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OXFORD CITY COUNCIL

Oxford City Council Local Plan 2036

Flood Risk and Sequential Test of Sites

BACKGROUND PAPER

INTRODUCTION

1. With two rivers running through it, and a high water table, Oxford has large areas of land that are at risk of flooding. A city wide Strategic Flood Risk Assessment (SFRA) (Level 1) was completed in December 2016 to provide detailed information on flood risk to inform the Local Plan 2036. The SFRA has gathered and refined information about different sources of flood risk and shows variations in flood risk across the city. Variation in flood risk from fluvial sources has been classed according to probability.

2. Figure 1 maps the flood zones in Oxford (based on fluvial flood risk). Flood Zone 1 has a low probability of flooding, Flood Zone 2 a medium probability of flooding, Flood Zone 3a a high probability of flooding and Flood Zone 3b is functional flood plain. The SFRA shows that some of the potential development sites being considered through the Local Plan 2036 Preferred Options are in Flood Zones 2 or 3. It is important to identify whether those developments can be directed to other parts of Oxford that are at less risk of flooding.

3. Central to the National Planning Policy Framework (NPPF) (paragraphs 100-102) is the idea that the sequential approach should be used to determine the suitability of land for development in flood risk areas. The aim is to identify land for development that is in the lowest possible flood risk zone as far as is reasonably possible. Additional guidance on how local authorities should apply the sequential approach and Sequential Test is provided in the National Planning Practice Guidance (PPG). This background paper shows how the sequential approach has been applied to the sites being considered for allocation in the Oxford Local Plan 2036 Preferred Options. As part of the sequential approach, the Sequential Test is used to test if there are any reasonably available sites appropriate to the type of land use proposed in an area with a lower probability of flooding.

SEQUENTIAL TEST METHODOLOGY

4. When developing site allocation policies, the Sequential Test should be applied if any of the potential sites are outside of Flood Zone 1. Before allocating sites in higher risk flood zones, it must be demonstrated that there are no reasonable alternative sites available in areas with a lower probability of flooding that would be appropriate to the type of development or land use proposed. When considering the allocation of sites beyond Flood Zone 1, wherever possible the most vulnerable uses (such as housing, hospitals and schools) should be located in the lowest flood risk areas and the least vulnerable uses (such as outdoor sports) should be located in the areas with a higher risk of flooding . It is also important that within each flood zone new development should be directed to the parts of the sites that have the lowest probability of flooding from all sources as indicated by the SFRA. The methodology in Table 1 was used to apply the sequential test.

Table 1: Sequential Test methodology (adapted from guidance within the NPPF and PPG)

Stage A: Identify the need for development

To assess whether land is needed for development, and whether any land is needed beyond Flood Zone 1, it is important to identify the development needed to achieve the aims, objectives and strategy of the Local Plan 2036 Preferred Options.

Stage B: Identification of the fluvial flood risk of potential development sites

This stage identifies all the reasonably available sites being considered for development at the preferred options stage and the flood risk zone for each site as determined by the SFRA (Level 1).

Stage C: Application of the Sequential Test

At this stage the potential development capacities of the proposed sites are estimated and consideration is given to whether development needs can be met entirely in Flood Zone 1. Where there are insufficient sites available in Flood Zone 1 to meet identified development needs, sites in Flood Zone 2 are considered (with regard given to the flood risk vulnerability of proposed land uses). Only where there are insufficient sites available to meet development needs in Flood Zones 1 and 2 are sites in Flood Zone 3 considered (again with regard given to the flood risk vulnerability of proposed land uses).

Where sites are proposed in Flood Zones 2 and 3, consideration is given to whether there are opportunities to swap 'less vulnerable' land uses proposed in low flood risk areas with 'more vulnerable' land uses proposed in higher flood risk areas.

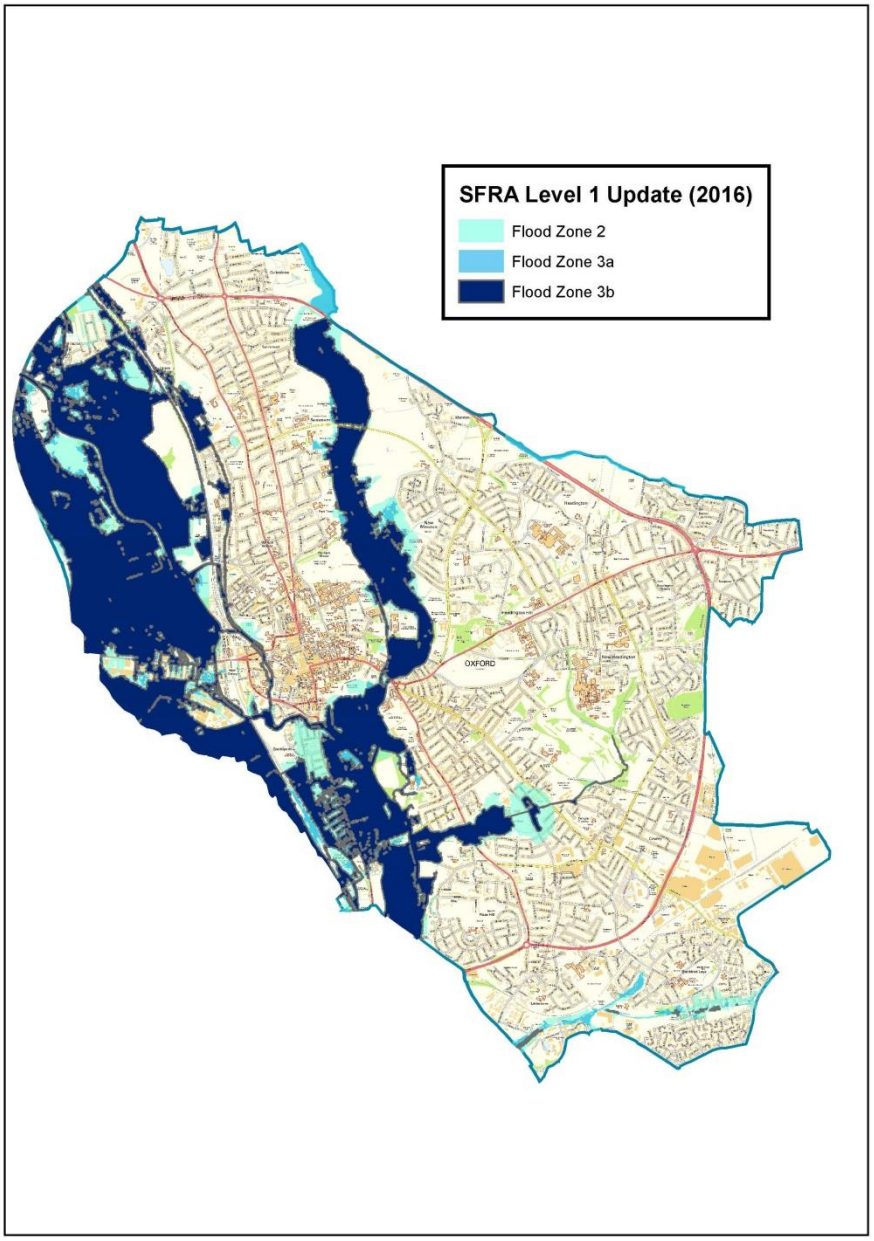
Stage D: Assess risk of flooding from other sources

