



**ENGINEERING**

**Flood Risk Assessment**  
**for the Change of Use and Conversion of Existing Buildings**  
**to Residential Use and Erection of New Residential Buildings at**  
**Northaw House, Cooper's Lane, Potters Bar, Hertfordshire, EN6 4PS**

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2090 – FRA Rev D Oct 2020

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**1 Introduction**

1.1 MTC Engineering (Cambridge) Limited has been asked to provide a Flood Risk Assessment in respect of the proposed change of use and conversion/refurbishment of existing buildings at Northaw House, Cooper's Lane, Potters Bar to a residential use alongside the erection of new buildings for residential use by Peter Dann Consulting Engineers Limited.

1.2 This Flood Risk Assessment is based on the following information:-

1.2.1 Proposed layouts provided by Bryant and Moore Architects;

1.2.2 Environment Agency flood information;

1.2.3 Welwyn Hatfield Council Level 1 and 2 Strategic Flood Risk Assessment;

1.2.4 Site survey provided by Peter Dann Consulting Engineers Limited;

1.2.5 British Geological Survey Geological Mapping.

- 1.3 The comments and opinions contained in this report including any conclusions are based on the information available to MTC Engineering (Cambridge) Ltd. during our investigations. The conclusions drawn could therefore differ if the information is found to be inaccurate, incomplete or misleading. MTC Engineering (Cambridge) Ltd. accept no liability should this prove to be the case, nor if additional information exists or becomes available with respect to this site.
- 1.4 MTC Engineering (Cambridge) Ltd. makes no representation whatsoever concerning the legal significance of its findings or any other matters referred to in the following report. Except as otherwise requested by the client, MTC Engineering (Cambridge) Ltd. are not obliged and disclaim any obligation to update the report for events taking place after the Assessment was undertaken.
- 1.5 This report is a Flood Risk Assessment of flooding issues associated with the proposed development. The information presented and conclusions drawn are based on statistical data and are for guidance purposes only. This report provides no guarantee against flooding of the study site or elsewhere, nor as to the absolute accuracy of water levels, flow rates and associated probabilities quoted.

## **2 Site Description**

- 2.1 The site is located on the eastern side of Cooper's Lane to the west of Northaw and northeast of Potters Bar, with a site location plan provided in Appendix 1.
- 2.2 To the north the site is bound by Judge's Hill, past which lies open grassland.
- 2.3 To the east the site is bound by the East Lodge and Stud Farm House which are at the western edge Northaw which is a small village surrounded by open grassland and agricultural land.
- 2.4 To the south the site is bound by open grassland and agricultural land.
- 2.5 To the west the site is bound by The White House, past which lies Cooper's Lane then Northaw Place and the associated grounds.
- 2.6 The site itself is occupied by the main Northaw House building along with a number of small outbuildings, with a number of the existing buildings being listed.
- 2.7 The site falls in a northerly direction from levels of generally just over 120 metres above Ordnance Datum (AOD) to the south of the existing buildings to levels generally a little over 118m AOD along the northern site of the main access road through the site, with a copy of the site survey provided in Appendix 2.
- 2.8 Ordnance Survey mapping shows the site lies near the crest of a ridge line that runs in a northeasterly direction, with land to the southeast falling reasonably steeply in a southeasterly direction towards Hook Wood, land to the northwest falling in a westerly/northwesterly direction towards Northaw Place, and land to the north of the main access road through the site falling reasonably steeply in a northerly direction towards Judge's Hill which is about 10 metres lower than the access track then continuing to fall in a northerly direction towards Nyn Pond.

- 2.9 The only significant surface water feature in the vicinity of the site is a small surface water ditch running in a westerly direction to the rear of the walled garden area to the west of the main buildings on the site, which is joined by a small drain running in a southerly direction along the western wall of this garden area. This then flows west to Coopers Lane and is believed to be culverted beneath this.
- 2.10 There are no further significant surface water features in the vicinity of the site.
- 2.11 British geological survey mapping shows the bedrock geology underlying the site to be the London Clay formation, with the higher southern area of the site (approximately from the main access road and southwards) being underlain by a superficial geology of sand and gravel, with no superficial geology present in the lower northern area.

