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Innovation Park, Medway

Flood Risk Assessment

For

INNOVATION PARK MEDWAY

Project Number:

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Campbell Reith Hill LLP
Raven House
29 Linkfield Lane
Surrey
RH1 1SS

T: +44(0)1737 784500
F: +44(0)1737 784501
E: surrey@campbellreith.com
W: www.campbellreith.com

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EXECUTIVE SUMMARY

CampbellReith have prepared on behalf of Innovation Park Medway, a FRA for the proposed development at Rochester Airport, written in accordance with the National Planning Policy Framework (NPPF).

The site is located at Rochester Aiport, Chatham MR5 9SD and sits within two local authorities, Medway Council (MC) and Tonbridge and Malling Borough Council (TMBC). The site boundary is split into two portions; the northern area which forms part of Rochester Airport runways and the southern area which forms a caravan park.

A Local Development Order (LDO) is being submitted for a scheme that will deliver a high quality innovation park with flexible plots to encourage a wide range of high-value technology, engineering, manufacturing and knowledge-intensive businesses.

This FRA aims to identify the sources of flooding related to the Proposed Development and demonstrates how residual flood risks will be managed.

The site is located within a Flood Zone 1 and is therefore at low risk from fluvial and tidal sources.

The site is underlain with Seaford Chalk Formation and has an expected infiltration rate of 0.036m/hr. No groundwater flooding has been recorded within the MBC or TMBC therefore the risk is expected to be low for the site. Further ground investigation and infiltration testing will confirm this conclusion.

The risk of sewer flooding to the site is deemed to be low. A preliminary enquiry to Southern Water should be undertaken for the proposed development.

The EA flood maps consider the risk of reservoir flooding to be low.

The majority of the site is considered by the EA to be at very low risk of sur face water flooding. An overland flow path has been identified as medium-high risk at the north most boundary of the northern area flowing towards Laker Road before heading north. This flow path should be maintained to minimise the risk of surface water flooding on-site. A small area at low-medium risk has been identified on the southern area as a result of the existing site use and topography. The proposed surface water drainage strategy will mitigate this risk of flooding on-site.

The proposed surface water drainage strategy is summarised in this report and discussed in detail in the accompanying drainage report. The northern and southern areas have been addressed separately and have been split further into parcels. Each parcel is to be served by its own surface water drainage network connected to dedicated soakaway features at strategic locations within each parcel. The preferred SuDS features are subject to architect's layouts but could include swales, dry basins, permeable paving, tree pits and cellular storage. The residual risk of surface water flow during exceedance events of 1 in 100 + 40% climate change will be managed through controlled flooding to assigned soft and hard landscaped areas.

It is concluded that the development proposals of the site is in accordance with both National and Local Planning Policies and based on the information provided by CampbellReith within this FRA are considered sustainable and acceptable in terms of flood risk.

1.0 INTRODUCTION

1.1. Brief

1.1.1. CampbellReith have been commissioned on behalf of Innovation Park Medway to prepare a Flood Risk Assessment (FRA) in accordance with the National Planning Policy Framework (NPPF) (2018) for the proposed development at Rochester Airport, Chatham, ME5 9SD; herein referred to as the site.

1.1.2. The site sits within two local authority boundaries; Medway Council (MC) and Tonbridge and Malling Borough Council (TMBC). This FRA has considered planning policy applicable to both authorities within this assessment.

1.2. Proposed Development

1.2.1. The Client is submitting an application for a Local Development Order to both Medway Council (MC) and Tonbridge and Malling Borough Council (TMBC). Kent County Council (KCC) are the Lead Local Flood Authority (LLFA) for the area.

1.2.2. The masterplan contained in Appendix A outlines a scheme that will deliver a high quality innovation park with flexible plots to encourage a wide range of high-value technology, engineering, manufacturing and knowledge-intensive businesses. This class of use is considered as 'Less Vulnerable' according to the Environment Agency (EA).

