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Flood Risk Assessment

Retrospective Application for Commercial Development

The Old Stone Yard
Off Near Bank
Shelley

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Doc Ref:	rep-tjba-beneficial-the old stone yard, shelley-FRA-060421.docx

Revision	Date	Reason
0	Jun 2020	Original to support planning application.

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Purpose of Flood Risk Assessment:

The purpose of the assessment is to inform & accompany a retrospective planning application for commercial development at The Old Stone Yard.

Planning permission was originally obtained for the Site, and the 'Proposed Development' was constructed but differed to the approved, and so a retrospective application has been submitted.

The original approval did not require a flood risk assessment as part of the planning process; however, the flood risk element of the Site has been flagged on the retrospective application which requires a flood risk assessment prior to validation.

Reference:

National Planning Policy Framework and the Planning Practice Guidance (flood risk & coastal change notes).

EA mapping data identifies the "Development Site" as being partly within Flood Zones 2 & 3, refer to EA Flood Zone Map in appendix. Flood Zone 2 is defined as land assessed as having between a 1:100 & 1:1000 or greater annual probability of river flooding (0.1-1%) in any year (land shown in light blue on the EA Flood Map). Flood Zone 3 is defined as land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) in any year (land shown in dark blue on the EA Flood Map).

The Planning Practice Guidance indicates the Flood Risk Vulnerability Classification (Table 2) for the proposed residential development end use to be 'Less Vulnerable'. The Flood Risk 'Vulnerability' and Flood Zone 'Compatibility' matrix (Table 3) indicate that Less Vulnerable development is acceptable in Flood Zone 3 areas.

A flood data request was sent to the Environment Agency in February 2021. The Environment Agency indicated that although some historic flood modelling was undertaken for the local area which designated part of the Site in flood zones 2 & 3, they did not hold any data regarding flow or level data.

Preliminary or Full Flood Risk Assessment:

Full to support planning application.

1.1 Plans.

1.1.1 Location Plan.

See Location Plan in Appendix showing the area features.

The Application Site is located on a parcel of land within a small commercial area off Near Bank, Shelley; identified by the red line boundary on the Location Plan.

The Application Site will be a closed off compound on the north half of the red line plan.

The red line boundary shows the adjacent Shepley Dyke which forms the south boundary and flows east to west. There is also a small stream which is culverted beneath the east of the area and Site, issuing to the north boundary of the Site & flowing open course to the west.

There were also two small mill ponds in the neighbouring site to the west, which were part of the Barncliffe Mills complex. These ponds were fed by a sluice from Shepley Dyke and have recently been filled in with inert material as part of a separate development.

The Site is accessed along an unnamed lane off Near bank. There is a public footpath across the lane (nominally immediately north of the Site), leading to the north and back to Near Bank at higher elevation.

1.1.2 Site plan.

Refer to Proposed Plans in the appendix.

The red line plan is an open piece of land nominally rectangular in shape, and was formerly used as a stone yard/masons and storage yard.

The retrospective planning permission is for a workshop to the north half of the red line plan.

The building comprises a workshop/storage space, small office and WC. The commercial building has been constructed a minimum of 150mm above existing Site ground level, finished floor level nominally 154.95m aOD.

1.2 Derivation of Data, Surveys and Models.

1.2.1 Existing and proposed topography.

A topographic survey for the site was undertaken by HH Surveys Ltd in June 2020.

The proposed Development Site is part of a wider red line boundary. The four Site corners of the Proposed Development Site are as follows in m aOD:

NE 154.40

SE 154.85

SW 155.00

NW 154.20.

The south part of the red line plan outside of that used for the Proposed Development is at slightly higher level nominally 155.40, with a bund adjacent to Shepley Dike up to 157.90.

The Shepley Dike water level on the day of the topographic survey was 154.24.

The drainage ditch to the unnamed watercourse to the north west boundary has a bed level of 153.15 to where it issues from the 600dia pipe on the east side, to 152.32 to the north west corner.

1.3 Assessments.

1.3.1 Existing site surface water system.

The Site generally comprises permeable granular surfacing.

The Shepley Dike to the south and unnamed watercourse running along the north boundary have a confluence 75m west flowing under the Near Bank highway.

There is understood to be a combined sewer to the south bank of the Shepley Dike.

1.3.2 Proposed site surface water system.

Development should follow the national hierarchy for surface water drainage in accordance with SUDS guidance.

The proposed development roof areas and hardstandings will be a source of rainfall runoff and will need to be managed so as not to contribute to flood problems locally.

External hardstandings should be permeable wherever possible and roof areas should comprise attenuation and flow control as the presence of existing and proposed development, retaining walls, geology, and culvert infrastructure beneath the site would prove problematic for mass infiltration.

Drainage design is to be undertaken by others.

1.3.3 Climate change impacts.

As identified in Section 1, the vulnerability of the development is 'less vulnerable'.

In flood zones 2 or 3a, Environment Agency guidance indicates climate change allowances to be used according to the vulnerability rating of the development, as follows:

- less vulnerable – use the central and higher central allowances to assess a range of allowances.
- In addition, the guidance recommends that for less vulnerable development, the higher central allowance should be used as the basis for designing safe access, escape routes and places of refuge to ensure the safety of people using the development.

In accordance with the Environment Agency Assessment of Climate Change Impacts, the Site is considered to be Minor Development (light industrial under 1Ha) and as such requires a basic assessment. The assessment allows precautionary allowance to be added to the design flood level in accordance with the above derived central/higher central scenarios for development type noted in the table below:

Table B – Local precautionary allowances for potential climate change impacts

Watercourse	Central	Higher Central	Upper
All	0.15m	0.24m	0.48m

The higher central allowance of 0.24m should be added to the design flood level of the Site.

1.3.4 Fluvial morphological impacts.

The site will not impact fluvial morphology.

1.3.5 Potential sources of flooding.

Flood risk maps and flow/level data were obtained from the Environment Agency, (refer to appendix).

a. Fluvial flooding from main rivers.

There are no designated main rivers that can impact the Site and development.

b. Artificial Watercourse/Canals.

There are no artificial watercourses in the local area.

c. Fluvial flooding from minor watercourses / drainage channels.

The Shepley Dike to the south and unnamed stream to the north boundary are the two minor watercourses noted locally converging approximately 75m west.

The fluvial flood map from the Environment Agency shows flood hatching over the Site but abruptly ends at the boundary with neighbouring land.

The Environment Agency indicated that the flood outlines were taken from the now outdated 2004 JFLOW modelling which was only partially completed for the local area, and was a regionalised flood model aimed to provide flood zones at a low level scale.

