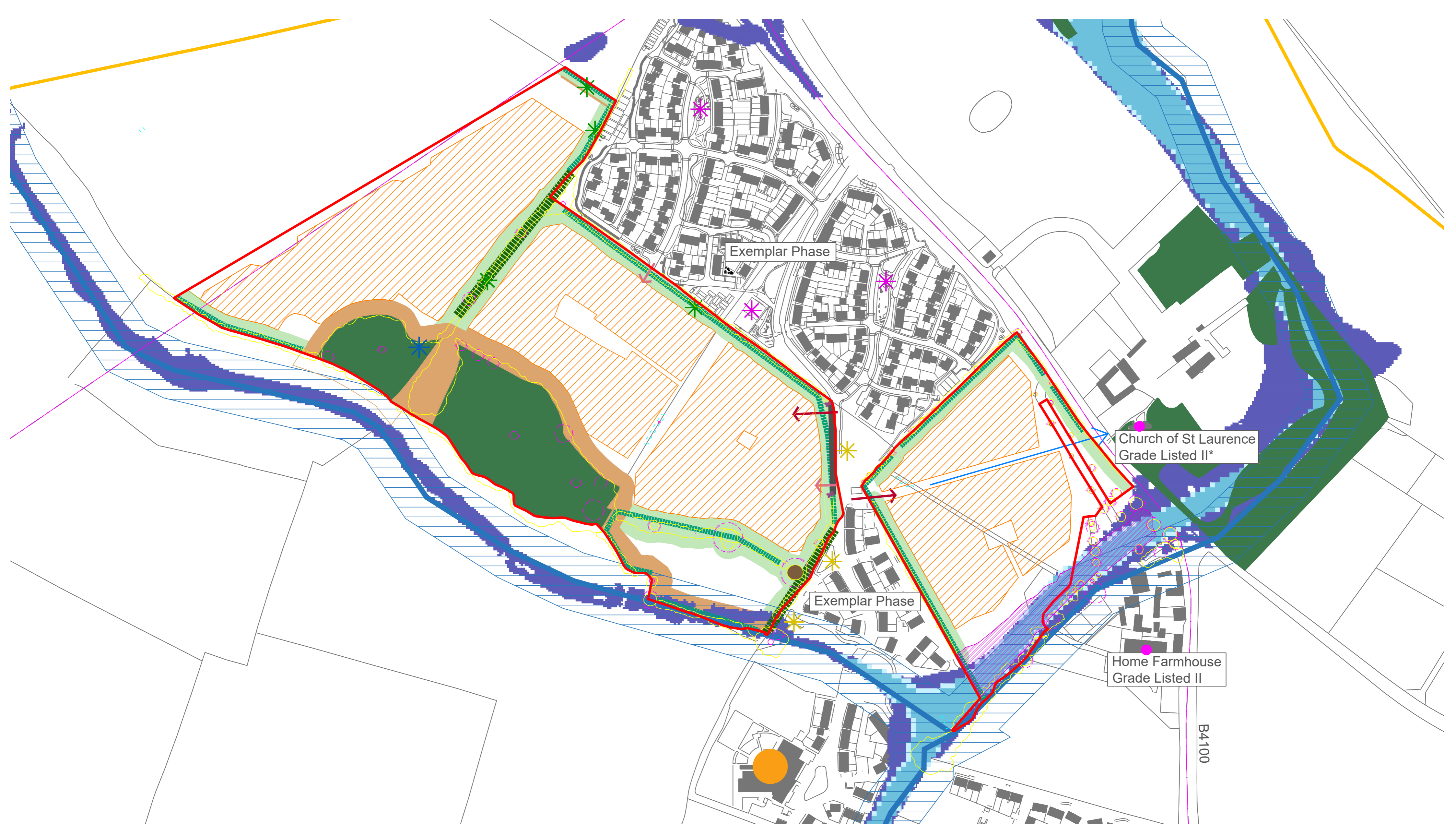


Appendix A

Parameters Plans



- | | | | | | |
|-------------------------------------|--|---|---|--|--|
| Site boundary | Dry pond (Aspect) | Flood zone 2 (Vectos) | 10m hedgerow buffer (SPD/Aspect) | Potential access points (RP) | Indicative tree root protection area - retention trees only (Flac) |
| Tree line (Aspect) | Tree with High Bat Roosting Potential (Aspect) | Flood zone 3 (Vectos) | Historic hedgerow (Cotswold) | Potential secondary access points (RP) | Trees for removal to facilitate development (Flac) |
| Hedgerow (Aspect) | 30m watercourse buffer (SPD) | Parish boundary (desktop) | Potential NDA | View towards the Church of St Laurence (Cotswold) | Vegetation canopy (Flac) |
| Watercourse (OS) | Listed buildings (desktop) | Gagle Brook Primary School | Surface water flooding 1 in 1000 extent | Access to be provided between this points (Velocity) | Exemplar Phase Children's Play |
| Priority Habitat Woodland (desktop) | Public right of way (desktop) | 15m woodland buffer and bat corridor (Aspect) | Servient Land (Velocity) | Exemplar Phase Growing Spaces | |
| Dry ditch (Aspect) | | Flood zone for the 1 in 100 year event + 35% climate change | | | |

Project
Land at North West Bicester

Drawing Title
Considerations

Date	Scale	Drawn by	Check by
02/02/2021	1:2,500 at A3	ML	LA
Project No	Drawing No	Revision	
1192	002	I	



- Key
- 01 Vehicular and cycle access point
 - 02 View to church
 - 03 Sustainable Drainage System(SuDS)
 - 04 Play
 - 05 Small new copses
 - 06 Trim trail
 - 07 Edible landscapes
 - 08 Ecological rich meadows
 - 09 Woodland with some limited public access
 - 10 Restricted vehicular access
 - Application boundary (22.07Ha)



CLIENT: Firethorn Development Ltd

PROJECT: North West Bicester

DRAWING: Illustrative Framework

PROJECT NUMBER: 1192

DRAWING NUMBER: SK001 CHECKED BY: ML/LA

REVISION: C STATUS: Draft

DATE: 02/02/2021 SCALE: NTS





- Key
- 01 Vehicular and cycle access point
 - 02 View to church
 - 03 Sustainable Drainage System(SuDS)
 - 04 Play
 - 05 Small new copses
 - 06 Trim trail
 - 07 Edible landscapes
 - 08 Wetland habitat
 - 09 Woodland with some limited public access
 - 10 Restricted vehicular access
 - Application boundary (22.07Ha)

N.

CLIENT: _____
Firethorn

PROJECT: _____
North West Bicester

DRAWING: _____
Illustrative Framework/SUDS overlay

PROJECT NUMBER: _____
1192

DRAWING NUMBER: SK001A CHECKED BY: ML/LA

REVISION: C STATUS: Draft

DATE: 02/02/2021 SCALE: NTS

Appendix B

EA Correspondence

Lizzie Todd-Davies

From: Enquiries_THM <enquiries_THM@environment-agency.gov.uk>
Sent: 16 October 2020 13:56
To: Nick Bosanko
Subject: THM185983_AK: Bicester - Product 4
Attachments: JFlow disclaimer Limitations of data.pdf; THM185983 JFLOW data for OX27 8BD.pdf

Dear Nick,

Reference: **THM185983**

Thank you for your data request for the JFLOW data for the site at **OX27 8BD**

Please see the data and the disclaimer limitations attached.

I hope that we have correctly interpreted your request. Please refer to our Open Government Licence for the permitted use of the supplied data: <http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Please be aware that many of our datasets are now available online. Simply visit environment.data.gov.uk

We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.


