



FLOOD RISK ASSESSMENT
FOR
PROPOSED RESIDENTIAL DEVELOPMENT
THAMES FARM, SHIPLAKE, HENLEY-ON-THAMES
ON BEHALF OF
MRS CLAIRE ENGBERS

MARCH 2016

[ISSUE 4]

Head Office:

Unit 2
York House
Edison Park
Dorcan Way
Swindon
Wiltshire
SN3 3RB

Tel. 01793 619965

Email: cec@ColeEasdon.com

www.ColeEasdon.com





COLE EASDON CONSULTANTS (CEC)

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Prepared:	S. Starr BSc (Hons)	S. Starr BSc (Hons)	S. Starr BSc (Hons)	S. Starr BSc (Hons)
Signature:				
Document Check:	S. Coates BA (Hons)	S. Coates BA (Hons)	S. Coates BA (Hons)	S. Coates BA (Hons)
Signature:				
Technical Check:	R. Bowley BSc CEng MCIWEM	R. Bowley BSc CEng MCIWEM	R. Bowley BSc CEng MCIWEM	R. Bowley BSc CEng MCIWEM
Signature:				
Authorised:	R. Bowley BSc CEng MCIWEM	R. Bowley BSc CEng MCIWEM	R. Bowley BSc CEng MCIWEM	R. Bowley BSc CEng MCIWEM
Signature:				
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CONTENTS

SECTION	HEADING	PAGE No.
1.0	INTRODUCTION	1
2.0	THE EXISTING SITE	3
3.0	FLOOD RISK ISSUES	5
4.0	PROPOSED SURFACE WATER DRAINAGE STRATEGY	8
5.0	PROPOSED FOUL WATER DRAINAGE STRATEGY	12
6.0	SUMMARY AND CONCLUSIONS	13



APPENDICES

Appendix 1 - CEC Figures

CEC Figure 3537/500/Figure 1	Site Location Plan
CEC Figure 3537/500/Figure 2	Flood Zone Map

Appendix 2 - Borehole Data

Appendix 3 - SFRA Excerpts

Appendix 4 -Calculations

Appendix 5 - Public Sewer Records & Thames Water Correspondence

Appendix 6 - CEC Plans & Drawings by Others

CEC Plan 3537/500	Existing Site Plan
CEC Plan 3537/501	Proposed Drainage Strategy
Drawing No. C11748.16.700	Site Layout (by DPDS Architects)

1.0 INTRODUCTION

- 1.1 This *Flood Risk Assessment* has been prepared by Cole Easdon Consultants (CEC) on behalf of Mrs Claire Engbers in respect of an outline planning application for residential redevelopment at Thames Farm, Reading Road (A4155), Shiplake, Henley-on-Thames, Oxfordshire. National Grid Reference SU 76911 80059. Refer to CEC Figure 3537/500/Figure 1 [*Site Location Plan*] in Appendix 1.

Development Proposals

- 1.2 The development proposal comprises 95 dwellings with associated highways, parking and landscaping. Refer to Drawing No. C11748.16.700 [*Site Layout*] by DPDS Architects in Appendix 6. This drawing forms the basis of CEC Plan 3537/501 [*Proposed Drainage Strategy*] also in Appendix 6.

Need for Study

- 1.3 The purpose of this assessment is to demonstrate that the proposals outlined above can be satisfactorily accommodated without worsening flood risk for the area, in accordance with the National Planning Policy Framework Document (NPPF).
- 1.4 Accordingly, this study has been prepared to:
- i) Assess flood risk to the development from fluvial sources;
 - ii) Assess flood risk to the development from other potential sources, including ditches, sewers, groundwater and overland surface water flow;
 - iii) Ensure that the development proposed will fully comply with the requirements of the EA's policy on the safeguarding of floodplains;
 - iv) Provide a SUDS surface water drainage strategy for the site; and
 - v) Identify a foul drainage strategy for the development.
- 1.5 A site topographical survey (referenced to Ordnance datum) has been provided to CEC and has been reviewed as part of this study. Refer to CEC Plan 3537/500 [*Existing Site Plan*] in Appendix 6.

Scope of Study

- 1.6 In Section 2.0, we describe the characteristics of the development site and surrounding area. In Section 3.0, we assess flood risk issues. Surface and foul drainage strategies are discussed in Sections 4.0 and 5.0. Finally, conclusions are presented in Section 6.0.

1.7 The following resources have been used for this study:

- Flood Zone Map – Environment Agency (EA);
- Groundwater Source Protection Zones Map - Environment Agency (EA);
- Geological Map - British Geological Survey (BGS);
- Topographical Survey Drawings by BDS; and
- Thames Water Public Sewer Records.

1.8 The following publicly available documents have been reviewed as part of this assessment:

- *South Oxfordshire & Vale Of The White Horse Strategic Flood Risk Assessment JBA (JBA 2013)*;
- *National Planning Policy Framework (NPPF) (March 2012)*;
- *Technical Guidance to the NPPF (March 2012)*;
- *Sewers for Adoption, 7th Edition – A Design and Construction Guide for Developers (SFA 7) (March 2006)*;
- *CIRIA C697 The SUDS Manual*; and
- *Building Regulations 2010 – Approved Document H (Drainage and Waste Disposal)*.

1.9 The following abbreviations are used in this report:

- AOD – Above Ordnance Datum;
- EA – Environment Agency;
- SUDS – Sustainable Urban Drainage Systems;
- HA – Highway Authority;
- FZM – Flood Zone Map prepared by the Environment Agency;
- NPPF – National Planning Policy Framework;
- LPA – Local Planning Authority;
- 1% event – 1 in 100 Year return period storm;
- 1% + CC event – 1 in 100 Year return period storm including a 30% allowance for climate change; and
- SFRA - *South Oxfordshire & Vale Of The White Horse Strategic Flood Risk Assessment JBA (JBA 2013)*.

2.0 THE EXISTING SITE

Refer to CEC Figure 3537/500/Figure 1 [*Site Location Plan*] in Appendix 1 and CEC Plan 3537/500 [*Existing Site Plan*] in Appendix 6.

- 2.1 The site is located on Reading Road (A4155), on the western edge of the village of Shiplake, near Henley-on-Thames, Oxfordshire. Refer to CEC Figure 3537/500/Figure 1 [*Site Location Plan*] in Appendix 1.
- 2.2 The site covers 5.6ha and currently comprises a large open grassed field with 3 No. barns, formerly used as poultry houses, near its northern boundary. A hardcore track provides access from Reading Road.
- 2.3 The site is a roughly rectangular parcel of land bounded to the north by a private farm access road, and to the east by Reading Road. Gardens and paddocks form the site's southern and western boundaries. Hedges line the site's southern and western boundaries, and mature trees are present along its northern and eastern edges.
- 2.4 Land use to the south and east of the site of the site is predominantly residential, with agricultural land use prevalent to the north and west.
- 2.5 The land in the locality falls toward the River Thames, which is located some 750m east of the site. The topography of the land within the site also falls in an easterly direction, at a gradient of approximately 1 in 30. Existing ground levels within the site vary from 56.00mAOD at its western boundary, to 42.00mAOD at its most northerly corner, adjacent to Reading Road.

Nearby Watercourses/Drainage Features

- 2.6 The River Thames, a designated Main River, drains the local catchment, and is the nearest watercourse to the site. The River is located some 750m east of the site and follows a roughly northerly course beyond the eastern edge of Shiplake. A number of tributary watercourses join the Thames in the vicinity of Shiplake, including the Lash Brook, the Hennerton Backwater and several unnamed drains.

Existing Surface Water Drainage

- 2.7 The existing buildings in the northern part of the site are drained to soakaways. There is no formal drainage system serving the majority of the site, which is at present drained by means of infiltration, evaporation and greenfield runoff.

