Bassetlaw Level 2 Strategic Flood Risk Assessment Detailed Site Summary Tables	

Site details

Site Code	**HS13**
Address	Land south of Orsdall, Ollerton Road, Worksop, DN22 7WW. Grid Reference: SK 69981 78745
Area	103.1ha
Current land use	Greenfield
Proposed land use	Residential and community facilities

Sources of flood risk

Location of the site within the catchment	The site is within the River Idle catchment. The River Idle is an Environment Agency designated main river and flows in a northerly direction through Retford towards its confluence with the River Trent.
Existing drainage features	Several watercourses are located on or near the site. An unnamed land drain flows east from the centre of the site, where it joins another land drain located along Ollerton Road. In the north-west of the site, a small land drain is present. The land drain flows north out of the site into an unnamed watercourse. Two ordinary watercourses are located along the eastern and western boundaries of the site. The watercourse on the eastern boundary rises 1.4km south of the site and flows north towards its confluence with the River Idle. The watercourse to the west of the site rises 1.3km south of the site and flows north along the edge of the site boundary before its confluence with the River Idle, 4km north of the site. The site is located 460m west of the River Idle. The River Idle flows from south to north through Retford. Several small unnamed land drains are also located around the existing fields.
Fluvial	**The proportion of site at risk:** **FZ3b –** 0% **FZ3a –** 1% **FZ2 –** 2% **FZ1 –** 98% *The % Flood Zones quoted show the % of the site at flood risk from that particular Flood Zone/event, including the percentage of the site at flood risk at a higher risk zone, e.g. FZ2 includes the FZ3 %. FZ1 is the remaining area outside FZ2 (FZ2 + FZ1 = 100%).* **Available data:** The assessment of flood risk is based on detailed 1D-2D Flood Modeller Tuflow modelling of the River Idle. Modelling was completed by the Environment Agency in 2020. Climate change uplifts were provided by the Environment Agency in line with latest guidance these are based on UKCP18 projections. The Environment Agency's Flood Zones have been used to assess the risk of flooding from the unnamed watercourse along the western boundary of the site. **Flood characteristics:** Fluvial flooding impacts a small area along the western boundary of the site. The site is not at risk of flooding from the River Idle. The site access point remains unaffected by fluvial flooding. The site is not located in Flood Zone 3b.

	A very small part of the site on the western boundary is in Flood Zone 3. The source of flood water is the unnamed watercourse that flows along the western boundary of the site. The extent of Flood Zone 2 is only marginally bigger than the extent of Flood Zone 3 and is still confined to the western boundaryt of the site. The eastern boundary of the site is also adjacent Flood Zone 3, associated with the Rive Idle, however flooding from the river Idle p[redominantly floods its eastern bank at this location, away from the site.
Coastal and Tidal	The site is not at risk of coastal or tidal flooding.
Surface Water	**Proportion of site at risk (RoFfSW):** **3.3% AEP** – 1% Max depth 0.3-0.6m, Max velocity 1-2m/s **1% AEP** – 3% Max depth 0.3-0.6m Max velocity 1-2m/s **0.1% AEP** – 11% Max depth 0.6-0.9m Max velocity 1-2m/s *The % SW extents quoted show the % of the site at surface water risk from that particular event, including the percentage of the site at flood risk at a higher risk zone (e.g. 1% AEP extent includes the 3.3 % AEP extent)* **Description of surface water flow paths:** In the 3.3% AEP flood event, several small surface water ponding areas are present around the site. Surface water ponding is most present in small topographic depressions on the site. Most surface water flows are channelled into drainage ditches located along the edge of the existing fields across the site. Surface water is predominantly shallow and below 0.3m across most of the site, increasing in depth in the drainage channels. In the 1% AEP flood event, flooding across the site is marginally increased from the 3.3% AEP event. An additional flow path is present in the north-west of the site. The flow path flows north-west towards an unnamed land drain in the north-western corner of the site. Water also flows from the north east corner of the site into Ordsall. As in the 3.3% AEP event, the surface water ponds across the site are shallow (less than 0.3m). Surface water flows into the drainage channels around the site. In the 0.1% AEP flood event, several surface water flow paths are present around the site. These flow paths mostly flow into the drainage ditches located around the site or into the unnamed watercourses situated to the west and east of the site. There is also a significant flow from the north east corner of the site into Ordsall. These flow paths are primarily between 0.3-0.6mm in depth, deeper in larger ponding areas in the western parts of the site. Large areas of surface water ponding are present in the north-western and western part of the site and along Ollerton Road.
Reservoir	A small part of the site is shown to be at risk of reservoir flooding from the available online maps.
Canals	The site is a significant distance from the Chesterfield Canal and would be unlikely to be affected if the canal was to breach.
Groundwater	The Environment Agency's Areas Susceptible to Groundwater Flooding dataset, provided as 1km grid squares, shows an area's susceptibility to groundwater flood emergence. The following comments can be made about groundwater flood risk: • The south western part of the site has a >75% susceptibility to groundwater flood emergence from superficial deposits. • The north western part of the site has a >= 25% <50% susceptibility to groundwater flood emergence from superficial deposits. • The north, south and north east of the site has a <25% susceptibility to groundwater flood emergence from superficial deposits. • No data is available for the south east of the site. This assessment does not negate the requirement that an appropriate groundwater regime assessment should be carried out at the site specific FRA stage.
Flood history	The Environment Agency's historic flooding map does not hold a record of flooding at the site. NCC does not hold any records of flooding within 100m of the site.
Flood risk management infrastructure	
Defences	This site is not protected by any formal flood defences.

