Flood Risk Sequential and Exception Test Statement

Ipswich Borough Council

Project number: 60612179

October 2020

Quality information

Prepared by	Checked by	Verified by	Approved by
Hannah Booth Graduate Consultant Sarah Littlewood Principal Consultant	Sarah Littlewood Principal Consultant	Emily Craven Associate Director	Emily Craven Associate Director

Revision History

Revision	Revision date	Details	Authorized	Name	Position
1	25th March 2020	Draft	EC	Emily Craven	Associate Director
2	1st April 2020	Final	EC	Emily Craven	Associate Director
3	19th April 2020	Final	EC	Emily Craven	Associate Director
4	1st June 2020	Final	EC	Emily Craven	Associate Director
5	7th October 2020	Final	EC	Emily Craven	Associate Director

Distribution List

# Hard Copies	PDF Required	Association / Company Name
0	Yes	Ipswich Borough Council

Prepared for:

Ipswich Borough Council

Prepared by:

AECOM Limited
Midpoint, Alencon Link
Basingstoke
Hampshire RG21 7PP
United Kingdom

T: +44(0)1256 310200
aecom.com

Table of Contents

Figures

Tables

1. Introduction

1.1 Sequential Test

1.1.1 The sequential approach is a decision-making tool designed to ensure that sites at little or no risk of flooding are developed in preference to sites at higher risk. This will help avoid the development of sites that are inappropriate on flood risk grounds. The subsequent application of the Exception Test where required will ensure that new developments in flood risk areas will only occur where flood risk is clearly outweighed by other sustainability drivers.

1.1.2 The Sequential Test requires an understanding of the risk of flooding from all sources in the study area as well as the vulnerability classification of the proposed developments. The SFRA prepared for Ipswich Borough Council and the associated mapping provides an assessment of flood risk from all sources in Ipswich. Flood risk vulnerability classifications for different development types, as defined in the PPG, are presented in Table 1-1.

1.1.3 The flow diagram presented in Figure 1-1 illustrates how the Sequential Test process should be applied to identify the suitability of a site for allocation, in relation to the flood risk classification.

1.1.4 Where it has been determined that the Sequential Test has been satisfied, and there are no reasonable available alternative sites in an area of lower flood risk where the development could be located, the compatibility matrix in Table 1-2 should be used to determine whether the Exception Test will need to be applied.

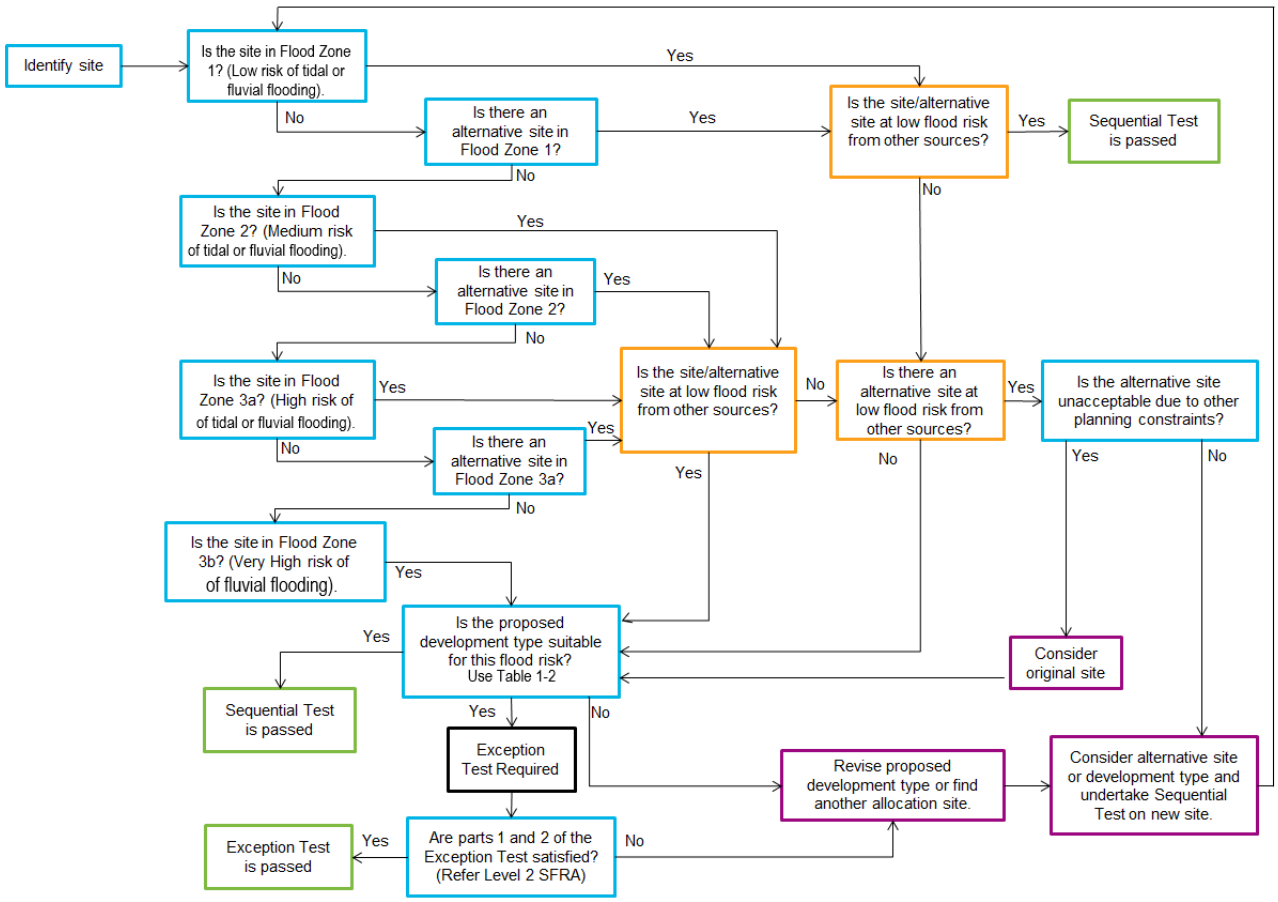

Figure 1-1 Application of Sequential Test for Plan-Making

Table 1-1 Flood Risk Vulnerability Classification (PPG)

Vulnerability Classification	Development Uses
Essential Infrastructure	Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. Wind turbines.
Highly Vulnerable	Police stations, ambulance stations and fire stations and command centres and telecommunications installations required to be operational during flooding. Emergency dispersal points. Basement dwellings. Caravans, mobile homes and park homes intended for permanent residential use. Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as "essential infrastructure").
More Vulnerable	Hospitals. Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. Non–residential uses for health services, nurseries and educational establishments. Landfill* and sites used for waste management facilities for hazardous waste. Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
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 and cafes, hot food takeaways, offices, general industry, storage and distribution, non–residential institutions not included in "more vulnerable", 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).
Water-Compatible Development	Flood control infrastructure. Water transmission infrastructure and pumping stations. Sewage transmission infrastructure and pumping stations. Sand and gravel working. Docks, marinas and wharves. Navigation facilities. MOD defence installations. Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. Water-based recreation (excluding sleeping accommodation). Lifeguard and coastguard stations. Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

* Landfill is as defined in Schedule 10 of the Environmental Permitting (England and Wales) Regulations 2010.

Table 1-2 Flood Risk Vulnerability and Flood Zone 'Compatibility' (PPG)

Flood Risk Vulnerability Classification		Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Flood Zone	1	✓	✓	✓	✓	✓
	2	✓	Exception Test Required	✓	✓	✓
	3a	Exception Test Required	×	Exception Test Required	✓	✓
	3b *	Exception Test Required*	×	×	×	✓*

✓ - Development is appropriate × - Development should not be permitted

* 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.

1.2 The Exception Test

1.2.1 The purpose of the Exception Test is to ensure that, following the application of the Sequential Test, new development is only permitted in Flood Zone 2 and 3 where flood risk is clearly outweighed by other sustainability factors and where the development will be safe during its lifetime, considering climate change. For the Exception Test to be passed:

- Part 1 - It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by the SFRA where one has been prepared; and
- Part 2 - A site-specific Flood Risk Assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

1.2.2 Both elements of the test have to be passed for development to be allocated or permitted. In order to determine part 1) of the Exception Test, applicants should assess their scheme against the objectives within the Safety Framework detailed in Section 7 of the SFRA Main Report and the Ipswich BC's Development and Flood Risk Supplementary Planning Document (SPD)[1].

1.2.3 In order to demonstrate Part 2) of the Exception Test, the measures presented as part of the Safety Framework (SFRA Main Report Section 7) should be applied and demonstrated within a site-specific FRA as detailed in SFRA Main Report Section 10.

[1] Ipswich Borough Council, Development and Flood Risk Supplementary Planning Document, January 2016. Available at: https://www.ipswich.gov.uk/sites/default/files/development_and_flood_risk_spd_jan_16_0.pdf

2. Sequential Test Statement

2.1 Assessment of Sites

2.1.1 Ipswich BC is currently producing a review of its Core Strategy and Policies Development Plan Document (DPD) and Site Allocations and Policies (incorporating IP-One Area action Plan) DPD. These two documents will form the Council's Local Plan once adopted.

