



Savills (UK) Ltd

SOUTHAMPTON INTERNATIONAL AIRPORT LTD

Flood Risk Assessment



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Flood Risk Assessment

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EXECUTIVE SUMMARY

This Flood Risk Assessment has been prepared by WSP on behalf of Savills (UK) Ltd, to support a planning application for a Proposed Development at Southampton International Airport, Eastleigh. It has been written in accordance with the requirements of the National Planning Policy Framework (2018), and other relevant National and Local Policy and Guidance documents.

The Site covers an area of approximately 140 hectares (ha).

The Proposed Development comprises the extension of the northern end of the runway by 170m on existing land owned by the airport, and an extension of the existing car park. The proposed runway and car park extensions total an area of approximately 2.65ha.

The runway extension will allow aircraft to operate with reduced weight restrictions and the range of aircraft using the airport to be increased.

The existing short and long stay car parking is proposed to be extended on available land to the west of the existing runway.

The Proposed Development is classified as 'Less Vulnerable' in accordance with Table 2 of the NPPF Flood Risk and Coastal Change Planning Practice Guidance (PPG). The Application Site is located in Flood Zone 1, which comprises land assessed as having less than a 0.1% (1 in 1000) annual probability of fluvial flooding. 'Less Vulnerable' development types are considered to be appropriate within Flood Zone 1. Therefore, the Sequential Test is deemed to have been satisfied.

Comprehensive stakeholder consultation was undertaken as part of this assessment including with Hampshire County Council as the Lead Local Flood Authority (LLFA), the Environment Agency and the local sewerage undertaker. Hampshire County Council have confirmed several incidents of flooding within a 500m radius of the Site. However, no historic flood events have been recorded within the immediate vicinity of the Site. The Environment Agency and Southern Water confirm they have no records of flooding within this area.

The risk of the Proposed Development exacerbating flood risks from tidal / coastal, fluvial, sewer and drainage infrastructure, and artificial sources to neighbouring property is assessed to be negligible, very low or low. No additional mitigation measures beyond the proposed drainage design are considered necessary for inclusion within the Proposed Development for these sources.

The risk of the Proposed Development exacerbating flood risks from pluvial / overland flow (pre-mitigation) is considered to be moderate. To mitigate this risk, it is proposed to utilise a SuDS management train for surface water drainage, in accordance with the SuDS Manual.

The proposed surface water drainage strategy prepared by Mott MacDonald (MM) demonstrates that the Proposed Development (runway extension) can be drained using SuDS techniques for events up to the 1 in 100 (1%) annual probability storm event, including a 40% allowance for climate change (with limited flooding). Typically, the Environment Agency's climate change guidance only suggests that an upper limit of 20% is required for a commercial development with a design life of 50



years however the surface water drainage strategy for the runway extension has also been tested for a 40% allowance for climate change (typical for a development with a 100 year design life). The drainage strategy prepared by MM for the car park extension has been designed to accommodate the 1 in 30 event, including a 20% allowance in accordance with BS7533-13 and the CIRIA C753 SuDS Manual.

In order to manage the increase in impermeable area resulting from the extension to the runway, attenuation in the form of geocellular storage combined with an infiltration drainage field are proposed. For the car park extension, permeable paving is proposed to discharge to ground. Discharge to ground has been confirmed as viable through the completion of a Site Investigation and soakage testing undertaken by Southern Testing.

In consideration of the drainage strategy, the risk of the Proposed Development exacerbating flood risks from pluvial / overland sources is considered to be low.

Safe and dry access and egress will be provided via the primary access to the site via Wide Lane, to the west of the Site.

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1 INTRODUCTION

1.1 APPOINTMENT AND BRIEF

- 1.1.1. WSP was appointed by Savills (UK) Ltd to complete a site-specific Flood Risk Assessment (FRA) as part of supporting documentation for a Planning Application for the extension of the existing runway and car park at Southampton International Airport, Eastleigh.
- 1.1.2. The Application Site is approximately 140 hectares (ha) and is considered to be a brownfield site. The proposed runway and car park extensions are present within the overall Application Site and comprise an area of approximately 2.65ha. A location plan is provided in Appendix A (Drawing No. 48854-LOC-001).
- 1.1.3. The extension to the existing runway equates to approximately 0.8ha, whilst the extension to the car park is approximately 1.85ha.

1.2 AIMS AND OBJECTIVES

- 1.2.1. The aim of this NPPF compliant FRA is to identify flood risks to the Site and those that may arise as a result of the Proposed Development. Where risks are identified, mitigation measures are proposed to manage the risks over the lifetime of the development, including accounting for the effects of climate change. This includes presentation of an outline surface water drainage strategy for the Proposed Development.
- 1.2.2. To achieve this aim the following objectives have been completed:
 - A desk study and data research including review of:
 - The National Planning Policy Framework (NPPF), 2018;
 - The NPPF Flood Risk and Coastal Change Planning Practice Guidance (PPG);
 - Non-statutory technical standards for sustainable drainage systems, DEFRA, 2015;
 - Building Regulations Approved Document H, 2015;
 - The SuDS Manual (CIRIA C753), CIRIA, 2015;
 - South East River Basin Management Plan, Environment Agency, 2015;
 - Test and Itchen Catchment Flood Management Plan, 2009;
 - Eastleigh Borough Local Plan Review (2001 – 2011) (2006);
 - Eastleigh Borough Local Plan 2016 – 2036 (2018);
 - Partnership for Urban South Hampshire Strategic Flood Risk Assessment (SFRA) (2016);
 - Hampshire County Council Preliminary Flood Risk Assessment (PFRA) (2011);
 - Hampshire County Council Local Flood Risk Management Strategy (LFRMS) (2013); and
 - Hampshire County Council Surface Water and Sustainable Drainage Guidance for Developers, Designers and Planners, Version 1 (2015)
 - Consultation with regulatory bodies and third parties, including:
 - The Environment Agency;
 - Hampshire County Council (HCC), including Pre-Application Consultation;
 - Eastleigh Borough Council (EBC); and
 - Southern Water

(Copies of correspondence received and exchanged with these stakeholders are provided Appendix B).

1.2.3. The following technical studies have been undertaken to support the evidence base for this FRA:

- An assessment of flooding to the Site and Proposed Development from fluvial, pluvial, groundwater, sewers and man-made infrastructure;
- An assessment of the opportunities and constraints presented by the water environment to the development;
- An assessment of the impact of the Proposed Development on local flood risks; and,
- An assessment of the residual flood risk to the Proposed Development and neighbouring property from local flood sources.

2 POLICY AND GUIDANCE

2.1 NATIONAL PLANNING POLICY / GUIDANCE

National Planning Policy Framework (2018)

- 2.1.1. The National Planning Policy Framework (NPPF) requires a Flood Risk Assessment (FRA) should be undertaken:
- For all developments greater than 1 Hectare (ha) in size in Flood Zone 1;
 - All proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has a critical drainage problem; and,
 - Where proposed development or a change of use (e.g. from commercial to residential) to a more vulnerable class may be subject to other sources of flooding (e.g. surface water drains, reservoirs).
- 2.1.2. The NPPF also requires development to be allocated towards areas at lowest risk of flooding (the Sequential Test), and, if necessary, the development proposals would be subject to satisfying the requirements of the Exception Test.
- 2.1.3. The NPPF requires that flood risk to land and property is not increased as a result of new development. Changes in the volume and rate of surface water runoff from the Proposed Development, resulting from an increase in impermeable surfacing at the Site, could increase the risk of pluvial flooding to areas downstream of the Site unless surface water runoff is managed sustainably by the Proposed Development.

