

# Land off Cambridge Road, Great Shelford

Flood Risk Assessment & Drainage Strategy

May 2025



**Woods Hardwick**

Architecture | Engineering | Planning | Surveying

# Contents

|          |  |           |
|----------|--|-----------|
| <b>1</b> | <b>Introduction</b>                                    | <b>05</b> |
| <b>2</b> | <b>Existing Site and Proposed Development</b>          | <b>08</b> |
| <b>3</b> | <b>Flood Risk</b>                                      | <b>10</b> |
|          | Risk of Flooding to the Development from Known Sources | 13        |
|          | Risk of Flooding from the Proposed Development         | 14        |
| <b>4</b> | <b>Proposed Development Drainage Strategy</b>          | <b>16</b> |
|          | Surface Water Drainage Strategy                        | 17        |
|          | Discharge Strategy                                     | 17        |
|          | Foul Water Drainage Strategy                           | 22        |
| <b>5</b> | <b>Summary and Conclusion</b>                          | <b>24</b> |

# Appendices

|                   |  |
|-------------------|--|
| <b>Appendix A</b> | Site Location Plan                           |
| <b>Appendix B</b> | Site Layout Plan                             |
| <b>Appendix C</b> | Topographical Survey                         |
| <b>Appendix D</b> | Environment Agency - Flood Map for Planning  |
| <b>Appendix E</b> | Environment Agency - Surface Water Flood Map |
| <b>Appendix F</b> | Ground Investigation Report                  |
| <b>Appendix G</b> | Anglian Water Wastewater Plan                |
| <b>Appendix H</b> | Anglian Water Sewer Flooding Enquiry         |
| <b>Appendix I</b> | Environment Agency - Reservoir Flood Map     |
| <b>Appendix J</b> | Proposed Drainage Strategy                   |
| <b>Appendix K</b> | Drainage Calculations                        |

# Report Reference

18926/FRA&DS

# Revision History

| Rev         | Amendments | Prepared By | Checked By | Date       |
|-------------|------------|-------------|------------|------------|
| First Issue | N/A        | GBR         | GBR        | 28/05/2025 |
|             |            |             |            |            |
|             |            |             |            |            |
|             |            |             |            |            |

---

# Introduction

---

# Introduction

The following paragraphs state the purpose of this document. A summary of existing and future site details is also provided.

- 1.1 This Flood Risk Assessment (FRA) and Drainage Strategy has been prepared by Woods Hardwick Ltd on behalf of Great Shelford Ten Acres LLP in support of an Outline Planning Application for a proposed residential development on a site known as 'Land off Cambridge Road, Great Shelford'. A Site Location Plan is included in **Appendix A**.
- 1.2 The application site covers an area of approximately 3.6ha and comprises a parcel of land separated by Almond Close which currently facilitates access to Shelford Rugby Club.
- 1.3 Development proposals are for the construction of 120 residential dwellings. Development proposals also include associated areas for access, parking, landscaping, public open space and a local equipped area for play (LEAP). A Site Layout Plan is included in **Appendix B**.
- 1.4 In terms of flood risk, the application site is situated in Flood Zone 1, which has less than a 1 in 1,000 annual probability of river or sea flooding.
- 1.5 This document has been written in accordance with the guidance contained in the Flood Risk and Coastal Change section of the Government's Planning Practice Guidance (FRCC, PPG).
- 1.6 This FRA concludes that the proposed development will not lead to the impedance of flood flows and will not increase the risk of flooding on the site itself, adjacent properties or to third parties situated either upstream or downstream of the site.
- 1.7 This document includes a Surface Water Drainage Strategy that identifies a suitable strategy for the disposal of surface water from the proposed development site that conforms with the guidance contained within the following documents:
  - CIRIA C753 SuDS Manual (2015).
  - Cambridgeshire County Council's (CCC) Surface Water Drainage Guidance for Developers.
- 1.8 The proposed drainage strategy is based on a maximum allowance of 40% climate change in accordance with the Cambridgeshire County Council Supplementary Planning Document for Sustainable Drainage Systems.

