

LITTLE DONGRAY FARM, BANGOR-ON-DEE

FLOOD PLAN
Final Report v1.0

February 2018

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Report Title: **Little Dongray Farm, Bangor-on-Dee**
Flood Plan
Final Report v1.0

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Every reasonable effort has been made to ensure that the information upon which this Flood Plan has been based is accurate and comprehensive at the date of production. It is the responsibility of the property owner to ensure that the plan is subsequently maintained up to date.

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1 INTRODUCTION

1.1 PURPOSE OF REPORT

This Flood Plan has been produced to ensure that the occupants at Little Dongray Farm, Bangor-on Dee are satisfactorily prepared for a flood event and have a clear understanding of the procedures involved with the evacuation of animals from the proposed stable building and horse manège; to a safe refuge point should a flood event occur.

Given that the stable building and horse manège are within close proximity to the existing building, it may be assumed that the following objectives set out in the Flood Plan can be applied to Little Dongray Farm.

The objectives of the Flood Plan are summarised below:

- To ensure all users and occupants are aware of the potential risk of flooding and the procedures that should be implemented in the event that flooding is expected or has occurred
- To reduce the risk to property and life (humans/animals)
- To reduce the likelihood of anyone entering flood waters
- To reduce the likelihood of a disorganised response to potential or actual flooding

1.2 STRUCTURE OF THE REPORT

The report is structured as follows:

- Section 1** Introduction and report structure
- Section 2** Background information and the potential risk of flooding at the site
- Section 3** How to receive flood messages and warnings
- Section 4** How to respond safely to a flood event

1.3 RELEVANT DOCUMENTS

The Flood Plan has been informed by a Flood Consequences Assessment (FCA) prepared by Weetwood Services Ltd ('Weetwood') for the site in January 2018¹ in support of the planning application for the stable building and horse manège.

¹ Flood Consequences Assessment; Little Dongray Farm, Bangor-on-Dee, Weetwood, January 2018 (ref: 4035/FCA/Final/v1.1/2018-01-08)

2 SITE LOCATION AND FLOOD RISK

2.1 SITE LOCATION

The site is located 270 m north of the B5069 (Station Road) at Ordnance Survey National Grid Reference SJ 399 458 as shown in **Figure 1**.

The River Dee is located approximately 485 m north of the site, and flows in a north-easterly direction. Dungrey Brook is located approximately 64 m west of the site and flows in a northerly direction, ultimately outfalling into the River Dee.

Watercourse A is located approximately 5 m east of the site and flows in a northerly direction, outfalling to Dol-Enion Brook approximately 95 m to the north-east. This Brook in turn flows in a north-easterly direction ultimately outfalling to the River Dee.

The River Dee, Dungrey Brook and Dol-Enion Brook are classified as 'main river'.

Watercourse A may be classified as an 'ordinary watercourse'.