Flood Risk and Coastal Change Planning Guidance

- 2.1.4. The NPPF is supported by the National Planning Practice Guidance (PPG). The Flood Risk and Coastal Change PPG states that an FRA must outline the following:
- whether a proposed development is likely to be affected by current or future flooding from any source;
 - whether it will increase flood risk elsewhere; and,
 - whether the measures proposed to deal with these effects and risks are appropriate.
- 2.1.5. The NPPF Flood Risk and Coastal Change Planning Practice Guidance (PPG) states that the lifespan of commercial development should be considered as 50 years.
- 2.1.6. Within Table 2 (Flood Risk Vulnerability Classification) of the NPPF and the Flood Risk and Coastal Change Planning Practice Guidance (PPG) (Communities and Local Government, 2014), the Proposed Development would be likely be classified as 'Less Vulnerable' (i.e. Commercial).
- 2.1.7. Table 3 (Flood Risk Vulnerability and Flood Zone Compatibility) of the PPG, states that Less Vulnerable development is appropriate in Flood Zone 1.

Non-Statutory Sustainable Drainage Technical Standards (March 2015)

- 2.1.8. The Non-Statutory Sustainable Drainage Technical Standards document provides significant guidance regarding the management of Sustainable Drainage Systems (SuDS). It states that:
- For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year

rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event; and

- Where reasonably practicable, for developments which have been previously developed, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event, but should never exceed the runoff volume from the development site prior to redevelopment for that event.

Building Regulations Approved Document H (Updated 2015)

2.1.9. Part H of the Buildings Regulations: Drainage and Waste Disposal, establishes a hierarchy for surface water disposal, which encourages a SuDS approach. The hierarchy stipulates that surface runoff not collected for reuse must be discharged to one or more of the following in order of priority:

- Discharge into the ground (infiltration); or, where not reasonably practicable,
- Discharge to a surface water body; or, where not reasonably practicable,
- Discharge to a surface water sewer, highway drain, or another drainage system; or, where not reasonably practicable,
- Discharge to a combined sewer.

2.2 REGIONAL GUIDANCE

South East River Basin Management Plan (RBMP) (2015)

2.2.1. Southampton is located within the South-East River Basin Management Plan, which provides a framework for protecting the water environment. The Plan assesses the pressures facing the basin and sets out potential actions to address them.

Test and Itchen Catchment Flood Management Plan (CFMP) (2009)

2.2.2. The Test and Itchen Catchment Flood Management Plan was published in December 2009 by the Environment Agency and sets out the flood risks, the sources of these risks and any associated concerns or issues in the catchment from rivers, groundwater and surface water. The CFMP establishes a number of flood risk management policies which will deliver sustainable flood risk management for the long term.

2.2.3. The Site falls into Sub-Area 8 '*Coastal Urban*' where the main risk of flooding is from the sea, which is considered by the North Solent Shoreline Management Plan; a total of 264 properties are at risk of flooding from a 1 in 100-year flood event.

2.2.4. Actions specific to the area in which the Site is located are:

- *"Undertake a study to reduce flood risk along Tanners Brook. Consider options for channel conveyance improvements that will work together with the river restoration project. Data improvements to the Tanners Brook flood modelling will also be required.*
- *Undertake System Asset Management Plans (SAMPs) to review maintenance regimes, to assess future investment needs and to reduce the current level of risk.*
- *Put in place policies within the local development frameworks that work towards long-term reduction of flood risk and the re-creation of river corridors through sustainable land use management.*

- *Seek out funding and partnership opportunities in connection with new development in the short to medium-term and consider options for redevelopment of more open river corridors through the coastal urban sub-area.”*

2.3 LOCAL POLICY

Eastleigh Borough Local Plan Review (2001 – 2011) (2006)

- 2.3.1. The ‘Eastleigh Borough Local Plan’ was adopted in 2006 and sets out the planning strategy in the district until 2011. The Council is currently undertaking a review of this plan. The emerging local plan was submitted to the Secretary of State on the 31 October 2018.

Eastleigh Borough Local Plan 2016 – 2036 (2018)

- 2.3.2. The ‘Eastleigh Borough Local Plan 2016 – 2036’ document sets out the strategy and policies for the use, development or protection of land and buildings in the area for the period of 2016-2036. A number of policies within this document are relevant to the Proposed Development:
- 2.3.3. Policy ‘S1: Delivering Sustainable Development’ states that any development should:
- *‘Have regard to the potential impacts of climate change...and restrict development in areas at risk from flooding...’*
- 2.3.4. Policy ‘DM3: Adaption to Climate Change’ states that all development should be designed to:
- *‘Reduce the potential impacts of surface water flooding, sustainable drainage systems need to be implemented as part of an integrated SuDS strategy for the site in accordance with Policy DM6 and as part of the landscape framework for the site including green open space and green roofs where appropriate.’*
- 2.3.5. Policy ‘DM5: Managing Flood Risk’ states that ‘development will only be permitted within the areas at risk of flooding, now and in the future, as identified on the Environment Agency’s most recent flood maps and the Council’s Strategic Flood Risk Assessment provided that:
- *‘It meets the sequential and exception test (where required) as outlined in Government guidance;*
 - *A site-specific flood risk assessment demonstrates that the development, including access, will be safe without increasing flooding elsewhere, and where possible, will reduce flood risk overall;*
 - *The scheme incorporates flood protection, flood resilience and resistance measures appropriate to the character and biodiversity of the area and the specific requirements of the site;*
 - *Appropriate flood warning and evacuation plans are in place; and,*
 - *New site drainage systems are designed taking account of events which exceed the normal design standard.’*
- 2.3.6. Policy ‘DM6: Sustainable Surface Water Management and Watercourse Management’ states that ‘new development in areas at risk of flooding.... that drain into a waterway within the Itchen or Hamble catchment...will only be permitted if they include SuDS...In order to reduce flooding and maintain water quality, SuDS schemes should:
- *Manage surface water runoff as close to its source as possible and include at least three forms of naturalised filtration within the treatment train where feasible;*
 - *Be designed in accordance with the CIRIA C697 SuDS Manual or equivalent national or local guidance;*
 - *Ensure that discharge rates at least mirror Greenfield rates before development;*

- *Where discharge is to a wetland or wet woodland habitat, flows offsite must mirror the natural hydrological pathways; and,*
- *Include clear arrangements for their whole life management and maintenance.*

- 2.3.7. *Where a watercourse is present on the development site, it should be retained or restored into a natural state and enhanced where possible. The culverting of any watercourse will not generally be permitted, and development should wherever possible remove any existing culverts and increase on-site flood storage. Development should be laid out to enable maintenance of the watercourse.*
- 2.3.8. *Where development drains into a waterway connected to the Natura 2000 or Ramsar network a site-specific Construction Environment plan must be prepared before construction.'*

