# South Oxfordshire District Council
# Detailed Site Summary Tables

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# Detailed Site Summary Tables

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|---|---|
| **Site code** | CHALGROVE |
| **Site name** | Chalgrove Airfield |

| | | |
|---|---|---|
| **Site details** | **OS Grid reference** | 463326, 197938 |
| | **Area** | 251.6Ha |
| | **Current land use** | Greenfield with some developed areas (airfield) |
| | **Proposed site use** | Residential and Employment |
| | **Flood risk vulnerability** | More vulnerable |
| **Sources of flood risk** | **Existing watercourses** | Unnamed tributaries of the Hasely Brook cross the north of the site and exit the western boundary of the site. |
| | **Flood history** | The site is not identified within the EA Historic Flood Map and no further flood incidents have been reported within the site boundary. Flooding occurred to the south of the site at Marley Lane, the High Street, Langley Road and Mill Lane from the Chalgrove Brook in Winter 2013/2014. |
| | **Fluvial** | **Proportion of site at risk in Flood Zones** |

| FZ3b | FZ3a | FZ2 | FZ1 |
|---|---|---|---|
| 0% | 0% | 0% | 100% |

**Available modelled data:** The Chalgrove Brook model (Environment Agency, 2015) covers the village of Chalgrove however does not extend onto the site. The Risk of Flooding from Surface Water mapping provides an indication of fluvial flood risk from ordinary watercourses at the north of the site.

**Flood characteristics:** The site lies beyond the 1 in 100-year (1%AEP) plus 70% climate change flood extent of Chalgrove Brook, and outside the 1 in 100-year flood extent of Hasely Brook.

Risk of Flooding from Surface Water mapping suggests that the northern portion of the site will be affected by flooding from tributaries of Hasely Brook. Further hydraulic modelling of these tributaries may be required within the site-specific Flood Risk Assessment, to better understand the extent of this flood risk.

**Surface Water** — **Proportion of site at risk (RoFSW)**

| 30-year | 100-year | 1,000-year |
|---|---|---|
| 1% | 1% | 5% |

**Description of surface water flow paths:**
The site shows potential for isolated ponding at the centre and peripheries during 1 in 30-year (3.3% AEP) rainfall event and greater return periods.

Surface water flow paths generated in the north, east and west of the site during the 1 in 1,000 (0.1%) year event contribute flows to the neighbouring tributaries of Hasely Brook.

The runway strips at the centre of the site currently provide linear surface water flow paths during the 1 in 1,000 (0.1%) year event, however will alter with the proposed development.

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| **Site code** | CHALGROVE |
| **Site name** | Chalgrove Airfield |

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|---|---|---|---|---|
| | **Groundwater** | **Areas Susceptible to Groundwater Flooding Map class (risk of groundwater emergence)** | | |
| | | North, centre and east of the site: >=75% probability of emergence.<br>West: >= 25% < 50% and >=50% < 75% probability. | | |
| | **Reservoir** | This site is not at risk of reservoir flooding. It is close to, but falls outside the risk zone for the failure of a reservoir at Standhill Farm. | | |
| | **Canal** | The site is not located within 100m of a canal. | | |
| **Flood risk management infrastructure** | **Defences** | **Defence Type** | **Standard of Protection** | **Condition** |
| | | The site does not receive protection from flood defences. | | |
| | **Residual risk** | **Culvert / structure blockage?** | There are no structures on the site (identified at this stage) with the potential to block. | |
| | | **Impounded water body failure?** | The site is not at risk of inundation in the event of reservoir failure. | |
| | | **Defence breach / overtopping?** | **Breach Zone** | |
| | | | The site is not at risk from breach of defences. | |
| **Emergency planning** | **Flood warning** | The site lies outside the former Chalgrove Brook at Chalgrove and Stadhampton Flood Warning Area. Environment Agency flood warnings are now issued to individuals via the Flood Information Service. | | |
| | **Access and egress** | Access and egress to this site may be achieved via the B480 to the south and Monument Road/Warpsgrove Lane to the east. However, Monument Road/Warpsgrove Lane and the junction between the B480 and High Street are at risk of localised surface water flooding during the 30-year and higher return periods. Other access routes may include Rofford Lane to the west, where flood risk is confined to the crossing with an unnamed ordinary watercourse. | | |
| **Climate Change** | **Climate change allowances for '2080s'** | **River Basin District** | **Central** | **Higher Central** | **Upper End** |
| | | Thames | 25% | 35% | 65% |
| | **Implications for the site** | Climate change is unlikely to significantly change the Flood Zone classification of this site. | | |

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|---|---|
| **Site code** | CHALGROVE |
| **Site name** | Chalgrove Airfield |

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|---|---|---|
| **Requirement for drainage control and impact mitigation** | **Bedrock Geology** | Gault and Upper Greensand mudstone, sandstone and limestone |
| | **Superficial Geology** | Sand and gravel river terrace deposits cover the southern two thirds of the site. |
| | **Soils** | Freely draining slightly acid loamy soils. |
| | **SuDS** | This large, relatively undeveloped site should be able to implement an exemplar SuDS scheme.<br><br>This site has freely draining soils, but restricted bedrock permeability and potenital for high groundwater mean options for deep infiltration SuDS are limited. Site investigations may be requried to determine levels of historic fuel contamination, as SuDS may need to be lined.<br><br>There are good opportunities for above ground SuDS, with neighbouring watercourses providing discharge locations for surface water from the site. The topography slopes gently towards the boundaries of the site, allowing for above ground coveyance along natural flow paths.<br><br>Opportunities should be taken to deliver SuDS with multiple benefits, such as biodiversity, recreation and water resource education, through integration within the secondary school and proposed areas of greenspace.<br><br>Further information on SuDS is available in the CIRIA SuDS Manual (2015) and on the Oxfordshire County Council website. |
| | **Groundwater Source Protection Zone** | The site is not located within a Groundwater Source Protection Zone. |
| | **Historic Landfill Site** | No part of the site is designated by the Environment Agency as an historic landfill site. |
| | **Opportunities for flood risk betterment** | Opportunity to implement exemplar SuDS design following CIRIA and OCC guidance on runoff rates and volumes, contributing to the reduction of flood peaks downstream.<br><br>It is understood that |
| **Recommend-actions for Local Plan policy** | **Sequential Test and Exception Test requirements** | |
| | The site is within Flood Zone 1 but at risk from surface water flooding, which should be taken into account when carrying out the Sequential Test and Exception test if required. | |
| | **Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers** | |
| | **Flood risk assessment:**<br>• At the planning application stage, a site-specific flood risk assessment and surface water drainage strategy will be required.<br>• Consultation with OCC, the Lead Local Authority, should be undertaken at an early stage.<br>• Hydraulic modelling may be required to determine the level of flood risk from the ordinary watercourse which crosses the site.<br>• Other sources of flooding should also be considered as part of a site-specific flood risk assessment. | |

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|---|---|
| **Site code** | CHALGROVE |
| **Site name** | Chalgrove Airfield |

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|---|---|
| | **Guidance for site design and making development safe:**<br>• Development must seek opportunities to reduce overall level of flood risk at the site.<br>• All development should integrate source control SuDS techniques to reduce the risk of flooding due to post-development runoff. SuDS design should follow current best practice (CIRIA Manual 2015) and OCC guidance on runoff rates and volumes, to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc.<br>• Safe access and egress should be demonstrated in the 1 in 100 plus climate change event.<br>• Drainage designs should 'design for exceedance' and accommodate existing surface water flow routes. |

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# Detailed Site Summary Tables

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|---|---|
| **Site code** | CULHAM |
| **Site name** | Culham No. 1 site |

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|---|---|---|
| **Site details** | **OS Grid reference** | 453049, 195645 |
| | **Area** | 22Ha |
| | **Current land use** | Greenfield with developed areas (light industrial) |
| | **Proposed site use** | Housing and Employment |
| | **Flood risk vulnerability** | More vulnerable |
| **Sources of flood risk** | **Existing watercourses** | An unnamed ordinary watercourse, a tributary of the River Thames (Culham Cut) flows from the western to southern boundary of the site. It is culverted for much of its length. |
| | **Flood history** | The EA Historic Flood Map identifies confined flooding to south west of site from the ordinary watercourse on 06/01/2003. No further flood incidents have been reported within the site boundary. |
| | **Fluvial** | **Proportion of site at risk in Flood Zones** |

| FZ3b | FZ3a | FZ2 | FZ1 |
|---|---|---|---|
| 0% | 0% | 2% | 98% |

**Available modelled data:**
There is no available modelling for the ordinary watercourse that runs through the site. The Risk of Flooding from Surface Water mapping provides a proxy for fluvial flood risk from ordinary watercourses and indicates low fluvial flood risk.

**Flood characteristics:**
An isolated area of the southwest of the site is at risk of fluvial flooding during the 1 in 1,000-year event, based on historic flood mapping. Flooding from the ordinary watercourse identified by the RoFSW data is tightly confined, as the watercourse is largely culverted in the site.

**Surface Water**

**Proportion of site at risk (RoFSW)**

| 30-year | 100-year | 1,000-year |
|---|---|---|
| 1% | 2% | 4% |

**Description of surface water flow paths:**
Surface water flood risk is disperse and limited to ponding in low points of the existing hardstanding in the centre and southwest of the site. Ponding occurs during the 1 in 30 (3.3%) , 1 in 100 (1%) and 1 in 1000 (0.1%) year rainfall events.

