2.2.1 Flood Risk Assessment

APPENDIX 8.1
FLOOD RISK ASSESSMENT

Pell Frischmann

excellence through innovation

FORMER AYLESFORD NEWSPRINT SITE

FLOOD RISK ASSESSMENT REPORT

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1. INTRODUCTION

1.1 COMMISSION

Panattoni has commissioned Pell Frischmann to undertake a Flood Risk Assessment (FRA) for the former Aylesford Newsprint site in support of a forthcoming hybrid planning application for a proposed industrial, storage and distribution development. The FRA has been undertaken to determine potential future development and regeneration constraints with respect to flood risk and drainage.

The site was formerly occupied by Aylesford Newsprint Ltd (ANL) as a B2 industrial use site until February 2015 when ANL entered administration. ANL was formerly a paper processing and recycling facility and employed around 300 people at the time of closure. The site is currently vacant and the majority of buildings at the site have now been demolished to slab level (with only three buildings now remaining).

1.2 PROPOSED DEVELOPMENT

The proposed development comprises the redevelopment of the 36.59 hectares (ha) of the former ANL site. This will involve the construction of up to 182,750 square metres (sqm) gross external area (GEA) of industrial, storage and distribution and parcel delivery uses (Use Classes B1(c)/B2/B8). This could comprise up to 16,250 sqm GEA of B1(c) use, up to 32,200 sqm GEA of B2 use and up to 182,750 sqm GEA of B8 Storage and Distribution use, including up to 36,050 sqm GEA of Parcel Delivery Use.

The proposed development also comprises the delivery of associated access servicing, parking, landscaping, drainage and earthworks and site remediation works. The maximum height of built development would be up to 28m to ridge line.

Hybrid planning application comprising the following:

- Full planning permission for erection of two warehouse buildings (unit 6 and unit 7) for flexible B1c/B2/B8 use class, realignment of Bellingham Way link road, creation of a north/south spine road, works to the embankment of Ditton Stream and associated servicing, parking, landscaping, drainage, infrastructure and earthworks; and

- Outline planning permission (all matters reserved) for the erection of flexible B1c/B2/B8 use class buildings and associated access, servicing, parking, landscaping, drainage and earthworks.

The proposed masterplan for the Hybrid Application is shown in Appendix A.

1.3 SCOPE OF WORK

The following scope of work has been undertaken to provide a FRA to meet the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance (PPG):

- Collate and undertake a desk-based review of publicly available flood risk information, such as Environment Agency mapping, Strategic Flood Risk Assessments (SFRAs) and local guidance;
- Review data supplied by the Environment Agency regarding flood risk;
- Desktop review of the local geology and available ground investigation data in order to assess the infiltration potential at the site;
- Undertake a desktop review of other data that has been made available: LiDAR, topographic data and existing drainage plans;
- Highlight flood risk constraints for future development at the site along with potential mitigation options;
- Undertake indicative surface water runoff calculations and to provide an estimation of attenuation volume required for the proposed development on the site at a future date; and
- Provide a FRA report based on the above information.

1.4 SOURCES OF INFORMATION

A review of relevant information from a range of sources has been undertaken and includes the following:

- Kent County Council (KCC) Preliminary Flood Risk Assessment (PFRA) (2011);
- Tonbridge and Malling Borough Council, Level 1 Strategic Flood Risk Assessment (SFRA), August 2016;
- Environment Agency – requested data;
- Environment Agency via Defra Data Download Platform – Flood Map for Planning (rivers and the sea), Risk of Flooding from Reservoirs, Risk of Flooding from Surface Water, historic and recorded flood outlines, spatial flood defences and statutory main rivers mapping;
- Defra Data Download Platform – LiDAR Composite DTM 1m;
- KCC – Maidstone & Malling Surface Water Management Plan, Final Report (2012);
- KCC – Flood Response Plan, Issue 7, December 2019;

- KCC – Drainage and Planning Policy Statement, Local flood risk management strategy guidance, June 2017;
- The SuDS Manual C753 – CIRIA (2015);
- British Geological Survey (BGS) – Geology of Britain Mapping;
- KCC – Flood Risk to Communities Tonbridge and Malling, June 2017;
- Medway Estuary and Swale Shoreline Management Plan, March 2010;
- Tonbridge & Malling Borough Council, Local Plan Regulation 22 Submission, January 2019; and
- Tonbridge & Malling Borough Council, Local Development Framework, Core Strategy, September 2007.

2. THE SITE

2.1 SITE CONTEXT

The site (as shown in Figure 2.1) is located in Aylesford, within the Ditton Ward in the Tonbridge and Malling Borough of Kent. The site forms part of the New Hythe Industrial Estate and lies approximately 5.1km to the north west of Maidstone town centre and approximately 1.3km to the west of Aylesford village centre.

The site is bound to the east by the Medway Valley railway line. Approximately 130m to the east, the River Medway runs roughly perpendicular to the eastern site boundary. To the east of the River Medway are two solar farms, a sewage treatment works, flooded sand and gravel pits and agricultural land. Further east, Aylesford village centre comprises St Peters Church of England primary school, a village community centre, pubs and restaurants and the Aylesford Conservation Area. Aylesford Railway Station is located approximately 300m to the south east of the site.

The southern part of the site boundary is located adjacent to the M20 motorway. Beyond this lies Aylesford Secondary and Primary School, a sports stadium, the residential area of Ditton, Ditton Recreation Ground, allotments and agricultural land.

The New Hythe Industrial Estate is located adjacent to the west of the site. This estate extends west towards New Hythe Lane and north to Abery Drive, where the residential areas of Larkfield and New Hythe are located, including sports fields, a leisure centre, school, food retail units and other local facilities. Leybourne Lakes Country Park is located approximately 300m to the north west of the site and was created from a series of disused gravel extraction pits.

The site is bordered to the north by the New Hythe train station and Larkfield Trading Estate. Further to the north of the site lies the River Medway and areas of woodland and agricultural land. Aylesford Wastewater Treatment Works (WWTT), operated by Southern Water, is located approximately 250m to the east of the site. The Holborough to Burnham Marshes site of Special Scientific Interest (SSSI) is located approximately 700m to the north of the site.

The site is accessed off Perimeter Road with a postcode of ME20 7DL. The centre of the site is approximately at National Grid Reference 571300, 159355.

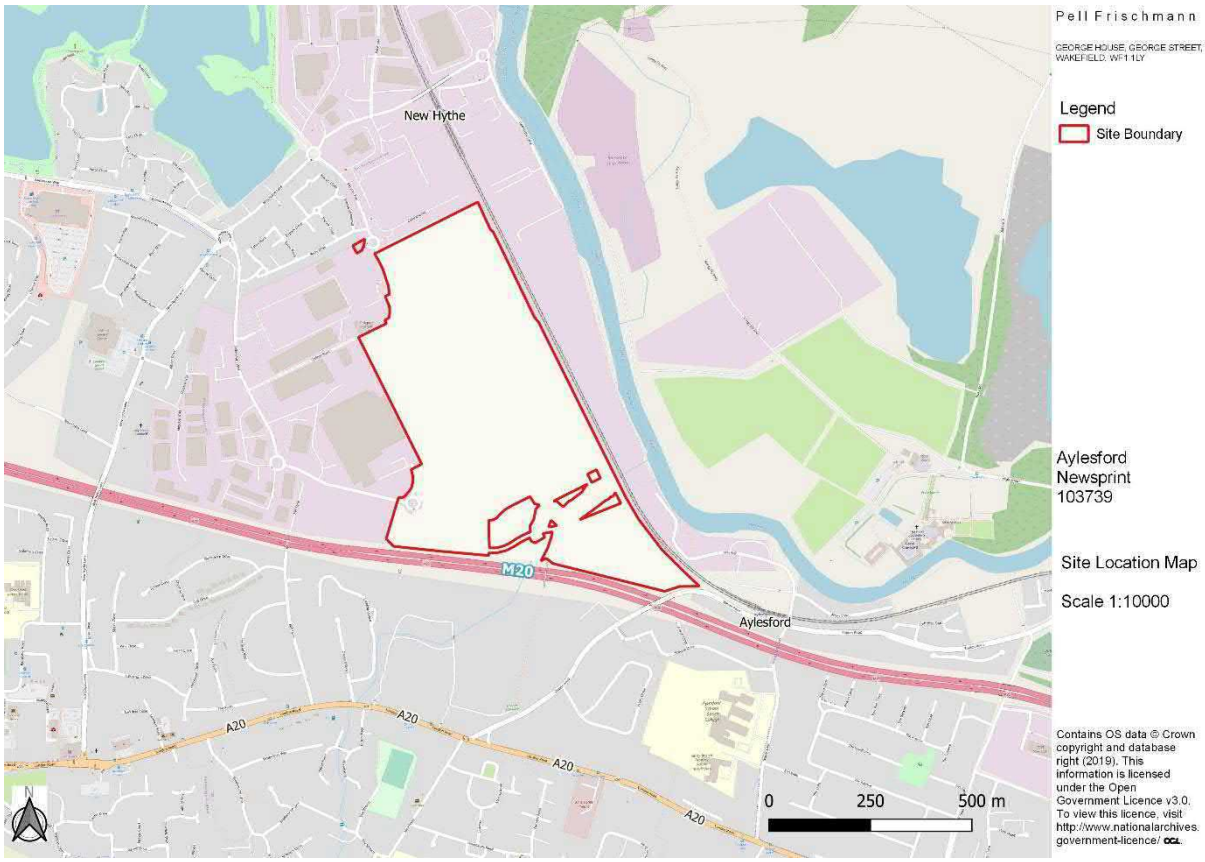

Figure 2.1: Site Location Plan

2.2 SITE DESCRIPTION

The site extends to approximately 36.59 ha. The site is largely vacant and was previously occupied by ANL (B2 industrial use) which manufactured paper until the closure of the plant in 2015. The majority of the buildings at the site have been demolished to slab level. Three buildings still remain, comprising a four storey high office building and an adjacent two storey ancillary office building, as well as a single open sided shed. Areas of remnant ornamental planting remain between areas of historic car parking. These remaining buildings have Prior Approval to be demolished to slab level under planning permission ref. TM/17/00493/FLEA.

2.3 TOPOGRAPHY

Digital Terrain Model (DTM) LiDAR data, at a resolution of 1m, taken from the Defra Data Download Platform, indicates gentle topographic change across the site. The ground level varies across the site, with levels ranging from 3.2mAOD in the north to 10mAOD in the south-eastern corner. A large proportion of the site is at a level of between 4.1mAOD and 4.7mAOD. Generally, the northern and far eastern areas of the site are at a lower elevation than the south. Ground levels start to rise more significantly (above 10m AOD) beyond the site boundary to the south of the M20 and the Ditton Stream beyond. These values are reflected within the LiDAR data represented within Figure 2.2, below.

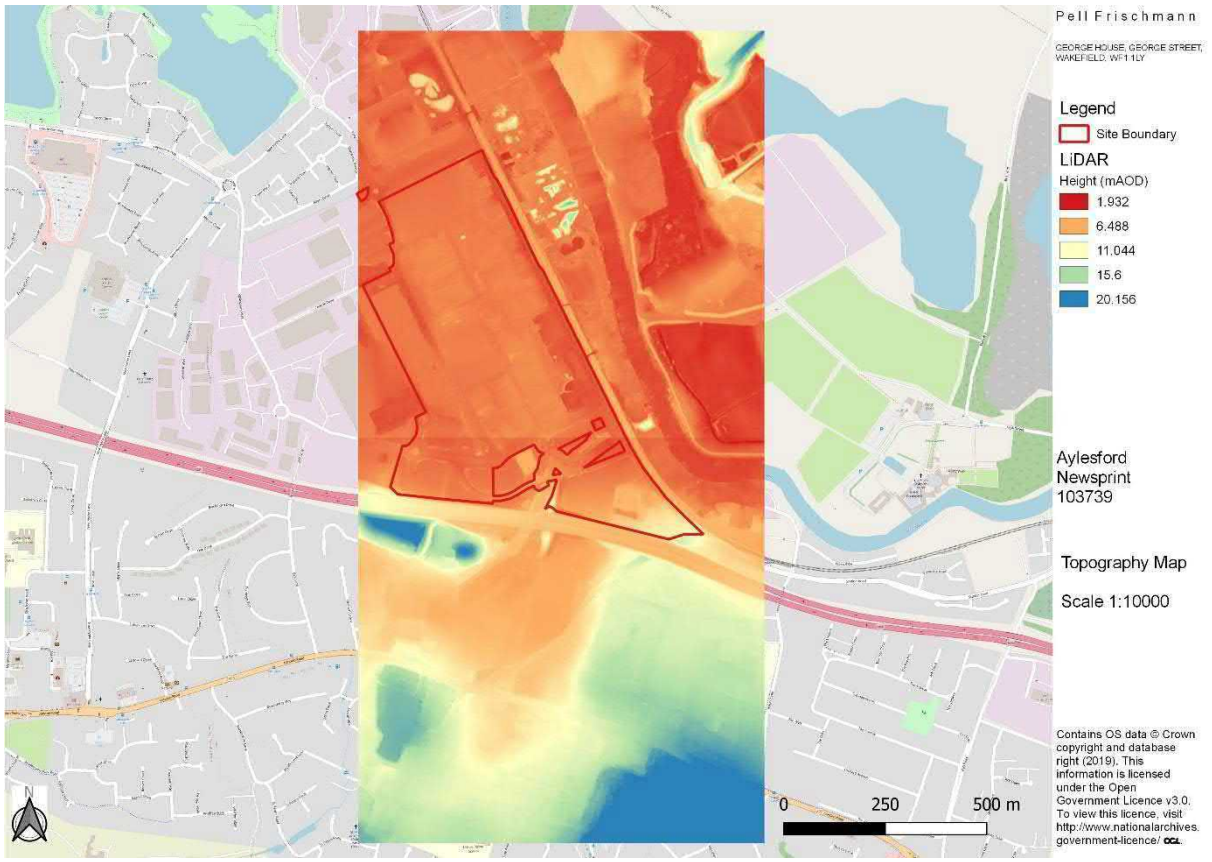

Figure 2.2: Site topography map

2.4 WATERCOURSES

There are two watercourses in the vicinity of the site:

- The River Medway flows towards the north west, approximately 125m east of the site, and is tidally influenced at this location. The River Medway is classed as a statutory main river by the Environment Agency; and

- The Ditton Stream flows into the site from the south, through piped culverting below the M20. Although the watercourse is located mostly outside of the site boundary, two short sections of the stream are culverted beneath the site in order to discharge into the River Medway to the east. The Ditton Stream is also classed as a statutory main river by the Environment Agency.

Ditton Stream has formerly been referred to as the 'Bradbourne', 'East Malling and Ditton Stream', 'Mill Stream' or locally as 'The Stream', however for the purposes of this reporting and going forward is referred to as the Ditton Stream.

The Ditton Stream drains an area of approximately 14 km², incorporating the eastern parts of Kings Hill, East Malling and parts of Ditton before entering into the site underneath the M20.

The Ditton Stream is groundwater fed, rising at Well Street which is found to the south-west of the site in East Malling. The catchment is fairly permeable consisting of a bedrock geology largely of Sandstone and Limestone of the Hythe Formation as shown on the BGS Geology of Britain Viewer. There are also number of lakes and ponds within the catchment.

As previously stated, the Ditton Stream flows into the south of the site through culverting below the M20. Off site to the south of the M20 the stream is formed into a pond (Figure 2.3) to the east of Cobdown Wood with the outflows limited as it is piped underneath the M20 towards the Site to the north.

Figure 2.3: The Ditton Stream, viewing pond looking north towards M20

North of the M20 and adjacent to the site the Ditton Stream is again formed into a pond as it receives the piped water flow from the south. The northern pond holds surface waters at a similar elevation to the upstream pond with a water elevation of 7.31mAOD determined during the 2016 topographical survey. This pond extends for approximately 75 m to the north on an elevated position adjacent to the site. The pond discharges over a waterfall and is then conveyed via pipe underneath the access road (Bellingham Way) to discharge into a channelled watercourse outside the redline boundary. Analysing the LiDAR data there is at least a 2 m drop from the pond into the channel where the water is allowed to cascade down the bank as shown in Figure 2.4.

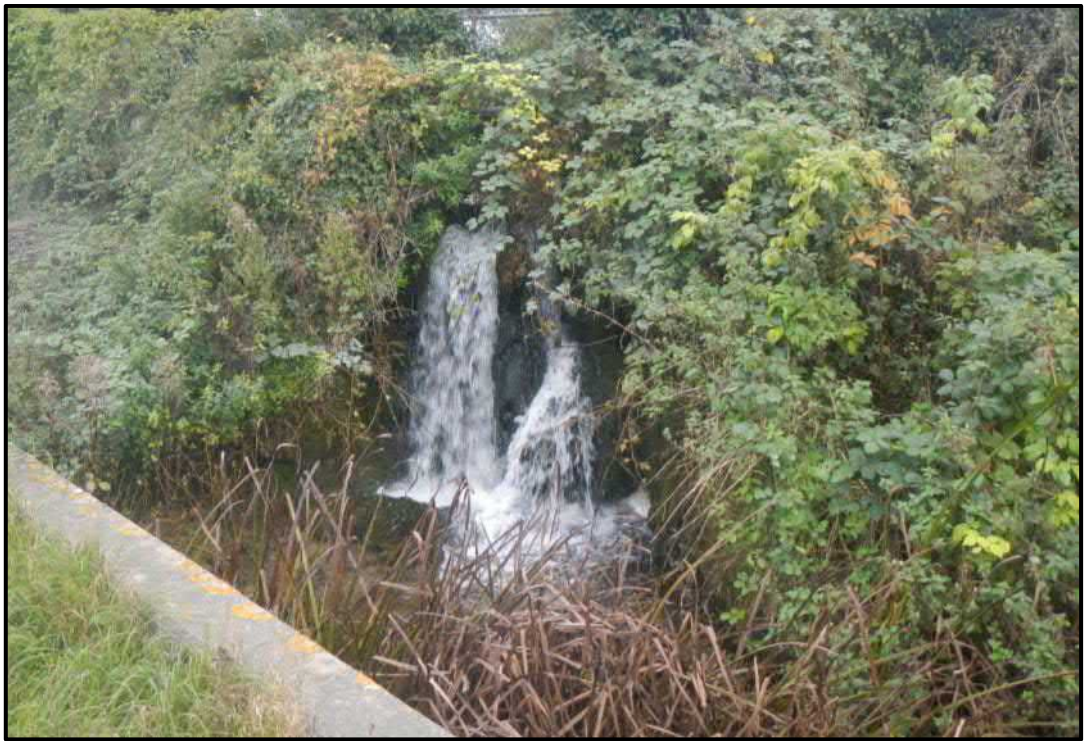

Figure 2.4: The Ditton Stream cascading from the ponds to the channel adjacent to the site

Flows are conveyed eastwards within a channelised watercourse (Figure 2.5) that is constricted in a number of locations by culverted sections. Prior to reaching the eastern site boundary, the Ditton Stream is culverted below approximately 30m of the site before continuing in the culvert below the adjacent Railway and undeveloped land before discharging to the River Medway some 90m to the east of the site.

