Flood Risk Addendum – July 2025

1.1 This paper provides additional context for the consideration of flood risk, based on the discussions during the Examination Stage 1 Hearings.

2.0 Policy Framework

2.1 The NPPF sets out that:

167. All plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:

a) applying the sequential test and then, if necessary, the exception test as set out below;

b) safeguarding land from development that is required, or likely to be required, for current or future flood management;

c) using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding, (making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management); and

d) where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations.

168. The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.And:

2.2 Planning Practice Guidance sets out the following:

The sequential approach to the location of development

The approach is designed to ensure that areas at little or no risk of flooding from any source are developed in preference to areas at higher risk. This means avoiding, so far as possible, development in current and future medium and high flood risk areas considering all sources of flooding including areas at risk of surface water flooding. Avoiding flood risk through the sequential test is the most effective way of addressing flood risk because it places the least reliance on measures like flood defences, flood warnings and property level resilience

features. Even where a flood risk assessment shows the development can be made safe throughout its lifetime without increasing risk elsewhere, the sequential test still needs to be satisfied. Application of the sequential approach in the plan-making and decision-making process will help to ensure that development is steered to the lowest risk areas, where it is compatible with sustainable development objectives to do so, and developers do not waste resources promoting proposals which would fail to satisfy the test. Other forms of flooding need to be treated consistently with river and tidal flooding in mapping probability and assessing vulnerability, so that the sequential approach can be applied across all areas of flood risk.

Paragraph: 023 Reference ID: 7-023-20220825

2.3 The SFRA Level 1 Addendum states in section 3.1 that:

All sources of flood risk can potentially be included in the sequential test including surface water, groundwater, sewer flooding and reservoir flooding (or other water impounding features).

3.0 Where the SFRA 2024 deals with surface water and groundwater flooding

SFRA L1 Addendum

3.1 Section 10 sets out:

This Level 1 SFRA identified potential development sites across St Albans which fall within areas of flood risk. Due to these findings, a Level 2 SFRA has been carried out to further assess the flood risk at those sites proposed for development to inform the exception test.

3.2 Paragraph 10.1.1 provides the methodology and states that:

To identify the sites to be taken forward for Level 2 assessment, the following screening process was undertaken:

- *All promoted sites were screened through JBA's FRISM software to identify fluvial, surface water, and reservoir risks to the site. The outputs of this FRISM screening are shown in Appendix Q.*
- *SADC identified the sites assessed as potentially suitable for development through the latest Housing and Economic Land Availability Assessment (HELAA) from all sites put forward through the 'Call for Sites' process and previous SHLAA process from 2016-2019.*
- *A high-level assessment of flood risk was then undertaken using the sites put forward by SADC as potentially suitable for development.*
- *All sites were assessed against the criteria set out in the Level 1 SFRA which sets out risk parameters for all sources of flooding: Site is within Flood Zone 1:*
    - *Site is within Flood Zone 1*
    - *Site is not within Flood Zone 3a plus climate change*

- *Site is <10% at risk from surface water flooding in the 1 in 1000-year event*
- *Site is <10% within highest risk category in JBA Groundwater map (groundwater is <0.025m below the surface in the 1 in 100-year event).*
- *Site is <25% within second highest risk category in JBA Groundwater map (groundwater is between 0.025m and 0.5m below the surface in the 1 in 100-year event)*
- *Site is not within the Historic Flood Map*
- *Site is not at risk of reservoir flooding*

- *A more conservative approach was taken for sites with marginal risk (between 5-10% coverage on a site) but significant surface water flow paths in the 0.1% AEP event. Sites were visually assessed to determine whether the site can be developed around the areas of risk, particularly if safe access or egress could be determined. If this is not the case, these were also highlighted for Level 2 assessment. All sites were also assessed for groundwater and reservoir risk against the criteria above, further sites were highlighted for Level 2 assessment*

3.3 For surface water the SADC SFRA report states at section 3.3.2 Flood Zones – other sources of flooding (page 26) (underlining added):

The available surface water mapping is most comparable [to fluvial flood risk]*, but it does not strictly describe the same conceptual risk zone as is defined for river and sea flooding (even though it is notionally associated with the same probability) as the mapping is based on different assumptions. However, it does result in a product that can accommodate sequential testing, as it can facilitate strategic decisions that direct development to land with lower risk of surface water flooding. Using this mapping, it is not anticipated that the sequential test for surface water would normally require alternative sites at lower risk to be considered, because the widespread and dendritic nature of surface water flood risk differs conceptually to river and sea flood risk. However, in some circumstances, for example, for relatively small sites that are potentially substantially affected by surface water, alternatives sites may be considered.*

3.4 The SFRA Level 1 Addendum makes clear at section 3.4 which flood risk event should be used to assess whether a site is safe from flood risk over its lifetime:

The fluvial/surface water 1% AEP + climate change flood event is a key event to consider because the National Planning Policy Guidance refers to this as the 'design flood' against which the suitability of a proposed development should be assessed and mitigation measures, if any, are designed.