Information about sources of flooding other than fluvial flooding is acknowledged and the significance assessed. The Environment Agency has published information on the susceptibility of broad areas to surface water flooding, which are shown in the SFRA. Often this data is of lower quality and accuracy than that of fluvial flooding and it can inform the Sequential Test to a lesser degree.

Stage E: The Exceptions Test

Any proposals for the development of sites in Flood Zone 3a proposed for 'more vulnerable' uses such as housing will also require the Exceptions Test. The Exceptions Test will be carried out to inform the site allocations in the Draft Local Plan.

Figure 1: Flood Zones in Oxford



STAGE A: IDENTIFYING THE NEED FOR DEVELOPMENT

5. Oxford has one the highest concentrations of knowledge intensive businesses in the UK and the city plays a vital role in the regional and national economies. Oxford is the 'service centre' for the Oxfordshire economy, having the fastest growing and best educated workforce and also being the main centre of research and spin-outs in the county. Oxford's population increased by 12% in the last decade, and significant population growth is expected over the plan period to 2036. However, the city's continuing housing crisis through the lack of housing availability, choice and affordability is a significant challenge for its future development. The housing crisis is having negative impacts on the ability of businesses and service providers to attract and retain staff. The housing crisis is also affecting the ability to

maintain mixed and balanced communities. Key objectives of the Local Plan 2036 will be to build on the city's economic strengths and to deliver as much housing as possible, all the while balancing this with the need to ensure Oxford remains a pleasant place to live, work and visit, making best use of resources and protecting and enhancing the city's unique historic environment and green setting.

6. Oxford is generally a sustainable location for housing development as it is the employment and retail centre for the wider Oxfordshire area and provides key health, education, leisure, cultural and community services. Oxford also has well established public transport and cycle networks.

The Local Plan 2036 Spatial Strategy: amount and types of development

Housing development

7. The Oxfordshire Strategic Housing Market Assessment (SHMA) 2014 assessed the overall need for new homes in Oxfordshire for the years 2011-2031. The SHMA identifies the need for around 1,200-1,600 new homes to be delivered annually in Oxford up to 2031. A further update to the SHMA will be required to assess housing need to 2036 to cover the whole Local Plan period. However, if current trends were continue to 2036, taking the midpoint of 1,400 dwellings per year, there would be a need for around 28,000 new homes to be delivered in Oxford in the 20 year period 2016-2036. However, due Oxford's intrinsic constraints (such as its tightly drawn administrative boundary, large areas of functional floodplain and significant heritage assets) there is not capacity to deliver this number of new homes within the city. It is clear that a significant amount of Oxford's housing need will need to be met elsewhere in the Oxfordshire housing market area. There has been on-going work with adjoining authorities within the strategic housing market area to positively address housing needs that cannot be met in Oxford. Currently this is based on a working assumption that around 15,000 homes will need to be provided outside of Oxford by 2031 (as agreed by the Oxfordshire Growth Board in September 2016). Further work will need to be undertaken to understand what this need would look like through to 2036.

8. The preferred option for the Local Plan 2036 is to set a capacity-based housing target aimed at meeting as much of Oxford's housing need as possible. It is proposed that this would be achieved by boosting housing supply balanced with appropriate consideration of other policy aims to ensure that Oxford remains a pleasant place to live, work and visit. At this stage in the Local Plan process it is not possible to identify a specific capacity based housing target. The housing target will evolve as part of an iterative process of policy development, evidence gathering and more detailed site assessments (including working with landowners and a review of the Housing and Employment Land Availability Assessment). However, in order to properly apply the sequential test, a figure of housing need is required. For the purposes of this sequential test, Oxford's housing need has been estimated based on the following assumptions:

Midpoint of Oxford's objectively assessed housing need as identified in the SHMA 2014 and rolled forward (1,400 dwellings per year) [1] (28,000 dwellings 2016-2036)	-	Homes to be provided elsewhere in the housing market area as agreed by the Oxfordshire Growth Board[2] (15,000 dwellings by 2031)	=	Oxford's proxy housing need from 2016-2036 for the purposes of this sequential test (13,000 dwellings)

It is important to be clear that the estimate of 13,000 dwellings needed in Oxford to 2036 is not the housing target for the Local Plan 2036. Neither is it the number of new homes that Oxford is expected to be able to accommodate up to 2036. Instead it is an estimate of the number of new homes needed in Oxford for the next 20 years based on available evidence for the purposes of applying this sequential test only.