### **3 Sources of Potential Flood Risk**

- 3.1 In accordance with The National Planning Policy Framework all forms of flood risk need to be considered in relation to any development.
- 3.2 The first form of flood risk to be considered in respect of The National Planning Policy Framework is fluvial flooding.
- 3.3 The Environment Agency Flood Map for Planning (Appendix 3) shows that the site and all land in the surrounding area is considered to lie in Flood Zone 1.
- 3.4 Mapping provided in Appendix D of the Strategic Flood Risk Assessment (SFRA) which includes climate change allowances (although at the original 20% allowance) again shows the site and all surrounding land to lie in Flood Zone 1 with no land in Flood Zone 3 in the vicinity of the site.
- 3.5 Should a blockage occur in the ditch running in a westerly direction to the south of the existing buildings, water would simply flow around this overland and then back in bank downstream of the blockage and with the section of site immediately adjacent to this falling towards the drain (and brick wall to the rear of the garden running along the majority of length of this drain), it is not considered that any significant flows would come north towards the existing buildings.
- 3.6 There are no other significant surface water features in the vicinity of the site considered to pose any significant risk of fluvial flooding to the site and the overall fluvial flood risk is considered to be low.
- 3.7 The second form of flood risk to be considered in respect of The National Planning Policy Framework is flooding from the sea.
- 3.8 The site is located well inland and with levels in the order of 120m AOD it is not considered that the risk of the site flooding from the sea is extremely low.

- 3.9 The third form of flood risk to be considered in respect of The National Planning Policy Framework is flooding from land.
- 3.10 Intense rainfall, often of short duration, that is unable to soak into the ground or enter drainage systems can quickly run off land and result in local flooding. In developed areas, this flood water can be polluted with domestic sewage with foul sewer surcharge and overflow. Local topography and built form can have a strong influence on the direction and depth of flow. The design of development down to a micro level can influence or exacerbate this. Overland flow paths need to be taken into account in development to minimise the risk of flooding from overland flow.
- 3.11 The majority of land in the vicinity of the site falls in a northwesterly or southeasterly direction, with a very limited area of higher land falling towards the site itself. Further to this the majority of higher land to the south/southwest is permeable land covered with vegetation and with a low gradient towards the site thus significant overland flows are unlikely to develop whilst any flows that did come towards the site would simply be picked up by the drain to the rear of the walled garden.
- 3.12 As such the overall risk of flooding from surface water is considered to be low, as confirmed by the Environment Agency Surface Water Flood Map which shows virtually the entire site to be at a very low risk of flooding.
- 3.13 The fourth form of flood risk to be considered in accordance with The National Planning Policy Framework is flooding from rising groundwater.
- 3.14 Groundwater flooding occurs when water levels in the ground rise above surface elevations. It is most likely to occur in low lying areas underlain by permeable rocks (aquifers). These may be extensive, regional aquifers, such as chalk or sandstone, or may be localised sands and river gravels in valley bottoms underlain by less permeable rocks. Water levels below the ground rise during wet winter months, and fall again in the summer as water flows out into rivers. In very wet winters, rising water levels may lead to the flooding of normally dry land.

- 3.15 The underlying bedrock clay geology is a low permeable geology and would not have any significant groundwater present, thus would not give rise to any significant risk of flooding due to rising groundwater.
- 3.16 Some groundwater may be present as a perched water table in the superficial sand and gravel geology, however geological mapping shows this extends east to Northsaw and land with a level of below 100m AOD, and also some lower land to the south of the site, and it is these areas in which outflow would generally be anticipated. Ordnance Survey mapping indeed shows watercourses commencing in these areas.
- 3.17 As such it is not considered that the site itself is at a significant risk of flooding from rising groundwater levels, whilst even if a spring line were to develop along the boundary between the bedrock and superficial geology at the site water would simply flow off site in a northeasterly direction overland without having any significant impact upon the site.
- 3.18 The fifth form of flood risk to be considered in accordance with the National Planning Policy Framework is the risk of flooding from blocked, overloaded, or burst sewers and water mains.
- 3.19 There are no sewers or water mains in the vicinity of the site considered to pose any significant flood risk to the site.
- 3.20 The last form of flood risk to be considered in accordance with the National Planning Policy Framework is flooding from reservoirs, canals or other artificial sources.
- 3.21 There are no reservoirs or artificial sources of water in the vicinity of the site considered to pose a flood risk to the site, and Environment Agency mapping indicates that the site is not at a significant risk of flooding from any reservoir.