The Environment Agency holds no flood or flow level data for the Site and the adjacent watercourses.

However, there are now newer Environment Agency Flood Maps which show fluvial, surface water and reservoir risk to give a more detailed view of flooding in the local area.

It appears that fluvial flow upstream of the development overflows the banks locally, owing to surface water flows in extreme rainfall events, resulting in surface water flow routing through the area especially down the lane to the north side, which acts as a flow conduit returning flood flows back to the fluvial system downstream of the Site. The maps are considered in more detail below.

d. Surface Water Risk.

The maps suggests that upstream of the Site, rapid inundation of rainfall runoff from upland areas collecting in minor watercourses accounts for flood risk in the area. This in turn creates overland flow upstream of the Site with some minor flows through the Site, but mostly coming from the east and down the adjacent lane which is the low point locally (apart from the watercourses).

There are 3 maps indicating elevated flood risk, those up to 30yr events, between 30yr and 100yr events, and the those between 100yr to 1000yr events.

The 30yr map indicates minimal surface water flow on Site, with most of this in the lowest depth bracket (<300mm). There is a flow route through the west boundary to the channel to the north side. No flow is noted to the adjacent lane.

The 30yr-100yr maps again indicate minimal surface water flow over the Site, with some minor but wider flows routing along the west boundary. Minor surface water flooding is also noted along the lane to the north.

The 100yr-1000yr map indicates much of the Site inundated by shallow flood water mostly in the low depth category of below 300mm flowing NW across the Site in the direction of the unnamed watercourse/lane. It is also important to note that some areas of the Site (ie adjacent the Site entrance) are not covered by flood water suggesting that adjacent surface water flow on the Site is very shallow flowing over low points in the surface rather that pooling at a blanket depth over the entire site.

Due to the above surface water flow are considered low risk.

e. Springs and high groundwater levels.

None noted.

f. Surcharging of local drainage & sewerage systems.

No surcharging of local sewerage is thought to impact the Site.

g. Reservoirs.

There is no risk of reservoir flooding locally.

1.4 Design.

The planning application is for a retrospective permission, and flood risk was not required in the original approval. As such, the building has already been constructed, and so flood levels etc cannot be set.

Considering the commercial nature of the development, the low risk vulnerability of the proposed use, and the minor flooding noted to the Site; it would instead be prudent to concentrate on safety of persons using the premises, and access/egress in an evacuation plan.

1.5 Emergency Evacuation Plan.

The Adept/Environment Agency guidelines indicate the requirements for flood risk emergency plans (EP) for new development. An EP would generally contain the following sub-sections:

- Section 1. Scope, Objectives and Background.
- Section 2. Location and Proposal.
- Section 3. Risk Summary.
- Section 4. Mitigation Measures.
- Section 5. Flood Warnings and Associated Actions.

- Section 6. Safe Access and Escape.
- Section 7. Temporary Refuge.
- Section 8. After the Flood.
- Section 9. List of Roles.
- Section 10. Plan Upkeep and Awareness.

As the main body of this flood risk assessment has covered the information required for sub-sections 1-4 of an EP, this EP part of FRA shall only further detail the requirements of sub-sections 5-10.

1.5.1 Section 5. Flood Warnings and Associated Actions

FLOOD INFORMATION SERVICE

Dwellings or businesses in England can sign up for the Environment Agency free flood alert service by phone, email or text message, if either homes or businesses are at risk of flooding.

The current & simple to follow flood alert/warnings used by the Environment Agency, including a simple/easy to understand statement of what is required for each as follows:

Flood Alert

What it means

Flooding is possible. Be prepared.

When it's used

Two hours to two days in advance of flooding.

What to do

- Be prepared to act on your flood plan.
- Prepare a flood kit of essential items.
- Monitor local water levels and the flood forecast on our website.

Flood Warning

What it means

Flooding is expected. Immediate action required.

When it's used

Half an hour to one day in advance of flooding.

What to do

- Move family, pets 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

What it means

Severe flooding. Danger to life.

When it's used

When flooding poses a significant threat to life.

What to do

- 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 999 if you are in immediate danger.

The Flood Information Service can been found on the internet using the following URL: https://www.gov.uk/sign-up-for-flood-warnings.

FLOODLINE

Alternatively, people at risk from flooding and without access to the internet can register for flood alert warnings & get in touch by calling Floodline on telephone: 0345 988 1188 OR Type talk: 0345 602 6340 (for the hard of hearing), which is a 24hr service.

For flood alerts/warnings, people will need to provide the following information:

- the address to be registered.
- a phone number for the person or people requesting the service can be contacted on 24hrs a day.
- an email address for the person or people requesting the service.

FLOOD WARDENS

Flood Wardens operate in some areas to provide alerts to the local community when flood warnings are issued. Contact Floodline on 0845 988 1188 to find out if this service is available in the area.

SIRENS/LOUDHAILERS

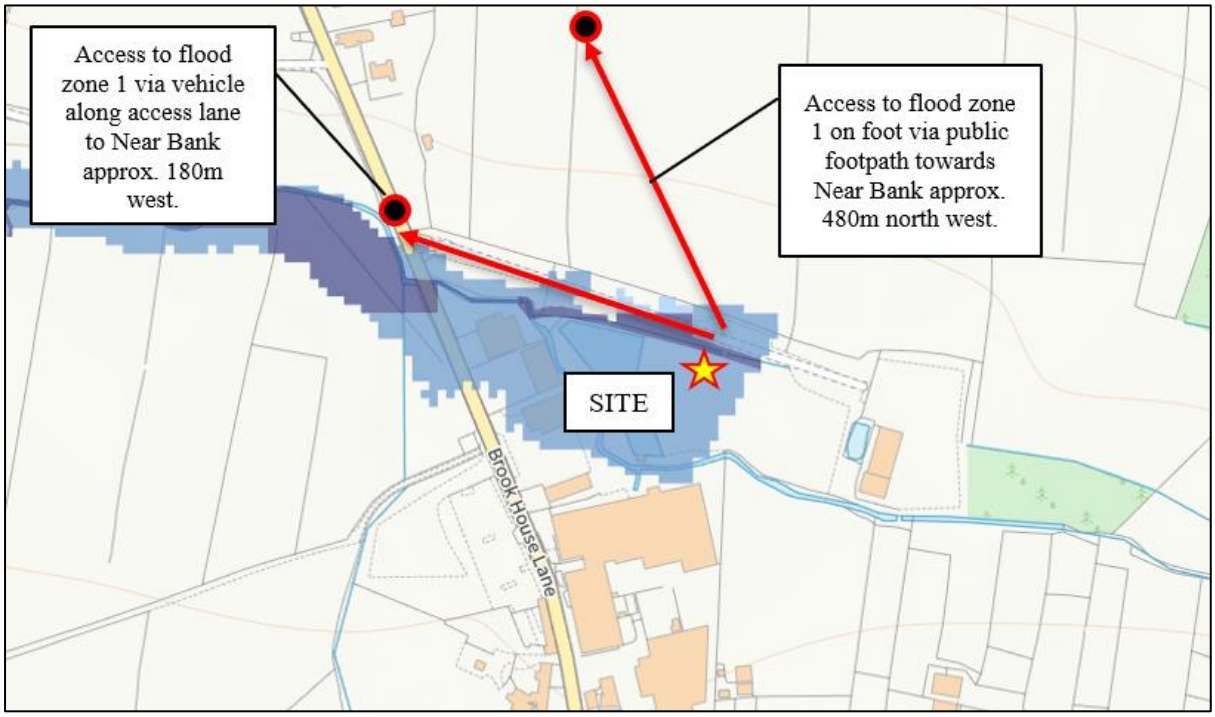
Sirens/loudhailers operate in some areas at risk from extreme flooding to alert residents that a flood warning is in force. Contact Floodline on 0845 988 1188 to find out if this service is available in the area.

