

Church Farm, Pound Lane, Hardwicke, Queadgely, Gloucestershire GL2 4RL

Flood Evacuation Plan (FEP) 10th August 2023, Rev V1







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Quality Assurance

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Appendix 2 Personal Flood Plan



1.0 Introduction

The Hardwicke Court Estate wishes to convert a disused barn into a single dwelling. A planning application is being submitted via Class Q and the submission has been discussed with the Planning Officer.

A Flood Risk Assessment and Drainage Strategy dated 3rd May 2018, V1, (FRADS) by Clive Onions Ltd has been prepared and the Planning Officer has requested that a Flood Evacuation Plan (FEP) also be submitted, with provision for flood warning. This FEP considers the findings of the FRADS and shows that the site will be safe for its lifetime for the occupants of the proposed dwelling and their access during flooding.

According to the Environment Agency (EA) Flood Map for Planning part of the site is located within Flood Zone (FZ) 3. The South Gloucestershire SFRA shows the west of the site to be in Flood Zone 2 and the east to be in Flood Zone 1.

However, the site is outside the EA's area within which flood warnings are currently offered, highlighting the considered low flood risk at the site.

This FEP describes the flood risk, warning periods, the EA Flood Warning Codes and includes the EA's Personal Flood Plan for the occupants to complete.

The barn floor is raised above the surrounding land and significantly above the predicted flood level at the end of the lifetime, and as such the proposals are safe and comply with the relevant National Planning Policy Framework (NPPF) Paragraph, 167 (e).

2.0 Site Description and Setting

The site is located in the rural area south of Hardwicke, within a group of barns associated with an adjacent occupied dwelling at Church Farm, Pound Lane, Hardwicke, Gloucestershire, GL2 4RL.

The main access to the site from major services (ie Gloucester) is along Pound Lane from the east, which joins the A38 some 800m to the east of the site.

The Gloucester and Sharpness Canal is 470m to the west, and the River Severn is some 3.2km west of the site (as the crow flies).



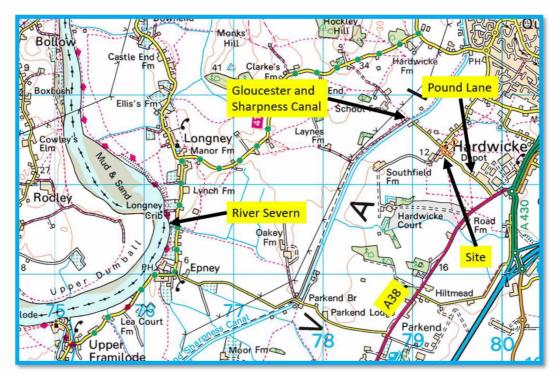


Figure 1 Site Location showing key features references in text (Streetmap)

3.0 Flood Risk and Access

3.1 Fluvial Flood Risk

The EA site-specific Flood Risk Map for Planning, supplied in response to an EA enquiry, shows the access within the site to be in Flood Zone 1 and shallow flooding on a short length of Pound Lane.

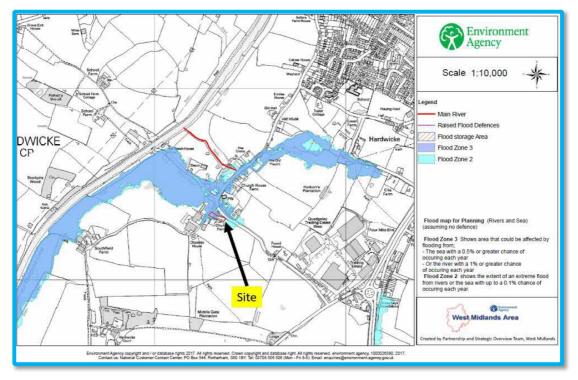
The wider published Flood Map for Planning shows the source of flooding to be the River Severn, and flooding would be caused by a coincidence of high flows in the River Severn potentially combined with high tides and surge tides.

The River Severn, the source of the potential flooding, is some 4.3km southwest of the site, due to high ground in a direct line between the site and the River Severn.

