FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

HAPPY HIDEAWAY Outdoor Wellness Centre
Calderbrook Road
Littleborough
OL15 9HN

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Client: Happy Hideaway

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Revision	Date	Reason
0	July 2026	Original to support planning application.

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1 Introduction.

1.1 Purpose of Report.

The purpose of the assessment is to inform & accompany a retrospective planning application for the change of use of a vacant plot of land to an outdoor wellness site.

1.2 Plans.

1.2.1 Location plan.

See Location Plan in Appendix showing the area features.

The Application Site is within Littleborough, in a semi-rural location.

Town House Brook flows west to east through the local area and is culverted beneath the north site boundary, becoming an open channel downstream of the site in adjacent land. It shares a confluence with the River Roch approximately 650m southeast.

1.2.2 Existing Site plan.

The Application Site comprises a former agricultural field/vacant land.

The site is bound by a car park to the west, Carriage Drive to the south, and Town House Farm residential cottages to the east.

1.2.3 Proposed Site plan.

The proposed development is for an outdoor wellness centre. The site comprises permeable gravels overlaid on the existing field surface, except an area left as a grass surface.

The installed amenities are as follows:

- 1 No. hot tub.
- 4 No. cold plunge baths.
- 1 No. sauna cabin.
- 1 No. WC cabin.
- 1 No changing cabin.
- 1 No. refreshments trailer.

All of the above units are temporary cabins that sit directly above the gravel ground surface; ie no proper foundations or slabs impeding the flow of surface water.

1.3 Data & Surveys.

1.3.1 Existing and proposed topography.

A topographic survey was recently undertaken.

The contours show the natural site drainage is from the northeast corner (161.15 m aOD), to the southeast corner at a height of 158.72m aOD.

Refer to plan in Appendix.

2 Drainage Strategy.

2.1 Existing Site rainfall & drainage systems.

The site is considered greenfield for the purposes of the assessment.

Local rainfall characteristics are as follows:

M5-60 rainfall depth (mm)	20
'r' ratio M5-60 / M5-2day	0.3
FEH/FSR conversion factor	1.12
Hydrological region	10

DESIGN RAINFALL 1YR (THE WALLINGFORD PROCEDURE)

Design rainfall in accordance with the Wallingford Procedure

Tedds calculation version 2.0.02

Design rainfall intensity

Location of catchment area	Other	
Storm duration	D = **30** min	
Return period	Period = **1** yr	
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.300**	
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm	
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %	
	Factor Z1 (Wallingford procedure)	Z1 = **0.77**
Rainfall for 30min storm with 5 year return period	$M5_30min_i$ = Z1 ´ M5_60min = **15.4** mm	
	Factor Z2 (Wallingford procedure)	Z2 = **0.62**
Rainfall for 30min storm with 1 year return period	M1_30min = Z2 ´ $M5_30min_i$ = **9.6** mm	
	Design rainfall intensity	I_{max} = M1_30min / D = **19.1** mm/hr

DESIGN RAINFALL 30YR (THE WALLINGFORD PROCEDURE)

Design rainfall in accordance with the Wallingford Procedure

Tedds calculation version 2.0.02

Design rainfall intensity

Location of catchment area	Other	
Storm duration	D = **30** min	
Return period	Period = **30** yr	
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.300**	
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm	
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %	
	Factor Z1 (Wallingford procedure)	Z1 = **0.77**
Rainfall for 30min storm with 5 year return period	$M5_30min_i$ = Z1 ´ M5_60min = **15.4** mm	
	Factor Z2 (Wallingford procedure)	Z2 = **1.53**
Rainfall for 30min storm with 30 year return period	M30_30min = Z2 ´ $M5_30min_i$ = **23.5** mm	
	Design rainfall intensity	I_{max} = M30_30min / D = **47.1** mm/hr

DESIGN RAINFALL 100YR (THE WALLINGFORD PROCEDURE)

Design rainfall in accordance with the Wallingford Procedure

Tedds calculation version 2.0.02

Design rainfall intensity

Location of catchment area	Other	
Storm duration	D = **30** min	
Return period	Period = **100** yr	
Ratio 60 min to 2 day rainfall of 5 yr return period	r = **0.300**	
5-year return period rainfall of 60 minutes duration	M5_60min = **20.0** mm	
Increase of rainfall intensity due to global warming	$p_{climate}$ = **0** %	
	Factor Z1 (Wallingford procedure)	Z1 = **0.77**
Rainfall for 30min storm with 5 year return period	$M5_30min_i$ = Z1 ´ M5_60min = **15.4** mm	
	Factor Z2 (Wallingford procedure)	Z2 = **1.99**
Rainfall for 30min storm with 100 year return period	M100_30min = Z2 ´ $M5_30min_i$ = **30.7** mm	
	Design rainfall intensity	I_{max} = M100_30min / D = **61.4** mm/hr

2.2 Proposed Surface Water Drainage.

2.2.1 Infiltration.

Due to the outdoor nature of the proposal, and temporary status of the structures required to run it, the site aim is to be as close to natural as possible. Therefore, the existing greenfield situation is proposed to remain.

The existing soils have simply been overlaid with gravel to create a permeable top surface. Rainfall will filter down through the permeable gravel, down to the existing soil, and then infiltrate the existing soil & runoff at its greenfield rate once saturated. The additional gravel upper surface should also provide some minor attenuation of flows through it.

The temporary amenities are installed over the permeable materials, with no in-ground foundations or slabs; so the full ground surface can infiltrate as it did prior to development; ie this will ensure development proposals will achieve greenfield run-off rates.

2.2.2 On-site treatment & discharge to watercourse.

Not required.

2.2.3 SW Sewer.

Not required.

2.2.4 Combined Sewer.

Foul water connections only.

2.3 Proposed Foul Water Drainage.

2.3.1 WCs.

The WCs are housed in a temporary welfare trailer. The providing company undertake contracted cleaning, servicing & emptying every 2–3 weeks.

2.3.2 Hot tub.

The hot tub is the only site unit that requires chemicals to run. When required, it is drained & refilled.

Considering the chemicals used are dangerous to aquatic life, as well as the close proximity to the nearest watercourse; it is proposed to discharge drained water to the local combined sewer which exists to the south side of the watercourse.

The closest mapped part of the United Utilities network is to the Town House Farm cottages to the east of the site.

2.3.3 Plunge baths.

The plunge baths are cold, and do not require chemicals for use. The water is simply chilled & filtered through a mechanical filter to remove natural debris falling into the baths.

2.4 Adoption.

Not applicable.

2.5 Maintenance & Management Plan.

Not applicable.

3 Flood Risk Assessment.

3.1 Flood Risk Reference.

Flood Risk Assessments are required for the following sites:

- *in flood zones 2, 3 or 3b.*
- *within flood zone 1 with a site area of 1 hectare or more.*
- *in areas with critical drainage problems.*
- *within flood zone 1 where the LPA's strategic flood risk assessment (SFRA) shows it will be at increased risk of flooding during its lifetime.*
- *that increases the vulnerability classification and may be subject to sources of flooding other than rivers or sea.*

Environment Agency (EA) mapping data identifies the Application Site as being primarily within **flood zone 1,** and part of the far west corner to be within **flood zone 2.** Parts of the local area are within **flood zones 2 & 3,** including all access and egress routes from the site. Refer to EA flood map in the 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). Flood zone 1 comprises all areas outside of flood zones 2 & 3.

The Planning Practice Guidance indicates the flood risk vulnerability classification (Table 2) for the Application Site end use to be '**Water Compatible Development'**.

Water compatible development comprises such activities as:

- Water-based recreation (excluding sleeping accommodation).
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.

