APPENDIX A JLL MARKET REPORT ON LOGISTICS

Industrial Market Study - North Weald Airfield

Final Report prepared for Paragon North Weald

12 December 2016

Contents

Executive Summary

- Each year a huge volume of industrial and distribution floorspace is taken up for occupation by companies across Britain and in the wider South East, a testament to the continuing need for this type of space despite our service-oriented economy.

- Businesses require light industrial, general industrial and distribution warehouse facilities for a wide range of purposes. Over the past 25 to 30 years the main area of growth within the industrial market has been for distribution warehouse buildings, and there has been a clear trend over time for these buildings to get bigger. These buildings and the logistics activities undertaken in, and associated with, them play vital roles in modern supply chains and make a major contribution to the UK economy in terms of Gross Value Added (GVA), employment and supporting the functioning of other economic activities.

- Independent research and JLL's data highlight that the demand for industrial and distribution floorspace is currently robust and we believe there are strong drivers of demand supporting continuing growth for large-scale distribution warehouse facilities especially.

- However, there is limited building supply and land available in the market to accommodate this demand, particularly along key motorway corridors such as the M11.

- The land at North Weald Airfield provides a significant opportunity to meet this demand. In particular, it has all the attributes to satisfy the requirements of companies requiring large-scale distribution facilities in this area.

- In addition, the site could potentially address the identified lack of employment sites available for development in Epping Forest and the identified need for net additional employment land (B1, B2, B8) within the local authority.

- Finally, we believe this site has potential to attract demand from industrial and distribution companies which may either relocate from London or which find that they cannot secure suitable premises there and, therefore, need to locate elsewhere. Bringing forward industrial development opportunities in the wider South East, especially in areas within existing growth corridors, such as the M11, is one potential spatial strategy for accommodating London's growth.

1 Introduction

This report has been prepared for Paragon North Weald to provide an industrial and distribution property market analysis to help it assess the development potential of land at North Weald Airfield for employment use.

The site under review is currently within Green Belt. It is situated just to the east of the airfield within an area bounded by Merlin Way, Vicarage Lane West and Church Lane. The architect's masterplan for this site shows access being provided from Rayley Lane, off the A414.

The scope of this report is limited to a consideration of market issues, namely industrial and distribution market demand and supply and the market attractiveness and development potential of this site. It does not consider planning policy issues which are being considered separately by PBA, Paragon North Weald's planning consultants.

Following this introduction, the report is divided into four sections:

- Section 2 provides an overview of corporate demand for industrial and distribution warehouse property. This section starts by examining the drivers of demand – why companies need this type of space – and then considers recent market evidence in terms of demand activity. It also considers potential future demand.

- Section 3 examines market supply. This section looks at the supply of property and land in the local area (Epping Forest local authority) and in the wider regional market.

- Section 4 looks at the development potential of land at North Weald Airfield, having regard to the demand and supply analysis and the site's key location attributes in terms of its access to markets, transport infrastructure and labour.

- Section 5 sets out our key conclusions.

2 Corporate demand for industrial and distribution property

2.1 Demand drivers

Light industrial and general industrial

Companies require industrial and distribution facilities to undertake whatever operations are essential to their business. In planning terms, industrial and distribution activities are classified as light industrial uses (planning use B1 c), general industrial uses (planning use B2) and storage and distribution activities (planning use B8).

Light industrial uses cover a wide range of activities, such as assembling goods, and these are generally undertaken in standard industrial buildings which provide general purpose industrial floorspace, typically with some separate office component.

General industrial uses cover a wide variety of manufacturing uses which may involve large-scale production plants, such as for car assembly, or smaller scale manufacturing uses. Larger general industrial uses are often undertaken in purpose built industrial facilities and corporates undertaking large-scale production often own their facilities rather than lease them. Smaller scale general industrial uses can generally be accommodated within standard industrial buildings.

Warehousing and distribution

Companies require warehouse and distribution facilities for a wide variety of purposes and demand for this use has been growing much more than light industrial or general industrial uses.

At a very basic level businesses may simply need space to store goods or plant and machinery which they may require from time to time. However, more typically warehouses perform a vital role in supply chains by enabling companies to hold, and distribute, inventory in order to satisfy customer demand. In many supply chains, goods are offered to customers, such as retailers or end consumers, on a much shorter order lead time (e.g. next day delivery or even same day) than their supply lead time and, in this situation, customer demand has to be supplied from inventory held in warehouses and distribution facilities.

In addition to performing this role, warehouses and distribution facilities may undertake a range of other specialist functions. These include:

- consolidating goods from different parts of the supply chain prior to onward distribution;
- cross-docking goods from elsewhere in the supply chain to fulfil customer orders, in which case goods may be delivered into a warehouse and transferred for dispatch without being put into storage.
- the sortation of parcels so that incoming parcels are sorted by end customer destination.
- the processing of returned goods, where returned goods (or materials) are processed, including packaging or end of-life electrical goods, or increasingly items that are purchased online (e.g. fashion purchases)

Over the past 25 to 30 years, there has been a trend towards larger warehouses and distribution facilities among retailers, manufacturers, third party logistics contractors and other occupiers. This trend has been driven by a number of factors including the fact that by consolidating inventory into fewer larger facilities companies can usually reduce the total amount of inventory they hold (and hence reduce inventory holding costs). In addition, consolidation into larger facilities typically enable companies to secure economies of scale within their warehouse operations and to reduce overall property and labour costs. According to JLL's data in 2016 to date 10 occupier transactions have been concluded across Britain involving new distribution warehouse buildings of 500,000 sq ft and over, including three of 1 million sq ft and above, whereas 10 years ago the corresponding number was seven and the largest building taken up was 800,000 sq ft.

Occupier demand for large distribution warehouses is driven by a wide range of companies including:

- Food and non-food retailers - which use warehouses for store replenishment and/or to fulfil online orders;
- Manufacturers and their suppliers - which use warehouses to support manufacturing supply chains, including the provision of supplies into factories, and for the storage and distribution of finished goods;
- Third party logistics contractors (3PLs) - which use warehouses on behalf of other companies such as retailers and manufacturers who appoint 3PLs on contracts to undertake warehouse and logistics services;
- Wholesalers - which use warehouses to service smaller independent retailers or other organisations such as catering and hospitality businesses;
- Post and parcel delivery companies - which use warehouses for the distribution of letters and parcels, with the latter growing strongly due to the growth in online retail.

Retailers are an especially significant source of demand for large warehouses, and accounted for approaching half (44%) of all Grade A distribution warehouse space taken-up over the last eight years (2008-2015) across Great Britain.

