Flood Risk Assessment for Yalding Enterprise Park, Kent

Final Report

December 2023

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This report describes work commissioned by Paul Medhurst on behalf of Civils Contracting Ltd. Aaron Barber, James Dunn and Ben Gibson of JBA Consulting carried out this work.

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Purpose

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Executive summary

JBA Consulting was instructed by YEP Property Ltd to undertake a Flood Risk Assessment (FRA) to support an outline planning application for the development of land at the former Syngenta site, Hampstead Lane, Yalding, Kent.

The proposed development comprises construction of a new industrial enterprise park, with associated car parking, landscaping and flood conveyance channel. The flood conveyance channel has been designed to improve conveyance through the site and reduce the impact of flooding to the site and surrounding area. The proposed commercial units, forecourts and access roads will be raised above the surrounding ground level with voids beneath the buildings. This is designed to improve conveyance at the site.

The application proposals for the site are classified in the Planning Practice Guidance as "less vulnerable" development and therefore the application proposal is compatible with the level of risk in Flood Zone 3 without the requirement to apply the Exception Test.

The land comprises a brownfield site which was the location for the former "Syngenta" agro-chemical works which comprised a substantial complex of offices, industrial buildings, storage lagoons and storage and processing areas. In accordance with the statement of agreed facts between Maidstone Borough Council and YEP Property Ltd, the former development has been considered in this FRA and is referred to as the "planning baseline scenario".

This Flood Risk Assessment has used readily available data, site specific survey data and hydraulic modelling to identify any potential flooding issues at the site which will require further consideration in accordance with local and national guidance.

Flood risk

The site is located north of the River Medway at Anchor Sluice and west of the canal at Hampstead Lane, and is situated within Flood Zone 3. The site has previously experienced flooding in November 1960 and September 1968 prior to the construction of the Leigh Flood Storage Area and more recently in October 2000 and December 2013.

Hydraulic modelling has been prepared for the defended 5% Annual Exceedance Probability (AEP), 1% AEP and 1% AEP (+35% flows) events for the planning baseline scenario and for the proposed development scenario.

Modelling undertaken to support the FRA demonstrates that flooding at the site is largely restricted to the flood conveyance channel during the 5% AEP return period event for the proposed development scenario. Indeed, the conveyance afforded through the site for this feature reduces flood depths south and east of the site, particularly for smaller magnitude (more frequent) flood events. There is flooding in the east of the site up to depths of 0.45m during this return period event. This area of flooding is small and will impact only the void areas beneath the buildings with no internal flooding predicted to the raised buildings.

During the present day defended 1% AEP event, large areas of the site would experience depths of flooding between 0.5m and 1.0m, with depths in the east of the site between 1.0m and 1.5m. When the effects of climate change are considered following Environment Agency guidance (by applying a 35% uplift in the flood flows) the depths of flooding across large areas of the site are shown to be between 1.5m and 2.0m. In this event, there are areas in the west of the site where depths of flooding would be between 1.0m and 1.5m, slightly lower than the depths experienced in the east.

Floor levels of the proposed commercial units have been raised to 13.7m AOD, approximately 450mm above the 1% AEP +35% flows climate change flood level and there would therefore be no internal flooding of the proposed units during such an event. The proposed commercial units and developed areas of the site would not experience flooding

during this flood event. The site has been designed in such a way to avoid internal flooding of the units and allow flooding of the voids beneath.

A comparison of the flood levels for the proposed development scenario (with proposed buildings and site levels represented) with flood levels from the planning baseline scenario (the previous configuration of buildings at the site prior to their removal for site remediation) shows that the development will have a positive effect on flood risk in the area. This is achieved through the incorporation of the flood conveyance channel and voids beneath the proposed units, as an integral part of the proposed scheme. Flood depths will be reduced by up to 0.05m during the 5% AEP event, by up to 0.002m during the 1% AEP event and are shown to remain unchanged by the proposed development during the 1% AEP event including an uplift in flows for climate change. The proposed development is shown to have a positive impact on flooding in the area, including Yalding village, for more frequent flood events as the conveyance route allows water to flow through the site, when otherwise it would have been directed eastward closer to the village.

The Environment Agency's Risk of Flooding from Surface Water map indicates that the site is predominantly at 'very low' risk from surface water flooding. There are localised areas of 'medium' and 'high' surface water flood risk in the centre and the north of the site. The potential surface water flood risk can be addressed through the careful preparation of co-ordinated detailed design proposals for the drainage, external ground levels and threshold levels of the proposed buildings.

Mapping available within Maidstone Borough Council's Strategic Flood Risk Assessment shows that the proposed development site is not located within an area that is susceptible to groundwater flooding. The overall risk of groundwater flooding to the site is considered 'low', particularly given that the proposed units will be raised well above the existing ground levels.

The site is potentially at risk of flooding in the unlikely event of a breach or failure of Leigh Flood Storage Area (13km south west of the site), Bewl Bridge reservoir (16km south of the site), Bough Beech reservoir (19km west of the site) and Weirwood reservoir (30km south west of the site). Given the raised nature of the proposed buildings and the distance of the reservoirs from the proposed development site, the likelihood of a breach impacting the site is considered to be 'low'.

Recommendations

It is recommended that a Flood Action Plan is developed so that occupants of the site are aware of the necessary actions to take in the event of a flood which could restrict access to and from the site for limited periods of time.

The assessment performed in support of the outline application demonstrates that the proposals are safe and contribute to an overall reduction in flood risk to the locality. To reflect the sensitivity of the site and surroundings to flood risk subsequent, detailed site development and construction proposals should assessed as necessary to confirm that the conclusions reached in the assessment for the outline application remain valid.

It is understood that the YEP Property Ltd are preparing a separate report detailing the surface water drainage arrangements at the site in line with relevant guidance. Please refer to this reporting for details of the proposed site drainage.

Contents

1	Introduction	1
1.1	Terms of reference	1
1.2	Flood Risk Assessment requirements	1
2	Site details	2
2.1	Current site description	2
2.2	Site topography	3
2.3	Watercourses	3
2.4	Site geology	4
2.5	Proposed development	5
3	Planning policy and flood risk	6
3.1	Planning context	6
3.2	Development site in flood zones	6
3.3	NPPF and PPG Flood Zone and risk tables	7
3.3.1	Sequential and Exception Tests	8
3.3.2	Environment Agency climate change allowances	8
3.4	Planning guidance review	9
3.4.1	Maidstone Borough Council Local Plan	9
3.4.2	Kent County Council Preliminary Flood Risk Assessment (September 2011)	9
3.4.3	Maidstone Borough Council Strategic Flood Risk Assessment (October 2016)	9
3.4.4	Kent Local Flood Risk Management Strategy (2017 – 2023)	10
3.4.5	Thames River Basin Flood Risk Management Plan (2015-2021)	11
4	Assessment of flood risk	12
4.1	Flood Risk Assessment	12
4.2	Historical flood risk	12
4.3	Fluvial flood risk modelling	13
4.3.1	Modelling results	14
4.3.1.1	5% AEP event	14
4.3.1.2	1% AEP event	15
4.3.1.3	1% AEP +35% flows event	16
4.3.2	Off-site flood risk	17
4.4	Surface water flood risk	18
4.5	Groundwater flood risk	19
4.6	Sewer flood risk	19
4.7	Risk of flooding from reservoirs	20
5	Flood risk mitigation measures	21
5.1	Finished floor levels and flood resilience	21
5.2	Flood warning	21
5.3	Emergency evacuation	22
6	Construction (Design Management) Compliance	23
7	Conclusions and recommendations	24
A	Proposed plan	I
B	Model development report	II
C	Mapping comparison: difference in peak water levels between the proposed development and planning baseline modelling	III

List of Figures

Figure 2-1: Ground levels at the site recorded in the UAV ground level data 3
Figure 2-2: Watercourses in the vicinity of the development site. 4
Figure 3-1: Environment Agency Flood Map for Planning 7
Figure 4-1: Environment Agency recorded flood outlines 12
Figure 4-2: On-site flood depths - 5% AEP defended flood event 15
Figure 4-3: On-site flood depths - 1% AEP defended flood event 16
Figure 4-4: On-site flood depths - 1% AEP +35% flows defended flood event 17
Figure 4-5: Environment Agency's Risk of Flooding from Surface Water map 19

List of Tables

Table 2-1: Site description 2
Table 3-1: Flood Zones 6
Table 3-2: Flood risk vulnerability and Flood Zone 'compatibility' 8
Table 3-3: Climate change allowances for Thames River Basin District 9
Table 5-1: The Environment Agency's Flood Alert and Warning codes 21

Abbreviations

AEP	Annual Exceedance Probability
BGS	British Geological Survey
CC	Climate Change
CDM	Construction (Design and Management) Regulations 2007
CFMP	Catchment Flood Management Plan
DEFRA	Department of the Environment, Food and Rural Affairs (formerly MAFF)
DTM	Digital Terrain Model
EU	European Union
FRA	Flood Risk Assessment
FRMP	Flood Risk Management Plan
Ha	Hectare
KCC	Kent County Council
LIDAR	Light Detection and Ranging
LLFA	Lead Local Flood Authority
mAOD	metres Above Ordnance Datum
NGR	National Grid Reference
NPPF	National Planning Policy Framework
OS	Ordnance Survey
OS NGR	Ordnance Survey National Grid Reference
PFRA	Preliminary Flood Risk Assessment
PPG	Planning Policy Guidance
SFRA	Strategic Flood Risk Assessment
SUDS	Sustainable Drainage Systems
UAV	Unmanned Aerial Vehicle

1 Introduction

1.1 Terms of reference

JBA Consulting was instructed by YEP Property Ltd to undertake a Flood Risk Assessment (FRA) to support an outline planning application for the redevelopment of the former Syngenta site, Hampstead Lane, Yalding, Kent.

The site is allocated for redevelopment which includes leisure and employment uses under policy RMX1(4) of the Maidstone Local Plan. Outline planning permission for up to 46,447 sqm of employment in use classes B1(c) (now use E(g)(iii)), B2 and B8 uses and a flood conveyance channel was granted in October 2021 (ref: 19/504910/OUT) and subject to a Section 73 variation of condition approval in November 2023 (ref: 23/502119/OUT). The reserved matters for phase B of the development, comprising erection of 20no. commercial units with associated parking, access and landscaping was approved in August 2023 (ref: 23/502118/REM).

The proposed commercial units and adjacent forecourts and roads will be raised above the surrounding ground level with a void space located beneath. The commercial units have floor levels set at 13.70mAOD.

