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**53 Hart Plain Avenue
Waterlooville
Hampshire
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Flood Risk Assessment

19 July 2013



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1. Introduction

Peak Quality Homes Ltd are to submit a planning application for the erection of 4 detached dwellings with garages and associated parking and access after demolition of an existing bungalow at 53 Hart Plain Avenue, Waterloooville.

The site is located within a Flood Zone 2 and therefore a flood risk assessment is required to accompany the planning application. I have been instructed by Peak Quality Homes Ltd to prepare this site specific flood risk assessment.

The flood risk assessment has been undertaken in compliance with the Technical Guidance to the National Planning Policy Framework 2012.

This report has been prepared by M J Harvey BSc. (Hons), C.Eng., M.I.C.E.

2. Development Description

It is proposed that an existing bungalow is demolished and replaced with 4 detached dwellings with garages and associated parking with access off of Wedgewood Way.

In accordance with the Technical Guidance to the National Planning Policy Framework March 2012 Table 2 the development has a flood risk vulnerability classification of 'more vulnerable'. An Exception Test is not required for 'more vulnerable' developments in Flood Zone 2.

3. Flood Risk Assessment – Sources, Mechanisms and Pathways of Flooding

This flood risk assessment has considered the six possible sources of flooding: Fluvial (Rivers); Tidal (Seas); Surface Water; Groundwater; Sewers and Infrastructure Failure.

The detailed site assessment is as follows:

Fluvial

Fluvial flooding is due to out-of-bank flow, overtopping or breach of river defences and blockages to culverts, flood channel or flood corridors.

The existing site is located within a Flood Zone 2 of medium probability of flooding assessed as having between a 1 in 100 and 1 in 1,000 annual exceedance probability (AEP) of river flooding (1%-0.1%).

The Environment Agency (EA) has supplied Product 4 detailed flood data for the site and this is provided in Appendix A.

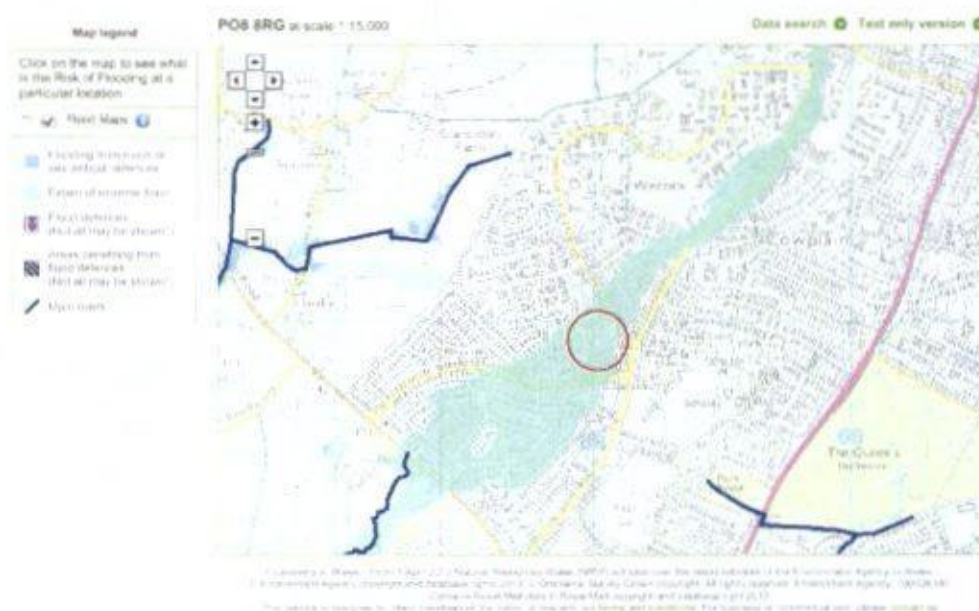
The EA has no record of flooding to the area, but not all flooding events are reported to them.

