FLOOD RISK ASSESSMENT

REF: - PWC/3240
FOR

Proposed Residential Development
Lane End Mews
High Street
Thurnscoe
Rotherham
S63 0RL

Peter Wade Consultancy
Stockrail House
Waggon Lane
Upton
Pontefract
WF9 1FE



1. DEVELOPMENT SITE AND LOCATION

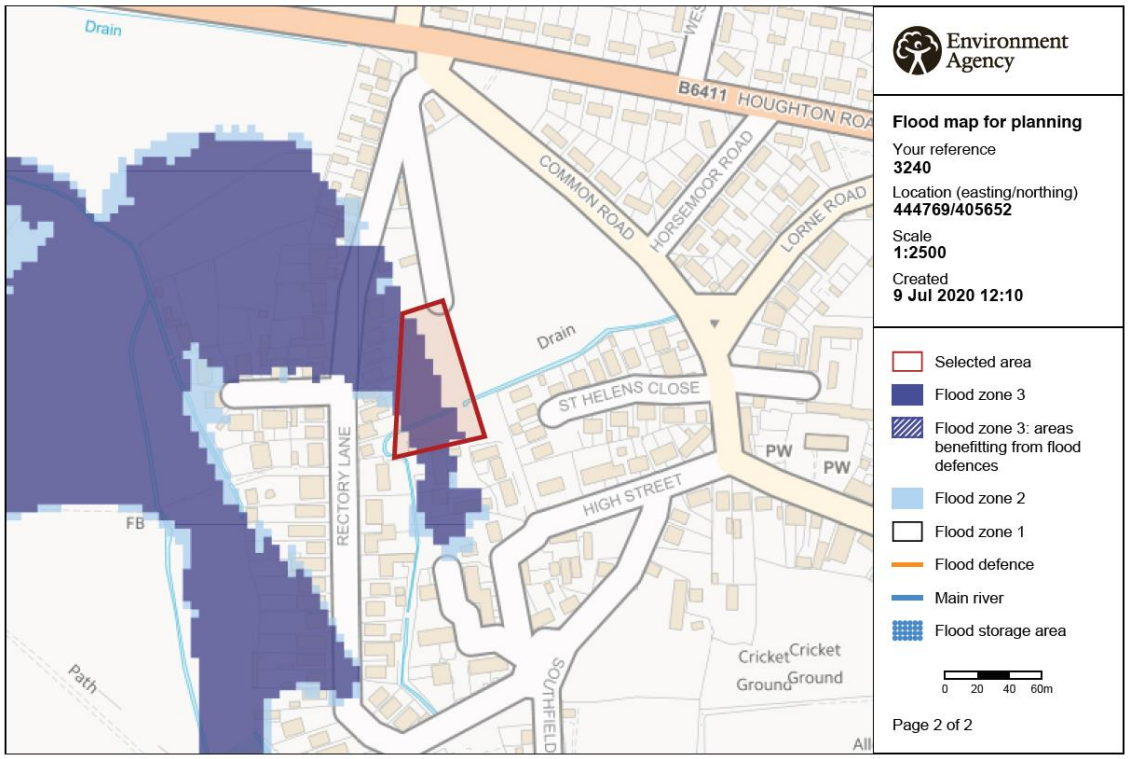
a. The development site is located at:

Lane End Mews
High Street
Thurnscoe
Rotherham
S63 0RL

b. The site is accessed from High Street, off Common Road. An open channel drain runs from east to west across the south edge of the site. Thurnscoe Dike lies to the west, past existing houses on Rectory Lane, flowing south towards the River Dearne.

c. The site is currently undeveloped.

d. The site is partially within flood zone 3.



2. DEVELOPMENT PROPOSALS

a. The development proposal is for the construction of a 5No. bungalows for residential use, as well as associated detached garages and private drive.



Site plan of the proposal provided by the applicant.

b. The Flood risk vulnerability classification for the proposed development would be 'more vulnerable,' which is in line with neighbouring uses. Table 3: Flood risk vulnerability and flood zone 'compatibility' suggests that 'less vulnerable' development is suitable in flood zones 1 and 2, and in 3a with an exception test.

c. As the development is residential, the lifetime of the development is considered to be 100 years.

3. CLIMATE CHANGE

a. The site is within the Humber river basin district.

b. Considering the development's 'more vulnerable' classification, higher central and upper end allowance categories should be used.

c. The higher central allowance for anticipated change to peak river flows into the '2080s' (2070-2115) is 30%, and the upper end allowance is 50%.

d. This forecasts that into the '2080s,' evidence suggests there is a 70% chance of a less than 30% increase in peak flows, and a 90% chance there will be an increase of less than 50%.

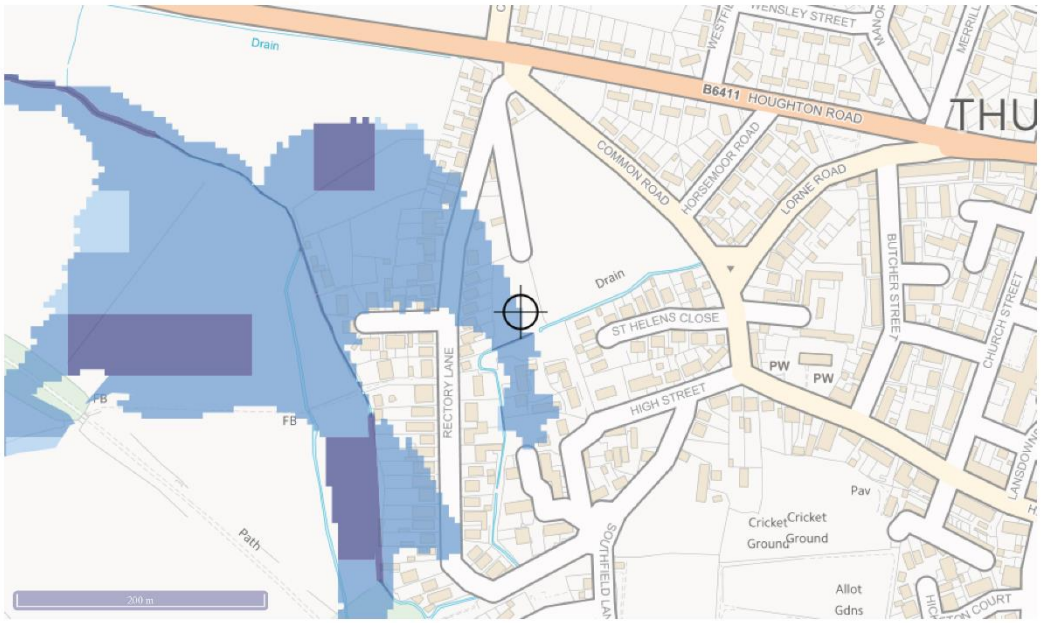
e. For all of England, the upper end allowance for peak rainfall intensities is 40% into the 2080s, and the central allowance is 20%.

f. The rainfall within the central allowance should not be allowed present a flood risk to occupants, mitigations may be required.