3.2 Existing fluvial & surface water system.

The local fluvial system is relatively simple, generally comprising Town House Brook from the northwest.

Townhouse brook is culverted beneath the site, but is an open channel approximately 40m to the northwest (upstream).

From the flood maps it would appear the area is relatively well defended, with flood waters generally contained within banks. Flooding is shown only in upper extreme events, nominally between a 100-1000yr fluvial event.

3.3 Proposed fluvial & surface water system.

No change.

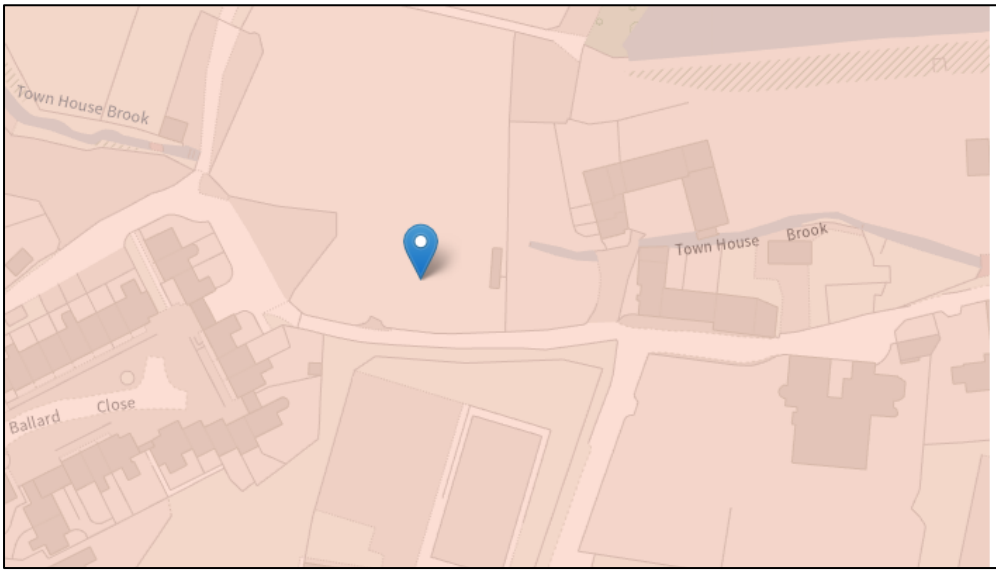
3.4 Climate change impacts.

Climate change impacts on fluvial flooding are measured on the potential increase through the expected development lifetime. With a longer development lifetime, the assessment must consider a greater chance of river level increase.

Residential developments are considered to have the longest potential development lifetimes. Commercial developments have shorter lifetimes owing to higher turnover of changes in use types etc, and therefore a higher frequency of associated redesign & updated flood risk assessment.

The proposed development is for a commercial use, and as identified in Section 1, the vulnerability of the development is 'water compatible'. The Planning Flood Maps designate the Site as being within flood zone 1/2.

EA guidance specifies climate change allowances by management catchment specific areas. Peak flow river maps have been produced which specify the climate change allowances to be used in a flood risk assessment:



Irwell Management Catchment peak river flow allowances

	Central	Higher	Upper
2020s	12%	15%	24%
2050s	19%	26%	43%
2080s	35%	46%	75%

EA guidance indicates the peak flow rates that should be used for the vulnerability classification:

- essential infrastructure – use the higher central allowance.

- highly vulnerable – use central allowance (development should not be permitted in flood zone 3a).
- more vulnerable – use the central allowance.
- less vulnerable – use the central allowance.
- water compatible – use the central allowance.

Given the water compatible development risk category, the central allowance climate change multiplier should be used as the basis for assessing the potential impact of climate change over the development lifetime.

As the Application Site is to be used as an outdoor commercial use, it is highly unlikely maximum development lifetimes will be attained, and the '2050s' timeline is appropriate. Comparing the '2050s' timeline with the central allowance from the peak river flow predictions above, suggests a 19% climate change allowance for the Site.

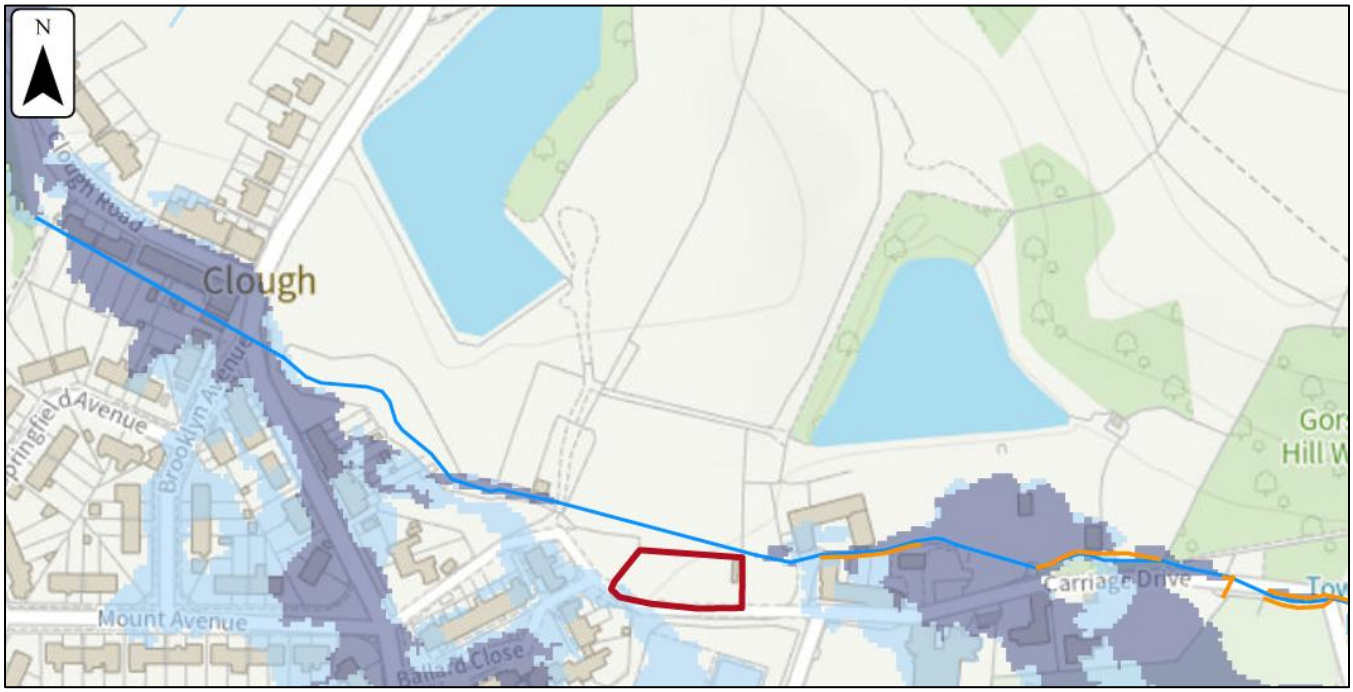
3.5 Fluvial morphological impacts.

The proposed development will not impact or change fluvial morphology.

3.6 Potential sources of flooding.

a. Fluvial flooding from rivers.

The Site is generally free from main river flooding apart from the far west corner, and has no permanent or critical flood risk uses.



Analysis of the flood maps suggest flooding occurs in the wider area to the northwest around the Clough Road & Calderbrook Road areas. The flooding to the west of the site is associated with overland flood flows between a 100-1000yr fluvial event, and is caused by residual overland flows in and around the residential areas to the west of the site and some minor flooding down Carriage Drive adjacent to the Application Site.

b. Surface water flood maps.