The culverted section of the watercourse is understood to pass through two chambers, on the eastern side of the railway. The first is believed to have been used to abstract water for use within the former newsprint facility and the second to act as an overflow receiving unused water from the previous site processes. It is believed that there is a flap valve on the outfall of the Ditton Stream into the River Medway. The outfall is believed to be set at a level of approximately 3mAOD.

Figure 2.5: The Ditton Stream channelled through the site

2.5 EXISISTING DRAINAGE

2.5.1 Surface Water Drainage

The existing surface water drainage comprises three separate sub-catchments as shown in Figure 2.6. There are currently understood to be three primary discharge routes for surface water, these are:

1. Surface water within the north of the site is indicated to discharge into private drainage of unknown diameter that exits the site on the northern site boundary.
2. Surface water within the central northern part of the site enters private drainage believed to comprise twin 900mm concrete pipes which leave the site on the eastern site boundary and are routed below the adjacent railway and private land beyond. It is believed that one of these pipes outfalls by gravity to the River Medway and one of these pipes enters the pumping station set just back from the River Medway outfall on the adjacent land to the west. The operational status of this drainage asset and the associated pumping station is unknown; however, it is considered likely that the pumping station is unlikely to be currently operational and that any current surface water discharge via this route is currently flowing by gravity only.
   Recent communications with Kent County Council (KCC) Lead Local Flood Authority (LLFA) have confirmed agreement that surface waters can be discharged into the River Medway via this route at an unrestricted rate, subject to tide locking restrictions.
3. Surface water across the central and southern site areas, is indicated to discharge to a Southern Water drainage asset which bisects the site from west to east as shown in Figure 2.6. A series of 225mm, 375mm, 450mm, 600mm and 1200mm pipes are shown to connect into this feature which is indicated to be formed as 3m x 2m box culvert leading to a pumping station near the eastern site boundary. Here a 900mm gravity pipe and 1650mm pumped culvert convey water below the railway land before discharging to the River Medway some 90m beyond the site boundary to the east.
   Recent consultation with Southern Water has agreed that surface water can discharge into this asset at a rate of 500l/s.

2.5.2 Foul Drainage

The foul drainage on site comprises of the following networks:

- The site foul drainage discharges to 2 No 150mm dia. outfalls located in the northwest part of the site, in College Road/Papyrus Way. These flow by gravity to pumping stations off site; and

- There is also a 200 dia. foul rising main from the south which runs along the west side of the railway track (within the Site) and which then turns west to follow the route of the surface water culvert through the south part of the site. It is understood that this is a foul water drainage asset operated by Southern Water.

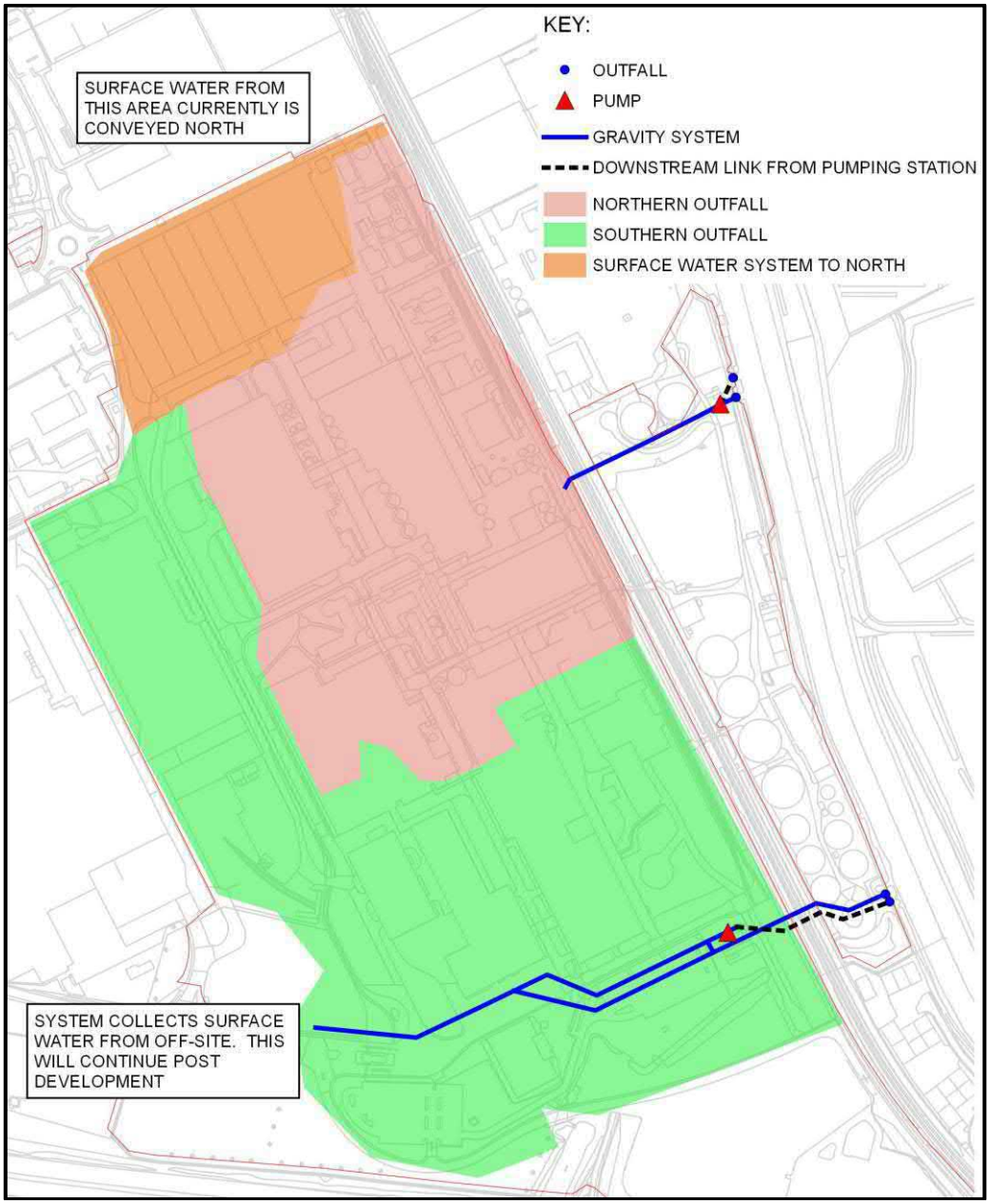

Figure 2.6 Surface water drainage sub-catchments

2.6 GEOLOGY

The published geology of the site area is shown on the 1:50,000 geological map of Maidstone (288). Further geological information has been obtained from the BGS website.

Superficial geology in the form of Alluvium and River Terrace Deposits are recorded at the site. The River Terrace Deposits are shown to be located in the southeast corner of the site, however are known to underlie much of the Alluvium indicated across the remainder of the site.

Alluvium is typically described as a compressible silty clay that can contain layers of silt, sand, peat and gravels. River Terrace Deposits are typically described as sand and gravel, with local lenses of silt, clay or peat.

The southern part the site is shown to be underlain by bedrock of the Hythe Formation – Sandstone and Limestone. North of this, a layer of the Sandgate Formation is shown - Sandstone, Siltstone and Mudstone. To the north of the site, the bedrock is shown to comprise sandstone of the Folkestone Formation.

The Hythe Formation in the region of Kent is described by the BGS to comprise alternating sandy limestones and glauconitic sandy mudstones. The Sandgate Formation is described to comprise fine sands, silts and silty clays, commonly glauconitic; some sands limonitic or calcareous; some soft sandstones. The Folkestone Formation is described to comprise medium- and coarse-grained, well-sorted cross-bedded sands and weakly cemented sandstones; sometimes including calcareous sandstones.

Made Ground is not formally recorded at the site by the BGS; however, previous ground investigations have confirmed its presence and variable thickness below much of the site.

There are no faults shown on the 1:50,000 map within 500m of the site.

3. POLICY AND GUIDANCE

3.1 NPPF

The NPPF and associated PPG provide policy and guidance with regard to flood risk at the national level and influences local planning policies. The main objective of the NPPF is to steer development to areas of lowest risk and provide sustainable development accounting for existing and future floods risk to and from the development.

3.1.1 Sequential Test

The NPPF and accompanying PPG sets out the aim of the Sequential Test which is to steer development away from areas at greatest risk of flooding. Only where it can be demonstrated that there are no suitable sites, then alternative sites may be considered through the application of the Exception Test.

The site is already allocated for commercial use and this is recorded by policies within the core strategy, see Section 3.3. Development along the riverside in Aylesford has been identified with commercial development being subjected to the Sequential Test as part of the adoption of the Core Strategy. Development on this site is supported by Policy CP11 as described in Section 3.3. Therefore, the Sequential Test is deemed to have been passed.

3.2 TONBRIDGE & MALLING BOROUGH COUNCIL LOCAL PLAN (2019)

Tonbridge & Malling Borough Council Local Plan is currently progressing through examination its Regulation 22 Submission Publication – draft Local Plan. According to the Tonbridge & Malling Planning webpages, once the new Local Plan has been adopted, it will form part of the Council's Development Plan and will enable other adopted local plans to be replaced. The new Development Plan will have a time horizon of up to 2031. The current Development Plan contains a Core Strategy, which was adopted in 2007.

The 2019 Local Plan has a section specifically covering at the Former Aylesford Newsprint site, New Hythe. It also has policies regarding flood risk and development.

Policy LP34: Employment Sites and Land

1. *The following existing areas are safeguarded for employment purposes for business (B1), general industrial (B2) and warehousing/ distribution (B8) use:*
   d) New Hythe area, Larkfield
2. *Development that results in the intensification of employment uses on the sites listed in this policy will be permitted provided that it is of an acceptable design to the locality and does not result in unacceptable impacts on the highway network, air quality and the amenity of the area and where it complies with the other policies in the Local Plan.*

Section 5.3.6. of this Local Plan (which refers to the Former Aylesford Newsprint site) states that:

> *Given the size of the site and the identified need for employment land the Council will support new employment uses including light industry, general industry and storage and distribution. The Council recognises that future employment opportunities are likely to result in more intensive use of the site than the former paper making plant*.

Policy LP35: Employment Land: Former Aylesford Newsprint Site

1. *Development of the former Aylesford Newsprint site, as illustrated on the proposals map, for light industrial, general industrial and/or storage and distribution uses will be permitted provided that a vehicular access between Bellingham Way and Station Road forms part of the scheme and the development is of an acceptable design to the locality and does not result in unacceptable impacts on the highway network, air quality and the amenity of the area and where it complies with the other policies in the Local Plan.*
2. *The vehicular access between Bellingham Way and Station Road will be required to be completed and open in advance of the majority of the development of the site taking place.*
3. *The prospective applicant should prepare a masterplan, to the satisfaction of the Council, delivering the necessary infrastructure to meet the needs of the development.*
4. *The masterplan needs to be prepared and completed in advance of the formal submission of the planning application. It shall be accompanied by a Planning Performance Agreement.*

Policy LP17: Flood Risk

1. *In determining planning applications, the Council will apply the policy on flood risk in the National Planning Policy Framework or whatever represents national planning policy on flood risk at the time the planning application is delivered.*
2. *If a development proposal is in conflict with the relevant national policy then it will be in conflict with this Policy.*

3.3 TONBRIDGE & MALLING BOROUGH COUNCIL CORE STRATEGY

Until the above Local Plan is adopted, the 2007 Development Plan consisting in part of the 2007 Core Strategy provides policies relating to flood risk.

The site falls under a number of different policy elements. Relevant policies, such as CP10, cover the whole site.

Part of Section 6.2 covers Flood Protection, with some of the key paragraphs provided below.

Paragraph 6.2.25 - A sequential approach to determining the suitability of land for development in flood risk areas is central to the guidance.

Paragraph 6.2.29 - Some redevelopment sites within the built-up areas, particularly in the central area of Tonbridge and along the riverside at Aylesford, are likely to be identified for redevelopment, or will come forward as windfalls, within areas which are at medium to high risk of flooding. In these cases the economic, social, environmental and regeneration benefits of redevelopment have to be weighed, as part of the Sequential Test, against the actual risk of flooding.

Policy CP10

1. *Within the floodplain development should first seek to make use of areas at no or low risk to flooding before areas at higher risk, where this is possible and compatible with other policies aimed at achieving a sustainable pattern of development;*
2. *Development which is acceptable (in terms of PPS25) or otherwise exceptionally justified within areas at risk of flooding must:*
    a) *Be subject to a flood risk assessment;*
    b) *Include an appropriately safe means of escape above flood levels anticipated during the lifetime of the development; and*

c) *Be designed and controlled to mitigate the effects of flooding on the site and the potential impact of the development on flooding elsewhere in the floodplain.*

Section 6.3 Location of Development includes policies regarding urban areas.

Paragraph 6.3.1 states that *Development should be concentrated at the urban areas where there is the greatest potential for re-use of previously developed land and other land damaged by former uses. Development at the urban areas can also minimise the need to travel, by being located close to existing services, jobs and public transport.*

Policy CP11

1. *Development will be concentrated within the confines of the urban areas of:*

b) The Medway Gap (i.e. the major developed parts of Kings Hill, Leybourne, East Malling, Larkfield, Lunsford Park, Ditton and ***Aylesford south of the River Medway****, Aylesford Forstal and Snodland).*

3.4 MEDWAY ESTUARY AND SWALE SHORELINE MANAGEMENT PLAN

The Medway Estuary and Swale Shoreline Management Plan (SMP) was produced in 2010 to provide a large-scale assessment of the risks associated with coastal evolution and presents a policy framework to address these risks to people and the developed, historic and natural environment in a sustainable manor. This document provides guidance as part of the Department for Environment, Food and Rural Affairs (Defra) strategy for flood and coastal defence (Defra, 2001).

The upper tidal reach of the River Medway, up to Allington Lock which passes the site falls under Policy Unit E4 09 of the SMP.

"Further studies to investigate Managed Realignment i.e. future morphology of the estuary; the combined effect of multiple realignments between Medway Bridge and Allington Lock; the flood risk consequences of undertaking managed realignment; define the standard and alignment of defences and details of policy delivery."

The long term SMP policy for the tidal affected river frontage forming the sites eastern boundary is 'Hold the Line'. On the opposite bank, the medium term plan is 'Managed Realignment'.

Guidance from Defra in 2006 defines 'hold the line' as;

"By maintaining or changing the standard of protection"

and 'managed realignment' as*;*

"By allowing the shoreline to move backwards or forwards, with management to control or limit movement"

3.5 CLIMATE CHANGE

The potential impact of climate change is expected to cause an increase in the magnitude and frequency of extreme weather events as outlined in the NPPF[1]. As a result, climate change will increase the flood risk to the site considerably during the lifespan of any proposed development, with increased sea levels, higher rainfall intensities and higher fluvial flows predicted.

The flood risk assessments: climate change allowances guidance document referred to within this section of the report came into effect on the 19th February 2016 and was last updated on the 16th March 2020.

Product 4 data was requested from the Environment Agency. On this occasion, the Environment Agency decided to provide data in a different format, which included the provision of data from Products 5, 6 and 7. According to the model operation manual, the modelling completed used 2016 sea levels to simulate defended and undefended case tidal design events. Annual Exceedance Probability (AEP) events of 0.5% (1 in 200 year) were also simulated with 2070 and 2115 sea levels, which referred to UKCP09 projections[2], as well as Environment Agency FRA: climate change allowances guidance.

3.5.1 Development Design Horizon

The effects of climate change will increase and therefore the effects upon the development will depend on the design life of the development. The proposed development will consist of commercial uses with a design life of 40 years and constructed within the next 5 years and hence a development design horizon of 45 years will be used as a basis to assess the impacts of climate change.

3.5.2 Sea Level

It is predicted that the impact of climate change will result in the global sea level to continue to rise, which will change the frequency of high-water levels relative to today's sea levels. Table 3.1 below has been extracted from Table 3 of the Environment Agency Guidance, 'Flood risk assessments: climate change allowances'. The values show the sea level allowance for each epoch in millimetres per year, with total sea level rise for each epoch in brackets (using 1981 to 2000 as a baseline).

[1] Flood risk assessments: climate change allowances; https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances [accessed March 2020]

[2] UKCP09 projections as referred to in the Adapting to climate change: guidance for risk management authorities guidance (Environment Agency, September 2011)

Table 3.1: Sea level allowance for South East England

Allowance category	2000 to 2035 (mm)	2036 to 2065 (mm)	2066 to 2095 (mm)	2096 to 2125 (mm)	Cumulative rise 2000 to 2125 (metres (m))
Upper end	6.9 (242)	11.3 (339)	15.8 (474)	18.2 (546)	1.6
Higher central	5.7(200)	8.7(261)	11.6(348)	13.1(393)	1.2

The climate change guidance states that for FRAs, both the central and upper end allowances should be assessed in order to understand the range of impact. With a development design horizon of 45 years, and construction likely occurring post-2020, the sea level allowances for the 2036 to 2065 period should be used: 8.7-11.3mm.