The EA has no river modelled flood levels for the site but have supplied flood levels derived from JFLOW. These are not as accurate as from detailed river modelling. The JFLOW flood levels for the 0.1% AEP (1 in 1000 year) are in the range of 42.57 – 42.74mAOD which range from 0.19 – 0.32m above existing ground level of the data set supplied.

The ground levels on the site as shown on the topographical survey (refer to Appendix B) range from 42.10 – 42.50mAOD at the proposed location of the new dwellings. Therefore, it is recommended that the floor levels of the proposed dwellings are raised a minimum of 300mm above the highest ground level of 42.50mAOD giving a minimum ground floor level of 42.80mAOD. This floor level is above the maximum JFLOW flood level of 42.74mAOD provided by the EA. The floor level of 42.80mAOD will be approximately 250mm above the existing ground level of 42.56mAOD by No. 11 Wedgewood Way and approximately 200mm above existing ground levels at the end of Wedgewood Way of 42.60mAOD so the ground floor levels of the proposed dwellings will not look out of place to the existing dwellings at the end of Wedgewood Way.

The following figures show the Environment Agency flood map with the site located within the red circle. A more detailed map is presented in Appendix A.

Figure 3 – Flood Map



Tidal

Tidal flooding occurs by the sea or estuary and can be due to breach or over topping of flood defences, wave action and fluvial flows due to tide locking.

The site is outside the influence of tidal flooding and therefore the risk of flooding to the site is low.

Surface Water Runoff

Sheet runoff from adjacent land (urban and rural) can result in local surface water flooding.

The British Geological Survey 'Geology of Britain' web viewer indicates that the site is underlain by Head material comprising clay, silt, sand and gravel over the Lambeth

Group comprising clay, silt and sand. Therefore, the site and surrounding area is underlain by impermeable soils which can cause a risk of sheet runoff (flash floods) occurring.

However, given the urban nature of the surrounding area and relatively flat topography it is considered that there is a low risk of sheet runoff (flash floods) coming from land upslope of the site and the proposed development increasing risk to properties downslope from the site.

Groundwater

The level of groundwater rises during wet winter months, and fall again in the summer as water flows out into rivers. In very wet winters, rising water levels may emerge to the surface and lead to flooding of normally dry land. This is most likely to occur in low-lying areas underlain by permeable rock (aquifers).

Just to the north of the site there are groundwater source protection zones but these do not appear to extend south under the site.

The site is not immediately located over permeable strata and therefore, it is considered that there is a 'low probability' of flooding by groundwater.

Sewers

Combined, foul or surface water sewers can surcharge due to insufficient capacity causing flooding of the surface depending upon the ground topography. Surface water sewers are now required to be designed not to flood for 1 in 30 year storm events but the older sewer networks may not have this level of capacity. Foul sewers can flood in periods of intense rainfall due to connection of surface water to the system.

There is also no knowledge of flooding on the site caused by any public or private sewers and therefore flooding by sewers has a low probability of occurrence.

Infrastructure Failure

Flooding due to infrastructure failure could be due to reservoirs, canals, industrial processes, burst water mains, blocked sewers or failed pumping stations.

No artificial sources of flooding have been identified; therefore, there is a low probability of flooding due to infrastructure failure.

Residual Risks

The residual risks to the development are summarised as follows:

- Fluvial flood events above 1 in 100 year (1%) annual exceedance probability (AEP) may result in shallow flood water on the site but with floor levels raised above the maximum JFLOW flood level provided by the EA this should not result in flooding of the dwellings.
- Flooding caused by failure of the public drainage system.
- Flooding caused by surface water runoff.
- Flooding caused by burst water mains.

However, as all the dwellings will be two-storey the first floor level will be located well above any flood water level and will be a 'place of safety' if any of the above flooding events occurred.

4. Management of Surface Water

At this stage it is not thought that soakaways will be suitable for the infiltration of surface water runoff to the ground but this will be subject to further detailed ground investigation at the site to confirm this. If at all possible, soakaways and infiltration structures will be used to discharge the surface water runoff to the ground in preference to disposal to watercourses or sewers.