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|---|---|---|---|---|
| | **Groundwater** | **Areas Susceptible to Groundwater Flooding Map class (risk of groundwater emergence %)** | | |
| | | •East: >=75% in east<br>•West: >= 50% < 75%<br>•Northern corner: >= 25% < 50% | | |
| | **Reservoir** | This site is not at risk of reservoir flooding. It is close to, but falls outside the risk zone for the failure of a reservoir at Standhill Farm. | | |
| | **Canal** | The site is not located within 100m of a canal. | | |
| **Flood risk management infrastructure** | **Defences** | **Defence Type** | **Standard of Protection** | **Condition** |
| | | The site does not receive protection from flood defences. | | |
| | **Residual risk** | **Culvert / structure blockage?** | A long culvert crosses the southwest corner of the site. Blockage of this asset should be assessed. | |
| | | **Impounded water body failure?** | The site is not at risk of inundation in the event of reservoir failure. | |
| | | **Defence breach / overtopping?** | **Breach Zone** | |
| | | | The site is not at risk from breach of defences. | |
| **Emergency planning** | **Flood warning** | The southeast corner of the site lies within the River Thames at Clifton Hampden, Dorchester and Little Whitenham Flood Warning Area. Environment Agency flood warnings are now issued to individuals via the Flood Information Service. | | |
| | **Access and egress** | Safe access to and egress from the site is possible on Station Road and Abingdon Road to the south, and Thame Lane to the east. | | |
| **Climate Change** | **Climate change allowances for '2080s'** | **River Basin District** | **Central** | **Higher Central** | **Upper End** |
| | | Thames | 25% | 35% | 65% |
| | **Implications for the site** | Climate change is unlikely to significantly change the Flood Zone classification of this site. | | |

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|---|---|---|
| **Requirement for drainage control and impact mitigation** | **Bedrock Geology** | The underlying geology is Lower Greensand Sandstone, with Gault Mudstone at the southwest corner of the site. |
| | **Superficial Geology** | Summertown-Radley Sand and Gravel cover the centre, north and south east of the site. |
| | **Soils** | Freely draining slightly acid but base-rich soils |
| | **SuDS** | Due to the bedrock permeability and overlying gravel deposits in the majority of the site, there is good potential for all types of SuDS. The southwest of the site has a lower potential for infiltration SuDS, however shallow infiltration may be possible in permeable superficial deposits. SuDS may be used to accommodate and manage existing areas at risk of surface water ponding on the site. |
| | **Groundwater Source Protection Zone** | The site is not located within a Groundwater Source Protection Zone. |
| | **Historic Landfill Site** | No part of the site is designated by the Environment Agency as an historic landfill site. |
| | **Opportunities for flood risk betterment** | Opportunity to implement exemplar SuDS design following CIRIA and OCC guidance on runoff rates and volumes, contributing to the reduction of flood peaks downstream.<br><br>Opportunity to investigate the condition and capacity of the long culvert at the southwest of the site, and determine whether it can accept flows from the developed site. Culvert enlargement or daylighting may be required if the asset is undersized. |

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|---|---|
| **Recommend-actions for Local Plan policy** | **Sequential Test and Exception Test requirements** |
| | The Sequential Test must be passed (see Section 4 of main report). Only once the Sequential Test is passed should the Exception Test be applied. **It is expected that all built development will be sequentially located within Flood Zone 1**, but the Exception Test would be required:<br>• If More Vulnerable and Essential Infrastructure is located in FZ3a.<br>• If Highly Vulnerable development is located in FZ2 or Flood Zone 3a plus climate change.<br>• If Essential Infrastructure is located in Flood Zone 3b<br>Development will not be permitted in the following scenarios:<br>• Highly Vulnerable development within FZ3a or Flood Zone 3a plus climate change and FZ3b.<br>• More Vulnerable and Less Vulnerable development within FZ3b. |
| | **Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers** |
| | **Flood risk assessment:**<br>• At the planning application stage, a site-specific flood risk assessment (considering all sources of flooding) and surface water drainage strategy will be required.<br>• Consultation with the Local Authority and the Environment Agency should be undertaken at an early stage.<br>• Detailed modelling should be undertaken to confirm Flood Zone and climate change extents. The Environment Agency and LLFA should be consulted to obtain the latest hydraulic modelling information for the site at the time of the flood risk assessment. They will advise as to whether existing detailed models need to be updated.<br>• Climate change modelling should be undertaken using the relevant allowances (February 2016) for the type of development and level of risk.<br><br>**Guidance for site design and making development safe:**<br>• Development must seek opportunities to reduce overall level of flood risk at the site.<br>• The development should be designed using a sequential approach. Flood Zones 2 and 3, and 3a + upper end climate change (subject to a detailed flood risk assessment) should be preserved as public green space, with built development restricted to Flood Zone 1.<br>• Safe access and egress should be demonstrated in the 1 in 100 plus climate change event.<br>• Groundwater flood risk in the east of the site should be investigated.<br>• Existing surface water flow paths should be retained and incorporated within the site design.<br>• All development should adopt source control SuDS techniques to reduce the risk of flooding due to post-development runoff. SuDS design should follow current best practice (CIRIA Manual, 2015) and OCC guidance on runoff rates and volumes, to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. |

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# Detailed Site Summary Tables

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|---|---|
| **Site code** | CULHAM |
| **Site name** | Land west of the Railway at Culham Science Centre |

| | | |
|---|---|---|
| **Site details** | **OS Grid reference** | 451856, 196085 |
| | **Area** | 220Ha |
| | **Current land use** | Largely greenfield, with some farm buildings. |
| | **Proposed site use** | Housing and Employment |
| | **Flood risk vulnerability** | More vulnerable |
| **Sources of flood risk** | **Existing watercourses** | The River Thames, a Main River, forms the northern boundary of the site. An unnamed ordinary watercourse, a tributary of the Culham Cut, flows out of the southeast of the site via a culvert. |
| | **Flood history** | The EA Historic Flood Map identifies flooding to north of site on 06/03/1947, 06/08/1977, 06/02/1979, 06/12/2000, 06/01/2003, 29/07/2007, Winter 2013-2014 due to capacity exceedance of the River Thames. It also identifies flooding to northeast of the site on 12/12/1979 from local drainage/surface water.<br><br>No further flood incidents have been reported within the site boundary. Flooding occurred southeast of the site, at the High Street in 2014/2015, with the cause thought to be surface water flooding. |
| | **Fluvial** | **Proportion of site at risk in Flood Zones**<br>**FZ3b**: **13%** \| **FZ3a**: 0% \| **FZ2**: 4% \| **FZ1**: 84%<br>**Available modelled data:**<br>There is no fluvial modelled data available for ordianary watercourses on the site, other than the existing Flood Zone mapping.<br>**Flood characteristics:**<br>The northern section of the site is at risk of fluvial flooding from River Thames during the 1 in 100 and 1 in 1,000-year flood events. A small area of the southeast of the site is also at risk during the 1 in 1,000-year flood event. |
| | **Surface Water** | **Proportion of site at risk (RoFSW)**<br>**30-year**: 0% \| **100-year**: 1% \| **1,000-year**: 3%<br>**Description of surface water flow paths:**<br>Surface water flood risk to the site is dispersed. Ponding occurs at the north and east of the site during the 1 in 30 (3.3%), 1 in 100 (1%) and 1 in 1000 (0.1%) year rainfall events. A significant surface water flow path forms at Thame Lane and flows eastwards into a culverted ordinary watercourse during the 1 in 1,000 (0.1%) year event. RoFSW mapping suggests that ponding may occur upstream of the culvert entrance during the 1 in 30-year event. |
| | **Groundwater** | **Areas Susceptible to Groundwater Flooding Map class (risk of groundwater emergence %)**<br>• West and southeast: >= 50% < 75%.<br>• Northeast corner: >= 25% < 50%.<br>• Southwest corner: <25%. |

# South Oxfordshire District Council

# Detailed Site Summary Tables

| | |
|---|---|
| **Site code** | CULHAM |
| **Site name** | Land west of the Railway at Culham Science Centre |

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|---|---|---|---|---|
| | **Reservoir** | The north of the site is at risk in the event of failure or overtopping of Farmoor Reservoir. | | |
| | **Canal** | The site is not located within 100m of a canal. | | |
| **Flood risk management infrastructure** | **Defences** | **Defence Type** | **Standard of Protection** | **Condition** |
| | | The site does not receive protection from flood defences. | | |
| | **Residual risk** | **Culvert / structure blockage?** | Blockage to the culvert entrance at the southeast of the site could affect the site. The impacts of a blockage should be modelled. | |
| | | **Impounded water body failure?** | This site at risk of flooding in the event of failure or overtopping of Farmoor Reservoir. The risk area extends along the northern boundary of the site, yet is confined within Flood Zone 3. Depths are range between 0-2m. | |
| | | **Defence breach / overtopping?** | **Breach Zone** | |
| | | | The site is not at risk from breach of defences. | |
| **Emergency planning** | **Flood warning** | The north of the site lies in the River Thames in Abingdon Flood Warning Area. Environment Agency flood warnings are now issued to individuals via the Flood Information Service. | | |
| | **Access and egress** | Safe access to and egress from the site is possible on Thame Lane and Abingdon Road to the south. | | |

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|---|---|---|---|---|---|
| **Climate Change** | **Climate change allowances for '2080s'** | **River Basin District** | **Central** | **Higher Central** | **Upper End** |
| | | Thames | 25% | 35% | 65% |
| | **Implications for the site** | Climate change under a +70% scenario is predicted to increase the extent of the 1 in 100 year event to greater than the current Flood Zone 2 extent. | | | |