The conditions which could potentially lead to flooding are likley to be;

- Heavy rain in the upper catchment of the River Severn, causing flooding in the Gloucestershire area in 2007 the flooding occurred 3 days after the heavy rains.
- A low pressure weather system crossing the Atlantic. Experience has shown that the Met Office gives several days' warning of such conditions, and recent experience has shown that 3 days' warning of a surge tide is routine.
- The combination of a high tide surge and heavy rain is rare, since the low pressure systems first cause the surge tide, then progresses across the





country causing heavy rain, and then the rain increases river flow, by which time the surge tide has past.

Figure 2 EA Product 4 site-specific flood map with site arrowed

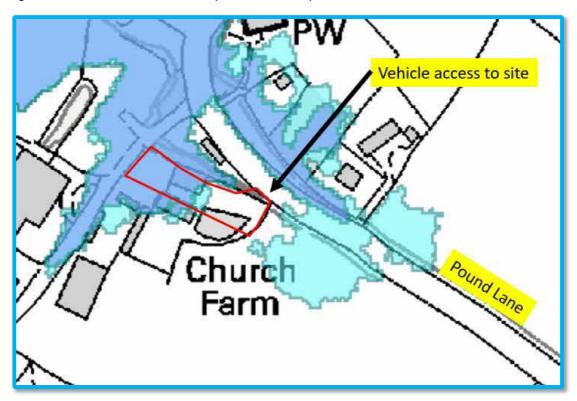


Figure 3 Extract from EA site-specific flood map showing west of site in FZ3 and site access to the east in FZ 1. Note Pound Lane is shown to be in FZ2 over a short distance (and the roadside ditches are not defined – see later).



The plan below shows that not only is there warning for the low pressure system causing the storm, but also the time for the water level to build up in the River Severn, then the 'flood wave' to travel down the river, then the banks of the river to breach and floodwater to travel the 4.4km to the site, which as can be seen, is at the extreme extent of the predicted flood zone.



Figure 4 EA Flood Risk Map for Planning with the flood pathway in black broken line

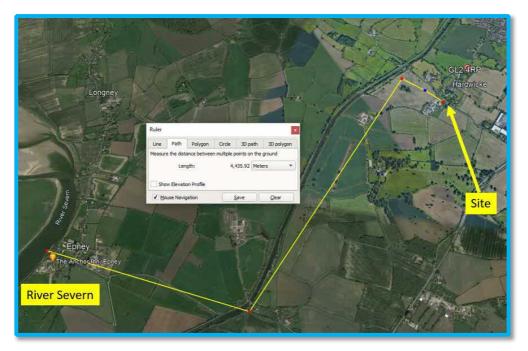
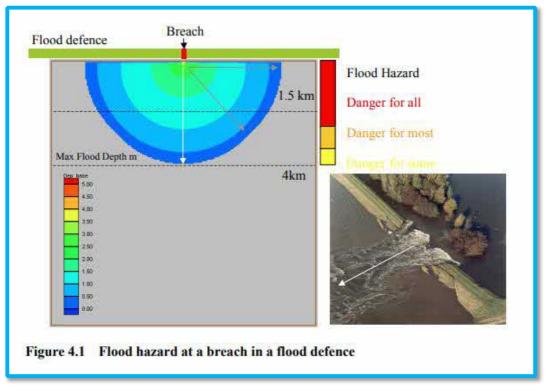


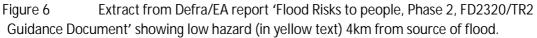
Figure 5 Google Earth image with same flood pathway superimposed, showing the travel distance over 4.4km



The above description of the flood mechanism shows that there are likley to be in the order of 4-5 days warning, new broadcasts, weather forecasts, social media reports etc before flooding would reach Chapel Farm in the most extreme event.

Furthermore, the Defra/EA report 'Flood Risks to people, Phase 2, FD2320/TR2 Guidance Document' shows that a hazard some 4km from the source of a breach in flood defences is categorised as Danger for Some, because it is remote from the source, moving slowly, and tending to be shallow, as in this case. This is an acceptable hazard within the guidance.





Referring to the Stroud District Council SFRA and considering climate change, it is clear that at this remote location from the source of flooding there is insignificant change in the flood risk due to climate change and the effect is not discernible at the site.