2.1.2 Site allocations are informed by the Strategic Housing and Employment Land Availability Assessment (SHELAA). The SHELAA looks at known potential development sites and assesses their suitability, availability and achievability, including consideration of the flood zone in which the site is located. Where all the criteria are met, this assessment of potential capacity provides the evidence for making Local Plan allocations.

2.1.3 In order to allocate sites, the Council has undertaken a Sequential Test of SHELAA sites to assess the level of flood risk present on each site and to steer development to sites at a lower risk of flooding where appropriate, while considering the necessity to develop on previously developed land in areas of central Ipswich. There are limited brownfield sites available for development in Flood Zone 1 and it is therefore likely to be necessary to locate some development in Flood Zones 2 and 3a when considering the need to regenerate brownfield sites, and to locate development in central locations to minimise carbon emissions and the need to travel.

Flood Zone Definitions

2.1.1 The NPPF assesses the probability of flooding from rivers and the sea by categorising areas into Flood Zones of low, medium and high probability, as defined in Table 2-1 and presented on the Flood Map for Planning (Rivers and Sea) available online[2].

Table 2-1 Flood Zones (extracted from the PPG)

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] https://flood-map-for-planning.service.gov.uk/

2.2 Sites in Flood Zone 1

2.2.1 Table 2-2, Table 2-3, and Table 2-4 identify sites in Flood Zone 1 under the following categories:

- Brownfield sites in Flood Zone 1 (Table 2-2);
- Greenfield sites in Flood Zone 1 (Table 2-3);
- Ipswich Garden Suburb sites (Table 2-4).

2.2.2 Within each table, the sites have been clustered to reflect the varying risk of flooding from all sources including rivers and the sea, ordinary watercourses, surface water and groundwater. i.e. those sites highest up in the table are considered to be generally at lower risk than those lower down the table and are therefore preferential for development. The order is based on a high-level sieving exercise referring to the following criteria:

- Proportion in each Flood Zone and Areas Benefitting from Flood Zones, as shown on the Flood Map for Planning (Rivers and Sea);
- Within 300m of a Main River (Yes/No);
- Within 300m of an Ordinary Watercourse (Yes/No);
- At High, Medium or Low risk of surface water flooding, based on the Risk of Flooding from Surface Water Mapping (Yes/No);
- Probability of groundwater emergence based on the Areas Susceptible to Groundwater Flooding mapping (proportion of the 1km grid square in which the site is located susceptible to groundwater emergence);
- Site is located within an area shown to have experienced flooding on the Environment Agency Historic Flood Map (Yes/No). These records may relate to tidal, fluvial or groundwater flooding; and
- Number of historic records of flooding recorded by Ipswich BC within 500m of the site.

2.2.3 Ipswich BC have identified 1,024 dwellings on brownfield sites in Flood Zone 1, shown in Table 2-2.

Ipswich BC have identified 698 dwellings on greenfield sites in Flood Zone 1, (not including the Ipswich Garden Suburb) shown in Table 2-3. A further 3,268 dwellings are identified at the Ipswich Garden Suburb between 2018 and 2036, shown in Table 2-4.

Table 2-2 Brownfield sites in Flood Zone 1

Site Reference	Address	Site Area*	IP One	Dwellings	FZ 2 Proportion (%)	FZ 3 Proportion (%)	Area Benefitting Defences (ABD)	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood Occurrences
IP382	42 Bond Street/rear of 65-71 Upper Orwell St	0.07	Y	6	0	0	0	-	-	-	-	-	>= 25% <50%	-	9
IP376	9-13 St Matthew's Street	0.04	Y	13	0	0	0	-	-	-	-	-	>= 50% <75%	-	15
IP336	Wellington Court garages, Beaufort Street	0.06	No	9	0	0	0	-	-	-	-	-	>= 25% <50%	-	21
IP089	Waterworks Street	0.3	Y	23	0	0	0	-	-	-	-	-	>= 25% <50%	-	15
IP024	Mallard Way garages	0.14	No	5	0	0	0	-	-	-	-	-	< 25%	-	5
IP172	15-19 St Margaret's Street	0.08	Y	9	0	0	0	-	-	-	-	-	>= 25% <50%	-	12
IP067a	Former British Energy Site (north), Cliff Quay	0.38	No	17	0	0	0	-	-	Y	-	-	< 25%	-	0
IP221	Waterford Road	0.35 (50%)	No	12	0	0	0	-	-	Y	-	-	< 25%	-	1
IP366	6 Lower Brook Street	0.04	Y	8	0	0	0	-	-	Y	Y	-	>= 25% <50%	-	12
IP084a	County Hall, St Helen's Street	0.32	Y	42	0	0	0	-	-	Y	Y	-	>= 25% <50%	-	12
IP150d	Ravenswood	1.79	No	34	0	0	0	-	-	Y	Y	-		-	6
IP249	131 Bramford Road	0.04	No	8	0	0	0	-	-	Y	Y	-	>= 25% <50%	Yes	27
IP307	Prince of Wales Drive	0.27	No	12	0	0	0	-	-	Y	Y	-	< 25%	-	2
IP266	Western House, Dunlop Road - JTS	0.17	No	9	0	0	0	-	-	Y	Y	-	>= 25% <50%	-	4
IP048b	Mint Quarter/Cox Lane west	1.34	Y	36	0	0	0	-	-	Y	Y	-	>= 25% <50%	-	14
IP010a	Co-op Depot, Felixstowe Road	2.22	No	75	0	0	0	-	-	Y	Y	-	< 25%	-	6
IP010b	Felixstowe Road	2.79	No	62	0	0	0	-	-	Y	Y	-	< 25%	-	7
IP014	Hope Church, Fore Hamlet	0.21	Y	23	0	0	0	-	-	Y	Y	-	< 25%	-	3

Site Reference	Address	Site Area*	IP One	Dwellings	FZ 2 Proportion (%)	FZ 3 Proportion (%)	Area Benefitting Defences (ABD)	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood Occurrences
IP135	112-116 Bramford Road	0.17	No	19	0	0	0	-	-	Y	Y	-	>= 25% <50%	Yes	27
IP012	Peter's Ice Cream etc., Grimwade Street	0.32	Y	35	0	0	0	-	-	Y	Y	-	>= 25% <50%	-	17
IP373	59 - 61 Westgate Street	0.06	Y	5	0	0	0	-	-	Y	Y	Y	>= 25% <50%	-	14
IP125	Corner of Hawke Road and Holbrook Road	0.25	No	15	0	0	0	-	-	Y	Y	Y	< 25%	-	1
IP277	Barrack Corner	0.03	No	6	0	0	0	-	-	Y	Y	Y	>= 50% <75%	-	10
IP048a	Mint Quarter	1.33	Y	53	0	0	0	-	-	Y	Y	Y	>= 25% <50%	-	18
IP150e	Ravenswood	3.61	No	126	0	0	0	-	-	Y	Y	Y	-	-	4
IP101	R/o Stratford Road and Cedarcroft Road	0.2	No	9	0	0	0	-	-	Y	Y	Y	< 25%	-	2
IP080	240 Wherstead Road	0.49	Y	27	0	0	0	-	-	Y	Y	Y	>= 25% <50%	-	6
IP009	Victoria Nurseries, Westerfield Road	0.39	No	12	0	0	0	-	-	Y	Y	Y	< 25%	-	11
IP041	Former Police Station site, Elm Street	0.52	Y	58	0	0	0	-	Y	Y	Y	Y	>= 50% <75%	-	23
IP040	Civic Centre area, Civic Drive	0.76	Y	59	0	0	0	-	Y	Y	Y	Y	>= 25% <50%	-	21
IP066	J Wilson, White Elm St and 46-70 Cavendish St	0.85	No	55	0	0	0	-	Y	Y	Y	Y	< 25%	-	4
IP177	Lock-up garages rear of 16-30 Richmond Road	0.13	No	6	0	0	0	-	Y	Y	-	-	>= 25% <50%	-	2
IP279b(1)	North of former BT office, fronting Handford Rd	0.44	Y	18	0	0	0	Y	Y	Y	-	-	>= 50% <75%	-	24
IP309	Bridgeward Social Club, 68A Austin Street	0.28	Y	15	0	0	0	Y	Y	Y	-	-	>= 25% <50%	-	9
IP143	Former Norsk Hydro ('Topsite'), Sandy Hill Lane	4.51	No	85	0	0	0	Y	-	Y	Y	Y	>= 25% <50%	-	2
IP011a	Smart Street/Foundation Street	0.15	Y	18	0	0	0	Y	Y	Y	Y	Y	>= 25% <50%	-	14

* Figure in brackets after site area indicates proportion of site for residential use, where provided.