# South Oxfordshire District Council

# Detailed Site Summary Tables

| | |
|---|---|
| **Site code** | CULHAM |
| **Site name** | Land west of the Railway at Culham Science Centre |

| | | |
|---|---|---|
| **Requirement for drainage control and impact mitigation** | **Bedrock Geology** | The majority of the site is underlain by Lower Greensand Sandstone. Ampthill Clay Formation and Kimmeridge Clay Formation occur at the north and Gault Formation Mudstone occurs at the western corner. |
| | **Superficial Geology** | Summertown-Radley Sand and Gravel overlie the south and southeast of the site. |
| | **Soils** | • Northern border: Loamy and clayey floodplain soils with naturally high groundwater.<br>• North and south: Freely draining slightly acid but base-rich soils<br>• Centre: Freely draining slightly acid sandy soils.<br>• West: Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils. |
| | **SuDS** | The majority of the site is suitable for all types of SuDS. There is lower potential for infiltration SuDS at the western corner and north of the site, however shallow infiltration may be possible in permeable superficial deposits. SuDS should accommodate fluvial flood risk in the north of the site and existing surface water flow paths. |
| | **Groundwater Source Protection Zone** | The site is not located within a Groundwater Source Protection Zone. |
| | **Historic Landfill Site** | No part of the site is designated by the Environment Agency as an historic landfill site. |
| | **Opportunities for flood risk betterment** | The northern border of the site should remain undeveloped and be used for flood plain storage, to stagger the volume of flows entering The River Thames and affecting the wider catchment.<br><br>Opportunity to investigate the condition and capacity of the culvert at the southeast of the site, and determine whether it can accept flows from the developed site. Culvert enlargement or daylighting may be required if the asset is undersized.<br><br>Opportunity to implement exemplar SuDS design following CIRIA and OCC guidance on runoff rates and volumes, contributing to the reduction of flood peaks downstream. |

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|---|---|
| **Recommend-actions for Local Plan policy** | **Sequential Test and Exception Test requirements** |
| | The Sequential Test must be passed (see Section 4 of main report). Only once the Sequential Test is passed should the Exception Test be applied. **It is expected that all built development will be sequentially located within Flood Zone 1**, but the Exception Test would be required:<br>• If More Vulnerable and Essential Infrastructure is located in FZ3a.<br>• If Highly Vulnerable development is located in FZ2 or Flood Zone 3a plus climate change.<br>• If Essential Infrastructure is located in Flood Zone 3b<br>Development will not be permitted in the following scenarios:<br>• Highly Vulnerable development within FZ3a or Flood Zone 3a plus climate change and FZ3b.<br>• More Vulnerable and Less Vulnerable development within FZ3b. |
| | **Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers** |
| | **Flood risk assessment:**<br>• At the planning application stage, a site-specific flood risk assessment (considering all sources of flooding) and surface water drainage strategy will be required.<br>• Consultation with the Local Authority and the Environment Agency should be undertaken at an early stage.<br>• Detailed modelling will be required to confirm Flood Zone and climate change extents. The Environment Agency and LLFA should be consulted to obtain the latest hydraulic modelling information for the site at the time of the flood risk assessment. They will advise as to whether existing detailed models need to be updated.<br>• Climate change modelling should be undertaken using the relevant allowances (February 2016) for the type of development and level of risk.<br><br>**Guidance for site design and making development safe:**<br>• Development must seek opportunities to reduce overall level of flood risk at the site.<br>• The development should be designed using a sequential approach. Flood Zones 2 and 3, and 3a + upper end climate change (subject to a detailed flood risk assessment) should be preserved as public green space, with built development restricted to Flood Zone 1.<br>• Safe access and egress should be demonstrated in the 1 in 100 plus climate change event.<br>• Compensation storage would need to be provided for any land-raising within the 1 in 100 plus appropriate climate change flood extent<br>• Onsite attenuation options would need to be tested to ensure that altering the timing of peak flows leaving the site does not exacerbate flooding downstream.<br>• All development should adopt source control SuDS techniques to reduce the risk of flooding due to post-development runoff. SuDS design should follow current best practice (CIRIA Manual, 2015) and OCC guidance on runoff rates and volumes, to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. |

# South Oxfordshire District Council

# Detailed Site Summary Tables

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|---|---|
| **Site code** | ELSFIELD |
| **Site name** | Land at Lower Elsfield |

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|---|---|---|
| **Site details** | **OS Grid reference** | 454229, 208761 |
| | **Area** | 80.7Ha |
| | **Current land use** | Greenfield |
| | **Proposed site use** | Housing and Employment |
| | **Flood risk vulnerability** | More vulnerable. |
| **Sources of flood risk** | **Existing watercourses** | The Main River Bayswater Brook crosses the southwest and southern border of the site. Two unnamed ordinary watercourses, tributaries of the Bayswater Brook, flow across the site appearing to act as a land drainage network. |
| | **Flood history** | The EA Historic Flood Map identifies that flooding from the Bayswater Brook reached the southwestern edge of the site on 12/12/1992. However, the flood extent did not enter the site boundary. No further flood incidents have been reported within the site boundary. |
| | **Fluvial** | **Proportion of site at risk in Flood Zones** |

| FZ3b | FZ3a | FZ2 | FZ1 |
|---|---|---|---|
| 12% | 0% | 3% | 84% |

**Available modelled data:**
There is no fluvial modelled data available for the Bayswater Brook, or the ordianary watercourses on the site, other than the existing Flood Zone mapping. The Risk of Flooding from Surface Water mapping can be used as a proxy for flood risk from ordinary watercourses.

**Flood characteristics:**
The southern boundary and southeast portion of the site are at risk of fluvial flooding from the Bayswater Brook during the 1 in 100 and 1 in 1,000-year flood events.
RoFWS mapping suggests that flooding to the site will occur from the ordinary watercourses during the 1 in 30-year rainfall event and higher return periods.

**Surface Water**

**Proportion of site at risk (RoFSW)**

| 30-year | 100-year | 1,000-year |
|---|---|---|
| 5% | 9% | 34% |

**Description of surface water flow paths:**
Surface water flood risk is high (1 in 30-year return period) across the south of the site, within the floodplain of the Bayswater Brook. During the 1 in 30-year return period and above, significant surface water flow paths cross the site from east to west, before entering the Bayswater Brook. A significant portion of the site is at risk of surface water flooding during the 1 in 1,000-year rainfall event.

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| **Groundwater** | **Areas Susceptible to Groundwater Flooding Map class (risk of groundwater emergence %)** |
| | • Majority of site: >=50% <75%.<br>• Northern edge and northeast corner: <25% risk. |

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| | |
|---|---|
| **Site code** | ELSFIELD |
| **Site name** | Land at Lower Elsfield |

| | | | | |
|---|---|---|---|---|
| | **Reservoir** | The site is not at risk of reservoir flooding. | | |
| | **Canal** | There are no canals within 100m of the site. | | |
| **Flood risk management infrastructure** | **Defences** | **Defence Type** | **Standard of Protection** | **Condition** |
| | | The site does not receive protection from flood defences. | | |
| | **Residual risk** | **Culvert / structure blockage?** | A culvert runs along the western boundary of the site. Blockage of the asset would cause flooding to the site, therefore the impacts should be modelled. | |
| | | **Impounded water body failure?** | The site is not at risk of inundation in the event of reservoir failure. | |
| | | **Defence breach / overtopping?** | **Breach Zone** | |
| | | | The site is not at risk from breach of defences. | |
| **Emergency planning** | **Flood warning** | The site does not lie in an Environment Agency flood warning area. Environment Agency flood warnings are now issued to individuals via the Flood Information Service. | | |
| | **Access and egress** | Safe access to and egress from the site is possible on A46 Northern Bypass Road. Access to the unnamed road to the west of the site would be restricted during rainfall events, due to the high risk of surface water flooding (1 in 30-year return periods and above). | | |
| **Climate Change** | **Climate change allowances for '2080s'** | **River Basin District** | **Central** | **Higher Central** | **Upper End** |
| | | Thames | 25% | 35% | 70% |
| | **Implications for the site** | Climate change under a +70% scenario is likely to increase the extent of the 1 in 100 year event to greater than the current Flood Zone 2 extent. | | | |

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# Detailed Site Summary Tables

| | |
|---|---|
| **Site code** | ELSFIELD |
| **Site name** | Land at Lower Elsfield |

| | | |
|---|---|---|
| **Requirement for drainage control and impact mitigation** | **Bedrock Geology** | The majority of the site is underlain by Weymouth Member Mudstone. At the northeast of the site there is an area of West Walton Formation Mudstone, Temple Cowley Sandstone and Siltstone and Beckley Sand Sandstone. |
| | **Superficial Geology** | Northmoor Sand and Gravel river terrace deposits cover the entire site. Alluvium is present at the south of the site, and head deposits of clay, silt, sand and gravel at the north of the site. |
| | **Soils** | Majority of site contains loamy soils with naturally high groundwater. Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils are found at the northeast of site. |
| | **SuDS** | Low permeability bedrock on the site suggests that infiltration systems may not be appropriate. However, localised sand and gravel deposits may allow shallow infiltration across the whole site. Infiltration SuDS may be suitable in more permeable geology at the northeast of the site.<br>SuDS should be designed to accommodate existing areas of fluvial and surface water flood risk. Drainage features at the south and southeast of the site should be designed to be resilient to fluvial flooding. |
| | **Groundwater Source Protection Zone** | The site is not located within a Groundwater Source Protection Zone. |
| | **Historic Landfill Site** | No part of the site is designated by the Environment Agency as an historic landfill site. |
| | **Opportunities for flood risk betterment** | Opportunity to implement source control SuDS design following OCC guidance on runoff rates and volumes, contributing to the reduction of flood peaks downstream.<br><br>As the site borders the Bayswater Brook, a tributary of the River Cherwell, opportunity to slow the river flows entering Oxford and reduce flood peaks. |
| **Recommend-actions for Local Plan policy** | **Sequential Test and Exception Test requirements** | |
| | The Sequential Test must be passed (see Section 4 of main report). Only once the Sequential Test is passed should the Exception Test be applied. **It is expected that all built development will be sequentially located within Flood Zone 1**, but the Exception Test would be required:<br>• If More Vulnerable and Essential Infrastructure is located in FZ3a.<br>• If Highly Vulnerable development is located in FZ2 or Flood Zone 3a plus climate change.<br>• If Essential Infrastructure is located in Flood Zone 3b<br>Development will not be permitted in the following scenarios:<br>• Highly Vulnerable development within FZ3a or Flood Zone 3a plus climate change and FZ3b.<br>• More Vulnerable and Less Vulnerable development within FZ3b. | |
| | **Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers** | |
| | **Flood risk assessment:**<br>• At the planning application stage, a site-specific flood risk assessment (considering all sources of flooding) and surface water drainage strategy will be required.<br>• Consultation with the Local Authority and the Environment Agency should be undertaken at an early stage.<br>• Detailed modelling will be required to confirm Flood Zone and climate change extents. The Environment Agency and LLFA should be consulted to obtain the latest hydraulic modelling information for the site at the time of the flood risk assessment. They will advise as to whether existing detailed models need to be updated. | |

