

# BRACKNELL DATA CENTRE

Flood Risk Assessment  
20305B-RPS-SI-XX-RP-C-9602



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Bracknell Data Centre  
Flood Risk Assessment  
1 March 2021

### Approval for issue

Jonathan Morley

March 2021

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# 1 INTRODUCTION

## 1.1 Background

- 1.1.1 This site-specific Flood Risk Assessment (FRA) has been prepared to support a planning application for the development of Land at Cain Road, Bracknell.
- 1.1.2 The key objectives of this FRA are to:
- Assess the flood risk to the proposed development and to demonstrate the feasibility of appropriately designing the development such that any residual flood risk to the development and users would be acceptable;
  - Assess the potential impact of the proposed development on flood risk elsewhere and to demonstrate the feasibility of appropriately designing the development such that the development would not increase flood risk elsewhere; and
  - Satisfy the requirements of the NPPF (Ministry of Housing, Communities and Local Government (MHCLG), 2019) and PPG ID7 (MHCLG, 2014) which require FRAs to be submitted in support of planning applications for development over 1 hectares (ha) in area.

## 1.2 Methodology

- 1.2.1 The FRA has taken account of the impact from the proposed development on the prevailing hydrological, surface water drainage, flooding and water quality environments. The assessment has been undertaken in accordance with the National Planning Framework (NPPF) (MHCLG, 2019), PPG ID7 (MHCLG, 2014) , Non-statutory technical standards for sustainable drainage systems (Defra, 2015) and CIRIA 753 The SuDS Manual (CIRIA, 2015).
- 1.2.2 A 500 metre (m) buffer for the proposed development has been selected for data collection and is considered appropriate taking into account the likely zone of influence on hydrological receptors. Given the landscape surrounding the development and ongoing anthropogenic activities it would be difficult to ascertain the exact source of any impacts on water quality beyond 500 m.
- 1.2.3 Determination of the baseline conditions at the site has been established through a review of literature and data obtained from publicly available sources.

## 1.3 Report Structure

- 1.3.1 This FRA has the following structure:
- Section 2 identifies the sources of information that have been consulted in preparation of the report;
  - Section 3 summarises the legislation, guidance and local planning policy;
  - Section 4 describes the site location and the existing and proposed site development layout;
  - Section 5 provides a hydrological review of the site and undertakes an FRA of the proposed development scheme;
  - Section 6 describes the site's vulnerability status in line with the NPPF and PPG;
  - Section 7 describes the runoff characteristics and drainage of the site; and
  - Section 8 provides a summary and conclusion to the report.

## 1.4 Sources of Information

1.4.1 Table 1.1 lists the information sources consulted during preparation of this report.

**Table 1.1. Information sources consulted during preparation of the report.**

Source	Data	Notes
Ordnance Survey (OS).	OS Tile SU86.	Area information, rivers and other watercourses, general site environs, built environment, catchment Information.
British Geological Survey (BGS).	BGS (online) Geology of Britain Viewer.	Site and area geology.
Environment Agency (EA).	EA data holdings, customer service and engagement team.	Current flood risk, local flood defences, flood levels, supplementary geology and groundwater information.
Local Planning Authority (LPA).	Bracknell Forest Level 1 Strategic Flood Risk Assessment	Flood Zoning. Local Development Framework
Water Utility Company.	Thames Water	Water and sewerage assets in the vicinity of the site.
Planning Policy	NPPF (2019). Planning Practice Guidance (2014)	FRA and Planning Guidance, Flood zoning for the site as used by the EA in England.
	The Department for Environment Food and Rural Affairs (Defra) Sustainable Drainage Systems Non-statutory technical standards for drainage systems (March 2015)	Surface water runoff standards
	UK Climate Projections 2018 (UKCP18)	Climate change prediction data



## 2 LEGISLATION AND GUIDANCE

### 2.1 Planning Policy

#### National Planning Policy Framework

- 2.1.1 The National Planning Policy Framework (NPPF) (MHCLG, 2019), sets out the Government's planning policies for England and how these are expected to be applied. The framework provides guidance for local planning authorities and decision-takers, both in drawing up plans and making decisions about planning applications.
- 2.1.2 Paragraph 163 of the NPPF (MHCLG, 2019) states that when determining planning applications, local authorities should ensure that the proposed development does not lead to an increased flood risk elsewhere.
- 2.1.3 Footnote 50 states that a site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving:
- Sites of 1 hectare or more;
  - Land which has been identified by the Environment Agency as having critical drainage problems;
  - Land identified in a strategic flood risk assessment as being at increased flood risk in future; or
  - Land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.
- 2.1.4 The NPPF (MHCLG, 2019) requires the application of a sequential risk-based approach to determining the suitability of land for development in flood risk areas. The Sequential Test approach steers new development to areas of land with the lowest probability of flooding (i.e. Flood Zone 1). Where there are no reasonably available sites in Flood Zone 1, LPAs should consider reasonably available sites in Flood Zone 2 (i.e. areas with a medium probability of flooding), applying the Exception Test if required. The Exception Test is a method to demonstrate that the flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

### 2.2 Planning Practice Guidance

- 2.2.1 Current guidance on development and flood risk (PPG ID7: Flood Risk and Coastal Change. MHCLG, 2014) identifies several key considerations for the design and operation of a development to ensure it is appropriately flood resilient and resistant, safe for its users for the development's lifetime, and will not increase flood risk overall. These considerations are as follows and have been taken into account in this FRA:
- The development should not be at a significant risk of flooding and should not be susceptible to damage due to flooding;
  - The development should not be exposed to flood risk such that the health, safety or welfare of the users of the development, or the population elsewhere, is threatened;
  - Normal operation of the development should not be susceptible to disruption as a result of flooding;
  - Safe access to and from the development should be possible during flood events;

- The development should not increase flood risk elsewhere;
- The development should not prevent safe maintenance of watercourses or maintenance and operation of flood defences;
- The development should not be associated with an onerous or difficult operation and maintenance regime to manage flood risk. The responsibility for any operation and maintenance required should be clearly defined;
- Future users of the development should be made aware of any flood risk issues relating to the development;
- The development design should be such that future users will not have difficulty obtaining insurance or mortgage finance, or in selling all or part of the development, as a result of flood risk issues;
- The development should not lead to degradation of the environment; and
- The development should meet all of the above criteria for its entire lifetime, including consideration of the potential effects of climate change.