Kind regards,

Anna Kovtun

Customers & Engagement Officer – Thames

Environment Agency | Red Kite House, Howbery Park, Wallingford, OX10 8BD

 enquiries_THM@environment-agency.gov.uk

 External: 0207 714 0455

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for people and wildlife**




From: Nick Bosanko [mailto:Nick.Bosanko@vectos.co.uk]
Sent: 22 September 2020 16:26
To: Enquiries_THM <enquiries_THM@environment-agency.gov.uk>
Subject: RE: THM185983_AK: Bicester - Product 4

Hi Anna

Thank you for the Product 4. I'm aware of some comments made by the EA with respect to a nearby site (ref 18/00484/OUT). As part of the FRA prepared for that application, the EA provided the applicant with JFLOW peak water levels to inform an assessment of climate change on flood risk. I assume you don't have the JFLOW peak water levels for the 1 in 100 plus 35% climate change event. Therefore, please can you also provide me with JFLOW peak water levels for the 1 in 100, 1 in 100 plus 20% climate change and 1 in 1000 year events?

Thanks, Nick

Nick Bosanko
Associate Director
0117 203 5240 (T) 07947 220 321
5th Floor, 4 Colston Avenue, Bristol, BS1 4ST

 Consider the environment. Do you really need to print this email?

From: Enquiries_THM <enquiries_THM@environment-agency.gov.uk>
Sent: 22 September 2020 14:36
To: Nick Bosanko <Nick.Bosanko@vectos.co.uk>
Subject: THM185983_AK: Bicester - Product 4

Dear Nick,

Reference: **THM185983**

Thank you for your email requesting Product 4 data for: **OX27 8BD**

We unfortunately do not have any detailed flood risk modelling in this location.

We are sorry that we are therefore unable to provide modelled flood levels and extents for your site.

We have attached a copy of our Flood Map for Planning and a map showing Historic Flood Event Outlines that we have records for.

We do not hold Environment Agency records of historic flood events in this location.

There are currently no formal Environment Agency flood defences in this location. There are currently no plans in the future for any formal Environment Agency flood defences in this location.

For more information about how surface water flooding is managed in your local area please contact **Oxfordshire County Council**.

You may also wish to contact your local authority or internal drainage board, **Oxfordshire County Council** to ask about surface water flooding or if they have other relevant local flood information.

I trust this is helpful.

How we have considered your request

We have considered your request under the provisions of the Freedom of Information Act 2000 / Environmental Information Regulations 2004 (EIR). The Act requires that we respond to requests by advising you whether or not information is held, and if so by providing you with that information.

EIR Regulation 3(2) states that information is held if it is in our possession and has been produced or received by us, or it is held by another person on our behalf at the time the request is received.

Information not held

In this case, the information you have requested is not held by the Environment Agency, and we are therefore refusing your request on the grounds that there is no information we can provide.

Where a request is for environmental information, the Regulations allow us to refuse to disclose it if the exception at EIR Regulation 12(4)(a) applies. The regulation states that a public authority may refuse to disclose environmental information to the extent that it does not hold that information when an applicant's request is received.

It is not possible for us to conduct a public interest balancing test because the reason for non-disclosure is that the information is not held.

I hope that we have correctly interpreted your request. Please refer to our Open Government Licence for the permitted use of the supplied data:

<http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Please be aware that many of our datasets are now available online. Simply visit environment.data.gov.uk

We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.


Many thanks,

Anna Kovtun

Customers & Engagement Officer – Thames

Environment Agency | Red Kite House, Howbery Park, Wallingford, OX10 8BD

 enquiries_THM@environment-agency.gov.uk

 External: 0207 714 0455

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Creating a better place for people and wildlife	
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From: Nick Bosanko [<mailto:Nick.Bosanko@vectos.co.uk>]

Sent: 17 August 2020 12:55

To: Enquiries_THM <enquiries_THM@environment-agency.gov.uk>

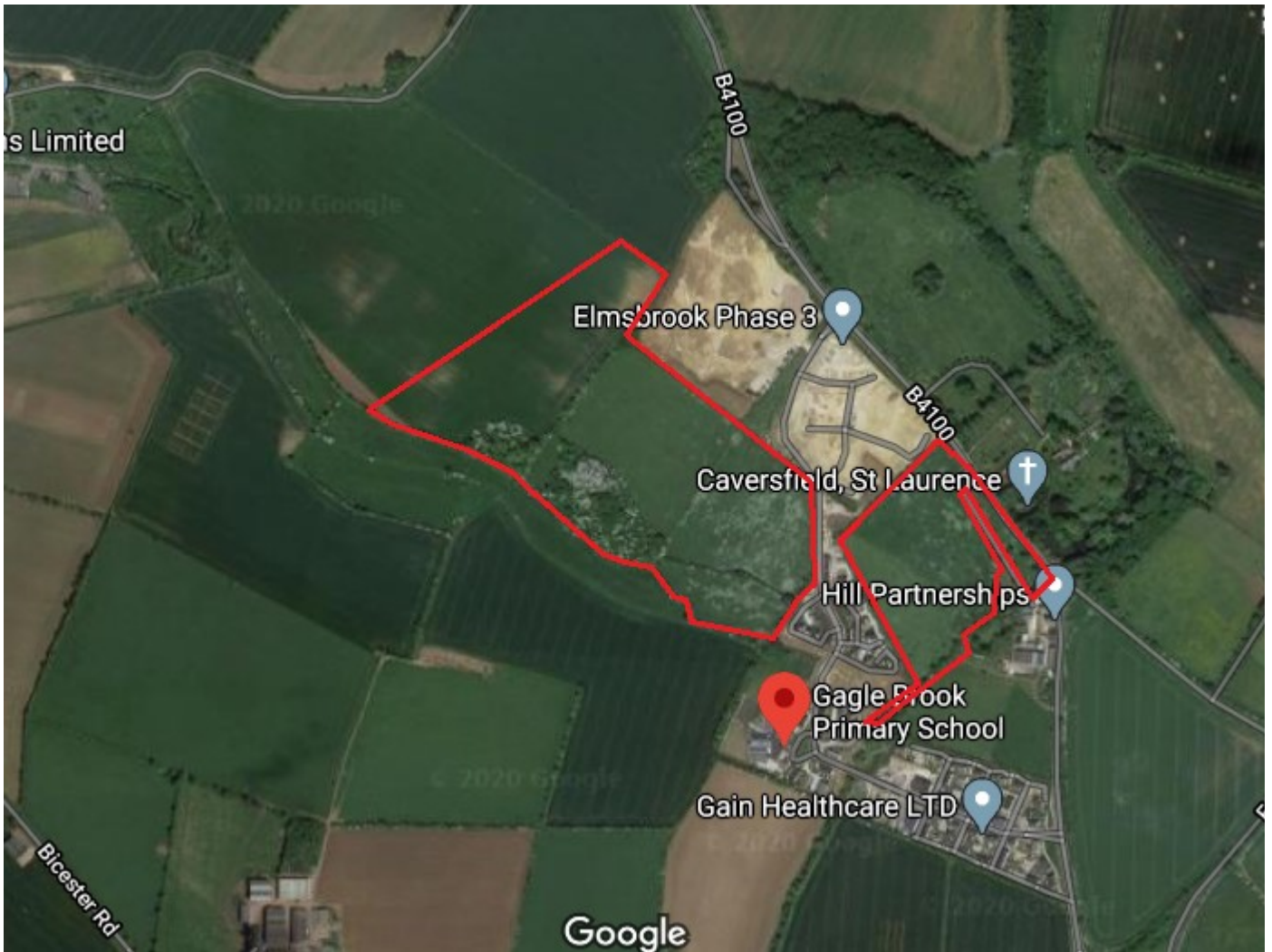
Cc: Jessica Evans <jessica.evans@vectos.co.uk>

Subject: Bicester - Product 4

Dear EA

Please can you provide a Product 4 for the site below. The approximate post code is OX27 8BD.