Table 2-3 Greenfield sites in Flood Zone 1

Site Reference	Address	Site Area	IP One	Dwellings	FZ 2 Proportion (%)	FZ 3 Proportion (%)	Area Benefitting Defences (ABD)	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood
IP372	62 Warrington Road	0.13	No	1	0	0	0	-	-	-	-	-	>= 25% <50%	-	3
IP296	57 Henley Road and land to rear	0.1	No	3	0	0	0	-	-	-	-	-	< 25%	-	9
IP380	113 Sidegate Lane	0.12	No	1	0	0	0	-	-	Y	-	-	< 25%	-	1
IP356	79 Hutland Road	0.09	No	5	0	0	0	-	-	Y	-	-	-	-	6
IP061	Lavenham Road School site	0.9	No	23	0	0	0	-	-	Y	-	-	>= 25% <50%	-	3
IP286	Adj 742 Old Norwich Road	0.97	No	14	0	0	0	-	-	Y	Y	-	< 25%	-	0
IP032	King George V Field, Old Norwich Road	3.7	No	99	0	0	0	-	-	Y	Y	Y	< 25%	-	4
IP033	Land at Bramford Road (Stock's site)	2.03	No	55	0	0	0	-	-	Y	Y	Y	< 25%	-	3
ISPA4.1	Land at Humber Doucy Lane - Urban Edge of Ipswich	23.6	No	496	0	0	0	-	Yes	Y	Y	Y	< 25%	-	7
IP374	Land adjacent Kingscroft, Thurleston Lane	0.18	No	1	0	0	0	-	Yes	-	-	-	< 25%	-	2

Table 2-4 Garden Suburb sites

Site Reference	Address	Site Area	IP One	Dwellings	FZ 2 Proportion (%)	FZ 3 Proportion (%)	Area Benefitting Defences (ABD)	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood
-	Ipswich Garden Suburb Phase N3a	59.14	No	912	0	1%	0	-	Y	Y	Y	Y	< 25%	-	7
-	Ipswich Garden Suburb Phase N2	50.01	No	1100	0	1%	0	-	Y	Y	Y	Y	< 25%	-	3
-	Ipswich Garden Suburb Phase N1a	43.29	No	800	0	1%	0	-	Y	Y	Y	Y	< 25%	-	17
-	Ipswich Garden Suburb Phase N1b	12.46	No	456	0	1%	0	-	-	Y	Y	Y	< 25%	-	17

2.3 Sites in Flood Zone 2 and 3

Table 2-2, Table 2-3 and Table 2-4 show potential housing capacity of 4,990 dwellings in Flood Zone 1. The Local Plan housing requirement is 8,010 dwellings 2018-2036 and therefore additional land will need to be identified to meet housing need. Sites identified as being within Flood Zones 2 and 3 have been taken forward for further assessment as part of the SFRA for Ipswich Borough Council.

2.3.1 It is necessary to continue to apply the sequential approach to the selection of sites within Flood Zone 2 and 3 to ensure that development is steered towards areas at lowest risk of flooding, prior to sites at greater risk being taken forward.

2.3.2 Mapping within the SFRA shows that, under different circumstances, Ipswich is at actual risk of flooding from the fluvial River Gipping in the future and at residual risk of flooding from the tidal River Orwell. These risks are described further below.

Actual risk of fluvial flooding from River Gipping

2.3.3 During present day conditions, the study area is not at risk of flooding from the River Gipping for the **design event** (1% AEP). However, based on current predictions of climate change and the assumption that no upgrades to the defences will be made, there is potential for areas of Ipswich to be at actual risk of fluvial flooding from the River Gipping during the design event in the future. This is shown in the SFRA Appendix A Figures 8B and 8C, where the 1% AEP event including 65% allowance for climate change leads to flooding in parts of Ipswich village with flood levels between 3 and 4.8m AOD.

2.3.4 With respect to the **extreme flood**, the modelling shows that a small area on the west bank of the River Gipping off Hadleigh Road is at risk of flooding during the extreme flood in the present day (0.1% AEP). In the future, the risk of flooding during the extreme flood event (0.1% AEP including 25% climate change) extends throughout Ipswich town with flood levels between 3.97m and 4.97m AOD. SFRA Appendix A Figures 8D and 8E show the depth and hazard rating during this extreme flood event.

2.3.5 Residual risk of fluvial flooding from the River Gipping

2.3.6 Paragraph 041 of the PPG defines residual risks as “those remaining after applying the sequential approach to the location of development and taking mitigating actions. Examples of residual flood risk include a severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence”.

2.3.7 In the case of the River Gipping, this ‘residual risk’ has been identified to be an ‘actual risk’ for the Ipswich study area, as shown by the modelled outputs for the extreme flood event (0.1% AEP) for the present day and including the impacts of climate change in the future.

2.3.8 For sites that are affected by flooding from the River Gipping, the following has been recorded:

- Flood level and hazard rating for **design event** (1% AEP) including 65% allowance for climate change;
- Flood level for **extreme flood** event (0.1% AEP) including 25% allowance for climate change.

Residual risk of tidal flooding from River Orwell

2.3.9 The Ipswich Flood Defence Management Strategy is designed to provide a standard of protection against tidal and fluvial flooding, including combinations of 0.33 % annual exceedance probability (1 in 300 years) allowing for increased sea levels to the year 2118.

2.3.10 Ipswich is therefore protected against tidal flooding for the ‘design event’ (0.5% AEP including climate change) and said to be at ‘residual’ risk of tidal flooding. The residual risk is the risk that remains after the flood risk defence and management measures are taken into account.

2.3.11 This remaining residual risk is different in its probability of occurring, likely warning time and anticipated flooding impacts. For example, a failure to close the Barrier may have some warning time associated with it, and it is assumed the Environment Agency have an operational strategy in place to mitigate the impacts. A breach in the local flood defences, whilst of low probability, may occur with little warning, and may lead to rapid onset of

flooding with greater flood depths and velocities than experienced during a fluvial flooding event. Such events are not considered the 'design event', rather an 'extreme flood' event.

Breach Modelling

2.3.12 As detailed in Section 6.2.3 of the SFRA, modelling of a number of breach events was undertaken and results have been presented in the SFRA to further understand the residual risk of tidal flooding i.e. the risk of flooding in the event of a failure of flood defences to perform as expected.

2.3.13 The flood hazard relating to a failure of the New Cut Barrier (i.e. Model IP03 and associated breaches BR02, BR03 and BR04), the Wet Dock Lock Gates (BR01) or the West Bank Railway Gates (BR06) would be managed largely by evacuation in advance. Therefore, these scenarios are not included when considering flood hazard in planning for land use allocations and development control.

2.3.14 Combined Flood Depth and Flood Hazard Maps have been created, combining the results for the remaining modelled scenarios, which are:

- IP03 BR05 Barrier Closed, Breach in new East Bank defence or Red 7 gate left open.
- IP03 BR07 Barrier Closed, Gate in Wherstead Rd defences left open.
- IP04 BR00 Barrier closed and pumping station not operational (just overtopping).

2.3.15 These maps have been used to provide more detail about the residual flood risks posed to each of the sites. The map for the 0.5% AEP event for the year 2118 (i.e. including climate change) has been used to assess the residual tidal flood risk to the sites. Information has been provided for each site detailing the

- Maximum flood depth (m);
- Maximum flood hazard[3] rating on the site (Low, Moderate, Significant, Extreme);
- The time to inundation (hours) for the Compartment in which the site is located; and
- The duration of flooding (hours) for the Compartment in which the site is located.

2.3.16 Further details about the modelling outputs are provided in the SFRA (October 2020).

Belstead Brook

2.3.17 The modelling of the Belstead Brook includes flood extent, depth and hazard mapping. However, it is noted that none of the sites identified for assessment are located within the floodplain of the Belstead Brook.

Sequential Testing of Sites in Flood Zones 2 and 3

2.3.1 The following tables in this Section group the sites by the risk of tidal flooding.

- Table 2-5 includes those sites that are not shown to be at risk of flooding from the River Gipping during the extreme flood event (0.1% AEP including 25% climate change). Within this table, the sites are ordered with respect to the potential impacts associated with the residual tidal risk of flooding (i.e. those with lower hazard rating during a potential breach event are higher up the table).
- Table 2-6 includes those sites that are shown to be at risk of flooding from the River Gipping during the extreme flood event (0.1% AEP including 25% climate change). Within this table, the sites are ordered with respect to the potential impacts associated with the residual tidal risk of flooding (i.e. those with lower hazard rating during a potential breach event are higher up the table).
- Table 2-7 includes those sites that are shown to be at risk of flooding from the River Gipping during the design event (1% AEP including 65% climate change). Within this table, the sites are ordered with respect to the potential impacts associated with the residual tidal risk of flooding (i.e. those with lower hazard rating during a potential breach event are higher up the table).

[3] Flood Hazard is a function of the depth and velocity of floodwater. Low Hazard = Caution; Moderate = Danger to Some; Significant =Danger to Most; Extreme = Danger to All. Full details are included in Section 6.2.4 of the SFRA Main Report.