GENERAL MEDIA

Media such as the Flood Information Service website details maps and current (up-to-date) area specific advice for all areas of England, including the type of flooding and flood alert/warning level in force for those areas. Other websites such as the Met Office have their own flood alert service. TV & radio news channels give warnings.

1.5.2 Section 6. Safe Access and Escape

The Environment Agency flood zone maps show the Site to be within flood zone 2&3. Following flood warnings & instruction to ACT, emergency escape from the Site via foot or vehicle is illustrated on the Emergency Evacuation Route Plan below:



The Environment Agency guidance is clear: when a flood alert to PREPARE is issued, preparations should be enacted in case a further flood warning to ACT is given and residents are ready for this scenario. When a flood warning to ACT is issued, residents should follow instructions & evacuate as per the Emergency Evacuation Route Plan above.

1.5.3 Section 7. Temporary refuge

As the Site is for a commercial use, temporary refuge will not be required.

Employees and Site users will have access to residential refuge away from the Development Site.

If required the Environment Agency has specially trained Flood Support Officers who provide information and advice during and after floods. Call Floodline (24-hour service) on 0345 988 1188 or type-talk (for the hard of hearing) on 0345 602 6340 to find out if they are active in the local area.

1.5.4 Section 8. After the Flood

After a flood, the Site owners/tenants should:

- Contact their insurance company.
- Find their local flood action group or flood warden for advice.
- Check if they can return home with the emergency services.
- Clean and repair the property/premises noting the flowing:

  Specialist advice will likely be required and may need to be undertaken in accordance with insurance company requirements.

  Photographs to document damage and record the flood water height.

  Flood water can be hazardous and contain sewage, chemicals, and animal waste. Care should be taken with personal protective equipment.

  Contact the LPA about disposing of large flood damaged items.
- Stay healthy – ensure services are running properly and potable water does not have a change in colour, taste or smell. Ensure food touched by flood water is disposed of.
- Get help via Floodline if required.
- Get emotional support if required from family, friends, GP, or charity organisations.
- Apply for financial aid if required. Apply to Kirklees Council for eligibility.

1.5.5 Section 9. List of Roles

It is the Site owners responsibility to ensure all tenants (if applicable) know they are within a flood zone, and should be notified of this flood risk assessment and Emergency Evacuation Plan.

It is then the individual tenants responsibility to sign up for flood alerts/warnings, and to keep up to date with current advice.

1.5.6 Section 10. Plan Upkeep and Awareness

The individual building tenants should ensure they are familiar with the Evacuation Plan and procedures, and keep up to date with latest Environment Agency Guidance.

Conclusion & Residual risks.

It is again noted that this is a retrospective planning application for a development that has already been constructed.

The commercial use and low flood risk vulnerability along with minimal flood depths noted in the basic search, suggest flood risk to the development is low.

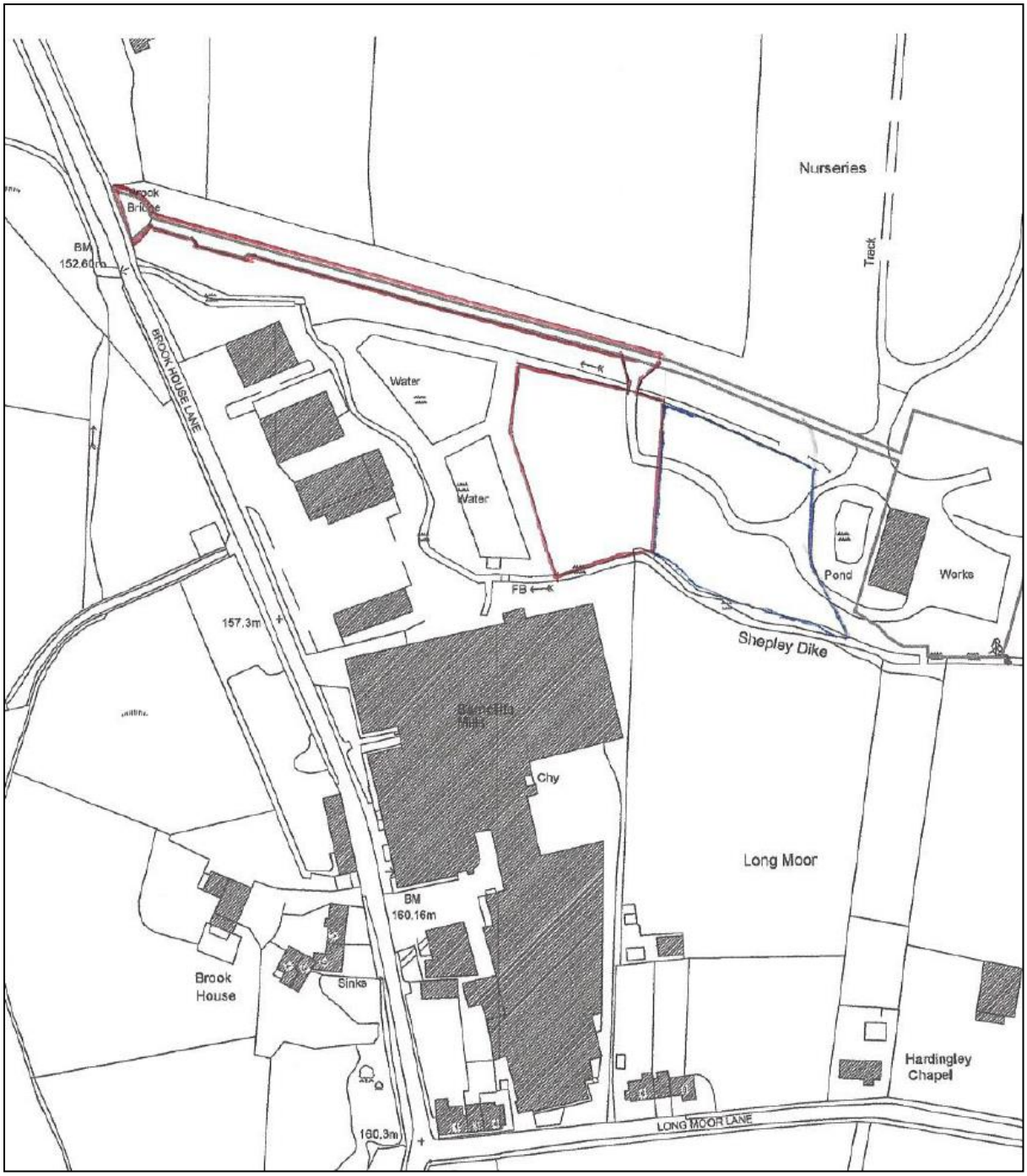
Finished floor levels are elevated from the surrounding ground level by at least 150mm, and higher than this to the north side owing to the gentle site slope ensuring minor surface water flows do not infiltrate the development building.

