2.10 As part of the site investigation, 16 narrow-diameter windowless sampler holes and three light cable percussive boreholes were excavated to understand the change of the superficial and bedrock materials and depths across the site.

2.11 The borehole investigations revealed that underneath the topsoil, the site is initially underlain by a layer of silty sandy clay with scattered flint gravel, limonite staining, traces of lignite and locally traces of fine chalk gravel.

2.12 The underlying Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) was encountered at ten of the 16 sampler holes and in all of the percussive boreholes. However the depth at which the top of the chalk was encountered was variable, ranging from 1.5 metres to greater than ten metres below ground level.

2.13 The Site Investigation Report further outlines that the Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated) has been classified as a Principal Aquifer, conferring with the information presented in Figure 2.2. It is further identified that the overlying Clay-with-flints formation is classified as an unproductive stratum however the significant layers and lenses of clayey silty sand would increase its permeability meaning the soils on site are soils of intermediate leaching potential (I1).

2.14 The report concludes that the use of soakaways is under consideration and will need careful assessment as erosion by water may form voids in the softened chalk layer. Catt et al advises that:

> ***"sites for soakaways should be chosen where the chalk surface is even and without cavities, as indicated by trial pitting or shallow boring. Where such areas are not available, bored soakaways to carry water into the chalk to a depth below any solution pipes should be considered, though these are subject to approval by the Environment Agency because contamination of the aquifer is likely" (John Catt[editor], Hertfordshire Geology and Landscape, 2010, page 293).***

Existing Foul Drainage Network

2.15 Thames Water asset plans, contained within **Appendix B**, indicated that there is a foul sewer located to the northeast of the site, located along Townsend Lane.

3 PROPOSED DEVELOPMENT

3.1 The proposal is to allocate the current Greenfield site as part of the local plan process currently being undertaken by St Albans City and District Council. The site seeks to be allocated to accommodate up to 60 residential units.

3.2 Proposed vehicular access to the development is to be granted from two locations along Townsend Lane.

4 FLOOD RISK

4.1 The Environment Agency ('EA') indicative flood maps for planning purposes has been consulted with regards to the proposed development.

4.2 The EA Flood Map 'Risk of flooding from Rivers and Seas' helped to ascertain the Flood Zone for the site with reference to the site's proximity to potential flood sources. The flood map for the area covering the development site shows it to be entirely within Flood Zone 1, i.e. where there is a less than 0.1% or 1 in 1000 probability of tidal or fluvial flooding in any one year.

4.3 The 'Risk of flooding from Rivers and Seas' mapping data, as well as all other EA mapping discussed below are contained within **Appendix C** of this report.

4.4 The EA 'Flood Warning / Alert' map shows that the site itself is not within a Flood Warning area, the nearest being located to the southwest of the site, in the vicinity of the River Ver.

4.5 The EA 'Landfill' map shows no evidence of either historic or current landfill activities on site with the nearest historic landfill located on the eastern edge of Harpenden. There are no currently authorised landfills within Harpenden.

4.6 The EA 'Pollution' map shows no evidence of pollution occurring on site. The nearest pollution identified near to the site, is radioactive pollution associated with a Rothamsted Research Ltd site on West Common. Given that the source is approximately 1.45km to the southeast of the site, it is unlikely to have any bearing or impact on the proposed development.

4.7 The EA 'Groundwater Source Protection Zone' map identifies that the site is located within a Total Catchment (Zone 3). This defines the area around a source within which all groundwater recharge is presumed to be discharged at the source. In confined aquifers, the source catchment may be displaced some distance from the source. For heavily exploited aquifers, the final Source Catchment Protection Zone can be defined as the whole aquifer recharge area where the ratio of groundwater abstraction to aquifer recharge (average recharge multiplied by outcrop area) is >0.75. There is still the need to define individual source protection areas to assist operators in catchment management. Given the location of the site within a Zone 3 Total Catchment, any water that is infiltrated into the groundwater supply will need to be filtered to ensure that the groundwater source does not become contaminated as a result of the proposed development.

4.8 The EA 'Superficial Deposits – Aquifer' map shows there to be no Superficial Deposits beneath the site.

4.9 The EA 'Bedrock – Aquifer' map shows the bedrock material beneath the site to be a Principal Aquifer, in line with the findings by Geo-Environmental Investigations Ltd in the Site Investigation Report.

4.10 The 'Groundwater Vulnerability' map shows the geology beneath the site to have an intermediate level of vulnerability from both groundwater emergence and pollution of the groundwater.

4.11 The EA 'Nitrate Vulnerability' map indicates that the site's surface water is vulnerable to nitrates.

4.12 The EA 'Drinking Water Safeguard Zones' map indicated that the site is within a drinking water safeguard zone. This identifies a designated area in which the use of certain substances must be carefully managed to prevent the pollution of raw water sources that are used to provide drinking water. Accordingly any surface water originating from the development site will need to be cleansed to ensure that drinking water does not become polluted.

Policy Guidance

4.13 The Flood Risk Assessment has considered National Policy and Local planning strategies in order to understand the wider implications of the development upon its surrounding area.

National Policy – National Planning Policy Framework, March 2012

4.14 The NPPF takes over from where PPS25 left off, although looks further into more community driven priorities. Its main driver is Sustainability making developments concentrate on how the proposals impact upon the community in which it resides. It incorporates a number of key objectives including providing quality homes, improving quality of life and meeting the challenge of climate change, flooding and coastal change.

4.15 Where the NPPF relates to Flooding and Flood Risk it states:-

> ***"100. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. Local Plans should be supported by Strategic Flood Risk Assessment and develop policies to manage flood risk from all sources, taking account of advice from the Environment Agency and other relevant flood risk management bodies, such as lead local flood authorities and internal drainage boards. Local Plans should apply a sequential, risk-based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking account of the impacts of climate change, by:***
>
> - ***applying the Sequential Test;***
> - ***if necessary, applying the Exception Test;***
> - ***safeguarding land from development that is required for current and future flood management;***

- ***using opportunities offered by new development to reduce the causes and impacts of flooding; and***
- ***where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term***

101. The aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding. The Strategic Flood Risk Assessment will provide the basis for applying this test. A sequential approach should be used in areas known to be at risk from any form of flooding.

102. If, following application of the Sequential Test, it is not possible, consistent with wider sustainability objectives, for the development to be located in zones with a lower probability of flooding; the Exception Test can be applied if appropriate. For the Exception Test to be passed:

- ***it must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared; and***
- ***a site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall."***

4.16 The development site, being located within Flood Zone 1 complies with the Sequential Test and is therefore suitable for all land uses. The proposed development meets the requirements of Sections 100 to 102 of the NPPF.

4.17 Based upon Tables 1-3 of the NPPF 'Technical Guidance' the development site is identified within the EA Flood Maps as being within Flood Zone 1 (Table 1), the proposed residential land use is categorised as being 'More Vulnerable' from effects of flooding (Table 2). Table 3 indicates that a 'More Vulnerable' categorised site, such as proposed for this development, is an appropriate land use for a Flood Zone 1 and an Exception Test is not required.

Regional Strategy

Preliminary Flood Risk Assessment ('PFRA') – Hertfordshire County Council, June 2011

4.18 The PFRA was produced to assist HCC in its duties to manage local flood risk and deliver its requirements under the Flood Risk Regulations 2009.

4.19 The aim of the document was to develop a strategic assessment of local flood risk across Hertfordshire based on information from past flood events and modelling of the potential impact of future flooding.

4.20 It is outlined that approximately 60% of the land area of Hertfordshire is farmed and of that in the region of 70% is in relation to crop production. In line with the land use, the document outlines that in Hertfordshire, the geology of the land ranges from the largely impermeable clay of the London Basin to extensive water bearing chalk lands which are exposed as the Chiltern Hills in the west and north of the county. Large areas of the chalk are covered by more recent river and glacial deposits which are a mixture of clays and gravels.

4.21 It is not specifically mentioned within the PFRA document that Harpenden in itself has any historic and identified risk of flooding.

Strategic Flood Risk Assessment ('SFRA'), dated August 2007

4.22 The SFRA was produced for Dacorum Borough Council, St Albans City and District Council, Watford Borough Council and Three Rivers District Council to map all forms of Flood Risk within the four council's areas and use this as an evidence base to locate new development within low flood risk areas.

4.23 With the four boundaries are three main catchments, namely the Colne, Lee and Thame catchments. It is outlined in the SFRA that in past historic events, flooding has occurred along the Upper River Lee and the Upper River Colne primarily and an estimated 2500 properties are stated to be at risk of flooding.

4.24 In the flood maps provided at the end of the SFRA, it is identified within Harpenden that there were six minor surface water events and a single minor groundwater event.

4.25 The closest event to the proposed development is the single minor groundwater event which is approximately 550 metres to the north of the site. The site itself has not been identified to have any existing evidence of a history of flooding.

5 SURFACE WATER MANAGEMENT STRATEGY

Existing Surface Water Drainage

5.1 Currently the development land is made up of approximately 1.65 ha of agricultural land. It is proposed to provide a residential development of up to 60 dwellings. It is assumed for assessment purposes that the developed site will provide approximately 50% of impermeable area (0.825 ha) and there will be approximately 0.825 hectares of soft landscaping.

5.2 Given that the site is Greenfield its current means of drainage is by natural soakaway across the site.

5.3 The ICP SUDS method of estimating drainage rates within the Micro Drainage software package Source Control has been used to gain an understanding of drainage flows for a site of this size. Qbar has been calculated as **0.7 L/s**, with the calculation outputs presented in **Appendix D**. The storm return period flows have been calculated as 1 in 1 = **0.6 L/s**, 1 in 30 = **1.5 L/s** and 1 in 100 = **2.1 L/s**.

Proposed Surface Water Drainage Strategy

5.4 Findings from research:

- The site is underlain by bedrock which has capacity for the storage of groundwater;
- The presence of a vulnerable aquifer throughout the development site, requires water cleansing SuDS to be incorporated preventing contamination of the groundwater;
- There are no public surface water sewers within the development site although there are foul water sewers within Townsend Lane to the north of the site.
- The SFRA produced for the four councils does not identify the site as a location of any historic flooding but the nearest recorded event was a minor groundwater event located to the north of the site.

5.5 It is proposed that this SWMS will use SuDS for infiltration, attenuation and water cleansing purposes, for up to the 1 in 100 year return periods, in a manner which mimics the surface water flow rate and volume from site whilst providing water cleansing.

5.6 The hierarchy of surface water disposal stated within Building Regulations approved document Part H are as follows:

- An adequate soakaway/infiltration system;
- A watercourse; and
- A sewer .

5.7 It is proposed that surface water management will use SuDS for attenuation and water cleansing purposes. To achieve this, the drainage strategy recommends the following approach:

- Domestic drainage from roofs shall discharge into water butts located at the ends of rainwater downpipes, with a high level overflow to take excess flows into the wider surface water drainage system.
- The excess flows from roofs will use a combination of draining to a series of soakaways located across the site for a Q10 return period and surface water drainage connections to a proposed attenuation basin for volumes greater than the Q10 return period.
- Permeable Paved granular filtration structures within shared drive areas will accommodate runoff from driveways and private access roads serving them. The structures will be sized to accommodate the full 100 year runoff volumes, which include a 30% allowance for climate change.
- In the first instance it would be preferable to have the adopted highway drainage use permeable paving for storm events and a piped drainage system to an attenuation basin for storage and soakaway beyond this storm event. If the local highway authority will not be in a position to adopt a permeable paving solution then the permeable element of the proposal will be replaced by appropriately located highway soakaways and/or increased attenuation.
- Swales, where possible, are proposed to be used in conjunction with other site wide features to carry surface water to an attenuation pond for extreme flood events.

Storage Requirement

5.8 Given at this stage of the development the internal impermeable areas of the site are unable to be accurately calculated, the impermeable area of the site is assumed to be 50% of the total developable site area.

5.9 Given the outlined strategy above, a combination of permeable paving and an attenuation basin to infiltrate the surface water, it is proposed that surface water is to be managed entirely within the site boundary.