4. SITE-SPECIFIC FLOOD RISK

Flood Risk Data

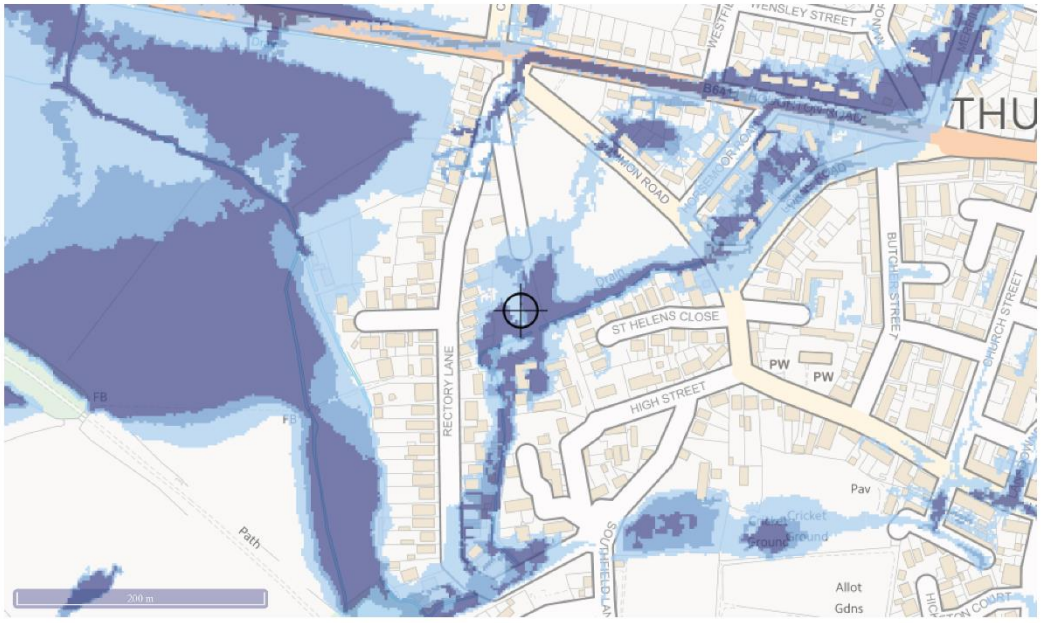
Data relating to flood risk and levels has been acquired from the Environment Agency, and the Barnsley Strategic Flood Risk Assessment 2010.



Extent of flooding from rivers or the sea

High Medium Low Very low Location

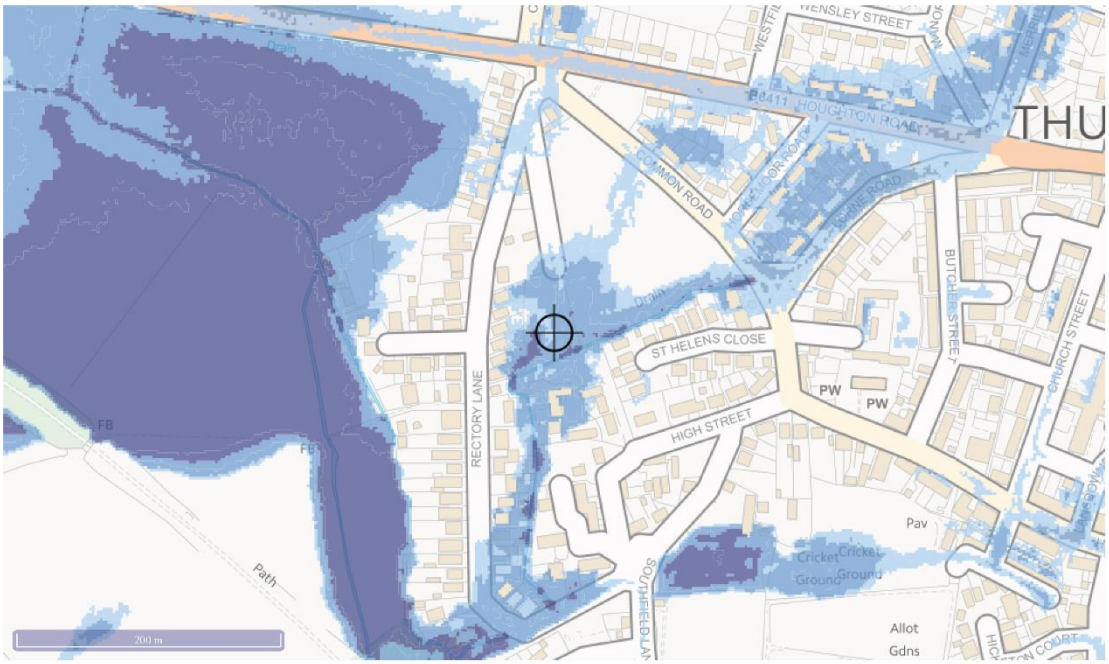
Extent of flood risk from rivers and sea.



Extent of flooding from surface water

High Medium Low Very low Location

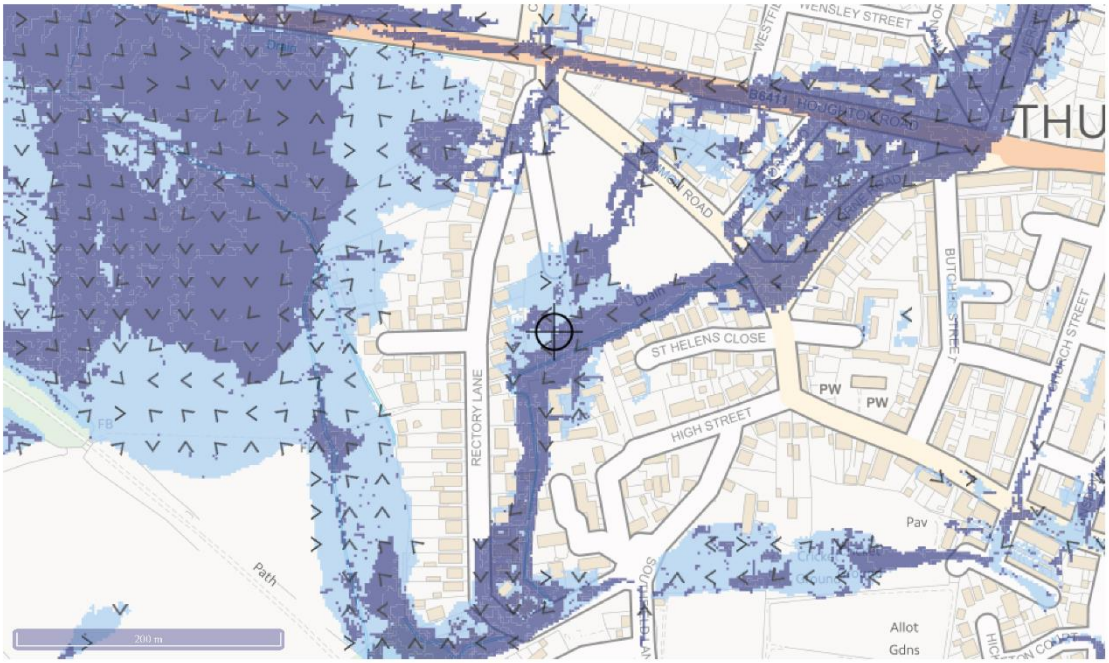
Extent of flood risk from surface water.



Surface water flood risk: water depth in a low risk scenario
Flood depth (millimetres)

Over 900mm | 300 to 900mm | Below 300mm | Location

Surface water depth in low risk scenario.



Surface water flood risk: water velocity in a low risk scenario
Flood velocity (metres/second)

Over 0.25 m/s | Less than 0.25 m/s | Direction of water flow | Location

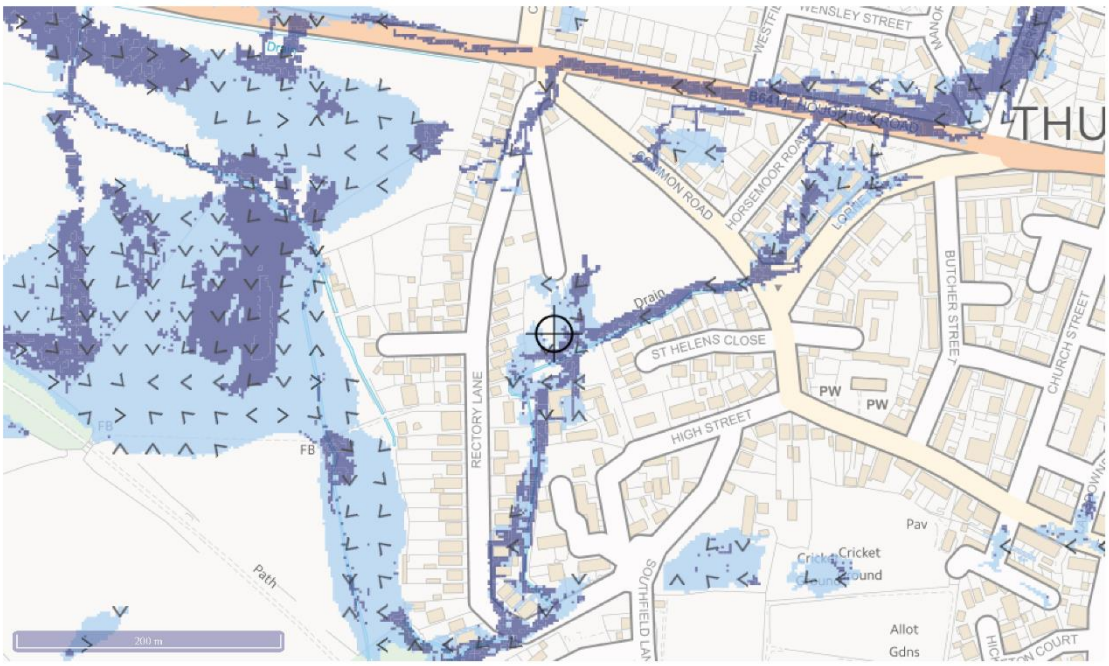
Surface water flows in low risk scenario.