Thanks, Nick



Nick Bosanko
Associate Director



0117 203 5240 (T) 07947 220 321
Nick.Bosanko@vectos.co.uk

5th Floor, 4 Colston Avenue, Bristol, BS1 4ST



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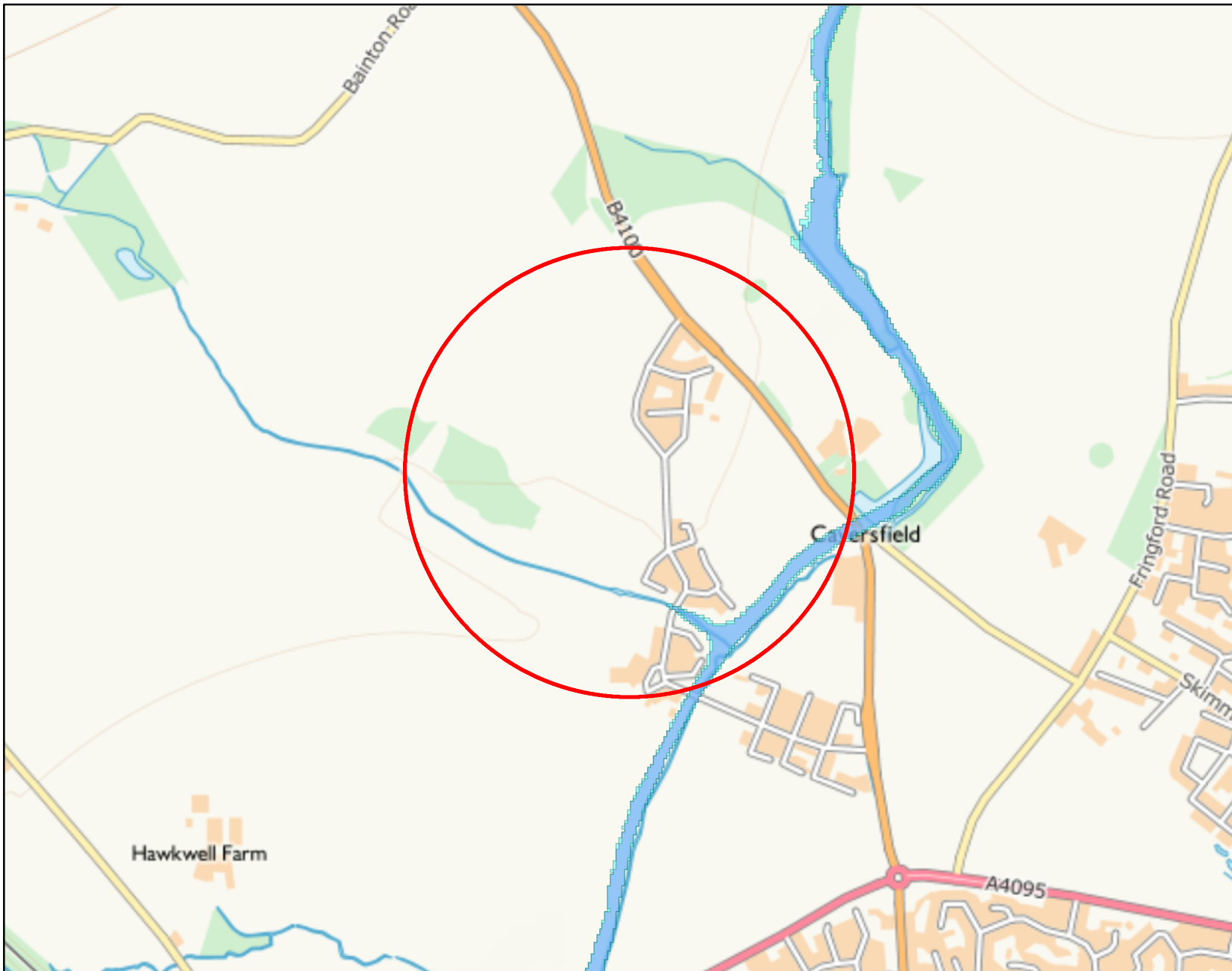
Registered Address: Vectos (South) Limited, Network Building, 97 Tottenham Court Road, London W1T 4TP. Company No. 7591661
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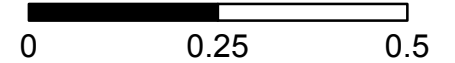
Information in this message may be confidential and may be legally privileged. If you have received this message by mistake, please notify the sender immediately, delete it and do not copy it to anyone else. We have checked this email and its attachments for viruses. But you should still check any attachment before opening it. We may have to make this message and any reply to it public if asked to under the Freedom of Information Act, Data Protection Act

Flood Map for Planning centred on OX27 8BD

Created on 22/09/2020 REF: THM185983



Kilometres



Legend

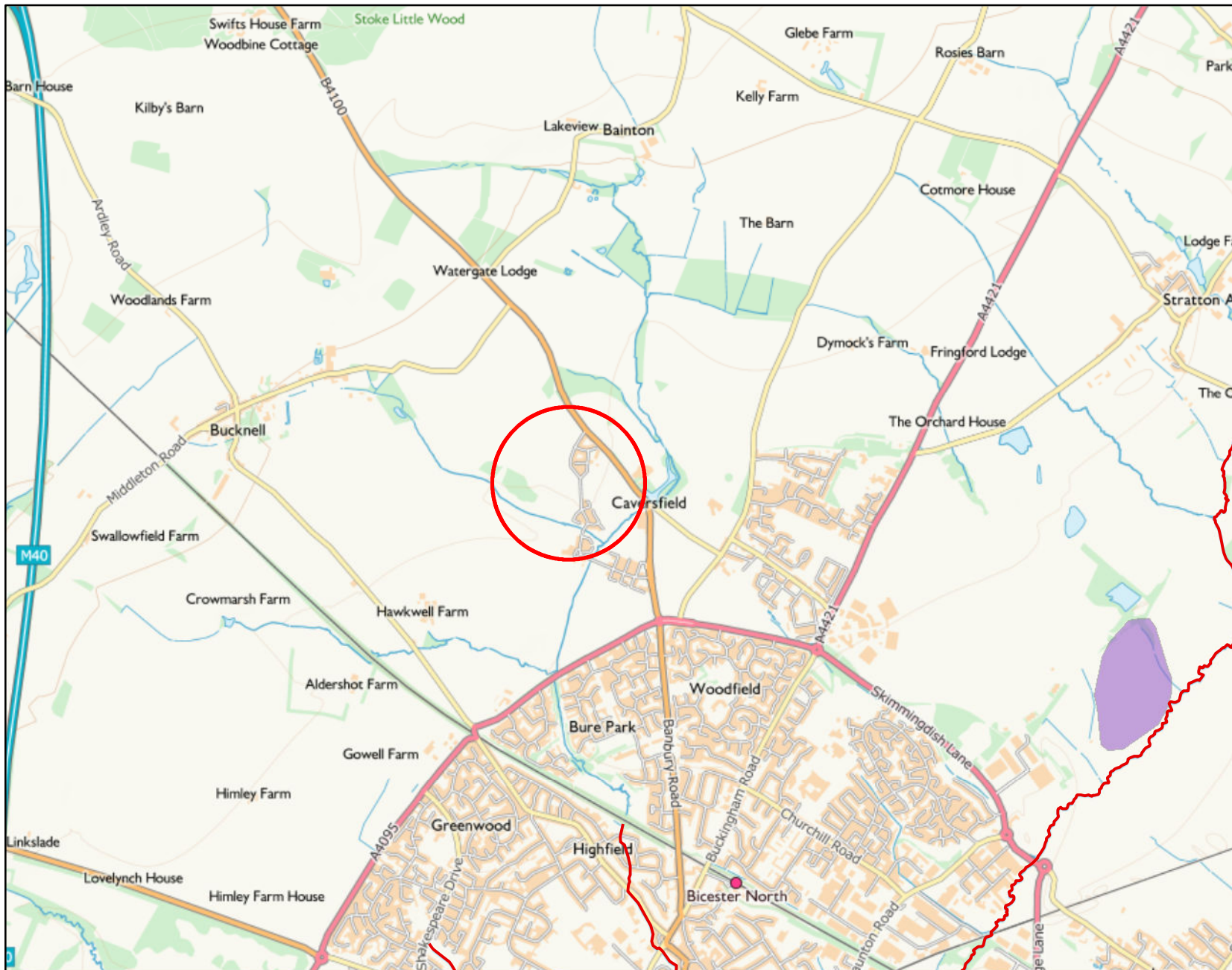
- Main River
- Flood defences
- Areas benefiting from flood defences
- Flooding from rivers or sea (FZ3)
- Extent of extreme flood (FZ2)
- Flood Map - flood storage areas
- Formal Defences

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

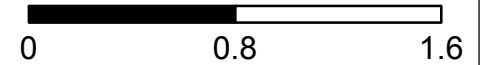
The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

Historic Flood Map centred on OX27 8BD

Created on 22/09/2020 REF: THM185983



Kilometres



Legend

— Main River

year

■ 1992

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

National generalised (JFLOW) flood levels for Land at OX27 8BD

Our Ref: THM185983

JFLOW includes the following information:

Ordnance Survey 1:25k colour raster base mapping;
Flood Zone 2 and Flood Zone 3;
Unique identifiers (for cross referencing to the water levels);
Flood defence locations (where available/relevant) and unique
Flood Map areas benefiting from defences (where
Flood Map flood storage areas (where available/relevant);
Statutory (Sealed) Main River (where available within map

A table showing:

- i) X/Y coordinate locations, unique identifiers and levels for *undefended* scenarios.