The residual risks noted are to the safety of the owners/tenants for access egress as the lane to the north of the Site can become a conduit for flood water. These groups should sign up to the emergency flood alert/warning scheme, and emergency flood evacuation plans should be made clear as part of the site health and safety management files and within the building.

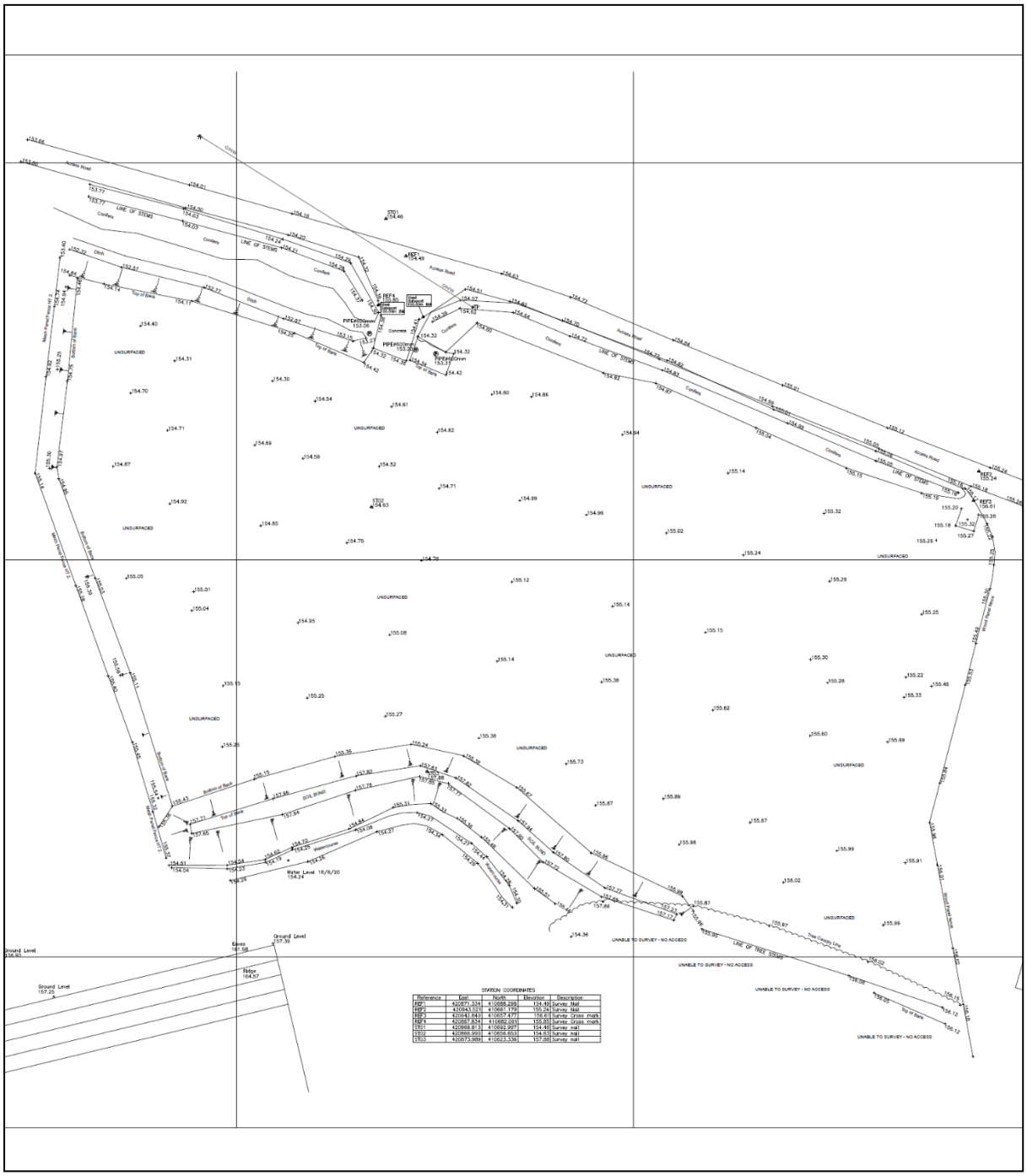
This FRA should be submitted for approval to planning as part of the current planning application.