Surface water flood risk: water depth in a medium risk scenario
Flood depth (millimetres)

Over 900mm | 300 to 900mm | Below 300mm | Location

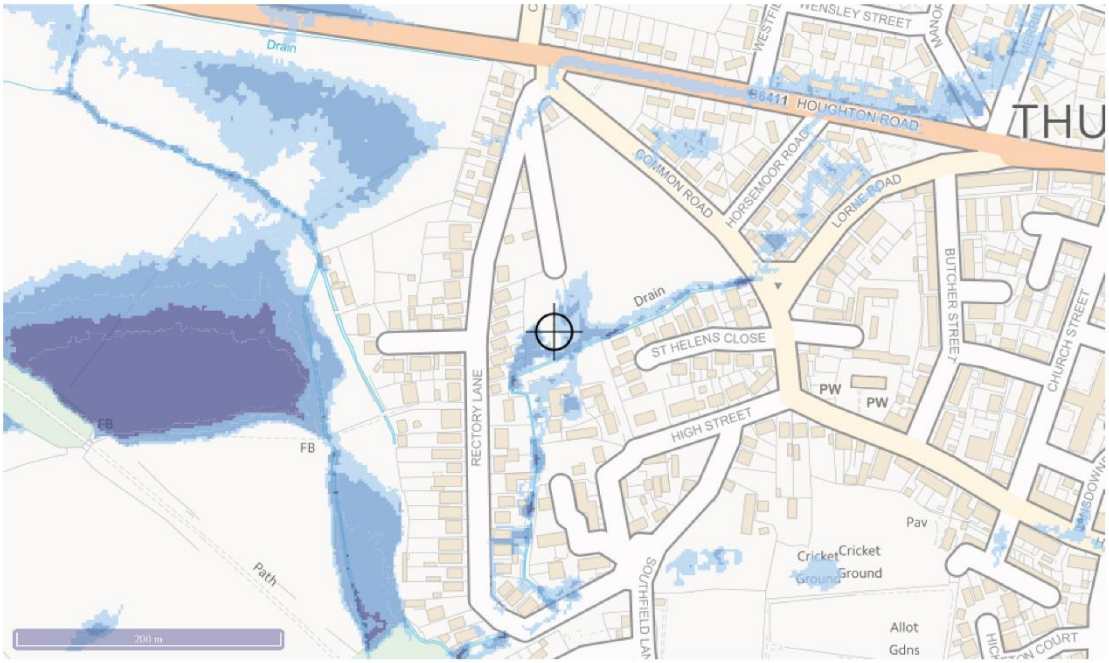
Surface water depth in medium risk scenario.



Surface water flood risk: water velocity in a medium risk scenario
Flood velocity (metres/second)

Over 0.25 m/s | Less than 0.25 m/s | Direction of water flow | Location

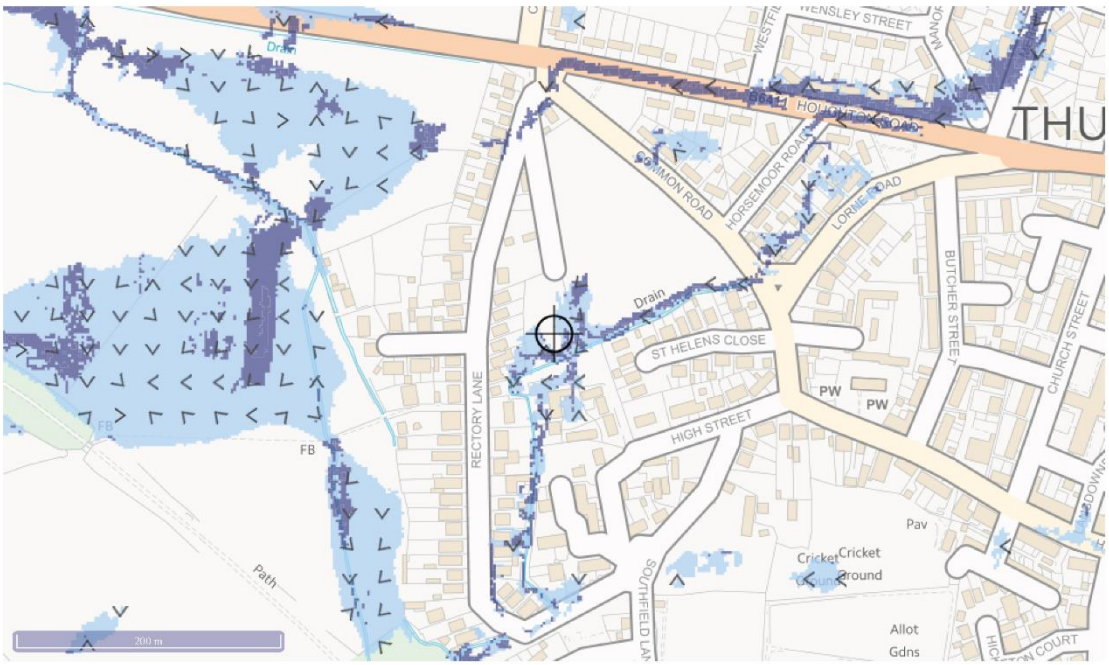
Surface water flows in medium risk scenario.



Surface water flood risk: water depth in a high risk scenario
Flood depth (millimetres)

Over 900mm | 300 to 900mm | Below 300mm | Location

Surface water depth in high risk scenario.