2.4 LOCAL GUIDANCE

Partnership for Urban South Hampshire Strategic Flood Risk Assessment (SFRA) (2016)

- 2.4.1. The Partnership for Urban South Hampshire (PUSH) SFRA:
- *'Informs the development of planning policy that will underpin decision making within all partner authorities (i.e. Eastleigh Borough Council), particularly within areas that are affected by (and/ or may adversely impact upon) flooding.*
 - *Assists the development management process by providing a more informed response to development proposals which may be affected by flooding.*
 - *Seeks to identify partnership opportunities and strategic solutions to flood risk.*
 - *Supports risk management authorities in the discharge of their duties.*
 - *Supports and informs the partner authorities emergency planning response to flooding.'*
- 2.4.2. The predominant source of flood risk to the New Forest PUSH area is from the sea (due to extreme tides/ storm surges).
- 2.4.3. Climate change poses a significant risk to the sub-region. Predicted sea-level rise will reduce the level of protection provided by the sub-region's flood defences over the coming century. Extreme tidal floods and river flood flows will increase the risk of inundation of flood water and flooding from rivers.
- 2.4.4. The Site is not mentioned specifically within the PUSH SFRA.

Hampshire County Council Preliminary Flood Risk Assessment (PFRA) (2011)

- 2.4.5. The Hampshire County Council (HCC) 'Preliminary Flood Risk Assessment' (PFRA) was produced to assess local flood risk from all sources of flooding, to investigate areas requiring extra investigation.
- 2.4.6. The PFRA is the starting point for a more detailed local flood risk management strategy and is intended to be updated as floods are identified and flooding mechanisms and consequences are understood.
- 2.4.7. Due to its extensive coastline, Hampshire is susceptible to coastal flooding. With a combination of high tides and high river levels, there is a high potential for river or surface water flooding where rivers in flood are unable to discharge into the sea due to high tides.
- 2.4.8. Long term developments will incorporate Policy 'PPS25' to direct developments away from areas at highest risk of flooding.

Hampshire County Council Local Flood Risk Management Strategy (LFRMS) (2013)

- 2.4.9. The 'Local Flood Risk Management Strategy' (LFRMS) is an over-arching strategy which is seen as the first step in understanding the flood risk in Hampshire. The aim of the document is to help understand the broad nature and extent of flood risk in the area.
- 2.4.10. The overall aim of the LFRMS is to produce a plan to reduce and manage flood risk in a way that will benefit people, property and the environment. The LFRMS highlights the wards with the highest risk of flooding.
- 2.4.11. Developers are responsible for considering flood risk so they do not put the occupants of new developments at risk, or increase flood risk elsewhere. Developers should ensure that they design and lay sites out to make the best use of natural drainage and topography. SuDS should be used where possible, to provide multiple benefits.
- 2.4.12. The Site is not mentioned specifically in the LFRMS.

Hampshire County Council Surface Water and Sustainable Drainage Guidance for Developers, Designers and Planners, Version 1 (2015)

- 2.4.13. Hampshire County Council, as Lead Local Flood Authority, should be consulted on all major developments. The purpose of the guide is to provide information on what should be provided by developers to support planning applications of new developments.
- 2.4.14. A surface water management developer's checklist has been created to ensure that the correct information is submitted when reviewing a planning application.

Additional requirements include:

- *'Maintenance and adoption: early discussions with the relevant authorities, groups and organisations to satisfy the LPA that the ongoing maintenance and management is adequate.*
- *Discharge consents: checking with the Environment Agency early to see if a permit is required to discharge into waterbodies.*
- *Run-off to a watercourse: connecting surface water into an existing watercourse may require a land drainage consent or a flood defence consent from the Environment Agency.'*

3 CLIMATE CHANGE

3.1 BACKGROUND INFORMATION

- 3.1.1. The NPPF Flood Risk and Coastal Change Planning Practice Guidance (PPG) states that, for commercial developments, it is reasonable to assume a typical lifespan of 50 years.

3.2 FLOOD RISK ASSESSMENTS: CLIMATE CHANGE ALLOWANCES (FEB 2017)

- 3.2.1. In February 2016, the Environment Agency released 'Flood Risk Assessments: Climate Change Allowances' guidance to support the NPPF (updated in February 2019). The climate change allowances relevant to the Site are summarised in Table 3-1 below.

Table 3-1 - Environment Agency Climate Change Allowances, South East River Basin District

Climate Change Estimate	For the '2020s' (2015 to 2019)	For the '2050s' (2040 to 2069)	For the '2080s' (2070 to 2115)
Fluvial Flows: Upper End (90 th Percentile)	+25% (peak river flow)	+50% (peak river flow)	+105% (peak river flow)
Fluvial Flows: Higher Central	+15% (peak river flow)	+30% (peak river flow)	+45% (peak river flow)
Fluvial Flows: Central	+10% (peak river flow)	+20% (peak river flow)	+35% (peak river flow)

Table 3-2 - Peak Rainfall Intensity Allowance in Small Urban Catchments

Climate Change Estimate	For the '2020s' (2015 to 2039)	For the '2050s' (2040 to 2069)	For the '2080s' (2070 to 2115)
Rainfall: Upper End	+10% (peak rainfall intensity)	+20% (peak rainfall intensity)	+40% (peak rainfall intensity)
Rainfall: Central	+5% (peak rainfall intensity)	+10% (peak rainfall intensity)	+20% (peak rainfall intensity)

- 3.2.2. The Government's Flood Risk Assessments: Climate Change Allowances guidance states that for peak rainfall intensity, which has been applied in the surface water drainage design for the Proposed Development, both the central and upper end allowances should be considered in order to understand the range of impacts that may occur as a result of climate change. Over 50 years, these allowances are 10% and 20% respectively as shown in Table 3-2 above. However, a more robust approach has been followed for the runway extension whereby an allowance of 40% has been used to test the design.
- 3.2.3. Please note that this guidance is currently being revised in line with the UK Climate Projections 2018.

4 BACKGROUND

4.1 SITE LOCATION

- 4.1.1. The Site is located at Southampton International Airport in Eastleigh, Hampshire. The approximate Ordnance Survey (OS) grid reference is 445278, 116935 and the nearest postcode is SO18 2NL. Refer to Drawing No. 48854-LOC-001 in Appendix A for the Site location plan.
- 4.1.2. The Application Site covers an area of approximately 140 hectares (ha) and is a brownfield site. It is bordered by a railway line to the north, the Itchen Valley Country Park, a Site of Special Scientific Interest (SSSI), to the east, the M27 to the south, and the University of Southampton sports ground and residential development to the west.

4.2 DEVELOPMENT PROPOSALS

- 4.2.1. It is proposed to extend the northern end of the runway by 170m (0.8 ha), on existing land owned by the airport. The extension will allow aircraft to operate with reduced weight restrictions and the range of aircraft using the airport to be increased.
- 4.2.2. The existing short and long stay car parking onsite is also proposed to be extended by 1.85 ha on available land to the west of the existing runway. This will provide a total of 928 car parking spaces and 10 coach parking spaces.