Residual risk	There is no residual risk to the site from flood risk management structures.
Emergency planning	
Flood warning	A small part of the west of the site is located in the 'River Idle in Nottinghamshire' Environment Agency Flood Warning Area. The site is not located in an Environment Agency Flood Alert Area.
Access and egress	Access to the site would be from Ollerton Road. A small access track is also present from Brecks Road, to the north of the site. Access to and from the site would not be restricted by surface water flooding on Ollerton Road, as flood depths are shallow.
Climate change	
Implications for the site	A small part of the site is at risk of flooding from the 1% plus 50% climate change extents of the River Idle. Flooding only affects a small part of the site, along the eastern boundary. Climate change outputs were not available for the unnamed watercourse to the west of the site and these should be modelled as part of a site-specific FRA for the site as part of anyn proposal. The significant increase in risk between the 1% and 0.1% AEP surface water flood event suggests that the site is sensitive to climate change. Flood depths on the site are predominantly between 0.3m-0.9m. The flow path velocities are between 1m/s and 2m/s across the site. The flow path has a flood hazard rating of 'caution' to 'dangerous for most'.
Requirements for drainage control and impact mitigation	

Broad-scale assessment of possible SuDS	**Geology & Soils**
	• Geology at the site consists of:
	  ○ Bedrock- Chester Formation- Sandstone, Pebbly (Gravelly), Retford Member- Mudstone, Tarporley Siltstone Formation- Siltstone Mudstone and Sandstone.
	  ○ Superficial: none recorded.
	• Soils at the site consist of:
	  ○ Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils.
	
	SuDS
	• The site is considered to have very low susceptibility to groundwater flooding, which should be confirmed through additional site investigation work. Below ground development such as basements may still be susceptible to groundwater flooding.
	• BGS data indicates that the underlying geology is Sandstone, Mudstone, and Siltstone, likely to be highly variable permeability. This should be confirmed through infiltration testing. Off-site discharge by the SuDS hierarchy may be required to discharge surface water runoff from the site.
	• The entire site is mainly located within Groundwater Source Protection Zone 1 (SPZ), and infiltration techniques may not appropriate for anything other than clean roof drainage. If infiltration is proposed for anything other than clean roof drainage, a hydrogeological risk assessment should be undertaken to ensure that the system does not pose an unacceptable risk to the supply source. Proposed SuDS should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible opportunities and constraints.
	• The site is not located within a historic landfill site.
	• Surface water discharge rates should not exceed the current greenfield runoff rates for the site. Opportunities to further reduce discharge rates should be considered and agreed with the LLFA. It may be possible to reduce site runoff by maximising the permeable surfaces on-site using a combination of permeable surfacing and soft landscaping techniques.
	• The Risk of Flooding from Surface Water (RoFSW) mapping indicates surface water flow paths during the 3, 1 and 0.1% AEP event. Existing flow paths should be retained and integrated with blue-green infrastructure and public open space.
	• If it is proposed to discharge runoff to a watercourse or sewer system, the receiving watercourse or asset's condition and capacity should be confirmed through surveys, and the discharge rate agreed with the asset owner.