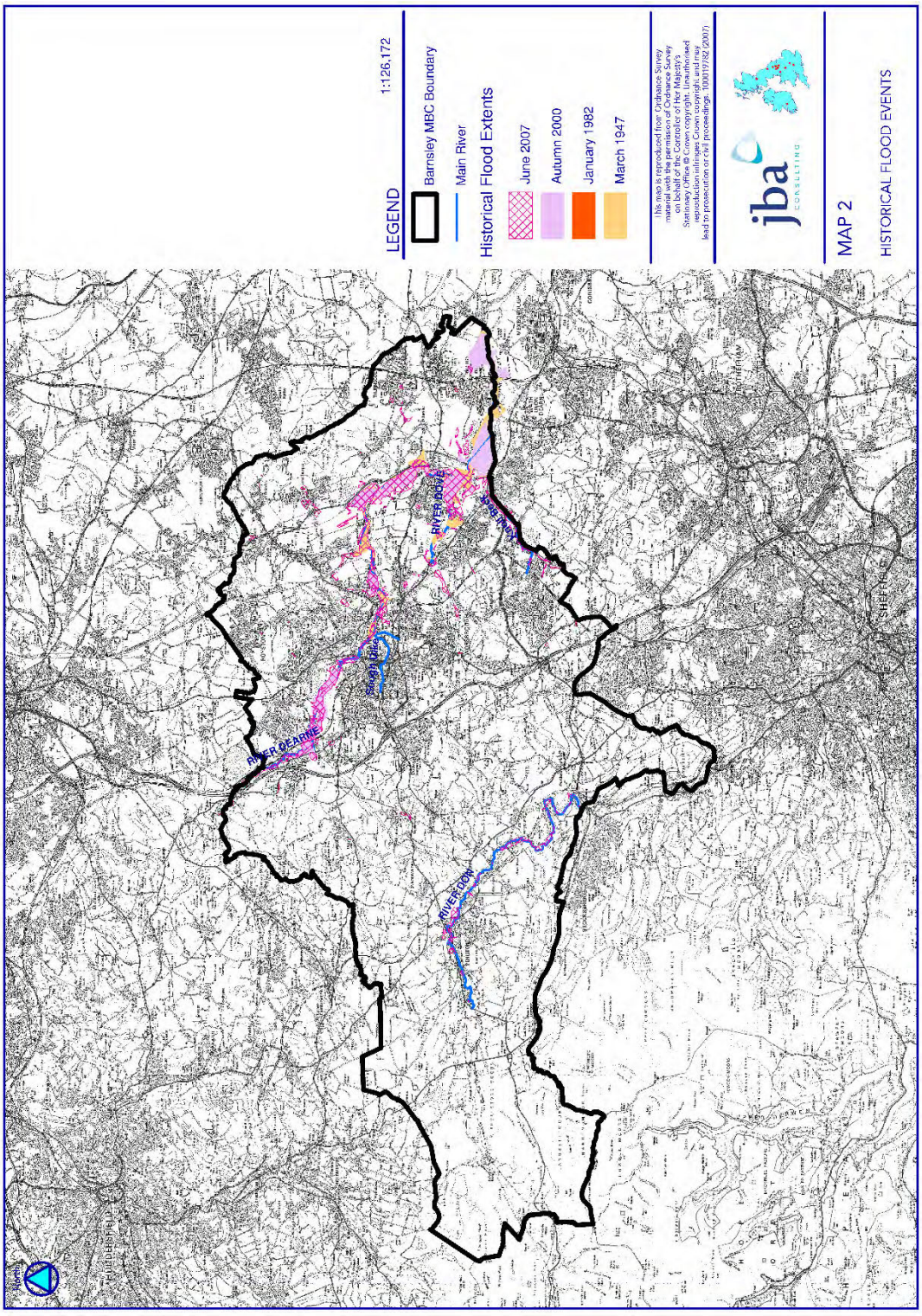
Surface water flood risk: water velocity in a high risk scenario
Flood velocity (metres/second)

Over 0.25 m/s | Less than 0.25 m/s | Direction of water flow | Location

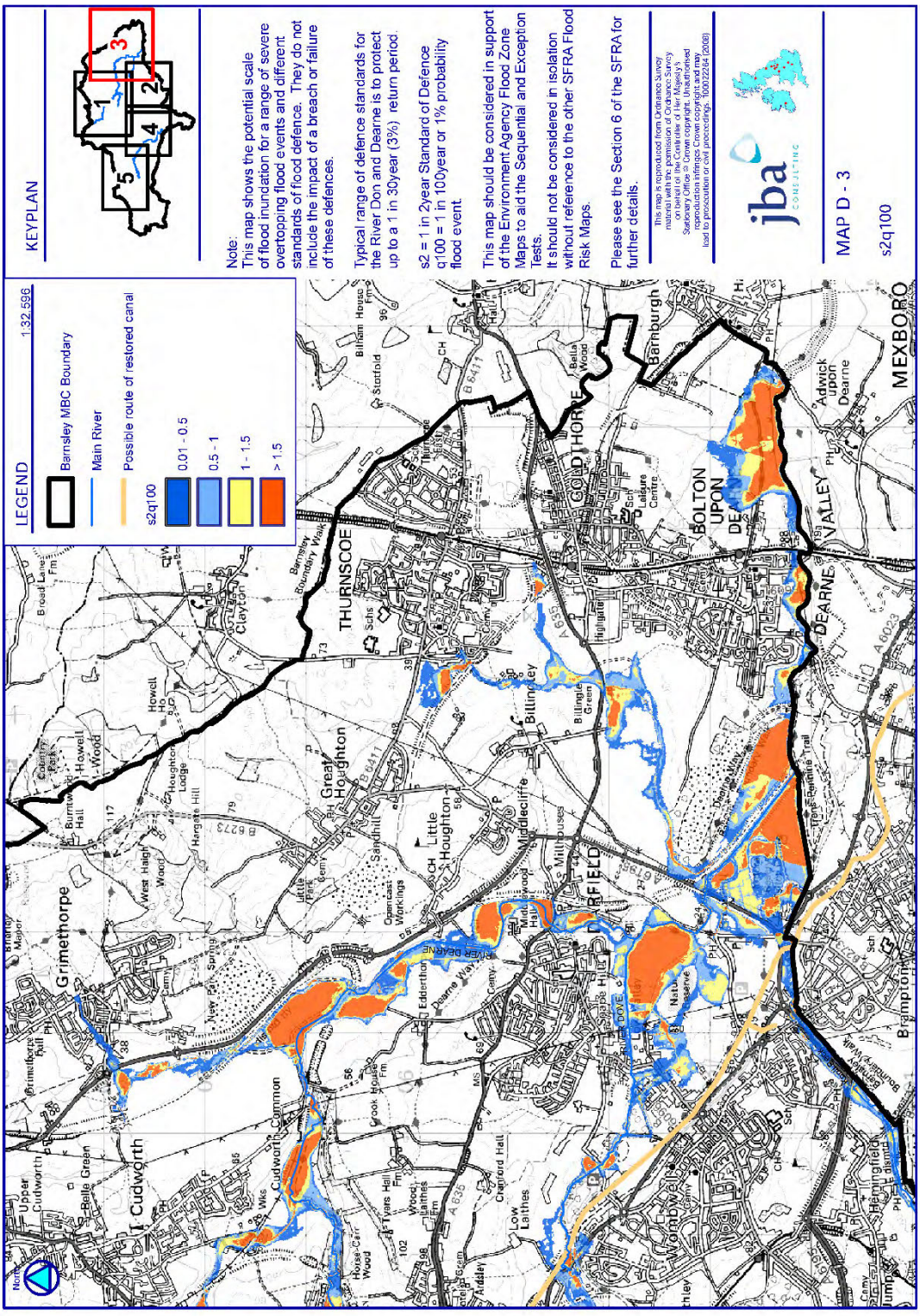
Surface water flows in high risk scenario.



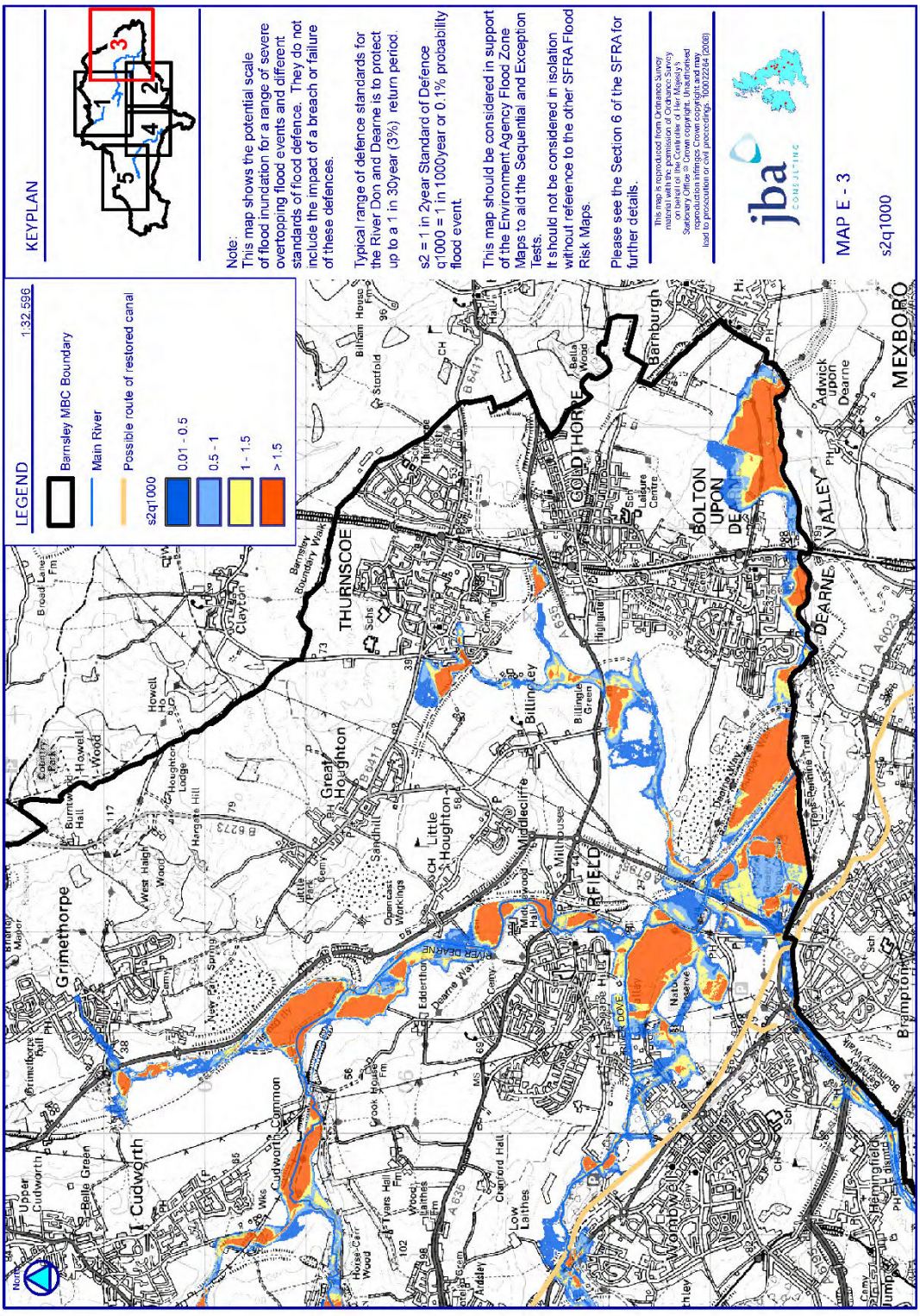
Extent of flooding from reservoirs.