This Flood Risk Assessment accompanies a planning application to Maidstone Borough Council ("MBC") for the continued development of building 1G approved under 23/502118/REM and change of permitted use to indoor and outdoor leisure and recreation uses. The proposals seek permission for an alternative use of Building 1G, and no further development is proposed as part of this application.

The proposed development is classified as "less vulnerable" under NPPF guidance.

1.2 Flood Risk Assessment requirements

It is a requirement for development applications to consider the potential risk of flooding from various sources to a proposed development over its lifetime and any possible impacts on flood risk elsewhere as a result of the development.

Where appropriate, the following aspects of flood risk should be addressed and the extent to which the development is designed to deal with flood risk

- the nature and expected lifetime of the development and the extent to which the development is designed to deal with flood risk;
- the area liable to flooding from various sources;
- the probability of the current and future flood risk;
- the extent and standard of existing flood defences and their effectiveness over time;
- the likely depth of flooding;
- the rates of predicted flows;
- the likelihood to impacts on other areas, properties and habitats; and
- the effects of climate change.

The level of flood risk to the site has been determined based on information provided by updates to existing Environment Agency flood models, Environment Agency LIDAR Digital Terrain Model (DTM)[1], flood history datasets[2,3], publicly available information and a review of Ordnance Survey (OS) maps[4].

[1] https://environment.data.gov.uk/DefraDataDownload/?Mode=survey/ - accessed May 2019

[2] https://environment.data.gov.uk/dataset/8c75e700-d465-11e4-8b5b-f0def148f590 - accessed May 2019

[3] https://environment.data.gov.uk/dataset/889885c0-d465-11e4-9507-f0def148f590 - accessed May 2019

[4] https://www.ordnancesurvey.co.uk/opendatadownload/products.html - accessed May 2019

2 Site details

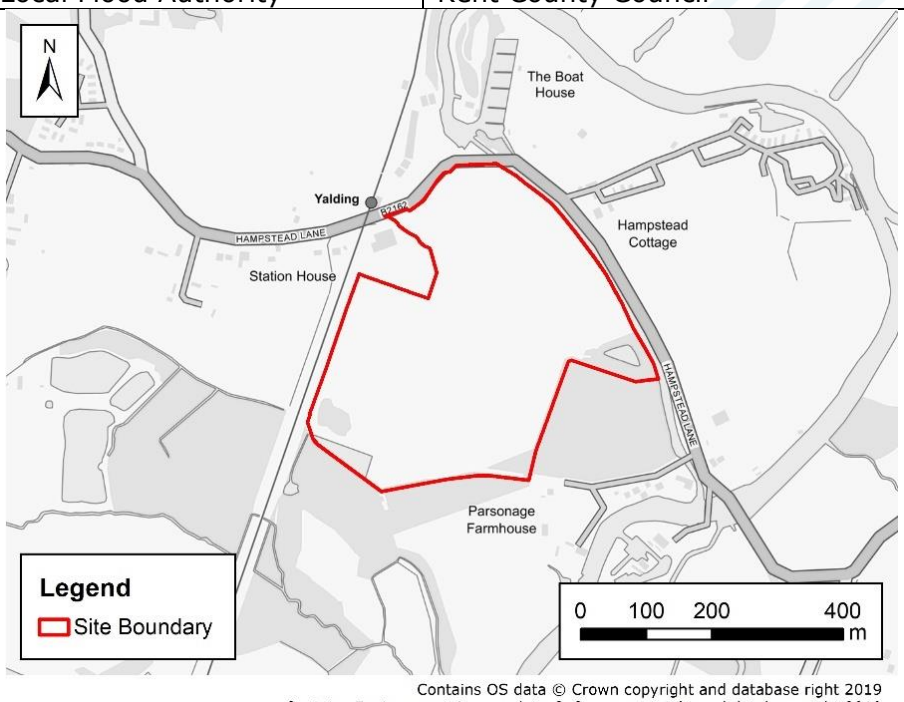
2.1 Current site description

The site is located to the south of Hampstead Lane, Yalding, Kent. The site is approximately 1km west of Yalding village centre and is approximately 14ha in area. The majority of the site comprises remediated land. There is a brick built electricity sub-station located in the north of the site. The site is former location of the "Syngenta" agro-chemical works. The northern half of the site was formerly used as a manufacturing area whilst the south of the development site was partially used for storage and partially undeveloped. The site closed in 2003 and the buildings associated with the agro-chemical works were removed between 2004 and 2006 to enable the remediation of the ground to be completed in accordance with local authority and statutory consents.

Extensive remediation has been undertaken at the site including the excavation and backfilling of contaminated soils to a depth of 0.0 to 4.0m. The primary remediation works were carried out over a two-year period and completed in September 2008. Following the completion of the primary remediation works the site has been subject to regular monitoring of the groundwater which formed an integral part of the secondary remediation works, these remains ongoing, the former manufacturing and storage areas have been left as loosely surfaced areas. The area was being used as storage until February 2019 whereby remaining equipment was removed.

Information relating to the existing site can be found in Table 2-1.

Table 2-1: Site description	
Site Location	Hampstead Lane, Yalding, Kent
Site Area	14 hectares
Existing land use	Brownfield
Proposed land use	Commercial
NPPF vulnerability classification	Less vulnerable
OS NGR	568670 150080 (TQ 68670 50080)
County	Kent
Country	England
Local Planning Authority	Maidstone Borough Council
Lead Local Flood Authority	Kent County Council



2.2 Site topography

Environment Agency LIDAR datasets were used to provide an understanding of the topography of the site and the wider area, supported by Unmanned Aerial Vehicle (UAV) elevation survey collected in April 2019 to obtain the latest topography of the site, post site remediation. The extent of the UAV survey data, displaying variation in ground levels across the site is displayed in Figure 2-1.

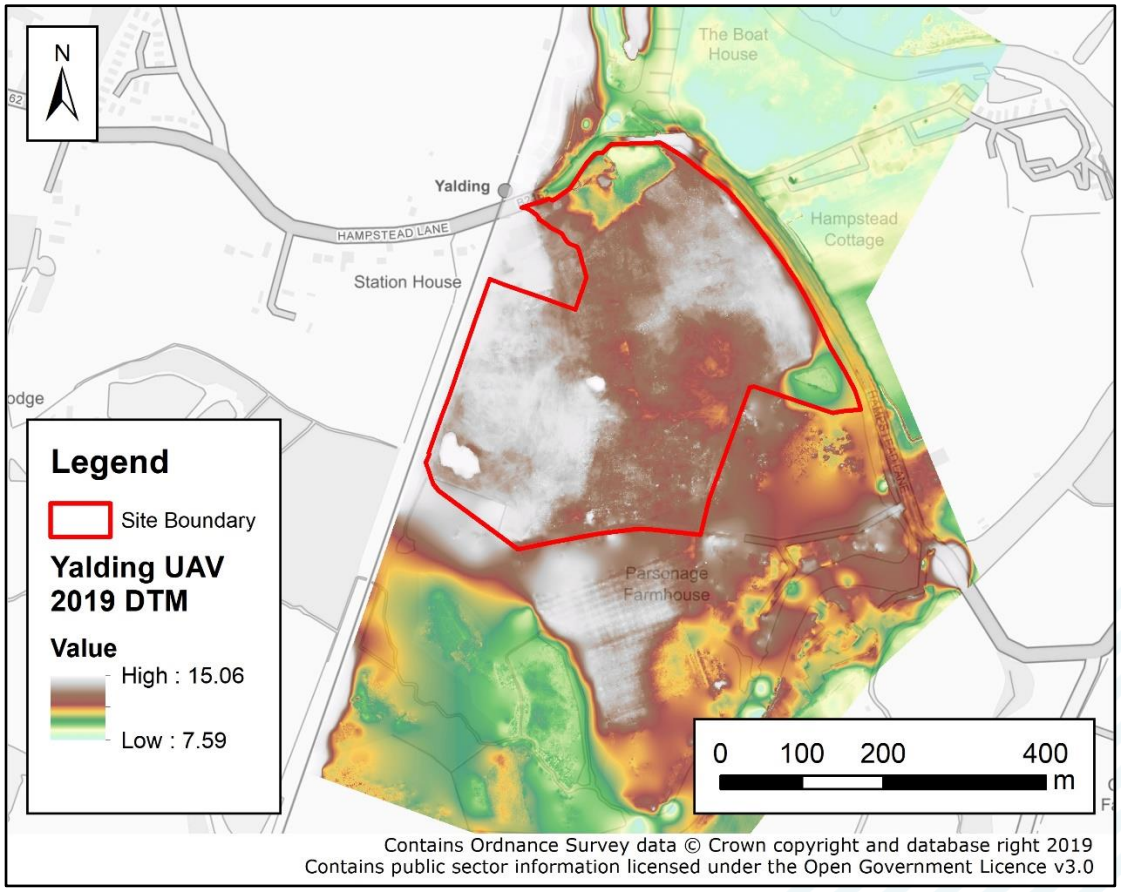


Figure 2-1: Ground levels at the site recorded in the UAV ground level data

The site in post remediation condition is relatively flat, with areas of higher ground to the west and north east of the site situated between 11.5mAOD and 12.0mAOD, and lower areas in the middle of the site, situated around 11.0mAOD to 11.5mAOD. Ground levels at the site drop notably in the north of the site to 9.8mAOD, where the adjoining Hampstead Lane borders the site, with five culverts present under the road, which are currently blocked via bricks preventing the flow of water thereby impeding the drainage of water to the River Medway to the north. A lagoon is present adjacent to the canal at the east of the site, which has a raised embankment at its perimeter (raised embankment not captured in the UAV ground level data presented above).

2.3 Watercourses

The River Medway is located approximately 130m to the south east of the most southerly point of the site and flows in a north easterly direction through Anchor Sluice, towards Yalding, before meandering in a more northerly direction and flowing some 200-400m north east of the development site. A navigable canal section of the Medway borders the site in the east, with Anchor Sluice complex location at the southern end of the canal branch and Hampstead Lock at the northern end. Due to the elevation of ground at the site, and the location of the watercourses in relation to the site, historical flooding has started first in the

floodplain to the south and east of the site before flood levels rise to a level that affect the site.

The site is situated in a relatively low lying part of the floodplain, close to where the rivers Beult, Teise and other ordinary watercourses with the River Medway. North of the site, the Medway flows north-east through an incised river valley through the Kent Greensand Ridge and the North Downs.

Watercourses located within the vicinity of the development site are shown in Figure 2-2.

