Wates Developments Ltd

Appledore Road, Tenterden

Flood Risk Assessment & Surface Water Drainage Strategy

133187-R4(3)-FRA

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RSK GENERAL NOTES

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Title: Flood Risk Assessment and Surface Water Drainage Strategy

Client: Wates Developments Ltd

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R4(3)	New layout	21.04.21	ST	SM	SM

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1 INTRODUCTION

RSK Land and Development Engineering Ltd (RSK) was commissioned to carry out a Flood Risk Assessment (FRA) for Wates Developments Limited (the 'client'). The assessment is in support of a hybrid planning application (part outline, part detailed) for land at Appledore Road (the 'site').

The assessment has been prepared in accordance with the National Planning Policy Framework (NPPF) (Ref. 1) and its accompanying Planning Practice Guidance (Ref. 2), the Interim Code of Practice for Sustainable Drainage (Ref. 3), BS 8533-2011 Assessing and Managing Flood Risk in Development Code of Practice (Ref. 4), BS 8582:2013 Code of practice for surface water management for development sites (Ref. 5) and the Non-statutory technical standards for sustainable drainage systems (Ref. 6), with site-specific advice from the Environment Agency (EA), the Lead Local Flood Authority (LLFA), the Local Planning Authority (LPA), the architect and the client.

The NPPF sets out the criteria for development and flood risk by stating that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere.

The key definitions within the PPG are:

- "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; and
- "Areas at risk of flooding" means areas at risk from all sources of flooding. For fluvial (river) and sea flooding, this is principally land within Flood Zones 2 and 3. It can also include an area within Flood Zone 1 which the EA has notified the local planning authority as having critical drainage problems.

For this site, the key aspects that require the assessment are:

- The EA's indicative flood zone map shows that the site is located within Flood Zone 1; and
- The site area is approximately 24 hectares, therefore surface water drainage must be considered, and sustainable drainage systems (SuDS) incorporated, where possible.

The comments given in this report and opinions expressed are subject to RSK Group Service Constraints provided in **Appendix A**.

2 CONTEXT AND SCOPE OF WORK

A key element of project development is to prepare an FRA to establish the flood risk associated with the proposed development and to propose suitable mitigation, if required, to reduce the risk to a more acceptable level.

The scope of work relating to a FRA is based on the guidance provided in Section 14 of the NPPF (Ref. 1) and its accompanying Planning Practice Guidance (Ref. 2).

A site-specific FRA must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall. The scope of this assessment therefore comprises the following elements:

- To review drawings/plans, planning information and other studies to determine existing site conditions;
- To obtain information on the hydrology and hydrological regime in and around the site;
- To obtain the views of the EA/LLFA including scope, location and impacts;
- To determine the possible extent of flooding and any potential impacts on the site;
- To assess the impact on the site from climate change effects and anticipated increases in rainfall over a 100 year period for residential uses;
- To review site surface water drainage based on the proposed layout and, if necessary, to determine the extent of infrastructure required; and
- To prepare a report including calculations and summaries of the source information and elements reviewed.

Reliance has been placed on factual and anecdotal data obtained from the sources identified. RSK cannot be held responsible for the scope of work, or any omissions, misrepresentation, errors or inaccuracies with the supplied information. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

3 SITE DESCRIPTION

3.1 Location

Site Name: Land north of Appledore Road

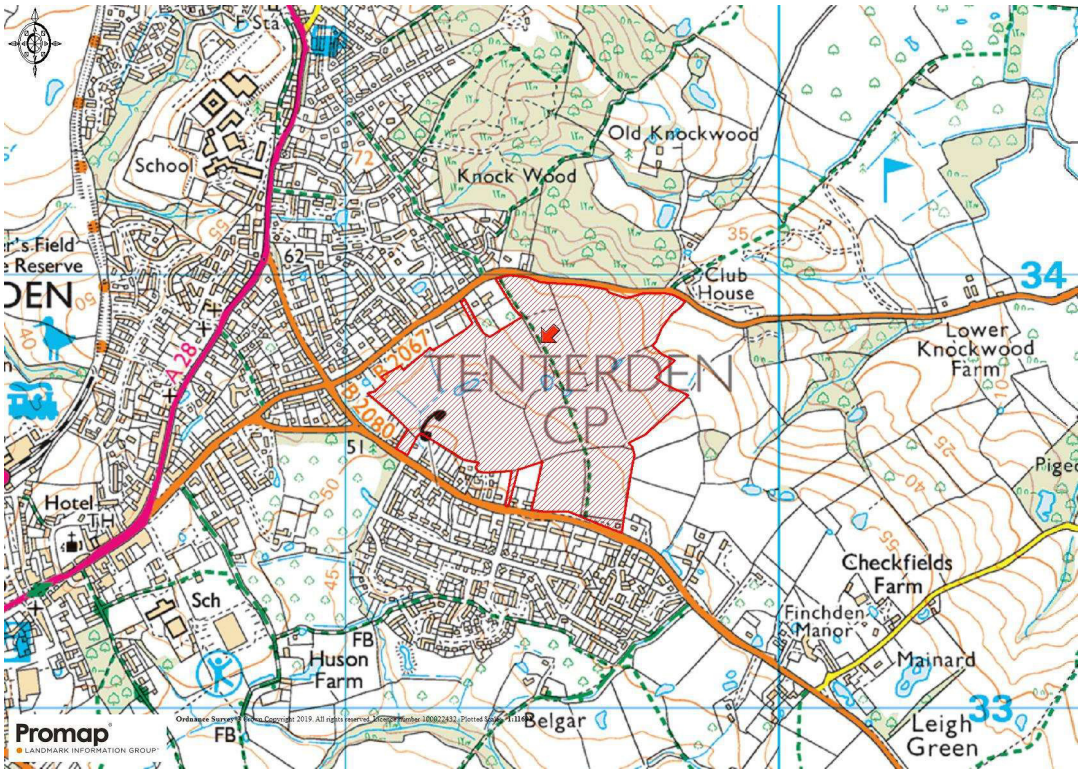
Site Address: Appledore Road, Tenterden (nearest postcode TN30 7DR)

Site National Grid Reference: 589449, 133727

The site is 23.34ha (57.67 acres) in size and is located between Appledore Road (B2080) and Woodchurch Road, on the eastern edge of Tenterden in Kent. Tenterden Golf Club is located to the north-east of the site, across Woodchurch Road. The site is crossed by a public footpath which runs from Appledore Road to Woodchurch Road, running approximately through the centre of the site. This public footpath provides the current pedestrian access to the site, from either Woodchurch or Appledore Road. Vehicular access is provided to Appledore Road along the south.

Figure 3.1 shows a site location map.

Figure 3.1: Site location map



3.2 Land use and topography

The site is currently Greenfield. The site is entirely occupied by agricultural land in the form of pastoral fields, grassland and sports pitches.

The approximate land use of the site is as follows:

Table 3.1: Existing site land uses

Land use	Area (m^2)	Percentage (%)
Impermeable	0	0
Permeable	233,400	100
Total	233,400	100

A site-specific topographic survey has been carried out by K.A.Rylance Limited. The survey shows the site's existing levels vary from approximately 40m above ordnance datum (mAOD) on the eastern site boundary to 63mAOD at the high point in the central northern area of the site. The land generally falls away from this high point, rapidly to the north-east, but more gradually to the south-east and south-west. The southern portion of the site mostly falls away southwards towards the site boundary.

The topographic survey and existing site layout is included in **Appendix B**.

3.3 Hydrology

There are no EA Main Rivers within the immediate vicinity of the site. The nearest Main Rivers are located approximately 2km to the east and west of the site, associated with the Tenterden Sewer and an unnamed watercourse.

There are three ponds located across the site, as well as drainage ditches or streams between some of the existing fields.

3.4 Geology

British Geological Survey (BGS) geological mapping indicates the geology of the site comprises the Tunbridge Wells Sand Formation (sandstone/siltstone) in the north, with the Wadhurst Clay Formation (mudstone) across the centre and southern portions. The mapping indicates the potential for the Wadhurst Clay Formation to comprise sandstone on the most southerly extent of the site. No superficial deposits are recorded.

Site-specific geotechnical investigations have been undertaken by Geo-Environmental, with their report dated 1st November 2017 (Ref. 7). The report details all the findings covering existing geology and hydrogeology, groundwater levels, permeability and contamination. The key points related to potential flood risk are highlighted below:

- *"The Tunbridge Wells Sand consists mainly of grey silt and yellowish fine silty sand with cemented beds of siltstone and sandstone at intervals;*
- *The Wadhurst Clay Formation consists of dark grey shales, clays and silty clays with subordinate beds of silt, sandstone, shelly limestone and clay ironstone;*

- *No discharge consents, abstractions or pollution incidents to groundwater were recorded within a 500m radius of the subject site. In addition, no prosecutions relating to controlled waters were identified within a 500m radius of the site;*
- *Several ponds were identified on the subject site. At the time of the site visit, these were mostly shallow or dry and appeared to be in poor condition, serving as output storage for their associated drains emanating from the residential areas;*
- *No licensed surface water abstractions were recorded within 500m of the site;*
- *No potentially contaminative activities have been identified on, or in close proximity to the site;*
- *The (intrusive) investigation encountered the anticipated geological succession of the Tunbridge Wells Sand or Wadhurst Clay Formation with a variable mantle of Topsoil and/or Made Ground in all locations;*
- *The investigation installed twelve standpipes measuring groundwater and groundwater was encountered within 2 positions at depths of 2.10m and 2.61m below ground level (bgl);*
- *A total of 12No. full scale soakage tests and 2No. Falling Head Soakage Tests were undertaken across the site. In all of the tests, there was insufficient drop in head (over the course of between 2 and 5 hours) recorded for infiltration rates to be calculated. Therefore, given the relatively impermeable nature of the underlying cohesive Wadhurst Clay Formation and Tunbridge Wells Sand, and based on the soakage testing results, it is considered unlikely that soakaways would perform satisfactorily on site. As such, an alternative form of surface water disposal should be sought;* and
- *No significant concentrations of potential mobile contamination were encountered across the site. Therefore, there is unlikely to be any significant risk posed to groundwater or surface water by on site soils.*"

3.5 Hydrogeology

Hydrogeological information was obtained from the EA's online mapping service. These maps indicate that the site is partially underlain by a secondary A bedrock aquifer (definition taken from EA website - permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers). The maps also indicate that the site is not underlain by a superficial aquifer.

The site is not located within a Groundwater Source Protection Zone and there are none in close proximity to the site.

3.6 History

From looking at historical maps it appears that the site was previously used as farmland and sports pitches and has always been classified as Greenfield.

4 DEVELOPMENT PROPOSALS

The proposed development covers a developable area of 23.34ha.

The proposed hybrid planning application consists of:

- Outline application for the development of up to 145 residential dwellings (50% affordable) including the creation of access points from Appledore Road (1 x all modes and 1 x emergency, pedestrian, and cycle only) and Woodchurch Road (pedestrian and cycle only), and creation of a network of roads, footways, and cycleways through the site. Provision of open space including children's play areas, community orchard, sustainable drainage systems, landscape buffers and green links all on 12.35 ha of the site. (Matters for approval: Access); and

- Full planning permission for the change of land use from agricultural land to land to be used as a country park (8.66 ha), and land to be used as formal sports pitches (3.33 ha), together with pavilion to serve the proposal and the surrounding area. Including accesses, ancillary parking, pathways, sustainable drainage systems and associated landscaping.

The approximate land uses of the proposed site are summarised in Table 4.1 below.

Table 4.1: Proposed site land uses of the developable area.

Land use	Area (m^2)	Percentage (%)
Impermeable *	31,840m^2	13.64
Permeable	201.560m^2	86.36
Total	233,400m^2	100

* Specific calculated impermeable areas used in drainage modelling.

The proposed site plans are shown in **Appendix C**.