4.3 TOPOGRAPHY

- 4.3.1. LiDAR obtained from the Environment Agency is largely incomplete for the proposed area of study, however, it indicates that the north-west corner of the Site is approximately 16m Above Ordnance Datum (AOD). The Site generally falls in a south-easterly direction towards the south-east corner where levels are approximately 8m AOD.
- 4.3.2. A topographic survey was undertaken (author and date unknown), and is included in Appendix C. Levels on the LiDAR mapping are generally in accordance with the surveyed levels.

4.4 GEOLOGY AND HYDROGEOLOGY

- 4.4.1. British Geological Survey (BGS) 1:50,000 scale On-shore Digital Mapping (British Geological Survey, 2019) shows the Site to be primarily underlain by bedrock of London Clay Formation – Clay, Silt and Sand. The north-east corner of the Site is underlain by bedrock of Wittering Formation – Sand, Silt and Clay. An extract of the BGS bedrock geology mapping is provided on Drawing No. 48854-BGS-001 in Appendix D for reference.
- 4.4.2. Superficial River Terrace Deposits, 1 – Clay and Silt are present at the Site. An extract of the BGS superficial geology mapping is provided on Drawing No. 48854-BGS-002 in Appendix D for reference.
- 4.4.3. The bedrock geology of the Site is classified as an ‘unproductive’ strata. Unproductive Strata are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow. The London Clay Formation is classified as “rocks with essentially no groundwater” by the Environment Agency and the Wittering Formation is classified as a Low Productivity Aquifer.

- 4.4.4. The Superficial deposits on the Site are classified as Secondary (Undifferentiated) Aquifer which means that the layer has previously been designated as both 'minor' or 'non-aquifer' in different locations due to the variable characteristics of the rock type.
- 4.4.5. The Site is located in a Nitrate Vulnerable Zone (NVZ) for Eutrophic Water.
- 4.4.6. There are no Source Protection Zones with 1km of the Site.
- 4.4.7. A 'Factual Ground Investigation Report' was undertaken by Southern Testing Environmental and Geotechnical in June 2019, and includes the results from exploratory hole logs, and field and laboratory test results. The Ground Investigation report can be found in Appendix E.
- 4.4.8. Table 4-1 presents the soils encountered in the boreholes:

Table 4-1 – Summary of Ground Conditions

Depth to Base (m)	Thickness (m)	Strata
0.2 – 0.3	0.2 – 0.3	Topsoil
1.2 – 1.9	1.2 – 1.9	River Terrace Deposits (Firm to stiff silty sandy clays)
5.4 – 5.6	3.6 – 3.7	River Terrace Deposits (Medium dense gravelly sands and sandy flint gravels)
20.0 +	Base not reached	London Clay Formation (thinly to thickly laminated fissure sandy clays, with laminations of fine sand)

- 4.4.9. Groundwater was encountered in the boreholes at a depth between 3.4m and 15m below ground level (bgl) with an average of approximately 6.2m bgl. Groundwater monitoring was undertaken between April and May 2019.
- 4.4.10. Soakage testing was also undertaken, in accordance with BRE 365 Digest. The results from the soakage testing are shown in Table 4-2.

Table 4-2 – Results of BRE365 Digest Soakage Tests

Hole No.	Soakage Rate (m/sec)
PT1	5.12E-4
PT2	3.26E-4
PT3	6.94E-5

4.5 IDENTIFICATION OF EXISTING WATERCOURSES

- 4.5.1. There are no known watercourses within the Site boundary.

- 4.5.2. The River Itchen, an Environment Agency main river, is located approximately 900m east of the Site. Monks Brook, a tributary of the River Itchen, is located approximately 780m west of the Site.
- 4.5.3. There are no other known waterbodies within 1km of the Site.

4.6 EXISTING FLOOD DEFENCES

- 4.6.1. The Government's online Flood Map for Planning mapping (accessed in March 2019) does not show any flood defences protecting the site.

4.7 EXISTING SEWER AND DRAINAGE INFRASTRUCTURE

- 4.7.1. Southern Water has confirmed there are no public sewers presently on Site.
- 4.7.2. There is an existing 24-inch diameter cast iron rising main (foul) crossing the proposed extension of the runway.
- 4.7.3. Historically, the surface water runoff from the airport discharged into the River Itchen (to the east of the site) via two outfalls. The drainage network for the airport was refurbished in 2017 and now discharges to ground via two soakaways located to the east of the runway. Each soakaway covers approximately half of the runway length.
- 4.7.4. Prior to infiltrating to ground, the runoff enters the soakaways via gullies and then passes through a silt trap, bypass interceptor and penstock valve.
- 4.7.5. Furthermore, there is an apron drainage system which is split into the Southern Apron and Eastern Apron. The Southern Apron drains aircraft stands 1 – 5, immediately to the south of the passenger terminal building. The Eastern Apron drains aircraft stands 6 – 12, immediately to the east of the passenger terminal building, the multi-storey car park, airside fire station and stands fronting the three hangers further to the north of aircraft stands 13 and 14.
- 4.7.6. The 'first flush' of the Southern Apron is pumped into a foul main, whilst the remainder of the surface water runoff is discharged to ground through a system of five soakaways. The Eastern Apron is not covered by the 'first flush' drain, meaning there are stringent operational restrictions on the type of activities which can be undertaken.
- 4.7.7. The existing drainage regime for the car park is assumed to be via an impermeable filter drain, which collects and conveys surface water to a trench soakaway via an interceptor. The trench soakaway discharges surface water to ground via infiltration.

4.8 HISTORIC FLOOD RECORDS

- 4.8.1. The Environment Agency confirm they have no records of flooding within this area. A copy of the correspondence with the Environment Agency is included in Appendix B for reference. This is confirmed by the Environment Agency Historic Flood Risk map provided on Drawing 48854-EA-003 in Appendix F for reference.
- 4.8.2. Hampshire County Council (the LLFA) have confirmed several incidents of flooding within a 500m radius of the Site. These include:
 - Surface water flood event, prior to 2012, on Southampton Road, due to no outfall to highway drainage;
 - Surface water flood event in 2014, on Wide Lane, due to blocked gullies; and,

- Surface water flood event in 2016, near Wide Lane, within the footpath adjacent to the University sports field.

- 4.8.3. No historic flood events have been recorded within the Site itself. A copy of the correspondence with Hampshire County Council is included in Appendix B for reference.
- 4.8.4. Southern Water have confirmed that they hold no records of historic sewer flooding within the Site. A copy of the correspondence with Southern Water is included in Appendix B for reference.
- 4.8.5. Eastleigh Borough Council have confirmed they hold no records of historic flood events at the Site. A copy of the correspondence with Eastleigh Borough Council is included in Appendix B for reference.

5 OVERVIEW OF FLOOD RISK

5.1 INTRODUCTION

- 5.1.1. The following section provides an overview of flood risk to the Site, along with flood risk, to and from the Proposed Development. An assessment has been undertaken for each source that could affect the Proposed Development in accordance with the NPPF Flood Risk and Coastal Change Planning Practice Guidance (PPG).
- 5.1.2. Flood risks have been qualitatively assessed on the following basis:
- Negligible risk (e.g. coastal flood risk posed to inland areas);
 - Very Low risk (e.g. Flood Zone 1 or <0.1% annual probability of flooding from surface water);
 - Low risk (e.g. Flood Zone 2 or between 0.1% and 1.0% annual probability of flooding from surface water);
 - Medium risk (e.g. Flood Zone 3a or between 1.0% and 3.3% annual probability of flooding from surface water); and
 - High risk (e.g. Flood Zone 3b or 3.3% annual probability of flooding from surface water).