2 Appendix.

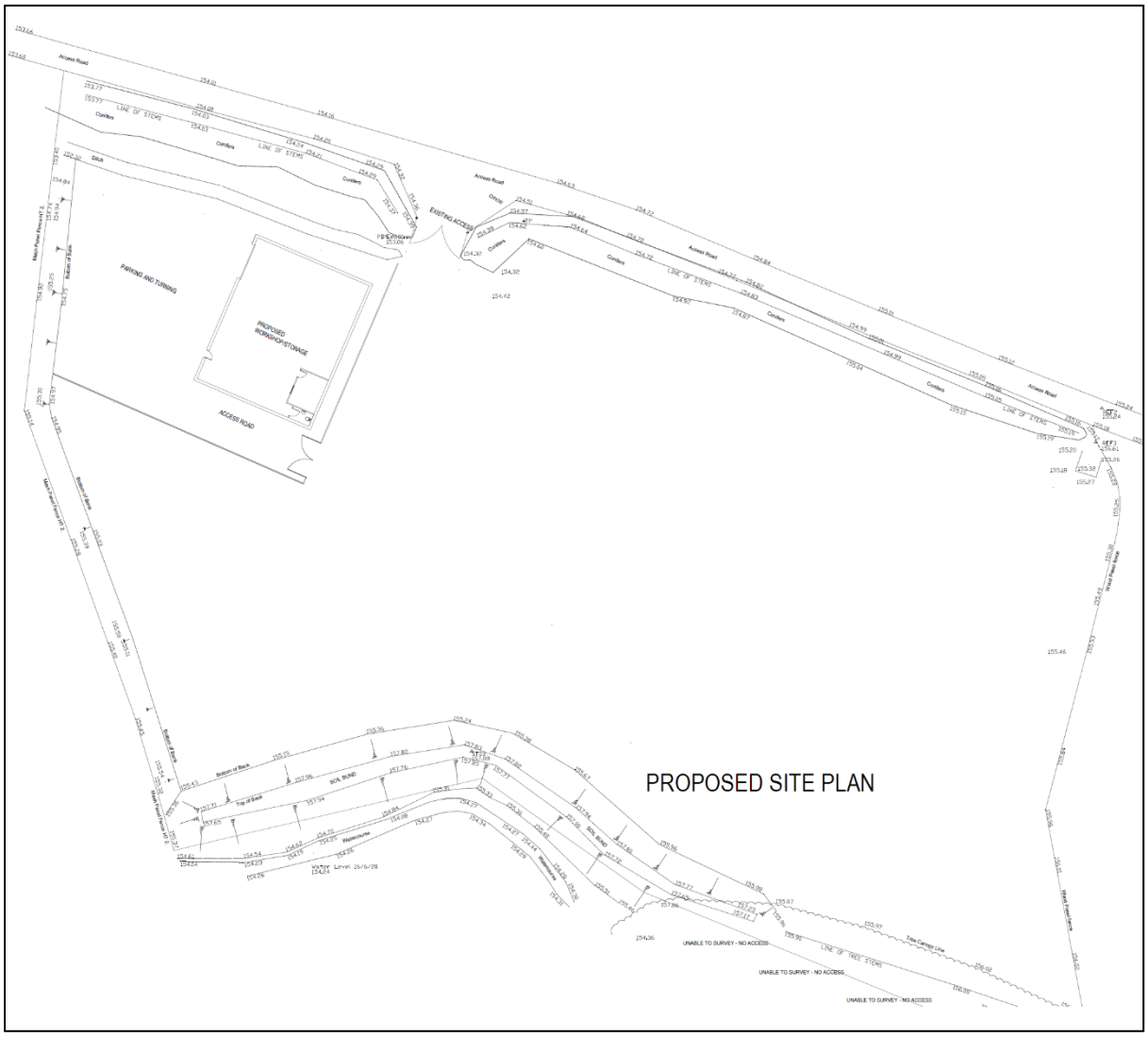
2.1 Location Plan.



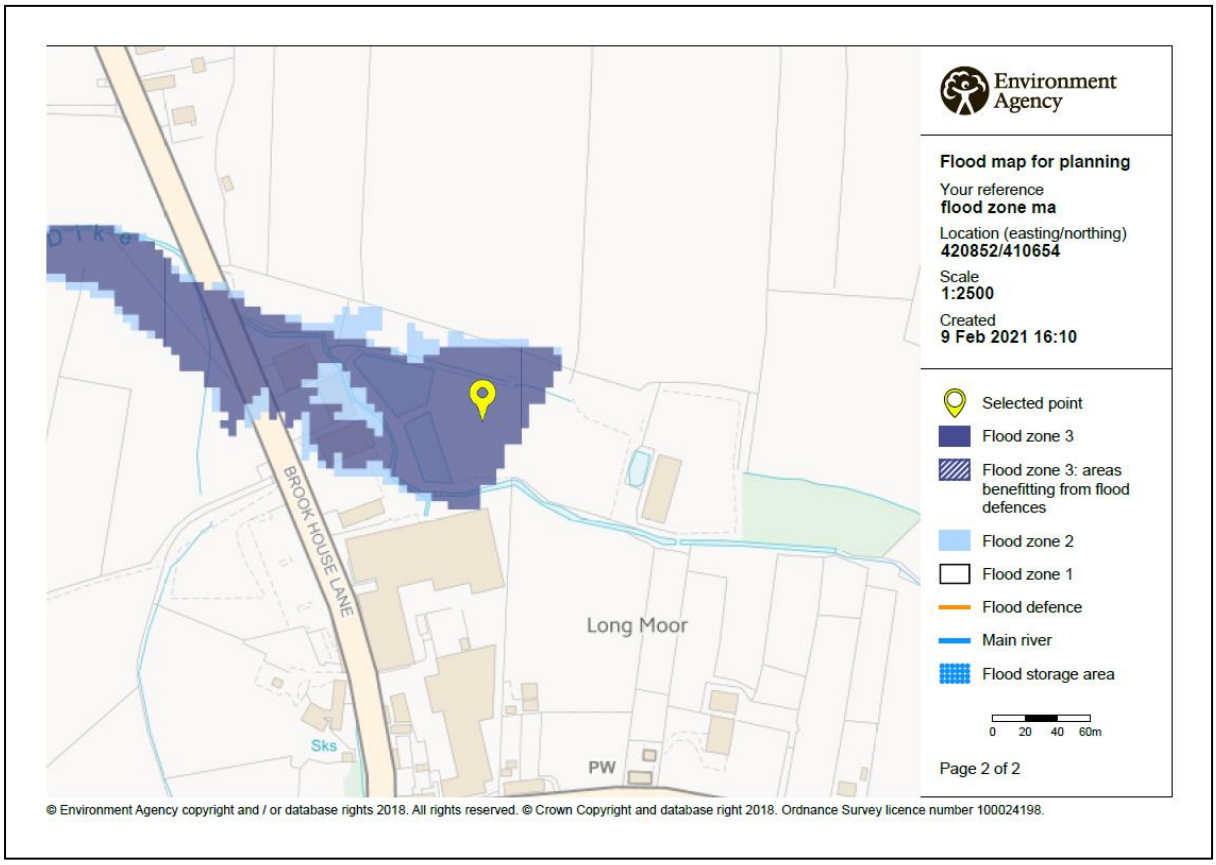
2.2 Existing Plans/Topographic Survey.