3.5.3 Fluvial Flows

Peak fluvial flows are expected to increase in the future as a result of climate change. Table 3.2 has been extracted from Table 1 of the Environment Agency's climate change guidance and states the potential changes anticipated for each river basin district across the United Kingdom.

Table 3.2: Fluvial climate change allowances for Thames catchment

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

As the site is situated within Flood Zones 2 and 3, the upper end and higher central allowances will need to be assessed. Thus, the site will need to have a 25-35% climate change allowance.

3.5.4 Rainfall Intensity

Peak rainfall intensities are also expected to increase in the future as a result of climate change. Table 3.3 has been taken from Table 2 of the Environment Agency's 'Flood risk assessments: climate change allowances' guidance. Calculations of future run-off rates should be undertaken to take into account the climate change factor based upon the design horizon of the development.

Table 3.3: Peak rainfall intensity allowance in small and urban catchments

Allowance category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

For flood risk assessments both the central and upper end allowances will need to be assessed to understand the range of impact. Thus, a climate change allowance of 10-20% will be required at the site.

The LLFA have stated (Appendix B) that the design must accommodate the 1 in 100 year storm with a 20% allowance for climate change, and additional analysis should outline the flooding implications for a greater climate change allowance of 40%. As a conservative approach the development has therefore adopted the 40% climate change allowance.

The proposed development should seek to maximise the use of SuDS techniques throughout the site whilst taking into account the allowance for climate change.

4. FLOOD RISK

4.1 HISTORIC FLOOD INFORMATION

A consultation of both the Environment Agency historic flood and recorded flood outline mapping services for the site suggests that, with the exception of southern parts of the site (land some 150m north of the M20), the majority of the site has been flooded in the past. Figure 4.1 below, shows the recorded flood outlines for the site and immediately surrounding area.

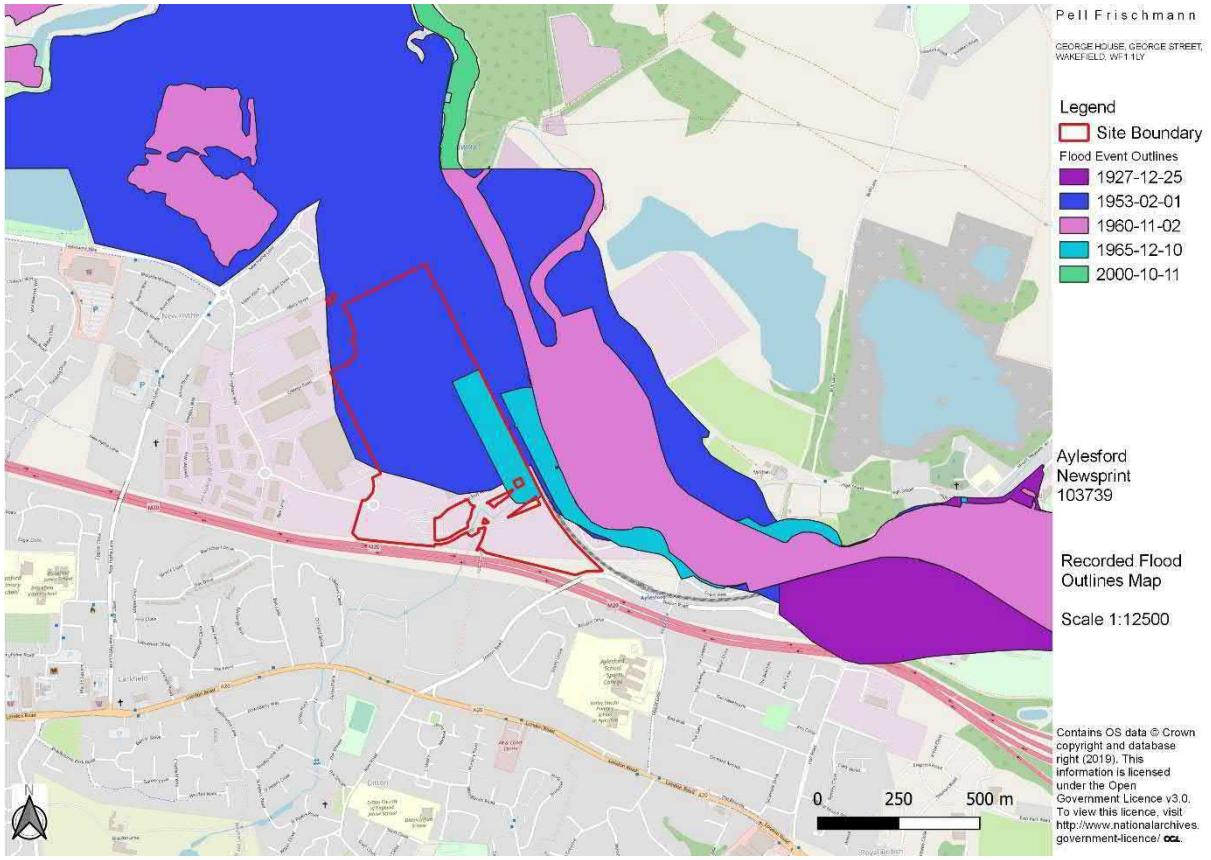

Figure 4.1: Map of recorded flood outlines

The attributes provided with the recorded flood outline mapping shows that a large portion of the site was flooded in February 1953 due to tidal flooding and the overtopping of flood defences installed at the time. These defences were subsequently improved. Part of the site along by the railway line immediately to the north of the Ditton Stream was flooded in December 1965 when the channel capacity of the ordinary watercourse was exceeded. No raised defences were present.

The Tonbridge & Malling Level 1 SFRA also contains information about past flooding events. The SFRA discusses the February 1953 event where a major storm surge and associated high tides and hurricane-force winds caused widespread flooding and the failure of flood defences in areas such as New Hythe and Snodland. Mapping found within the SFRA also shows that the site was flooded during a 1965 flood event, although the flooding mechanisms for this event are not described.

The SFRA also discusses October 2000 and December 2013 flood events, with the 2013/2014 winter flooding causing some of the highest fluvial flows on record for the River Medway. The Aylesford Newsprint site did not flood during these events, which suggests that the defences along the River Medway protected the site from flooding.

No historic flooding has been recorded to the section of the site that seeking full planning application i.e. for units 6 and unit 7 and associated infrastructure.

4.2 FLOOD DEFENCES

As shown by the Environment Agency Flood Map for Planning, flood defences are present along both the east and west side of the River Medway (located to the east of the site). This means that the site benefits from the protection given by the flood defences, as shown in Figure 4.2.

Areas benefitting from flood defences are defined as areas which benefit from formal flood defences specifically in the event of flooding from rivers with a 1 in 100 (1%) change in any given year, or flooding from the sea with a 1 in 200 (0.5%) chance in any given year.

Most flood defences along the Medway estuary were improved after the flooding event of 1953 but with varied levels of protection. According to an Environment Agency policy paper[3], the Leigh flood storage area (FSA) was built in 1982 in Tonbridge on the River Medway to alleviate fluvial flooding to an estimated 965 properties and 300 businesses in the Tonbridge area. This prevents large quantities of water from flowing downstream during high flow events.

The Environment Agency spatial flood defences including standardised attributes dataset was reviewed to provide information about surrounding flood defences. The dataset shows that flood defences surrounding Ditton Stream at the south of the site include precast concrete walls, earth banks and earth bank to fishing lake just after the stream has gone under the M20. These defences are classed as high ground asset types.

The Environment Agency dataset also shows that flood defences along the Medway vary with a combination of steel sheet piling, gabions, concrete wall, masonry wall, geotextile defence and flood gates along the length of the River Medway which runs parallel with the site. These are designed to provide protection from both fluvial and tidal events.

The Allington Lock on the River Medway is situated approximately 3.0 km upstream of the site in Allington to the south east. This lock forms the tidal limit of the Medway Estuary. Earth embankments, structure walls, and sluice gates (on incoming tributaries) form the tidal defences from Allington Lock to the Isle of Grain (downstream of the site, at the easternmost point of the Hoo Peninsula).

The Shoreline Management Plan shows that the policy for this stretch of the estuary is 'hold the line' which means "maintaining or changing the standard of protection" but maintaining the existing alignment.

[3] Environment Agency Policy paper: Leigh flood storage area (2012) https://www.gov.uk/government/publications/leigh-flood-storage-area/leigh-flood-storage-area [Accessed May 2020]

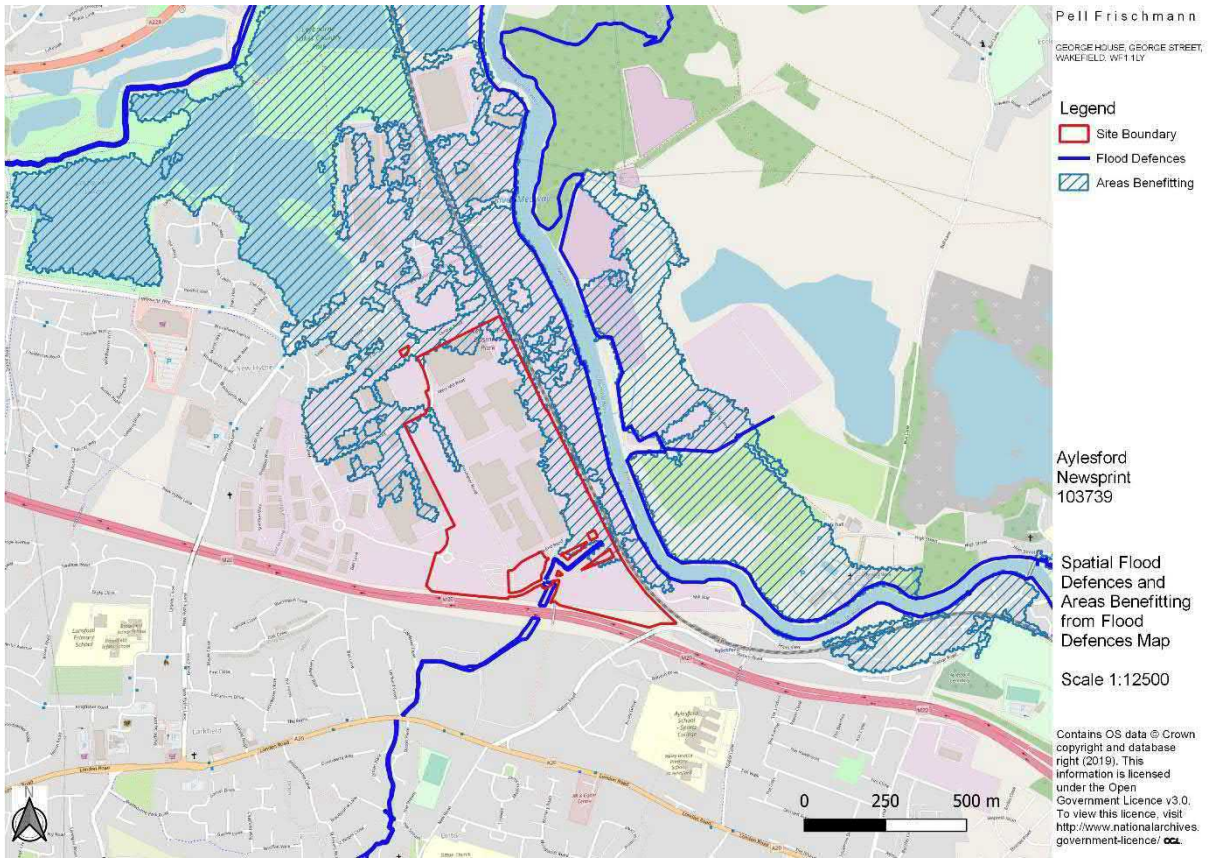

Figure 4.2: Flood defences and areas benefitting from the defences within the vicinity of the site

In correspondence from 2016 The Environment Agency stated that the Standard of Protection from the River Medway Flood defences from tidal flooding is 1 in 1000 years.

A review of the available flood defence information, including previous topographic surveys completed at the ANL site prior to the current development proposals, suggests that flood defences immediately to the east of the northern and central portions of the site exceed the 1 in 1000 year level and are constructed at a level of approximately 6.2mAOD. These defences appear to extend from near the Ditton Stream outfall (at the southern extent of the former ANL site) some 1.5km northwards. Immediately south of the former ANL land, 3D imagery available through Google Earth indicates that the River Medway flood defences step down alongside the Mill Hall Business Estate some 80m northeast of the southern area of the site. Analysis of LiDAR data and street imagery has provided an estimated elevation of these flood defences of approximately 5.55mAOD. This elevation ties in with the simulated 1 in 1000 year tidal flood event from the recent Environment Agency's modelling data that indicates a peak level of 5.51mAOD for this return period which appears to be slightly below the inferred flood defence elevation at this location.

On this basis, it is considered that the site is protected from a 1 in 1000 year tidal flood event (from a 2016 baseline) from the River Medway as previously confirmed by the Environment Agency.

4.3 FLUVIAL AND TIDAL FLOOD RISK

The Tonbridge & Malling Level 1 SFRA (2016) states that 0-25% of Former Aylesford Newsprint is within Flood Zone 1, 0-25% in Flood Zone 3a, 0-25% in Flood Zone 3b, and 25-50% is within Flood Zone 2.

However, it should be noted that the current application does not include all of the land that belonged to the former Aylesford Newsprint and therefore, the calculated flood zone area differs from the values stated within the SFRA. The Environment Agency's flood risk map shows the site to be partially located within Flood Zones 1 (approximately 21%), 2 (approximately 61%) and 3 (approximately 18%) when the presence of flood defences is excluded.

Flood Zone 3b is a zone known as the Functional Floodplain, which comprises land where water has to flow or be stored in times of flood. The site is defended from the River Medway by defences offering a 1 in 1000-year standard of protection, as described in Section 4.2.

In addition, the Ditton Stream is heavily attenuated south of the M20 and within the site itself, with no reports of flooding from this source. In the absence of detailed modelling of the Ditton Stream, the SFRA has considered Flood Zone 3b to match Flood Zone 3a. This is a very conservative approach and does not reflect local knowledge of the watercourse to the north of the M20. As the whole of the site benefits from flood defences no part of the site can be described to be within Flood Zone 3b.

Parts of the site are shown to be situated within Flood Zone 1, 2 and 3. A large proportion of the site (excluding some of the southern limits) is within Flood Zone 2. Parts of the Site within Flood Zone 3 are mostly limited to the eastern edges of the site. Flood zones represent the risk of flooding from rivers and sea, with areas within Flood Zone 3 is classed as having a greater than 1 in 100 (1%) chance of flooding annually from fluvial sources or 1 in 200 (0.5%) chance from tidal sources. Flood Zone 2 is classed as land having between a 1 in 100 (1%) to 1 in 1000 (0.1%) annual probability of flooding. Flood Zone 1 has the lowest risk of flooding, with a less than 1 in 1000-year (0.1%) chance of flooding annually. Figure 4.3 below, shows the flood zone classifications within the site boundary.

The site (especially the eastern edges) benefits informally from the main railway line, which is surrounded by embankments. However, it should be noted that there are two road underpasses which connect to the eastern edge of the site, meaning potential flow paths exist through these underpasses.

The Environment Agency Flood Map for Planning is provided as Figure 4.3 shows that flows within the Ditton Stream are liable to break out of bank to the south of the M20 and cause flooding across the adjacent low ground to the south. Flows are indicated to the north west toward Bell Lane. Floodwater following this route can pass underneath the embanked M20 via an underpass before flowing northwards towards College Road and onto the site's western boundary at Perimeter Road.

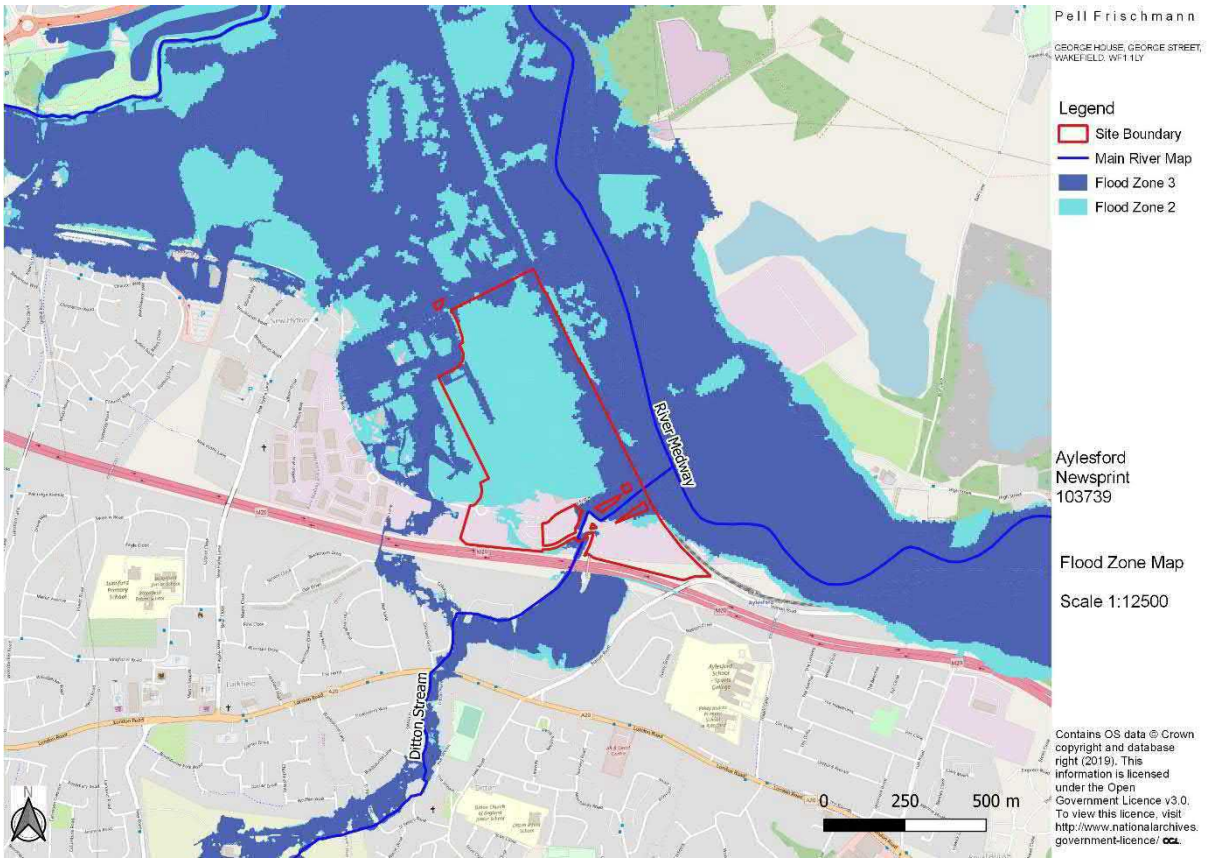

Figure 4.3: Flood Map for Planning

To the north of the M20, after flowing through the site, Ditton Stream flows into a below ground culvert before discharging into the River Medway via a flap valve located off-site some 90m to the east. There is a risk that high tide in the River Medway may result in a tidal restriction to the Ditton Stream outflow. This could affect the discharge capacity of the stream during this period of 'tide-lock' and lead to flooding to the site. The Environment Agency do not hold any information on Ditton Stream apart from flood defence data described in Section 4.2.