5.2 FLOODING FROM COASTAL AND TIDAL SOURCES

- 5.2.1. Tidal flooding occurs when sea levels rise above the level of the land or beyond the operational level of flood defences.
- 5.2.2. The Environment Agency's Flood Map for Planning, reproduced on Drawing No. 48854-EA-001 in Appendix F, shows that the Site is not in proximity of a tidal section of watercourse or the coast; consequently, the risk of flooding posed to the Site and the Proposed Development from this source is considered to be negligible.
- 5.2.3. As the Site is not considered to be at risk of tidal flooding, and this from of flooding will not impact safe access and egress from the Site, no mitigation measures will be required and the Proposed Development will not increase tidal flood risk elsewhere.

5.3 FLOODING FROM FLUVIAL SOURCES

- 5.3.1. Fluvial flooding occurs when flows within watercourses exceed the capacity of the watercourse causing out of bank flows.
- 5.3.2. The Environment Agency's Flood Map for Planning, reproduced on Drawing No. 48854-EA-001 in Appendix F, shows that the Site is wholly located within Flood Zone 1, i.e. land with an annual risk of flooding from rivers of less than 0.1% (1 in 1,000).
- 5.3.3. The risk of flooding from fluvial sources to the Proposed Development is therefore considered to be Very Low, as confirmed by the Environment Agency.
- 5.3.4. As the Site is not considered to be at risk from fluvial flooding, and this from of flooding will not impact safe access and egress from the Site, no mitigation measures will be required and the Proposed Development will not increase fluvial flood risk elsewhere.

5.4 FLOODING FROM PLUVIAL / OVERLAND FLOW SOURCES

- 5.4.1. During extreme storms the ground may become saturated and drains and sewers which carry away surface water may not be able to accommodate the overland flows that arise from such conditions, or may become blocked with debris. This may lead to surface water flooding.
- 5.4.2. The Environment Agency's Risk of Flooding from Surface Water mapping, reproduced on Drawing No. 48854-EA-002 in Appendix F, indicates that the main risk of flood from surface water is Very Low. Areas at Very Low risk of surface water flooding have an annual probability of flooding of less than 0.1%.
- 5.4.3. Isolated areas of the Site are shown to be subject to a risk of flooding of between 0.1% and 1.0% annual probability and are therefore considered to have a Low risk of surface water flooding.
- 5.4.4. The Proposed Development will increase the impermeable surface area at the Site, potentially generating greater volumes and rates of surface water discharging from the Application Site. By developing the Application Site without appropriate mitigation measures, the risk of pluvial / overland flooding would be considered to be Moderate.
- 5.4.5. The proposed surface water drainage strategy (SWDS), outlined in Section 7, will incorporate sufficient attenuation and utilise infiltration to restrict run-off from the development to less than existing Greenfield rates, which is a betterment on the requirements of the Non-Statutory Technical Standards for Sustainable Drainage. The SWDS will therefore mitigate the potential for the Proposed Development to exacerbate flood risk to and from pluvial / overland flow sources. The resultant risk from the Proposed Development will be Very Low.

5.5 FLOODING FROM GROUNDWATER SOURCES

- 5.5.1. Groundwater flooding occurs when water stored below ground reaches the surface. It is commonly associated with porous underlying geology, such as chalk, sands and gravels.
- 5.5.2. A 'Factual Ground Investigation Report' was undertaken by Southern Testing in June 2019, and includes the results from exploratory hole logs, and field and laboratory test results. The Ground Investigation report can be found in Appendix E. The summary of the ground conditions at the Site can be found in Table 4-1 (a bedrock of London Clay Formation, overlain by approximately 5.5m of River Terrace Deposits).
- 5.5.3. Groundwater monitoring shows groundwater was encountered at a minimum of 3.5m bgl.
- 5.5.4. Soakage testing was also undertaken by Southern Testing, in accordance with BRE 365 Digest. The results from the soakage testing is shown in Table 4-2. The soakage testing confirms that infiltration is viable at the Site.
- 5.5.5. The SFRA indicates significant flooding from groundwater sources has occurred in Hampshire since the original SFRA published in 2007. Most recently, during the winter period of 2013/14, a substantial number of homes and business within PUSH were affected by groundwater flooding, most notably in Winchester, the Test Valley and East Hampshire. None of these events affected the Site.
- 5.5.6. The risk of Groundwater flooding to the Proposed Development is therefore considered to be Low.
- 5.5.7. The Proposed Development will be designed with minimal risk of groundwater interference. Appropriate construction techniques and mitigation measures, should effectively manage the

potential groundwater flood risk. Furthermore, basements and underground car parks are not proposed as part of the Proposed Development.

- 5.5.8. The risk of the Proposed Development increasing flood risk from this source to the Application Site is considered to be Low.

5.6 FLOODING FROM SEWER AND DRAINAGE INFRASTRUCTURE SOURCES

- 5.6.1. Southern Water Asset Location Plans indicate there are no public sewers in Site. There are two private soakaways located to the east of the runway which accommodate existing surface water runoff from the Site. It is anticipated that all surface water within the Site discharges to ground via these soakaways.
- 5.6.2. The risk of the Proposed Development exacerbating flood risk to neighbouring property, from sewer and drainage infrastructure, prior to mitigation is considered to be Low. The risk to the Proposed Development and of the Proposed Development exacerbating flooding to neighbouring property once a drainage scheme has been implemented is considered to be Very Low.

5.7 FLOODING FROM ARTIFICIAL SOURCES

- 5.7.1. The Environment Agency's Flood Risk from Reservoirs Mapping indicates that the Site does not lie within the extreme inundation area of any reservoirs.
- 5.7.2. As the Site is not considered to be at risk of reservoir flooding, no mitigation measures will be required and the Proposed Development will not increase reservoir flood risk elsewhere.

6 SEQUENTIAL AND EXCEPTION TEST

6.1 INTRODUCTION

- 6.1.1. The purpose of the Sequential Test is to ensure that land use and planning takes due regard of flood risk and ensure that areas at low or no risk of flooding are developed in preference to areas at higher risk.

6.2 VULNERABILITY CLASSIFICATION

- 6.2.1. The vulnerability classification is defined as Table 3, as part of the PPG *Flood Risk and Coastal Change*. The purpose of the vulnerability classification is to identify appropriate land use activities relative to the level of flood risk.
- 6.2.2. Within Table 2 (Flood Risk Vulnerability Classification) of the NPPF Planning Practice Guidance, the Proposed Development is classified as 'Less Vulnerable' as it provides Commercial development.

6.3 FLOOD ZONE DEFINITION

- 6.3.1. According to the Environment Agency's *Flood Map for Planning*, the Proposed Development is located wholly within Flood Zone 1.

6.4 COMPATIBILITY TEST

- 6.4.1. The PPG identifies different land use vulnerabilities that are appropriate within each of the Flood Maps for Planning flood risk classification, see Table 6-1.