1.3. Aims and Objectives

1.3.1. The FRA aims to identify the sources of flooding related to the Proposed Development and demonstrates how residual flood risks will be managed.

1.3.2. In accordance with the NPPF and online Planning Practice Guidance (PPG) a FRA is required for sites which are greater than a hectare and located within a Flood Zone 1.

1.3.3. The objectives of this FRA are to establish:

- Whether a proposed development is likely to be affected by current or future flooding from any source;
- Whether it will increase flood risk elsewhere;
- Whether the measures proposed to deal with these effects and risks are appropriate;
- The evidence to satisfy the Local Planning Authority's (LPA) (if necessary) Sequential Test, and;
- Whether the development will be safe and pass the Exception Test, if applicable.

2.0 PLANNING POLICY AND LOCAL LEGISLATION

2.1. National Planning Policy Framework (NPPF) (2018)

2.1.1. The National Planning Policy was recently updated in August 2018. The NPPF sets out the government's national planning policies to protect people and property from flooding from either now or in the future which all local panning authorities are expected to follow. There are three main steps which should be followed to ensure that the risk of flooding from development is minimised; assess the flood risk, avoid flood risk and manage and mitigate the flood risk.

2.1.2. The NPPF recommends new development to adopt a sequential, flood risk-based approach to the location of development, taking into account climate change and its impact now and for the future to avoid any possible flood risk. The aim of the sequential test is to steer development to areas considered to be at the lowest risk from sources of flooding. If this is not possible then the exception test would be required demonstrating that the development would provide wider sustainability benefits to the community that would outweigh the flood risk and that the development would be safe for its lifetime taking into account the vulnerability of the users without increasing flood risk elsewhere and where possible reducing the current risk of flooding.

2.1.3. The NPPF also states that major developments should incorporate sustainable drainage systems (SUDS) unless there is clear evidence that this would be inappropriate.

2.2. Planning Practice Guidance

2.2.1. The proposed development falls into the 'industrial and commercial use' category and is assigned a status of 'less vulnerable'. The PPG's '*Table 3: Flood risk vulnerability and flood zone 'compatibility'* [1] details what level of vulnerability is considered compatible and therefore acceptable within each Flood Zone.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓*

Figure 2.1: Environment Agency Table 3: Flood risk vulnerability and flood zone compatibility

[1] Environment Agency (2014) Flood Zone and Vulnerability Classification https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-2-Flood-Risk-Vulnerability-Classification

2.3. Medway Council Local Plan

2.3.1. MBC are currently working on their local plan for the period up to 2035. This new Local Plan (2012-2035) will eventually replace the MBC 2003 Local Plan, which is understood to be implemented by 2020.

2.3.2. MBC Local Plan 2012-2035 Policy EN7 is applicable to Flood and Water Management. The policies ensures the Local Plan will seek to reduce flood risk, promote water efficiency measures, and protect water quality through flood risk management and sustainable urban drainage.

2.3.3. The MBC 2003 Local Plan's Policies FR1-6 were applicable to Flood Risk. The policies outline the requirements of flood risk and development and state that proposals for development should be accompanied by a flood risk assessment. The existing policy also suggests that where proposals are likely to increase the amount of runoff as a result of the development, the development will only be permitted where effective preventative measures are incorporated and surface water runoff is managed.

2.4. Tonbridge and Malling Borough Council Local Development Framework (2007)

2.4.1. Policy CP10 relates to flood risk and development. The policy states

> *Within the floodplain development should first seek to make use of areas at no to low risk of flooding before areas at higher risk, where this is possible and compatible with other policies aimed at achieving sustainable development.*

2.5. Kent County Council (KCC) Sustainable Drainage

2.5.1. Kent County Council are the LLFA for the area and have issued "Water. People. Places." Which is a guide intended for developers when masterplanning sustainable drainage into major development. The document was prepared by the LLFAs of the South East and has been used to inform the proposed surface water drainage strategy for the proposed development.