Employment development

9. The Oxford Employment Land Assessment (ELA) 2016 assessed the quality and quantity of B1, B2 and B8 employment land and premises in Oxford and compared employment land supply against forecast demand to test whether there is sufficient land of the right quality and in the right location to meet the identified needs. The overall findings of the ELA were that demand for employment land in Oxford is in excess of the current supply.

10. The preferred options for the Local Plan 2036 aim to support Oxford's economic growth by protecting existing employment sites and by supporting their potential intensification and modernisation. The city and district centres are identified as good locations for new employment space. It is proposed that one new large employment site will be allocated at the Northern Gateway, as detailed in Northern Gateway Area Action Plan.

Other uses

11. In addition to delivering new homes and employment space it is important that the Local Plan 2036 ensures that the infrastructure, services and facilities needed to support new development and a growing population are in place. This includes transport infrastructure, schools, green spaces, retail, leisure and community facilities. The Local Plan 2036 aims to maintain the city centre's position as the primary focus for shopping, leisure and cultural activities, as well as a major tourist destination. District centres are identified as needing to play an extended role in accommodating a range of town centre uses, complementing those

[1] This assumes that the rate of 1,400 dwellings per year identified in the SHMA 2014 continues from 2031-2036. This is only an assumption for the purposes of the sequential test. It has not been tested. An update to supplement the SHMA is required to fully understand Oxford's housing needs to 2036.

[2] This figure reflects the working assumption of dwellings that the adjoining authorities are currently expected to accommodate as agreed through the Oxfordshire Growth Board. It should not be assumed that this represents the entirety of Oxford's unmet housing need. Further assessments of housing demand and land supply will be required.

provided in the city centre. As most housing growth in Oxford will be delivered through small sites, there are limited opportunities for entirely new schools to be provided. The Local Plan 2036 therefore aims to support Oxfordshire County Council as the Education Authority to meet school provision requirements by growing existing schools. The Local Plan 2036 preferred options also aim to protect and enhance a network of multi-functional green spaces across Oxford.

The Local Plan 2036 Spatial Strategy: locating new development

Previously developed land

12. The Local Plan 2036 Preferred Options focus on delivering new development by intensifying the use of previously developed land. This is not only best practice, but is essential in a constrained urban environment like Oxford. The preferred options seek to identify sites that are underused (for example low-rise buildings and unused spaces, or sites in a use that does not make most efficient use of land, such as large surface-level car parks). The redevelopment of these sites will help to accommodate the development needs of the city in a sustainable and efficient way; locating new development alongside existing uses, facilities and public transport connections.

13. The Local Plan 2036 Preferred Option is to allow some development Flood Zone 3b which is brownfield (previously developed land), either small-scale household extensions or redevelopment of sites that does not increase the footprint of built development. Very high standards of flood mitigation measures and reduced water run-off would be required to ensure that development would not reduce flood storage or lead to increased risk of flooding elsewhere and to ensure its occupants are not put at risk. Evidence would be required to demonstrate that any development would have a neutral or positive effect on water retention and storage. This approach has been discussed with the Environment Agency.

Greenfield sites

14. The Local Plan 2036 Preferred Options aim to protect the majority of green spaces as evidence indicates they provide a variety of benefits (such as recreational and health, biodiversity provision, adaptation to climate change and improvements in air quality). If it can lead to improvements in quality and public access of other green spaces, consideration will be given to allocating green spaces for development in order to help meet the development needs of Oxford. This will only be where they are not well used and located, do not offer a variety of functions and where they have little potential for improvement, or where a limited amount of development could facilitate significant improvements of green space and public access on or very close to the site, which it would not be possible to deliver otherwise.

15. The Local Plan 2036 Preferred Options explains that the Green Belt areas in Oxford will be appraised using the formal process and tests set out by the government. Green Belt areas that do not have important public access value, are not in flood plain or of biodiversity importance and have landowner interest for development will be considered for development, if development on those sites could take place while the integrity and purpose of the wider Green Belt is maintained. The City Council considers that exceptional circumstances exist to justify a Green Belt boundary review due to the need to support Oxford's economic success and its dependence on the delivery of additional housing to meet housing need.

Oxford city centre

16. The Local Plan 2036 Preferred Options seek to maintain and enhance the role of Oxford City Centre as a primary focus for shopping, employment, leisure and cultural activities, as well as its role as a major tourist destination. This is vitally important to the overall success of Oxford. The varied role and mix of uses in the city centre mean that it draws people in from all over the city, the county, and much further afield.

District centres

17. The Local Plan 2036 Preferred Options says that district centres will need to play an extended role in accommodating a range of town centre uses, complementing those provided in the city centre. District centres offer the opportunity to provide facilities more locally for communities, reducing the need to travel and easing the pressure on the city centre. Providing a wide range of uses will help them to function as 'hubs' for the local community.

STAGE B: IDENTIFICATION OF THE FLOOD RISK OF POTENTIAL DEVELOPMENT SITES

18. Sites have been identified through a number of different methods including the HELAA (2016), a call for sites and officer assessments. Approximately 517 sites were identified initially. These sites were subject to a three stage assessment process to filter out those that were not sustainable and/or deliverable:

Stage 1: Sites were excluded where there were clear conflicts with national planning policy and/or any insurmountable environmental or physical constraints. The following sites were excluded: sites with SAC or SSSI designations covering more than 80% of the site area; greenfield sites in Flood Zone 3b; sites of less than 0.25ha in area; sites at an advanced stage in the planning process (development commenced).