Please note:

If you will be carrying out computer modelling as part of your Flood Risk Assessment, please request our guidance which sets out the 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

This information is provided subject to the enclosed notice which you This letter is not a Flood Risk Assessment. The information supplied can be used to form part of your Flood Risk Assessment. Further

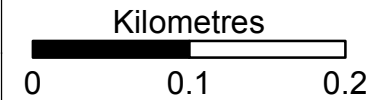
<https://www.gov.uk/guidance/flood-risk-assessment-local->

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

[enquiry-form-preliminary-opinion](#)

Flood Map for Planning (Rivers & Sea) centred on OX27 8BD

Created on 15 October 2020 REF: THM 185983



Legend

- Main River
- Flood defences
- Areas benefiting from flood defences
- Flooding from rivers or sea (FZ3)
- Extent of extreme flood (FZ2)
- Flood Map - flood storage areas

Flooding from rivers or sea without defences (Flood Zone 3) shows the area that could be affected by flooding:
- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

The Extent of an extreme flood (Flood Zone 2) shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

National generalised (JFLOW) flood levels

THM185983

The modelled flood levels for the closest most appropriate points for your site that are provided below:

Grid cell reference	Easting	Northing	Maximum Depths (m)		
			1% annual probability	1% annual probability + (20%)	0.1% annual probability
Flood point 1	457929	224986	0.21	0.27	0.29
Flood point 2	458007	225058	0.59	0.63	0.70
Flood point 3	458070	225097	0.68	0.72	0.79

Grid cell reference	Easting	Northing	Maximum Levels (mAOD)		
			1% annual probability	1% annual probability + (20%)	0.1% annual probability
Flood point 1	457929	224986	84.39	84.45	84.47
Flood point 2	458007	225058	84.42	84.46	84.53
Flood point 3	458070	225097	84.69	84.72	84.79

Nick Bosanko

To: Planning_THM
Subject: RE: WA/2020/128574/01-L01 - flood risk

From: Planning_THM <Planning_THM@environment-agency.gov.uk>
Sent: 22 April 2021 12:41
To: Nick Bosanko <Nick.Bosanko@vectos.co.uk>
Subject: RE: WA/2020/128574/01-L01 - flood risk

Dear Nick,

Firstly, please accept my apologies for the delay in responding. We are currently having to prioritise our workstream to those sites which present the most significant environmental risk and therefore delays are being experienced.

I have re-assessed our response to this site in relation to your points and our response to planning application 18/00484/OUT (75 dwellings). From the details we have on file for the 2018 application, we did accept the use of JFLOW data within the FRA. There are notes on file of discussions between us and the consultant compiling the FRA that while the use of JFLOW is not the most robust, and in normal circumstances due to the scale of the development we would seek hydraulic modelling, topographical data supplied by the consultant indicated land levels increase fairly steeply away from the watercourse. Based on this and the indicative masterplan submitted with the application, we took the decision that this would be acceptable in this instance.

Based on our previous position, the topography of the site in the area adjacent to the watercourse and that the site as shown within the scoping report does not include any additional land within an area at risk of flooding, we do agree to review the detailed FRA you are producing for the NW Bicester site using JFLOW data.

However, we reserve the right to alter this position once the FRA and planning application for this site is submitted and reviewed. Should the application and accompanying FRA show that vulnerable development is to be located closer to the area of flood risk, or that the topography with the area of flood risk is to be lowered, or any other factor that may give us cause for concern that vulnerable development on site or any land off site may be put at increased risk of flooding, a hydraulic model may be required.

You may wish to put this to your client and to avoid any delays to the planning process, they may wish to ask us to review your FRA prior to submitting the planning application to obtain our views in advance of our statutory response. We can do this through our pre-planning service and our current fees are £100 per hour, plus VAT. The standard terms of our charged for service are available [here](#).

Kind regards,

Sarah Green

Planning Advisor, Thames Sustainable Places Team
Environment Agency, Red Kite House, Wallingford, OX10 8BD

Planning_THM@environment-agency.gov.uk

Tel : 0208 474 9253

Normal working hours:
MON/TUE/WED/FRI 10am – 2pm
THUR 10am – 5pm

Speak to us early about environmental issues and opportunities – We can provide a free pre-application advice note or for more detailed advice or meetings we can provide a project manager to co-ordinate specialist advice which costs £100 per hour + VAT. For more information, please email us at planning_THM@environment-agency.gov.uk



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From: Nick Bosanko [<mailto:Nick.Bosanko@vectos.co.uk>]
Sent: 21 April 2021 16:05
To: Planning_THM <Planning_THM@environment-agency.gov.uk>
Subject: RE: WA/2020/128574/01-L01 - flood risk

Hi Sarah

Can you now come to me on this please?


Thanks, Nick

Nick Bosanko
Associate Director

-
0117 203 5240
07947 220 321

-
5th Floor, 4 Colston Avenue
Bristol, BS1 4ST

vectos.

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From: Planning_THM <Planning_THM@environment-agency.gov.uk>
Sent: 11 March 2021 12:20
To: Nick Bosanko <Nick.Bosanko@vectos.co.uk>
Cc: Rob Bolton <rb@reviewpartners.uk.com>; 'Hannah Leary' <Hannah.Leary@bartonwillmore.co.uk>
Subject: RE: WA/2020/128574/01-L01 - flood risk

Hi Nick, sorry we are extremely busy. I will look into this for you and come back with a response as soon as I can

Sarah

Sarah Green

Planning Advisor, Thames Sustainable Places Team

Environment Agency, Red Kite House, Wallingford, OX10 8BD

Planning_THM@environment-agency.gov.uk

Tel : 0208 474 9253

Please note I am currently working on Tuesdays & Thursdays. I will access emails Mondays/Wednesdays & Fridays for urgent matters.

Normal working hours:

MON/TUE/WED/FRI 10am – 2pm

THUR 10am – 5pm

Speak to us early about environmental issues and opportunities – We can provide a free pre-application advice note or for more detailed advice or meetings we can provide a project manager to co-ordinate specialist advice which costs £100 per hour + VAT. For more information, please email us at planning_THM@environment-agency.gov.uk



From: Nick Bosanko [<mailto:Nick.Bosanko@vectos.co.uk>]
Sent: 10 March 2021 15:19
To: Planning_THM <Planning_THM@environment-agency.gov.uk>
Cc: Rob Bolton <rb@reviewpartners.uk.com>; 'Hannah Leary' <Hannah.Leary@bartonwillmore.co.uk>
Subject: RE: WA/2020/128574/01-L01 - flood risk

Hi Sarah

I don't have a number for you.

I was hoping you could respond to the below please?

Thanks, Nick

Nick Bosanko
Associate Director

-
0117 203 5240
07947 220 321

-
5th Floor, 4 Colston Avenue
Bristol, BS1 4ST

vectos.

Consider the environment. Do you really need to print this email?