Occupiers of large distribution warehouses will typically have a network of facilities to service Britain, with retailers generally having more facilities than manufacturers as they have to service large, often country-wide, store networks and increasing online orders, whereas manufacturers typically have a much smaller number of delivery points (e.g. the distribution centres of retailers). The distribution networks of retailers and manufacturers typically include national distribution centres (NDCs) designed to service the whole country and regional distribution centres (RDCs) designed to service specific regional markets.

In general, NDCs tend to be situated in the Midlands in an area that is often referred to in the property industry (by developers, investors and consultants) as the distribution 'golden triangle'. This area is not objectively defined but the three points of the triangle are generally considered to be around Birmingham (M6 junction 6) in the west, Castle Donington (M1Junction 24) in the north and Northampton (M1 junction 15) in the south. NDCs are typically located within this area as it provides a 'centre of gravity' location to service the whole of Britain based on access to the country's main centres of population.

By contrast, the location of RDCs is more dispersed as these facilities are generally located in the regions they service, although in some cases RDCs may service larger areas, such as southern England or northern England.

Over recent years, the growth of online retail has generated significant retailer demand for large distribution warehouses, both from 'pureplay' (internet only) retailers, such as Amazon, and multi-channel retailers. Online spending as a percentage of total retail spending more than doubled in the seven years between October 2009 and October 2016, rising from a 6.8% share to a share of 15.1% over this period.[1]). The growth of online retail has generated demand for a range of different types of distribution facilities including large fulfilment centres (where the stock is held and picked at item level), central parcel hubs and local parcel delivery centres, and facilities for the fulfilment of online grocery orders (sometimes referred to as 'dark stores'). In addition, some retailers operate their own facilities to process returned items, although often these facilities are outsourced to 3PLs which may operate them on a shared user basis for a number of different parties.

Companies seeking a new distribution warehouse location will typically first identify an area of search having regard to the location of the customers they intend to service from the warehouse. Reflecting this:

- the area that can be serviced from the warehouse is an important location consideration - ideally the warehouse needs to have a good 'market reach'.
- good motorway access is also an important consideration, reflecting the fact that around three-quarters of all domestic freight in Britain is transported by road, with the motorway network responsible for a disproportionately high share of freight traffic relative to the length of the motorway network.[2] [3]

[1] ONS, Internet sales: value non-seasonally adjusted internet sales as a proportion of all retailing excluding automotive fuel
[2] Department of Transport, *Domestics freight transport by mode*. In 2015 road accounted for 76% of freight moved by al modes (road, rail and water).
[3] In 2015 motorways accounted for less than 1% of the GB road network by length of road but carried 46% of all HGV traffic, see Department of Transport *Road Lengths in Great Britain 2015* and Department of Transport, *Road Traffic Estimates Great Britain 2015*

A good supply of suitable labour is also an important location factor particularly for large buildings that often employ hundreds of workers.[4] Given current high levels of employment, low unemployment and the national shortage of Large Good Vehicle (LGV) drivers, which the FTA estimates to stand at around 35,000, labour supply has become an increasingly important consideration for companies when seeking to establish a new distribution centre.[5]

Finally, the availability of suitable sites is an absolutely fundamental location driver because if sites are not available then demand cannot be satisfied even if locations within the identified area of search are suitable from all other perspectives.

It should be noted that requirements for large distribution can often be quite footloose in terms of location in so far as companies can have a relatively large area of search to start with and may have to compromise on their preferred locations due to a lack of supply or other factors. For example, Tesco.com located a new dot.com warehouse of c 150,000 sq ft for online order fulfilment at G-Park Enfield but considered a wide range of locations around the north east quadrant of the M25 before selecting this site. Similarly, Sainsbury also considered a relatively wide area as part of a wider restructuring of its national distribution network prior to it choosing to select Waltham Point in Epping Forest for a new regional distribution centre.

Recent research shows that distribution warehouse buildings and the logistics activities undertaken in, or associated with, them play vital roles in modern supply chains and make a major contribution to the UK economy in terms of the GVA, employment and supporting the functioning of other economic activities.[6]

2.2 Recent activity – overview of national and regional demand trends

Each year, companies take-up a huge amount of industrial floorspace across Britain to meet their business needs and the market in the wider South East region, including Essex, Hertfordshire and Bedfordshire, makes a significant contribution to this.[7] Over the past five years 2011-2015 inclusive, the take-up of industrial floorspace (all sizes of units from 1,000 sq ft upwards) averaged some 91.2 million sq ft per annum across GB, of which the wider South East accounted for close to 18% (16.2 million sq ft per annum).

Nationally, and in all regions, the majority of floorspace taken up over the past five years was in buildings under 100,000 sq ft. Across GB, take-up of smaller and medium sized buildings accounted for 70% of all floorspace taken up, while in the South East the corresponding share was even higher, at 78%. These statistics highlight that, despite the importance of large-scale distribution uses involving facilities of 100,000 sq ft and over (including Grade A distribution facilities), the main driver of industrial property demand across the country, and even more so in the wider South East, comprises small and medium sized requirements for buildings below 100,000 sq ft. This reflects the fact that SMEs make up the majority of businesses in Britain and in each of its regions.

Table 1: Industrial take-up five years 2011-2015 inclusive

	Annual average take-up 2011-2015 (million sq ft)	Annual average take-up units less than 100,000 sq ft (million sq ft)	Percent share below 100,000 sq ft
GB	91.2	63.6	70
Wider South East	16.2	12.6	78
Greater London	5.3	4.5	84
Wider South East + Greater London	21.6	17.1	79

Source: JLL

Table 2 presents data on the take-up of industrial floorspace by unit sizes for the South East over the past five years 2011-2015. As this highlights, 47% of all take-up was in buildings from 1,000 sq ft to 19,999 sq ft, 30% was for buildings between 20,000 sq ft and 99,999 sq ft and 22% was for buildings of 100,000 sq ft and over.

[4] Survey based research from Prologis published as *Distribution Warehouses Deliver More Jobs*, May 2015 shows an employment density of 1 worker per 69 sq m in large warehouses. This density would mean that a 500,000 sq ft (46,450 sq m) distribution warehouse would employ around 670 workers.
[5] FTA *The Driver Shortage, Issues and Trends*, October 2016.
[6] BPF, *Delivering the goods. The economic impact of the UK logistics sector*, December 2015
[7] When we refer to the wider South East we mean the official South East region plus Essex, Hertfordshire and Bedfordshire, which were formerly in the South East region before moving into the official Eastern region. We include Essex, Hertfordshire and Bedfordshire into the wider South East because these are generally considered to be part of the same property market area.