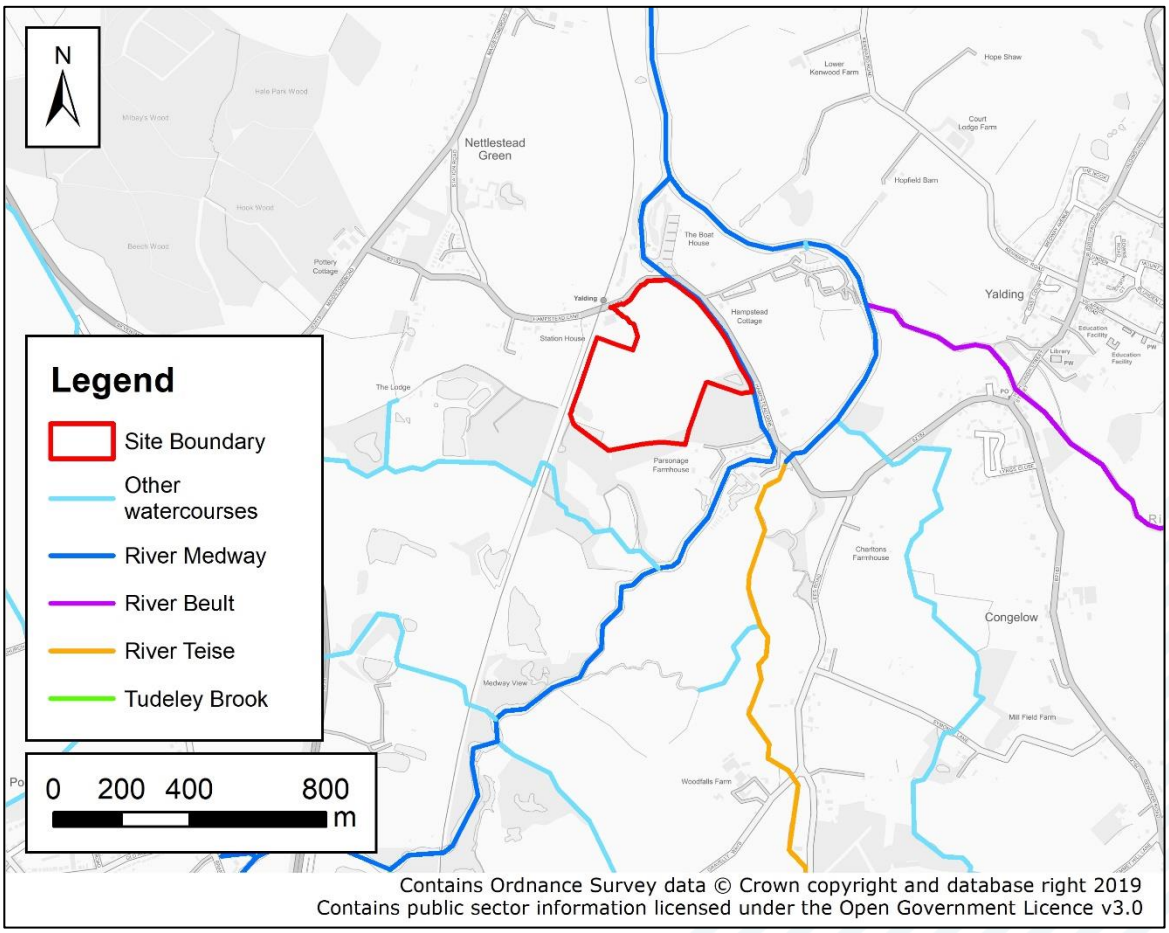


Figure 2-2: Watercourses in the vicinity of the development site.

2.4 Site geology

The British Geological Survey (BGS) 'Geology of Britain Viewer'[5] 1:50,000 scale mapping has been used to identify the geological setting of the site. The site is situated upon the Weald Clay Formation, a sedimentary bedrock comprising of mudstone. The Weald Clay Formation is classified by the Environment Agency's Aquifer Designation Map as an unproductive unit.

The site is also identified to be situated upon the superficial deposits of alluvium (comprising of clays, silts, sands and peat) and undifferentiated river terrace deposits (comprising clays and silts). The superficial deposits at the site are classified by the Environment Agency's Aquifer Designation Map as Secondary (undifferentiated) aquifers.

[5] British Geological Survey, 'Geology of Britain Viewer'. http://mapapps.bgs.ac.uk/geologyofbritain/home.html? – (Last accessed 06/08/2019)

The Groundwater Vulnerability Map, available on DEFRA's MAGIC interactive map[6], indicates that the aquifers beneath the site are classified as a Minor Aquifer High.

During historical remedial works, the groundwater across the site was found to lie between 1m and 4m below ground level, within the River Terrace Gravels.

2.5 Proposed development

The proposed development comprises the construction of a new industrial enterprise park, with associated car parking, landscaping, and flood conveyance channel. The commercial units, adjacent forecourt areas and access roads will be raised above ground level with voids beneath these areas to improve flood conveyance at the site.

The proposed flood conveyance route is an integral component of the scheme and will slope from south to north enabling flood water to flow in a controlled manner through the site. This feature will improve conveyance capacity through the site and allow flood water to flow via this route for smaller magnitude, more frequent events than currently flow across the site, thereby not only assisting with the proposed form of development, but providing betterment (reduction) in flood levels to the surrounding floodplain. The feature serves to direct flood water away from the operational areas of the site (forecourts, roads and commercial) units and improve flood risk in the surrounding area of the site. The nature of the flood conveyance route has been informed by modelling described further in Section 4.3 and the Model Development Report in Appendix B.

A basin will also be incorporated into the layout of the site at the downstream (northern) extent of the flood conveyance route, making use of the existing depression in this area. The culverts beneath Hampstead Lane (which are currently blocked) and the chambers connecting to the former mill race under Hampstead Lane (which are currently sealed) connect to this location and will be re-opened to permit flow of flood water.

Access routes into the development site have a design level of 11.70mAOD, with the level of roads rising to a level of 13.35mAOD adjacent to the proposed commercial units. The raised roads will be connected to the surrounding site by 1:30 slope ramps. The finished floor level of the proposed commercial buildings will be set to 13.70mAOD, circa 0.45m above the 1% AEP +35% flows (to represent the effects of climate change) maximum flood level. The level of the forecourt adjacent to the proposed commercial buildings will slope up at 1:40 and be between 13.35mAOD and 13.70mAOD. There will be void space beneath the raised commercial buildings at the site enhancing conveyance through the site, and also limiting any change in floodplain volume at ground level on the site.

The remaining areas of the site are to remain at the existing site level. The existing office block at the northwest of the site is to remain as currently without any alterations to the built footprint or floor level.

The proposed development plan and the proposed site levels for the site are shown in Appendix A. Please note that the modelling undertaken to support the FRA uses an earlier iteration of the development plan which has the same building layout apart from one building in the east of the site which is orientated in a different direction. This minor change in layout is not expected to influence the overall trend of betterment in flood risk brought about by the implementation of the development.

[6] MAGIC Interactive Map, Department for Environment, Food and Rural Affairs. https://magic.defra.gov.uk/ - (Last accessed 06/08/2019)

3 Planning policy and flood risk

3.1 Planning context

The National Planning Policy Framework (NPPF) was introduced by the Department for Communities and Local Government in March 2012 and updated in July 2018. Its technical guidance relates to development planning and flood risk using a sequential characterisation of risk based on planning zones, and the Environment Agency Flood Map and minerals policy. The main study requirement is to identify the Flood Zones and vulnerability classification relevant to the proposed development, based on an assessment of current and future conditions. The NPPF is accompanied by the Planning Practice Guidance (PPG) on Flood Risk and Coastal Change, which gives further information on the approaches to be adopted in the assessment of flood risk for new development.

3.2 Development site in flood zones

For the purposes of applying the National Planning Policy Framework, flood risk is a combination of the probability and the potential consequences of flooding from all sources – including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

The NPPF has defined the risk of flooding in a series of Flood Zones; a definition of such Flood Zones can be found in Table 3-1.

Flood Zone	Definition
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).
Zone 2 (Medium Probability)	Land having between a 1 in 100 and 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).
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 in dark blue on the Flood Map).
Zone 3b* (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 Zone 3a on the Flood Map).

Table 3-1: Flood Zones

**Flood Zone 3b is defined by mapping provided within the Maidstone Borough Council Level 1 Strategic Flood Risk Assessment*

It should also be noted that the Environment Agency Flood Zone Map does not consider the presence of flood defences or the flood risk associated with culvert blockages, sewer flooding or any other specific local conditions.

The Environment Agency Flood Map (Figure 3-1) shows that the site in the remediated condition (which is not reflective of the planning baseline for assessment in this FRA, as agreed with Maidstone Borough Council) lies almost entirely within fluvial Flood Zone 3 which is defined as an area that has a greater than 1 in 100 chance (1% AEP) of fluvial flooding in any given year. A small raised area of the site (a lagoon and raised embankment) is located within fluvial Flood Zone 2 which is defined as having between a 1 in 100 and 1 in 1000 chance (1% AEP – 0.1% AEP) of fluvial flooding in any given year.