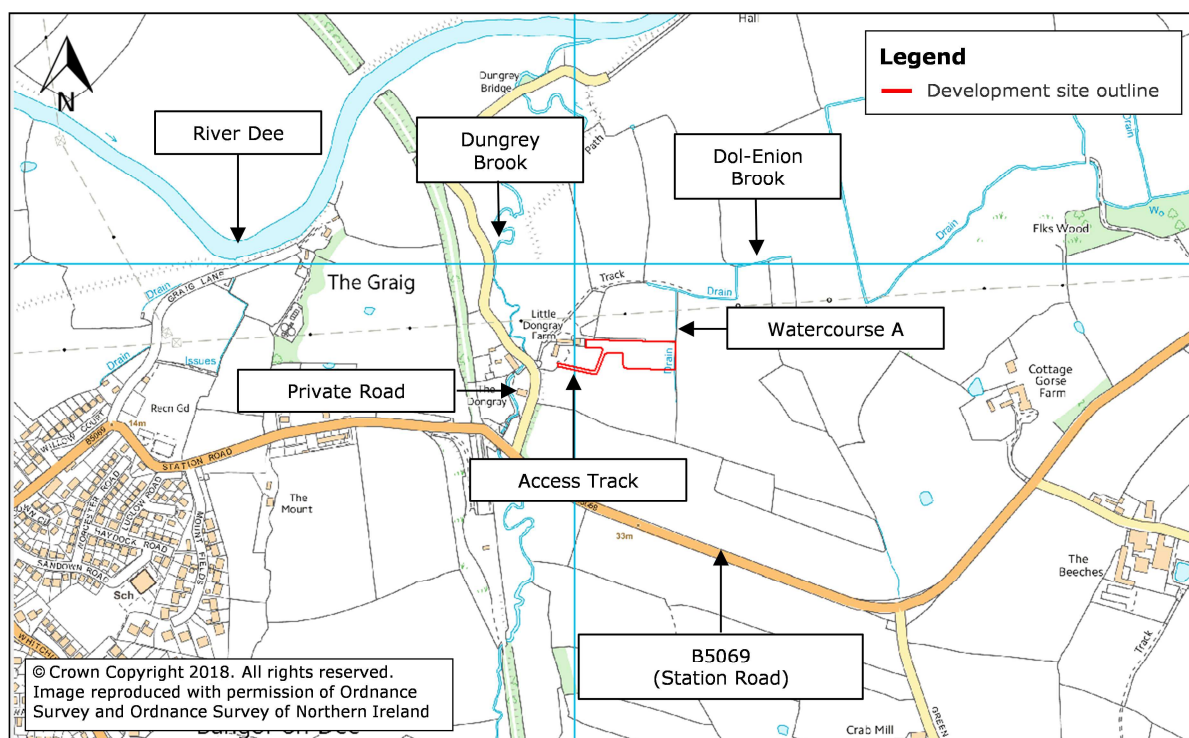


Figure 1: Site Location and Waterbodies

2.2 SITE LEVELS

LiDAR data has been utilised to develop a digital elevation model of the site and surrounding areas as illustrated in **Figure 2**. Levels on site are generally shown to be in the region of 12.1 – 16.4 metres Above Ordnance Datum (m AOD), with levels shown to rise from east to west.

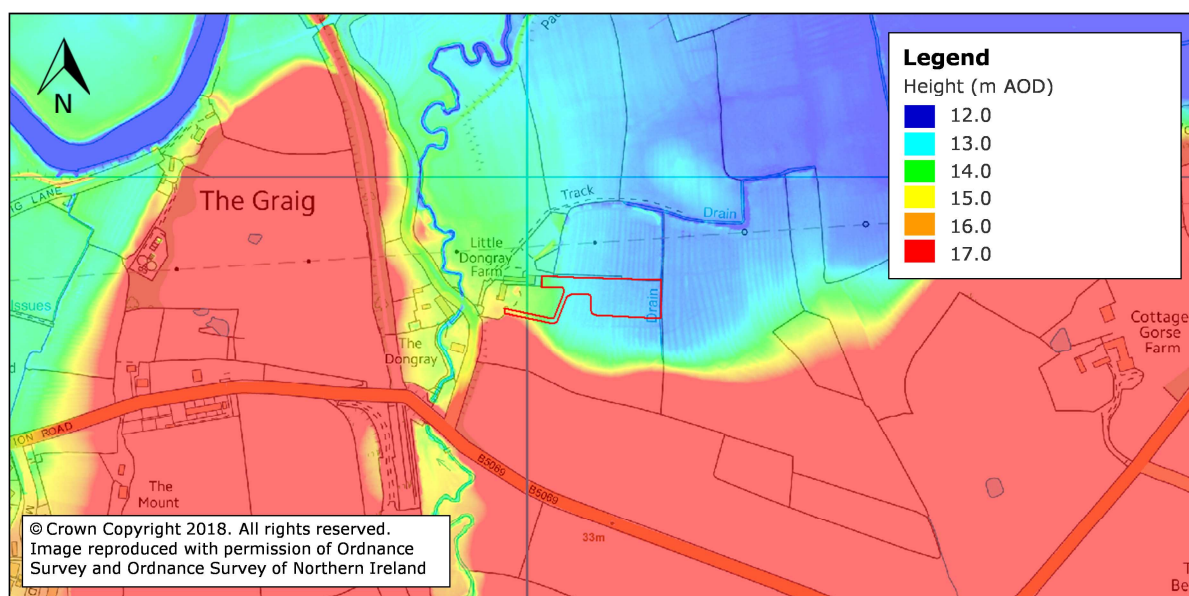


Figure 2: Digital Elevation Model

2.3 ACCESS AND EGRESS

Access and egress to the site is provided via a private road that branches north off the B5069 (Station Road).