5.10 At this stage, infiltration testing has not been undertaken however, it is assumed that infiltration will be possible. Therefore to undertake a storage capacity assessment, a minimum infiltration rate of $3x10^{-6}$ m/s has been utilised.

5.11 Based on the minimum infiltration rate, the storage requirement for the whole site has been calculated as 629m³ for the Q100 + 30% Climate Change event. The attenuation calculations, generated using Source Control are presented in **Appendix D**. The identified storage requirement will be achieved across the site through SUDS measures such as the permeable paved structures, swales, potential crated storage and attenuation ponds.

5.12 Further infiltration testing should be undertaken at locations across the site to provide a specific infiltration test result in accordance with BRE 365. The attenuation pond should also be designed in accordance with BRE 365.

6 PROPOSED FOUL WATER DRAINAGE STRATEGY

Proposed Foul Flow

6.1 The proposed development will comprise of up to 60 new residential dwellings. Based upon Sewers for Adoption 7th Edition, the foul flow has been calculated as **2.78 L/s**.

6.2 The proposed foul flow calculations are based on 4000 litres per dwelling per day, which is then divided by 86,400 seconds (24 hours x 60 minutes x 60 seconds) to give a foul flow rate in litres per second.

Foul Water Drainage Strategy

6.3 The apparatus search conducted by Thames Water demonstrates that there is a foul water network in the vicinity of the site, running along the northern boundary of the site within the carriageway of Townsend Lane.

6.4 Appropriate connections will be made to the existing infrastructure to allow the correct drainage of the foul water generated by the site.

6.5 A pre-development planning enquiry has been made to Thames Water to understand if the existing foul water network has sufficient capacity to accommodate the foul water flows from the proposed development. A response has been received which identifies that the existing foul sewer network has sufficient capacity to accommodate the proposed development. The received response is contained within **Appendix B**.

7 CONCLUSIONS AND RECOMMENDATIONS

7.1 This report concludes that the proposed development is entirely within Flood Zone 1 and as such there is a less than 0.1% or 1 in 1000 probability of tidal or fluvial flooding in any one year.

7.2 This report concludes that the proposed development is not at risk of flooding.

7.3 It is proposed that surface water from the proposed development will be managed through a combination of soakaways, rainwater harvesting, permeable paving with attenuation and infiltration properties, swales and an attenuation basin.

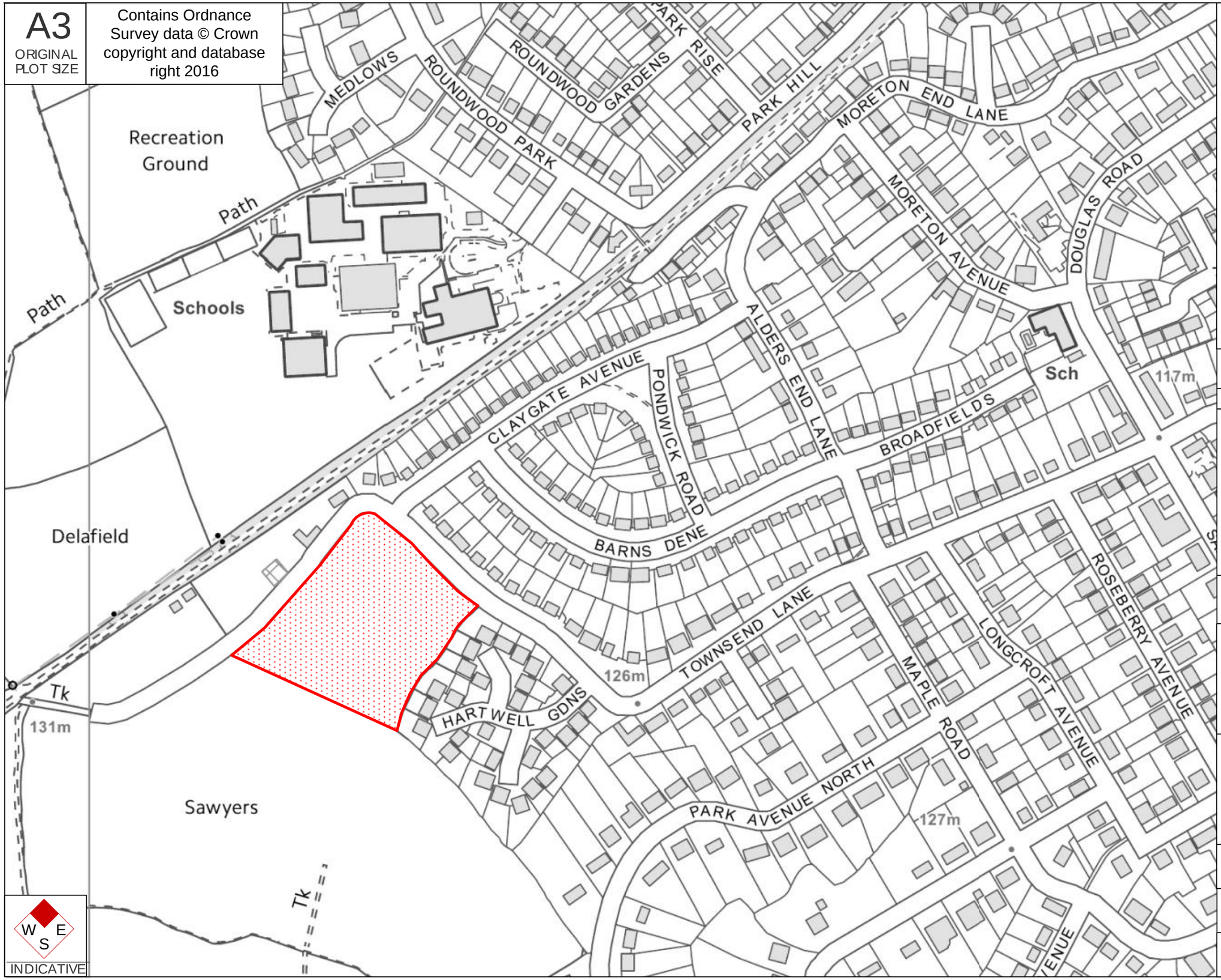
7.4 The foul discharge from the proposed development has been calculated as 2.78 L/s.

7.5 The storage estimate for surface water totals 629 m^3.

7.6 It is proposed that foul flows from the development will discharge to the foul sewer located to the north east of the application site and it is acknowledged that capacity exists for the proposed scheme.

APPENDIX A

A3
ORIGINAL PLOT SIZE



Key

Indicative site location

Rev	Date	Details	Drawn by	Checked by

Bristol
Cambridge
Cardiff
London
Oxford
Welwyn Garden City

tpa Transport Planning Associates

Sheraton House
Castle Park
Cambridge
CB3 0AX

01223 370135
www.tpa.uk.com

Hill Residential Limited

Land off Townsend Road, Harpenden

Indicative site location plan

STATUS: INFORMATION

SCALE:	PREPARED BY:	CHECKED BY:	APPROVED BY:
NTS	TH	JH	JH

JOB NO:	DRAWING NO:	DATE:
1605-86	Appendix A	OCT '16

APPENDIX B

Your account number
DS4014276

Mr. Tim Hornby
Transport Planning Associates
Sheraton House
Castle Park
Cambridge
CB3 0AX

Mon – Fri 9am-5pm,

22nd August 2016

Pre Development Enquiry

Site Address: 92 Townsend Lane, St. Albans, AL5 2RQ

Development Details: Development proposal of 60 housing units. No Surface Water proposal

Dear Mrs. Bishop,

I write in relation to the above site regarding the proposed development here.

Please note: your initial fee of £398+ VAT covers the expense of our asset planners reviewing your proposed discharges in relation to the capacity in our existing network. They also carry out flood risk assessments. At this stage if your proposal is accepted, we issue an approval letter for you to progress with your development.

Foul Water

From the information you have provided, I can confirm that the existing foul sewer network does have sufficient capacity to accommodate the proposed foul water discharge from the proposed development.

Surface Water

Please note that discharging surface water to the public sewer network should only be considered after all other methods of disposal have been investigated and proven to be not viable. In accordance with the Building Act 2000 Clause H3.3, positive connection to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. The disposal hierarchy being: 1st Store rain water for Later Use; 2nd Use infiltration techniques, such as porous surfaces in non-clay area; 3rd Attenuate rainwater in ponds or open water features for gradual release to a watercourse; 4th Attenuate rainwater by storing in tanks or sealed water features for gradual release to a watercourse; 5th Discharge rainwater direct to a watercourse; 6th Discharge rainwater to a surface water drain; 7th Discharge rainwater to the combined sewer.

You should be aware that in the public sewer system will be unable to accommodate any storm greater than a 1 in 20 year event. You should assume this level of storm when calculating the current discharge rate. Please ensure that storm flows are attenuated or regulated into the receiving public network through on or off site storage.

Only when it can be proven that soakage into the ground or a connection into the adjacent watercourse is not possible would we consider a restricted discharge into the public surface water sewer network. A reduction of at least 50% on existing flows from the same site area would be sought for a range of storm conditions.

Please Note

All connection requests are subject to a full Section 106 (Water Industry Act 1991) application before the Company can confirm approval to the connection itself. Please also note that capacity in the public sewerage system cannot be reserved.

The views expressed by Thames Water in this letter are in response to this pre development enquiry at this time and do not represent our final views on any future planning applications made in relation to this site.

Yours sincerely

David Stamateris
Development Engineer

APPENDIX C

Environment Agency

Enter a postcode or place name:

Go

Other topics for this area...

Flood Map for Planning (Rivers and Sea) ▼

Flood Map for Planning (Rivers and Sea)

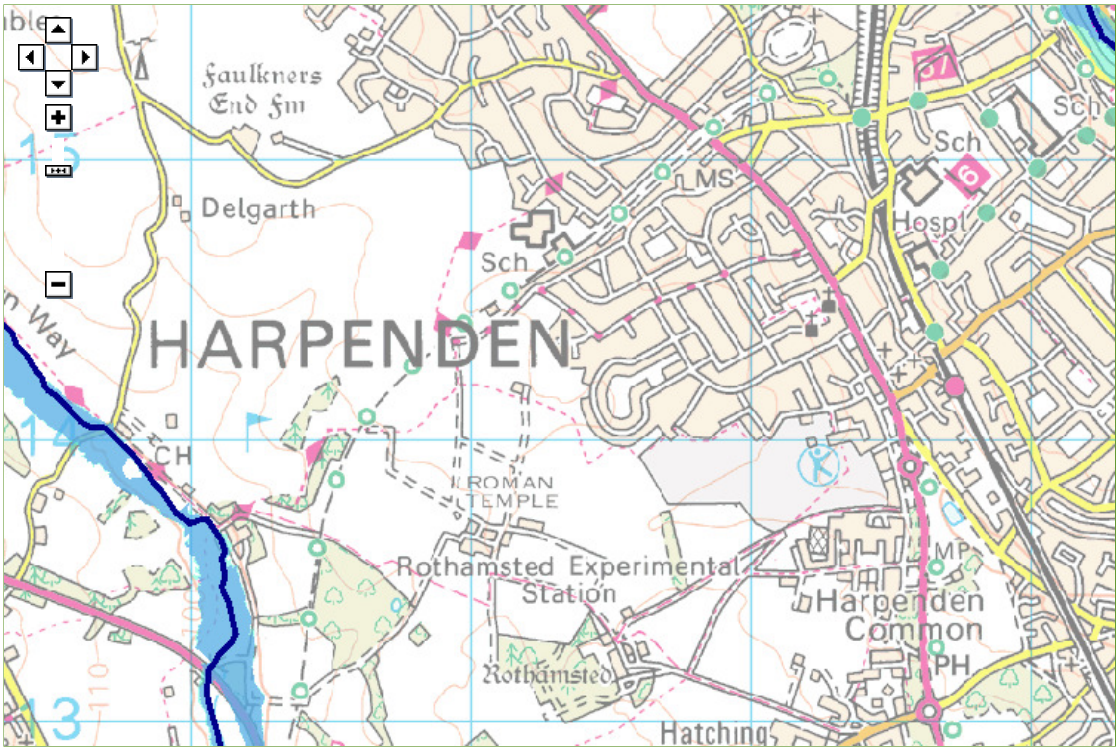
X: 512,320;Y: 214,226 at scale 1:20,000

Other maps | Data search | Text only version

Map legend

Click on the map to see what Flood Zone (National Planning Policy Guidance definitions) the proposed development is in.