2.2.2 The FRA has taken account of the impact from the proposed development on the prevailing hydrological, surface water drainage, flooding and water quality environments. The assessment has been undertaken in accordance with the NPPF (MHCLG, 2019), PPG ID7 (MHCLG, 2014), Non-statutory technical standards for sustainable drainage systems (Defra, 2015) and CIRIA 753 The SuDS Manual (CIRIA, 2015).

2.2.3 PPG ID7 provides guidance to ensure the effective implementation of the NPPF planning policy for development in areas at risk of flooding. The NPPF (MHCLG, 2019) sets out when a site-specific FRA is needed (see above). The FRA should consider vulnerability to flooding from a range of sources (e.g. groundwater) as well as from river and sea flooding. PPG ID7 also sets out a checklist of the information that should be included in a site-specific flood risk assessment, including the following key stages:

- Development site and location – including current use of the site;
- Development proposals;
- Sequential test – for development in Flood Zones 2 and 3 only. If the development site is wholly within Flood Zone 1 it is not necessary to undertake this stage;
- Climate change – how is the flood risk likely to be affected by climate change;
- Site specific flood risk – what are the main sources of flooding, what is the probability of flooding, how will the development be made safe from flooding, ensure that the development and any flood risk measures do not increase the risk of flooding off-site; and
- Surface water management.

## 2.3 Local Planning Policy

### Existing Policy

2.3.1 The Bracknell Local Plan, adopted in 2002, and Core Strategy, adopted in 2008, are the existing policy documents however the replacement Draft Bracknell Forest Local Plan is due to be adopted in 2021 to 2022. Whilst this document has not been through examination in public so less weight can be given, it does however, give a clear direction for future Bracknell Forest Council policies.

- 2.3.2 Neither of the existing documents contain policies that specifically address flood risk, however the Local Plan refers to relevant policies in the Berkshire Structure Plan 2001 – 2016 which contains the following relevant policy:

**Policy EN6 : Prevention of Flooding**

1. *Development proposals will avoid adding to flood risk, either within the development site or elsewhere. Measures to employ sustainable drainage solutions will be encouraged.*
2. *Local planning authorities and developers will carry out a flood risk assessment based on a sequential approach when identifying new development sites, or assessing development proposals to ensure that the site can be developed and occupied safely and to prevent adverse flooding effects elsewhere in the catchment.*
3. *New development in the functional flood plain will only be permitted in exceptional circumstances and will be limited to essential infrastructure. Redevelopment of previously developed land in the functional floodplain should not interfere with flood flows or with river management options.*

- 2.3.3 As part of the Core Strategy, new developments are required to produce a 'Sustainability Statement' that includes details of:

- *The use of sustainable drainage systems in the management of run-off;*

**Emerging Policy – Draft Bracknell Forest Local Plan Part 1 (Further Consultation on Revised Growth Stage) (October 2019)**

**Policy LP 17 Flood risk**

*Development will only be permitted if:*

- i. *the sequential test is applied to the location of development taking into account flood risk from all sources, both now and in the future;*
- ii. *the sequential approach is applied to the layout of development within an application site, taking into account flood risk from all sources, both now and in the future;*
- iii. *where application of the exception test is required by national policy, it is fully complied with; and*
- iv. *flood risk from all sources of flooding, now and in the future, is taken into consideration and fully addressed.*

*Minor development and changes of use are excluded from the application of the sequential test.*

*A Flood Risk Assessment (FRA) will be required for developments in areas identified in the latest SFRA as being at risk of flooding now or in the future, and when required by national policy. The FRA is required to demonstrate that:*

- i. *all forms of flooding have been considered;*
- ii. *the development will not exacerbate flood risk off-site over the lifetime of the development and implements opportunities to reduce the causes and impacts of flooding;*
- iii. *suitable allowances for climate change have been taken into account in accordance with the most up to date guidance;*



- iv. *the development is safe for its lifetime from all forms of flooding with finished floor levels above predicted design flood levels; and*
- v. *safe access and egress routes are provided.*

### **Draft Bracknell Forest Local Plan Part 2 - Non-Strategic Development Management Policies (October 2019)**

#### **Policy LP48 Sustainable Drainage Systems (SuDS)**

*Development will be permitted if all the following criteria are met:*

- i. *Major development proposals and developments in areas at risk of flooding from all sources, both now and in the future, identified in the latest SFRA, shall incorporate SuDS as an intrinsic part of the design and layout, unless it can be demonstrated that provision on site is inappropriate;*
- ii. *SuDS shall be designed in accordance with the principles set out in the Bracknell Forest Local Flood Risk Management Strategy, incorporating urban creep allowances and utilising the most up to date climate change allowances and rainfall data;*
- iii. *SuDS will be designed without creating excessive maintenance burdens to future owners/occupiers, and where possible, incorporated in tandem with other site requirements in order to utilise land efficiently;*
- iv. *Clear arrangements are in place for on-going maintenance secured by legal agreement;*
- v. *Runoff from brownfield development should be reduced to as close as practicable to greenfield runoff rates;*
- vi. *SuDS solutions are selected in accordance with the hierarchy of drainage options, with a preference for green solutions; The proposed SuDS solution shall meet the needs of the proposed development, over its lifetime; and*
- vii. *The SuDS solutions proposed will provide sufficient water quality treatment to mitigate the impact of development in accordance with the Thames River Basin Management Plan.*

## **2.4 Guidance**

### **Non-statutory technical standards for sustainable drainage systems (SuDS)**

- 2.4.1 The document contains non-statutory technical standards for the design, maintenance and operation of sustainable drainage systems to drain surface water from housing, non-residential or mixed-use developments for the lifetime of the development.
- 2.4.2 Sustainable drainage systems slow the rate of surface water run-off and improve infiltration, by mimicking natural drainage in both rural and urban areas. This reduces the risk of “flash-flooding” which occurs when rainwater rapidly flows into the public sewerage and drainage systems.
- 2.4.3 The drainage system must be designed so that (unless an area is designated to hold and/or convey water as part of the design) flooding does not occur on any part of the site for a 1 in 30 year rainfall event.