5 LEGISLATION AND POLICY CONTEXT

5.1 National policy

Table 5.1: National legislation and policy context

Legislation	Key provisions
National Planning Policy Framework (2019) (Ref. 1)	Relevant guidance is provided in Section 14 of the NPPF on 'Flood risk and coastal change'. The aims of planning policy on development and flood risk are to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest risk (paragraph 155). Where new development is, exceptionally, necessary in such areas, policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.
Planning Practice Guidance (2014) (Ref. 2)	The NPPF is supported by an online Planning Practice Guidance, which provide additional guidance on flood risk.
Flood and Water Management Act 2010 (Ref. 8)	The Flood and Water Management Act (FWMA) aims to implement the findings of the 2007 Pitt Review and co-ordinate control of drainage and flood issues. There are a number of increased responsibilities within the Act that affect adoption of SuDS features and the role of the EA to expand on the mapping data they provide. The implementation of SuDS features has many beneficial impacts on the treatment of surface water during remediation works.
Water Resources Act 1991 (Ref. 9)	Section 24 – The EA is empowered under this Act to maintain and improve the quality of 'controlled' waters Section 85 – It is an offence to cause or knowingly permit pollution of controlled waters Section 88 – Discharge consents are required for discharges to controlled waters
Water Framework Directive (2000) (Ref. 10)	The Water Framework Directive (WFD) requires all inland and coastal waters to reach 'good' chemical and biological status by 2015. Flood risk management is unlikely to have a significant impact on chemical water quality except where maintenance works disturb sediment (such as de-silting) or where pollutants are mobilised from contaminated land by floodwaters. The main impact of the WFD on flood risk management, both now and in the future, relates to the ecological quality of water bodies. Channel works, such as straightening and deepening, or flood risk management schemes that modify geomorphological processes can change river morphology. The WFD aims to protect conservation sites identified by the EC Habitats Directive and

Legislation	Key provisions
	Birds Directive that have water-related features, by designating them as 'protected sites'.

5.2 Local policy

Local policies ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding and making development safe without increasing flood risk elsewhere and where possible, reducing flood risk.

Table 5.2: Local policy context

LDF document	Key provisions and policies
Ashford Borough Council Local Plan, adopted February 2019 (Ref. 11)	**Policy ENV6 – Flood Risk** Proposals for new development should contribute to an overall flood risk reduction. Development will only be permitted where it would not be at an unacceptable risk of flooding on the site itself, and there would be no increase to flood risk elsewhere. The sequential test and exception tests established by the National Planning Policy Framework will be strictly adhered to across the Borough, with new development preferably being located in Flood Zone 1. Where it is demonstrated development is unable to take place in an area of lower flood risk, essential transport or utility infrastructure, or other development may be allowed as per an exception test if the development is designed to be compatible with potential flood conditions, and: a) Suitable flood protection and mitigation measures are incorporated into the development appropriate to the nature and scale of risk; b) Comprehensive management and maintenance plans are in place for its effective operation during the lifetime of the development (taking account of climate change allowances); c) Adoption arrangements are secured (where applicable) with the relevant public authority or statutory undertaker; d) The development would make a significant contribution to the overall sustainable development objectives of the Local Plan, such that the wider sustainability benefits of the development outweigh the flood risk; and, e) It can be demonstrated to the satisfaction of the Council and the Environment Agency that adequate resistance and resilience measures have been put in place to avoid any increase in flooding either on site or elsewhere. A site-specific Flood Risk Assessment (FRA), endorsed by the Environment Agency, appropriate to the scale and nature of the development and the risks involved will be required in line with Planning Practice Guidance and in particular where the Strategic Flood Risk Assessment or Surface Water Management Plan,

LDF document	Key provisions and policies
	indicates there are records of historic flooding or other sources of flooding. In all cases, development that would harm the effectiveness of existing flood defences or prejudice their maintenance or management will not be permitted. **Policy ENV8 – Water Quality, Supply and Treatment** Major proposals for new development must be able to demonstrate that there are, or will be, adequate water supply and wastewater treatment facilities in place to serve the whole development, or where development is being carried out in phases, the whole of the phases for which approval is being sought. Improvements in these facilities, the timing of their provision and funding sources will be key to the delivery of development. All development proposals must provide a connection to the sewerage system at the nearest point of adequate capacity, as advised by the service provider, and ensure future access to the existing sewerage systems for maintenance and upsizing purposes. Schemes that would be likely to result in a reduction in the quality or quantity of groundwater resources will not be permitted. The Council will support, in principle, infrastructure proposals designed to increase water supply and wastewater treatment capacity subject to there being no significant adverse environmental impacts and the minimisation of those that may remain. **Policy ENV9 - Sustainable Drainage** All development should include appropriate sustainable drainage systems (SuDS) for the disposal of surface water, in order to avoid any increase in flood risk or adverse impact on water quality, and to mimic the drainage from the pre-developed site. On greenfield sites, development should discharge at a maximum of 4l/s/ha, or 10% below current greenfield rates for the existing 1:100 storm event, whichever is lower. There must be no increase in discharge rate from less severe rainfall events, with evidence submitted to demonstrate this principle. On Previously Developed Land, development must endeavour to achieve 4 l/s/ha runoff or seek to achieve 50% reduction of existing peak runoff rates for the site where existing discharge rates can be established. On smaller sites (less than 0.25ha), development should achieve a maximum discharge of 2l/s. Any SuDS scheme must demonstrate regard to the adopted Sustainable Drainage SPD and any subsequent revisions. SuDS features should always be the preferred option and provided onsite wherever practicable. All development proposals will be required to: a) Ensure all new developments are designed to reduce the risk of flooding, and maximise environmental gain, such as: water

LDF document	Key provisions and policies
	quality, water resources, biodiversity, landscape and recreational open space; b) Ensure that all new developments are designed to mitigate and adapt to the effects of climate change; c) Lower runoff flow rates, reducing the impact of urbanisation on flooding; d) Protect or enhance water quality. Incorporating appropriate pollution control measures, to ensure there are no adverse impacts on the water quality of receiving waters, both during construction and in operation; e) Be sympathetic to the environmental setting and the needs of the local community; f) Incorporate a SuDS scheme that is coherent with the surrounding landscape and/or townscape; g) Provide a habitat for wildlife in urban watercourses; and encourage natural groundwater recharge (where appropriate); h) Demonstrate that opportunities have been taken to integrate sustainable drainage with biodiversity enhancements through appropriately designed surface water systems, as well as contribute to amenity and open spaces; i) Demonstrate that the first 5mm of any rainfall event can be accommodated and disposed of on-site; and, j) Demonstrate that clear arrangements have been established for the operation and maintenance of the SuDS component for the lifetime of the development.
Ashford Borough Council Sustainable Drainage Supplementary Planning Document 2010 (Ref. 12)	All development should include appropriate sustainable drainage systems (SUDS) for the disposal of surface water, in order to avoid any increase in flood risk or adverse impact on water quality. For greenfield developments in that part of the Ashford Growth Area that drains into the River Stour, SUDS features shall be required so as to achieve a reduction in the pre-development runoff rate. On all other sites in the Borough, including those in the south-western part of the Growth Area that drains to the River Beult, developments should aim to achieve a reduction from the existing runoff rates but must at least, result in no net additional increase in runoff rates. SUDS features should normally be provided on-site. In the Ashford Growth Area if this cannot be achieved, then more strategic forms of SUDS may be appropriate. In such circumstances, developers will need to contribute towards the costs of provision via Section 106 Agreements or the strategic tariff. In all cases, applicants will need to demonstrate that acceptable management arrangements are funded and in place so that these areas are well maintained in future.

6 SOURCES OF INFORMATION

6.1 Environment Agency consultation

6.1.1 Flood zone maps

The EA Flood Zone mapping study for England and Wales is available on their website at: https://flood-map-for-planning.service.gov.uk/

The current displayed map is reproduced as **Figure 7.1** and shows the site to lie wholly within Flood Zone 1, showing the site with low risk of flooding from fluvial or tidal sources.

In December 2013, the EA released an additional form of mapping 'Risk of Flooding from Rivers and Sea', which is available at:

https://flood-warning-information.service.gov.uk/long-term-flood-risk

This map has been reproduced as **Figure 7.2** and shows the EA's assessment of the likelihood of flooding from rivers and the sea at any location and is based on the presence and effect of all flood defences, predicted flood levels, and ground levels. The site is shown to be located within an area of 'very low' risk.

The relevant guidance note from the EA is available online through the following link: https://www.gov.uk/planning-applications-assessing-flood-risk

6.1.2 Site specific consultation

The EA was formally consulted as part of this assessment, with request for flood related information (including flood levels) included in the consultation. Their full response can be found in **Appendix D**.

The EA response confirms that the site is located in Flood Zone 1 and that they do not have any modelled flood levels. The EA do not have any records of flooding from rivers or the sea for this location.

6.2 County Council

Kent County Council (KCC) is the Lead Local Flood Authority (LLFA) for the area and was contacted in March 2018 to establish the LLFA's guidance on any constraints related to the site and any historic flooding records. Since first engagement, three meetings have been held between RSK and KCC. Key points are as follows:

KCC correspondence and meeting minutes can be found in **Appendix E**. The responses confirmed:

- It was agreed that surface water overland flows from the site reaches the existing surface water drainage assets in Appledore Road and is collected by drainage features either classified as public sewerage or land drainage;
- Proposed peak flows from the development site must match the existing greenfield run off rates for the developable areas under consideration;
- No existing greenfield areas that are not subject to redevelopment should be included in any calculations. The status quo for all greenfield areas of the site not subject to development shall be maintained;

- Greenfield runoff rates shall be calculated in accordance with IoH 124 or the Ashford Borough Council Policy Document ENV9, whichever is lower;
- The proposed development must be a SuDS led scheme;
- All surface water drainage modelling shall be simulated for all storm events up to and including the 100 year + 40% climate change event;
- All existing ditches, pond and other soft features shall be retained as far as practicable and incorporated into the proposed surface water design for the proposed development; and
- The proposed surface water design shall incorporate soft drainage features that complement the ecology provision for the development.

A previous 250 unit scheme was proposed at the site and was approved in principle by the LLFA (correspondence dated February 2020 included as **Appendix E**). The features of the surface water drainage strategy and proposed flood mitigation measures (see Sections 9 and 10 respectively) have been kept consistent with the previous scheme to ensure LLFA requirements are adhered to. In addition, the proposed units have been reduced from 250 to 145, meaning the associated impermeable area and anticipated surface water runoff will be significantly reduced, resulting in a much more positive scheme with regards to flood risk and drainage.

6.3 Borough Council

Ashford Borough Council (ABC) is the Local Planning Authority (LPA) for the area and was contacted in March 2018 to establish any guidance on any constraints related to the site and any historic flooding records. The enquiry and responses can be found in **Appendix F**. The responses confirmed:

- The ABC Policy Document ENV9 should be used to determine proposed surface water run off rates; and
- ABC are led by the LLFA on surface water drainage matters and do not need to be consulted further as part of the planning process.

6.4 Canal & River Trust

There are no Canal & River Trust assets in the vicinity of the site.

6.5 Site walkover

A site walkover was undertaken on 8th March 2018 with representatives from RSK, KCC as the LLFA, KCC Ecology and EPR Ecology. A further site meeting and walkover was carried out on the 7th July 2019 with members of the LLFA and RSK attending. The following key points were discussed and noted:

- Generally, the site topography is variable and as such there are areas of standing water and ponds;
- There are clear existing drainage routes and flow paths across portions of the site, and these should be maintained as far as practicable;
- All proposed roads should cross any existing ditches at right angles where possible;

- The drainage features to the land to the north of the site that is to form the Country Park should be left in its current form with generally no changes to the existing hydrology proposed;
- New ponds can be created in the Country park. Some of these new ponds contribute towards the great crested newt mitigation measures during construction. They also form part of the biodiversity net gain strategy and will provide new habitat for amphibians and aquatic invertebrates;
- Consideration can be given to enhancing the existing ditches and ponds in this sector of the site to improve habitat for various existing species currently known to populate the site;
- The existing ponds provide habitat for a range of fauna. One of the existing ponds provides breeding habitat for great crested newts (and great crested newts were recorded in an additional two ponds). They also provide habitat for aquatic invertebrates. Unfortunately, some of the ponds also support non-native, invasive plant species;
- The existing 'pond' feature and excavation located to the north of Pond 1 serves no hydrological purpose and can be backfilled if necessary;
- The proposed surface water drainage design should incorporate improvements to the existing surface water outfall arrangements as they currently exist in and around 13 Appledore Road;
- The principle of maintaining existing connections to land drainage and public sewerage assets can be applied to this development; and
- It will be necessary to carry out necessary repairs and replacement of the culverted existing land drainage features in Appledore Road to ensure that the receiving pipe networks are fit for purpose and that the known risk of surface flooding in Appledore Road is reduced.