3.5 It should be noted that a 1% AEP + climate change is a 1 in 100 chance each year.

4.0 Consideration of Surface Water Flood Risk in The Flood Risk Sequential and Exception Test

4.1 The Flood Risk Sequential and Exception Test 2024 (SET) (SADC/ED64) consideration of non-fluvial sources of flood risk was aligned with the approach set out in the SFRA Level 1 Addendum and summarised above:

it is not anticipated that the sequential test for surface water would normally require alternative sites at lower risk to be considered, because the widespread and dendritic nature of surface water flood risk differs conceptually to river and sea flood risk.

4.2 For this reason the surface water flood risk was treated within the Flood Risk Sequential and Exception Test 2024 (SADC/ED64) (SET) as a factor that could be managed on-site. For sites where the proportion of surface water flood risk is low the development can be directed away from areas at risk, along with the inclusion of design features such as raising ground levels, raising floor levels, and Sustainable Drainage Systems (SuDS).

4.3 The SFRA Level 1 Addendum does go on to state, as summarised above and provided again here that:

in some circumstances, for example, for relatively small sites that are potentially substantially affected by surface water, alternatives sites may be considered

4.4 Small sites with a high proportion of surface water flood risk will therefore be considered further in detail below.

5.0 Sites with High Risk of Surface Water Flooding

5.1 It is the case that there are no broad locations or large sites where there is a high surface water flooding risk over a significant part of the site, i.e. they are all less than 10%.

5.2 Furthermore, for sites above 0.4ha an assumption is made that not all of the site will be used for residential, with a proportion required to provide infrastructure, main roads, open space and public facilities. Generally, as a site's area increases so does the need for additional infrastructure and this reduces the proportion of developable area within a site. The gross to net ratios is based on best practice guidance which presents a range of ratios to use. For larges sites of above 2ha 40% of the site will not be used for residential and it is considered that areas such as green spaces can be located where there is identified risk of surface water flooding. The HELAA Report (2021) (HELAA 01.01) explains this in paragraphs 3.29 – 3.32, and sets out the following ratios:

Site Area (hectares)	Gross to net ratio)
Sites up to 0.4ha	100%
Sites between 0.4 to 2ha	85%
Sites greater than 2ha	60%

5.3 There are no sites from 0.4ha to 2ha where more than 10% of the site is at risk of surface water flooding at 1% AEP. There is one allocated site greater that 2ha where more than 10% of the site is at risk of surface water flooding at 1% AEP; this is site M6 South of Harpenden Lane with 22% of the site at this level of flood risk. The indicative housing capacity for this site has already been reduced to take account of the proportion of the site subject to flood risk.

5.4 There are 10 smaller sites where risk of surface water flooding is 10% or more of the area and these are set out in the Table 1 below. Each of these sites underwent a SFRA Level 2 assessment that are published in the Examination Library. Where the proportion of site subject to surface water flood risk is above 10% and where, if this proportion of the site was removed from the indicative housing capacity, then the capacity would fall below the minimum 5 homes threshold, then the site allocations may need to be reconsidered.

Table 1

Site ref	Site	Surface Water Flood Risk (1 in 100 year)	No. of homes current Part B allocation	Adjusted capacity after removal of Surface Water Flood Risk area	No. of homes after adjustment and removal of sites falling below minimum 5 unit threshold
UC8	Public Hall, 6 Southdown Road, Harpenden, AL5 1TE *	17%	24	19	19
UC17	Garage Block off Cotlandswick, London Colney, AL2 1ED	10%	5	5	5
UC24	Garages Rear of Hill End Lane	41%	8	5	5
UC32	Garages off Creighton Avenue, St Albans, AL1 2LZ **	14%	5	5	5
UC36	Garages off Park Street Lane, Park Street, AL2 2ND	20%	5	4	0
UC43	Garage block to west of 32-46 Riverside Road, St Albans, AL1 1SD	52%	5	2	0
UC46	Garage Blocks adj. to 76 Oakley Road and 151 Grove	11%	6	5	5
UC53	Motor Repair Garage, Park Street Lane, Park Street	22%	11	9	9
UC55	44 – 52 Lattimore Road, St Albans	15%	15	13	13
UC58	Garage Block B off Cotlandswick, London Colney	31%	5	3	0

Total			**89**	**70**	**61**

* Site no longer available for residential use.

