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Flood Risk Assessment

For

Additional 5 Mobile Homes

On

Land adjacent to

Cartref Farm, Wokingham Road, Hurst, RG10 0RJ

Site is now known as

Wind in The Willows

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Our Ref: 16698

May 2024

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1. INTRODUCTION

- 1.1 We were instructed by Mr H Giles to carry out a Flood Risk Assessment on land known as Wind in The Willows, Wokingham Road, Hurst, RG10 0RU.
- 1.2 The site has been visited for a walk over survey. We have consulted with the published information from the Environment Agency, their indicative flood maps and have considered the Strategic Flood Risk Assessment by Wokingham Borough Council. We understand that a revised Strategic Flood Risk Assessment is to be published shortly by the Planning Authority.
- 1.3 The recommendations of the National Planning Policy Framework have been considered.
- 1.4 Sites can be wrongly blighted by a precautionary approach that fails to fully assess a site within its general environment and topography. This report considers this possibility.
- 1.5 Our report is prepared in accordance with our Standard Conditions of Appointment, copies of which are attached herewith as Appendix A. The only variation of these conditions is that this report may be copied by others without our consent, provided the copies are used for the purpose for which the report is prepared. Our reports may not be published or uploaded on to the internet without our written permission.
- 1.6 The original walk over survey was carried out by Gerry Cutting. Gerry Cutting is a Fellow of Institution of Civil Engineers with in excess of 30 years' experience of assessing land prior to development. A recent walkover was completed by one of our technicians. The facts gleaned are presented in Section 2.

2. DESCRIPTION OF SITE AND LOCAL ENVIRONS

- 2.1 The site was visited in late November 2009 when the weather was wet and windy. Prior to the visit substantial quantities of rain had fallen in the area. The site was visited again by our Stuart Warner on 26th April 2024.
- 2.2 Located close to the junction between Islandstone Lane and Nelson Lane, the site is to the east of the main A321, approximately 1.5 kilometres from the village of Hurst.
- 2.3 For the purposes of the description the site will be taken as approximately rectangular with its main longest access running north south. The site is shaped more as a truncated triangle.
- 2.4 The south boundary is onto Islandstone Lane, and access is gained from the highway by a slight rise onto what is visually flat land.
- 2.5 A survey company completed a level survey to ordnance datum of the site and one of the approach roads. A copy of the survey is attached as Appendix B. The level survey indicates that the site is more or less flat and level.
- 2.6 To the west and north boundary is a drainage stream that appears to flow slightly in a north, north easterly direction. The west (more truly the southwest boundary) is formed by Islandstone Lane, and the north boundary abuts onto further open land. There are drainage ditches to the north and east boundaries, but these are probably more depressions standing with water after the recent heavy rains.
- 2.7 There are numerous trees around the site and at the northeast corner is a small copse of woodland separating the site from neighbouring land. A bridle way extends towards Bridleway Farm to the west of the site. A separate report by another Consultant details the trees.
- 2.8 Walking the general area within 2 kilometres of the site there is no impression of significantly rising land.
- 2.9 As can be seen from Appendix B, the levels of the site generally vary between 37.03 metres AOD and 37.4 metres AOD, with the very occasional one at 37.01 metres AOD. This indicates that the site is Flood Zone 1 and not Flood Zone 2, however, the level of the site and the predicted flood level are so close to each other that we have considered the site as Flood Zone 2. The highway i.e. the junction of Nelson Lane and Islandstone Lane is approximately 36.8 metres AOD.
- 2.10 The levels given on the site are higher than road levels taken to the north of the site. The flood map, however, indicates that the road where lower than the site is free from flooding, whereas the site is shown as flooded for Flood Zone 2. We suspect that the discrepancy may have been generated by historic LIDAR data that has an accuracy worse than + or – 150mm.
- 2.11 Levels around the junction between Islandstone Lane and the A321 were downloaded, these indicate that the A321 is between 36.7 metres AOD and 37 metres AOD.
- 2.12 Islandstone Lane to the northeast rises from about 36.7 metres AOD to 37.8 metres AOD opposite Grange Farm.
- 2.13 A general review of the levels in the vicinity of the site confirms that the levels do not vary by more than approximately a metre over a very large area.