- 2.8 Public sewer records obtained from Thames Water Utilities (TWU) confirm that there are no public surface water sewers in the vicinity of the site. Refer to Appendix 5 for sewer records. It is therefore assumed that surface water in the locality is disposed of by soakaway.

Existing Ground Conditions

Refer to BGS Borehole logs in Appendix 2.

- 2.9 An intrusive site investigation is yet to be undertaken. Borehole logs relating to the land adjacent to the site have been obtained from the British Geological Survey (BGS) website. The logs indicate that ground conditions in the vicinity of the site are characterised by a thin surface layer of topsoil, underlain by Taplow Gravel deposits comprising a mixture of clays, gravels and sands to a depth of 2 – 3m below ground level. Below 2 – 3m depth the sand content of this material increases to a depth of approximately 10m below ground level. The Taplow Gravel is underlain by Upper Chalk strata to depth.
- 2.10 Resting groundwater levels were recorded at between 12 – 16m below ground level.
- 2.11 According to the EA Aquifer Map, the bedrock chalk strata at the site is classified as a Principal Aquifer. As such the aquifer may support water supply or river base flow on a strategic scale. The gravels underlying the site have minor aquifer status. The vulnerability of these aquifers to pollution is considered to be 'Intermediate'.
- 2.12 The EA Groundwater Source Protection Zone Map confirms that the site lies within Zones 1 and 2 and is therefore in the proximity of a ground water abstraction point. Thames Water records confirm that a potable water abstraction and pumping station is located on the eastern side of Reading Road, near the north-eastern corner of the site.

3.0 FLOOD RISK ISSUES

Flood History

- 3.1 The Strategic Flood Risk Assessment (SFRA) for South Oxfordshire District Council contains records of flooding within the village of Shiplake, to the east of the site. There are however no recorded instances of flooding occurring within, or in the vicinity of, the development site. Refer to Appendix 3 for SFRA excerpts.

Fluvial/Tidal Flood Risk

- 3.2 The Flood Zone Map (FZM) produced by the EA indicates that the site lies within Flood Zone 1 (Low Risk). According to the FZM, the nearest floodplain is located approximately 350m east of the site and emanates from the River Thames. Refer to CEC Figure 3537/500 Figure 2 [*Flood Zone Map*] in Appendix 1.
- 3.3 In accordance with *Technical Guidance to the NPPF Table 2: Flood Risk Vulnerability Classification*, the proposed site usage (residential) is classified as 'more vulnerable'. *Technical Guidance to the NPPF Table 3: Flood Risk Vulnerability and Flood Zone Compatibility* relates that less vulnerable land use is acceptable in Flood Zones 1, 2 and 3a. As such, the flood vulnerability of the proposed site use is compatible with the fluvial/tidal flood risks associated with the site.
- 3.4 Fluvial/tidal flood risk to the site is therefore low.

Assessment of Flood Risk from Existing Sewers/Drains

- 3.5 TWU records confirm that there are no public surface or foul water sewers located in the immediate vicinity of the site. Refer to Public Sewer Records in Appendix 5.
- 3.6 The presence of gullies on Reading Road indicates that a highway drain is located beneath the carriageway. Flood risk from this drain is negligible, as it is located at a lower level than the development site.
- 3.7 Note that there will be no increase in surface water flows to the existing sewer network as a result of the proposed development, as discussed in Section 4 below.
- 3.8 Sewer flood risk is therefore considered low.

Assessment of Flood Risk from Overland Flow

- 3.9 The development site falls in an easterly direction at a gradient of 1 in 30. Based on the existing topography, although surface water from the rural catchment to the west could flow onto the site, it would be limited to minor greenfield runoff. Furthermore, the sloping nature of the site would prevent overland flow accumulating to a significant depth within the site.
- 3.10 Mapping contained within the South Oxfordshire District Council Strategic Flood Risk Assessment shows an overland flow route running east through the site. The flow route originates near the boundary of the site, with the majority of the flow generated by the land within the site. Under the proposals the proposed surface water drainage system will capture this flow and retain it within the site. This will significantly reduce flood risk to Reading Road and Shiplake, which are located down-slope of the site. The proposed drainage strategy for the redevelopment will provide additional on site storage for events up to and including the 1% + CC storm. This will ensure that even during heavy rainfall, runoff from the site will not impact upon neighbouring land or any receiving drainage system. Refer to Section 4.0.
- 3.11 Refer to CEC Plan 3537/500 [*Existing Site Plan*] in Appendix 6 for overland flow routes.
- 3.12 Flood risk from this source is considered low.

Overland Flow Flood Risk Mitigation Measures

- 3.13 FFLs will be set at a minimum of 150mm above external levels. This will prevent flooding from surface water flows.
- 3.14 Any runoff generated by the development itself will be accommodated within the proposed surface water drainage system, as discussed in Section 4 of the report. Refer to CEC Plan 3537/501 [*Proposed Drainage Strategy*] in Appendix 6.

Assessment of Flood Risk from Groundwater

- 3.15 The borehole data in Appendix 2 suggest that the water table lies at considerable depth (approximately 10m below ground level) in the locality. Mapping within the SFRA indicates that the site lies in an area which is not considered susceptible to ground water flooding. Refer to Appendix 3. In the unlikely event that groundwater levels rose sufficiently to cause flooding, water would follow the existing topography and flow off site to the east.



3.16 Flood risk to the site from groundwater is therefore considered low.

4.0 PROPOSED SURFACE WATER DRAINAGE STRATEGY

Refer to CEC Plan 3537/501 [*Proposed Drainage Strategy*] in Appendix 6.

- 4.1 The introduction of roof and road areas associated with the proposed development will result in an increase in the impermeable area of the site.
- 4.2 Runoff from this catchment will be disposed of at source by means of infiltration based SUDS facilities. This will ensure that the proposals do not increase flood risk to the locality, in accordance with NPPF requirements.
- 4.3 The following SuDS are proposed:
- *Infiltration Basins*
 - o 2 No. infiltration basins will be provided to drain runoff from the highways within the site, which form a catchment of 0.81ha. Preliminary sizing calculations indicate that a total volume of approximately 400m³ will be required to accommodate the 1% +CC event from this catchment. A minimum 500mm freeboard will be incorporated into the ponds to mitigate residual risk and design exceedance.
 - o The basins will be located in the lower lying eastern part of the site, adjacent to Reading Road. Indicative basin locations are shown on CEC Plan 3537/501 [*Proposed Drainage Strategy*] in Appendix 6
 - *Permeable Pavements*
 - o Permeable pavements will be installed in private drives and parking areas and will drain the parking areas themselves, and, where necessary, can also accept roof water from adjacent houses and garages. CEC Plan 3537/501 [*Proposed Drainage Strategy*] in Appendix 6 demonstrates that up to 3,000m² permeable paving could be accommodated at the site; however, the extent of permeable paving needed should be confirmed at the detailed design stage.
 - *Trench Soakaways*
 - o Trench soakaways will be provided in rear gardens to drain roof water. Trench soakaways have been included throughout the development layout wherever the necessary 5m buffer is available between a soakaway and any building/foundation. A 3m long x 1.5m wide x 1.5m deep soakaway will be required per 75m² roof area.
- 4.4 All SuDS have been designed to accommodate the 1% + CC storm, in accordance with EA guidance.

- 4.5 British Geological Survey borehole data confirm that the locality is underlain by Head Deposits (Taplow Gravel) characterised by gravels and sand with clay. A representative soil infiltration rate of 2.7×10^{-5} m/s has therefore been used in the preliminary design of the proposed infiltration systems. In due course, infiltration testing should be carried out in accordance with BRE365 guidance.
- 4.6 Preliminary storage design calculations have been undertaken using MicroDrainage software. Refer to Appendix 4.
- 4.7 A 5m buffer has been provided between the proposed soakaways buildings in order to prevent damage to foundations.
- 4.8 Infiltration basins, permeable pavements and soakaways are recognised by the EA and CIRIA as Sustainable Urban Drainage Systems (SUDS).