If it proves necessary for surface water runoff to be discharged to existing watercourses or sewers, as this is a brownfield development, the rate of runoff will be attenuated to the pre-development condition with surface water storage provided on the site. The surface water drainage system and any attenuation storage will be designed to cater for the critical 1 in 100 year storm event with an allowance of 30% for climate change.

Preliminary design data:

Site area	1960 m ²
Pre-Development impermeable area (brownfield)	280 m ²
Post-Development impermeable area	680 m ²

The Micro Drainage calculated rate and volume of runoff from the site pre and post-development are summarised as follows:

Pre-Development	
Return Period	Impermeable area 280 m ²
1 year	3.6 l/s
100 year	9.6 l/s
100 year 6 hour duration volume	15.2 m ³

Post-Development	
Return Period	Impermeable area 680 m ²
1 year	8.8 l/s
100 year + 30% CC	32.9 l/s
100 year 6 hour duration volume	47.9 m ³

The preliminary estimate of attenuation storage for the critical 1 in 100 year storm event with an allowance of 30% for climate change based upon a maximum discharge rate of 9.6 l/s is between 8.3 and 19.0 m³, subject to detailed design.

5. Flood Resilience and Resistance and Emergency Escape Measures

The Environment Agency Flood Risk Standing Advice is that flood resilience / resistance and emergency escape measures / procedures are incorporated, where possible, to any part of the building (e.g. basements) that are situated below the 1% AEP (1 in 100 annual probability) river flood; or 0.5% AEP (1 in 200 annual probability) sea flood level in any year (including an allowance for climate change). As the site is within a Flood Zone 2 flood resilience / resistance and emergency escape measures/procedures will not be necessary.

6. Conclusions and Recommendations

The site is shown to be located within a flood Zone 2 and may be at risk of flooding in an extreme event greater than the 1%CC AEP.

It is recommended that the ground floor levels of the dwellings are raised to 42.80mAOD to be above the maximum JFLOW flood level for the 0.1% AEP.

Due to the medium risk of flooding it is not considered necessary for flood resilience or flood repairable construction to be used or that an Emergency Flood Plan is prepared.

There will be an increase in impermeable areas post-development and the rate of surface water runoff to watercourses and sewers needs to be managed to not exceed the pre-development rates so that the risk of flooding will not be increased by the development on the site or elsewhere.