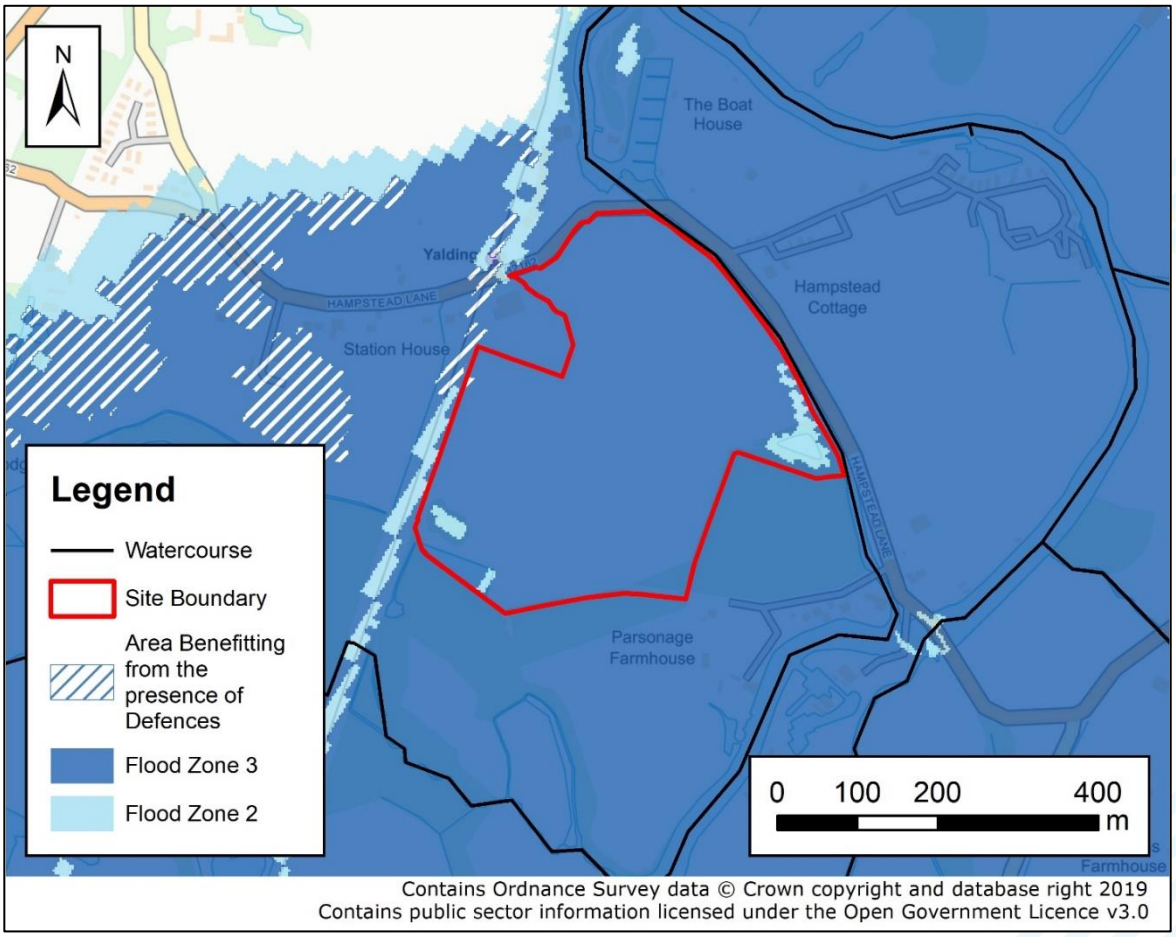


Figure 3-1: Environment Agency Flood Map for Planning

The remediated site is therefore predicted to be at a medium to high flood risk from fluvial sources. The Environment Agency Flood Map for Planning does not consider the presence of flood defences. The Maidstone Borough Council Strategic Flood Risk Assessment (SFRA) 2016 designates approximately half of the site as Flood Zone 3b, the functional floodplain, and defined by the flood event for the 5% AEP (1 in 20 chance of flooding) event. Again, this is based on the site being in the remediated condition and does not reflect the planning baseline as agreed with Maidstone Borough Council.

3.3 NPPF and PPG Flood Zone and risk tables

Table 3-2 shows how the Flood Zones relate to sequential planning response. Table 2 of the NPPF[7] shows the classification of flood risk vulnerability in relation to a proposed development type. The proposed development is classified as 'less vulnerable' under the NPPF. Table 3-1 and Table 3-2 are based on Tables 1 and 3 in the PPG/NPPF Technical Guidance.

[7] https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-3-Flood-risk-vulnerability

Table 3-2: Flood risk vulnerability and Flood Zone 'compatibility'

Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test	✓	✓
	Zone 3a	Exception Test	✓	×	Exception Test	✓
	Zone 3b	Exception Test	✓	×	×	×

✓ *Development is appropriate*

× *Development should not be permitted*

Notes:

This table does not show:

1. The application of the sequential test which guides development to Flood Zone 1 first, then Zone 2, and then Zone 3

2. Flood risk assessment requirements

3. The policy aims for each flood zone.

3.3.1 Sequential and Exception Tests

The Sequential Test aims to promote development in low flood risk areas. The Exception Test is used where no suitable development areas can be found in low flood risk zones. When planning a development, a sequential approach should be applied to identify suitable sites which are at minimal risk from flooding, avoiding Flood Zone 2 and 3 where possible.

The Sequential Test requires that consideration is given to reasonably available sites at locations where the flood risk is lower. The development site is located within Flood Zone 3a and the risk of flooding to the site is therefore considered to be 'high'. However, this FRA aims to demonstrate that the proposed development will be safe from flooding throughout its lifetime without increasing flood risk elsewhere and recommending suitable flood mitigation measures. The proposed development site is highlighted in the Local Plan as a strategic development site within which development would be supported by the local council provided suitable flood mitigation is provided.

The proposed development is considered to be 'less vulnerable' and therefore application of the Exception Test is not necessary.

3.3.2 Environment Agency climate change allowances

The NPPF and supporting Planning Practice Guidance on flood risk and coastal change explains when and how Flood Risk Assessments should be used. This includes demonstrating how flood risk will be managed now and over the development's lifetime, taking climate change into account.

On 19 February 2016, the Environment Agency released updated guidance on climate change allowances to support the NPPF (https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances).

Table 3-3: Climate change allowances for Thames River Basin District

Allowance category	Total potential change anticipated for the 2020s (2015 – 2039)	Total potential change anticipated for the 2050s (2040 – 2069)	Total potential change anticipated for the 2080s (2070 – 2115)
Upper end	25%	35%	70%
Higher central	15%	25%	35%
Central	10%	15%	25%

To assess whether the proposed development complies with the 2016 Environment Agency climate change guidance, a 1% AEP scenario has been considered with 35% uplift in flows. The guidance suggests that a range of allowances should be tested, which in this case would be +25% and +35%. Therefore, the decision to focus on the +35% allowance is making use of the worst-case estimate of climate change between the two possible.

3.4 Planning guidance review

3.4.1 Maidstone Borough Council Local Plan[8]

The Maidstone Borough Council Local Plan provides a framework for development until 2031. It plans for homes, jobs, shopping, leisure and the environment, and provides infrastructure to support these. The Local Plan is supported by a robust evidence base and considers a number of relevant national and local planning policies. To achieve the spatial vision and objectives for the borough set out in the Local Plan, a number of strategic policies have been identified.

The proposed development site is located within the Yalding Larger Village strategic policy area (Policy SP 16 – Yalding Larger Village). Robust flood mitigation measures should form an essential part of any development proposal within the settlement area. The Local Plan states that the council will support redevelopment of the former Syngenta Works site. Subject to the findings of a Flood Risk Assessment for the site, potential suitable uses could include employment (B classes), leisure, commuter car parking and open space.

The Local Plan contains Policy DM 3 – Natural Environment which sets out how development should ensure that natural assets remain robust and viable.

3.4.2 Kent County Council Preliminary Flood Risk Assessment (September 2011)[9]

The Preliminary Flood Risk Assessment (PFRA) carried out by Kent County Council (KCC) as Lead Local Flood Authority (LLFA) was published in September 2011. The PFRA aims to provide a clear overall understanding of flood risk across Kent and identify areas of flood risk that need to be investigated further.

The PFRA details that the Environment Agency has undertaken a national exercise to map areas of risk of surface water flooding to help identify the future flood risk and significant flood risk areas across England and Wales. Ten significant areas of surface water flood risk have been identified in England. Out of these ten areas, none are located within Kent County Council. The PFRA states that the county is still at significant risk of surface water flooding and also has significant risks from groundwater and ordinary watercourses, but no particular flood issues are identified at the site.

3.4.3 Maidstone Borough Council Strategic Flood Risk Assessment (October

[8] Maidstone Borough Council Local Plan, Adopted October 2017. Last accessed 01/08/2019. http://services.maidstone.gov.uk/docs/October%202017%20Adopted%20Local%20Plan.pdf

[9] Kent County Council Preliminary Flood Risk Assessment (Last accessed 5 June 2019) https://www.kent.gov.uk/__data/assets/pdf_file/0013/12091/Preliminary-flood-risk-assessment.pdf

2016)[10]

The Strategic Flood Risk Assessment 2016 addendum updated elements of the Level 1 SFRA 2008 document to provide supporting evidence for the emerging Local Plan. The addendum considers the latest flood risk policy and the latest flood risk information and available data since the previous SFRA. The document provides a comprehensive set of maps presenting flood risk from all sources to be used as part of the evidence base for the Local Plan.

The Level 1 SFRA identifies that Maidstone Borough has a history of documented flood events and flood records which indicate that the main risk is from fluvial sources. The primary source of fluvial flood risk in the borough is from the River Medway and its major tributaries the River Beult and River Teise.

Maidstone Borough has also experienced a number of historic surface water / drainage related flood events which have been attributed to a range of sources including overloaded highways and blockages of surface water drains and gullies. Mapping provided alongside the SFRA shows that the proposed developed site is predominantly located outside of the extents of the modelled surface water flooding return period events (3.33% AEP, 1% AEP and 0.1% AEP). There are localised areas within the development site boundary that are within the 1% AEP and 0.1% modelled surface water flood extents.

Groundwater flooding incidents have been recorded within the borough. However, they have been isolated events. SFRA mapping shows that the proposed development site is not located within an area that is susceptible to groundwater flooding.

The SFRA states site-specific FRA should support planning applications for development located in Flood Zone 2 and 3 and that the impact of climate change to a proposed development is considered within any FRA. Development should seek opportunities to reduce overall flood risk at the site.

Maidstone Borough Council considered flood risk and potential development of this development site as part of the investigations for their Level 1 SFRA. The analysis investigated current levels of flood risk at the site, the proposed development type and to assess whether there are practical potential flood risk management approaches to enable development to be safely at the site. The modelling prepared for the study indicated increases to flood risk for the form of development considered. However, the study did not investigate the effects of improved conveyance measures at the site which are now being considered as part of this development and which are beneficial to flood risk.

3.4.4 Kent Local Flood Risk Management Strategy (2017 – 2023)[11]

As the Lead Local Flood Authority, Kent County Council is responsible for publishing a Local Flood Risk Management Strategy (LFRMS) to set out how the risk of flooding will be managed across the county. The LFRMS was first published in 2013 and updated in 2017.

The LFRMS outlines the types of flooding that are most likely to impact Kent and the roles and responsibilities of Risk Management Authorities that have a responsibility in managing flood risk. The strategy then sets out the ways in which its objectives and strategies will be monitored to ensure they are achieved and how the development and construction of future flood schemes will be prioritised across the borough.

The LFRMS does not identify any additional flood risk issues at the development site.