Adoption

- 4.9 All SUDS will be maintained privately by a management company, in accordance with the tables below.

Table 4.1: Ponds Operation and Maintenance Requirements

Maintenance Schedule	Required Actions	Frequency
Regular maintenance	Litter removal	As required
	Grass cutting – public areas	Monthly (during growing season)
	Grass cutting – meadow grass	Half-yearly (spring, before nesting season, and autumn)
	Inspect vegetation to pond edge and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1 m above pond base; include max 25% of pond surface)	Annually
	Remove 25% of bank vegetation from waters edge to a minimum of 1 m above water level	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from forebay. 1-5 years, or as required. Remove sediment from one quadrant of the main body of ponds without sediment forebays	2-10 years

Maintenance Schedule	Required Actions	Frequency
Occasional maintenance	Remove sediment from the main body of big ponds when pool volume is reduced by 20%	>25 years (usually)
Remedial actions	Repair of erosion or other damage	As required
	Aerate pond when signs of eutrophication are detected	As required
	Realignment of rip-rap or other damage	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
Monitoring	Inspect structures for evidence of poor operation	Monthly/after large storms
	Inspect banksides, structures, pipework etc. for evidence of physical damage	Monthly/after large storms
	Inspect water body for signs of eutrophication	Monthly (May–October)
	Inspect silt accumulation rates and establish appropriate removal; frequencies	Half-yearly
	Check penstocks and other mechanical devices	Half-yearly

Table 4.2: Pervious Pavement Operation and Maintenance Requirements

Maintenance Schedule	Required Actions	Frequency
Regular maintenance	Brushing and vacuuming	Three time/year at end of winter, mid-summer, after autumn leaf fall, or as required based on site-specific observations of clogging or manufacturers' recommendations
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weed	As required
Remedial actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving	As required
	Remedial works to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users	As required
Remedial actions	Rehabilitation of surface and upper sub-structure	As required (if infiltration performance is reduced as a result of significant clogging)
Monitoring	Initial inspection	Monthly for 3 months after installation

Maintenance Schedule	Required Actions	Frequency
	Inspect for evidence of poor operation and/or weed growth. If required take remedial action	3-monthly, 48h after large storms
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table 4.3: Soakaway Maintenance and Operation Requirements

Maintenance Schedule	Required Actions	Frequency
Regular maintenance	Remove sediment and debris from pre-treatment devices and floor of inspection tube or chamber.	Annually
	Cleaning of gutters and any filters on downpipes.	Annually (or as required)
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs.	As required
	Replacement of clogged geotextile.	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation.	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring.	Annually

Water Quality

- 4.10 SUDS systems such as ponds provide effective water quality treatment, as recognised by the CIRIA SUDS Manual. Trapped gullies throughout the proposed highways, drives and parking areas will provide further treatment by retaining particulates and hydrocarbons.

5.0 PROPOSED FOUL WATER DRAINAGE STRATEGY

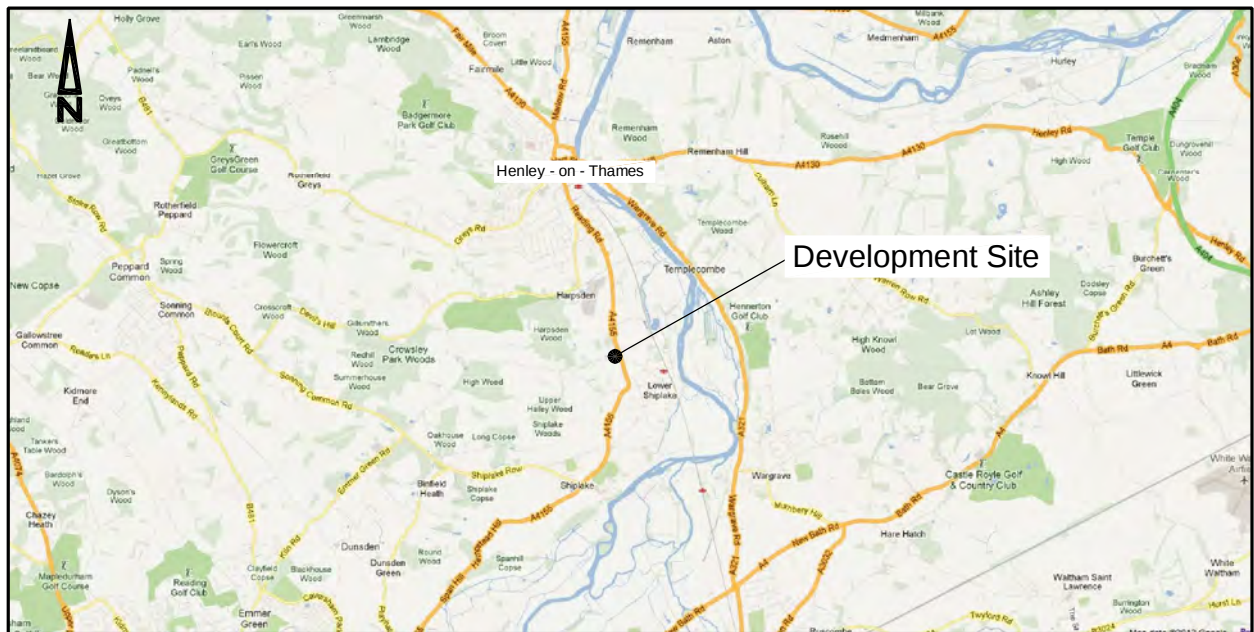
- 5.1 Based on Sewers for Adoption guidance, the proposed development of 95 units will generate peak foul flow rate of 4.4 l/s.
- 5.2 Thames Water records confirm that there are no public foul sewers in the immediate proximity of the development site, therefore an off-site connection to the existing sewer at the junction of Reading Road and Station road in Lower Shiplake will be necessary. As a gravity connection is not possible, an on-site pumping station will be required. The location of the pumping station is a reserved feature. One possible location is indicated on CEC Plan 3537/501 [*Proposed Drainage Strategy*] in Appendix 6.
- 5.3 A sewer capacity check and Impact Study undertaken by Thames Water confirm that the existing public foul sewer network in the vicinity of the site does not have sufficient capacity to accommodate the predicted development foul flows.
- 5.4 The Thames Water Impact Study identifies the foul sewer improvements required to ensure that foul flows from the site can be discharged to the public sewer system without detriment to the network. The improvement works comprise upgrading a 168 linear metres of 150mm diameter sewer to 525mm diameter. The proposed upgrade is located in Station Road, downstream of the proposed connection point at the junction of Reading Road and Station road. Refer to Appendix 5 for Thames Water correspondence.
- 5.5 A budget estimate of the cost of the sewer upgrade is £250,000.

6.0 SUMMARY AND CONCLUSIONS

- 6.1 Flood risk to the proposed development from fluvial sources, overland flow, sewers and groundwater has been considered in this study. No significant risks have been identified.
- 6.2 The site lies within Flood Zone 1 (Low Risk) according to the FZM produced by the EA. As such, the flood vulnerability of the proposed site use is compatible with the fluvial/tidal flood risks associated with the site.
- 6.3 Surface water runoff from the redeveloped site will be discharged at source by means of infiltration basins, permeable pavements and soakaway SuDS. Disposing of post development runoff at source will ensure that the proposals do not increase flood risk to the locality, in accordance with NPPF requirements. Indicative locations for the proposed SuDS features are shown on CEC Plan 3537/501 [*Proposed Drainage Strategy*] in Appendix 6.
- 6.4 Foul water will be drained to the existing public foul sewer in Station Road. The foul sewer upgrading works designed by Thames Water will be undertaken as part of the development.
- 6.5 This study has been undertaken in accordance with the principles of the NPPF document. We conclude that providing the development adheres to the conditions advised within this report, the proposals can be accommodated without increasing flood risk within the locality in accordance with objectives set by Central Government and the EA.