6.6 Relevant studies

Table 6.1: Relevant studies

Study	Comments
SFRA: Ashford Borough Council Strategic Flood Risk Assessment 2014 (Ref. 13)	The principle aim of the SFRA was to map all forms of flood risk in order to provide an evidence base to locate new development. It also aims to provide appropriate policies for the management of flood risk and identify the level of detail required for site-specific FRAs. The SFRA contains information and maps detailing flood sources and risks. Information relevant to the site is detailed in Section 7 of this report.
PFRA: Kent County Council Preliminary Flood Risk Assessment 2011 (Ref. 14)	Preliminary Flood Risk Assessments are produced by LLFAs in England and Wales. A Preliminary Flood Risk Assessment (PFRA) is the first part of the planning cycle for flood risk management as set out in the Flood Risk Regulations (2009), which implement the requirements of the European (EU) Floods Directive (2007). The EU Floods Directive aims to provide a consistent approach to managing flooding across Europe. The PFRA is organised by the River Basin District (in this case the South East River Basin District) and produced by the LLFA (in this case KCC). The PFRA considers local sources of flooding that the LLFA is responsible for: ordinary watercourses, surface water, groundwater and sewers where flooding is wholly or partially

Study	Comments
	caused by rainwater or other precipitation entering or affecting the system. Information is gathered from existing sources on past floods and flood models to identify Flood Risk Areas.
CFMP: Rother and Romney Catchment Flood Management Plan 2009 (Ref. 15)	Catchment Flood Management Plans (CFMP) give an overview of the flood risk from inland sources across each river catchment and recommend ways of managing those risks now and over the next 50-100 years. The EA is responsible for producing CFMPs. The site falls within the 'Upper and Middle Stour' sub-catchment and the policy applicable to this site is Policy Option 6 which states "Areas of low to moderate flood risk where we will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits". The CFMP notes that there is potential to increase the amount of flood storage in this sub-area in order to reduce the flood risk in sub catchments further downstream.
SWMP: Ashford Stage 1 Surface Water Management Plan 2013 (Ref. 16)	SWMPs are led by the Lead Local Flood Authority (KCC) in partnership with other flood risk management authorities. In relation to the Stage 1 SWMP, risk management authorities include KCC, LPAs, EA, Internal Drainage Boards (IDBs), Southern Water and other relevant authorities. The purpose of a SWMP is to identify what the local flood risk issues are, the effect they have and what options there may be to manage them. These options are presented in an Action Plan which lists the partners who are responsible for taking the options forward. Although the SWMP provides a full flood history for the study area which may include coastal and fluvial flood sources, the action plan only proposes measures to manage local flooding. The Action Plan is agreed by partners and reviewed periodically.
LFRMS: Kent County Council Local Flood Risk Management Strategy, 2013 (Ref. 17)	This strategy sets out a countywide framework for managing the risk of local flooding. It will help risk management authorities and communities understand their different roles and responsibilities and how they can work together to manage local flooding. It addresses local flooding which the Flood and Water Management Act 2010 defines as flooding from: • Surface water • Groundwater • Ordinary Watercourses. Many authorities have a role to play in the management of these flood risks in Kent. They include KCC, the EA, District and Borough Councils, IDBs and Water Companies.
Water. People. Places. September 2013 (Ref. 18)	This guidance outlines the process for integrating sustainable drainage systems (SuDS) into the master planning of large and small developments. The South East Lead Local Flood Authorities expect this guidance to be used as part of the initial planning and design process for all types of residential, commercial and industrial development. It has been developed through a partnership of South East Authorities and it intends to provide a consistent approach to best practice design of SuDS at the master planning stage.

Study	Comments
	The document provides an overview of SuDS features, site specific conditions which will dictate their use and a number of development typologies.

6.7 Drainage

6.7.1 Public sewers

Sewer details have been referenced from sewer record plans obtained from Southern Water (**Appendix G**). The plans indicate the following network of sewers around the site:

- Surface water: To the north-west of the development site there is a surface water network in Woodchurch Road that flows north to south and enters the site at manhole 185X. This surface water passes through the site in the existing ditch network and outfalls at manhole 1553 in the curtilage of number 13 Appledore Road;
- Within Appledore Road there are two surface water networks into which surface water from the development site discharges into. The first is located to the west of the development site and flows west to east along Appledore Road, before heading south down Shrubcote. The second flows west to east, with the head of the run located in the northern verge, opposite number 21 Appledore Road at manhole 1554. Surface water from the development site outfalls into this sewer at manhole 2450, at which point the sewer heads south across Appledore Road; and
- Foul water: a 200mm vitrified clay sewer runs south-west beneath Woodchurch Road. It then becomes a 225mm sewer before flowing south-east beneath Beacon Oak Road and Appledore Road. Another branch of this sewer flows north-west beneath Appledore Road, to its junction at Shrubcote. This sewer then flows away to the south beneath Shrubcote.

In addition, a pre-development enquiry has been submitted to Southern Water (SWS) to establish any initial restrictions on capacity in this area and establish the appropriate connection points that could be utilised as part of the development. The enquiry and response is included in **Appendix G**. The following summarises the main conclusions:

- There is currently inadequate capacity in the local surface water network to accommodate a new, proposed flow of 5l/s; and
- Surface water should be disposed of by alternative means such as, discharge into soakaways if effective at this location or to any local drainage watercourses, subject to interested parties approval.

A meeting was held between Southern Water and RSK on the 28th June 2019. The following key points were discussed and noted, with the meeting minutes contained in **Appendix G**:

- If surface water is shown to connect to a public surface water sewer in Appledore Road, the existing rates of flow can be maintained at the same point of connection;
- SWS will not accept any new surface water flows from the development site into their existing surface water network in Appledore Road;
- If surface water is shown to connect to land drainage features, then any connections and rates of flow will have to be agreed with the land owner at the point of connection and the LLFA;

- Any new surface water connection to an existing land drainage feature will not require consent from SWS;
- All new, on-site surface water sewers will be technically approved and adopted under a Section 104 agreement; and
- The connection of new, on-site adoptable surface water drainage to land drainage systems would not compromise any Section 104 adoptions.

A CCTV survey was also undertaken for the sewers located within Appledore Road. The results are included in **Appendix H** and the principal findings are as follows:

- All the surface water sewers in Appledore Road appear to be impacted with root ingress that will need to be cleared to ensure that hydraulic performance is restored; and
- Both the public surface water sewers and culverted land drainage pipes appear to be consistent with the available sewer records.

6.7.2 Private drainage

No details of the site's existing on-site drainage were provided. It is presumed that drainage from the site connects to the local sewer networks.

6.7.3 Internal Drainage Boards

There are no known Internal Drainage Boards covering the site area.

7 SOURCES OF FLOOD RISK

7.1 Criteria

In accordance with the NPPF [Ref. 1] and advice from the EA, a prediction of the flood sources and levels is required along with the effects of climate change from the present for the design life of the development (in this case assumed to be 100 years).

Changes to climate change guidance in February 2016 indicate that increased allowances in peak river flow and rainfall intensity should now be incorporated within any assessment. The appropriate allowance for peak river flow is based on the sites location in the country, the lifetime of development, the relevant flood zone and the vulnerability of the proposed end use.

The flood risk elements that need to be considered for any site are defined in BS 8533 as the "Forms of Flooding" and are listed as:

- Flooding from rivers (fluvial flood risk);
- Flooding from the sea (tidal flood risk);
- Flooding from the land;
- Flooding from groundwater;
- Flooding from sewers (sewer and drain exceedance, pumping station failure etc); and
- Flooding from reservoirs, canals and other artificial structures.

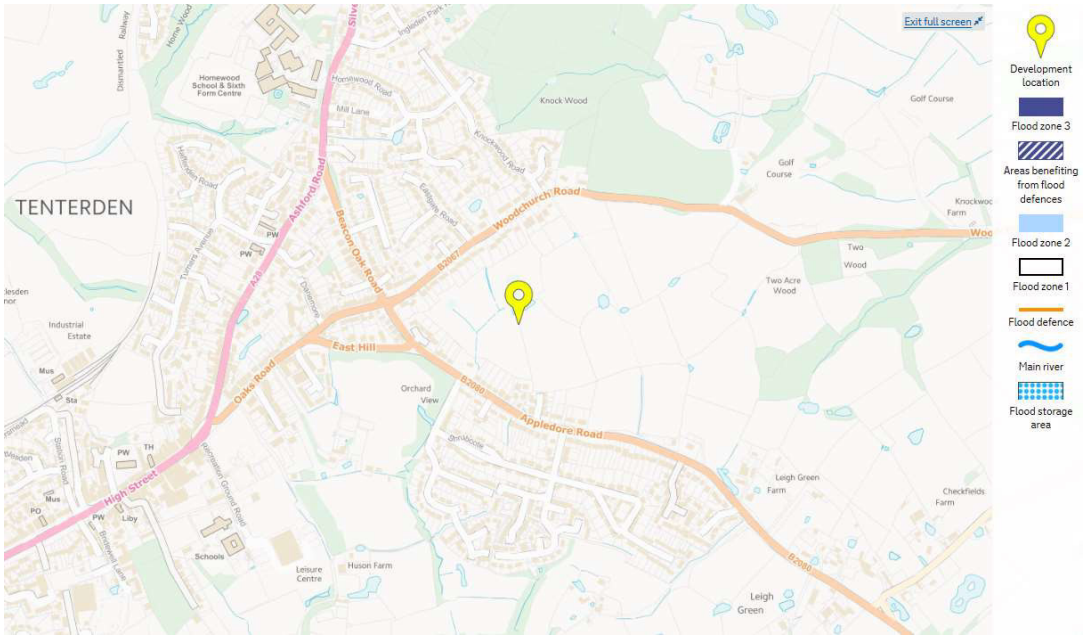
The following section reviews each of these in respect of the subject site.

7.2 Flooding from rivers (fluvial flood risk)

7.2.1 Main River

The latest EA published flood zone map (Figure 7.1 over) shows that the site lies within Flood Zone 1, representing a less than 1 in 1000 year probability of flooding from fluvial sources.

Figure 7.1: Environment Agency 'Flood map for planning'



The latest 'Flood risk from rivers or the sea' map (**Figure 7.2**) indicates that the site is considered to be at 'very low' risk of flooding, taking into account the presence of defences.

Figure 7.2: Environment Agency 'Flood risk from rivers or the sea' map

There are no Main Rivers flowing across or close to the site, as such, it is unlikely that fluvial flooding will occur on the site as a result of a Main River flooding.

Fluvial flooding is reognised as a problem across Kent and an issue which needs to be given careful consideration. The PFRA and SFRA note that it is a larger problem in built up areas along river courses in Ashford and Maidstone. More rural areas away from Main Rivers such as Tenterden are therefore less likely to be affected.

7.2.2 Ordinary watercourse

The site is crossed by land drains which serve as an overland surface water drainage route, fed by both the runoff currently generated on site as well as an outfall from the surface water sewer network to the north beneath Woodchurch Road.

As agreed with the LLFA, all drainage ditches are being maintained in their current form with local clearing and improvement works to be carried out as necessary to ensure that the existing flow capacities of all ditches is maintained or improved.

Ordinary watercourse flooding is recognised in the SFRA, PFRA and SWMP as being a hazard throughout Kent. The SFRA and SWMP note that Ashford Borough and the area to the south of Ashford is at particular risk from Ordinary Watercourse flooding due to the concentration of Ordinary Watercourses in this area. Two IDBs cover the southern portion of Ashford Borough owing to the number of Ordinary Watercourses. The site does not fall into an area covered by an IDB.

Due to the local high point located on the site itself, the catchment associated with the on-site watercourses and therefore the anticipated catchment flows are considered to be minimal. No upstream inflow is anticipated to enter these ditches (other than urban flows conveyed from the upstream surface water sewer) and therefore flows are anticipated to be small, generated by on-site site runoff. It is therefore considered that no significant flooding will occur as a result of the on-site ditches.

The Ordinary Watercourses crossing the site discharge back into the public sewer network, which may present a risk to the site if the sewer network becomes surcharged. This will need to be managed as discussed in Section 9 of this report.

The overall risk of fluvial flooding is considered **low**.

7.2.3 Climate change

Fluvial flooding is likely to increase as a result of climate change. A greater intensity and frequency of precipitation is likely to raise river levels and increase the likelihood of a river overtopping its banks. Climate change guidance for river modelling has been updated by the EA in February 2016. No model re-runs have been undertaken as part of this site-specific FRA, and the supplied EA data therefore represents the best available and up-to-date data when considering the flood risk to the site. The impact upon the site should be negligible given its location within Flood Zone 1.

7.3 Flooding from the sea (tidal flood risk)

The site is not considered to be at risk from tidal flooding due to its inland location.