- 2.14 To the southwest of Islandstone Lane, approximately opposite the site entrance is a pond that appears to be known as Islandstone Pond. This pond is connected, we believe, to the drainage system that runs to the northwest of the site. There is a head wall to the pond, but we could not find any culverts, we assume that they are buried within the silt.
- 2.15 The current buildings on the site consist of a mobile home, associated day room, a barn and some stables.

3. PROPOSED DEVELOPMENT OF THE SITE AND RELEVANCE OF NATIONAL PLANNING POLICY FRAMEWORK

- 3.1 It is proposed that the site will have pitches for an additional 5 No mobile homes, each with its own day room and space for a touring caravan.
- 3.2 The National Planning Policy Framework identifies the use of mobile homes on the site as highly vulnerable, see extract below.

Annex 3: Flood risk vulnerability classification

Information on flood risk vulnerability classification.

Essential infrastructure

- Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.
- Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including infrastructure for electricity supply including generation, storage and distribution systems; including electricity generating power stations, grid and primary

substations storage; and water treatment works that need to remain operational in times of flood.

- Wind turbines.
- Solar farms.

Highly vulnerable

- Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding.
- Emergency dispersal points.
- Basement dwellings.
- Caravans, mobile homes and park homes intended for permanent residential use.
- Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure'.)

More vulnerable

- Hospitals
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.
- Non-residential uses for health services, nurseries and educational establishments.
- Landfill* and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

Less vulnerable

- Police, ambulance and fire stations which are not required to be operational during flooding.
- Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill* and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
- Car parks.

Water-compatible development

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.
- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.
- Essential ancillary sleeping or residential accommodation for staff required by uses in this

category, subject to a specific warning and evacuation plan.

*Landfill is as defined in Schedule 10 of the Environmental Permitting (England and Wales) Regulations 2010
(<https://www.legislation.gov.uk/uksi/2010/675/schedule/10>).

- 3.3 The flood maps, such as the one pasted below, gives the site as Flood Zone 2. We have endeavoured to obtain a flood level for the site. The Product 4 from the Environment Agency did not give all the values for the node points as shown on their detailed FRA map. The only value given relating directly to the site is 37.02 metres AOD related to Flood Zone 3.



Flood map for planning

Your reference	Location (easting/northing)	Created
<Unspecified>	480433/172971	29 May 2024 11:23

Your selected location is in flood zone 2, an area with a medium probability of flooding.

This means:

- you must complete a flood risk assessment for development in this area
- you should follow the Environment Agency's standing advice for carrying out a flood risk assessment (see www.gov.uk/guidance/flood-risk-assessment-standing-advice)

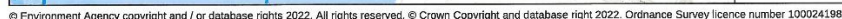
Notes

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

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

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2022 OS 100024198. <https://flood-map-for-planning.service.gov.uk/os-terms>



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- CONCRETE SPECIFICATION
-
- ALL EXIST. DOORS TO BE PROVIDED FOR
MAINTENANCE BUT NO 30mm DRAINAGE MATERIALS
- OPEN MESH FIXED TO CONCRETE RAFT AND UNDERSIDE OF MOBILE HOME
HOLES IN MESH TO BE 20/25mm MIN/MAX
150 THICK CONCRETE RAFT MESH REINFORCEMENT
200 THICK FREE DRAINING 300mm VOID WHOLE STONE
- | CONCRETE SPECIFICATION | LENGTHS IN METRES FOR | COMMODITY | | | | | | UNIT | STANDARD
COMMODITY
PRICE PER UNIT |
|--|-----------------------|-----------|----------|------------|-------------|------------|-------------|------|---|
| | | GRADE | QUANTITY | UNIT PRICE | TOTAL PRICE | UNIT PRICE | TOTAL PRICE | | |
| FABRICATED CONCRETE
CARRYING TO WALLS | 120 | 20 | 100 | — | 800 | 800 | 800 | 100 | 100 |
| | 120 | 20 | 100 | — | 800 | 800 | 800 | 100 | 100 |
| FABRICATED CONCRETE
CARRYING TO WALLS | 120 | 20 | 100 | — | 800 | 800 | 800 | 100 | 100 |
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CARRYING TO WALLS | 120 | 20 | 100 | — | 800 | 800 | 800 | 100 | 100 |
| | 120 | 20 | 100 | — | 800 | 800 | 800 | 100 | 100 |
| FABRICATED CONCRETE
CARRYING TO WALLS | 120 | 20 | 100 | — | 800 | 800 | 800 | 100 | 100 |
| | 120 | 20 | 100 | — | 800 | 800 | 800 | 100 | 100 |
| FABRICATED CONCRETE
CARRYING TO WALLS | 120 | 20 | 100 | — | 80 | | | | |