Table 2-5 Sites in Flood Zone 2 and 3, NOT at risk from River Gipping during the extreme flood event in the future (0.1% AEP including 25% climate change)

Site Reference	Address	Greenfield or Brownfield	Site Area*	IP One	Dwellings	FZ 2 Proportion	FZ 3 Proportion	Area Benefitting from Defences	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood	Actual risk of FLUVIAL flooding from R. Gipping during design flood: Max water level 1% AEP plus 65% CC	Actual flood risk of FLUVIAL flooding from R. Gipping during design flood: Hazard rating 1% AEP plus 65% CC	Actual risk of FLUVIAL flooding from Ri. Gipping during extreme flood: Max water level 0.1% AEP plus 25% CC	Residual risk of TIDAL flooding: Max Depth on Site (m)	Residual risk of TIDAL flooding: Maximum Hazard Rating on Site	Residual risk of TIDAL flooding: Time to inundation	Residual risk of TIDAL flooding: Duration of flooding	Safety Framework
IP011c	Smart Street/Foundation Street	B	0.08	Yes	7	1%	0%	0%	Yes	Yes	Yes	Yes		>= 25% <50 %		14	None	None	None	-	No hazard in modelled scenario	-	-	The site is largely in Flood Zone 1 and not at risk of fluvial or tidal flooding. No further mitigation measures are required.
IP052	Land between Lower Orwell Street and Star Lane	B	0.4 (80%)	Yes	29	5%	1%	0%	Yes	Yes	Yes	Yes	Yes	>= 25% <50%		17	None	None	None	-	No hazard in modelled scenario	-	-	Majority of site in Flood Zone 1 and not at risk of fluvial or tidal flooding. The site is safe for development. Risk of flooding from surface water and combined sewers should be assessed as part of a FRA. Attenuation is likely SuDS at this location.
IP096	Car Park, Handford Road (east)		0.22	Yes	22	6%	3%	6%		Yes	Yes			>= 50% <75%		11	None	None	None	-	No hazard in modelled scenario	-	-	Majority of the site is in Flood Zone 1, and safe for development. Development should be set back from the Alderman Canal. The southern edge of the site may be at residual risk of tidal flooding, in event of failure of flood defence infrastructure. Maximum breach level compartment J 3.61 – 3.7m AOD. Sleeping accommodation above maximum breach flood level. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD.
IP031a	103-115 Burrell Road	B	0.44	Yes	20	7%	81%	83%	Yes	Yes	Yes	Yes	Yes	>= 25% <50%		24	None	None	None	-	No hazard in modelled scenario	-	-	The site is not at actual risk of fluvial flooding from the River Gipping during the design flood or the extreme flood. The site may be at residual risk of tidal flooding in the event of a failure of tidal flood defence infrastructure. Maximum breach level for compartment D is 4m AOD. Sleeping accommodation above maximum breach flood level. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD. Potential to raise the site to provide safe access from the east. Likely SuDS is attenuation.
IP031b	22 Stoke Street IP2 8BX	B	0.18	Yes	18	26%	40%	40%	Yes	Yes	Yes			>= 25% <50%		22	None	None	None	-	No hazard in modelled scenario	-	-	The site is not at actual risk of fluvial flooding from the River Gipping during the design flood or the extreme flood. The site may be at residual risk of tidal flooding in the event of a failure of tidal flood defence infrastructure. Maximum breach level for compartment D is 4m AOD. Sleeping accommodation above maximum breach flood level. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD. Potential to raise the site to provide safe access from the east. Likely SuDS is attenuation.

Site Reference	Address	Greenfield or Brownfield	Site Area*	IP One	Dwellings	FZ 2 Proportion	FZ 3 Proportion	Area Benefitting from Defences	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood	Actual risk of FLUVIAL flooding from R. Gipping during design flood: Max water level 1% AEP plus 65% CC	Actual flood risk of FLUVIAL flooding from R. Gipping during design flood: Hazard rating 1% AEP plus 65% CC	Actual risk of FLUVIAL flooding from Ri. Gipping during extreme flood: Max water level 0.1% AEP plus 25% CC	Residual risk of TIDAL flooding: Max Depth on Site (m)	Residual risk of TIDAL flooding: Maximum Hazard Rating on Site	Residual risk of TIDAL flooding: Time to inundation	Residual risk of TIDAL flooding: Duration of flooding	Safety Framework
IP133	South of Felaw Street		0.37	Yes	45	39%	51%	61%	Yes	Yes	YES	YES		>= 25% <50%		4	None	None	None	<0.25m	Low	1.5hrs	>21hrs	The site is not at actual risk of fluvial flooding from the River Gipping during the design flood or the extreme flood. Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment C 3.5m AOD. Sleeping accommodation above maximum breach flood level. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m of a flood defence (whether fluvial or tidal).
IP188	Websters saleyard site, Dock Street		0.1	Yes	9	17%	83%	94%	Yes	Yes	YES	YES	YES	>= 25% <50%		22	None	None	None	0.25m	Low	1.5hrs	>21hrs	The site is not at actual risk of fluvial flooding from the River Gipping during the design flood or the extreme flood. Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment C 3.5m AOD. Sleeping accommodation above maximum breach flood level. The hazard mapping shows that in the event of a breach in the flood defences during the 0.5% AEP event (2118), part of the access/egress routes away from the site along Stoke Quay may have a potential hazard rating of up Low to Moderate ("Danger for some"). Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m of a flood defence (whether fluvial or tidal).
IP039a	Land between Gower Street and Great Whip Street	B	0.48	Yes	45	9%	76%	72%	Yes	Yes	YES	YES	YES	>= 25% <50%		22	None	None	None	1m	Significant	1.5hrs	>21hrs	The site is not at actual risk of fluvial flooding from the River Gipping during the design flood or the extreme flood. Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment C 3.5m AOD. Sleeping accommodation above maximum breach flood level. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. Risk from tidal surface water and combined sewers. A high-level trunk sewer crosses the site. Likely SuDS is attenuation.

* Figure in brackets after site area indicates proportion of site for residential use, where provided.

Table 2-6 Sites in Flood Zone 2 and 3, at actual risk from River Gipping during the extreme event in the future (0.1% AEP including 25% climate change)

Site Reference	Address	Greenfield or Brownfield	Site Area*	IP One	Dwellings	FZ 2 Proportion	FZ 3 Proportion	Area Benefitting from Defences	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood	Actual risk of FLUVIAL flooding from R. Gipping during design flood: Max water level 1% AEP plus 65% CC	Actual flood risk of FLUVIAL flooding from R. Gipping during design flood: Hazard rating 1% AEP plus 65% CC	Actual risk of FLUVIAL flooding from Ri. Gipping during extreme flood: Max water level 0.1% AEP plus 25% CC	Residual risk of TIDAL flooding: Max Depth on Site (m)	Residual risk of TIDAL flooding: Maximum Hazard Rating on Site	Residual risk of TIDAL flooding: Time to inundation	Residual risk of TIDAL flooding: Duration of flooding	Safety Framework
IP001	Land between 81-97 Fore Street	B	0.08	Yes	7	15%	31%	6%	No	No	Yes	Yes		>= 25% <50%		14	None	None	3.97m AOD	-	No hazard in modelled scenario	-	-	Actual risk of fluvial flooding from the River Gipping during an extreme flood in the future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment H 4 – 4.1m AOD. Sleeping accommodation above maximum breach flood level. Safe access/egress achievable along Fore St and to the north. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD.
IP105	Depot, Beaconsfield Road		0.33	No	15	100%	0%	57%	Yes	Yes	Yes	Yes	Yes	>= 25% <50%	Yes	10	None	None	4.85m AOD	-	No hazard in modelled scenario	-	-	Site located in Flood Zone 2. Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). The site is not shown to flood during the design flood, and therefore requirements for finished floor levels and access/egress are met. Safe refuge must be provided above the extreme flood level for the River Gipping, which is 4.85m AOD. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m of a flood defence (whether fluvial or tidal).
IP054b	Land between Old Cattle Market and Star Lane	B	1.08 (60%)	Yes	40	29%	23%	27%	Yes	Yes	YES	YES	YES	>= 25% <50%		24	None	None	3.97m AOD	0.5m	Moderate	1.5hrs	>12hrs	The majority of the site is in Flood Zone 1; south eastern part in Flood Zone 3. Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment H 4 – 4.1m AOD. Sleeping accommodation above maximum breach flood level. Dry access/egress for the site may be achievable from the northern side of the site along Turret Lane or Rose Lane / St Peter's Street. The route along Star Lane is shown to be flooded, at Significant hazard (Danger for Most), and would therefore not offer a dry route. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD. Potential to include new landscaping river wall / terrace. An Anglian water sewer crosses the site. Foul capacity is limited as the local sewer network is served by a pumping station in Portman Road.

