

Appendix C Correspondence

Sarah Kirby

From: WT Enquiries [WTenquiries@environment-agency.gov.uk]
Sent: 21 December 2011 15:04
To: Sarah Kirby
Subject: RE: 26004 Southam Road Retail, Banbury - FRA data request
Attachments: Prod_4.pdf; 89_07_SD02_November 11.pdf
Our ref: WT/003293

Dear Sarah

Thank you for your enquiry.

Please find attached the product 4.

There are no formal defences in this area and nothing planned at present. Banbury FAS will not effect this area.

For an ordinary watercourse we request that a 5 metre buffer zone/maintenance strip be retained.

The Environment Agency cannot at this time provide any flood warning service for the area in question.

The area of Banbury at the confluence of the Birds Brook & River Cherwell (downstream of the area in question) is covered by a Flood Alert area, 061WAF14UChrwell - 'River Cherwell from Charwelton to just above Upper Heyford' and a Flood Warning area 061FWF14Banbury - 'River Cherwell at Banbury'.

The customer could, if they wish be registered to receive Flood Alerts and Warnings for these areas. However, this would not cover the specific piece of land that they are enquiring about and would only provide them an appreciation for what is occurring locally in the River Cherwell catchment.

The lead time for issuing Flood Alerts and Warnings is a minimum of two hours, according to the Environment Agency's customer charter. However we would always endeavour to provide Alerts & Warnings at the earliest possible opportunity where we are confident in the evidence that we have.

Groundwater Levels and Flows

The site is situated on Charmouth Mudstone. These deposits are classed as unproductive strata. As such they are unlikely to hold much groundwater, so we have no information on groundwater levels or flow.

Groundwater Flooding

As the site lies on unproductive strata, groundwater flooding at the site is unlikely. Water logging would be possible following heavy or prolonged rainfall due to the low permeability geology, but this is not groundwater flooding.

Source Protection Zones

The site is not in a Source Protection Zone. More information on Source Protection Zones and their locations can be seen on our website by following links to 'What's In your Backyard > Groundwater'.

Yours sincerely



Dawn Cooper
External Relations Officer
West Thames Area
Environment Agency, Red Kite House, Howbery Park, Crowmarsh Gifford, Wallingford OX10 8BD
Tel: 01491 828352
email: wtenquiries@environment-agency.gov.uk

21/02/2012



Heating and lighting buildings when they're half empty is a waste. Over the festive period this year, we'll be closing some of our offices and floors to save us money and energy. We'll be supporting our colleagues to work from alternative nearby locations.

Please help us to improve our service. Click on the link below to complete our Customer Survey – we use every piece of feedback we receive.

<https://web.questback.com/isa/qbv.dll/SQ?q=8w2Qkfx%2BivsepdhrrIUf4oN%2BWx2h2wqtHwtHJZWNcAtnPg%3D%3D>

From: Sarah Kirby [mailto:skirby@peterbrett.com]
Sent: 09 December 2011 14:30
To: WT Enquiries
Subject: 26004 Southam Road Retail, Banbury - FRA data request
Importance: High

Click [here](#) to report this email as spam.

FAO Jean Fulker - External Relations

Hi

Please find attached a data request for flood risk information for a site at Southam Road in Banbury. Please advise of the costs required to supply this data.
I will be sending a hard copy in the post as well today.

Any queries please contact me on 0121 6332900

Thanks

Regards,
Sarah Kirby
Assistant Engineer
For and on behalf of Peter Brett Associates LLP
Waterloo House, Victoria Square, Birmingham, B2 5TB
Tel: +44 (0)121 633 2900
Fax: +44 (0)121 633 2901
E-mail: skirby@peterbrett.com
Website: www.peterbrett.com

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**Product 4 (Detailed Flood Risk) for Southam Road, Banbury NGR 445196(E), 241434(W)
Our Ref: 14_061_021_001**

Product 4 is designed for developers where Flood Risk Standing Advice FRA (Flood Risk Assessment) Guidance Note 3 Applies.

- i) "all applications in Flood Zone 3, other than non-domestic extensions less than 250 sq meters; and all domestic extensions",
- ii) "all applications with a site area greater than 1 ha" in Flood Zone 2.

Product 4 includes the following information:

Ordnance Survey 1:25k colour raster base mapping;
Flood Zone 2 and Flood Zone 3;
Relevant model node locations and unique identifiers (for cross referencing to the water levels, depths and flows table);
Model extents showing *defended* scenarios;
FRA site boundary (where a suitable GIS layer is supplied);
Flood defence locations (where available/relevant) and unique identifiers; (supplied separately)
Flood Map areas benefiting from defences (where available/relevant);
Flood Map flood storage areas (where available/relevant);
Historic flood events outlines (where available/relevant, not the Historic Flood Map) and unique identifiers;
Statutory (Sealed) Main River (where available within map extents);

A table showing:

- i) model node X/Y coordinate locations, unique identifiers, and levels and flows for *defended* scenarios.
- ii) Flood defence locations unique identifiers and attributes; (supplied
- iii) Historic flood events outlines unique identifiers and attributes; and
- iv) local flood history data (where available/relevant).

Please note:

If you will be carrying out computer modelling as part of your Flood Risk Assessment, please read the enclosed guidance which sets out our requirements and best practice for computer river modelling.

This information is based on that currently available as of the date of this letter. You may feel it is appropriate to contact our office at regular intervals, to check whether any amendments/ improvements have been made. Should you re-contact us after a period of time, please quote the above reference in order to help us deal with your query.

This information is provided subject to the enclosed notice which you should read.

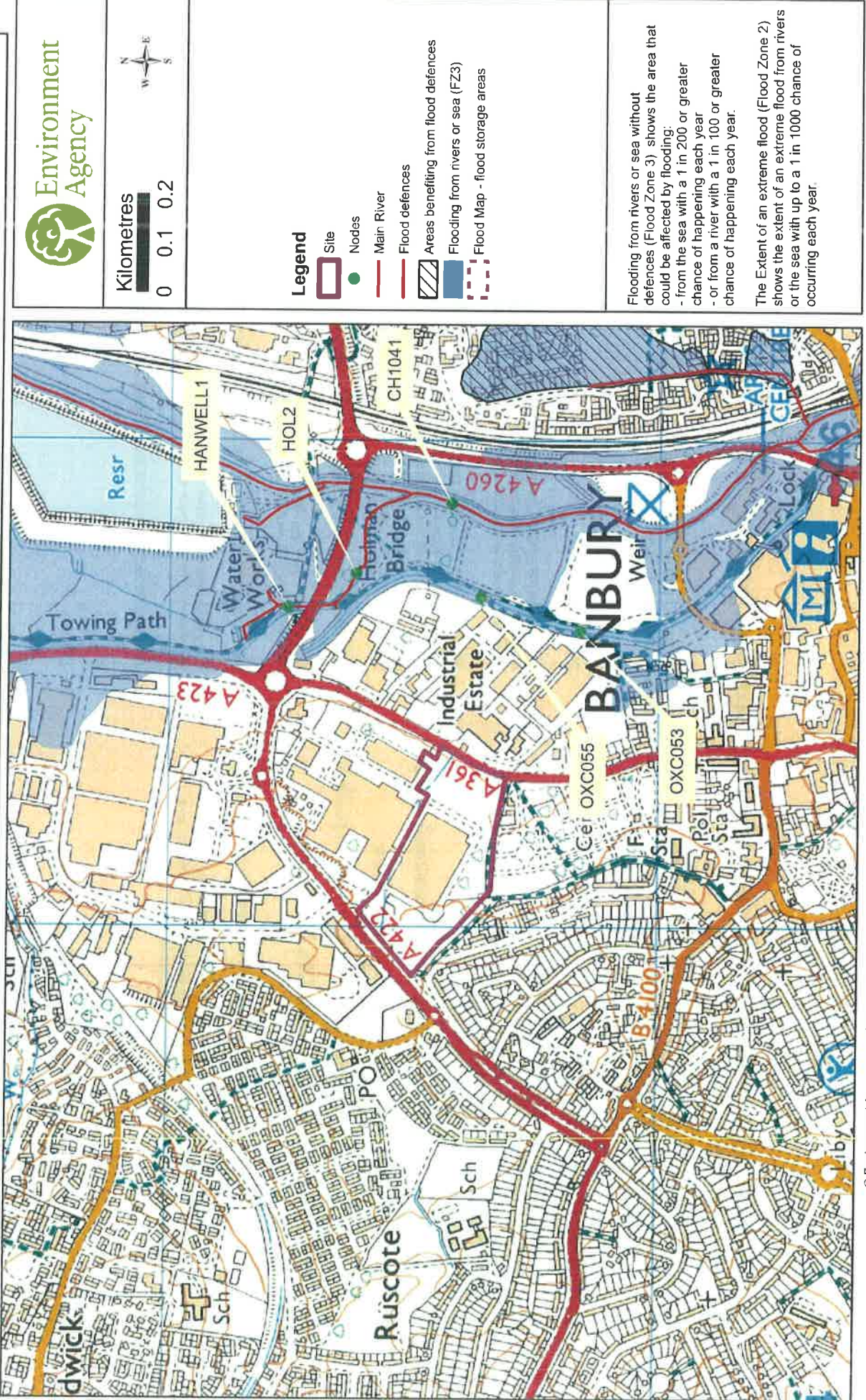
This letter is not a Flood Risk Assessment. The information supplied can be used to form part of your Flood Risk Assessment. Further advice and guidance

<http://www.environment-agency.gov.uk/research/planning/82584.aspx>

If you would like advice from us regarding your development proposals you can complete our pre application enquiry form which can be found at

<http://www.environment-agency.gov.uk/research/planning/33580.aspx>

**Basic Flood Map centred on Southam Road, Banbury NGR 445196(E), 241434(W)
 Created 16/December/2011 - REF: 14_061_021_001**



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Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 08708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Modelled in-channel flood flows and levels