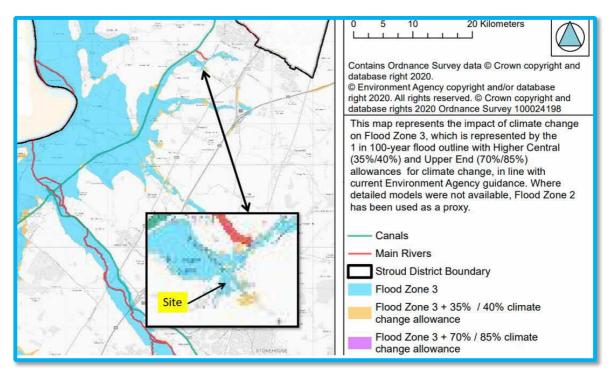


Figure 7 Extract from Stroud District Council SFRA showing impact of climate change is negligible at the site.

In Summary, the warning time of fluvial flooding at the site is in days, and the hazard is shown to be low. This shows that the proposal is safe in terms of fluvial flood risk.

3.2 Surface Water Flood Risk

The EA surface water flood risk map for the design case (Medium Risk Scenario) shows that the site is at very low risk of flooding, and that shallow flooding of less than 300mm occurs on Pound Lane.

However, given that the lane is raised above the surrounding fields (which are not shown to be at risk of flooding) and the lane has substantial roadside ditches, the judgment is that the water would be collected in the ditches and the road is likley to be free from flooding.

This site-specific assessment therefore shows that the road is above the surrounding land, which is not shown to be flooded, and that the surface water will be gathered and conveyed in the historic ditches which are there for that purpose. In summary, the following images show the surface water flood risk map, the ditches with site access, and the Hazard Rating Table to show that the proposal is safe for its lifetime.





Figure 8 EA Surface water flood map showing the site to accessible with less than 300mm of flooding along Pound Lane



Figure 9 Site superimposed on EA surface water flood map showing building and access to Pound Lane free from flood risk (using bridge access). Note that section of Pound Lane shown flooded is similar to that show on the fluvial map, confirming that the fluvial flooding is also less than 300mm deep.



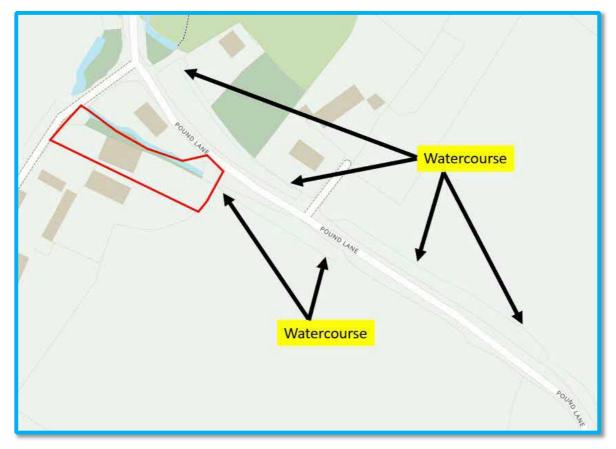


Figure 10 Ordnance Survey map showing roadside ditches



Figure 11 Goole Streetview image showing substantial roadside ditches, Pound Lane above the surrounding land and the established site access.





Figure 12 Established site access off Pound Lane



This table is recommended for development planning and control use.

Table 4 – Hazard to People Classification using Hazard Rating (HR = d x (v + 0.5) + DF) for (Source Table 13.1 of FD2320/TR2 - Extended version)