Site Reference	Address	Greenfield or Brownfield	Site Area*	IP One	Dwellings	FZ 2 Proportion	FZ 3 Proportion	Area Benefitting from Defences	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood	Actual risk of FLUVIAL flooding from R. Gipping during design flood: Max water level 1% AEP plus 65% CC	Actual flood risk of FLUVIAL flooding from R. Gipping during design flood: Hazard rating 1% AEP plus 65% CC	Actual risk of FLUVIAL flooding from Ri. Gipping during extreme flood: Max water level 0.1% AEP plus 25% CC	Residual risk of TIDAL flooding: Max Depth on Site (m)	Residual risk of TIDAL flooding: Maximum Hazard Rating on Site	Residual risk of TIDAL flooding: Time to inundation	Residual risk of TIDAL flooding: Duration of flooding	Safety Framework
IP011b	Smart Street/Foundation Street	B	0.62	Yes	56	31%	47%	52%	Yes	Yes	YES	YES	YES	>= 25% <50%		32	None	None	3.97m AOD	<0.5m	Moderate	Within 2hrs	>12hrs	Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment H 4 – 4.1m AOD. Sleeping accommodation above maximum breach flood level. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD. Development here has potential to influence flooding at Key Street.
IP028b	Land west of Greyfriars Road (Jewsons)	B	0.9 (50%)	No	40	13%	86%	91%	Yes	Yes	YES	YES	YES	>= 25% <50%	Yes	21	None	None	3.97m AOD	<1m	Danger to Most	1.5hrs	>12hrs	Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of failure of flood defence infrastructure. Maximum breach level compartment J 3.61 – 3.7m AOD. Sleeping accommodation above maximum breach flood level. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD. Site also at risk of flooding from overland flow and the local sewer network.
IP037	Island Site	B	6.02 (70%)	Yes	421	5%	95%	57%	Yes	Yes	YES	YES		>= 25% <50%		35	None	None	3.97m AOD	0.25-1.25m	Danger to Most	1.5hrs	>12hrs	Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment H 4 – 4.1m AOD. Sleeping accommodation above maximum breach flood level. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD. Potential to provide a new bridge to Mather Way and raise parts of the site. Develop the site with IP133 and IP050. At risk from tidal surface water and combined sewers. Existing defences here have failed in the past. As part of a site-specific FRA, a site-specific breach assessment close to the site will be required. Off-site foul water sewer under the river will be required.

Site Reference	Address	Greenfield or Brownfield	Site Area*	IP One	Dwellings	FZ 2 Proportion	FZ 3 Proportion	Area Benefitting from Defences	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood	Actual risk of FLUVIAL flooding from R. Gipping during design flood: Max water level 1% AEP plus 65% CC	Actual flood risk of FLUVIAL flooding from R. Gipping during design flood: Hazard rating 1% AEP plus 65% CC	Actual risk of FLUVIAL flooding from Ri. Gipping during extreme flood: Max water level 0.1% AEP plus 25% CC	Residual risk of TIDAL flooding: Max Depth on Site (m)	Residual risk of TIDAL flooding: Maximum Hazard Rating on Site	Residual risk of TIDAL flooding: Time to inundation	Residual risk of TIDAL flooding: Duration of flooding	Safety Framework
IP043	Commercial Buildings, Star Lane	B	0.7 (80%)	Yes	50	16%	21%	18%	Yes	Yes	YES			>= 25% <50%		18	None	None	3.97m AOD	0.25m	Significant	1.5hrs	>12hrs	Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment H 4 – 4.1m AOD. Sleeping accommodation above maximum breach flood level. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD. The site is sloping; more vulnerable uses can be located at higher level. Risk of flooding from surface water and combined sewers. Discharge of surface water may be an issue as Star Lane surface water sewer is pumped via Stoke Bridge Tank back into the combined sewer.
IP064a	Holywells Road (east)		1.2	Yes	66	19%	29%	30%		Yes	YES	YES	YES	< 25%		3	None	None	3.97m AOD	<1.25m	Significant	1.5hrs	>12hrs	Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment H close to Breach 05 is 4.1 – 5.3m AOD. Sleeping accommodation above maximum breach flood level. Access/egress routes along Holywells Road may have a potential hazard rating of up to Significant (“Danger for most”) and Extreme (“Danger for all”) during breach scenario. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD. The site is at risk of flooding from surface water and combined sewers. There is frequent deep flooding on Holywells Road – the cause needs to be established and resolved. There may be a risk of collapsing embankments to the canal in Holywells park.
IP015	West End Road Surface Car Park	B	1.21 (55%)	Yes	67	40%	51%	84%	Yes	Yes	YES	YES	YES	< 25%	Yes	22	None	None	3.97m AOD	<0.5m	Significant	1.5hrs	>12hrs	Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of failure of flood defence infrastructure. Maximum breach level compartment J 3.61 – 3.7m AOD. Sleeping accommodation above maximum breach flood level. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD.

Site Reference	Address	Greenfield or Brownfield	Site Area*	IP One	Dwellings	FZ 2 Proportion	FZ 3 Proportion	Area Benefitting from Defences	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood	Actual risk of FLUVIAL flooding from R. Gipping during design flood: Max water level 1% AEP plus 65% CC	Actual flood risk of FLUVIAL flooding from R. Gipping during design flood: Hazard rating 1% AEP plus 65% CC	Actual risk of FLUVIAL flooding from Ri. Gipping during extreme flood: Max water level 0.1% AEP plus 25% CC	Residual risk of TIDAL flooding: Max Depth on Site (m)	Residual risk of TIDAL flooding: Maximum Hazard Rating on Site	Residual risk of TIDAL flooding: Time to inundation	Residual risk of TIDAL flooding: Duration of flooding	Safety Framework
IP178	Island House, Duke Street		0.09	Yes	8	44%	51%	50%			YES	YES		< 25%		6	None	None	3.97m AOD	0.5m	Significant	1.5hrs	>12hrs	Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment H 4.1 – 5.3m AOD. Sleeping accommodation above maximum breach flood level. Dry access/egress routes along Duke Street and to the east. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD.
IP035	Key Street/Star Lane/Burtons Site	B	0.54 (80%)	Yes	86	1%	99%	100%	Yes	Yes	YES	YES		>= 25% <50%		23	None	None	3.97m AOD	<1.25m	Significant	1.5hrs	>12hrs	Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment H 4 – 4.1m AOD. Sleeping accommodation above maximum breach flood level. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD.
IP047	Land at Commercial Road	B	3.11	Yes	173	0%	100%	100%	Yes	Yes	YES			>= 25% <50%	Yes	43	None	None	3.97m AOD	<1.25m	Significant	1.5hrs	>12hrs	Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of failure of flood defence infrastructure. Maximum breach level compartment J 3.61 – 3.7m AOD. Sleeping accommodation above maximum breach flood level. Access/egress route along Commercial Road / Grafton Way may have a potential hazard rating of up to Significant (“Danger for most”) and Extreme (“Danger for all”) during breach scenario. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD. **Note – breach modelling outputs at this location assume that land raising has been completed which is not the case currently. This will have to be considered as part of site design.**

Site Reference	Address	Greenfield or Brownfield	Site Area*	IP One	Dwellings	FZ 2 Proportion	FZ 3 Proportion	Area Benefitting from Defences	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood	Actual risk of FLUVIAL flooding from R. Gipping during design flood: Max water level 1% AEP plus 65% CC	Actual flood risk of FLUVIAL flooding from R. Gipping during design flood: Hazard rating 1% AEP plus 65% CC	Actual risk of FLUVIAL flooding from Ri. Gipping during extreme flood: Max water level 0.1% AEP plus 25% CC	Residual risk of TIDAL flooding: Max Depth on Site (m)	Residual risk of TIDAL flooding: Maximum Hazard Rating on Site	Residual risk of TIDAL flooding: Time to inundation	Residual risk of TIDAL flooding: Duration of flooding	Safety Framework
IP132	Bridge Street, Northern Quays (west)		0.18	Yes	73	0%	100%	100%	Yes	Yes	YES	YES		>= 25% <50%		22	None	None	3.97m AOD	1m	Significant	<2hrs	>4hrs	Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment H 4 – 4.1m AOD. Sleeping accommodation above maximum breach flood level. In the event of a failure of the tidal flood defences, the access / egress route along College Street and Star Lane are shown to have a hazard rating of Significant (Danger for Most) and would therefore not offer a safe route. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD.
IP136	Silo, College Street		0.16 (80%)	Yes	48	0%	100%	100%	Yes	Yes	YES	YES		>= 25% <50%		23	None	None	3.97m AOD	1m	Significant	<2hrs	>4hrs	Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment H 4 – 4.1m AOD. Sleeping accommodation above maximum breach flood level. The hazard mapping shows that in the event of a breach in the flood defences during the 0.5% AEP event (2118), parts of the access/egress routes away from the site along College Street and Star Lane may have a potential hazard rating of up to Significant (“Danger for most”). Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD.