The EA detailed online technical flood maps show detailed flooding in the local area from various sources, including allowances from climate change, and consider return period events & depth as follows:

- High chance/3.3% AEP (30yr).
- Medium chance/1-3.3% AEP (30-100yr).
- Low chance/0.1-1% AEP (100-1000yr).
- Very low chance/<0.1% AEP (<1000yr).

For each of the above chances of flooding, the maps also show potential flood depths as follows:

- To 20cm depth.

- To 30cm depth.
- To 60cm depth.
- To 90cm depth.

The surface water maps indicate there is no risk of flooding within the Application Site boundaries.

c. Artificial Watercourse/Canals.

No risk to the Application Site.

d. Loss of overland flow.

There will be no loss of overland flow routes due to development of the Application Site.

e. Loss of Floodplain.

There will be no loss of floodplain due to development of the Application Site.

f. Springs and high groundwater levels.

No risk to the Application Site.

g. Surcharging of local drainage & sewerage systems.

No risk to the Application Site.

h. Reservoirs.

The reservoir flood maps show there is no risk to the development including an allowance for climate change.

There are no permanent structures on site to affect.

3.7 Design.

Not required.

4 Emergency Evacuation Plan.

4.1 Section 1-4. Scope, Location, Risk & Mitigation.

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.

The previous sections of this report have covered the information required for sub-sections 1-4 noted above required for an EP, and thus this EP section shall start at subsection 5 – Flood Warnings & Associated Actions.

4.2 Section 5. Flood Warnings and Associated Actions.

The Site is within a flood warning area.

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 Site is within the Environment Agency Flood Warning Area and it is strongly advised that the Owner/Tenant, must sign up to receive flood warnings via the Environment Agency Flood Information Service.

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 - Prepare



- prepare a bag that includes medicines and insurance documents
- check flood warnings

Flood warning - Act



- turn off gas, water and electricity
- move things upstairs or to safety
- move family, pets and car to safety

Severe flood warning - Survive



- call 999 if in immediate danger
- follow advice from emergency services
- keep yourself and your family safe

The Flood Information Service can be found on the internet using the following URL: https://www.gov.uk/get-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.

4.3 Section 6. Safe Access and Escape.

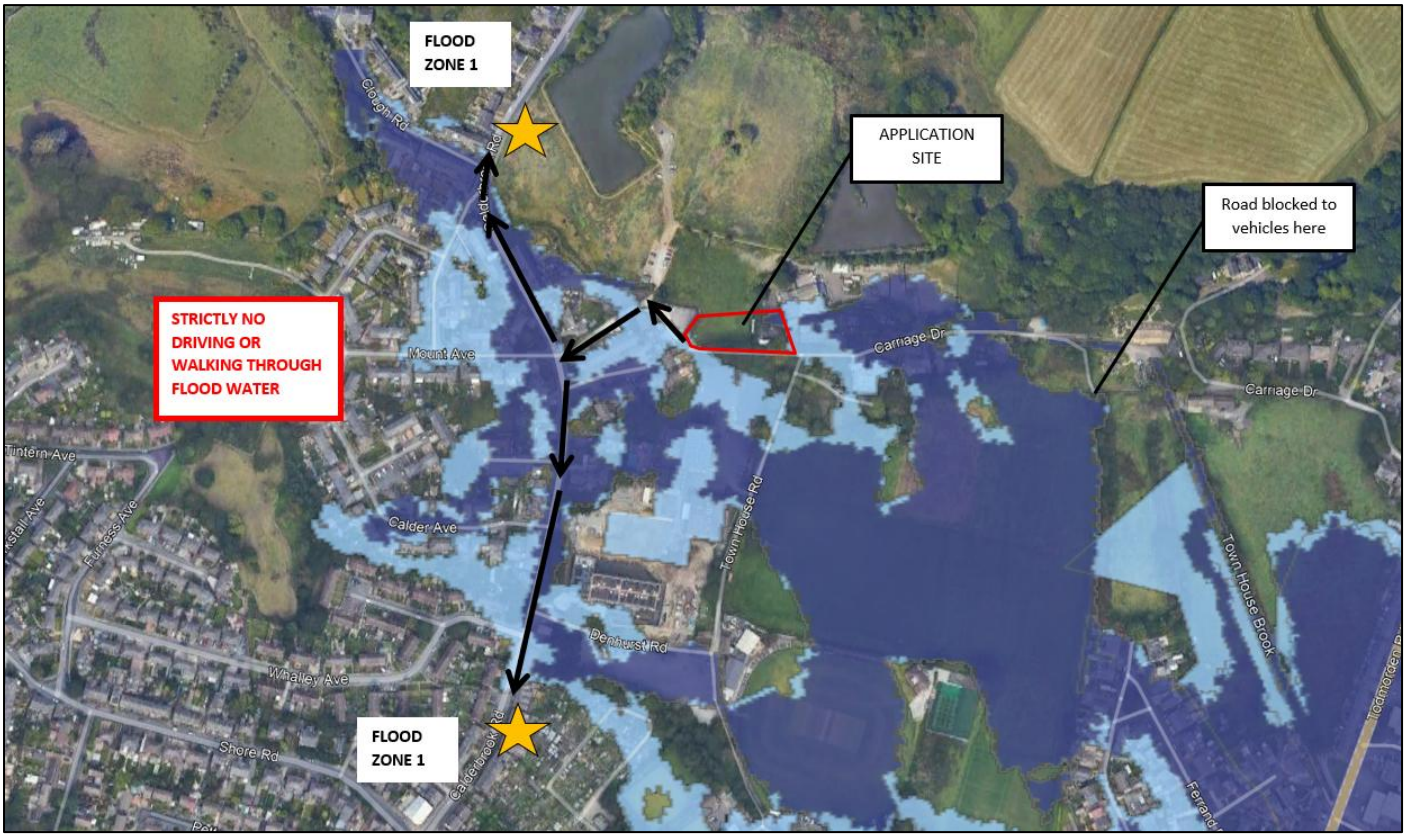
In flood risk areas, safe access and exit from new developments should be in accordance with the Adept EP guidance, and that of the referenced background documentation Defra/EA R&D Technical Report FD2320/TR2; and should be in the following order of preference:

- Safe dry route for people and vehicles.
- Safe dry route for people.

- If a dry route for people is not possible, a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause a risk to people.
- If a dry route for vehicles is not possible, a route for vehicles where the flood hazard (in terms of depth and velocity of flooding) is low to permit access for emergency vehicles. However, the public should not drive vehicles in floodwater.

The far west corner of the site is within flood zone 2 according to flood maps, as well as surrounding off-site areas to the west & south.

The only access for vehicles is via the route shown as other roads/lanes turn into pedestrian only access. To escape the entire wider area flood zone, the evacuation plan should be followed to Flood Zone 1.



The EA/DEFRA surface water flood maps indicate the local flood Surface Water Flood Maps indicate the local flood depth to be <200mm for the 100-1000yr flood event.

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 business owners should be ready for this scenario.

When a flood warning to ACT is issued, people should follow instructions to evacuate as per the above Emergency Evacuation Route Plan– assuming a flood event could be imminent.

This route provides the simplest path for pedestrians, users with specific needs such as wheelchair users or those with pushchairs as well as vehicular users prior to surface flooding.

HOWEVER - DRIVING OR PEDESTRIAN MOVEMENTS SHOULD NOT BE ATTEMPTED THORUGH FLOOD WATERS.

4.4 Section 7. Temporary Refuge

Shouldn't be required as it is unlikely the site will be operational in times of extreme flood. However, the site is safe from fluvial flooding so can provide refuge.

The Application Site should be evacuated prior to a flood event if instructed to ACT by the Flood Warning Service.

If flood advice is required as an emergency, 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.

