FAIRFORD NEIGHBOURHOOD PLAN

ADDITIONAL DOCUMENTATION
FNP4 SUPPORTING EVIDENCE

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FAIRFORD

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REFERENCES

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GCC Gloucestershire SUDS Design and Maintenance Guide (SDMG) [Report]. - Dec 2015.

GCC Local Flood Risk Management Strategy [Report]. - Summer 2014.

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JBA CDC's Strategic Flood Risk Assessment Report [Report]. - 2014.

NBS The SuDS Manual [Report]. - 2015.

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WRA Groundwater Monitoring and Review of Flood Risk at Fairford [Report]. - 2018.

1 FNP4 SUPPORTING EVIDENCE

This document contains the detailed evidence for the conclusions made in Policy FNP4 Managing Flood Risk.

1.1. **Residents' Feedback**: Residents' concerns on flooding and overloaded sewers came from the community consultation open day on 14th March 2019, and from the previous questionnaire.

1.2. **Legislation**: Gloucestershire County Council (GCC) was made the Lead Local Flood Authority (LLFA) for Gloucestershire by the Flood and Water Management Act 2010. This gives it responsibility for managing local flood risk from surface water, groundwater and ordinary watercourses. The Act requires developers to include sustainable drainage systems (SuDS) where practicable in all new developments and ensure SuDS are built to a standard that will reduce flood risk and improve water quality. To minimise the impact of the development on the environment, surface water discharges from the site should not exceed the current run-off rate from the pre-developed condition. The Act also made the right to connect surface water run-off to public sewers conditional on meeting new standards.

GCC has produced a Local flood risk management strategy (LFRMS) (GCC, Summer 2014), a detailed Surface Water Management Plan (SWMP) (GCC, March 2015), and Gloucestershire SUDS Design and Maintenance Guide (SDMG) (GCC, Dec 2015).

The SDMG (3.2.3), states "*the geology around Fairford is complex and will require identification on site.*" and "*Areas of the Cotswolds can also be affected by a high water table, which should be investigated through infiltration testing.*" The SDMG also stresses (1.1) the importance of contacting the Planning Authority at an early stage in development so that pre-application talks can take place, and that detailed discussion of the proposal should take place during the design phase of the scheme, if an application is to be successfully approved. When designing SuDS (4.1.2) it is also important to consider the receiving watercourses and drainage systems, and overland flows to and from adjacent land. It must be demonstrated that the proposed development will mitigate flood risk from the existing adjacent land (if any) and will not increase flood risk at any other points upstream or downstream of the development. And (5.2) When considering the method of discharge the developer must establish the soil conditions and infiltration rates of the site at an early stage. Evidence of the site investigations (at locations and at an adequate depth of any proposed soakaway) must be provided. Appendix B 5 requires *Evidence that the site and SuDS will not become compromised by flooding from other sources and retains its capacity during the design rainfall events*.

Further information on SuDs is given in National Standards for SuDS (DEFRA, 2015)[1] and detailed in The SuDS Manual (NBS, 2015)[2], and EA SuDS Guidance (Environment Agency, 2005)[3]. There are many different SuDS methods, but all require space for surface water to run or soak into. CIRIA guidelines emphasise that effective SuDS infiltration schemes require that maximum groundwater levels are at least 1 m below the bottom of soakaways.

GCC Groundwater Intermediate Assessment (GIA) (Atkins, April 2015 p. 52) identifies Fairford as subject to groundwater flooding and noted that further housing development on sites with high groundwater level is likely to exacerbate the problem. P17 6.2 notes *Consideration should be given to areas identified as having granular superficial deposits, such as the sand and gravel deposits, during the planning process and for new developments which include the provision of infiltration SuDS. The superficial deposits might appear suitable for infiltration SuDS; however additional infiltration from such systems could result in raised groundwater levels and potential for groundwater flooding*. The water table is known to be significantly variable in Fairford and in parts close to (or above) the surface in wet seasons. This means that rain or surface water cannot be dealt with by soak-away methods and the consequential run-off is likely to increase flood risk elsewhere.

1.3. **National Planning Policy Framework (NPPF)**: The NPPF gives clear guidance on how flood risk issues should be dealt with at the planning stage. Local Planning Authorities (LPAs) are required to steer new development away from areas at highest risk (whether existing or in future) to areas with the lowest probability of flooding, using the sequential test (NPPF para 155). Para 156 states: "*Strategic policies should be informed by a Strategic Flood Risk Assessment and should manage flood risk from all sources. They should consider cumulative impacts …*". Para 163 states: "*When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment ….*".

NPPF stipulates a Sequential Test which looks at the risk of flooding of each site to enable planners to steer development to areas with the lowest probability of flooding. NPPF Planning Practice Guidance gives detailed steps which, in summary, are designed to ensure that if there are better sites in terms of flood risk, or a proposed development cannot be made safe, development should not be allocated or permitted, if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding.