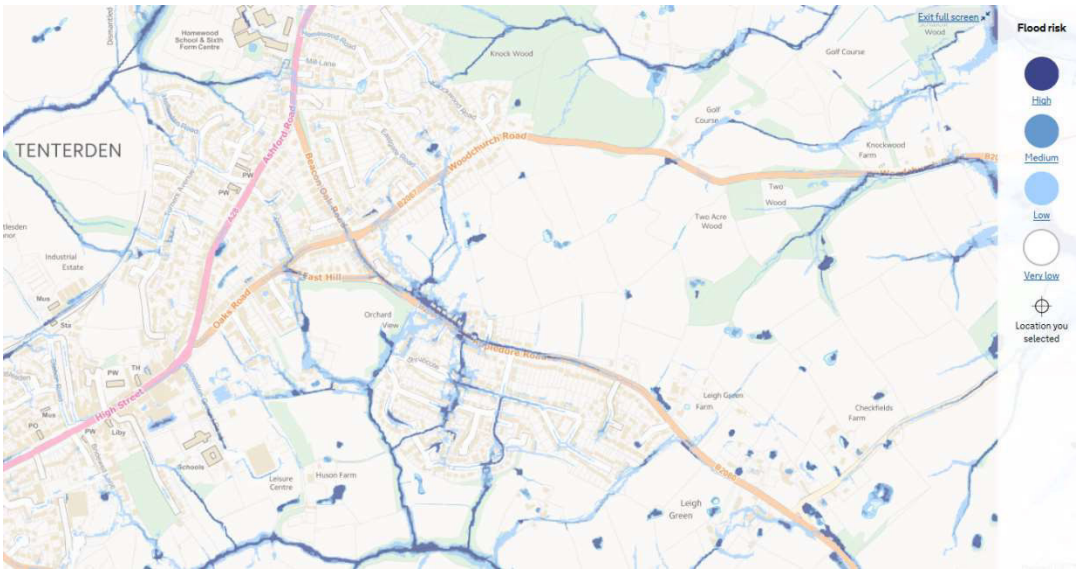
7.4 Flooding from the land (overland pluvial flood risk)

If intense rain is unable to soak into the ground or be carried through manmade drainage systems, for a variety of reasons, it can run off over the surface causing localised floods before reaching a river or other watercourse.

Generally, where there is impermeable surfacing or where the ground infiltration capacity is exceeded, surface water runoff can occur. Excess surface water flows from the site are believed to drain naturally to the local water features, either by overland flow or through infiltration.

The EA's surface water flood map (**Figure 7.3**) shows that small sections of the site are at a 'low' to 'high' risk of flooding from pluvial sources, associated mainly with the on-site ditches. Appledore Road also acts as an overland flow route. As such the overall risk of pluvial flooding to the site can be considered **moderate** and this will be taken into account within the detailed surface water design and layout of the site.

Figure 7.3: Environment Agency 'Flood risk from surface water' map



Tenterden is not specifically highlighted as an area at risk within the SWMP.

The topographic survey on site shows that the land generally falls away from a central point. From this point the land falls away rapidly to the north-east and more gradually towards the south-east and south-west, and therefore any surface water runoff will likely fall away in most directions. The proposed development will generate additional quantities of on-site surface water runoff, which will be controlled on-site to prevent surface water flooding elsewhere. This is discussed further in Section 9.

Some land to the north-west of the site appears to fall towards the site, which may generate runoff that will flow onto the site if not intercepted by highway drainage.

The risk of surface water flooding at the site is considered to be **low-moderate**.

7.4.1 Climate change

Surface water flooding is likely to increase as a result of climate change in a similar ratio to fluvial flooding. Increased intensity and frequency of precipitation is likely to lead to reduced infiltration and increased overland flow. Climate change guidance for rainfall intensity was updated by the EA in February 2016. Revised allowances for climate change have been included in the indicative drainage strategy below.

7.5 Flooding from groundwater

Groundwater flooding tends to occur after much longer periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels. Groundwater tends to flow from areas where the ground level is high, to areas where the ground level is low. In low-lying areas the water table is usually at shallower depths anyway, but during very wet periods, with all the additional groundwater flowing towards these areas, the water table can rise up to the surface causing groundwater flooding.

The SFRA and PFRA both recognise that it is difficult to quantify the extent of groundwater flooding during flood events, as it often occurs alongside other forms of flooding, making it difficult to understand which type of flooding is the greatest contributor.

The SWMP indicates that while groundwater flooding can occur across the county, it has only been reported in very localised spots when it does occur. No areas mentioned are in close vicinity to the site at Tenterden.

Available geological mapping indicates that the site is underlain by bedrock geology of Tunbridge Wells Sand Formation (Sandstone and Siltstone) and Wadhurst Clay Formation (mostly mudstone/sandstone). The presence of a mixture of permeable and impermeable strata could give rise to potential fluctuations in groundwater levels.

The Geo-Environmental investigation recorded groundwater at depths of 2.10m and 2.61bgl. The report also states, *"The site was indicated by the BGS to be in an area identified as having a limited potential for groundwater flooding to occur".*

The proposed development does not include any basement proposals. Therefore, aside from shallow foundations works, the proposals will have no material impact on the risk of groundwater flooding both to and from the development.

The resultant groundwater flood risk is considered to be **low**.

7.5.1 Climate change

Climate change could increase the risk of groundwater flooding as a result of increased precipitation filtering into the groundwater body. If winter rainfall becomes more frequent and heavier, groundwater levels may increase. Higher winter recharge may however be balanced by lower recharge during the predicted hotter and drier summers. This is less likely to cause a significant change to flood risk than from other sources, since groundwater flow is not as confined. It is probable that any locally perched aquifers may be more affected, but these are likely to be isolated. The change in flood risk is likely to be low.

7.6 Flooding from sewers

Flooding from artificial drainage systems occurs when flow entering a system, such as an urban storm water drainage system, exceeds its conveyance capacity, the system becomes blocked or it cannot discharge due to a high water level in the receiving watercourse. A sewer flood is often caused by surface water drains discharging into the combined sewer systems; sewer capacity is exceeded in large rainfall events causing the backing up of floodwaters within properties or discharging through manholes.

Most adopted surface water drainage networks are designed to the criteria set out in Sewers for Adoption (Ref. 19). One of the design parameters is that sewer systems be designed such that no flooding of any part of the site occurs in a 1 in 30 year rainfall event. By definition a 1 in 100 year event may exceed the capacity of the surrounding sewer network as well as any proposed drainage.

If exceeded, the surcharged pipe work could lead to flooding from backed up manholes and gully connections. This could lead to immediate flooding within highways surrounding the site. As described above, surface water would most likely flow away from the site in all directions.

While there are currently no sewer pipes running across the site, the site does serve as part of an above ground surface water sewer flow route. Water from the surface water sewer beneath Woodchurch Road to the north discharges into a ditch which then conveys the water south across the site. On the southern side of the site, this then re-enters the surface water sewer network beneath Appledore Road.

As stated previously, all drainage ditches on site are to be maintained in their current form with local clearing work and reinstatement carried out as necessary. This will ensure that all current surface water pathways from Woodchurch Road to Appledore Road are maintained.

If the sewer beneath Woodchurch Road was to surcharge, then the resulting floodwater would likely follow the topography south onto the western portion of the site. Any exceedance flood waters in this area would flow overland and re-enter either the existing or proposed surface water drainage networks downstream.

If the sewer beneath Appledore Road was to surcharge, then drainage off the site would likely back up, potentially causing flooding in the south-west part of the site. It has been suggested by some of the local residents that this has occurred in the recent past.

CCTV surveys have been carried out to the existing surface water sewers in Appledore Road and the majority of the sewers are impacted to varying degrees of severity by root ingress. This root ingress has caused a severe reduction in the capacity of the sewerage system to carry surface water away from this area and will have contributed to the historical surface water flooding that is known to have occurred in Appledore Road.

As agreed with the LLFA, steps will be taken to re-instate all these sewers to an acceptable condition and ensure that their hydraulic performance is no longer compromised. Following advice from SJA Trees (the arboricultural consultant) it is considered that the best approach to reinstate these sewers is to carry out root cutting and clearance, jetting and clearing all detritus and pipe repairs. The replacement of any specific lengths of pipe should be avoided wherever possible and all works to the existing

surface water sewerage systems in Appledore Road should be carried out under the supervision of a suitably qualified arboricultural professional. Refer to RSK drawing 133187-RSK-C-ALL-05-08-01 in **Appendix J** for details of existing surface water sewers that are impacted by root ingress.

It is considered that the reinstatement of the surface water sewer networks in Appledore Road will significantly reduce the risk of surface flooding that is known to have occurred in Appledore Road.

Although the reinstatement of the sewerage assets in Appledore Road is not the responsibility of the developer. The developer would carry out the necessary repair and pipe clearance works to facilitate the development and ensure that the risk of surface water flooding in Appledore Road is further reduced.

The SFRA and PFRA do not mention sewer flooding as being an issue within the site area, though they recognise that sewer flooding has been an issue across the county historically. Sewer flooding can be managed by careful management of the sewer network and ensuring that new developments can be accommodated.

The proposed development will cause an increase in impermeable area, an associated increase in surface water runoff rates and volumes, and a consequent potential increase in downstream flood risk due to overloading of sewers, watercourses, culverts and other drainage infrastructure.

To ensure that sewer and surface water flooding is not exacerbated; surface water has been be considered within the design context of the entire site and surrounding environment. This ensures that any additional surface water and overland flows are managed correctly, to minimise flood risk to the site and the surrounding area. The proposed surface water network on the site has been designed to ensure exceedance of the network has been considered.

The resultant sewer flood risk is considered to be **low-moderate**.

7.6.1 Climate change

The impact of climate change is likely to be negative regarding flooding from sewers. Increased rainfall and more frequent flooding put existing sewer and drainage systems under additional pressure resulting in the potential for more frequent surcharging and potential flooding. This would increase the frequency of local sewer flooding but would not be significant in terms of the proposed development.

7.7 Other sources of flooding

7.7.1 Reservoirs

Flood events can occur from a sudden release of large volumes of water from reservoirs, canals and artificial structures. There are no known reservoirs within the immediate vicinity of the site.

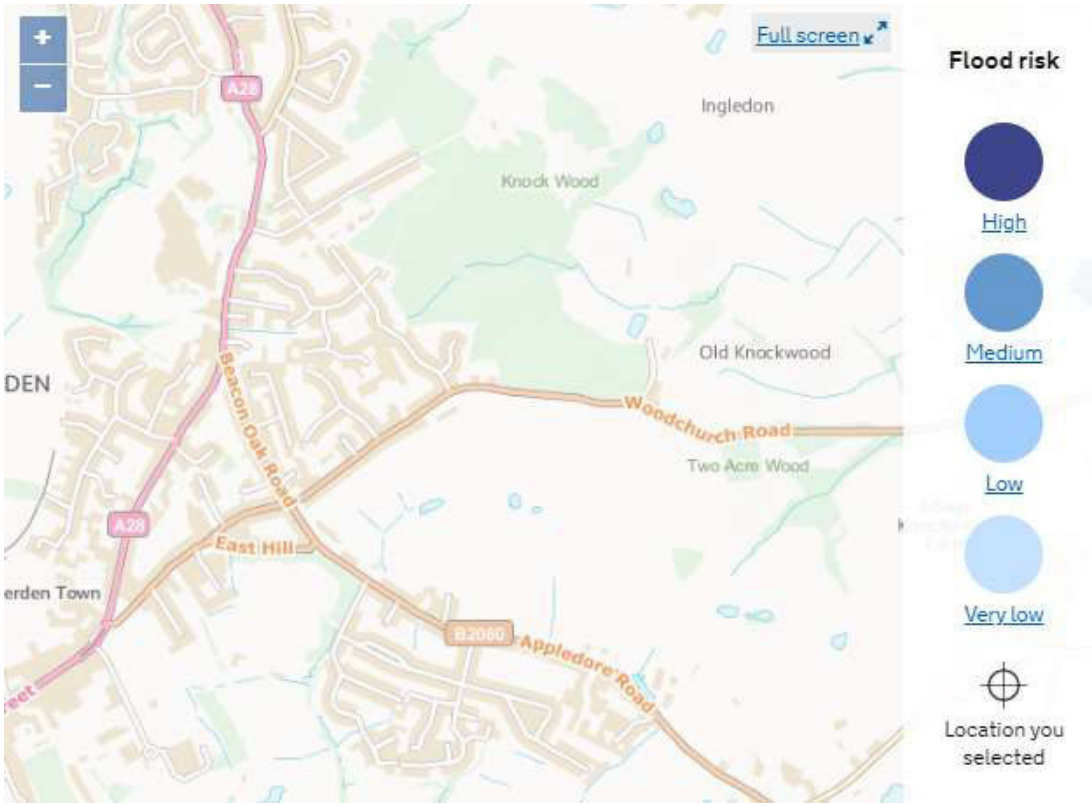
The EA reservoir flood map (reproduced as **Figure 7.4**) shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. Since this is a

prediction of a worst-case scenario, it is unlikely that any actual flood would be this large. According to the EA Reservoir flood maps the site is not at risk of flooding from reservoirs.