## **4 The Proposed Development**

- 4.1 The proposal involves the change of use and conversion/refurbishment of a number of existing buildings at Northaw House to residential use and erection of a number of new residential buildings as shown on the site plans provided in Appendix 4.
- 4.2 As detailed in Section 3 there are no significant sources of flood risk to the site, and therefore specific finished floor levels are not required on flood related grounds and no flood resistant or resilient construction is required at the new buildings, and no flood resilient or resistant retrofitting is required at the buildings to be refurbished and converted to residential use.
- 4.3 General good practice should however be followed during the detailed design phase with finished external levels designed to ensure that flow paths are available between buildings and finished floor levels set sufficiently above adjacent ground levels in order to ensure that water will not pond in the vicinity of access points or enter buildings under any circumstances during any extreme rainfall event in which drainage systems become blocked or over capacity.
- 4.4 The main flood risk related issue associated with the proposed development is therefore ensuring that the proposed development has no adverse impact upon the off-site risk of flooding as a result of the increased impermeable area to be provided at the site which could increase run off rates onto surrounding land and thereby increase the downstream risk of flooding if drainage is not properly designed.
- 4.5 For this reason a drainage strategy in line with the requirements of the Drainage Hierarchy and all relevant local and national guidance has been completed by Peter Dann Consulting Engineers which will ensure that there is no adverse impact upon the flood risk to the surrounding area associated with the proposed development. As such the Drainage Strategy should be read in conjunction with this Flood Risk Assessment when considering potential off site impacts associated with drainage.

## **5 Assessment**

- 5.1 The proposal involves the change of use of existing buildings at Northaw House to residential use and erection of a number of new residential buildings at the site.
- 5.2 Under Table 2 of the Technical Guidance of the National Planning Policy Framework the proposed residential use would be classified as a ‘more vulnerable’ use.
- 5.3 The site is shown as lying completely in Flood Zone 1 on the Environment Agency Flood Map for Planning, with no areas of surrounding land indicated as lying in Flood Zone 2 or Flood Zone 3. It is not anticipated that climate change will alter this.
- 5.4 In accordance with the National Planning Policy Framework, development of a ‘more vulnerable’ nature is appropriate in Flood Zone 1 without the need to apply the Exception Test, whilst in Flood Zone 1 the Sequential Test is automatically passed.
- 5.5 The site is considered to be at a low risk of flooding by any means and no specific flood resilient or resistant construction or retrofitting is considered necessary at either the converted buildings or new buildings.
- 5.6 To ensure that there is no adverse impact upon the off-site risk of flooding associated with the introduction of new drainage areas at the site a surface water drainage strategy compliant with all local and national guidance has been produced by Peter Dann Consulting Engineers Limited and should be read in conjunction with this Flood Risk Assessment.

## **6 Conclusion**

- 6.1 The proposal involves the change of use of existing buildings at Northaw House to residential use and erection of a number of new residential buildings at the site.
- 6.2 The site is shown on the Environment Agency Flood Map as lying in Flood Zone 1 and is considered to be at a low risk of flooding from any source as detailed in Section 3.
- 6.3 ‘More vulnerable’ development is appropriate in Flood Zone 1 without the need for an Exception Test whilst the Sequential Test is automatically passed.
- 6.4 Minimum finished floor levels are not necessary at the new buildings for flood related reasons.
- 6.5 No flood resilient or resistant construction or retrofitting is required.
- 6.6 Surface water drainage will be designed and constructed in line with the strategy produced by Peter Dann Consulting Engineers to ensure that there is no adverse impact upon the off-site risk of flooding and that drainage is in accordance with all relevant local and national requirements.
- 6.7 There are no flood risk related grounds under The National Planning Policy Framework on which to object to the proposed redevelopment of Northaw House, Coopers Lane, Potters Bar with the change of use of various existing buildings to a residential use and the erection of various new buildings for residential use.