Table 6-1 - Flood Risk Vulnerability and Flood Zone Compatibility (PPG Table 3)

Flood Zone	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	Development is appropriate	Development is appropriate	Development is appropriate	Development is appropriate	Development is appropriate
Zone 2	Development is appropriate	Exception test required	Development is appropriate	Development is appropriate	Development is appropriate
Zone 3A	Exception test required	Development should not be permitted	Exception test required	Development is appropriate	Development is appropriate
Zone 3B	Exception test required	Development should not be permitted	Development should not be permitted	Development should not be permitted	Development is appropriate

6.5 CONCLUSION ON THE SEQUENTIAL AND EXCEPTION TESTS

- 6.5.1. Table 6-1 shows that less vulnerable development (i.e. commercial development) is appropriate in Flood Zone 1. As a result, the Sequential Test is satisfied and the Exception Test is not required.

7 DRAINAGE STRATEGY

7.1 EXISTING DRAINAGE REGIME

- 7.1.1. The Site is considered to be a brownfield site, with a gross area of 140ha. The Proposed Development comprises extensions to the existing runway and car park.
- 7.1.2. The drainage network for the airport was refurbished in 2017 and now discharges to ground via two soakaways located to the east of the runway. Each soakaway covers approximately half of the runway length.
- 7.1.3. Prior to infiltrating to ground, the runoff enters the soakaways via gullies and then passes through a silt trap, bypass interceptor and penstock valve.
- 7.1.4. Furthermore, there is an apron drainage system which is split into the Southern Apron and Eastern Apron. The Southern Apron drains aircraft stands 1 – 5, immediately to the south of the passenger terminal building. The Eastern Apron drains aircraft stands 6 – 12, immediately to the east of the passenger terminal building, the multi-storey car park, airside fire station and stands fronting the three hangers further to the north of aircraft stands 13 and 14.
- 7.1.5. The existing drainage regime for the car park is assumed to be via an impermeable filter drain, which collects and conveys surface water to a trench soakaway via an interceptor. The trench soakaway discharges surface water to ground, via infiltration.
- 7.1.6. Southern Water has confirmed there are no public sewers present on Site. However, there is an existing 24-inch diameter cast iron rising main (foul) crossing the proposed extension of the runway.
- 7.1.7. Mott Macdonald (MM) have undertaken the drainage design for the runway extension and the extension to the car park.
- 7.1.8. As part of that exercise they estimated greenfield runoff rates for the site using the Microdrainage ICP SuDS rural runoff calculation tool. These are summarised in Table 7-1.

Table 7-1 – Greenfield Runoff Rates

	Q ₁ (l/s)	Q _{BAR} (l/s)	Q ₅ (l/s)	Q ₃₀ (l/s)	Q ₁₀₀ (l/s)
Greenfield Runoff Rate	3.5	4.1	5.3	9.3	13.1

7.2 SURFACE WATER MANAGEMENT STRATEGY REQUIREMENTS

- 7.2.1. The proposed surface water drainage strategy seeks to demonstrate the Proposed Development can be drained in a sustainable manner, commensurate with local and national policy.
- 7.2.2. The NPPF requires that flood risk to land and property is not increased as a result of new development. Changes in the volume and rate of surface water runoff from the development, as a result of increases in impermeable land uses, can increase the risk of flooding to areas downstream unless sufficient steps are taken within a proposed development.

- 7.2.3. A fundamental principle of sustainable development in terms of flood defence is the reduction of surface water runoff from new developments.
- 7.2.4. The non-statutory sustainable drainage technical standards¹ state that peak runoff rates should be limited to Greenfield runoff rates, and long-term storage should be provided. Exceedance routes should be shown not to affect the safety of people or property.

7.3 PRELIMINARY SURFACE WATER DRAINAGE STRATEGY

- 7.3.1. Part H of the Building Regulations: Drainage and Waste Disposal establishes a hierarchy for surface water disposal, which encourages a SuDS approach. This hierarchy stipulates that surface water runoff, not collected for re-use, must be discharged to one or more of the following in order of priority:
- Discharge into the ground (infiltration); or, where not reasonably practicable;
 - Discharge to a surface water body; or, where not reasonably practicable;
 - Discharge to a surface water sewer, highway drain, or another drainage system; or, where not reasonably practicable,
 - Discharge to a combined sewer.
- 7.3.2. Results of an intrusive ground investigation have been made available to inform the drainage strategy. Soakage testing was undertaken in accordance with BRE 365 Digest. The results from the soakage testing are shown in Table 4-2.
- 7.3.3. The soakage testing shows that the existing geology has infiltration potential and therefore, discharge to ground is viable at both the location of the runway and car park extensions.
- 7.3.4. By using infiltration, the greenfield runoff rate is negated as, for the design storm events, there would be no overland surface water generated.

RUNWAY EXTENSION

- 7.3.5. The proposed surface water drainage strategy proposed by MM for the runway extension is summarised below. For more detail, please refer to MM's 'RIBA Stage 3 Developed Design End of Stage Report'.
- 7.3.6. MM states that the proposed catchment area of the runway extension is 0.8ha.
- 7.3.7. Three options for the management of surface water generated by the runway extension have been proposed by MM. The preferred option is to discharge to ground via attenuation storage, replicating the existing runway drainage arrangement, with a high-level overflow into an infiltration drainage field.
- 7.3.8. Runoff will be collected by filter drains along the eastern side of the runway extension. Runoff will then be conveyed by gravity to a bypass interceptor, prior to discharging, via a Penstock valve, into attenuation storage and high-level overflow into the infiltration field. The surface water will ultimately be discharged to ground, via the attenuation storage and / or the overflow infiltration field.

¹ DEFRA, 2015, *Non-statutory technical standards for sustainable drainage systems*

- 7.3.9. The attenuation required has been calculated using Microdrainage, using an infiltration rate of 102.85mm/hr. The proposed dimension of the attenuation storage is 13mx13mx1.5m, and the drainage field is comprised of 3mx17m long filter trenches.
- 7.3.10. MM undertook the design of the surface water management system in accordance with the Sewers for Adoption 7th Edition. It is proposed that there will be no surface water flooding during the 1 in 1 (100%) event, and the 1 in 30 (3.33%) event. The drainage design has also been tested for the 1 in 100 (1%) event including a 40% allowance for climate change. This exceeds the Environment Agency's climate change guidance which indicates that an upper limit of 20% is required for a commercial development with a design life of 50 years. Please see Section 9 for more information.