4.5 Section 8. After the Flood

Clean-up will be required following an extreme storm event, and the following procedures should be followed:

- Contact your insurance company.
- Cleaning and repairing the property.

  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.

4.6 Section 9. List of Roles

It is the Owner's responsibility to follow this EP and keep up to date with current advice, and warn staff and customers of flood warning advice.

4.7 Section 10. Plan Upkeep and Awareness

The Owner should ensure they are familiar with the Evacuation Plan and procedures and keep up to date with latest Environment Agency Guidance or changes in local infrastructure.

Signed……  .

D.S.Slattery BSc (Hons).

T J Booth Associates.

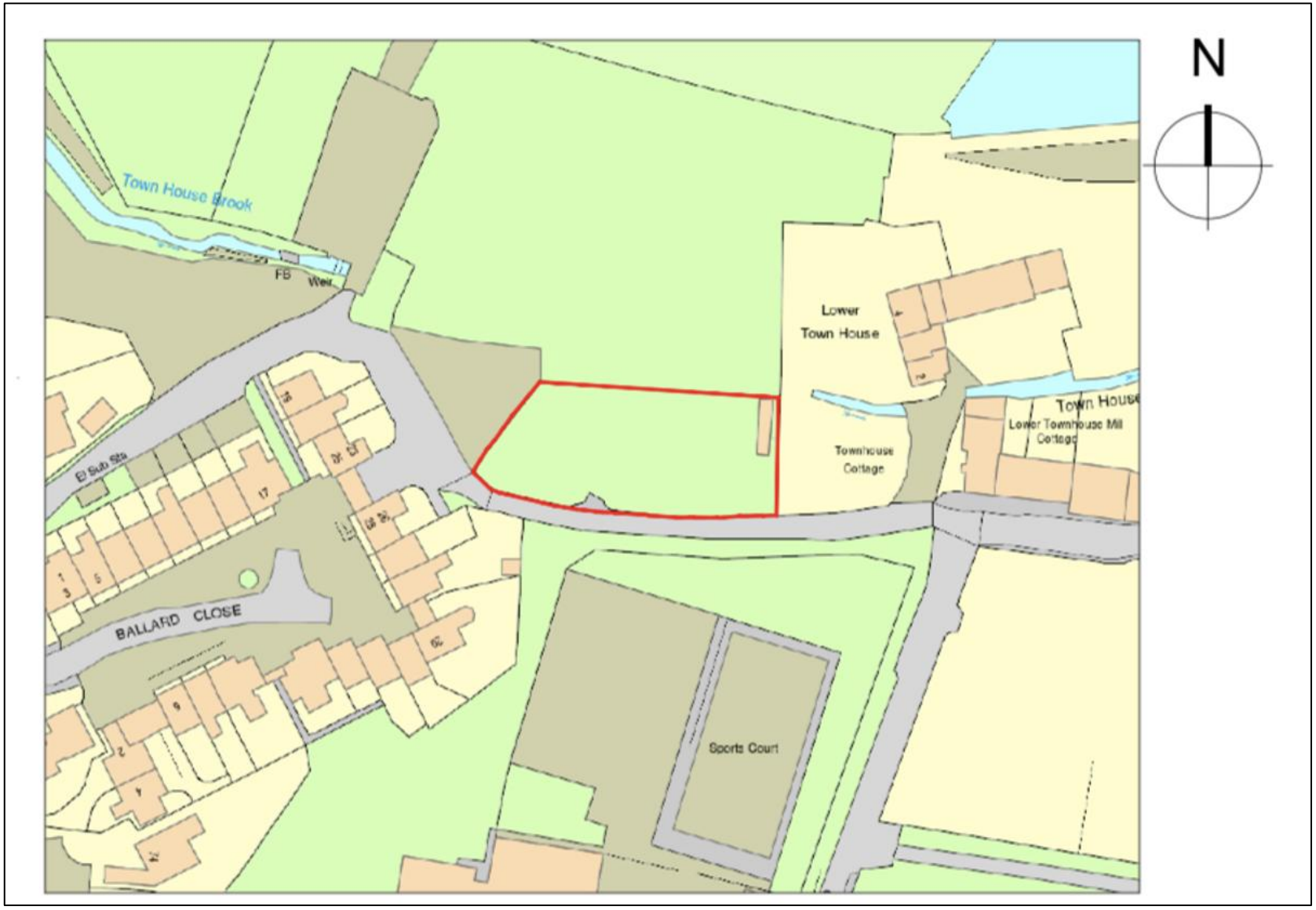
Authorised…  .

T J Booth BSc (Hons), C. Eng. C. Env. MICE.

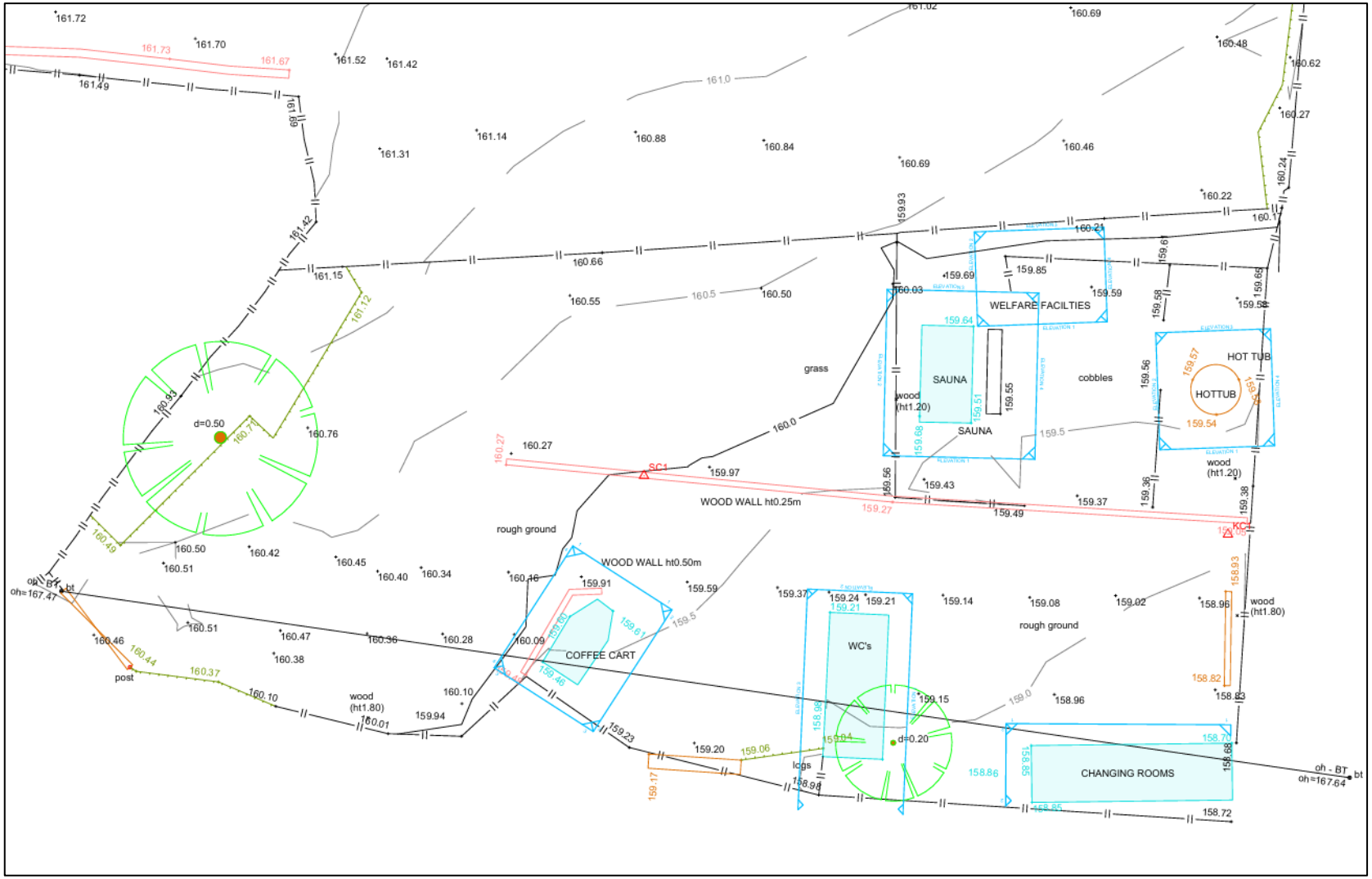
T J Booth Associates.