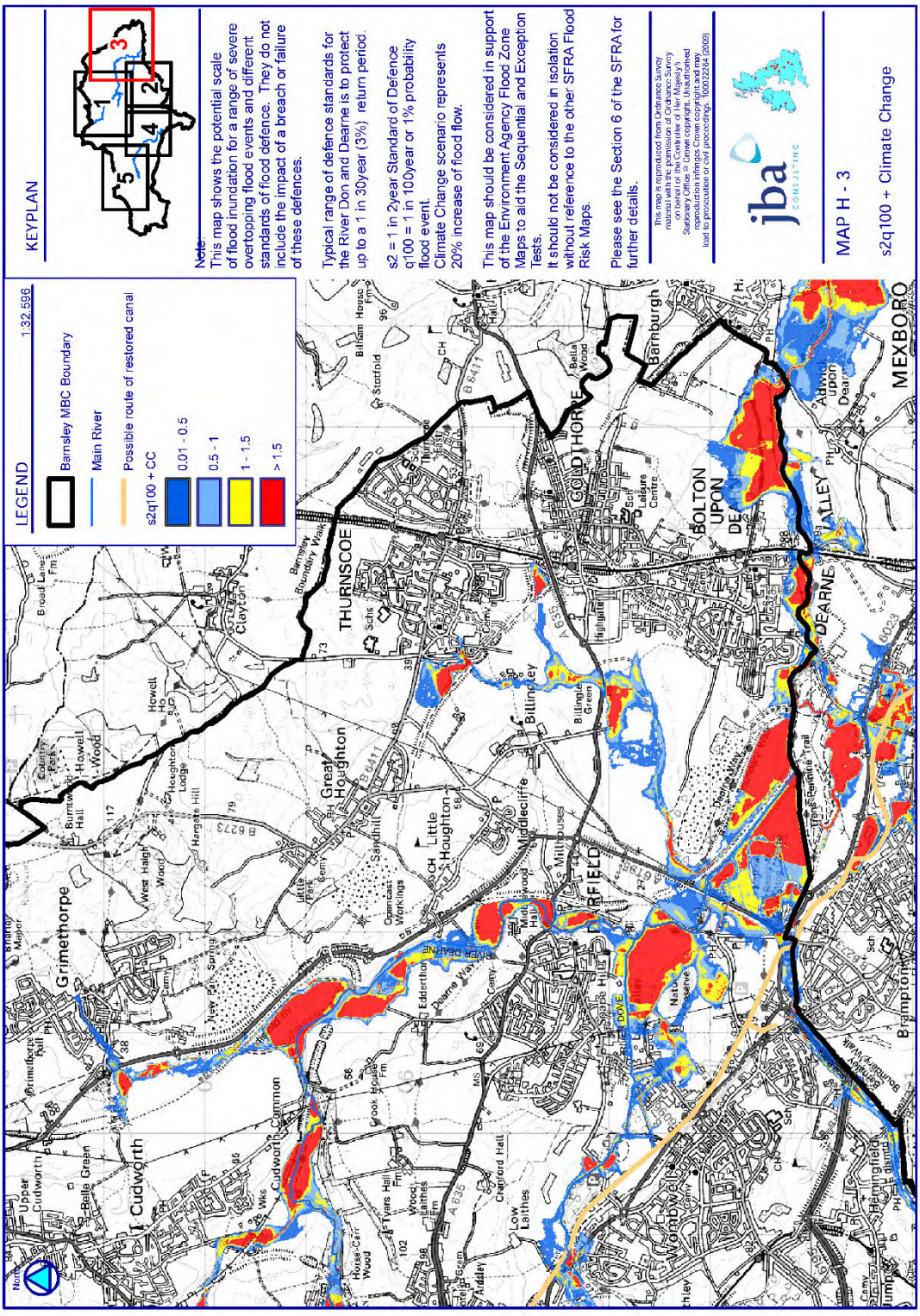
Map 2 from Barnsley SFRA – Historical Flood Events.



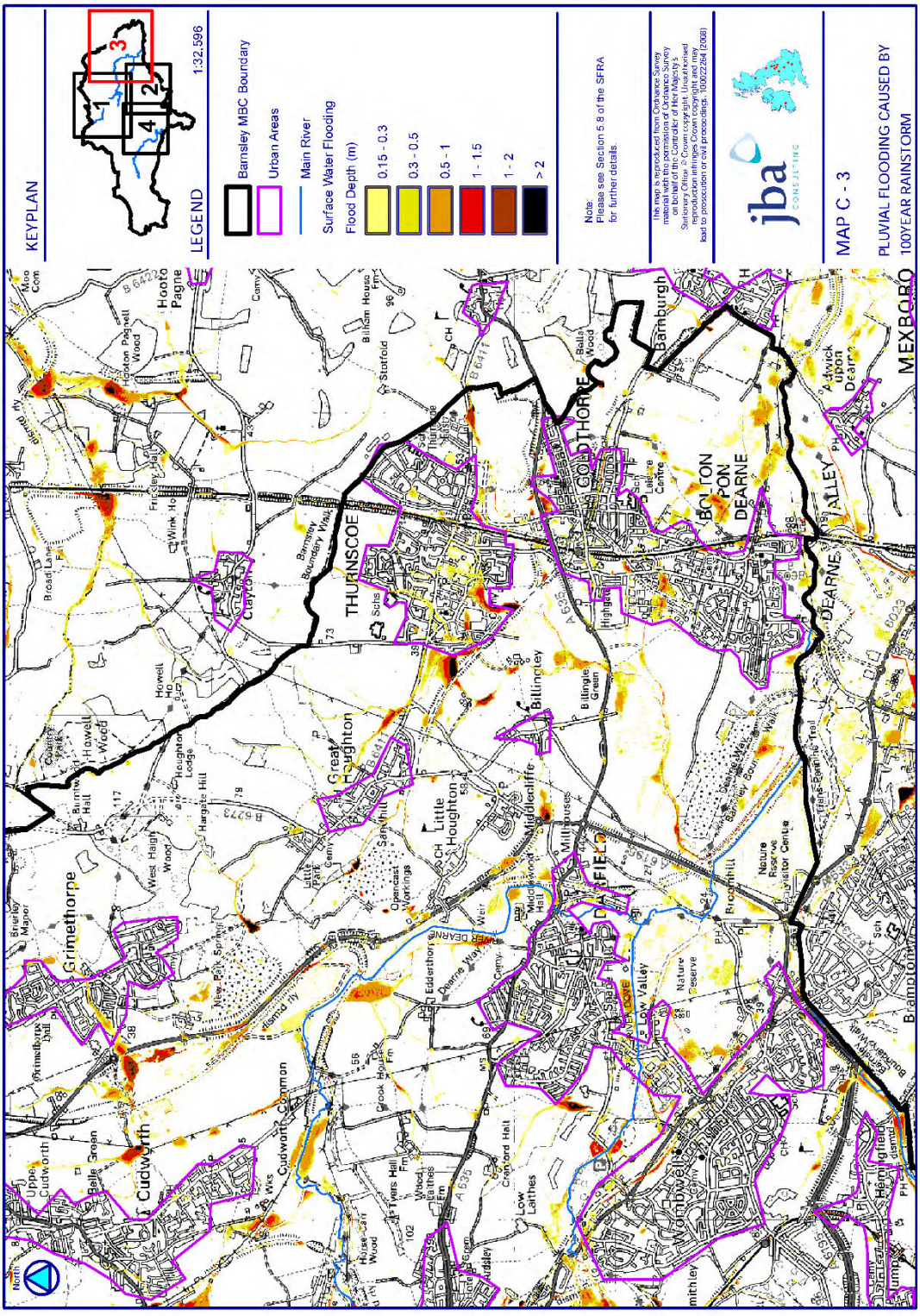
Map D-3 from Barnsley SFRA – 1 in 100 yr flooding.