## **2.5 Climate Change Guidance**

- 2.5.1 In February 2016 (updated July 2020) the Environment Agency published advice on climate change allowances to support NPPF. The guidance requires that flood risk assessments and

strategic flood risk assessments, take into account, where appropriate, increases in rainfall intensity, peak river flows and sea level rise. Table 2.1 presents both the central and upper end estimates for climate change associated with rainfall intensity to understand the range of the potential impact.

**Table 2.1. Change to extreme rainfall intensity compared to a 1961-90, applicable across England**

Climate Change Allowance	Total potential change anticipated for '2020s' (2015-2039)	Total potential change anticipated for '2050s' (2040- 2069)	Total potential change anticipated for the '2080s' (2070-2115)
Upper Estimate	10%	20%	40%
Central Estimate	5%	10%	20%

### Peak River Flow (2015 baseline)

- 2.5.2 The peak river flow allowances show the anticipated changes to peak flow by river basin district. The site falls within the Thames river basin district and the peak river flow allowance and outlined in Table 2.2 below.

**Table 2.2. Peak river flow allowances by river basin district**

River Basin District	Allowance	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Thames	H++	25%	40%	80%
	Upper end	25%	35%	70%
	Higher central	15%	25%	35%
	Central	10%	15%	25%

- 2.5.3 The guidance on flood risk assessments and climate change allowances (online) notes that the allowances provided have been derived from national scale research. There may be cases where local evidence supports the use of other local climate change allowances.
- 2.5.4 RPS has added 40% to all attenuation / runoff calculation for the development to account for climate change.

## 2.6 Local Authority Strategic Flood Risk Assessment

### Bracknell Forest Strategic Flood Risk Assessment, published in August 2010

- 2.6.1 The Bracknell Forest Strategic Flood Risk Assessment (SFRA) is a planning tool to guide local planning authorities in their selection and development of sustainable site allocations away from vulnerable flood risk areas. It provides an overview of flood risk from various sources within the district. Relevant information from the SFRA has been included in section 4 of this report.

### 2.7 Drainage Responsibilities

- 2.7.1 Following the implementation of the Flood and Water Management Act 2010, local flood risk has become the responsibility of the local planning authority. The Act places new duties on upper tier councils, by designating them as Lead Local Flood Authorities (LLFAs) for the coordination of local flood risk management in their respective administrative areas.
- 2.7.2 From 6 April 2015, the local planning authority is responsible for approving the design of proposed drainage and surface water management systems. The designs have to meet national standards for sustainable drainage and the proposals should be submitted as part of the planning application process.
- 2.7.3 The local planning authority is also responsible for adopting and maintaining Sustainable Drainage Systems (SuDS) which serve more than one property and have been approved. The Highways Authorities will be responsible for maintaining SuDS in public roads to National Standards.
- 2.7.4 The SuDS Manual C753 sets out the criteria by which the form of drainage appropriate to any particular site or development can be determined, as well as requirements for the design, construction, operation and maintenance of SuDS.
- 2.7.5 Additional guidance for the use of SuDS is provided via CIRIA and BRE in the following:
- C523 Sustainable Drainage Systems - Best practice (CIRIA, 2001);
  - C156 Infiltration Drainage - Manual of Good practice (CIRIA, 1996); and
  - BRE365 Soakaway design (BRE, 2016).

### 3 BASELINE

#### 3.1 Baseline Conditions

##### Site Location

- 3.1.1 The site is located west of Bracknell at National Grid Reference (NGR) SU846691 and occupies an area of approximately 6.8 hectares (ha). The site located in a mixed setting, with woodland and residential housing north of the site, commercial units east and west, and a main road and further residential housing to the south.
- 3.1.2 Wykery Copse, a Site of Special Scientific Interest (SSSI), is located approximately 325 m south east of the site. Farley Copse, a Local Nature Reserve (LNR) is located approximately 420 m north of the site. There are no further sites of special designation, such as SSSI and LNR, within 1 km of the site.
- 3.1.3 The site lies within the administrative area of Bracknell Forest Council (BFC).

##### Existing Site

- 3.1.4 The site currently comprises 2 no. existing commercial office buildings with associated car parking. The main access to the site is via the main entrance in the north from a roundabout leading on to Cain Road.
- 3.2 The Application Site extends to a total of 9.9 Ha and is made up of 2 distinct sections. The Main site (7.5 Ha) (hereafter called the Site) and an area of land (2.4 Ha) to the south on the opposite side of Beehive Road (the 'Former Recreation Site').
- 3.2.1 A topographical survey completed by Site Vision Surveys Limited in June 2020 (drawing reference 0520-ARC-13281) indicates that the site has a general level of approximately 67 metres (m) above Ordnance Datum (AOD) across the central area and rising to approximately 68m AOD at the eastern and western areas. The level drops to approximately 66m AOD in the north and southern areas, dropping further to approximately 65m AOD in the central area of the southern perimeter.

#### 3.3 Proposed Development

- 3.3.1 This application seeks consent for the construction of a new data centre and associated auxiliary buildings, with associated office administration areas, emergency generators and emission stacks, diesel tanks and filling area, electrical switchroom, a water sprinkler pump room and storage tank, a gate house / security building, site access, internal access roads, drainage infrastructure and hard and soft landscaping.
- 3.3.2 The main access to the site will remain as existing via the roundabout in the central of the north of the site.