Reservoir flooding is also extremely unlikely, although the consequence of a breach or overtopping failure in terms of the rate, depth and extent of inundation could be significant. There has been no loss of life in the UK from reservoir flooding since 1925. Since then reservoir safety legislation has been introduced to ensure reservoirs are maintained. Reservoirs in England and Wales are regulated under the Reservoirs Act 1975, as amended by FWMA 2010, and this is enforced by the EA in England with inundation mapping and robust emergency plans.

The resultant flood risk is considered to be **low**.

Figure 7.4: Environment Agency 'Flood risk from reservoirs' map



7.7.2 Climate change

Reservoirs can be managed over time, controlling inflow/outflow of water and therefore there is the capacity to control the effects of climate change. Increased rainfall has the potential to increase base flow, but this should be minimal. It is unlikely that there will be a substantial change to the risk of flooding for this site.

7.7.3 Canals

There are no Canal & River Trust owned canals within the site area.

7.7.4 Blockages of artificial drainage systems

There is a possibility that flooding may result due to culverts and/or sewers being blocked by debris or structural failure. This can cause water to backup and result in localised flooding, as well as placing areas with lower ground levels at risk.

As mentioned in the sewer flooding section previously, there is a risk of flooding originating from the outfall back into the piped sewer network in the south-west of the site, especially if this becomes blocked.

The risk of flooding from artificial drainage systems is considered to be **low**.

Climate change is unlikely to affect the flooding risk to the site from such blockages.

8 PLANNING CONTEXT

8.1 Application of planning policy

Section 14 of the NPPF includes measures specifically dealing with development planning and flood risk using a sequential characterisation of risk based on planning zones and the EA Flood Map. 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.

8.2 Land use vulnerability

Planning Practice Guidance (PPG) includes a list of appropriate land uses in each flood zone dependent on vulnerability to flooding. In applying the Sequential Test, reference is made to Table 8.1 below, reproduced from Table 3 of PPG.

Table 8.1: Flood risk vulnerability and flood zone 'compatibility'

Flood Risk Vulnerability Classification		Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	Zone 1	Appropriate	Appropriate	Appropriate	Appropriate	Appropriate
	Zone 2	Appropriate	Appropriate	Exception Test Required	Appropriate	Appropriate
	Zone 3a	Exception Test Required	Appropriate	Should not be permitted	Exception Test Required	Appropriate
	Zone 3b functional floodplain	Exception Test Required	Appropriate	Should not be permitted	Should not be permitted	Should not be permitted

With reference to Table 2 of the PPG, the proposed development, based on its residential use, is classed as 'More Vulnerable'. This classification of development is appropriate for areas within Flood Zone 1 and therefore appropriate for the subject site.

8.3 Sequential Test

The Sequential Test is required to assess flood risk and the PPG recommends that the test be applied at all stages of the planning process to direct new development to areas with the lowest probability of flooding (Flood Zone 1).

The site is located within Flood Zone 1 and passes the Sequential Test; therefore, there is no requirement for the Exception Test to be satisfied.

9 SURFACE WATER DRAINAGE ASSESSMENT

9.1 Scope

As development will be located in Flood Zone 1 and it is greater than 1ha in size, the EA requires such development to focus on the management of surface water run-off. This section discusses the potential quantitative effects of the development on both the risk of surface water flooding on-site and elsewhere within the catchment, as well as the type of potential SuDS features that could be incorporated as part of the masterplan to mitigate this.

The NPPF states that SuDS should be considered wherever practical. The use of SuDS is also encouraged by regional and local policy (see Section 5).

In accordance with the Defra Non-Statutory Technical Standards, the surface water drainage strategy should seek to implement a SuDS hierarchy that aspires to achieve reductions in surface water runoff rates to greenfield rates. Where a reduction to the greenfield rate is not practicable, the proposed surface water drainage strategy should not exceed the existing runoff rate.

In addition, Building Regulations Part H (Ref. 20) requires that the first choice of surface water disposal should be to discharge to an adequate soakaway or infiltration system, where practicable. If this is not reasonably practicable then discharge should be to a watercourse, the least favourable option being to a sewer (surface water before combined). Infiltration techniques should therefore be applied wherever they are appropriate.

9.2 Pre-development situation

The existing site area is 23.34ha and 100% permeable.

Existing greenfield runoff rates have been assessed against the IOH 124 method (Ref. 21) and the Ashford Borough Council SPD, with the lower of the two to be adopted as the peak flow rate for the proposed surface water design. In the developable area of the site to the south, there are three existing surface water outfalls to the public sewerage and land drainage systems in Appledore Road.

Details of the existing greenfield runoff rates to these outfalls are outlined in Table 9.1 below and are reproduced on RSK drawing 133187-RSK-C-ALL-01-03-01. Refer to **Appendix J** for details.

Table 9.1: IOH 124 & ABC SPD surface water runoff (greenfield)

Outfall reference	IOH 124 Peak flow (l/s)	ABC SPD Peak flow (l/s)
Outfall 1	14	11.3
Outfall 2	31.9	30.5
Outfall 3	23.9	20.3

As instructed by the LLFA, only the developable areas can be used to calculate the final greenfield runoff that can be utilised for the development, with the Ashford Borough Council SPD greenfield runoff rates presenting the lower rate of greenfield runoff for the development site.

These conservative runoff rates have been adopted to calculate the peak rates of discharge for the developable areas and as such should be considered the worst case. Details of the final proposed peak rates of surface water discharge for the development areas are outlined in Table 9.2 below.

Table 9.2: Proposed surface water peak flow discharge rates

Outfall reference	Peak flow for proposed development areas (l/s)
Outfall 1	5.04
Outfall 2	10.2
Outfall 3	7.0

9.3 Off site discharge options and limits

9.3.1 Infiltration

Infiltration should be considered as the primary option to discharge surface water from the developed site. The effectiveness of infiltration is completely dependent on the physical conditions at the site. Potential obstacles include:

- Local variations in permeability preventing infiltration – It is understood from the local geology and Site Investigation Report (Ref. 7) that the site is situated on an area of Wadhurst Clay Formation and Tunbridge Wells Sand, which is not considered suitable for the use of soakaways due to its low permeability;
- Shallow groundwater table - For infiltration drainage devices, Building Regulation approved document H2 states that these *"should not be built in ground where the water table reaches the bottom of the device at any time of the year".* The Site Investigation Report indicates a potentially high water table which potentially further limits soakage potential; and
- Source Protection Zones - As discussed above, the site is not located within a Groundwater Source Protection Zone.

From the information available in the Site Investigation Report, infiltration is not considered a viable option as part of the drainage strategy.

9.3.2 Discharge to watercourse

Within the development site there are existing ditch networks that connect to existing sewerage in Appledore Road to the south. As instructed by the LLFA, the existing ditch networks will be maintained in their current condition and improved locally as necessary. As such new connections within the development site to the existing ditch features are considered and included in the surface water drainage models as necessary.

9.3.3 Discharge to surface water sewers

The existing topography of the site and the ditch networks to the southern sector of the site all flow north to south and outfall from the site at three locations in Appledore Road.

Outfall 1

Outfall 1 is located to the north side of Appledore Road and via a public surface water in No. 15 Appledore Road, connecting at manhole reference SWS MH 1553. Although currently designated as public sewerage, Southern Water has advised that they intend to reverse this adoption, with the status of this sewer reverting to land drainage.

It is proposed that surface water discharge from the development site will be restricted to a peak flow of 5.04l/s, to match the greenfield runoff for the developable area of this part of the site.

Outfall 2

Outfall 2 is located within the development site, adjacent to the southern boundary to the north of Rose Cottage and No. 6 Limes Close.

The current outfall pipe is a 375mm diameter pipe that flows south through the rear gardens of Rose Cottage and No. 45 Briar Court.

It is proposed that surface water discharge from the development site will be restricted to a peak flow of 10.2/s, to match the greenfield runoff for the developable area of this part of the site.

Outfall 3

Outfall 3 is located in Appledore Road, to the south east of the site. Currently a road gully is located at a low point in the verge area directly adjacent to the existing culverted land drainage system that flows east to west along Appledore Road.

Currently surface water runoff from the development site flows overland to this road gully, prior to the land drainage network.

It is proposed that surface water discharge from the development site will be restricted to a peak flow of 7.0l/s, to match the greenfield runoff for the developable area of this part of the site.

9.4 Post-development situation

The proposed development is approximately 13% impermeable (including the Country Park area), which will result in an increase in surface water across the site. It will therefore be necessary to manage surface water on-site in order to limit the discharge of surface water off-site to an agreed rate (as above), to provide sufficient on-site attenuation up to

the 1 in 100 year climate change rainfall event and to provide improvements to water quality through appropriate source treatment.

9.4.1 Design criteria

As agreed with the LLFA, the proposed peak surface water runoff rates should not exceed the current greenfield run off rates for the worst case, which should be calculated in accordance with IoH 124 or the ABC SPD, whichever is lower. This information and the design criteria applied can be seen on RSK drawing 133187-RSK-C-ALL-01-03-01 for details. Refer to **Appendix J** for all engineering drawings.

Greenfield runoff rates should be calculated to match the developable areas only. As all of the drainage ditches are being maintained it is agreed with the LLFA that the status quo for existing greenfield runoff can be maintained.

The LLFA has confirmed that all drainage features in the area of the Country Park should remain in their current condition and that no hydraulic assessment of these features will be required as part of this submission. The addition of new surface water ponds and soft drainage features in this area of the site has been discussed with the LLFA and it is agreed that there is no objection in principle to improving the features and further enhancing them to create ecological habitat.

All proposed surface water drainage systems should be SuDS led, with the existing ditch networks utilised as part of the proposed surface water drainage strategy.

ABC confirmed that all modelled data should comply with either the FEH dataset or the FSR dataset adjusted to use a M5-60 of 26.25mm. The latter dataset has been applied in this instance. The modelled data can be applied to 1 in 100 year + 20% climate change and tested at 1 in 100 year + 40% climate change for exceedance. All of the surface water drainage modelling has been carried out for all seasonal events up to and including the 1 in 100 year + 40% climate change event.

All pond features have been sized and modelled based on the invert levels stated in the Microdrainage calculations, see **Appendix I** for details. If required, all ponds can be constructed to a greater depth below the inlet and outlet pipe invert levels and permanently hold water, to allow new flora and fauna to be established that will be beneficial to the general environment as well as providing improved habitat and foraging for the local amphibian and reptile populations.

9.4.2 Proposed drainage strategy

The proposed SuDS for the site include a combination of existing and new ditches/swales, checkdams (weirs), existing and new ponds, detention basins, ditches and permeable paving.

The proposed surface water networks have been designed and modelled to ensure that there is no flooding for all storm events, up to and including the 1 in 100 year + 40% climate change event.

Where appropriate the existing ditches, swales and ponds have been included in the Microdrainage models, with culvert features created to reflect the existing swale/ditch profiles. These existing features are represented as dashed red lines on the proposed surface water general arrangement drawings.

The SuDS measures are outlined in the Surface Water Strategy as attached in **Appendix J**. Refer to RSK drawings 133187-RSK-C-ALL-05-03-01 & 05-03-02 for details.

Although the current planning application is a hybrid submission with all the housing areas subject to a future reserved matters application, the surface water drainage models have been completed to a full detailed design.

As such any future reserved matters application will need to follow the principles of the surface water design and models outlined in this report and be adjusted as necessary to accommodate any minor changes as the detailed site layout evolves.

The detailed design criteria applied in this report has been based upon guidance given in the CIRIA publication 'The SUDS Manual' (Ref. 22).