Cole Easdon Consultants Limited
March 2016

Appendix 1



Scale: 1:100,000



Scale: 1:20,000

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**COLE EASDON
CONSULTANTS**

YORK HOUSE
EDISON PARK
DORCAN WAY
SWINDON
WILTSHIRE
SN3 3RB
Tel : 01793 619965
Fax : 01793 619967

Web Site : www.ColeEasdon.com
E-mail : cec@ColeEasdon.com

Job Title:
**Thames Farm
Shiplake
Henley - on -Thames**

Drawing Title:
Site Location Plan

Client:
Mrs Claire Engbers

Drawn By
SMS

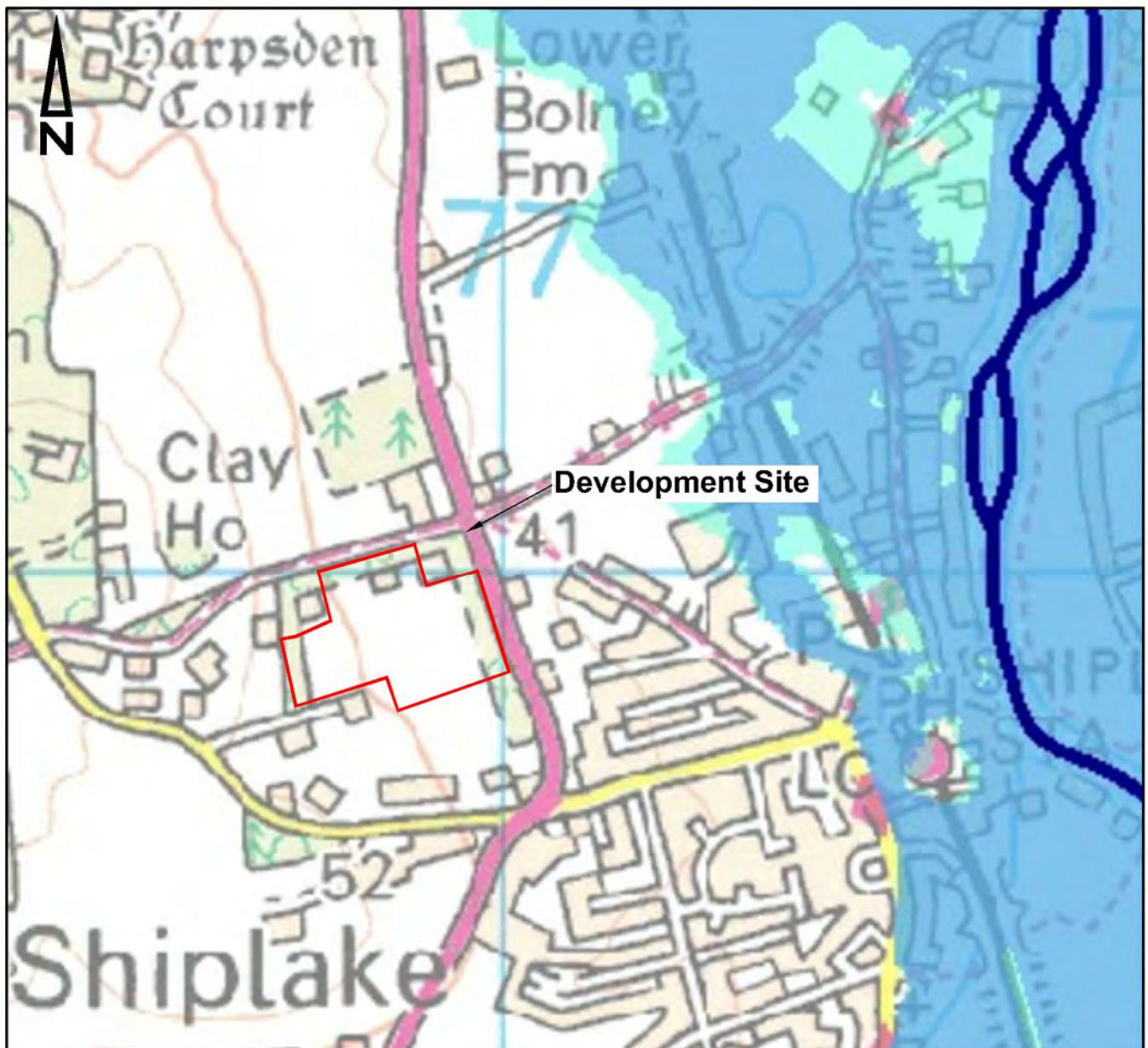
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February 2016

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DR

Drawing No.
CEC/500/FIGURE 1

Revisio



KEY:



Flood Zone 1
- Low Risk



Flood Zone 2 -
Medium Risk



Flood Zone 3
- High Risk

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Main Rivers

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COLE EASDON
CONSULTANTS

YORK HOUSE
EDISON PARK
DORCAN WAY
SWINDON
WILTSHIRE
SN3 3RB
Tel : 01793 619965
Fax : 01793 619967

Web Site: www.ColeEasdon.com
Email: cec@ColeEasdon.com

Job Title:
Thames Farm
Shiplake
Henley On Thames

Drawing Title:
Flood Zone Map

Client:
Mrs Claire Engbers

Drawn By
SMS

Date Drawn
February 2016

Scale
1:10,000@A4

Checked By
RB

Drawing No:
3537/500 Figure 2

Revision

Appendix 2

SU 77NE 74 [7712 7977]

British Geological Survey IGES 19 Talisman Square, KENILWORTH, CV8 1JB. Tel: 0926 851113 Fax: 0926 851394		Job No. 6157		Site Geology: SHIPLAKE, NEAR READING, OXON (ADDITIONAL PLOT) Client : BRAYANT COUNTRY HOMES LIMITED Engineer :			BOREHOLE LOG BH 4 Sheet 1 of 2 Scale 1:50										
Method Light Cable Percussion.		Date 22/08/94		Drilling Crew KS		Logged By SC											
Dia (mm) 150		Coord		Ground Level m.													
Date & Casing Depth	Depth m.	Sample Type	Water Level	SPT N or Cu	M/C %	Depth m.	Description of Strata Legend										
						0.25	TOPSOIL. Very dense brown and grey very medium-coarse sandy fine-coarse angular and subangular GRAVEL.										
1.00	1.00 - 1.45	C	DRY	62N													
	1.50	J				1.50	Medium dense brown and grey medium-coarse sandy fine-coarse GRAVEL with occasional cobbles.										
2.10	2.10 - 2.55	C	2.00	13N													
	2.50	J															
3.00	3.10 - 3.55	C	2.70	19N													
	3.50	J															
4.00	4.15 - 4.60	C	3.90	16N													
	4.60	J															
5.00	5.00 - 5.45	C	4.50	15N													
	5.50	J				5.50	Structureless CHALK composed of subangular and subrounded gravel size white highly weathered very weak to weak fragments in a matrix of white sandy silt size particles; scattered up to cobble size flints. (Grade V-VI).										
5.80	5.80 - 6.25	SD	WET	19N													
	6.80	J															
6.00	7.40 - 7.85	SD	DRY	13N													
	8.40	J															
6.00	9.00 - 9.45	SD	DRY	6N													
	10.00	J															
Remarks 1/ Water added to assist drilling from GL to 5.8m 2/ Chiselling required from 0.7 to 1.0m (0.5hr)						GROUNDWATER <table border="1"> <tr> <th>Struck</th> <th>Cased</th> <th>20 mins</th> <th>Sealed</th> <th>Remarks</th> </tr> <tr> <td>10.50</td> <td>6.00</td> <td>10.40</td> <td>NS</td> <td></td> </tr> </table>		Struck	Cased	20 mins	Sealed	Remarks	10.50	6.00	10.40	NS	
Struck	Cased	20 mins	Sealed	Remarks													
10.50	6.00	10.40	NS														

