.27 l/s         Duration       Intensity       Required       Storage(m²)       3.6 hrs       Volume       Pass         Critical Storm Duration       2.8 hrs       Critical Storm Duration       2.8 hrs       Critical Storm Duration       2.8 hrs         Stores 69.7       3.4.8       7.046       Nome       0.1 m       Time to half empty       3.6 hrs         Volume Required       7.125 m²       Tank Utilisation (All storms)       Tank Behaviour In the Design Storm         0	Option 1 ·	- Roof 2			Length	75 m	
Dense surfacing m <sup>2</sup> x 90 % Effective Area 118.75 m <sup>2</sup> Width 1 m Crossfall None Depth 0.15 m Porosity 95 % Slope Efficiency 100 % Rainfall Details - FSR Method: Return Perio 100 years Climate Change Factor 40 % Yalue 0.44 Width 1 m Crossfall None Depth 0.15 m Porosity 95 % Slope Efficiency 100 % Outflow Details: Design Flow 0.3 l/s Attenuation Control Orifice Plate Orifice Diameter 20 mm Number of Outles 1 Flow per Outlet 0.27 l/s Duration Intensity Required 30 min 47.9 95.7 5.424 15 min 54.2 72.3 6.025 Duration 69.7 34.8 7.046 Shours 86.8 14.5 6.956 24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Dehaviour In the Design Storm 10 0 0 0 0 0 0 0 0 0 0 0 0 0	Buildings		125	m² x 95 %	Bed Slope	Horizontal	
Effective Area 118.75 m <sup>2</sup> Crossfall None Depth 0.15 m Porosity 95 % Stope Efficiency 100 % Curflow Details: Design Flow 0.3 //s Attenuation Control Orifice Plate Orifice Plate 20 mm Number of Outlets 1 Flow per Outlet 0.27 //s Summer Storm Profile Duration Intensity Required 50 min 54.2 72.3 6.025 30 min 54.2 72.3 6.025 30 min 54.2 72.3 6.025 30 min 54.2 72.3 6.025 10 min 44.7 5.211 Duration All storms Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) The Environmental Protection Group Warrington Business Park, Long Lane, Warrington, WA5 1JG Tel: 01925-652980 Email: consultantrequest@epg-ltd.o.uk 210/2019 10:26:17 Page 2	Dense surfa	cing		m² x 90 %	Width	1 m	
Effective Area 118.75 m <sup>2</sup> Depth 0.15 m Porosity 95 % Slope Efficiency 100 % <b>Rainfall Details - FSR Method:</b> Return Period 100 years Dimate Change Factor 40 % Value 0.44 W5-60 20.7 mm Summer Storm Profile Duration mm mm/h storage(m <sup>2</sup> ) 30 min 47.9 95.7 5.424 15 min 54.2 72.3 6.025 30 min 58.7 58.7 6.403 21 nours 69.7 34.8 7.046 31 hours 86.8 14.5 6.956 24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Details Tormental Protection Group Warrington Business Park, Long Lane, Warrington, WA5 1JG Tel: 01925-652980 Email: consultantrequest@epg-ltd.co.uk 2/10/2019 10:26:17 Page 2					Crossfall	None	
Porosity 95 % Stope Efficiency 100 % Dutation 00 years Summer Storm Profile Duration 11tensity Required 50 min 54.2 72.3 6.025 50 min 54.2 72.3 6.025 50 min 54.2 72.3 6.025 50 min 54.2 72.3 6.025 50 min 54.2 72.3 6.025 51 min 54.2 72.3 7 51 min 54.2 72.5 min 54.5 7 52 min 54.5 7 54 min 54.5 7 5	Effective Are	ea	118.75	m²	Depth	0.15 m	
Signe Efficiency 100 % Signe Efficiency 100 % Setum Period 100 years Value 0.44 W5-60 20.7 mm Summer Storm Profile Duration Intensity Required to mm frank 14.5 6.25 30 min 58.7 58.7 6.403 21 hours 69.7 34.8 7.046 Shours 68.8 14.5 6.956 24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (hours) Company: The Environmental Protection Group Warrington Business Park, Long Lane, Warrington, WA5 1JG Tel: 01925-652980 Email: consultantrequest@epg-ltd.co.uk 2/10/2019 10:26:17 Page 2					Porosity	95 %	