In principle, the strategy contains the following features and criteria:

- Infiltration techniques are not suitable on site due to the impermeable nature of the underlying geology and therefore soakaways are not considered in this design. Any infiltration that is achieved post construction will be considered to be beneficial to the scheme and will further reduce the risk of flooding both on site and to the adjacent properties;
- Permeable paving shall be incorporated within all private minor roads, private parking courts and on-plot parking spaces. This can be used to collect and store runoff from the houses and surrounding hardstanding areas before joining the on-site surface water network that flows into the swales and basins. Main roads will not be constructed using permeable paving due to ownership and future maintenance issues, where responsibility will most likely lie with the highway authority. For extents of permeable paving refer to RSK drawing 133187-RSK-C-ALL-05-05-01. See **Appendix J** for all engineering drawings;
- Where required modular storage has been located mainly beneath shared permeable paved areas to provide storm volumes. Although not anticipated it should be noted that in areas of high groundwater levels, these tanks may need to be lined to prevent groundwater interaction. Floatation issues should also be considered at the detailed design stage;
- Where possible swales have been utilised alongside roads to convey runoff through the drainage network to the various attenuation features;
- Existing ditches have been incorporated into the drainage models where necessary.
- Bioretention features are located in open spaces across the site with design depths up to 200mm and side slopes of 1:3;
- New detention basins have been strategically located within the areas of open space. The topography in this area is suitable for SuDS features. To accommodate the required volumes, the features have been designed up to 1.6m deep and have side slopes of 1:4 to comply with safety and maintenance guidelines as highlighted in the SuDS Manual (Ref. 22); and
- Rainwater harvesting is not proposed as part of this development and therefore has not been included as part of any of the calculations. Green roofs are not part of proposal.

The SuDS features have been designed to accommodate the 1 in 100 year plus 40% climate change events. Any local, minor flooding from exceedance would overflow from within swales, bioretention areas and detention basins to flow overland and be re-introduced back into the drainage systems downstream.

The short-medium term maintenance of the various SuDS features within the site boundary will be undertaken by a management company. A separate Management Statement has been provided with the application with further details.

Maintenance of SuDS features should be undertaken in line with maintenance schedules outlined in the SuDS Manual (Ref. 22). A typical maintenance regime for the SuDS features proposed for this scheme can be found in **Appendix K**. Full maintenance schedules should be confirmed at the detailed design stage in consultation with appropriate product suppliers.

In accordance with the emerging Kent County Council Drainage and Planning Policy Statement, RSK has produced an engineering plan showing the critical hydrological features associated with the development of the Appledore Road site. Refer to RSK drawing 133187-RSK-C-ALL-05-07-01 in **Appendix J** for details.

Temporary drainage should be established for the construction phase of development to prevent silt mobilisation, potentially impacting on flow regimes and silt pollution downstream. The construction of SuDS should be considered in the early stages of site design.

9.4.3 Proposed drainage network descriptions

Network 1

Network 1 is located to the western sector of the site, flows north to south and utilises the existing outfall into the public sewerage in Appledore Road.

There are existing ditches that are to be maintained, with culverted crossings installed where proposed roads cross these features. The existing surface water inlet into the on-site ditch network is to be retained and is unaffected by the proposed development.

Network 1 collects impermeable areas from the parcels located in Fields F1b, F3 and F4. The extents of the developable area for Network 1 can be seen on RSK drawing 133187-RSK-1-C-ALL-01-03-01, in **Appendix J**.

Peak surface water flows for Network 1 will be restricted to 5.04l/s, with new SuDS detention basins provided at the southern end of this network. All the private roads will be constructed with a porous paving construction, which will offer the first drainage quality treatment stage at the first point of rainfall entry to the system.

Network 2

Network 2 is located in the central sector of the site, flows north to south and utilises the existing outfall into the culverted land drainage system that flows towards Appledore Road.

There are existing ditches and ponds that are to be maintained, with culverted crossings installed where proposed roads cross these features. The existing surface water inlet into the on-site ditch network from Woodchurch Road is to be retained and is unaffected by the proposed development.

Network 2 collects impermeable areas from the parcels located in Fields F3, F4 and F5. The extents of the developable area for Network 2 can be seen on RSK drawing 133187-RSK-1-C-ALL-01-03-01, in **Appendix J**.

Peak surface water flows for Network 2 will be restricted to 10.2l/s, with new SuDS detention basins, swales and cellular storage provided at the southern end of this

network. All of the private roads will be constructed with a porous paving construction, which will offer the first drainage quality treatment stage at the first point of rainfall entry to the system.

Network 3

Network 3 is located to the eastern sector of the site, flows north to south and utilises the existing outfall into the culverted land drainage in Appledore Road.

There are existing ditches that are to be maintained, with culverted crossings installed where proposed roads cross these features.

Network 3 collects impermeable areas from the parcels located in Fields F6, F7, F10 and F13. The proposed sports pitches are located to the east in Fields F10 and F14. The proposed pavilion and associated parking areas are included in Network 3 and there is provision for any additional detention/treatment features that may be required for field drainage systems under the sports pitches.

The extents of the developable area for Network 3 can be seen on RSK drawing 133187-RSK-1-C-ALL-01-03-01, in **Appendix J**.

Peak surface water flows for Network 3 will be restricted to 7.0l/s, with new SuDS detention basins provided at the centre and southern end of this network. A new swale with checkdams will be constructed adjacent to the proposed spine road and all the private roads will be constructed with a porous paving construction, which will offer the first drainage quality treatment stage at the first point of rainfall entry to the system.

9.4.4 Water quality

The SUDS Manual (Ref. 22) contains guidance on how to assess water quality, stating *"Determining the hazard posed by the land use activities at a site and the extent to which underlying soil layers and/or proposed treatment components reduce the associated risk can be done using a variety of methods that vary in complexity and data requirements."*

In accordance with Table 4.3 of the SuDS Manual, the proposed development for the site can be summarised with the following pollution hazard levels and management requirements for discharge to the receiving surface water (there will be no infiltration on site, therefore receiving groundwater is not considered here):

- Residential roofs – **Very Low** Pollution Hazard – Simple Index Approach; and
- Individual property driveways, roofs, residential car parks, low traffic roads, non-residential car parking with infrequent change (schools, offices) – **Low** Pollution Hazard – Simple Index Approach.

It is therefore considered appropriate to use the Simple Index Approach for the purpose of this assessment.

Table 26.1 of the SUDS Manual indicates that for the Simple Index Approach:

- Simple pollution hazard indices should be based on land use (e.g. Table 26.2); and
- Risk reduction for Surface Water should be done using Simple SuDS hazard mitigation indices (e.g. Table 26.3)

Extracts of Tables 26.2 and 26.3 are replicated below, highlighting the relevant features applicable to this site:

Table 9.3: Extract of SuDS Manual Table 26.2: Pollution hazard indices for different land use classifications

Land use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential roofs	**Very Low**	0.2	0.2	0.05
Individual property driveways, roofs, residential car parks, low traffic roads, non-residential car parking with infrequent change (schools, offices)	**Low**	0.5	0.4	0.4

Table 9.4: Extract of Table 26.3: Indicative SuDS mitigation indices for discharges to surface waters

Land use	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Swale	0.5	0.6	0.6
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.6
Bioretention system	0.8	0.8	0.8

The SuDS Manual States:

Total SuDS mitigation index ≥ pollution hazard index

(for each contaminant type) (for each contaminant type)

In conclusion, any of the individual SuDS features on their own (shown in Table 9.4) would be in excess of the requirement for all receiving land use on site (residential roofs, individual property driveways, roofs, residential car parks, low traffic roads and non-residential car parking with infrequent change, shown in Table 9.3) i.e. the corresponding index value for the SuDS feature is more than that required for the land use. As an example, a swale with indices of 0.5 and 0.6, is in excess of worst case pollution levels of 0.5 and 0.4 expected from individual driveways.

It should also be noted that all surface water runoff will pass through a treatment train of at least two features e.g. permeable paving into swale and detention basin, and therefore the water quality requirements are considered to be met.

9.4.4.1 Nutrient Neutrality

In June 2019 Natural England first advised that new development was likely contributing to increased nitrogen and phosphorus input into the Stodmarsh, causing eutrophication and impacting the designated sites' protected habitats and species. One way to address the risk of increased nutrients entering the surface water catchment would be for new development to achieve 'nutrient neutrality'; meaning the nutrients (nitrogen and

phosphorus) from all surface water runoff and wastewater generated by the proposed development must be less than or equal to the nutrients generated by the existing land.

As indicated within **Appendix L**, the site lies outside of the Stodmarsh catchment and therefore does not need to demonstrate nutrient neutrality.

9.5 Foul drainage provision

Although not part of this report, the proposed foul water drainage strategy has been considered in the context of the current Masterplan and the proposed surface water drainage general arrangements.

Consultations and meetings with Southern Water Services have been held and the principles of the proposed foul water strategy have been agreed with their offices.

Details of the proposed foul water strategy can be found in the RSK report reference 133187-R5(3).

10 FLOOD MITIGATION MEASURES

10.1 Overview

The site is located within Flood Zone 1, and as such, no fluvial flood mitigation is required. Overland flows generated due to drainage capacity exceedance are discussed and addressed below.

10.2 Overland flood flow

In an extreme storm event overland flood flow may enter the site along the ditches in the western sector of the site. This water emanates from the surface water sewer flowing from Woodchurch Road.

The existing flow paths shall be retained as part of the development, with the utilisation of the existing ditches continuing this function. The topography across the developable area of the site dictates that all proposed road alignments will facilitate any overland flow in the unlikely event that surface flows be generated due to drainage capacity exceedance.

The proposed layout includes soft landscaping areas adjacent to existing ditches which will ensure that these overland flow paths are retained. No further overland flow control measures are proposed as all surface water runoff up to the 1 in 100 year climate change storm event will be stored on site, which can be conveyed into the SuDS features via surface flows along the new roads.

During the public consultation, anecdotal comments were received that there is a history of flooding to the rear gardens of 1-5 Stace Close and 1-11 Appledore Road due to water from the site flowing into these properties. As part of the proposed development it is proposed that a new swale/ditch be constructed adjacent to the northern boundaries of these properties to intercept any surface water flows from the site prior to them reaching these properties (as shown in RSK drawing 133187-RSK-C-ALL-05-05-01 in **Appendix J**).

10.3 Finished floor levels

As this site will not be affected by fluvial flooding there is no requirement to incorporate any freeboard levels into the finished floor levels (FFLs) of the design. Low lying areas that could lead to ponding of surface flows will be avoided by careful design of finished levels.

The proposed road alignments will be generally designed to have a minimum of 1m clearance above the existing ditch level at the point where these features intersect. This will dictate that FFLs are set above any existing or proposed drainage features that may be at risk of flooding in the event of an exceedance failure.

However, given the potential for some surface water overland flow passing through the site, it is recommended that proposed finished floor levels in this part of the site are to be raised by a minimum of 300mm above the surrounding ground level and a minimum of

150mm above the site access roads which will act as exceedance flow routes, to ensure no internal surface water ingress.

10.4 Ordinary watercourse easement

The existing on-site ditches are to be retained as part of the development proposal and existing crossings should be maintained. Any new crossings will be minimised and wherever any crossing needs to be incorporated, i.e. to facilitate footpath access/ vehicular road crossings, these should be appropriately sized and designed to ensure capacity of the ditch is not impacted.

There are a number of ditches on the site itself, and while no formal instruction has been given from the LLFA on easement requirements, it should be noted that all existing ditches remain with a landscaped buffer either side of the watercourse that ties in with the existing trees (as shown in **Appendix C**), to ensure that development is protected from potential future floodwaters overtopping the channel banks and to allow for any maintenance access.

10.5 Other Flood Mitigation

As this site will not be affected by fluvial flooding, there is no requirement for floodplain compensation storage or any flood resilience/resistance measures and there is no need to sign up future properties to the EA's Flood Warning service. Safe access will be available via all routes.

11 CONCLUSIONS AND RECOMMENDATIONS

This FRA complies with the NPPF and Planning Practice Guidance and demonstrates that flood risk from all sources has been considered in the proposed development. It is also consistent with the Local Planning Authority requirements with regard to flood risk.

The proposed development site lies in an area designated by the EA as Flood Zone 1 and is outlined to have a chance of flooding of less than 1 in 1,000 (<0.1%) in any year.

NPPF sets out a Sequential Test, which states that preference should be given to development located within Flood Zone 1. This flood risk assessment demonstrates that the requirements of the Sequential Test have been met, with the location of the site within Flood Zone 1 and 'More Vulnerable' classification of the development.