# South Oxfordshire District Council

# Detailed Site Summary Tables

| | |
|---|---|
| **Site code** | ELSFIELD |
| **Site name** | Land at Lower Elsfield |

| | |
|---|---|
| | • Climate change modelling should be undertaken using the relevant allowances (February 2016) for the type of development and level of risk.<br><br>**Guidance for site design and making development safe:**<br>• Development must seek opportunities to reduce overall level of flood risk at the site.<br>• The development should be designed using a sequential approach. Flood Zones 2 and 3, and 3a + upper end climate change (subject to a detailed flood risk assessment) should be preserved as public green space, with built development restricted to Flood Zone 1.<br>• Safe access and egress should be demonstrated in the 1 in 100 plus climate change event.<br>• Compensation storage would need to be provided for any land-raising within the 1 in 100 plus appropriate climate change flood extent<br>• Existing surface water flow paths should be retained and incorporated within the site design.<br>• Onsite attenuation options would need to be tested to ensure that altering the timing of peak flows leaving the site does not exacerbate flooding downstream.<br>• All development should adopt source control SuDS techniques to reduce the risk of flooding due to post-development runoff. SuDS design should follow current best practice (CIRIA Manual, 2015) and OCC guidance on runoff rates and volumes, to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. |

# South Oxfordshire District Council
# Detailed Site Summary Tables

| | |
|---|---|
| **Site reference** | GRENOBLE |
| **Site name** | Land south of Grenoble Road / Land at Ninevah Farm, Oxford |

| | | | | | |
|---|---|---|---|---|---|
| **Site details** | **OS Grid reference** | 455826.31, 201569.56 | | | |
| | **Area** | 324.16Ha | | | |
| | **Current land use** | Predominantly greenfield | | | |
| | **Proposed site use** | Housing, employment and traveller use. | | | |
| | **Flood risk vulnerability** | More vulnerable (highly vulnerable for traveller site) | | | |
| **Sources of flood risk** | **Existing watercourses** | The upper reaches of the Main River Baldon Brook and its two ordinary watercourse tributaries cross the southeast corner of the site.<br>An ordinary watercourse tributary of the Littlemore Brook originates in the south of the site and flows northwards.<br>Unnamed field drains cross the north and southeast of the site. | | | |
| | **Flood history** | The EA Historic Flood Map identifies flooding to southeast corner of the site on 06/09/1992 and 06/10/1993, due to exceedance of capacity of the Baldon Brook. Although no flood incidents have been recorded at the site itself, Church Road to the west of the site was affected by flooding during Winter 2013/2014. | | | |
| | **Fluvial** | **Proportion of site at risk in Flood Zones** | | | |
| | | **FZ3b** | **FZ3a** | **FZ2** | **FZ1** |
| | | 4% | 0% | 8% | 88% |
| | | **Available modelled data:**<br>There is no fluvial modelled data available for the Baldon Brook, or ordinary watercourses on the site, other than the existing Flood Zone mapping. The Risk of Flooding from Surface Water mapping has been used as a proxy.<br>The extent of the River Thames Sandford to Whitchurch 1D model lies to the west of the site.<br><br>**Flood characteristics:**<br>The northeast and southeast corners of the site are at risk of flooding from the Littlemore Brook and Baldon Brook during the 1 in 100 and 1 in 1,000-year events.<br>The Flood Zones do not cover the ordinary watercourses within the site, but using the Risk of Flooding from Surface Water mapping as a proxy indicates that these watercourses would pose a risk to the site during the 1 in 30-year flood event and above, up to depths of 0.6m. | | | |
| | **Surface Water** | **Proportion of site at risk (RoFSW)** | | | |
| | | **30-year** | | **100-year** | **1,000-year** |
| | | 7% | | 12% | 25% |

# South Oxfordshire District Council

# Detailed Site Summary Tables

| | |
|---|---|
| **Site reference** | GRENOBLE |
| **Site name** | Land south of Grenoble Road / Land at Ninevah Farm, Oxford |

| | | | | |
|---|---|---|---|---|
| | | **Description of surface water flow paths:**<br>The Risk of Flooding from Surface Water mapping identifies major surface water flow paths in the centre and east of the site, near the Baldon Brook and central ordinary watercourse (during the 1 in 30-year return period and above). There is a large area of ponding either side of Blackberry Lane at the centre and northeast of the site, which is at risk during the 1 in 30 (3.3%), 1 in 100 (1%) and 1 in 1000 (0.1%) year events. Areas of localised ponding also occur on currently developed surfaces in the centre and northwest of the site at the 1 in 30-year (3.3%) event and above. | | |
| | **Groundwater** | **Areas Susceptible to Groundwater Flooding Map class (risk of groundwater emergence %)** | | |
| | | North of the site: >=75% susceptibility of emergence.<br>West and northeast: >=50%<75%<br>Centre and southeast: >=25% < 50% risk. | | |
| | **Reservoir** | The site is not at risk from reservoir flooding. The predicted flood extent from Farmoor Reservoir is located approximately 650m west of the site. | | |
| | **Canal** | There are no canals within 100m of the site. | | |
| **Flood risk management infrastructure** | **Defences** | **Defence Type** | **Standard of Protection** | **Condition** |
| | | The site does not receive protection from flood defences. | | |
| | **Residual risk** | **Culvert / structure blockage?** | Two sections of ordinary watercourses in west and southeast of the site are culverted. The risk of flooding from blockage of these structures should be assessed. | |
| | | **Impounded water body failure?** | The site is not at risk of inundation in the event of reservoir failure. | |
| | | **Defence breach / overtopping?** | **Breach Zone** | |
| | | | The site is not at risk from breach of defences. | |
| **Emergency planning** | **Flood warning** | The site lies outside former River Thames and tributaries at Sandford and Radley near Oxford Flood Warning Area. Environment Agency flood warnings are now issued to individuals via the Flood Information Service. | | |
| | **Access and egress** | Safe access to and egress from the site are possible on Grenoble Road to the north and A4074 to the west. Access to the northeast via Grenoble Road, B480 Watlington Road and Blackberry Lane will be restricted by fluvial and surface water flooding at return periods of 1 in 30-years and above. | | |
| **Climate Change** | **Climate change allowances for '2080s'** | **River Basin District** | **Central** | **Higher Central** / **Upper End** |
| | | Thames | 25% | 35% / 70% |
| | **Implications for the site** | Climate change under a +70% scenario is predicted to increase the extent of the 1 in 100 year event, which may affect the suitability of the northeast and southeast sections of the site. | | |

# South Oxfordshire District Council

# Detailed Site Summary Tables

| | |
|---|---|
| **Site reference** | GRENOBLE |
| **Site name** | Land south of Grenoble Road / Land at Ninevah Farm, Oxford |

| | | |
|---|---|---|
| **Drainage control and impact mitigation** | **Bedrock Geology** | Littlemore Limestone and Mudstone underlies most of the site; a band of Ampthill Clay Formation crosses the centre of the site. |
| | **Superficial Geology** | Head deposits of clay, silt, sand and gravel across the northwest, south, northeast and centre of the site.<br>Alluvium surrounds the lower reaches of the ordinary watercourse at the north of the site. |
| | **Soils** | Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils across the majority of site. Northern corner of site contains freely draining, slightly acid loamy soils. |
| | **SuDS** | SuDS should be designed around existing surface water flow paths. Due to the downstream flood risk at Barton Brook, surface water discharge should be restricted to greenfield runoff rates as a minimum.<br>Due to the presence of historic landfill sites and a wastewater treatment works in the northwest of the site, water quality may be an issue. The SuDS management train should be followed, and SuDS components may need to be lined, to prevent leaching of pollutants.<br>The potential for infiltration is likely to be low in the band of clay geology across the centre of the site. However, almost all SuDS can be used with some modification. |
| | **Groundwater SPZ** | The site is not located within a Groundwater Source Protection Zone. |
| | **Historic Landfill Site** | The Nuneham Road and Henley Road historic landfill sites are located in the northwest of the site. Industrial, chemical and sewage waste may have been buried at Nuneham Road. A thorough ground investigation will be required as part of a detailed site specific Flood Risk Assessment to determine the extent of the contamination and the impact this may have on SuDS. |
| | **Opportunities for flood risk betterment** | Opportunity to reduce surface water runoff to Barton Brook and Littlemore Brook offsite.<br>The northeast corner of the site should remain undeveloped and be used for flood plain storage, to stagger the volume of flows entering Littlemore Brook and affecting Sandford-on-Thames.<br>Opportunities should be taken to daylight culverted ordinary watercourses on-site, to increase channel capacity and reduce the risk of blockage. |
| **Recommend-actions for Local Plan policy** | **Sequential Test and Exception Test requirements** | |
| | The Sequential Test must be passed (see Section 4 of main report). Only once the Sequential Test is passed should the Exception Test be applied. **It is expected that all built development will be sequentially located within Flood Zone 1**, but the Exception Test would be required:<br>• If More Vulnerable and Essential Infrastructure is located in FZ3a.<br>• If Highly Vulnerable development is located in FZ2 or Flood Zone 3a plus climate change.<br>• If Essential Infrastructure is located in Flood Zone 3b<br>Development will not be permitted in the following scenarios:<br>• Highly Vulnerable development within FZ3a or Flood Zone 3a plus climate change and FZ3b.<br>• More Vulnerable and Less Vulnerable development within FZ3b. | |