Stage 2: Sites were assessed against the Local Plan 2036 sustainability appraisal objectives. The following sites were excluded: sites identified for protection as

green infrastructure; sites where vehicle access could not be achieved; sites subject to excessive noise; cemeteries.

Stage 3: The deliverability of sites was assessed based on their broad suitability, availability and achievability. The following sites were excluded: sites considered extremely unlikely to become available during the plan period; sites with no landowner intention to develop; sites where development would conflict with the NPPF/ Oxford Local Plan 2036 strategy.

19. Following the three stage site assessment process, 97 sites remained that are considered for allocation at the preferred options stage. The level of flood risk on each of these sites has been assessed by comparing the sites to flood zone maps prepared as part of the SFRA. The table in **Appendix 1** lists each site with its level of identified flood risk. It should be noted that flood zones are not mutually exclusive because they overlap. Any area that is in Flood Zone 3b is also in Flood Zone 3a and Flood Zone 2, any land in Flood Zone 3a is also in Flood Zone 2. This is important when calculating the percentage of a site within any given flood risk zone. For example a site that is 5% in Flood Zone 3b, 15% in Flood Zone 3a and 5% in Flood Zone 2 would be 20% Flood Zone 3a and 25% Flood Zone 2 and as such considered as being Flood Zone 3a for the purposes of the sequential test.

20. Sites are classed as being within the highest risk flood zone present on the site. However, for the purpose of the sequential test, if the proportion of the site in the highest risk Flood Zone is less than 20%, it should be classed as being within the next lowest area of flood risk that covers more than 20% of the site. This approach was agreed with the Environment Agency for the Sequential Test in plan making. This is different to the approach used to assess whether a Flood Risk Assessment is required for a planning application, or for identifying whether the exceptions test will need to be passed for a planning application, where the formal classification of the site will remain as the area of highest Flood Risk found on the site.

STAGE C: APPLICATION OF THE SEQUENTIAL TEST

Calculating potential housing capacities on sites taken forward to the preferred options

21. At Stage A it was identified that Oxford has a huge need for new housing and that the Local Plan preferred option is to boost housing delivery in the city. Where sites have been identified as having potential to be allocated for residential uses, or for a mix of uses that includes residential, an estimate of their housing capacity is also provided in **Appendix 1.**

22. The housing capacity of many of the sites has already been estimated in the HELAA (2016). However, it should be noted that the HELAA was published prior to the preferred options for the new Local Plan 2036 being developed. Therefore some of the assumptions that fed into the capacity calculations in the HELAA (such as open space provision, outside space

requirements, heights and so on) may not reflect the Local Plan Preferred Options. Whilst the HELAA is expected to be re-done later in 2017 to reflect the new Local Plan 2036 strategy, to enable the sequential test to be carried out at this stage an additional 5% has been added to housing capacity estimates to reflect the preferred options' aim to maximise housing delivery (unless a site already has planning permission or is highly constrained). For consistency, where new sites have been identified that were not included in the HELAA, the HELAA capacity methodology has been applied (median densities by site type) and an additional 5% added.

23. In 2014 the Planning Practice Guidance (PPG) introduced that student accommodation could be counted in housing land supply figures based on the amount of accommodation it releases in the housing market. The question of the 'amount of accommodation it releases in the market' is not defined in the PPG and it is up to local authorities to determine this based on local circumstances. Estimates based on typical house sizes in Oxford and data on HMO occupancy rates suggests that houses in Oxford, when occupied by students that house share, may contain between four and six students per house. Taking the mid-point of five, it is reasonable to assume that developing five student rooms would release the equivalent of one dwelling in the housing market. This is the approach taken in the HELAA and that has been continued in **Appendix 1**.

24. In 2014 the PPG also introduced that care homes could be counted in housing land supply figures. The PPG does not provide any methodology as to how they should be counted. The approach used in the HELAA was to consider care home rooms in a similar way to student accommodation, as in how many dwellings a care home would release in the housing market. The City Council has taken the approach that one room in a C2 care home would on average release one dwelling in the housing market. Therefore where a residential care home is likely to be developed on a site, or where one has been completed, a 1:1 ratio of rooms to dwellings delivered will be applied. This approach has also been continued in **Appendix 1**.

25. A number of preferred options include housing as only one of a list of uses expected, for example on hospital sites such as the John Radcliffe and Churchill. If housing comes forward it will only be on a small part of the site. In these cases a notional estimate of the amount of housing has been made to reflect the specifics of the site.

26. It is important to note that the predicted housing capacities are only broad estimates for the purposes of the sequential test. A detailed analysis has not been made so capacities estimated should not be assumed to be acceptable if they came forward in a planning application. Any capacity stated does not prejudice any decision made by the Council on a planning application.

Estimating the amount of housing that could be delivered in each flood zone and comparison with Local Plan requirements

27. Appendix 1 lists available sites by flood risk zone. Table 2 summarises the information in Appendix 1 and shows the quantum of housing development that can be provided on sites in Flood Zone 1, and whether this provides enough housing or whether sites in higher risk areas need to be considered.

Table 2: Site capacity by flood zone

Flood Zone	Capacity of sites considered for allocation in the Local Plan 2036 (Appendix 1)	Area Action Plan (AAP) sites[3]	Total capacity (C3 dwellings)[4]	Cumulative capacity across flood zones (C3 units)
Flood Zone 1	4895	1,385	6280	6280
Flood Zone 2	22	0	22	6302
Flood Zone 3a	260	750	1010	7312
Flood Zone 3b	296	0	296	7608

28. The maximum estimated amount of new housing that could be delivered on sites in Flood Zone 1 is likely to be 4895 dwellings, which would not meet the approximate housing need (13,000 dwellings) as identified at Stage A. Adding to this, the sites that could be delivered in Flood Zone 2 gives a cumulative total of 6302 dwellings which would also not meet Oxford's housing need. This justifies looking at sites in Flood Zone 3a. Including sites in Flood Zone 3a still leaves a shortfall of 5392 dwellings. There is therefore a need to consider some brownfield sites in Flood Zone 3b. This is necessary due to the limited number of sites that are available in Oxford and the significant housing need.

