A3 Environment Agency Correspondence

Sophie McCabe

From: NET Enquiries <HNLenquiries@environment-agency.gov.uk>
Sent: 31 December 2020 15:37
To: Sophie McCabe
Subject: HNL 198456 JH - RE: Twickenham Studios - Flood Enquiry

Dear Sophie

Thank you for your request dated 9 December 2020 to use Product 4 and 6 Environment Agency data.

The information on Flood Zones in the area relating to Twickenham Studios, TW1 2AW is as follows:

The property is in an area located within Flood Zone 1 shown on our Flood Map for Planning (Rivers and Sea).

Note - This information relates to the area that the above named site is in and is not specific to the property/proposed development itself.

Because this site does not fall within an area at risk of flooding from rivers or the sea, we do not hold any detailed flood modelling data that would impact your site. As such we are unable to provide a flood risk product.

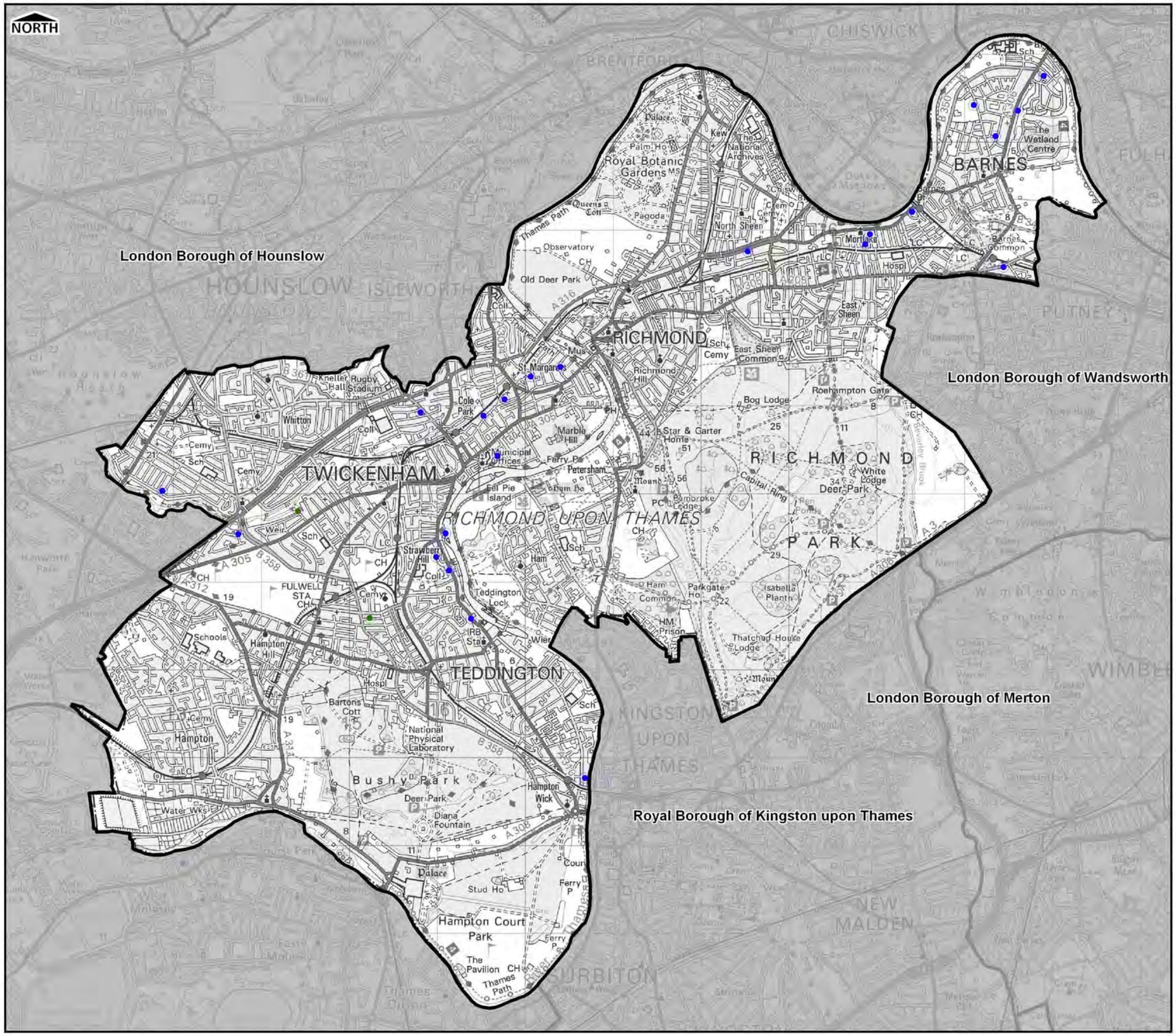
We do not hold records of historic flood events from rivers and/or the sea affecting the area local to this site. However, please be aware that this does not necessarily mean that flooding has not occurred here in the past, as our records are not comprehensive.

The following information is not available under the Open Government Licence but we may be able to license it to you under the Environment Agency Conditional Licence:

River Crane Mapping Study (Halcrow 2008) - P5&6 link: https://ea.sharefile.com/d-s055f7202fb74a4e9 & Thames Tidal Upriver Breach Inundation Modelling 2017 - P5&6 Link: https://ea.sharefile.com/d-s7da331f0e9f41d2a

Name	Products 5 and 6
Description	River Crane Mapping Study (Halcrow 2008) & Thames Tidal Upriver Breach Inundation Modelling 2017
Licence	Environment Agency Conditional Licence

A4 Preliminary Flood Risk Assessment Mapping



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED

Legend

- Borough Administrative Boundary
- Fluvial Flooding Incidents
- Surface Water Flooding Incidents

London Borough of Richmond

LONDON BOROUGH OF RICHMOND UPON THAMES

Preliminary Flood Risk Assessment

Scale at A3	Date	Drawn by	Approved by
1:45,000	13/05/2011	D.SKILTON	E.CRAVEN

Surface Water Flooding Incidents and Fluvial Flooding Incidents

Consultants
CAPITA SYMONDS Flood Risk Management
Scott Wilson
URS / Scott Wilson
6 - 8 Greencoat Place
London
SW1P 1PL

Drain London Programme Board Members

Environment Agency · Thames Water · LONDON COUNCILS · GREATERLONDONAUTHORITY

FIGURE 1

Filepath: N:\Water\Current Projects\D134785 D134786 DRAIN LONDON Tier 2\02 Group 8 (D134786)\05 GIS

THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED

NORTH

London Borough of Hounslow

London Borough of Wandsworth

London Borough of Merton

Royal Borough of Kingston upon Thames

TW8 0
TW9 3
TW9 4
TW9 2
TW9 1
TW106
TW1 1
TW1 2
TW1 3
TW1 4
TW107
TW105
TW3 2
TW7 7
TW4 5
TW2 7
TW2 6
TW2 5
TW136
TW121
TW123
TW118
TW119
TW110
TW165
TW122
KT8 1
KT8 9
KT1 4
KT2 5
KT2 7
KT7 0
SW138
SW139
SW130
SW151
SW147
SW148
SW156
SW155
SW154
SW153

0 0.25 0.5 1 2 Kilometres

Legend

- Borough Administrative Boundary
- Sewer Flooding Incidents

No. of Sewer Flood Records

- None
- 1 - 5
- 6 - 10
- 11 - 20
- 21 - 50
- 51 - 100
- 101+

Notes

1. Sewer flood records relate to internal and external flooding of properties
2. Data supplied by Thames Water Ltd and is correct as at June 2010
3. Point data supplied by Borough Council

London Borough of Richmond

LONDON BOROUGH OF RICHMOND UPON THAMES

Preliminary Flood Risk Assessment

Scale at A3	Date	Drawn by	Approved by
1:45,000	13/05/2011	D.SKILTON	E.CRAVEN

Sewer Flooding Incidents

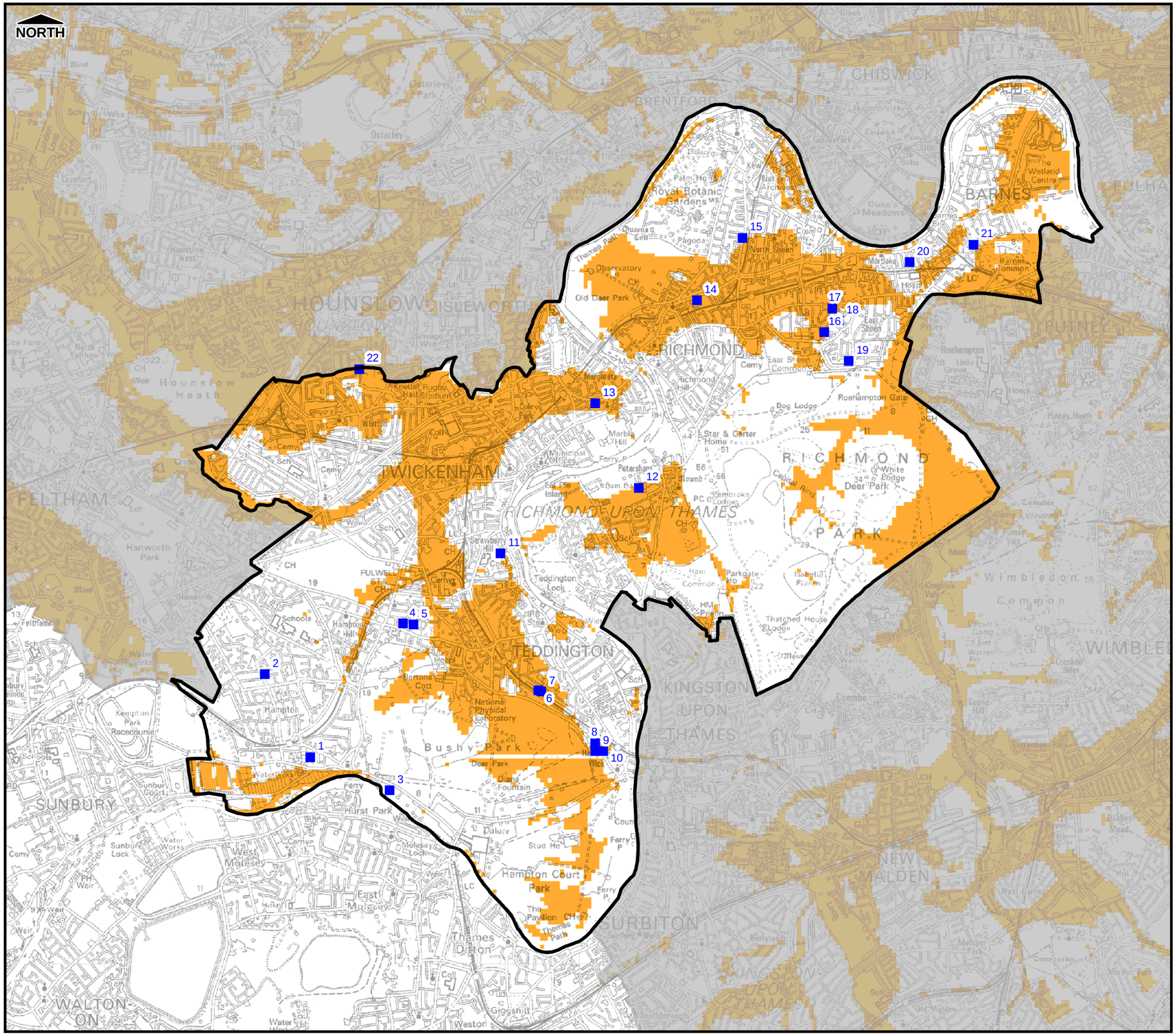
Consultants
CAPITA SYMONDS Flood Risk Management
Scott Wilson
URS / Scott Wilson
6 - 8 Greencoat Place
London
SW1P 1PL