NPPF Planning Guidance Paragraph: 080 Reference ID: 7-080-20150323 states *Particular types of sustainable drainage systems may not be practicable in all locations. It could be*

[1] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf

[2] https://www.thenbs.com/PublicationIndex/documents/details?Pub=CIRIA&DocID=314088

[3] https://www.gov.uk/government/publications/sustainable-urban-drainage-system-suds-techniques-hydraulic-structural-and-water-quality-issues

helpful therefore for local planning authorities (LPAs) to set out those local situations where they anticipate particular sustainable drainage systems not being appropriate.

1.4. **LPA Reports**: The 'Guidance for planners and developers' in the CDC SFRA Final Report (JBA, 2014) and the recommendations of the GCC SuDS Design and Maintenance Guide should be followed where practicable.

The SFRA describes Fairford as an "*Area Susceptible to Groundwater Flooding*" and makes particular recommendations for Fairford including "*More vulnerable development should be located in the areas of least flood risk through sequential design of the site*".

Under the GCC Local Flood Risk Management Strategy, authority for flood risk management for all except major developments is allocated to District Councils, which now have delegated powers for flood investigation, consents and enforcement. Cotswold District Council (CDC) is the authority for Fairford. CDC has produced two Strategic Flood Risk Assessments, a level 1 SFRA (Halcrow, 2008) and CDC SFRA Final Report (JBA, 2014). This report includes 'Guidance for planners and developers' and identifies areas, including Fairford, considered at higher risk of flooding from all sources, and requires that proposed development will mitigate flood risk from adjacent land and will not increase flood risk at any other points upstream or downstream of the development. The report makes many recommendations, including:

a. Developers should prepare a preliminary drainage strategy for the site at an early stage, Surface water drainage should be considered as early in the planning process as is feasible, and could be subject to planning conditions.

b. Section 6.3.1 p46 discusses development permitted in Flood Zone 1 areas. All development proposals should consider the sites' vulnerability to flooding from other sources as well as from fluvial flooding; their potential to increase flood risk elsewhere through the addition of impermeable surfaces and the effect of the new development on surface water runoff; their potential impact on other sources of flood risk such as the groundwater regime (specifically underground development) and the overland flow routes for surface water; and their potential impact on watercourses including those not considered in the Flood Zones.

c. For developments greater than one hectare in Flood Zone 1, a detailed Flood Risk Assessment (FRA) must be undertaken. It should assess risk from all sources of flooding (e.g. fluvial, surface water, sewer, and groundwater) for the lifetime of the development (accounting for climate change); should provide a detailed assessment of the risk using hydraulic modelling, surface water modelling or groundwater investigations as appropriate; should recommend mitigation measures in response to any identified flood risk; should sequentially design the site to locate the built element of the development away from the source of flood risk; and should substitute less vulnerable development types for those incompatible with the degree of flood risk. It should assess the impact of the proposed development upon surface water

drainage following any increase in impermeable area, including the potential impact on areas and receiving watercourses downstream.

d. For surface water, a FRA should consider how surface water will be managed on the development site. A preliminary drainage strategy should be fully outlined in the FRA, even at an outline application stage. Drainage strategies must consider the impact of climate change on rainfall intensity as outlined in NPPF Guidance. Site drainage should be to SuDS infiltration systems where practicable. Where it is not practicable to drain the entire site to infiltration systems, appropriate assessments should be carried out for green and brownfield developments. Appropriate space should be allocated within the site for SuDS, and developers must demonstrate that flood risk will not be increased elsewhere.

e. Developers should also be able to demonstrate that a proposed development does not adversely impact on the local groundwater regime. It is recommended that the FRA should propose a schedule to monitor groundwater levels from the conception to the completion of a proposed development.

f. For developments less than one hectare in Flood Zone 1 (section 6.3.1) - If a site within Flood Zone 1 has been identified by the SFRA as having a known drainage problem, or has experienced flooding from other sources, then a detailed FRA is required (as above). Additionally, for infiltration SuDS it is imperative that the water table is low enough and a site-specific infiltration test is undertaken.

g. For those proposed developments where no drainage issue is known, then a detailed FRA is not required. Nevertheless, the proposed development should include the appropriate application of sustainable drainage techniques to maintain, or preferably reduce, the existing runoff and flood risk in the area. There are many different SuDS techniques which can be implemented. The effectiveness of a flow management scheme within a single site is heavily limited by site constraints including (but not limited to) topography, geology (soil permeability), and available area, and groundwater levels. The design, construction, and ongoing maintenance regime of such a scheme must be carefully defined, and a clear and comprehensive understanding of the catchment hydrological processes (i.e., nature and capacity of the existing drainage system) is essential.

Since many Flood Zone 1 areas in Fairford are known to have surface water and or groundwater flooding in wet seasons, , it is important that the requirements for a FRA as detailed in the CDC SFRA should be strictly enforced. SuDS drainage using infiltration is unlikely to be feasible for those areas to the south and southeast of Fairford with high groundwater levels. Maximum ground water levels should therefore be considered for all developments and sufficient attenuation storage capacity provided where necessary and appropriately managed. This could include the management of levels and flows in and out of lakes at Horcott and to the south-east of Fairford. Proposals must consider the groundwater levels in the town as a whole, not just the immediate site, and should consider the cumulative effect, particularly on the Dudgrove Brook and Court brook catchments. Any development in Fairford should avoid decreasing floodplain storage.