Potential to locate more vulnerable uses on lower flood risk sites

29. Sites in Flood Zone 1 are suitable for all types of development and can be said to pass the sequential test. If allocations are needed on sites outside of Flood Zone 1, another important part of the sequential test is identifying whether more vulnerable uses proposed in a higher risk flood zone can be swapped with less vulnerable or water-compatible uses in a lower risk flood zone.

30. **Appendix 1** shows the flood risk vulnerability classification of proposed uses for sites in Flood Zone 1. It shows that the majority of the preferred uses in Flood Zone 1 are more

[3] This includes the Barton AAP (planning permission for 885 dwellings in Flood Zone 1), the Northern Gateway AAP (expected to deliver 500 dwellings in Flood Zone 1) and the West End AAP (expected to deliver 750 dwellings in Flood Zone 3a).

[4] Where student housing or care homes are identified as preferred uses a 'dwelling equivalent' figure has been used based on the ratios set out in paragraphs 23 and 24.

vulnerable uses. Where a less vulnerable use is the preferred option, a brief explanation is given in the table as to why a more vulnerable use would not be prioritised given the Local Plan 2036 spatial strategy.

STAGE D: ASSESS RISK OF FLOODING FROM OTHER SOURCES

31. The PPG states that, for the purposes of applying the NPPF, flood risk should be interpreted of as a combination of the probability and the potential consequences of flooding from all sources, including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources. Within each flood zone, surface water and other sources of flooding also need to be taken into account in applying the sequential approach to the location of development.

32. The Flood Zones identified in the SFRA and subsequently applied in **Appendix 1** are based on flood risk from fluvial sources. The SFRA identifies fluvial sources as the primary source of flood risk in Oxford in terms of both flooding extent and the number of properties at risk. However, it is important that the risk of flooding from other sources is also considered (although data for other flood risk sources may not be as reliable).

33. In addition to fluvial flood risk, the SFRA also considers:

    Ordinary watercourses - There are a number of ordinary watercourses in Oxford that are not included in either the Environment Agency's fluvial flood maps or the existing hydraulic models for Oxford. However, they still have the potential to contribute to overall flood risk in Oxford and thereby represent a separate flood risk. However there is a lack of reliable data relating to flood risk associated with ordinary watercourses and therefore it is difficult to make any site specific judgements on this issue alone.

    Surface water flooding - Surface water flooding is often the result of high peak rainfall intensities and insufficient capacity in the sewer network. Surface water flooding is a significant flood risk in an urban area like Oxford due to the high proportion of impermeable surfaces that cause a significant increase in runoff rates and consequently the volume of water that flows into the sewer network.

    The SFRA is clear that, due to accuracy levels, available data relating to surface water flood risk should be used at the strategic planning level only. Therefore it is not possible to assess surface water flood risk to individual sites. However, all sites greater than 1 hectare or in Flood Zone 2 or above will be required to produce a site specific Flood Risk Assessment to assess the risk from surface water flooding at the detailed planning application stage.

    Reservoir flooding - Oxford is located in an area considered to be at risk from reservoir flooding associated with potential failure of the Farmoor Reservoir, approximately 6 miles to the west of the city. In the event of the reservoir failing, water is likely to spill directly into the Thames valley and flow downstream. As a result, the areas likely to be affected in Oxford are those on the River Thames floodplain, including Wolvercote, New Botley, New Osney,

Grandpont, and New Hinksey. However, reservoir failure is considered to be an extremely rare event with a very low probability of occurrence. Current reservoir regulation aims to ensure that all reservoirs are properly maintained and monitored in order to detect and repair any problem. Therefore the risk of reservoir flooding should not influence the site allocations process.

Oxford Canal - Given the proximity of the Oxford Canal to other watercourses in the centre of the town, flooding from the canal should be recognised as a potential risk. However, British Waterways have not identified any historical occurrences of flooding or flood risk within the city limits.

Ground water flooding - The majority of areas at risk from groundwater flooding tend to be in the low lying parts of Oxford that are also subject also to fluvial flood risk. There is a lack of reliable data relating to groundwater flooding and therefore it is difficult to make any site specific judgements on this issue alone.

Sewers and drainage systems (Thames Water) – The SFRA retains the assumption that the surface water flood risk from the surface water sewer network in Oxford is low. It is suggested that foul sewer flooding is primarily a result of operational issues such as sewer blockages, although there are areas where sewers are overloaded during significant rainfall events. Thames Water is working to reduce the risk of sewer flooding in Oxford as part of a £9 million project. There is insufficient data available to assess the flood risk resulting from sewers and drainage systems to individual sites.

STAGE E: THE EXCEPTIONS TEST

34. The Exception Test, as set out in paragraph 102 of the NPPF, is a method to demonstrate and help ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

35. There are two parts to the Exceptions Test:
    i. It must be shown that wider sustainability benefits to the community outweigh flood risk; and
    ii. It must be shown that development will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall. An SFRA (Level 2) is required to inform this assessment.

36. The PPG sets out when the Exception Test should be applied. Development of sites in Flood Zone 3a proposed for more vulnerable uses such as housing will require an Exceptions Test. In addition, where previously developed sites in Flood Zone 3b are proposed, an exceptions test will also be required. The Exceptions Test will be carried out to inform the Draft Local Plan.