- Flood Map for Planning (Rivers and Sea)
  - Flood Zone 3
  - Flood Zone 2
  - Flood defences (Not all may be shown*)
  - Areas benefiting from flood defences (Not all may be shown*)
- Main River Line
  - Main River Line
- Other national environmental organisations
  - Natural Resources Wales Area of responsibility
  - Scottish Environment Protection Agency Area of responsibility



More about flooding:

Understanding the Flood Map for Planning (Rivers and Sea)

A more detailed explanation to help you understand the flood map shown above.

Current flood warnings

We provide flood warnings online 24 hours a day. Find out the current flood warning status in your local area.

* **Legend Information:** Flood defences and the areas benefiting from them are gradually being added through updates. Please contact your local environment agency office for further details.

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Last updated: 22nd September 2016

Environment Agency

Enter a postcode or place name: Harpenden, Hertfordshire Go

Other topics for this area... Flood Warning Areas

Flood Warning

Map legend

Click on an area for details.

Flood Warning Areas

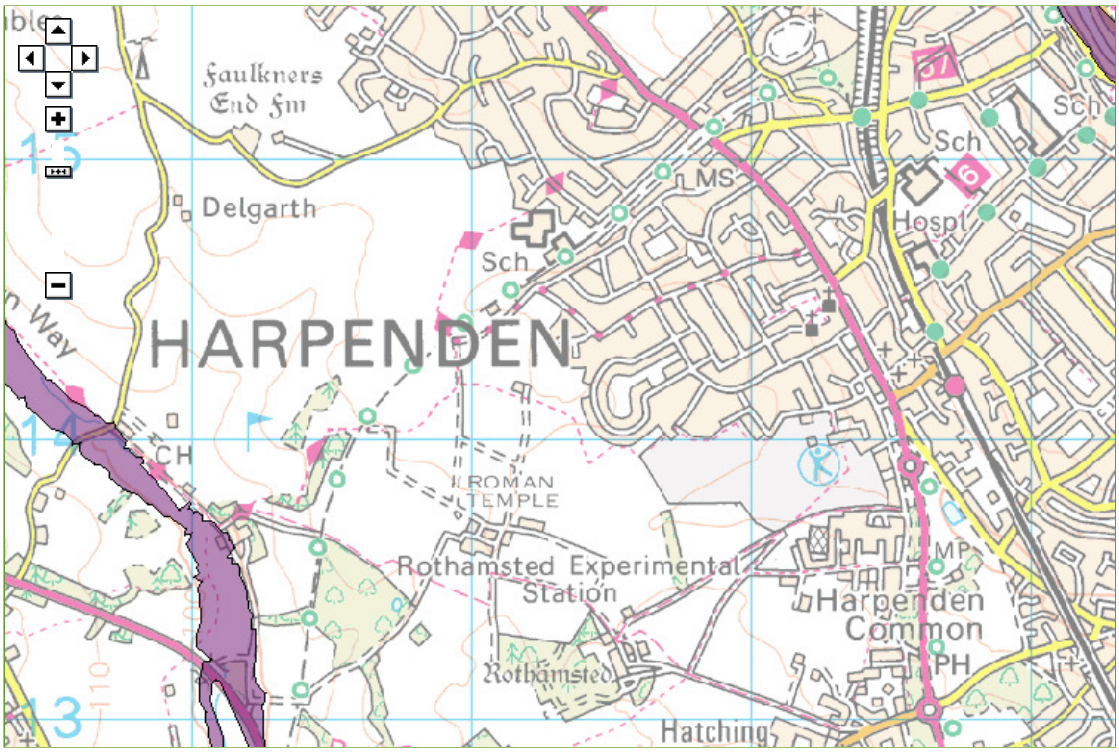
Areas where we issue flood warnings

Flood Alert Areas

Areas where we issue flood alerts

Harpenden, Hertfordshire at scale 1:20,000

Other maps Data search Text only version



More about Flood Warnings:

Flood Warning Areas

If your home or business is within a purple shaded area on the map then you can receive free flood warnings. We issue flood warnings to specific areas when flooding is expected. **If you receive a flood warning you should take immediate action**.

For further information visit our Flood warning pages.

Flood Alert Areas

If your home or business is within a pink shaded area on the map then you can receive free flood alerts. We issue flood alerts when flooding is possible. In many areas we issue flood alerts for flooding from rivers, the sea and groundwater. **If you receive a flood alert you should be prepared for flooding and to take action**.

It is very difficult to predict the exact location of flooding from groundwater as it is often related to local geology. We can't say for definite which properties are at risk from groundwater flooding. To help people we provide flood alerts for large areas that could be affected if groundwater levels were high.

For further information visit our Flood warning pages.

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Other topics for this area... Landfill

Waste

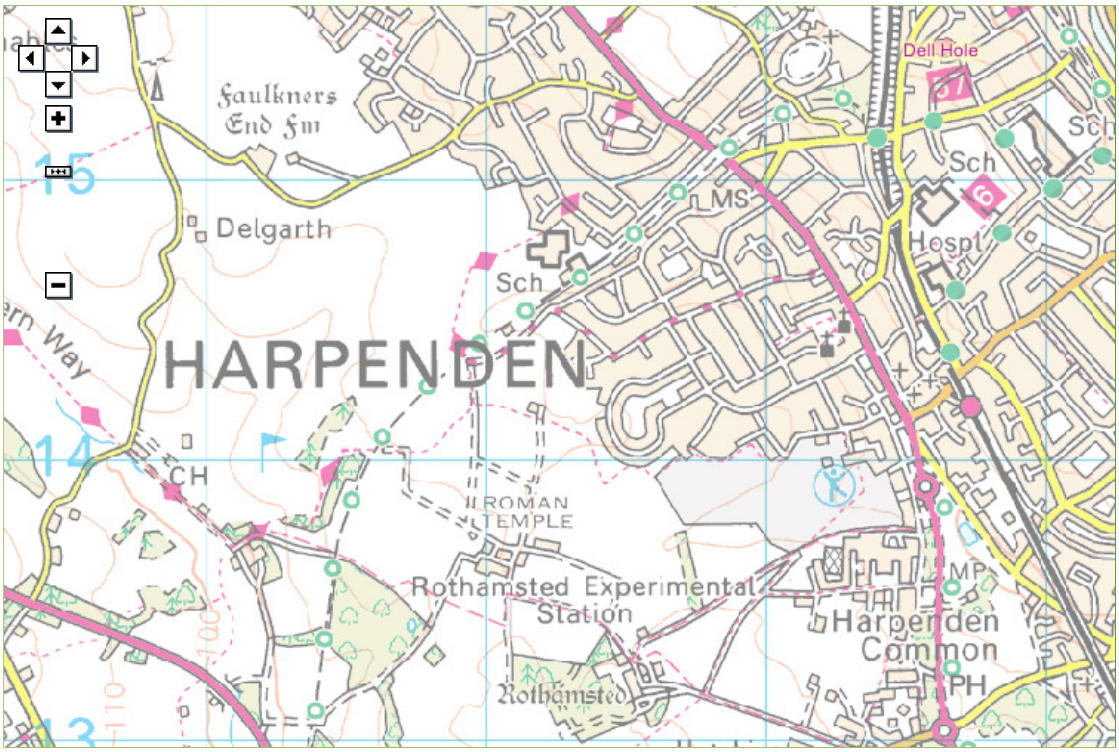
Map legend

Click on a feature for details of that site

- Authorised Landfill
- Site boundary
- Historic landfill
- Site boundary
- Mining Waste
- Closed Mining Waste Sites
- Other national environmental organisations
- Natural Resources Wales Area of responsibility
- Scottish Environment Protection Agency Area of responsibility

Map of X: 512,267; Y: 214,295 at scale 1:20,000

Other maps | Data search | Text only version



Tell me more about waste and landfill:

Waste regulation

We regulate waste management through a system of licences. Find out how to get the correct licence here, get data on waste and find out if there are any rules applying to household waste.

Waste facts and figures

The UK produces about 220 million tonnes of controlled wastes per year. Find out about waste incineration, hazardous waste, recycling and landfill.

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Enter a postcode or place name:

Go

Other topics for this area...

Pollution

Pollution

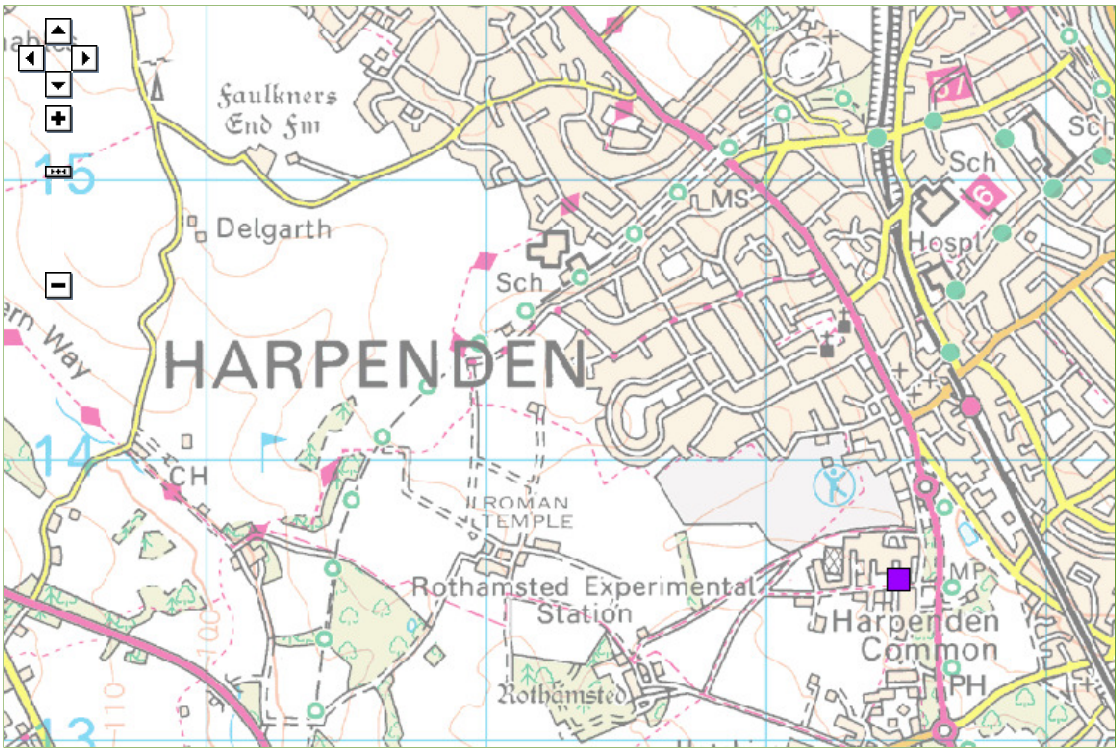
Map legend

Click on a feature for details of that site

- Pollution Incidents
  - Major
  - Significant
- Industrial Pollution
  - Fuel & Power
  - Metal
  - Mineral
  - Chemical
  - Waste
  - Water
  - Radioactive
  - Associated
  - Other
  - Not Classified
- Industrial Operator Scores (OPRA) 2011
  - Band A
  - Band B
  - Band C
  - Band D
  - Band E
  - Band F
- Compliance Rating Scores
  - Very Good
  - Good
  - Moderate
  - Fair
  - Poor
  - Bad
- Other national environmental organisations
  - Natural Resources Wales Area of responsibility
  - Scottish Environment Protection Agency Area of responsibility

Map of X: 512,267; Y: 214,295 at scale 1:20,000

Other maps | Data search | Text only version



Tell me more about Pollution:

Pollution Incidents

Find out how we categorise incidents and their possible effects on health and the environment

Industrial Pollution

Every industrial process could theoretically pose a risk to human health and the environment. Find out how we measure this risk and how we score operators on their potential to impact the environment.