2.6. Local Guidance

2.6.1. The following sources have been referenced when carrying out this FRA:

- MBC Strategic Flood Risk Assessment (2006)
- MBC Surface Water Management Plan (2016)
- MBC Preliminary Flood Risk Assessment (2011)
- TMBC Strategic Flood Risk Assessment (2016)

3.0 SITE CONTEXT

3.1. Site Area

3.1.1. The site is split into 2 separate areas, to the north and to the south of the existing airfield site. Overall, the site area is 18.36 Hectares (Ha). Rochester Airport is a general aviation aerodrome on the boundary of Medway Council and Tonbridge and Malling Borough Council. The airport has been used since the early 20th century.

3.1.2. The Northern Area consists of two distinct parcels.

- The main parcel (*Parcel 1*) comprises the airfield occupied by part of the runway 16/34, which is laid to well-maintained grass.
- The second parcel (Parcel 2) is currently occupied by BAE systems. It is laid to concrete slabs as a car park area and secured by palisade fence

3.2. The Southern Area also consists of two distinct parcels:

- The eastern parcel, (*Parcel 3*), has concrete remnants of structures that have been previously demolished on the site. Part of the site is currently being used as an overflow parking for the Innovation Centre, to the north. Within the Parcel 3 is a single storey brick structure and fenced compound. It is thought that both are related to utilities supplies within the site and the wider area.
- The western parcel (Parcel 4), is the site of the Woolmans Wood Caravan Park. The site is currently operational as a caravan park and has space for approximately 100-125 Caravans.

3.3. Site Ownership

3.3.1. Medway Council owns the majority of the site with two leasholders on the site, Rochester Airport Ltd (RAL) and BAE Systems. Although parcels 1, 2 and 3 are owned by Medway Council, a small area of the site falls within the boundary of Tonbridge and Malling Borough Council. Parcel 4, the site of Woolmans Wood Caravan Park to the south west of the Innovation Centre Medway, is privately owned.

3.4. Site Surroundings

3.4.1. To the north of the northern area, the site is bounded by buildings occupied by BAE systems. These comprise a mixture of industrial sheds and office accommodation. To the north west is the Rochester Airport Industrial Estate with a variety of building types including office and industrial. To the west is the Laker Road Industrial Estate comprising a variety of varying office and industrial/manufacturing uses. To the east is the retained Rochester Airport Site. The M2 is located to the west, adjacent to the Kent Downs Area of Outstanding Natural Beauty.

3.4.2. To the north of the southern area, the site is bounded by the existing Innovation Centre owned by Medway Council. The site is bounded by the B2097 to the west and the A229 to the east. To the north west is the retained Rochester Airport site and, to the south, the site is bounded by existing residential developments.

3.5. Topography

3.5.1. The existing site is relatively flat with Levels Above Ordnance Datum (AOD) being between 127m AOD in the south, and 120 AOD in the north.

3.5.2. Significant gradients are absent from all land parcels, with the only variation being the level of surface cover as a result of previous use. There are localised areas of uneven ground on the southern area due to previous demolition and remnant material.

3.5.3. The topography of Parcel 1 and 2 is predominantly flat with falls of approximately 1:80 from south to the north.

3.6. Ground Conditions

3.6.1. The British Geological Survey (BGS) geology viewer of the area shows the bedrock of the site to be the Seaford Chalk Formation, described as a firm, white chalk with nodular and tabular flint seams. Hard lithified strata and thin marls are known to be present within the lower beds of the formation. Flint nodules are noted to be large to very large in size. Superficial deposits of the Clay with Flints Formation are recorded to overlay the Chalk, described broadly as unbedded and heterogeneous orange to brown and red to brown sandy Clays.

3.6.2. Nearby boreholes, accessed through the online BGS borehole archive, indicate a layer of turf over topsoil up to 0.1m bgl, underlain by Made Ground up to 0.45-0.60m bgl. Variable Clay deposits (Clay with Flints Formation) are recorded beneath the Made Ground up to 2.20m bgl, in turn underlain by variable Chalks (Seaford Chalk Formation) encountered up to hole completion (4.6m bgl).