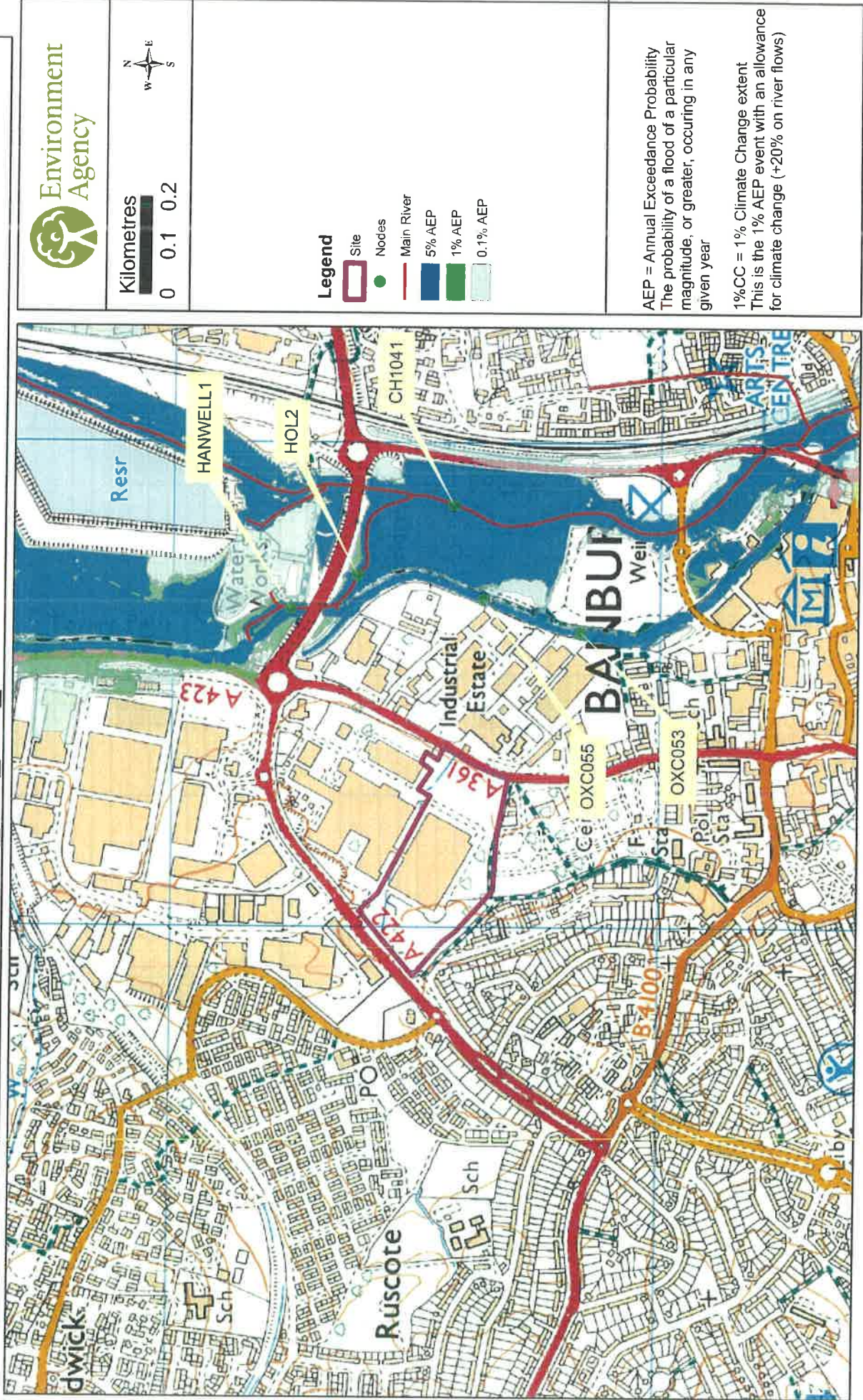
14_061_021_001

The modelled flood levels and flows for the closest most appropriate model node points for your site that are within the river channel are provided below:

Node label	Model	Easting	Northing	Flood Levels (mAOD)			
				5% AEP	1% AEP	1% AEP with climate change allowance (+20% on river flows)	0.1% AEP
CH1041	Cherwell (Banbury) 2011	445872	241425	90.82000	90.88000	n/a	91.92000
OXC055	Cherwell (Banbury) 2011	445679	241364	92.06000	92.12000	n/a	92.22000
OXC053	Cherwell (Banbury) 2011	445611	241163	92.05000	92.09000	n/a	92.14000
HOL2	Cherwell (Banbury) 2011	445728	241621	90.93000	91.00000	n/a	91.93000
HANWELL	Cherwell (Banbury) 2011	445658	241758	91.25000	91.42000	n/a	92.50000

Node label	Model	Easting	Northing	Flood Flows (m ³ /s)			
				5% AEP	1% AEP	1% AEP with climate change allowance (+20% on river flows)	0.1% AEP
CH1041	Cherwell (Banbury) 2011	445872	241425	27.29000	26.16000	n/a	36.75000
OXC055	Cherwell (Banbury) 2011	445679	241364	0.90000	1.80000	n/a	3.25000
OXC053	Cherwell (Banbury) 2011	445611	241163	0.89000	1.80000	n/a	3.22000
HOL2	Cherwell (Banbury) 2011	445728	241621	6.36000	7.68000	n/a	9.24000
HANWELL	Cherwell (Banbury) 2011	445658	241758	6.74000	8.94000	n/a	14.87000

**Detailed FRA Map centred on Southam Road, Banbury NGR 445196(E), 241434(W)
 Created 16/December/2011 - REF: 14_061_021_001**



Model information

14_061_021_001

Model: **Cherwell (Banbury) 2011**

Description: The information provided is taken from the Cherwell (Banbury) Flood Study completed in February 2011. The study was carried out using ISIS TUFLOW 2D modelling software.

Model design runs - defended:
1 in 20 / 5%; 1 in 100 / 1% and 1 in 1000 / 0.1%

Model design runs – undefended:
1 in 20 / 5%; 1 in 100 / 1% and 1 in 1000 / 0.1%

Mapped outputs:
1 in 20 / 5%; 1 in 100 / 1% and 1 in 1000 / 0.1%

Model accuracy:
Levels +/- 250mm

Historic flood data

14_061_021_001

Our records show that the area of your site has been affected by flooding. Information on the floods that have affected your site is provided in the table below:

Flood Event Code	Flood Event Name	Start Date	End Date	Source of Flooding	Cause of Flooding
EA0619470300444	06MarchSpring1947	01/01/1947	12/12/1947	main river	channel capacity exceeded (no raised defences)
EA0619790200400	06FebruaryWinter1979	01/01/1979	12/12/1979	main river	channel capacity exceeded (no raised defences)
EA06199209000281	06SeptemberAutumn1992	01/01/1992	12/12/1992	main river	channel capacity exceeded (no raised defences)
EA0619980400071	06AprilEaster1998	01/04/1998	30/04/1998	main river	channel capacity exceeded (no raised defences)
ea061142598	Banbury CP_ Fluvial Water	19/07/2007	29/07/2007	main river	channel capacity exceeded (no raised defences)

Please note the Environment Agency maps flooding to land not individual properties. Floodplain extents are an indication of the geographical extent of a historic flood. They do not provide information regarding levels of individual properties, nor do they imply that a property has flooded internally.

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Sarah Kirby

From: Hunt, Gordon - Environment & Economy - Highways & Transport
[Gordon.Hunt@Oxfordshire.gov.uk]

Sent: 03 January 2012 16:20

To: Sarah Kirby

Subject: RE: Proposed retail redevelopment at Southam Road, Banbury - request for info to support FRA

Hi Sarah

Sorry for the delay in replying.

1. The culvert across ruscote ave. is owned by Thames Water
The ditch and culvert system through kraft works is owned and maintained by Kraft
Where it leaves Kraft it reverts to the ownership of Thames Water
2. I know of two flooding incidents in July 2006 on Ruscote Ave. , both caused by a bad joint under the road and the right angled bend in Kraft
3. we relayed the pipework , as far as I know no works were undertaken in the Kraft site
4. A careful check of the system through the Kraft site should be undertaken as the sizes of the structures varies through the system as I remember
5. The stream through Kraft takes water from as far as highlands R/A on the Warwick rd (a large catchment)
6. in this area this is the only outlet
7. The County Council intends to forfill its role as Local Lead Flood Authority
8. There will be no problem adopting Suds under the Act

Regards

Gordon Hunt

County Drainage Engineer

From: Sarah Kirby [mailto:skirby@peterbrett.com]

Sent: 03 January 2012 14:45

To: Hunt, Gordon - Environment & Economy - Highways & Transport

Subject: FW: Proposed retail redevelopment at Southam Road, Banbury - request for info to support FRA

Hi

Happy New Year

Have you had a chance to look at our request for flood risk and drainage information?

Any information/guidance would be greatly appreciated

Thanks

Regards,

Sarah Kirby

Assistant Engineer

For and on behalf of Peter Brett Associates LLP

Waterloo House, Victoria Square, Birmingham, B2 5TB

Tel: +44 (0)121 633 2900

Fax: +44 (0)121 633 2901

E-mail: skirby@peterbrett.com

Website: www.peterbrett.com

Roger Tym & Partners and Baker Associates are now part of Peter Brett Associates LLP.

21/02/2012

From: Sarah Kirby
Sent: 09 December 2011 15:17
To: 'gordon.hunt@oxfordshire.gov.uk'
Subject: Proposed retail redevelopment at Southam Road, Banbury - request for info to support FRA

Hi

We are currently preparing a FRA to support a planning application for retail development on part of the existing Kraft site at Southam Road in Banbury. I understand that Oxfordshire County Council has taken on the role of Lead Local Flood Authority for this area.

I attach a data request for flood risk and drainage information and a site location plan.

Any information you can provide would be greatly appreciated.

Regards,
Sarah Kirby
Assistant Engineer
For and on behalf of Peter Brett Associates LLP
Waterloo House, Victoria Square, Birmingham, B2 5TB
Tel: +44 (0)121 633 2900
Fax: +44 (0)121 633 2901
E-mail: skirby@peterbrett.com
Website: www.peterbrett.com

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Andy Preston – Head of Public Protection & Development Management



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B2 5TB

*Bodicote House
Bodicote
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Oxfordshire
OX15 4AA*

www.cherwell.gov.uk

Please ask for: Stephanie Betts
Email: Stephanie.betts

Direct Dial: 26004 BIR Drainage
Our Ref: PL5/3

23 December 2011

Dear Sirs

Re: Flood Risk Assessment – Land off Southam Road Banbury

I write with reference to your letter dated 9 December 2011 received in this office on 12 December 2011.