Rainfall Details - FSR Method: Return Period 100 years Climate Change Factor 40 % value 0.44 W5-60 20.7 mm Summer Storm Profile Duration Intensity Required storage(m <sup>2</sup> ) 30 min 47.9 95.7 5.424 15 min 54.2 72.3 6.025 20 hours 69.7 34.8 7.046 31 hours 86.8 14.5 6.956 24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Definite Protection Group Warrington Business Park, Long Lane, Warrington, WA5 1JG Tel: 01925-652980 Email: consultantrequest@epg-ltd.co.uk 2/10/2019 10:26:17 Page 2					Slope Efficiency	100 %	
Return Period 100 years Climate Change Factor 40 % value 0.44 M5-60 20.7 mm Summer Storm Profile Duration minimetry mm/h Required 30 min 47.9 95.7 5.424 45 min 54.2 72.3 6.025 30 min 58.7 58.7 6.403 21 hours 66.8 14.5 6.956 24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) Tank Utilisation (hours) Tank Utilisation (hours) Tank Utilisation (hours) Tank Utilisation (hours) Tank Utilisation (hours) Tank Dehaviour In the Design Storm 100 % Seed 0 100 100 100 100 100 100 100	Rainfall D	etails - FSR I	Method:		Outflow Details:		
Climate Change Factor       40 %         ivalue       0.44         W5-60       20.7 mm         Summer Storm Profile       0.21 / mm         Duration       Intensity       Required storage(m)         30 min       47.9       95.7       5.424         15 min       54.2       72.3       6.025         30 min       58.7       5.424       Outcome       Pass         Critical Storm Duration       2.82 hrs       Critical Rainfall Rate       2.66 mm/h         2 hours       69.7       34.8       7.046       Time to half empty       3.6 hrs         2 hours       86.8       14.5       6.956       Critical Rainfall Rate       2.6 nm/h         40 hours       112.1       4.7       5.211       Tank Utilisation (All storms)       Tank Behaviour In the Design Storm         100       0       24       48       0       0       5         Volume Required       7.125 m <sup>3</sup> Time (hours)       Time (hours)       Time (hours)         Company:       The Environmental Protection Group       Yatington Business Park, Long Lane, Warrington, WA5 1JG       Time (hours)       Page 2	Return Perio	bd	100 years	5	Design Flow	0.3 l/s	
value 0.44 VIS-80 20.7 mm Summer Storm Profile Duration mm 47.9 95.7 5.424 15 min 54.2 72.3 6.025 30 min 47.9 95.7 5.424 30 min 58.7 58.7 6.403 2 hours 69.7 34.8 7.046 36 hours 86.8 14.5 6.956 24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (hours) Tank Dehaviour In the Design Storm 100 9% ed 9% ed	Climate Cha	inge Factor	40 %		Attenuation Control	Orifice Plate	
M5-60 20.7 mm Summer Storm Profile Duration Intensity Required storage(m <sup>2</sup> ) 30 min 47.9 95.7 5.424 45 min 54.2 72.3 6.025 60 min 58.7 58.7 6.403 2 hours 86.8 14.5 6.956 24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) 100 0 0 101 102 102 102 102 10	r value		0.44		Orifice Diameter	20 mm	
Summer Storm Profile Duration Intensity Required 30 min 47.9 95.7 5.424 45 min 54.2 72.3 6.025 30 min 58.7 58.7 6.403 2 hours 69.7 34.8 7.046 5 hours 86.8 14.5 6.956 24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (hours) Tank Behaviour In the Design Storm 10 0 24 48 0 0 5 Time (hours) The Environmental Protection Group Warrington Business Park, Long Lane, Warrington, WA5 1JG Tel: 01925-652980 Email: consultantrequest@epg-ltd.co.uk 2/10/2019 10:26:17 Page 2	M5-60		20.7 mm		Number of Outlets	1	
Duration intensity mm/h storage(m <sup>2</sup> ) 30 min 47.9 95.7 5.424 45 min 54.2 72.3 6.025 30 min 58.7 58.7 6.403 2 hours 69.7 34.8 7.046 3 hours 86.8 14.5 6.956 24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Behaviour In the Design Storm 100 % sed 0 24 48 0 0 5 Duration (hours) Time (hours) Company: The Environmental Protection Group Warrington Business Park, Long Lane, Warrington, WAS 1JG Tel: 01925-652980 Email: consultantrequest@epg-ltd.co.uk 2/10/2019 10.26:17 Page 2	Summer Sto	orm Profile			Flow per Outlet	0.27 l/s	