From: Nick Bosanko

Sent: 18 February 2021 14:43

To: Planning_THM <Planning_THM@environment-agency.gov.uk>

Cc: Rob Bolton <rb@reviewpartners.uk.com>; 'Hannah Leary' <Hannah.Leary@bartonwillmore.co.uk>

Subject: RE: WA/2020/128574/01-L01 - flood risk

Hi Sarah

Thank you for the email.

I have included an extract from your scoping opinion below:

It's noted that the site resides within FZ3 close to the south-eastern boundary. Our GIS data does not reveal the presence of any detailed hydraulic modelling in this area. Therefore, in accordance with the document 'Thames Area Climate Change Allowances (v1.1, 02/2019)' and assuming the proposed development will be classified as "large major" and "more vulnerable", future impacts of climate change on fluvial flooding will need to be informed by detailed hydraulic modelling. The EIA Scoping Report does not recognise this requirement.

In the absence of detailed modelling, we note that the Cherwell District Council SFRA states that "the extent of flood zone 3b is equal to flood zone 3a" (Table 4-3). We recommend that a 'sequential location' approach is taken in regards to minimising/avoiding development within flood zone 3 with an appropriate allowance made for climate change. Guidance on choosing appropriate climate change allowances for assessment and design can be found here: <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

It outlines an alternative method in the absence of detailed hydraulic modelling, which is what we have adopted. There is no development proposed in Flood Zone 3a or b.

As noted in my email below, in order to determine how the flood zones are impacted by climate change we have obtained JFLOW flood levels from the EA and have extrapolated these in accordance with the NPPF climate change allowances. This has allowed us to derive a 1 in 100 year plus 35% climate change flood zone.

This is now complete and the resultant flood map is attached. Further details will be included in the FRA.

Your email below suggests that this would not be acceptable. However, the same approach was adopted for Land North and Adjoining Home Farm Banbury Road B4100 Caversfield (18/00484/OUT). For clarity, this site now forms part of this forthcoming planning application. The JFLOW data for 18/00484/OUT is the same and the same approach has been adopted, so I see no reason why this would not be acceptable now. We have adopted the same approach recently for another site further upstream, which was accepted.

I have attached a series of letters from the Environment Agency, which were concerned with this same issue on 18/00484/OUT. Ultimately, the approach outlined above was adopted and the Environment Agency removed their objection. Please take note of the extract from the final letter below, which refers in a proposed planning condition.

Since our response, we have received additional information including the documents listed above. The Flood Risk Assessment, prepared by Peter Brett Associates, reference 41436/2002, revision 03, dated February 2019, has satisfactorily addressed our earlier concerns as raised in our response to this application, our reference WA/2018/125145/03-L01, dated 6 December 2018. Subject to the condition below, we therefore **withdraw our objection** to this proposal as submitted.

Environment Agency position

The proposed development will be acceptable if the following **planning condition** is included on the planning permission's decision notice. Without this condition we would object to the proposal due to its adverse impact on the environment.

Condition

Cont/d..

The development shall be carried out in accordance with the submitted the Flood Risk Assessment, prepared by Peter Brett Associates, reference 41436/2002, revision 03, dated February 2019, and the following mitigation measures it details

1. Using the 1 in 100 year plus 35% flood level (extrapolated from JFlow data) of 84.55m AOD, the lowest residential dwelling will be located at 87.50m AOD (as shown within table 3.1).

In light of the attached information, please can you reconsider your response?

Many thanks, Nick

From: Planning_THM <Planning_THM@environment-agency.gov.uk>

Sent: 18 February 2021 13:07

To: Nick Bosanko <Nick.Bosanko@vectos.co.uk>

Subject: RE: WA/2020/128574/01-L01 - flood risk

Dear Mr Bosanko,

Thank you for your email, please accept my apologies for the delay in coming back to you.

We must advise that JFLOW data is not suitable for use within a site specific Flood Risk Assessment. The data is too coarse and does not take into account river channels or any structures/features present.

We will expect to see detailed modelling in this case to establish the extent of the 5% annual probability flood (1 in 20) and the 1% annual probability flood with the appropriate allowance for climate change to more accurately demonstrate that development will be sited outside of these areas. As stated within our response to the scoping exercise, hydraulic modelling is required and it is likely that we would object to any forthcoming planning application if not carried out to establish the baseline level of risk and to inform mitigation if necessary.

I have enclosed a copy of our Thames area climate change guidance for your reference.

I would like to encourage you to approach us for further advice once the model and FRA have been compiled, prior to a planning application submission. Early engagement will ensure that a sound baseline flood risk level is agreed to inform ongoing designs and can often lead to a smoother transition through the planning process.

As part of our charged for service we will provide a dedicated project manager to act as a single point of contact to help resolve any problems. We currently charge £100 per hour, plus VAT. We will provide you with an estimated cost for any further discussions or review of documents. The standard terms of our charged for service are available [here](#).

If you would like more information on our planning advice service, including a cost estimate, please contact me.

Regards,

Sarah

Sarah Green

Planning Advisor, Thames Sustainable Places Team
Environment Agency, Red Kite House, Wallingford, OX10 8BD

Planning_THM@environment-agency.gov.uk

Tel : 0208 474 9253

Please note I am currently working on Tuesdays & Thursdays. I will access emails Mondays/Wednesdays & Fridays for urgent matters.

Normal working hours:
MON/TUE/WED/FRI 10am – 2pm
THUR 10am – 5pm

Speak to us early about environmental issues and opportunities – We can provide a free pre-application advice note or for more detailed advice or meetings we can provide a project manager to co-ordinate specialist advice which costs £100 per hour + VAT. For more information, please email us at planning_THM@environment-agency.gov.uk



From: Nick Bosanko [<mailto:Nick.Bosanko@vectos.co.uk>]
Sent: 14 January 2021 09:05
To: Planning_THM <Planning_THM@environment-agency.gov.uk>
Subject: WA/2020/128574/01-L01 - flood risk

Dear EA

Further to your response attached, I'd writing with respect to your comments on hydraulic modelling.

We do not intend to undertake hydraulic modelling to support the outline planning application and accept the status of Flood Zone 3b, as outlined in the SFRA. No development is proposed in the flood zones. In order to determine how the flood zones are impacted by climate change we have obtained JFLOW flood levels from the EA and will extrapolate these in accordance with the NPPF climate change allowances. No development will be proposed in these climate change flood zones. This will therefore adopt the same approach that was undertaken for a number of planning applications in the local vicinity.

Regards, Nick


Nick Bosanko
Associate Director

-
0117 203 5240
07947 220 321
Nick.Bosanko@vectos.co.uk

-
5th Floor, 4 Colston Avenue
Bristol, BS1 4ST



While we are working remotely, there may be some times the phonenumber is busy or not staffed. Please bear with us and use the central email, reception@vectos.co.uk, as a point of contact. Your details will be passed on the relevant staff member and your call will be returned.

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Appendix C

LLFA Correspondence

Nick Bosanko

From: Nick Bosanko
Sent: 02 February 2021 14:56
To: Jeevarangan, Sujeenthan - Communities; Bennett, Richard - Communities
Cc: Rob Bolton; emusgrove@firethornttrust.com
Subject: RE: NW Bicester - Greenfield Rate Query

Hi Sujee, Richard

Thank you for your time today. I think you were largely in support of our surface water strategy as outlined in the email below, but as agreed, I have prepared a summary of the key points/changes discussed in the meeting:

1. Revise greenfield runoff rates using IH124 method, based on a soil type 2.
2. For all rainfall events, surface water should be restricted to the agreed QBAR rate (or 2l/s/ha whichever is greater), but it is not necessary to restrict the 1 in 1 year event to the corresponding green field event. Instead, we can use shallow unlined swales (where groundwater levels etc permit) to manage these smaller storms through infiltration.
3. The QBAR greenfield runoff rate should be calculated based upon the total development area, not just the assumed impermeable area.
4. As part of the reserved matters stage, consideration of some additional source control measures can be considered (such as permeable paving), but it was agreed that the use of swales and ponds meet with the requirements of the SuDS manual. The FRA can address this.
5. The basin locations are unlikely to be significantly susceptible to the impacts of surcharged outfalls (given the ground levels). This is therefore likely to have been designed out, but the FRA will make comment on this and it may need to be assessed in more detail at the reserved matters stage.