- 
- 1.9 A suitable foul water outfall by way of a gravity connection to Anglian Water assets adjacent to the site in Cambridge Road has also been identified for the proposed development.
- 1.10 From the findings of this report, the development proposals are considered appropriate for the site location and therefore should be fully supported through the planning process in terms of flood risk, foul and surface water drainage.

# Existing Site and Proposed Development



**Woods Hardwick**

Architecture | Engineering | Planning | Surveying

---

---

# Existing Site and Proposed Development

The following paragraphs provide detail on the existing and proposed future development site; in relation to location, land use and topography.

- 2.1 The application site is located off Cambridge Road, to the south of Trumpington and to the north west of the village of Great Shelford. By road, the site is currently accessible via Cambridge Road and Almond Close which passes through the centre of the site.
- 2.2 The application site covers approximately 3.6ha of land, and consists of arable fields. The site is bisected through the centre by Almond Close, which provides access to Shelford Rugby Club. The site is abutted by Shelford Rugby Club to the west; and by existing residential dwellings to the north, south and east.
- 2.3 The Topographic Survey of the site recorded the location and type of land features observed on the site, including type of surface finishes, land boundaries, access routes and vegetation. All surveyed elevations were recorded at heights in metres Above Ordinance Datum (mAOD). Ground levels and spot levels are also indicated on the drawing where they were recorded onsite. A copy of the Topographical Survey can be viewed in **Appendix C**.
- 2.4 In terms of existing drainage utilities, the Anglian Water Wastewater Plan identifies a 6in VC foul sewer which runs along Westfield Road to the north and Stonehill Road to the south; and a 9in VC foul sewer which runs along Cambridge Road to the east.
- 2.5 The Topographic Survey confirms that there are no ditches within the application site boundary or within the immediate vicinity of the site.
- 2.6 As previously mentioned, the development proposals are for the construction of 120 residential dwellings. The proposals also include pedestrian and vehicular access, parking, landscaping, public open space and a local equipped area for play. A Site Layout Plan is included in **Appendix B**.

# Flood Risk



**Woods Hardwick**

Architecture | Engineering | Planning | Surveying

---

---

# Flood Risk

The following paragraphs will identify whether or not there are any flood risks associated with the proposed development, which may affect the proposals impact on the surrounding environment.

- 3.1 This FRA has been prepared in accordance with the National Planning Policy Framework (NPPF) which was published in March 2012 (last updated February 2025) and accompanying Planning Practice Guidance (PPG) published in November 2016 (last updated February 2024).
- 3.2 Table 1 of the Flood Risk and Coastal Change (FRCC), PPG seeks to define Flood Risk Zones. An extract of this table is shown in Figure 3.1 which follows.
- 3.3 Annex 3 of the FRCC, PPG defines 'Flood Risk Vulnerability Classification'. Whilst Table 2 of the same document compared the suitability of a development within a particular Flood Zone based on its corresponding Flood Risk Vulnerability Classification.
- 3.4 As previously mentioned, the development proposals comprise up to 120 dwellings and associated infrastructure.
- 3.5 The Environment Agency (EA) Flood Map demonstrates that the site lies within Flood Zone 1 and is therefore classified as having less than a 1 in 1,000 annual probability of flooding from rivers or seas. A copy of the EA Flood Map covering the immediate surrounding area for the proposed development is shown in **Appendix D**.
- 3.6 According to Annex 3, residential dwellings are classified under the 'More Vulnerable' category, which is considered to be appropriate for development within Flood Zone 1 (Table 2). Therefore, there is no need to carry out a Sequential Test or Exception Test.

| <b>Flood Zone</b>                 | <b>Definition</b>   |
|-----------------------------------|---|
| Zone 1 Low Probability            | Land having a less than 0.1% annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b)  |
| Zone 2 Medium Probability         | Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding. (Land shown in light blue on the Flood Map)  |
| Zone 3a High Probability          | Land having a 1% or greater annual probability of river flooding; or Land having a 0.5% or greater annual probability of sea. (Land shown in dark blue on the Flood Map)  |
| Zone 3b The Functional Floodplain | <p>This zone comprises land where water from rivers or the sea has to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise:</p> <ul style="list-style-type: none"> <li>• land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or</li> <li>• land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding).</li> </ul> <p>Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)</p> |

Figure 3.1: Flood Zone Definitions - Planning Practice Guidance Extract

---

### **Risk of Flooding to the Development from Known Sources**

- 3.7 Notwithstanding the above, a summary and analysis of the potential for the site to flood from known sources is provided below.