by min 47.9 95.7 5.424 45 min 54.2 72.3 6.025 50 min 58.7 58.7 6.403 2 hours 69.7 34.8 7.046 3 hours 86.8 14.5 6.956 24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Behaviour In the Design Storm 100 % sed 0 24 48 0 5 Duration (hours) The Environmental Protection Group Warrington Business Park, Long Lane, Warrington, WA5 1JG Tel: 01925-652980 Email: consultantrequest@epg-Itd.co.uk 2/10/2019 10:26:17 Page 2	Duration	Intensit	y mm/b	Required	Results:		
00 min       47.3       50.7       5.424         15 min       54.2       72.3       6.025         30 min       58.7       58.7       6.403         2 hours       69.7       34.8       7.046         30 min       112.1       4.7       5.211         Critical Storm Duration       2.82 hrs         Critical Rainfall Rate       26.6 mm/h         Hmax       0.1 m       1       1         Tank Utilisation (All storms)         Tank Utilisation (Nors)         Tank Utilisation (Nors)         Time (hours)         Tome (hours)         Time (hours)	30 min	//T Q	95.7	5 4 2 4	Outcome	Pass	
So min 58.7 58.7 6.403 2 hours 69.7 34.8 7.046 3 hours 86.8 14.5 6.956 24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) 0 0 0 0 0 0 0 0 0 0 0 0 0	45 min	47.9 54.2	33.7 72 3	6.025	Critical Storm Duration	2 82 hrs	
24 hours 69.7 34.8 7.046 3 hours 86.8 14.5 6.956 24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) 100 5 mm to half empty 3.6 hrs Volume Required 7.125 m <sup>3</sup> Tank Behaviour In the Design Storm 100 % sed 0 0 10 10 10 10 10 10 10 10	40 min	58.7	58.7	6 403	Critical Rainfall Rate	26.6 mm/h	
shours 86.8 14.5 6.956 24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Behaviour In the Design Storm Tank Behaviour In the Design Storm Tank Behaviour In the Design Storm Marriagton (hours) Time to half empty 3.6 hrs Volume Required 7.125 m <sup>3</sup> Tank Behaviour In the Design Storm Tank Behaviour In the Design Storm Tank Behaviour In the Design Storm Time to half empty 3.6 hrs Volume Required 7.125 m <sup>3</sup> Tank Behaviour In the Design Storm Tank Behaviour In the Design Storm Warrington (hours) Time (hours) Time (hours) Time (hours) The Environmental Protection Group Warrington Business Park, Long Lane, Warrington, WA5 1JG Tel: 01925-652980 Email: consultantrequest@epg-Itd.co.uk 2/10/2019 10:26:17 Page 2	2 hours	69.7	34.8	7 046	Hmax	0.1 m	
24 hours 112.1 4.7 5.211 Tank Utilisation (All storms) Tank Utilisation (All storms) Volume Required 7.125 m <sup>3</sup> Tank Behaviour In the Design Storm Tank Behaviour In the Design Storm 0 0 0 0 10 0 0 10 0 0 10 0 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 0 10 1	6 hours	86.8	14.5	6.956	Time to half empty	3.6 hrs	
Tank Utilisation (All storms) Tank Utilisation (All storms) Tank Behaviour In the Design Storm Tank Behaviour In the Design Storm 100 % % % % % % % % % % % % %	24 hours	112.1	4.7	5.211	Volume Required	7.125 m <sup>3</sup>	
100 % sed 0 0 0 100 100 100 % sed 0 0 100 % sed 0 0 100 % sed 0 0 100 % sed 0 0 100 % sed 0 0 100 % sed 0 0 100 % sed 0 0 100 % sed 0 100 % sed 0 100 % sed 0 100 100 % sed 0 100 100 15 Time (hours) Time (hours) Time (hours) Tompany: Tel: 101 Tel: 01925-652980 Email: consultantrequest@epg-ltd.co.uk 2/10/2019 10:26:17 Page 2		Tank U	tilisation (All	storms)	J L Tank Be	haviour In the De	esian Storm
0       24       48       0       5         Duration (hours)       Time (hours)       Time (hours)         Company:       The Environmental Protection Group Warrington Business Park, Long Lane, Warrington, WA5 1JG Tel: 01925-652980 Email: consultantrequest@epg-ltd.co.uk       Page 2	% Jsed				% used		