The District Council no longer has a team dedicated to dealing with drainage matters. This area of responsibility is now dealt with by staff at the County Council.

I note that your letter states that you have already contacted the County Council direct regarding the information that you seek.

Yours faithfully

Stephanie Betts
Planning Administration

Asset Location Search



Carmen Hervas
Brett Consulting Ltd
11 Prospect Court
Courteenhall Road
BLISWORTH
NN7 3DG

Search address supplied Land At Banbury 445131 241459
Ruscote Avenue and Southam Road
Banbury

Your reference 26004

Our reference ALS/ALS Standard/2011_2136537

Search date 16 December 2011

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

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504

F 0118 923 6655/57

E searches@thameswater.co.uk

I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2365661, Registered office
Clearwater Court, Vastern Road
Reading RG1 3DB

Asset Location Search



Search address supplied: Land At Banbury 445131 241459 , Ruscote Avenue and Southam Road, Banbury,

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.

This search provides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0118 925 1504, or use the address below:

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

Tel: 0118 925 1504
Fax: 0118 923 6657

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

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T 0118 925 1504
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E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No 2366661, Registered office
Clearwater Court, Vastem Road
Reading RG1 8DB

Asset Location Search



Waste Water Services

Please provide a copy extract from the public sewer map.

The following quartiles have been printed as they fall within Thames' sewerage area:

SP4441SE
SP4541SW
SP4441NE
SP4541NW

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.

The following quartiles have been printed as they fall within Thames' water

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504
F 0118 923 6655/57
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

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No 2366661. Registered office
Cleanwater Court, Western Road
Reading RG1 8DB

Asset Location Search



area:

SP4441SE
SP4541SW
SP4441NE
SP4541NW

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 0845 920 0800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

An invoice is enclosed. Please send remittance to Thames Water Utilities Ltd., PO Box 223, Swindon, SN38 2TW.

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

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F 0118 923 6655/67
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

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No. 2366661, Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB

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, 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
Clear Water Court
Vastern Road
Reading
RG1 8DB

Tel: 0845 850 2777
Fax: 0118 923 6613
Email: developer.services@thameswater.co.uk

Should you require any further information regarding budget estimates, diversions or stopping up notices then please contact:

DevCon Team
Asset Investment
Thames Water
Maple Lodge STW
Denham Way
Rickmansworth
Hertfordshire
WD3 9SQ

Tel: 01923 898 072
Fax: 01923 898 106
Email: devcon.team@thameswater.co.uk

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Asset Location Search



Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact our Kew Service Desk by writing to:

Clean Water Design
Thames Water Utilities
1 Kew Bridge Road
Brentford
Middlesex
TW8 0EF

Tel: 0845 850 2777
Fax: 0208 213 8833
Email: developer.services@thameswater.co.uk

Thames Water Utilities Ltd

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PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

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No 2366661. Registered office
Clearwater Court, Vastern Road
Reading RG1 8DB



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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
9308	101.42	100.41
9304	101.52	100.71
9309	101.41	100.76
9313	n/a	n/a
9305	101.56	100.86
9312	n/a	n/a
9311	n/a	n/a
9310	n/a	n/a
9201	102.71	102.18
9202	102.72	101.38
9204	101.69	99.89
9252	101.72	99.53
9205	101.46	99.43
9251	101.43	99.19
9303	101.94	100.17
9351	102.25	100.64
9352	101.82	99.8
9001	99.67	97.99
9051	99.92	98.63
9055	n/a	n/a
9003	100.41	98.66
9054	n/a	n/a
9053	100.26	98.75
9002	101.83	100.36
9052	102.6	101.67
9153	105.34	104.28
9103	106.61	103.96
9101	105.99	104.41
9152	107.19	105.43
9151	107.43	105.34
9203	102.5	101.64
9307	102.57	101.75
9302	102.08	100.7
9353	102.09	100.3
9306	101.91	101.11
9301	102.36	101.08
9453	102.78	101
9403	102.51	101.7
9452	103.14	102.4
9404	102.51	101.97
9402	103.01	101.58
9451	103.66	102.03
9401	104.23	102.4
8259	108.25	103.66
8054	n/a	n/a
8258	107.98	103.7
8253	109.15	107.57
8356	105.68	103.89
8260	n/a	n/a
8351	105.72	104.74
8201	108.59	105.16
9254	106.66	103.73
9206	106.68	104.06
9253	106.58	104.97
9102	107.84	105.06
8492	n/a	n/a
8495	106.71	105.26
8055	n/a	n/a
8496	106.26	105.22
8160	n/a	n/a
8051	102.93	100.48
8159	n/a	n/a
8255	109.84	108.29
8002	102.91	100.16
8452	106.12	105.19
8050	102.05	100.06
8001	102.06	99.99
8251	109.71	108.47
8056	n/a	n/a
8202	109.21	103.39
8354	106.56	105.52
8252	106.34	104.8
8352	n/a	n/a
8353	111.01	110.12
8451	103.67	101.14
8005	n/a	n/a
8053	106.02	103.7
8052	104.34	101
8102	105.95	103.4
8003	104.19	100.48
8060	n/a	n/a
7051	n/a	n/a
8059	n/a	n/a
7158	106.61	104.15
8254	110.99	109.4
8494	107.72	105.34
7451	104.41	102.93
7154	105.28	102.86
7352	110.21	107.5
7102	109.89	107.22
7150	109.93	108.2

Manhole Reference	Manhole Cover Level	Manhole Invert Level
7157	n/a	n/a
7452	104.58	103
7104	110.63	108.61
7151	109.8	107.77
7152	110.68	109
7103	109.64	107.43
7156	n/a	n/a
7351	111.04	110.16
7101	109.42	107.56
7155	n/a	n/a
7201	111.11	109.04
7353	109.28	108.23
7250	111.1	109.15
7202	111.26	109.3
7050	99.79	n/a
6055	104.46	102.02
6452	105.37	103.72
6151	106.25	105.07
6101	107.73	106.03
6451	103.41	102.41
6301	108.9	106.88
6401	103.21	101.85
6353	109.6	107.84
6150	107.79	104.83
7105	109.24	106.94
7153	109.38	108.39
6003	103.16	100.77
6002	102.43	100.32
6004	104.52	101.47
6057	101.22	n/a
6005	101.1	n/a
6056	104.15	102.16
5403	102.2	100.37
5404	102.56	100.88
5197	n/a	n/a
5154	105.76	104.27
5152	104.26	103
5453	102.26	100.83
5252	106.97	105.7
6351	104.53	102.58
6454	102.54	101.04
6402	102.62	100.71
6252	107.63	106.19
6155	n/a	n/a
6154	n/a	n/a
6156	n/a	n/a
6153	n/a	n/a
6453	102.71	101.33
6202	107.68	104.19
6152	n/a	n/a
6455	103.85	102.05
6403	103.85	101.76
6203	108.36	106.26
6253	108.63	106.89
6352	105.08	103.6
6201	108.51	106.35
8251	109.32	107.53
6052	103.24	101.46
6051	103.44	99.88
6001	103.45	100.43
6053	102.8	100.94
6054	102.38	101.22
5102	104.91	103.53
5201	105.05	104.36
5251	105.11	103.09
5151	105.11	103.93
5195	n/a	n/a
5194	n/a	n/a
5104	104.81	101.34
5193	n/a	n/a
5196	n/a	n/a
5156	105.13	104.16
5158	104.28	n/a
5153	105.05	103.77
5105	105.04	103.32
5051	103.71	102.66
5155	105.5	104.23
5101	105.47	102.67
5093	n/a	n/a
5094	n/a	n/a
5103	105.37	102.4
5351	103.43	101.64
5352	103.42	100.82
5353	103.1	100.15
5301	103.08	100.88
5451	102.32	99.49
5402	102.32	100.32
5354	103.95	102.09
5454	102.59	101.23
5401	102.18	100.05
5452	102.18	100.73

Manhole Reference	Manhole Cover Level	Manhole Invert Level
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Manhole Reference	Manhole Cover Level	Manhole Invert Level
4061	n/a	n/a
4067	92.15	90.19
4063	91.03	n/a
4062	92	91
4065	92.57	n/a
4058	92.6	90.71
4059	92.55	89.43
3051	94.71	90.46
3053	n/a	n/a
3001	94.63	93.42
3052	94.33	93.58
4057	93.43	92.1
4953	93.32	90.82
4056	92.72	89.44
4052	92.34	90.66
4051	92.77	90.11
4066	92.7	89.34
4054	92.56	90.57
4060	n/a	89.86
4053	92.72	90.1
3101	94.39	91.81
3102	n/a	n/a
3253	n/a	n/a
3201	93.41	91.14
3202	93.27	91.15
3251	93.89	90.1
2303	94.07	90.7
3353	94.17	92.71
2302	93.93	92.5
2352	94.45	91.1
3301	94.47	90.56
0052	100.72	98.85
0051	101	99.83
0101	101.26	99.97
0151	101.22	100.14
0152	101.49	99.94
0102	101.44	99.1
0201	101.09	98.74
0251	101.17	99.62
2301	94.23	93.08
2351	94.48	93.56
0356	99.17	98.49
1302	95.52	93.66
1351	95.55	94.31
0305	97.51	95.85
0357	97.5	96.27
1301	96.68	94.87
1352	n/a	n/a
0354	99.09	98.61
0202	98.31	97.2
0252	98.37	97.5
0297	n/a	n/a
0296	n/a	n/a
0295	n/a	n/a
0203	98.53	97.17
0294	n/a	n/a
0302	97.77	96.53
0351	98.93	97.29
0355	97.77	96.75
0301	99.31	97.85
0352	99.21	97.71
0353	99.12	97.97
0358	n/a	n/a
0303	97.58	96.18
0304	97.52	96.01
3352	93.99	93.16
3302	95.03	90.43
3351	95.15	91.77
3401	94.57	89.69
2401	95.85	90.83