Site Reference	Address	Greenfield or Brownfield	Site Area*	IP One	Dwellings	FZ 2 Proportion	FZ 3 Proportion	Area Benefitting from Defences	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood	Actual risk of FLUVIAL flooding from R. Gipping during design flood: Max water level 1% AEP plus 65% CC	Actual flood risk of FLUVIAL flooding from R. Gipping during design flood: Hazard rating 1% AEP plus 65% CC	Actual risk of FLUVIAL flooding from Ri. Gipping during extreme flood: Max water level 0.1% AEP plus 25% CC	Residual risk of TIDAL flooding: Max Depth on Site (m)	Residual risk of TIDAL flooding: Maximum Hazard Rating on Site	Residual risk of TIDAL flooding: Time to inundation	Residual risk of TIDAL flooding: Duration of flooding	Safety Framework
IP045	Holywells Road west/Toller Road	B	2.06 (80%)	Yes	148	17%	83%	100%	Yes	Yes	YES	YES	YES	< 25%		3	None	None	3.97m AOD	1.5m	Extreme	1.5hrs	>12hrs	Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment H close to Breach 05 is 4.1 – 5.3m AOD. Sleeping accommodation above maximum breach flood level. Access/egress routes along Holywells Road may have a potential hazard rating of up to Significant ("Danger for most") and Extreme ("Danger for all") during breach scenario. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD. There have been suggestions to raise the site and provide safe access through the site to junction of Toller and Holywells Road. The site is at risk of flooding from surface water and combined sewers. There is frequent deep flooding on Holywells Road – the cause needs to be established and resolved. There may be a risk of collapsing embankments to the canal in Holywells park.
IP226	Helena Road		1.87 (90%)	Yes	337	2%	98%	100%	Yes	Yes	YES	YES		< 25%		3	None	None	3.97m AOD	1m	Extreme	1.5hrs	>24hrs	Actual risk of fluvial flooding from the River Gipping during an extreme flood in future (extreme flood level including 25% climate change is 3.97m). Residual risk of tidal flooding, in event of a failure of flood defence infrastructure. Maximum breach flood level in compartment H 4.1 – 5.3m AOD. Sleeping accommodation above maximum breach flood level. In the event of a failure of the tidal flood defences, access/egress routes along Cliff Road towards the Myrtle Road roundabout and along Patteson Road may have a potential hazard rating of up to Significant ("Danger for most") and Extreme ("Danger for all"). Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD.

Table 2-7 Sites in Flood Zone 2 and 3, at actual risk from River Gipping during the design event (1% AEP including 65% climate change)

Site Reference	Address	Greenfield or Brownfield	Site Area*	IP One	Dwellings	FZ 2 Proportion	FZ 3 Proportion	Area Benefitting from Defences	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood	Actual risk of FLUVIAL flooding from R. Gipping during design flood: Max water level 1% AEP plus 65% CC	Actual flood risk of FLUVIAL flooding from R. Gipping during design flood: Hazard rating 1% AEP plus 65% CC	Actual risk of FLUVIAL flooding from Ri. Gipping during extreme flood: Max water level 0.1% AEP plus 25% CC	Residual risk of TIDAL flooding: Max Depth on Site (m)	Residual risk of TIDAL flooding: Maximum Hazard Rating on Site	Residual risk of TIDAL flooding: Time to inundation	Residual risk of TIDAL flooding: Duration of flooding	Safety Framework
IP279b(2)	South of former BT office, Bibb Way		0.61	Yes	29	18%	2%	1%	Yes	Yes	Yes	Yes		>= 50% <75%		39	3.9m AOD	Low	4.6m AOD	-	No hazard in modelled scenario	-	-	Majority of the site is in Flood Zone 1, and safe for development. The southern edge of the site is within Flood Zone 3. Actual risk of fluvial flooding from River Gipping in future during the design flood (design flood level including 65% climate change is 3.9m AOD on the site). Residual risk of tidal flooding, in event of failure of flood defence infrastructure. Maximum breach level compartment J 3.61 – 3.7m AOD. Finished floor levels 300mm above fluvial design flood level including climate change (3.9m AOD). Sleeping accommodation above maximum breach flood level. Dry access/egress achievable during the fluvial design flood including 65% climate change north towards Handford Road. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 4.6m AOD.
IP120b	Land west of West End Road		1.03 (80%)	Yes	103	39%	8%	11%	Yes	Yes	Yes			>= 50% <75%	Yes	24	4.75m AOD	Moderate	4.80m AOD	-	No hazard in modelled scenario	-	-	Approximately half of the site is in Flood Zone 1 and half in Flood Zone 2/3. Most of the island at West End Road has ground levels between 4 and 5.5m AOD. Actual risk of fluvial flooding from River Gipping in future during the design flood (design flood level including 65% climate change is 4.75m AOD on the site). Residual risk of tidal flooding in the event of a failure of flood defence infrastructure. Finished floor levels 300mm above fluvial design flood level including climate change (4.75m AOD). The section of West End Road to the north of the site is shown to be at Significant hazard during the design flood including an allowance for climate change (1% AEP plus 65% climate change) and therefore does not provide a suitable access/egress route. However, dry access/egress for the site is achievable to the south along West End Road. There may also be potential to design a route into the site layout to the north of the site towards the A1071. The use of a raised riverside pathway in the site design would enable a dry access route for people to be maintained without resulting in significant land take. With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7m AOD to 2118). This will also be adequate as a safe place of refuge for the extreme fluvial flood, as the flood level for the 0.1% AEP event including 25% allowance for climate change is 4.80m AOD. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m of a flood defence (whether fluvial or tidal).

Site Reference	Address	Greenfield or Brownfield	Site Area*	IP One	Dwellings	FZ 2 Proportion	FZ 3 Proportion	Area Benefitting from Defences	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood	Actual risk of FLUVIAL flooding from R. Gipping during design flood: Max water level 1% AEP plus 65% CC	Actual flood risk of FLUVIAL flooding from R. Gipping during design flood: Hazard rating 1% AEP plus 65% CC	Actual risk of FLUVIAL flooding from Ri. Gipping during extreme flood: Max water level 0.1% AEP plus 25% CC	Residual risk of TIDAL flooding: Max Depth on Site (m)	Residual risk of TIDAL flooding: Maximum Hazard Rating on Site	Residual risk of TIDAL flooding: Time to inundation	Residual risk of TIDAL flooding: Duration of flooding	Safety Framework
IP355	77-79 Cullingham Road		0.06	Yes	6	90%	4%	62%	Yes	Yes	Yes	Yes		>= 50% <75%		24	4.16m AOD	Low / Moderate	4.49m AOD	-	No hazard in modelled scenario	-	-	Majority of the site is in Flood Zone 2, with a small section of Flood Zone 3 and Flood Zone 1. Actual risk of fluvial flooding from River Gipping in future during the design flood (design flood level including 65% climate change is 4.16m AOD on the site). Residual risk of tidal flooding, in event of failure of flood defence infrastructure. Maximum breach level compartment J 3.61 – 3.7m AOD. Finished floor levels 300mm above fluvial design flood level including climate change (4.16m AOD). Sleeping accommodation above maximum breach flood level. Safe access/egress achievable during the fluvial design flood including 65% climate change along Cullingham Road, at low hazard rating. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 4.7 – 4.95m AOD. Development must be set back from the edge of the Alderman Canal.
IP354	72 (Old Boatyard) Cullingham Road IP1 2EG		0.34	Yes	24	74%	26%	45%	Yes	Yes	Yes			>= 50% <75%	Yes	39	4.47m AOD	Low / Moderate / Significant	4.7 – 4.95m AOD	-	No hazard in modelled scenario	-	-	Majority of the site is in Flood Zone 2, with the western edge within Flood Zone 3. Actual risk of fluvial flooding from River Gipping in future during the design flood (design flood level including 65% climate change is 4.47m AOD on the site). Residual risk of tidal flooding, in event of failure of flood defence infrastructure. Maximum breach level compartment J 3.61 – 3.7m AOD. Finished floor levels 300mm above fluvial design flood level including climate change (4.47m AOD). Sleeping accommodation above maximum breach flood level. Safe access/egress achievable during the fluvial design flood including 65% climate change along Cullingham Road, at low hazard rating. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 4.7 – 4.95m AOD. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m of a flood defence (whether fluvial or tidal).