7. Report Signature



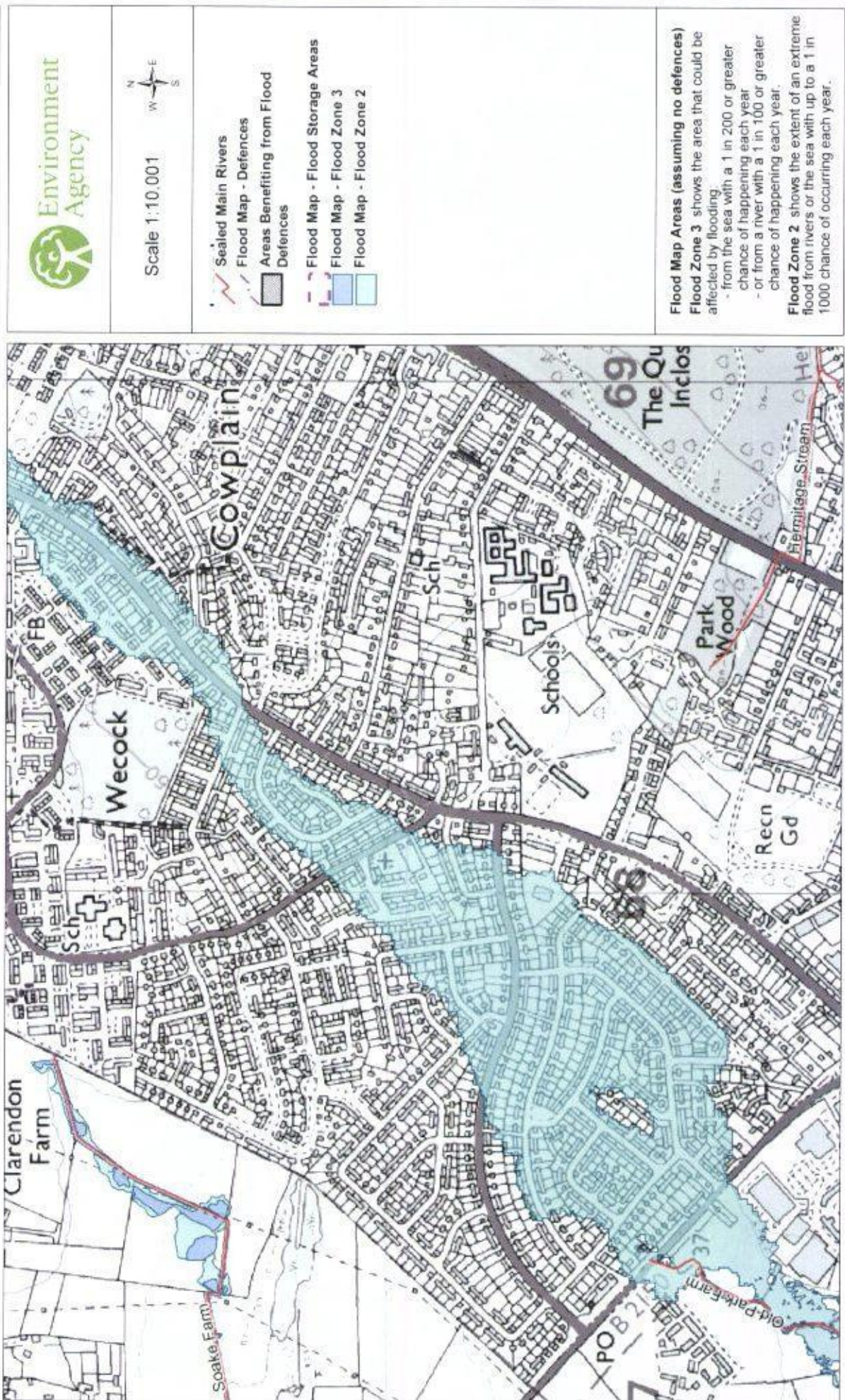
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Appendix A

Environment Agency Product 4 Flood Data

Flood Map Centered on Hart Plain Avenue - Created 17 July 2013 (Ref: SSD/1461/FS)



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Flood Levels Centered on Hart Plain Avenue - Taken from JFlow Created 17 July 2013 (Ref: SSD1461/FS)



Legend

● Location Points

Ground Level

Value

High : 233.2

Low : 16.5628

Depth

Value

High : 2.0349

Low : 0



1:342

*when printed at A4.