Appendix 1

HELAA Ref	Site	Site area (ha)	Proportion of site within flood zone			Flood Zone for seq. test	Preferred option	Flood risk vulnerability classification of proposed use	Opportunities to swap with a more vulnerable use/higher priority use?	Potential site housing capacity*
			%2	%3a	%3b					
Flood zone 1										
006	Banbury Road University Sites	3.07	0	0	0	1	Academic, student and staff accommodation	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	80
009	Blackbird Leys Central Area	8.1	0	0	0	1	Mixed use 'town centre' uses and housing	Potential for a mix of more vulnerable and less vulnerable uses	The Local Plan 2036 strategy is to encourage a range of uses in district centres to support their vitality and viability as sustainable hubs for local communities.	300
012	Churchill Hospital and Ambulance Resource Centre	22.74	0	0	0	1	Hospital related uses and: employment; academic; hotel; primary health care; education; staff accommodation; housing; student accommodation.	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	136
014	Cowley Centre (Templars Square)	3.65	0	0	0	1	Retail; housing; town centre uses	Mix of more vulnerable and less vulnerable uses	The Local Plan 2036 strategy is to encourage a range of uses in district centres to support their vitality and viability as sustainable hubs for local communities.	225
016	Cowley Marsh Depot, Marsh Road	1.71	0	0	0.1	1	Relocate depot to new site. Housing.	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	80
018	Diamond Place and Ewert House	1.73	0	0	0	1	Retail; health centre; community and leisure facilities; housing; public car parking (Diamond Place SPD).	Mix of more vulnerable and less vulnerable uses	The site is located within Summertown district centre. The Local Plan 2036 strategy is to encourage a range of uses in district centres to support their vitality and viability as sustainable hubs for local communities.	130
021	Faculty of Music, St. Aldate's	0.33	0	0	0	1	Housing and student accommodation with academic	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	8
024	Government Buildings and Harcourt House, Marston Road	2.37	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	70

Appendix 1

HELAA Ref	Site	Site area (ha)	Proportion of site within flood zone			Flood Zone for seq. test	Preferred option	Flood risk vulnerability classification of proposed use	Opportunities to swap with a more vulnerable use/higher priority use?	Potential site housing capacity*
			%2	%3a	%3b					
026	Jesus College Sports Ground, Herbert Close	0.55	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	28
027	John Radcliffe Hospital Site	27.75	0	0	0	1	Hospital related uses and: employment; academic; hotel; primary healthcare; education; staff accommodation; housing; student accommodation.	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	180
028	Kassam Stadium and surrounding area	11.23	0	0	0.007	1	Stadium; housing; public open space; commercial leisure; education; small-scale local shops.	Mix of more vulnerable, less vulnerable and water compatible uses	The site includes an existing stadium which is in use and could not be easily relocated. The additional uses proposed are to help make a more efficient use of parts of this brownfield site.	150
031	Land off Manor Place	1.24	9.15	0	0	1	Housing (car free); student accommodation	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	40 (or 200 student rooms)
032	Lincoln College Sports Ground	2.35	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	90(removes 10% for public open space)
034	Littlemore Park, Armstrong Road	5.44	0	0	4.97	1	Housing (outline planning permission granted for up to 270 dwellings); employment	More vulnerable	More vulnerable use. Not possible to provide in Flood Zones 1 or 2. Exception Test required.	270
038	Nielsens, London Road	4.85	0	0	0	1	Housing; care accommodation (provided existing number of employees retained)	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	200 (accounting for re-provision of employment space (20%) and 10% for Public open space)
039	Northfield Hostel, Sandy Lane West	0.7	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	35

Appendix 1

HELAA Ref	Site	Site area (ha)	Proportion of site within flood zone			Flood Zone for seq. test	Preferred option	Flood risk vulnerability classification of proposed use	Opportunities to swap with a more vulnerable use/higher priority use?	Potential site housing capacity*
			%2	%3a	%3b					
042	Nuffield Orthopaedic Centre	8.38	0	0	0	1	Healthcare and medical research Employer linked housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	25
043	Old Road Campus	6.41	0	0	0	1	Medical teaching and research	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	0
044	Oriel College land at Edward Street and High Street	0.27	0	0	0	1	B1 office; student accommodation; A uses ground floor	Mix of more vulnerable and less vulnerable uses	The site is located within the city centre. The Local Plan 2036 strategy is to encourage a range of uses in the city centre to support its vitality and viability.	7 (resi on upper floors – remainder for retail)
049	Oxford University Press Sports Ground, Jordan Hill	3.66	0	0	0	1	Housing (if sports facility replaced)	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	55
054	Ruskin College Campus, Dunstan Road	1.86	0	0	0	1	Academic; student accommodation; housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	10
058	Temple Cowley Pools	0.51	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	48
060	Travis Perkins, Chapel Street	0.72	0	0	0	1		More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	24
061	Union Street Car Park	0.26	0	0	0	1	Housing; student accommodation	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	20 (allowing space for car park)
062	University of Oxford Science Area & Keble Road Triangle	12.41	0	0	0	1	Academic and research; student accommodation	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	50 student rooms (equivalent to 10 homes)
063	Warneford Hospital	8.78	0	0	0	1	Healthcare related uses; housing; student accommodation; hospital and medical research; B1(a) and B1(b); academic	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	75.