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[10] Maidstone Borough Council Level 1 Strategic Flood Risk Assessment (Last Accessed 01/08/2019) http://www.maidstone.gov.uk/__data/assets/pdf_file/0015/132810/CC-005-Level-One-Strategic-Flood-Risk-Assessment-Addendum-October-2016.pdf

[11] Kent County Council Local Flood Risk Management Strategy (Last Accessed 01/08/2019) https://www.kent.gov.uk/__data/assets/pdf_file/0010/79453/Local-Flood-Risk-Management-Strategy-2017-2023.pdf

3.4.5 Thames River Basin Flood Risk Management Plan (2015-2021)[12]

Where appropriate, each EU member country must produce Flood Risk Management Plans (FRMPs) as set out in the EU Floods Directive 2007. The South East River Basin FRMP describes the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs in the district. It sets out how risk management authorities will work with communities to manage flood and coastal risk up to the year 2021.

The development site is located within the Medway Catchment.

The sources of flood risk within the Medway Catchment include tidal, river, surface water and groundwater flooding. The primary source of flood risk across the catchment if from fluvial flooding in the Eden, Medway, Bourne, Beult and Teise; and tidal flooding in the Tidal Medway Estuary.

The FRMP sets out 75 measures to manage flood risk in the Medway Catchment under the following categories:

- Preventing the risk
- Preparing for risk
- Protecting from risk

The proposed development site has not been specifically highlighted as a result of the action plan, besides the requirement of the site to follow standard planning policy as set out in local and national planning policies.

The Flood Risk Management Plan states that investigations are underway to increase the storage at Leigh FSA, which likely provide some benefit to the site. However, the modelling prepared to date for the study reflects the current level of storage available.

FRMPs work with the River Basin Management Plans as part of the Water Framework Directive.

[12] Thames River Basin District Flood Risk Management Plan (Last Accessed 01/08/19) https://www.gov.uk/government/publications/thames-river-basin-district-flood-risk-management-plan

4 Assessment of flood risk

4.1 Flood Risk Assessment

The aim of the FRA is to demonstrate how flood risk to the development and flood risk to others from all sources, will be managed now and in the future. The site is shown to be located within Flood Zone 3 and therefore needs to be supported by a Flood Risk Assessment.

The watercourses adjacent to the development site are not tidally influenced in this area and therefore tidal flooding has not been considered further in this assessment.

4.2 Historical flood risk

The Environment Agency Recorded Flood Outlines in Figure 4-1 show that the entire site flooded in November 1960 and September 1968. The dataset indicates that approximately 90% of the site area was affected by flooding in December 2013 whilst approximately 30% of the site area was flooded in October 2000 (areas at the north and south of the site). In these two events, peak water levels at the Anchor Sluice were recorded as 11.49mAOD and 10.76mAOD, respectively, although the December 2013 recorded data appears to have underestimated the peak water level, supported by peak water level at the downstream of Hampstead Lock being recorded as 11.73mAOD and 10.88mAOD, respectively.. Flooding in November 1963 and December 1979 appears to have only affected peripheral areas of the site. The Environment Agency recorded flood outline dataset uses a range of sources including aerial photography, topographic surveys and visual analysis to give a broadscale overview of areas that have experienced flooding historically. There are no historical flood depths provided with the dataset and it does not show the historical flooding at an individual property level.

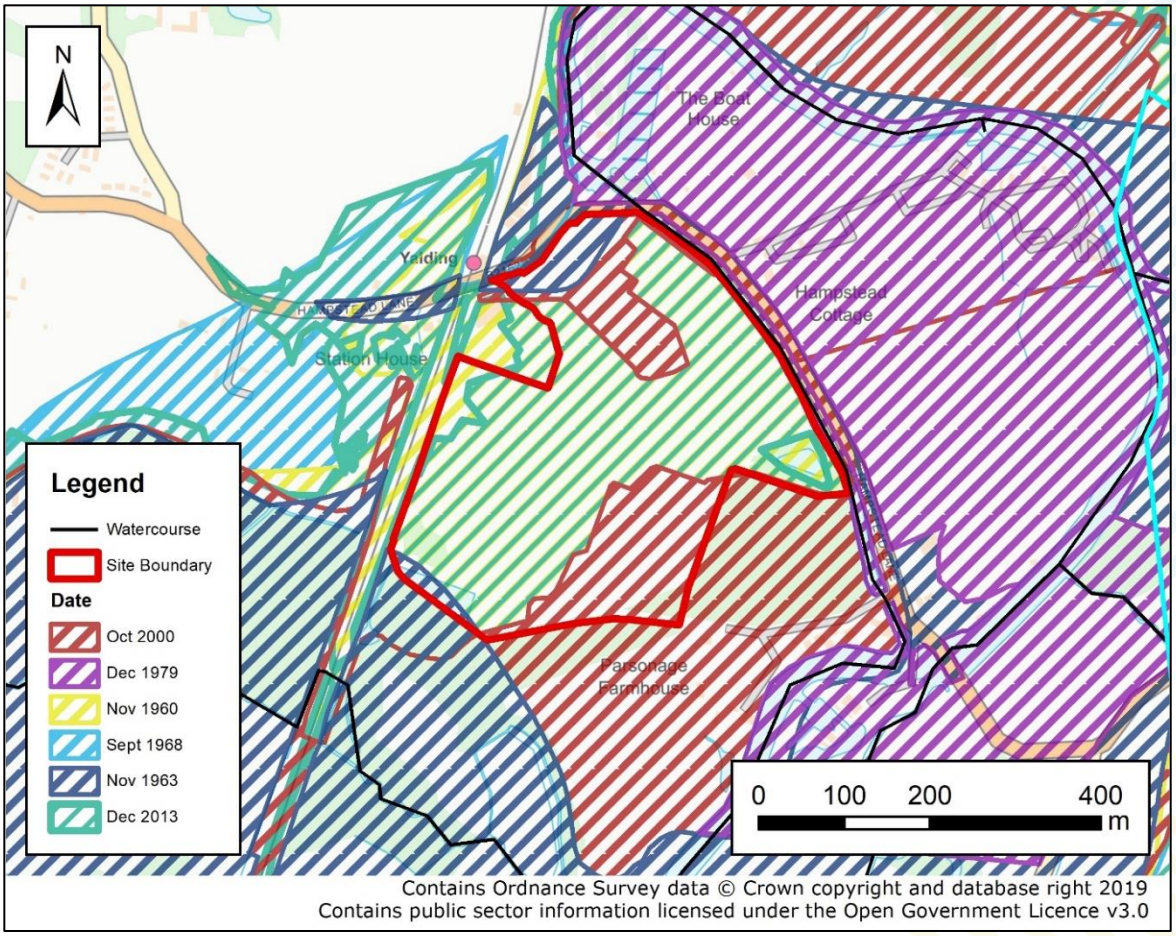

Figure 4-1: Environment Agency recorded flood outlines

The Environment Agency's recorded flood outline dataset shows that the majority of the development site was flooded in November 1960 and September 1968. These events occurred prior to the construction of Leigh Flood Storage Area. During the September 1968 flood event, recorded river levels at Hampstead Lock on the River Medway (near the development site) reached 11.77mAOD. These events occurred as a result of the magnitude of the flood event which exceeded the capacity of the channel causing the watercourse to overtop its banks and flow across the floodplain and through the site. The Leigh Barrier Flood Risk Management Scheme, upstream of Tonbridge, was constructed in response to the flooding in 1968. Peripheral areas of the site also experienced flooding in November 1963 as a result of the River Medway exceeding its channel capacity.

More recently flooding has occurred at the site including events in October 2000 and December 2013. Leigh Flood Storage Area operated during the October 2000 event. However, due to prolonged rainfall, the gates which impound flood water had to be opened to prevent overtopping upstream of the flood storage area embankment[13]. The release of water was controlled to reduce the impact downstream and recorded levels downstream were significantly lower than those during the 1968 flood event.

The 1968 flood event which occurred as a result of the River Medway exceeding its channel capacity resulted in observed floodwater depths up to 0.5m at the development site. In contrast to this in 2000, flooding at the site occurred from water levels rising to the north of the site resulting in ponding across the eastern car park at the site, reportedly up to depths of 0.2m.

A background research document for the proposed development site provided by Civils Contracting Ltd[13] describes flood modelling undertaken previously at the site to understand the risk of flooding and mitigation required to reduce the risk of manufactured or raw chemicals entering watercourses during a flood event. The reader should refer to this document for further context to the area. Flooding at the site and in the wider floodplain is influenced by flood flows from the rivers Medway, Teise and Beult which converge in the Yalding area, and flow northwards as the River Medway through the narrower floodplain towards Maidstone. This constriction in floodplain width, combined with the expansive floodplain upstream exacerbates the extent of flooding near the site during times of flood. Given the floodplain is lower towards Yalding village, and the rivers flow east from Anchor Sluice to this area, water preferentially flows in this direction prior to exceedance of ground levels at the site. Additionally, historical flooding at the site was exacerbated by the urban design and 'close knit nature' of buildings which impeded flood flows associated with historic flood events

4.3 Fluvial flood risk modelling

Fluvial flood risk modelling has been completed to inform the FRA evidence.

The modelling used the Environment Agency's River Medway 'Model 3' flood risk model (obtained via request reference KSL/111101/18 RB), which has been updated and refined in the area of interest to enable the baseline and proposed development conditions to be developed. The Model 3 flood risk model was developed as part of the Medway Catchment Mapping and Modelling study[14], delivered in October 2015. Following completion of the 2015 mapping study, the modelling was also used to prepare climate change flood risk mapping for scenario in which flood flows were increased by +35% and +70% as part of a follow-on Environment Agency commission[15]. This modelling and its outputs were also made available for the YEP FRA modelling.

13 Background Research Document, Syngenta Works, Yalding, Civils Contracting Ltd. March 2019.

14 JBA Consulting for the Environment Agency. Medway Catchment Mapping and Modelling, Final Report, October 2015.

15 JBA Consulting for the Environment Agency. Medway Scenario Modelling, Climate change modelling workstream. December 2016.

Following updates to the model, briefly described below, the changes in flood risk in the development scenario were compared against those for the "planning baseline scenario" (this scenario describes the site with the conditions as pertained prior to the remediation works being performed) for three flood events: the defended case 5%, 1% and 1% (+35% increase in flow) Annual Exceedance Probability (AEP) scenarios. The modelling has been undertaken to consider the actual risk to the development site, and so the defended case has been considered during the flood risk modelling assessment presented. Principally, this means that Leigh Flood Storage Area is present and operated to reduce flood risk to downstream communities. The +35% flow scenario represents the upper of the two flow allowances (+25% and +35%) which the Environment Agency guidance advocates is used for less vulnerable development (the category in which commercial development falls) in order to understand how appropriate the development is across its lifetime.

Appendix B provides a detailed account of the updates made to the hydraulic model, and the schematisation of the planning baseline and proposed development scenario. The information presented below provides only a precis of the modelling.