Table 2: Industrial take-up in the wider South East, five years 2011-2015 inclusive

Unit size sq ft	South East - Million sq ft	Percent of total
1-4,999	13.8	17
5-9,999	11.6	14
10-19,999	13.4	16
20-49,999	16.3	20
50--99,999	8.1	10
100+	18.0	22
Total	81.1	100.00

Source: JLL

Over the past few years industrial property demand has been generally strong as highlighted by the recent quarterly surveys undertaken by the RICS. The latest (Q3 2016) survey, for example, highlights that the 'industrial sector sees solid demand growth.' Indeed, according to this survey, 'the industrial sector was the only area of the market in which occupier demand increased, with the retail and office sectors displaying little change.'[8]

However, over the past year or so a lack of supply has started to restrain take-up activity. For example, Glenny, a leading property consultancy specialising in markets in the North East and South East sections of the M25, report that industrial take-up has reduced in this area 'with a lack of supply holding back the number of transactions completing, particularly at the larger (>50,000 sq ft) end of the market.' Despite this, 'current demand has remained strong, with a total of 15.3 million sq ft of requirements in the Glenny system.'[9]

Glenny report robust demand in each of the four submarkets they review with strong demand in Essex and in North London/Hertfordshire especially.

- In Essex, Glenny report that 'demand remains strong, with total requirements now at the highest level on record for the Essex market at 10.5 m sq ft.'

- In North London and Hertfordshire, 'demand continued to be strong, surpassing the previous peak level of 9.5 m sq ft at the end of 2014. Overall demand in the six months to September 2016 was recorded at 10.2 m sq ft, with more than 83% of requirements for units of 25,000 sq ft and above.'

JLL's own data on active (verified) current requirements for all sizes and types of industrial and distribution space, excluding requirements expressed in terms of a land area, indicate:

- 100 active requirements for Essex, totalling between 4.2 million sq ft and 8.3 million sq ft based on the minimum and maximum size indicated for each requirement. Although these figures are lower than the total volume of requirements logged on the Glenny system, and referred to above (i.e. 10.5 million sq ft) they reinforce the observation that current demand is strong. One reason why the level of requirements logged by Glenny and JLL is different is because many of these requirements will be supply-led and reflect what space each consultant is instructed to market. In addition to these supply-led requirements there will be a core of requirements that are seeking an Essex location, irrespective of what supply is currently on the market.
- 131 active requirements for Hertfordshire, totalling between 5.6 million sq ft and 8.8 million sq ft.

The above evidence highlights strong and ongoing demand for industrial and distribution units across a range of size bands in the wider South East region generally, and more specifically within Essex and North London and Hertfordshire.

2.3 Large-scale distribution property demand

As noted above, over the past 25 to 30 years the UK distribution market has seen a trend towards large buildings and this 'big box' market is recognised as a distinct segment of the market. JLL has monitored demand activity in this market for some 20 years for new space and since 2008 for both new and good quality secondhand space, which together we refer to as Grade A space.

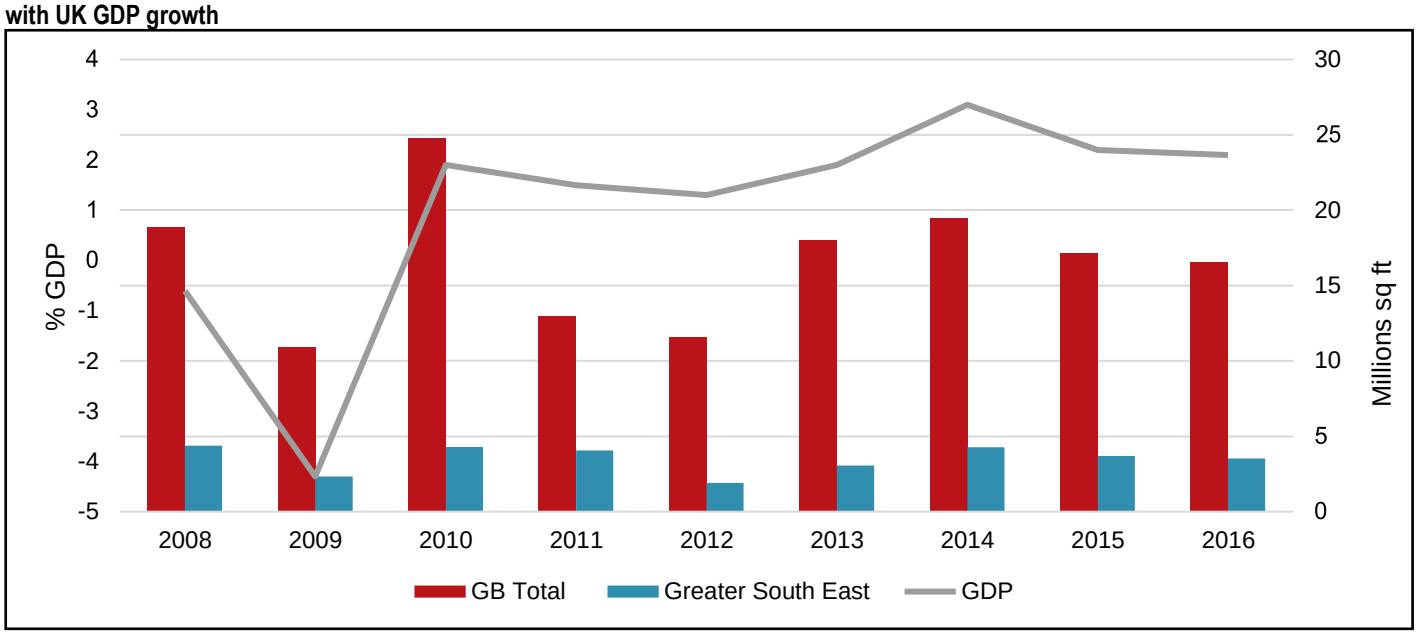
In the eight years 2008 to 2015 inclusive, the take-up of Grade A distribution units of 100,000 sq ft and over totalled 133.8 million sq ft across Britain of which 28.0 million sq ft was taken-up in the greater South East area (i.e, the regions of London, the South East and Eastern).

[8] RICS, *Q3 2016: UK Commercial Property Market Survey*
[9] Glenny Databook, Q3 2016.

Therefore, over this period the annual average level of **Grade A** take-up was 16.7 million sq ft across Britain and 3.5 million sq ft across the greater South East, with the greater South East accounting for 21% of the GB total.

In the same period, the take-up of solely **new** floorspace totalled 88.2 million sq ft across Britain and 18.7 million sq ft in the greater South East. Therefore, over this period the annual average level of new take-up was 11.0 million sq ft across Britain and 2.3 million sq ft across the greater South East, with the greater South East accounting for 21% of the GB total.