Warrington Business Park, Long Lane, Warrington, WA5 1JG         Tel: 01925-652980 Email: consultantrequest@epg-ltd.co.uk         2/10/2019       10:26:17         Page 2	0 0 Company:	Du : The Ei	24 ration (hours	इ) I Protection Group	48 0	5 Time (hours)	
2/10/2019 10:26:17 Page 2		Warrin Tel: 01	gton Busine 1925-652980	ess Park, Long Lane ) Email: consultant	e, Warrington, WA5 1JG request@epg-ltd.co.uk		
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StormFlow	Stormwate	er Manage	ement	Software										
Project:	Royal	College St	treet											
Client:	HTS													
Location:	Londo	n												
Catchment	Details:				Stor	age Details:								
Option 1 -	Roof 3				Leng	th	105 m							
Buildings		160	m² x	x 95 %	Bed	Slope	Horizontal							
Dense surfac	sing		m² >	x 90 %	Width	า	1 m							
					Cros	sfall	None							
Effective Are	а	152	m²		Dept	h	0.15 m							
					Poro	sity	95 %							
					Slope	e Efficiency	100 %							
Rainfall De	tails - FSR M	Method:			Out	tflow Details:								
Return Perio	d	100 yea	ars		Des	ign Flow	0.3 l/s							
Climate Char	nge Factor	40 %			Atte	nuation Control	Orifice Plate							
r value		0.44			Orif	ice Diameter	20 mm							
M5-60		20.7 mr	n		Nun	nber of Outlets	1							
Summer Stor	rm Profile				Flov	v per Outlet	0.27 l/s							
Duration	Intensity	/		Required	Re	sults:								
	mm	mm/h		storage(m <sup>3</sup> )		ouno.	Daaa							
30 min	47.9	95.7		7.027	Out	come								
45 min	54.2	72.3		7.846	Criti	cal Storm Duration	0.02 IIIS 21.8 mm/b							
	56.7 60.7	24.0		0.300			21.8 mm/n							
2 nours	09.7 86.8	04.0 14.5		9.404	Tim	ax a ta half ampty	0.090 m							
24 hours	112 1	4.5		7 891	Volu	ime Required	9 776 m <sup>3</sup>							
	T 1 1 1			\										
100	Tank Ut	ilisation (A	All stori	ms)	100	I ank Be	haviour in the D	esign Storm						
% used					% used									
0		24		4	8 U '	0	5		10					
	Du	ration (hou	urs)				Time (hours)							
Company:	The Fr	nvironmen	tal Pro	tection Group										
	Warrin	gton Busi	ness P	ark, Long Lane.	Warring	gton, WA5 1JG								
	Tel: 01	925-6529	80 En	nail: consultantre	equest@	)epg-ltd.co.uk								
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Project:	Roval	College St	reet			
	Ruyar	College St	Teel			
Client:	HIS					
Location:	Londo	ſ				
Catchment	Details:			Storage Details:		
Option 1 - R	Roof 4			Length	45 m	
Buildings		50	m² x 95 %	Bed Slope	Horizontal	
Dense surfaci	ng		m² x 90 %	Width	1 m	
				Crossfall	None	
Effective Area		47.5	m²	Depth	0.085 m	
				Porosity	95 %	
				Slope Efficiency	100 %	
Rainfall Det	ails - FSR N	Method:		Outflow Details:		
Return Period		100 yea	irs	Design Flow	0.2 l/s	
Climate Chang	ge Factor	40 %		Attenuation Control	Orifice Plate	
r value		0.44		Orifice Diameter	20 mm	
M5-60		20.7 mr	n	Number of Outlets	1	
Summer Storr	n Profile			Flow per Outlet	0.21 l/s	
Duration	Intensity	/	Required	Results:		
20 min	mm 47.0	mm/n	storage(m°)	Outcome	Booo	
30 min 45 min	47.9 54.0	95.7	2.071	Critical Starm Duration		
40 min	04.Z	72.3 58.7	2.200	Critical Bainfall Pate	2.1 1115 33.5 mm/b	
2 hours	50.7 60.7	34.8	2.347		0.057 m	
6 hours	86.8	14.5	2.425	Time to half empty	1.6 hrs	
24 hours	112.1	4.7	1.231	Volume Required	2.437 m <sup>3</sup>	
	Topk Lit	ilication (A		Tank Po	haviour In the Deci	an Storm
100						-
% Jsed				% used		
0 0 Company:	Dui The Er	24 ration (hou	irs) tal Protection Group		T 5 Time (hours)	
	Warrin Tel: 01	gton Busir 925-6529	ness Park, Long Lan 80 Email: consultan	e, Warrington, WA5 1JG trequest@epg-ltd.co.uk		
)2/10/2019	10:26:	17				Page 4