Updates to the Environment Agency's base model were made to produce an improved base case for testing of the planning baseline and proposed development scenarios. Principally, this involved refining the resolution of the modelling in the area of interest (so that features of the planning baseline and proposed development could be represented in the model) and incorporating updated information on ground elevations at the site.

The main updates made were:

1 Tested and adopted latest software versions of flood modelling software were used

2 A new model domain was implemented covering the study area, with a grid size (density of elevation points) of 5m, a notable improvement in resolution from the 20m grid size in the Environment Agency's existing modelling

3 Updated ground level information from UAV survey collected in 2019 was included and adjustments made elsewhere in the study area to elevations informed by LIDAR data.

Once updates had been made to the base model, the planning baseline and proposed development scenarios could be represented in the model and model simulations completed to prepare flood risk outputs for each scenario. Details of the methods used to schematise each scenario are recorded in Appendix B.

4.3.1 Modelling results

4.3.1.1 5% AEP event

Modelled outputs for the proposed development scenario, which include the proposed layout and levels of buildings, roads, ramps and forecourt indicate that during the defended 5% AEP present day event, the site including the majority of the proposed commercial buildings, forecourts and access road would largely remain outside of the modelled flood extent as shown in Figure 4-2. The east of the site would experience flood depths of up to 0.45m with the maximum modelled flood level in this area of the site shown to be 11.30m AOD. This is 2.05m lower than the proposed raised road level and 2.40m lower than the finished floor level of the proposed commercial units.

For this event, peak water depths in the flood conveyance route would be circa 0.8m at the south of the site, 1.15m at the bridge crossing the channel and 1.4m in the basin at the north of the site. The flows are contained within the channel.

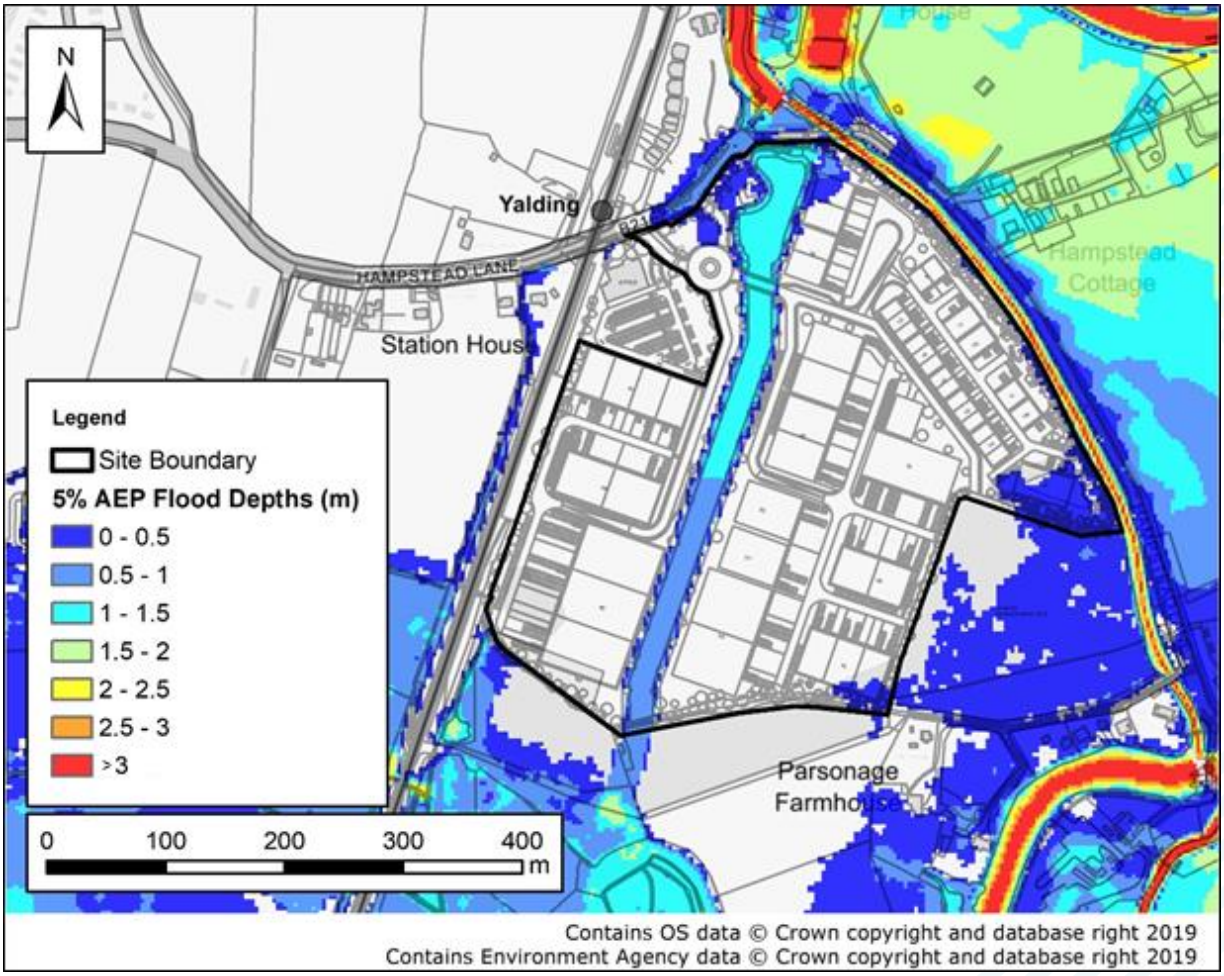

Figure 4-2: On-site flood depths - 5% AEP defended flood event

4.3.1.2 1% AEP event

During the 1% AEP present day event for the proposed development scenario, flooding is shown in to be more widespread across the site. As shown in Figure 4-3, flood depths in the east of the site during this event are shown to be between 1.0 and 1.5m whilst depths in the centre of the site are shown to be between 0.5 and 1.0m.

Peak water depths in the flood conveyance route would be circa 1.7m at the south of the site, 2.3m at the bridge crossing the channel and 2.5m in the basin at the north of the site. The greatest depths of flooding outside of the flood conveyance channel, are shown to occur in peripheral areas in the east of the site and localised areas in the centre of the site. The maximum flood level in the centre and east of the site is shown to be approximately 12.35mAOD with a maximum flood level in the north of the site slightly lower at 12.32mAOD. Flooding during this return period event is therefore predicted to occur beneath the proposed buildings but the raised road, forecourt and threshold levels are not exceeded.

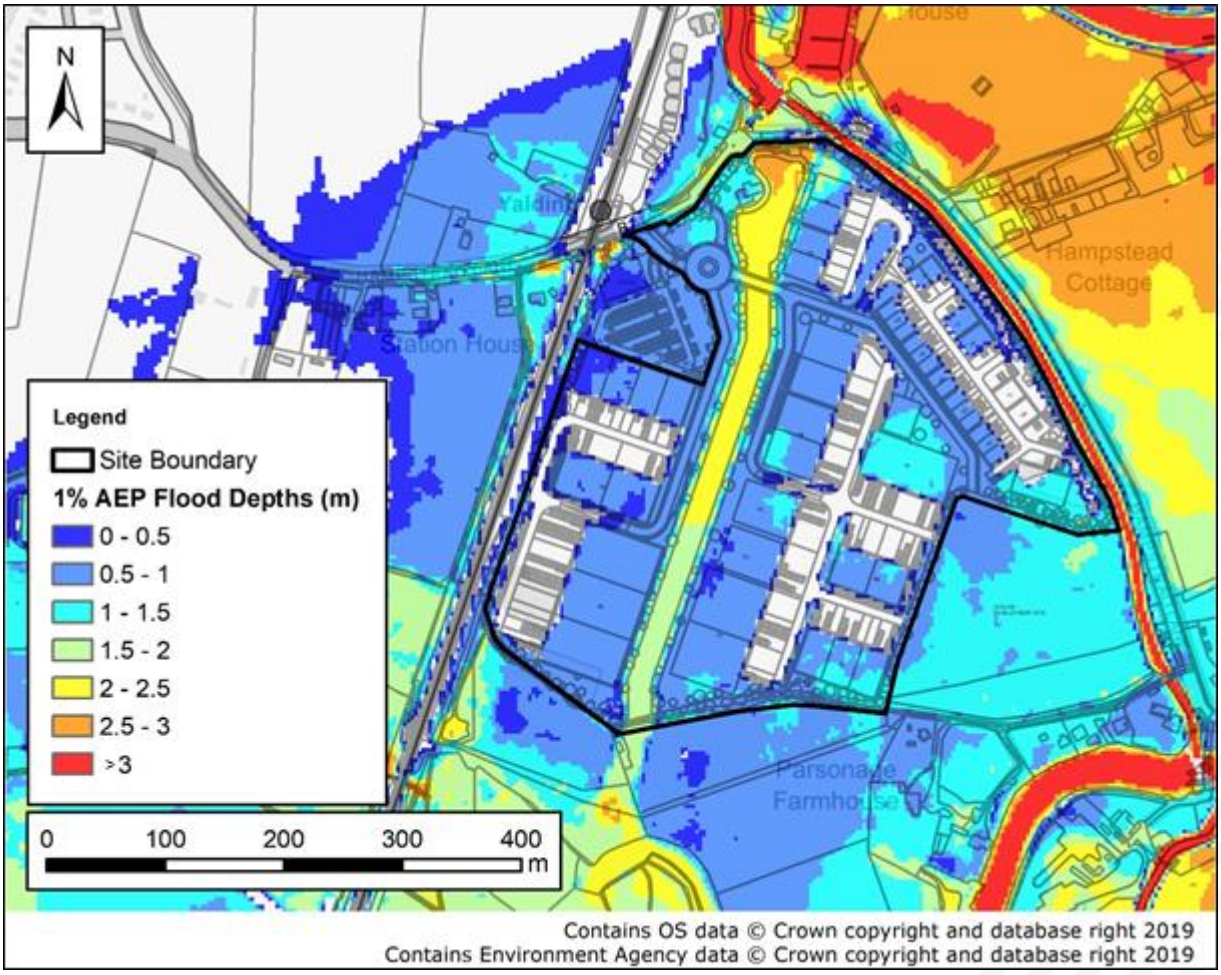

Figure 4-3: On-site flood depths - 1% AEP defended flood event

4.3.1.3 1% AEP +35% flows event

During the 1% AEP +35% flows proposed development scenario, which includes an appropriate allowance for climate change, the depths of flooding across the site would largely be between 1.5m and 2.0m. There are areas in the west of the site where depths of flooding would be between 1.0m and 1.5m, slightly lower than the depths experienced in the east. There is a small peripheral area in the east of the site where depths are between 2.0m and 2.5m. The maximum flood level across much of the site during this event would be 13.25mAOD with a slightly lower maximum flood level in the north of the site of 13.21mAOD. Flooding during this return period event is predicted to occur beneath the proposed buildings to depths between 1.0m and 2.0m however the raised road, forecourt and threshold levels are not exceeded (roads levels are set above 13.35mAOD whilst the buildings finished floor level will be 13.70mAOD).