#### Flooding from Rivers and/or Watercourses

- 3.8 As previously mentioned, the topographical survey confirms that there are no ditches located within the application site boundary or within the immediate vicinity of the site.
- 3.9 The nearest EA main river is the River Cam, located approximately 0.8km to the south of the site.
- 3.10 As confirmed by the EA flood mapping, the site is not at risk of flooding from this source.

#### Flooding from the Sea

- 3.11 The nearest sea to the site is the North Sea, which is located over 100km to the east. Given this distance, the proposed development site is not considered to be at risk of flooding from this source.

#### Flooding from Land

- 3.12 The potential for overland flows needs to be considered to ensure that neither the development nor adjacent land and/or property, including that which may be under the responsibility of a third party, is placed at an unacceptable risk of flooding.
- 3.13 As can be appreciated from the EA Surface Water Flood Map for the site which is included in **Appendix E**, small isolated parts of the site are considered to be at low, medium and high risk of flooding. The area associated with high risk is in the northern corner of the site; which according to the Topographical Survey is the lowest recorded ground level on site.
- 3.14 It should be noted that the Strategic Flood Risk Assessment for the area did not identify any historic surface water flooding incidents in the vicinity of the site.
- 3.15 Notwithstanding the above, any surface water flows which may emanate from the site will be managed within the drainage strategy following the development of the site. Final external levels on site will be designed to ensure that surface water flows are routed away from any vulnerable areas towards the proposed drainage network.

#### Flooding from Groundwater

- 3.16 Inspection of the British Geological Survey (BGS) website confirmed that the site's underlying ground conditions comprise West Melbury Marly Chalk Formation - Chalk. Superficial deposits comprise River Terrace Deposits, 3 - Sand and Gravel.

- 
- 3.17 A Ground Investigation (GI) Report (included in **Appendix F**) was prepared by A F Howland Associates. Their report dated June 2022 confirms that the ground investigation generally confirms the aforementioned geology.
- 3.18 The SFRA for the area indicates that the site is in an area which is low risk for groundwater flooding due to the geology of the area.
- 3.19 It is therefore anticipated that groundwater flooding will not be an issue to the proposed development site.

#### Flooding from Sewers

- 3.20 A copy of the Anglian Water Wastewater Plan showing the approximate location of any assets is included in **Appendix G**. From the plan it can be appreciated that there is an existing 6in VC sewer along Westfield Road to the north and Stonehill Road to the south; and a 9in VC sewer along Cambridge Road and Cherry Trees.
- 3.21 A sewer flooding history enquiry has been carried out with Anglian Water who confirmed that they have no record of flooding in the vicinity of the site that can be attributed to capacity limitation in the public sewerage system. A copy of the Anglian Water Sewer Flooding Enquiry is included in **Appendix H**.
- 3.22 Based on the above information, the application site is not considered to be at risk of flooding from this source.

#### Flooding from Reservoirs, Canals and Other Artificial Sources

- 3.23 The EA Reservoir Flood Map, a copy of which is included in **Appendix I**, demonstrates that no part of the site or land within the immediate vicinity is at risk of flooding from reservoirs. The nearest area at risk of flooding from this source is land approximately 800m to the south of the site's south western boundary.
- 3.24 It should be noted that an occurrence of flooding from a reservoir is considered by the EA to be extremely rare. There has been no loss of life in the UK from reservoir flooding since 1925.

#### Risk of Flooding from the Proposed Development

- 3.25 Presented below is a summary and analysis of the potential for the site to exacerbate the risk of flooding to third parties both upstream and downstream of the site.

#### Encroachment onto Floodplain

- 3.26 As outlined above, the site does not lie within the floodplain, therefore there is no risk of encroachment upon the floodplain.