StormFlow	Stormwa	ter Managen	nent Software		
Project:	Roya	College Stre	eet		
Client:	HTS				
Location:	Londo	on			
Catchment	Details:			Storage Details:	
Option 1 - I	Roof 5			Length	215 m
Buildings		245	m² x 95 %	Bed Slope	Horizontal
Dense surfac	cing		m² x 90 %	Width	1 m
				Crossfall	None
Effective Area	а	232.75	m²	Depth	0.085 m
				Porosity	95 %
				Slope Efficiency	100 %
Rainfall De	tails - FSR	Method:		Outflow Details:	
Return Period	d	100 year	s	Design Flow	0.2 l/s
Climate Char	nge Factor	40 %		Attenuation Control	Orifice Plate
r value		0.44		Orifice Diameter	20 mm
M5-60		20.7 mm		Number of Outlets	1
Summer Stor	rm Profile			Flow per Outlet	0.25 l/s
Duration	Intensi mm	ty mm/h	Required storage(m³)	Results:	
30 min	47.9	95.7	10.929	Outcome	Pass
45 min	54.2	72.3	12.282	Critical Storm Duration	6.72 hrs
60 min	58.7	58.7	13.202	Critical Rainfall Rate	13.2 mm/h
2 hours	69.7	34.8	15.186	Hmax	0.083 m
6 hours	86.8	14.5	16.860	Time to half empty	9.5 hrs
24 hours	112.1	4.7	15.577	Volume Required	16.953 m³
100	Tank L	Itilisation (Al	l storms)	Tank Be	haviour In the Design Storm
% used				% used	
0		24		48 0	24 4
	Du	uration (hour	s)		Time (hours)
Company:	The E	nvironmenta	al Protection Group		
	Warri	ngton Busine	ess Park, Long Lan	e, Warrington, WA5 1JG	
	Tel: 0	1925-65298	0 Email: consultan	trequest@epg-ltd.co.uk	
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StormFlow	Stormwater	Managem	ent Software			
Project:	Royal C	ollege Stre	et			
Client:	HTS					
Location:	London					
Catchment De	etails:			Storage Details:		
				Length	215 m	
Buildings		455	m² x 95 %	Bed Slope	Horizontal	
Dense surfacing			m² x 90 %	Width	1 m	
				Crossfall	None	
Effective Area		432.25	m²	Depth	0.235 m	
				Porosity	95 %	
				Slope Efficiency	100 %	
Rainfall Detail	s - FSR M	ethod:		Outflow Details:		
Return Period		100 years		Design Flow	0.3 l/s	
Climate Change	Factor	40 %		Attenuation Control	Orifice Plate	
r value		0.44		Orifice Diameter	20 mm	
M5-60		20.7 mm		Number of Outlets	1	
Summer Storm F	Profile			Flow per Outlet	0.35 l/s	
Duration m	Intensity m	mm/h	Required storage(m³)	Results:		
30 min 47	7.9	95.7	20.389	Outcome	Pass	
45 min 54	4.2	72.3	22.958	Critical Storm Duration	9.1 hrs	
60 min 58	8.7	58.7	24.728	Critical Rainfall Rate	10.3 mm/h	
2 hours 69	9.7	34.8	28.665	Hmax	0.163 m	
6 hours 86	6.8	14.5	32.805	Time to half empty	13.3 hrs	
24 hours 1	12.1	4.7	31.716	Volume Required	33.293 m <sup>3</sup>	
100	Tank Utili	sation (All	storms)	Tank Be	haviour In the Design S	torm
% used				% used		
0		24	Δ	0 <sup>2</sup>	24	4
-	Dura	tion (hours	)	- •	Time (hours)	-
Company:	The Env Warring Tel: 019	ironmental ton Busine 25-652980	Protection Group ss Park, Long Lane Email: consultantr	, Warrington, WA5 1JG equest@epg-ltd.co.uk	Dan	e 6
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StormFlow	Stormwate	r Managen	nent Software		
Project:	Royal C	College Stre	eet		
Client:	HTS				
Location:	London				
Catchmont	Dotaile:			Storago Dotaile:	
Ontion 1 - I	Roof 7			l ength	65 m
Buildings		75	m² x 95 %	Bed Slope	Horizontal
Dense surfac	ing		m² x 90 %	Width	1 m
	0			Crossfall	None
Effective Area	a	71.25	m²	Depth	0.085 m
				Porosity	95 %
				Slope Efficiency	100 %
Rainfall De	tails - FSR M	lethod:		Outflow Details:	
Return Period	t	100 year	S	Design Flow	0.2 l/s
Climate Char	ige Factor	40 %		Attenuation Control	Orifice Plate
r value		0.44		Orifice Diameter	20 mm
M5-60		20.7 mm		Number of Outlets	1
Summer Stor	m Profile			Flow per Outlet	0.22 l/s
Duration	Intensity mm	mm/h	Required storage(m <sup>3</sup> )	Results:	
30 min	47.9	95.7	3.201	Outcome	Pass
45 min	54.2	72.3	3.530	Critical Storm Duration	2.48 hrs
60 min	58.7	58.7	3.724	Critical Rainfall Rate	29.4 mm/h
2 hours	69.7	34.8	3.980	Hmax	0.065 m
6 hours	86.8	14.5	3.808	Time to half empty	2.5 hrs
24 hours	112.1	4.7	2.542	Volume Required	4.014 m <sup>3</sup>
400	Tank Uti	lisation (Al	l storms)	Tank Beh	naviour In the Design Storm
% used				% used	
0		24			5 10
	Dura	44 ation (hour	s)	<del>1</del> 0 U	Time (hours)
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	Tel: 019	)25-65298	0 Email: consultan	trequest@epg-ltd.co.uk	
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# Appendix H Thames Water Correspondence