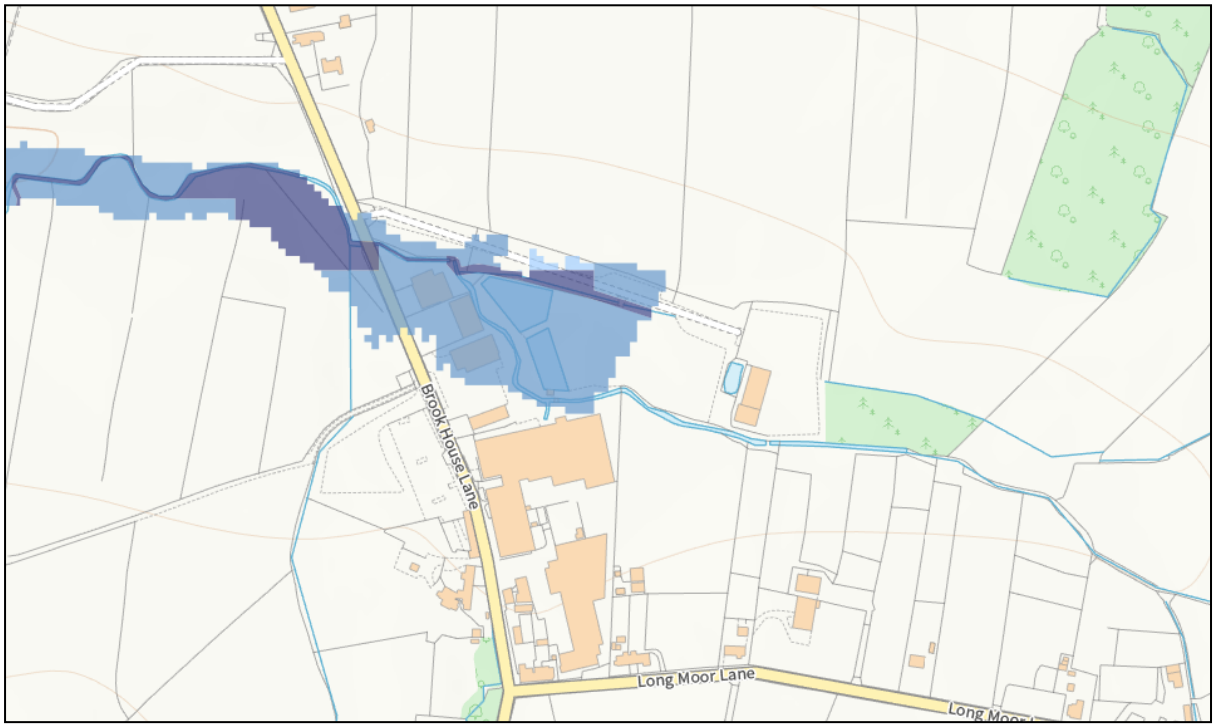
2.3 Proposed Plans.



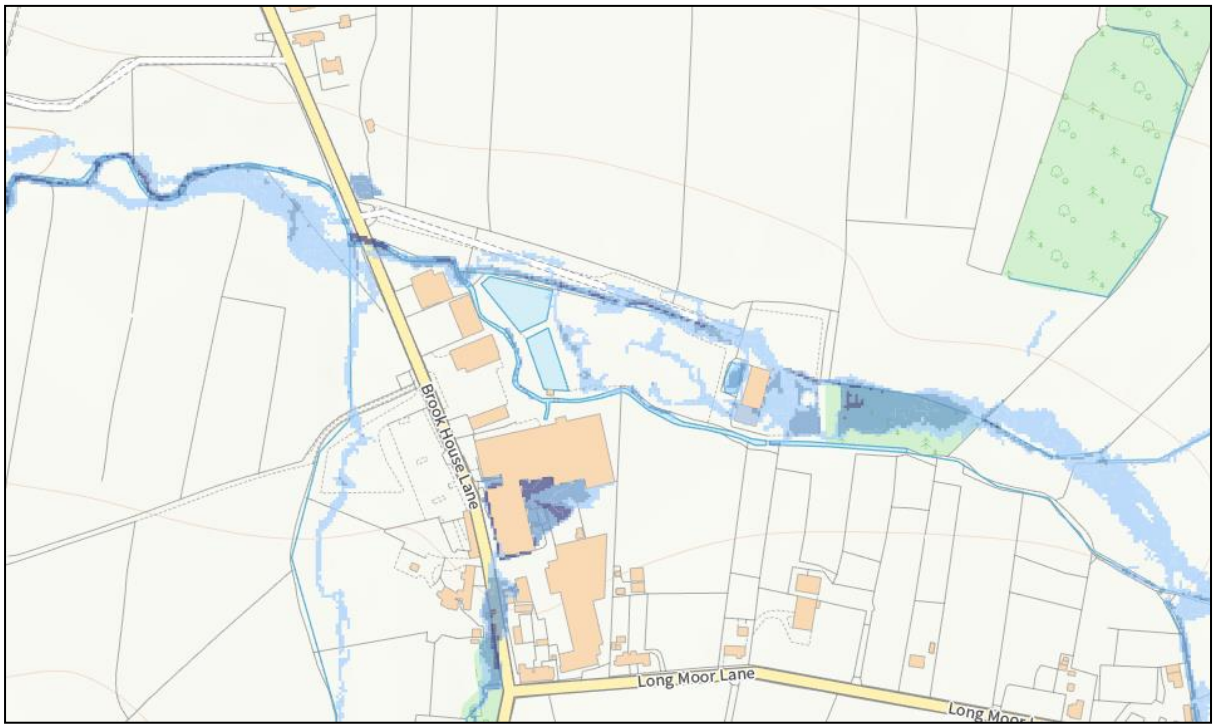
2.4 Environment Agency Flood Zone Map.



