FLOOD RISK ASSESSMENT FOR PROPOSED RESIDENTIAL DEVELOPMENT AT TWENTY PENCE ROAD, COTTENHAM, CAMBS.

REVISED FINAL REPORT

GEOFF BEEL CONSULTANCY

JULY 2022

GCB/GREEN PLANNING

CONTENTS

1.0 INTRODUCTION

1.1 A full planning application is to be submitted by Green Planning Studio Ltd on behalf of Messrs D Price & J Ball for proposed residential development of land south of Chear Fen Boat Club, Twenty Pence Road, Cottenham, Cambs.

1.2 Planning approval requires a Flood Risk Assessment to be submitted to the Environment Agency to meet the requirements and general principles contained in the Planning Practice Guidance of the National Planning Policy Framework (NPPF).

The majority of the site is situated within Flood Zone 1 with a small area in defended Flood Zone 3 as shown on the Agency's Flood Maps for Planning. The latest Environment Agency Maps have been created as a tool to raise awareness of flood risk with the public and their partner organisations, such as Local Authorities, Emergency Services and Drainage Authorities. The Maps take into account existing flood defences and standards of protection..

The site is also within the Old West Internal Drainage Board's area

1.3 Geoff Beel Consultancy was appointed on 9th May 2022 to undertake a Flood Risk Assessment.

1.3 The Environment Agency has objected to the development proposals by way of letter dated 7th June 2022 file ref: AC/2022/131078 as it falls within a flood risk vulnerability category that is inappropriate to the Flood Zone in which the application is located.

The objection can be overcome by removing the plot with the proposed mobile home and utility/day room and proposed touring caravan at the north eastern edge of the site within Flood Zone 3. This can either be done, by removing the plot altogether or rearranging the proposed plots to ensure that the one in the north-eastern corner is removed from Flood Zone 3.

This Revised Flood Risk Assessment addresses the issues raised.

2.0 LOCATION

2.1 The development site is located on land south of Chear Fen Boat Club, Twenty Pence Road, Cottenham. The National Grid Reference of the central point of the site is TL 48157115.

2.2 The position and extent of the site is shown on Fig 1 – Location Plan and Fig 2 – Proposed Block Plan.

2.3 The majority of the site is located in Flood Zone 1 with a small area in defended Flood Zone 3 of the River Ely Ouse and within the catchment area of the Old West Internal Drainage Board.

3.0 THE SITE AND SEQUENTIAL TEST

3.1 The site is currently waste ground.

3.2 The area of development is approximately 5.50 hectares with existing vehicular access off the Twenty Pence Road.

3.3 The proposed site layout consists of a central access road off Twenty Pence Road to service a 9 pitch travellers site with a package treatment plant and drainage field to discharge foul drainage with soakaway drainage for surface water run-off.

3.4 The Sequential Test and Exception Test should be applied but the development may be permitted as the majority of the site is in Flood Zone 1 and is protected against the 1 in 100 year return period fluvial event and in a defended flood zone.

4.0 EXISTING FLOOD ALLEVIATION MEASURES

4.1 The site is within a defended floodplain, as defined in Appendix 1 of the Environment Agency's 'Policy and Practice for the Protection of Floodplains' and is considered to be passive until such time as a flood greater than that for which the defences were designed occurs. The likelihood of flooding due to overtopping or failure of a flood defence embankment is considered to be very small.

4.2 The site is located within the catchment of the Old West Internal Drainage Board with an existing Boards' main drain located on the northern boundary to the development. A topographical survey has subsequently been carried as shown in Fig. 3 since the Environment Agency letter of objection showing land levels in the north-eastern corner varying between 3.20m and 3.80m aOD and highest of the development site but located in Flood Zone 3.

This compares with the remainder of the development site located in Flood Zone 1 at 2.80m aOD suggesting there is a discrepancy with the published Flood Map for Planning.

Apparently, this highest part of the development site was raised with tipped materials a number of years ago as Google earth from 2003 confirms. The ground level of the north-eastern corner of the site is therefore between 400mm and 1.00m above the remainder of the site shown in Flood Zone 1 and therefore should be permitted for development.

4.3 The existing standard of drainage for the Old West IDB is assessed at 1 in 50 years return period, compatible with the Department of the Environment, Food and Rural Affairs target level of service for rural drainage and flood defence works. Freeboard of 900mm is provided to the lowest land levels.

4.4 The site and surrounding land drains by gravity to the Chear Fen Engine Pumping Station to discharge into the Old West River and hence to the River Ely Ouse.

4.5 The Old West River and the River Ely Ouse are embanked main rivers, the responsibility of the Environment Agency, with operating water levels controlled by the sluices and weirs of the Denver Complex, some 30.0kms downstream of the development site.

4.6 The Environment Agency has commissioned in recent years the Ely Ouse Flood Defences Strategy; carried out by its Consulting Engineers. This Strategy included a hydraulic model of the River Ely Ouse System and the Old West River extending from Bottisham Lock on the River Cam downstream of Cambridge to the Wash downstream of Kings Lynn.