CAR PARK EXTENSION

- 7.3.11. The proposed surface water drainage strategy proposed by MM for the car park is summarised below. For more detail, please refer to MM's 'Southampton Airport Car Park Extension Drainage Strategy'.
- 7.3.12. The proposed increase in impermeable area as a result of the car park extension is approximately 1.85ha.
- 7.3.13. It is proposed that runoff generated by the car park extension will be attenuated within permeable paving, prior to discharge to ground. The proposed surface water system will be independent of the existing drainage conveyance systems.
- 7.3.14. The attenuation volumes required have been calculated using Microdrainage's Quick Storage Estimate (QSE) tool, using an infiltration rate of 250mm/hr. Please note that no specific ground investigation has been undertaken at the location of the proposed car park extension and that infiltration rates will be confirmed during detailed design.
- 7.3.15. The drainage for the car park extension has been designed in accordance with BS7533-13 and the CIRIA C753 SuDS Manual and such that there is no flooding for the 1 in 30 event, including a 20% allowance.
- 7.3.16. Groundwater is assumed to be at 9.167m AOD (~3.9mbgl) which will provide, on the basis that the permeable paving will have a depth of roughly 600mm, approximately 3.3m clearance to the recorded groundwater level.
- 7.3.17. Please note that the construction of the car park extension will result in the removal of an existing bund. As the bund is not within a surface water flow route (as shown on the EA's Flood Map for Surface Water) there will be no negative impact to surface water flows as a result of the Proposed Development.

7.4 WATER QUALITY

RUNWAY EXTENSION

- 7.4.1. Most of the year, surface water run-off from the runway predominantly comprises of rainwater, however during cold weather, de-icers are applied to ensure that planes can take-off and land safely.
- 7.4.2. The proposed water quality treatment for the runway extension is proposed to be essentially the same as the existing proprietary system, implemented in 2017 by Southampton Airport. Runoff, collected in filter drains, is be conveyed, via gravity, to a bespoke bypass interceptor, prior to discharging to ground via attenuation crates via a Penstock valve.
- 7.4.3. The proprietary system, designed by Ricardo in 2017, received an Environmental Permit to discharge surface water run-off, generated by the runway, to ground through a system of soakaways.
- 7.4.4. A conceptual model was developed by Ricardo to identify potential receptors and possible pathways of contaminants, including de-icer. The modelling demonstrated that solids, heavy metals and hydrocarbons would be controlled by the proprietary system and Risk Management Techniques implemented by the airport. However, de-icer would not be retained by interceptors and instead, would be discharged, via the soakaways, into the superficial aquifer where they will break down naturally in the soil or groundwater. Detailed modelling indicated that there should be sufficient attenuation in the sub-surface to reduce de-icer concentrations to below water quality standards prior to discharge into the River Itchen. For more information, refer to Report No. ED62947: Environmental Risk Assessment Runway and Apron Drainage at Southampton Airport (Ricardo, 2017) in Appendix G.
- 7.4.5. Please note that this methodology was signed off by the Environmental Agency and a discharge permit was granted in 2018.
- 7.4.6. Therefore, it is considered that there is a Negligible risk of surface water containing de-icer or sediments entering the River Itchen above Environmental Quality Standards (EQS).
- 7.4.7. The risk of a large (>200 litres) uncontrolled hydrocarbon spillage (i.e. aircraft fuel leak) has also been considered. Table 4.2 in Report ED62497 demonstrates that there is a very low risk of hydrocarbons from a fuel leak entering the River Itchen subject to Risk Management Techniques being adhered to (i.e. all spills are reported to the Airport Fire Service, Airport Operations Teams check hard surfaces continuously, and penstocks at each soakaway are closed in the event of spillages).

CAR PARK EXTENSION

- 7.4.8. Table 26.2 of the CIRIA C753 SuDS Manual identifies that the pollution hazard level associated with the land uses within the Proposed Development as being 'Medium'.
- 7.4.9. On a scale from 0 – 1, 'non-residential car parking' is deemed to have the following pollution hazard indices:
- Total suspended solids = 0.7
 - Metals = 0.6
 - Hydrocarbons = 0.7

- 7.4.10. The pollution mitigation assessment is described in **Error! Reference source not found.** below (in accordance with Table 26.4 of the SuDS Manual).

Table 7-2 – Pollution Mitigation Assessment for Flows going to Ground for the Car Park Extension

	Total Suspended Solids	Hydrocarbons	Metals
Permeable Paving	0.7	0.6	0.7
Residual Impact	0	0	0

7.5 MAINTENANCE AND ADOPTION

- 7.5.1. The general maintenance regime of the proposed strategy is outlined below:

Attenuation Crates

- Ownership/ Adoption: Southampton International Airport Ltd
- Maintenance requirement: monthly inspection, litter and debris removal, grass cutting and, weed and invasive plant control. 6-monthly removal of sediment and debris. Reconstruction of soakaway (i.e. in case of clogged geotextile) when required.

Drainage Field

- Ownership/ Adoption: Southampton International Airport Ltd
- Maintenance requirement: monthly inspection, litter and debris removal, grass cutting and, weed and invasive plant control. 6-monthly removal of sediment and debris. As required wash or replace filter medium, clear perforated pipes of blockages, and reconstruct soakaway (i.e. in case of clogged geotextile).

Bypass Interceptor

- Ownership/ Adoption: Southampton International Airport Ltd
- Maintenance requirement: monthly inspection and, litter and debris removal. 6-monthly removal of sediment and debris, and change the filter medium (as required). Replacement of malfunctioning parts (when required).

Permeable Paving

- Ownership/ Adoption: Southampton International Airport Ltd
- Maintenance requirement: brushing and vacuuming three times per year; removal of weeds, repair any broken blocks / damaged areas; maintain vegetation; 3 monthly inspection of poor operation and/or weed growth; annual inspection of silt accumulation and inspection chambers.

Gullies

- Ownership/ Adoption: Southampton International Airport Ltd
- Maintenance requirement: Gullies visually checked post-rain event (i.e. via daily airside operational inspections of standing water). Full check completed annually. Gully sucking (including, litter and debris removal and weed and invasive plant control) completed reactively and as required following daily / annual inspection or report of blockage.

Penstocks

- Ownership/ Adoption: Southampton International Airport Ltd
- Maintenance requirement: Penstocks tested (open / close) remotely on a six monthly basis. Runway drainage valves are checked manually on a 6 monthly basis (open / close through a process call easing). Blockages resolved reactively following inspection / testing or report of blockage

8 FLOOD RISK MANAGEMENT MEASURES

8.1 INTRODUCTION

- 8.1.1. The following section discusses the mitigation measures necessary to ensure the Proposed Development remains safe over its lifetime and does not exacerbate flood risk to neighbouring property (including allowances for the effects of climate change).

8.2 MITIGATION MEASURES

POST DEVELOPMENT MITIGATION

- 8.2.1. The risk of the Proposed Development exacerbating flood risks from tidal / coastal, fluvial, groundwater, sewer & drainage infrastructure and artificial sources to neighbouring property is assessed to be low, very low or negligible. Therefore, no measures are considered necessary to mitigate against these sources.

Surface Water / Pluvial Flood Risk Management

- 8.2.2. Prior to the implementation of a SWDS the risk of the Proposed Development exacerbating flood risks from pluvial / overland flow flooding to neighbouring property is considered to be moderate.
- 8.2.3. The proposed surface water drainage strategy demonstrates that the runway extension can be drained using SuDS techniques for events up to the 1 in 100 annual probability storm event, with limited flooding (approximately 15m³) during a 1 in 100 plus 40% climate change event. The car park extension has been designed for no flooding during the 1 in 30 year event, including a 20% increase in climate change.
- 8.2.4. In order to manage the increase in impermeable area resulting from the extension to the runway, attenuation crates and a drainage field are proposed. For the car park extension, permeable paving is proposed. For both sites, surface water will ultimately discharge to ground.
- 8.2.5. In consideration of the presented drainage strategy, the risk of the Proposed Development exacerbating flood risks from pluvial / overland sources is considered to be low.