Please let me know if you are happy with the above or if there are any additional comments you would like to make.

Many thanks, Nick

From: Nick Bosanko
Sent: 01 February 2021 15:39
To: Jeevarangan, Sujeenthan - Communities <Sujeenthan.Jeevarangan@Oxfordshire.gov.uk>
Cc: Bennett, Richard - Communities <Richard.Bennett@Oxfordshire.gov.uk>; Rob Bolton <rb@reviewpartners.uk.com>; emusgrove@firethornttrust.com
Subject: RE: NW Bicester - Greenfield Rate Query

Dear Sujee

Thank you for agreeing to meet with us tomorrow. I wanted to provide some information in advance of the meeting, so you could review and we can get the most out of the meeting, along with some agreement on the principles of the surface water drainage strategy for this outline planning application.

We have revised the surface water drainage strategy, which was originally presented as part of the pre-app submission and subsequent meeting. We have also reviewed your pre-app response (dated 21st December 2020) and we hope that you will now be in favour of our proposals.

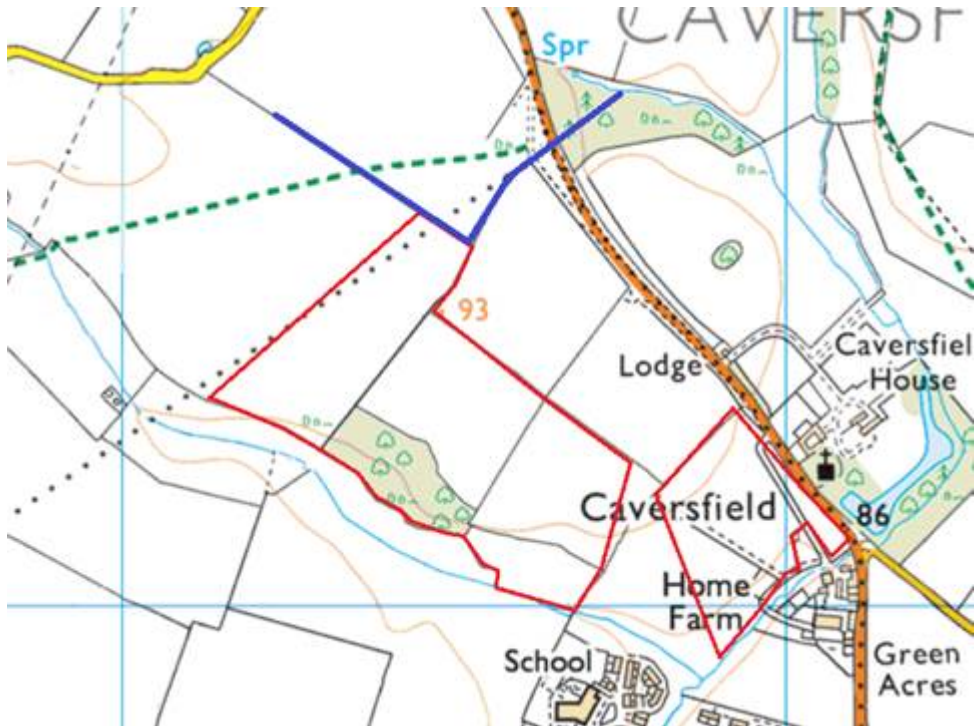
I have provided a brief summary below, including key opportunities and constraints. We can treat this as an agenda.

Topography

The majority of the site falls in a south or south east direction towards a stream. The north west corner of the site falls to the north, to a drainage ditch. A topo survey can be found on the following link:

Hydrology

There are three streams and ditches on site. Forgive the crude image below, but it shows these three streams and ditches along with the indicative red line. The stream along the east and south boundary is identified on the OS mapping. However, the ditch along the north west boundary is not and I have marked this up in blue. These streams and ditches are shown on the topo survey. No other ditches or drainage features are present on site.



Geology

A thorough ground investigation has been undertaken by Hydrock. This has included two rounds on intrusive works. The first round of intrusive works spread across the whole site, but more targeted investigations were undertaken as part of the second round to collect further information with respect to infiltration potential for management of surface water runoff.

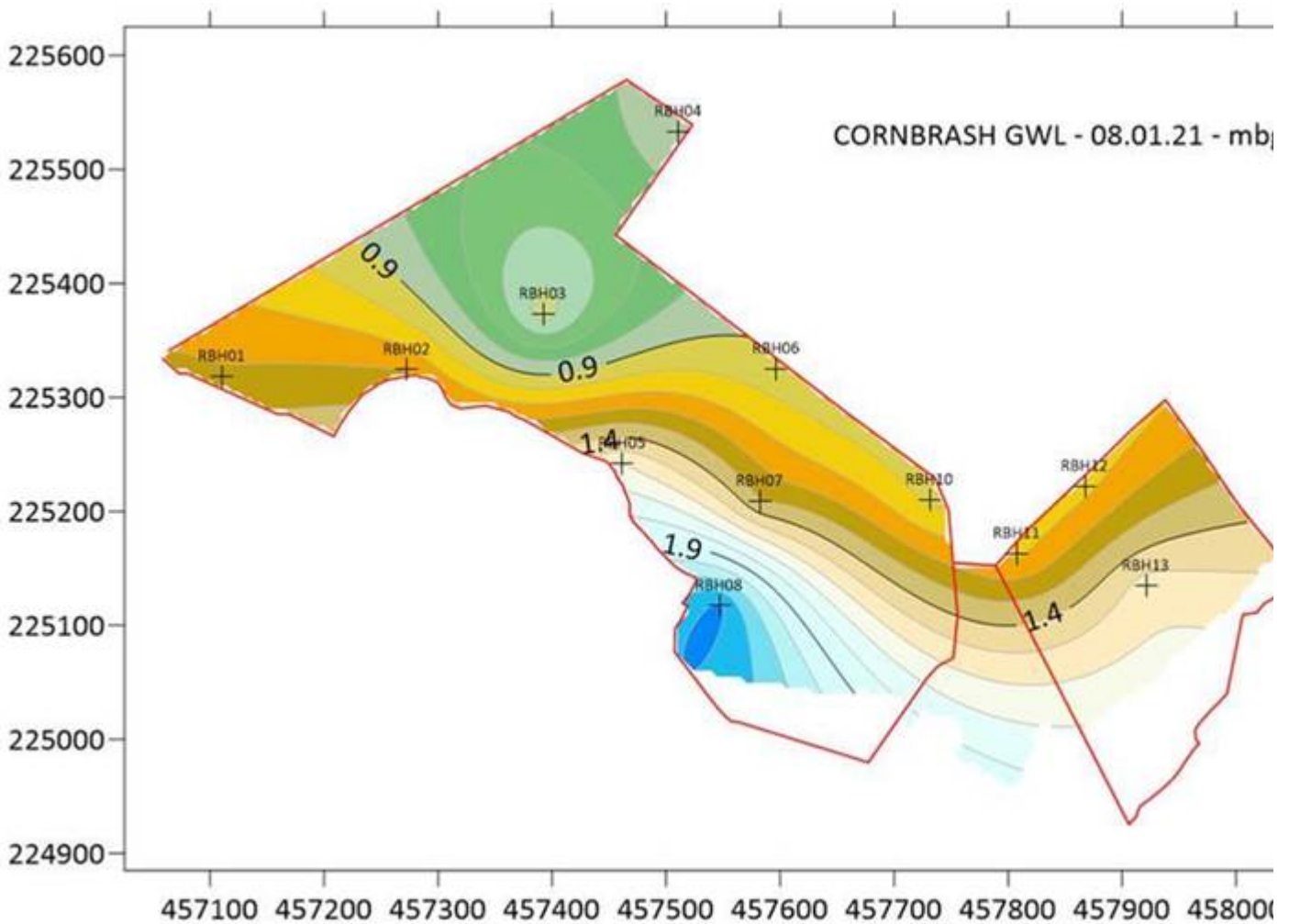
The ground investigation is a very large document and can be downloaded on the following link:

I have attached a factual summary of the soil infiltration test results dated 25th September 2020. A second note was prepared following the more recent round of intrusive works, which is also attached and dated 20 January 2021. Please ignore the comments on the surface water drainage strategy, as these are incorrect and need to be changed. The table below has been extracted from the noted date 20 January 2021, which provides a summary of the ground conditions encountered.