Ms Katrina Wylie Heyne Tillett Steel 4 Pear Tree Court London EC1R 0DS



13 November 2019

## Pre-planning enquiry: Confirmation of sufficient capacity

Dear Ms Wylie,

Thank you for providing information on your development:

60-86 Royal College Street, London, NW1 0TH.

Existing: 650m<sup>2</sup> MOT garage.

Proposed: 72 bed hospital. Foul water discharging by gravity via existing connection to the combined trunk sewer in Royal College Street. Surface water discharging by gravity via existing connection to the combined trunk sewer in Royal College Street restricted to 2l/s.

We have completed the assessment of the foul water flows and surface water run-off based on the information submitted in your application with the purpose of assessing sewerage capacity within the existing Thames Water sewer network.

#### **Foul Water**

If your proposals progress in line with the details you've provided, we're pleased to confirm that there will be sufficient sewerage capacity in the adjacent combined sewer network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

## **Surface Water**

Please note that discharging surface water to the public sewer network should only be considered after all other methods of disposal have been investigated and proven to not be viable. In accordance with the Building Act 2000 Clause H3.3, positive connection to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. The disposal hierarchy being: 1st Soakaways; 2nd Watercourses; 3rd Sewers.

Only when it can be proven that soakage into the ground or a connection into an adjacent watercourse is not possible would we consider a restricted discharge into the public combined sewer network.

If the peak surface water run-off discharge is then restricted to Greenfield run-off rates/a maximum of 2l/s as your drainage strategy indicates, then we would have no objections to the proposals.

Thames Water Planning team would ask to see why it is not practicable on the site to restrict to Greenfield run-off rates if they are consulted as part of any planning application.

In considering your surface water needs, we support the use of sustainable drainage on development sites. You'll need to show the local authority and/or lead local flood authority how you've taken into account the surface water hierarchy that we've included.

Please see the attached 'Planning your wastewater' leaflet for additional information.

## What happens next?

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you've any further questions, please contact me on 0203 577 9811.

Yours sincerely

Siva Rajaratnam - Adoptions Engineer

Thames Water

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