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Manhole Reference	Manhole Cover Level	Manhole Invert Level
9503	100.35	95.54
9554	100.44	95.39
8501	101.85	96.62
8550	103.42	96.58
8651	100.24	98.87
7607	100.58	98.67
7703	102.11	100.07
7754	102.14	100.45
7704	102.68	100.45
7753	102.73	101.03
7752	103.17	101.47
7851	103.49	101.22
7801	103.59	100.91
7805	104.67	102.98
7808	104.63	102.96
7804	105	103.15
7806	104.26	102.59
7807	104.51	102.9
7853	104.67	102.86
7951	107.84	105.69
7952	106.73	104.9
9751	102.75	100.56
9752	103.72	101.2
9701	103.62	101.18
9850	104.38	101.77
9801	104.28	101.76
9951	102.23	99.14
9901	102.16	99.46
7651	100.71	99.24
8701	101.65	99.22
8752	101.6	99.58
8751	102.77	100.79
7755	102.35	101.6
8852	104.45	101.91
8801	104.39	102.13
7802	104.39	101.49
7852	104.41	101.56
8953	103.93	102.81
8952	104.29	102.99
8951	104.82	103.29
8551	100.66	95.46
9551	99.82	95.42
8504	100.41	95.74
9502	98.53	94.97
9504	99.79	95.19
8502	101.31	95.74
8503	100.62	95.92
8753	104.68	101.91
9851	104.62	103
8851	104.24	101.99
9852	103.78	102.32
8954	103.75	102.8
7552	101.2	99.83
6503	101.48	98.35
6555	101.22	99.43
7501	100.72	98.06
7557	100.61	99.12
6553	100.99	98.68
6557	100.9	98.58
6559	n/a	98.12
6558	100.69	98.3
6652	100.94	99.85
7601	101.63	99.64
7702	101.95	99.97
6751	102.25	101.59
7701	103.67	100.9
7751	103.98	102.65
6701	104.51	101.9
7803	104.86	103.42
7855	105.54	104.45
7854	105.54	104.16
6802	107.64	105.4
6953	109.85	108.21
7551	101.93	100.11
7554	103.42	98.65
7555	100.65	99.17
7502	100.45	97.65
7553	100.9	97.64
7556	100.62	98.77
7503	100.54	97.1
7505	100.68	97.39
7606	100.24	97.59
7653	100.2	98.45
7605	100.31	97.92
7604	100.6	98.69
7652	100.38	98.59
7603	100.77	99.17
7602	100.89	99.34
9501	97.89	95.44
9553	98.11	96.55
9651	98.39	96.51

Manhole Reference	Manhole Cover Level	Manhole Invert Level
6556	102.06	100.62
6501	101.83	99.58
6502	101.72	98.93
6551	101.7	99.94
6504	101.77	99.27
6552	100.81	99.01
6505	101.14	98.78
6554	101.68	100.36
6601	101.58	100.04
5654	106.58	105.5
6651	102.63	101.29
5602	103.87	101.74
6752	103.01	101.68
6753	104.29	102.57
5856	108.89	107.11
6801	108.99	106.85
5910	113.3	110.86
5956	113.34	110.98
6952	111.36	109.39
5959	117.47	111.62
6951	118.12	112.47
6901	118.93	116.1
5901	123.01	121.01
5951	122.9	121.25
5903	123.72	121.19
5953	123.73	121.87
5952	121.26	118.44
5904	121.73	120.08
5954	121.85	119.89
5905	119.81	117.24
5955	119.35	115.92
5962	121.18	119.03
5803	115.69	111.94
5902	121.45	118.55
5853	115.29	112.15
5909	120.69	116.59
5908	119.52	115.85
5961	119.31	116.23
5906	117.28	113.28
5958	117.02	111.31
5960	117.6	114.14
5957	114.36	111.16
5907	117.54	114.36
5753	105	103.29
5751	108.5	107.01
5752	107.55	105.27
5854	113.44	112.37
5801	116.49	113.11
5851	116.46	113
5855	112.71	111.21
5852	119.34	116.04
5802	119.3	116.79
5651	105.96	104.48
5653	104.02	102.5
5652	104.57	103.27
5551	102.8	101.55
5601	104.08	101.78
5501	103	100.56

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Manhole Reference	Manhole Cover Level	Manhole Invert Level
0701	102.44	100.55
1752	102.43	100.37
1753	101.52	99.34
2501	96.93	91.58
1501	96.79	92.39
0501	97.04	93.23
0602	99.03	97.18
0852	99.04	97.49
0651	100.65	98.86
0601	100.78	98.61
1751	102.73	101.35
3501	94.07	89.35
4501	93.98	88.96
4502	93.74	88.42
4754	93.01	91.91
4753	93.76	91.92
4794	n/a	n/a
4752	93.99	91.84
4751	93.67	91.14
3891	99.18	96.23
491A	n/a	n/a
491B	n/a	n/a
2850	n/a	n/a
-	-	-
391A	n/a	n/a

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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
	Trunk Combined
	Storm Relief
	Vent Pipe
	Proposed Thames Surface Water Sewer
	Gallery
	Surface Water Rising Main
	Sludge 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
	Filling
	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

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

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		Gully
	Culverted Watercourse		Proposed
			Abandoned Sewer



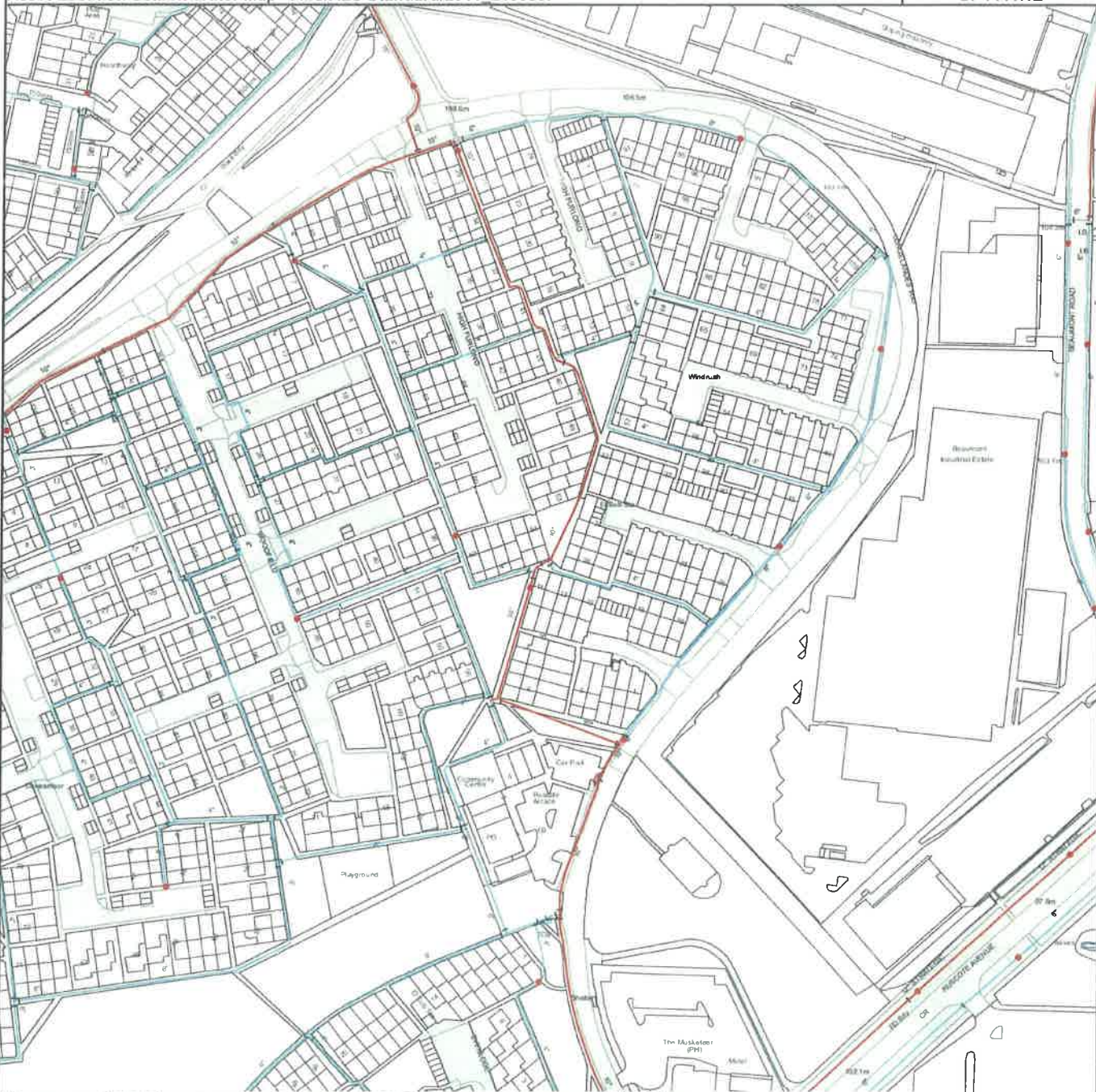
The width of the displayed area is 500m and the centre of the map is located at OS coordinates 444750,241250