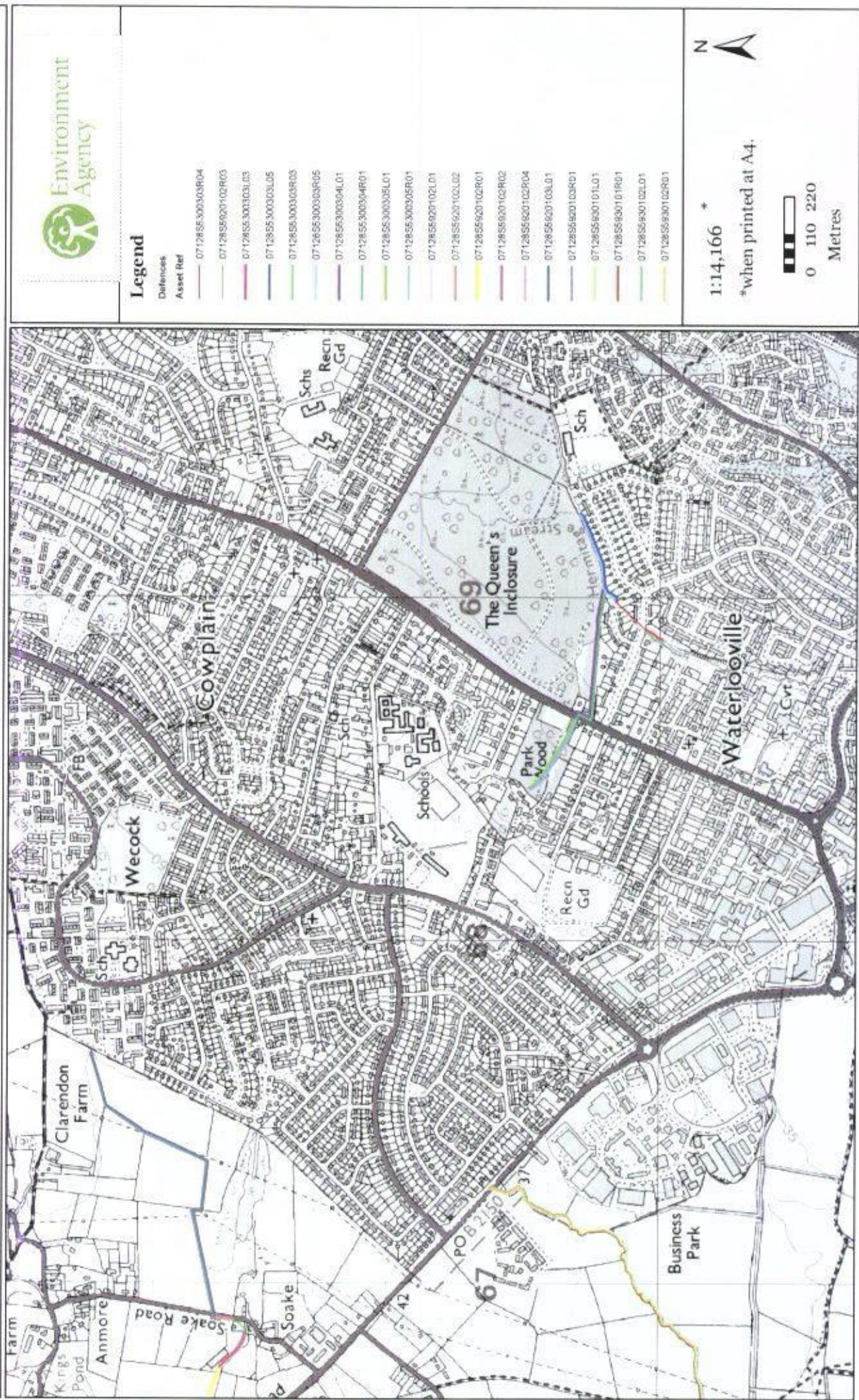


Water Depths & Levels for Hart Plain Avenue - JFlow
(SSD/1461/FS)

Point	Water Depth (Metres)	Water Surface Level (mAOD*)	Ground Level
	0.1% Annual Probability/1 in 1000 Year (Flood Zone 2)	0.1% Annual Probability/1 in 1000 Year (Flood Zone 2)	
1	0.21	42.63	42.42
2	0.20	42.57	42.37
3	0.23	42.61	42.38
4	0.22	42.60	42.38
5	0.19	42.57	42.38
6	0.21	42.60	42.39
7	0.29	42.73	42.44
8	0.28	42.73	42.45
8	0.30	42.73	42.43
10	0.32	42.74	42.42

* Levels in metres above Ordnance Datum Newlyn

Flood Defences Centered on Hart Plain Avenue - Created 17 July 2013 (Ref: SSD1461/FS)