# South Oxfordshire District Council

# Detailed Site Summary Tables

| | |
|---|---|
| **Site reference** | GRENOBLE |
| **Site name** | Land south of Grenoble Road / Land at Ninevah Farm, Oxford |

| | |
|---|---|
| | **Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers** |
| | **Flood risk assessment:**<br>• At the planning application stage, a site-specific flood risk assessment (considering all sources of flooding) and surface water drainage strategy will be required.<br>• Consultation with the Local Authority and the Environment Agency should be undertaken at an early stage<br>• Groundwater flood risk in the north of the site should be investigated.<br>• Detailed modelling will be required to confirm Flood Zone and climate change extents. The Environment Agency and LLFA should be consulted to obtain the latest hydraulic modelling information for the site at the time of the flood risk assessment. They will advise as to whether existing detailed models need to be updated.<br>• Climate change modelling should be undertaken using the relevant allowances (February 2016) for the type of development and level of risk.<br><br>**Guidance for site design and making development safe:**<br>• Development must seek opportunities to reduce overall level of flood risk at the site.<br>• The development should be designed using a sequential approach. Flood Zones 2 and 3, and 3a + upper end climate change (subject to a detailed flood risk assessment) should be preserved as public green space, with built development restricted to Flood Zone 1.<br>• Safe access and egress should be demonstrated in the 1 in 100 plus climate change event.<br>• Compensation storage would need to be provided for any land-raising within the 1 in 100 plus appropriate climate change flood extent<br>• Onsite attenuation options would need to be tested to ensure that altering the timing of peak flows leaving the site does not exacerbate flooding downstream.<br>• All development should adopt source control SuDS techniques to reduce the risk of flooding due to post-development runoff. SuDS design should follow current best practice (CIRIA Manual, 2015) and OCC guidance on runoff rates and volumes, to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. |

# South Oxfordshire District Council

# Detailed Site Summary Tables

| | |
|---|---|
| **Site code** | GRENOBLE |
| **Site name** | Land at Northfield, Oxford |

| | | |
|---|---|---|
| **Site details** | **OS Grid reference** | 456550, 203498 |
| | **Area** | 67.9Ha |
| | **Current land use** | Largely greenfield, with some farm buildings. |
| | **Proposed site use** | Housing and Employment |
| | **Flood risk vulnerability** | More vulnerable |
| **Sources of flood risk** | **Existing watercourses** | An ordinary watercourse, the Northfield Brook forms the eastern border of the site. An unnamed tributary of Littlemore Brook, also an ordinary watercourse, flows from the west of the site. |
| | **Flood history** | The site is not identified within the EA Historic Flood Map and no further flood incidents have been reported within the site boundary. |
| | **Fluvial** | **Proportion of site at risk in Flood Zones** |

| FZ3b | FZ3a | FZ2 | FZ1 |
|---|---|---|---|
| **14%** | 0% | 2% | 84% |

**Available modelled data:**
There is no fluvial modelled data available for the Bayswater Brook, or the ordianary watercourses on the site, other than the existing Flood Zone mapping. The Risk of Flooding from Surface Water mapping can be used as a proxy for flood risk from ordinary watercourses.

**Flood characteristics:**
The east of the site is at risk of fluvial flooding from the Northfield Brook during the 1 in 100 and 1 in 1,000-year events. RoFSW mapping predicts flooding to the west of the site from the straight ordinary watercourse during the 1 in 30-year rainfall event and greater return periods.

| | | |
|---|---|---|
| **Surface Water** | **Proportion of site at risk (RoFSW)** | |
| **30-year** | **100-year** | **1,000-year** |
| 7% | 10% | 20% |

**Description of surface water flow paths:**
Surface water flood risk on the site is identified within the floodplain of watercourses on the site. Large surface water flow paths are predicted along the eastern and western borders of the site during the 1 in 1,000-year rainfall event. Ponding occurs at the west of the site and north of Oxford Road during the 1 in 30-year rainfall event and higher return periods.

# South Oxfordshire District Council

# Detailed Site Summary Tables

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|---|---|---|---|---|---|
| | **Groundwater** | **Areas Susceptible to Groundwater Flooding Map class (risk of groundwater emergence %)** | | | |
| | | >=25% and <50% | | | |
| | **Reservoir** | This site is not at risk of reservoir flooding. | | | |
| | **Canal** | The site is not located within 100m of a canal. | | | |
| **Flood risk management infrastructure** | **Defences** | **Defence Type** | **Standard of Protection** | **Condition** | |
| | | The site does not receive protection from flood defences. | | | |
| | **Residual risk** | **Culvert / structure blockage?** | Blockage to the culvert entrance at the west boundary could cause flooding to the site. The impacts of a blockage should be modelled. | | |
| | | **Impounded water body failure?** | The site is not at risk of inundation in the event of reservoir failure. | | |
| | | **Defence breach / overtopping?** | **Breach Zone** | | |
| | | | The site is not at risk from breach of defences. | | |
| **Emergency planning** | **Flood warning** | The site does not lie in an Environment Agency flood warning area. Environment Agency flood warnings are now issued to individuals via the Flood Information Service. | | | |
| | **Access and egress** | Access to and egress from the site is possible to the west on Oxford Road. However, the road is at risk of surface water flooding during the 1 in 30-year event and higher return periods. | | | |
| **Climate Change** | **Climate change allowances for '2080s'** | **River Basin District** | **Central** | **Higher Central** | **Upper End** |
| | | Thames | 25% | 35% | 65% |
| | **Implications for the site** | Climate change under a +70% scenario is likely to increase the extent of the 1 in 100 year event to greater than the current Flood Zone 2 extent. | | | |

| | | |
|---|---|---|
| **Requirement for drainage control and impact mitigation** | **Bedrock Geology** | Wheatley Limestone underlies the majority of site. Ampthill Clay occurs at the north of site and Littlemore Limestone and Mudstone and Beckley Sandstone at the southwest. |
| | **Superficial Geology** | Head deposits of clay, silt, sand and gravel overlie the east and southwest of the site. Alluvium occurs alongside the Northfield Brook. |
| | **Soils** | Shallow lime-rich soils over chalk or limestone cover the majority of site, with slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils at the northern and eastern borders. |
| | **SuDS** | Most of the site has freely draining soils, and should be suitable for all types of SuDS. The north of the site is unlikely to be suitable for infiltration SuDS. SuDS should utilise existing surface water flow paths and be located outside areas of fluvial flood risk. |
| | **Groundwater Source Protection Zone** | The site is not located within a Groundwater Source Protection Zone. |
| | **Historic Landfill Site** | No part of the site is designated by the Environment Agency as an historic landfill site. |
| | **Opportunities for flood risk betterment** | As an upper catchment tributary of the Littlemore Brook, which feeds into the Thames, opportunities should be taken to leave the eastern border of the site undeveloped and use it for flood plain storage.<br><br>Opportunity to investigate the condition and capacity of the culvert at the west of the site, and determine whether it can accept flows from the developed site. Culvert enlargement or daylighting may be required if the asset is undersized.<br><br>Opportunity to implement exemplar SuDS design following CIRIA and OCC guidance on runoff rates and volumes, contributing to the reduction of flood peaks downstream. |

| | |
|---|---|
| **Recommend-actions for Local Plan policy** | **Sequential Test and Exception Test requirements** |
| | The Sequential Test must be passed (see Section 4 of main report). Only once the Sequential Test is passed should the Exception Test be applied. **It is expected that all built development will be sequentially located within Flood Zone 1**, but the Exception Test would be required:<br>• If More Vulnerable and Essential Infrastructure is located in FZ3a.<br>• If Highly Vulnerable development is located in FZ2 or Flood Zone 3a plus climate change.<br>• If Essential Infrastructure is located in Flood Zone 3b<br>Development will not be permitted in the following scenarios:<br>• Highly Vulnerable development within FZ3a or Flood Zone 3a plus climate change and FZ3b.<br>• More Vulnerable and Less Vulnerable development within FZ3b. |
| | **Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers** |
| | **Flood risk assessment:**<br>• At the planning application stage, a site-specific flood risk assessment (considering all sources of flooding) and surface water drainage strategy will be required.<br>• Consultation with the Local Authority and the Environment Agency should be undertaken at an early stage.<br>• Detailed modelling will be required to confirm Flood Zone and climate change extents. The Environment Agency and LLFA should be consulted to obtain the latest hydraulic modelling information for the site at the time of the flood risk assessment. They will advise as to whether existing detailed models need to be updated.<br>• Climate change modelling should be undertaken using the relevant allowances (February 2016) for the type of development and level of risk.<br><br>**Guidance for site design and making development safe:**<br>• Development must seek opportunities to reduce overall level of flood risk at the site.<br>• The development should be designed using a sequential approach. Flood Zones 2 and 3, and 3a + upper end climate change (subject to a detailed flood risk assessment) should be preserved as public green space, with built development restricted to Flood Zone 1.<br>• Safe access and egress should be demonstrated in the 1 in 100 plus climate change event.<br>• Compensation storage would need to be provided for any land-raising within the 1 in 100 plus appropriate climate change flood extent<br>• Onsite attenuation options would need to be tested to ensure that altering the timing of peak flows leaving the site does not exacerbate flooding downstream.<br>• All development should adopt source control SuDS techniques to reduce the risk of flooding due to post-development runoff. SuDS design should follow current best practice (CIRIA Manual, 2015) and OCC guidance on runoff rates and volumes, to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. |

# South Oxfordshire District Council

# Detailed Site Summary Tables

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|---|---|
| **Site code** | HARRINGTON |
| **Site name** | Harrington (land south of M40 J7), Milton Common |

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|---|---|---|
| **Site details** | **OS Grid reference** | 466258, 202052 |
| | **Area** | 499.7Ha |
| | **Current land use** | Greenfield |
| | **Proposed site use** | Housing, Employment and Traveller |
| | **Flood risk vulnerability** | More vulnerable (highly vulnerable for traveller site) |
| **Sources of flood risk** | **Existing watercourses** | The Main River Hasely Brook borders the south of the site. A tributary of the Haseley Brook flows out of the west of the site, and is fed by ordinary watercourses flowing from the north and northwest of the site. |
| | **Flood history** | The EA Flood History Map identifies flooding occurred to the south of the site from the Haseley Brook on 06/09/1992 and 06/10/1993. No further flood incidents have been reported within the site boundary. |
| | **Fluvial** | **Proportion of site at risk in Flood Zones** |

| FZ3b | FZ3a | FZ2 | FZ1 |
|---|---|---|---|
| 6% | 0% | 2% | 92% |

**Available modelled data:**
There is no fluvial modelled data available for the Haseley Brook, or the ordianary watercourses on the site, other than the existing Flood Zone mapping. The Risk of Flooding from Surface Water mapping can be used as a proxy for flood risk from ordinary watercourses.