---

### Impedance of Flood Flows

- 3.27 As previously mentioned, the EA surface water flood map shows that small areas of the site are at risk of surface water flooding. As can be appreciated from the Topographical Survey, the site falls from south to north and therefore it is not anticipated that the development will cause an impedance of flood flows to Hobson's Brook (which lies to the east of the site at a lower mAOD) or the River Cam (which lies to the west of the site at a higher mAOD).

### Contribution of Flood Flows by Development Drainage

- 3.28 As previously mentioned, the site covers an area of approximately 3.6ha.
- 3.29 The proposed development comprises a total of 120 residential dwellings with associated infrastructure such as roads and parking. These elements will all contribute to the development's surface water discharge.
- 3.30 If it is considered appropriate at the detailed design stage, flood routing measures will be incorporated to ensure that flood waters in excess of those for which the site has been designed to accommodate, will be routed away from the more vulnerable areas of the site.
- 3.31 The surface and foul water disposal strategies for the site are described in greater detail in the following 'Chapter 4: Proposed Development Drainage Strategy'.

### Climate Change

- 3.32 There is an increasing body of scientific evidence that suggests that global climate is changing as a result of human activity. Past, present and future emissions of greenhouse gases are expected to cause significant climate change during this century.
- 3.33 The nature of climate change will vary for the UK. Projections of future climate change indicate that more frequent short duration, high intensity rainfall and more frequent periods of long duration rainfall can be expected. These kinds of changes will have implications on river flooding and also localised flash flooding.
- 3.34 The Planning Practice Guidance requires developments to consider the potential impacts of climate change. In February 2016 the EA released new guidance titled 'Flood risk assessments: climate change allowances' (FRA:CC), in which the peak rainfall intensity allowance in small and urban catchments is assessed.
- 3.35 Considering the above, the climate change allowance that the proposed development's drainage strategy will be based on, is set at a value of +40% ('Upper End' value i.e. 90<sup>th</sup> Percentile, taken from Table 2 of the FRA:CC, representing the total potential change anticipated for 2070 to 2115).

# Proposed Development Drainage Strategy



**Woods Hardwick**

Architecture | Engineering | Planning | Surveying

---

# Proposed Development Drainage Strategy

The following paragraphs will provide detail on the proposed site generated foul and surface water disposal methods, design criteria, maintenance regimes and potential third-party legal agreements.

- 3.1 In addition to ensuring that the development is not at risk of flooding from external sources, it is also important to ensure that the scheme itself does not exacerbate flood risk for others. It is therefore essential that the arrangements for storm and foul water disposal are fully assessed to guarantee that the effects are mitigated and that there will be no impact on the existing land drainage regime.

## Surface Water Drainage Strategy

- 3.2 All of the recent guidance on the arrangements for storm water disposal from new developments has encouraged the applications of a hierarchy for surface water disposal. This has now been formalised in the Building Regulations Part H. The hierarchy is also the basis of the advice on surface water disposal contained within Cambridgeshire County Council's Surface Water Drainage Guidance for Developers.
- 3.3 The first choice for surface water disposal which should be pursued is via infiltration. Only where it has been determined that the ground conditions are not suitable should the second choice of disposal to a ditch and/or watercourse be considered. If there is no alternative the third and last choice of disposal to the public sewer can be considered.

## Method of Surface Water Discharge

### Infiltration

- 3.4 The results of the infiltration testing carried out on site indicates that infiltration techniques would be viable for the discharge of surface water. A copy of the results are included in **Appendix F**. In light of the above, and in accordance with the hierarchy for surface water disposal, the site is proposed to discharge surface water via infiltration in the form of permeable paving.

## Discharge Strategy

### Rainfall Data

- 3.5 The Flood Estimation Handbook (FEH) methodology has been used in order to determine the requirements of the drainage network. The FEH methodology generally provides a more robust assessment of the drainage network.

---

### Runoff Rate

- 3.6 The impermeable area of the site has been calculated from the proposed Site Layout Plan. This impermeable area comprises surfaces occupied by the proposed dwellings, private drives, car parking and access roads.