Asset Ref.	Asset Type	Description	Location	Maintainer	Estimated Design Standard
07128S5300303L03	natural channel	overgrown channel	d/s Highfield Ave	private	1:5
07128S5300303L05	natural channel	Various 'makeshift' defences	The Queen's Inclosure	private	1:5
07128S5300303R03	natural channel	Overgrown channel	d/s Highfield Ave	private	1:5
07128S5300303R05	natural channel	Various 'makeshift' defences	The Queen's Inclosure	private	1:5
07128S5300304L01	natural channel	Natural channel	Queen's Inclosure	private	1:5
07128S5300304R01	natural channel	Natural channel	Queen's Inclosure	private	1:5
07128S5300305L01	natural channel	Natural bank	Park Wood	private	1:5
07128S5300305R01	natural channel	Natural channel	Park Wood	private	1:5
07128S5920102L01	maintained channel	Natural bank	Hambledon Road to Soake Farm	EA	1:2
07128S5920102L02	maintained channel	Natural bank	Soake Farm	EA	1:5
07128S5920102R01	maintained channel	Natural bank	Hambledon Road to Soake Farm	EA	1:2
07128S5920102R02	maintained channel	Natural bank with development at crest of bank.	Soake Farm	private	1:2
07128S5920102R04	maintained channel	Natural bank	Soake Farm	EA	1:5
07128S5920103L01	maintained channel	Natural bank.	Soake Farm to end of study.	EA	1:5
07128S5920103R01	maintained channel	Natural bank	Soake Farm to end of study	EA	1:5
07128S5930101L01	maintained channel	Natural bank	Wallington confluence to farm bridge.	private	1:2
07128S5930101R01	maintained channel	Natural bank	Wallington Confluence to Farm Bridge	private	1:2
07128S5930102L01	maintained channel	Natural bank	Old Park Farm	private	1:2
07128S5930102R01	maintained channel	Natural bank	Old Park Farm	private	1:2
07128S5300303R02	culverted channel	Culverted channel	Rear of 15 Billett Ave	EA	1:5
07128S5300303R04	culverted channel	Culverted channel	Under Highfield Ave	private	1:5
07128S5920102R03	culverted channel	Culvert	Soake Farm	private	1:5

Use of Environment Agency Information for Flood Risk / Flood Consequence Assessments

Important

If you have requested this information to help inform a development proposal, then we recommend that you undertake a formal pre-application enquiry using the form available from our website:-

<http://www.environment-agency.gov.uk/research/planning/33580.aspx>

Depending on the enquiry, we may also provide advice on other issues related to our responsibilities including flooding, waste, land contamination, water quality, biodiversity, navigation, pollution, water resources, foul drainage or Environmental Impact Assessment.

In **England**, you should refer to the Environment Agency's Flood Risk Standing Advice, the technical guidance to the National Planning Policy Framework and the existing PPS25 Practice Guide for information about what flood risk assessment is needed for new development in the different Flood Zones. These documents can be accessed via:

<http://www.environment-agency.gov.uk/research/planning/82587.aspx>

<http://www.communities.gov.uk/publications/planningandbuilding/nppftechnicalguidance>

<http://www.communities.gov.uk/publications/planningandbuilding/pps25guideupdate>

You should also consult the Strategic Flood Risk Assessment produced by your local planning authority.

In **Wales**, you should refer to TAN15 for information about what flood consequence assessment is needed for new development in the different flood zones

<http://new.wales.gov.uk/splash.jsessionid=8yIGTfGZthmB0t2vhp6hS1GcB1LXvZzB3Ylczf20Xn7LK3zK0nMk!981825250?orig=/topics/planning/policy/tans/tan15/>

You should also consult the Strategic Flood Consequence Assessment if one has been produced by your local planning authority.

In both **England and Wales** you should note that:

1. Information supplied by the Environment Agency may be used to assist in producing a Flood Risk / Consequence Assessment (FRA / FCA) where one is required, but does not constitute such an assessment on its own.
2. This information covers flood risk from main rivers and the sea, and you will need to consider other potential sources of flooding, such as groundwater or overland runoff. The information produced by the local planning authority referred to above may assist here.
3. Where a planning application requires a FRA / FCA and this is not submitted or deficient, the Environment Agency may well raise an objection.
4. For more significant proposals in higher flood risk areas, we would be pleased to discuss details with you ahead of making any planning application, and you should also discuss the matter with your local planning authority.