Levels along the private road are generally shown to be in the region of 13.4 - 21.3 m AOD, with levels shown to rise from north to south. At the junction of the B5069 (Station Road) and the private road, ground levels are shown to be in the region of 18.4 - 21.4 m AOD.

2.4 FLOOD RISK

According to the Natural Resources Wales (NRW) Flood Risk Map (**Figure 3**), the site is located within the 1 in 100 fluvial annual probability flood outline.

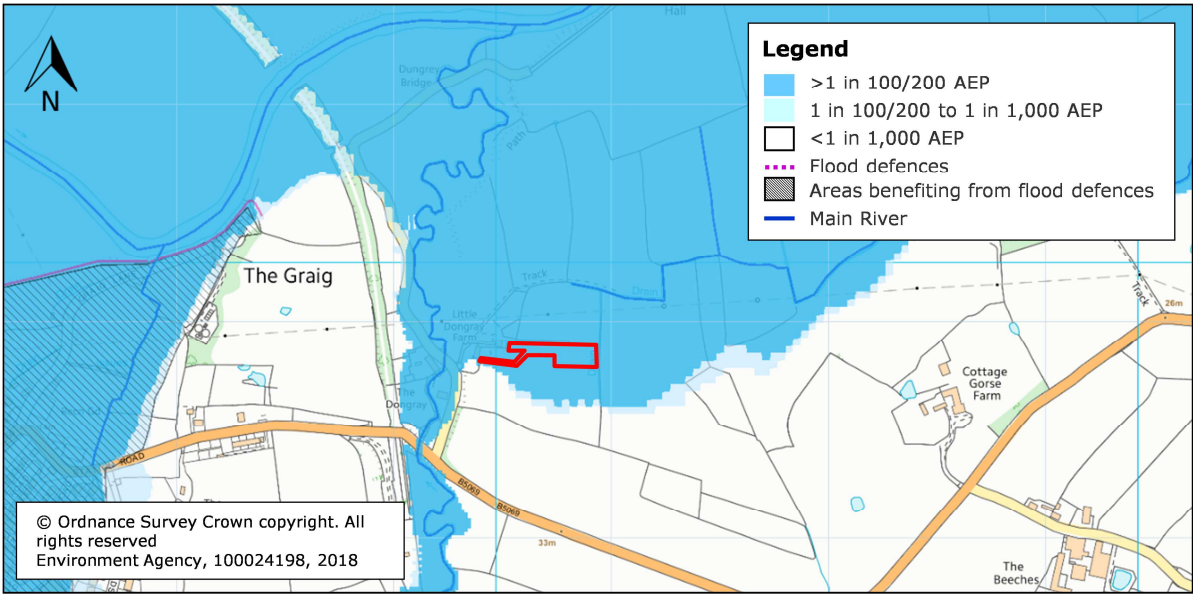


Figure 3: Natural Resources Wales Flood Risk Map
(Source: NRW Website)

Locations of the waterbodies are shown in **Figure 1**. The potential sources of flood risk to the site, as assessed within the FCA, are listed in **Table 1**.

Table 1: Potential Sources of Flood Risk

River Dee	The River Dee is located approximately 485 m to the north of the site. The River Dee at Bangor-on-Dee Flood Risk Mapping study was published by NRW in May 2012 and was utilised to inform the Weetwood FCA. The site is shown not to benefit from flood defences on the NRW Flood Risk Map; however, modelled outputs were provided for the defended scenario. This indicates that the site marginally benefits from upstream flood defences. The NRW model outputs indicate that some flooding of the site may be expected for both the defended and undefended scenarios during the 1 in 100, 100 +CC (climate change) (20%) and 1,000 annual probability events. During the 1 in 100 +CC (20%) annual probability defended and undefended events, depths and velocities on site would be expected to reach up to 1.54 m and 0.43 m/s and up to 1.49 m and 0.15 m/s respectively. A small part of the access track (Figure 1) is expected to flood to depths in the region of 0.2 – 0.6 m and 0.6 – 1.2 m, in up to the 1 in 1,000 annual probability defended and undefended events respectively; however, the B5069 (Station Road) and the connecting private road leading to the site would be expected to remain dry.
	© NRW copyright and database rights 2018 © Ordnance Survey Crown copyright. All rights reserved Environment Agency, 100024198, 2018
	Undefended Modelled Flood Outline (Source: JBA River Dee at Bangor-on-Dee Flood Risk Mapping Study May 2012)