As a result of this study, the River Ely Ouse flood defences have a minimum protection of 1 in 100 years return period against a fluvial event. There is a long term strategy for the maintenance of the defences which is reviewed and updated every 5 years. The main element of the strategy is the development of a programme for protecting the river banks from erosion.

The study also took into account the consequences of a combined tidal and fluvial event occurring at the Denver Complex. The probability of such extreme events occurring at the same time is negligible and would not affect the River Ely Ouse defences.

Likewise the study analysed the impacts of climate change which the hydraulic model identified as a 250mm increase in sea level on fluvial flooding. This was found to have little effect on the 1 in 100 year fluvial flood event and well within the freeboard allowances of the River Ely Ouse defences.

4.7 Current maintenance standards of the Old West IDB main drains and the Environment Agency's flood embankments are generally good.

During the operation and maintenance of its pumping stations, associated structures and channel systems, particularly those that could affect property, the Board seeks to maintain a general standard capable of providing flood protection to its district. A routine maintenance programme is in place to ensure that the Boards assets are commensurate with the standard of protection that is sought. However, bank slips, blocked culverts etc. may occur from time to time and these matters are usually dealt with promptly.

5.0 POTENTIAL SOURCES OF FLOODING

5.1 Four potential sources of flooding have been identified as a result of this assessment:

a) local blockages to IDB system
b) storm return period of 1 in 50 years being exceeded
c) failure of Chear Fen Engine Pumping Station
d) overtopping and breaching of the River Ely Ouse flood defences

5.2 The probability of flooding from source a) is low due to the maintenance standards already achieved and managed by the IDB.

The probability of flooding from b) is also low due to the Old West IDB main drain design standard incorporating a minimum 900mm freeboard to the lowest land level which provides adequate storage in events greater than 1 in 50 years.

5.3 Failure of Chear Fen Engine Pumping Station may occur due to long term mechanical breakdown or power supply being disrupted. However, in these circumstances, if conditions were such to put properties and land at risk of flooding, the Internal Drainage Board would take emergency action to maintain the drainage level of service by utilising temporary pumping equipment. The probability of such an occurrence is also considered to be low as whilst the Chear Fen pumps failed in December 2020 and flooded surrounding agricultural land the proposed development site was unaffected.

5.4 Overtopping and breaching of the River Ely Ouse flood defences is also considered to be a low risk as a result of the River Ely Ouse Flood Defences Strategy which identified a minimum protection of 1 in 100 years allowing for climate change and the effect of a tidal event combining with a fluvial event.

5.5 The occupiers of the travellers site should be made aware of the risk of flooding, and the standard of the existing defences. The Environment Agency provides a Flood Warning Service which includes Flood Warning Codes and uses direct warning methods where the risks and impacts of flooding are high. Indirect warnings are provided to all flood risk areas, even those at low risk of flooding. The main method is media broadcasts via local radio and also by television.

In addition to direct and indirect flood warnings, the Environment Agency operates a 24 hour a day Floodline Service providing advice and information on flooding contacting 0345 988 1188.

5.6 The standard of protection provided by the existing IDB main drain system gives a low risk of flooding due to high groundwater, overland flow and any surcharging of systems due to prolonged or intense rainfall.

6.0 EXTENT OF KNOWN FLOODING

6.1 During the preparation of this assessment, no evidence was discovered of the development site being flooded.

7.0 PROBABILITIES AND TRENDS OF FLOODING

7.1 The probability of this development flooding from localised drainage systems is very low. It is also intended to retain ground levels in Flood Zone 1 as existing at 2.80m aOD with the north – eastern plot ground level at 3.70m aOD. The present proposals will not have any adverse impact or increase the risk of flooding to adjoining land and property.

7.2 The probability of the site flooding with water from any Environment Agency system is less than 1% because of the standards of the existing flood defence systems, storage within existing drainage channels and existing land level of the site.

7.3 If under very extreme events, levels of floodwater from the River Ely Ouse and the Old West IDB main drain rose to such an extent that the site was affected, the situation would not be sudden. It is very probable that sufficient time would be available to take precautionary actions to limit the extent and potential impact of flooding.

7.4 The water levels in the drainage channels will tend to rise as a result of the impacts of climate change. However the existing systems and defences together with the development proposals will be appropriate for the design life of the development (i.e. 60 years). No adverse effect will be suffered at the site.

7.5 Safe access and egress is available in a southerly direction via the Twenty Pence Road and hence to Cottenham where facilities are in Flood Zone 1.

8.0 IMPACTS OF FLOODING

8.1 No significant impacts of flooding are anticipated due to the existing standards of drainage provided by the Internal Drainage Board.

8.2 The general location of the site within the catchment is such that if flooding occurred from the River Ely Ouse and Old West IDB main drain systems, then probably sufficient warning time would be available.