This flood risk assessment has concluded that:

- The location at which the proposed development is situated within Flood Zone 1, and as such is at a very low risk of flooding from fluvial sources;
- The site is far enough inland not to be at risk of any tidal flooding event;
- Flood risk from surface water/sewers is considered low-moderate at the site and the remedial measures proposed will further reduce this risk;
- Flood risk from other sources – groundwater, reservoirs and artificial sources – is demonstrated to be low;
- The development will have no impact on other forms of flooding;
- The proposals will follow best practice regarding site drainage to ensure that any surface water runoff from the development is managed, ensuring flood risk is not increased elsewhere;
- The proposed development will increase the impermeable area on site resulting in an increase in surface water runoff if unmanaged. Therefore, surface water from the proposed development will be attenuated and discharged at rates agreed with the drainage stakeholders, utilising the existing surface water outfalls from the site;
- In order to prevent flooding, both on and off the site, a variety of Sustainable Drainage Systems (SuDS) will be utilised to control surface water flows, including detention basins, ponds, swales, checkdams, ditches and significant areas of permeable paving;
- These features will be designed to store the volume of water associated with a 1 in 100 year rainfall event, plus an additional allowance to account for increased rainfall due to climate change, providing a betterment over the existing scenario;
- SuDS features have been strategically located across the site, taking into consideration the topography of the site and will also provide additional water quality, amenity and biodiversity benefits; and
- Improvements and repairs will be carried out to the existing surface water drainage systems in Appledore Road to ensure that their hydraulic performance is no longer compromised.

Overall and taking into account the above points, the development of the site should not be precluded on flood risk grounds.

12 REFERENCES

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6. DEFRA, 'Sustainable Drainage Systems - Non-statutory technical standards for sustainable drainage systems', March 2015.
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11. Ashford Borough Council, 'Ashford Local Plan 2030', February 2019.
12. Ashford Borough Council, 'Sustainable Drainage Supplementary Planning Document', 2010
13. JBA Consulting, 'Ashford Borough Council Strategic Flood Risk Assessment', July 2014.
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16. JBA Consulting, 'Ashford Stage 1 Surface Water Management Plan', October 2013.
17. Kent County Council, 'Kent Local Flood Risk Management Strategy', 2017-2023.
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19. WRC, 'Sewers for Adoption' 8th Edition, August 2018.
20. HM Government (2010 with 2013 amendments), 'The Building Regulations 2010: Approved Document H - Drainage and Waste Disposal (2002 Edition incorporating 2010 amendments)'.
21. Institute of Hydrology (IoH), 'Flood Estimation for small catchments - Report 124', 1994.
22. CIRIA, 'The SUDS Manual – C753', 2015.

APPENDIX A
RSK GROUP SERVICE CONSTRAINTS

1. This report and the drainage design carried out in connection with the report (together the "Services") were compiled and carried out by RSK LDE Ltd (RSK) for Wates Developments Ltd (the "client") in accordance with the terms of a contract between RSK and the "client" dated November 2017. The Services were performed by RSK with the skill and care ordinarily exercised by a reasonable civil engineer at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the client.

2. Other than that expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.

3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the client. RSK is not aware of any interest of or reliance by any party other than the client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.

4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.

5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.

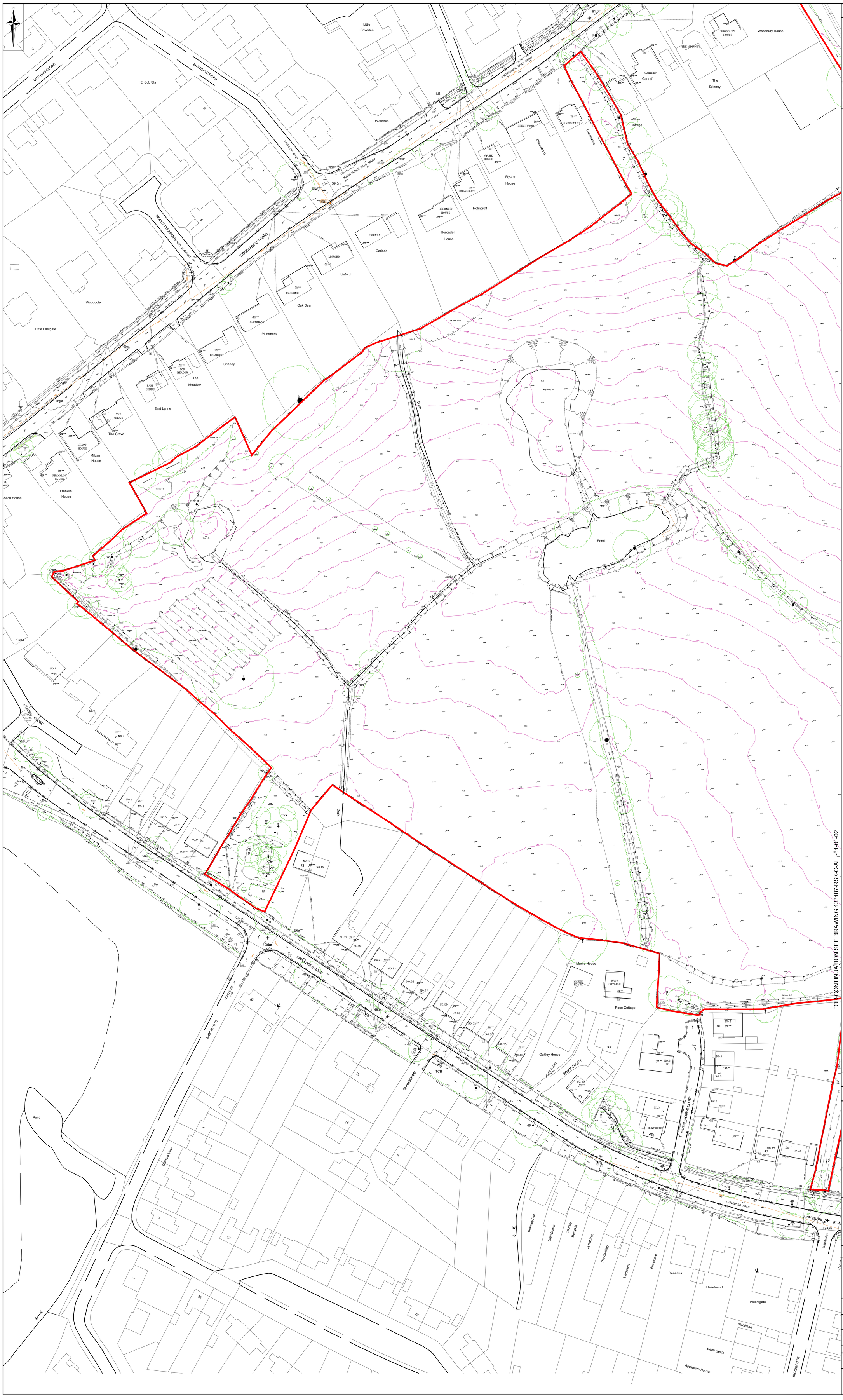
6. The observations and conclusions described in this report are based solely upon the Services, which were provided pursuant to the agreement between the client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials.

7. The Services are based upon RSK's observations of existing physical conditions at the site gained from a walk-over survey of the site together with RSK's interpretation of information including documentation, obtained from third parties and from the client on the history and usage of the site. The Services are also based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely. The Services clearly are limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the walk-over survey. Further RSK was not authorised and did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services. RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the client and RSK.

8. The phase II or intrusive environmental site investigation aspects of the Services is a limited sampling of the site at pre-determined borehole and soil vapour locations based on the operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the soil and groundwater conditions, together with the position of any current structures and underground facilities and natural and other activities on site. In addition chemical analysis was carried out for a limited number of parameters [as stipulated in the contract between the client and RSK] [based on an understanding of the available operational and historical information,] and it should not be inferred that other chemical species are not present.

9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan, but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (boreholes, trial pits etc) annotated on site plans are not drawn to scale but are centred over the appropriate location. Such features should not be used for setting out and should be considered indicative only.

APPENDIX B
TOPOGRAPHIC SURVEY



CIVIL / STRUCTURAL DESIGN RISK MANAGEMENT

Abnormal or unusual residual risks associated with the design outcomes shown on this drawing are:-

RSK LDE LTD has followed its Design Risk Management process for Hazard Elimination and Risk reduction in developing the designs shown on this drawing.
Abnormal or unusual residual risks may be shown above where it is considered that such risk may not normally be expected by competent persons engaged on work of this nature or type.

NOTE:

SURVEY INFORMATION BASED ON THE "3D TOPOGRAPHICAL SURVEY" DRAWING NO: TENTERDEN200 REV A, BY K.A.RYLANCE LIMITED, JUNE 2017.

Benchmark Details:
Co-ordinates are on a plane rectangular grid based on Ordnance Survey National Grid Co-ordinates at station 202, orientated to OS Grid North and with a scale factor of 1.
Levels are based on OS Datum by GPS.
To convert GPS value to O.S.B.M +21mm.

Rev.	Date	Amendment	Drawn	Chkd.	Appd.
P01	20.07.19	ISSUED FOR PLANNING	IM	IM	

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Client

Project Title
APPLEDORE ROAD
TENTERDEN

Status
FOR PLANNING

Drawing Title
TOPOGRAPHICAL SURVEY
Sheet 1 of 2

Drawn	Date	Checked	Date	Approved	Date
IM	01.19				

Scale	Orig Size	Dimensions	Revision
1:500	A0		P01

Drawing File
133187-C-ALL-01-01-01_02 TOPOGRAPHICAL SURVEY.DWG

Project No.	Originator	Unit	Site Area	Series	Number	Sheet
133187	RSK	C	ALL	01	01	01

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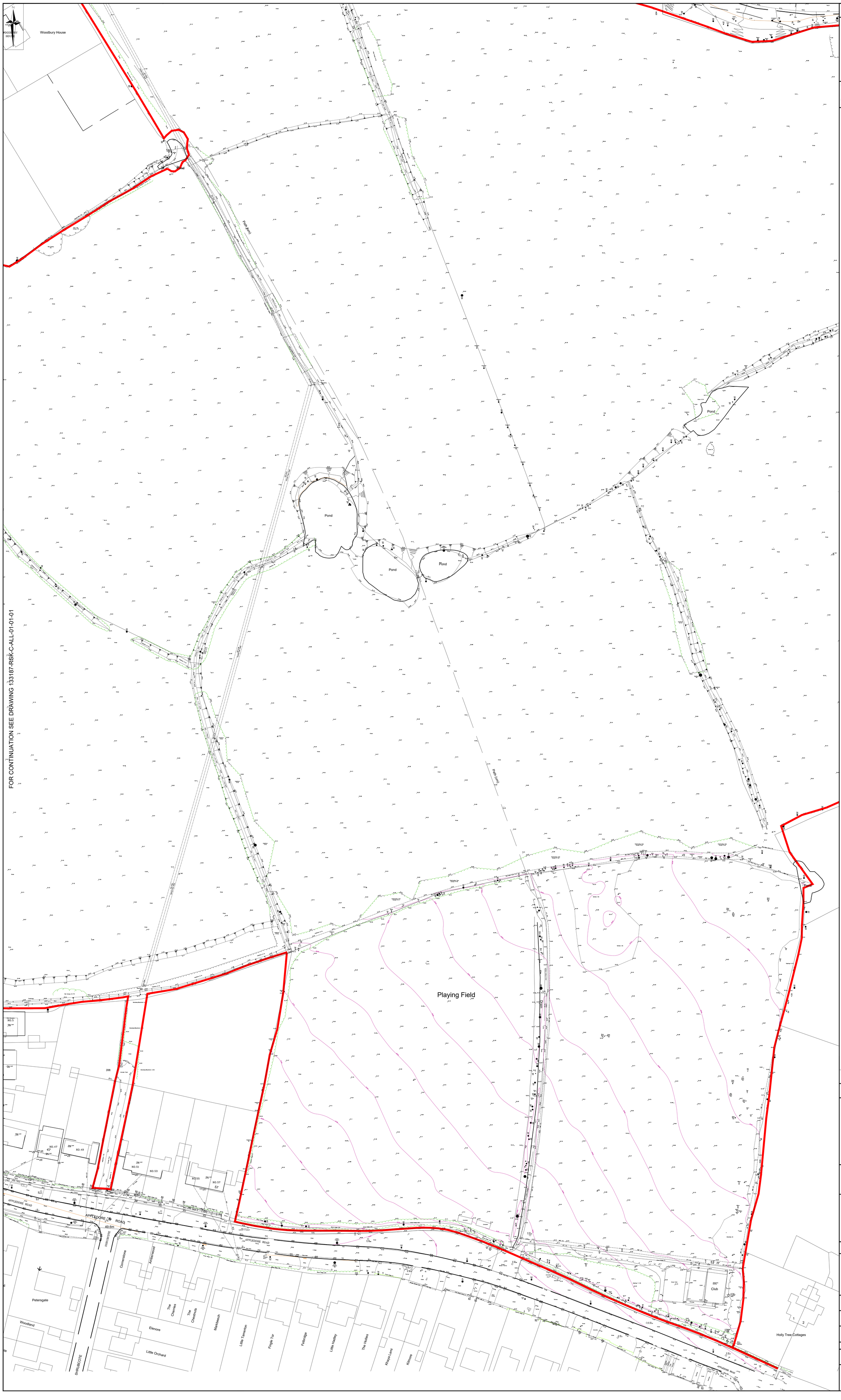

FOR CONTINUATION SEE DRAWING 133187-RSK-C-ALL-01-01-01

CIVIL / STRUCTURAL DESIGN RISK MANAGEMENT

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To convert GPS value to O.S.B.M +21mm.