SU 77 NE 75 [7712 7980]

British Geological Survey		19 Talisman Square, KENILWORTH, CV8 1JB. Tel: 0926 851113 Fax: 0926 851394		Job No. 6157		Site : SHIPLAKE, NEAR READING, OXON (ADDITIONAL PLOT) Client : BRAYANT COUNTRY HOMES LIMITED Engineer :		BOREHOLE LOG BH 5 Sheet 1 of 2 Scale 1:50		
Method Light Cable Percussion.				Date 23/08/94		Drilling Crew ks		Logged By SC		
Dia (mm) 150		Coord		Ground Level m.						
Date & Casing Depth	Depth m.	Sample Type	Water Level	SPT N or Cu	M/C %	Depth m.	Description of Strata		Legend	
						0.20	TOPSOIL. Dense brown and grey medium-coarse sandy fine-medium GRAVEL with some small predominantly clay pockets.			
1.00	0.70 1.00 - 1.45	J C	0.80	27N						
2.00	1.70 2.00 - 2.45	J C	1.70	31N						
3.00	2.70 3.00 - 3.45	J C	2.00	28N			occasional cobbles.			
3.90	3.90 3.90 - 4.35	J C	2.90	37N						
4.50	4.50 4.70 - 5.15	J C		13N						
5.50	5.20 5.50 - 5.95	J SD	WET	13N		5.20	Structureless CHALK composed of up to cobble size white highly weathered very weak to weak fragments with some matrix of white sandy silt size particles; scattered up to cobble size flints. (Grade V).			
6.00	6.50 7.00 - 7.45	J SD	WET	16N						
6.00	8.00 8.50 - 8.95	J SD	DRY	18N						
6.00	9.50 10.00 - 10.45	J SD	DRY	16N						
Remarks 1/ Water added to assist drilling from 0.2m to 5.2m bgl 2/ Chiseling required from 4.7 to 5.2m (0.5hr) 3/ Borehole dry during drilling						GROUNDWATER				
						Struck	Cased	20 mins	Sealed	Remarks

~~Eastern~~ S Thames NRA. HILLSIDE ABOVE ENGBERS OBH

266 SU 78 / 118

SU 78 SE / 44

Owner TWIL. Land owned by: Mr. Hopper,
Sheephouse Farm Shop,
Occupier Reading Road, Henley

Licence No.

IGS Ref No.

Nat. Grid Ref. SU 7666 8014

Status OBH

Ground Level: m OD ft OD

Level of Well Top m OD ft OD

Rest Water Level 16.70 m bwt ft bwt

(Date 1/9/94) m OD ft OD

Construction B

Aquifer CHALK

Summary of Geological Section Thickness Depth

Brown topsoil & gravel 0.30
Clay & gravel 2.00
Sandy clay & gravel 10.30
Soft Chalk & flints 12.00
Firm chalk & flints 50.00

Depth bwt	Dia.	Linings (below well top)			
		From	To	Dia.	Type
50m	200mm	0	15m	210mm	plan.

Abstraction Rates

Type of Pump

gph

Chem./Bact. Anal.

YES NO

gpd

Well Driller G. Stow 1994

If insufficient space has been allowed, continue in 'Notes' overleaf.

NGDC
ACCESSION
NUMBER

22152

Site Plan

RECEIVED N.G.D.C.

DATE: 24.10.95

SIG: S. Road

Notes

L. SHIPLAKE ROADSIDE VERGE OBH

SU 77 / 175 181

SU 77 NE / 52

Owner <i>TWUL. Land owned by:</i>		Licence No.		Nat. Grid Ref. <i>SU 7709 7966</i>			
Occupier <i>Oxfordshire County Council</i>		IGS Ref No		Status <i>OBH</i>			
Ground Level		m OD	ft OD	Aquifer <i>CHALK</i>			
Level of Well Top		m OD	ft OD				
Rest Water Level <i>12.504</i>		m bwt	ft bwt	Summary of Geological Section			
Date <i>1/9/94</i>		m OD	ft OD	Thickness			
Construction <i>B</i>				Depth			
Depth bwt	Dia.	Linings (below well top)					
		From	To	Dia.	Type		
<i>32</i>	<i>200mm</i>	<i>0</i>	<i>16.8m</i>	<i>210mm</i>	<i>Plain</i>	<i>Dark brown sandy soil</i>	<i>0.30</i>
						<i>Sand & clay</i>	<i>3.10</i>
						<i>Sand & gravel</i>	<i>6.65</i>
						<i>Silty sand</i>	<i>7.90</i>
						<i>Sand & gravel + traces of Chalk</i>	<i>9.80</i>
						<i>Crumbly Chalk & flints</i>	<i>11.00</i>
						<i>Firm Chalk & flints</i>	<i>32.00</i>
Abstraction Rates		Type of Pump					
gph		Chem./Bact. Anal.		☒ YES ☐ NO			
gpd		Well Driller <i>G. Stone 1994</i>					

If insufficient space has been allowed, continue in 'Notes' overleaf.

Site Plan

Notes

~~Eastern~~ **HS Thames NRA.**
HILLSIDE ABOVE ENGBERS OBH

SU 78 / 118

SU78SE

Owner TWHL. Land owned by: Mr. Hopper,		Licence No.		Nat. Grid Ref. SU 7666 8014		
Occupier Sheephouse Farm Shop,		IGS Ref. No.		Status OBH		
Ground Level		m OD	ft OD	Aquifer CHALK		
Level of Well Top		m OD	ft OD			
Rest Water Level 16.70		m bwt	ft. bwt	Summary of Geological Section		
(Date 11/9/94)		m OD	ft. OD	Thickness		
Construction B				Depth		
Depth bwt	Dia.	Linings (below well top)				
		From	To	Dia.	Type	
50m	200mm	0	15m	210mm	plan	0.30
						2.00
						10.30
						12.00
						50.00
Abstraction Rates		Type of Pump				
gph		Chem./Bact. Anal.		(YES) NO		
gpd		Well Driller		G. Stow 1994		