8.3 Displacement of water from the site will not affect any adjoining properties and agricultural land due to the existing standard of drainage provided by the Internal Drainage Board and the proposed surface water drainage proposals.

8.4 Whilst the total development site has an area of 5.50 hectares; the actual area of loose bound permeable hardstanding proposed is only 1967 sq. metres (approximately 0.20 hectare) and only the mobile homes and dayrooms will require draining to ground which from British Geological Society maps consists superficial geology as River Terrace Deposits of Sand and Gravel with underlying bedrock clay. Therefore infiltration drainage should be feasible subject to ground investigation as a planning condition.

9.0 RESIDUAL RISK – EXTREME EVENTS

9.1 The residual risk from extreme events is very low on this site, because of its location within the catchment and the level of protection offered by the River Ely Ouse and the Old West IDB defences to surrounding land and road levels.

9.2 In the extreme event of a serious blockage or pumping station failure occurring to the arterial drainage system, protection will be afforded by the storage available within the IDB system and only affect existing agricultural land.

10.0 CONCLUSIONS AND RECOMMENDATIONS

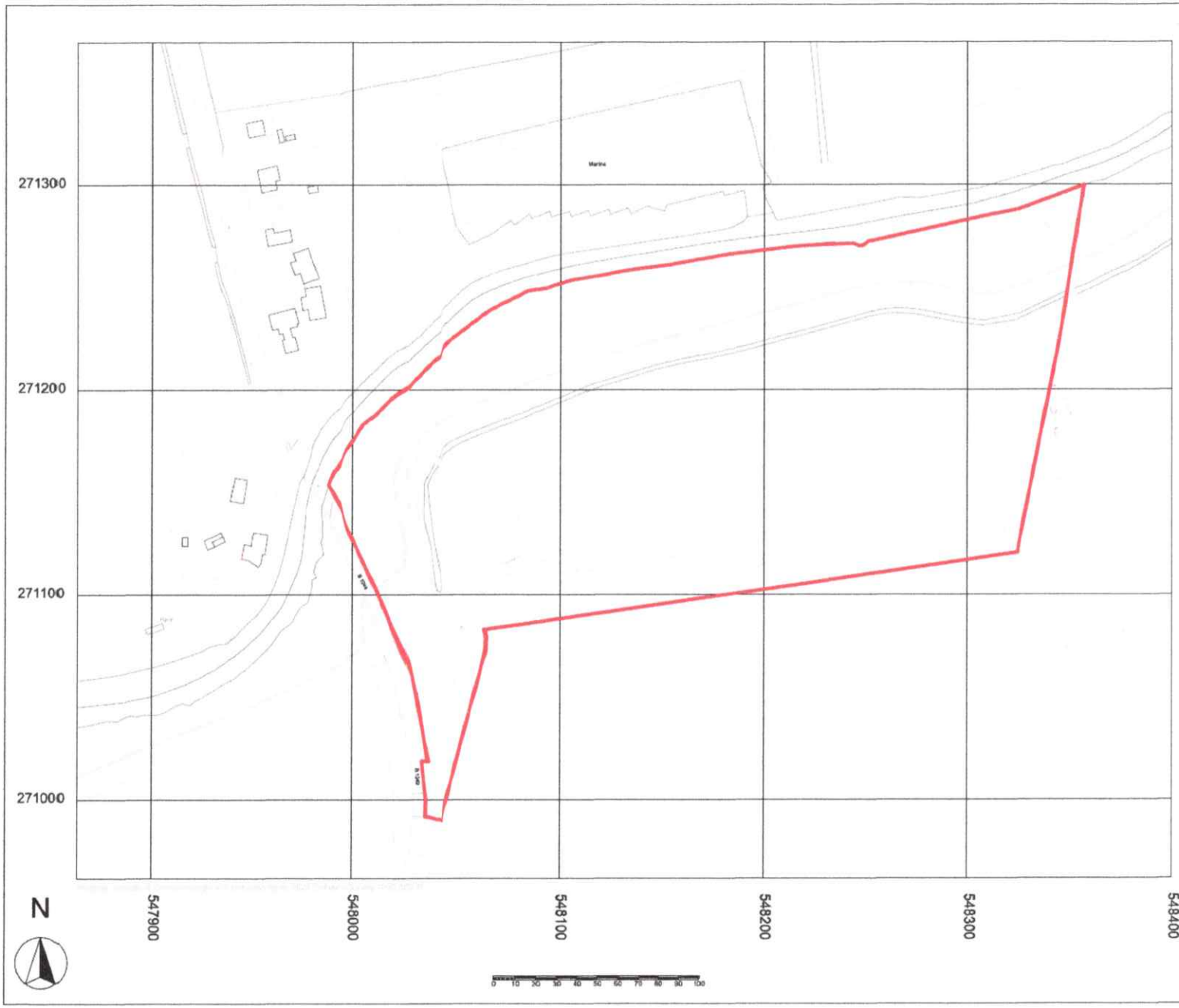
10.1 As a result of the assessment, the following conclusions have been reached:-

- The proposed development is not in a Functional Floodplain. It is located in the Passive floodplain of the Old West River and River Ely Ouse.