### Attenuation Volume Requirement

- 3.7 Based on the Site Layout Plan, the development would generate an impermeable area of approximately 2.05 ha.
- 3.8 The Proposed Drainage Strategy is included in **Appendix J**. The proposed strategy utilises the acceptable soakage rates and proposes discharge of surface water runoff from all areas of hard standing on the site via permeable paving which will be used for the construction of the roads and driveways on the site. There will be both areas of private permeable estate roads and private permeable shared / individual driveways.
- 3.9 The surface water runoff will drain via infiltration to the soil below the permeable paving. The permeable pavement has been designed using the infiltration rate of  $3.89 \times 10^{-6}$  m/s taken from BRE365 testing document DGWD/22.127.
- 3.10 The drainage calculations are included in **Appendix K**. These calculations demonstrate that the features are capable of accepting flows from the 100-year rainfall event, including 40% allowance for climate change, without flooding.
- 3.11 It is therefore necessary to ensure that sufficient attenuation is provided within the site to accommodate the runoff from the impermeable surfacing during the 1 in 100-year (+40% climate change) storm event.
- 3.12 The associated drainage calculations are included in **Appendix K**. These calculations demonstrate that the proposed permeable paving is capable of accepting flows from the 1 in 100-year rainfall events, including 40% allowance for climate change.
- 3.13 At the detailed design stage, the proposed permeable paving (which will be used for the construction of the private roads and drives) will be sized appropriately to cater for surface water runoff from the associated private road/drives; ensuring that the necessary half drain times of 1440 minutes as stipulated in the BRE Digest 365 can be achieved.

---

### Surface Water Treatment

- 3.14 Lined permeable paving is very effective at removing pollution from runoff. CIRIA Report C753 (2015) demonstrates the effectiveness of permeable pavements in reducing pollution. For example, between 60% and 90% of total suspended solids and 70% to 95% of hydrocarbons are removed. When permeable paving is subjected to low level oil drips that may result from parked vehicles, the pavements continue to biodegrade the hydrocarbons indefinitely.
- 3.15 For further details of the aforementioned surface water attenuation and treatment methods, please refer to the Proposed Drainage Strategy Drawing which can be viewed in **Appendix J**.

### Sustainability and Water Quality

- 3.16 The hazard and treatment indices for the proposed development have been reviewed from the CIRIA SuDS Manual C753. As the proposed development is characterised as residential, the land use in terms of pollution hazard consist of:
- Residential roofs
  - Individual property driveways/residential car parks
- 3.17 The pollution hazards associated with the above land use classifications are as follows:

**Table 3 Pollution Hazard Indices**

|  | Pollution Hazard Level | Total Suspended Solids (TSS) | Metals | Hydrocarbons |
|--|------------------------|------------------------------|--------|--------------|
| Residential roofs  | Very low               | 0.2                          | 0.2    | 0.05         |
| Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, homezones and general access roads) | Low                    | 0.5                          | 0.4    | 0.4          |

- 3.18 The selected SuDS for the drainage strategy comprise permeable paving. The mitigation index provided by the SuDS Manual for the proposed SuDS feature is shown in the table below.

**Table 4 Mitigation Indices**

|                  | TSS | Metals | Hydrocarbons |
|------------------|-----|--------|--------------|
| Permeable Paving | 0.7 | 0.6    | 0.7          |

- 
- 3.19 To deliver adequate treatment, the proposed SuDS components should have a total mitigation index (for each contaminant type) that equals or is greater than the pollution hazard index (for each contaminant type). Where a single SuDS component is insufficient, additional components in a series would be required, where:

**Total SuDS mitigation index = mitigation index 1 + 0.5 (mitigation index)**

- 3.20 It is evident from the table above that the mitigation indices for the SuDS feature is greater than the pollution hazard indices and therefore offers sufficient treatment.

Surface Water Conveyance

- 3.21 The permeable paving will be sized appropriately to cater for surface water runoff from the associated private road/drives; ensuring that the necessary half drain time of 1440 minutes as stipulated in the BRE Digest 365 can be achieved.
- 3.22 The proposed drainage network has been modelled using the Causeway Flow software. The results demonstrate that the features are capable of accepting flows from the 100-year storm event, including 40% allowance for climate change (without flooding). The proposed drainage strategy and associated calculations can be found in **Appendix J** and **Appendix K** respectively.