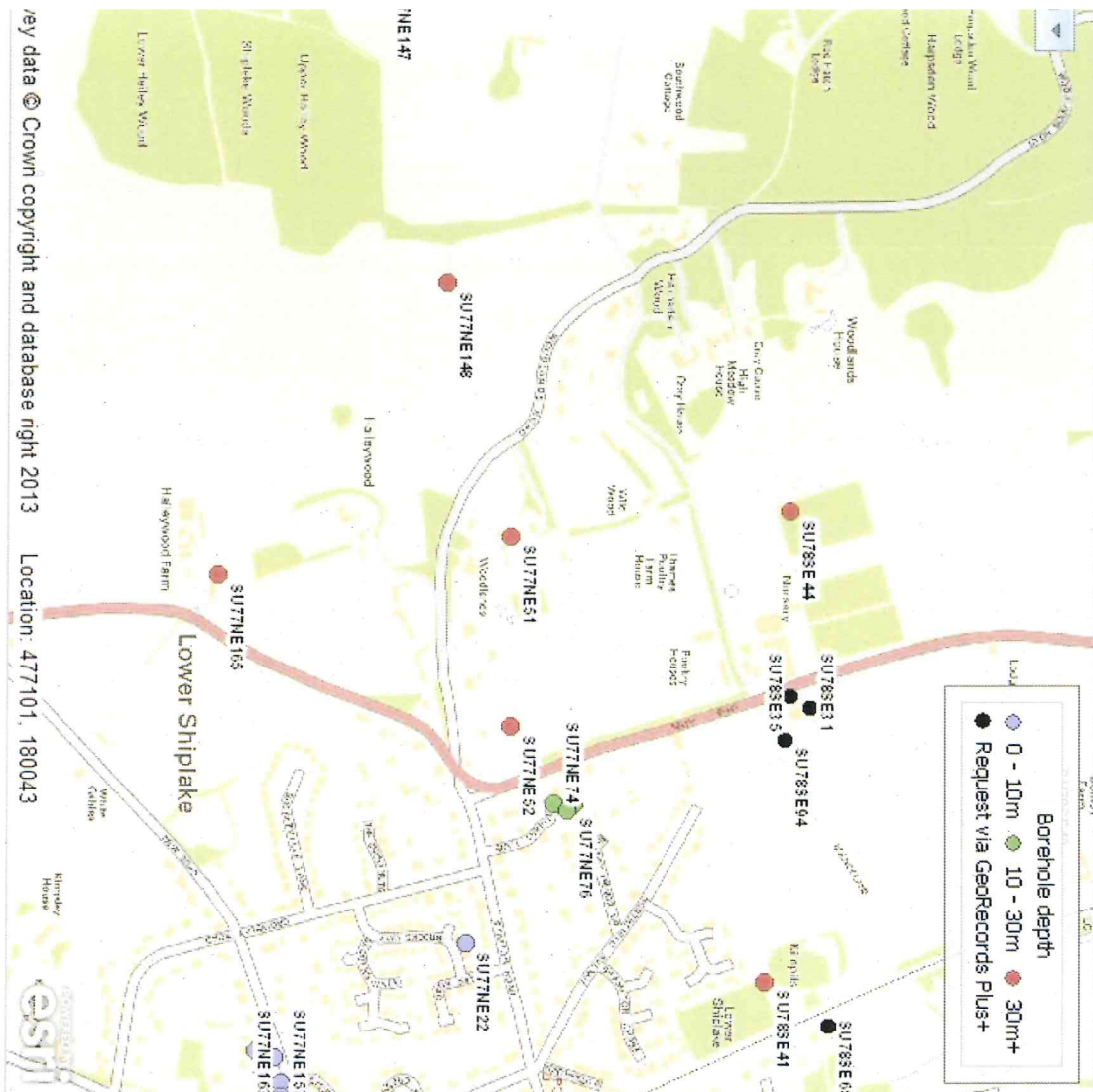
If insufficient space has been allowed, continue in 'Notes' overleaf.

Site Plan

Notes

Search or pan and zoom to an area of interest.

Click on a borehole to open record.



Appendix 3

C.2.20 Shiplake

Local Authority

South Oxfordshire District Council

Fluvial Flood Risk

Watercourse	Flood Zone Coverage	Model Type	Channel Survey	Flood risk	Climate change Impact
Thames	Complete	ISIS / Flood Zone	Complete	Flood Zone 3 contains large numbers of properties within the village, including the railway station.	Some additional properties in Shiplake fall into Flood Zone 3.

Fluvial Flooding History

Several Thames floods mapped, outlines fall within Flood Zone 3. 60 sandbag requests on SODC records in Shiplake and Lower Shiplake.
History of highway drainage problems in Station Road, Shiplake.

Sewer Flooding

Zero incidents of sewer flooding reported within RG9 3 and RG9 4 postcodes.

Surface Water Flooding

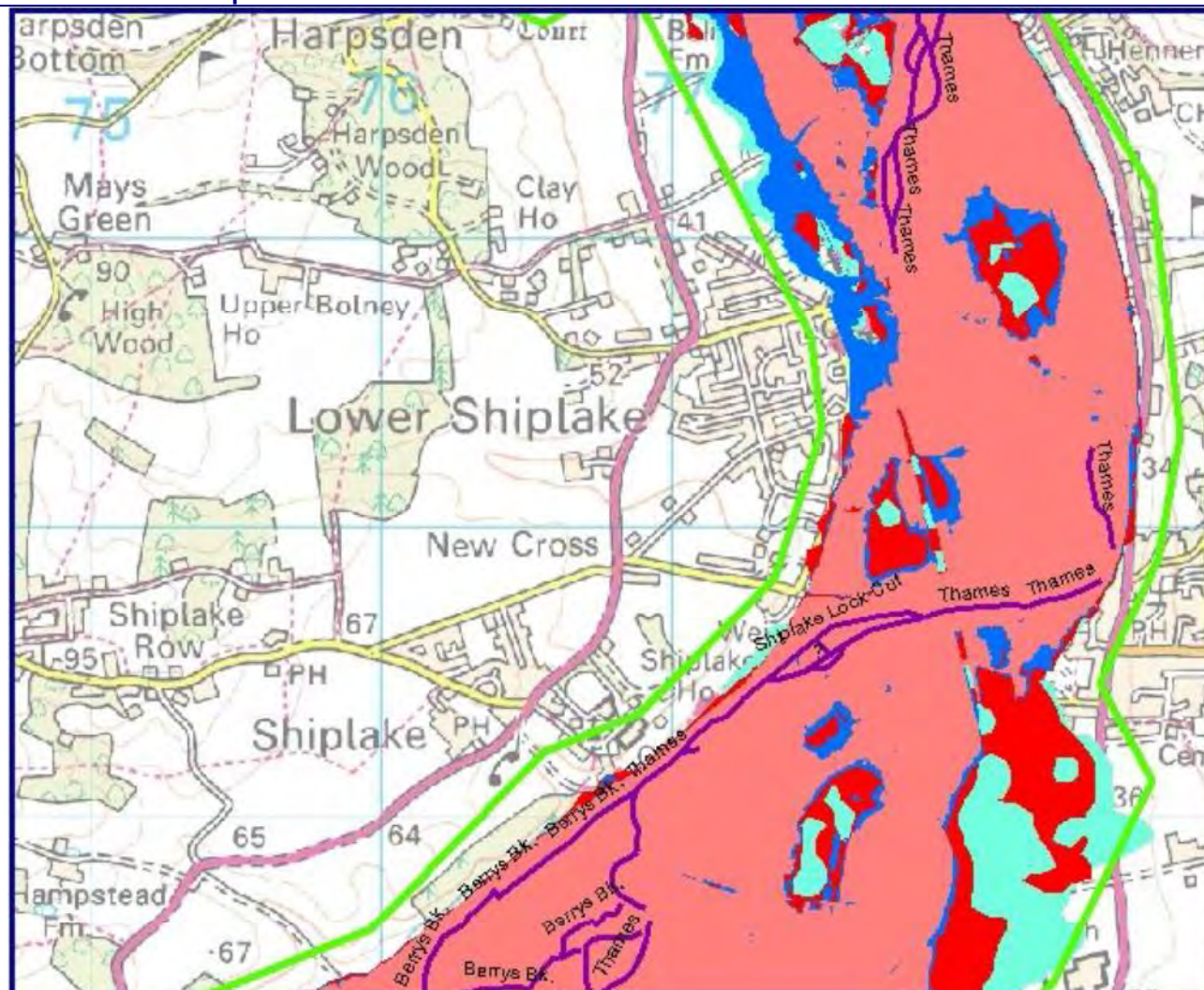
Low – Minor flow paths.

Groundwater Flooding

No incidents mapped in Defra report for 2000/1 and 2002/3 events. No incidents on Environment Agency records.