5 Appendix.

5.1 Location Plan.



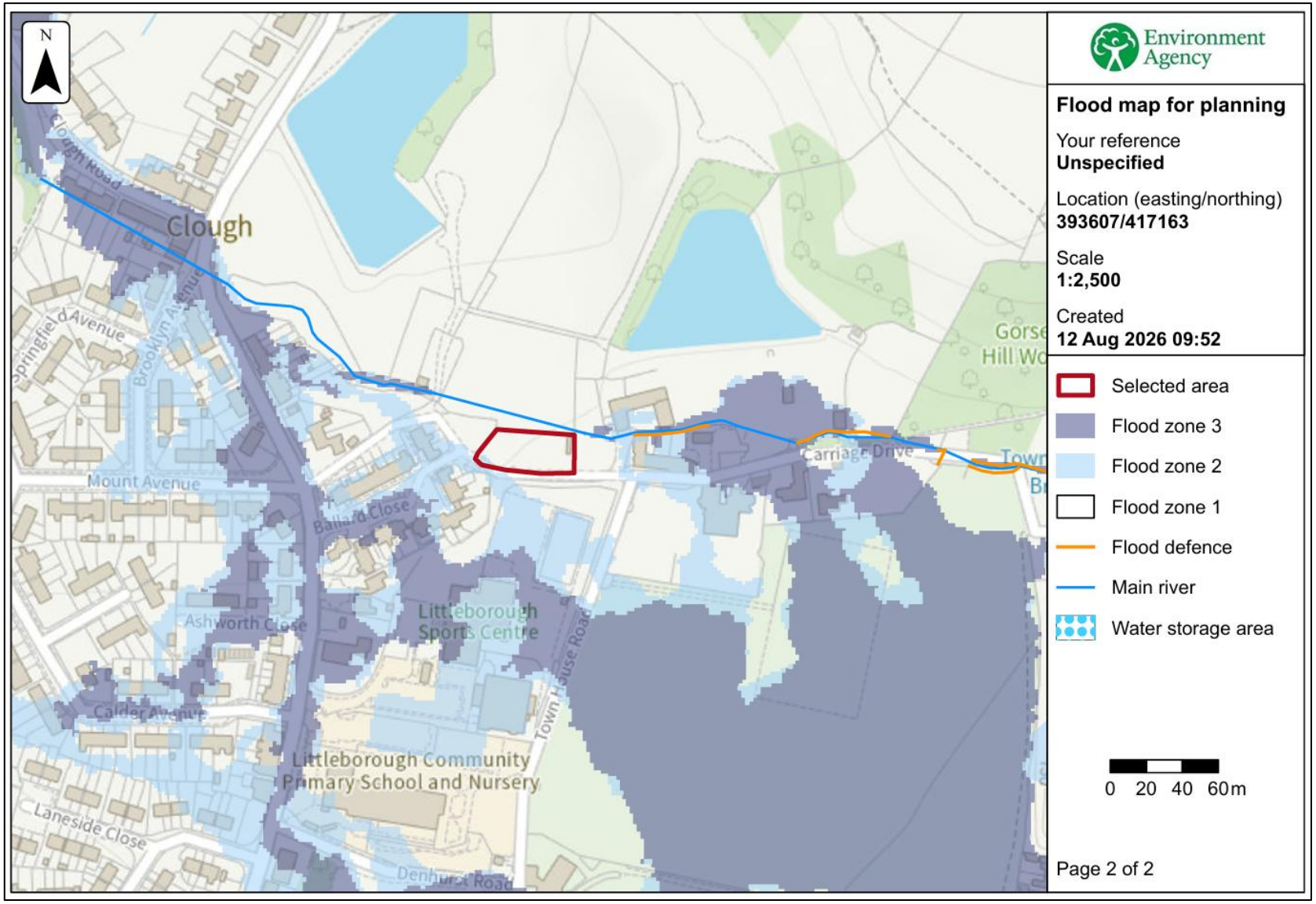
5.2 Topographic Survey.



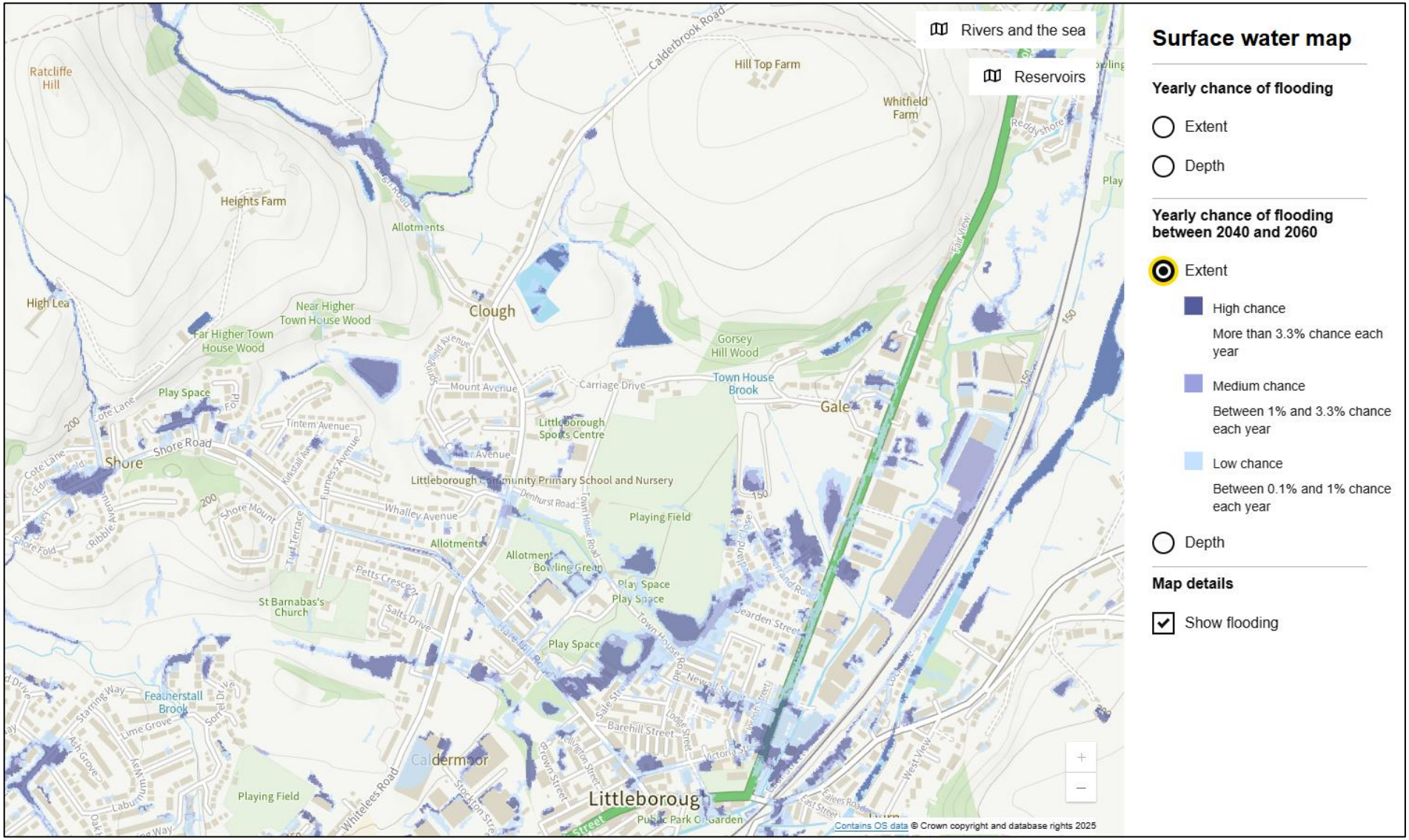
5.3 Proposed site Plan.