Chart 1. The take-up of Grade A distribution warehouses of 100,000 sq ft and over across Britain and the greater South East compared with UK GDP growth



Source: JLL. Greater South East defined at regions of Greater London, South East and Eastern England

As this highlights the greater South East is a significant area for big box distribution demand, which largely reflects the size of this area's economy and consumer market. Within the greater South East, the main focus of demand for large distribution facilities is in the northern 'home counties' and unitary authorities rather than the southern 'home counties' and unitary authorities due to the fact that locations in the north of the region generally have better access to key motorways corridors and can service larger economic and consumer hinterlands in given drive-times. In addition, land for large distribution development has historically been more available in the northern part of South East than in the southern part.

Within the northern home counties, a significant proportion of demand is concentrated along the M1 motorway, including at locations such as Hemel Hempstead, Dunstable and Milton Keynes. The A1 (M) has also attracted some, but more limited, demand, largely focused around Hatfield. The M11 corridor is not as established a distribution corridor compared with the M1 but has, nonetheless, attracted some very significant demand where appropriate sites have been made available, notably at Harlow. For example, recent transactions in Harlow have seen:

- ITS (the supplier of professional power tools and hand tools) lease 150,000 sq ft in DC380, the former Comet building, on Edinburgh Way;
- Poundland (the discount retailer) lease a new purpose built facility of 360,000 sq ft on Fourth Avenue;
- Brakes (the food supplier) lease the former Tesco warehouse on Flex Meadow totalling some 270,000 sq ft.

As another relevant example of demand in the wider area, Sainsbury's opened a 700,000 sq ft RDC (regional distribution centre) at Waltham Point, within Epping Forest local authority, back in 2003 as part of a wider restructuring of its national distribution network.

2.4 Potential future demand

Future demand for industrial and distribution property will be influenced by overall economic conditions and by businesses restructuring their manufacturing and distribution facilities in response to changing market conditions and business objectives.

In general, economic forecasts suggest that the UK economy will grow relatively modestly over the medium-term.[10] Growth is expected to slowdown next year due to lower consumer spending (as rising inflation squeezes real incomes) and weaker business investment, partly due to uncertainty over the Brexit negotiations.

We would expect the overall slowdown in UK economic growth to lead to a more subdued outlook for corporate demand for industrial and distribution facilities nationally in the short-term. However, we believe market demand will nonetheless be supported by continuing strong growth in certain sectors and by the fact that companies will continue to review and restructure their distribution networks to drive down supply chain costs and improve efficiency.

As noted above, at present, a particularly important driver of demand for distribution space is the growth of online retail. This growth is leading to demand for a range of distribution facilities including very large fulfilment centres (often over 500,000 sq ft) where the stock is held and picked at item level, large parcel sortation hubs and local parcel delivery centres, delivery centres for large (2-man) items that are too big to be handled by a parcel network and facilities for the fulfilment of online grocery orders. A study by E-Marketer forecasts that ecommerce retail sales in the UK will grow by 44% over the four years 2016-2019.[11] Given these predictions of strong online growth, this will continue to be a significant source of distribution property demand in the future.

To illustrate continuing strong demand at present, the following companies have active requirements for large-scale distribution facilities in the wider South East and, based on our intelligence, would consider a M11 location:

- Culina Logistics: 200,000 sq ft;
- Bibby Distribution: 150,000 sq ft to 200,000 sq ft;
- Ikea/Wincanton: 250,000 sq ft;
- Matches Fashion / XPO Logistics: 200,000 sq ft;
- An internet retailer: 400,000 sq ft to 500,000 sq ft;
- Keuhne & Nagel: 200,000 sq ft to 300,000 sq ft;

This suggests that if appropriate land is made available along the M11 corridor then it would attract strong interest from companies requiring large distribution buildings.

As noted above, it is important to understand that these requirements are not driven from a location perspective by bottom up local employment growth. Rather the key location drivers are access to customers, transport infrastructure and labour supply plus critically the availability of suitable sites. If appropriate sites are available that provide good access to markets, transport infrastructure and labour, then these sites will attract demand. But companies clearly cannot establish large distribution facilities where such sites do not exist. This has been one reason why the M11 corridor has not secured as many distribution operators as might be expected given its strong location fundamentals.

[10] HM Treasury, *Forecasts for the UK economy: a comparison of independent forecasts*, November 2016
[11] Emarketer, *Worldwide Retail Ecommerce Sales: Emarketer's updated estimates and forecasts through 2019*.

3 Market supply

3.1 Epping Forest

A study by Hardisty Jones Associates (HJA) for Epping Forest District Council (September 2015) identified 42 employment sites within Epping Forest local authority area with a total built stock of over 500 premises.[12] The average size of premises was 'considered small', with around one-third of the stock judged to be 'good' and around two-thirds 'average' with just 3% 'poor'. It noted that the Employment Land Review (2010) identified a vacancy rate of up to 6% which is relatively low. In a strengths, weaknesses, opportunities and threats (SWOT) assessment HJA note that there is limited availability of development land within Epping Forest, which it highlights as a one the district's weaknesses. This study identifies development opportunities at North Weald Airfield, as an opportunity for the local authority, along with opportunities at Debden and St John's Road, Epping.

3.2 The wider market

Research from Glenny referred to above, highlights that industrial supply continues to tighten in Essex generally with total availability down to under 2.2 million sq ft at September 2016. Availability in the North London and Hertfordshire market stood at the same level (i.e. 2.2 million sq ft). Whilst higher than 3 months ago, it reports that the availability rate in this market 'remains close to its recent low point at 3.7%.'

In the wider market area neighbouring Epping Forest the main industrial locations are Harlow, Bishop's Stortford and Chelmsford, of which Harlow is the most significant. All of these locations have limited building availability and land being promoted in the market for future industrial or distribution development.

It is important to note that in Harlow the three Enterprise Zones' sites that are being promoted for a variety of uses would not compete with the subject site at North Weald Airfield in terms of use. London Road North has planning consent for a 50,000 sq m Science Park, while at London Road South the proposed developments will comprise a 32,000 sq m data centre complex with a 20,000 sq m business park providing grade A office space. The vision for Templefields involves its redevelopment for growing SMEs with a focus on manufacturing and associated design activities and potentially businesses in the ICT sector. Therefore, these development opportunities would not compete with the subject site at North Weald Airfield where industrial and distribution uses are the envisaged uses.

3.3 The large scale distribution market

There is a very limited supply of available Grade A distribution warehouses of 100,000 sq ft and over. As Table 3 and Map 1 show there are only eight Grade A buildings in the broad area extending from the A1 (M) in the west round to Thurrock on the A13 in the east. Two of these buildings are under offer. The eight buildings are divided between Harlow (one unit), Enfield (three units) and Thurrock (four units).