Drain London Programme Board Members

Environment Agency · Thames Water · LONDON COUNCILS · GREATERLONDONAUTHORITY

FIGURE 3

Filepath: N:\Water\Current Projects\D134785 D134786 DRAIN LONDON Tier 2\02 Group 8 (D134786)\05 GIS



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED

Legend

- Richmond Borough Council
- Groundwater Flood Incident (EA Records)

Increased Potential for Elevated Groundwater in

- Permeable Superficial Deposits
- Consolidated Aquifers

Notes

1.The increased Potential for Elevated Groundwater map shows those areas within the London Boroughs where there is an increased potential for groundwater to rise sufficiently to interact with the ground surface or be within 2m of the groundsurface. Such groundwater rise could lead to the following:

-Flooding of basements of buildings below ground level;
-Flooding of buried services or other assets below ground level;
-Inundation of farmland, roads, commercial, residental and amenity areas;
-Flooding of ground floors of buildings above ground level; and Overflowing of sewers and drains

2.Incident records shown are generally unconfirmed and may include issues such as water main bursts or non-groundwater related problems.
3.Areas not shown to have increased potential for elevated groundwater should be considered to have a low potential for elevated groundwater - Lack of information does not imply 'no potential' of elevated groundwater in that area.
4.Includes groundwater flood mapping provided by JBA consulting, Copyright. Jeremy Benn Associates Limited 2008-2011, partially derived from data supplied by the Environment Agency.

London Borough Richmond

LONDON BOROUGH OF RICHMOND UPON THAMES

Preliminary Flood Risk Assessment

Scale at A3	Date	Drawn by	Approved by
1:50,000	22/03/2011	C.Woolhouse	S.Cox

Increased Potential For Elevated Groundwater

Consultants
CAPITA SYMONDS Flood Risk Management
Scott Wilson
URS / Scott Wilson
6 - 8 Greencoat Place
London
SW1P 1PL

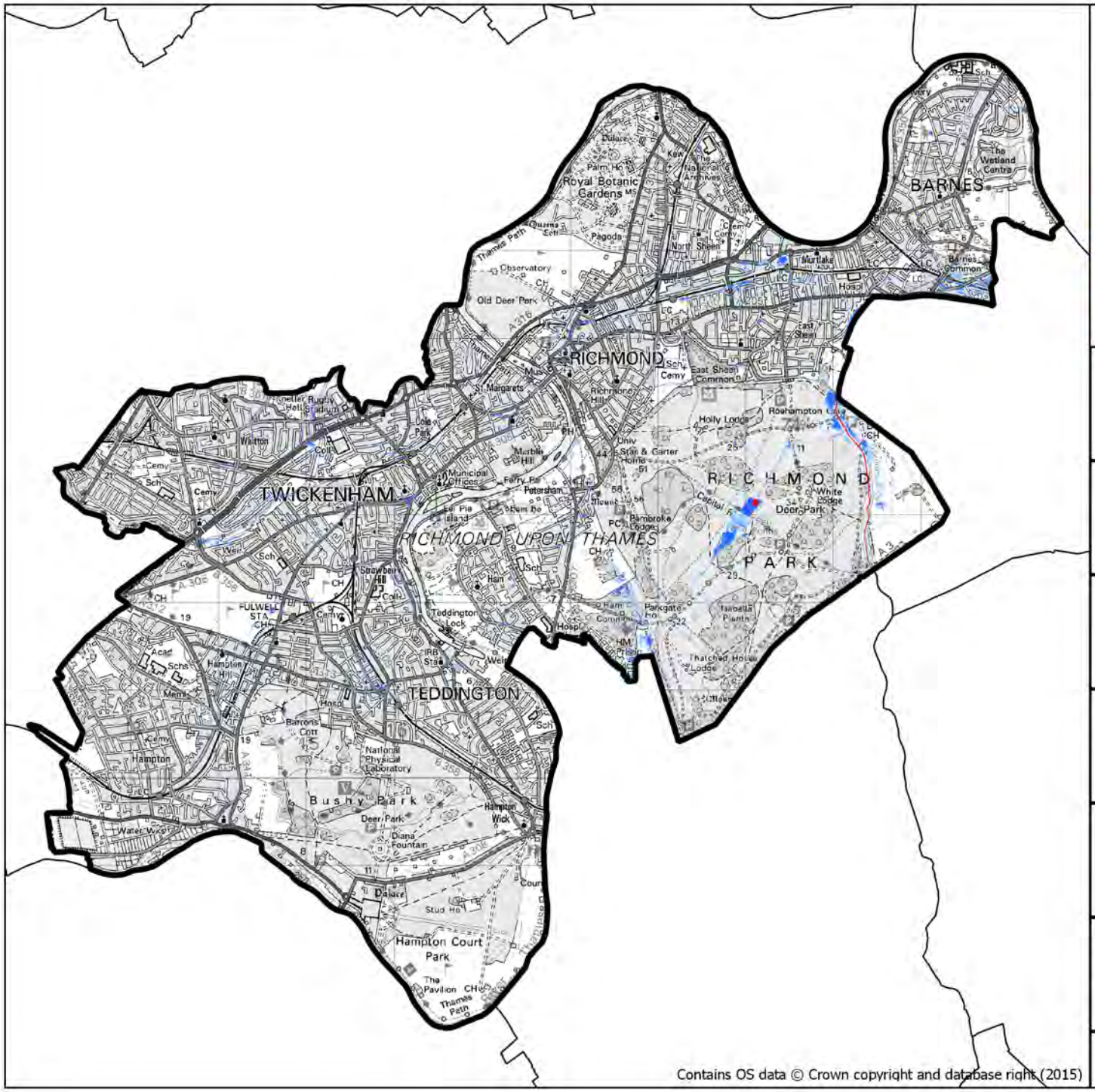
Drain London Programme Board Members

Environment Agency · Thames Water · LONDON COUNCILS · GREATERLONDONAUTHORITY

FIGURE 2

Filepath: D:\34786 Drain London_Tier 2_Group 8\700 Technical\711 GIS\01 Layout\Richmond\Increased Potential for Elevated GW.mxd

A5 Strategic Flood Risk Assessment Mapping



Legend

Borough Boundary

Predicted Surface Water Flood Depth (m)