Dungrey Brook, Dol-Enion Brook and Watercourse A	Dungrey Brook, Dol-Enion Brook and Watercourse A are located approximately 64 m, 95m and 5 m away from the site respectively. Dungrey Brook, Dol-Enion Brook and Watercourse A are shown to flow away from the site and ultimately outfall into the River Dee. Given the limited catchment area of the watercourses (12.82 km²), and the capacity of their channels, it is not considered that these watercourses would pose significant risk of flooding to the site. In the event of floodwaters overtopping their banks, the decrease in ground elevation across the site from west to east would suggest that floodwaters would be expected to be conveyed across/away from the site. As a result, floodwaters would not be expected to accumulate to any significant depth on site.
Reservoirs, Canals and other Artificial sources	There are no canals located within the immediate vicinity of the site. The NRW Risk of Flooding from Reservoirs map indicates that the site is located within the maximum flood extents of reservoirs Llyn Celyn, Llyn Brenig and Alwen. However, it is important to consider that reservoir flooding is extremely unlikely to happen as all large reservoirs are regularly inspected by reservoir panel engineers and essential safety work is carried out.
Groundwater	Ground conditions at the site and within the surrounding area are described as '<i>slowly permeable and seasonally wet, slightly acidic but base-rich loamy and clayey soils</i>'. The permeability of the underlying soils and the subsequent propensity for groundwater flooding may therefore be assessed to be low. According to the British Geological Survey (BGS) Groundwater Flooding Hazard map the susceptibility to groundwater flooding is moderate.
Surface Water	As detailed above, ground conditions at the site and within the surrounding area are described as clayey. There may therefore be the propensity for surface water flooding at the existing site. However, the NRW Risk of Flooding from Surface Water map indicates the site has a very low risk of surface water flooding. Dŵr Cymru Welsh Water (DCWW) has confirmed that it holds no recorded historical sewer flooding events at or within vicinity of the site.

2.5 FLOOD RISK MITIGATION

As part of the proposals, the following design principles have been incorporated in order to ensure that the site remains safe over its lifetime (i.e. taking climate change into account):

- Finished floor level of the stable building to be set a minimum of 0.15 m above adjacent ground levels
- The latest best practice flood resilient construction techniques to be incorporated into the design of the buildings
- Site owner to register to receive NRW's Flood Warnings.

3 FLOOD WARNINGS

3.1 NATURAL RESOURCES WALES FLOOD ALERT AND FLOOD WARNING AREAS

Flood Alerts are issued for large areas of floodplain and can cover an entire river catchment. They provide an early notification of possible flooding. Flood Warnings are targeted at specific communities at risk.

The Flood Warning and Alert designations for the site are shown in **Table 2** and **Figure 4**.

Occupants at Little Dongray Farm have been advised that they must register to receive NRW's Flood Warnings, which will provide an early notification of any possible flooding. Early notification will enable occupants to safely evacuate themselves and the animals (i.e. horses) and any other valuables away from site to a point of recommended safe refuge.

Table 2: Flood Alert and Flood warning Areas

Flood Alert / Flood Warning	Location	Call Floodline on 0345 9881188, select option 1 and enter the following quickdial number:
Flood Warning	Lower Dee Valley	192102