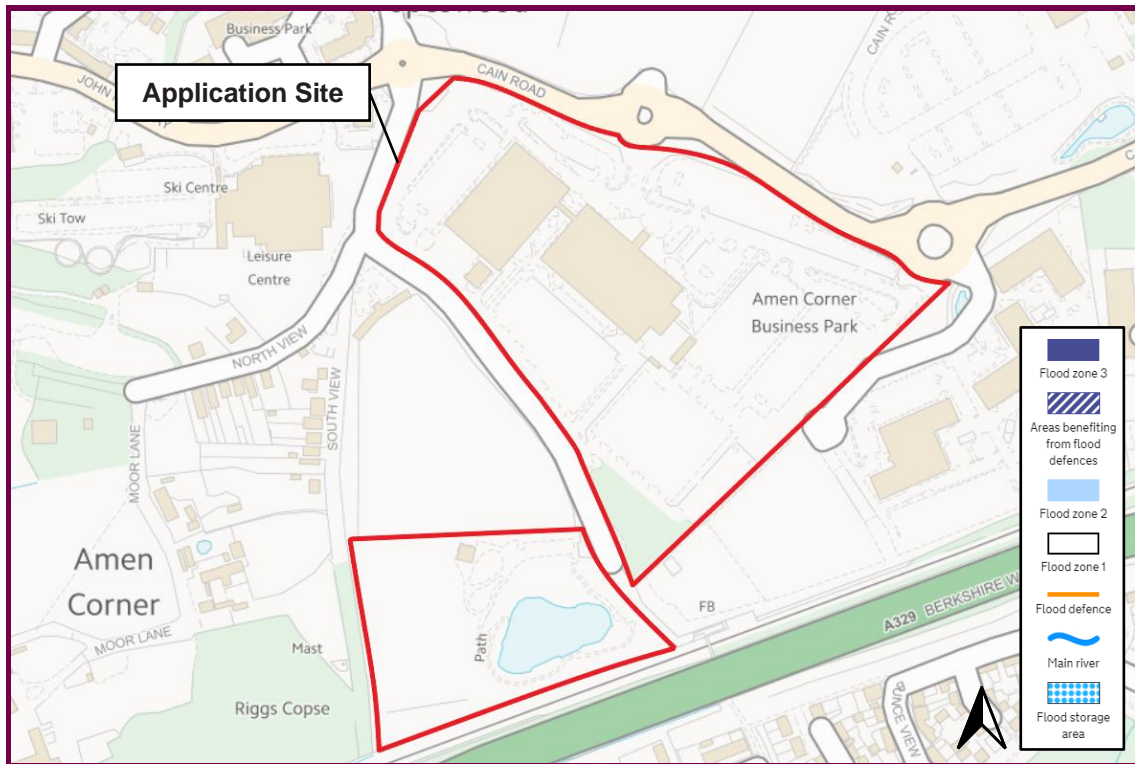
#### 3.4 Flood Risk Assessment

##### Hydrological Overview

- 3.4.1 The site comprises an attenuation pond, located approximately 200 m south of the existing buildings on the 'Former Recreation Site'. In the surrounding area, OS Mapping indicates that the nearest offsite surface water feature is an unnamed pond (known locally as Farleymoor Lake) located approximately 530m north east of the site. The nearest watercourse is an unnamed drainage channel located approximately 850m north west of the site.
- 3.4.2 No additional significant artificial watercourses / features (e.g. canals, reservoirs) have been identified within 1km of the site.

## Fluvial and Tidal Flooding

- 3.4.3 The Environment Agency Flood Map for Planning, which is available online, indicates that the site in its entirety is located within Flood Zone 1, where the annual probability of flooding from fluvial or tidal sources is classified as less than 1 in 1,000. The Environment Agency Flood Map for Planning is provided in Figure 1.



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**Figure 1. Environment Agency Flood Map for Planning (River and Sea), indicative red line boundary**

- 3.4.4 Environment Agency Rivers and Sea flood mapping, which takes into account the effect of any local flood defences, if present, indicates that the entire site is located within an area assessed as very low risk, defined as land with 1 in 1,000 or greater chance of flooding each year.

## Surface Water Flood Risk

- 3.4.5 The Environment Agency's updated Flood Map for Surface Water, which is available online, indicates that the site is classified as having a predominantly 'very low' surface water flood risk. Surface water flood risk extents are predicted in the north, south and west of the site. In the north of the site, there is a linear extent of 'low' surface water flood risk, with discrete areas of 'medium' and 'high' flood risk located within it. There is a linear extent of predominantly 'medium' surface water flood risk across the southern perimeter, and an area of 'high' risk in the central southern area. In the west of the site, there is a linear area of predominantly 'medium' surface water flood risk rising to a small area of 'high' flood risk in the south of the predicted extent. Surface water flood risk is classified as 'high' on the attenuation pond in the southernmost area of the site. The 'Former Recreation Site' is also classified as 'very low' surface water flood risk in the north and west, in addition with linear extents of 'high', 'medium' and 'low' also present across the east, south west and north west.. The updated Flood Map for Surface Water is presented in Figure 2 and the EA's surface water flood risk classifications are given below.