- 0.00 - 0.15
- 0.15 - 0.30
- 0.30 - 0.60
- 0.60 - 0.90
- 0.90 - 1.20
- > 1.20

in association with

Environment Agency

Metis Consultants Limited

METIS

Client

LONDON BOROUGH OF RICHMOND UPON THAMES

Project Title

London Borough of Richmond Upon Thames Strategic Flood Risk Assessment Level 1

Drawing Title

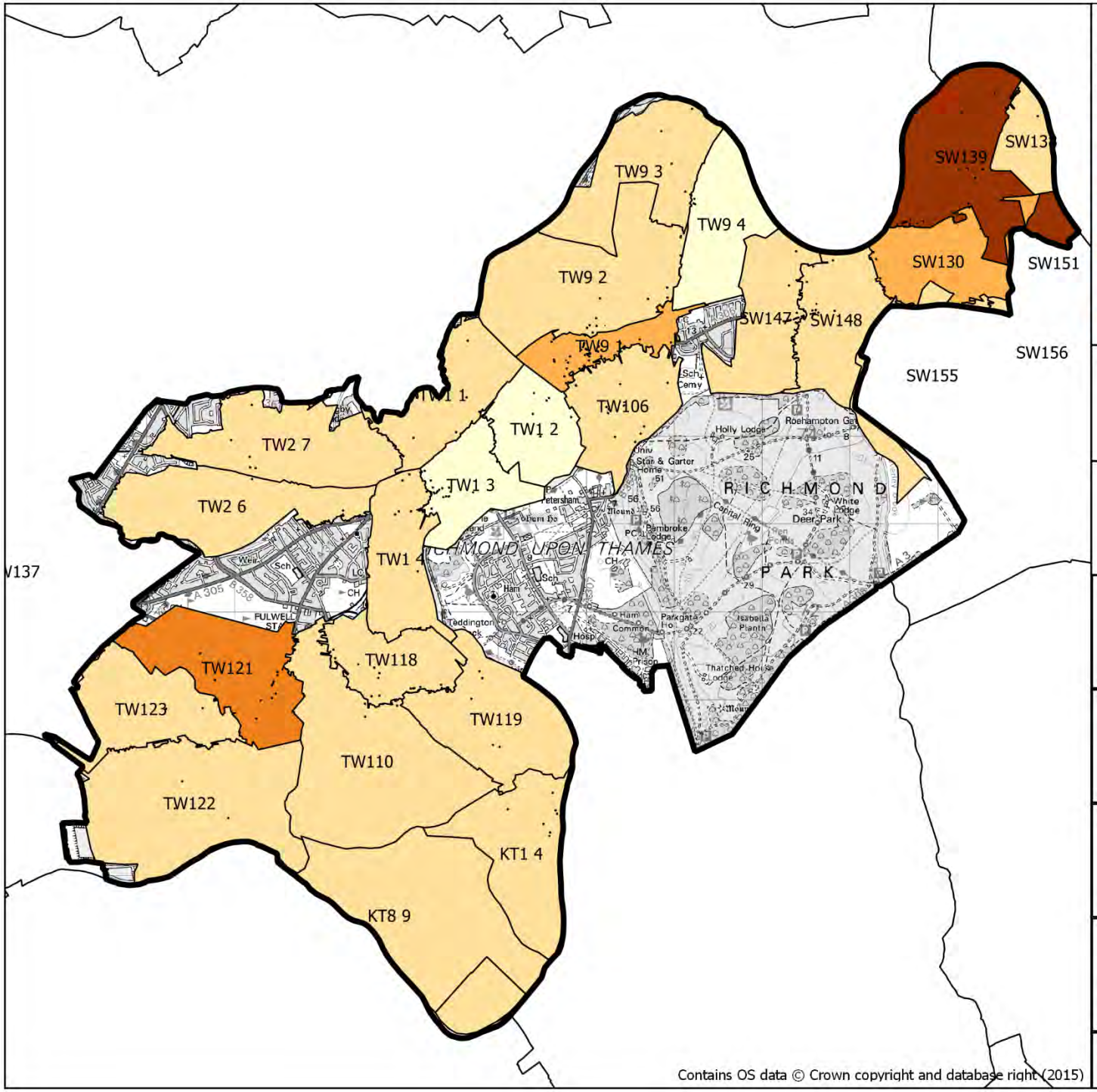
Updated Flood Map for Surface Water

1% chance of flooding in any one year

Drawing Number

FIGURE G

1:65,000



Legend

Borough Boundary

Number of Sewer Flooding Incidents based on DG5 data

- 0
- 1 - 5
- 6 - 10
- 11 - 15
- 16 - 20
- 21 - 25

in association with Thames Water

Metis Consultants Limited

METIS

Client

LONDON BOROUGH OF RICHMOND UPON THAMES

Project Title

London Borough of Richmond Upon Thames Strategic Flood Risk Assessment Level 1

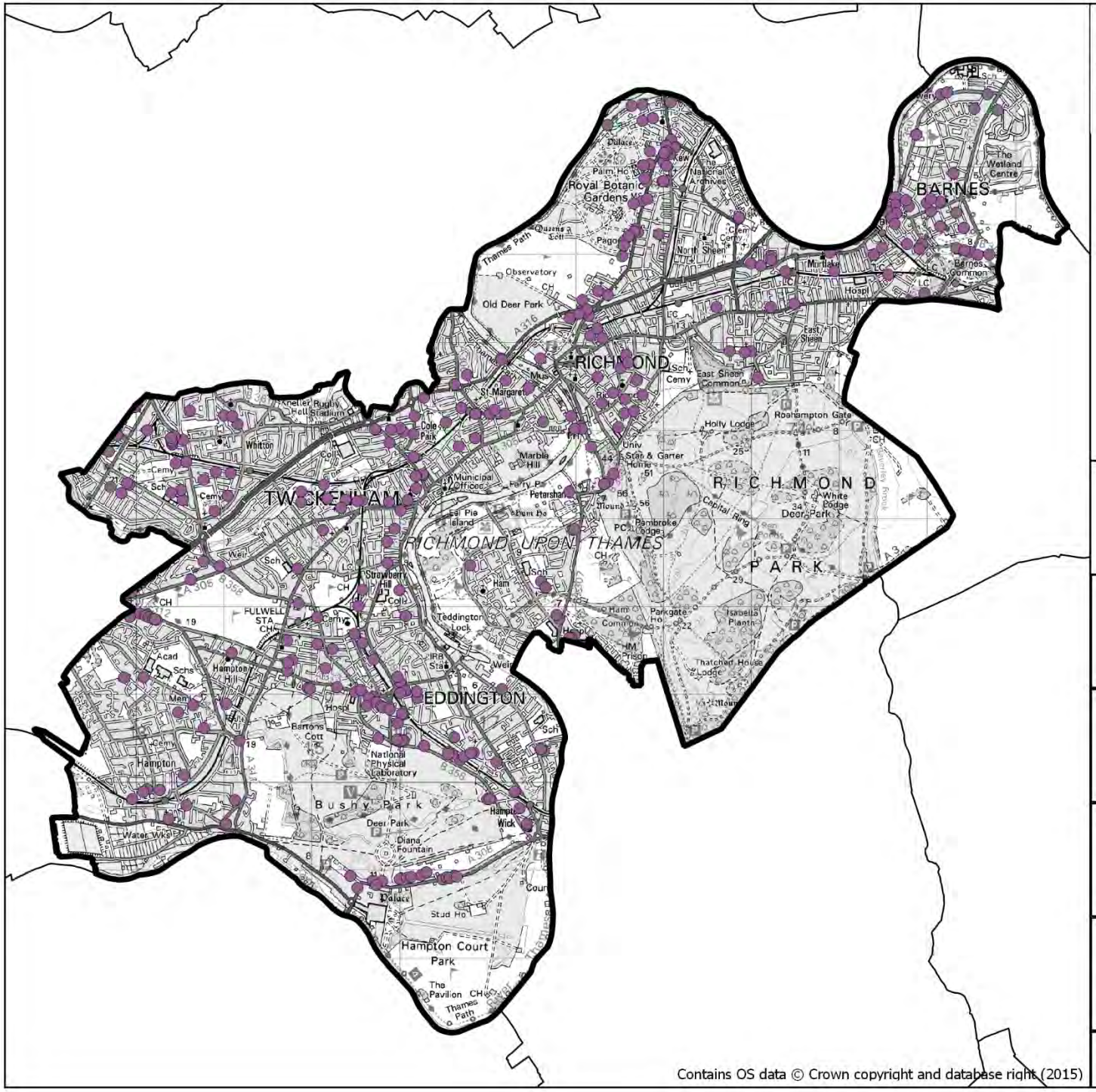
Drawing Title

Sewer Flooding Incidents

Drawing Number

FIGURE I

1:65,000



Legend

- Borough Boundary
- Blocked Gully Incidents

Metis Consultants Limited

Client

LONDON BOROUGH OF RICHMOND UPON THAMES

Project Title

London Borough of Richmond Upon Thames Strategic Flood Risk Assessment Level 1

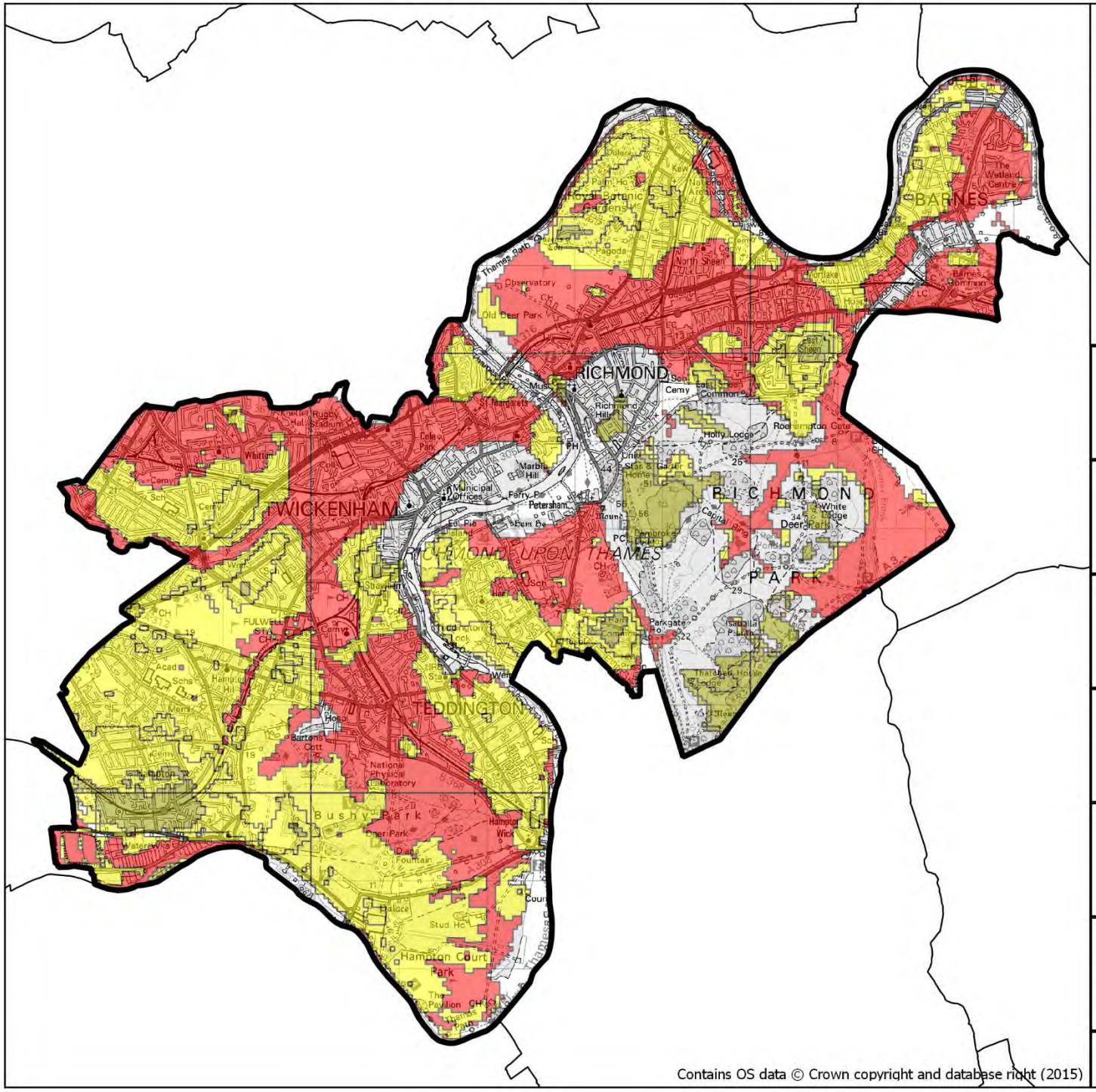
Drawing Title

Blocked Gully Incidents

Drawing Number

FIGURE J

1:65,000



Legend

Borough Boundary

BGS Susceptibility to Groundwater Flooding

- Limited potential for groundwater flooding to occur
- Potential for groundwater flooding of property situated below ground level
- Potential for groundwater flooding to occur at surface