The southern parts of the site including the section that is seeking full planning application (land proposed to be occupied by units 6 and 7) are mostly within Flood Zone 1, and thus have a lower risk of flooding.

4.3.1 Tidal Flood Modelling Data

There have been a number of flood models produced to assess the flood risk on the River Medway. The fluvial flood risk information within the updated Tonbridge and Malling Borough Council SFRA Level 1 (2016), is based upon computer models from the Environment Agency which were reviewed and analysed by JBA Consulting. The mapping provides areas shown to be within Flood Zone 3b and maps out the flood extents for Flood Zone 3a when the upper central and upper end climate change allowances are included, for the River Medway.

In response to the request for Product 4 data made on the 23rd March 2020, the Environment Agency provided modelling data (Products 5, 6 and 7) on the 6th May 2020. The modelling which was completed as part of an Environment Agency study to develop an improved understanding of tidal flood risk along the North Kent coastline and was last updated in

January 2019. As part of this modelling, flood return periods in Aylesford and Snodland were investigated. Part of the modelling data provided included maps (within the Environment Agency North Kent Coast Model Updates Report) to show the defended and undefended scenarios. In the defended scenario, the site is protected fully during 20%, 5%, 0.5% and 0.1% AEP events. However, the flood extents for the undefended scenario indicate that the site would be flooded during a 0.5% and 0.1% AEP event. The predicted flooding extents for the 0.1% AEP event based on the 2016 sea levels include expansive flooding of railways and properties. The 0.5% AEP event based on 2115 sea level data suggests connectivity between the channel and floodplain, with largest increases to the west of Aylesford (which includes the application site).

Table 4.1 is based on the Environment Agency data, which includes model information last updated in January 2019. Three nodes used in the Environment Agency modelling were located close to the site within the River Medway. The highest predicted flood levels were taken from node MED_03500, which is located within the River Medway, closest to the southern part of the site. A map of node locations can be viewed within Appendix C.

Based on review of the Environment Agency modelling data in relation to the known River Medway flood defences surrounding the site, it is known that while the flood defences starting at Mill Hall Business Estate are set at an elevation to protect against a 1 in 1000 year event, these defences are approximately 0.7m lower than the defences to the north. As such, assuming that no defence failure occurs then any overtopping of defences during an extreme event would breach the defences first at this location. The Environment Agency modelling data indicates that peak defended water levels in the Medway during a 0.1% AEP (1 in 1000) event would be 5.50mAOD (2016 baseline.)

Table 4.1: Flood data analysis of Environment Agency data (Environment Agency modelling last updated January 2019)

Scenario	2016 (Baseline sea levels)	2070 (55-year design horizon)	2115 (100-year design horizon)
5% AEP Defended	No flooding at site. Highest flood level predicted at node MED_03500 is 4.76mAOD.	Not provided.	Not provided.
0.5% AEP Defended	No flooding at site. Highest flood level predicted at node MED_03500 is 5.05mAOD.	No flooding at Site. Highest flood level predicted at node MED_03500 is 5.54mAOD.	Highest flood level predicted at node MED_03500 is 5.88mAOD. Flooding likely to occur on land to the east due to flood waters overtopping the lower flood defences along Mill Hall Business Estate. Connecting underpasses below the railway are likely to be exploited by flood waters which will follow the site topography and lead to on-site flooding.
0.1% AEP Defended	No flooding at site. Highest flood level predicted at node MED_03500 is 5.5mAOD.	Not provided.	Not provided.
5% AEP Undefended	No flooding at site. Highest flood level predicted at node MED_03500 is 4.47mAOD.	Not provided.	Not provided.
0.5% AEP Undefended	Highest flood level predicted at node MED_03500 is 4.8mAOD. Flooding predicted to occur around the edges of the site.	Highest flood level predicted at node MED_03500 is 5.18mAOD.	Highest flood level predicted at node MED_03500 is 5.64mAOD. Flooding predicted to occur across most of the site, although not in the southern areas.
0.1% AEP Undefended	Highest flood level predicted at node MED_03500 is 5.15mAOD. Flooding predicted to occur across the site, although not in the southern areas.	Not provided.	Not provided.

4.3.2 The Ditton Stream

The only information that the Environment Agency holds on the Ditton Stream is the flood defence data mentioned in Section 4.2. It is not found within the Environment Agency Data Catchment Explorer.

The Ditton Stream is attenuated by the ponds located on both sides of the M20. The flows into the site are limited due to the pipes which convey the water underneath the M20 along with the shallow hydraulic gradients between the two ponds. During times of high flow within the watercourse, and based on the mapped Flood Zones, the Ditton Stream is indicated to breach its banks to the south of the M20. The raised M20 is shown to act as a barrier to flow onto the site to the north, instead floodwater would be able to flood onto lower adjacent land to the west of the watercourse between Cobdown Wood and the M20 (south of the site boundary).

Assessing the LiDAR data to the south of the M20, the Ditton Stream (in the form of a pond) is perched at approximately 1.2 m higher than the immediately surrounding ground to the east and south. Downstream of the pond the site levels generally fall towards the north.

The Environment Agency flood mapping shown in Figure 4.3 indicates a flow route for flood water to the south of the M20 beneath the embanked M20 via an underpass before flowing northwards towards College Road and onto the site's western boundary at Perimeter Road.

To the north of the M20, the Ditton Stream pond (receiving piped flows from the pond to the south of the M20) is perched at least 1.5 m higher than the immediately surrounding ground to the west and north. After cascading approximately 2.0m into the stream channel immediately south of Bellingham Way, the stream flows approximately north-eastwards through land between the site boundaries, before it is culverted underneath the railway line and discharges into the River Medway to the east.

The main flood risk from the Ditton Stream is the potential risk of tide locking, where fluvial water will be prevented from discharging into the River Medway whilst the outfall is blocked due to the high water levels within the River Medway. The flood zones mapped to the north of the M20 relate to flooding from the River Medway and not from the Ditton Stream (as can be inferred from Figure 4.2). In order to determine potential flood risks from the Ditton Stream alone, detailed hydraulic modelling would be required in order to confirm the Ditton Stream flood flow regime, and discharge response in relation to modelled tide lock data provided by the Environment Agency. This can also be undertaken to understand the changes that opening up of the Ditton Stream will create in improving the flood risk overall from this source. The worst case flooding scenario to the site in general would however be from the tidal Medway.

4.4 SURFACE WATER FLOOD RISK

The Environment Agency's online mapping, 'Risk of Flooding from Surface Water', shows the site has the potential to be affected by surface water flooding. There are four categories of surface water flooding presented by the Environment Agency, Very Low (<0.1%), Low (between 0.1% and 1%), Medium (between 1% and 3.3%) and High (>3.3%).

Figure 4.4, below, combines three surface water flood event scenarios (1 in 30, 1 in 100 and 1 in 1000), which show the risk to the site from surface water flooding. Generally, there is a 'low' risk of surface water flooding on the site. During the 3.33% and 1% AEP event (1 in 30 and 1 in 100, respectively), there is shown to be little surface water flooding on the site, apart from

a few low points within the current site. During the 0.1% AEP (1 in 1000) there is shown to be a significant proportion of the site affected by surface water flooding. However, despite the 1 in 1000 event covering a significant proportion of the site, this has a lower risk attributed to it. This is reflected in the latest Tonbridge and Malling Borough Council SFRA report.

Although parts of the site are at a very low risk of flooding from surface water, other parts have a low, medium or high risk. Areas at 'very low' risk are generally where there is a building, or where a building was located prior to demolition of the former site structures, undertaken within the last 3 years.

The areas at 'low risk' are shown to be between the former buildings and the railway line, along the roads and impermeable areas between the former buildings and a flow path from the M20 to the railway line at the south east of the site (in the vicinity of the Ditton Stream watercourse). Within the 'low' risk areas there are isolated areas shown to be at 'medium' or 'high' risk, however, in general the surface water flood risk on the main parcel of land as it was formerly constructed is shown to be low as shown by Figure 4.4.

During extreme events, surface water ponding within the sports ground (south of the M20) is able to flood onto the M20. Exceedance flows from the overland flow route from the M20 and from Ditton Stream are able to pond along the railway embankment, with floodwater extending north east along this embankment. However, the risk of this happening is low, as reflected by Figure 4.4.

To the west and north west of the site there is shown to be widespread low and medium risk of surface water flooding, mainly concentrated along the roads and impermeable areas, which is extensive throughout the New Hythe industrial estate.

The areas subject to the full planning application are located within the low surface water flood risk as shown on Figure 4.4.

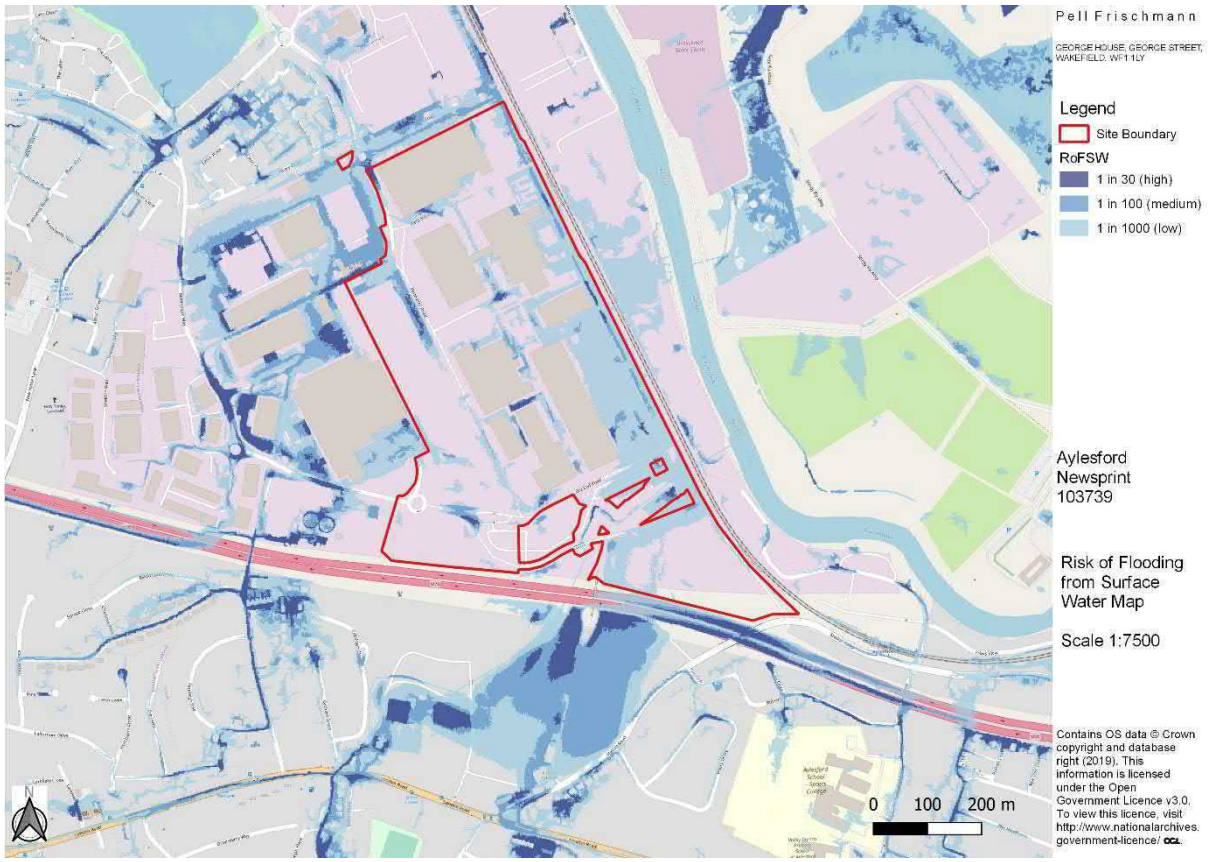

Figure 4.4: Risk of Flooding from Surface Water

The site provides opportunities to improve and reduce the surface water flood risk both on and off the site.

4.5 GROUNDWATER FLOOD RISK

Within the PFRA undertaken by KCC it states that the potential risk from groundwater flooding in Kent is significant. The chalk hills of the North Downs and the sandstones and greensands of the Weald represent potential sources of groundwater flooding. The PFRA does not highlight specific groundwater flood risk in the vicinity of the site. However, in a groundwater risk area figure, it appears that there is a low and medium risk of flooding from groundwater.

Within the Tonbridge and Malling SFRA, it is mentioned that sea level rise will also affect the groundwater within tidal effected areas. This increases the risk of groundwater flooding as well as other types of flooding (such as sewer flooding from increased infiltration or entry of groundwater into the sewer system). Within Appendix F of the SWMP, the Environment Agency's, Areas Susceptible to Groundwater Flooding (AStGWF) map illustrates areas susceptible to groundwater flooding. This shows that for 1 km^2 grid squares in which the site is located there is a susceptibility to groundwater flooding of 50% to 75% in the northern part of the site, and a less than 25% susceptibility in the southern parts of the site. The Tonbridge & Malling Level SFRA also contained this AStGWF mapping.

A number of water abstraction licences were held in the past by Aylesford Newsprint Ltd. Some of these licenses related to groundwater abstractions from boreholes within or in close proximity to the site. It is understood that these licenses are currently in the process of being

acquired by South East Water as part of their Water Resources Management Plan 2020 to 2080.

A brief review of BGS borehole data and previous ground investigation data for the site, suggests that groundwater is located at shallow depths (less than 5m below ground level in some locations).

4.6 ARTIFICIAL SOURCES OF FLOOD RISK

The Environment Agency's online mapping 'Risk of Flooding from Reservoirs' indicates that the site is at risk of flooding from large reservoirs (over 25,000m³).

According to the Tonbridge & Malling Level 1 SFRA, there are three reservoirs which could potentially affect the Tonbridge & Malling Borough: Bough Beech, Weirwood and Leigh Barrier Flood Storage Area (FSA). These reservoirs are all located south-west of Aylesford and Maidstone. Bewl Water is not identified within the SFRA but is located south of Maidstone. All of these reservoirs are over 20km from the site. The Environment Agency Catchment Data Explorer holds information regarding Snodland Reservoir, which is situated under 2km north-east of the site. However, Snodland Reservoir is not considered within the SFRA or within the Environment Agency 'Risk of Flooding from Reservoirs' mapping to cause a risk of flooding at the site.

Three of the reservoirs, Bewl Water, Bough Beech and Weirwood, have the potential to cause flooding at the site if they failed. The River Medway would be utilised as the flow route. The flood extent across the site shows the majority of the northern, western and central parts of the site are at risk from a failure of one of these reservoirs. The southern part of the site, and a section of the site surrounding the railway track towards the north of the site are not at risk of reservoir flooding, possibly due to a local rise in topography. As the site is significantly downstream of the reservoirs the velocities are likely to be below 0.5 m/s but depths are shown to be in the band between 0.3 and 2 m. The flood extents do not take into account the significant flood defences which serve the site, which would reduce the flood risk to the site in the unlikely event of reservoir failure.

The flood risk from these sources is deemed to be low risk due to the requirements imposed on them by the Reservoirs Act 1975. In addition, the reservoirs are a significant distance from the site and in the unlikely event of failure it is likely that sufficient warning would be provided and that the existing flood defences along the Medway would likely afford protection to the site.

There is a small body of elevated water at approximately 7.7mAOD and located adjacent to the site between the M20 and Bellingham Way adjacent to the site, fed by the piped Ditton Stream from the south.

4.7 SEWER FLOOD RISK

The site is currently served by a separate surface water and foul water system, therefore the risk of sewer flooding is likely to be low, unless operational failures or capacity exceedances occur. It is known that the foul and surface water drainage is connected by Southern Water (SW) drainage assets. Recent work undertaken by Pell Frischmann involving consultation with Southern Water, has led to agreed storm water flow rates into the Southern Water culvert to the south of 500l/s. There are no known instances of flooding from the foul or surface water sewer network within the site based on data reviewed within the SFRA and PFRA.

However, it should be noted that the SFRA recorded 6 sewer flood incidents in the ME20 6 post code region (which belongs to commercial buildings immediately to the west of the site, also within the New Hythe Industrial Estate). It is unknown, though, whether these flood incidents occurred due to sewer exceedance or operational issues, such as blockages.