Table 3: Available Grade A distribution warehouse buildings of 100,000 sq ft and over from A1(M) to A13 Thurrock

Map No.	Site	Location	Size (sq ft)	Comment
1	DC380, Edinburgh Way CM20 2GF	Harlow	230,000	Secondhand, former Comet, warehouse. Under offer at present to Wincanton for an IKEA contract.
2	Expansion, Stockingswater Lane EN3 7PZ	Enfield	166,850	Secondhand building under offer to CEVA Logistics.
3	One Mollison Avenue EN8 7XQ	Enfield	139,060	Secondhand building owned by Standard Life
4	19 Crown Road EN1 1TX	Enfield	100,833	Secondhand building.
5	Gateway, Central Avenue RM20 3WZ	West Thurrock	110,771	Secondhand building.

[12] Hardisty Jones Associates, Economic and Employment Evidence to Support the local Plan and Economic Development Strategy, Final Report September 2015, page v.

6	Unit 3, Tower Thurrock, Oliver Road RM20 3ED	West Thurrock	101,000	New speculative development completed by Bericote and Black Rock.
7	Thurrock 162 RM20 3FG	West Thurrock	162,508	New speculative development by Graftongate and Legal & General. Completed Q4 2016.
8	Prologis at London Gateway SS17 9FE	London Gateway, Thurrock	316,946	New speculative development by a JV between DP World and Prologis.

Source: JLL

Map 1: Available Grade A distribution warehouses of 100,000 sq ft and over

Table 4 details the main sites that are being promoted for large-scale industrial and distribution development in the same broad market area extending from the A1(M) round to Thurrock.

Table 4: Major sites in the market being promoted for large-scale industrial and distribution development from A1 (M) to A13 Thurrock

Site name	Location	Size acres	Development potential (sq ft)	Developer	Comments
GSK site, Third Avenue CM19 5AW	Harlow	c. 40 acres	c. 600,000 sq ft		Allocated employment site which GSK is currently seeking to sell to an industrial developer. Subject to this sale, c 10 acres would be immediately available for development with GSK retaining short-term occupation of other parts on a leasehold basis. Long-term, GSK wishes to remain on part of the site. .
Midas, River Way CM20 2EA	Harlow		Up to 200,000	Canmoor/Clerical Medical	
Enfield Distribution Park, East Duck Lees Lane, Mollison Avenue EN3 7SR	Enfield	7	BTS up to 120,000 + phase 2 land.	Aberdeen Asset Management & Graftongate	Potential for a 120,000 sq ft unit plus smaller trade style units + phase 2 land. Outline planning consent.
Montagu406, Montagu Road SN18 2NZ	Edmonton	29	c 680,000	Enfield Council seeking developer partner	Redevelopment of existing Montagu Estate extending to 29 acres of which Enfield Council owns 18 acres. The Council is seeking to promote forindustrial employment, but likely to be B1c, B2 and managed workspace/offices (B1a).
Urban Logistics, London Hawley Road N18 3SB	Edmonton	30	386,000	LaSalle & Fairacre	Outline planning consent for two units, one of 300,000 sq ft and the second of 86,000 sq ft. The site also has the potential of further development. Adjacent to the Meridian Water development and could go to residential instead.
Avocet Distribution Park RM13 9DD	Rainham	25	Up to 410,000	Rainham Steel Investment Ltd	New development site with potential from 24,700 sq ft to 410,000 sq ft.
Brentwood Enterprise Park	Brentwood	60	In excess of 1 million	St Modwen	St Modwen intends to submit a planning application post allocation of the site in the adopted Local Plan, currently targeted for adoption in Autumn 2017.
East Plus - Beam Reach 6	Rainham	14	250,000	SEGRO & GLA	Potential to develop two units of 125,000 sq ft each
East Plus - Beam Reach 5	Rainham	16.4	308,664	SEGRO & GLA	Part of the wider East Plus development between SEGRO and GLA. Seeking planning permission for two 100,000 sq ft + units (205,213 sq ft & 103,451 sq ft). Part of the site is being speculatively developed.
East Plus - Ferry Lane	Rainham	8.5	Up to 215,00 with largest unit of 150,000	SEGRO & GLA	Up to 215,000 sq ft with the largest unit being 150,000 sq ft
The Crux Logistics Park, Purfleet RM15 4YD	Purfleet	23	50,000 to 400,000	SEGRO	A new BTS development opportunity.
Purfleet Commercial Park, Bluelands Quarry site RM19 INS	Purfleet	15	Up to c. 330,000 depending on layout	Goodman	
London Gateway SS17 9DY	Thurrock		c 8 million potentially remaining	DP World	
Former Coryton Refinery SS17 9LL	Coryton	400	7 million	Shell/Greenergy	Long-term (10 years +) development opportunity which is likely to be brought

					forward over the long-term via a JV between Shell and another party.
Lee Park Distribution Centre EN3 7SS	Enfield		208,000	SEGRO	Build to suit opportunities from 25,000 sq ft to 208,000 sq ft, deliverable from Q3 2017.

Source: JLL

As this highlights, within this wide market area, there is very little land in the vicinity of the subject site with the main development potential in east London and the wider East Thames Gateway (e.g. London Gateway).

4 Market potential of land at North Weald Airfield

4.1 Location and site attributes

North Weald Airfield has a number of strong attributes as an industrial/distribution location.

- A distribution facility at North Weald Airfield would be able to service a large population within a 1-hour, 2-hour and 4.5 hour LGV drive-time making it an attractive location for a distribution facility designed to service London or the wider South East / southern England. As Table 5 highlights 5.6 million people can be reached within a 1-hour catchment, 18.6 million within a 2-hour drive from the site and 45.8 million within a 4.5-hour drive time. The latter is the legal maximum length of drive a lorry driver can drive for without taking a mandatory break. As the map in **Appendix 1** shows a distribution facility located at North Weald Airfield would be able to service a large part of London and the wider South East, East Midlands and Eastern regions within a 2-hour LGV drive time, making it a good location for a facility to provide a same day delivery service to these destinations. Within a 4.5 hour drive, this catchment area extends to cover all of the South East, Eastern and East and West Midlands and significant parts of northern England and into the South West towards Exeter. The population within this larger area (45.8 million) represents 72% of the GB population (63.6 million).

Table 5: Drive time population catchments 2016-2026 from North Weald Airfield

	LGV Drive Times		
Population at 2016	**1-hour**	**2-hour**	**4.5 hour**
Total population	5,629,197	18,575,594	45,786,196
Projected population at 2026			
Total population	6,271,498	20,444,626	49,249,557
Change 2016-2026	11.4	10.1	7.6

Source: CACI

- It has good access to the M11 motorway (at junction 7) via the A414; the junction is around 1.9miles away from the roundabout at the intersection of Rapley Lane, Merlin Way and Vicarage Lane West, which is the proposed access to the subject site. The M11 is a key strategic growth corridor for London and the South East.