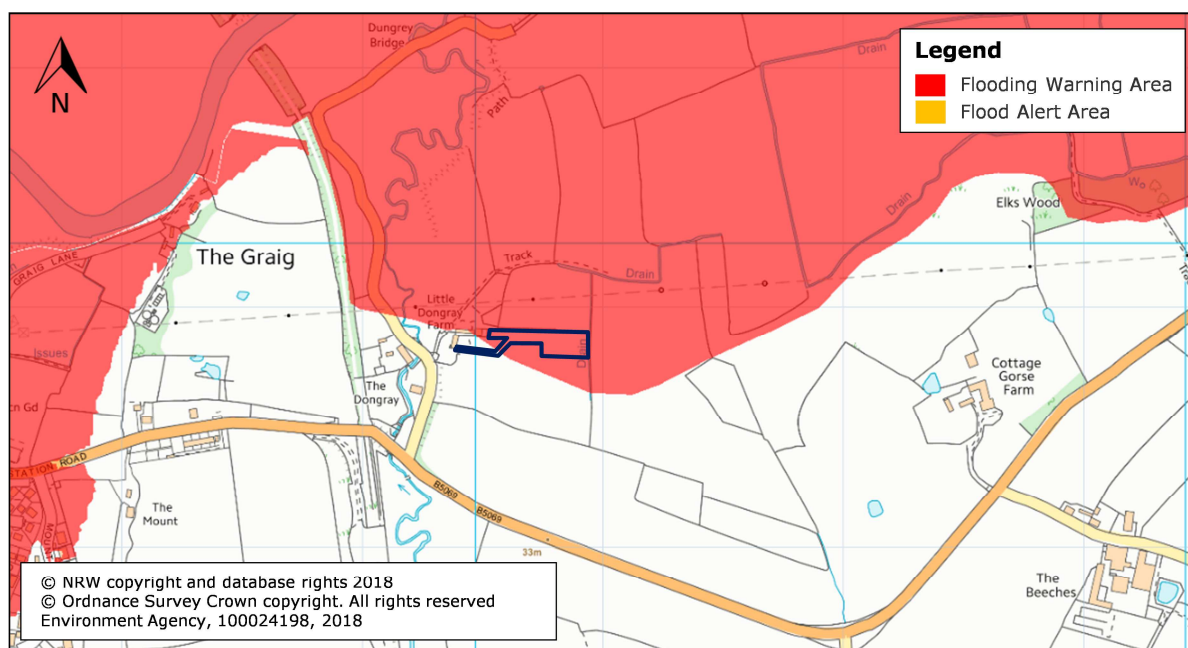


Figure 4: Natural Resources Wales Flood Warning Map
(Source: NRW website)

3.2 NATURAL RESOURCES WALES FLOOD WARNING CODES

If flooding is forecast, NRW warnings are issued using a set of three recognisable codes. Each of the three codes indicates the level of danger associated with the warning, as detailed below.

Code	Meaning	NRW General Advice
	Flood Alert: Flooding is possible. Be prepared.	• Be prepared to act on your flood plan • Prepare a flood kit of essential items • Monitor local water levels and the flood forecast on the EA website
	Flood Warning: Flooding is expected. Immediate action required.	• Move staff, stock and valuables to a safe place • Turn off gas, electricity and water supplies if safe to do so • Put flood protection equipment in place
	Severe Flood Warning: Severe flooding. Danger to life.	• Stay in a safe place with means of escape • Co-operate with the emergency services • Call 999 if you are in immediate danger

NRW also uses the codes 'Warnings No Longer in Force' and 'No Warnings'. 'Warnings no Longer in Force' is used when warnings have been removed in the last 24 hours and 'No Warnings' means that no flooding is expected.

3.3 OBTAINING FLOOD WARNING INFORMATION

3.3.1 Natural Resources Wales Floodline Warnings Direct

NRW offers a free flood warning service called Floodline Warnings Direct. Flood alerts/warnings may be provided by telephone, email, text or fax. When registering, users must request to receive Flood Alerts.

To register for the Floodline Warnings Direct service, or for more information, visit NRW's website <http://naturalresources.wales/flooding/sign-up-to-receive-flood-warnings/?lang=en> or call Floodline on 0345 988 1188.

The owner of the property must ensure that they are registered to receive both Flood Alerts and Flood Warnings via the Floodline Warnings Direct service.

3.3.1.1 NRW Floodline – 0345 988 1188

In times of adverse weather the site occupants may telephone Floodline on **0345 988 1188** and when prompted enter the quick-dial codes listed in **Occupants at** Little Dongray Farm have been advised that they must register to receive NRW's Flood Warnings, which will provide an early notification of any possible flooding. Early notification will enable occupants to safely evacuate themselves and the animals (i.e. horses) and any other valuables away from site to a point of recommended safe refuge. Table 2 for recorded local flood warnings and codes (as described in **Section 3.1**).