Southern Water operate a major surface water pumping station in the south eastern part of the site which discharges water from the area into the River Medway during times when the gravity discharge is tide locked or the capacity of this flow route is exceeded. As such the flood risk from sewers is likely to be dependent on the operation of this pumping stations during periods of high tide or very high flows. If the pumps were to fail, then the flood risk would be likely similar to that shown by the surface water flood mapping. Further information on the operation and pump capacity of this station would be required to further assess the potential flood risks from this source.

4.8 EXISTING FLOOD RISK SUMMARY

- The site is shown to be located within Flood Zones 1, 2 and 3;
- The southern parts of the site including the section that is seeking full planning application (land proposed to be occupied by Units 6 and 7) are mostly within Flood Zone 1, and thus have a lower risk of flooding;
- The highest flood risk on the site as shown by the Environment Agency data is from the tide and is particularly at risk from a large storm surge in the North Sea, such as that which occurred in 1953;
- Modelling scenario information provided by the Environment Agency suggests that the River Medway flood defences protect the site from flooding and that no tidal flooding would occur on site during a defended scenario based on the current baseline. However, the undefended scenario does suggest flooding on site, during different AEP events;
- There is a residual risk of tidal flooding from a breach in the defences or by overtopping. Although the site is informally protected by the embanked railway to the east, there are two known flow paths via railway underpasses which connect the site to the land to the east;
- A risk of flooding associated with the River Medway relates to the potential risk of tide locking of the Ditton Stream outfall, where during high water levels within the River Medway, flood risk for the site is likely to be increased due to fluvial water discharge from this watercourse being restricted into the River Medway at very high tides. The risk of fluvial flooding from the Ditton Stream is however reduced due to the floodplain attenuation capacity to the south of the M20 and channel features either side of the M20 with pipes controlling their flows into the lower section of the Ditton Stream adjacent to the site;
- There is a risk of surface water flooding at the site based on the current site conditions, although it is predominantly a ‘low’ risk site, with small pockets at ‘medium’ and ‘high’ risk within local depressions;

- There is a risk of groundwater flooding at the site, partly attributed to the underlying geology for the site and wider area being chalk, sandstone and limestone, and the fact that groundwater can be found in relatively close proximity to the surface, additional groundwater at the site is likely to be in hydraulic continuity with the nearby River Medway and long term rises in hydraulic head within this watercourse will result in consequential rises in groundwater below the site;

- Although there is a low risk of flooding from reservoirs at the site, the reservoirs are at a significant distance from the site and thus, the risk is lowered as water velocities and depths are reduced with distance from the reservoirs. As the flow route would be via the River Medway, the flood defences along the stretch of river are likely to provide sufficient protection in most cases; and

- The risk of flooding from sewers is generally deemed to be low as the site is served by a separate sewer connection, although there is a potential for sewer flooding if operations were to fail.

5. FLOOD RISK OPPORTUNITIES AND CONSTRAINTS

Table 3 of the PPG that accompanies NPPF shows the flood risk vulnerability and flood zone 'compatibility' (see Table 5.1). The flood vulnerability classification is described by Table 2 within the PPG. As the proposed redevelopment concerns commercial and industrial uses, the 'Less Vulnerable' vulnerability classification is deemed appropriate.

Table 5.1: Flood risk vulnerability and flood zone 'compatibility' [Table 3 of the NPPF PPG]

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

As shown by Table 5.1, all vulnerability classes are suitable to be situated within Flood Zone 1. Utilising a sequential approach, preference should be given to site uses that have a greater vulnerability in Flood Zone 1 (e.g. dwellings) with uses that have a lower vulnerability in Flood Zone 2, then Flood Zone 3. Table 5.1 indicates that business and industrial uses ('less vulnerable') on the site are appropriate for all of the flood zones within the site area.

As the information in Section 4 demonstrates, from local knowledge the site should not be considered as being within the Functional Floodplain (Flood Zone 3b).

5.1 OPPORTUNITIES TO REDUCE FLOOD RISK

5.1.1 Reducing residual tidal flood risk

The embankments of the main railway line to the east presents a physical barrier, which offers informal flood protection to the site. However, there are two underpasses beneath the rail embankment. These underpasses present potential flow paths, which connect the site to adjacent land to the east of the railway embankment.

These underpasses are expected to remain open as part of the proposed development. Nevertheless, the residual impacts to the site is expected to be negligible as the adjacent area already benefits from flood protection offered by the existing flood defences which run along the western embankment of the River Medway. If additional protection against extreme flooding events (beyond current baseline 0.1% AEP) was desired, then flood gates could be added to these access routes.

5.1.2 Reducing fluvial flood risk

The watercourse of the Ditton Stream is not believed to have been maintained for a number of years and as a result is likely to be in poor condition. At present the stream is channelled, with a number of control structures throughout its length. A right of maintenance and improvement along the Ditton Stream has been agreed and as part of a wider package of betterment this includes the enhancement of this watercourse corridor to the benefit of stream flow, ecology and flood resilience. As part of this right an 8m easement either side of the Ditton Stream has been defined to allow for maintenance and improvements to the watercourse.

The current flood data and information provided within this FRA suggests that flows within the Ditton Stream are restricted to the south of the M20. It is intended to provide ground level raising either side of the Ditton Stream channel to provide a defined overland flow route, either side of the main stream channel as well as opening up and improving the watercourse itself.

Any improvements to the Ditton Stream corridor will help reduce residual risks to the proposed development from less likely scenarios such as failure of the flap valve into the River Medway or indeed from a failure of the pond adjacent to the M20.

In addition to providing flood protection, opportunities have been taken to combine the proposed landscaping of Ditton Stream with the ecological and landscape requirements at the site. Such measures have been designed to enhance the ecological and amenity value of the steam as well as reducing flood risk.

5.1.3 Reducing surface water runoff flood risk

To reduce the surface water runoff flood risk to the site during a 0.1% AEP event, the flow routes across the site should be managed. Figure 5.1 shows surface water flow route coming from the south over the M20 and into the site affecting Unit 7 which is seeking a full planning application. The ground levels around Unit 7 should be landscaped in such a way to allow the runoff to flow towards the north west and into the Ditton Stream. This would allow these flow paths to enter into the stream where it can be managed through the site and will prevent the flows ponding in the lower parts of the site.

As detailed in Appendix E, permeable paving on car parking areas, rainwater harvesting and underground attenuation storage tanks have been designed for the part of the development subject to full planning permission.

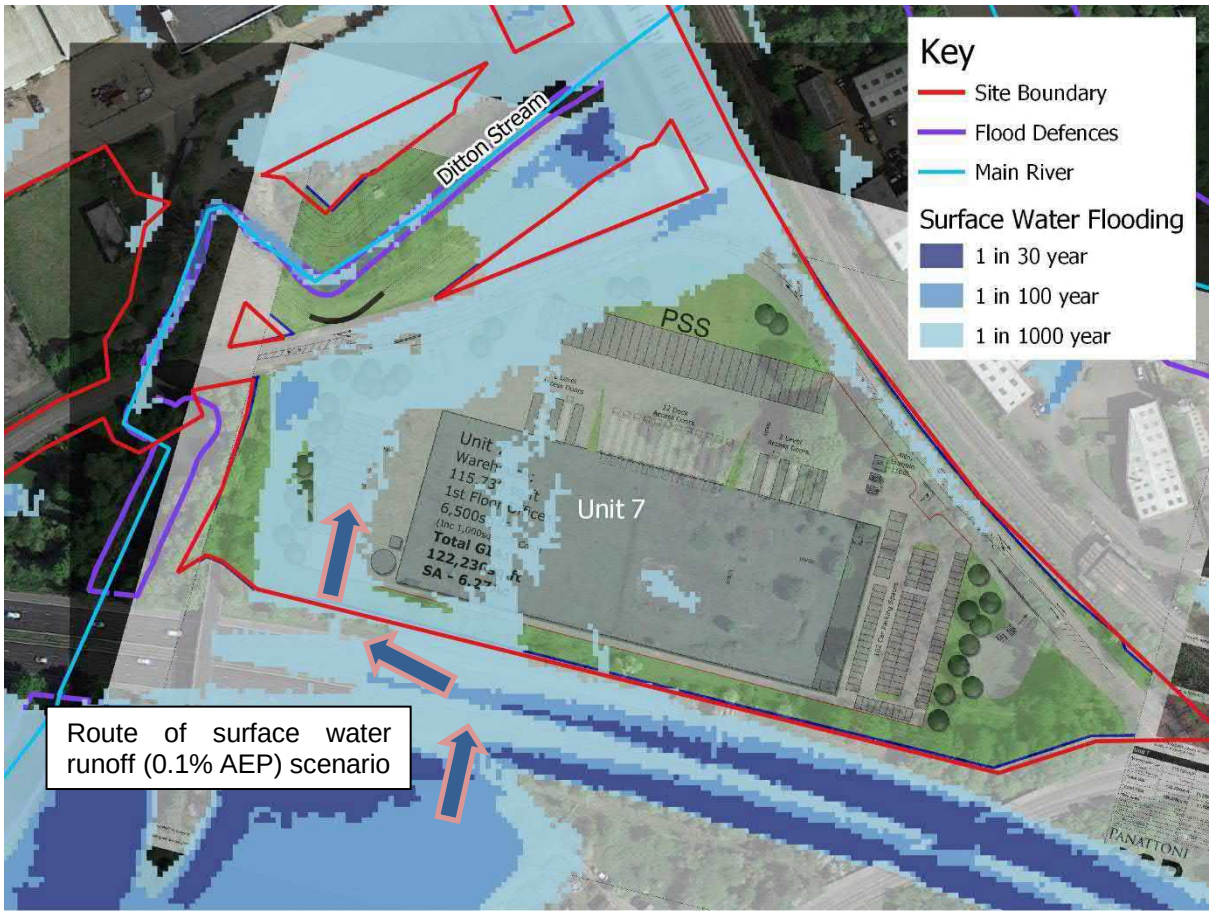

Figure 5.1: Interpreted surface water flow routes

5.1.4 Reducing groundwater flood risk

It is recommended that proposed levels throughout the development are set no lower than the existing ground levels, to reduce increasing flood risk from groundwater. The buildings should adopt flood resistant and resilient construction as appropriate as described in Section 5.22 and carry out a Flood Action Plan as described in Section 5.4. This also helps in dealing with the flood risk from other sources.

5.2 FLOOD RESILIENCE

As described in Section 4.2, the flood defences in the vicinity of the site provide flood protection from the River Medway for a 1 in 1000 year event (0.1% AEP). The existing railway line which cuts through the site provides additional, arbitrary protection, but the majority of the site is shown to be classified as Flood Zone 2 or Flood Zone 3 based on flooding that would occur if the flood defences were not present or were subject to failure.

There will be an 8 m easement zone either side of the Ditton Stream. This would provide access for maintenance purposes and green open space within the development. Raising the land on either side of the channel, will provide additional protection and flood storage for fluvial flows.

Flood risk will be considered during the detailed design of the part the development subject to the outline planning application. Flood resilience measures need to be considered and potentially implemented if required. Such methods include:

- Waterproof membrane in the ground floor;
- Waterproof plaster and waterproofing to ground floor;
- Electric sockets high up off the ground floor;
- Non return valves on the sewerage pipes;
- Emergency escape plan for each individual property; and
- Air brick covers.

Further information on providing flood resilient construction can be found in the Communities and Local Government report, 'Improving the flood performance of new buildings', May 2007.

5.3 SAFE ACCESS AND EGRESS

The southern boundary of the site, along by the M20, is shown to be at least risk of flooding compared to the rest of the site. An existing footpath is shown along the southern boundary, parallel to the M20. A footbridge over the M20 is present linking the site area with Ditton, however the land between the M20 and Ditton is situated within Flood Zone 3. A dry pedestrian route would therefore be either to head eastwards along the footpath towards Aylesford Station or to head towards higher ground to the west of the site. For vehicular access, the south east corner of the site, around Millhall, will provide the most convenient link into existing infrastructure within Flood Zone 1.

Where commercial development is proposed access must be made available to an area above the estimated design flood level. This could be external to the building or provided on the first floor. Careful consideration will need to be given to single storey buildings or ground floor units which don't have access to higher floors.

The full planning application for erection of two warehouse buildings (unit 6 and unit 7) are situated within the areas on the site at least risk of flooding. Both buildings are located predominantly within Flood Zone 1, allowing for dry access and egress during these extreme events.

5.4 FLOOD WARNINGS AND SITE FLOOD PLANS

Any future occupiers of the site should sign up to the Environment Agency's flood warning service, Floodline. This should provide the site users time to go through the procedures set out in the flood plan.

A Flood Action Plan should be prepared which should be communicated to users of the site at risk of flooding. Its purpose is to:

- protect staff;

- deal with hazardous equipment; and
- reduce the risk from polluting materials.

The Flood Action Plan should make everyone aware of their responsibilities after a flood warning from the Environment Agency. The plan should include emergency escape plans for any parts of a building which is below the estimated flood level, to allow occupants to reach areas free from flooding. A template is shown at Appendix F.

KCC have produced their own Flood Plan advice; within it they state that the chance of overtopping of defences from a storm surge tide should be evident several hours beforehand. The Environment Agency aims to issue a warning at least 2 hours in advance. In terms of a breach within the defences the Flood Plan states that a breach in defences is unlikely to be predictable, although it is possible that signs of weakness may be evident prior to failure. It must be assumed that no advance warning will be provided.

As the design of the site develops a site flood plan should be produced to show how occupants of the site will be able to access areas higher than any potential residual flooding.

5.5 OWNERSHIP AND MAINTENANCE OF THE DITTON STREAM

The Environment Agency will need to be made aware who will be taking ownership and responsibility for the maintenance of the Ditton Stream and any enhancement to the flood protection of the site. Works within 8m of the banks of the Ditton Stream are likely to need Environmental Permits from the Environment Agency. Defences will need to be owned and maintained throughout the lifetime of the development.

6. SURFACE WATER DRAINAGE

6.1 EXISTING SURFACE WATER DRAINAGE

As described in section 2.5.1, the existing surface water drainage comprises three separate sub-catchments. There are three primary discharge routes for surface water, these are:

- Discharge route 1 - surface water within the north of the site is indicated to discharge into private drainage of unknown diameter that exits the site on the northern site boundary;
- Discharge route 2 - surface water within the central northern part of the site enters private drainage believed to comprise twin 900mm concrete pipes which leave the site on the eastern site boundary and are routed below the adjacent railway and private land beyond. Recent communications with Kent County Council LLFA have confirmed agreement that surface waters can be discharged into the River Medway via this route at an unrestricted rate, refer to Appendix B for the email communication with the LLFA; and
- Discharge route 3 - surface water across the central and southern site areas, is indicated to discharge to a Southern Water drainage asset which bisects the site from west to east. Recent consultation with Southern Water has agreed that surface water can discharge into this asset at a rate of 500l/s. Refer to Appendix C for the email communication with Southern Water.

6.2 PROPOSED SURFACE WATER DRAINAGE

The proposed surface water drainage to mimic the existing site drainage. However, discharge route 1 will not be considered due to lack of information regarding the existing pipe networks and capacity within the discharge route 1.

Two surface water drainage options below are proposed.

6.2.1 Surface Water Drainage – Option 1

The surface water strategy for Option 1 closely mimics the existing discharge route 3. All surface water from the development will be directed to the Southern Water drainage asset located to the south of the site that running from west to east. Southern Water has confirmed that a total discharge of 500l/s is allowed to discharge to their asset. Refer to drawing 103739-PEL-CD-00-DR-HDG-0001 in Appendix D for the Option 1 proposed drainage layout.

6.2.2 Surface Water Drainage – Option 2

The surface water strategy for Option 2 closely mimics the existing discharge routes 2 and 3. This option would be the preferred drainage strategy; however, a drainage asset survey would be required to confirm the operational status of the asset and pumping station associated with the discharge route 2. An agreement with Network Rail may be required as the existing drainage line outside of the development boundary is located under the Network Rail's railway track.

In this option the surface water within the central northern part of the development will discharge to the existing pipe located to the north east of the site and surface water from the central and southern site of the development will be directed to the Southern Water drainage

asset located to the south of the site that running from west to east. The LLFA has confirmed that a free discharge is allowed to the northern outfall and Southern Water has confirmed that a total discharge of 500l/s is allowed to discharge to their asset. Refer to drawing 103739-PEL-CD-00-DR-HDG-0002 in Appendix D for the Option 2 proposed drainage layout.

6.2.3 Delivering a SuDS scheme

The philosophy of SuDS is about maximising the benefits and minimising the negative impacts of surface water runoff from developed areas. The 'four pillars' of SuDS design as described by the SuDS Manual are:

- Water Quantity;
- Water Quality;
- Amenity; and
- Biodiversity.

SuDS deliver high quality drainage while supporting areas to cope better with severe rainfall both now and in the future.

The geology and ground conditions at this site show surface geology as alluvium described as 'silty clay' and the groundwater is impacted in places by historic hydrocarbon contamination. As a result, infiltration drainage as SUDS features will not be viable at this site. SuDS selection should instead focus on controlling the rate and quality of surface water runoff from the site to provide benefit to receptors at risk of flooding downstream and to the downstream ecological receptors identified in the ES.

The SuDS design should, as far as possible, be based around the following:

- Using surface water runoff as a resource;
- Managing rainwater close to where it falls;
- Slowing and storing runoff to mimic natural runoff characteristics;
- Reducing contamination of runoff through pollution prevention and controlling the runoff at source;
- Treating runoff to reduce the risk of urban contaminants causing environmental pollution.

Any proposed development on the site has the potential to maximise SuDS and conform to SuDS best practice. Ultimately a well designed and constructed SuDS scheme will provide a robust and reliable surface water drainage network, whilst providing increased amenity and biodiversity.

Detailed SuDS strategy for Zones A and B (sections of site that are currently seeking outline planning permission) should be developed when these zones are going for full planning application in the future.

Refer to BWB Consulting Ltd's Sustainable Drainage Statement ref: AYL-BWB-ZZ-XX-RP-CD-0001 (Appendix E) for the detailed SuDS strategy for the section of the site that is seeking

full planning application within this application i.e. erection of two warehouse buildings (unit 6 and unit 7) for flexible B1c/B2/B8 use class, realignment of Bellingham Way link road, creation of a north/south spine road, works to the embankment of Ditton Stream and associated servicing, parking, landscaping, drainage, infrastructure and earthworks.