Site Reference	Address	Greenfield or Brownfield	Site Area*	IP One	Dwellings	FZ 2 Proportion	FZ 3 Proportion	Area Benefitting from Defences	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood	Actual risk of FLUVIAL flooding from R. Gipping during design flood: Max water level 1% AEP plus 65% CC	Actual flood risk of FLUVIAL flooding from R. Gipping during design flood: Hazard rating 1% AEP plus 65% CC	Actual risk of FLUVIAL flooding from Ri. Gipping during extreme flood: Max water level 0.1% AEP plus 25% CC	Residual risk of TIDAL flooding: Max Depth on Site (m)	Residual risk of TIDAL flooding: Maximum Hazard Rating on Site	Residual risk of TIDAL flooding: Time to inundation	Residual risk of TIDAL flooding: Duration of flooding	Safety Framework
IP119	Land east of West End Road		0.61 (45%)	Yes	28	42%	4%	3%	Yes	Yes	Yes			>= 50% <75%	Yes	40	4.82m AOD	Moderate / Significant	4.97m AOD	-	No hazard in modelled scenario	-	-	Approximately half of the site is in Flood Zone 1 and half in Flood Zone 2/3. Most of the island at West End Road has ground levels between 4 and 5.5m AOD. Actual risk of fluvial flooding from River Gipping in future during the design flood (design flood level including 65% climate change is 4.82m AOD on the site). Residual risk of tidal flooding in the event of a failure of flood defence infrastructure. Finished floor levels 300mm above fluvial design flood level including climate change (4.82m AOD). The section of West End Road immediately adjacent to the site is shown to be at Significant hazard during the design flood including an allowance for climate change (1% AEP plus 65% climate change) and therefore does not provide a suitable access/egress route. However, dry access/egress for the site is achievable to the south along West End Road. There may also be potential to design a route into the site layout to the north of the site towards the A1071. The use of a raised riverside pathway in the site design would enable a dry access route for people to be maintained without resulting in significant land take. With respect to the residual risk of tidal flooding, safe refuge must be provided above the 0.1% AEP flood level including an allowance for climate change over the lifetime of the development (5.7m AOD to 2118). This will also be adequate as a safe place of refuge for the extreme fluvial flood, as the flood level for the 0.1% AEP event including 25% allowance for climate change is 4.97m AOD. The Environment Agency need to be consulted and an Environmental Permit obtained for any works within 16m of a flood defence (whether fluvial or tidal).
IP003	Waste tip north of Sir Alf Ramsey Way	B	1.41 (90%)	Yes	114	16%	78%	87%	Yes	Yes	YES			>= 50% <75%	Yes	23	Varies: Western edge 3.45 - 4.80m AOD Eastern edge 3.17 – 3.68m AOD	Low / Moderate / Significant	3.97m AOD	0-1.25m	Significant	Within 2hrs	15hrs	Actual risk of fluvial flooding from River Gipping in the future during the design flood (design flood level including 65% climate change is 3.5 – 4.8m AOD across site). Residual risk of tidal flooding, in event of failure of flood defence infrastructure. Maximum breach level compartment J 3.61 – 3.7m AOD. Finished floor levels 300mm above fluvial design flood level including climate change (3.5 – 4.8m AOD). Sleeping accommodation above maximum breach flood level. Dry access/egress achievable during the fluvial design flood including 65% climate change south along West End Road. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD.

Site Reference	Address	Greenfield or Brownfield	Site Area*	IP One	Dwellings	FZ 2 Proportion	FZ 3 Proportion	Area Benefitting from Defences	Within 300m of a Main River	Within 300m of an Ordinary Watercourse	ROFSW Low	ROFSW Medium	ROFSW High	ASTGWF	Historic Flood Map	IBC Historic Flood	Actual risk of FLUVIAL flooding from R. Gipping during design flood: Max water level 1% AEP plus 65% CC	Actual flood risk of FLUVIAL flooding from R. Gipping during design flood: Hazard rating 1% AEP plus 65% CC	Actual risk of FLUVIAL flooding from Ri. Gipping during extreme flood: Max water level 0.1% AEP plus 25% CC	Residual risk of TIDAL flooding: Max Depth on Site (m)	Residual risk of TIDAL flooding: Maximum Hazard Rating on Site	Residual risk of TIDAL flooding: Time to inundation	Residual risk of TIDAL flooding: Duration of flooding	Safety Framework
IP004	Bus Depot, Sir Alf Ramsey Way	B	1.07 (50%)	Yes	48	1%	99%	100%	Yes	Yes	YES			>= 50% <75%	Yes	26	3.17m AOD	Low / Moderate / Significant	3.97m AOD	1.25m	Significant	1.5hrs	> 12hrs	Actual risk of fluvial flooding from River Gipping in future during the design flood (design flood level including 65% climate change is 3.17m AOD on the site). Residual risk of tidal flooding, in event of failure of flood defence infrastructure. Maximum breach level compartment J 3.61 – 3.7m AOD. Finished floor levels 300mm above fluvial design flood level including climate change (3.17m AOD). Sleeping accommodation above maximum breach flood level. Dry access/egress achievable during the fluvial design flood including 65% climate change south along West End Road. Safe refuge above the extreme maximum breach flood level (0.1% AEP 2118) 5.7m AOD. This is also adequate for the fluvial extreme fluvial flood as the level for the 0.1% AEP event including 25% climate change is 3.97m AOD. Investigate potential to raise site and part of the existing highway linking to site IP003 to aid site safety. Likely SuDS is attenuation.

* Figure in brackets after site area indicates proportion of site for residential use, where provided.

2.3.2 Ipswich BC is not able to meet its total housing requirements from sites within Flood Zone 1, and therefore sites within Flood Zone 2 and 3 are required for development to ensure the regeneration of central Ipswich, and to ensure brownfield land is recycled to take account of the benefits of sustainable development.

2.3.3 This Sequential Test has identified the variation in flood risk between the sites. Redevelopment of those sites at lowest actual risk of flooding should be prioritised, prior to the consideration of sites at higher risk. In areas of residual risk, those sites at lower hazard should be prioritised, prior to consideration of sites at greater hazard.

2.3.4 Ultimately, in order to meet the housing requirements to 2036, Ipswich BC will need to develop some or all of these sites.

2.4 Windfall Sites

2.4.1 Windfall sites are those which have not been specifically identified in the Local Plan process or they are below the site size threshold to be considered. They comprise sites that have unexpectedly become available.

2.4.2 In cases where development needs cannot be fully met through the provision of site allocations, a realistic allowance for windfall development should be assumed, based on past trends.

2.4.3 It is recommended that the acceptability of windfall applications in flood risk areas should be considered at the strategic level through a policy setting out broad locations of windfall development that would be acceptable or not in Sequential Test terms.

2.4.4 Where this is not possible, windfall applications will need to apply the Sequential Test as part of the planning application process in consultation with Ipswich BC.

3. Exception Test Statement

3.1 Overview

3.1.1 Where residential development, or other More Vulnerable uses, are proposed in Flood Zone 3, Table 1-2 identifies that the Exception Test needs to be applied. For the Exception Test to be passed:

- Part 1 - It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by the SFRA where one has been prepared; and
- Part 2 - A site-specific Flood Risk Assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

3.2 Part 1)

3.2.1 With respect to Part 1 of the Exception Test, the sites will need to be considered against the sustainability objectives set out in the Sustainability Appraisal for Ipswich BC. These are presented in Table 3-1.

3.2.2 All the sites identified as within Flood Zones 2 and 3 are either brownfield land or located within the existing town of Ipswich. As a result, they contribute towards a number of sustainability objectives. The final column in Table 3-1 identifies the justification for allocating these types of sites in relation to each of the sustainability objectives.

3.3 Part 2)

3.3.1 Information to support the application of Part 2 of the Exception Test is provided in the final columns of Table 2-5, Table 2-6 and Table 2-7, in the site proformas within the SFRA (Appendix F) as well as Sections 7 and 8 of the SFRA.

3.3.2 The information within these sections indicates that development of these sites could be done in a way that meets the requirements of Part 2 of the Exception Test. This will need to be addressed as part of the specific development proposals for each site, and support by a site-specific Flood Risk Assessment (FRA).

Table 3-1 Ipswich Borough Council Sustainability Objectives [4]

SA Objective		Sub objectives	Sustainability benefits of town centre and brownfield sites
T1	To improve air quality	Would the policy contribute to the protection and improvement of local air quality? Would the policy contribute to the impact of traffic congestion on air quality?	**Development of town centre sites enables use of public transport and thereby reduces the impact on air quality.**
ET2	To conserve soil resources and quality	Would any new developments protect the land within the Borough from new contamination and exposure to existing contaminated land? Would new developments help to maintain and enhance soil quality where possible?	**Development on brownfield land is favorable over greenfield sites where the impact on soil quality will be more notable.**
ET3	To reduce waste	Would the implementation of the policy increase the proportion of waste recycling and re-use? Would the implementation of the policy reduce the production of waste per capita? Would the implementation of the policies result in reduction of the proportion of waste landfilled? Would new developments encourage a reduced demand for raw materials? Would new developments promote the use of recycled and secondary materials in construction?	**Unknown.**
ET4	To reduce the effects of traffic upon the environment	Would the policy ensure that public transport services meet people's needs i.e. through new bus services? Would the policy ensure that highways infrastructure meets people's needs (including walking and cycling routes)? Would new developments promote the use of sustainable travel modes and reduce dependence on the private car?	**Development of town centre sites enables use of sustainable travel modes and reduces the dependence on the private car.**
ET5	To improve access to key services[5] for all sectors of the population	Would new development maintain and improve access to essential services and facilities? Would new development improve access to open space?	**Development of town centre sites maintains and improves access to essential services and facilities.**
ET6	To limit and adapt to climate change	Would new developments contribute to a reduction in greenhouse gas emissions? Would new developments require the inclusion of SuDS? Would new developments reduce the demand for energy and increase energy efficiency? Would new developments increase the use of renewable energy? Would the policy contribute to a reduction in CO_2 emissions from the transport sector? Would new developments reduce and manage flooding?	**Development will require the inclusion of SUDS.** **Development will be delivered with due consideration of the risks of flooding, described further in Section 3.3.**
ET7	To protect and enhance the quality of water features and resources and reduce the risk of flooding	Would the policy ensure the protection and enhancement of ground and surface water quality? Would the policy encourage sustainable use of water resources? Would the policy encourage the inclusion of flood mitigation measures such as SuDS? Would new developments reduce and manage flooding?	**Development will require the inclusion of SUDS.** **Development will be delivered with due consideration of the risks of flooding, described further in Section 3.3.**
ET8	To conserve and enhance biodiversity and geodiversity, including favorable conditions on SSSIs, SPAs and SACs	Would the policy protect and enhance designated sites of nature conservation importance? Would the policy protect and enhance wildlife especially rare and endangered species? Would new developments protect and enhance habitats and wildlife corridors? Would new developments provide opportunities for people to access wildlife and open green spaces?	**Development of brownfield and town centre sites contributes to the protection of sites of nature conservation importance, habitats and wildlife corridors.**

[4] Ipswich Borough Council Strategic Environmental Assessment and Sustainability Appraisal, Table 2-3 The SA Framework https://ipswich.oc2.uk/readdoc/16/3#d39727 Accessed March 2020.