- 3.6 A touring caravan will be stored on the site for use while travelling and will not be used as accommodation. Even so, we recommend that the caravan is chained to the ground.
- 3.7 A day room provides basic washing and cooking facilities. It is not habitable accommodation. Taking the precautionary approach resilient constructions will be used.

4. HISTORY OF FLOODING AND LIKELY FLOODING SOURCES

- 4.1 As far as we have been able to establish there has been no significant flooding on this site.
- 4.2 The Flood Map for Planning as pasted in paragraph 3.3 above indicates that the site lies within Flood Zone 2 i.e. have a probability of flooding of between 1 in 100 and 1 in 1000 years.
- 4.3 We sought from the Environment Agency their Product 4. The data and information contained in the Product 4 is attached as Appendix C.
- 4.4 Product 4 gave a level of 37.02 metres AOD for Flood Zone 3 at the site, but other data was not given. We assume that modelling has not been carried out in sufficient detail.
- 4.5 We have endeavoured to interpret the maximum level of Flood Zone 2 flooding using the survey data and the indicative flood map produced by the Environment Agency. Comparing these two documents we conclude that the maximum flood level of Flood Zone 2 flooding local to the site is approximately 36.8 metres AOD.
- 4.6 From the foregoing we conclude that the maximum flooding on the site, in the worst case of 1 in 1000 event will be as puddles less than 100mm deep with a return frequency of 1 in 1000 years.
- 4.7 Given the topography of the site and the general area, it is unlikely that climate change will drastically increase this depth of flooding. The very flat nature of the surrounding area means that an increase in the level of flooding very quickly brings it into account substantially greater volumes of storage for that water, thus a 30% increase in water volumes would not alter the flood level substantially. We estimate that the maximum flood level for Zone 2 would not increase beyond 37.0 metres AOD even with a 30% climate change allowance.
- 4.8 As far as we have been able to establish there are no substantial underground services in this rural area and therefore there is no risk from foul sewage flooding or from breaking of substantial water mains.
- 4.9 We do not consider that ground water is a likely problem given the very flat nature of the general area.
- 4.10 No other sources of flooding to the site could be identified.

5. ISSUES TO BE ADDRESSED

5.1 Finished Floor levels to mobile home caravans and day room

- 5.1.1 The mobile home will sit approximately 600mm above ground level. We have established that the maximum flood level for Flood Zone 2, allowing for climate change is unlikely to exceed 37.0 metres AOD, the level without allowance for climate change is approximately 36.8 metres AOD.
- 5.1.2 It is usual to site the building with a finished floor level at least 300mm above the predicted flood level. In this case this would give a finished floor level of 37.3 metres AOD (allowing for climate change), the current ground level is generally above 37.1 metres AOD, this would equate to a finished floor level within the mobile home of 37.7 metres AOD. On a basis of flood levels, we see no reason to lift the floor level above that which stems from basing the mobile home at existing ground level. The floor level of the mobile home should be 37.7 metres AOD.
- 5.1.3 The caravan sits with its floor level approximately 500mm above ground level. It is not usual to install slabs beneath the caravan. The caravan will therefore sit with the floor level of about 37.6 metres AOD i.e. at least 500mm above the predicted flood level including a 30% allowance for climate change. As a sensible precaution we recommend that the caravan is anchored by tension chains to suitable anchors either using concrete blocks or substantial stakes driven into the ground.
- 5.1.4 The day room is not a habitable area and provides basic washing and cooking facilities. This may be sat with a floor level at ground level or approximately 150mm above as is more typical of building construction. We recommend that the day room is built using flood resilient construction. Details of the resilient construction are attached as Appendix C.
- 5.1.5 To summarise the following floor levels should be used:

Mobile Home	37.7 AOD
Caravan	37.6 AOD
Day Room	37.15 AOD

5.2 Proposed ground levels on the site

- 5.2.1 The site is within Flood Zone 2, any alteration of ground levels is not usually permitted. However, it is usual on this type of development to provide an open hardcore surfacing for the areas around the caravan, mobile home and day room.
- 5.2.2 Here we recommend, to maintain the flood storage capacity, that if any wholestone is placed above existing ground levels that approximately 200mm is dug out before placing wholestone. This will give the same flood storage as any space occupied, by increasing the levels would be more than compensated for by the additional storage provided within the wholestone.
- 5.2.3 This is a precautionary approach as our analysis above concludes that the site is Flood zone 1 not 2.

5.3 Effect of the development on the flood plain

- 5.3.1 The footprint of the mobile home and caravan will be virtually insignificant compared to the overall flooded area and therefore not detract from the flood plain.
- 5.3.2 The day room is a very small area, approximately 3 metres by 4 metres. This will not affect the flood storage, particularly as it will be of resilient construction and could be flooded without harm.
- 5.3.3 We conclude therefore that there is no effect on the flood plain even when the site is considered as Flood Zone 2.

5.4 Flood Flows

- 5.4.1 The site is virtually out of Flood Zone 2; the flood flows through the site will be of a very low velocity and be very shallow, about 100mm deep. We do not consider therefore that the provision of a mobile home, caravan and day room will have any effect whatsoever on the flood flows.
- 5.4.2 The site has substantial trees and hedgerows to the perimeter and the landscaping proposals is for further hedgerows within the site.
- 5.4.3 Theoretically these hedges could obstruct flood flows, but as discussed in Section 5.1 above, flood water is not expected on the site if Flood Zone 1.

5.5 Climate change effecting flood levels

- 5.5.1 It is anticipated that due to climate change sea levels will rise. This site is approximately 38 metres above sea level. It is unlikely that any rise in sea levels will have any material effect on this site.
- 5.5.2 It is further speculated that heavy rain and the intensity of that rain will increase with climate change. We have considered the effect in Paragraphs 4.5 of an increase in volume to be stored within the Flood Zone 2 and concluded that the increase in depth will be small.
- 5.5.3 The SFRA for this area has considered the area (Page 29, Section 6.4, third paragraph) and concludes that climate change will not have a significant effect.

5.6 Access and egress to and from the site

- 5.6.1 Reference to the Environment Agency indicative flood map indicates that Islandstone Lane is within Flood Zone 2 as is a substantial section of the A321, however, Nelson Lane to the south of the site is within Flood Zone 2 for approximately 100 metres.
- 5.6.2 Comparison of the levels in Appendix B with the predicted flood level of 36.8 metres AOD shows that the depth of water on Nelson Lane, immediately in front of the site, will be of the order of 50mm to 100mm. Such depth of water is easily passed with a 4x4 or even a normal car. Further it is possible to walk through such depths of water without difficulty. The event has an expectation of 1 in 1000 years.
- 5.6.3 It is possible with climate change that this depth of water could increase to approximately 150mm to 200mm. We consider this unlikely but even so, it is still possible to safely drive through 200mm of water for approximately 100 metres and it is further possible to walk through such water in an emergency. This occurrence has a predicted return of 1 in 1000 years and assumes a disputed allowance for the effect of climate change.

5.6.4 There are no foul or surface water sewers in the locality, thus no risk of the covers lifting to give a hidden hole.

5.6.5 We therefore conclude that access and egress from the site will be available at all times.

5.7 Drainage Issues

5.7.1 Both mobile homes and caravans discharge water falling onto their roof immediately by the unit but the use of wholestone surfacing allows this water to dissipate both around and beneath the caravan and mobile home.

5.7.2 The surface water drainage arrangements will therefore mirror that which happens currently with the green fill site.

5.7.3 A separate report on the drainage strategy has been prepared, reference should be made to that.

5.8 Foul Drainage

5.8.1 A Package Treatment Plant suitable for discharge to low flow stream and rivers has been designed by the manufacturer and their details are pasted below.