in association with

Environment Agency

Metis Consultants Limited

METIS

Client

LONDON BOROUGH OF RICHMOND UPON THAMES

Project Title

London Borough of Richmond Upon Thames Strategic Flood Risk Assessment Level 1

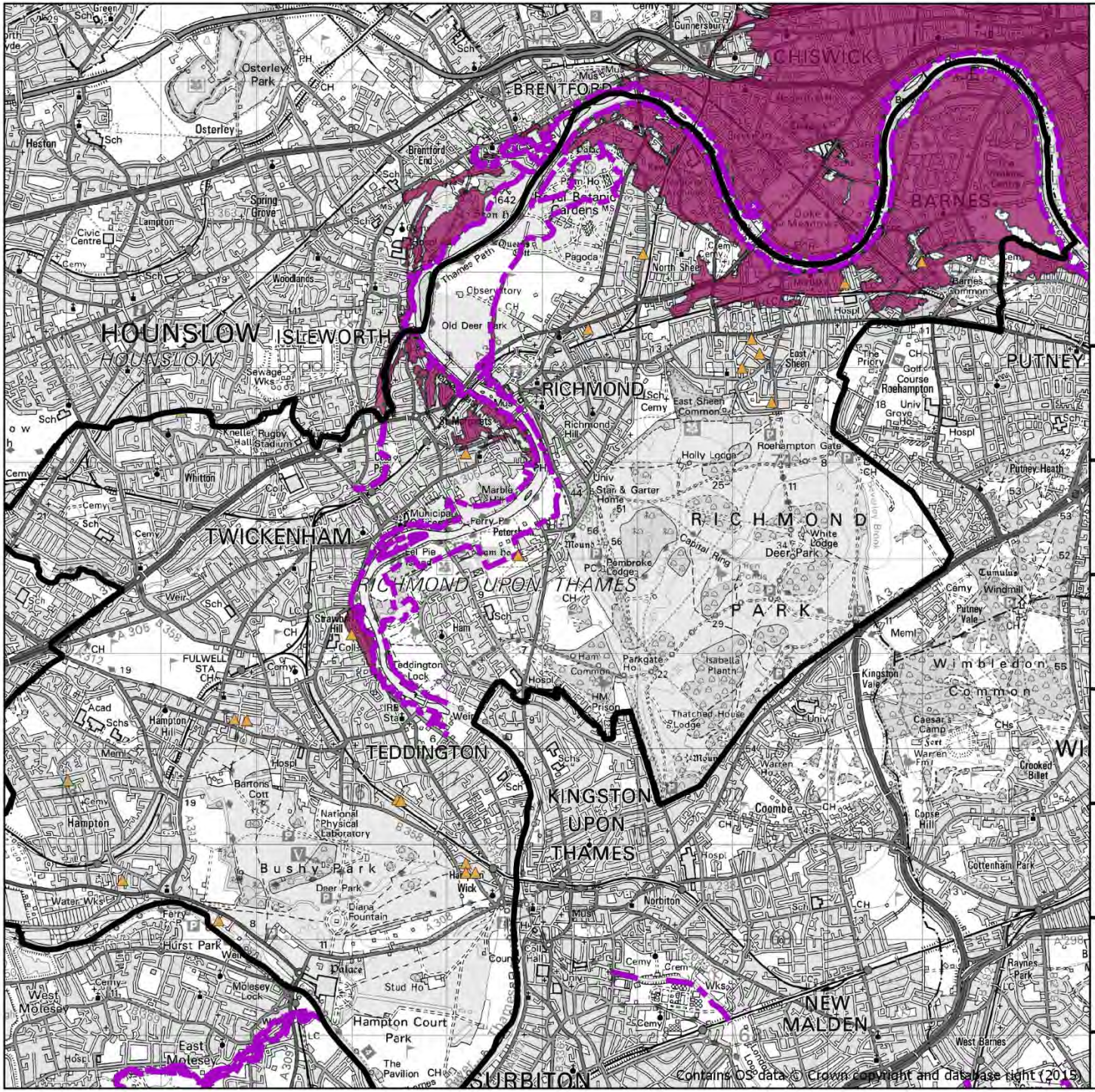
Drawing Title

BGS Susceptibility to Groundwater Flooding

Drawing Number

FIGURE E

1:65,000



Legend

Borough Boundary

Groundwater Flooding Incidents

Flood Defences

Areas benefiting from flood defences

in association with

Environment Agency

Metis Consultants Limited

METIS

Client

LONDON BOROUGH OF RICHMOND UPON THAMES

Project Title

London Borough of Richmond Upon Thames Strategic Flood Risk Assessment Level 1

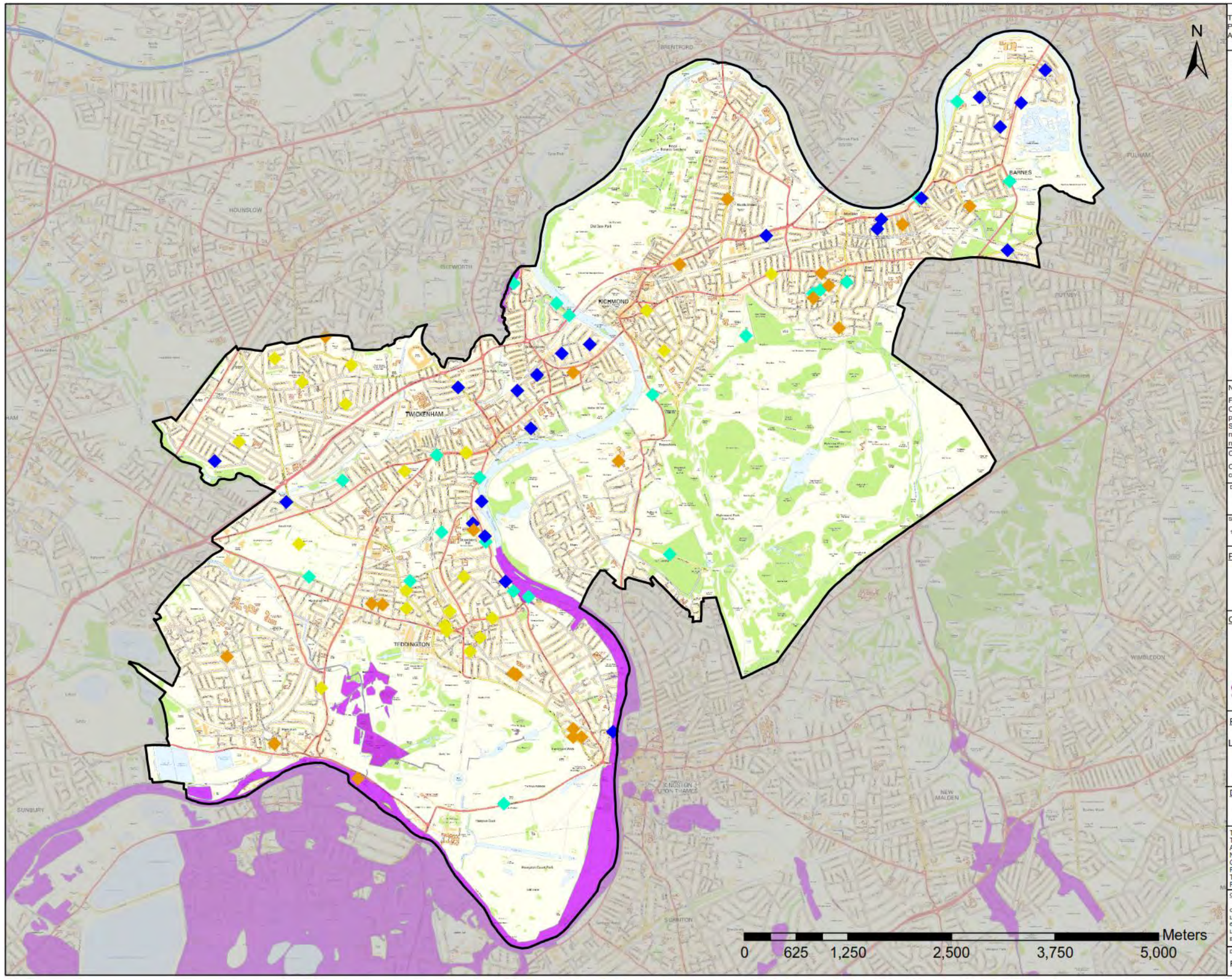
Drawing Title

Areas Benefiting from Defences and Groundwater Flooding Incidents

Drawing Number

FIGURE D

1:65,000



THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

Legend

- Administrative Boundary
- Environment Agency Historic Flood Map

Reported Flooding Incidents

- River
- Multiple
- Surface Water
- Groundwater

Notes

Flooding incidents have been mapped based on Council records available at the time of the production of the Local Flood Risk Management Strategy.In many cases incidents of flooding may not been reported to the Council and will therefore not be shown on this map.

DRAWN BY	CHECKED BY	PASSED BY	DATE
GA	LT	PH	June 2014

SCALE @ A3	ISSUING OFFICE
1:42,000	Gresham Street

Purpose of Issue

DRAFT REPORT
FOR CONSULTATION

Client

Wandsworth, merton, CROYDON www.croydon.gov.uk, Sutton, Royal Kingston

Project Title

LONDON BOROUGH OF RICHMOND
LOCAL FLOOD RISK
MANAGEMENT STRATEGY

Drawing Title

HISTORIC FLOODING

Consultant

Capita
Level 4,
65 Gresham Street
London
EC2V 7NQ

CAPITA | URS

DRAWING NUMBER	REV
FIGURE 1	A

A6 Thames Water Consultation

Sewer Flooding
History Enquiry

Property Searches

Logika Consultants

Search address supplied	Twickenham Studios Ltd The Barons Twickenham TW1 2AW
Your reference	Twickenham Studios
Our reference	SFH/SFH Standard/2020_4322695
Received date	**11 December 2020**
Search date	**11 December 2020**

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

Sewer Flooding
History Enquiry

Property Searches

Search address supplied: Twickenham Studios Ltd,The Barons,Twickenham,TW1 2AW

This search is recommended to check for any sewer flooding in a specific address or area

TWUL, trading as Property Searches, are responsible in respect of the following:-

(i) any negligent or incorrect entry in the records searched;

(ii) any negligent or incorrect interpretation of the records searched;

(iii) and any negligent or incorrect recording of that interpretation in the search report