**Flood characteristics:**
The centre and southern boundary of the site are at risk from fluvial flooding from the Haseley Brook during the 1 in 100 and 1 in 1,000-year flood events. The Risk of Flooding from Surface Water mapping suggests localised flooding may occur alonside the ordinary watercourses in the site during the 1 in 100 and 1 in 1,000-year rainfall events.

# South Oxfordshire District Council

# Detailed Site Summary Tables

| | | | | |
|---|---|---|---|---|
| | **Surface Water** | **Proportion of site at risk (RoFSW)** | | |
| | | **30-year** | **100-year** | **1,000-year** |
| | | 6% | 10% | 21% |
| | | **Description of surface water flow paths:** Surface water flood risk is high (1 in 30-year return period) alongside the watercourses and the large area of ponding between the M40 and A40 at the north of the site. However, the efficiency of drainage within highway culverts beneath the roads is not represented in the data. Significant surface water flow paths cross centre, west and north of the site during the 1 in 100 to 1 in 1,000-year rainfall events, draining into the watercourses. | | |
| | **Groundwater** | **Areas Susceptible to Groundwater Flooding Map class (risk of groundwater emergence %)** | | |
| | | • South, southwest and northeast: >=25% <50%<br>• North, northwest and southeast: <25% | | |
| | **Reservoir** | The site is not at risk of reservoir flooding. | | |
| | **Canal** | There are no canals within 100m of the site. | | |
| **Flood risk management infrastructure** | **Defences** | **Defence Type** | **Standard of Protection** | **Condition** |
| | | The site does not receive protection from flood defences. | | |
| | **Residual risk** | **Culvert / structure blockage?** | A number of culverts link ordinary watercourses from the north to the south of the site, beneath the M40. RoFSW mapping suggests constriction of flows may be an issue. Blockage of these assets should be modelled. | |
| | | **Impounded water body failure?** | The site is not at risk of inundation in the event of reservoir failure. | |
| | | **Defence breach / overtopping?** | **Breach Zone** | |
| | | | The site is not at risk from breach of defences. | |
| **Emergency planning** | **Flood warning** | The site does not lie in an Environment Agency flood warning area. Environment Agency flood warnings are now issued to individuals via the Flood Information Service. | | |
| | **Access and egress** | Safe access to and egress from the site is possible on the M40 at the north of the site. Further access can be found on A40 London Road, Thame Road and Latchford Lane; however, these roads are subject to localised flooding where the roads cross watercourses. | | |
| **Climate Change** | **Climate change allowances for '2080s'** | **River Basin District** | **Central** | **Higher Central** | **Upper End** |
| | | Thames | 25% | 35% | 70% |
| | **Implications for the site** | Climate change under a +70% scenario is likely to increase the extent of the 1 in 100 year event to greater than the current Flood Zone 2 extent. | | | |

# South Oxfordshire District Council

# Detailed Site Summary Tables

| | | |
|---|---|---|
| **Requirement for drainage control and impact mitigation** | **Bedrock Geology** | The majority of the site is underlain by Gault Formation Mudstone. An area of Whitchurch Sand Formation, Portland Group Limestone and Sandstone and Lower Greensand Sandstone is present at the northwest of the site. |
| | **Superficial Geology** | River terrace deposits overlie the north and northeast of the site. Alluvium, head deposits and peat surround the watercourses on the site. |
| | **Soils** | To the north, slowly permeable seasonally wet acid loamy and clayey soils. In the centre and south, loamy soils with naturally high groundwater. In the east and west, slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils. |
| | **SuDS** | Low permeability bedrock on the site suggests infiltration systems may not be appropriate, although they may be suitable in more permeable geology at the northwest of the site. Localised sand and gravel deposits may also allow shallow infiltration. There are good opportunities for above ground SuDS, with neighbouring watercourses providing discharge locations surface water from the site. SuDS should be designed around existing large surface water flow paths. |
| | **Groundwater Source Protection Zone** | The site is not located within a Groundwater Source Protection Zone. |
| | **Historic Landfill Site** | No part of the site is designated by the Environment Agency as an historic landfill site. |
| | **Opportunities for flood risk betterment** | Opportunities for using source control SuDS to manage runoff rates and volumes, contributing to the reduction of flood peaks downstream.<br><br>Options on the large site to provide areas of flood storage in the upper catchment, managing the flows which enter the Haseley Brook during high flows.<br><br>Opportunity to investigate the capacity and condition of the three culverts beneath the M40, at the northern edge of the site, and work with the Highways England to enlarge the assets as part of the development if required. |
| **Recommend-actions for Local Plan policy** | **Sequential Test and Exception Test requirements** | |
| | The Sequential Test must be passed (see Section 4 of main report). Only once the Sequential Test is passed should the Exception Test be applied. **It is expected that all built development will be sequentially located within Flood Zone 1**, but the Exception Test would be required:<br>• If More Vulnerable and Essential Infrastructure is located in FZ3a.<br>• If Highly Vulnerable development is located in FZ2 or Flood Zone 3a plus climate change.<br>• If Essential Infrastructure is located in Flood Zone 3b<br>Development will not be permitted in the following scenarios:<br>• Highly Vulnerable development within FZ3a or Flood Zone 3a plus climate change and FZ3b.<br>• More Vulnerable and Less Vulnerable development within FZ3b. | |
| | **Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers** | |
| | **Flood risk assessment:**<br>• At the planning application stage, a site-specific flood risk assessment (considering all sources of flooding) and surface water drainage strategy will be required.<br>• Consultation with the Local Authority and the Environment Agency should be undertaken at an early stage<br>• Detailed modelling will be required to confirm Flood Zone and climate change extents. The Environment Agency and LLFA should be consulted to obtain the latest hydraulic modelling information for the site at the time of the flood risk assessment. They will advise as to whether existing detailed models need to be updated.<br>• Climate change modelling should be undertaken using the relevant allowances (February 2016) for the type of development and level of risk. | |

| | |
|---|---|
| | **Guidance for site design and making development safe:**<br>• Development must seek opportunities to reduce overall level of flood risk at the site.<br>• The development should be designed using a sequential approach. Flood Zones 2 and 3, and 3a + upper end climate change (subject to a detailed flood risk assessment) should be preserved as public green space, with built development restricted to Flood Zone 1.<br>• Safe access and egress should be demonstrated in the 1 in 100 plus climate change event.<br>• Compensation storage would need to be provided for any land-raising within the 1 in 100 plus appropriate climate change flood extent<br>• Existing surface water flow paths should be retained and incorporated within the site design.<br>• Onsite attenuation options would need to be tested to ensure that altering the timing of peak flows leaving the site does not exacerbate flooding downstream.<br>• All development should adopt source control SuDS techniques to reduce the risk of flooding due to post-development runoff. SuDS design should follow current best practice (CIRIA Manual, 2015) and OCC guidance on runoff rates and volumes, to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. |

# South Oxfordshire District Council
# Detailed Site Summary Tables

| | |
|---|---|
| **Site code** | THORNHILL |
| **Site name** | Land at south of Oxford (Thornhill) |

| | | |
|---|---|---|
| **Site details** | **OS Grid reference** | 456700, 207006 |
| | **Area** | 38.92Ha |
| | **Current land use** | Greenfield |
| | **Proposed site use** | Housing and Employment |
| | **Flood risk vulnerability** | More vulnerable |
| **Sources of flood risk** | **Existing watercourses** | Two unnamed tributaries of the Bayswater Brook cross the site; one ordinary watercourse borders the west of the site and a second originates in the centre of the site and flows northwards. |
| | **Flood history** | The site is not identified within the EA Historic Flood Map. No further flood incidents have been reported within the site boundary. |
| | **Fluvial** | **Proportion of site at risk in Flood Zones** |

| FZ3b | FZ3a | FZ2 | FZ1 |
|---|---|---|---|
| **0%** | 0% | 0% | 100% |

**Available modelled data:**
There is no fluvial modelled data available for the ordianary watercourses on the site, and the Risk of Flooding from Surface Water mapping has been used as a proxy.

**Flood characteristics:**
Risk of Flooding from Surface Water mapping suggests that localised flooding may occur to the site from the unnamed ordinary watercourse to the north.

**Surface Water**

**Proportion of site at risk (RoFSW)**

| 30-year | 100-year | 1,000-year |
|---|---|---|
| 1% | 1% | 3% |

**Description of surface water flow paths:**
Surface water flood risk to the site is relatively low. The highest risk is at the north of the site, alongside the unnamed ordinary watercourse, with ponding occurring at either end of the access road during the 1 in 30 (3.3%), 1 in 100 (1%) and 1 in 1000 (0.1%) year events.
Surface water flow paths are generated at the west and northeast of the site during the 1 in 100 (1%) and 1 in 1,000 (0.1%) year events and flow offsite.