Industrial Operator Scores (OPRA)

Industrial Operator Scores reflect two of the five attributes that make a site's Operational risk appraisal (Opra) profile. The Compliance Rating band reflects the number of non-compliances with permit conditions we have recorded at the site over the course of a year.
The Operator Performance band is influenced by the type of management system the operator has in place and any formal enforcement action we have taken at the site.

More information about OPRA

Compliance Rating Scores

Compliance Rating Scores is our report of the level of permit breaches we've recorded at sites during the year.
We include both the number of breaches and also our assessment of the severity of these breaches, as determined by our Compliance Classification Scheme (CCS).

More information about Compliance Classification Scheme

Author: Environment Agency | wiybysupport@environment-agency.gov.uk
Last updated: 22nd September 2016

Environment Agency

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Go

Other topics for this area...

Groundwater

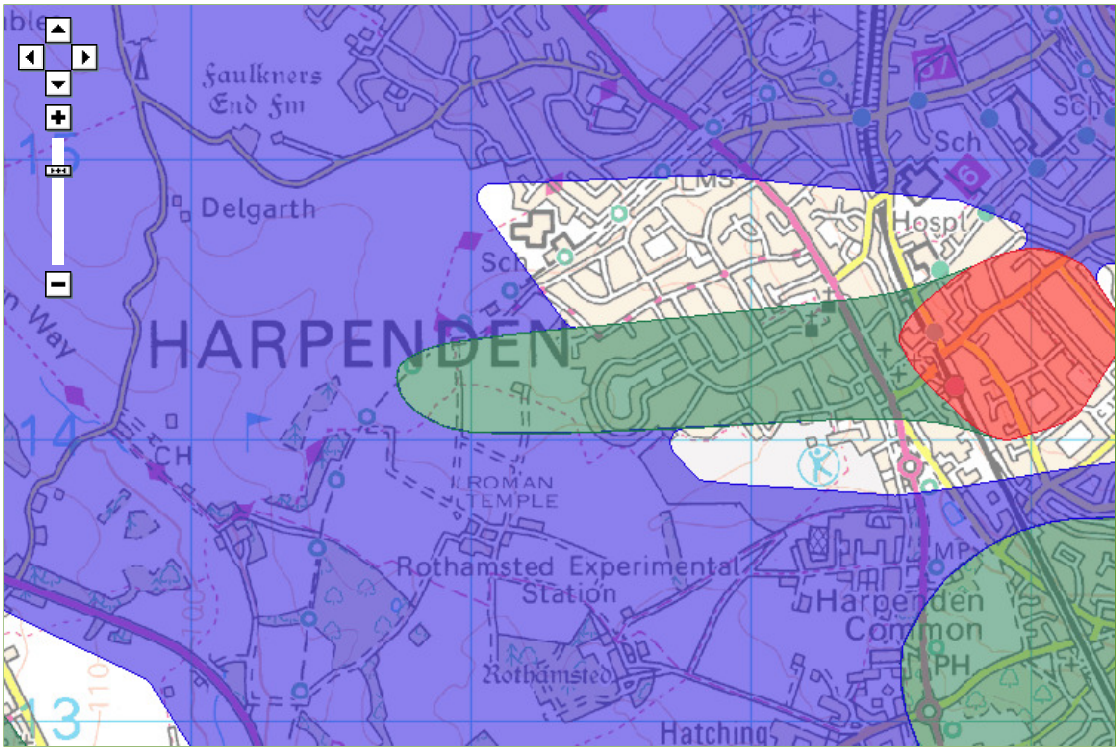
Groundwater

Map legend

- Groundwater source protection zones
  - Inner zone (Zone 1)
  - Inner zone - subsurface activity only (Zone 1c)
  - Outer zone (Zone 2)
  - Outer zone - subsurface activity only (Zone 2c)
  - Total catchment (Zone 3)
  - Total catchment - subsurface activity only (Zone 3c)
  - Special interest (Zone 4)
- BGS Aquifer Maps - Superficial Deposits Designation
- BGS Aquifer Maps - Bedrock Designation
- Groundwater Vulnerability Zones
- Other national environmental organisations
  - Natural Resources Wales Area of responsibility
  - Scottish Environment Protection Agency Area of responsibility

Map of X: 512,320.33; Y: 214,226.41 at scale 1:20,000

Other maps | Data search | Text only version



More about Groundwater

Groundwater Source Protection Zones:

Groundwater provides a third of our drinking water. We ensure that your water is safe to drink defining Source Protection Zones. These zones help to monitor the risk of contamination from any activities that might cause pollution in the area.

The Source Protection Zones are not displayed at scales greater than 1:20,000 (Ordnance Survey 1:50,000 scale) as the data was only modelled to this level and is not accurate pass this. They should not be compared against field boundaries.

Understanding Groundwater Source Protection Zones maps

British Geological Survey's Aquifer Maps:

From 1st April 2010 new aquifer designations replace the old system of classifying aquifers as Major, Minor and Non-Aquifer. This new system is in line with our Groundwater Protection Policy (GP3) and the Water Framework Directive (WFD) and is based on British Geological Survey mapping.

The Aquifer Extents are not displayed at scales greater than 1:75,000 (Ordnance Survey 1:250,000 scale) as the data was only modelled to this level and is not accurate pass this.

Understanding the British Geological Survey's Aquifer maps

Groundwater Vulnerability Maps:

Ww are currently updating our groundwater vulnerability maps to reflect improvements in data mapping and understanding of the factors affecting vulnerability. The new maps will be released later in 2016.

The 'New groundwater vulnerability mapping methodology' report provides technical information about how the new maps have been created.
The user guide outlines the kinds of activities the new maps can be used for.
These reports have been published on GOV.UK in advance of the release of the new maps to give users time to understand the new approach and how this differs from the previous groundwater vulnerability maps.

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Last updated: 22nd September 2016

Environment Agency

Enter a postcode or place name:

Go

Other topics for this area...

Groundwater

Groundwater

Map legend

- Groundwater source protection zones
  - Inner zone (Zone 1)
  - Inner zone - subsurface activity only (Zone 1c)
  - Outer zone (Zone 2)
  - Outer zone - subsurface activity only (Zone 2c)
  - Total catchment (Zone 3)
  - Total catchment - subsurface activity only (Zone 3c)
  - Special interest (Zone 4)
- BGS Aquifer Maps - Superficial Deposits Designation
  - Principal
  - Secondary A
  - Secondary B
  - Secondary (undifferentiated)
  - Unknown (lakes and landslip)
- BGS Aquifer Maps - Bedrock Designation
  - Principal
  - Secondary A
  - Secondary B
  - Secondary (undifferentiated)
- Groundwater Vulnerability Zones
  - Major Aquifer High
  - Major Aquifer Intermediate
  - Major Aquifer Low
  - Minor Aquifer High
  - Minor Aquifer Intermediate
  - Minor Aquifer Low
- Other national environmental organisations
  - Natural Resources Wales Area of responsibility
  - Scottish Environment Protection Agency Area of responsibility

X: 512,357;Y: 214,416 at scale 1:75,000

Other maps | Data search | Text only version

More about Groundwater

Groundwater Source Protection Zones:

Groundwater provides a third of our drinking water. We ensure that your water is safe to drink defining Source Protection Zones. These zones help to monitor the risk of contamination from any activities that might cause pollution in the area.

The Source Protection Zones are not displayed at scales greater than 1:20,000 (Ordnance Survey 1:50,000 scale) as the data was only modelled to this level and is not accurate pass this. They should not be compared against field boundaries.

Understanding Groundwater Source Protection Zones maps

British Geological Survey's Aquifer Maps:

From 1st April 2010 new aquifer designations replace the old system of classifying aquifers as Major, Minor and Non-Aquifer. This new system is in line with our Groundwater Protection Policy (GP3) and the Water Framework Directive (WFD) and is based on British Geological Survey mapping.

The Aquifer Extents are not displayed at scales greater than 1:75,000 (Ordnance Survey 1:250,000 scale) as the data was only modelled to this level and is not accurate pass this.

Understanding the British Geological Survey's Aquifer maps

Groundwater Vulnerability Maps:

Ww are currently updating our groundwater vulnerability maps to reflect improvements in data mapping and understanding of the factors affecting vulnerability. The new maps will be released later in 2016.

The 'New groundwater vulnerability mapping methodology' report provides technical information about how the new maps have been created.
The user guide outlines the kinds of activities the new maps can be used for.
These reports have been published on GOV.UK in advance of the release of the new maps to give users time to understand the new approach and how this differs from the previous groundwater vulnerability maps.

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Author: Environment Agency | wiybysupport@environment-agency.gov.uk
Last updated: 22nd September 2016

Environment Agency

Enter a postcode or place name:

Go

Other topics for this area...

Groundwater

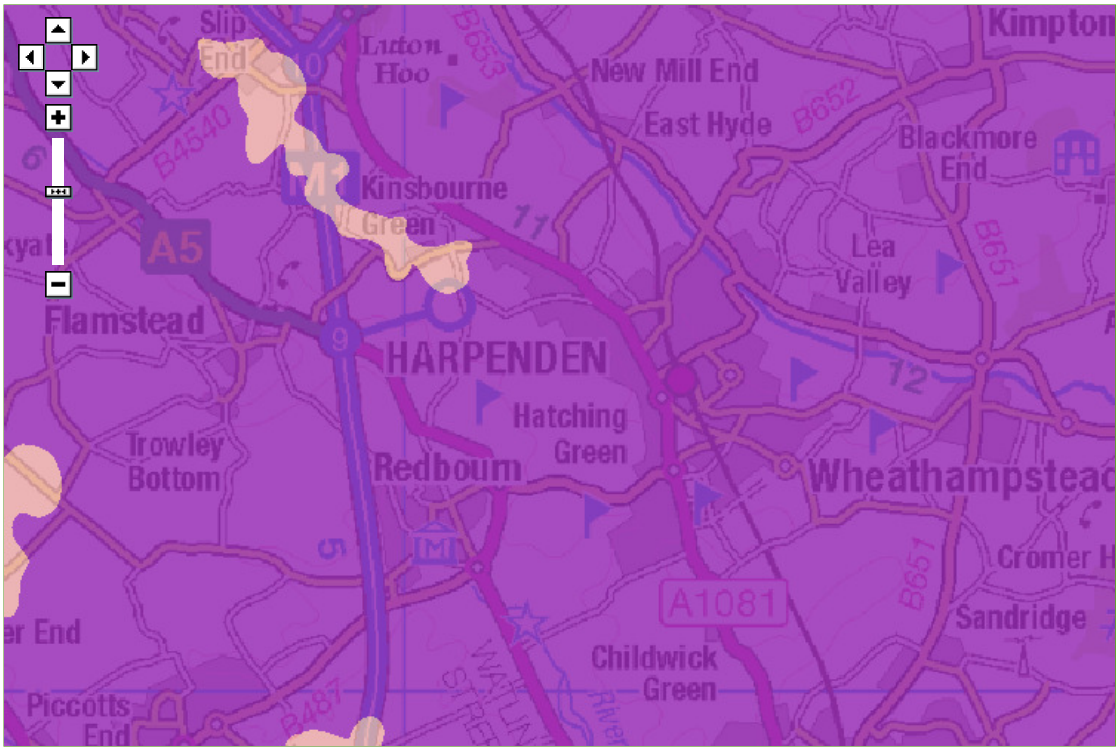
Groundwater

Map legend

- Groundwater source protection zones
- BGS Aquifer Maps - Superficial Deposits Designation
- BGS Aquifer Maps - Bedrock Designation
  - Principal
  - Secondary A
  - Secondary B
  - Secondary (undifferentiated)
- Groundwater Vulnerability Zones
- Other national environmental organisations