Opportunities for wider sustainability benefits and integrated flood risk management	• Implementation of SuDS at the site could provide opportunities to deliver multiple benefits, including volume control, water quality, amenity and biodiversity. This could provide more comprehensive sustainability benefits to the site and surrounding area. Proposals to use SuDS techniques should be discussed with relevant stakeholders (LPA, LLFA and EA) at an early stage to understand possible constraints. • There are known surface water flooding issues in Ordsall with water currently flowing off of the site and through the town. Opportunities for SuDS implementation on site to alleviate this known issue should be explored. • Development at this site should not increase flood risk either on or off-site. The design of the surface water management proposals should consider the impacts of future climate change over the projected lifetime of the development.
NPPF and planning implications	
Exception Test requirements	The Local Authority will need to confirm that the sequential test has been carried out. The Sequential Test will need to be passed before the Exception Test is applied. Residential development is classified as 'more vulnerable', and community facilities are described as 'less vulnerable'. As the site is partially located in Flood Zone 3, the Exception Test will be required.
Requirements and guidance for site-specific Flood Risk Assessment	**Flood Risk Assessment:** • A site-specific Flood Risk Assessment will be required at the planning application stage as the development is more than 1ha in size and is partially within Flood Zone 3. • All flooding sources, particularly the risk of fluvial flooding and surface water, should be considered part of a site-specific flood risk assessment. • The site-specific FRA should be carried out according to the National Planning Policy Framework; Flood Risk and Coastal Change Planning Practice Guidance, Bassetlaw Council's Local Plan policies, and the Nottinghamshire County Council Lead Local Flood Authority's Statutory Consultee for Planning Guidance Document. • The development should be designed using a sequential approach. Development should be steered away from fluvial flood risk areas and surface water flow routes, preserving these spaces as green infrastructure. Development must be in line with Table 3: flood risk vulnerability and flood zone compatibility of the NPPG. • At site specific Flood Risk Assessment stage it is recommended that more detailed modelling is undertaken based on a site topographical survey. The anecdotal information on past flooding impacts to Ordsall should also be investigated further. **Guidance for site design and making development safe:** • Any proposal should be accompanied by an overall Surface Water Management Masterplan and Strategy (SWMMS) which should cover: o How the cumulative effects of potential peak rates and volumes of water from development sites would impact on peak flows, duration of flooding and timing of flood peaks on receiving watercourses. This should be used to develop and implement appropriate drainage sub catchments and specific runoff rate and volume requirements for each phase of the development. o The risk of flooding from all sources, including for rainfall events greater than the design standard of the surface water drainage system should be taken into account to ensure there is no flood risk to new properties and that exceedance flows in extreme events are safely routed around those properties. o The consideration of how SuDS, natural flood management techniques, green infrastructure and green-blue corridors can be designed into the development master plan to facilitate drainage flood risk management and ensure wider benefits such as biodiversity, amenity, water quality and recreation are realised. o Based on the above, a Drainage Phasing Plan should be developed, based on the SuDS train method (considering firstly how water can be infiltrated/stored at a plot level, then conveyed through the site and any regional storage needs at a settlement level). o The provision of drainage during the building phase shall be based on the Drainage Phasing Plan to ensure adequate drainage is provided and implemented throughout the development life. o The LLFA, Environment Agency and LPA should be consulted during the development of the Surface Water Management Masterplan and Strategy. • Areas at risk from surface water flooding should ideally be integrated into green infrastructure, which presents wider opportunities to improve biodiversity and amenity and climate change adaptation. An integrated flood risk management and sustainable drainage scheme for the site is advised. A detailed surface water flooding model using the existing drainage system, topographical and asset survey must be constructed at the FRA stage. This will determine the risk from surface water flooding further and ensure that overland flows do not overwhelm future sustainable drainage features.