(iv) compensation payments

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

Sewer Flooding
History Enquiry

Thames Water Property Searches

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

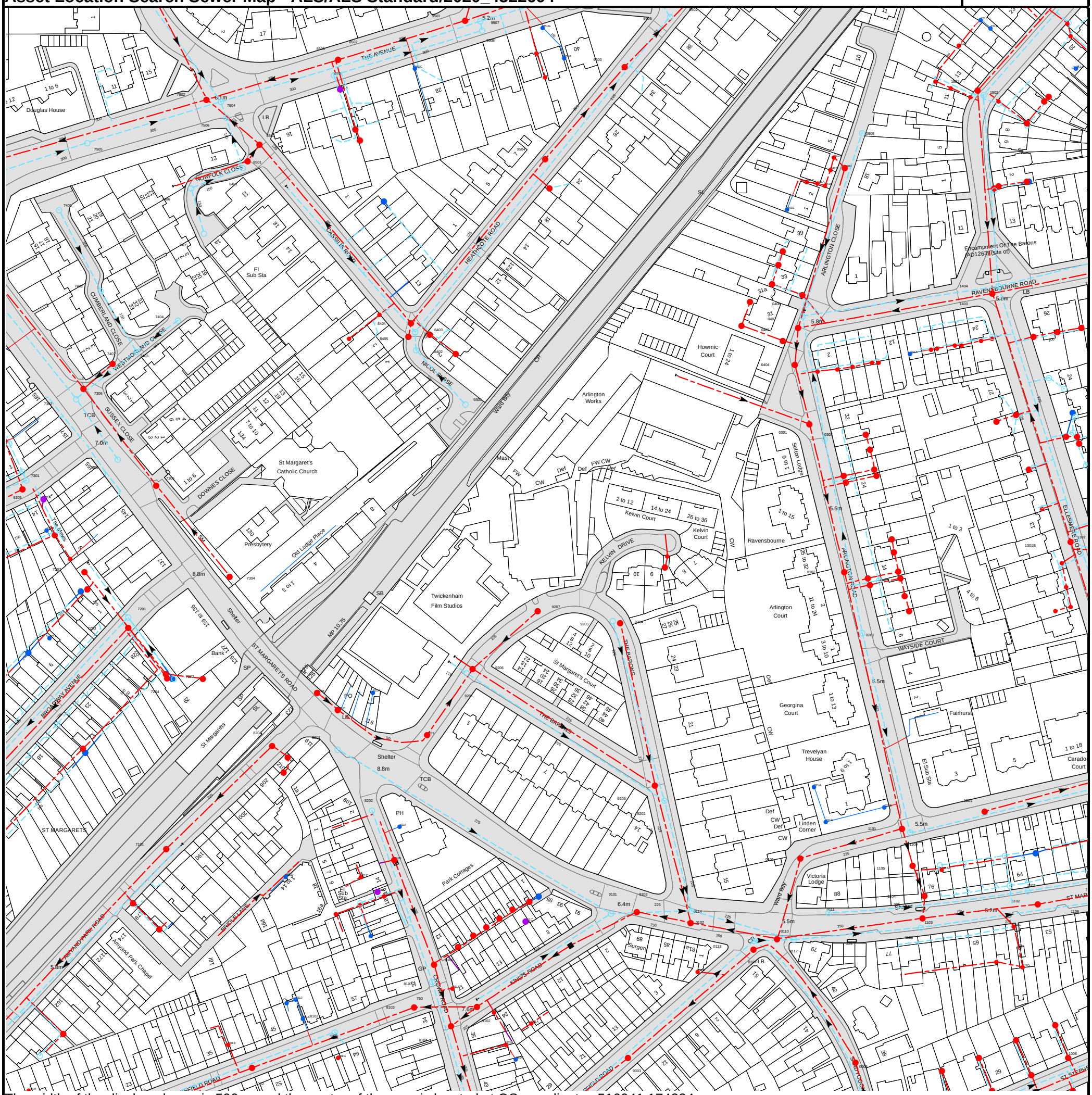
- A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- "Internal flooding" from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- "At Risk" properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company's reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk

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 Sewer Map - ALS/ALS Standard/2020_4322694



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 516941,174324

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

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

Manhole Reference	Manhole Cover Level	Manhole Invert Level
15NL	n/a	n/a
15NE	n/a	n/a
15LJ	n/a	n/a
15LK	n/a	n/a
15ME	n/a	n/a
1502	7.24	4.19
15LM	n/a	n/a
1501	7.4	4.63
15MF	n/a	n/a
15MH	n/a	n/a
15LN	n/a	n/a
151A	n/a	n/a
151D	n/a	n/a
15NK	n/a	n/a
151B	n/a	n/a
15NJ	n/a	n/a
15NC	n/a	n/a
151C	n/a	n/a
15JN	n/a	n/a
7404	7.29	6.18
7406	7.12	6.05
7405	7.34	6.23
7502	6.22	3.81
7504	6.18	2.55
7506	n/a	n/a
8401	6.52	5.78
8501	6.13	5.09
8502	6.07	3.79
851B	5.38	3.53
8505	n/a	3.68
851A	n/a	n/a
85MF	n/a	n/a
85MH	n/a	n/a
8507	5.45	2.3
84MK	n/a	n/a
84LM	n/a	n/a
8404	5.33	3.96
851C	n/a	n/a
9501	5.35	3.77
9507	5.41	2.24
9508	5.26	2.52
95MN	n/a	n/a
951G	n/a	n/a
9504	5.2	4.2
95NE	n/a	n/a
94NK	n/a	n/a
951F	n/a	n/a
9503	5.7	4.05
9505	5.82	2.53
04NL	n/a	n/a
04NM	n/a	n/a
7401	7.3	6.87
7505	6.77	2.6
7402	7.37	6.23
7403	7.12	5.8
14LE	n/a	n/a
14LD	n/a	n/a
14LC	n/a	n/a
14MH	n/a	n/a
14KH	n/a	n/a
1403	5.85	4.36
14NE	n/a	n/a
14NK	n/a	n/a
13JJ	n/a	n/a
1404	5.83	3.24
15LF	n/a	n/a
15KM	n/a	n/a
14NL	n/a	n/a
13JC	n/a	n/a
13JH	n/a	n/a
15LH	n/a	n/a
14NM	n/a	n/a
15LC	n/a	n/a
14NH	n/a	n/a
14KD	n/a	n/a
14MN	n/a	n/a
14KE	n/a	n/a
13LH	n/a	n/a
13KD	n/a	n/a
13KM	n/a	n/a
14KF	n/a	n/a
0301	5.51	3.76
04KC	n/a	n/a
04KD	n/a	n/a
04LF	n/a	n/a
04KE	n/a	n/a
0404	5.59	3.83
04KH	n/a	n/a
04KF	n/a	n/a
141A	n/a	n/a
14LH	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
14LF	n/a	n/a
04NK	n/a	n/a
0403	5.58	3.87
0407	5.67	3.51
0406	5.67	4.03
04ND	n/a	n/a
04MH	n/a	n/a
04NE	n/a	n/a
04NF	n/a	n/a
04NH	n/a	n/a
041E	n/a	n/a
041B	n/a	n/a
041A	n/a	n/a
041C	n/a	n/a
041D	n/a	n/a
0401	n/a	n/a
051A	n/a	n/a
0505	6.18	4.72
0303	5.26	3.71
03LK	n/a	n/a
0302	5.86	3.59
03MD	n/a	n/a
03LE	n/a	n/a
03LN	n/a	n/a
03NE	n/a	n/a
03LM	n/a	n/a
03NK	n/a	n/a
03LL	n/a	n/a
03ME	n/a	n/a
03ML	n/a	n/a
03NH	n/a	n/a
03NF	n/a	n/a
13HH	n/a	n/a
13HJ	n/a	n/a
13HK	n/a	n/a
12NH	n/a	n/a
13LN	n/a	n/a
13LK	n/a	n/a
13MH	n/a	n/a
13MD	n/a	n/a
12NL	n/a	n/a
13ND	n/a	n/a
13MK	n/a	n/a
13NC	n/a	n/a
13KF	n/a	n/a
13ML	n/a	n/a
12NK	n/a	n/a
1301B	5.59	4.8
13LC	n/a	n/a
1302	5.62	4.3
13KH	n/a	n/a
13KJ	n/a	n/a
13LE	n/a	n/a
13NH	n/a	n/a
13NL	n/a	n/a
72ML	n/a	n/a
72KM	n/a	n/a
72NM	n/a	n/a
721A	n/a	n/a
7203	6.85	3.4
7201	6.81	4.37
73NK	n/a	n/a
73NM	n/a	n/a
7307	n/a	n/a
73MK	n/a	n/a
73NC	n/a	n/a
73NF	n/a	n/a
731B	n/a	n/a
731A	n/a	n/a
6305	6.28	3.48
7301	6.25	4.22
63KJ	n/a	n/a
7303	7.31	4.98
63KK	n/a	n/a
63JK	n/a	n/a
7302	6.96	4.87
7306	7.13	5.34
7407	6.86	4.04
8201	n/a	n/a
8204	9.62	4.38
8203	7.49	3.58
821C	n/a	n/a
821B	n/a	n/a
821A	n/a	n/a
7202	6.3	4.55
72KH	n/a	n/a
72KL	n/a	n/a
7204	6.35	4.34
72KF	n/a	n/a
9201	6.77	4.71
9206	6.73	3.38
9204	6.18	3.28
9203	6.24	4.67