1.5. **British Geological Society (BGS)**: The British Geological Survey (BGS) have produced a series of maps which provide information on the potential suitability of ground to accept infiltration from SuDS. Table 4 of the BGS document "Suitability of the subsurface for infiltration SuDS in Great Britain" (Dearden, 2011) indicates that in Gloucestershire, 81% of the area is compatible for infiltration SuDS (suitable for free-draining SuDS) if the system is carefully designed to meet local ground conditions; only around 20% of the area has significant constraints limiting infiltration SuDS. Fairford is included in the area with significant constraints.

1.6. **Environment Agency (EA)**: It is important that information on flood risk is updated regularly. The EA carries out flood modelling and mapping studies, and updates to the Flood Map are made quarterly, but this does not relate to groundwater and surface water. Local planning authorities use the best available information on local flood risk to inform spatial planning, but flood risk data should be updated following flood events, and there seems to be no clear strategy for ensuring this is done. CDC SFRA 2014 p 21 notes the data was downloaded in February and March 2013, and the GCC LFRMS Updates of 2017/18 and 20/21 refer to the Fairford (fluvial) Flood Alleviation scheme of 2013 being completed, with no information about flooding incidents since that alleviation scheme. This suggests that the high groundwater and sewage flooding events in Fairford in December 2013, throughout January 2014, and surface water flooding in June 2016 may not have been considered. Data was collected in 2018 for the WRA report, and groundwater monitoring continues. Further localised flooding occurred in 2020 and 2021.

Information and data on flooding is available from Environment Agency (Historic Flood map, Areas subject to GW Flooding, Flood map for SW etc); from GCC publications and records including GCC LFRMS, and 'Locally Agreed Surface Water Information'; from Thames Water; from CDC, and from Fairford Town Council/WRA. Groundwater levels in the area are regularly monitored.

Fairford is in the Upper Thames Valley area where the Upper Thames Catchment Flood Management Plan applies. This area is classed as having low to moderate flood risk and Policy 6 applies "*we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits*".

1.7. **Thames Water (TW)**: After many events of sewage flooding, Thames Water has made detailed investigations and carried out remedial work in East End, Court Brook and Quenington Rd. They have acknowledged that the town's sewer system is now operating around the limit of the population capacity it was designed for and are preparing a comprehensive Drainage Strategy for Fairford. Their report Thames Water Drainage Strategy v3 (Thames Water, 2018) details sewer flooding problems, and records (P15 that: "There's a strong link between the rising groundwater levels across the Fairford area and the drainage issues some of our customers have experienced, including sewer flooding and restricted use of their toilets and bathrooms". They have identified (P 9) "Loss of green spaces that previously provided natural drainage for rainwater as new paths, extensions and houses are built" as one of the causes of drainage problems. This report concludes that

"sustainable drainage solutions (SuDS) using infiltration are unlikely to be effective in the low-lying areas to the south of the town because of frequent high groundwater levels."

1.8. **Water Resource Associates**: Fairford Town Council (FTC) commissioned a study "Groundwater Monitoring and Review of Flood Risk at Fairford" by Water Research Associates'. Their report (WRA, 2018) identifies areas which are unsuitable for building development and emphasises (1.3.5) that CIRIA guidelines for effective SuDS infiltration schemes require at least 1 m freeboard i.e., available water storage space between the groundwater level and the surface.

Flood Zone 1 comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%). The low-lying areas to the south of Fairford are underlain with lower permeability mudstones which limit the ability for infiltration. When there is high intensity or prolonged rainfall, rapid run off inundates ditches, sewers, and highway drains. The water table rises to the surface, even in Flood Zone 1 areas, which means that the surface water drainage methods are ineffective, and the consequential run-off is likely to increase flood risk elsewhere.

WRA suggest that for sensitive sites, developers should provide a flood risk assessment with infiltration tests to confirm the suitability or otherwise of that site, at the preliminary planning stage. They note (1.3.3) *There is no scope for SuDS drainage using infiltration in low-lying areas associated with the Coln alluvial corridor due to frequent high groundwater levels. In such conditions, attenuation storage ponds provided as a SuDS solution can only take the form of shallow depressions which would require significant land.*

WRA 2018 calculated the 200-year maximum groundwater levels for all Fairford proposed development sites. This has driven the site selection in this Plan, and therefore we have not allocated site F44 which was deemed unsuitable for development and likely to increase the flood risk to others.

1.9. **Conclusion**: The natural floodplains of river valleys and also minor watercourses are important features in terms of flood risk management. Future development sites should be guided away from these areas, using the Sequential Test, and should be preserved for flood water storage/attenuation. Development in these areas would have detrimental effect on flood risk in the immediate vicinity and downstream, by displacing groundwater, and/or causing surface water to run-off onto neighbouring properties instead of soaking into the ground. Identifying areas suitable for water storage and safe-guarding them from development, and harnessing the ability of wetlands to store water, are vital to surface water management and flood alleviation.