Surface Water Drainage Maintenance

- 3.23 The arrangements for further maintenance of the surface water drainage system needs to be fully considered.
- 3.24 The permeable paving within the private drives and roads will be maintained by a management company; whilst the permeable paving within individual drives will be maintained by the homeowners. Homeowners will be made aware of their maintenance responsibilities which will also be included in the deeds of the property and the Homeowners/Homecare Booklet or similar.
- 3.25 A summary of the likely maintenance requirements for the permeable paving are provided in Table 4.2 on the following page.

Table 4.2: Recommended Maintenance for Permeable Paving

| <b>Permeable Paving</b>  |  |
|--|--|
| <b>Monitoring</b>  | <b>Frequency</b>   |
| Initial inspection   | Monthly for three months after installation.   |
| Inspect for evidence of poor operation and/or weed growth - if required, take remedial action.   | Monthly for three months after installation; 48 hours after large storms in the first 6 months.  |
| Establish appropriate brushing frequencies.  | Annually.  |
| <b>Regular Maintenance</b>   | <b>Frequency</b>   |
| Brush regularly and remove sweepings from all hard surfaces.   | Annually, as required.   |
| <b>Occasional Maintenance</b>  | <b>Frequency</b>   |
| Brush surface once a year to prevent silt blockage and enhance design life.  | Annually, after leaf fall, or reduced frequency as required, based on site specific observations of clogging or manufacturers recommendations. |
| Particular attention must be taken to areas where water runs onto previous surface from adjacent impermeable areas as this area is most likely to collect the most sediment. |  |
| <b>Remedial Work</b>   | <b>Frequency</b>   |
| Monitor effectiveness of permeable pavement and when water does not infiltrate, seek advice for possible need for reinstatement of top layers or specialist cleaning.        | As required.   |

- 3.26 It should be noted that the maintenance schedule described above should be considered indicative only. The frequency and type of maintenance tasks to be carried out should be reviewed as necessary to ensure that the schedule remains relevant to the nature of the location of the proposed development.

---

### **Foul Water Drainage Strategy**

- 3.27 As previously mentioned, the Anglian Water Asset Plans show that there are existing foul water sewers located along Westfield Road, Stonehill Road and Cambridge Road; which are located to the site's north, south and eastern borders respectively. It is proposed to discharge the site's foul flows into the public foul water sewer within Cambridge Road via a gravity connection (exact location and levels to be confirmed). This is demonstrated on the Proposed Drainage Strategy included in **Appendix J**.
- 3.28 The Anglian Water Pre-Planning Assessment Report confirms that at present, there is not capacity within the Cambridge Water Recycling Centre to accommodate the foul flows from the development. However, based upon recent advice provided by Anglian Water this water recycling centre is being upgraded to accommodate growth within their current funding period (2025-2030).
- 3.29 The AW Report also states that the nearest practicable connection is to the 225mm diameter VC sewer at manhole 5403, via a gravity connection.
- 3.30 No invert level information is recorded on the AW manhole records for manhole 5403. The nearest manhole with records available is manhole 5401, which has an invert level of 14.4m. The lowest surveyed ground level on site is approximately 18.5mAOD. Based on this information, a gravity connection would be feasible. Additionally, the Pre-Planning Report states that: *"Anglian water has assessed the impact of gravity flows from the planned development to the public foul sewerage network. We can confirm that this is acceptable as the foul sewerage system, at present, has available capacity for your site."*
- 3.31 The existing 100mm foul sewer serving Shelford Rugby Club is set to be abandoned, and the flows to be diverted into the new proposed 150mm sewer serving the development site. The new proposed sewer will be offered for adoption by Anglian Water under a Section 104 Agreement. The sewer will therefore be designed in accordance with Anglian Water's adoptable standards, providing a direct point of connection between the development site and the aforementioned AW foul water sewer along Cambridge Road to the east of the site.
- 3.32 Notwithstanding the above, and in accordance with the relevant drainage policy, AW are obliged to accept foul water flows from a proposed development, subject to the site receiving planning consent. In anticipation that such a consent will be granted for the proposed scheme, it is expected that AW will make the necessary arrangements to ensure that the required provision within their public foul sewer network and treatment works will be available at the time that the applicant wishes to connect the site's foul sewers to the public foul sewer network.