# South Oxfordshire District Council

# Detailed Site Summary Tables

| | |
|---|---|
| **Site code** | THORNHILL |
| **Site name** | Land at south of Oxford (Thornhill) |

| | | | | |
|---|---|---|---|---|
| | **Groundwater** | **Areas Susceptible to Groundwater Flooding Map class (risk of groundwater emergence %)** | | |
| | | Northeast of the site: >=25% <50%<br>Rest of the site: <25% | | |
| | **Reservoir** | The site is not at risk from reservoir flooding. | | |
| | **Canal** | There are no canals within 100m of the site. | | |
| **Flood risk management infrastructure** | **Defences** | **Defence Type** | **Standard of Protection** | **Condition** |
| | | The site does not receive protection from flood defences. | | |
| | **Residual risk** | **Culvert / structure blockage?** | There are no culverts within the site boundary. However, the ordinary watercourse at the north of the site discharges into a long culvert, therefore the impacts of this asset backing up should be investigated. | |
| | | **Impounded water body failure?** | The site is not at risk of inundation in the event of reservoir failure. | |
| | | **Defence breach / overtopping?** | **Breach Zone** | |
| | | | The site is not at risk from breach of defences. | |
| **Emergency planning** | **Flood warning** | The site does not lie in an Environment Agency flood warning area. Environment Agency flood warnings are now issued to individuals via the Flood Information Service. | | |
| | **Access and egress** | Access to and egress from the site are possible on A40 London Road in the north and via Thornhill Park and Ride to the northeast. Care should be taken during heavy rainfall, as both roads are prone to localised surface water flooding up to depths of 0.3m during the 1 in 100 (1%) and 1 in 1,000 (0.1%) year events. | | |

# South Oxfordshire District Council

# Detailed Site Summary Tables

<table>
<tr><td rowspan="3">Climate Change</td><td rowspan="2">Climate change allowances for ‘2080s’</td><td>River Basin District</td><td>Central</td><td>Higher Central</td><td>Upper End</td></tr>
<tr><td>Thames</td><td>25%</td><td>35%</td><td>70%</td></tr>
<tr><td>Implications for the site</td><td colspan="4">Climate change is unlikely to significantly change the Flood Zone classification.</td></tr>
<tr><td rowspan="8">Drainage control and impact mitigation</td><td>Bedrock Geology</td><td colspan="4">The site is underlain by clay, with Ampthill Clay Formation in the north and Kimmeridge Clay Formation in the south.</td></tr>
<tr><td>Superficial Geology</td><td colspan="4">Head deposits of clay, silt, sand and gravel overlie the south and east of the site.</td></tr>
<tr><td>Soils</td><td colspan="4">Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils, with shallow lime-rich soils over chalk or limestone at the northern extent of the site.</td></tr>
<tr><td>SuDS</td><td colspan="4">The low permeability of this site suggests that infiltration systems may not be appropriate. However, superficial geology deposits may allow some localised shallow infiltration, such as in swales and filter trenches. The 3.7% slope of the site allows opportunities for SuDS which drain by gravity.</td></tr>
<tr><td>Groundwater SPZ</td><td colspan="4">The site is not located within a Groundwater Source Protection Zone.</td></tr>
<tr><td>Historic Landfill Site</td><td colspan="4">No part of the site is designated by the Environment Agency as an historic landfill site.</td></tr>
<tr><td>Opportunities for flood risk betterment</td><td colspan="4">Opportunities for using source control SuDS to manage runoff rates and volumes, contributing to the reduction of flood peaks downstream and existing surface water flow paths leaving the site.<br><br>Opportunity to investigate the condition and capacity of the long culvert at the northern edge of the site, and determine whether it can accept flows from the developed site. Culvert enlargement or daylighting may be required if the asset is undersized.</td></tr>
<tr><td rowspan="4">Recommend-actions for Local Plan policy</td><td colspan="5">Sequential Test and Exception Test requirements</td></tr>
<tr><td colspan="5">The site is within Flood Zone 1 but at risk from surface water flooding, which should be taken into account when carrying out the Sequential Test and Exception test if required.</td></tr>
<tr><td colspan="5">Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers</td></tr>
<tr><td colspan="5">Flood risk assessment:<ul><li>At the planning application stage, a site-specific flood risk assessment (considering all sources of flooding) and surface water drainage strategy will be required.</li><li>Consultation with the Local Authority and the Environment Agency should be undertaken at an early stage</li><li>Impacts of the development on flood risk to the wider catchment should assessed.</li></ul>Guidance for site design and making development safe:<ul><li>Development must seek opportunities to reduce overall level of flood risk at the site.</li><li>The surface water drainage strategy should ensure that the development does not increase flood risk elsewhere.</li><li>Safe access and egress should be demonstrated in the 1 in 100 plus climate change event.</li></ul></td></tr>
</table>

| | |
|---|---|
| | • All development should adopt source control SuDS techniques to reduce the risk of flooding due to post-development runoff. SuDS design should follow current best practice (CIRIA Manual, 2015) and OCC guidance on runoff rates and volumes, to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc.<br>• Drainage designs should 'design for exceedance' and accommodate existing surface water flow routes, with development located outside of existing flood risk areas. |

# South Oxfordshire District Council

# Detailed Site Summary Tables

| | |
|---|---|
| **Site code** | WHEATLEY |
| **Site name** | Oxford Brookes University, Wheatley |

| | | |
|---|---|---|
| **Site details** | **OS Grid reference** | 460212, 20603 |
| | **Area** | 21.5Ha |
| | **Current land use** | Partially developed (education facility) with greenfield land to the west. |
| | **Proposed site use** | Housing and Employment |
| | **Flood risk vulnerability** | More vulnerable. |
| **Sources of flood risk** | **Existing watercourses** | There are no watercourses within the site boundary. |
| | **Flood history** | The site is not identified within the EA Historic Flood Map and no further flood incidents have been reported within the site boundary. Flooding occurred to London Road to the south of the site during 2016/2017. |
| | **Fluvial** | **Proportion of site at risk in Flood Zones** |

| FZ3b | FZ3a | FZ2 | FZ1 |
|---|---|---|---|
| 0% | 0% | 0% | 100% |

**Available modelled data:**
There is no fluvial modelled data available for site.
**Flood characteristics:**
The site is not classified as at risk of fluvial flooding.

**Surface Water** — **Proportion of site at risk (RoFSW)**

| 30-year | 100-year | 1,000-year |
|---|---|---|
| 0% | 1% | 3% |

**Description of surface water flow paths:**
Surface water flood risk is disperse and limited to ponding in low points of the existing hardstanding. Ponding occurs next to buildings during the 1 in 30 (3.3%), 1 in 100 (1%) and 1 in 1000 (0.1%) year rainfall events.

| | |
|---|---|
| **Groundwater** | **Areas Susceptible to Groundwater Flooding Map class (risk of groundwater emergence %)** |
| | <25% risk. |
| **Reservoir** | The site is not at risk of reservoir flooding. |
| **Canal** | There are no canals within 100m of the site. |

# South Oxfordshire District Council

# Detailed Site Summary Tables

| | |
|---|---|
| **Site code** | WHEATLEY |
| **Site name** | Oxford Brookes University, Wheatley |

<table>
<tr><td rowspan="5">Flood risk management infrastructure</td><td rowspan="2">Defences</td><td>Defence Type</td><td>Standard of Protection</td><td>Condition</td></tr>
<tr><td colspan="3">The site does not receive protection from flood defences.</td></tr>
<tr><td rowspan="3">Residual risk</td><td>Culvert / structure blockage?</td><td colspan="2">There are no structures within the site boundary.</td></tr>
<tr><td>Impounded water body failure?</td><td colspan="2">The site is not at risk of inundation in the event of reservoir failure.</td></tr>
<tr><td rowspan="2">Defence breach / overtopping?</td><td colspan="2">Breach Zone</td></tr>
<tr><td colspan="2">The site is not at risk from breach of defences.</td></tr>
<tr><td rowspan="2">Emergency planning</td><td>Flood warning</td><td colspan="3">The site does not lie in an Environment Agency flood warning area. Environment Agency flood warnings are now issued to individuals via the Flood Information Service.</td></tr>
<tr><td>Access and egress</td><td colspan="3">Safe access to and egress from the site is possible to the east via College Close onto Waterperry Road.</td></tr>
</table>

# South Oxfordshire District Council

# Detailed Site Summary Tables

| | | | | | |
|---|---|---|---|---|---|
| **Climate Change** | **Climate change allowances for '2080s'** | **River Basin District** | **Central** | **Higher Central** | **Upper End** |
| | | Thames | 25% | 35% | 70% |
| | **Implications for the site** | Climate change is unlikely to significantly change the Flood Zone classification. | | | |
| **Requirement for drainage control and impact mitigation** | **Bedrock Geology** | The north of the site is underlain by Arngrove Spiculite Sandstone, the south by Beckley Sand Sandstone. | | | |
| | **Superficial Geology** | None | | | |
| | **Soils** | The majority of site is covered by lime-rich loamy and clayey soils with impeded drainage, with shallow lime-rich soils over limestone in the west of the site. | | | |
| | **SuDS** | The permeable geology of the site suggests deep infiltration SuDS will be suitable, although waterlogging of soils indicates restrictions for shallower infiltration techniques. If infiltration is not used, discharge locations for surface water may be challenging, with no nearby surface water bodies. There may be potential to enhance the site character by integrating SuDS into the existing built area and green spaces. | | | |
| | **Groundwater Source Protection Zone** | The site is not located within a Groundwater Source Protection Zone. | | | |
| | **Historic Landfill Site** | No part of the site is designated by the Environment Agency as an historic landfill site. | | | |
| | **Opportunities for flood risk betterment** | Existing surface water ponding issues could be managed by retrofitting SuDS to increase the permeability of areas of hard standing.<br>Opportunity to implement source control SuDS designs following OCC guidance on runoff rates and volumes. | | | |
| **Recommend-actions for Local Plan policy** | **Sequential Test and Exception Test requirements** | | | | |
| | The site is within Flood Zone 1 but at risk from surface water flooding, which should be taken into account when carrying out the Sequential Test and Exception test if required. | | | | |

| | Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers |
|---|---|
| | **Flood risk assessment:**<br>• At the planning application stage, a site-specific flood risk assessment and surface water drainage strategy will be required.<br>• Consultation with OCC, the Lead Local Authority, should be undertaken at an early stage.<br>• Other sources of flooding should also be considered as part of a site-specific flood risk assessment.<br><br>**Guidance for site design and making development safe:**<br>• Development must seek opportunities to reduce overall level of flood risk at the site.<br>• All development should integrate source control SuDS techniques to reduce the risk of flooding due to post-development runoff. SuDS design should follow current best practice (CIRIA Manual 2015) and OCC guidance on runoff rates and volumes, to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc.<br>• Safe access and egress should be demonstrated in the 1 in 100 plus climate change event.<br>• Drainage designs should 'design for exceedance' and accommodate existing surface water flow routes. |