- Although the site is located within a Internal Drainage Board catchment with a minimum standard of drainage of 1 in 50 years, this accords with Defra guidelines for rural development. Freeboard to design water level of 900mm to lowest land level is available for events greater than 1 in 50 years providing further storage within the drainage channels.

- Development will be at existing ground level of 2.80m aOD and 3.70m aOD as per the topographical survey with the permanent caravans and utility/day rooms floor levels positioned some 400mm above ground level and anchored to the ground.

- Surface water run-off from the permeable areas will be discharged via soakaways to BRE365 design requirements and Building Regulations approval after ground investigation carried out as a planning condition.



Notes

LEGEND

Application Boundary

Rev.	Date	Amendment	Author

GreenPlanningStudio

Client

Drew Price and James Ball

Project title:

Chear Fen Boat Club,
Twentypence Road,
Cottenham,
Cambridge,
CB6 8PX

Drawing title:

Location Plan

Scale @ A2:	Date of first issue:	Drawn:
1:1250	April 2022	KL

Project No.	Issue Status
21_1161B	Planning

Drawing No.	Revision:
21_1161B_001	

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LEGEND

- Proposed mobile home
- Proposed utility/day room
- Proposed touring caravan
- Proposed loose bound, permeable hardstanding
- Residential gardens
- Grassed area
- Additional native hedge & tree planting
- Existing hardstanding
- Existing hedgerow
- Soakaway
- Proposed tree planting
- Existing trees
- Proposed foul drainage
- Proposed package treatment plant e.g. Biodigester T5
- Existing buildings/structures
- Existing post & rail timber fence
- Existing close boarded timber fence
- Proposed post & rail timber fence
- Proposed close boarded timber fence
- 9m buffer from existing watercourse drainage
- Existing Watercourse
- Proposed tarmacadam surface
- Overhead powerline and telegraph poles
- Indicative turning space
- Indicative parking space
- Proposed bin storage
- Proposed gate
- Existing gate

Rev.	Date	Amendments	Author
A	12.05.2022	Addition of landfill/turning/foul drainage	OL

GreenPlanningStudio

Client:
Drew Price and James Ball

Project title:
Chear Fen Boat Club, Twentypence Road, Cottenham, Cambridgeshire, CB6 8PX

Drawing title:
Proposed Block Plan

Scale @ A1	Date of first issue	Drawn
1:500	June 2022	OL

Project No.	Issue Status
21_1161B	Planning

Drawing No.	Revision
21_1161B_003	A

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Survey Notes

1. All levels and coordinates relate to a GPS derived datum. Control was established using Ordnance Survey's Active GPS Network OSGB36. Translated from ETRS89 using OSGM15 and OSTN15 models. Positions were recorded using Trimble R12 GPS RTK equipment using the VRS correction service. Control station information may not be shown on this drawing, please contact Plandescil Ltd should you require assistance.
2. All levels shown adjacent to kerb lines have been taken at channel face unless stated otherwise.
3. Not all existing services are necessarily shown on this drawing. All services that could be located at the time of the survey have been positioned but should be taken as approximate and used as a guide to their presence. Clarification of all underground routes should be confirmed by the individual service provider and prior to project construction.
4. Land ownership boundaries and legal title extents have not been identified in this survey. Fences have been surveyed at post positions and changes of direction. Hedges located at face or line of main stem, see drawing note to specify.
5. Not all trees have been surveyed, trees shown as below have been fixed by trunk position. Level relates to ground at base of trunk.

   Example of surveyed tree, species not recorded unless stated. Trunk diameter shown to scale, average canopy spread surveyed and plotted to scale.

   Areas of dense trees and vegetation have been shown by the approximate ground coverage and have no trunk positioning.

   Areas of non surveyed planting, positions shown indicatively only, or perimeter surveyed where level information is present.
6. This survey has been merged with Ordnance Survey Master Map Data. Boundaries and physical objects have only been fixed where level information is present. See Licence details No. AL100005817 All Ordnance Survey mapping is subject to their own accuracy and tolerances.
7. The information presented in this survey is a recording of what was present and accessible at the time of survey. Areas of the site not surveyed are represented by Ordnance Survey mapping.
8. The original survey drawing is produced to scale, printed copies to be scaled at users risk. If any stated dimensions are not clear please contact Plandescil Ltd for assistance.