HR		Depth of flooding - d (m)													
		DF=	0.5						DF = 1						
Velocity v (m/s)	0.05	0.10	0.20	0.25	0.30	0.40	0.50	0.60	0.80	1.00	1.50	2.00	2.50		
0.0	0.03 +0.5 = 0.53	0.05 + 0.5 = 0.55	0.10+0 <i>5</i> = 0 .60	0.13+0.5 = 0.63	0.15 + 1.0 = 1.15	0.20+1.0 =1.20	023 + 1.0 = 125	0.30 + 1.0 = 1 .30	0.40 + 1 0 = 1.40	0.50 + 1.0 = 1.50	0.75 + 1.0 × 1.75	1.00 + 1.0 = 2.00	125+13 +2.25		
0.1	0.03+05= 0.53	0.06 + 0.5 = 0.56	0.12+05 = 0.62	0.15+0.5 = 0.65	0.12 +1.0 = 1.18	0.24+1.0 =1.24	030+10 = 130	0.36 + 1.0 = 1 .36	0.48+10 = 1.48	0.60 + 1.0 = 1.60	0.90 + 1.0 = 1.90	100+10 = 2.20	1.50+1.0		
0.3	0.04+0.5= 0.54	0.08 + 0.5 = 0.58	0.15+05 = 0.65	0.19+0.5 = 0.69	0.23+1.0 =1.23	0.30+1.0 =1 .30	038+1.0 = 1.38	0.45 + 1.0 = 1. 45	0.60+10 = 1.60	0.75 + 1.0 = 1.75	110+11 =233	1.30 +1 0 = 2.50	1 (8) +1 () = 2.88		
0.5	0.05+0.5= 0.55	0.10+0.5 = 0.60	0.20+0.5 = 0.70	0.25+0.5 = 0.75	0.30+1.0 = 1.30	0.40 + 1.0 = 1.40	0.50 + 1.0 = 1.50	0.60 + 1.0 = 1.60	0.80 + 1 0 = 1.80	1.00 + 1.0 = 2.00	1.30+11 = 2.50	200+10 = 3400	2.53+1.1 = 3.50		
1.0	0.08+0.5= 0.58	0.15+0.5	0.30+0 <i>5</i> - 0.60	0.38+0.5 - 0.68	0.45 +1.0 -1.45	0.60 + 1.9 - 1.60	075+1.0 -1.75	0.90 + 1.0 - 1. 90	120+10 - 220	1.59 + 10 - 2.59	221+11 -3.28	0.00 + 1.0 - 4.00	375+11		
1.5	0.10+0.5= 0.60	0.20 + 0.5 = 0.70	0.40+0 <i>5</i> = 0.90	0.30 + 0.5 = 1.00	0.60 + 1.0 = 1.60	0.80 + 1.9 = 1.80	1 00 ± 1.0 = 2.00	1 20 + 1 0 + 2 28	+2.60 +2.60	200+10 +3.00	3.00 + 1.0 + 8.00	4.00 ±1 0 = 5.00	580 +11 = 6.00		
2.0	0.13+0.5= 0.63	0.25+0.5 = 0.75	0.50+0.5 = 1.00	0.63+0.5 = 1.13	0.75 +1 0 = 1.75	1.00+1.0 = 2.00	1.23 + 16 • 2.25	1 50 + 1 0 + 2 50	0 (+ + 08 C) + 3 00	3.50	4.75	6.00	7.25		
2.5	0.15+0.5= 0.65	0.30+0.5 = 0.80	0.60+0 <i>5</i> = 1.10	0.75+0.5 = 1.25	0.90+1.0 =1.90	120+10	1.50+1.0 +2.50	1.80+1.0 +2.80	3.48	4.86	5.50	7.00	8.58		
3.0	0.18+05= 0.68	0.35+0.5 = 0.85	0.70+05 = 1.20	0.88 +0.5 = 1.38	105+11 +238	140+18	195+11 =275	3.10	3.80	4.50	6.25	8.06	9.75		
3.5	0.20+0.5= 0.70	0.40+0 <i>5</i> -0.90	0.80+0 <i>5</i> - 1.30	1.00 + 0.5 - 1.50	120+1.0 + 2.20	1.60+1.0	300	3.40	8.28	5.00	2.00	9.00	11.00		
4.0	0.23+0.5= 0.73	0.45+0.5 = 0.95	0.90+0.5 = 1.40	1.13+0 <i>5</i> = 1.63	133+1.0 +2.35	120+10 - 2.80	3.25	3.76	¥ 58	5.50	7.75	30.00	12.25		
4.5	0.25+0.5= 0. 75	0.50 + 0.5 = 1.00	1.00+0.5 = 1.50	125+0.5 = 1.75	1 50 + 1 II = 2.50	-3.00	350	4.00	5.08	6.00	8.50	11.00	13.50		
5.0	0.28+05= 0.78	0.60 + 0.5 = 1.10	1.10+0 <i>5</i> = 1.60	1.38+0.5 = 1.88	165+1.0 =2.65	3.20	375	4.30	5.00	\$.50	9.25	12.00	14.75		
Flood Hazard Colour Hazard to Rating (HR) Code						e Class	ificatio	n							
Less than 0.75 Very low						and the second second									
0.75 to 1.25 Danger for						- includ	les chil	dren, th	e elderl	y and th	ne infirr	n			
1.25 to	2.0	(D	anger fo	or most -	- includ	es the g	eneral	public	141					
More t	han 2.0		D	anger fo	or all - in	ncludes	the em	ergency	service	es					