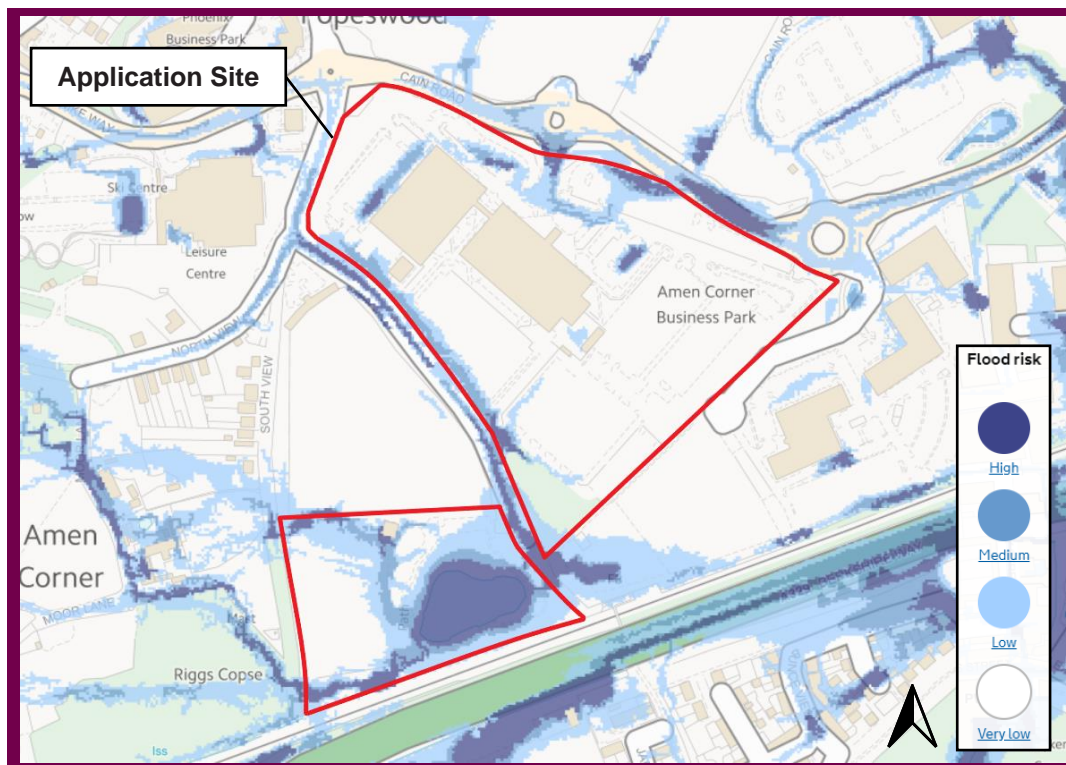
- 'Very Low' surface water flood risk corresponds with an annual probability of surface water flooding of less than 0.1%;



- 'Low' risk flood risk corresponds with an annual probability of surface water flooding of between 0.1% and 1%;
- 'Medium' flood risk corresponds with an annual probability of surface water flooding of between 1% and 3.3%; and
- 'High' flood risk corresponds with an annual probability of surface water flooding of greater than 3.3%.

3.4.6 Environment Agency surface water flood modelling predicts that during a 1 in 100 year rainfall event the site is generally not expected to experience surface water flooding. In the north of the site, there are 4 isolated areas of surface water flooding to a depth of 'below 300mm' are predicted. Within these, the depth is predicted to increase in part, to an expected flood depth of '300 to 900mm'. A linear extent of surface water flooding to predominantly a depth of 'below 300mm' is predicted across the southern perimeter of the site, with minor areas flooding predicted to flood to a depth of '300 to 900mm'. In addition, a linear extent of surface water flooding is predicted in the western area of the site, with a maximum depth of '300 to 900mm' predicted in-part. The 'Former Recreation Site' to the south is predicted to experience limited surface water flooding. The area of the attenuation pond is predicted to experience flooding to a depth of predominantly 'over 900mm', with a linear border extent of increasing depths of 'below 300m' and '300 to 900mm'. Linear extents of flooding to a depth of 'below 300mm' are predicted east and west of the pond and small localised extents of flooding to a depth of '300 to 900mm' are predicted in the south west and north western corners.

3.4.7 Existing information of the site reports the occurrence of surface water pooling on Cain Road in the area of the site entrance, however the SFRA does not provide any records of surface water flooding at the site or on Cain Road.



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**Figure 2. Updated Flood Map for Surface Water, indicative red line boundary**

3.4.8 Surface water flooding is likely to occur in topographical depressions, as reflected in the areas of high surface water flood risk predicted in the southern and northern extents of the site. The topographical depression associated with the attenuation pond in the 'Former Recreational Site', is

likely to directly influence the predicted 'high' surface water flood risk and in reality, is not likely to represent an area of elevated surface water flood risk. On this basis, surface water flood risk across the 'Former Recreation Site' is considered to be generally low.

- 3.4.9 In addition, surface water flood modelling does not take into account drainage in urban areas and naturally is a conservative prediction. The site is likely to be relevelled as part of the redevelopment, an action that is likely to significantly contribute to mitigating the predicted surface water flood risk.
- 3.4.10 The Drainage Design Philosophy, 20305B-RPS-00-XX-RP-D-9605, proposes to utilise only the southern drainage connection conveying runoff to the south of the site. On this basis, surface water flooding issues associated with drainage on Cain Road are considered to be mitigated.
- 3.4.11 To further consider for the elevated surface water flood risk, conservative approach has been taken with the drainage strategy. The impermeable area of the neighbouring road to the north has also been considered in the calculations for the volume of attenuation capacity. This directly provides greater attenuation capacity demonstrating the direct reduction of flood risk off-site as a result of the proposed measures and acknowledgement of the predicted surface water flooding issues.
- 3.4.12 The proposed development will result in a 50% reduction of impermeable area, representing approximately 3.1 ha, which further contributes to a reduction of surface water flood risk across the site.
- 3.4.13 Overall, the site is assessed as having generally a very low susceptibility to surface water flooding.

### Reservoir Failure Assessment

- 3.4.14 Environment Agency mapping indicates that the site is not at risk of reservoir flooding.

### Flooding from Rising / High Groundwater

- 3.4.15 British Geological Survey (BGS) online mapping (1:50,000 scale) indicates that the site is underlain predominantly by the London Clay Formation consisting of clay, silt and sand. The western extent of the site is indicated to be underlain by the Claygate Member consisting of sand, silt and clay. No superficial deposits are indicated to be present under the site.
- 3.4.16 There are 6 available BGS borehole logs located across the site, references SU86NW16 to NW21. The boreholes were dug prior to the construction of the existing eastern building and are located within its building footprint. Borehole logs SU86NW21 and NW18 do not record encountering groundwater and are located in the south western and south eastern corners of the building footprint. Borehole logs NW16 and NW17 record encountering groundwater at 4.1 and 4.7m below ground level (bgl) and are located in the north eastern and north western corners, respectively. Borehole logs NW19 and NW20 record encountering groundwater at 20m bgl, and are located centrally.
- 3.4.17 The soils are described as '*slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils*' by the National Soils Research Institute.
- 3.4.18 According to the Environment Agency's Aquifer Designation Mapping (Environment Agency, 2017), the London Clay is classified as an unproductive Aquifer. This is described by the Environment Agency as having '*rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow*'. The Claygate Member reported to be present under the western extent of the site, is classified as a Secondary A aquifer which is described by the Environment Agency as having '*permeable layers capable of supporting water supplies at a local rather than strategic scale*'.
- 3.4.19 Based on the information outlined above the potential for groundwater flooding is considered to be low.