- Via the M11 the location has access to the M25 motorway which is just one junction away. The M25 provides access to the national motorway network, including the M1 and M4 motorways.

- It has a sizeable population catchment and large population of working age within a 20 and 30-minute car drive time, indicating a large potential labour supply for potential businesses to draw on. Within a 20-minute car drive time of the subject site the population is around 221,100 and within a 30-minute drive time this rises to over 1 million. The population aged 15 to 64 totals around 140,400 within 20 minutes and 694,000 within 30 minutes. **Appendix 2** provides a map of the 15 and 30-minute drive time areas from the site under review.

Table 6: Drive time population catchments 2016-2026 from North Weald Airfield

	Car Drive Times		
Population at 2016	**10 minutes**	**20 minutes**	**30 minutes**
Total population	51,417	221,102	1,082,135
Population aged 15-64	32,058	140,428	694,066
Projected population at 2026			
Total population	56,085	242,214	1,208,585
Change 2016-2026	9.1%	9.5%	11.7%

Source: CACI

- The site could address the identified lack of employment sites available for development in Epping Forest and the identified need for net additional employment land (B1, B2, B8) within the local authority. This requirement has been identified by Hardisty Jones Associates (HJA) based on forecasts of employment growth in relevant employment sectors in Epping Forest district and its wider

functional economic market area (i.e. Epping Forest plus East Hertfordshire, Harlow and Uttlesford).[13] However, whilst this approach indicates a need for net additional employment land based on local authority employment forecasts, it does not, in our opinion, take account of the new demand that could be created by the availability of land. In other words, whilst employment growth may create demand for new development land supply, new land supply can itself generate demand and hence create new employment growth. This supply-led demand has been proven in many cases of industrial and distribution development. For example, IDI Gazeley's flagship distribution development at Magna Park, Lutterworth (the former Bitteswell Airfield), which is currently the UK's largest dedicated distribution park with some 8.3 million sq ft developed, would not have been justified by any local employment forecasts for Harborough district.

- Finally, we believe this site has potential to attract demand from industrial and distribution companies which may either relocate from London, or which find that they cannot secure suitable premises there and, therefore, need to locate elsewhere. Existing research for the Greater London Authority (GLA) highlights the extent to which London's stock of industrial land has diminished over time and the extent to which over recent years this loss has run at around three times that envisaged in the Greater London Authority's Land for Industry and Transport Supplementary Planning Guidance.[14] This pressure on London's industrial land is not expected to abate given long-term employment, population and household growth projections, and currently residential land values are typically three to seven times industrial values. Bringing forward industrial development opportunities in the wider South East, especially in areas within existing growth corridors, such as the M11, is one potential spatial strategy for accommodating London's growth.[15]

4.2 Market potential

Based on our assessment of recent market demand and our analysis of current active requirements we believe that the subject site has the potential to be a significant industrial/distribution site offering a combination of large-scale distribution facilities and a range of smaller scale units in the range 15,000 sq ft to 100,000 sq ft.

The provision of large-scale distribution buildings could help meet the demand for this type of use north of London. This demand tends to be relatively footloose but is typically focused on key motorway corridors. The available supply of appropriate land is a critical location factor for companies requiring these facilities.

The provision of smaller industrial buildings e.g. from 15,000 sq ft upwards could help to address the lack of 'grow-on-space' which has been identified as causing some businesses to leave Epping Forest local authority in order to grow elsewhere.[16] This type and size of unit might also be suitable to companies that might relocate from London, due to the pressure on industrial land there and the high costs of operating (property and labour costs).

[13] Hardisty Jones Associates, *Economic and Employment Evidence to support the Local Plan and Economic Development Strategy. Final Report* prepared for Epping Forest District Council, September 2015.
[14] AECOM, London Industrial Land Supply & Economy Study 2015, prepared for the Greater London Authority.
[15] Outer London Commission, *Seventh Report: Accommodating London's Growth. Main Report*, March 2016.
[16] Hardisty Jones Associates, *Economic and Employment Evidence to support the Local Plan and Economic Development Strategy. Final Report* prepared for Epping Forest District Council, September 2015.

5 Conclusions

We believe there is a compelling case for further employment land in Epping Forest district and that the subject site at land at North Weald Airfield provides a significant opportunity in this respect.

The research in this study provides support for this case by highlighting strong commercial demand for industrial and distribution space. In particular, JLL's data on active (verified) current requirements for all sizes and types of industrial and distribution space, excluding requirements expressed in terms of a land area, indicate 100 active requirements for Essex, totalling between 4.2 million sq ft and 8.3 million sq ft based on the minimum and maximum size indicated for each requirement. Independent research from Glenny reports that 'demand remains strong, with total requirements now at the highest level on record for the Essex market at 10.5 m sq ft.' Specifically with respect to the large distribution market, there are a number of named requirements for large facilities which we believe would consider a M11 corridor location.