3.3.2 Smartphone Flood Warning Application

Flood Alert is a flood warning application for smartphones which allows users to get real time updates on flood warnings near them, at locations important to them and for the rest of England and Wales.

3.3.3 Website

Visit <http://naturalresources.wales/flooding/check-flood-warnings/?lang=en> for current flood warning information, a live flood warning map and 5-day flood forecast information.

4 RESPONSE TO FLOOD WARNINGS

4.1 PLANNING A RESPONSE

As detailed in **Section 3** residents should register with NRW's Floodline Warning Direct service. Residents should also identify the actions that need to be taken in the event of flooding and gather the contact details of Category 1 responders and other useful organisations.

The Flood Checklist provided in **Appendix A** should be utilised to collate this information and should be reviewed annually to ensure that all details are correct.

4.2 FLOOD WARNING CODES

The response to NRW flood warning codes received via Floodline is set out below. **These procedures should only be followed if it is safe to do so.**

Residents should liaise closely with the emergency responders at all times. Details regarding the roles and responsibilities of the emergency responders are provided in **Appendix B**.

4.2.1 If a FLOOD ALERT is received:

- Monitor local water levels and the online flood forecast on the NRW website on an hourly basis, or more if deemed appropriate
- Prepare for site evacuation including animals (i.e. horses)

4.2.2 If a FLOOD WARNING is received:

- Undertake the protective actions identified in the Flood Checklist (**Appendix A**)
- Evacuate occupants and animals (i.e. horses) and any other valuables away from site to a point of recommended safe refuge outlined in **Section 4.4**.

4.2.3 If a SEVERE FLOOD WARNING is received:

- No evacuation should take place when flooding has occurred or is imminent, unless it is safe to do so. Refuge should be sought within a designated refuge area if safe to do so, or on another area of higher ground as outlined **Section 4.4**.
- Liaise with emergency responders

4.3 EVACUATION ROUTE

If necessary or as instructed, it is recommended that the site is evacuated by proceeding west along the access track. Occupants are then advised to turn left out of Little Dongray Farm, proceeding south along the private road beyond which land is shown to be outside the extent of flooding expected during both the defended and undefended 1 in 1,000 annual probability event as shown in **Figure 5**.

Occupants may then evacuate the wider area via the B5069 (Station Road) which remains dry during all modelled probability events.