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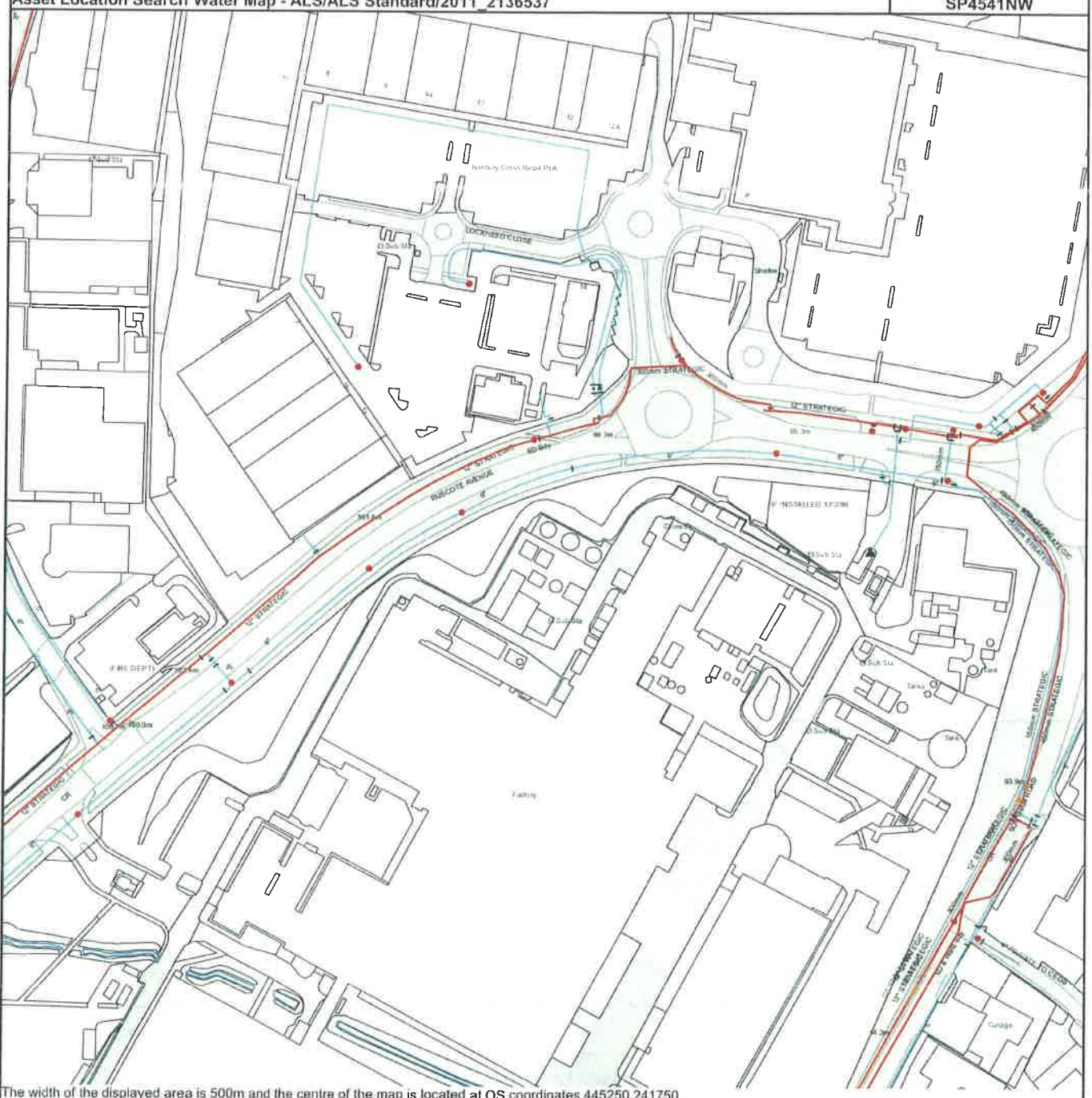
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ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

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

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

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

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

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

PIPE DIAMETER DEPTH BELOW GROUND

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	0.5m (1.7')
300mm (12")	1.0m (3.3')
375mm (15")	1.5m (5.0')
450mm (18")	2.0m (6.6')

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

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

Other Symbols

- Data Logger

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indicates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Sewer Flooding

History Enquiry



Brett Consulting Limited
Victoria Square

Search address supplied Kraft Factory
Southam Road
Banbury

Your reference N/A

Our reference SFH/SFH Standard/2015_3019692

Received date 16 April 2015

Search date 16 April 2015

Thames Water Utilities Ltd

Property Searches
PO Box 3189
Slough SL1 4WW

DX 151280 Slough 13

T 0118 925 1504
E searches@thameswater.co.uk
I www.thameswater-propertysearches.co.uk

Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vauxhall Road
Reading RG1 8DB

Sewer Flooding

History Enquiry



Search address supplied: Kraft Factory, Southam Road, Banbury

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

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Registered in England and Wales
No 2366661, Registered office
Clearwater Court, Vaselem Road
Reading RG1 8DB

Sewer Flooding

History Enquiry



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

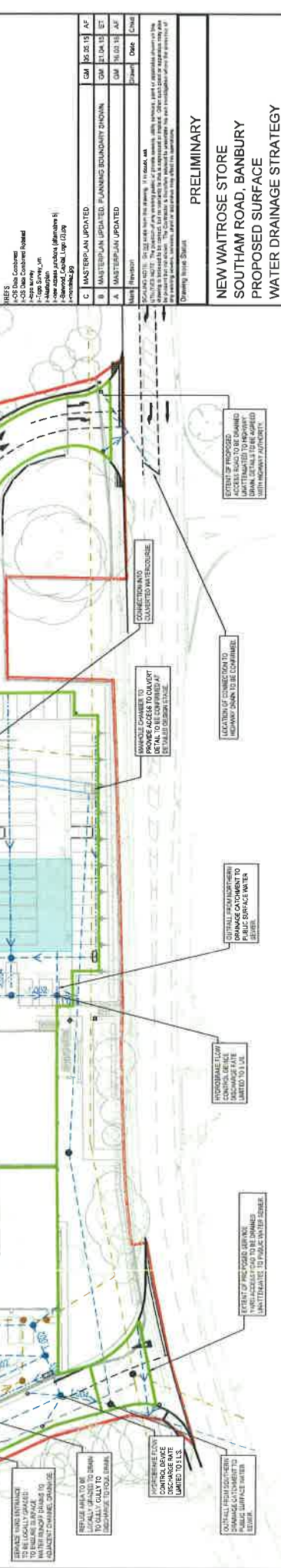
Property Searches
PO Box 3189
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Registered in England and Wales
No. 2366661, Registered office
Clearwater Court, Vaseem Road
Reading RG1 8DB

Appendix D Surface Water Drainage Strategy



PROPOSED SURFACE WATER NETWORK

- PROPOSED SURFACE WATER MANHOLE
- PROPOSED SURFACE WATER DRAINAGE CHANNEL (ACTS OR SIMILAR)
- PROPOSED UNDERGROUND ATTENUATION TANK
- PROPOSED FLOOD WATER NETWORK
- PROPOSED FLOOD WATER MANHOLE
- ABANDONED SURFACE WATER DRAIN
- EXISTING SURFACE WATER DRAIN/SEWER
- EXISTING FLOOD WATER DRAIN/SEWER
- EXISTING MANHOLE
- PROPOSED COLLECTED WATER COURSE
- PROPOSED SURFACE WATER DRAINAGE CHANNEL OUTLET/INSPECTION CHAMBER
- PROPOSED GULLY
- SITE BOUNDARY
- DRAINAGE CATCHMENT AREAS

Notes

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT DOCUMENTATION.
2. SCALE IS 1:500 UNLESS OTHERWISE STATED. USE ONLY PRINTED DIMENSIONS.
3. ALL THE METERS ARE IN METERS. ALL DIMENSIONS, LEVELS, AND COORDINATES ARE IN METERS UNLESS OTHERWISE STATED.
4. DRAWING BASED UPON TOPOGRAPHICAL SURVEY BY COLLECTOR DRAWING NO. 2066-12-01 DATED 23/09/08.
5. DRAWING BASED UPON MASTERPLAN PREPARED BY COLLECTORWINE & WINEY DRAWING NO. 2044300-REV F DATED MAY 2015.
6. PIPE SIZES ARE TO BE CONFIRMED AT THE CONSTRUCTION STAGE.

Scale Reference:

1:500

0m 25m 50m

FILES

- 3D Data Collection
- 3D Data Collection (Revised)
- Asap survey
- Asap survey (1m)
- New access structure (Preliminary B)
- New access structure (Preliminary C)
- Proposed drainage

C	MASTERPLAN UPDATED	GM	20.05.15	AF
B	MASTERPLAN UPDATED - PLANNING BOUNDARY CHOWN	GM	23.04.15	ET
A	MASTERPLAN UPDATED	GM	16.03.15	AF

Notes: ALL WORKS TO BE COMPLETED BY THE END OF 2015. ALL WORKS TO BE COMPLETED BY THE END OF 2015. ALL WORKS TO BE COMPLETED BY THE END OF 2015.

PRELIMINARY

NEW WAITROSE STORE

SOUTHAM ROAD, BANBURY

PROPOSED SURFACE

WATER DRAINAGE STRATEGY

Client: Waitrose Capital

Monteleir

Drawn by: NM


Checked by: ET

Scale: NTS

Project No: 26004-2001-002

Revision: C

PRELIMINARY DRAWING: THIS DRAWING IS FOR PRELIMINARY PURPOSES ONLY AND MUST NOT BE READ AS A CONSTRUCTION ISSUE. IT INDICATES DESIGN INTENT ONLY AND IS SUBJECT TO AMENDMENT DURING DESIGN DEVELOPMENT.