Rev	Date	Chkd	Description
0	24.06.22	CSJ	First Issue

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civil / structural / environmental / surveying

Client

-

Project

Land South Of
River Great Ouse
Twenty Pence Rd, Cottenham

Drawing Title

Topographical Survey

Scale U.N.O.	Date	Drawn By
1:500 (A1)	June 2022	JMW

Drawing No.	Rev
SK1	0

1:500 - DRAWING SCALE REFERENCE (m)

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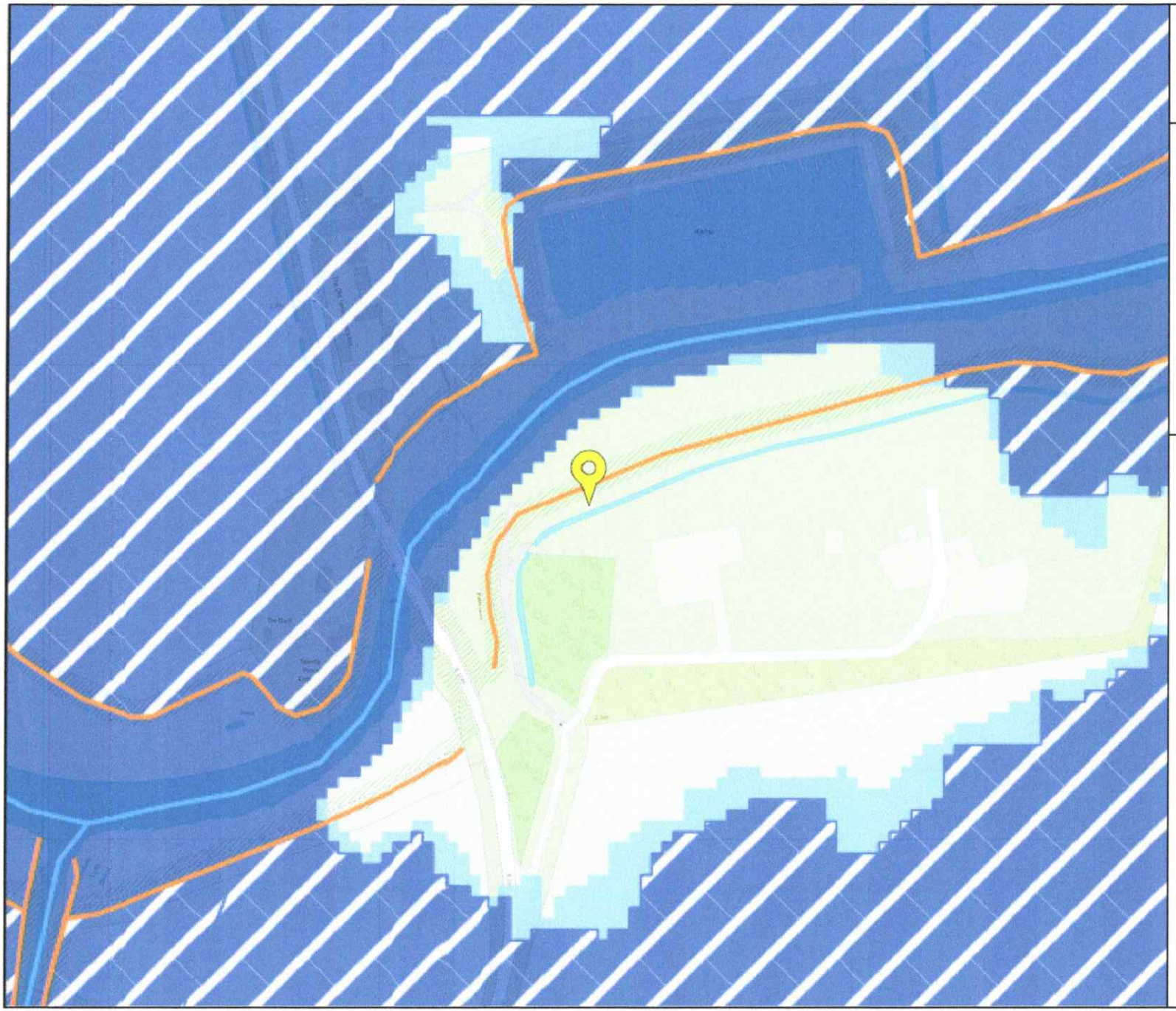