---

Foul Water Drainage Maintenance

- 3.33 In anticipation that the proposed development will be connected to the existing AW public foul water sewer network within Cambridge Road; it is considered reasonable to expect AW to act in their full capacity as the wastewater provider for the local area, to ensure that maintenance of their public sewers will be carried out as required from the point at which the proposed private sewer outfalls connect to the public sewer network.

# Summary and Conclusion

---

# Summary and Conclusion

The following paragraphs summarise the findings of this Flood Risk Assessment and Drainage Strategy. Details of foul and surface water outfalls, SuDS features and legal agreements are also provided.

- 4.1 This Flood Risk Assessment (FRA) and Drainage Strategy has been prepared by Woods Hardwick Ltd on behalf of Great Shelford Ten Acres LLP in support of an Outline Planning Application for a proposed residential development on a site known as 'Land off Cambridge Road, Great Shelford'.
- 4.2 The development proposals are for the construction of up to 120 units; with associated access, parking, landscaping, public open space and a local equipped area for play.
- 4.3 The application site comprises a parcel of land that is divided by Almond Close which facilitates access to Shelford Rugby Club. The site comprises arable fields, and is bordered to the west by Shelford Rugby Club; and to the north, south and east by existing residential dwellings.
- 4.4 In terms of flood risk, the EA flood maps indicate that the proposed development site is situated in Flood Zone 1, meaning it has an annual probability of river and/or sea flooding of less than 1 in 1,000.
- 4.5 All potential sources of flooding to the proposed development have been considered and it has been demonstrated that the site will not be at any significant risk of flooding.
- 4.6 The EA Surface Water Flood Map shows that parts of the site are considered to be at low to high risk of surface water flooding. It is however considered that the areas shown to be at risk reflect areas where water collects at the low points of the site. Following the development of the site this would not occur as surface water would be intercepted and managed within the proposed drainage networks.
- 4.7 It has also been demonstrated that the proposed development will not exacerbate the risk of flooding to third parties either upstream or downstream of the site.
- 4.8 The proposed Surface Water Drainage Strategy has been developed in accordance with the hierarchy for sustainable surface water disposal.
- 4.9 The Ground Investigation report containing the results of infiltration testing confirmed that infiltration techniques would be suitable as a means of surface water discharge at the site.

- 
- 4.10 The proposed surface water drainage strategy proposes discharge of surface water runoff from private roads and drives via permeable paving which will be used for the construction of those areas. The permeable paving will be sized appropriately to cater for surface water runoff from the associated private roads/drives ensuring that the necessary half drain times of 1440 minutes as stipulated in the BRE Digest 365 can be achieved. Sufficient storage will be provided within the sub-base to accommodate a 1 in 100-year (+40% climatic change) storm.
- 4.11 It is proposed to discharge the site's foul water flows into the public foul water sewer along Cambridge Road to the east of the site. The Anglian Water Pre-Planning Assessment Report confirmed that manhole 5403 in Cambridge Road (NGR TL 45528 53437) is the closest practicable connection point for the development site, and that a gravity connection would be acceptable.
- 4.12 It is also proposed that that the existing 100mm foul sewer serving Shelford Rugby Club is to be abandoned up to the point where it reaches the infrastructure in Cambridge Road; and the flows from the Rugby Club are proposed to be diverted into the new 150mm sewer serving the proposed development site.
- 4.13 In accordance with the relevant policy, AW are obliged to accept foul water flows from a proposed development, subject to the site receiving planning consent. In anticipation that such a consent will be granted for the proposed residential scheme, it is expected that AW will make the necessary arrangements to ensure that the required provision within their public foul sewer network and treatment works will be available at such time as the applicant wishes to connect the site's foul sewers to the public foul network.
- 4.14 From the information provided within this report, it is concluded that the proposed development at 'Land off Cambridge Road, Great Shelford', should be fully supported through the planning process in terms of drainage and flood risk.

---

# Appendix A

## Site Location Plan



**Woods Hardwick**

Architecture | Engineering | Planning | Surveying

---



---

# Appendix B

## Site Layout Plan