7. PROJECT SUMMARY AND RECOMMENDATIONS

This report has been prepared to support the hybrid planning application for a proposed industrial, storage and distribution developments at former ANL site. The main findings of this FRA are as follows:

Flood Risk

- The Environment Agency's flood risk map shows the site to be partially located within Flood Zones 1, 2 and 3;
- Due to the presence of flood defences, the site cannot be considered as being within the Functional Floodplain (Flood Zone 3b) as it does not lie within an area which provides flood conveyance or attenuation;
- The proposed development is deemed as being 'Less Vulnerable' and therefore is compatible with Flood Zone 3. The Exception Test was therefore not required.
- The site is protected by flood defences set at a level of 6.2mAOD and 5.55mAOD. This offers a standard of protection for the 1 in 1000 year (0.1% AEP) fluvial and 1 in 200 year (0.5% AEP) tidal events (including climate change) from the River Medway in relation to the current baseline;
- There is a fluvial flood risk associated with the Ditton Stream where the culverted discharge into the River Medway may be restricted during very high tides. The risk of fluvial flooding from the Ditton Stream is however reduced due to the floodplain attenuation capacity to the south of the M20 and channel features either side of the M20 with pipes controlling their flows into the lower section of the Ditton Stream through the site. As well as opening up the watercourse, it is intended to provide ground level raising either side of the Ditton Stream channel to provide a defined overland channel, either side of the main stream channel. Any improvements to the Ditton Stream corridor will help reduce flood risk to the proposed development;
- Evidence suggests that groundwater is very shallow (less than 3 m below ground level in some locations). With the increase in tidal levels associated with climate change, the risk of groundwater flooding is likely to increase. It is recommended that for the majority of the site the proposed levels should be set no lower than the existing ground level. The buildings should adopt flood resilient construction as appropriate and carry out a Flood Action Plan. This also helps in dealing with the flood risk from other sources.
- Environment Agency mapping shows that there is a low flood risk from a reservoir breach, but as the site is located at a significant distance from the reservoirs, the risk is lowered as water velocities and depths are reduced with distance from the reservoir. Also, as the flow route would be the River Medway, the flood defences along the stretch of river parallel to the site are likely to provide sufficient protection.
- The existing site is largely impermeable and fairly flat. Environment Agency Mapping suggests that parts of the site are susceptible to surface water flooding.

SuDS

- Two surface water drainage options have been considered. Final surface water drainage strategy is subject to further survey and agreement with Network Rail;

- Detailed SuDS strategy for Zones A and B (sections of site that are currently seeking outline planning permission) should be developed when these zones are going for full planning application in the future; and

- Refer to BWB Consulting Ltd's Sustainable Drainage Statement ref: AYL-BWB-ZZ-XX-RP-CD-0001 (Appendix E) for the detailed SuDS strategy for the section of the site that is seeking full planning application.

APPENDIX A

Proposed Development Masterplan

Rev	Date	By	Description
D	04/06/2020	MMS	Floorspace parameters revised, Unit numbering reinstated.
E	24/06/2020	MMS	Unit 7 updated.
F	22/07/2020	MMS	Redline updated, key access points described. Road layout updated
G	22/07/2020	MMS	Redline updated
H	22/07/2020	MMS	Access points updated. Area schedule updated.
I	23/07/2020	MMS	Zone B Access note revised
J	07/082020	LVA	Total B8 GIA/GEA increased
K	10/082020	LVA	Total B8 GEA updated

Zone B Parameters

Developable Area:
5.89Ha/14.55Ac
Proposed Use:
B8(Storage & Distribution), B8 (Parcel Delivery), B2, B1(c)
Proposed Maximum Unit Height
18m to ridge (23.50 AOD)

Zone A Parameters

Developable Area:
20.31Ha/50.19Ac
Proposed Use:
B8(Storage & Distribution), B8 (Parcel Delivery), B2, B1(c)
Proposed Maximum Unit Height
28m to ridge (34.0 AOD)

Additional Access Points Along Estate Road subject to separate Reserved Matters Application

Additional Access Points Along Estate Road subject to separate Reserved Matters Application

Access for up to 36,050sq.m B8 (Parcel Delivery) or equivalent use in traffic terms.

HGV Access only

Car, Light Vehicle & Pedestrian Access only

PSS

Development Schedule

Redline Area:
38.30Ha/94.63c

Developable Area:
30.58Ha/75.58Ac
Proposed Use:
B8(Storage & Distribution), B8 (Parcel Delivery), B2, B1(c)

Maximum Built Development Floorspace Parameter for Zone A and B Outline Element:
164,000sq.m/*1,765,281sq.ft* GEA
159,235sq.m/*1,713,991sq.ft* GIA

Maximum Use Class Floorspace Parameters for Full (Units 6 & 7) and Outline Elements:

B1(c)	16,250sq.m/*174,913sq.ft* GEA (15,760sq.m/*169,640sq.ft* GIA)
B2	32,200sq.m/*346,598sq.ft* GEA (31,250sq.m/*336,372sq.ft* GIA)
B8(Storage + Distribution)	182,750sq.m/*1,967,104sq.ft* GEA (177,280sq.m/*1,908,226sq.ft* GIA)
Including:	
B8(Parcel Delivery)	36,050sq.m/*388,039sq.ft* GEA (35,000sq.m/*376,737sq.ft* GIA)

Extent of Full Detailed element
(Refer to detailed drawings)

Landscape Buffer Zone

Unit 6		
Warehouse GIA	68,000sq.ft	6,317.4sq.m
1st Fl. Offices (Inc. 1,000sq.ft GF Core)	4,000sq.ft	371.6sq.m
Total GIA	**72,000sq.ft**	**6,689.0sq.m**
Total GEA	**75,347sq.ft**	**7,000sq.m**
Site Area	4.20Ac	
Building Height (to ridge)	15.5m	(AOD to be confirmed)
Dock Doors	8	
Level Access	2	
Trailer Spaces	8	
Car / Motorcycle Spaces	60	Ratio: 1:110sq.m
Cycles	10	

Unit 7		
Warehouse GIA	115,730sq.ft	10,751.7sq.m
1st Fl. Offices (Inc. 1,000sq.ft GF Core)	6,500sq.ft	603.9sq.m
Total GIA	**122,230sq.ft**	**11,355.5sq.m**
Total GEA	**126,476sq.ft**	**11,750sq.m**
Site Area	6.27Ac	
Building Height (to ridge)	15.5m	(AOD to be confirmed)
Dock Doors	12	
Level Access	4	
Trailer Spaces	56	
Car / Motorcycle Spaces	102	Ratio: 1:111sq.m
Cycles	20	

PANATTONI
SGP
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2a Smith Way
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Enderby
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Aylesford, College Road

Drawing Name:
Hybrid Planning Application
Parameters Plan

Drawing Stage: PLANNING

Suitability: S0 - Work In Progress

SGP File Ref: 18-103-110002

SGP Project No:	Date:	Drawn:	Team:	Scale:	Rev:
18-103	05/2020	MMS	MMS	1:2000 @ A1	K

Drawing Number:
18-103 - SGP - ZZ - 00 - DR - A - 110002
Project Code | Originator | Volume | Level | Type | Role | Number

Red Line Boundary based on O/S Data and **NOT** confirmed as the Legal Boundary

APPENDIX B

Email Communication with the LLFA

Nigel Tsang

Flood and Water Management
Invicta House
Maidstone
Kent
ME14 1XX
Website: www.kent.gov.uk/flooding
Email: suds@kent.gov.uk
Tel: 03000 41 41 41
Our Ref: NON/2019/075584
Date: 4 October 2019

Application No: pre app

Location: Former Aylesford Newsprint New Hithe Business Park Aylesford Kent ME20 7JZ

Proposal: The proposed development is to convert the former newsprint site in to new warehouses or similar commercial units with associated vehicle and parking. See attached proposed site layout drawing uploaded as part of this submission.

Thank you for your enquiry in relation to the above site.

We have reviewed our records that we hold for your site and we can provide you with the following information:

Previous Application Submission:

We note that the Aylesford Newsprint site has had a previous planning application submitted to Tonbridge and Malling Borough Council under the reference number: 16/03025/OAEA. The submission to the LPA was for outline planning permission with the following description:

Outline Application for mixed use development comprising up to 120,500 sqm of B1, B2 and B8 employment space (GEA) and 79,000 sqm of residential land capable of accommodating up to 450 residential dwellings, including affordable housing, land for a two form entry school and a dedicated community facility, with appearance and landscaping reserved for future consideration.

During the course of this planning submission, we as the Lead Local Flood Authority provided 3 responses with the first two objecting and the third recommending approval subject to conditions. We highlight that on the LPA planning site, there is a document withdrawing the application on the 4th June 2018.

For ease, I have compiled our responses and the submitted Flood Risk Assessment Reports into a folder that has been sent to you along with this response.

LLFA Responses to Planning Application:

As noted above, during the outline submission, KCC LLFA provided three responses to the LPA of which we raised several concerns with the proposed developments. A summary of these points is provided below:

1. Original proposals within the outline Flood Risk Assessment was to continue using the drainage regime on site of which the the majority of the site would discharge into existing surface water sewers before discharging at an unrestricted rate into the River Medway. This approach is in line with the Non-Statutory Technical Standards Document (March 2015) for discharging into a large water body. We had no objections to the principle of unrestricted discharge into the River Medway however we had concerns with the reliance on pumping where gravity discharge could not be achieved.

    - KCC would strongly advise where possible that the use of pump stations is avoided. Therefore, any redevelopment of the site should consider the implications of using pumping stations. Should pumping be necessary, it should be demonstrated within any future report why it is needed and future maintenance requirments.

2. The River Medway at this location is tidal and during times of high tide can have the potential to tide lock the outfalls and thus prevent surface water from being taken offsite. Brief discussions held with the EA back in 2017 confirmed this view and therefore the drainage system design should account for the coincidence of the critical 100 year rainfall event with the Mean High Spring Tide. The design should accommodate/attenuate several hours of tide locking within the system while ensuring that no flooding occurs above ground.

3. Although it has not been mentioned within this pre-app, the original FRA submitted for planning proposed to "Open Up" the Ditton Stream to provide an improved easement zone for easier maintenace and amenity. The proposed alteration also mentioned modifying levels within the stream to better manage surface water flow paths. We would advise a new assessment of this is undertaken as this improvement could provide increased biodiversity while reducing flood risk.

Pre-application Submission:

The documents provided by yourself containing the proposed layout is distinctly different to what was previously submitted at planning stage back in 2017. The layout drawing submitted now is reduced in size from the layout plan within application 16/03025/OAEA.

The original site area encompassed both sides of the railway line adjacent to the River Medway. The segment to the right hand side of the railway line was outlined to contain a mix of residential and green space.

This current pre-application drawing shows the preliminary layout for the site which removes the residential and green space elements from the design and is purely for commercial warehouse units only.

I have discussed these points raised in our consultation responses to the original outline application within the team and we believe these points would still be valid for this application regardless of the proposed changes in design/layout. Therefore, we would advise these points are developed upon and the subsequent drainage scheme is designed to reflect them.

It may be advantageous that a future meeting is held to discuss any ideas or any concerns that arise from designing the drainage strategy.

Further recommendations taking this application forward to planning:

1. We would strongly advise that a CCTV survey and assessment is undertaken of the existing surface water sewer network serving the site which includes the outfalls. This is to ensure that the system operates as intended and any inherent issues within the network can be resolved.

2. Within Kent County Councils Drainage and Planning Policy Statement 2017 we ask that developments safeguard water quality through providing pollution controls on site which provide treatment prior to discharge to watercourses. We would expect to see demonstrated that surface water is managed appropriately. We would seek that any new drainage system complies with the required total treatment levels as detailed within Ciria Suds Manual (2015) Part E section 26 and is detailed within the future drainage strategy report.

Climate Change Allowances and Supporting Calculations

Given the latest guidance from the EA, the design must accommodate the 1 in 100 year storm with a 20% allowance for climate change, and additional analysis should outline the flooding implications for a greater climate change allowance of 40%. We would refer you to the Environment Agency guidance pages on climate change at Gov.uk.

Please note that we would also expect to see the drainage system modelled using FeH rainfall data in any appropriate modelling or simulation software. Where FeH data is not available, 26.25mm should be manually input for the M5-60 value, as per the requirements of our latest drainage and planning policy statement (June 2017).

I trust this information assists with your enquiries.

Yours faithfully,

Daniel Hoare
Flood Risk Project Officer
Flood and Water Management

APPENDIX C

Email Communication with Southern Water

Mohd Bahardin

From: Karpezo, Marta <Marta.Karpezo@southernwater.co.uk>
Sent: 06 November 2019 11:21
To: Mohd Bahardin
Subject: RE: 112510 Aylesford Newsprint Redevelopment, Mill Hall Business Park, Aylesford Kent ME20 7JZ - Email 3

Good Morning Mohd

Further to the drainage information provided and the assessment carried out by our capacity checks manager, we would like to see the discharge of surface water runoff at total peak rates not exceeding 500 l/s. Are you able to provide storage that would attenuate the flows to required levels?

Also, Southern Water would stress that any other existing discharge options for surface water runoff disposal shall also be fully incorporated where feasible.

Kind Regards

Marta Karpezo
Planning Coordinator
for Hants and IOW

T. **0330 303 0119**
southernwater.co.uk

From: Mohd Bahardin [mailto:MBahardin@pellfrischmann.com]
Sent: 30 October 2019 09:33
To: Karpezo, Marta <Marta.Karpezo@southernwater.co.uk>
Subject: RE: 112510 Aylesford Newsprint Redevelopment, Mill Hall Business Park, Aylesford Kent ME20 7JZ - Email 3

Hi Marta,

You should now have received three separate emails (including this one) which contains the following attachements:

- K-100086101-Z-500_SK02_Extg Pipe Slopes – showing existing drainage layouts, pipe sizes, pipe gradients and contributing areas.
- 57-00001 Site Drainage – as-built drainage drawing.
- Aylesford Discharge Rates – Microdrainage result showing discharge rates at outfalls 4,5 and 7.
- D-100086101-Z-500-300 – Proposed drainage strategy
- ANL_MicroD-ExistingResults - full Microdrainage results.

Kind regards

Mohd Bahardin
Associate
George House T: 01924 36 8145
George Street D: 01924 33 5209
Wakefield, WF1 1LY M: 07775 674252
Pell Frischmann
Excellence through innovation
www.pellfrischmann.com

From: Mohd Bahardin
Sent: 30 October 2019 09:27
To: 'Karpezo, Marta' <Marta.Karpezo@southernwater.co.uk>
Subject: RE: 112510 Aylesford Newsprint Redevelopment, Mill Hall Business Park, Aylesford Kent ME20 7JZ - Email 2

From: Karpezo, Marta <Marta.Karpezo@southernwater.co.uk>
Sent: 24 October 2019 14:37
To: Mohd Bahardin <MBahardin@pellfrischmann.com>
Subject: RE: 112510 Aylesford Newsprint Redevelopment, Mill Hall Business Park, Aylesford Kent ME20 7JZ

Hello Mohd

Thank you for your email.

The below seems the confirmation of what we discussed.

Although quite extensive information was provided with regards to the existing drainage, the gradient at which the drainage was laid seems to be missing which is quite important factor in determining the level of flows.

Kind Regards

Marta Karpezo
Planning Coordinator
for Hants and IOW

T. **0330 303 0119**
southernwater.co.uk

From: Mohd Bahardin [mailto:MBahardin@pellfrischmann.com]
Sent: 23 October 2019 10:06
To: Karpezo, Marta <Marta.Karpezo@southernwater.co.uk>
Subject: RE: 112510 Aylesford Newsprint Redevelopment, Mill Hall Business Park, Aylesford Kent ME20 7JZ

Hi Marta,

Thank you for your email, this email is to summarise our conversation following the email below.

- To complete the capacity assessment, Southern Water would require to see gradient for each pipe serving the existing Aylesford Newsprint development. This information can be extracted from the as-built drawing and added to our current drawing. You confirmed that this should suffice, therefore CCVTV drainage survey is not required.
- For completeness Pell Frischmann will update the current drawings to show pipe size, level and gradient for each pipe that connected to Thames Water network.
- We aim to provide this information by end of this week.

Kind regards

Mohd Bahardin
Associate
George House T: 01924 36 8145
George Street D: 01924 33 5209
Wakefield, WF1 1LY M: 07775 674252
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From: Karpezo, Marta <Marta.Karpezo@southernwater.co.uk>
Sent: 22 October 2019 09:33
To: Mohd Bahardin <MBahardin@pellfrischmann.com>
Subject: RE: 112510 Aylesford Newsprint Redevelopment, Mill Hall Business Park, Aylesford Kent ME20 7JZ

Good Morning Mohd

Further to this below matter of establishing flows to be allowed for discharge, can you please provide the details of existing drainage discharging to public network (the details we are mainly missing are the gradients for particular pipes, submission shall have pipe sizes associated with each run) for the purpose of assessment by our capacity check manager.

Kind Regards

Marta Karpezo
Planning Coordinator
for Hants and IOW

T. **0330 303 0119**
southernwater.co.uk

From: Mohd Bahardin [mailto:MBahardin@pellfrischmann.com]
Sent: 14 October 2019 11:52
To: Karpezo, Marta <Marta.Karpezo@southernwater.co.uk>
Subject: RE: 112510 Aylesford Newsprint Redevelopment, Mill Hall Business Park, Aylesford Kent ME20 7JZ

Good morning Marta,

Hope you are well. I received the attached email from your colleague David Akehurst, I believe he is responding to our enquiries that we submitted immediately after receipt of the initial pre-development response from Southern Water. David has confirmed that Southern Water would be happy to accept our proposal to match the pre-existing discharge rates. Therefore we will base our design on this principle, thank you for your help in this matter.