3.7. Hydrology

3.7.1. There are no surface water features or EA Main Rivers located within the site boundary. The River Medway runs west-east approximately 2.5km to the north of the site.[2].

3.7.2. Currently, all surface water on the developed site drains via infiltration, while overland flow discharges to the west onto Laker Road.

3.8. Hydrogeology

3.8.1. The superficial deposits contained within the site are assessed as being unproductive strata. The soil/bedrock deposits of the Seafor Chalk Formation are considered a Principal Aquifer. The groundwater vulnerability map shows the whole site to be classed as a 'major aquifer high'.

3.8.2. A Source Protection Zone 2 (Outer Catchment (Area B) and Source Protection Zone 3 (Total Catchment (Area B) are present on site.

3.8.3. Two groundwater abstraction licenses have been recorded 513m east of the site and 697m west of the site.

3.9. Existing Drainage

[2] Environment Agency Main River Map https://environment.maps.arcgis.com

3.10. Currently, all surface water on the site drains via infiltration, while overland flow discharges to the west onto Laker Road. Other than the private airport network there are no surface water sewers on the existing site.

3.11. A historic drainage strategy, compiled in 2014, derived an infiltration rate of 19.8m/hr (5.5 x10^{-3} /sec) from a back-analysis of the existing drainage. The exact infiltration rate of the existing geology is subject to confirmation.

3.12. Southern Water are the incumbent sewerage provider for the area. The local asset plans are contained in Appendix B. A Southern Water foul sewer running parallel to the site is present in Laker Road.

3.13. The greenfield runoff rates for the site have been calculated using the ReFH2 method and are shown in Table 3.1.

Table 3.1: Greenfield Runoff Rates

Annual rainfall Event	Greenfield Runoff Rate (litres/sec)	Site Area (h	Greenfield Runoff Rate (litres/sec/ha)
1 in 1 Year	48.5	/18.65	2.6
1 in 30 Year	129.3	/18.65	6.9
1 in 100 Year	187.4	/18.65	10.0
QMed	53.7	/18.65	2.9
QBar	56.7	/18.65	3.0
In in-line with Section 6.2.2 of the Environment Agency Report – SC030219, QMed to QBar conversion factor = 0.9			

4.0 ASSESSMENT OF EXISTING FLOOD RISK TO THE SITE

4.1. Flood Zones

4.1.1. The EA define[3] Flood Zones from rivers or the sea as follows:

- Flood Zone 1 (Low Probability): Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3).
- Flood Zone 2 (Medium Probability): Land having between a 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map).
- Flood Zone 3a (High Probability): Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown n dark blue on the Flood Map).
- Flood Zone 3b (The Functional Floodplain): This zone comprises land where water has to flow or be stored in times of flood. Local Planning Authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Flood Zone 3a on the Flood Map).

4.2. Fluvial Flooding

4.2.1. The River Medway is located approximately 2.5km north and the site is located within a Flood Zone 1 denoting a low risk to the site, see Figure 4.1. The TMBC climate change map confirms the site is not at future risk due to climate change from the River Medway.

4.3. Tidal Flooding

4.3.1. There are no known coastal sources of flood risk on or adjacent to the site; the risk of tidal flooding is therefore low.

[3] Environment Agency & DEFRA (2014) Flood Zone Definition: https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-zone-and-flood-risk-tables