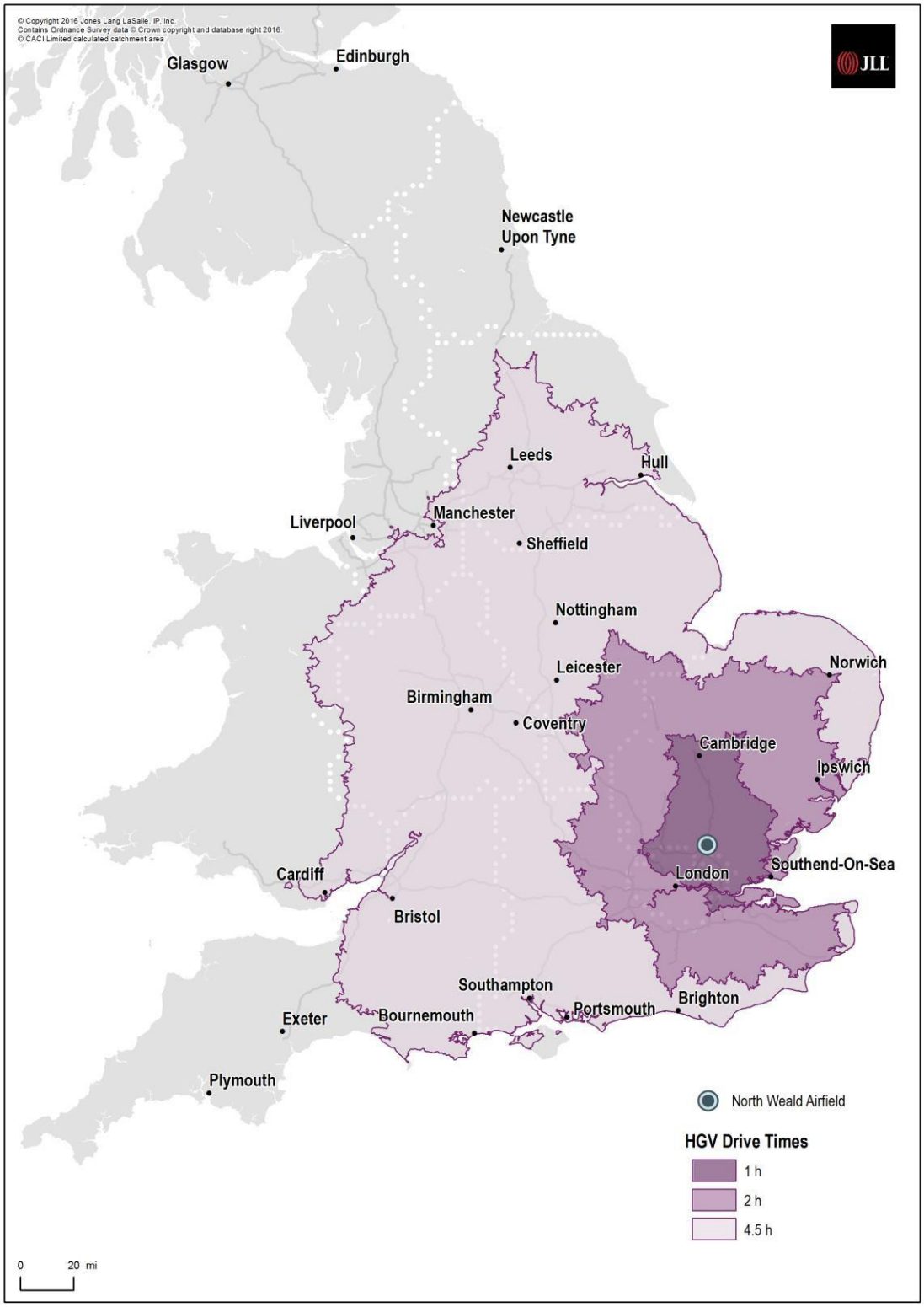
In addition to addressing the demand for large distribution facilities, which is often quite footloose and driven in part by the availability of land, the subject site would address the identified lack of employment sites available for development in Epping Forest and the identified need for net additional employment land (B1, B2, B8) within the local authority. This requirement has been identified by Hardisty Jones Associates (HJA) based on forecasts of employment growth in relevant employment sectors in Epping Forest district and its wider functional economic market area (i.e. Epping Forest plus, East Hertfordshire, Harlow and Uttlesford). However, whilst this approach indicates a need for net additional employment land based on local authority employment forecasts, it does not, in our opinion, take account of the new demand that could be created by the availability of land. In other words, whilst employment growth may create demand for new development land supply, new land supply can itself generate demand and hence create new employment growth.

Finally, we believe this site has potential to attract demand from industrial and distribution companies which may either relocate from London, or which find that they cannot secure suitable premises there and, therefore, need to locate elsewhere. Existing research for the Greater London Authority (GLA) highlights the extent to which London's stock of industrial land has diminished over time and this pressure on London's industrial land is not expected to abate given long-term employment, population and household growth projections. Bringing forward industrial development opportunities in the wider South East, especially in areas within existing growth corridors, such as the M11, is one potential spatial strategy for accommodating London's growth.

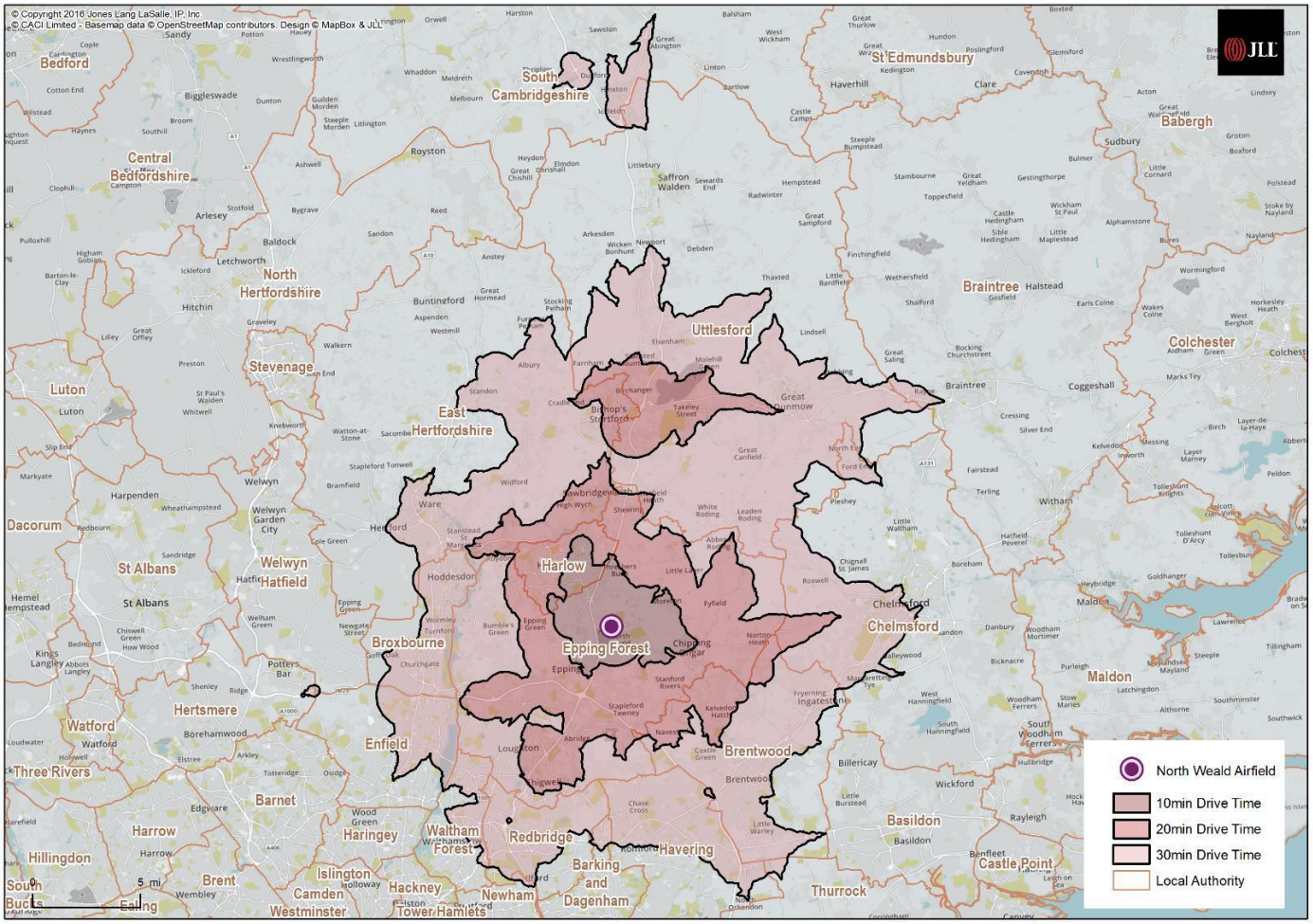
Compared with this strong demand, available industrial and distribution supply is tight. In particular, there is a very limited supply of available distribution warehouses of 100,000 sq ft and over. As Table 3 and Map 1 show there are only eight Grade A buildings in the broad area extending from the A1 (M) in the west round to Thurrock on the A13 in the east and two of these are under offer. In addition, there is little available supply of development sites in the market that are currently being promoted for industrial and distribution development in the vicinity of the subject site, with the bulk of these sites being further away, e.g. in Thurrock.