Appendix 1

HELAA Ref	Site	Site area (ha)	Proportion of site within flood zone			Flood Zone for seq. test	Preferred option	Flood risk vulnerability classification of proposed use	Opportunities to swap with a more vulnerable use/higher priority use?	Potential site housing capacity*
			%2	%3a	%3b					
							institutional; education.			
064	Warren Crescent	0.37	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	10
065	West Wellington Square	0.88	0	0	0	1	Housing; student accommodation; academic uses	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	140 student units (equivalent to 28 homes)
067	Wolvercote Paper Mill	4.96	0.17	0	11	3a	Housing; employment; community facilities	Mix of more vulnerable and less vulnerable uses	N/A – Mix of more vulnerable and less vulnerable uses. Not possible to provide in Flood Zone 1. The PPG says Flood Zone 2 is acceptable.	190
081	Worcester Street Car Park	0.52	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	18
091	Keble College, former Acland Hospital, 46 Woodstock Rd, 25 Banbury Rd	0.61	0	0	0	1	Housing; student accommodation; academic uses	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	50 (or 250 student rooms)
095	Between Towns Road	0.57	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	29
104	Former Iffley Mead Playing Field	2.04	0	0	0	1	School; housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	84
107	Green Belt land St Frideswide Farm	3.95	0	0	0	1	Housing (Green Belt - exceptional circumstances will need to be demonstrated)	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	178
110	Speedwall House (west part)	0.38	0	0	0	1	Category 2 Employment Site Housing	Mix of more vulnerable and less vulnerable uses	N/A – Already a more vulnerable use in Flood Zone 1.	13
111	Oxford Stadium (former greyhound stadium)	3.37	0	0	0	1	Housing; community facilities; sports	Mix of more vulnerable and	The site currently provides sports and community facilities. These uses would	100

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			%2	%3a	%3b					
								less vulnerable uses	need to be retained on-site alongside any residential development as they are important to the character of the conservation area.	
112a1	Hill View Farm	3.52	0	0	0	1	Housing (Green Belt - exceptional circumstances will need to be demonstrated)	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	110
112b1	Land West of Mill Lane	1.99	0	0	0	1	Housing (Green Belt - exceptional circumstances will need to be demonstrated)	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	75
113	Green Belt land east of Redbridge Park and Ride	3.64	0.96	0.17	0	1	Housing, depot (Green Belt - exceptional circumstances will need to be demonstrated)	Mix of more vulnerable and less vulnerable uses	Housing is a more vulnerable use and it is appropriate to locate this in Flood Zone 1. The use of this site as a depot would not be justified according to the sequential test as this is a less vulnerable use that should be relocated to an area of higher flood risk.	162
114d	Marston Paddock	0.78	0	0	0	1	Housing (Green Belt - exceptional circumstances will need to be demonstrated)	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	39
117	Land north of St Clement's Church	1.61	2.25	0	0	1	Housing; Student accommodation	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	50
120	Unipart	30.63	0	0	0	1	Employment – Manufacturing (Category 1)	Less vulnerable?	N/A – Already a more vulnerable use in Flood Zone 1.	0
124	Slade House	1.68	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	84
125	Summer Field School athletics site	1.38	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	120

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HELAA Ref	Site	Site area (ha)	Proportion of site within flood zone			Flood Zone for seq. test	Preferred option	Flood risk vulnerability classification of proposed use	Opportunities to swap with a more vulnerable use/higher priority use?	Potential site housing capacity*
			%2	%3a	%3b					
173	Bayards Hill Primary School Playing Fields	1.89	0	0	0	1	Housing and public open space	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	35
216	Former Barns Road East Allotments	0.5	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	25
289	Sandy Lane Recreation Ground and land rear of Retail Park	5.14	0	0	0	1	Housing and open air sports	Mix of more vulnerable and water compatible uses	Housing is a more vulnerable use and it is appropriate to locate this in Flood Zone 1. The provision of open air sports relates to the retention of the majority of the existing recreation ground, which is needed in this location and could not be re-provided elsewhere.	120
329	Valentia Road Recreation Ground (part)	0.76	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	12
341	William Morris Close Sports Ground	1.24	0	0	0	1	Housing; replacement sports	Mix of more vulnerable and water compatible uses	Housing is a more vulnerable use and it is appropriate to locate this in Flood Zone 1. Replacement sports facilities may be provided on site or nearby. It is important to provide facilities in the area where they have been lost/are most needed. This means that it may not be possible to relocate them to a higher Flood Zone which would reduce capacity.	62
356	276 Banbury Road	0.351	0	0	0	1	Retail on ground floor; housing, student and office above	Mix of more vulnerable and less vulnerable uses	The site is located within Summertown district centre. The Local Plan 2036 strategy is to encourage a range of uses in district centres to support their vitality and viability as sustainable hubs for local communities.	35
389	Land at Meadow Lane	1.66	19.04	7.61	6.55	2	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	49
437	Stansfeld Outdoor Study Centre	0.414	0	0	0	1	Science education and innovation centre	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	0
438	Blanchford's Building	0.938	0	0	0	1	Housing	More	N/A – Already a more vulnerable use in	40

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HELAA Ref	Site	Site area (ha)	Proportion of site within flood zone			Flood Zone for seq. test	Preferred option	Flood risk vulnerability classification of proposed use	Opportunities to swap with a more vulnerable use/higher priority use?	Potential site housing capacity*
			%2	%3a	%3b					
	Merchants/Builders yard							vulnerable	Flood Zone 1.	
439	Oxford Brookes Marston Road Campus	1.18	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	59
440	1 Pullens Lane	0.423	0	0	0	1	Housing, care home	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	11 based on current planning application
463	Ruskin Field	4.7	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	40
467	Edge of Playing fields Oxford Academy	0.58	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	29
497	BMW – Mini Plant Oxford	69.9	0	0	0	1	Category 1 Employment site	Less vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	0
498	Broadfield House and Trinity Court 4 Between Towns Road	0.35	0	0	0	1	Remaining land to be developed	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	3
514	Magdalen Road and Newtec Place	0.39	0	0	0	1	Category 2 Employment site	Less vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	20
516	Powell's Timber Yard, 474 Cowley Road	0.34	0	0	0	1	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	17
560	Headington Hill Hall Site	5.74	0	0	0	1	Academic, student accommodation, sport and leisure	Mix of more vulnerable and less vulnerable uses	This is an existing university site which is currently in use. It could not be easily relocated. Development on this site would primarily be intensification.	100(500 student rooms)
569	Green Templeton College	1.59	0	0	0	1	Student accommodation with sports use	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	28 (140 student rooms)
570	Rewley Abbey Court	0.30	0	0	0	1	Student accommodation	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	30 (150 student rooms)
574	Manzil Resource Centre	0.75	0	0	0	1	Clinic and associated offices, housing, student	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	10