Manhole Reference	Manhole Cover Level	Manhole Invert Level
9207	6.3	3.53
7304	7.16	4.8
93NL	n/a	n/a
93NK	n/a	n/a
7305	7.22	4.28
9301	4.65	3.78
84NJ	n/a	n/a
8402	5.22	3.63
84ML	n/a	n/a
8405	5.23	n/a
84NH	n/a	n/a
8403	5.21	3.13
1102	n/a	2.31
1104	5.55	2.94
1107	5.21	3.86
11KC	n/a	n/a
111A	n/a	n/a
1105	5.47	3
11HF	n/a	n/a
0101	5.56	2.89
11KD	n/a	n/a
11MD	n/a	n/a
11LK	n/a	n/a
1109	5.39	3.79
1101	5.43	3.25
011A	n/a	n/a
1201	5.37	3.19
021B	n/a	n/a
021A	n/a	n/a
0201	5.35	4.06
72MH	n/a	n/a
71ND	n/a	n/a
71NE	n/a	n/a
7101	7.01	3.83
82NM	n/a	n/a
811D	n/a	n/a
811L	n/a	n/a
82NK	n/a	n/a
811J	n/a	n/a
811K	n/a	n/a
81NC	n/a	n/a
81NF	n/a	n/a
81ML	n/a	n/a
811C	n/a	n/a
81NJ	n/a	n/a
8202	8.49	5.62
811A	n/a	n/a
811B	n/a	n/a
8105	8.08	5.36
811F	n/a	n/a
8103	n/a	1.9
8101	7.57	6.07
8106	7.56	5.11
811I	n/a	n/a
81NL	n/a	n/a
91ML	n/a	n/a
9102	n/a	1.94
91MM	n/a	n/a
911B	n/a	n/a
10NJ	n/a	n/a
10KL	n/a	n/a
10KE	n/a	n/a
10LF	n/a	n/a
0005	6.74	4.23
10KM	n/a	n/a
10JN	n/a	n/a
10KF	n/a	n/a
11MH	n/a	n/a
11ME	n/a	n/a
111D	n/a	n/a
11NL	n/a	n/a
0112	5.38	3.94
0110	5.48	2.16
1108	5.1	3.75
111C	n/a	n/a
1103	5.27	2.24
0111	5.3	4.09
901C	n/a	n/a
9003	n/a	2.62
901A	n/a	n/a
911A	n/a	n/a
011B	n/a	n/a
0109	5.48	2.81
0113	5.63	4.04
0102	6.23	2.87
911C	n/a	n/a
91MN	n/a	n/a
9101	6.58	4.45
9103	6.7	2.06
0114	6.16	4.1
91NC	n/a	n/a
91ND	n/a	n/a
91NM	n/a	n/a

Manhole Reference	Manhole Cover Level	Manhole Invert Level
9202	6.1	4.3
9205	6.23	3
701B	n/a	n/a
8002	n/a	1.79
8102	5.83	4.63
801G	n/a	n/a
8104	7.12	4.98
701H	n/a	n/a
70NL	n/a	n/a
71NJ	n/a	n/a

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)

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

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

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

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

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

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

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

Control Valve

Drop Pipe

Ancillary

Weir

End Items

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

Outfall

Undefined End

Inlet

Other Symbols

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

Public/Private Pumping Station

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

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

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

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole level indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

A7 Surface Water Calculations

Surface Water Calculations
Summary

Project: Twickenham Studios - Block A
Project Number: LJ1009

Calculated: S McCabe Date: 17.12.2020
Checked: T Gibbs Date: 17.12.2020

Notes	Calculations

Surface water runoff will be managed in accordance with the London Plan and Council requirements, with discharge restricted as close to the greenfield rate as feasible, including for the impacts of climate change.

Existing discharge regime (M100_60):

	Area (ha)	Calculation method	Discharge Rate
Impermeable Site	0.026	Wallingford (Page 2)	3.2 l/s

Proposed drainage regime (Q100):

Impermeable Site	0.026	IoH124 (Page 3)	0.20 l/s
			0.30 l/s *

*(Minimum restriction based on minimum orifice size of 20mm, as set by LBRT to reduce the potential for blockages)

Intial attenuation estimate

Attenuation Feature	Area	Rate (l/s)	Attenuation (m3)
Tank	0.026	0.3	20

Surface Water Calculations
Wallingford Method

Logika CONSULTANTS

Project: Twickenham Studios - Block A
Project Number: LJ1009

Calculated: S McCabe Date: 17.12.2020
Checked: T Gibbs Date: 17.12.2020

Notes	Calculations		
	Calculations based on: Design and Analysis of urban storm drainage. The Wallingford Procedure, Volume 1 Principles methods and practice.		
	User Input Data		
	Total site area	0.026	ha
	SAAR (From FEH)	601	
	Rainfall Intensity (From FEH)	44.6	
	PIMP (% impervious)	100	%
	Soil Type	0.40	
	Very Low Runoff (well drained sandy, loamy or earthy peat soils)	0.15	
	Low Runoff (Very permeable soils (e.g. gravel, sand)	0.30	
	Moderate (Very fine sands, silts and sedimentary clays)	0.40	
	High Runoff (Clayey or loamy soils)	0.45	
	Very High Runoff (Soils of the wet uplands)	0.50	
Fig. 9.7	UCWI (From Figure 9.7 of Wallingford Method)	53	
Eqn. 13	Qp (peak discharge) = 2.78 Cv CR i A		
	Where: Qp (Peak Discharge) i = rainfall intensity A = Total Area		
From FEH	Average rainfall Intensity (i)		
	M100_60 is: 44.6 mm		
Eqn 7.20	Cv = PR/100		
Eqn 7.3	PR = (0.829 PIMP) + (25.0 SOIL) + (0.078 UCWI) - 20.7		
	PIMP (Percentage of catchment which is impervious)	100	%
Page 52	Note: PIMP can not be less than 40%	40	%
	Thus value of PIMP to be used	100	%
	Soil: 0.40 UCWI: 53.05		
	PR =	76.34	
	Thus Cv =	0.76	
Sec 7.10	CR (Recommended for simulation and design)	1.3	
	Qp for 1 in 100 year 60 minute duration =	**3.2 l/s** or	123.0 l/s/ha

Project:	Twickenham Studios - Block A	Calculated: S McCabe	Date: 17.12.2020
Project Number:	LJ1009	Checked: T Gibbs	Date: 17.12.2020

Notes	Calculations

The ICP SuDS method has been used to calculate the greenfield runoff rate from the pre-developed site, the input and output data for which are shown below. The ICP SuDS method utilises the IoH 124 Methodology, and pro-ratas the runoff rate as the site area is less than 50ha (the smallest area which can be used under IoH 124).

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	0.026	Urban	0.000
SAAR (mm)	601	Region Number	Region 6

Results l/s

QBAR Rural	0.1
QBAR Urban	0.1
Q100 years	0.2
Q1 year	0.1
Q30 years	0.2
Q100 years	0.2

Qbar (1 in 2.333)	0.1 l/s
1 in 100	**0.2 l/s**

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 656 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	9.552	0.052	0.0	0.2	0.2	7.5	O K
30 min Summer	9.567	0.067	0.0	0.2	0.2	9.6	O K
60 min Summer	9.582	0.082	0.0	0.2	0.2	11.7	O K
120 min Summer	9.601	0.101	0.0	0.3	0.3	14.4	O K
180 min Summer	9.610	0.110	0.0	0.3	0.3	15.7	O K
240 min Summer	9.615	0.115	0.0	0.3	0.3	16.4	O K
360 min Summer	9.619	0.119	0.0	0.3	0.3	16.9	O K
480 min Summer	9.618	0.118	0.0	0.3	0.3	16.8	O K
600 min Summer	9.616	0.116	0.0	0.3	0.3	16.6	O K
720 min Summer	9.615	0.115	0.0	0.3	0.3	16.3	O K
960 min Summer	9.611	0.111	0.0	0.3	0.3	15.8	O K
1440 min Summer	9.603	0.103	0.0	0.3	0.3	14.7	O K
2160 min Summer	9.592	0.092	0.0	0.2	0.2	13.1	O K
2880 min Summer	9.583	0.083	0.0	0.2	0.2	11.8	O K
4320 min Summer	9.569	0.069	0.0	0.2	0.2	9.9	O K
5760 min Summer	9.560	0.060	0.0	0.2	0.2	8.6	O K
7200 min Summer	9.553	0.053	0.0	0.2	0.2	7.6	O K
8640 min Summer	9.548	0.048	0.0	0.2	0.2	6.9	O K
10080 min Summer	9.544	0.044	0.0	0.2	0.2	6.3	O K
15 min Winter	9.559	0.059	0.0	0.2	0.2	8.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	156.006	0.0	6.4	26
30 min Summer	100.963	0.0	8.4	41
60 min Summer	62.432	0.0	11.5	70
120 min Summer	39.611	0.0	14.7	128
180 min Summer	29.728	0.0	16.6	186
240 min Summer	23.987	0.0	17.8	244
360 min Summer	17.422	0.0	19.4	362
480 min Summer	13.735	0.0	20.4	440
600 min Summer	11.363	0.0	21.1	494
720 min Summer	9.704	0.0	21.6	554
960 min Summer	7.529	0.0	22.2	680
1440 min Summer	5.238	0.0	22.9	952
2160 min Summer	3.631	0.0	25.0	1360
2880 min Summer	2.804	0.0	25.7	1760
4320 min Summer	1.966	0.0	26.8	2516
5760 min Summer	1.541	0.0	28.6	3280
7200 min Summer	1.288	0.0	29.8	4032
8640 min Summer	1.119	0.0	31.0	4752
10080 min Summer	0.999	0.0	32.1	5448
15 min Winter	156.006	0.0	7.2	26

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	9.575	0.075	0.0	0.2	0.2	10.8	O K
60 min Winter	9.592	0.092	0.0	0.2	0.2	13.1	O K
120 min Winter	9.613	0.113	0.0	0.3	0.3	16.2	O K
180 min Winter	9.624	0.124	0.0	0.3	0.3	17.7	O K
240 min Winter	9.630	0.130	0.0	0.3	0.3	18.6	O K
360 min Winter	9.634	0.134	0.0	0.3	0.3	19.2	O K
480 min Winter	9.634	0.134	0.0	0.3	0.3	19.1	O K
600 min Winter	9.632	0.132	0.0	0.3	0.3	18.8	O K
720 min Winter	9.629	0.129	0.0	0.3	0.3	18.4	O K
960 min Winter	9.624	0.124	0.0	0.3	0.3	17.7	O K
1440 min Winter	9.613	0.113	0.0	0.3	0.3	16.1	O K
2160 min Winter	9.598	0.098	0.0	0.2	0.2	14.0	O K
2880 min Winter	9.586	0.086	0.0	0.2	0.2	12.2	O K
4320 min Winter	9.568	0.068	0.0	0.2	0.2	9.6	O K
5760 min Winter	9.556	0.056	0.0	0.2	0.2	7.9	O K
7200 min Winter	9.547	0.047	0.0	0.2	0.2	6.7	O K
8640 min Winter	9.541	0.041	0.0	0.1	0.1	5.9	O K
10080 min Winter	9.537	0.037	0.0	0.1	0.1	5.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	100.963	0.0	9.4	40
60 min Winter	62.432	0.0	12.9	68
120 min Winter	39.611	0.0	16.5	126
180 min Winter	29.728	0.0	18.6	182
240 min Winter	23.987	0.0	20.0	240
360 min Winter	17.422	0.0	21.8	352
480 min Winter	13.735	0.0	22.9	460
600 min Winter	11.363	0.0	23.6	558
720 min Winter	9.704	0.0	24.2	578
960 min Winter	7.529	0.0	24.9	728
1440 min Winter	5.238	0.0	25.6	1030
2160 min Winter	3.631	0.0	28.1	1460
2880 min Winter	2.804	0.0	28.8	1876
4320 min Winter	1.966	0.0	30.1	2648
5760 min Winter	1.541	0.0	32.1	3408
7200 min Winter	1.288	0.0	33.5	4176
8640 min Winter	1.119	0.0	34.8	4848
10080 min Winter	0.999	0.0	36.0	5560

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 516901 174310 TQ 16901 74310
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.026

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.009	4	8	0.009	8	12	0.009

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 9.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	150.0	0.0	0.151	0.0	0.0
0.150	150.0	0.0			

Orifice Outflow Control

Diameter (m) 0.020 Discharge Coefficient 0.600 Invert Level (m) 9.500

Surface Water Calculations
Summary

Project:	Twickenham Studios - Block C		Calculated:	S McCabe	Date: 05.01.2021
Project Number:	LJ1009		Checked:	S McCabe	Date: 05.01.2021

Notes	Calculations

Surface water runoff will be managed in accordance with the London Plan and Council requirements, with discharge restricted as close to the greenfield rate as feasible, including for the impacts of climate change.