	• A drainage strategy should help inform site layout and design to ensure no increase in runoff beyond current rates. Surface water mitigation measures should be designed for the 1% plus climate change event. • Opportunities to alleviate known surface water issues in Ordsall originating from the site through the implementation of SuDS and storing water onsite should be explored. Those could be incorporated into blue-green infrastructure, making use of the proposed country park to provide amenity value as well as reduce the risk downstream of the site. Any onsite storage proposal should carefully consider the storage capacity- should storage capacity exceed 10,000m3 there may be additional considerations under the Reservoir Act (1975). • Through an FRA, the developer will need to show that users of the development will not be placed in danger from flood hazards throughout its lifetime. It is for the applicant to show that the development meets the objectives of the NPPF's policy on flood risk. For example, the operation of any mitigation measures can be safeguarded and maintained effectively through the development's lifetime. (Para 048 Flood Risk and Coastal Change PPG) • Safe access and egress will need to be demonstrated in the 1 in 100 year plus climate change, considering climate change (upper-end scenario), using depth, velocity and hazard outputs. The raising of access routes must not impact surface water flow routes. Consideration should be given to the siting of access points concerning areas of surface water flood risk. • Resilience measures will be required if buildings are situated in the flood risk area. • Developers should refer to Nottinghamshire County Council's 'Nottinghamshire County Council's Guidance Note on the Validation Requirements for Planning Applications' and the Level 1 SFRA for information on SuDS for guidance on the information required by the LLFA from applicants to enable it to respond to planning applications.

Key messages

The site is predominantly located within Flood Zone 1, with a small area located in Flood Zones 2 and 3, and therefore the Exception will be required. There is a significant risk of surface water flooding that must be considered further to ensure the development can be made safe from flooding and that it will not increase flood risk elsewhere.

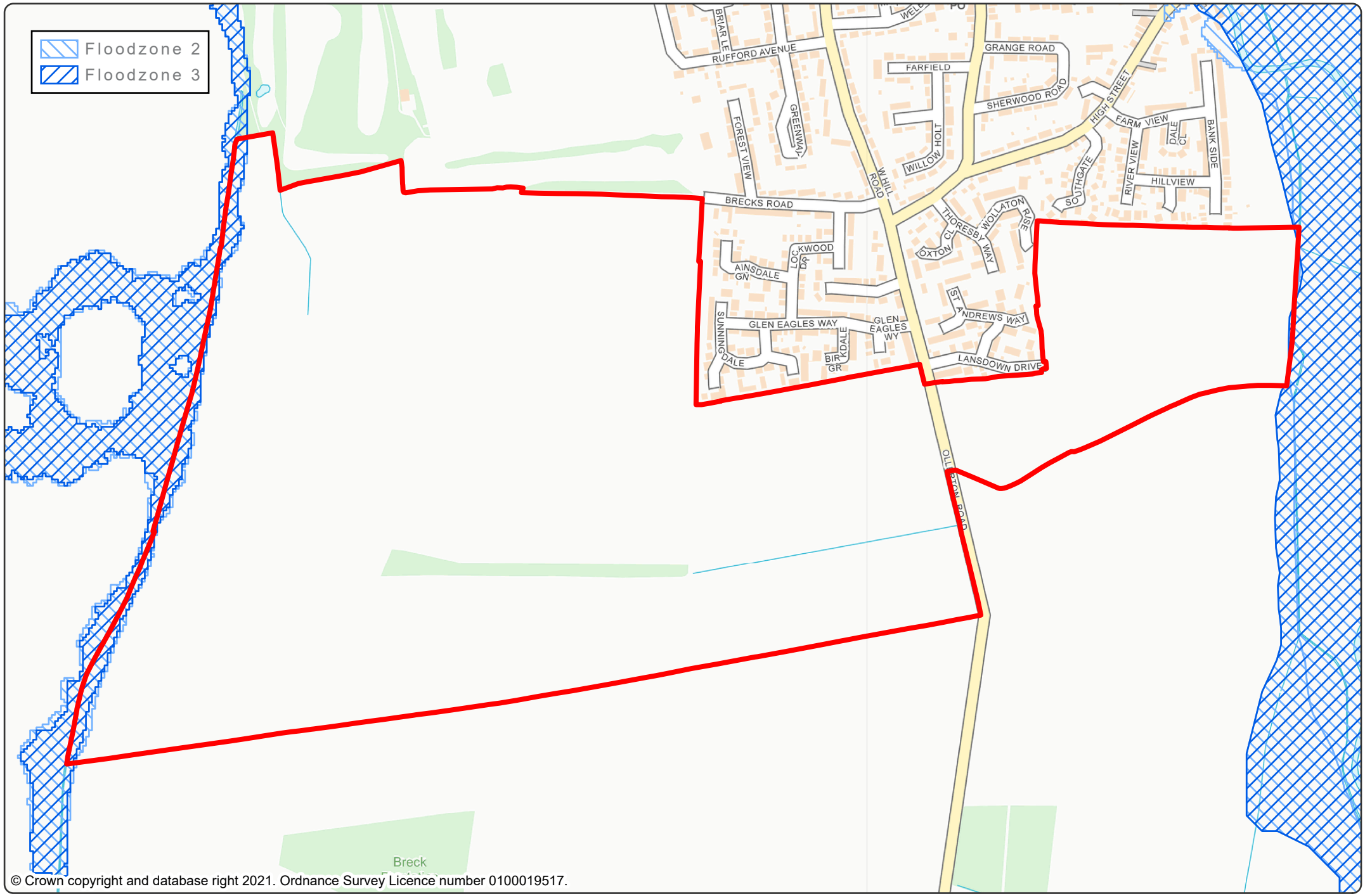
The development is likely to be able to proceed if:

- Development is located outside of areas at risk of flooding.
- A site specific FRA, including a detailed model of surface water flooding and the existing drainage system using topographical and asset survey, is undertaken to further determine the risk from surface water to the site and ensure surface water flows do not overwhelm any planned SuDS features.
- Space for surface water to be stored on the site is provided, and rainwater harvesting should be considered. Given the degree of surface water flood risk and the location of the surface water flow path crossing the site, the density of the development may need to be lowered to make space for water. Surface water mitigation measures should be designed for the 1% plus climate change event.
- New developments should adopt exemplar source control SuDS techniques to reduce the risk of frequent low impact flooding due to post-development runoff. This should include allowance for climate change.

Mapping Information

The key datasets used to make planning recommendations regarding this site were the Environment Agency's Flood Map for Planning, flood modelling of the River Idle and the Risk of Flooding from Surface Water map. More details regarding data used for this assessment can be found below.

Flood Zones	The extent of flooding from the River Idle is based on detailed 1D-2D Flood Modeller Tuflow modelling. Modelling was completed by the Environment Agency in 2020. Flood Zones 2 and 3 have been taken from the Environment Agency's Flood Map for Planning mapping to assess the risk fo flooding from the unnamed watercourse.
Climate change	Climate change uplifts for the River Idle were provided by the Environment Agency in line with latest guidance- these are based on UKCP18 projections. Climate change modelling outputs were not available for the unnamed watercourse. Climate change has been assessed using Flood Zone 2 as a proxy for Fluvial flooding and the 0.1% AEP event as a proxy for surface water flooding.
Fluvial depth, velocity and hazard mapping	Flood depths, velocity and hazards were not available for the River Idle.
Surface Water	The Risk of Flooding from Surface Water map has been used to define areas at risk from surface water flooding.
Surface water depth, velocity and hazard mapping	The surface water depth and hazard mapping for the 1 in 0.1% AEP event is taken from the Environment Agency's Risk of Flooding from Surface Water mapping.