Our Ref: QK30382
Date: 02/05/2024
Your ref: 16698 Wind in the Willows, Hurst

Clare Cutting
Prior Associates
1st Floor Offices, STRFC
Julius Martin Lane
Soham
Ely
Cambridgeshire
CB7 5EQ

16698 Wind in the Willows, Hurst

Dear Clare,

BUDGETARY

Thank you for your valued enquiry, we now have pleasure in submitting our proposal to meet with your requirements.

Requirement:

Bio Pure 6 E Range (Gravity) Treatment Plant suitable for 25 persons.

Treatment Plant serving 24 people.

Incoming invert depth on this option is **0.82m.**

System Offered:

The Bio-Pure 6 E Range (Gravity) treatment plant will be suitable for this option.

Bio-Pure 6 E Range (Gravity) Treatment Plant

- Treatment Plant in accordance to BS EN12566-3, Population of 20 – 27 persons.
- 20mg/l Biological Oxygen Demand (BOD), 30mg/l Suspended Solids (SS) and 20mg/l Ammonia (NH3).
- **To suit inlet depth of 0.82m.**

Unit Price EACH £ 6,300.00 NET + VAT SUPPLY ONLY

T-T PUMPS® T-T Projects T-T Controls T-T Service T-T Enviro 

T-T PUMPS Ltd., Onneley Works, Newcastle Road, Woore, Cheshire CW3 9RU
Tel: 01630 647200 Fax: 01630 642100 www.ttpumps.com e-mail: response@ttpumps.com

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Our Ref: QK30382
Date: 02/05/2024
Your ref:

VAT:	Extra as applicable
Validity:	30 Days
Terms:	T-T Pumps Limited standard conditions of sale apply
Delivery:	2 to 3 weeks from order
Carriage:	Included to UK Mainland

Model	Max O/D (m)	Height	Weight empty	Inlet invert depth	Height to inlet
Bio-Pure 6	2.53m	2.98m	350kg	0.82m	2.16m

We trust that we have interpreted your requirements correctly, however if you have any queries or require additional information, please do not hesitate to contact us.

Yours sincerely
T-T Pumps Limited

Karl Taylor
Tendering Engineer

T-T PUMPS **T-T Projects** **T-T Controls** **T-T Service** **T-T Enviro** **aqua**

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5.9 Residual Risk

- 5.9.1 No residual risk has been identified but taking a precautionary approach a Personal Flood Plan should be drawn up for each adult using the site and all users should register for Flood Warnings. The proforma for the Personal Flood Plan is attached as Appendix D.

6. SEQUENTIAL TEST

- 6.1 Based on the Environment Agency/Government published details, the site is in Flood Zone 2. The development is classified as 'highly vulnerable'. We believe both these are not necessarily correct, however, following the guidance to the letter, a Sequential Test has been prepared by the Planning Consultant, E T Planning.

7. EXCEPTION TEST

7.1 Sustainable benefits of the development to the community.

- 7.1.1 The proposal is to remove the topsoil from the site, particularly in the areas of development. The topsoil will be replaced with wholestone fill with a 30% void ratio. This will increase the storage capacity on the site (see Drainage Strategy), thus there will be a small reduction in flood risk to other properties in the area.

7.2 Management of potential flood.

- 7.2.1 The mobile homes will be sat substantially above the higher flood level and will be anchored to a concrete slab using steel chains. Further, the area underneath the mobile homes will be accessible for maintenance but will not have any storage facilities and will be available to flood water through open mesh.
- 7.2.2 The dayrooms will be sat lower than the floor level of the mobile home, but will be constructed in a flood resilient manner, see Appendix E. This will mean that should they flood; they can be quickly returned to use.
- 7.2.3 The floor could be raised so that car parking and storage of touring caravans will be well above the predicted flood levels. This is not considered necessary as both will be off site if a flood is expected.



.....
Gerry Cutting, BSc, CEng, FICE
For and on behalf of Prior Associates



APPENDIX A

Conditions of Appointment

APPENDIX B

Level Survey

APPENDIX C

Product 4 – Environment Agency

APPENDIX D

Flood Plan

APPENDIX E

Resilient Construction