X: 512,087;Y: 214,211 at scale 1:75,000

Other maps | Data search | Text only version



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Groundwater

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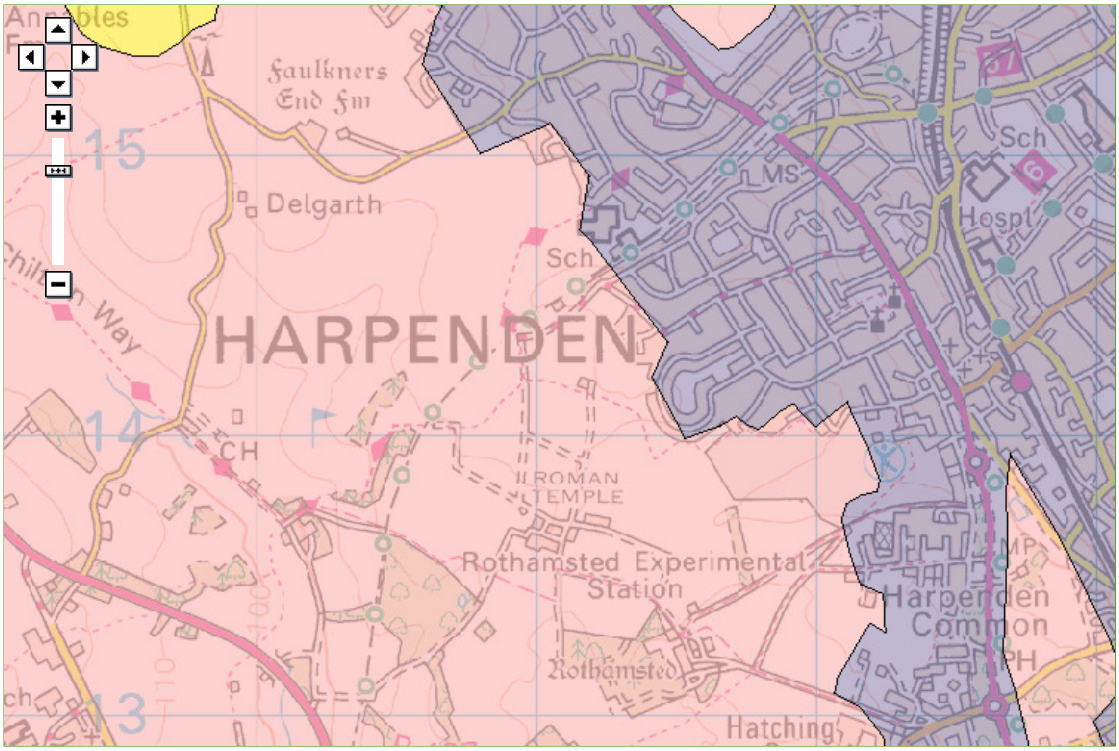
  - Major Aquifer Low
  - Minor Aquifer High
  - Minor Aquifer Intermediate
  - Minor Aquifer Low
- Other national environmental organisations

X: 512,087;Y: 214,211 at scale 1:20,000

Other maps | Data search | Text only version



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Other topics for this area...

Nitrate Vulnerable Zones

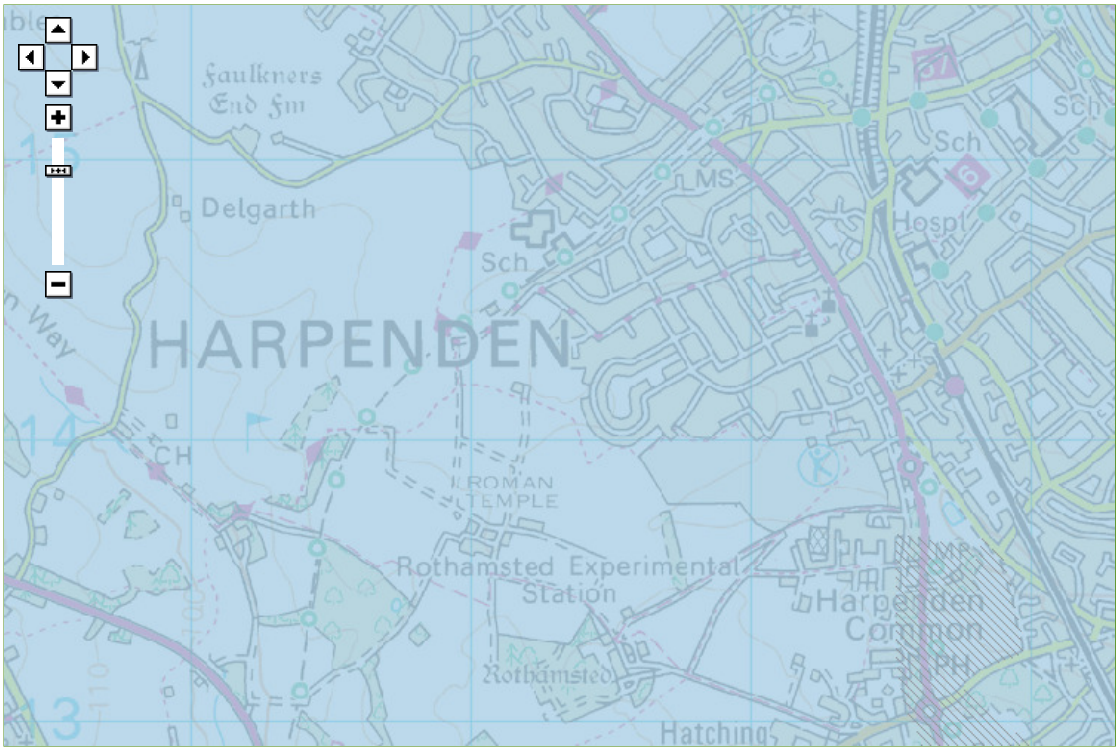
Nitrate Vulnerable Zones

Map legend

- Nitrate Vulnerable Zones
  - Surface Water NVZ Area
  - Groundwater NVZ Area
  - Eutrophic NVZ Area
- Other national environmental organisations
  - Natural Resources Wales Area of responsibility
  - Scottish Environment Protection Agency Area of responsibility

Map of X: 512,320.33; Y: 214,226.41 at scale 1:20,000

Other maps | Data search | Text only version



Nitrate Vulnerable Zones

These maps show the areas of England and Wales that are designated as Nitrate Vulnerable Zones from November 2013. The areas shown reflect the versions deposited for England at the offices of the Secretary of State for Environment, Food and Rural Affairs and for Wales deposited at the offices of the Welsh Government. For further information and advice for farmers visit our Nitrate Vulnerable Zone pages.

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Author: Environment Agency | wiybysupport@environment-agency.gov.uk
Last updated: 22nd September 2016

Environment Agency

Enter a postcode or place name:

Go

Other topics for this area...

Drinking Water Safeguard Zones

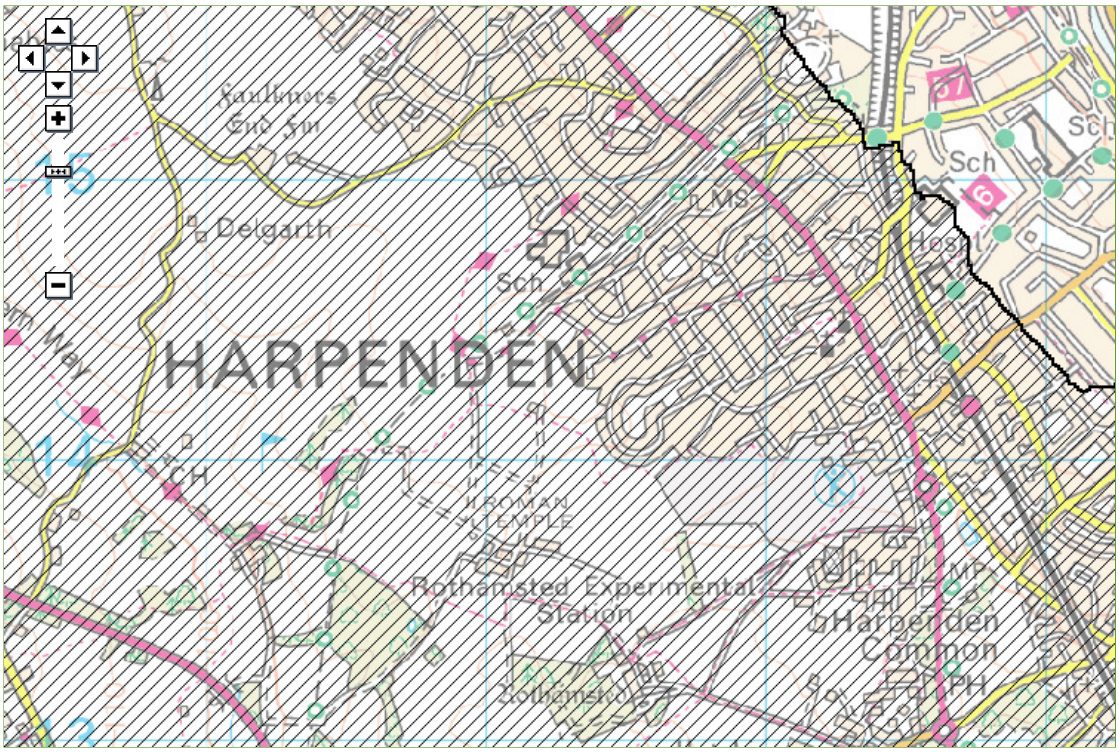
Drinking Water Safeguard Zones

Map legend

- Surface Water Safeguard Zones
- Safeguard Zones
- Groundwater Safeguard Zones
- Safeguard Zones
- Water Protection Zones
- Dee Catchment
- Other national environmental organisations
- Natural Resources Wales Area of responsibility
- Scottish Environment Protection Agency Area of responsibility

Map of X: 512,267.42; Y: 214,295.2 at scale 1:20,000

Other maps | Data search | Text only version



Surface Waters and Groundwater

What are Drinking Water Safeguard Zones?

These are catchment areas that influence the water quality at drinking water abstractions which are at risk of failing the drinking water protection objectives.

These non-statutory Safeguard Zones are where action to address water contamination will be targeted, so that extra treatment by water companies can be avoided. Safeguard Zones are a joint initiative between the Environment Agency and water companies. Safeguard Zones are one of the main tools for delivering the drinking water protection objectives of the Water Framework Directive.

Note: there is no risk to the drinking water quality at your tap because there is a robust regulatory framework in place to ensure that water company supplied drinking water is of wholesome quality.

New Safeguard Zones are added as required where new risks are identified. Please contact your local Environment Agency Area office for more information. If you click on any Safeguard Zone (SgZ) a pop-up box will appear giving the following information:

- the reference number of the SgZ;
- why there is a SgZ – i.e. the substances that need to be addressed;
- contact details if you would like to speak to someone about the SgZ;
- links to other useful information.