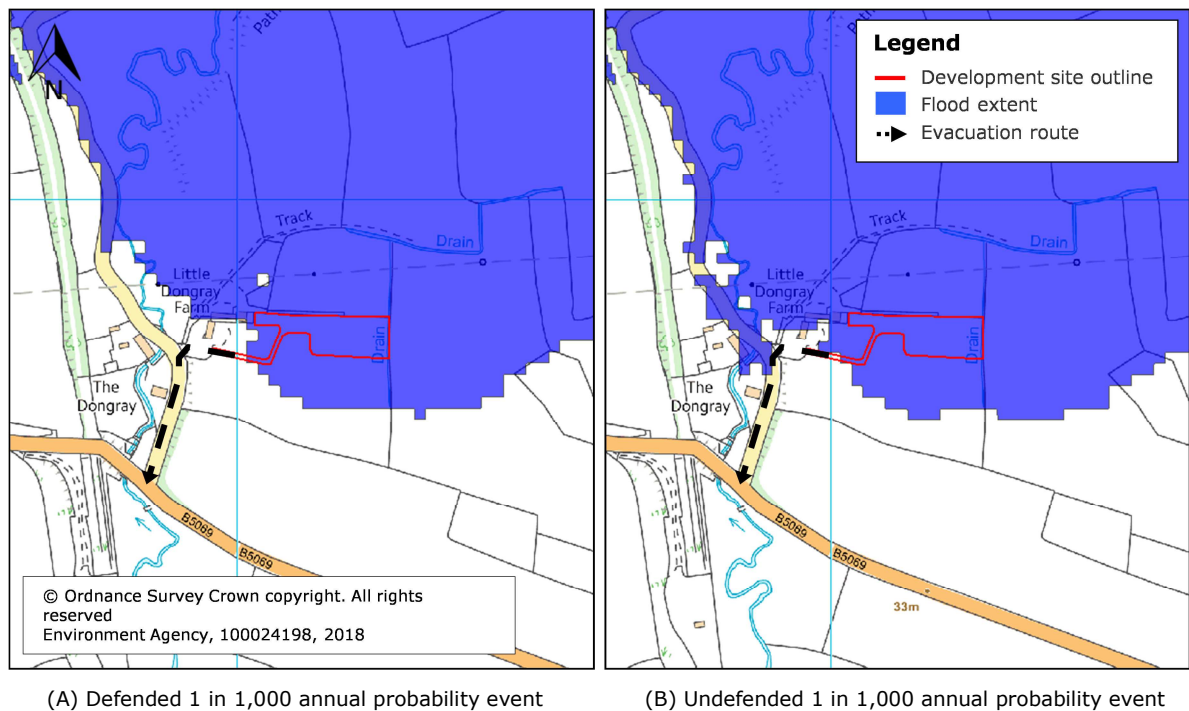


Figure 5: Evacuation Route

Any advice provided by the Emergency Services, NRW, or the Local Planning Authority regarding whether and where to evacuate should be adhered to.

4.4 SITE REFUGE

If the Emergency Services/NRW/local planning authority decides that it is not safe to evacuate the site, then residents should take refuge within the first floor of the building until they are instructed otherwise or an all clear announcement is made.

However as outlined in **Figure 6**, the site ownership boundary is shown to extend outside of 1 in 100 fluvial annual probability flood outline, with site levels shown to rise from north to south as illustrated in **Figure 2**.

This identifies that land closest to the southern extent of the greater site ownership boundary would offer a safe point of refuge for occupants at Little Dongray Farm to locate their animals (i.e. horses) in the event that a flood event was to take place.

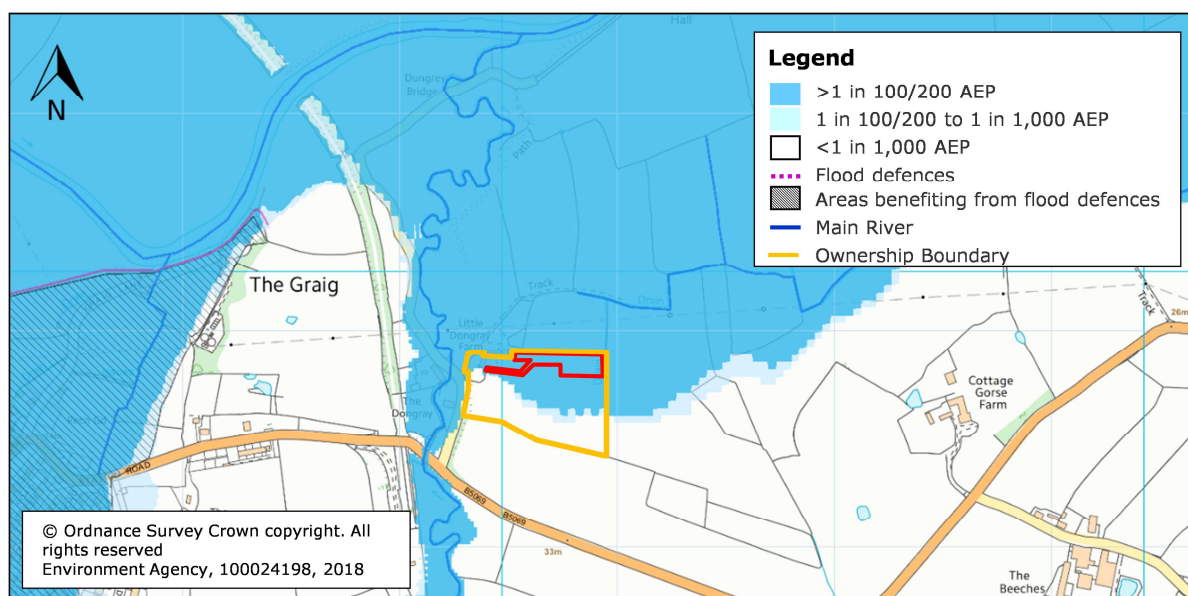


Figure 6: Site Ownership

4.5 GENERAL ADVICE

Floods Can Kill!