Peter Brett Associates		Page 1
Future House 125 Chatham Street Reading RG1 7JG	26004 Southam Rd GRO rates	
Date 21/02/2012 File	Designed by SK Checked by	
Micro Drainage	Source Control W.12.6.1	

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	1.000	Urban	0.000
SAAR (mm)	647	Region Number	Region 6

Results l/s

QBAR Rural 4.0
QBAR Urban 4.0

Q100 years 12.8

Q1 year 3.4
Q30 years 9.1
Q100 years 12.8

Peter Brett Associates

Page 1

Future House

26004 Southam Road, Banbury

125 Chatham Street

Surface Water Drainage Design

Reading RG1 7JG

South Network - Service Yard

Date 11/12/14

Designed by EJT

File 26004 Surface Water

Checked by

Micro Drainage

Network 2014.1.1



STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	Add Flow / Climate Change (%)	0
M5-60 (mm)	19.700	Minimum Backdrop Height (m)	0.200
Ratio R	0.408	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	250	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	27.256	0.274	99.3	0.060	4.00	0.0	0.600	ø 150		☑
1.001	34.840	0.351	99.3	0.060	0.00	0.0	0.600	ø 150		☑
1.002	6.172	0.277	22.3	0.060	0.00	0.0	0.600	ø 150		☑
2.000	13.153	0.132	99.3	0.069	4.00	0.0	0.600	ø 150		☑
2.001	23.128	0.233	99.3	0.041	0.00	0.0	0.600	ø 150		☑
→ 2.002	13.430	0.107	125.5	0.072	0.00	0.0	0.600	ø 300		☑
3.000	12.668	0.050	253.4	0.000	4.00	0.0	0.600	ø 525		☑
1.003	7.632	0.435	17.5	0.000	0.00	0.0	0.600	ø 525		☑

includes Oil Interceptor

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	57.23	4.45	93.000	0.060	0.0	0.0	0.0	1.01	17.8	9.3
1.001	54.32	5.03	93.726	0.120	0.0	0.0	0.0	1.01	17.8	17.7
1.002	54.15	5.06	93.300	0.180	0.0	0.0	0.0	2.78	110.7	26.4
2.000	58.51	4.22	93.850	0.069	0.0	0.0	0.0	1.01	17.8	10.9
2.001	56.44	4.60	93.518	0.110	0.0	0.0	0.0	1.01	17.8	16.8
2.002	55.63	4.76	93.135	0.182	0.0	0.0	0.0	1.40	99.1	27.4
3.000	58.89	4.15	92.945	0.000	0.0	0.0	0.0	1.40	303.6	0.0
1.003	54.04	5.09	92.695	0.362	0.0	0.0	0.0	5.10	1161.6	53.0

Future House
125 Chatham Street
Reading RG1 7JG

26004 Southam Road, Banbury
Surface Water Drainage Design
South Network - Service Yard



Date 11/12/14
File 26004 Surface Water

Designed by EJT
Checked by

Micro Drainage


Network 2014.1.1

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
4.000	14.511	0.700	20.7	0.001	4.00	0.0	0.600	ø	100	Ⓢ
4.001	42.546	0.915	46.5	0.001	0.00	0.0	0.600	ø	100	Ⓢ
1.004	9.842	0.035	281.2	0.046	0.00	0.0	0.600	ø	525	Ⓢ

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
4.000	58.94	4.14	94.300	0.001	0.0	0.0	0.0	1.70	13.4	0.2
4.001	55.59	4.77	93.600	0.002	0.0	0.0	0.0	1.13	8.9	0.3
1.004	53.46	5.21	92.260	0.410	0.0	0.0	0.0	1.33	288.1	59.4

Peter Brett Associates		Page 3
Future House 125 Chatham Street Reading RG1 7JG	26004 Southam Road, Banbury Surface Water Drainage Design South Network - Service Yard	
Date 11/12/14 File 26004 Surface Water	Designed by EJT Checked by	
Micro Drainage		Network 2014.1.1

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
1	95.350	1.350	Open Manhole	1200	1.000	94.000	150				
2	95.350	1.624	Open Manhole	1200	1.001	93.726	150	1.000	93.726	150	
3	95.350	2.050	Open Manhole	1200	1.002	93.300	225	1.001	93.375	150	
4	95.000	1.350	Open Manhole	1200	2.000	93.650	150				
5	95.000	1.482	Open Manhole	1200	2.001	93.518	150	2.000	93.518	150	
6	95.000	1.865	Open Manhole	1200	2.002	93.135	300	2.001	93.285	150	
7	95.200	2.455	Open Manhole	1500	3.000	92.745	525				
7	95.200	2.505	Open Manhole	1500	1.003	92.695	525	1.002	93.023	225	28
								2.002	93.028	300	108
								3.000	92.695	525	
7	95.600	1.300	Open Manhole	1200	4.000	94.300	100				
8	94.900	1.300	Open Manhole	1200	4.001	93.600	100	4.000	93.600	100	
6	94.500	2.240	Open Manhole	1500	1.004	92.260	525	1.003	92.260	525	
								4.001	92.685	100	
	94.420	2.195	Open Manhole	0		OUTFALL		1.004	92.225	525	

Future House
 125 Chatham Street
 Reading RG1 7JG
 Date 11/12/14
 File 26004 Surface Water
 Micro Drainage

26004 Southam Road, Banbury
 Surface Water Drainage Design
 South Network - Service Yard
 Designed by EJT
 Checked by
 Network 2014.1.1



PIPELINE SCHEDULES for Storm

Upstream Manhole


PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	1	93.350	93.000	1.200	Open Manhole	1200
1.001	o	150	2	95.350	93.726	1.474	Open Manhole	1200
1.002	o	225	3	95.350	93.300	1.825	Open Manhole	1200
2.000	o	150	4	95.000	93.650	1.200	Open Manhole	1200
2.001	o	150	5	95.000	93.518	1.332	Open Manhole	1200
2.002	o	300	6	95.000	93.135	1.565	Open Manhole	1200
3.000	o	525	7	95.200	92.745	1.930	Open Manhole	1500
1.003	o	525	7	95.200	92.695	1.980	Open Manhole	1500
4.000	o	100	7	95.600	94.300	1.200	Open Manhole	1200
4.001	o	100	8	94.900	93.600	1.300	Open Manhole	1200
1.004	o	525	6	94.500	92.260	1.715	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	27.256	99.3	2	95.350	93.726	1.474	Open Manhole	1200
1.001	34.840	99.3	3	95.350	93.375	1.825	Open Manhole	1200
1.002	6.172	22.3	7	95.350	93.023	1.952	Open Manhole	1500
2.000	13.153	99.3	5	95.000	93.518	1.332	Open Manhole	1200
2.001	23.128	99.3	6	95.000	93.285	1.565	Open Manhole	1200
2.002	13.430	125.5	7	95.000	93.028	1.872	Open Manhole	1500
3.000	12.668	253.4	7	95.200	92.695	1.980	Open Manhole	1500
1.003	7.632	17.5	6	94.500	92.260	1.715	Open Manhole	1500
4.000	14.511	20.7	8	94.900	93.600	1.300	Open Manhole	1200
4.001	42.546	46.5	6	94.500	92.685	1.715	Open Manhole	1500
1.004	9.842	281.2	6	94.500	92.225	1.670	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.004		94.420	92.225	92.000	0	0

Peter Brett Associates		Page 5
Future House 125 Chatham Street Reading RG1 7JG	26004 Southam Road, Banbury Surface Water Drainage Design South Network - Service Yard	
Date 11/12/14 File 26004 Surface Water	Designed by EJT Checked by	
Micro Drainage	Network 2014.1.1	

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	2	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.700	Storm Duration (mins)	30
Ratio R	0.408		

Future House
 125 Chatham Street
 Reading RG1 7JG
 Date 11/12/14
 File 26004 Surface Water
 Micro Drainage

26004 Southam Road, Banbury
 Surface Water Drainage Design
 South Network - Service Yard
 Designed by EJT
 Checked by
 Network 2014.1.1



Online Controls for Storm

Hydro-Brake® Manhole: 7, DS/PN: 1.003, Volume (m³): 7.9

Design Head (m) 1.000 Hydro-Brake® Type Md6 SW Only Invert Level (m) 92.695
 Design Flow (l/s) 5.0 Diameter (mm) 93


*Small catchment
 ! S/s
 min restriction
 applicable*

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.8	1.200	5.4	3.000	8.5	7.000	13.1
0.200	4.0	1.400	5.8	3.500	9.2	7.500	13.5
0.300	3.8	1.600	6.2	4.000	9.9	8.000	14.0
0.400	3.7	1.800	6.6	4.500	10.5	8.500	14.4
0.500	3.7	2.000	7.0	5.000	11.0	9.000	14.8
0.600	3.9	2.200	7.3	5.500	11.6	9.500	15.2
0.800	4.4	2.400	7.6	6.000	12.1		
1.000	4.9	2.600	8.0	6.500	12.6		

Hydro-Brake® Manhole: 6, DS/PN: 1.004, Volume (m³): 5.6

Design Head (m) 2.000 Hydro-Brake® Type Md6 SW Only Invert Level (m) 92.260
 Design Flow (l/s) 5.0 Diameter (mm) 78

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.1	1.200	3.8	3.000	6.0	7.000	9.2
0.200	2.5	1.400	4.1	3.500	6.5	7.500	9.5
0.300	2.4	1.600	4.4	4.000	6.9	8.000	9.8
0.400	2.4	1.800	4.7	4.500	7.4	8.500	10.1
0.500	2.5	2.000	4.9	5.000	7.8	9.000	10.4
0.600	2.7	2.200	5.1	5.500	8.1	9.500	10.7
0.800	3.1	2.400	5.4	6.000	8.5		
1.000	3.5	2.600	5.6	6.500	8.8		

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Future House	26004 Southam Road, Banbury	
125 Chatham Street	Surface Water Drainage Design	
Reading RG1 7JG	South Network - Service Yard	
Date 11/12/14	Designed by EJT	
File 26004 Surface Water	Checked by	
Micro Drainage	Network 2014.1.1	

Storage Structures for Storm

Cellular Storage Manhole: 7, DS/PN: 3.000

Invert Level (m) 92.745 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	240.0	0.0	1.300	0.0	0.0
0.100	240.0	0.0	1.400	0.0	0.0
0.200	240.0	0.0	1.500	0.0	0.0
0.300	240.0	0.0	1.600	0.0	0.0
0.400	240.0	0.0	1.700	0.0	0.0
0.500	240.0	0.0	1.800	0.0	0.0
0.600	240.0	0.0	1.900	0.0	0.0
0.700	240.0	0.0	2.000	0.0	0.0
0.800	0.0	0.0	2.100	0.0	0.0
0.900	0.0	0.0	2.200	0.0	0.0
1.000	0.0	0.0	2.300	0.0	0.0
1.100	0.0	0.0	2.400	0.0	0.0
1.200	0.0	0.0	2.500	0.0	0.0

Future House 26004 Southam Road, Banbury
 125 Chatham Street Surface Water Drainage Design
 Reading RG1 7JG South Network - Service Yard
 Date 11/12/14 Designed by EJT
 File 26004 Surface Water Checked by
 Micro Drainage Network 2014.1.1



1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
 Number of Online Controls 2 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details


Rainfall Model FSR Ratio R 0.408
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 19.700 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
 720, 960, 1440, 2160, 2880, 4320, 5760, 7200,
 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 20