JFLOW - Appendix

- Our work to produce Flood Zones followed a 10 year programme which delivered more detailed mapping for 821 locations. However, in order to complete Flood Zones we needed national coverage, hence a generalised approach was used to provide this national coverage within the time available, to fill the gaps between the 821 locations where we had more detailed information. The Flood Zones are therefore not as accurate as we would normally specify for river modelling, but they do provide an adequate indication of the extent of flood risk such that developers can consider flooding as part of their proposals to ensure they are not unknowingly putting additional lives at risk. This is the purpose for which the Flood Zones were produced.
- Neither water depths nor water levels were outputs that were specified when we commissioned this generalised modelling for Flood Zones. Whilst the modelling process does provide some information on depth of water, it would have been possible to produce the flood extents without storing the water depth values, since water depth is only a 'by-product' of the calculation process. As the JFLOW modelling method was developed, tested and reviewed for production of the Flood Zone extents only, we currently have no information on the accuracy of the water depth data.
- The models were run using a Digital Terrain Model (DTM) with a 5m x 5m grid. However the DTM grids were generalised to between 5m and 100m (depending on the type of model and location, for reasons such as processing speed). Fluvial modelling produced depth data which can be processed using the DTM to provide water level data. However the differing grid sizes means that there is a significant potential for inaccuracy in producing level data, because of the DTM generalisation.
- Therefore because of the nature of the model and the DTM, in many cases it will not be possible to confidently assess whether or not a site is above the resulting water level. This is because there are further inherent uncertainties in the depth calculation and within the DTM itself.
- Depth or level outputs from the National Generalised Modelling (JFLOW) are only suitable to be used for decision making at a broad catchment or Shoreline Management Plan coastal cell scale (or larger).
- **They are not suitable for use in site specific Flood Risk Assessments or Strategic Flood Risk Assessments and must not normally be used for these studies. However, where in exceptional circumstances Nationalised Generalised Modelling outputs are requested to be used for anything other than at a broad catchment or Shoreline Management Plan coastal cell scale further verification must be undertaken. As part of this verification the outputs must be proven to be suitable and appropriate bearing in mind the conclusions the user wishes to draw from them and this use must be agreed in writing by the local Environment Agency staff.**
- If any agreement is given by the Environment Agency in pursuance of the above, the User accepts and agrees that such agreement by the Environment Agency that that National Generalised Modelling outputs are suitable for a particular use does not imply agreement that the proposals are appropriate or that the Environment Agency has no further comment on flood risk, rather that following verification the User has proven that the outputs are suitable to help assess the flood risk in the particular circumstances.
- Any assessment of Flood Risk undertaken must be appropriate for the decisions that need to be based upon it, consider the risks and also take into account any limitations of the data used
- Please read the enclosed Notice and be aware that the Environment Agency does not guarantee that this data is suitable for your purposes.
- **The consultants employed to deliver JFLOW Flood Zones to the Environment Agency were Jeremy Benn Associates (JBA). I should make you aware that JBA will not release information that either is owned by the Environment Agency or based upon Environment Agency information as they are not licensed to do so. You will need to request any information you require from the Environment Agency.**
- Information provided relates solely to flood risk issues and is based on the best available information to date in the Environment Agency. If further information becomes available to the Environment Agency (on flood risk issues or on other environmental issues which affect a FRA) or policy changes, we reserve the right to comment further or to supply further information or to amend information sent.
- If this information is supplied in connection with a flood risk assessment of development proposals and any material amendments made thereto at any stage prior to the submission of a planning application, the User should be aware of the need to consult the Environment Agency further

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Appendix B

Drawings:

E133/01	LOCATION PLAN
E133/02	SITE PLAN
1569/01	EXISTING SURVEY



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JOB TITLE

**Proposed development at
53 Hartplain Avenue**

DRAWING TITLE

Location plan

Scale

1:1250@A4

Date

March 2013

Drawing No.

E133/01



P E A K

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