		Would new development protect and enhance geodiversity?	
ET9	To conserve and enhance the historic environment, heritage assets and their settings	Would the policy protect and enhance heritage assets and their setting? Would the policy contribute to the protection and enhancement of historic landscape / townscape value?	**Development of brownfield land and town centre sites helps to preserve and enhance the historic landscape and townscape.**
ET10	To conserve and enhance the quality and local distinctiveness of landscapes and townscapes	Would new developments protect and enhance landscape character and quality? Would new developments protect and enhance townscape character and quality? Would new developments promote sensitive design in development? Would new developments promote local distinctiveness?	**Development of brownfield land and town centre sites helps to preserve and enhance the historic landscape and townscape.**
HW1	To improve the health of those most in need	Would the implementation of the policy improve access to health and social care services? Would the policy contribute to a reduction in health inequalities amongst different groups in the community? Would new developments promote healthy lifestyles?	**Development of town centre sites helps to reduce the dependence on the private car, and thereby healthy transport travel modes (walking, cycling).**
HW2	To improve the quality of life where people live and encourage community participation	Would new development encourage community participation? Would new development protect residential amenity from pollution? Would new developments minimise noise and light pollution?	**Development of town centre sites enables residents to join existing communities.** **Development of town centre sites can help to improve local facilities and neighbourhoods as a place to live.**
ER1	To reduce poverty and social exclusion	Would the policy contribute to reduced overall levels of deprivation?	**Unknown.**
ER2	To offer everybody the opportunity for rewarding and satisfying employment	Would the policy contribute to a reduction in unemployment in the areas most at need? Would new developments improve physical accessibility to jobs for those in greatest need? Would the policy ensure people are educated, trained and skilled to meet local economic needs? Would the policy ensure labour supply meets local economic needs?	**Development of town centre sites promotes access to employment opportunities in the town centre.**
ER3	To help meet the housing requirements for the whole community	Would the policy ensure that there is sufficient housing to meet identified needs in all areas? Would new developments ensure that housing meets acceptable standards? Would new developments increase the availability of affordable housing?	**Development will help meet housing need.**
ER4	To achieve sustainable levels of prosperity and economic growth throughout the plan area	Would the policy encourage new business formation? Would the policy increase and diversify employment opportunities? Would the policy encourage economic growth? Would the policy ensure sufficient land, buildings and premises are available to accommodate business start-up and growth? Would the policy ensure Infrastructure (including transportation) meets the needs of business?	**Unknown.**
ER5	To support vital and viable town, district and local centres	Would new developments maintain and improve access to shops, services and facilities in centres? Would new developments ensure a mix of retail units in centres?	**Development of town centre sites will maintain and improve access to existing shops, services and facilities in those areas.**
ER6	To encourage efficient patterns of movement in support of economic growth	Would the policy ensure sufficient land, buildings and premises are available to accommodate business start-up and growth? Would the policy ensure Infrastructure (including transportation) meets the needs of business? Would the policy ensure that public transport services meet people's needs i.e. through new bus services?	**Development of town centre sites will encourage the use of sustainable travel modes and reduce dependence on the private car.** **Development of town centre sites will support the town centre as a place for business start-up and growth.**

		Would the policy ensure that highways infrastructure meets people's needs (including walking and cycling routes)? Would the policy promote the use of sustainable travel modes and reduce dependence on the private car? Would the policy reduce the impact of traffic on the economy?	
ER7	To encourage and accommodate both indigenous and inward investment	Would the policy encourage inward investment and new business formation? Would the policy support the preservation and / or development of a high-quality built environment? Would the policy promote the development of multi-functional green infrastructure in urban areas? Would the policy enhance the reputation of urban areas as places to live, work and visit?	**Development of town centre sites will support the preservation and development of a high-quality town centre environment and will enhance the reputation of the urban area.**
CL1	To maintain and improve access to education and skills for both young people and adults	Would new development increase levels of participation and attainment in education for all members of society? Would new development improve access to and involvement in lifelong learning opportunities? Would new developments improve the provision of education and training facilities?	**Unknown.**
CD1	To minimise potential opportunities for crime and anti-social activity	Would the policy contribute to a reduction in crime levels? Would the policy contribute to a reduction in the fear of crime? Would the policy contribute to a reduction in levels of anti-social behaviour? Would new developments encourage secured by design?	**Unknown.**

4. Conclusion

4.1.1 Ipswich BC is not able to meet its total housing requirements from sites within Flood Zone 1, and therefore sites within Flood Zone 2 and 3 are required for development to ensure the regeneration of central Ipswich, and to ensure brownfield land is recycled to take account of the benefits of sustainable development.

4.1.2 This Sequential Test has identified the variation in flood risk between the sites. Redevelopment of those sites at lowest risk of flooding and lower hazard rating should be prioritised, prior to the consideration of sites at greater risk and greater flood hazard.

4.1.3 Ultimately, in order to meet the housing requirements to 2036, Ipswich BC will need to develop some or all of these sites.

Appendix A Applying Sequential Test to Planning Applications

It is necessary to undertake a Sequential Test for a planning application if both of the following apply:

- The proposed development is in Flood Zone 2 or 3.
- A Sequential Test hasn't already been done for a development of the type you plan to carry out on your proposed site (check with Ipswich BC).

The Environment Agency publication 'Demonstrating the flood risk Sequential Test for Planning Applications[5]' sets out the procedure for applying the sequential test to individual applications as follows:

- Identify the geographical area of search over which the test is to be applied; this could be the Borough area, or a specific catchment if this is appropriate and justification is provided (e.g. school catchment area or the need for affordable housing within a specific area).
- Identify the source of 'reasonably available' alternative sites; usually drawn from evidence base / background documents produced to inform the Local Plan.
- State the method used for comparing flood risk between sites; for example, the Environment Agency Flood Map for Planning, the SFRA mapping, site-specific FRAs if appropriate, other mapping of flood sources.
- Apply the Sequential Test; systematically consider each of the available sites, indicate whether the flood risk is higher or lower than the application site, state whether the alternative option being considered is allocated in the Local Plan, identify the capacity of each alternative site, and detail any constraints to the delivery of the alternative site(s).
- Conclude whether there are any reasonably available sites in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed.
- Where necessary, as indicated by Table 1-2 apply the Exception Test.
- Apply the Sequential approach to locating development within the site.

It should be noted that it is for IBC, taking advice from the Environment Agency as appropriate, to consider the extent to which Sequential Test considerations have been satisfied, taking into account the particular circumstances in any given case. The developer should justify with evidence what area of search has been used when making the application.

Ultimately, after applying the Sequential Test, IBC needs to be satisfied in all cases that the proposed development would be safe and not lead to increased flood risk elsewhere. This needs to be demonstrated within a FRA and is necessary regardless of whether the Exception Test is required.

Sequential Test Exemptions

It should be noted that the Sequential Test does not need to be applied in the following circumstances:

- Individual developments proposed on sites which have been allocated in development plans through the Sequential Test.
- Minor development, which is defined in the NPPF as:
  - minor non-residential extensions: industrial / commercial / leisure etc. extensions with a footprint <250m^2.
  - alterations: development that does not increase the size of buildings e.g. alterations to external appearance.
  - householder development: for example; sheds, garages, games rooms etc. within the curtilage of the existing dwelling, in additional to physical extensions to the existing dwelling itself. This

[5] Environment Agency, April 2012, 'Demonstrating the flood risk Sequential Test for Planning Applications', Version 3.1

definition excludes any proposed development that would create a separate dwelling within the curtilage of the existing dwelling resulting in a net addition e.g. subdivision of houses into flats.

- Change of Use applications, unless it is for a change of use of land to a caravan, camping or chalet site, or to a mobile home site or park home site.
- Development proposals in Flood Zone 1 (land with a low probability of flooding from rivers or the sea) unless the SFRA, or other more recent information, indicates there may be flooding issues now or in the future (for example, through the impact of climate change).

Redevelopment of existing properties (e.g. replacement dwellings), provided they do not increase the number of dwellings in an area of flood risk (i.e. replacing a single dwelling within an apartment block).

aecom.com