Comments

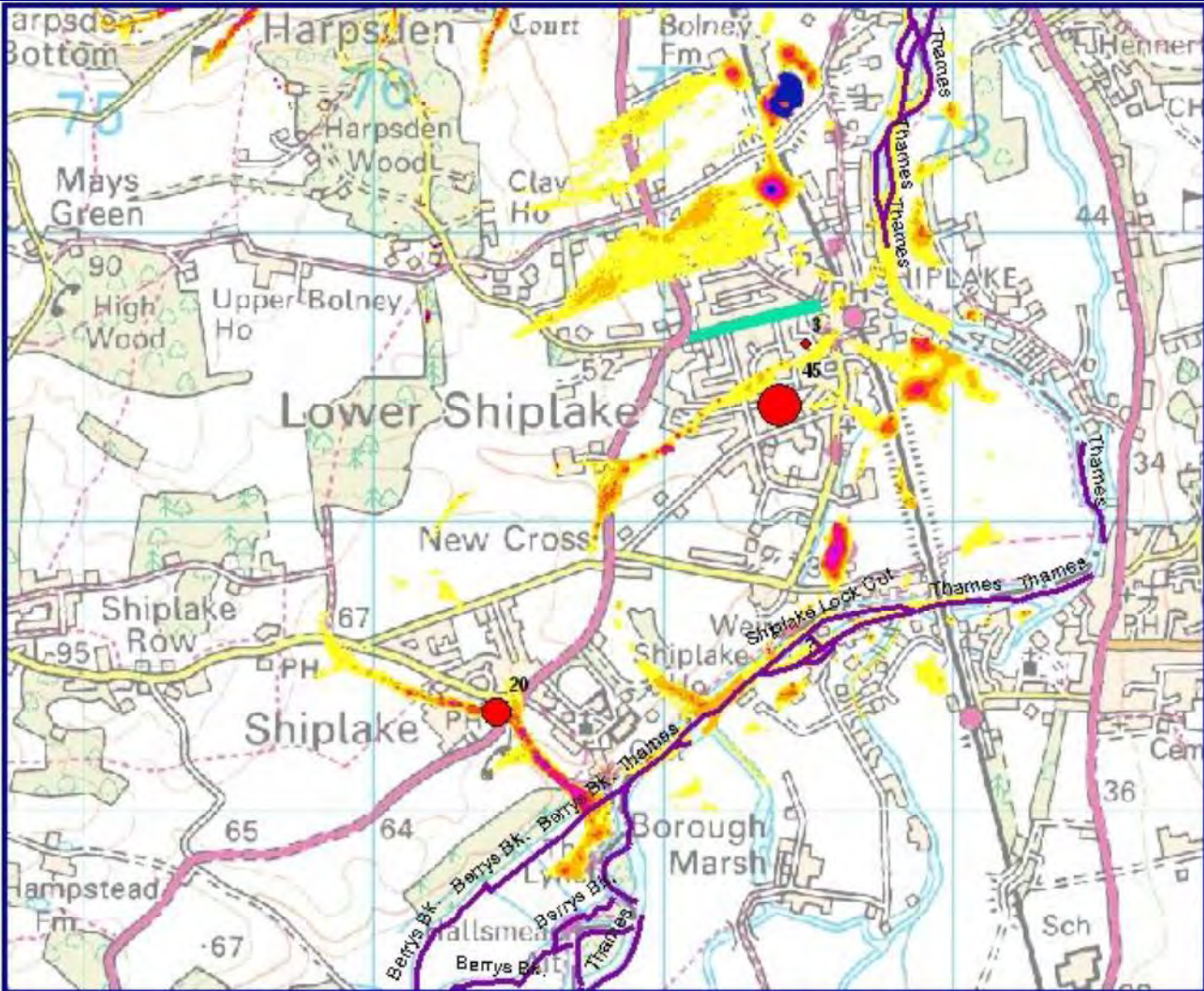
Fluvial Flood Risk Map



Key to Fluvial Flood Risk Maps

- | | | | |
|---|--|---|--------------------------------|
|  | Outlines from SFRA models and other detailed EA models |  | 1 in 100 year (Flood Zone 3a) |
|  | Detailed model built for SFRA but outline unchanged due to DTM issues |  | 1 in 100 year + climate change |
|  | Functional floodplain (Flood Zone 3b). Within modelled area boundaries, 1 in 20. Outside of these areas, 1 in 20 outlines are not available so the 1 in 100 year outline is used as an initial, precautionary approach |  | 1 in 1000 year (Flood Zone 2) |

Other Sources Flood Risk Map



Key to Other Sources Flood Risk Maps

SODC Sandbag Requests 2000-8

Requests by settlement

- 1 - 5
- 6 - 5
- 6 - 10
- 11 - 20
- 21 - 30
- 31 - 40
- 41 - 100

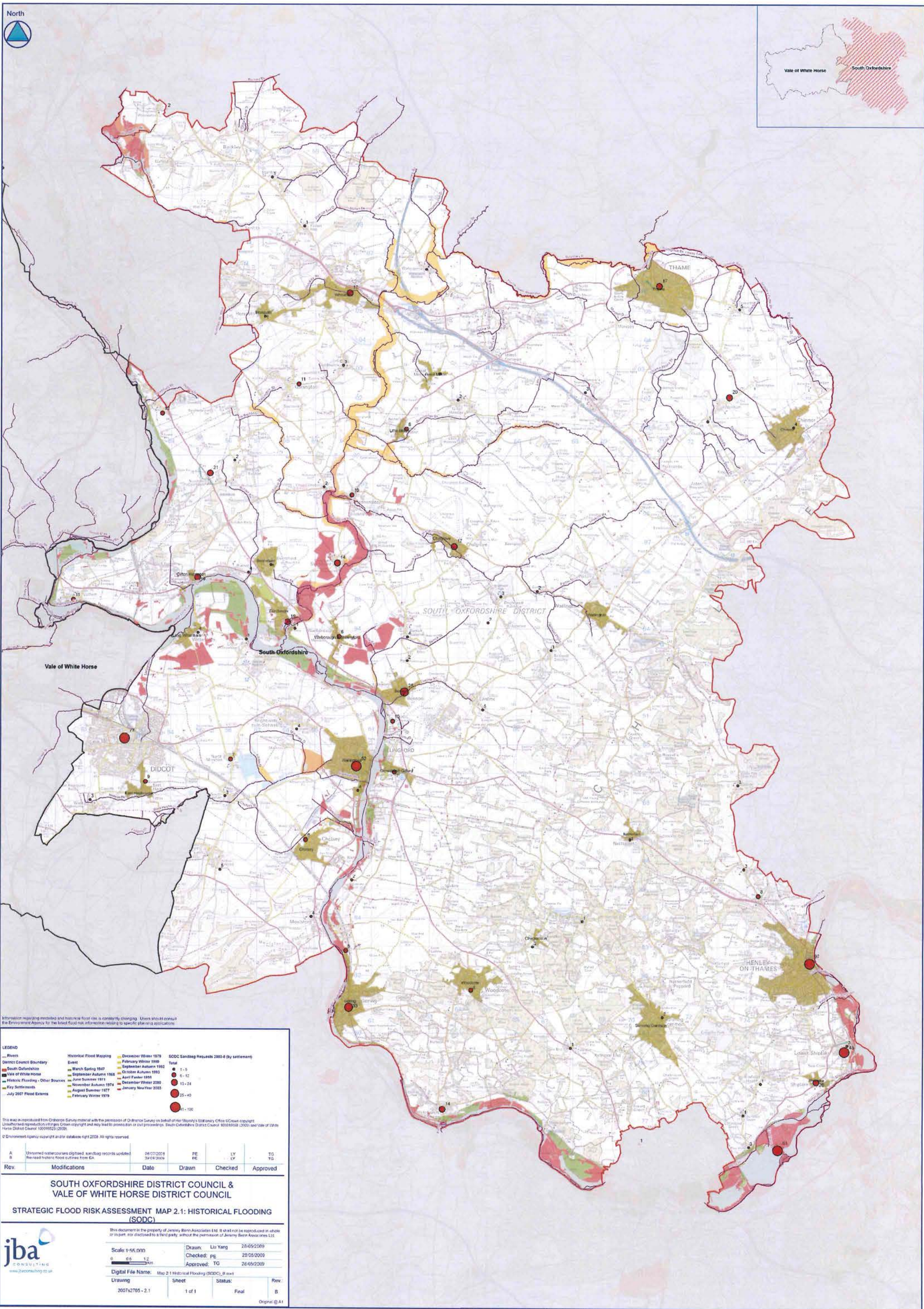
- Reported Groundwater flooding
- Groundwater Flood locations 2001
- Historic Flooding - Other Sources