Existing discharge regime (M100_60):

	Area (ha)	Calculation method	Discharge Rate
Impermeable Site	0.014	Wallingford (Page 2)	1.7 l/s

Proposed drainage regime (Q100):

Impermeable Site	0.014	IoH124 (Page 3)	0.10 l/s
			0.30 l/s *

*(Minimum restriction based on minimum orifice size of 20mm, as set by LBRT to reduce the potential for blockages)

Intial attenuation estimate

Attenuation Feature	Area	Rate (l/s)	Attenuation (m3)
Tank	0.014	0.3	9

Surface Water Calculations
Wallingford Method

Logika CONSULTANTS

Project: Twickenham Studios - Block C
Project Number: LJ1009

Calculated: S McCabe Date: 05.01.2021
Checked: S McCabe Date: 05.01.2021

Notes	Calculations		
	Calculations based on: Design and Analysis of urban storm drainage. The Wallingford Procedure, Volume 1 Principles methods and practice.		
	User Input Data		
	Total site area	0.014	ha
	SAAR (From FEH)	601	
	Rainfall Intensity (From FEH)	44.6	
	PIMP (% impervious)	100	%
	Soil Type	0.40	
	Very Low Runoff (well drained sandy, loamy or earthy peat soils)	0.15	
	Low Runoff (Very permeable soils (e.g. gravel, sand)	0.30	
	Moderate (Very fine sands, silts and sedimentary clays)	0.40	
	High Runoff (Clayey or loamy soils)	0.45	
	Very High Runoff (Soils of the wet uplands)	0.50	
Fig. 9.7	UCWI (From Figure 9.7 of Wallingford Method)	53	
Eqn. 13	Qp (peak discharge) = 2.78 Cv CR i A		
	Where: Qp (Peak Discharge) i = rainfall intensity A = Total Area		
From FEH	Average rainfall Intensity (i)		
	M100_60 is: 44.6 mm		
Eqn 7.20	Cv = PR/100		
Eqn 7.3	PR = (0.829 PIMP) + (25.0 SOIL) + (0.078 UCWI) - 20.7		
	PIMP (Percentage of catchment which is impervious)	100 %	
Page 52	Note: PIMP can not be less than 40%	40 %	
	Thus value of PIMP to be used	100 %	
	Soil: 0.40 UCWI: 53.05		
	PR =	76.34	
	Thus Cv =	0.76	
Sec 7.10	CR (Recommended for simulation and design)	1.3	
	Qp for 1 in 100 year 60 minute duration =	**1.7 l/s** or 123.0 l/s/ha	

Project:	Twickenham Studios - Block C	Calculated:	S McCabe	Date:	05.01.2021
Project Number:	LJ1009	Checked:	S McCabe	Date:	05.01.2021

Notes	Calculations

The ICP SuDS method has been used to calculate the greenfield runoff rate from the pre-developed site, the input and output data for which are shown below. The ICP SuDS method utilises the IoH 124 Methodology, and pro-ratas the runoff rate as the site area is less than 50ha (the smallest area which can be used under IoH 124).

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	0.014	Urban	0.000
SAAR (mm)	601	Region Number	Region 6

Results l/s

QBAR Rural	0.0
QBAR Urban	0.0
Q100 years	0.1
Q1 year	0.0
Q30 years	0.1
Q100 years	0.1

Qbar (1 in 2.333)	0.0 l/s
1 in 100	**0.1 l/s**

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 331 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	9.550	0.050	0.0	0.2	0.2	3.8	O K
30 min Summer	9.563	0.063	0.0	0.2	0.2	4.8	O K
60 min Summer	9.576	0.076	0.0	0.2	0.2	5.8	O K
120 min Summer	9.591	0.091	0.0	0.2	0.2	6.9	O K
180 min Summer	9.597	0.097	0.0	0.2	0.2	7.4	O K
240 min Summer	9.599	0.099	0.0	0.2	0.2	7.5	O K
360 min Summer	9.599	0.099	0.0	0.2	0.2	7.6	O K
480 min Summer	9.598	0.098	0.0	0.2	0.2	7.4	O K
600 min Summer	9.595	0.095	0.0	0.2	0.2	7.2	O K
720 min Summer	9.593	0.093	0.0	0.2	0.2	7.0	O K
960 min Summer	9.587	0.087	0.0	0.2	0.2	6.6	O K
1440 min Summer	9.576	0.076	0.0	0.2	0.2	5.8	O K
2160 min Summer	9.563	0.063	0.0	0.2	0.2	4.8	O K
2880 min Summer	9.554	0.054	0.0	0.2	0.2	4.1	O K
4320 min Summer	9.542	0.042	0.0	0.1	0.1	3.2	O K
5760 min Summer	9.535	0.035	0.0	0.1	0.1	2.6	O K
7200 min Summer	9.530	0.030	0.0	0.1	0.1	2.3	O K
8640 min Summer	9.528	0.028	0.0	0.1	0.1	2.1	O K
10080 min Summer	9.526	0.026	0.0	0.1	0.1	2.0	O K
15 min Winter	9.556	0.056	0.0	0.2	0.2	4.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	156.006	0.0	3.6	26
30 min Summer	100.963	0.0	4.7	39
60 min Summer	62.432	0.0	6.1	68
120 min Summer	39.611	0.0	7.7	124
180 min Summer	29.728	0.0	8.7	182
240 min Summer	23.987	0.0	9.4	220
360 min Summer	17.422	0.0	10.2	280
480 min Summer	13.735	0.0	10.8	344
600 min Summer	11.363	0.0	11.1	412
720 min Summer	9.704	0.0	11.4	480
960 min Summer	7.529	0.0	11.8	616
1440 min Summer	5.238	0.0	12.3	882
2160 min Summer	3.631	0.0	13.0	1264
2880 min Summer	2.804	0.0	13.3	1644
4320 min Summer	1.966	0.0	13.9	2376
5760 min Summer	1.541	0.0	14.7	3064
7200 min Summer	1.288	0.0	15.4	3760
8640 min Summer	1.119	0.0	16.0	4496
10080 min Summer	0.999	0.0	16.6	5240
15 min Winter	156.006	0.0	4.0	25

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	9.571	0.071	0.0	0.2	0.2	5.4	O K
60 min Winter	9.585	0.085	0.0	0.2	0.2	6.5	O K
120 min Winter	9.603	0.103	0.0	0.3	0.3	7.8	O K
180 min Winter	9.610	0.110	0.0	0.3	0.3	8.4	O K
240 min Winter	9.612	0.112	0.0	0.3	0.3	8.5	O K
360 min Winter	9.612	0.112	0.0	0.3	0.3	8.5	O K
480 min Winter	9.609	0.109	0.0	0.3	0.3	8.3	O K
600 min Winter	9.606	0.106	0.0	0.3	0.3	8.0	O K
720 min Winter	9.602	0.102	0.0	0.3	0.3	7.7	O K
960 min Winter	9.593	0.093	0.0	0.2	0.2	7.1	O K
1440 min Winter	9.578	0.078	0.0	0.2	0.2	6.0	O K
2160 min Winter	9.562	0.062	0.0	0.2	0.2	4.7	O K
2880 min Winter	9.550	0.050	0.0	0.2	0.2	3.8	O K
4320 min Winter	9.536	0.036	0.0	0.1	0.1	2.7	O K
5760 min Winter	9.529	0.029	0.0	0.1	0.1	2.2	O K
7200 min Winter	9.526	0.026	0.0	0.1	0.1	1.9	O K
8640 min Winter	9.523	0.023	0.0	0.1	0.1	1.8	O K
10080 min Winter	9.522	0.022	0.0	0.1	0.1	1.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30 min Winter	100.963	0.0	5.3	39
60 min Winter	62.432	0.0	6.8	66
120 min Winter	39.611	0.0	8.7	122
180 min Winter	29.728	0.0	9.8	178
240 min Winter	23.987	0.0	10.5	232
360 min Winter	17.422	0.0	11.5	292
480 min Winter	13.735	0.0	12.1	368
600 min Winter	11.363	0.0	12.5	444
720 min Winter	9.704	0.0	12.8	518
960 min Winter	7.529	0.0	13.2	664
1440 min Winter	5.238	0.0	13.8	942
2160 min Winter	3.631	0.0	14.5	1332
2880 min Winter	2.804	0.0	14.9	1708
4320 min Winter	1.966	0.0	15.6	2424
5760 min Winter	1.541	0.0	16.5	3104
7200 min Winter	1.288	0.0	17.2	3752
8640 min Winter	1.119	0.0	17.9	4584
10080 min Winter	0.999	0.0	18.6	5248

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 516901 174310 TQ 16901 74310
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.013