**APPENDIX 1**

**SITE LOCATION PLAN**



**APPENDIX 2**

**SITE SURVEY**

shown on survey plan are indicated in approximate locations only

Rev A: Dec 03: Minor alterations  
Revisions

NOTES:  
Do not scale. This drawing is to be read in conjunction with all relevant consultants, sub contractors and specialist drawings.  
All trees and shrubs to be planted in accordance with NHBC guidelines chapter 4.2 building near trees.  
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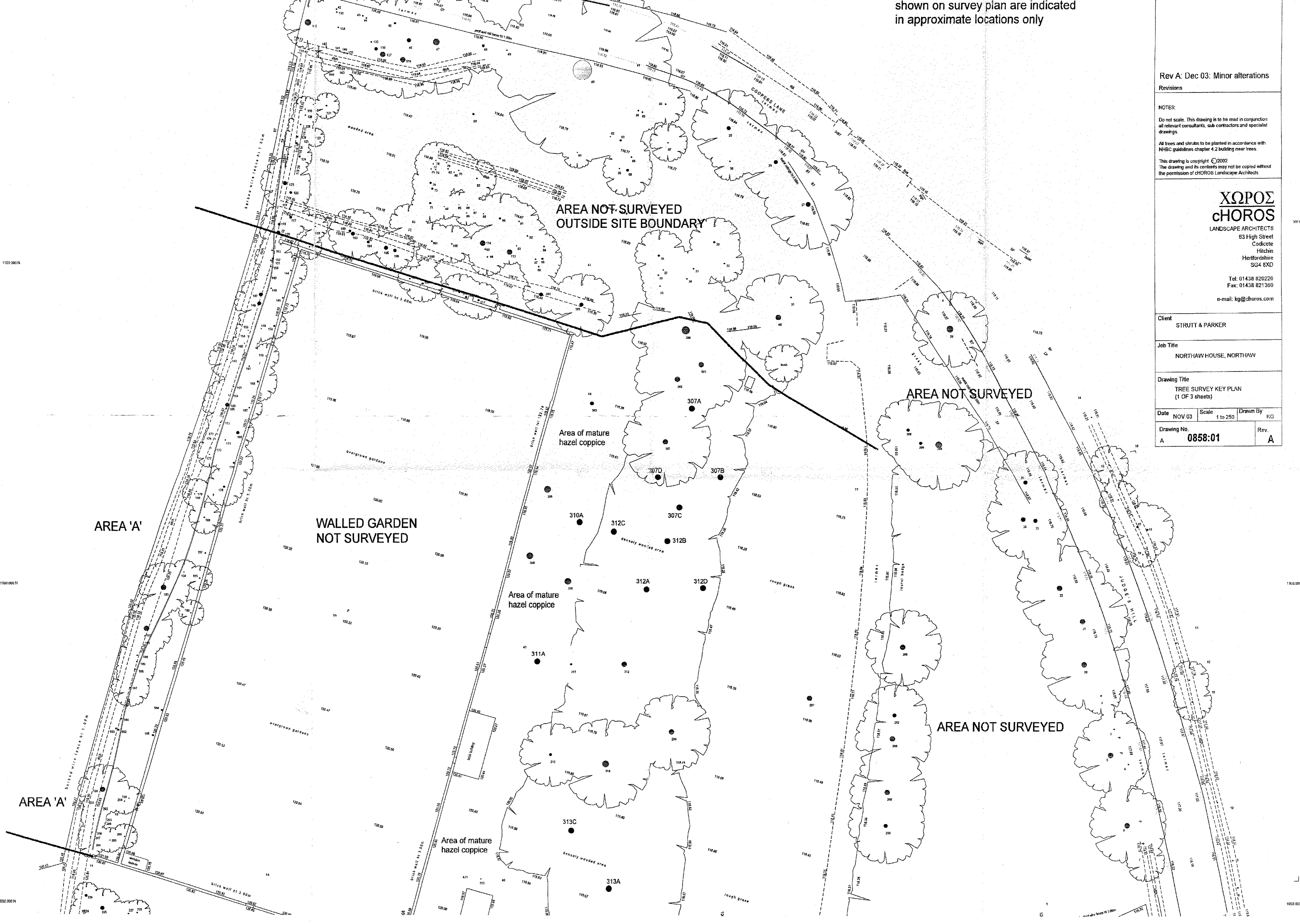
Client  
STRUTT & PARKER

Job Title  
NORTHAW HOUSE, NORTHAW

Drawing Title  
TREE SURVEY KEY PLAN  
(1 OF 3 sheets)

Date NOV 03 Scale 1 to 250 Drawn By KG

Drawing No. A 0858:01 Rev. A



1150 000 N

1160 000 N

1000 000 N

1160 000 N

1000 000 N



**NOTE:**  
 Additional trees found on site but not shown on survey plan are indicated in approximate locations only

Rev A: Dec 03: Minor alterations

Revisions

NOTES:

Do not scale. This drawing is to be read in conjunction with all relevant consultants, sub contractors and specialist drawings.

All trees and shrubs to be planted in accordance with NHBC guidelines chapter 4.2 building near trees.