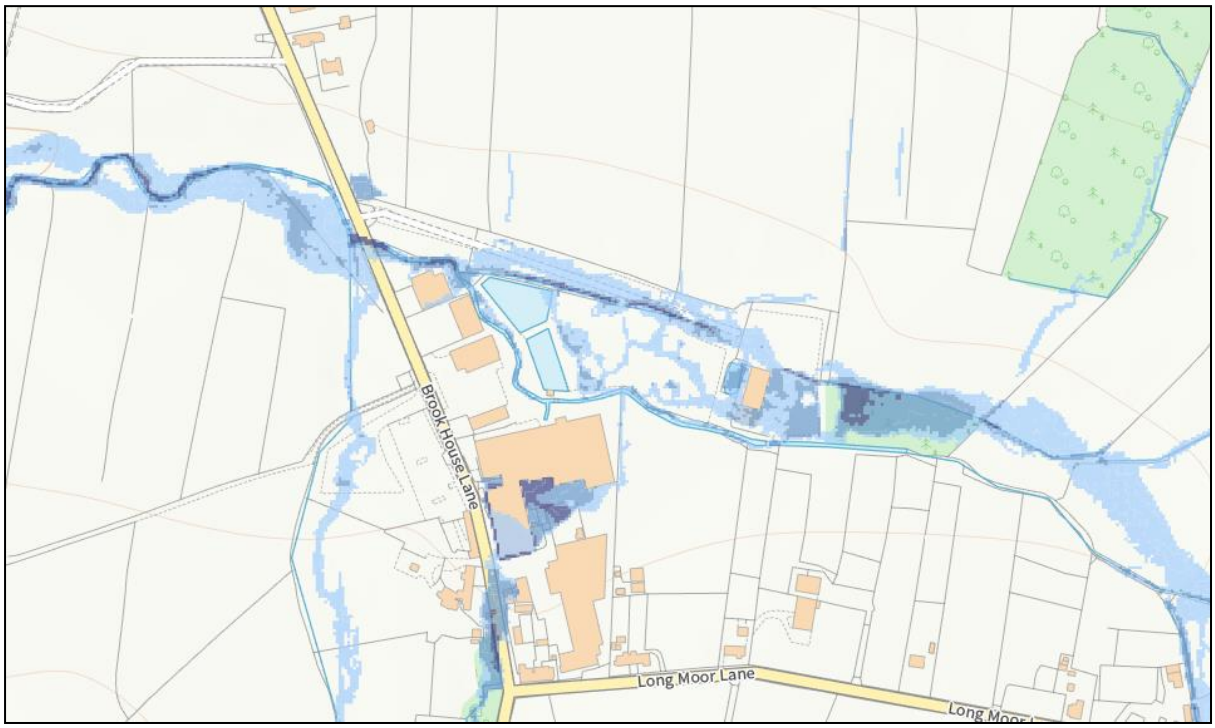
2.5 Environment Agency Fluvial Flood Risk Map – Flood Extents.



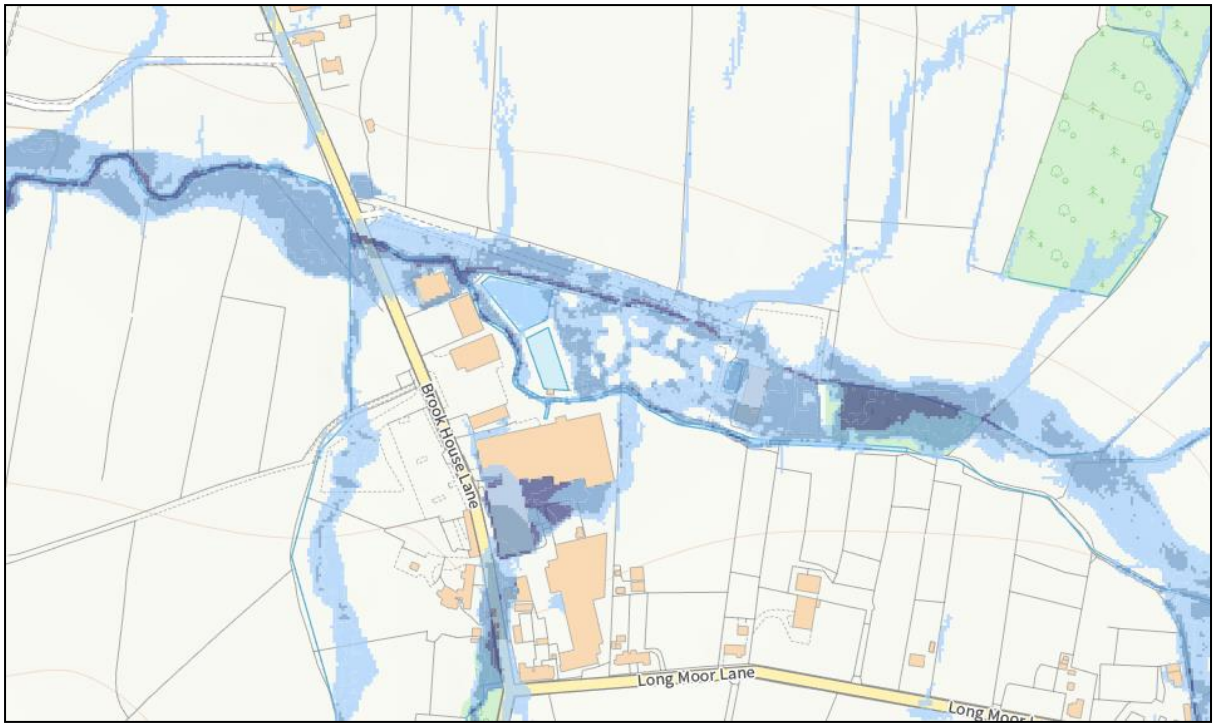
2.6 Environment Agency Surface Water Flood Risk Map – High Risk Depth (up to 30yr).



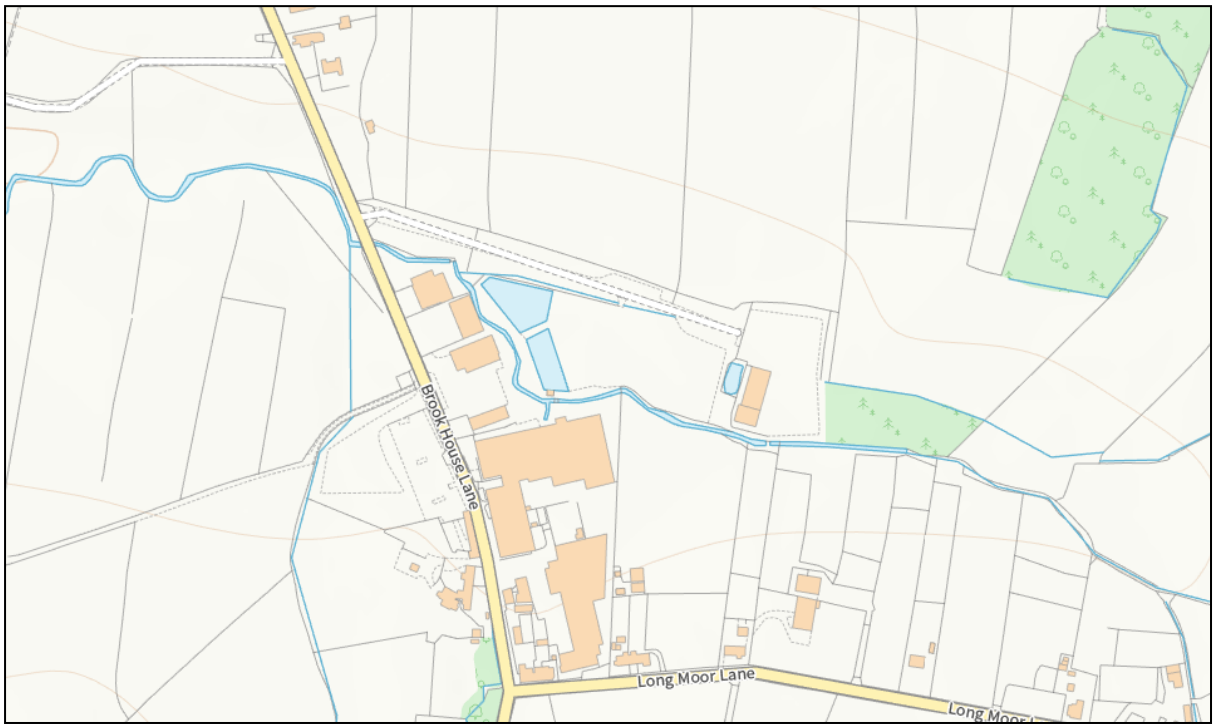
2.7 Environment Agency Surface Water Flood Risk Map – Medium Risk Depth (between 30yr-100yr).