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.005	4	8	0.005	8	12	0.004

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

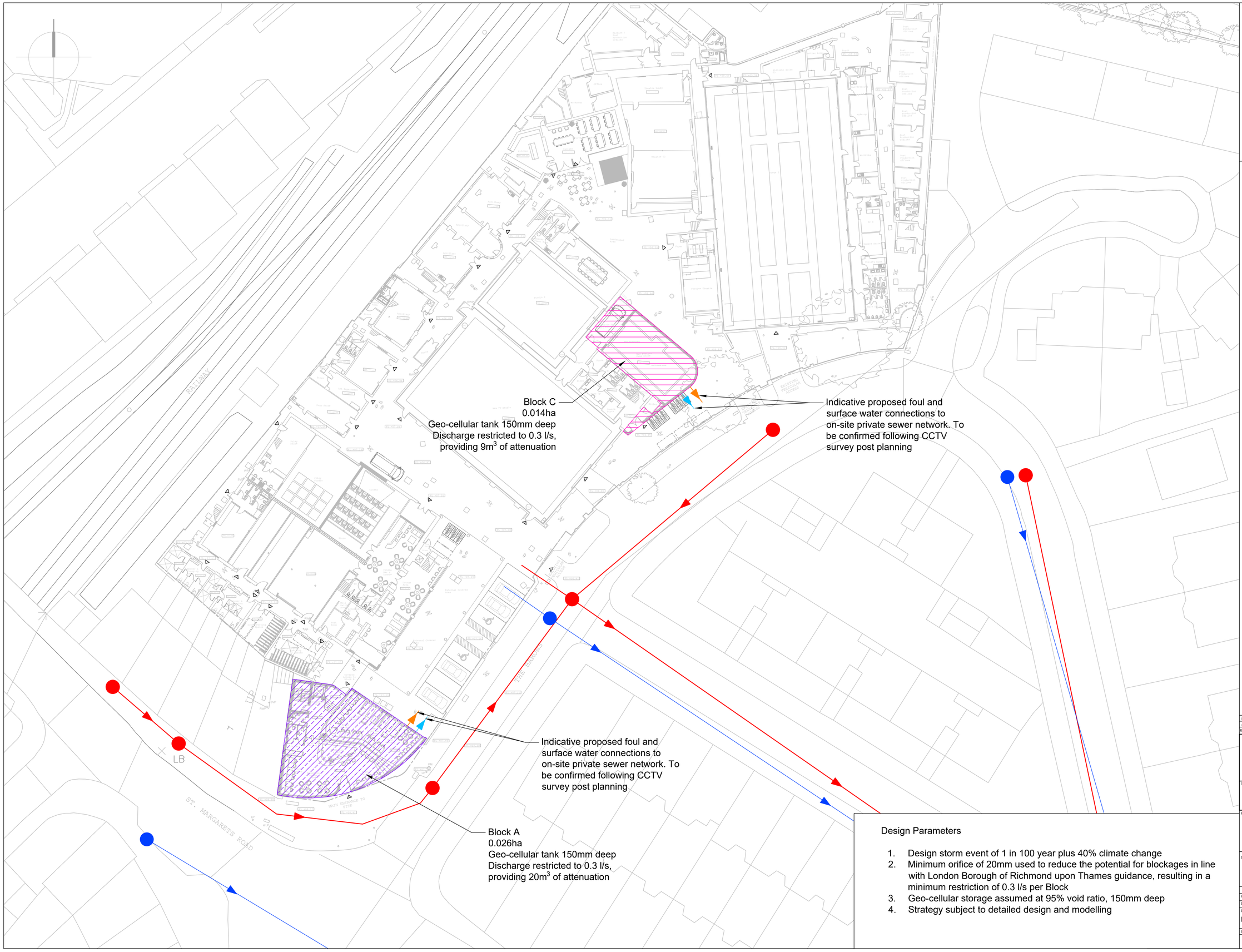
Invert Level (m) 9.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	80.0	0.0	0.151	0.0	0.0
0.150	80.0	0.0			

Orifice Outflow Control

Diameter (m) 0.020 Discharge Coefficient 0.600 Invert Level (m) 9.500

A8 Drainage Strategy Drawing



NOTES:

1 - To be read in conjunction with Logika Consultants' Flood Risk and Drainage Strategy, LJ1009-A-F1-Flood.

2 - All dimensions to be checked on site.

3 - Attenuation volumes and drainage strategy to be refined at the detailed design stage.

4. Any requirement for on-site private drainage diversions to be confirmed post planning, following completion of a CCTV survey.

5 - Refer to Architect's drawings for building layout.

6 - All work by the contractor must be carried out in such a way that all requirements under the health and safety at work act are satisfied.

7 - All work to be carried out in compliance with the requirements of the relevant statutory authorities and regulations.

Key

- Block A
- Block C
- Thames Water surface water sewer
- Thames Water foul sewer
- Proposed surface water sewer
- Proposed foul sewer

Design Parameters

1. Design storm event of 1 in 100 year plus 40% climate change
2. Minimum orifice of 20mm used to reduce the potential for blockages in line with London Borough of Richmond upon Thames guidance, resulting in a minimum restriction of 0.3 l/s per Block
3. Geo-cellular storage assumed at 95% void ratio, 150mm deep
4. Strategy subject to detailed design and modelling

REV	DATE	PURPOSE OF ISSUE	DWN	APP
B	07.01.21	FOR PLANNING - UPDATED SCHEME PLAN	SM	TL
A	06.01.21	FOR PLANNING	SM	TL

Logika CONSULTANTS

ISSUER: Logika Consultants

PROJECT TITLE: Twickenham Film Studios

DRAWING TITLE: Outline Drainage Strategy

	NAME:	DATE:
CHECKED:	TOMAS LISKA	07.01.21
DRAWN BY:	SOPHIE MCCABE	07.01.21

DRAWING STATUS	SIZE	SCALE
FOR PLANNING	A1	1:250

ISSUER	PROJECT NO	TYPE	SEQUENCE	REV
LJ	1009	DWG	001	B

A9 Foul Calculations

Foul Calculations
Existing Rate

Project: Twickenham Studios
Project Number: LJ1009

Calculated: S McCabe Date: 06.01.2020
Checked: S McCabe Date: 06.01.2020

	Dry Weather Flow Rate (per day)	Number	Factor	Profile (hours)	Peak Flow Rate (litres/second)
Residential[1]			2.12	24	
Existing property 160 l/person/day	368.0 l/ unit	2 existing units			0.0
New property = 125 l/person/day	287.5 l/ unit	0 proposed units			0.0
Occupancy = 2.3 persons					
Hotel[2]	500.0 l/ room	0 rooms	3	24	0.0
Student Accommodation[1]	200.0 l/ bed	0 beds	3	24	0.0
Offices[3]	750.0 l/ 100m^2	5449 m^2	3	10	3.4
Retail[3]	400.0 l/ 100m^2	0 m^2	3	12	0.0
Cinema[3]	10.0 l/ seat	0 seats*	3	8	0.0
Health Club/Sports Centre[2]	50.0 l/ customer	0 customers**	3	16	0.0
Day School[2]	90.0 l/ pupil	0 pupils	3	10	0.0
Boarding School[2]	175.0 l/ pupil	0 pupils	3	24	0.0
Hospital[3]	625.0 l/ bed	0 beds	3	24	0.0
Nursing Home[2]	350.0 l/ bed	0 beds	3	24	0.0
Restaurant/Café[2]	30.0 l/ cover	50 covers	3	8	0.2
Pub/Club[4]	15.0 l/ customer	37 customers***	3	12	0.0
Warehouse[3]	150.0 l/ 100m^2	0 m^2	3	12	0.0
Manufacturing[3]	550.0 l/ 100m^2	0 m^2	3	12	0.0
Commercial[3]	300.0 l/ 100m^2	2586 m^2	3	12	0.5
SUB TOTAL					4.2
Infiltration percentage 10%					0.4
TOTAL					**4.6**

* Foul flow rate calculated based on number of seats, 4m^2 allowed for each seat.
Floor area = 0 m^2 4 m^2 per person

** Foul flow rate calculated based on number of customers, 4m^2 has been allowed for each customer.
Floor area = 0 m^2 4 m^2 per person

*** Foul flow rate calculated based on number of customers, 4m^2 has been allowed for each customer.
Floor area = 148 m^2 4 m^2 per person

Source: Thames Water Guidelines (2016)
[2] British Water (2013)
[3] Jones (1992)
[4] Butler and Davies (2004)

Foul Calculations
Proposed Rate

Project: Twickenham Studios
Project Number: LJ1009

Calculated: S McCabe Date: 06.01.2020
Checked: S McCabe Date: 06.01.2020

	Dry Weather Flow Rate (per day)	Number	Factor	Profile (hours)	Peak Flow Rate (litres/second)
Residential[1]			2.12	24	
Existing property 160 l/person/day	400.0 l/ unit	0 existing units			0.0
New property = 125 l/person/day	312.5 l/ unit	0 proposed units			0.0
Occupancy = 2.5 persons					
Hotel[2]	500.0 l/ room	0 rooms	3	24	0.0
Student Accommodation[1]	200.0 l/ bed	0 beds	3	24	0.0
Offices[3]	750.0 l/ 100m^2	6911 m^2	3	10	4.3
Retail[3]	400.0 l/ 100m^2	0 m^2	3	12	0.0
Cinema[3]	10.0 l/ seat	23.3 seats*	3	8	0.0
Health Club/Sports Centre[2]	50.0 l/ customer	0 customers**	3	16	0.0
Day School[2]	90.0 l/ pupil	0 pupils	3	10	0.0
Boarding School[2]	175.0 l/ pupil	0 pupils	3	24	0.0
Hospital[3]	625.0 l/ bed	0 beds	3	24	0.0
Nursing Home[2]	350.0 l/ bed	0 beds	3	24	0.0
Restaurant/Café[2]	30.0 l/ cover	170 covers	3	8	0.5
Pub/Club[4]	15.0 l/ customer	37 customers***	3	12	0.0
Warehouse[3]	150.0 l/ 100m^2	0 m^2	3	12	0.0
Manufacturing[3]	550.0 l/ 100m^2	0 m^2	3	12	0.0
Commercial[3]	300.0 l/ 100m^2	2604 m^2	3	12	0.5
SUB TOTAL					5.5
Infiltration percentage 10%					0.5
TOTAL					**6.0**

* Foul flow rate calculated based on number of seats, 4m^2 allowed for each seat.
Floor area = 93 m^2 4 m^2 per person

** Foul flow rate calculated based on number of customers, 4m^2 has been allowed for each customer.
Floor area = 0 m^2 4 m^2 per person

*** Foul flow rate calculated based on number of customers, 4m^2 has been allowed for each customer.
Floor area = 148 m^2 4 m^2 per person

Source: Thames Water Guidelines (2016)
[2] British Water (2013)
[3] Jones (1992)
[4] Butler and Davies (2004)