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z O/P Overflow Act.	Lvl Exc.
1.000	15 Winter	1	0%	30/15 Summer	100/15 Summer		4
1.001	15 Winter	1	0%	30/15 Summer			
1.002	15 Winter	1	0%	100/15 Summer			
2.000	15 Summer	1	0%	30/15 Summer	100/15 Summer		3
2.001	15 Winter	1	0%	30/15 Summer			
2.002	15 Winter	1	0%	100/120 Winter			
3.000	120 Winter	1	0%	100/60 Summer			
1.003	15 Winter	1	0%	30/15 Summer			
4.000	15 Winter	1	0%	100/15 Winter			
4.001	15 Winter	1	0%	30/15 Summer			
1.004	30 Winter	1	0%	1/15 Summer	100/15 Winter		3

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	O'flow (l/s)	Pipe Flow (l/s)	
1.000	1	94.077	-0.073	0.000	0.52	0.0	8.8	OK
1.001	2	93.839	-0.037	0.000	0.92	0.0	15.8	OK

Peter Brett Associates		Page 9
Future House 125 Chatham Street Reading RG1 7JG	26004 Southam Road, Banbury Surface Water Drainage Design South Network - Service Yard	
Date 11/12/14 File 26004 Surface Water	Designed by EJT Checked by	
Micro Drainage	Network 2014.1.1	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

PN	US/ME Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	O'flow (l/s)	Flow (l/s)	
1.002	3 93.385		-0.140	0.000	0.31	0.0	22.7	OK
2.000	4 93.736		-0.064	0.000	0.63	0.0	10.2	OK
2.001	5 93.628		-0.040	0.000	0.88	0.0	14.8	OK
2.002	6 93.244		-0.190	0.000	0.29	0.0	23.3	OK
3.000	7 92.890		-0.380	0.000	0.02	0.0	3.7	OK
1.003	7 93.076		-0.144	0.000	0.01	0.0	4.0	OK
4.000	7 94.305		-0.095	0.000	0.01	0.0	0.1	OK
4.001	8 93.611		-0.089	0.000	0.03	0.0	0.3	OK
1.004	6 93.060		0.275	0.000	0.02	0.0	3.1	SURCHARGED

- control
MH

Future House
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 Surface Water Drainage Design
 South Network - Service Yard
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
 Number of Online Controls 2 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details


Rainfall Model FSR Ratio R 0.408
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 19.700 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
 720, 960, 1440, 2160, 2880, 4320, 5760, 7200,
 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 20

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z O/P Overflow Act.	Lvl Exc.
1.000	15 Winter	30	0%	30/15 Summer	100/15 Summer		4
1.001	15 Winter	30	0%	100/15 Summer			
1.002	15 Winter	30	0%	100/15 Summer			
2.002	15 Winter	30	0%	100/120 Winter			
3.000	180 Winter	30	0%	100/60 Summer			
1.003	15 Winter	30	0%	30/15 Summer			
4.000	15 Winter	30	0%	100/15 Winter			
4.001	15 Winter	30	0%	30/15 Summer			
1.004	15 Winter	30	0%	1/15 Summer	100/15 Winter		3

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Flow (l/s)		
1.000	1	94.858	0.708	0.000	0.89	0.0	15.2	SURCHARGED

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

FN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	O'flow (l/s)	Flow (l/s)	
1.002	3	93.435	-0.090	0.000	0.65	0.0	47.9	OK
2.000	4	94.413	0.613	0.000	1.19	0.0	19.4	SURCHARGED
2.001	5	94.220	0.552	0.000	1.82	0.0	30.7	SURCHARGED
2.002	6	93.330	-0.104	0.000	0.65	0.0	53.2	OK
3.000	7	93.193	-0.077	0.000	0.03	0.0	6.1	OK
1.003	7	93.281	0.061	0.000	0.01	0.0	4.0	SURCHARGED
4.000	7	94.311	-0.089	0.000	0.03	0.0	0.4	OK
4.001	8	93.793	0.093	0.000	0.18	0.0	1.6	SURCHARGED
1.004	6	93.818	1.033	0.000	0.02	0.0	4.3	SURCHARGED

Future House 26004 Southam Road, Banbury
 125 Chatham Street Surface Water Drainage Design
 Reading RG1 7JG South Network - Service Yard
 Date 11/12/14 Designed by EJT
 File 26004 Surface Water Checked by
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
 Number of Online Controls 2 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.408
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 19.700 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
 720, 960, 1440, 2160, 2880, 4320, 5760, 7200,
 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 20

PN	Storm	Return Period	Climate Change	First X Surcharged	First Y Flood	First Z O/P Overflow Act.	Lvl Exc.
1.001	240 Winter	100	+20%	100/15 Summer			4
1.002	240 Winter	100	+20%	100/120 Winter			4
3.000	240 Winter	100	+20%	100/60 Summer			
1.003	240 Winter	100	+20%	30/15 Summer			
4.000	30 Winter	100	+20%	100/15 Winter			
4.001	30 Winter	100	+20%	30/15 Summer			
1.004	480 Summer	100	+20%	1/15 Summer	100/15 Winter		3

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Flow (l/s)	Flow (l/s)	
1.001	100	1.20	0.20	100	100	100	100	OK
1.002	100	1.20	0.20	100	100	100	100	OK

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	O'flow (l/s)	Pipe Flow (l/s)	Status
1.002	3	94.002	0.477	0.000	0.24	0.0	17.9	SURCHARGED
2.000	4	95.001	1.201	1.428	1.77	0.0	28.8	FLOOD
2.001	5	94.806	1.139	0.000	2.41	0.0	40.7	FLOOD RISK
2.002	6	94.001	0.567	0.000	0.22	0.0	18.1	SURCHARGED
3.000	7	94.000	0.730	0.000	0.04	0.0	8.6	SURCHARGED
1.003	7	94.000	0.780	0.000	0.01	0.0	3.9	SURCHARGED
4.000	7	94.489	0.089	0.000	0.10	0.0	1.3	SURCHARGED
4.001	8	94.491	0.791	0.000	0.31	0.0	2.7	SURCHARGED
1.004	6	94.500	1.715	0.228	0.03	0.0	5.1	FLOOD

- Flooding within Service yard Turning area.

- Side access gullies are located downstream of this MH located any standing

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	1	Add Flow / Climate Change (%)	0
MS-60 (mm)	19.700	Minimum Backdrop Height (m)	0.200
Ratio R	0.408	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	250	Min Design Depth for Optimisation (m)	1.200
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500
Volumetric Runoff Coeff.	0.750		

Designed with Level Soffits


Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	37.315	0.249	149.9	0.070	4.00	0.0	0.600	o	225	o
1.001	23.643	0.158	149.9	0.070	0.00	0.0	0.600	o	225	o
2.000	20.034	0.015	1335.6	0.127	4.00	0.0	0.600	o	300	o
2.001	1.806	0.007	244.7	0.230	0.00	0.0	0.600	o	300	o
2.002	17.517	0.072	244.7	0.000	0.00	0.0	0.600	o	300	o
2.003	23.812	0.097	244.7	0.020	0.00	0.0	0.600	o	300	o
→ 2.004	7.128	0.216	33.1	0.047	0.00	0.0	0.600	o	300	o
1.002	8.947	0.032	281.3	0.100	0.00	0.0	0.600	o	375	o
3.000	8.714	0.044	200.0	0.000	4.00	0.0	0.600	o	375	o

includes oil interceptor

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	E I.Area (ha)	E Base Flow (l/s)	Poul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	56.53	4.58	93.615	0.070	0.0	0.0	0.0	1.07	42.4	10.7
1.001	54.67	4.95	93.366	0.140	0.0	0.0	0.0	1.07	42.4	20.7
2.000	55.47	4.79	93.540	0.127	0.0	0.0	0.0	1.00	29.8	19.1
2.001	55.32	4.82	93.525	0.357	0.0	0.0	0.0	1.00	70.7	53.5
2.002	53.91	5.11	93.518	0.357	0.0	0.0	0.0	1.00	70.7	53.5
2.003	52.13	5.51	93.446	0.377	0.0	0.0	0.0	1.00	70.7	53.5
2.004	51.94	5.55	93.349	0.424	0.0	0.0	0.0	2.74	193.9	59.6
1.002	51.35	5.69	93.058	0.664	0.0	0.0	0.0	1.08	118.8	92.3
3.000	59.10	4.11	93.070	0.000	0.0	0.0	0.0	1.28	141.1	0.0


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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.003	3.586	0.011	321.0	0.070	0.00	0.0	0.600	c	375	rf

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	I.Area (ha)	Base Flow (l/s)	Foul Flow (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	51.10	5.75	93.026	0.734	0.0	0.0	0.0	1.01	111.1	101.6

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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
1	95.250	1.635	Open Manhole	1200	1.000	93.615	225				
2	95.250	1.884	Open Manhole	1200	1.001	93.366	225	1.000	93.366	225	
3	95.490	1.950	Open Manhole	1200	2.000	93.540	300				
4	95.490	1.965	Open Manhole	1200	2.001	93.525	300	2.000	93.525	300	
5	95.490	1.972	Open Manhole	1200	2.002	93.518	300	2.001	93.518	300	
6	95.250	1.804	Open Manhole	1200	2.003	93.446	300	2.002	93.446	300	
7	95.110	1.761	Open Manhole	1200	2.004	93.349	300	2.003	93.349	300	
8	95.110	2.052	Open Manhole	1350	1.002	93.058	375	1.001	93.208	225	
								2.004	93.133	300	
9	95.070	2.000	Open Manhole	1350	3.000	93.070	375				
10	95.070	2.044	Open Manhole	1350	1.003	93.026	375	1.002	93.026	375	
								3.000	93.026	375	
	95.000	1.985	Open Manhole	0		OUTFALL		1.003	93.015	375	

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PIPELINE SCHEDULES for Storm