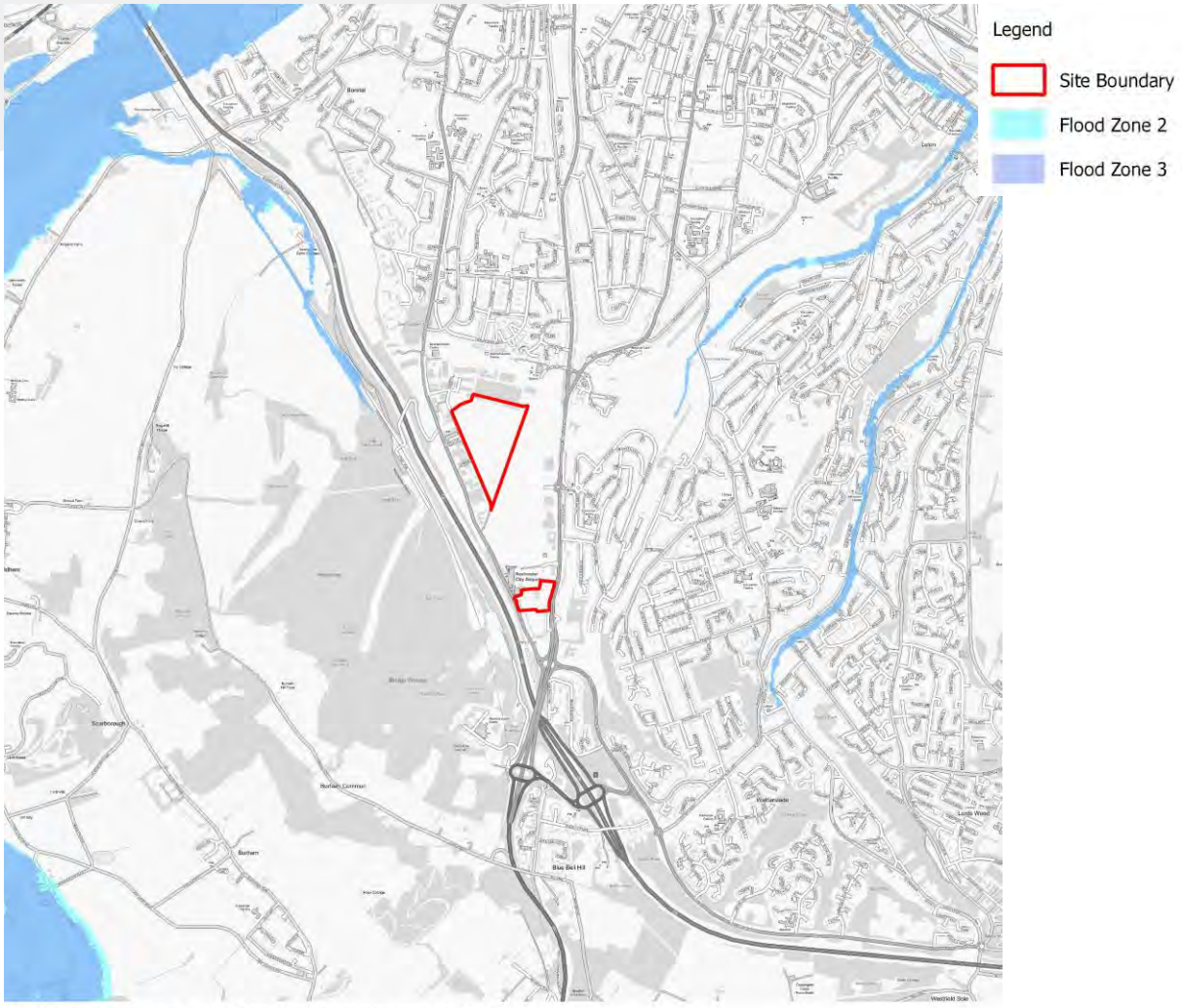

Figure 4.1: Environment Agency Flood Zone Map for Planning

4.4. Surface Water Flooding

4.4.1. The EA classify surface water flood risk as follows:

- VERY LOW – the area has a chance of surface water flooding of less than 0.1%
- LOW – the area has a chance of surface water flooding of between 0.1% and 1%
- MEDIUM – the area has a chance of surface water flooding of between 1% and3.3%
- HIGH - the area has a chance of surface water flooding of greater than 3.3%

4.4.1. The EA's Updated Flood Map for Surface Water (UFMfSW) is shown in Figure 4.2. The majority of the northern area is at very low risk of surface water flooding. Small areas towards the northmost boundary, south of the existing buildings are at low-medium risk of surface water flooding. An overland flow route of low-medium-high risk, at the north western boundary of the site flows towards Lake Road.