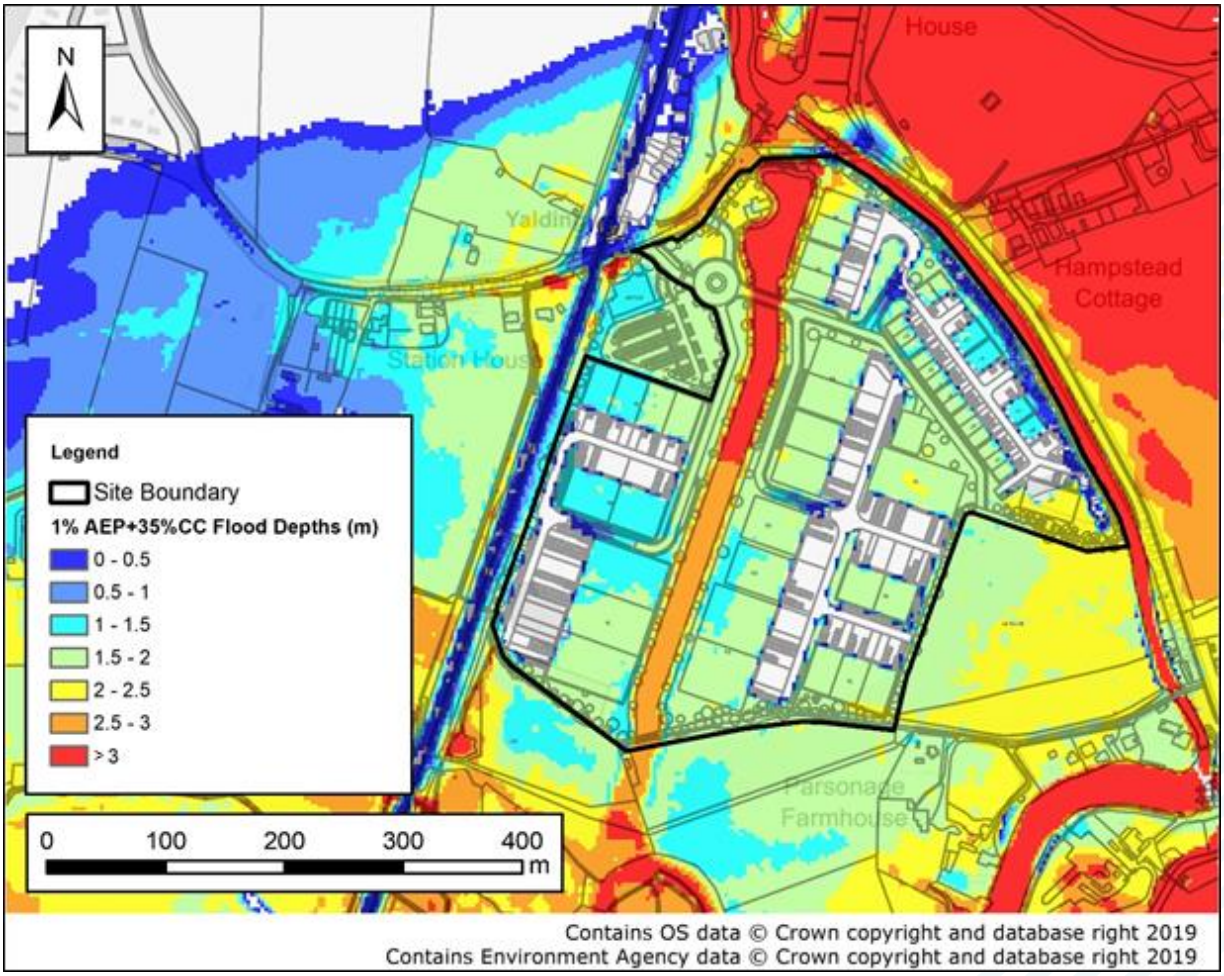

Figure 4-4: On-site flood depths - 1% AEP +35% flows defended flood event

4.3.2 Off-site flood risk

Figures provided in Appendix C show how the proposed development will affect flood levels at the site and surrounding area for the modelled return period events. These figures show how modelled flood levels for the proposed development scenario compare with flood levels for the planning baseline scenario within which the layout of the buildings is represented as they were prior to removal for site remediation. The modelling results demonstrate the effect the development and the proposed flood conveyance channel will have on flood depths to the site and surrounding area.

Appendix C presents changes in flood levels each of the three design events, comparing the proposed development scenario. with the planning baseline scenario. For the defended 5% AEP event, flood levels in floodplain to the south of the site reduce by between 0.05m and 0.02m as a result of the proposed development. This evidences the betterment in conveyance in the area and reduction in flood risk for the wider area resulting from the proposed development. Areas to the east of the site, including Yalding village, also benefit from reduced flood levels, with peak water levels reducing the development, with flood depths reducing by up to 0.01m.

For the 1% AEP event, peak water levels reduce by between 0.005m and 0.001m in the proposed development scenario, evidencing continued betterment in flood levels in the proposed development scenario.

For the 1% AEP event with a 35% increase in flows to account for the potential effects of climate change, there is less than ±0.002m change in flood levels, indicating that the conveyance capacity of the on site measures has been reached,

and flooding does not increase materially as a result of the development during this future flood event.

4.4 Surface water flood risk

Flooding from surface water runoff is usually caused by intense rainfall that may only last a few hours. Flooding usually occurs when rainfall fails to infiltrate to the ground or enter the drainage system with ponding generally occurring at low points in the topography. The likelihood of flooding is dependent on not only the rate of runoff but also saturation of the receiving soils, the groundwater levels and the condition of the surface water drainage systems (i.e. surface water sewers, highway authority drains and gullies, open channels, ordinary watercourses and SUDS). Surface water flooding problems are inextricably linked to issues of poor drainage, or drainage blockage by debris, and sewer flooding.

Surface water flood risk to the site has been assessed using the national scale Environment Agency surface water flood map which identifies those areas where surface water flooding poses a risk, classifying this in one of four categories. The mapping does not reflect the proposed layout of the site and site drainage is being prepared as separate evidence to support the outline planning application.

These categories are detailed below:

- High – an area has a chance of flooding of greater than 1 in 30 (3.3%) each year
- Medium – an area has a chance of flooding of between 1 in 30 (3.3%) and 1 in 100 (1%) each year
- Low – an area has a chance of flooding of between 1 in 1000 (0.1%) and 1 in 100 (1%) each year
- Very low – an area has a chance of flooding of less than 1 in 1000 (0.1%) each year

The Environment Agency's Risk of Flooding from Surface Water map (Figure 4-5) shows that the development site is predominantly at 'very low' risk from surface water flooding where the annual probability of flooding is less than 1 in 1000 (0.1% AEP). There are small localised areas in the centre and in the north of the site that are at 'medium' (1% AEP) and 'high' (3.33% AEP) risk from surface water flooding.

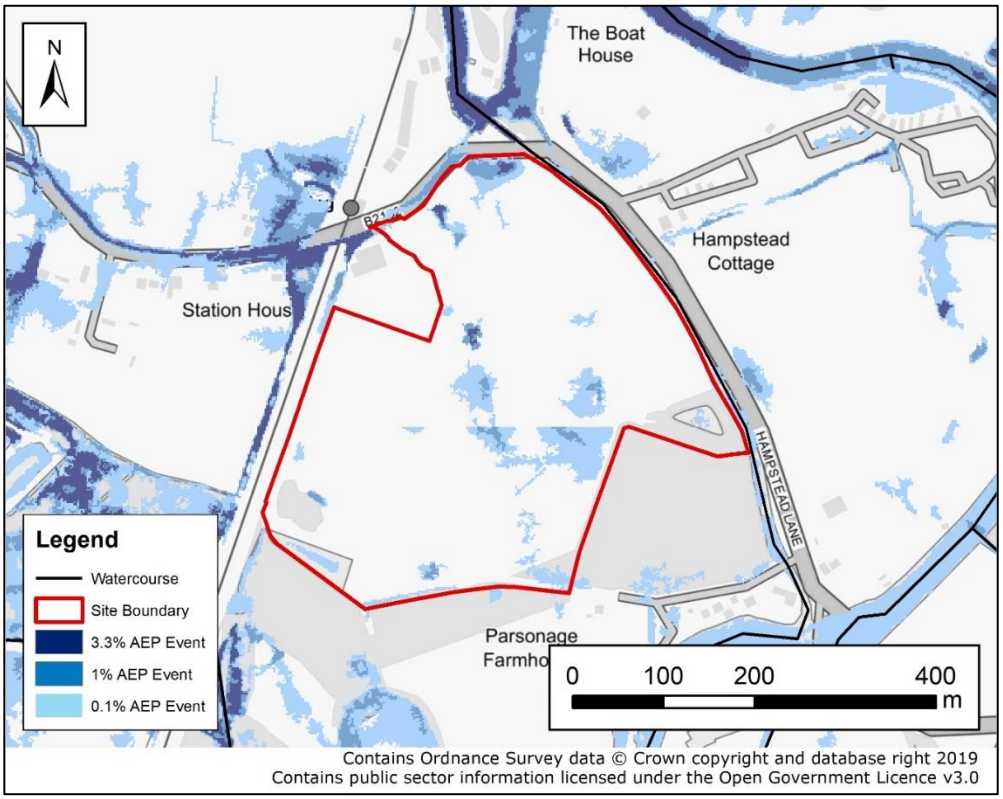

Figure 4-5: Environment Agency's Risk of Flooding from Surface Water map

4.5 Groundwater flood risk

Groundwater flooding occurs when the water table rises above ground level, especially after prolonged rainfall evens. This is most likely to occurs in low-lying areas that are underlain by permeable bedrock and superficial geologies. Unlike other forms of flooding, groundwater flooding does not pose a significant risk to life but can cause serious damage to property.

The British Geological Survey (BGS) 'Geology of Britain Viewer'[5] 1:50,000 scale mapping has been used to identify the geological setting of the site. The site is situated upon the Weald Clay Formation, a sedimentary bedrock comprising of mudstone. The Weald Clay Formation is classified by the Environment Agency's Aquifer Designation Map as an unproductive unit. There are superficial deposits beneath the site in the form of River Terrace Deposits (clay and silt) and Alluvium (clay, silt, sand and peat) which are classified as secondary aquifers.