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Author: Environment Agency | wiybysupport@environment-agency.gov.uk

Last updated: 22nd September 2016

APPENDIX D

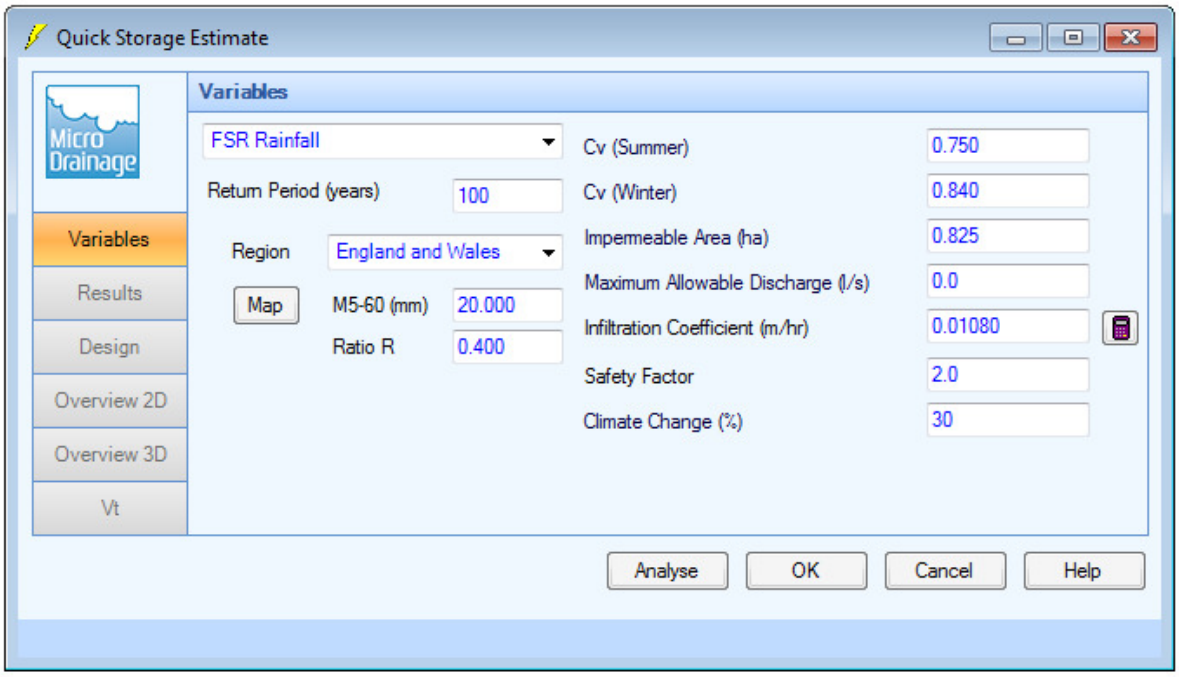
ICP SUDS Mean Annual Flood

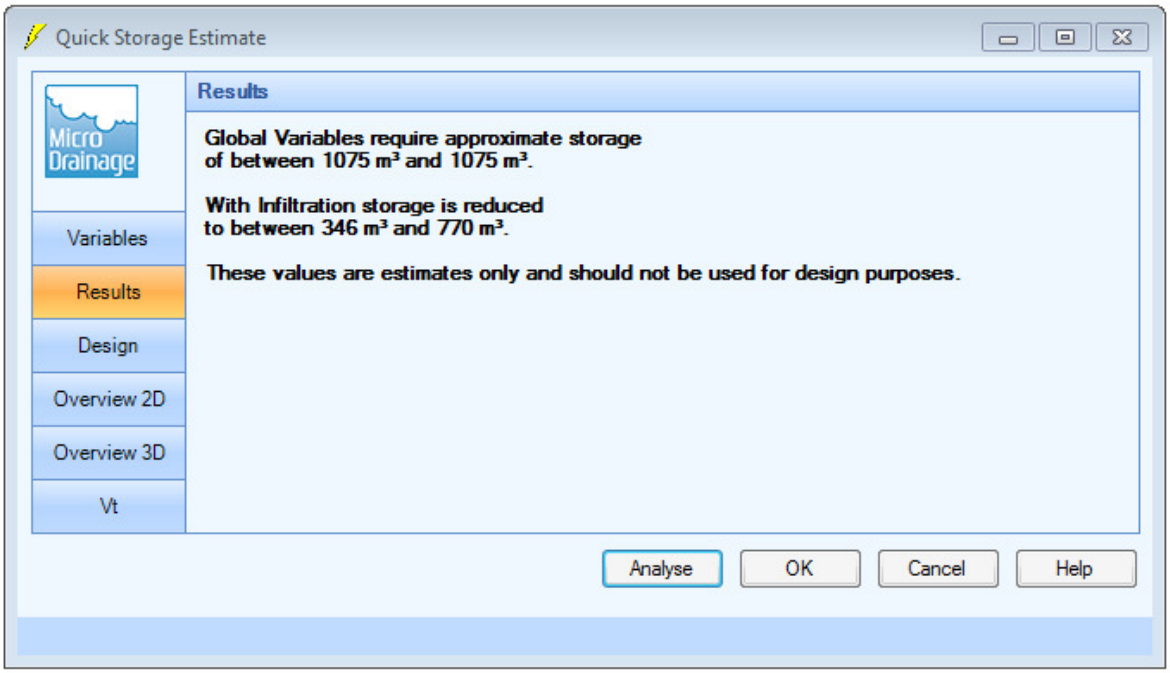
Input

Return Period (years)	100	Soil	0.150
Area (ha)	1.650	Urban	0.000
SAAR (mm)	685	Region Number	Region 6

Results l/s

QBAR Rural	0.7
QBAR Urban	0.7
Q100 years	2.1
Q1 year	0.6
Q30 years	1.5
Q100 years	2.1


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Variables
FSR Rainfall
Return Period (years) 100
Region England and Wales
Map
M5-60 (mm) 20.000
Ratio R 0.400
Cv (Summer) 0.750
Cv (Winter) 0.840
Impermeable Area (ha) 0.825
Maximum Allowable Discharge (l/s) 0.0
Infiltration Coefficient (m/hr) 0.01080
Safety Factor 2.0
Climate Change (%) 30
Analyse
OK
Cancel
Help


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Results
Global Variables require approximate storage of between 1075 m³ and 1075 m³.
With Infiltration storage is reduced to between 346 m³ and 770 m³.
These values are estimates only and should not be used for design purposes.
Analyse
OK
Cancel
Help

PRELIMINARY ECOLOGICAL APPRAISAL

Site:

Townsend lane
Harpenden,
Hertfordshire,
AL5 2RH

Presented to:

Hill Residential Limited

By:

Landscape Planning Limited
4 The Courtyards
Wyncolls Road
Colchester
CO4 9PE

March 2016

Ref: 66734

Contents –

1.0 DISCLAIMER AND LIMITATIONS 3
2.0 REPORT CHECKING PROCEDURES 4
3.0 SUMMARY 5
4.0 INTRODUCTION 6
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6.0 DESKTOP STUDY 9
7.0 HABITAT DESCRIPTIONS 11
8.0 PROTECTED SPECIES 12
9.0 CONCLUSIONS AND RECOMMENDATIONS 14
10.0 ECOLOGICAL ENHANCEMENT OPPORTUNITIES 15

APPENDICES

APPENDIX 1 Legislation, Planning Policy, and Biodiversity
APPENDIX 2 Extended Phase 1 Plan and target notes
APPENDIX 3 Photographs

1.0 DISCLAIMER AND LIMITATIONS

Field Surveys

1.1 Field surveys are undertaken or supervised by a Company Senior Ecologist. In certain circumstances, full survey coverage may not be possible due to land permission requirements or health and safety restrictions. Where possible, visual assessment is undertaken and photographic evidence documented. If appropriate, full details of any constraint to survey or special circumstances are given in the report.

Limitations and Seasonal Constraints

1.2 Owing to seasonal variances and prevailing weather, conditions may sometimes be sub-optimal for surveying and this may delay or disrupt planned survey programmes. If applicable, full details are given in the report.

Quality Assurance

1.3 The Ecologist delivering or supervising this report is bound by Company policy and their own institute's Code of Professional Conduct when undertaking surveys on behalf of Landscape Planning Limited.

Preliminary Report Only

1.4 This report is an assessment of the potential for the presence of European and other protected species; it is not designed to deliver specific species surveys but assesses the likely presence or absence of a particular species with recommendations for further action as necessary.

2.0 REPORT CHECKING PROCEDURES

2.1 This Report has been prepared in accordance with Landscape Planning Ltd quality assurance procedures.

Survey

2.2 The survey has been completed and/or supervised by a practice consultant.

Drawings

2.3 Drawings have been delivered by the project manager and have been cross checked against field data and annotated field plans.

Report and Findings

2.4 The report and findings have been prepared and/or quality checked by a practice principal consultant prior to issue to the client.

Report Prepared by:	Report checked by:
Sorrel Kiamil BSc MSc	Adele Devonshire MCIEEM BSc MSc
Ecologist	Ecologist
For and on behalf of Landscape Planning Ltd	

3.0 SUMMARY

3.1 Landscape Planning Limited (LPL) was commissioned by Hill Residential Limited to produce a Preliminary Ecological Appraisal for Townsend Lane, Harpenden, Hertfordshire, AL5 2RH. The site is predominantly arable field, the north and west boundary is intact hedgerow adjacent to Townsend road. The east was hedgerow, fences, and residential gardens and south was arable fields.

3.2 This site is the subject of a planning application for 41 new dwellings.

3.3 The survey was carried out in order to highlight the potential presence of protected species and habitats, and those of notable ecological value. This is necessary in the proposed development of a site to comply with existing legislation and also to allow any work that may otherwise be detrimental to ecology to be appropriately scheduled.

3.4 The site has potential to support foraging and commuting bats, nesting birds, and reptiles.

3.5 Further surveys are recommended;

- Reptile surveys between March and October to determine the presence / likely absence of reptiles. Presence / absence surveys would involve the placement of artificial refuges on the site to attract any basking animals present, which are then checked over seven visits.

- Bat activity surveys, consisting of bat transects, should be undertaken on site to establish the value of the site for foraging bats and to inform suitable lighting design and mitigation if necessary. Current guidance recommended seven transects (one a month) should be undertaken between April and October on a site with moderate suitability.

3.6 Additionally to avoid disturbing nesting birds it is recommended that any vegetation clearance should be done outside of breeding season (generally March – August). If vegetation or tree clearance work has to be undertaken during breeding season, it is recommended an ecologist undertake a nest search immediately prior to works commencing.

3.7 It is recommended that the site be enhanced post development for the benefit of local biodiversity via the implementation of a landscape scheme that incorporates native and wildlife friendly species. The inclusion of bird and bat boxes or tiles should also be considered as part of the development of 41 dwellings, even if this is not required as part of a mitigation scheme.

4.0 INTRODUCTION

Instruction

4.1 This report has been prepared by Sorrel Kiamil BSc MSc following instruction by Oliver Mealey of Hill Residential Limited for Townsend lane, Harpenden, Hertfordshire, AL5 2RH on 18/03/2016.

Site Location

4.2 The site is known as Townsend lane, Harpenden, Hertfordshire, AL5 2RH, and is situated at grid reference TL122144. The site is predominantly arable field, the north and west boundary is intact hedgerow adjacent to Townsend road. The east was hedgerow, fences and residential gardens and south was arable fields. See also Figure 1, below.

Figure 1. Aerial image of surveyed site and surroundings (Source Google Maps ©)

4.3 It is understood that the development proposals are 41 dwellings.

Brief

4.4 The brief was as follows:

- To undertake an assessment of the habitats and the potential likelihood of protected species that might materially impact on proposals;
- To carry out relevant desk based surveys in order to ascertain whether the site or nearby land has any conservation designation, and to highlight records of protected species locally;
- To identify and make recommendations for any further surveys required to satisfactorily inform a planning decision;
- To identify opportunities for ecological enhancement which would be of benefit to protected and notable species.

Planning and Legislation

4.5 The site has the potential to support foraging and commuting bats, reptiles, and breeding birds.

4.6 These species are afforded protection under the:

- Wildlife and Countryside Act 1981 (as amended);
- Conservation of Habitats and Species Regulations 2010 (as amended).

4.7 For further details on the legislation and planning policies that may affect this site, please see Appendix 1.

5.0 METHODOLOGY

Desktop Study

5.1 A desktop study was carried out for any statutory or non-statutory wildlife sites within 2km of the proposal area. The following readily available online resources were accessed to conduct this search:

- Multi-Agency Geographic Information for the Countryside (MAGIC) www.magic.gov.uk
- Joint Nature Conservation Committee www.jncc.defra.gov.uk

5.2 The following designated sites were included in the data search:

- RAMSAR
- Special Marine Conservation Areas
- Special Areas of Conservation concern (SACs)
- Special Protected Areas (SPAs)
- Sites of Special Scientific Interest (SSSIs)
- National Nature Reserves (NNR)
- Local Nature Reserves (LNR)
- Local or County Wildlife Sites

5.3 A search was also conducted for local protected species records by contacting Herts Environmental Records Centre (HERC) on 22/03/2016 for records of all protected species and Species of Principle Importance in England (SPIE) within 2km of the site.