Figure 13 Extract from FD2320/TR2 showing that 300mm is a safe depth (Up to Hazard Rating 1.25 is accepted as safe)

4.0 Safe Access at Peak of Design Flood Event

The above assessment of the fluvial and surface water flood risks shows that access to and from the site will be safe for its lifetime at the peak of the predicted flooding, and therefore complies with paragraph 167 (e) of the National Planning Policy Framework (NPPF).



5.0 Flood Warning and Access

It has been explained above that the occupants of the site will have several days' warning of potential flooding. The EA considers flood risk and warning areas, and if residents are not within the food warning area, they are usually unable to receive warnings.

The site is currently not in an area which could benefit from EA warnings (see Figure 14 below).

However, we would advise the residents to complete a Personal Flood Plan (as in Appendix 2) and also contact the EA to see if they can register with the EA's Flood Warning Service. The EA would usually write to existing residents if they extend the flood warning area to include their postcode.

The fact that the site is outside the EA's flood warning area emphasises the low flood risk that the EA considers applies to the site.

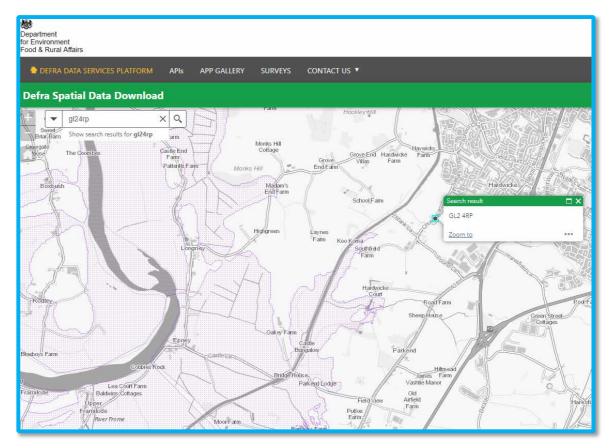


Figure 14 Extract from EA Flood Warning Areas map, showing sit to be outside the warning area (purple stippled areas).

The occupants have the choice of remaining in the building, which is safety above the predicted flood level, or they can travel eastwards along Pound Lane to the A38 and hten to the main services in Gloucester.



6.0 Conclusions

It is proposed to change the use of a barn via Class Q. The barn is in a group of buildings adjacent to an occupied dwelling.

A Flood Risk Assessment and Drainage Strategy (FRADS) has been prepared which describes the flood risk to he site.

In consultation about the proposal, the Plannign Officer has requested a Flood Emergency Plan (FEP) with provision for flood warning.

This FEP has undertaken a site-specific assessment to the flood risk to the site and access in the context of the Emergency Plan.

This FEP shows the following;

The fluvial food risk is low and has several day's warning The site is some 4.4km from the potential source of predicted fluvial flooding, providing further warning, Surface water flooding does not affect access within the site Shallow surface water flooding of less than 300mm is predicted on the Lane, although this assessment considers the water will collect int eh substantial roadside ditches The depth of predicted flooding is less than Hazard Rating 1.25, and therefore safe The site is outside the EA's Flood Warning Zone, highlighting the low flood risk anticipated This report recommends nevertheless that the occupants seek to Register with the EA's Flood Warning Service The occupants will complete the Personal Flood Plan in Appendix 2

The above assessment shows that the occupants will be able to safely leave the site at the peak of the predicted design flood, and that the proposal complies with the NPP.