2.8 Environment Agency Surface Water Flood Risk Map – Low Risk Depth (between 100yr-1000yr).



2.9 Environment Agency Reservoir Flood Risk Map – Flood Extents



2.10 NPPF Planning Practice Guidance Table 1.

Table 1: Flood Zones

These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood Map for Planning (Rivers and Sea), available on the Environment Agency's web site, as indicated in the table below.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.(Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

2.11 NPPF Planning Practice Guidance Table 2.

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.

2.12 NPPF Planning Practice Guidance Table 3.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Notes to table 3:

- This table does not show the application of the Sequential Test which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and Exception Tests do not need to be applied to minor developments and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site;
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

2.13 Environment Agency Climate Change Allowances.

Using peak river flow allowances for flood risk assessments

Consider the flood risk vulnerability classification to decide which allowance applies to your development or plan. This will help you understand the range of impact. The central, higher central and upper end allowances are in table 1.

Also apply these allowances to developments and allocations where the strategic flood risk assessment shows an increased risk of flooding in the future. This includes locations that are currently in flood zone 1, but might be in flood zone 2 or 3 in the future.

In flood zones 2 or 3a for:

- essential infrastructure – use the upper end allowance
- highly vulnerable – use higher central and upper end allowances to assess a range of allowances (development should not be permitted in flood zone 3a)
- more vulnerable – use the higher central and upper end allowances to assess a range of allowances
- less vulnerable – use the central and higher central allowances to assess a range of allowances
- water compatible – use the central allowance

For less vulnerable development, use the higher central allowance as the basis for designing safe access, escape routes and places of refuge. This will ensure the safety of people using the development.

2.14 Application of Precautionary Allowances.

2) Assessment of climate change impacts on fluvial flooding

Table A below indicates the level of technical assessment of climate change impacts on fluvial flooding appropriate for new developments depending on their scale and location. This should be used as **a guide only**. Ultimately, the agreed approach should be based on expert local knowledge of flood risk conditions, local sensitivities and other influences. **For these reasons we recommend that applicants and / or their consultants should contact the Environment Agency at the pre-planning application stage to confirm the assessment approach, on a case by case basis**. **Table A** defines three possible approaches to account for flood risk impacts due to climate change, in new development proposals:

- **Basic:** Developer can add an allowance to the 'design flood' (i.e. 1% annual probability) peak levels to account for potential climate change impacts. The allowance should be derived and agreed locally by Environment Agency teams.
- **Intermediate:** Developer can use existing modelled flood and flow data to construct a stage-discharge rating curve, which can be used to interpolate a flood level based on the required peak flow allowance to apply to the 'design flood' flow.
- **Detailed:** Perform detailed hydraulic modelling, through either re-running Environment Agency hydraulic models (if available) or construction of a new model by the developer.

Table A – Indicative guide to assessment approach

VULNERABILITY CLASSIFICATION	FLOOD ZONE	DEVELOPMENT TYPE		
		MINOR	SMALL-MAJOR	LARGE-MAJOR
ESSENTIAL INFRASTRUCTURE	Zone 2	Detailed		
	Zone 3a	Detailed		
	Zone 3b	Detailed		
HIGHLY VULNERABLE	Zone 2	Intermediate/ Basic	Intermediate/ Basic	Detailed
	Zone 3a	Not appropriate development		
	Zone 3b	Not appropriate development		
MORE VULNERABLE	Zone 2	Basic	Basic	Intermediate/ Basic
	Zone 3a	Basic	Detailed	Detailed
	Zone 3b	Not appropriate development		
LESS VULNERABLE	Zone 2	Basic	Basic	Intermediate/ Basic
	Zone 3a	Basic	Basic	Detailed
	Zone 3b	Not appropriate development		
WATER COMPATIBLE	Zone 2	None		
	Zone 3a	Intermediate/ Basic		
	Zone 3b	Detailed		

Environment Agency March 2016

NOTES:

- Minor: 1-9 dwellings/ less than 0.5 ha | Office / light industrial under 1ha | General industrial under 1 ha | Retail under 1 ha | Gypsy/traveller site between 0 and 9 pitches
- Small-Major: 10 to 30 dwellings | Office / light industrial 1ha to 5ha | General industrial 1ha to 5ha | Retail over 1ha to 5ha | Gypsy/traveller site over 10 to 30 pitches
- Large-Major: 30+ dwellings | Office / light industrial 5ha+ | General industrial 5ha+ | Retail 5ha+ | Gypsy/traveller site over 30+ pitches | any other development that creates a non residential building or development over 1000 sq m.

3) Specific local considerations

Where the Environment Agency and the applicant and / or their consultant has agreed that a '**basic**´ level of assessment is appropriate the figures in Table B below can be used as a precautionary allowance for potential climate change impacts on peak 'design' (i.e. 1% annual probability) fluvial flood level rather than undertaking detailed modelling.

Table B – Local precautionary allowances for potential climate change impacts

Watercourse	Central	Higher Central	Upper
All	0.15m	0.24m	0.48m

2.15 References.

i. Environment Agency Flood Maps.

ii. Environment Agency Flood & Flow Data.

iii. Government Planning Practice Guidance.

iv. EA/DEFRA - Flood Risk Assessment: Standing Advice.