Upstream Manhole


PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	1	95.250	93.615	1.410	Open Manhole	1200
1.001	o	225	2	95.250	93.366	1.659	Open Manhole	1200
2.000	o	300	3	95.490	93.540	1.650	Open Manhole	1200
2.001	o	300	4	95.490	93.525	1.665	Open Manhole	1200
2.002	o	300	5	95.490	93.518	1.672	Open Manhole	1200
2.003	o	300	6	95.250	93.446	1.504	Open Manhole	1200
2.004	o	300	7	95.110	93.349	1.461	Open Manhole	1200
1.002	o	375	8	95.110	93.058	1.677	Open Manhole	1350
3.000	o	375	9	95.070	93.070	1.625	Open Manhole	1350
1.003	o	375	10	95.070	93.026	1.669	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	37.315	149.9	2	95.250	93.366	1.659	Open Manhole	1200
1.001	23.643	149.9	8	95.110	93.208	1.677	Open Manhole	1350
2.000	20.034	1335.6	4	95.490	93.525	1.665	Open Manhole	1200
2.001	1.806	244.7	5	95.490	93.518	1.672	Open Manhole	1200
2.002	17.517	244.7	6	95.250	93.446	1.504	Open Manhole	1200
2.003	23.812	244.7	7	95.110	93.349	1.461	Open Manhole	1200
2.004	7.128	33.1	8	95.110	93.133	1.677	Open Manhole	1350
1.002	8.947	281.3	10	95.070	93.026	1.669	Open Manhole	1350
3.000	8.714	200.0	10	95.070	93.026	1.669	Open Manhole	1350
1.003	3.586	321.0		95.000	93.015	1.610	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.003		95.000	93.015	0.000	0	0

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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.700	Storm Duration (mins)	30
Ratio R	0.400		


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Online Controls for Storm

Hydro-Brake[®] Manhole: 10, DS/PN: 1.003, Volume (m³): 4.6

Design Head (m) 1.000 Hydro-Brake[®] Type Md6 SW Only Invert Level (m) 93.026
Design Flow (l/s) 5.0 Diameter (mm) 93

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.8	1.200	5.4	3.000	8.5	7.000	13.1
0.200	4.0	1.400	5.8	3.500	9.2	7.500	13.5
0.300	3.8	1.600	6.2	4.000	9.9	8.000	14.0
0.400	3.7	1.800	6.6	4.500	10.5	8.500	14.4
0.500	3.7	2.000	7.0	5.000	11.0	9.000	14.8
0.600	3.9	2.200	7.3	5.500	11.6	9.500	15.2
0.800	4.4	2.400	7.6	6.000	12.1		
1.000	4.9	2.600	8.0	6.500	12.6		

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Storage Structures for Storm

Cellular Storage Manhole: 9, DS/PN: 3.000

Invert Level (m) 93.070 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	600.0	0.0	1.300	0.0	0.0
0.100	600.0	0.0	1.400	0.0	0.0
0.200	600.0	0.0	1.500	0.0	0.0
0.300	600.0	0.0	1.600	0.0	0.0
0.400	600.0	0.0	1.700	0.0	0.0
0.500	600.0	0.0	1.800	0.0	0.0
0.600	600.0	0.0	1.900	0.0	0.0
0.700	600.0	0.0	2.000	0.0	0.0
0.800	600.0	0.0	2.100	0.0	0.0
0.900	600.0	0.0	2.200	0.0	0.0
1.000	600.0	0.0	2.300	0.0	0.0
1.100	0.0	0.0	2.400	0.0	0.0
1.200	0.0	0.0	2.500	0.0	0.0

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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.409
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 19.700 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
 720, 960, 1440, 2160, 2880, 4320, 5760, 7200,
 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 20

PN	Storm	Return Period	Climate Change	First X Surcharged	First Y Flood	First Z O/F Overflow Act.	Lvl Exc.
1.000	15 Winter	1	0%	30/15 Summer			
1.001	15 Winter	1	0%	30/15 Summer			
2.000	15 Winter	1	0%	30/15 Summer	100/15 Summer		4
2.001	15 Winter	1	0%	30/15 Summer	100/15 Summer		3
2.002	15 Winter	1	0%	30/15 Summer			
2.003	15 Winter	1	0%	30/15 Summer			
2.004	15 Winter	1	0%	30/15 Summer			
1.002	15 Winter	1	0%	1/15 Summer			
3.000	240 Winter	1	0%	100/30 Winter			
1.003	15 Winter	1	0%	1/15 Summer			

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Flow (l/s)	Flow (l/s)	
1.000	1	93.692	-0.148	0.000	0.25	0.0	10.1	OK
1.001	2	93.553	-0.038	0.000	0.43	0.0	16.8	OK
2.000	3	93.791	-0.049	0.000	0.94	0.0	18.0	OK

Future House
 125 Chatham Street
 Reading RG1 7JG
 Date 11/12/14
 File 26004 Surface Water
 Micro Drainage

26004 Southam Road
 Surface Water Drainage Design
 North Network - Car Park
 Designed by EJT
 Checked by
 Network 2014.1.1



1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MS Name	Water Level (m)	Surch'd Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	O'flow (l/s)	Pipe Flow (l/s)	Status
2.001	4	93.733	-0.092	0.000	0.82	0.0	44.7	OK
2.002	5	93.710	-0.108	0.000	0.73	0.0	44.5	OK
2.003	6	93.640	-0.106	0.000	0.74	0.0	46.4	OK
2.004	7	93.544	-0.105	0.000	0.44	0.0	51.2	OK
1.002	8	93.516	0.083	0.000	0.92	0.0	78.2	SURCHARGED
3.000	9	93.198	-0.247	0.000	0.03	0.0	3.5	OK
1.003	10	93.487	0.086	0.000	0.05	0.0	4.0	SURCHARGED

Upstream and downstream of control MH

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125 Chatham Street	Surface Water Drainage Design
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
 Number of Online Controls 1 Number of Time/Area Diagrams 0
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.409
 Region England and Wales Cv (Summer) 0.750
 M5-60 (mm) 19.700 Cv (Winter) 0.840


Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status OFF
 Inertia Status OFF

Profile(s)

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
 720, 960, 1440, 2160, 2880, 4320, 5760, 7200,
 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 20

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z O/F Overflow Act.	Lvl Exc.
1.000	15 Winter	30	0%	30/15 Summer			
1.001	15 Winter	30	0%	30/15 Summer			
1.002	15 Winter	30	0%	30/15 Summer	100/15 Summer		1
1.003	15 Winter	30	0%	30/15 Summer	100/15 Summer		3
1.004	15 Winter	30	0%	30/15 Summer			
1.005	15 Winter	30	0%	30/15 Summer			
1.006	15 Winter	30	0%	30/15 Summer			
1.007	15 Winter	30	0%	30/15 Summer			
1.008	15 Winter	30	0%	30/15 Summer			
3.000	480 Winter	30	0%	100/30 Winter			
1.003	600 Winter	30	0%	1/15 Summer			

PN	Name	Water		Flooded		Pipe		Status
		US/ME Level (m)	Surch'ed Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	O'flow (l/s)	Pipe Flow (l/s)	
1.000	1	94.156	0.316	0.000	0.51	0.0	20.6	SURCHARGED
1.001	1	94.156	0.316	0.000	0.51	0.0	20.6	SURCHARGED
1.002	3	94.156	0.316	0.000	0.51	0.0	20.6	SURCHARGED

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Micro Drainage	Network 2014.1.1	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	O'flow (l/s)	Flow (l/s)	
2.001	4	94.761	0.936	0.000	1.85	0.0	101.4	SURCHARGED
2.002	5	94.596	0.778	0.000	1.64	0.0	99.1	SURCHARGED
2.003	6	94.401	0.654	0.000	1.67	0.0	104.8	SURCHARGED
2.004	7	94.132	0.483	0.000	1.01	0.0	116.9	SURCHARGED
1.002	8	93.915	0.482	0.000	2.15	0.0	183.1	SURCHARGED
3.000	9	93.439	-0.006	0.000	0.08	0.0	8.2	OK
1.003	10	93.791	0.389	0.000	0.05	0.0	4.0	SURCHARGED

Future House
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 1
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.409
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.700 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status OFF
Inertia Status OFF

Profile(s)

Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600,
720, 960, 1440, 2160, 2880, 4320, 5760, 7200,
8640, 10080

Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 20

PN	Storm	Return Period	Climate Change	First X Surchage	First Y Flood	First Z Overflow	O/F Act.	Lvl Exc.
1.000	15 Winter	100	+20%	30/15 Summer				
1.001	15 Winter	100	+20%	30/15 Summer				
1.002	15 Winter	100	+20%	30/15 Summer				
1.003	15 Winter	100	+20%	30/15 Summer				
1.004	15 Winter	100	+20%	30/15 Summer				
1.005	15 Winter	100	+20%	30/15 Summer				
1.006	15 Winter	100	+20%	30/15 Summer				
1.007	15 Winter	100	+20%	30/15 Summer				
1.008	15 Winter	100	+20%	30/15 Summer				
3.000	480 Winter	100	+20%	100/30 Winter				
1.003	15 Winter	100	+20%	1/15 Summer				

PN	US/MH Name	Water		Flooded		Pipe		Status
		Level (m)	Surch'd Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	O'flow (l/s)	Pipe Flow (l/s)	
1.000	1	94.961	1.121	0.000	0.80	0.0	31.9	FLOOD RISK
1.001	2	94.896	1.121	0.000	0.80	0.0	31.9	FLOOD RISK
1.002	3	94.831	1.121	0.000	0.80	0.0	31.9	FLOOD RISK

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MS Name	Water		Flooded		Pipe		Status
		Level (m)	Surched Depth (m)	Volume (m ³)	Flow / Cap.	O'flow (l/s)	Flow (l/s)	
2.001	4	95.492	1.667	2.056	2.33	0.0	127.4	FLOOD
2.002	5	95.321	1.504	0.000	2.13	0.0	129.3	FLOOD RISK
2.003	6	95.099	1.353	0.000	2.10	0.0	132.3	FLOOD RISK
2.004	7	94.722	1.074	0.000	1.26	0.0	146.1	SURCHARGED
1.002	8	94.375	0.942	0.000	2.99	0.0	254.5	SURCHARGED
3.000	9	93.704	0.259	0.000	0.04	0.0	4.4	SURCHARGED
1.003	10	93.952	0.551	0.000	0.06	0.0	4.7	SURCHARGED