### Source Protection Zones

- 3.4.20 Environment Agency online groundwater Source Protection Zone (SPZ) mapping indicates that the site is not located within a groundwater SPZ.

### Sewer/Water Main Failure Assessment

#### Current Drainage

- 3.4.21 A topographic survey completed by Site Vision Surveys Limited in June 2020, reference 0520-ARC-13281, indicates the presence of a private surface water sewer network at the site. The survey is included as Appendix A.
- 3.4.22 Surface water sewers are present parallel to the eastern and western elevations of the western building, both flowing in a southerly direction and diameters ranging from 150 to 600mm. Surface water drainage is also present west of the western car park, with a diameter of 150mm.
- 3.4.23 Surface water sewers are also present parallel to the north car park's northern and southern perimeters. Drainage north of the car park has a diameter of 225 and 300mm and conveys surface water in an easterly direction to a manhole in the north eastern extent of the site. The surface water sewer south east of the car park conveys water in an easterly direction also. The surface water sewer south west of the car park has a diameter of 225mm and conveys water into a manhole located adjacent-south east of the main entrance.
- 3.4.24 Surface water drainage is present parallel to all elevations of the eastern building. Surface water drainage present adjacent to the eastern elevation, and north eastern corner of the building conveys water in a north easterly direction, with diameters of the smaller sewers predominantly 100mm and the larger sewers ranging from 650mm to 1,100mm. Surface water sewers present west and south west of the building with diameters ranging from 100 to 225mm convey surface water to a manhole south west of the building. A surface water sewer south of the building with a diameter of 150mm conveys surface water in a southerly direction across the southern car park into a manhole in the southern extent of the site.
- 3.4.25 A surface water sewer with a diameter of 600mm flows through the centre of the site in a southerly direction, turning east at the south eastern corner of the southern car park and flowing across the southern perimeter of the car park in a south easterly direction past the eastern survey limit.
- 3.4.26 Thames Water assets plans identify a 300mm diameter foul water sewer (FW) located parallel to the western perimeter of the site going around the north westerly corner of the site and going eastward shortly before redirecting north. The sewer is indicated to flow in a northerly direction and 4 manholes are indicated to be present in proximity to the western extent of the site, references 5008, 6101, 6102 and 6103. A surface water (SW) sewer is also indicated to be present with an outflow located under Beehive Road adjacent to the southern extent of the site. The sewer is indicated to have a diameter of 450mm and flow in a southerly direction, with a manhole indicated to be present approximately 20m west of the southernmost site extent, reference 7810. An abandoned sewer is indicated to also be present across the eastern area of the site. Manhole cover levels and invert levels are given in Table 3.1.

**Table 3.1. Manhole level details**

Manhole Reference	Type of Sewer	Manhole Cover Level (mAOD)	Manhole Invert Level (mAOD)	Invert Depth (m)
5008	FW	68.28	65.36	2.92
6101	FW	68.20	64.86	3.34
6102	FW	68.27	64.30	3.97
6103	FW	67.26	63.78	3.48

7810

SW

64.01

60.40

3.61

- 3.4.27 The Office of Water Services (Ofwat) formerly the Director General of Water Services, require that all water companies keep a record of properties that have been affected by sewer flooding or are assessed as "At Risk". At Risk properties are those that the water company is required to include in the Regulatory Register that is reported annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company's reporting procedure. Thames Water sewer flooding records specifically relating to the postcode area 'RG12 1' are not presented in the SFRA. The area of Bracknell is represented by the postcode area of 'RG12 2' in which there are 2 recorded instances of sewer flooding, indicating a low risk of sewer flooding.
- 3.4.28 A Drainage Design Philosophy has been prepared by RPS for the proposed development and accompanies the planning application, reference 20305B-RPS-00-XX-RP-D-9605.
- 3.4.29 Taking into account the above and absence of any historical sewer flooding, the overall risk of flooding via artificial drainage system to the site has been assessed as a low.

### Infrastructure Failure Assessment

- 3.4.30 The Environment Agency indicates that no flooding has occurred on site due to infrastructure failure.

### Historical Flood Events

- 3.4.31 The Bracknell Forest SFRA does not present recorded instances of historical flooding at the site or within its vicinity.

### Flood Risk Vulnerability Classification

#### Vulnerability Classification

- 3.4.32 In accordance with the Flood Risk Vulnerability Classification in Table 2 of PPG ID7, a data centre facility is classified as a 'Highly Vulnerable' development in flood risk terms; representing a telecommunications use required to be operational during flooding.
- 3.4.33 The site is located within an area identified predominantly as Flood Zone 1. Table 3.2 of this report presents Table 3 of PPG ID7 which indicates that 'highly vulnerable' developments within Flood Zone 1 are generally considered appropriate for development. The table does not show the application of the Sequential Test which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea.

**Table 3.2. Flood Risk Vulnerability and Flood Zone 'Compatibility'**

Flood Risk Vulnerability classification (Table 3 of Planning Practice Guidance)	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	Yes	Yes	Yes	Yes	Yes
Zone 2	Yes	Yes	Exception test required	Yes	Yes

**FLOOD RISK ASSESSMENT**

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<b>Zone 3a</b>	Exception test required	Yes	No	Exception test required	Yes
<b>Zone 3b Functional Floodplain</b>	Exception test required	Yes	No	No	No

Key: Yes: Development is appropriate, No: Development should not be permitted.