Environment Agency

Flood map for planning

Your reference
cottenham

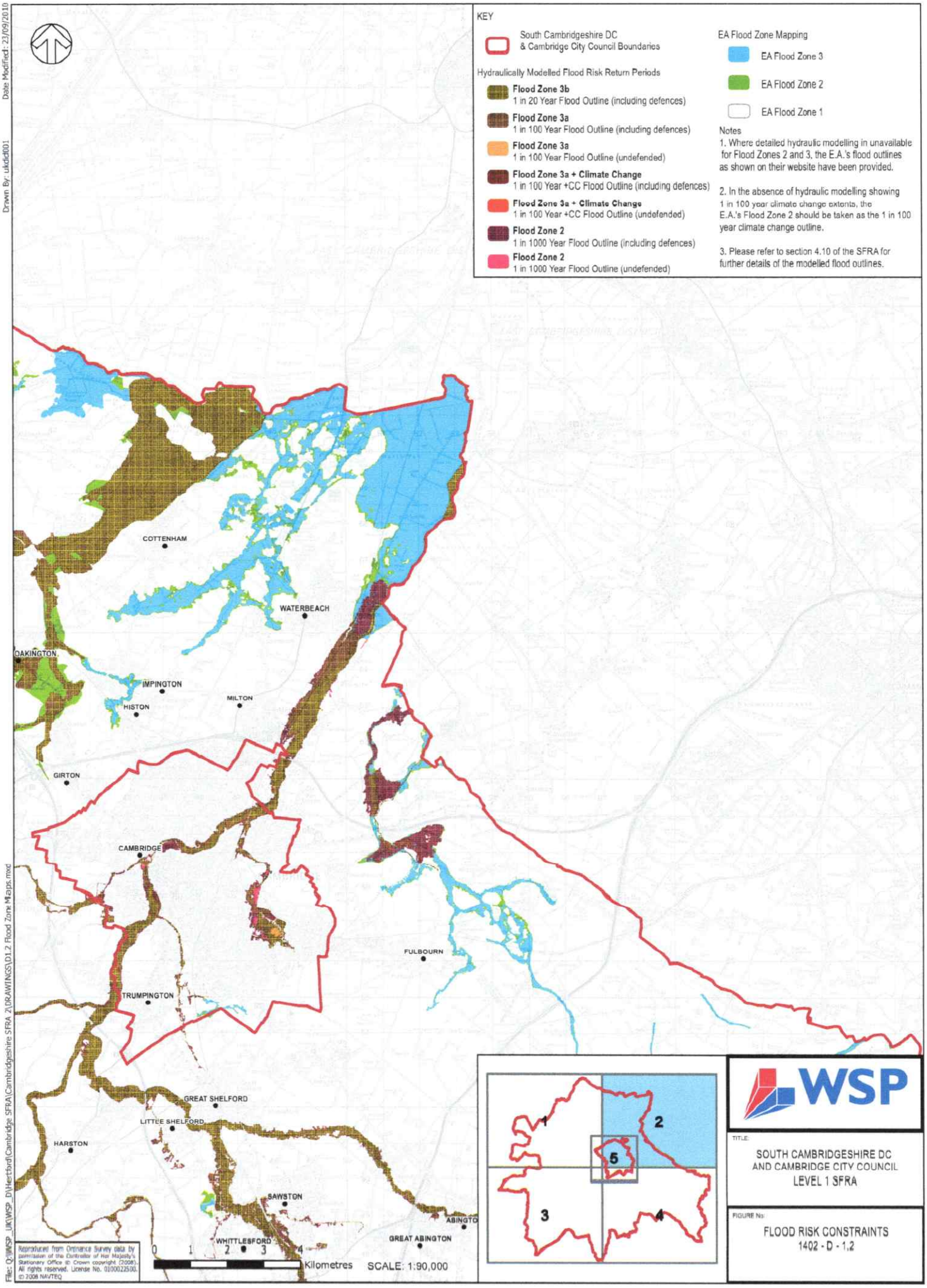
Location (easting/northing)
548065/271185

Scale
1:2500

Created
17 Jun 2022 9:40

- Selected point
- Flood zone 3
- Flood zone 3: areas benefitting from flood defences
- Flood zone 2
- Flood zone 1
- Flood defence
- Main river
- Water storage area