Field Survey

5.4 The habitat survey and mapping exercise was carried out by Sorrel Kiamil BSc MSc, on 17/03/2016 using standard Phase 1 Habitat survey methodology (JNCC, 2010).

5.5 The weather conditions at the time of survey were sunny, dry, and light wind.

5.6 The survey area was limited to the site boundary shown in Figure 1, plus land immediately adjacent to the site, where accessible or visible.

Limitations

5.7 Habitats and the wildlife they may support are subject to change over time. A single site visit will record only the site as it is at the time of survey.

6.0 DESKTOP STUDY

6.1 The desktop study involved consulting Multi Agency Geographical information for the Countryside (MAGIC) in relation to statutory designated sites within a 2km radius of the application area, and consulting the local biological recording office for records of protected species and Species of Principle Importance in England in order to further inform the site assessment.

Designated Sites

Statutory

Examples:

6.2 MAGIC and HERC data search identified no statutory sites within a 2km radius of the application area.

Non-statutory

6.3 The data search from HERC identified 3 Ancient Woodland Inventory Sites. These included Knott wood, Northfield spring and Westfield wood. The largest and closest site is Knott wood at 9.91ha and approximately 1040m from site, primarily a beech (*Fagus sylvatica*) plantation with a few coppiced species and many native bluebells.

6.4 The data search from HERC identified 10 Local Wildlife Sites, the closest are listed below;

- **The Nicky Line**: Approximately 37m north of the site, is a disused railway line bordered by a species rich woodland, scrub, herbs, and grassland.

- **Rothamsted Broadbalk, Park Grass, Manor Wood, and Knott Wood**: This is a world-renowned site for agricultural experiments. This site is approximately 780m from the site. A large proportion is arable but there is a mix of semi-natural habitats including woodland, hedgerows, and waterbodies. Two areas of grassland have been left untouched in Broadbalk since 1882 and support the endangered species corn bedstraw (*Galium tricornutum*).

- **Woodland strip, east of Harpendenbury golf course**: This fragment of ancient semi-natural woodland is approximately 850m from site. This site contains many species such as pedunculate oak (*Quercus robur*), ash (*Fraxinus excelsior*) and field maple (*Acer campestre*). The shrub layer is dominated by hazel (*Corylus avellana*) and elder (*Sambucus nigra*). The ground flora is dominated by bluebell (*Hyacinthoides non-scripta*), dog's

mercury (*Mercurialis perennis*), and moschatel (*Adoxa moschatellina)* – an uncommon plant in Hertfordshire.

- **Harpenden common**: This mosaic of habitats is 1280m from site and comprises of amenity grassland, semi-improved neutral grassland, remnant acid grassland, scrub, and broadleaved woodland. The site is important for reptiles, with slow worms (*Anguis fragilis*) and common lizard (*Lacerta vivipara*) being recorded.

Data search

6.5 HERC provided biological data records for a 2km radius from the site. Records relevant to the site and context are summarized below.

6.6 Fifty four records for bats were returned from the data search. Species include lesser noctule (*Nyctalus leisleri)*, natterers *(Myotis nattereri)*, pipistrelle species (*Pipistrellus),* common pipistrelle (*Pipistrellus pipistrellus)*, brown long-eared (*Plecotus auritus),* and unknown bat species (*Chiroptera).* The most common was pipistrelle species with twenty six returns. The location of the majority of records was not given, however the closest received was 520m from site, and was pipistrelle species.

6.7 One record for great crested newt (*Triturus cristatus*) was identified. An exact location is not known; the four figure grid reference given identified it at being approximately 3km away.

6.8 A number of Schedule 1 listed birds, and birds identified as Species of Principal Importance in England (SPIE) were identified within the search radius, including barn owl (*Tyto alba*), hoopoe (*Upupa epops)*, firecrest (*Regulus ignicapilla)*, fieldfare (*Turdus pilaris*), red kite (*Milvus milvus),* kingfisher *(Alcedo atthis)*, skylark (*Alauda arvensis),* great spotted woodpecker *(Dendrocopos major),* and tawny owl (*Strix aluco)*.

6.9 Ten reptile records where returned: three grass snake (*Natrix natrix)* and seven slow worm. The closest known grass snake was approximately 1.8km north east of the site and the closest known slow worm is 810m from site.

6.10 Twenty seven badger (*Meles meles)* records were returned. The closest was on The Nicky line approximately 900m west.

7.0 HABITAT DESCRIPTIONS

Arable land

7.1 The majority of site was arable field growing wheat. At the time of survey it was young shoots.

Trees

7.2 The site contained hazel (*Corylus avellana*), oak (*Quercus sp*), field maple (*Acer campestre*), hornbeam (*Carpinus betulus)*, ash (*Fraxinus excelsior)*, spindle (*Euonymus europaeus),* and cherry (*Prunus avium)*. In addition, large Corsican pines (*Pibus nigra) were* overhanging from residential gardens. Full details on trees can be found in the associated AIA report (Landscape Planning, 2016).

Hedgerow

7.3 The majority of the site was bounded by intact, species poor hedgerow, wsith the exception of a fence behind a residential garden and an opening into the southern adjacent field. The hedgerow was well maintained and approximately 3m wide and ranging between 2m-5m high. The dominant species were hazel and blackthorn (*Prunus spinosa)*. Other species included holly (*Ilex aquifolium)*, hornbeam, bramble (*Rubus fructicosus)*, honeysuckle (*Lonicera periclymenum),* and ivy (*Hedera helix)*.

7.4 The understory of the hedgerow was predominately bluebells (*Hyacinthoides sp*.). Other species include cleavers (*Galium* aparine), cow parsley (*Anthriscus sylvestris),* lords and ladies (*Arum maculatum)*, hogweed (*Hercleum sphondylium),* bracken *(Pteridium aquilinum),* and nettles (*Urtica dioica*).

7.5 Between the hedgerow and arable field was approximately a 1m buffer of grass species include yorkshire fog (*Holcus lanatus*) and fescue (*Festuca sp)*.

Scrub

7.6 In the southern corner was a small patch of scrub dominated by bramble. On the eastern boundary was a small area of scrub approximately 4m by 2m behind a residential garden containing primarily bramble and cleavers.

8.0 PROTECTED SPECIES

8.1 An assessment has been made as to the protected species that may be using the site, based on the habitats present, the connectivity to the wider landscape, the site context, and the results of the desk study. Where appropriate, the likely absence of a species is justified.

Birds

8.2 Trees and hedgerows on site show potential to support nesting birds.

8.3 All birds are afforded protection under the Wildlife and Countryside Act 1981 (as amended), with their nests and eggs protected by law, and it is thus an offence, with certain exceptions of pest species, to: intentionally kill, injure, or take any wild bird; take, damage or destroy the nest of any wild bird while it is in use or being built; or take or destroy the egg of any wild bird.

8.4 In addition, further provision and protection is given to any wild bird listed on Schedule 1 of the Wildlife and Countryside Act while it is nest building, at a nest containing eggs or young, and whilst the young birds remain dependent upon the adults.

Bats

8.5 There were two trees on site with low potential to support roosting bats. The north west boundary had two mature large oaks within the hedgerows (see target notes 1 and 3 in appendix 3, and photographs 1 and 2 in appendix 2). Both were low potential with only small areas of lifting bark and no cavities. The main trunks on both trees where ivy clad which may hide potential holes and cavities.

8.6 In the south west corner, just off site in the adjacent arable field, was another mature oak with bat features including aerial deadwood (see target note 5 in appendix 3), a large hole approximately 40cm in length and 30cm in width facing east (see photograph 3 in appendix 2), and a smaller hole approximately 15cm facing south west.

8.7 The site shows moderate potential for foraging / commuting activity, as there are avenues of trees / hedgerows connecting the site.

8.8 All bats are European Protected Species afforded strict protection under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010 (as amended). This protection also extends to their roosts.

Great Crested Newts

8.9 The majority of the site was considered unsuitable for great crested newts being predominantly arable field; however, the hedgerows did provide some suitable habitat. However there was an area of suitable hibernation to the north (see target note 2 in appendix 3), a large section of dead oak tree with surrounding bramble from the hedgerow and old vegetation (see photograph 4 in appendix 2).

8.10 OS maps and google earth showed no suitable waterbodies within 500m. The closest suitable pond was 900m east with 700m of residential housing and roads acting as a dispersal barrier. It is therefore considered unlikely that great crested newt would be present on site due to a lack of potential breeding ponds nearby.

8.11 Great crested newts and their habitats are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010 (as amended).

Dormice

8.12 There was no evidence of dormice found, only hazel nuts opened by wood mice (*Apodemus sylvaticus*). Even though hazel and honeysuckle grew within the hedgerows there was no dormouse evidence. Additionally, no dormice were returned in the data search and the closest woodland was over 1km from site. Therefore, it is considered unlikely that dormouse would be present on site.

8.13 Dormice and their habitats are protected under the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010 (as amended).

Reptiles

8.14 The majority of the site was considered unsuitable for reptiles, it being predominantly arable field; however, the hedgerows did provide some suitable habitat. Additionally there was suitable hibernation habitat to the north (see target note 2 in appendix 3). It was a large section of dead oak tree with surrounding bramble from the hedgerow and old vegetation (see photograph 4 in appendix 2). Therefore, further recommendations regarding the potential presence of reptiles on site are provided in Section 9.

8.15 Common lizard (*Zootoca vivipara)*, slow worm (*Anguis fragilis)*, adder (*Vipera berus)* and grass snake (*Natrix natrix)* are protected against killing and injury under the Wildlife and Countryside Act 1981 (as amended).

Badgers

8.16 There were no badger sets or badger signs (hairs, foraging, latrines, or dung pits) on the site. Therefore, it is considered unlikely that they would be present on the site and no further action is required.

8.17 Badgers and their setts (whilst in use) are afforded protection against injury, death, destruction, and obstruction under the Protection of Badgers Act 1992.

Bluebells

8.18 There was a large amount of bluebells (*Hyacinthoides sp)* present on site in the understory of the hedgerow. As they had not flowered the species could not be distinguished. Native bluebell (*Hyacinthoides non-scripta)* is protected under the Wildlife and Countryside act 1981 (in respect of section 13(2) only), it is an offense to sell, offer, or expose for sale a live or dead wild plant.

9.0 CONCLUSIONS AND RECOMMENDATIONS

9.1 This preliminary ecological appraisal recorded all habitats present and made an assessment for the potential presence of protected species. In addition, a desktop study was undertaken to identify any designated sites that may be adversely impacted by any future development of the site and highlight any known records for protected species.

Designated sites

Statutory

9.2 No designated sites were identified within a 2km radius of the site that would be affected by any works within the proposal footprint.

Non-statutory

9.3 The closest and most likely to be effected is the Nicky Line approximately 37m north of the site, a disused railway line bordered by species rich woodland, scrub, herbs and grassland. However there is no direct access from the site or adjacent road and the Townsend nursery, other buildings and a field. This makes it unlikely to be effected by this project proposal.

Protected Species

9.4 The site shows potential to support nesting birds, foraging and commuting bats, and reptiles. There is no other habitat on or immediately adjacent to the site that shows potential to support any other protected flora or fauna.

9.5 In order to comply with relevant legislation and planning policy as detailed in Appendix 1, the following recommendations are made:

- Any tree works should be undertaken outside of the breeding season (March-September), or a nest search undertaken by an ecologist immediately prior to works commencing.

- Bat activity surveys, consisting of bat transects, should be undertaken on site to establish foraging and commuting activity. It is recommend in the guidelines that seven transects (one a month) should be undertaken between April and October on a site with moderate suitability for bats.