Rev.	Date	Amendment	Drawn	Chkd.	Appd.
P01	20.07.19	ISSUED FOR PLANNING	IM	IM	

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Client

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APPLEDORE ROAD
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Drawing Title
TOPOGRAPHICAL SURVEY
Sheet 2 of 2

Drawn	Date	Checked	Date	Approved	Date
IM	01.19				

Scale	Orig Size	Dimensions	Revision
1:500	A0		P01

Drawing File
133187-C-ALL-01-01-01_02
TOPOGRAPHICAL SURVEY.DWG

Project No.	Originator	Unit	Site Area	Series	Number	Sheet
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File Location: K:\133000-133999\133187 - APPLEDORE ROAD, TENTERDEN\GRAPHI\INFRASTRUCTURE\DRAWINGS\01 - PRE-DESIGN.DRAWINGS\133187-C-ALL-01-01-01_02 TOPOGRAPHICAL SURVEY.DWG

APPENDIX C
ARCHITECTURAL PLANS

rev.	date	changes description	status	issued by
P05	22/04/2021	Amended footpath	S2	CB
P04	19/04/2021	Revised to incorporate the landscape design	S2	CB
P03	15/04/2021	Amendment to redline boundary	S2	CB

N

0 20 40 80 100m

RE-FOR MAT

www.re-format.co.uk
mail@re-format.co.uk
+44 (0)1730 778778

drawn by: CB
date created: March 2021
checked by: MS
scale at A2: 1:2000

project title: Appledore Road
document title: Site Plan

project	originator	volume	level	type	role	number
21037	RFT	00	00	DR	A	0121

status: S2
suitability description: Suitable for Information
revision: P05

APPENDIX D
ENVIRONMENT AGENCY CORRESPONDENCE

Sam Williams

From: KSL Enquiries <KSLE@environment-agency.gov.uk>
Sent: 11 April 2018 17:08
To: Adan Banga
Cc: KSLPlanning
Subject: KSL 81788 JM - 180309/SR03 Site at Appledore Road - Request for Product 4 data and surface water flood maps
Attachments: Promap Capture.PNG; KSL 78955 JM map TN30 7DR.pdf

Dear Adan

KSL 81788 JM Appledore Road - Request for Product 4 data and surface water flood maps TN30 7DR

Thank you for your request for information that was received on 06 March 2018.

We respond to requests under the Freedom of Information Act 2000 and Environmental Information Regulations 2004.

This site is located in an area of Flood Zone 1 where we do not have modelled flood levels.

We can confirm that we have no record of flooding (from rivers and/or the sea) for this location. You may wish to check with the Lead Local Flood Authority for this area, Kent County Council, who hold detailed records for surface water flooding.

Please be aware that you can access our flood map(s) for free here.

Please note I have copied in our Sustainable Places/ Planning team to assist you directly with your pre-planning enquiry.

Additional questions: please see responses in green below.

Please can we obtain **flood levels and flows** for all available return periods for any watercourses within this area. – This information would usually be included within the Product 4, as the location is in Flood Zone 1, unfortunately we are not able to supply this data.

Please can we also obtain any surface water flooding maps if available. – Please refer to your lead local planning authority, Kent County Council, for further information on surface water flooding.

Please can you also provide any details of further constraints such as culverts etc and any historical flood mapping. – Please find attached a map showing culverts and historical flooding for the location.

If you have requested this information to help inform a development proposal, then you should refer to the flood risk standing advice pages on our website

http://www.environment-agency.gov.uk/research/planning/82584.aspx

You can find further information about flooding and our flood maps on our website:

http://www.environment-agency.gov.uk/homeandleisure/floods/default.aspx

http://www.environment-agency.gov.uk/homeandleisure/floods/31650.aspx

Please refer to the Open Government Licence which explains the permitted use of this information.

I trust this information is of use. If you have any further questions, please contact us and we will be happy to help.

If you have any further queries or if you'd like us to review the information we have provided under the Freedom of Information Act 2000 and Environmental Information Regulations 2004 please contact us within two months and we will happily do this for you.

We would be really grateful if you could spare five minutes to help us improve our service. Please click on the link below and fill in our survey – we use every piece of feedback we receive:http://www.smartsurvey.co.uk/s/EnvironmentAgencyCustomerSurvey/?a=KSL

Kind regards

Jessica

Jessica Mayall
Customers and Engagement Officer
Kent, South London and East Sussex

Environment Agency | 0207 7140521 | Orchard House | Endeavour Park | London Road | Addington | West Malling | ME19 5SH

For general enquiries please call | 0208 474 6848

From: KSL Enquiries
Sent: 11 April 2018 11:05
To: 'ABanga@rsk.co.uk'
Subject: KSL 81788 JM - 180309/SR03 Site at Appledore Road - Request for Product 4 data and surface water flood maps

Dear Adan

Please accept my apologies that your enquiry requesting a Product 4, related information and pre-planning advice, as forwarded below, has been delayed. This is due to an administrative error. Please be reassured, however, that it is now being processed as a priority.

Kind regards

Jessica

Jessica Mayall
Customers and Engagement Officer

Kent, South London and East Sussex

Environment Agency | 0208 474 6848 | Orchard House | Endeavour Park | London Road | Addington | West Malling | ME19 5SH

DO YOU KNOW WHAT TO DO? FLOODS DESTROY BE PREPARED

From: ABanga@rsk.co.uk [mailto:ABanga@rsk.co.uk]
Sent: 06 March 2018 10:26
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: 180309/SR03 Site at Appledore Road - Request for Product 4 data and surface water flood maps

Dear External Relations,

Please could we request a **Product 4 (Detailed FRA/FCA Map)** and **the surface water flood maps** for the following site:

Appledore Road
Tenterden
Kent
TN30 7DR

OS Grid ref: 589449, 133727

I have also attached a map with the site highlighted.

Please can we obtain **flood levels and flows** for all available return periods for any watercourses within this area.
Please can we also obtain any surface water flooding maps if available.
Please can you also provide any details of further constraints such as culverts etc and any historical flood mapping.

If you require any additional information, please do not hesitate to contact me.

Many thanks.

Kind Regards,

Adan Banga
Graduate Hydrologist

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From: ABanga@rsk.co.uk [mailto:ABanga@rsk.co.uk]
Sent: 06 March 2018 10:58
To: Enquiries, Unit <enquiries@environment-agency.gov.uk>
Subject: 180309/MS04 Site at Appledore Road - Pre-planning enquiry

Dear External Relations,

Please find attached a pre-planning enquiry for the site named above, along with a site location plan.

We would appreciate any comments you may have on this site, particularly regarding flood risk and drainage and the following questions:

1. Please can you confirm the new climate change allowance (%) which should be included within our assessment of flood risk. Please can you also confirm the acceptable technical methodology for applying this new allowance.
2. Are there any historical reports of flooding that you are aware of in the area surrounding the site? If so what is the source of these events?
3. Are there any particular local requirements relating to the proposed drainage strategy for the area? i.e. in relation to expected discharge rates etc.
4. Please could you clarify the Agency's position regarding the proposal to change the vulnerability rating of the development (from less vulnerable to more vulnerable)?

(Please note, we have also sent a request for product 4 data in a separate request).

Whilst we have attempted to cover all relevant details in the questions above we are aware that the local knowledge of the Environment Agency is often essential in ensuring that a robust Flood Risk Assessment is achieved. Therefore if there are other issues or information over and above the responses to the questions above that you feel may be of use in this work we would be most grateful if you could let us know.

If you require any additional information, please do not hesitate to contact me.

Many thanks.

Kind regards,

Adan Banga
Graduate Hydrologist

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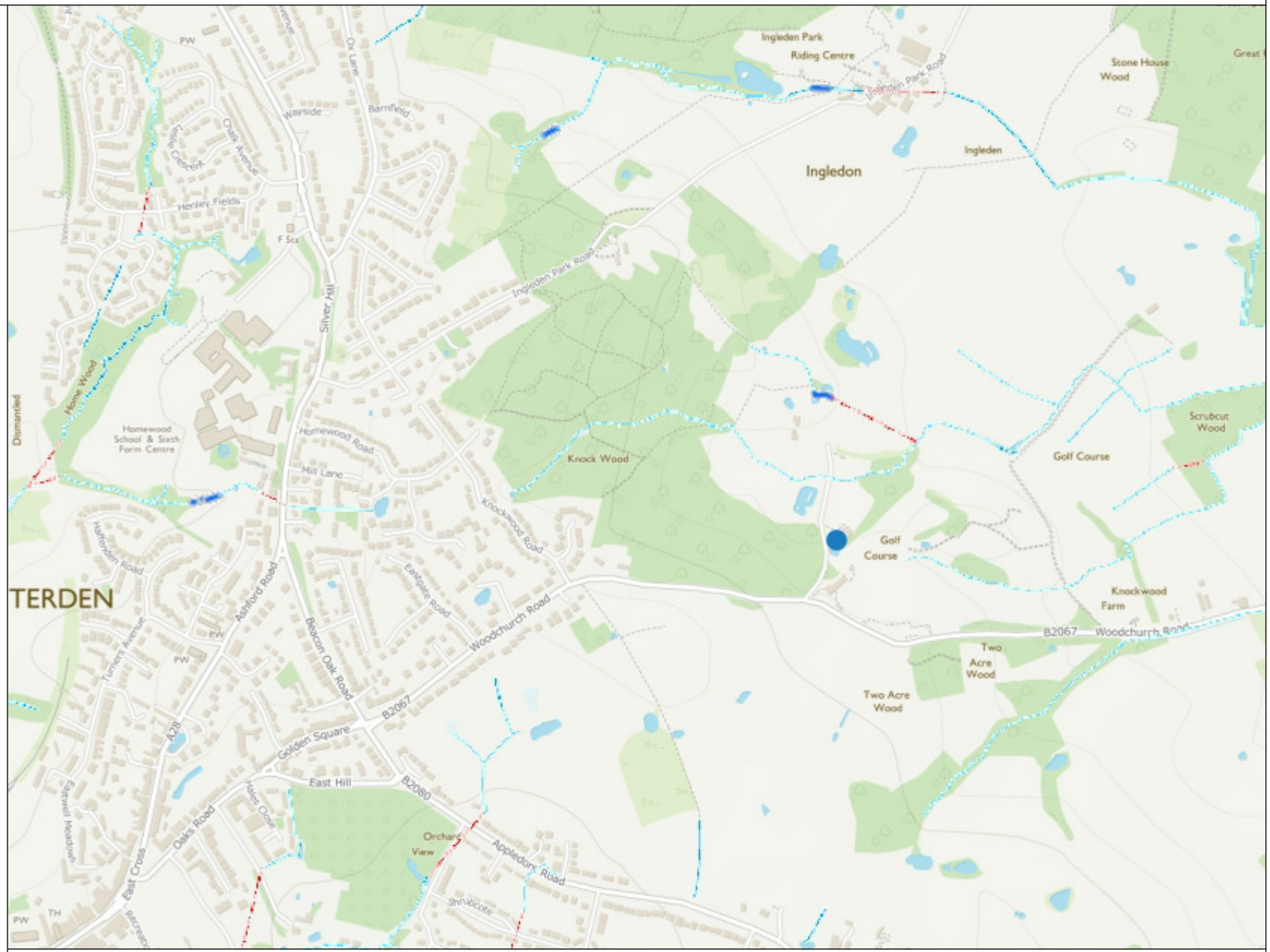
KSL 81788 JM historic flood and water course map centred on TN30 7DR

Environment Agency

Legend

- Statutory Main Rivers
- Detailed River Network
  - Primary River
  - Secondary River
  - Tertiary River
  - Lake / Reservoir
  - Canal
  - Canal Tunnel
  - Extended Culvert
  - Multiple Channel Culvert
  - Underground River (potential sewer)
  - Underground River (inferred)
  - Underground River (local knowledge)
  - Undefined
- Offline Drainage features
- All recorded flood outlines



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