Surface Water Flooding 1 in 100 year

Max depth in metres

- 0.0
- 0.0 - 0.1
- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4

- 0.4 - 0.5
- 0.5 - 0.6
- 0.6 - 0.7
- 0.7 - 0.8
- 0.8 - 32.0



Information regarding modelled and historical flood risk is constantly changing. Users should consult the Environment Agency for the latest flood risk information relating to specific planning applications.

LEGEND

— Rivers
— District Council Boundary
— South Oxfordshire
— Vale of White Horse
— Historic Flooding - Other Sources
— Key Settlements
— July 2007 Flood Extents

Historical Flood Mapping

Event:
— March Spring 1947
— September Autumn 1968
— June Summer 1971
— November Autumn 1974
— August Summer 1977
— February Winter 1979

— December Winter 1979
— February Winter 1989
— September Autumn 1992
— October Autumn 1993
— April Easter 1995
— December Winter 2000
— January New Year 2003

SODC Sandbag Requests 2003-8 (by settlement)

Total:
● 1-5
● 6-12
● 13-24
● 25-40
● 41-100

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Rev	Modifications	Date	Drawn	Checked	Approved
A	Unlicensed watercourses digitised; sandbag records updated	08/07/2009	PE	LY	TG
B	Revised historic flood outlines from EA	26/05/2009	PE	LY	TG

SOUTH OXFORDSHIRE DISTRICT COUNCIL & VALE OF WHITE HORSE DISTRICT COUNCIL

STRATEGIC FLOOD RISK ASSESSMENT MAP 2.1: HISTORICAL FLOODING (SODC)

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Scale: 1:55,000

0 0.5 1.0 Km

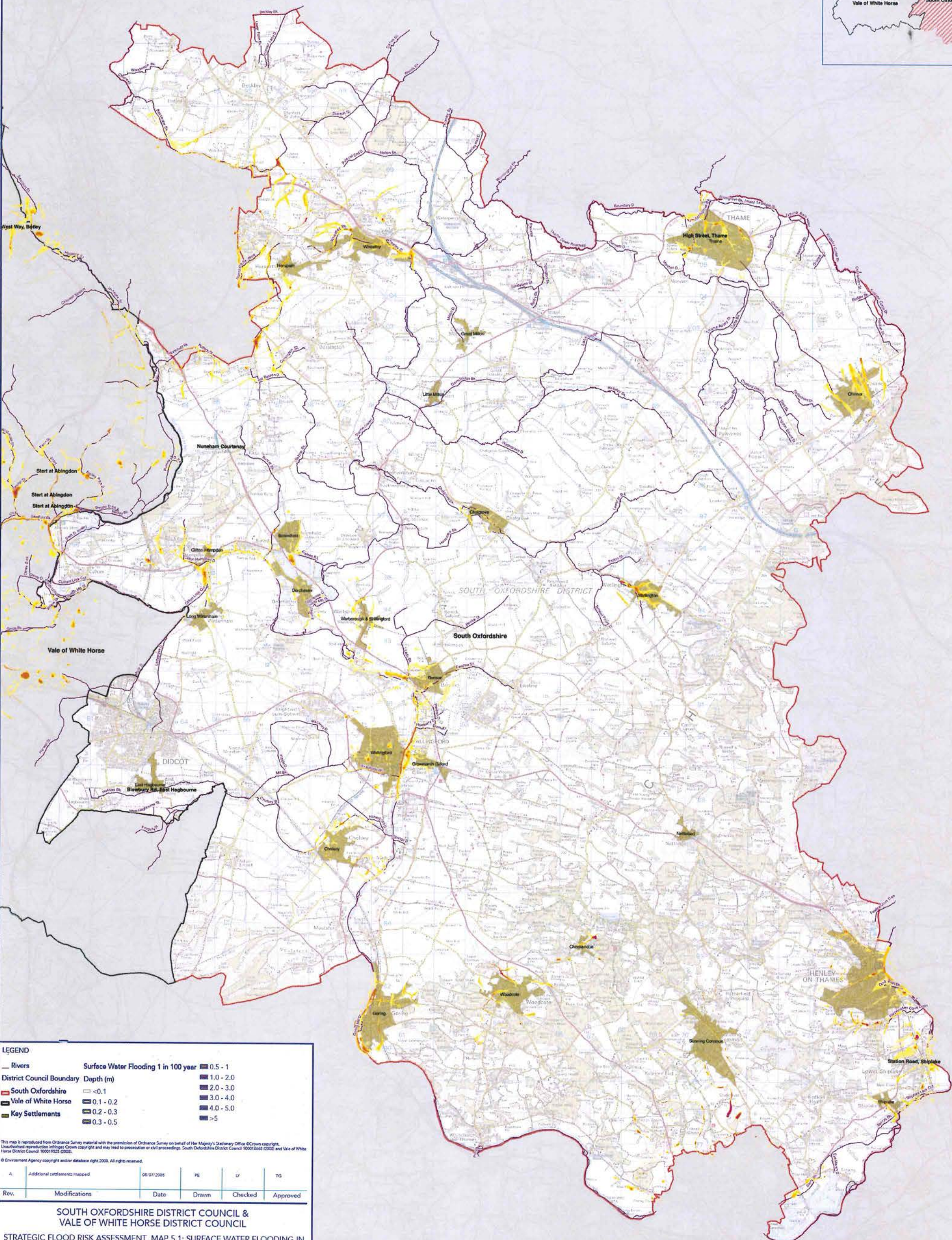
Digital File Name: Map 2.1 Historical Flooding (SODC).B.mxd

Drawing	Sheet	Status	Rev
200742705 - 2.1	1 of 1	Final	B

Original: @ A1

jba
CONSULTING
www.jbamconsulting.co.uk

Drawn: Lu Yang 28/05/2009
Checked: pg 28/05/2009
Approved: TG 26/05/2009



LEGEND

 Rivers

District Council Boundary

 South Oxfordshire

 Vale of White Horse

 Key Settlements

Surface Water Flooding 1 in 100 year

Depth (m)

 <0.1

 0.1 - 0.2

 0.2 - 0.3

 0.3 - 0.5

 0.5 - 1

 1.0 - 2.0

 2.0 - 3.0

 3.0 - 4.0

 4.0 - 5.0

 >5

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A.	Additional settlements mapped	05/07/2005	PE	LY	TG
Rev.	Modifications	Date	Drawn	Checked	Approved

SOUTH OXFORDSHIRE DISTRICT COUNCIL &
VALE OF WHITE HORSE DISTRICT COUNCIL

STRATEGIC FLOOD RISK ASSESSMENT MAP 5.1: SURFACE WATER FLOODING IN
KEY SETTLEMENTS (SODC)

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	Scale: 1:55,000	Drawn: Liu Yang	10/07/2008
		Checked: pg	10/07/2008
	Approved: TG	10/07/2008	

Drawing	Sheet	Status	Rev.:
200762705 - 5.1	1 of 1	Draft	A

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