4.4.2. The majority of the southern area is considered very low risk in terms of surface water flooding. Towards the north eastern boundary of the southern area, the site exhibits areas of low-medium risk of surface water flooding, the direction of this overland flow path heads north.

4.4.3. The proposed development will increase the amount of impermeable area on site and as a result will increase the volume of runoff and rate of runoff from the site. In order to mitigate this risk and negate an increase in risk off-site the management of surface water has been discussed in Section 5.0.

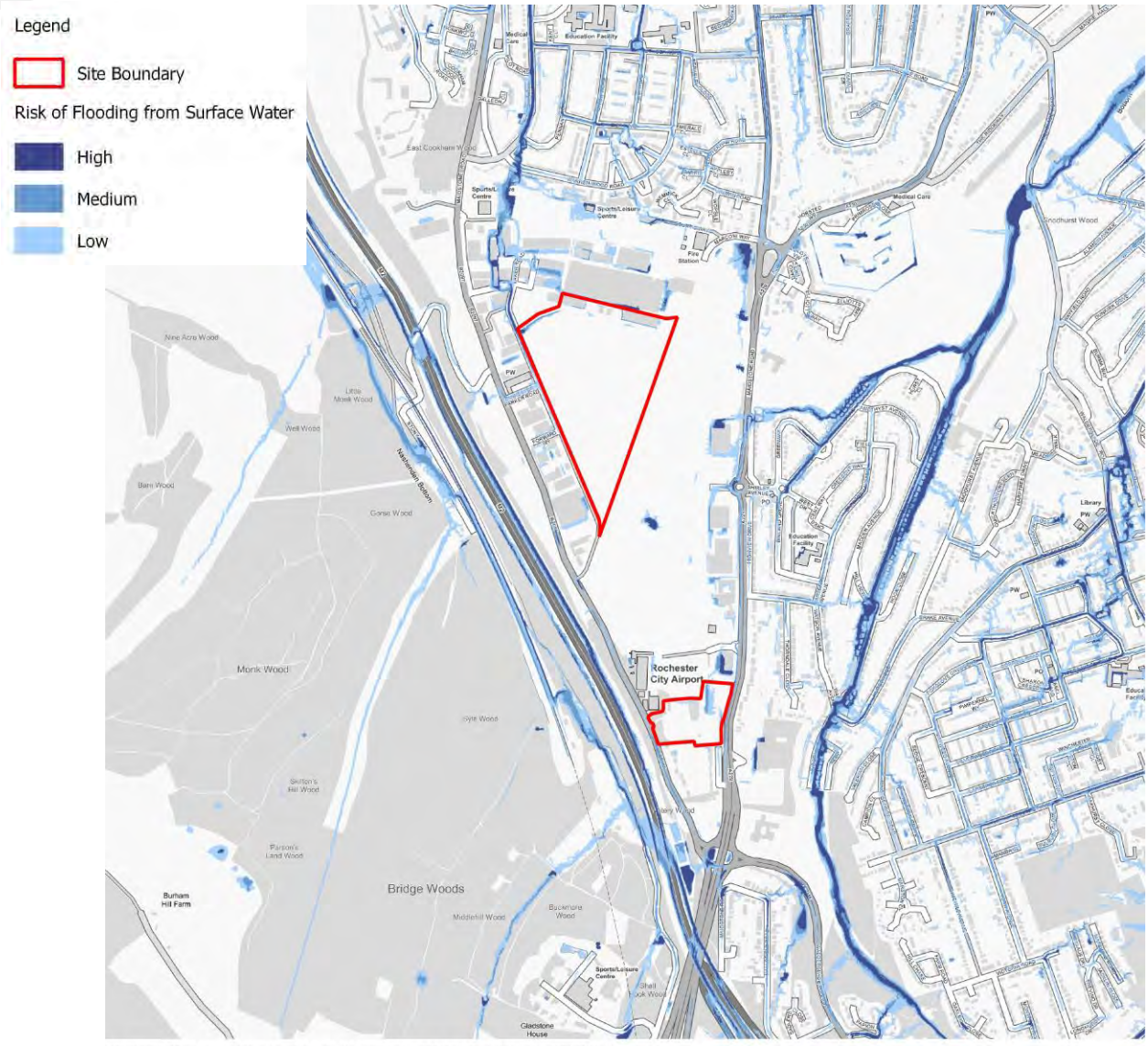

Figure 4.2: Environment Agency Updated Flood Map for Surface Water Flooding

4.5. Groundwater Flooding

4.5.1. A review of the MBC and TMBC SFRA's confirm the risk of groundwater flooding for the site and the surrounding area is low. There has been no recorded groundwater flooding in the past and due to the relatively elevated location of the site in comparison to the surrounding area, groundwater is not considered to be a risk.

4.5.2. Based on the information available from MBC and TMBC, the risk of groundwater flooding is considered to be low.

4.6. Sewer Flooding

4.6.1. A review of the MCB and TMBC SFRAs suggest the risk of sewer flooding to the site is low. Due to the existing nature of the site the risk of existing sewer flood risk is further reduced.

4.6.2. A preliminary inquiry to Southern Water is required to confirm this low risk of sewer flooding.

4.7. Flooding from Reservoirs

4.7.1. The EA flood risk from reservoirs flood map suggests the site is at low risk of flooding from reservoirs.

5.0 SURFACE WATER MANAGEMENT

5.1. Overview