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HELAA Ref	Site	Site area (ha)	Proportion of site within flood zone			Flood Zone for seq. test	Preferred option	Flood risk vulnerability classification of proposed use	Opportunities to swap with a more vulnerable use/higher priority use?	Potential site housing capacity*
			%2	%3a	%3b					
							accommodation			
579	Radcliffe Observatory Quarter	4.29	0	0	0	1	Employment, academic, student accommodation, staff accommodation	Mix of more vulnerable and less vulnerable uses	This is an existing university site which is currently in use. It could not be easily relocated. Development on this site would primarily be intensification.	68
580	Summertown House	0.29	0	0	0	1	Housing and student accommodation	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	10
587	Oxford Business Park (whole site)	35.4	0	0	0	1	B1 office; B2 general industrial	Less vulnerable	This is an existing business park which is currently in use and is a protected key employment site. It is of strategic importance and could not be easily relocated. The Local Plan 2036 strategy is to protect and intensify uses on existing employment sites.	0
590	Pear Tree Farm	2.01	0	0	0	1	Housing(Green Belt - exceptional circumstances will need to be demonstrated)	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	122
593	Knights Road	2.33	0	0	5	1	Housing	More vulnerable	More vulnerable use. Not possible to provide in Flood Zones 1 or 2. Exception Test required.	80
597	Northgate House, 13-120 Cornmarket Street	0.96	0	0	5	1	Student housing	Mix of more vulnerable and less vulnerable uses	More vulnerable use. Not possible to provide in Flood Zones 1 or 2. Exception Test required.	14 (68 student rooms)
595	OBU Student Village (Former Morrell Hall Site)	4.31	0	0	0	1	Student housing	Mix of more vulnerable and less vulnerable uses	N/A – Already a more vulnerable use in Flood Zone 1.	120
594	Somerville College	2.02	0	0	0	1	Student housing	Mix of more vulnerable and less vulnerable uses	N/A – Already a more vulnerable use in Flood Zone 1.	20 (102 student rooms)

Appendix 1

HELAA Ref	Site	Site area (ha)	Proportion of site within flood zone			Flood Zone for seq. test	Preferred option	Flood risk vulnerability classification of proposed use	Opportunities to swap with a more vulnerable use/higher priority use?	Potential site housing capacity*
			%2	%3a	%3b					
600	Student Castle, Osney Lane	0.91	0	0	0	1	Student housing	Mix of more vulnerable and less vulnerable uses	N/A – Already a more vulnerable use in Flood Zone 1.	100
Flood zone 2										
106	Grandpont Car Park	0.44	82.75	0	0	2	Housing	More vulnerable	N/A – Already a more vulnerable use in Flood Zone 1.	22
Total in flood zone 2										**22**
Flood zone 3a										
013	Court Place Gardens, Iffley Village	3.89	16.31	14.17	13.16	3a	Staff accommodation	More vulnerable	N/A – More vulnerable use. Not possible to provide in Flood Zone 1. The PPG says Flood Zone 2 is acceptable.	100
462	Park Farm, Marston	1.56	85.34	26.12	0.07	3a	Housing	More vulnerable	More vulnerable use. Not possible to provide in Flood Zones 1 or 2. Exception Test required.	58
070	Island Site (Park End Street/Hythe Bridge Street)	0.69	0	47.3	11	3a	Category 2 employment site; housing	More vulnerable	More vulnerable use. Not possible to provide in Flood Zones 1 or 2. Exception Test required.	50
008	Bertie Place Recreation ground and land behind Wytham Street	3.27	75.66	43.59	3.45	3a	Primary school or housing	Mix of more vulnerable and less vulnerable uses	N/A – More vulnerable use. Not possible to provide in Flood Zone 1. PPG says Flood Zone 2 is acceptable.	30
011	Canalside Land, Jericho	0.5	78.17	27.91	12.39	3a	Housing, community centre, boatyard (Jericho Canalside SPD)	Mix of more vulnerable, less vulnerable and water compatible uses	More vulnerable use. Not possible to provide in Flood Zones 1, 2 or 3a. Exception Test required.	22
Total in flood zone 3a										**260**
Flood zone 3b										
586	Osney Mead (whole site)	17.45	82.27	55.64	28.29	3b	Housing, student accommodation,	Mix of more vulnerable, less	More vulnerable use. Not possible to provide in Flood Zones 1 or 2. Exception	280

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HELAA Ref	Site	Site area (ha)	Proportion of site within flood zone			Flood Zone for seq. test	Preferred option	Flood risk vulnerability classification of proposed use	Opportunities to swap with a more vulnerable use/higher priority use?	Potential site housing capacity*
			%2	%3a	%3b					
							employment, retail, academic, primary healthcare, hospital/medical research, hotel, community/cultural facilities, open space	vulnerable and water compatible uses	Test required.	
592	St Catherine's College	0.52	40.28	27.15	22.85	3b	Academic and student accommodation (Green Belt - exceptional circumstances will need to be demonstrated)	More vulnerable	N/A – More vulnerable use. Not possible to provide in Flood Zone 1. PPG says Flood Zone 2 is acceptable.	16 (78 student rooms)
Total in flood zone 3b										**296**

* Capacity data from the HELAA 2016 (Appendix B) has been used where possible, with an additional 5% added to capacity estimates to reflect the preferred options' aim to maximise housing delivery. Where capacity information is not provided in the HELAA, an estimation of approximate site capacity has been made by officers using the same methodology. This is a rough estimate and does not assume this capacity would be acceptable nor prejudice any decision by the City Council.