The Maidstone Borough Council SFRA states that groundwater flooding incidents have been recorded within the borough. However, they have been isolated events. SFRA mapping shows that the proposed development site is not located within an area that is susceptible to groundwater flooding.

Given the proximity of the River Medway to the development site, it is likely that groundwater levels will be closely linked to river levels. Given that the proposed commercial units will be raised approximately 2m above ground level, it is very unlikely that groundwater flooding would result in internal flooding at the site. The risk of groundwater flooding at the site is therefore considered to be low.

4.6 Sewer flood risk

Data from the Sewer Incident Report Form data supplied by Southern Water for the Maidstone Borough Council SFRA indicates a total of 188 recorded flood incidents in Maidstone Borough between 2011 and 2016. The postcode area 'ME18 6', within which the proposed development site is located, is considered to be one of the more frequently flooded postcode areas according to the SFRA with 28 recorded instances of sewer flooding between

2011 and 2016. Given that the site has been going through a remediation process, the reports are unlikely to have been associated with the site.

Mitigation techniques described in Section 5 will reduce the likelihood of sewer flooding impacting the development. It is recommended that drainage systems of the proposed development are designed in such a way that minimises the risk of surface water flooding occurring at the site. This should be addressed further at detailed design stage.

4.7 Risk of flooding from reservoirs

The Environment Agency's Risk of Flooding from Reservoirs map has identified that the proposed development site is at risk from flooding in the unlikely event of a breach in such a structure. The reservoirs that could impact the site in the event of a breach are Leigh Flood Storage Area (13km south west of the site), Bewl Bridge reservoir (16km south of the site), Bough Beech reservoir (19km west of the site) and Weirwood reservoir (30km south west of the site).

When considering the probability of a reservoir breach, the Environment Agency website states that reservoir flooding is extremely unlikely and there has been no loss of life as a result of a reservoir breach since 1925. Given the distance of the reservoirs from the development site and the nature of the development with raised buildings and voids to convey flood water, it is considered unlikely that reservoir flooding would impact the site.

5 Flood risk mitigation measures

In accordance with the NPPF and associated PPG, it must be demonstrated that the proposed development will be safe for its lifetime, taking account the vulnerability of its users without increasing flood risk elsewhere and where possible, will reduce flood risk overall. To achieve this and make the proposed development flood resilient, the following mitigation options have been recommended.

5.1 Finished floor levels and flood resilience

The modelled defended 1% AEP plus 35% climate change flood level (design flood level) at the site has been used to inform the finished floor levels of the proposed commercial units. The maximum modelled flood level during this return period event is 13.25mAOD. The finished floor level of the proposed commercial units is 13.70mAOD which is therefore 450mm above the modelled design flood level.

The forecourt areas and roads adjacent to the proposed units will be at 13.35mAOD and therefore 100mm above the defended 1% AEP plus 35% climate change flood level. The roads in the centre of the site will be at 11.70mAOD whilst the ramps from the lower roads to the raised roads between will be built between 11.70mAOD and 13.135mAOD. These areas will therefore experience flooding during the defended 5% AEP, 1% AEP and 1% AEP plus 35% climate change events as described in Section 4.3, however, there will be no internal flooding of the proposed commercial units.

5.2 Flood warning

Where a development or its main route of access is located within a flood risk area, the NPPF recommends that Flood Warning Plans are put in place for managing the flood risk to the development and, if necessary, support the evacuation of the site. It is therefore recommended that the site owner(s) sign up to the Environment Agency's flood alert and warning services and make these services known to the site occupants.

The Environment Agency's Flood Warning and alert services are free services that are frequently updated and accessible for 24 hours of the day. In order to register for this service or find out if a flood warning or alert has been issued for the area of interest, the following telephone number and website should be used:

0345 988 1188

https://www.gov.uk/sign-up-for-flood-warnings

If a flood event is forecast, alerts and warnings are issued using a set of four easily recognisable codes as shown in Table 5-1. Generic advice and examples of actions to be taken on receipt of the alert of warning are shown in Table 5-1.

Table 5-1: The Environment Agency's Flood Alert and Warning codes

Flood code	What it means	What to do
 Flood alert	Flooding is possible, be prepared	Be prepared to act on your flood plan. Prepare a flood kit of essential items. Monitor local water levels and the flood forecast on our website.
 Flood warning	Flooding is expected, immediate action is required	Move family, pets and valuables to a safe place. Turn off gas, electricity and water supplies if safe to do so. Put flood protection equipment in place.

Flood code	What it means	What to do
 Severe flood warning	Severe flooding and danger to life	Stay in a safe place with a means of escape. Be ready should you need to evacuate from your home. Co-operate with the emergency services. Call 999 if you are in immediate danger.
Warning no longer in force	Warning has been removed in the last 24 hours	Be careful. Flood water may still be around for several days and could be contaminated If you've been flooded, ring your insurance company as soon as possible.

Flood alerts cover larger areas than flood warnings and are issued more frequently when flooding is possible. It is noted by the Environment Agency that site users should be prepared for flooding and to take action upon the receipt of a flood alert. According to the Environment Agency's Flood Warning Areas Map, free flood alerts are available for this site.

Flood warnings are only issued to specific areas when flooding is expected. Again, the Environment Agency note that site users should take immediate action following the receipt of a flood warning. According to the Environment Agency's Flood Warning Areas Map, free flood warnings are available for this site.

It is recommended that the site owners are signed up to this service so that the site and its users would receive a flood alert and/or warning when flooding is possible.

5.3 Emergency evacuation

The PPG states considerations should include the voluntary and free movement of all people during the design flood, as well as the potential for evacuation before a more extreme flood. Therefore, it is recommended that a Flood Evacuation Plan is developed for the site which identifies the actions to take in the event of flooding at the site. The plan should include details of how the site will be vacated prior to a significant flood event occurring at the site. Void spaces beneath the buildings should not be used for storage in such instances and should be free from obstructions such as vehicles to allow the flow of flood water through the voids.

Hydraulic modelling undertaken to support this FRA shows that whilst the raised areas of the site do not flood during the 1% AEP +35% flows event, the lower areas of the site, including access roads into the site experience 1m to 2m flood depths. Access into and out of the site would therefore be restricted during such an event. However, safe refuge would remain available for the occupants of the site in the raised commercial units and adjacent forecourt and road areas.

6 Construction (Design Management) Compliance

Under the Construction (Design and Management) Regulations 2015 (CDM 2015) it is the designer's duty to:

- eliminate foreseeable health and safety risks to anyone affected by the project;
- take steps to reduce or control any risks that cannot be eliminated; and
- communicate, cooperate and coordinate with the client, other designers and contractors involved in the project so that designs are compatible, and health and safety risks accounted for during the project and beyond.

The following hazards associated with the construction, operation and maintenance of the mitigation measures outlined in Section 5. have been identified during the preliminary site assessment:

- Fluvial flood risk: Flood zone 3 (high risk) however this will be mitigated through measures described in Section 5.
- Surface water flood risk: areas of the site at 'medium' to 'high' risk of surface water flooding.
- Underground services: it is not currently known whether hidden services exist beneath the site (e.g. drainage pipes, potable water infrastructure, cables, sewer)
- Live vehicular traffic: Hampstead Lane adjacent to the north and east of the site
- Unknown ground/groundwater conditions
- Environmental: excavations within current site and use of construction machines may pose a risk of pollution to the water environment and hazard to site staff. Appropriate mitigation measures should be put in place.
- Working near water: any existing drainage infrastructure on site that has not been removed following remediation works or drainage infrastructure associated with existing office building on site.

It should be noted that the potential hazards have been identified through a desk study of currently available information and this list should not be considered as exhaustive. A detailed site survey should be undertaken prior to any construction / installation activities commencing to confirm the presence of potential unidentified hazards on and in the immediate vicinity of the site. It is noted that the design detail for features such as the flood conveyance route will be made at full application stage as part of a detailed design process.

7 Conclusions and recommendations

The proposed development of land at the former Syngenta site, Hampstead Lane, Yalding, Kent, comprises construction of a new industrial enterprise park, with associated car parking, landscaping and flood conveyance channel.

A desk-based study, supported by updated flood risk modelling and mapping for the site, was undertaken, using the best available practices for the assessment of flood risk at the site, in order to address requirements in the National Planning Policy Framework and accompanying Planning Practice Guidance.

The site is classified in the Planning Practice Guidance as "less vulnerable" development, and therefore the application proposal is compatible with the level of risk in Flood Zone 3.

The site is located adjacent to the River Medway and is situated in Flood Zone 3. Hydraulic modelling has been undertaken for the defended case 5% AEP, 1% AEP and 1% AEP +35% flows events for the planning baseline scenario as agreed with Maidstone Borough Council (with ground levels at the site designed to be reflective of previous conditions) and for the proposed development scenario.

Modelled flood levels for the 1% AEP +35% flows (the design flood event) for the proposed development scenario are 0.45m below the proposed finished floor level of the commercial units (13.70mAOD) which have been raised above the surrounding site level. Therefore, internal flooding is not predicted to occur at the site.

A comparison of the flood levels for the modelled proposed development scenario (with proposed buildings and site levels represented) with modelled flood levels from the modelled planning baseline scenario shows that the development will have a positive impact on flood risk in the area. This is achieved through the incorporation of the flood conveyance channel and voids beneath the proposed units, amongst other flood conveyance measures. Flood depths will be reduced by up to 0.05m in during the defended 5% AEP event, by up to 0.01m in the defended 1% AEP event and are shown to be unaffected by the development during the defended 1% AEP event including an uplift for climate change. The positive impact on flooding (reduced flood levels) for the surrounding area, including Yalding village, is most prominent during more frequent flood events, given that the flood conveyance route allows for controlled flow of flood water through the site that was otherwise not permitted in its current configuration.

The Environment Agency's Risk of Flooding from Surface Water map indicates that the site is predominantly at 'very low' risk from surface water flooding with localised areas at 'medium' to 'high' risk. The site is considered to be at low risk of groundwater flooding and sewer flooding. The site is at risk of flooding in the unlikely event of a reservoir breach or failure.

The overall risk to the site is considered to be low, where the consequences and the severity of impacts of flooding can be mitigated by the use of resilient construction, the implementation of a flood plan and emergency refuge on site.

Appendices

A Proposed plan

B Model development report

C Mapping comparison: difference in peak water levels between the proposed development and planning baseline modelling

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