0 20 40 60m


KEY
South Cambridgeshire DC & Cambridge City Council Boundaries
Hydraulically Modelled Flood Risk Return Periods
Flood Zone 3b
1 in 20 Year Flood Outline (including defences)
Flood Zone 3a
1 in 100 Year Flood Outline (including defences)
Flood Zone 3a
1 in 100 Year Flood Outline (undefended)
Flood Zone 3a + Climate Change
1 in 100 Year +CC Flood Outline (including defences)
Flood Zone 3a + Climate Change
1 in 100 Year +CC Flood Outline (undefended)
Flood Zone 2
1 in 1000 Year Flood Outline (including defences)
Flood Zone 2
1 in 1000 Year Flood Outline (undefended)
EA Flood Zone Mapping
EA Flood Zone 3
EA Flood Zone 2
EA Flood Zone 1
Notes
1. Where detailed hydraulic modelling in unavailable for Flood Zones 2 and 3, the E.A.'s flood outlines as shown on their website have been provided.
2. In the absence of hydraulic modelling showing 1 in 100 year climate change extents, the E.A.'s Flood Zone 2 should be taken as the 1 in 100 year climate change outline.
3. Please refer to section 4.10 of the SFRA for further details of the modelled flood outlines.
COTTENHAM
WATERBEACH
OAKINGTON
IMPINGTON
HISTON
MILTON
GIRTON
CAMBRIDGE
FULBOURN
TRUMPINGTON
GREAT SHELFORD
LITTLE SHELFORD
HARSTON
SAWSTON
WHITTLESFORD
ABINGTON
GREAT ABINGTON
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Kilometres
SCALE: 1:90,000
1
2
3
4
5
WSP
TITLE:
SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL LEVEL 1 SFRA
FIGURE No:
FLOOD RISK CONSTRAINTS
1402 - D - 1,2
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Date Modified: 23/09/2010
Drawn By: ukdlc8001