Stratum	Depth to top (m bgl)	Depth to base (m bgl)	Thickness (m) (range)	Thi (m) (a
Topsoil	0.00	0.20 – 0.60	0.20 – 0.60	0
Made Ground	0.00 – 0.30	0.25 – 1.60	0.25 – 1.30	0
Alluvium*	0.30	0.80	0.50	0
Head Deposits	0.25 – 0.80	0.50 – 2.40	0.20 – >1.75	0
Cornbrash Formation	0.20 – 2.00	1.00 – 3.73	>0.02 – 2.60	1
Forest Marble Formation	0.60 – 3.73	>1.35 - >5.00	Not proven	Not

*TP11 only.

Infiltration testing was undertaken and results were sporadic, depending on whether they hit the clay and/or groundwater. Groundwater was also recorded and was found to be variable across the site. The image below shows the results of some monitoring, where groundwater ranges between 0.5 to 2.3 m bgl (January 2021).



The ground investigation concluded that infiltration is sporadic across the site, with the same geological units being highly variable in infiltration rates, and as such the effectiveness of any single infiltration feature will be highly variable and should not be adopted at the site.

Flood Risk

The stream on the east site boundary introduces an area of Flood Zone 2 and 3. All development, including SuDS will be steered into Flood Zone 1. The stream on the south boundary results in some surface water flooding. Similarly, all development, including SuDS will be steered out of the surface water floodplain.

Surface Water Drainage Strategy

Proposed Surface Water Discharge Receptor

As noted above, infiltration as a means of surface water management is not practical. All of the site naturally drains to a stream or ditch. These natural catchments will be preserved and have been used to inform the location of SuDS.

Greenfield Runoff Rates

Desktop data indicates very permeable soil conditions on site. This in turn results in very low greenfield runoff rates. However, the ground investigation identifies clay top soils and shallow groundwater. This site specific data is therefore considered to portray a more accurate representation of the ground conditions on site, which will impact the greenfield runoff rates.

Please refer to the borehole logs in the main ground investigation report, which identify the presence of shallow clay soils and groundwater.

Similar to the Home Farm application (18/00484/OUT), we have used the EA Rainfall runoff management for Developments ASV1 method to estimate greenfield runoff rates. We have used this approach because of the ability to define a soil type, through comparison with observations made in the field. The soil types used in the method are presented below.

Soil Index	General Description	Soil Type
0.150	i) Well drained permeable sandy or loamy soils and shallower analogues over highly permeable limestone, chalk, sandstone or related drifts. ii) Earthy peat soil drained by dikes and pumps. iii) Less permeable soils in valleys.	1
0.300	i) Very permeable soils with shallow ground-water. ii) Permeable soils over rock or frangipani, commonly on slopes in western Britain associated with smaller areas of less permeable wet soils. iii) Moderately permeable soils, some with slowly permeable subsoils.	2
0.400	i) Relatively impermeable soils in boulder and sedimentary clays and in alluvium, especially in eastern England. ii) Permeable soils with shallow ground-water in low lying areas. iii) Mixed areas of permeable and impermeable soils in approximately equal proportions.	3
0.450	i) Clayey, or loamy over clayey soils with an impermeable layer at shallow depth.	4
0.500	Soils of the wet upland i) With peaty or humose surface horizons and impermeable layers at shallow depth. ii) Deep raw peat associated with gentle upland slopes or basin sites. iii) Bare rock cliffs and screes. iv) Shallow, permeable rocky soil on steep slopes.	5

Following their site investigations works, Hydrock categorised the soils to best suit type 2 (soil index 0.3), see page 31 of the main report.

Based on these soil type, the greenfield rates are presented below:

Return Period	Peak Greenfield Discharge (l/s/ha)
QBAR	1.63
1 in 1	1.39
1 in 30	3.85
1 in 100	5.20

The calculation sheet is attached.

Greenfield Runoff Volumes

The Oxfordshire local SuDS standards present two methods for managing runoff volumes. We have chosen the simple method, which states:

“Limit discharge rates for rainfall events up to and including the 1 in 100 year event (including climate change allowances) to the agreed QBAR rate (or 2l/s/ha whichever is greater) and 1 in 1 year event to the corresponding green field event.”

As you can see, the QBAR rate is less than 2 l/s/ha so we have adopted 2 l/s/ha for rainfall events up to and including the 1 in 100 year event (including climate change allowances). To meet with the requirements of this method, runoff in a 1 in 1 year rainfall event will be restricted to 1.39 l/s/ha or less.

These greenfield rates are still very low, which result in a greater volume / area of attenuation storage across the site.

SuDS Strategy

The site has been split into 4 catchments, based on topography and natural outfall locations. These can be seen in our draft Preliminary Surface Water Drainage layout, which is attached.

The development proposals are entirely for residential purposes. The developable area of each catchment has been measured (i.e. excluding areas of POS, SuDS, green corridors etc) . The impermeable area of each catchment has then been calculated based upon a 60% impermeable ratio (i.e. that 60% of the developed area would have an impermeable cover). This is a standard approach for a residential scheme at the outline stage.

A 10% allowance for urban creep has been specified on the impermeable area. This urban creep factor has not been reflected in the proposed discharge rates. The table below provides a summary of impermeable areas and discharge rates for each catchment.

	Development Area (ha)	Assumed Impermeable Area (ha)	Future Impermeable Area (ha)	Discharge Rate - 1 in 1 year (l/s)	Discharge Rate - Storm > 1 in 1 year (l/s)
Catchment 1	2.68	1.61	1.77	2.2	3.2
Catchment 2	6.81	4.09	4.50	5.7	8.2
Catchment 3	1.40	0.84	0.93	1.2	1.7
Catchment 4	0.97	0.58	0.64	0.8	1.2

Data in the last three columns were derived using MicroDrainage Source Control to estimate attenuation requirements. This has been based on the 1 in 100 year plus 40% climate change design storm and basin side slopes of 1:3.5. This will allow some variation in basin side slopes, with 1:3.5 being an average.

The Source Control estimates were also run for smaller storms to ensure that the 1 in 1 year runoff rates were also met.

An example of these Source Control estimates are attached for Catchment 1.

Catchment 1 and 2 are large, and the total attenuation provision has been split across a number of attenuation basins located throughout the development parcels. Furthermore, swales have been incorporated extensively across the site. The swales will be to convey water across the site to the attenuation features.

Please also note that rainwater harvesting is likely to be integrated into the scheme, which may require pumping of surface water from one of the larger SuDS basins. However, this is being dealt with by another team and details are to be confirmed.

SuDS Treatment Train

The information below is based on the requirements of the SuDS Manual. The pollution indices from the residential development are identified and the mitigation indices follow. The mitigation indices are a result of the role the

swales and ponds can provide. It is considered that the SuDS provided as part of the surface water drainage strategy would offer sufficient mitigation for the land use classification.

Land Use	Pollution Hazard Indices for Different Land Use Classifications			
	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	<u>Hydro-carbons</u>
Residential Roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads and non-residential car parking with infrequent change	Low	0.5	0.4	0.4
Total	Low	0.7	0.6	0.45

Type of SuDS	Mitigation Indices		
	TSS	Metals	<u>Hydro-carbons</u>
Swales	0.50	0.60	0.50
Ponds	0.35	0.35	0.25
Total	0.85	0.95	0.75

The attenuation basins are likely to be designed in a way that a component will hold a permanent body of water, which is desired for bio-diversity requirements. The wider basin will wet and dry as a result of each rainfall event and will be used for meadow and wetland planting. This will offer alternative opportunities for various flora and fauna. The use of a pond (or permanent body of water) scores highly on the mitigation indices, but the as per the CIRIA SuDS Manual, a factor of 0.5 is used to account for the secondary or tertiary components associated with the already reduced inflow concentrations in the treatment train.