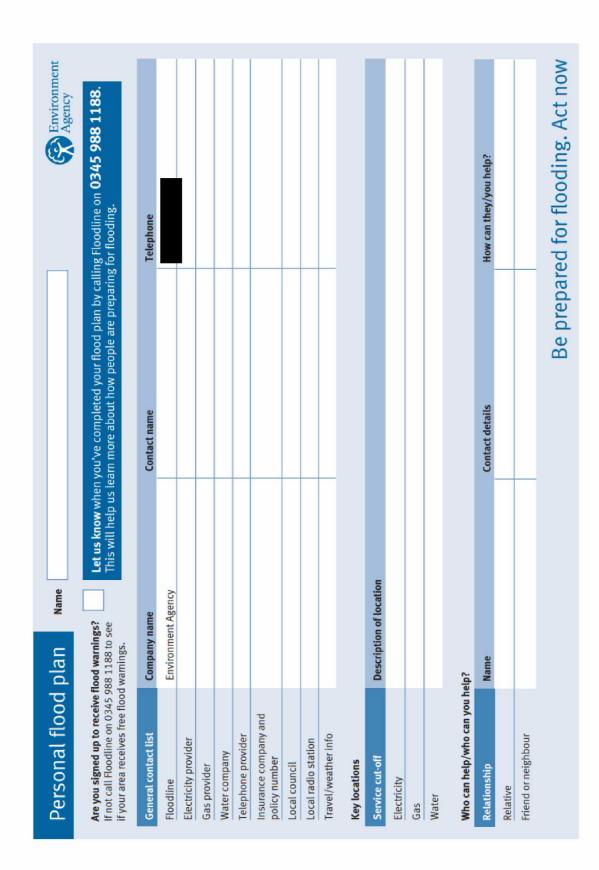
It is important that nobody is complacent about flooding, and Appendix 1 includes the Flood Warning Codes as a precaution.

Environment Agency Flood Warning Codes

Warning no longer in force	What it means No further flooding is currently expected for your area.	When it's used When a flood warning or severe flood warning is no longer in force.	Triggers • Risk of flooding has passed. • River or scal tevels have dropped back below severe flood warning or flood warning levels. • No further flooding is expected. • Professional judgment and discussions with partners agree that a severe flood warning status is no longer needed.	Impact on the ground • No new impacts expected from flooding, however there still may be: • standing water following flooding; • flooded properties; • flooding or damaged infrastructure.	Advice to the public/media - Be careful. Flood wate may still be around for several days and could be contaminated. - If you've been flooded, ring your insurance company as soon as possible.	Advice to operational organisations • Recovery phase will have started. • Advise the public co call foldinge on 0845 981 188 for advice on what to do if they have been affected by flooding.
SEVERE FLOOD WARNING	What it means Severe flooding. Danger to life.	When it's used When flooding poses a significant risk to life or significant disruption to communities.	Triggers • Actual flooding where the conditions pose a significant risk to life and/or widespread discuption to communities. • On-site observations from flooded locations. • A breach in defences or failure of a barrier that is likely to cause significant risk to life. • Discussions with partners.	Impact on the ground • Deep and fast flowing water. • Deep and fast flowing water. • Debtain in the water causing danger. • Detential or observed collapse of buildings and structures. • Communities isolated by flood waters. • Communities isolated by flood waters. • Carrier infrastructure for communities disabled. • Military support.	Advice to the public/media - Stay in a safe place with a means of escape. - Be ready should you need to evacuate from your home. - Co-operate with the emergency services. - Call Poop fryou are in immediate darger. - Call Rooding on 0845 988 1188 for up-to-date flooding information.	Advice to operational organisations - Check flood response plans for actions required at this stage. Required at this stage. The stage should the authorities decide fir's needed. Develop rism reeded. and the public.
	What it means Flooding is expected. Immediate action required.	When it's used Half an hour to one day in advance of flooding.	Triggers - High tides, surges coupled with strong winds. - Heavy rainfall forecast to cause flash flooding of nivers. - Forecast flooding from rivers.	Impact on the ground Flooding of homes and businesses. Flooding of nainestructure. Flooding of mads with major impacts. Significant waves and spray on the coast. Extensive flood plain inundation (including caravan parks or campsites). Flooding of major tourist/recreational attractions.	Advice to the public/media Protectyourself, your family and help others. More family, pets and valuables to a safe place. Turn off gas, electricity and water supplies if sche od so. Put flood protection equipment in place. Put flood are caught in a flash flood, get to higher gound. If you are caught in a flash flood, get to higher gound.	Advice to operational organisations - Check flood response plans for actions required at this starge. The starge at this starge. required at this starge. Foreket to your local Environment Agency Flood Warning Duty Officer for the latest forecast minormation. - Advise the public to call Flooding information. - Please report any flooding in your area to your local Environment Agency office.
FLOOD ALERT	What it means Flooding is possible. Be prepared.	When it's used Two hours to two days in advance of flooding.	Triggers • Forecasts that indicate that flooding from there may be possible. • Forecast intense rainfall for rivers that respond very rapidly. • Forecasts of high tides, surges or strong winds.	Impact on the ground • Flooding of fields, recreation land and car parks • Flooding of minor roads. • Flooding of farmland. • Spray or wave overtopping on the coast.	Advice to the public/media Be prepared to act on your flood plan. Prepare allood kit of essential items. Avoid walking, cycling or driving through flood water. Farmers should consider moving livestock and equipment away from areas likely to flood. Call Floodline on 0845 988 1188 for up-to-deline on 0845 988 1188 for up-to-deline on 0845 988 1188 for motion local water levels on the Environment Agency website www.environment-agency.gov.uk.	Advice to operational organisations - Check your flood response plans to see how your organisation needs to respond. - Speak to your local Environment Agency Flood Warning Duty Officer for the latest forecast information. Dial into Flood Advisory Service teleconferences. 2 Advise the public to call Flooding information. - Please report any flooding in your area to your local Environment Agency office.
Three-day flood risk forecast	What it means Be aware. Think ahead. Keep an eye on the weather situation.	When it's used Daily forecasts of flood risk on our website www.environment-agency.gov.uk. These are updated more frequently for higher flood risk situations:	Triggers Information updated daily on the Environment Agency website The information includes the current and The information and how this is likely to affect each county in England and Wales over the next three days.	Impact on the ground Maps will show one of four levels of risk for each county. Green = no risk of flooding • Yellow = low risk of flooding • Amber = medium risk of flooding • Red = high risk of flooding	Advice to the public/media • Check the forecast on our website. • Remain aware of the impending weather conditions for your area.	Advice to operational organisations • The three-day forecast is the public facing version of the Flood Guidance Statement that category 1 and 2 responders receive. • Advice for organisations varies depending on the level of flood risk and is provided on the Flood Guidance Statement issued by the Flood Forecasting Centre.