** A significant proportion of the site (33%) has already been removed from the capacity calculation, so the net effect is no reduction in capacity.

5.5 Table 1 shows that here is a potential impact of 28 fewer homes delivered from these sites.

6.0 Sites at a High Risk of Groundwater Flooding

6.1 The SFRA Level 1 Addendum states at Section 3.3.2, in relation to flood risk from groundwater, reservoirs and sewers report that:

It is not possible to prepare compatible reservoir flood risk, sewer flood risk or groundwater flood risk as the appropriate analyses and data is not available. The available mapping … does not describe a risk-based scenario, as they do not indicate the relative risk to land based on the probability and as such, these datasets do not provide a logical basis for zoning. The mapping could however be used to direct proposed new development away from locations that could potentially be affected by reservoir, groundwater or sewer flood risk. However, it is important to note that this is different to the risk pertaining to river and sea flooding and further assessment would be required to understand the magnitude of the potential hazard.

6.2 The SFRA Level 1 Addendum Appendix C SFRA User Guide (2024) (EDH 02.03) sets out details on groundwater flood risk:

Site is >10% within highest risk category in JBA Groundwater map (groundwater is <0.025m below the surface in the 1 in 100-year event)	Development might be appropriate but a site-specific FRA should consider groundwater risk. A high likelihood may mean infiltration SuDS are not appropriate and groundwater monitoring should be recommended.
Site is <10% within highest risk category in JBA Groundwater map (groundwater is <0.025m below the surface in the 1 in 100-year event)	Development is likely to be appropriate in this risk area, however as groundwater datasets are generally produced nationally it is recommended that ground investigations are carried out and reported on within a site-specific FRA where this is required (known to be a problem locally).
Applying the sequential and exception tests:	Mapping should be considered in conjunction with historic evidence of known problems - a site-specific FRA should consider overland flow paths once groundwater has emerged. It is unlikely that infiltration SuDS will be appropriate and groundwater monitoring should be recommended.

6.3 Those sites in Part B of the Draft Local Plan where more than 10% of the site is indicated as being at risk of groundwater flooding from 0 to 0.025m is shown in Table 2 below along with the proportion of the site removed from the overall site area during the calculation of the housing capacity. For the three sites with the

largest capacity the area removed is higher than the proportion of the site subject to groundwater flood risk.

Table 3

Site code	Site Name	Indicative no of homes	Groundwater Flood Map - Percentage of site 0 to 0.025m depth of water level below ground surface in 100 year event	Proportion of the site removed from the overall area to be built on due to the Gross to Net Ratio and development constraints	Explanation of the calculation	Capacity after groundwater area removed
M6	South of Harpenden Lane, Redbourn, AL3 7RQ	68	51%	86%	Total site 12.04ha; 10.04ha removed due to development constraints; of remaining 2ha, 0.3ha (15%) not built on due to 15% gross/ net ratio; total of 10.34ha (86%) not built on	68
M20	Lower Luton Road, Harpenden, AL5 5AF	25	58%	15%	15% of site not built on due to gross/ net ratio.	12
B5	Glinwell, Hatfield Road, St Albans, AL4 0HE	485	29%	47%	Total site 22.9ha; 2.7ha removed from site due to development constraints; of remaining 20.2ha 40% not built on 8.08ha; total 10.78ha (47%) not built on	485
P1	Smallford Works, Smallford Lane, AL4 0SA *	58	55%	57%	Total site 3.34ha; 0.94ha removed from site due to development constraints; of remaining 2.4ha 40% not built on 0.96ha; total 1.9ha (57%) not built on	58

* Site no longer considered to be available for residential use.

6.4 Table 2 above therefore shows groundwater flood risk to be manageable for three out of the four sites within the proportion of the sites identified for non-residential development. For site M20 Lower Luton Road, the potential proportion of the site vulnerable to groundwater flood risk would reduce the capacity of homes to 12, a fall of 13.