Regards, Nick

From: Jeevarangan, Sujeentan - Communities <Sujeentan.Jeevarangan@Oxfordshire.gov.uk>
Sent: 29 January 2021 14:59
To: Nick Bosanko <Nick.Bosanko@vectos.co.uk>
Cc: Bennett, Richard - Communities <Richard.Bennett@Oxfordshire.gov.uk>
Subject: RE: NW Bicester - Greenfield Rate Query

Afternoon,

Me and Richard can only do Tuesday 2nd, at 13:00. If this is okay with you, please send us a teams invite.

Kind Regards

Sujee Jeeva
LLFA Planning Engineer
Oxfordshire County Council
County Hall

New Road
Oxford
OX1 1ND
Tel: 07488704922

From: Nick Bosanko <Nick.Bosanko@vectos.co.uk>
Sent: 27 January 2021 09:14
To: Jeevarangan, Sujeenthan - Communities <Sujeenthan.Jeevarangan@Oxfordshire.gov.uk>
Cc: Bennett, Richard - Communities <Richard.Bennett@Oxfordshire.gov.uk>
Subject: RE: NW Bicester - Greenfield Rate Query

Hi Sujee

Can you provide some dates/times for the latter part of next week please?

Thanks, Nick

Nick Bosanko
Associate Director


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From: Nick Bosanko
Sent: 22 January 2021 12:58
To: Jeevarangan, Sujeenthan - Communities <Sujeenthan.Jeevarangan@Oxfordshire.gov.uk>
Cc: Bennett, Richard - Communities <Richard.Bennett@Oxfordshire.gov.uk>
Subject: RE: NW Bicester - Greenfield Rate Query

Hi Sujee

Further to the below, we have finally got the additional ground investigation back now and are interpreting that. Would you be able to make any time after 3pm from 1st - 5th Feb? This will give us enough time to prepare something for you in advance, as we'd like to agree the principles of the strategy so that the wider disciplines can progress their elements.

Thank you. Nick

From: Nick Bosanko
Sent: 14 January 2021 13:41
To: Jeevarangan, Sujeenthan - Communities <Sujeenthan.Jeevarangan@Oxfordshire.gov.uk>
Cc: Bennett, Richard - Communities <Richard.Bennett@Oxfordshire.gov.uk>
Subject: RE: NW Bicester - Greenfield Rate Query

Hi Sujee

Thanks for the email. I'm just waiting on the date of when we will get back the further SI, as I'll need to allow sufficient time to revise our strategy prior to our meeting. Therefore, I'll confirm the date asap, but it's more likely to be towards the later dates suggested.

Regards, Nick

From: Jeevarangan, Sujeenthan - Communities <Sujeenthan.Jeevarangan@Oxfordshire.gov.uk>
Sent: 13 January 2021 10:47
To: Nick Bosanko <Nick.Bosanko@vectos.co.uk>
Cc: Bennett, Richard - Communities <Richard.Bennett@Oxfordshire.gov.uk>
Subject: Re: NW Bicester - Greenfield Rate Query

Good Morning Nick,

We can do any time after 3pm from 25th - 28th Jan.

Please send us Microsoft Teams invite .

Kind Regards

Sujee
LLFA Planning Engineer
Oxfordshire County Council
County Hall
New Road
Oxford
OX1 1ND
Mob: 07488704922

From: Nick Bosanko <Nick.Bosanko@vectos.co.uk>
Sent: Tuesday, January 12, 2021 5:23 PM
To: Jeevarangan, Sujeenthan - Communities <Sujeenthan.Jeevarangan@Oxfordshire.gov.uk>
Cc: Bennett, Richard - Communities <Richard.Bennett@Oxfordshire.gov.uk>
Subject: RE: NW Bicester - Greenfield Rate Query

Hi Sujee

Can you come back to me on the below please?

Thanks, Nick

Nick Bosanko
Associate Director


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From: Nick Bosanko
Sent: 08 January 2021 12:40

To: Jeevarangan, Sujeenthan - Communities <Sujeenthan.Jeevarangan@Oxfordshire.gov.uk>
Cc: Bennett, Richard - Communities <Richard.Bennett@Oxfordshire.gov.uk>
Subject: RE: NW Bicester - Greenfield Rate Query

Hi Sujee

Thank you for the confirmation.

Once we have finalised the additional site investigation, it would be good if we could set up a meeting. Is that possible? If so, I'll come back to you with some potential dates.

Regards, Nick

From: Jeevarangan, Sujeenthan - Communities <Sujeenthan.Jeevarangan@Oxfordshire.gov.uk>
Sent: 07 January 2021 17:53
To: Nick Bosanko <Nick.Bosanko@vectos.co.uk>
Cc: Bennett, Richard - Communities <Richard.Bennett@Oxfordshire.gov.uk>
Subject: RE: NW Bicester - Greenfield Rate Query

Good Evening Nick,

As long as evidence of infiltration testing in accordance with BRE365 is provided and water quality measures are in place, the groundwater vulnerability issue can be mitigated.

Feel free to email me if you have any more queries in relation to my comments.

Kind Regards

Sujee Jeeva
LLFA Planning Engineer
Oxfordshire County Council
County Hall
New Road
Oxford
OX1 1ND
Tel: 07488704922

From: Littler, Adam - Communities <Adam.Littler@Oxfordshire.gov.uk>
Sent: Thursday, January 7, 2021 12:34 PM
To: Nick Bosanko <Nick.Bosanko@vectos.co.uk>
Cc: Jeevarangan, Sujeenthan - Communities <Sujeenthan.Jeevarangan@Oxfordshire.gov.uk>; Bennett, Richard - Communities <Richard.Bennett@Oxfordshire.gov.uk>
Subject: RE: NW Bicester - Greenfield Rate Query

Dear Sujee,

I hope you are well.

Please could you respond to Nick's below query.

Many thanks,

Adam.

From: Nick Bosanko <Nick.Bosanko@vectos.co.uk>
Sent: 06 January 2021 11:19
To: Littler, Adam - Communities <Adam.Littler@Oxfordshire.gov.uk>
Cc: Brown, Chris - Communities <Chris.Brown@Oxfordshire.gov.uk>
Subject: RE: NW Bicester - Greenfield Rate Query

Dear Adam

Further to your email below, I have just received a copy of the LLFA consultation response to the formal scoping opinion (20/03254/SCOP), which was prepared by Sujeenthan Jeevarangan. I have no means of contacting Sujeenthan. Please can you provide a phone number and email address?

I have extracted some text below from the consultation response:

As the area proposed covers 22ha, it is suggested that numerous source control techniques can be integrated into the scheme. It is also suggested that infiltration techniques could be feasible. Due to the location and scale of scheme, we will expect detailed infiltration testing to BRE365 and substantial long-term groundwater monitoring across the site to support any proposed infiltration. However, the site is a high groundwater vulnerability area, therefore infiltration is unlikely to be feasible.

Due to the size of development proposed, we will expect surface to be managed in a number of small catchments with attenuation features provided across the whole site.

We have undertaken some detailed site investigation, which identifies variable infiltration potential across the site. However, groundwater was fairly shallow which is likely to mean that infiltration as a means of surface water management won't be practical. However, further site investigations are ongoing in targeted parts of the site where a greater potential exists (i.e. where groundwater was deeper and using shallow infiltration techniques).

Given the comments above on groundwater vulnerability, is the LLFA suggesting that infiltration is not appropriate at the site? I note that soakaways and infiltrating highway swales were used for the Exemplar site to the north.

I'd appreciate a response at your earliest opportunity.

Thanks, Nick

Nick Bosanko
Associate Director


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Bristol, BS1 4ST

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