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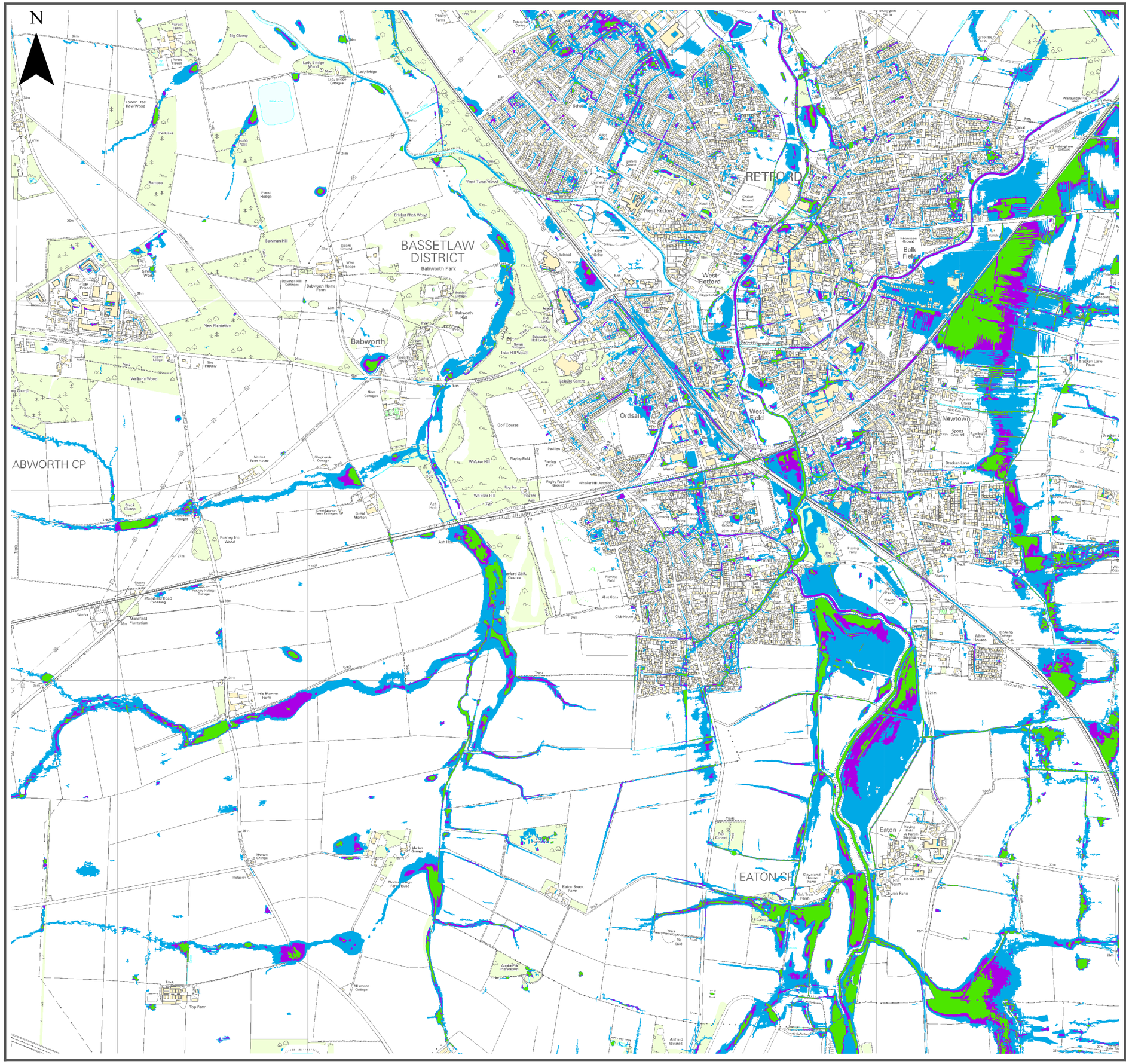


Notes

Mapping of surface water flood risk has been taken from the Flood Map for Surface Water (RoFfSW) published online by the Environment Agency. The RoFfSW is derived primarily from identifying topographical flow paths of existing watercourses or dry valleys that contain some isolated ponding locations in low lying areas. They provide a map which displays different levels of surface water

Important: The 2017 SFRA has been developed using the best available information at the time of preparation, taking into account the latest flood risk data and the current state of national planning policy. This relates both to the current risk of flooding from fluvial, pluvial, groundwater, sewers and reservoirs as well as the potential impacts of future climate change.

Appendix H.2 Mapping Supporting Information.docx II

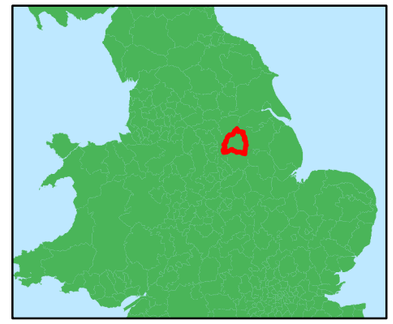
flood risk depending on the annual probability of the land in question being inundated by surface

water.

Although the RoFfSW offers improvement on previously available datasets, the results should not

be used to understand flood risk for individual properties. The results should be used for high level assessments such as SFRAs for local authorities.

Key Plan



Legend

- Bassetlaw District Boundary
- Surface Water Flooding 1 in 30
- Surface Water Flooding 1 in 100
- Surface Water Flooding 1 in 1000

0 50 100 200 300 400 500 km

STRATEGIC FLOOD RISK ASSESSMENT LEVEL 1

APPENDIX D - Surface Water Mapping

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