5.1.1. A Surface Water Drainage Strategy has been prepared by CampbellReith and has been submitted as part of this planning application. The surface water drainage strategy is written in accordance with the CIRIA SuDS Manual, Best Practice and the KCC's "Water. People. Places. Guidance".

5.1.2. This section of the FRA summaries the report and outlines how surface water runoff will be managed for the northern area and southern area of the proposed development. The drainage strategy masterplan is contained in Appendix C.

5.2. Proposed Impermeable and Permeable Areas

Northern Area

5.2.1. The northern area drainage strategy has been split into four catchments, see Figure 5.1.

Figure 5.1: Drainage catchments of the northern area

5.2.2. The permeable and impermeable areas have been estimated based on an assumption of 20% and 80% respectively, see Table 5.1.

Table 5.1: Northern Area impermeable and permeable areas & generated surface water volume

Parcel	Site Area (m^2)	Assumption	
		20% permeable (m^2)	80% Impermeable (m^2)
1	35,377	7,075	28,302
2	48,155	9,631	38,524
3	45,045	9,009	36,036
4	25,637	5,127	20,510

Southern Area

5.2.3. The southern area is split into one catchment. The impermeable and permeable areas assigned to each catchment is shown in Table 5.2.

Table 5.2: Southern Area impermeable and permeable areas & generated surface water volume

Parcel	Site Area (m^2)	Assumption	
		20% permeable (m^2)	80% Impermeable (m^2)
1	32,300	6,460	25,840

5.3. Surface Water Volume Attenuation

5.3.1. Based on the outputs of Table 5.1 and 5.2, the volume of surface water generated by the proposed development has been calculated and shown in Table 5.5 and 5.6 below. The volumes requiring attenuation have been based on 1 in 100 + 40% climate change allowance.