6.5 Table 3 below provides the SFRA Level 2 Guidance for site design and making development safe regarding groundwater.

Table 3

Site code	Site Name	JBA Groundwater Flood Map (depth of water level below ground surface in 100 year event Percentage of site 0 to 0.025m	SFRA Level 2 –Guidance for site design and making development safe regarding Groundwater
M6	South of Harpenden Lane, Redbourn, AL3 7RQ	51%	• Mitigation for seasonal high groundwater levels must be considered (for example by raising finished floor levels to an appropriate height above ground level). • Due to the high groundwater flood risk for most of the site, basements are not advised. • The design of SuDS schemes must consider the seasonally high groundwater table
M20	Lower Luton Road, Harpenden, AL5 5AF	58%	• Mitigation for seasonal high groundwater levels must be considered (for example by raising finished floor levels to an appropriate height above ground level). • Due to the high groundwater flood risk, basements are not advised. • The design of SuDS schemes must consider the seasonally high groundwater table. Infiltration techniques may be ineffective and may pose a pollution risk. SuDS may need to be shallow and take up larger areas. Above ground conveyance and attenuation can be used but care must be taken that groundwater does not enter the SuDS feature and reduce the storage capacity and structural integrity of the design.
B5	Glinwell, Hatfield Road, St Albans, AL4 0HE	29%	• Mitigation for seasonal high groundwater levels must be considered (for example by raising finished floor levels to an appropriate height above ground level). • Due to the high groundwater flood risk, basements are not advisable. • The design of the development and its SuDS schemes must consider the seasonally high groundwater table. Infiltration techniques may be ineffective and may pose a pollution risk. SuDS may need to be shallow and take up larger areas. Above ground conveyance and attenuation can be used but care must be taken that groundwater does not enter the SuDS feature and reduce the storage capacity and structural integrity of the design.
P1	Smallford Works, Smallford Lane, AL4 0SA	55%	• Mitigation for seasonal high groundwater levels must be considered (for example by raising finished floor levels to an appropriate height above ground level). • Due to the high groundwater flood risk, basements are not advisable. • The design of the development and its SuDS schemes must consider the seasonally high groundwater table. Infiltration techniques may be ineffective and may pose a pollution risk. SuDS may need to be shallow and take up larger areas. Above ground conveyance and attenuation can be used but care must be taken that groundwater does not enter the SuDS feature and reduce the storage capacity and structural integrity of the design.

7.0 Conclusions

7.1 The application of the sequential test is on all types of flood risk. SADC's SFRA Level 1 Addendum (2024) carried out a screening exercise on the sites for potential allocation in the draft Local Plan which included flood risk from surface water and ground water.

7.2 As required by paragraphs 167 and 168 of the NPPF, the Council has done what is required to demonstrate the application of the sequential test on fluvial flood risk through the Flood Risk Sequential and Exception Test 2024 (SADC/ED64), and this has been acknowledge by the Environment Agency in their letter of 27.01.25 (SADC/ED65). There is no development proposed outside of fluvial Flood Risk Zone 1.

7.3 In terms of the risk of surface water flooding, the SRFA Level 1 Addendum states that '*it is not anticipated that the sequential test for surface water would normally require alternative sites at lower risk to be considered, because the widespread and dendritic nature of surface water flood risk differs conceptually to river and sea flood risk.'* and that '*in some circumstances, for example, for relatively small sites that are potentially substantially affected by surface water, alternatives sites may be considered.*' On this basis the approach to surface water flood risk for larger sites for the sequential test is that this type of flood risk can be managed on site through design and layout, and mitigation measures such as SuDS. It should be noted that surface water flood risk comprises less than 10% at each Broad Location site.

7.4 It is acknowledged for some small sites where the risk of surface water flooding comprises 10% or more of the site that this should have been taken into account in the sequential test. The potential impact is 28 fewer homes delivered from these sites.

7.5 Groundwater flood risk is shown to be manageable for three out of the four sites within the proportion of the sites identified for non-residential development. For site M20 Lower Luton Road, Harpenden, the potential proportion of the site vulnerable to groundwater flood risk would reduce the capacity of homes to 12, a fall of 13.

7.6 To apply an approach consistent with that for fluvial flooding, such that no development takes place in areas at medium or high risk of flooding, the following sites would either need to be removed from the Plan, or have their capacity reduced as follows:

- UC8, Public Hall, 6 Southdown Road, Harpenden – reduce from 24 to 19 units *
- UC24, Garages Rear of Hill End Lane – reduce from 8 to 5 units
- UC36, Garages off Park Street Lane, Park Street – remove site
- UC43, Garage block to west of 32-46 Riverside Road, St Albans – remove site

- UC46, Garage Blocks adj. to 76 Oakley Road and 151 Grove – reduce from 6 to 5 units
- UC53, Motor Repair Garage, Park Street Lane – reduce from 11 to 9 units
- UC55, 44 – 52 Lattimore Road, St Albans – reduce from 15 to 13 units
- UC58, Garage Block B off Cotlandswick, London Colney – remove site
- M20, Lower Luton Road, Harpenden, AL5 5AF – reduce from 25 to 12 units.

* Site no longer available

7.7 Overall, the approach to flood risk has been an appropriate one that is in accordance with the NPPF, NPPG and good practise. However, it is acknowledged that in relation to surface water and groundwater flooding a more appropriate approach as set out in this document should be taken. This would lead to the potential loss of home capacity of 41 homes from the relevant sites.