## 4 MITIGATION & DRAINAGE

### 4.1 Surface Water and Drainage Strategy

- 4.1.1 The sustainable management of surface water is an essential element of reducing future flood risk to the site and its surroundings.
- 4.1.2 The site is currently used for two large commercial office buildings with existing drainage infrastructure which largely conveys runoff to an attenuation pond south of the site within the 'Former Recreation Site'. The setting of the site is predominantly commercial and is associated with high levels of surface water runoff. As such the area is characterised by managed water conveyance and drainage. The existing drainage network conveys surface water runoff to an attenuation pond south of the buildings at a rate of 621 litres per second (l/s).
- 4.1.3 Surface water arising from a developed site should as far as is practicable be managed in a sustainable manner and provide betterment to the existing surface water flows arising from the site prior to the proposed development while reducing the risk of flooding at the site and elsewhere, taking climate change into account.
- 4.1.4 A drainage strategy has been prepared, Drainage Design philosophy ref 20305B-RPS-XX-XX-RP-C-9605, for the proposed development to support this FRA and forms part of the planning application. It sets out the proposed approach for managing surface water from the proposed development.

### 4.2 Sustainable Drainage System (SuDS) Techniques

- 4.2.1 The NPPF (Ministry of Housing, Communities and Local Government, 2019) associated PPG ID7 (Ministry of Housing, Communities and Local Government, 2014), CIRIA C753 SUDS Manual (2015) and Local Authority policy promotes sustainable water management through the use of SuDS. A hierarchy of techniques is identified:
1. Prevention – the use of good site design and housekeeping measures on individual sites to prevent runoff and pollution (e.g. minimise areas of hard standing).
  2. Source Control – control of runoff at or very near its source (such as the use of rainwater harvesting).
  3. Site Control – management of water from several sub-catchments (including routing water from roofs and car parks to one/several large soakaways for the whole site).
  4. Regional Control – management of runoff from several sites, typically in a detention pond or wetland.
- 4.2.2 The implementation of SuDS as opposed to conventional drainage systems provides several benefits by:
- Reducing peak flows to watercourses or sewers and potentially reducing the risk of flooding downstream;
  - Reducing the volumes and frequency of water flowing directly to watercourses or sewers from developed sites; improving water quality over conventional surface water sewers by removing pollutants from diffuse pollutant sources;
  - Reducing potable water demand through rainwater harvesting;
  - Improving amenity through the provision of public open spaces and wildlife habitat; and
  - Replicating natural drainage patterns, including the recharge of groundwater so that base flows are maintained.

### Surface Water Drainage Constraints

4.2.3 Constraints placed on the design of surface water drainage serving the proposed development are as follows:

- Surface water runoff is proposed to use the existing infrastructure and will be limited by its existing discharge rate.

### 4.3 Proposed Surface Water Drainage

4.3.1 Details for of the calculations are presented in RPS Drainage Design Philosophy (20305B-RPS-00-XX-RP-D-9605).

4.3.2 The proposed new surface water drainage system has been designed using current Micro Drainage analysis software, cognisant of planning policies, LLFA and EA guidance to prevent uncontrolled flooding off the site to surrounding areas.

4.3.3 The proposed surface water drainage strategy is presented in drawing 20305B-RPS-00-XX-DR-D-9630 within the RPS Drainage Design Philosophy (20305B-RPS-00-XX-RP-D-9605) (& at Appendix B).

4.3.4 In summary surface water runoff from the proposed development will be collected as follows:

1. The existing surface water drainage network conveying runoff to an attenuation pond to the south of the site, in the 'Former Recreation Site'. The discharge of surface water runoff into the existing Thames Water surface water sewer under Cain Road has been reduced by 100%; and
2. Sufficient attenuation capacity is proposed to be provided to achieve the existing discharge rate of 621 l/s, for all rainfall events up to a 1 in 100 year plus 40% climate change allowance.

4.3.5 This strategy is presented in the Drainage Design Philosophy (20305B-RPS-00-XX-RP-D-9605) of the planning application in addition to indicative invert levels and depths. The location and levels of the proposed measures will be confirmed during the detailed design stage.

4.3.6 The attenuation pond will assist with the removal of sedimentation from runoff, with benefits in improving water quality and reducing the total maintenance required.

## 5 SUMMARY AND CONCLUSIONS

- 5.1.1 A site-specific FRA in accordance with the NPPF and PPG ID7 has been undertaken for the construction of a proposed new data centre facility at Cain Road, Bracknell.

### Flood Risk

- 5.1.2 Environment Agency mapping shows that the proposed development is located within an area designated as Flood Zone 1, classified as low risk of flooding from fluvial and tidal sources.
- 5.1.3 Environment Agency surface water flood risk mapping indicates the site is predominantly has a 'very low' surface water flood risk, with areas of 'low', 'medium' and 'high' flood risk predicted across the site. During a 1 in 100 year rainfall event, Environment Agency and SFRA surface water flood modelling indicates that the site is predicted to predominantly not experience surface water flooding. However, there are 3 discrete areas where flooding is predicted to a depth of 'below 300mm', with minor areas within the predicted extent expected to have a depth of '300 to 900mm'. The predicted surface water flood risk has been considered by adopting a conservative approach to the drainage strategy. The impermeable area of the neighbouring road north of the site has been included into the calculations of attenuation capacity.
- 5.1.4 The site susceptibility to groundwater flooding has been assessed as low.
- 5.1.5 The site is not at low risk of flooding from reservoir infrastructure failure.
- 5.1.6 The proposed development type is defined as 'highly vulnerable' in the NPPF and PPG ID7 and such development is generally acceptable in Flood Zone 1 considering the effects of climate change for the lifetime of the development.
- 5.1.7 Surface runoff is proposed to use the existing infrastructure as defined in the Drainage Design Philosophy (20305B-RPS-00-XX-RP-D-9605).
- 5.1.8 The Drainage Design Philosophy proposes a drainage system discharging surface water runoff into the existing attenuation pond. Underground attenuation is proposed at the site to attenuate runoff generated by rainfall events up to a 1 in 100 year plus 40% climate change allowance.
- 5.1.9 The impacts of the increase in surface water runoff will be reduced by the incorporation of appropriate and practicable SuDS mitigations measures in the built design, including the implementation of appropriate on-site management pollution control strategy.