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Job Title  
 NORTHAW HOUSE, NORTHAW

Drawing Title  
 TREE SURVEY KEY PLAN  
 (2 of 3 sheets)

Date	NOV 03	Scale	1 to 250	Drawn By	KG
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Drawing No.	A	0858 02	Rev.	A
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**APPENDIX 3**

**ENVIRONMENT AGENCY FLOOD MAP FOR PLANNING**

# Flood map for planning

Your reference  
**2090**

Location (easting/northing)  
**527444/202413**

Created  
**13 Dec 2018 4:38**

**Your selected location is in flood zone 1, an area with a low probability of flooding.**

## **This means:**

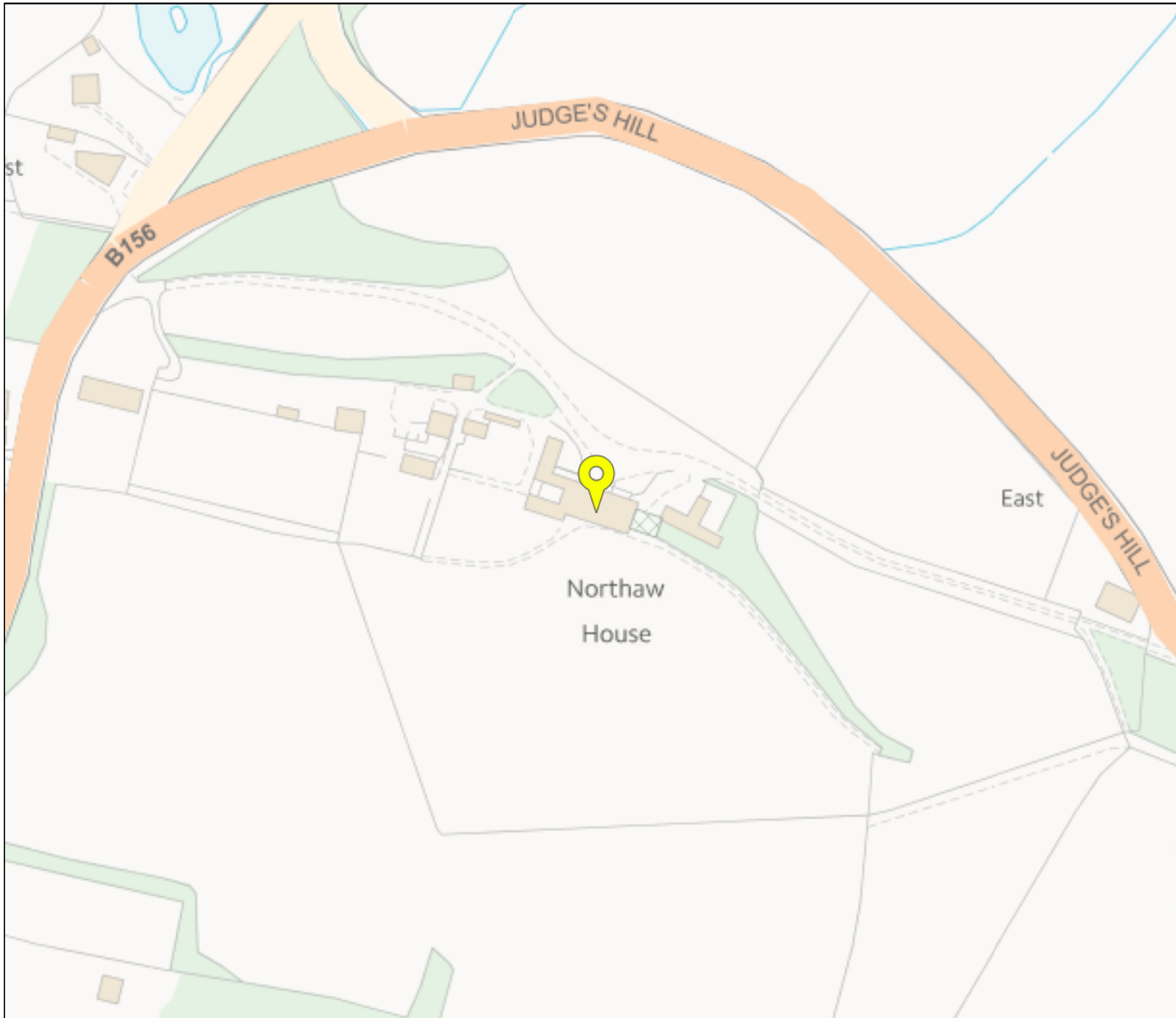
- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

## **Notes**

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

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











### Flood map for planning

Your reference  
**2090**

Location (easting/northing)  
**527444/202413**

Scale  
**1:2500**

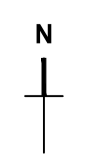
Created  
**13 Dec 2018 4:38**

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



**APPENDIX 4**

**PROPOSED SITE PLAN**



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PROPOSED DEVELOPMENT AT:  
Northaw House, Coopers Lane, Potters Bar, Hertfordshire EN6 4PS

PROPOSED SITE PLAN 1:1000@A1 MARCH 2018 16\_254\_PL03