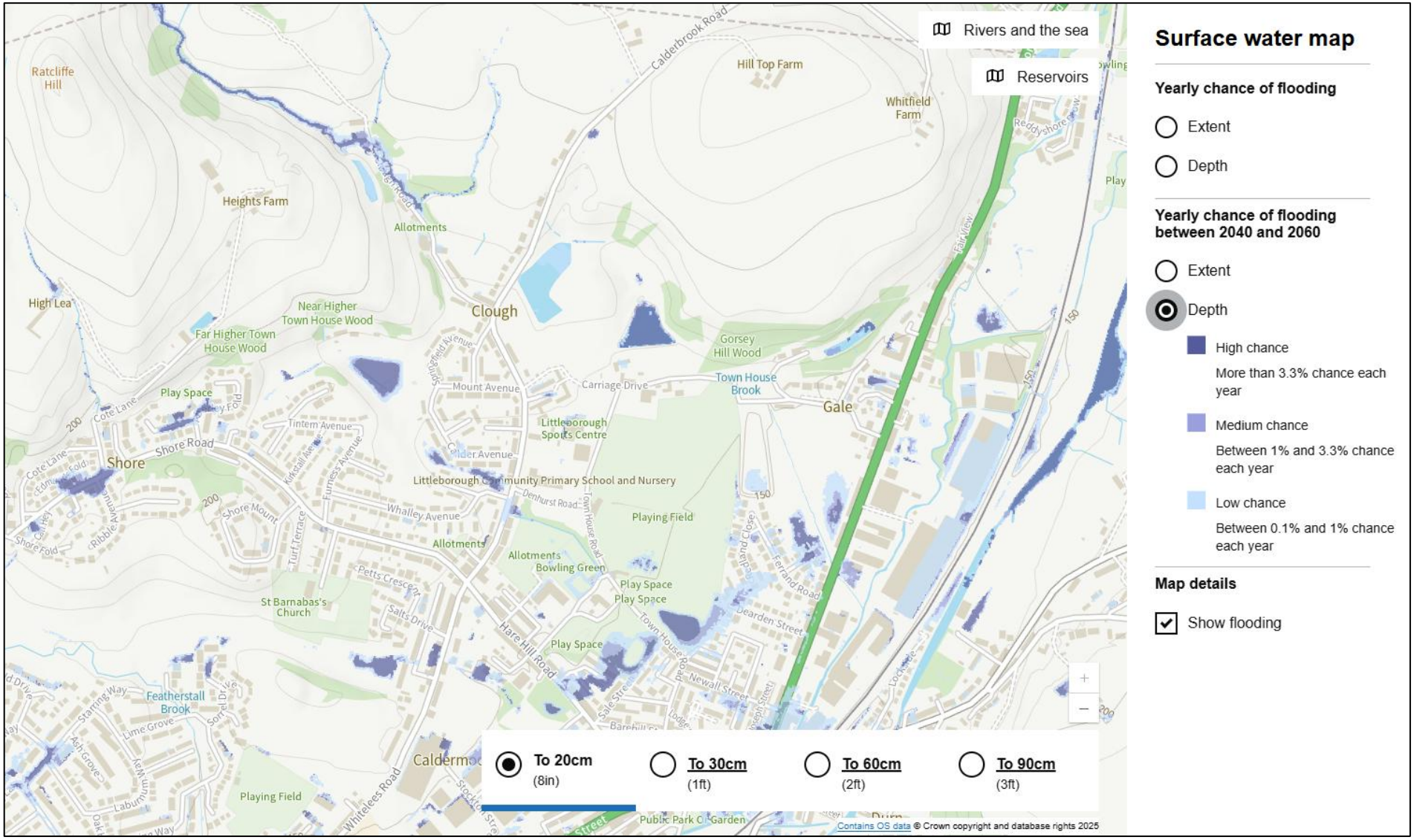
5.4 Environment Agency Flood Zone Map (Planning).