# South Oxfordshire District Council

# Level 2 SFRA Detailed Site Summary Tables

| | |
|---|---|
| **Site code** | WICKFARM |
| **Site name** | Land at Wick Farm |

| | | |
|---|---|---|
| **Site details** | **OS Grid reference** | 455379, 208764 |
| | **Area** | 116.5Ha |
| | **Current land use** | Largely greenfield, with some existing buildings |
| | **Proposed site use** | Housing and Employment |
| | **Flood risk vulnerability** | More vulnerable |
| **Sources of flood risk** | **Existing watercourses** | The Main River Bayswater Brook flows along the southern boundary of the site. Four ordinary watercourses flow from the site into Bayswater Brook at the south, and a fifth flows along the northern boundary. |
| | **Flood history** | The EA Flood History Map identifies the southeast corner of site was affected by flooding from Bayswater Brook on 06/09/1992. No further flood incidents have been reported within the site boundary. |
| | **Fluvial** | **Proportion of site at risk in Flood Zones** |

| FZ3b | FZ3a | FZ2 | FZ1 |
|---|---|---|---|
| 3% | 0% | 1% | 95% |

**Available modelled data:**
There is no fluvial modelled data available for the Bayswater Brook, or the ordianary watercourses on the site, other than the existing Flood Zone mapping. The Risk of Flooding from Surface Water mapping does not identify the flood risk from ordinary watercourses.

**Flood characteristics:**
The southern boundary of the site is at risk of flooding from the Bayswater Brook during the 1 in 100 (1%) and 1 in 1,000-year (0.1%) flood events.

**Surface Water**

**Proportion of site at risk (RoFSW)**

| 30-year | 100-year | 1,000-year |
|---|---|---|
| 3% | 4% | 6% |

**Description of surface water flow paths:**
With the exception of Bayswater Brook floodplain at the southern boundary of the site, surface water flood risk on the site is low. Isolated flow paths are generated at the north during the 1 in 1,000-year event and at the centre of the site during all return periods.

**Groundwater**

**Areas Susceptible to Groundwater Flooding Map class (risk of groundwater emergence %)**

- Northeast of the site: >=50% <75%
- Rest of the site: <25% risk.

# South Oxfordshire District Council

# Level 2 SFRA Detailed Site Summary Tables

| | |
|---|---|
| **Site code** | WICKFARM |
| **Site name** | Land at Wick Farm |

| | | | | |
|---|---|---|---|---|
| | **Reservoir** | The site is not at risk from reservoir flooding. | | |
| | **Canal** | There are no canals within 100m of the site. | | |
| **Flood risk management infrastructure** | **Defences** | **Defence Type** | **Standard of Protection** | **Condition** |
| | | The site does not receive protection from flood defences. | | |
| | **Residual risk** | **Culvert / structure blockage?** | There are no structures on the site that have the potential to block | |
| | | **Impounded water body failure?** | The site is not at risk of inundation in the event of reservoir failure. | |
| | | **Defence breach / overtopping?** | **Breach Zone** | |
| | | | The site is not at risk from breach of defences. | |
| **Emergency planning** | **Flood warning** | The site does not lie in an Environment Agency flood warning area. Environment Agency flood warnings are now issued to individuals via the Flood Information Service. | | |
| | **Access and egress** | The site does not lie in an Environment Agency flood warning area. Environment Agency flood warnings are now issued to individuals via the Flood Information Service. | | |

# South Oxfordshire District Council

# Level 2 SFRA Detailed Site Summary Tables

<table>
<tr><td rowspan="2">Climate Change</td><td>Climate change allowances for ‘2080s’</td><td>River Basin District</td><td>Central</td><td>Higher Central</td><td>Upper End</td></tr>
<tr><td></td><td>Thames</td><td>25%</td><td>35%</td><td>70%</td></tr>
<tr><td></td><td>Implications for the site</td><td colspan="4">Climate change under a +70% scenario is likely to increase the extent of the 1 in 100 year event to greater than the current Flood Zone 2 extent.</td></tr>
<tr><td rowspan="7">Requirement for drainage control and impact mitigation</td><td>Bedrock Geology</td><td colspan="4">The site is largely underlain by Beckley Sandstone. There are areas of Wheatley Limestone in the north, West Walton Mudstone at the south and Arngrove Spiculite Sandstone to the southwest.</td></tr>
<tr><td>Superficial Geology</td><td colspan="4">Alluvium occurs at the south of the site, alongside the Bayswater Brook. Northmoor sands and gravels and head deposits of clay, silt and sand overlie the southwest of the site.</td></tr>
<tr><td>Soils</td><td colspan="4">To the north, freely draining slightly acid loamy soils, in the centre, slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils. Loamy soils with naturally high groundwater are present in the southwest.</td></tr>
<tr><td>SuDS</td><td colspan="4">The range of soil types mean that the permeability of the site will vary. There is good potential for all types of SuDS in the north and centre of the site, with lower potential for infiltration SuDS at the south and southwest of the site. However, shallow infiltration may be possible in permeable superficial deposits. Due to the presence of historic landfill sites in the site, water quality may be an issue. The SuDS management train should be followed, and SuDS components may need to be lined, to prevent leaching of pollutants.<br>The site gradient of 3.7% towards the south provides opportunities for SuDS which drain by gravity. Drainage features at the south of the site should be designed to be resilient to fluvial flooding.</td></tr>
<tr><td>Groundwater Source Protection Zone</td><td colspan="4">The site is not located within a Groundwater Source Protection Zone.</td></tr>
<tr><td>Historic Landfill Site</td><td colspan="4">Wick Copse, Wick Farm and Barton Village Road historic landfill sites have been designated by the Environment Agency within the site boundary. A thorough ground investigation will be required as part of a detailed site specific Flood Risk Assessment to determine the extent of the contamination and the impact this may have on SuDS.</td></tr>
<tr><td>Opportunities for flood risk betterment</td><td colspan="4">Opportunity to implement exemplar SuDS design following CIRIA and OCC guidance on runoff rates and volumes, which provide multiple benefits.<br><br>As the site borders the Bayswater Brook, a tributary of the River Cherwell, opportunity to slow the river flows entering Oxford and reduce flood peaks.</td></tr>
<tr><td rowspan="4">Recommend-actions for Local Plan policy</td><td colspan="5">Sequential Test and Exception Test requirements</td></tr>
<tr><td colspan="5">The Sequential Test must be passed (see Section 4 of main report). Only once the Sequential Test is passed should the Exception Test be applied. It is expected that all built development will be sequentially located within Flood Zone 1, but the Exception Test would be required:<br>• If More Vulnerable and Essential Infrastructure is located in FZ3a.<br>• If Highly Vulnerable development is located in FZ2 or Flood Zone 3a plus climate change.<br>• If Essential Infrastructure is located in Flood Zone 3b<br>Development will not be permitted in the following scenarios:<br>• Highly Vulnerable development within FZ3a or Flood Zone 3a plus climate change and FZ3b.<br>• More Vulnerable and Less Vulnerable development within FZ3b.</td></tr>
<tr><td colspan="5">Recommendations for requirements of site-specific Flood Risk Assessment, including guidance for developers</td></tr>
<tr><td colspan="5">Flood risk assessment:</td></tr>
</table>

| | |
|---|---|
| | • At the planning application stage, a site-specific flood risk assessment (considering all sources of flooding) and surface water drainage strategy will be required.<br>• Consultation with the Local Authority and the Environment Agency should be undertaken at an early stage<br>• Groundwater flood risk in the northeast of the site should be investigated.<br>• Detailed modelling will be required to confirm Flood Zone and climate change extents. The Environment Agency and LLFA should be consulted to obtain the latest hydraulic modelling information for the site at the time of the flood risk assessment. They will advise as to whether existing detailed models need to be updated.<br>• Climate change modelling should be undertaken using the relevant allowances (February 2016) for the type of development and level of risk.<br><br>**Guidance for site design and making development safe:**<br>• Development must seek opportunities to reduce overall level of flood risk at the site.<br>• The development should be designed using a sequential approach. Flood Zones 2 and 3, and 3a + upper end climate change (subject to a detailed flood risk assessment) should be preserved as public green space, with built development restricted to Flood Zone 1.<br>• Safe access and egress should be demonstrated in the 1 in 100 plus climate change event.<br>• Compensation storage would need to be provided for any land-raising within the 1 in 100 plus appropriate climate change flood extent<br>• Onsite attenuation options would need to be tested to ensure that altering the timing of peak flows leaving the site does not exacerbate flooding downstream.<br>• All development should adopt source control SuDS techniques to reduce the risk of flooding due to post-development runoff. SuDS design should follow current best practice (CIRIA Manual, 2015) and OCC guidance on runoff rates and volumes, to deliver multiple benefits including water quality, biodiversity, amenity, green infrastructure etc. |