Kind regards

Mohd Bahardin
Associate

George House T: 01924 36 8145
George Street D: 01924 33 5209
Wakefield, WF1 1LY M: 07775 674252
Pell Frischmann
Excellence through innovation
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From: Karpezo, Marta <Marta.Karpezo@southernwater.co.uk>
Sent: 10 October 2019 10:31
To: Mohd Bahardin <MBahardin@pellfrischmann.com>
Subject: RE: 112510 Aylesford Newsprint Redevelopment, Mill Hall Business Park, Aylesford Kent ME20 7JZ

Good Morning Mohd

Thank you for your email and the additional information provided.

I reviewed the data relating to pre-development onsite drainage and can confirm that quite high level of flows was confirmed, however I would not exactly agree with the determination of the impermeable areas. Some southern areas have a much lower degree of impermeable area than indicated.

Also, can you advise if this provided information is based on drainage survey carried out? The notes on drawings do not exactly confirm it.

Generally, before I give the final flow rate that we can accept in the system, I am trying to determine the flow data for the receiving pumping station. This information is missing from our model data and therefore I have to carry out some internal consultations to determine this information. I shall advise you in due course.

Kind Regards

Marta Karpezo
Planning Coordinator
for Hants and IOW

T. **0330 303 0119**
southernwater.co.uk

From: Mohd Bahardin [mailto:MBahardin@pellfrischmann.com]
Sent: 09 October 2019 12:21
To: Karpezo, Marta <Marta.Karpezo@southernwater.co.uk>
Subject: RE: 112510 Aylesford Newsprint Redevelopment, Mill Hall Business Park, Aylesford Kent ME20 7JZ

Hi Marta,

Please find attached drawings D100086101Z500-201 & 202 showing the pre-development impermeable areas in sqm as requested.

Please do not hesitate to contact me if you require further information.

Kind regards

Mohd Bahardin
Associate
George House T: 01924 36 8145
George Street D: 01924 33 5209
Wakefield, WF1 1LY M: 07775 674252
Pell Frischmann
Excellence through innovation
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From: Karpezo, Marta <Marta.Karpezo@southernwater.co.uk>
Sent: 09 October 2019 11:06
To: Mohd Bahardin <MBahardin@pellfrischmann.com>
Subject: RE: 112510 Aylesford Newsprint Redevelopment, Mill Hall Business Park, Aylesford Kent ME20 7JZ

Good Morning Mohd

Thank you for your email.

For all the areas discharging at various outfall locations, can you please provide the existing pre-development impermeable area in sqm?

Kind Regards

Marta Karpezo
Planning Coordinator
for Hants and IOW

T. **0330 303 0119**
southernwater.co.uk

From: Mohd Bahardin [mailto:MBahardin@pellfrischmann.com]
Sent: 04 October 2019 16:29
To: Karpezo, Marta <Marta.Karpezo@southernwater.co.uk>
Subject: Ref: 112510 Aylesford Newsprint Redevelopment, Mill Hall Business Park, Aylesford Kent ME20 7JZ

Hi Marta,

Thank you for taking my call this afternoon, as discussed Pell Frischmann has been commissioned to develop the drainage strategy for a proposed re-development of the former Aylesford Newsprint Site in New Hythe Business Park, Aylesford, Kent. The proposed development comprises business and industrial units, refer to the attached proposed drawing: 18-103-F016-001-001_Proposed.pdf. You may note this development has had a previous enquiry which included residential properties that have since been removed and the size and shape of the proposed site differs from previous.

As part of the initial outline feasibility we have modelled the existing drainage network from archive sources in MicroDrainage to obtain the existing discharges from the site outfalls. Refer to the attached drawings; D100086101Z500-201_P1_Extg_Q.pdf and D100086101Z500-202_P1_Extg_Q.pdf, for the existing drainage layout which served the newsprint with the various outfall locations numbered sequentially. The main outfalls from the site are grouped in to three distinct areas; notionally to the North, midway and South of the site. The north section discharges northwards (Outfall 1- **Not** Southern Water Sewer) into a separate network off site, midway down the site (Outfalls 2 and 3 – **Not** Southern Water Sewer) the outfall pipe crosses land on the east and discharges directly in to the River Medway. The southern outfalls (**Outfall 5 to 10 – Southern Water Sewer network**) are directed into the River Medway via Southern Water sewer and pumping station.

We propose that the proposed development to re-use the existing connections to the Southern Water sewer networks with future discharges restricted to the levels to match the existing arrangement, as shown on drawing D-100086101-Z-500-300. On-site attenuation will be provided to store access water during peak rainfall events up to 100 year plus 40% climate change and 2hrs tide lock.

The main objective for this enquiry is to confirm the following:

- Point of discharge to Southern Water sewer.
- Allowable discharge rates to Southern Water sewer.

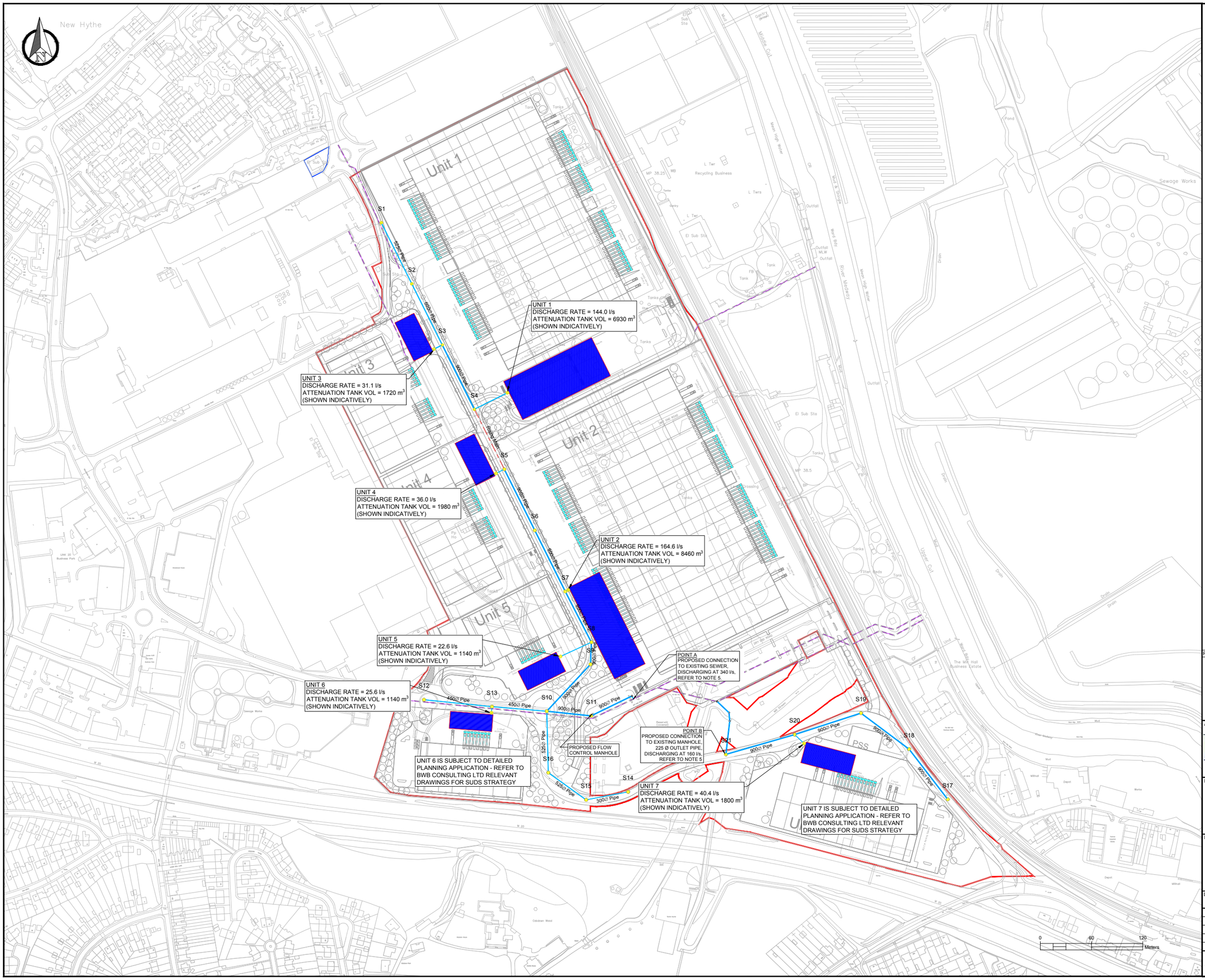
Looking forward to receiving your comments and please do not hesitate to contact me if you require further information.

Kind regards

Mohd Bahardin
Associate
George House T: 01924 36 8145
George Street D: 01924 33 5209
Wakefield, WF1 1LY M: 07775 674252
Pell Frischmann
Excellence through innovation
www.pellfrischmann.com

APPENDIX D

Proposed Drainage Options



LEGEND

- DEVELOPMENT BOUNDARY
- SURFACE WATER ATTENUATION STORAGE TANK (SHOWN INDICATIVELY)
- PROPOSED SURFACE WATER DRAINAGE
- EXISTING SURFACE WATER DRAINAGE
- RISING MAIN

NOTES

1. DO NOT SCALE THIS DRAWING.
2. ANY DIMENSIONAL DISCREPANCIES SHOULD BE NOTIFIED TO THE ENGINEER IMMEDIATELY.
3. NORTH SHOWN INDICATIVE ONLY.
4. WORK TO COMPLY WITH THE BUILDING REGULATIONS 2010 APPROVED DOCUMENT H.
5. ATTENUATION VOLUMES BASED ON DISCHARGE RATES WHICH HAVE BEEN APPROVED IN PRINCIPLE WITH THE LLFA AND SOUTHERN WATER AS BELOW:
   - POINT A = 360 L/S
   - POINT B = 140 L/S

   COMBINED DISCHARGE = 500 L/S
6. A S106 APPLICATION FOR ANY NEW CONNECTIONS INTO A PUBLIC SEWER WILL NEED TO BE COMPLETED.

REV	DESCRIPTION	DRN	CHK	APP	DATE

Pell Frischmann

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Architect/Client/Contractor

PANATTONI

Project

AYLESFORD NEWSPRINT

Drawing Title

PROPOSED SURFACE WATER DRAINAGE NETWORK OPTION 1

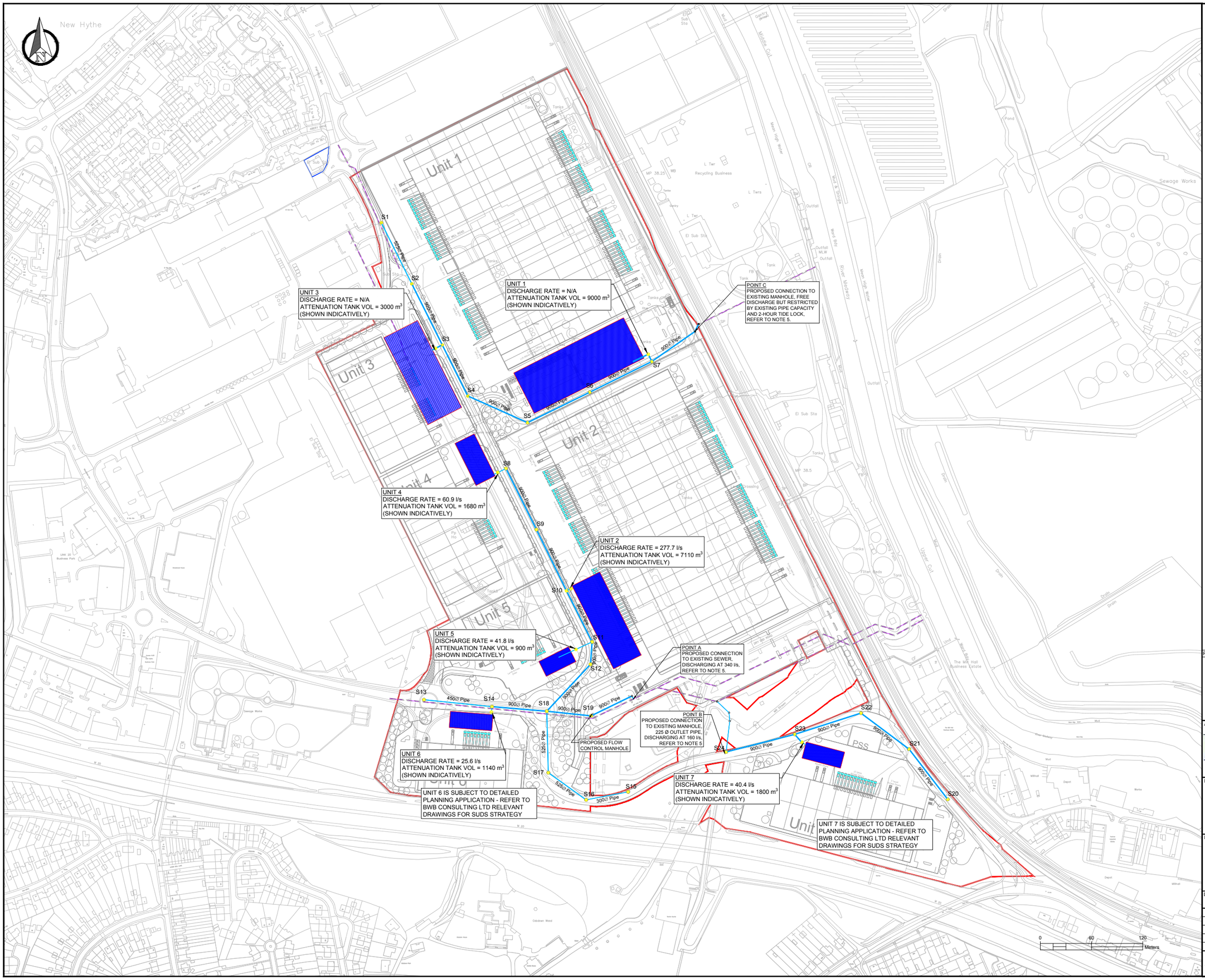
Drawing Status

FOR PLANNING

	Name	Date	Status Code
Drawn	NT	JULY 2020	S0
Designed	NT	JULY 2020	Scale 1:2000
Eng Chk	MB	JULY 2020	Revision 0
Approved	MB	JULY 2020	

Drawing No.

103739 - PEL - CD - 00 - DR - HDG - 0001



LEGEND

- DEVELOPMENT BOUNDARY
- SURFACE WATER ATTENUATION STORAGE TANK (SHOWN INDICATIVELY)
- PROPOSED SURFACE WATER DRAINAGE
- EXISTING SURFACE WATER DRAINAGE

NOTES

1. DO NOT SCALE THIS DRAWING.
2. ANY DIMENSIONAL DISCREPANCIES SHOULD BE NOTIFIED TO THE ENGINEER IMMEDIATELY.
3. NORTH SHOWN INDICATIVE ONLY.
4. WORK TO COMPLY WITH THE BUILDING REGULATIONS 2010 APPROVED DOCUMENT H.
5. ATTENUATION VOLUMES BASED ON DISCHARGE RATES WHICH HAVE BEEN APPROVED IN PRINCIPLE WITH THE LLFA AND SOUTHERN WATER AS BELOW:
   - POINT A = 360 L/S
   - POINT B = 140 L/S
   - POINT C = FREE DISCHARGE

   COMBINED DISCHARGE = 500 L/S
6. A S106 APPLICATION FOR ANY NEW CONNECTIONS INTO A PUBLIC SEWER WILL NEED TO BE COMPLETED.

REV	DESCRIPTION	DRN	CHK	APP	DATE

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Architect/Client/Contractor

PANATTONI

Project

AYLESFORD NEWSPRINT

Drawing Title

PROPOSED SURFACE WATER DRAINAGE NETWORK OPTION 2

Drawing Status

FOR PLANNING

	Name	Date	Status Code
Drawn	NT	JULY 2020	S0
Designed	NT	JULY 2020	Scale 1:2000
Eng Chk	MB	JULY 2020	Revision 0
Approved	MB	JULY 2020	

Drawing No.

103739-PEL-CD-00-DR-HDG-0002

APPENDIX E
BWB Sustainable Drainage Statement

BETTER SOLUTIONS, INTELLIGENTLY ENGINEERED

TRANSPORT & INFRASTRUCTURE

Panattoni UK Developments Ltd
Aylesford, College Road
Unit 6, Unit 7 & Access Road
Sustainable Drainage Statement

www.bwbconsulting.com

TRANSPORT & INFRASTRUCTURE

Panattoni UK Developments Ltd
Aylesford, College Road
Unit 6, Unit 7 & Access Road
Sustainable Drainage Statement

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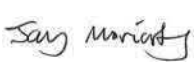
August 2020

DOCUMENT ISSUE RECORD

Document Number:	AYL-BWB-ZZ-XX-RP-CD-0001_SDS Unit 6, Unit 7 & Access Road
BWB Reference:	NTS 2849

Revision	Date of Issue	Status	Author:	Checked:	Approved:
P01	August 2020	S8	Matt Ross BEng (Hons)	Jay Moriarty BEng (Hons)	Jean Benard MEng (Hons), ACGI, CEng, MICE
					

Notice

All comments and proposals contained in this report, including any conclusions, are based on information available to BWB Consulting during investigations. The conclusions drawn by BWB Consulting could therefore differ if the information is found to be inaccurate or misleading. BWB Consulting accepts no liability should this be the case, nor if additional information exists or becomes available with respect to this scheme.

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(i) The date on which this assessment was undertaken, and
(ii) The date on which the final report is delivered

BWB Consulting makes no representation whatsoever concerning the legal significance of its findings or the legal matters referred to in the following report.

All Environment Agency mapping data used under special license. Data is current as of August 2020 and is subject to change.

The information presented, and conclusions drawn, are based on statistical data and are for guidance purposes only. The study provides no guarantee against flooding of the study site or elsewhere, nor of the absolute accuracy of water levels, flow rates and associated probabilities.