- The site was considered suitable habitat for reptiles. If present, proposed works could result in adverse impacts on native reptiles, including the incidental killing or injuring of individual animals and thus possible contravention of the law. It is therefore recommended that presence / absence surveys are undertaken and the status of reptiles within the site is established in order to determine whether mitigation will be required. Presence / absence surveys would involve the placement of artificial refuges on the site to attract any basking animals present, which are then checked over seven visits. These surveys can only be undertaken at certain times of the year (March to October), and during appropriate weather conditions.

10.0 ECOLOGICAL ENHANCEMENT OPPORTUNITIES

10.1 It is recommended that the site be enhanced post development for the benefit of local biodiversity via the implementation of a landscape scheme that incorporates native and wildlife friendly species. The inclusion of bird and bat boxes or tiles should also be considered as part of the development of 41 dwellings, even if this is not required as part of a mitigation scheme.

10.2 References

- JNCC (2010) Handbook for phase 1 habitat survey: a technique for environmental audit. ISBN 0 861 39 636 7.
- MAGIC (2016) www.magic.defra.co.uk (Accessed 22/03/2016)
- Department for Communities and Local Government (2012), *National Planning Policy Framework.*
- Google Maps (2016) http://www.google.co.uk (Accessed 22/03/2016)
- Herts environmental Records Centre (2016), data search results
- Bat Conservation Trust (2016) *Bat Surveys* for Professional *Ecologist: Good Practice Guidelines*. Bat Conservation Trust.

APPENDIX 1

Legislation and Policy

The European and national legislation of England and Wales relevant to nature conservation is as follows:

- The Conservation of Habitats and Species Regulations 2010 (as amended) (the Habitats Regulations);
- The Wildlife and Countryside Act 1981 (as amended);
- The Protection of Badgers Act 1992 (as amended);
- The Countryside and Rights of Way Act 2000 (CROW);
- The Natural Environment and Rural Communities Act 2006 (NERC) (as amended).

European Protected Species – the Conservation of Habitats and Species Regulations 2010 (as amended)

European Protected Species (EPS) – all UK species of bat, dormice, otter and great crested newt – are protected under both the Wildlife and Countryside Act 1981 (as amended) and the Conservation of Habitats and Species Regulations 2010 (as amended). In summary, this makes it an offence to:

- Deliberately capture, kill or injure an EPS (including their eggs)
- Damage or destroy a breeding site or resting place used by an EPS
- Deliberately disturb an EPS in a way that is likely to impair their ability to survive, breed or raise young, or affect their ability to migrate or hibernate, or in a way that is likely to significantly affect their local distribution or abundance
- Intentionally or recklessly disturb an EPS while they are occupying a place of shelter and / or protection
- Intentionally or recklessly obstruct access to any structure of place that an EPS uses for shelter or protection

Sand lizard, smooth snake and natterjack toad are also fully protected under the Conservation of Habitats and Species Regulation (2010) as amended. These species have a limited range and habitat type, and will be referred to in further detail where the need arises.

Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) are afforded protection under the Conservation of Habitats and Species Regulations (as amended). National Planning Policy provides Ramsar sites with the same level of protection.

The Wildlife and Countryside Act 1981 (as amended)

As well as all species listed above, this Act affords varying levels of protection to UK wildlife, including the following:

- Reptiles – it is an offence to intentionally kill or injure any reptile
- Water vole – it is an offence to intentionally kill, injure or take a water vole, to disturb a water vole whilst occupying a structure or place used for shelter and protection, to intentionally or recklessly damage or destroy a structure or place used for shelter or protection, and to obstruct access to a structure or place used for shelter or protection
- Birds – it is an offence to intentionally destroy an active bird's nest, and the eggs and / or young within. Schedule 1 listed species are also protected from intentional and reckless disturbance whilst breeding

Schedule 9 of the Wildlife and Countryside Act lists plant species for which it is an offence to plant or otherwise cause to grow, in the wild; and animals for which it is an offence to release into the wild.

Sites of Special Scientific Interest (SSSI) and National Nature Reserves are afforded protection by the Wildlife and Countryside Act 1981 (as amended).

The Protection of Badgers Act 1992

Under the Protection of Badgers Act, it is an offence to:

- Wilfully kill or injure a badger
- Intentionally or recklessly damage, destroy or obstruct access to a sett
- Intentionally or recklessly disturb a badger whilst occupying a sett

Biodiversity

Following the production of Publicly Available Specification (PAS 2010) by the British Standard Institute (BSI), local governments now have clear guidelines by which to take action to ensure that they help halt the loss of biodiversity and contribute to sustainable development.

Section 40 of the Natural Environment and Rural Communities (NERC) Act (2006) places a duty on public authorities to have regard for the purpose of conserving biodiversity. PAS 2010 aims to reduce the varied applications of this obligation, ensuring that all parties have a clearer understanding of information required at the planning stage.

Section 41 of the NERC Act (2006) identifies habitats and species which are of principal importance for the conservation of biodiversity in England. There are 56 habitats and 943

Species of Principal Importance in England (SPIE), and most of the UK's protected species are listed under Section 41.

Whilst the possible presence of a protected species is accompanied by legal obligations and will remain the first consideration of planning departments, the total biodiversity value of a site must now be considered.

Non-statutory sites such as Local Wildlife Sites, Sites of Importance for Nature Conservation and County Wildlife Sites are generally not subject to legal protection, but will be recognised in the planning system for their value to protected species and habitats, and / or habitats and SPIE.

Planning Policy

The policies in the National Planning Policy Framework (NPPF) apply from the day of publication 27 March 2012. It sets out the out the Government's planning policies for England and replaces all previous PPGs/PPSs, however the government circular 06/05 which accompanied PPS9: 'Biodiversity and Geological Conservation – Statutory Obligations and the Impact within the Planning System' remains valid.

National Planning Policy Framework (NPPF)

The policies in Local Plans (and the London Plan) should not be considered out of date simply because they were adopted prior to the publication of the NPPF. However, the NPPF policies are material considerations which local planning authorities should take into account from the day of its publication. The NPPF must also be taken into account in the preparation of plans.

NPPF: Conserving and Enhancing the Natural Environment; section 11; paragraph 109:

The planning system should contribute to and enhance the natural and local environment by:

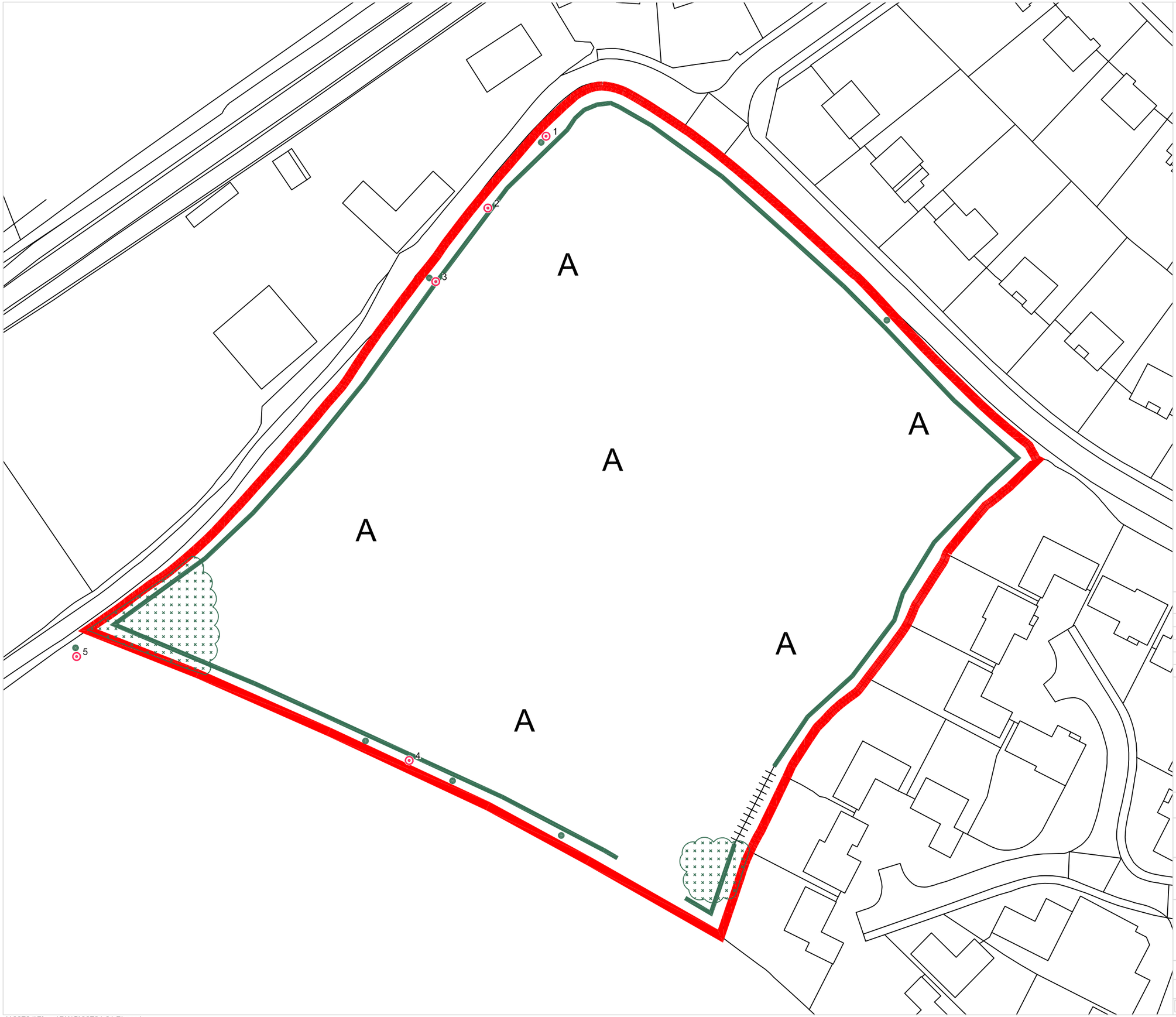
- Protecting and enhancing valued landscapes, geological conservation interests, and soils;
- Recognising the wider benefits of ecosystem services;
- Minimising impacts on biodiversity and proving net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including establishing coherent ecological networks that are more resilient to current and future pressures;
- Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water, or noise pollution or land instability; and
- Remediating and mitigating despoiled, degraded, derelict, contaminated, and unstable land where appropriate.

APPENDIX 2

Habitat types and target notes

Phase 1 Habitat	JNCC Code
Fence	J2.4
Species poor intact hedge	J2.1.2
Arable field	J1.1
Scattered scrub	A2.2
Broad-leaved trees In hedge	J2.3.2

Target Note	Description
TN1	Large mature oak (*Quercus)* tree, ivy clad, small area of lifting bark with in hedgerow.
TN2	Large section of fallen dead oak (*Quercus)*, bramble (*Rubus fruticosus)* and long grass surrounding it, good hibernacula. Gnawed hazel nuts where found to be eaten by wood mice (*Apodemus sylvaticus*).
TN3	Large mature oak (*Quercus)* tree, ivy clad within hedgerow
TN4	Young hedgerow approximately 1m and 3m high. Hazel (*Corylus avellana),* blackthorn (*Prunus spinose)* and cherry (*Prunus avium*).
TN5	Off site, mature oak with bat features. Large hole approximately 40cm by 30cm and a smaller hole approximately 15cm.



KEY

- Survey boundary
- Scattered scrub
- Broad-leaved tree
- A — Arable
- Species poor intact hedge
- Fence
- 1 — Target note

REVISIONS

No	Description	By	Date	Chkd

LANDSCAPE PLANNING LTD

ISSUE:
-

CLIENT:
Hill Residential Limited

LOCATION:
Townsend Lane, Harpenden, Hertfordshire

DRAWING TITLE:
Extended Phase 1 Habitat Survey

SCALE:	DATE:		
1:1250 @ A3	March 2016		
DRAWN BY: TF	CHKD BY: SK	DRAWING No: 66734-01	REV: -

J:\66734\Plans\DWG\66734-01 Phase1

APPENDIX 3