## 5.2 Conclusion

- 5.2.1 This FRA illustrates that the application area is at low risk of flooding and meets the requirements of the NPPF and PPG ID7.



## APPENDICES

## Appendix A

# Topographic Survey





























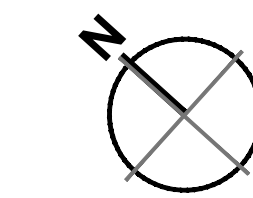


## Appendix B

# Surface Water Drainage Layout 20305B-RPS-00-XX-DR-D-9630



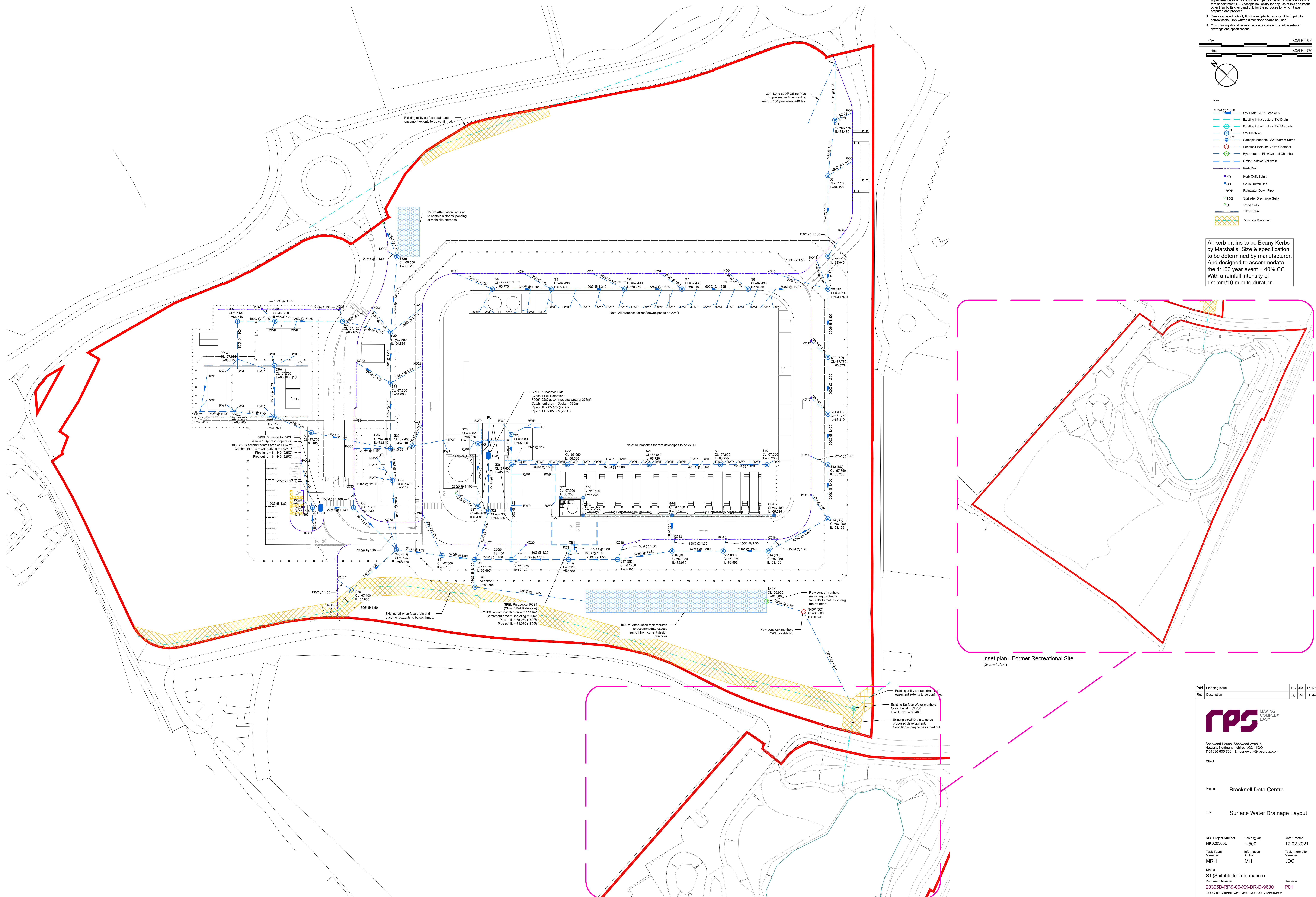
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**Key**

- | 3750 @ 1300 |                                    |  |
|-------------|------------------------------------|--|
|             | SW Drain (i/D & Gradient)          |  |
|             | Existing infrastructure SW Drain   |  |
|             | Existing infrastructure SW Manhole |  |
|             | SW Manhole                         |  |
|             | Catchpit                           |  |
|             | Catchpit Manhole C/SW 300mm Sump   |  |
|             | Pentstock isolation Valve Chamber  |  |
|             | Hydrobrake - Flow Control Chamber  |  |
|             | Galic Castslot Slot drain          |  |
|             | Kerb Drain                         |  |
|             | Kerb Outfall Unit                  |  |
|             | Galic Outfall Unit                 |  |
|             | Rainwater Down Pipe                |  |
|             | Sprinkler Discharge Gully          |  |
|             | Road Gully                         |  |
|             | Filter Drain                       |  |
|             | Drainage Easement                  |  |

All kerb drains to be Beany Kerbs by Marshalls. Size & specification to be determined by manufacturer. And designed to accommodate the 1:100 year event + 40% CC. With a rainfall intensity of 171mm/10 minute duration.



<b>P01</b>	Planning Issue	RB	JDC	17.02.2017
Rev	Description	By	Ckd	Date



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Client \_\_\_\_\_

Project Bracknell Data Centre

Title **Surface Water Drainage Layout**

RPS Project Number	Scale (to A)	Date Created
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Task Team Manager	Information Author	Task Information Manager
MRH	MH	JDC

Status  
S1 (Suitable for Information)

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20305B-RPS-00-XY-DR-D-9630	R01

Project Code - Originator - Zone - Level - Type - Role - Drawing Number