Appendix 2 Personal Flood Plan



Revironment Agency	you can get Identify what you would need to take with you if you had to leave your home help you/ Understand the flood warning codes lp																				Be prepared for flooding. Act now
What can I do NOW?	Look at the best way of stopping Find out where you can get floodwater entering your property Make a flood plan and prepare a who you can help you/ flood kit who zan help you/	Location	afety	ags in place	way from the risk	ies		ang curtains over rods		bags and move to safety			them down	14 14 15 15	and stock		safety		ay need to leave your home	Get your flood kit together and include a torch, warm and waterproof clothing, water, food, medication, toys for children and pets, rubber gloves and wellingtons	otect
Personal flood plan	Put important documents out of Look at flood risk and protect in Make a polythene Make a Check your insurance covers you flood ki for flooding What can you do if a flood is expected in your area?	Actions	Home Move furniture and electrical items to safety	 Put flood boards, polythene and sandbags in place 	 Make a list now of what you can move away from the risk 	 Turn off electricity, water and gas supplies 	 Roll up carpets and rugs 	 Unless you have time to remove them hang curtains over rods 	 Move sentimental items to safety 	 Put important documents in polythene bags and move to safety 	Garden and outside	 Move your car out of the flood risk area 	 Move any large or loose items or weigh them down 	Business	 Move important documents, computers and stock 	 Alert staff and request their help 	 Farmers move animals and livestock to safety 	Evacuation - Prepare a flood kit in advance	 Inform your family or friends that you may need to leave your home 	 Get your flood kit together and include a torch, warm and waterproof clothing, water, food, medication, toys for children and pets, rubber gloves and welling 	There are a range of flood protection products on the market to help you protect your property from flood damage. A directory of these is available from the National Flood Forum at www.bluepages.org.uk

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