Map E-3 from Barnsley SFRA – 1 in 1000 yr flooding.



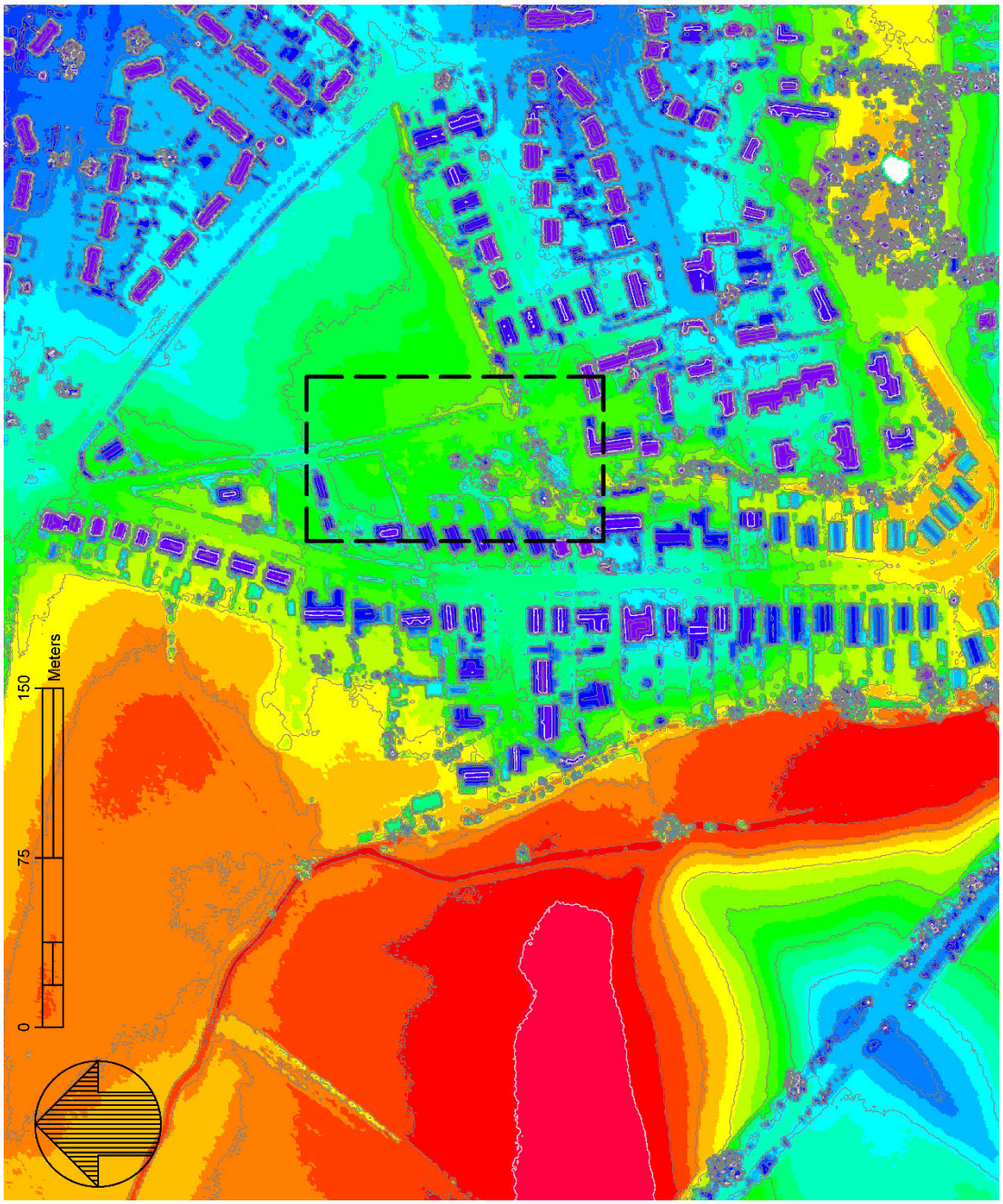
Map H-3 from Barnsley SFRA – 1 in 100 yr + Climate change flooding.



Map C-3 from Barnsley SFRA – 1 in 100 yr surface water flooding.

Elevations Table

Number	Minimum Elevation	Maximum Elevation	Color
1	25.91	30.03	
2	30.03	31.01	
3	31.01	31.68	
4	31.68	32.10	
5	32.10	32.57	
6	32.57	33.10	
7	33.10	33.57	
8	33.57	33.99	
9	33.99	34.37	
10	34.37	34.73	
11	34.73	35.10	
12	35.10	35.47	
13	35.47	35.85	
14	35.85	36.34	
15	36.34	36.89	
16	36.89	37.54	
17	37.54	38.33	
18	38.33	39.05	
19	39.05	40.55	
20	40.55	53.35	



Environment Agency LIDAR heightmap, location of proposal shown in black.

a. The main sources of flooding on the site are from surface water and the nearby Thurnscoe Dike. Environment Agency maps designate part of the site as medium risk of flooding from rivers and sea, between 1% and 3.3% chance in a given year.

b. The site is not at risk of flooding from reservoirs.

c. There is an unnamed open channel watercourse that runs through the site, which is culverted under the access road:



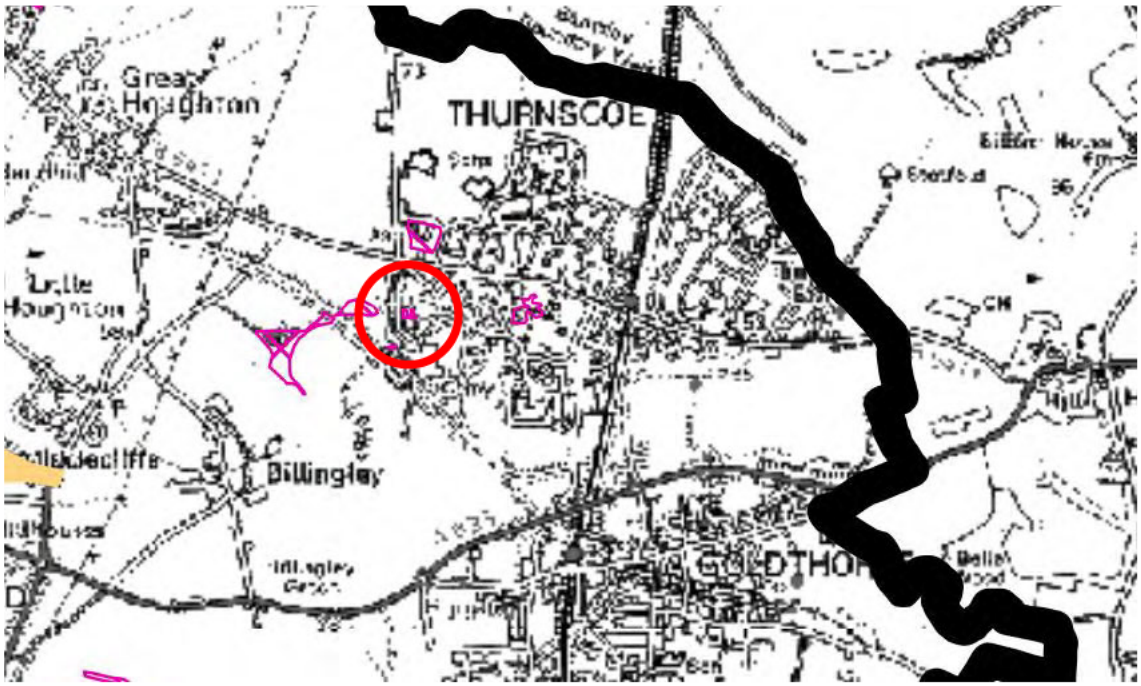
d. During periods of heavy rain, the level of the stream rises significantly:



e. Current site levels are around 34.5m AOD, with some variation.

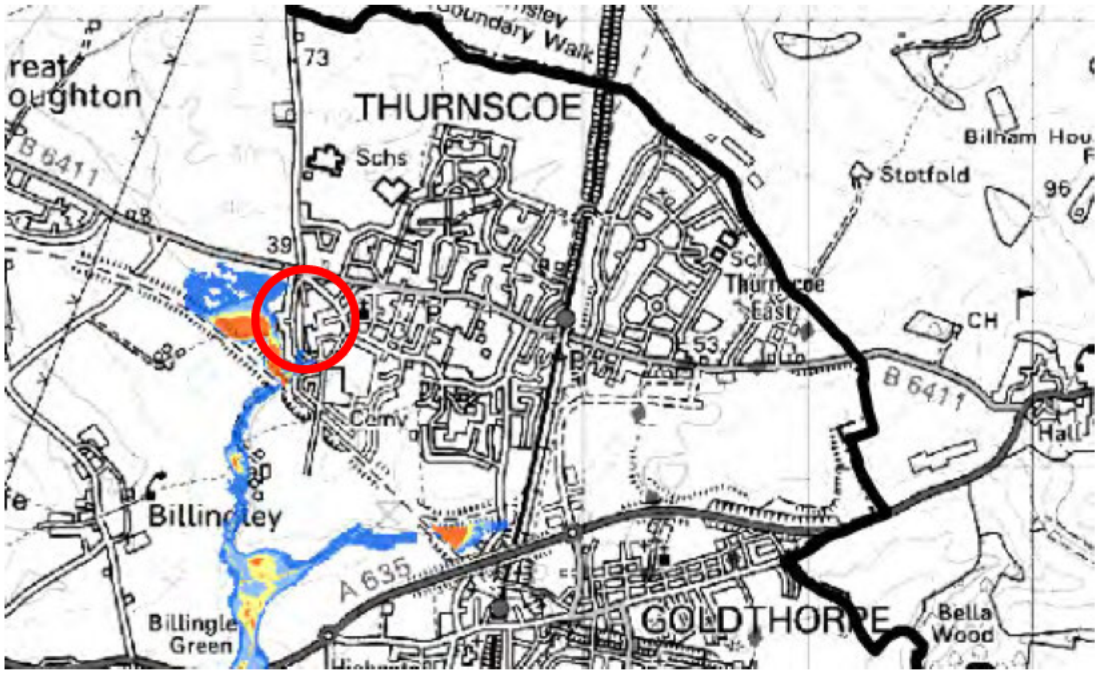
f. There are no mapped flood defences local to the site that if overtopped or failed would cause additional flooding on the site.

g. The site appears to have been affected by the 2007 flood event:



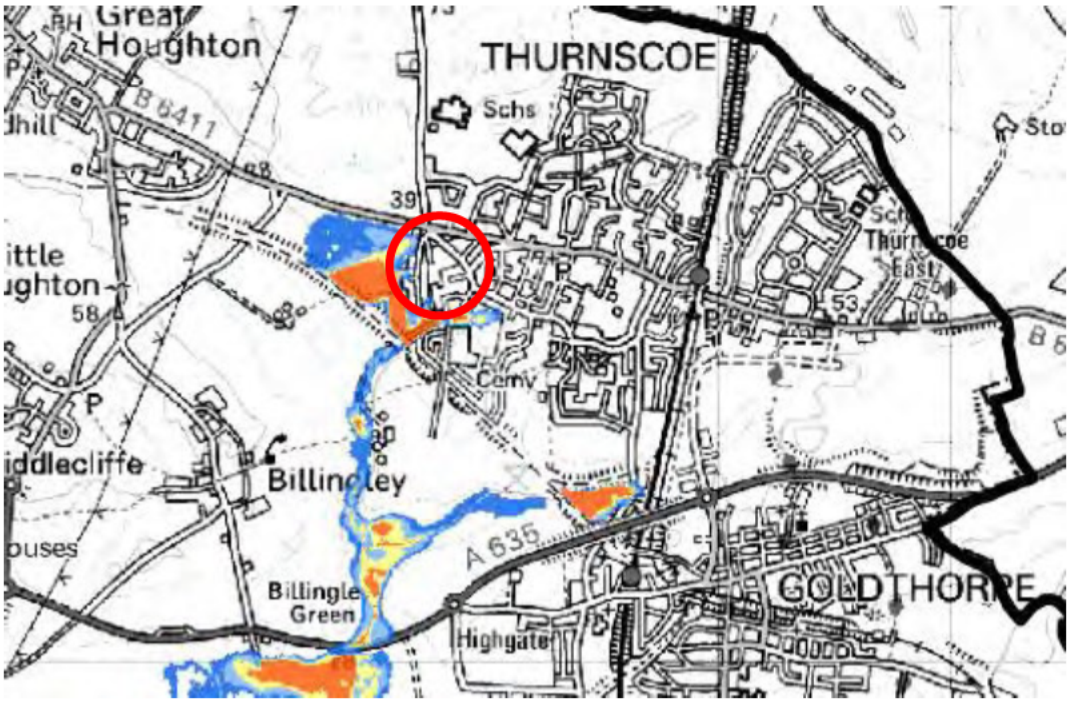
Enlargement of map 2 of the Barnsley SFRA 2010.

h. Map D-3 of the Barnsley SFRA includes the expected flood depths for 1 in 100 year events. The site is not within a flooded area on this map:



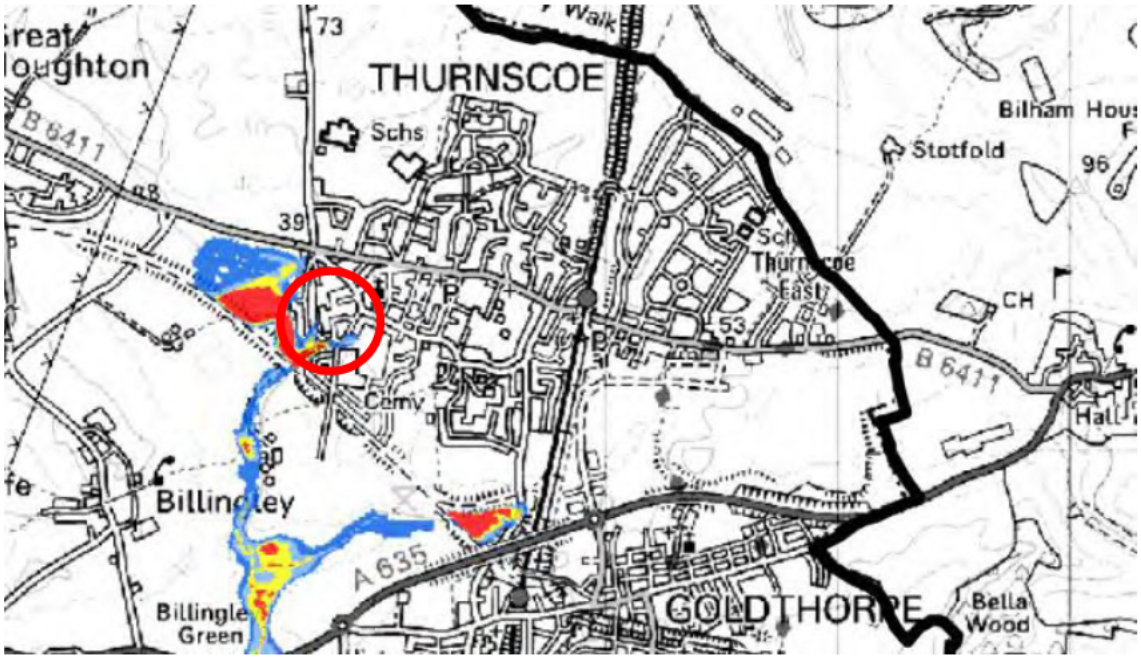
Enlargement of Map D-3 of the Barnsley SFRA 2010.