- Don't walk through flowing water - *currents can be deceptive, and shallow, fast moving water can knock you off your feet*
- If you have to walk in standing water, use a pole or stick to ensure that you do not step into deep water, open manholes or ditches
- Don't drive through a flooded area - *half a metre of floodwater can carry a car away*
- Stay away from power lines - *electrical current can travel through water*
- Look before you step - *after a flood, the ground and floors can be covered with debris, which may include broken bottles, sharp objects and nails. Floors and stairs covered with mud and debris can be slippery*
- Avoid contact with floodwater

4.6 SITE RE-OCCUPATION

Once floodwaters have subsided, NRW will issue a 'Warnings No Longer in Force' notice.

- Once floodwaters have receded and it is safe to do so, the site should be inspected to determine the extent of any water damage and to determine whether it is safe to re-enter / re-occupy the site.
- Care should be taken when re-entering the site as floodwater can carry silt and debris which may pose a hazard or obscure other hazards. Floodwaters may have also caused structural damage to buildings.
- The mains services should not be turned on until checked by a qualified engineer.
- Any food which has been in contact with floodwater should be disposed of as it could be contaminated.
- Keep a record of flood damage (especially photographs or video footage)

4.7 REVIEWING AND UPDATING THE PLAN

The Flood Plan should be reviewed and updated accordingly, on an annual basis if possible, but at least every three years. This will ensure that all information contained within the plan is current, and in-line with best practice.

APPENDIX A:

Flood Checklist

Flood Checklist

Site Name:	
Address:	
Date:	

PART 1 – CONTACT DETAILS

Category 1 Responders

	Telephone
Wrexham County Borough Council	01978 298989
Police Headquarters	999 or 101
North Wales Fire & Rescue Service	01745 535 250
Welsh Ambulance Service	01745 532900
Environment Agency	0800 80 70 60

General Contact List

	Name	Telephone
Floodline	Natural Resources Wales	0345 988 1188
Electricity Provider		
Gas provider		
Water company		
Telephone provider		
Insurance company		
	Insurance policy number:	

Useful Contacts

Identify people who can help you before, during and after a flood. For example:

- Provision of flood products; provision of water pumping services
- Transporting staff or materials from the site
- Provision of emergency storage
- Emergency power supply
- Equipment repair
- Building services
- Security services

Flood Service Company	Company Name	Contact Name	Telephone

PART 2 – PROCEDURES TO PROTECT THE SITE

Services

Service Cut-Off	Description of Location
Electricity	
Gas	
Water	

Protective Actions

Identify actions to protect the site, for example:

- Switch off appliances and turn services off at the mains (gas, electricity and water)
- Move anything not fixed down into a safer location
- Install flood protection products
- Weigh down any manhole covers to prevent them floating away and leaving a hazardous hole

Item	Location	Action

Key Locations

Identify locations of key property, protective materials and service shut-off points

APPENDIX B:

Roles and Responsibilities of Relevant Agencies

Natural Resources Wales:

- Issue flood warnings
- Receive and record details of flooding incidents
- Monitor the situation and advise other organisations
- Deal with emergency repairs and blockages on main rivers and own structures
- Respond to pollution incidents
- Advise on waste disposal issues

Wrexham County Borough Council:

- Work with the police, fire and rescue services and the NRW/EA to co-ordinate the response during severe flooding
- Provide emergency assistance- provide sandbags
- Clear blocked watercourses (Land Drainage Act powers)
- Deal with environmental health issues- pollution
- Clear blocked road channels and gullies
- Establish additional community information and enquiry services

North Wales Fire & Rescue Service:

- Rescue
- Respond to all emergency incidents as required
- Assist the populace where a need is identified and the use of Fire Service personnel and equipment is relevant

The Police:

- Take an overall co-ordination role during an incident

Dŵr Cymru Welsh Water:

- Clear blockages in public sewers
- May take action to protect property from flooding by water from the public water mains or discharges from the public sewerage systems

Electricity, Gas and Telecommunication companies:

- Attend to emergencies relating to their service at properties where life is at risk as a result of flooding
- Attend to flooding emergencies at their own serviced installations



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Flood Consequences Assessments
Surface Water Drainage
Foul Water Drainage
Environmental Impact Assessments
River Realignment and Restoration
Water Framework Directive Assessments
Flood Defence Consent Applications
Sequential, Justification and Exception Tests
Utility Assessments
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