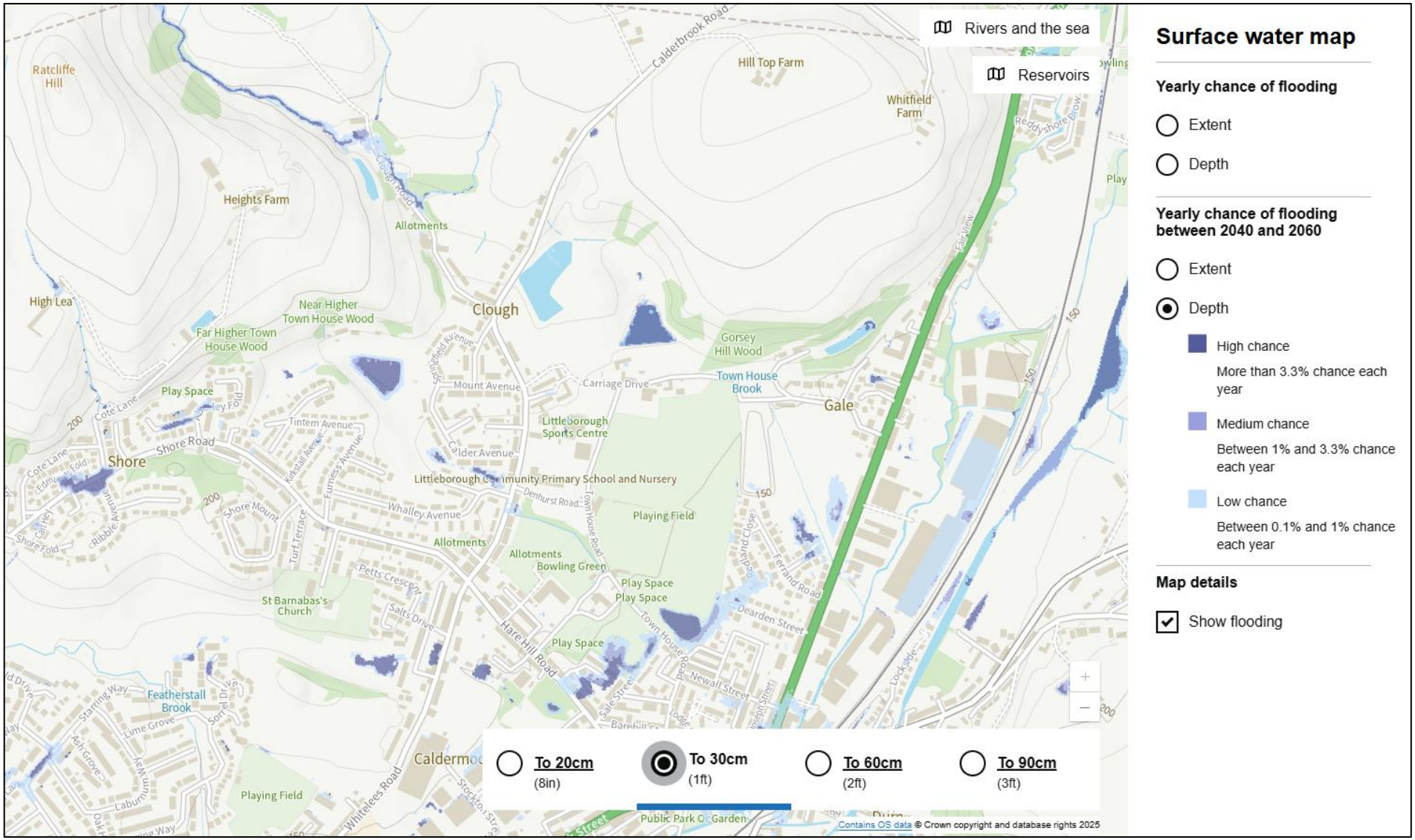


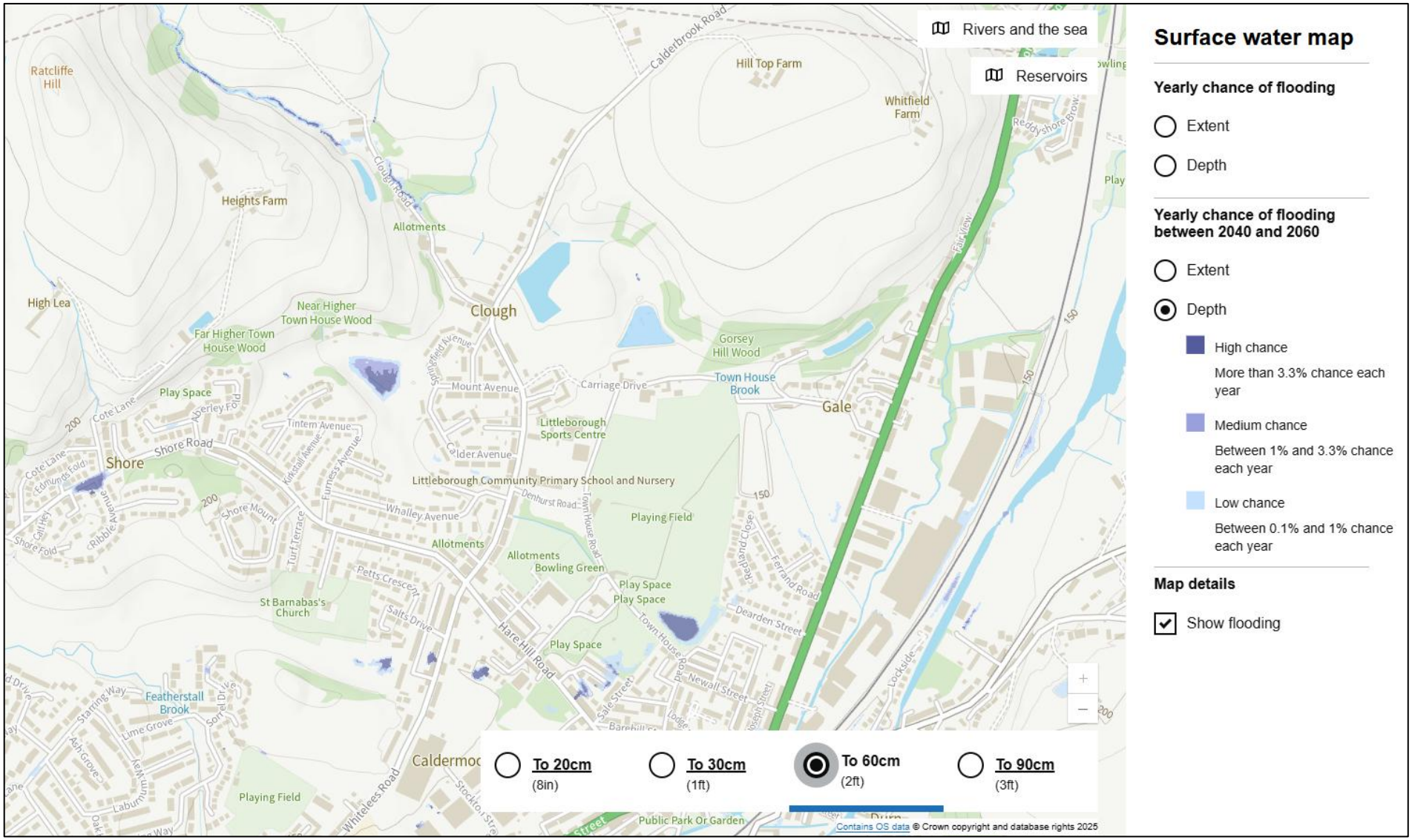
5.5 Environment Agency Technical Surface Water Climate Change Flood Risk Extent Maps.