Northern Area

Table 5.3: Surface water volume generated from northern area (1 in 100 + 40% climate change)

Parcel	Volume of surface water generated by the proposed development (m^3)
1	3,521
2	4,793
3	4,484
4	2,552

Southern Area

Table 5.4: Surface water volume generated from southern area (1 in 100 + 40% climate change)

Parcel	Volume of surface water generated by the proposed development (m^3)
1	2,575

5.4. Long-term Storage Volume Estimate

5.4.1. The aim of long-term storage is to mitigate the impact of the additional volume of surface water runoff from the proposed development on the receiving surface water bodies. By restricting the total discharge rate from the site to greenfield runoff for the 1 year storm and QBar for all other storms up to and including the 1 in 100 year climate change storm (40% increase in peak rainfall intensities) the long-term storage requirements are satisfied in accordance with best practice guidance

5.5. Sustainable Urban Drainage Systems (SuDS)

5.5.1. The proposed surface water drainage strategy adopts a Strategic SuDS Network comprising of a series of above ground open blue/green features and below ground attenuation storage in the form of permeable pacing and tree pits.

5.5.2. In line with the SuDS hierarchy, infiltration is the preferred method of surface water disposal. The estimated infiltration rate for the site based on the assumed geology and nearby infiltration testing is 0.036m/hr. Further infiltration testing is required to confirm the expected rates and confirm whether infiltration SuDS are suitable for the site. The proposed strategy also puts forward a Strategic SuDS Network satisfying the four pillars of SuDS design through controlling water quantity, improving water quality, encouraging biodiversity and offering amenity value.

5.5.3. Each parcel is to be served by its own surface water drainage network connected to dedicated soakaway features at strategic locations within each parcel. The possible SuDS features considered although are subject to the architects layout, are:

- Swales
- Dry Basins
- Permeable Paving
- Tree Pits
- Cellular Storage

5.5.4. The surface water drainage strategy also puts forward options for managing the exceedance volumes during a 1 in 100 (+40% climate change) critical storm event.

5.5.5. The accompanying Surface Water Drainage Strategy discusses the management of surface water in more detail. This chapter summarises the report and shows that the additional volume of water can be accommodate for within the Masterplan now and for the future without increasing the risk of flooding off-site. The proposed strategy is subject to confirmation and acceptance from the Lead Local Flood Authority (LLFA).

6.0 CONCLUSIONS

6.1.1. CampbellReith have prepared this FRA to show the proposed development at Innovation Park Medway in accordance with the NPPF.

6.1.2. The site is located within a Flood Zone 1 and therefore considered to be at low risk from fluvial flooding.

6.1.3. The site is not situated near any tidal sources and is deemed to be at low risk from tidal flooding.

6.1.4. The site is underlain with Seaford Chalk Formation and has an expected infiltration rate of 0.036m/hr. No groundwater flooding has been recorded within the MBC or TMBC therefore the risk is expected to be low for the site. Further ground investigation and infiltration testing will confirm this conclusion.

6.1.5. The risk of sewer flooding to the site is deemed to be low. A preliminary enquiry to Southern Water should be undertaken for the proposed development.

6.1.6. The risk of reservoir flooding is considered to be low.

6.1.7. The majority of the northern and southern areas of the site are at very low risk from surface water flooding. A small area at the north most boundary of the northern area is at medium to high risk and the EA data suggests an overland flow route heading towards Lake Road. This overland flow path should be maintained within the masterplanning process to reduce any increased flooding to the site. A small portion of the southern area is at low-medium risk of surface water flooding and is a result of the existing impermeable areas on site.

6.1.8. The proposed surface water drainage strategy proposes infiltration subject to further ground investigation and infiltration testing on site; this is the preferred method within the SuDS hierarchy. The surface water volumes generated as a result of the proposed development will be managed through SuDS features such as swales, dry basins, tree pits, permeable paving and cellular storage.

6.1.9. The residual flood risk to the site identifies with surface water flooding during an exceedance event however the Surface Water Drainage Strategy highlights that during an exceedance critical storm event of 1 in 100 + 40% climate change the exceedance flow paths will be directed away from buildings to hard and soft landscaped areas.

6.1.10. It is concluded that the development proposals of the site is in accordance with both National and Local Planning Policies and based on the information provided by CampbellReith within this FRA are considered sustainable and acceptable in terms of flood risk.