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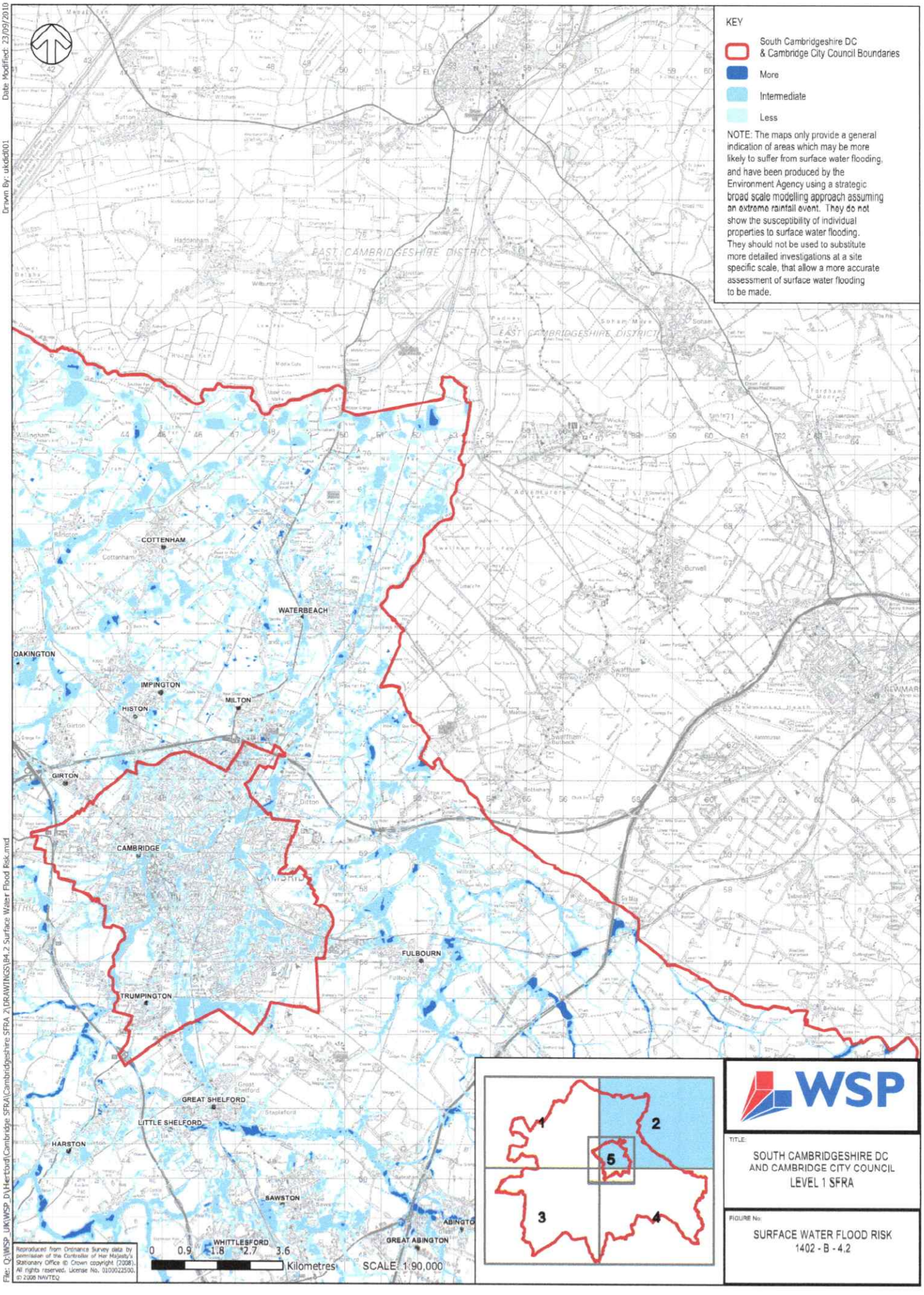
KEY
South Cambridgeshire DC & Cambridge City Council Boundaries
More
Intermediate
Less
NOTE: The maps only provide a general indication of areas which may be more likely to suffer from surface water flooding, and have been produced by the Environment Agency using a strategic broad scale modelling approach assuming an extreme rainfall event. They do not show the susceptibility of individual properties to surface water flooding. They should not be used to substitute more detailed investigations at a site specific scale, that allow a more accurate assessment of surface water flooding to be made.
EAST CAMBRIDGESHIRE DISTRICT
COTTENHAM
WATERBEACH
OAKINGTON
IMPINGTON
HISTON
MILTON
GIRTON
CAMBRIDGE
FULBOURN
TRUMPINGTON
GREAT SHELFORD
LITTLE SHELFORD
HARSTON
SAWSTON
WHITTLESFORD
GREAT ABINGTON
ABINGTON
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Kilometres
SCALE: 1:90,000
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2
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WSP
TITLE:
SOUTH CAMBRIDGESHIRE DC AND CAMBRIDGE CITY COUNCIL
LEVEL 1 SFRA
FIGURE No:
SURFACE WATER FLOOD RISK
1402 - B - 4.2
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Date Modified: 23/09/2010
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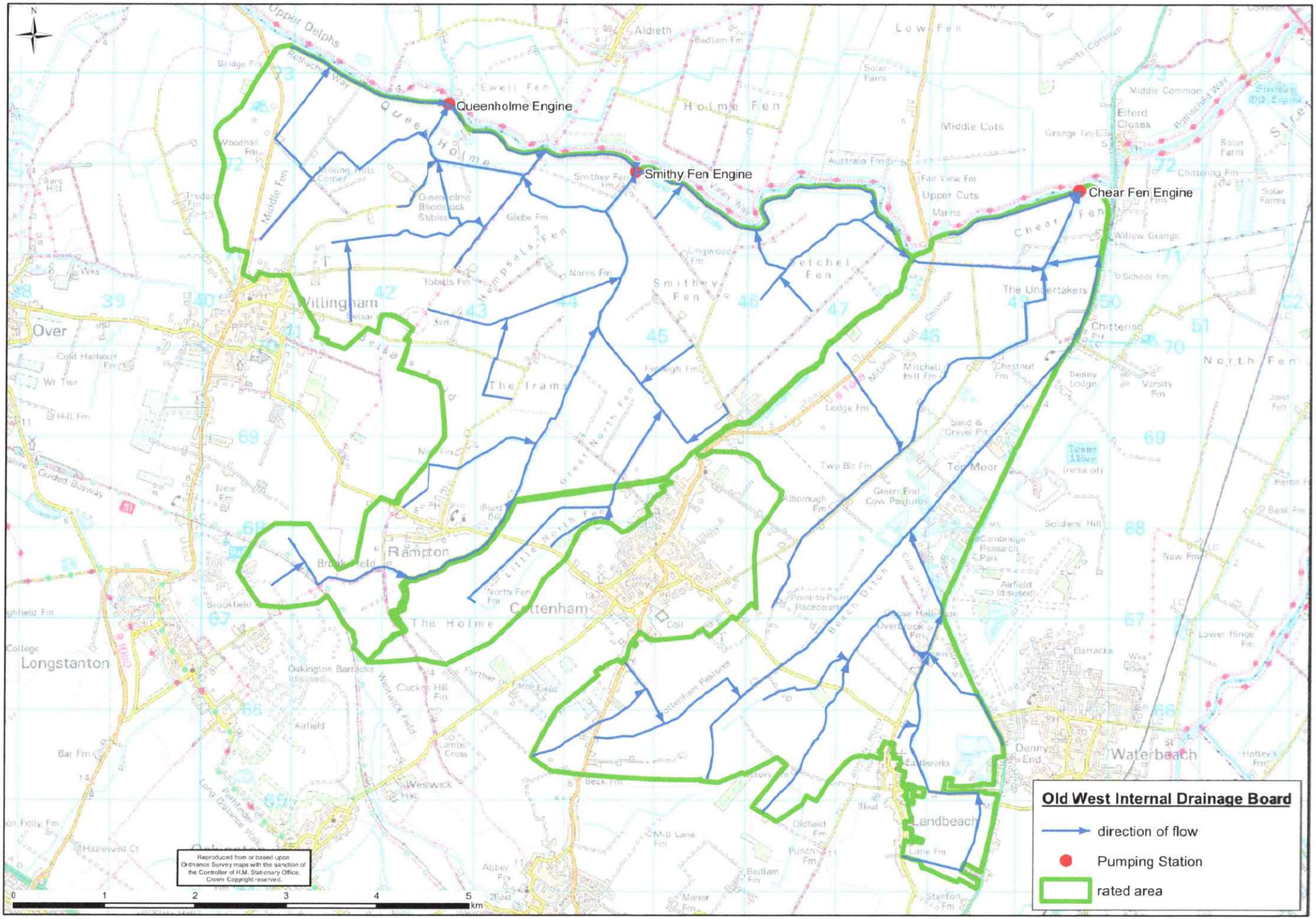
Queenholme Engine
Smithy Fen Engine
Chear Fen Engine
Old West Internal Drainage Board
direction of flow
Pumping Station
rated area
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0 1 2 3 4 5 km