i. Map E-3 of the Barnsley SFRA includes the expected flood depths for 1 in 1000 year events. The site is not within a flooded area on this map, although an area south of the site is at risk of flooding:



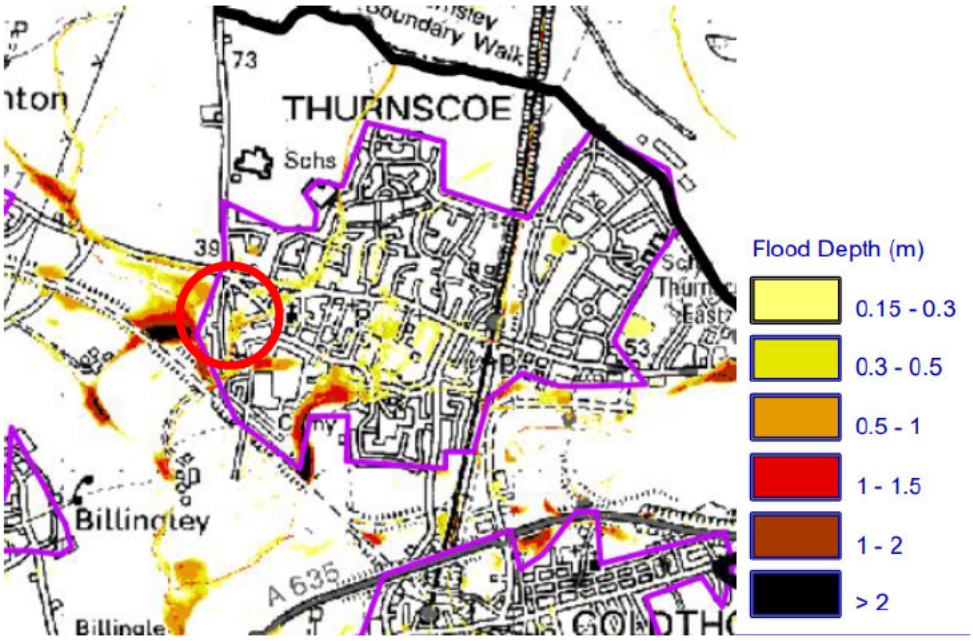
Enlargement of Map E-3 of the Barnsley SFRA 2010.

j. Map H-3 of the Barnsley SFRA includes the expected flood depths for 1 in 100 year events plus 20% climate change. The site is still not within a flooded area of the map.



Enlargement of Map H-3 of the Barnsley SFRA 2010.

k. Map C-3 of the Barnsley SFRA shows surface water flooding depths for a 1 in 100 year storm. Some parts of the site are within the orange 0.5-1m depth area, other parts are within the 0.3-0.5m area.



l. It is understood that water does not infiltrate the soil quickly at the site. Significant ponding can be seen.



m. Environment Agency recommends floor levels are situated 300mm above the modelled flood level. Considering surface water appears to be the main risk of flooding on the site, Map C-3 is relevant and shows the expected flood

depths for a 1 in 100 year storm are 0.3-0.5m in some areas of the site, but could be up to 1m. The inconsistency is likely due to undulations in the site currently. After the development, the site is expected to be more uniform, and the average flood depth might be around 0.5m. Adding the 20% central climate change allowance would bring the expected depth to 0.6m. The floor levels should be 900mm above the ground level, which would be 300mm above an expected 1 in 100 year flood level. This results in floor levels around 35.4mAOD.

n. The extra 300mm recommended may also provide enough freeboard such that the dwellings do not flood even with the 40% upper end climate change allowance.

o. In addition to raising floor levels, the dwellings should have a flood resilient design. The ground floor should be a ground bearing slab with an effective damp proofing membrane and insulation above the slab. Internal finishes should be either water resilient or inexpensive to replace. Engineering bricks or external render should be considered for use in the walls up to the floor level plus 0.6m freeboard to ensure resiliency of the walls. Insulation should be a closed cell type to assist drying versus mineral wool types. Cavities should either be partially filled or open with external insulation. Electrics and services should terminate 450mm above floor level or higher.

5. SURFACE WATER MANAGEMENT

a. The twin 600mm dia. storage pipes will provide over 80 m3 of volume to retain water, reducing pressure on the watercourse already present onsite during times of heavy rain. The site will be gently sloped towards the watercourse so that in the event of a storm overwhelming the storage pipes, water will be directed to a watercourse ensuring flood waters recede quickly without the need for pumping.

b. The storage system means the runoff rates will not be significantly worse than what is already present on site. A 2.4L/s restriction is to be installed after the storage pipes to reduce the runoff rate. A vortex flow control device of this flow rate is generally considered large enough to be maintenance free.

6. OCCUPANTS AND USERS OF THE DEVELOPMENT

a. The development is solely for the use of the future occupiers of the dwellings on site.

b. As the land is currently vacant, the proposals will increase occupancy of the site. 5 No. 3 bedroom bungalows are proposed, each dwelling is likely to have 2-4 occupants, total occupancy of the site is expected to be 10-20 people.

c. Bungalows are the predominant house type in the local area, and the development continues the trend. Due to the single storey design, all rooms are at ground floor level including bedrooms.

7. EXCEPTION TEST

a. As the proposed development is 'more vulnerable' in flood zone 3, an exception test should be done.

b. The proposals are for 5 new 3 bedroom dwellings within a residential area, providing all the benefits additional housing typically offers, including additional revenue for local shops, pubs and other local businesses and reducing overall high demand for housing. The site is not readily accessible as green space for local residents and is right next to a large open green space so the development will not represent a significant loss of amenity space for other residents.

c. The vacant site has no controlled drainage currently. The proposals will formalise the drainage, improving the efficacy of the system and controlling the discharge to reduce the flood risk downstream towards the Dearne. The proposals follow the typical sustainable drainage hierarchy of infiltration -> attenuated watercourse discharge -> attenuated sewer discharge. Infiltration is infeasible so the next best system is to be implemented. Residual risk to occupants can be managed.

8. RESIDUAL RISK

a. Raising the floor levels and flood resilient construction significantly reduce the risks for residents and their property, but risk still exists, especially outside of the dwellings.

b. Residents must be made aware of flood warning systems that are available and should be signed up to receive notifications of flood warnings.

c. Residents should have a plan in place in case of a flood. Flood defence measures such as sandbags should be on hand. Important possessions should be moved to a high level to prevent damage if possible. Residents should be prepared to leave the dwelling if required, flood resilience measures included in the buildings will minimise the risk to property during a flood, but flood levels may make leaving the site more difficult after a flood occurs.

9. CONCLUSION

a. The proposal is to construct 5 dwellings on currently vacant land. The land has the possibility of flooding.

b. Measures are to be taken in the design of the development to reduce flood risk, including improved drainage, raised floor levels and resilient construction.

c. In addition to the above measures, residents still must be aware of the flood risk and have a plan in place in the event of a flood.



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10.07.2020

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