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CONTENTS

FIGURES

TABLES

APPENDICES

1. INTRODUCTION

1.1 A Sustainable Drainage Statement (SDS) sets out the principles of drainage design for a development and summarises the reasoning behind the chosen design. This includes consideration of national and local guidance, justification of specific flow rates, volumes of attenuated storage, as well as the appropriate level of treatment to be provided to surface water runoff.

1.2 This SDS has been produced by BWB Consulting on behalf of Panattoni UK Developments Ltd in respect of the full planning application for the proposed development at Aylesford, College Road, for Unit 6, Unit 7 and the Access Road.

1.3 A Flood Risk Assessment has been developed for the site by Pell Frischmann (Flood Risk Assessment Report RA103739-V010/A) and this Sustainable Drainage Statement accompanies this overarching document.

1.4 This SDS is intended to support a full planning application for Unit 6, Unit 7 and the Access Road and as such the level of detail included is commensurate and subject to the nature of the proposals.

1.5 The location of the site is illustrated within **Figure 1.1** showing a red line boundary for the overall site and a blue line for the development area for this application (Unit 6, Unit 7 and the Access Road). Contextual information is provided within **Table 1.1**.

Table 1.1: Site Details

Site Name	Former Aylesford Newsprint
Location	Aylesford, College Road
NGR (approx.)	TQ713593
Overall Site Area (ha)	38.3
Development Area covered in this application (ha)	11.9
Development Type	Commercial
Lead Local Flood Authority	Kent County Council
Local Planning Authority	Kent County Council
Sewerage Undertaker	Southern Water

Figure 1.1: Site Location

Sustainable Drainage Guidance

1.6 The LLFA, Kent County Council (KCC), have specific SuDS guidance[1] which has been reviewed in the production of this Drainage Strategy. The guidance identifies the purpose of SuDS, aims for the Kent County region and specific local policies to be followed.

1.7 The Non-Statutory Technical Standards for Sustainable Drainage Systems[2] as published by DEFRA have also been utilised to inform the strategy.

1.8 In line with the KCC guidance, a 40% uplift has been applied to account for the impact of climate change.

[1] Sustainable Drainage Systems Supplementary Planning Document (West Berkshire Council, December 2018)
[2] 2015, DEFRA. Non-statutory technical standards for sustainable drainage systems

2. EXISTING CONDITIONS

2.1 The site was formally a Newspaper printworks, where much of the site was impermeable hardstanding. The printworks have now been demolished leaving behind general building rubble. A topographic survey of the existing site post demolition has been undertaken and has been included as **Appendix 1**. This shows levels generally fall from the M20 towards the north from approx. 11.000m AOD falling towards 3.800m AOD. The site has the river Medway towards the East and the Ditton Stream towards the south as seen in **Figure 1.1**.

2.2 The overall site is approximately 38.3ha with the development area for this application being 11.9ha.

2.3 The Ground Investigation undertaken by RSA for Pell Frischmann indicates that the site is underlain by Made Ground compromising of gravel, brick and ash – Superficial Deposits compromising of slightly gravelly clay. RSA/PF site investigations recorded groundwater between 2.8m and 3.4m below ground level. The shallow depths of groundwater suggest there is a risk of groundwater emergence. This risk would preclude the use of infiltration techniques.

2.4 Due to the existing site conditions, it is assumed that current surface water runoff from the site discharges into the Southern Water (SW) sewer. In the event of exceedance, it is assumed that excess surface water would enter the Ditton Stream or River Medway.

Existing Runoff Rates

2.5 An assessment of the existing surface water runoff rates from the overall site area have been undertaken and are summarised within **Table 2.1**.

2.6 The runoff rates have been estimated using Micro Drainage to calculate rainfall intensities for a 15-minute storm at each rainfall event.

Table 2.1: Existing Discharge Rates from the Site

Return Period (Yrs.)	Runoff Rate (l/s)
1	2859.1
30	7012.7
100	9108.1

3. SURFACE WATER DRAINAGE STRATEGY

3.1 The development proposals under this Full planning permission for erection of two warehouse buildings for flexible B1c/B2/B8 use class, realignment of Bellingham Way link road, creation of a north/south spine road, works to the embankment of Ditton Stream and associated servicing, parking, landscaping, drainage, infrastructure and earthworks. Based on the masterplan included as **Appendix 2**, the total proposed impermeable area is 33.5ha, however for this application, it is 11.9ha.

3.2 A proposed drainage strategy has been developed and is included as **Appendix 3**.

3.3 The surface water drainage strategy for Aylesford, College Road has been developed based upon the following design standards aimed at providing Sustainable Drainage System:

Sewers for Adoption 7th Edition

Building Regulations – Part H

BS EN 752, BS EN 12056

National Planning Policy Framework (NPPF, March 2012)

The SuDS Manual – CIRIA (C753)

3.4 In line with current best practice for SuDS hierarchy, the development targets various methods of source control to limit surface water pollution (and minimise overall peak demand on the existing sewer network).

3.5 The Building Regulations recommend a hierarchy of methods of disposal of surface water. In the following order these are: Disposal by infiltration, discharge to watercourse and if neither are reasonably practical then discharge to a public sewer.

3.6 The proposal is to discharge to an existing SW sewer. Infiltration is not viable due to the gravelly clay ground and relatively high-water table. The surrounding watercourses are subject to flooding in storm events and therefore it is not practical to increase the flood risk. As the site already discharges into the SW sewer there is capacity in the sewer as we are providing a betterment.

3.7 Each plot is to discharge its surface water runoff into the Access Road at restricted rates equivalent to their percentage of site area. The Access Road will then discharge into the existing SW sewer at a maximum discharge rate of 500.0 l/s.

3.8 On-site attenuation will be incorporated to account for all events up to a 1 in 100 year plus 40% climate change. The amount of storage required has been designed using the proposed discharge rate of 500.0 l/s. Each plot will incorporate its own attenuation through cellular/oversized pipe storage and permeable paving, and the Access Road through oversized pipes.

Residual Risk and Designing for Exceedance

3.9 If the capacity of attenuation is exceeded for the more extreme storm events beyond the 1 in 100 year events (including 40% for Climate Change), flood water will be directed away from buildings and pool within external areas. Significant excess flows will drain away from the site and onto Bellingham Way where they will be intercepted by the highway drainage network.

Peak Flow Control

3.10 In order to comply with the Non-Statutory Technical Standards for Sustainable Drainage Systems S2-S3[3], runoff from brownfield developments should not exceed existing discharge rates and a betterment is to be provided.

3.11 To comply with the peak flow control criterion, surface water discharge would need to be restricted from all rainfall events to the equivalent Greenfield QBAR rate up to the 1 in 100-year plus climate change event which would equate for the overall site area to 313 l/s. However, following initial discussions with SW by Pell Frischmann, a maximum discharge rate of 500.0 l/s would be accepted in principle to discharge into their surface water sewer. A higher discharge rate could be agreed with SW depending on the capacity available in their network. At the time of writing this report, a maximum of 500.0 l/s will be considered. This discharge rate value may increase subject to further discussions with SW but the proposed discharge rates from the development will not exceed this. This is summarised within **Table 3.1**.

Table 3.1: Existing & Proposed Runoff Rates

Return Period (Yr.)	Existing Runoff Rate (l/s)	Proposed Discharge Rate (l/s)
1	2859.1	500 l/s (Agreed in principle by SW)
30	7012.7	
100	9108.1	
100 + 40%	-	

3.12 Based on a restricted discharge rate of 500 l/s, the overall site will achieve a 82% betterment compared to existing for the 1 in 1 year and 94% betterment for the 1 in 100 year.

3.13 Each plot is to discharge its surface water runoff into the Access Road at restricted rates equivalent to their percentage of site area.

3.14 For Unit 6 and Unit 7, the discharge of surface water will be restricted to 25.4 l/s and 39.9 l/s respectively. The flow will be controlled via a Hydrobrake.

[3] 2015, DEFRA. Non-statutory technical standards for sustainable drainage systems

Attenuated Storage

3.15 As the development proposals require a restricted runoff rate, it will be necessary to provide attenuated storage to balance the excess volume in a safe manner within the site.

3.16 The surface water storage should be located within the site in a position where it can receive runoff from the development and also in a position where it is hydraulically isolated from any fluvial floodplain, external surface water floodplain or overland flow route that may be present. Sufficient storage for events up to the 1 in 100-year storm including a 40% allowance for climate change should be provided. The KCC guidance states that the drainage system and storage should be designed so that flooding does not occur on any part of the site for a 1 in 30-year rainfall event.

3.17 After considering, the site constraints and development aspirations it is suggested that the necessary surface water storage volume is found within a combination of permeable paving within the car parks and cellular/oversized pipe storage located in the service yards. Filter trenches are also proposed around the buildings to provide an additional level of treatment.

3.18 A simulation has been run of the strategic pipe network including storage provision using Micro Drainage. Using a restriction of 500.0 l/s and an impermeable area of 33.5ha, the storage provided ensures the network operates effectively up to the design event. There is no flooding to the network in the 30-year event, and any flooding encountered in the 100 year+40% event will be contained within the site.

3.19 A total volume of 18,960m^3 of attenuation will be provided for the overall site.

3.20 For Unit 6 and Unit 7, a volume of 970m^3 and 1670m^3 of attenuation will be provided respectively.

3.21 The complete MicroDrainage calculations are detailed in **Appendix 5**.

3.22 If SW allow for a higher discharge rate (more than 500 l/s) from the development, the attenuation allowance would reduce.

Sustainable Drainage Systems

3.23 The proposals include multiple cellular/oversized pipe storage units due to the quantum of development proposed. Additionally, permeable paving is included in all car parking areas and a filter drain is included surrounding the proposed warehouse units. The two warehouse units have proposed Rainwater Harvesting tanks as a complimentary source to mains water for the building.

3.24 The Filter Drain/Permeable Paving system, by its nature, conveys flows whilst improving water quality by reducing the likelihood of silt reaching the perforated pipe system and consequently the surface water outfall.

3.25 The use of Full Retention Separators is proposed within service yard areas, in order to remove hydrocarbons, prior to flows entering the attenuation.

3.26 An indicative surface water drainage layout for the development is shown on BWB drawing No. AYL-BWB-GEN-FA-DR-C-0500-0501-0502_Proposed Drainage Layout, included as **Appendix 3**. Additional construction details are shown on BWB drawing No. AYL-BWB-GEN-XX-DR-C-0560-0561_Proposed Drainage Details, included as **Appendix 4.**

4. FOUL WATER DRAINAGE

4.1 It is proposed to drain foul water from the development separately to surface water.

4.2 There is an existing foul water sewer that runs along the southern boundary of the site, parallel with the M20 as identified within the SW sewer records **(Appendix 6)** and site topographical survey.

4.3 It is proposed to divert the existing SW Foul Sewer (subject to a S185 agreement) around Unit 7, then discharge Unit 7 at an unrestricted rate into the sewer, subject to a pre-development inquiry and S106 agreement.

4.4 The remainder of the site has no foul sewer within proximity to it. It is therefore necessary to bring a SW Foul Sewer into the site through the process of a sewer requisition.

4.5 It is proposed that Unit 6 and the potential additional 5 units (included in the outline application) will discharge into a foul sewer contained within the access road at an unrestricted rate. At the time of writing this report, an allowance has been made for pumping foul water from units 1 to 5 into the newly constructed foul water sewer brought into the site via a foul sewer requisition. If the new sewer is built at a deep enough level, then pumping will not be required.

4.6 This strategy is shown within drawing AYL-BWB-GEN-FA-DR-C-0500-0501-0502_Proposed Drainage Layout, included as **Appendix 3**.

5. MAINTENANCE

5.1 Unless adopted, it is likely that a management company would adopt the SuDS features, and maintenance of these, including vegetation maintenance, trash screen clearing and regular outfall inspections.

5.2 Requirements for ongoing maintenance of the drainage network should form part of the Operation and Maintenance manual for the site and should be undertaken by the site management. Any specialist or proprietary products that are specified at detailed design should have a manufacturer specific maintenance regime which should be included within the document.

5.3 It is envisaged that the Operation and Maintenance manual will be developed at the detailed design stage, but some examples are included below.

i. All drainage features should be located in open areas which are readily accessible.
ii. Gullies should be inspected and de-silted at least once a year, where necessary.
iii. Pipes, manholes and silt traps should be inspected and de-silted at least once a year, where necessary.
iv. Regular inspections of the cellular/oversized pipe storage should be undertaken to remove litter/debris, invasive/colonising vegetation and silt build up as necessary. Inlet and outlet structures to be regularly inspected, with remedial work as required to maintain water flows and prevent silt/vegetation build up.
v. Pumps should be inspected as per manufacturers guidance, litter/debris and silt build up should be removed as necessary.
vi. Any specialist or proprietary products specified as part of foul water and surface water strategy should have a manufacturer specific maintenance regime which should be included within the Operation and Maintenance Manual.

6. SUMMARY

6.1 This statement and supporting appendices demonstrate that the drainage design for the development will comply with the relevant local and national standards.

6.2 This SDS is intended to support a full planning application and as such the level of detail included is commensurate and subject to further detailed development of the proposals.

Table 6.1: Sustainable Drainage Statement Summary

		Existing Site	Proposed Development
Site Area (Ha)		38.3	
Impermeable Area (Ha)		-	(33.5 Full Site) 11.9 this application
Outfall Location		Southern Water Sewer	Southern Water Sewer
Peak Runoff Rate (l/s)	**1 in 1-year**	2859.1	500
	1 in 30-Year	7012.7	500
	1 in 100-Year	9108.1	500
	1 in 100-Year + CC	-	500
Infiltration Rate		N/A	N/A
Proposed Storage Volume		-	2,640m^3 This application (18,960m^3 Total Site)
Flow Control Type		-	Hydrobrake, Orifice Plate
SuDS Features		-	Filter Drains, Permeable Paving, Cellular/Oversized Pipe Storage, Rainwater Harvesting
Maintenance Responsibility		-	Management Company

APPENDICES

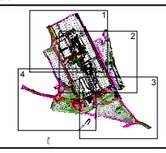
APPENDIX 1: Topographical Survey

Station Coordinates			
Station Name	Eastings (m)	Northings (m)	Height (m)
BWB01	571255.676	158945.751	4.632
BWB02	571162.104	158957.852	5.038
BWB03	571652.832	158984.783	4.199
BWB04	571614.550	159061.567	3.999
BWB05	571553.106	159194.214	3.640
BWB06	571364.174	159541.116	4.630
BWB07	571312.792	159664.630	3.444
BWB08	571172.523	159508.669	4.445
BWB09	571130.666	159475.352	4.549
BWB10	571096.615	159472.964	4.231
BWB11	571087.821	159423.151	4.122
BWB12	571088.389	159516.084	4.116
BWB13	571052.784	159589.117	3.701

Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in metres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.
5. No scale factor has been applied to this survey, therefore the os coordinates are to be treated as arbitrary. Please refer to survey station information below for on site control establishment.
6. All coordinates and height data relate to OSGB36(15). Control stations are coordinated by means of GPS receiving real time corrections via OS smart net.
7. All manhole data is collected from ground level therefore discrepancies may occur. More accurate data is only achievable via confined space entry.
8. OS license number: 100022432

Key Plan



Legend

- OS Buildings
- Surveyed Buildings
- Building
- Wall
- Kerb Channel Line
- Top of Kerb
- Edge of Surface
- Top of Bank
- Bottom of Bank
- Canopy / Overhang
- Line Marking
- Centre Line
- Watercourse Centre Line
- Barrier
- Fence
- Gate
- Overhead Powerline
- Overhead Utilities
- Contour Lines
- Inspection Chamber
- Flow direction and pipe diameter (0.25 / 1)
- Station and Name (BH 1)
- Monitoring Borehole
- Tree / Bush / Sapling
- Area of Vegetation/ Extent of Tree Canopy
- Hedge
- Body of Water
- Body of Water from OS
- Spot Level (*50.00)
- Assumed Surface Water Drainage Line
- Surface Water Drainage Line

AP	Anchor Point	FBW	Fence Barbed Wire	LB	Litter Bin
BG	Back Gully	FCB	Fence Closed Board	LP	Lamp Post
BO	Bollard	FCL	Fence Chain Link	MH	Manhole
BS	Bus Stop	FEL	Fence Electric	Mkr	Service Marker
BT	British Telecom	FMP	Fence Metal Panel	PB	Post Box
C	Crest	FMR	Fence Metal Railing	PT	Post
CL	Cover Level	FOB	Fence Open Board	RE	Rodding Eye
CMP	Cable Marker Post	FPW	Fence Post & Wire	SP	Sign Post
		FSP	Fence Steel Palisade	ST	Stop Tap
CCTV	Security Camera	FWM	Fence Wire Mesh	SV	Stop Valve
CTV	Cable TV	FFL	Finished Floor Level	TCB	Telephone Call Box
DC	Drainage Channel	FP	Flagpole	THL	Threshold Level
		Gas	Gas	TL	Traffic Light
DK	Drop Kerb	GV	Gas Valve	TP	Telegraph Post
DP	Down Pipe	GY	Gully	TS	Traffic Signal
Elec	Electric	Ht	Height	UTS	Unable to Survey
EP	Electricity Post	IC	Inspection Chamber	WL	Water Level
ER	Earth Rod	IFL	Internal Floor Level	WM	Water Meter
FH	Fire Hydrant	IL	Invert Level (as a reduced level)	WO	Wash Out
FL	Floodlight				

Rev	Date	Details of issue / revision	Drw	Rev
P1	14.05.20	First Issue	DS	SS

Issues & Revisions

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Client

Panattoni UK Developments Ltd

Project Title

Aylesford

Drawing Title

Existing Site Plan Sheet 1 of 4

Drawn:	D.Smith		Reviewed:	S.Shreeves	
BWB Ref:	NTS2849	Date:	14.05.20	Scale@A1:	1:1000

Drawing Status

INFORMATION

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
ANP-BWB-00-01-DR-G-0001	S2	P1

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