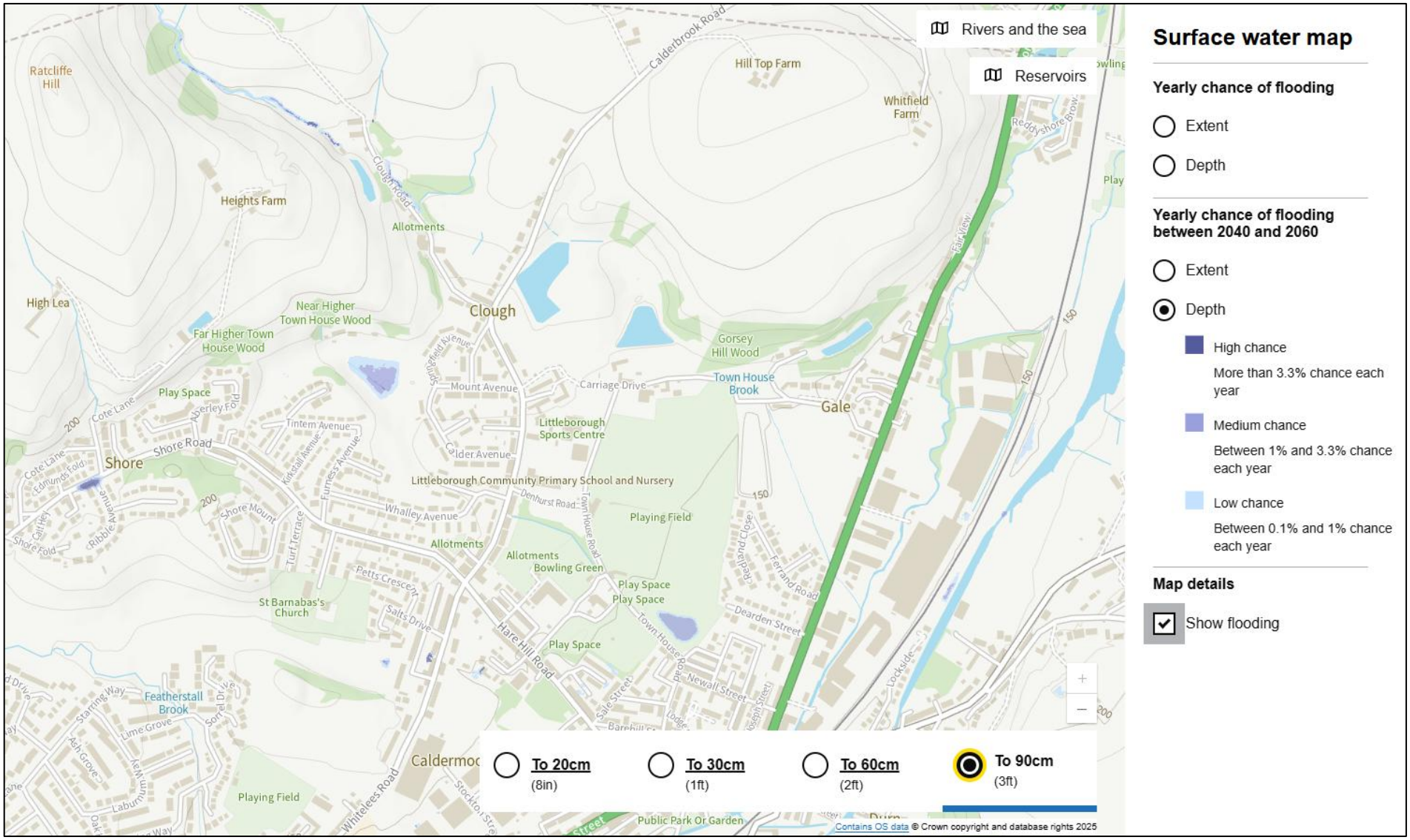


5.6 Environment Agency Technical Surface Water Climate Change Flood Risk Depth Maps.

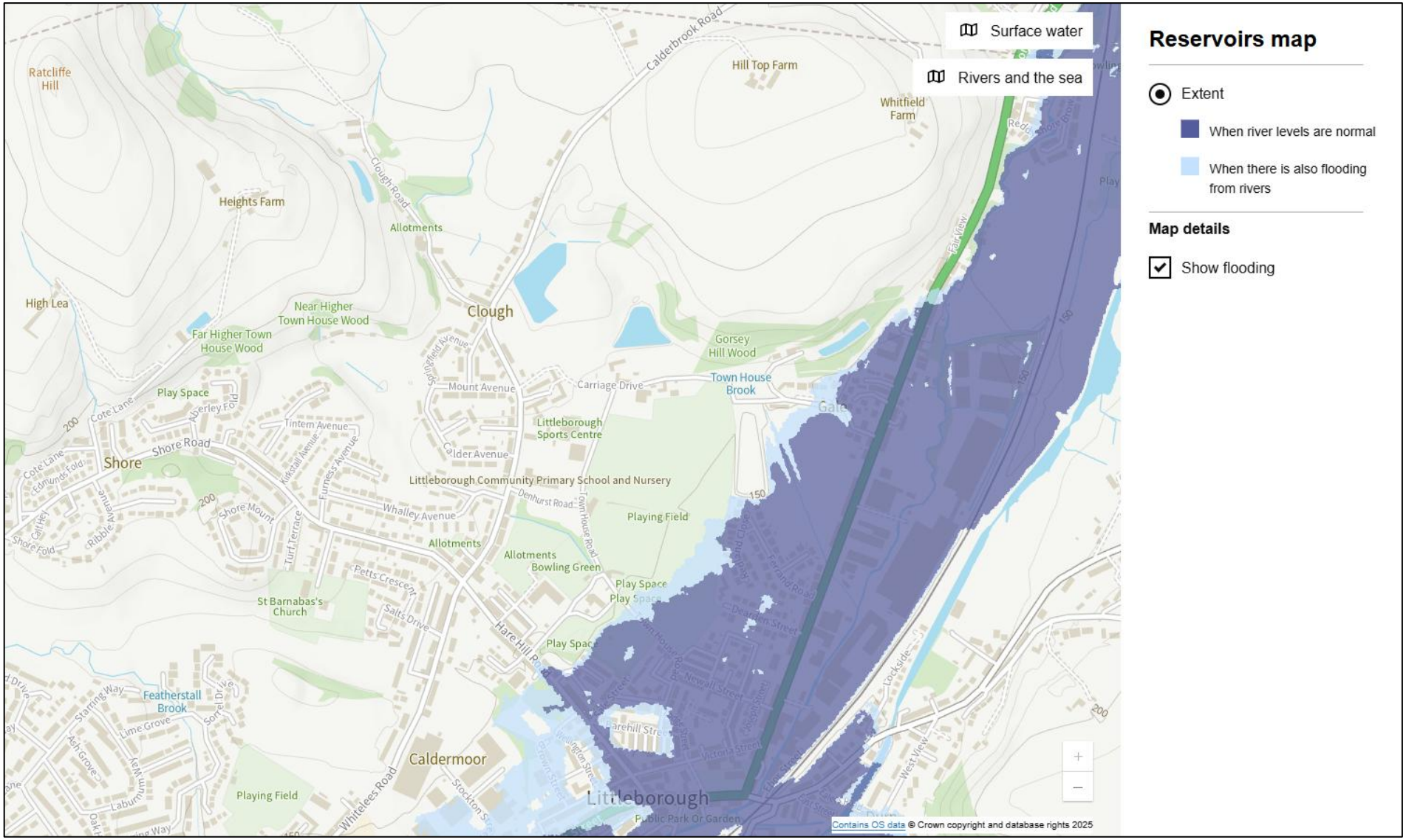



Rivers and the sea
Reservoirs
Surface water map
Yearly chance of flooding
Extent
Depth
Yearly chance of flooding between 2040 and 2060
Extent
Depth
High chance
More than 3.3% chance each year
Medium chance
Between 1% and 3.3% chance each year
Low chance
Between 0.1% and 1% chance each year
Map details
Show flooding
To 20cm (8in)
To 30cm (1ft)
To 60cm (2ft)
To 90cm (3ft)
Contains OS data © Crown copyright and database rights 2025
Ratcliffe Hill
Hill Top Farm
Whitfield Farm
Heights Farm
Allotments
High Lea
Near Higher Town House Wood
Far Higher Town House Wood
Clough
Gorsey Hill Wood
Town House Brook
Gale
Play Space
Mount Avenue
Carriage Drive
Littleborough Sports Centre
Shore
Shore Road
Littleborough Community Primary School and Nursery
Playing Field
Whalley Avenue
Allotments
Allotments Bowling Green
Play Space
St Barnabas's Church
Salts Drive
Hare Hill Road
Featherstall Brook
Caldermoor
Playing Field
Whitelees Road
Public Park Or Garden


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Allotments
High Lea
Near Higher Town House Wood
Far Higher Town House Wood
Clough
Gorsey Hill Wood
Town House Brook
Gale
Play Space
Cote Lane
Shore
Shore Road
Littleborough Sports Centre
Littleborough Community Primary School and Nursery
Playing Field
Allotments
Allotments Bowling Green
Play Space
Play Space
St Barnabas's Church
Play Space
Featherstall Brook
Playing Field
Public Park Or Garden
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Rivers and the sea
Reservoirs
Surface water map
Yearly chance of flooding
Extent
Depth
Yearly chance of flooding between 2040 and 2060
Extent
Depth
High chance
More than 3.3% chance each year
Medium chance
Between 1% and 3.3% chance each year
Low chance
Between 0.1% and 1% chance each year
Map details
Show flooding
To 20cm (8in)
To 30cm (1ft)
To 60cm (2ft)
To 90cm (3ft)
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Ratcliffe Hill
Hill Top Farm
Whitfield Farm
Heights Farm
Allotments
High Lea
Near Higher Town House Wood
Far Higher Town House Wood
Clough
Gorsey Hill Wood
Town House Brook
Gale
Play Space
Mount Avenue
Carriage Drive
Littleborough Sports Centre
Shore
Shore Road
Littleborough Community Primary School and Nursery
Playing Field
Allotments
Allotments Bowling Green
Play Space
St Barnabas's Church
Play Space
Play Space
Featherstall Brook
Playing Field
Public Park Or Garden

5.7 Environment Agency Technical Reservoir Flood Risk Depth Map.



5.8 Sewer Plans.