RESIDUAL RISK

Surface Water / Pluvial Flood Risk Management

- 8.2.6. The surface water management system for the runway extension has been tested by MM for the 1 in 100 year event, including a 40% allowance for climate change which is robust in that it exceeds the Environment Agency's climate change guidance that an upper limit of 20% should be tested for a commercial development with a design life of 50 years. Approximately 15m³ of flooding would occur during the 1 in 100 plus 40% climate change event. It is proposed that this flooding will be contained within the surrounding landscape and allowed to re-enter the system following the storm event. An exceedance plan is provided on Page 19 in MM's 'RIBA Stage 3 Developed Design End of Stage Report'.
- 8.2.7. The surface water management system for the car park extension has been tested for the 1 in 30 year event, including a 20% allowance for climate change, and the Quick Storage Estimate shows that there would be no flooding during this event.

SAFE ACCESS AND EGRESS

- 8.2.8. Safe and dry access and egress will be provided via the primary access to the site via Wide Lane, to the west of the Site.

9 CONCLUSIONS

- 9.1.1. This Flood Risk Assessment has been prepared on behalf of Savills (UK) Ltd to support a planning application for an extension to the northern end of the runway and an existing car park at Southampton International Airport.
- 9.1.2. The total Site covers an area of approximately 140 hectares (ha) and the proposed runway and car park extensions are present within this, totalling an area of approximately 2.65ha.
- 9.1.3. The Proposed Development comprises the extension of the northern end of the runway by 170m which will be accommodated on existing land owned by the airport. This will allow existing aircraft using the airport to carry heavier loads and more fuel, thereby enabling them to travel further distances. Furthermore, the extension could allow larger narrow-body aircraft, such as Airbus A319/A320 and Boeing 737-800, to use the airport.
- 9.1.4. The existing short and long stay car parking is also proposed to be extended on available land to the west of the existing runway. This will provide a total of 928 car parking spaces and 10 coach parking spaces.
- 9.1.5. Comprehensive stakeholder consultation was undertaken as part of this assessment including the Lead Local Flood Authority, the Environment Agency and the local sewerage undertaker. Hampshire County Council have confirmed several incidents of flooding within a 500m of the Site. However, no historic flood events have been recorded within the immediate vicinity of the Site. The Environment Agency and Southern Water confirm they have no records of flooding within this area.
- 9.1.6. Flood risk to the Proposed Development from coastal/tidal, groundwater, sewage and drainage infrastructure and artificial sources is assessed to be negligible to low and no specific flood mitigation measures are considered necessary over and above the drainage design.
- 9.1.7. The risk of the Proposed Development exacerbating flood risk to neighbouring property is assessed to be moderate, therefore mitigation measures are necessary to manage this risk.
- 9.1.8. The proposed surface water drainage strategy prepared by Mott MacDonald demonstrates that the Proposed Development (runway extension) can be drained using SuDS techniques for events up to the 1 in 100 annual probability storm event, including an allowance for climate change (with limited flooding occurring with a 40% increase on peak rainfall intensity). Note that the Environment Agency's climate change guidance which indicates that an upper limit of 20% is required for a commercial development with a design life of 50 years. The proposed strategy for the car park has been designed to accommodate flows up to and including a 1 in 30 plus 20% climate change event.
- 9.1.9. In order to manage the increase in impermeable area resulting from the extension to the runway, attenuation crates and a drainage field are proposed. For the car park extension, permeable paving is proposed. For both sites, surface water will ultimately discharge to ground. Discharge to ground has been confirmed as viable through the completion of a Site Investigation undertaken by Southern Testing.
- 9.1.10. In consideration of the presented drainage strategy, the risk of the Proposed Development exacerbating flood risks from pluvial / overland sources is considered to be low.
- 9.1.11. Safe and dry access and egress will be provided via the primary access to the site via Wide Lane, to the west of the Site.

- 9.1.12. The Flood Risk Assessment and proposed mitigation measures ensure that the development and its users will be safe from flood risk over its lifetime. Proposals for the site are therefore considered to be acceptable in terms of the requirements of the NPPF.

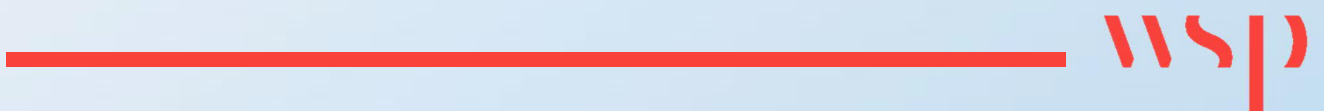
Appendix A

LOCATION PLAN



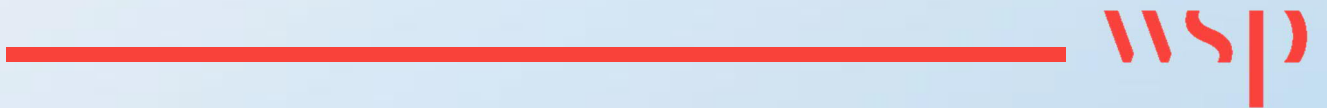
Appendix B

STAKEHOLDER CORRESPONDENCE



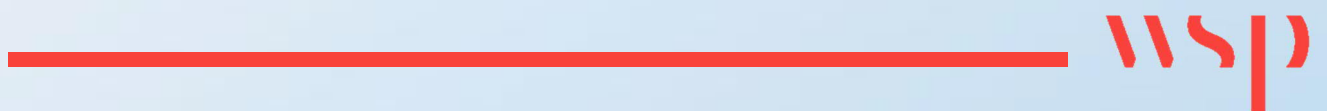
Appendix C

TOPOGRAPHIC SURVEY



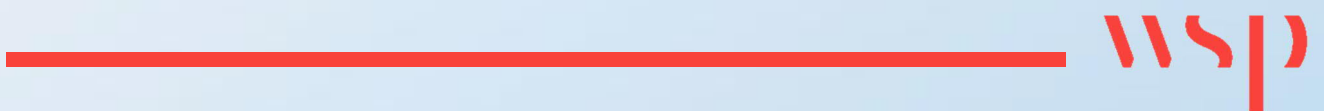
Appendix D

BGS GEOLOGY MAPPING



Appendix E

GROUND INVESTIGATION REPORT



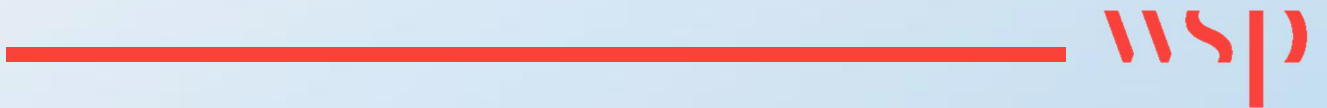
Appendix F

ENVIRONMENT AGENCY FLOOD
MAPS



Appendix G

DRAINAGE STRATEGY







Matrix House
Basing View
Basingstoke
RG21 4DZ

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