It is important to note that in Harlow the three sites in the Enterprise Zones that are being promoted for a variety of uses would not compete with the subject site at North Weald Airfield in terms of use because they are being promoted for different uses than those envisaged at the subject site.

Appendix 1. Map showing 1, 2 and 4.5-hour LGV drive time from North Weald Airfield



Appendix 2. Map showing 10, 20 and 30-minute car drive catchment from North Weald Airfield



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APPENDIX B DELIVERY EVIDENCE

TECHNICAL NOTE

Job Name:	North Weald Airfield
Job No:	39454
Date:	January 2018
Prepared By:	N Newe
Reviewed By:	R Parker
Subject:	**Trip Generation and Transport Constraints Report**

1.0 Introduction

1.1 This Transport Technical Note) has been prepared by Peter Brett Associates LLP (PBA) to support the promotion of the whole Site for its inclusion within the local plan as a strategic warehousing (B8 use) site at North Weald Airbase, Essex.

1.2 The proposed development site is located to the east of the North Weald Airfield. It includes a proposed land allocated (Site Allocation Ref: NWB.E4) in Epping Forest District Council's Local Plan (Submission Version 2017), which comprises part of the existing airfield site as well as land to the east of Merlin Way, and unallocated adjacent land to the south of Merlin Way / Vicarage Lane roundabout. The Figure below shows the red line boundary of our proposed development site.

1.3 The development site is located to the east of the M11 motorway. The village of North Weald Bassett lies just to the south east of the site and the town of Epping is approximately 5 kilometres to the south west, while Harlow about 10 kilometres to the north.

1.4 The indicative masterplan indicates a development proposal comprising up to 13 commercial warehouse units with associated car parking and loading bays. The 13 units are proposed to comprise 9,838sqm of B1 office associated with 163,453sqm of commercial warehousing (B2/B8), resulting in 173,291sqm in total. The following Figure illustrates the proposed site layout.

Figure 1: Indicative Development Layout

2.0 Development Impact

Trip Generation

2.1. A high level trip generation assessment has been undertaken as part of our previous Note in December 2016, using trip rates derived from the TRICS database, the standard tool used in the industry. The following Table shows the likely peak hour trips of the proposed development by employees and visitors as well as HGVs.

	AM Peak Hour			PM Peak Hour		
	Arr	Dep	2-Way	Arr	Dep	2-Way
Employees and Visitors	93	45	138	44	111	155
HGVs	29	29	58	11	22	33
Total	**122**	**75**	**197**	**55**	**133**	**187**

2.2 The above estimates of employee and visitor car trips reflect a worst case position with no enhancement to current poor public transport connections.

Trip Distribution

Employees and Visitors

2.3 In order to determine the likely distribution of employee and visitor trips, Census 2011 Flow Data for the super output middle layer area of Epping Forest 001 and for the vehicle driver mode has been utilised. Based on this data, vehicular routes have been established between the proposed development site and the top 10 origins (usual residence) of employees.

2.4 With regard to the M11 motorway, the data analysis has shown that about 40% of the workforce would be likely to access the site via the M11 (N) and a further 13% via the M11 (S).

Heavy Goods Vehicles

2.5 At this early stage of the process, the final occupiers of the units at the North Weald Airfield development are not known, and therefore, the distribution of HGV trips travelling to and from the proposed development site is not known. As a result, HGV trips have been assigned to the local highway network based on available turning count data for the M11 J7 presented within the Transport Assessment (TA) for the Enterprise West Essex development prepared by Mouchel (August 2012).

2.6 The data shows that in the morning peak hour 47% of existing traffic along the M11 travels in a northbound direction and 53% in a southbound direction. In the evening peak hour, 52% of the total traffic along the M11 travels northbound and 48% southbound.

2.7 Based on this distribution, HGV trips of the proposed development have been assigned to the motorway. It should be noted that all forecast HGV trips have been assigned to the motorway, however it is considered likely that a proportion of HGV trips would utilise local links of the highway network. As such, the assessment presented is considered to present a robust case.

2.8 The following Table shows the morning and evening peak hour total vehicle trips of the proposed development by direction and by slip roads of the M11 J7.

	AM Peak Hour	PM Peak Hour
Northbound		
Diverge	29	10
Merge	30	57
Southbound		
Diverge	49	24
Merge	23	23

Impact Assessment Requirements

2.9 HE have advised that the following assessment would be required to determine the development impact on the M11 J7:

- if a development is forecast to generate more than 30 vehicle movements an hour in the AM or PM peak periods (on any arm of the roundabout) than this would trigger the need for a capacity assessment;
- if a capacity assessment is required, HE recommends that either a LinSig or TRANSYT model of the current M11 J7 layout is undertaken. Junction 7 would need to be modelled with and without Junction 7a (as a worst case).

2.10 As shown in the initial high level trip generation and distribution assessment presented above, the proposed development is likely to generate in excess of 30 vehicle movements on different arms of the roundabout forming the M11 J7. Thus, it is currently anticipated that junction capacity modelling will need to be undertaken for the proposed development in order to identify the developments' impact on this junction and in order to proposed appropriate mitigation measures.

2.11 HE reiterated that *"as there is currently no identified improvement scheme for Junction 7, the developer would need to mitigate the impact of their development at M11 Junction 7 (measures that are in proportion to the scale of the development impact if required)."*

2.12 Based on the outcomes of the high level assessment, it is considered, however, that the improvements to M11 J7 required as a result of the additional development traffic would be relatively minor.

3.0 Highway Access

3.1 **Figure 2** identifies the local highway network. Access to the site is via the A414, a single carriageway road which links Harlow in the west with Chelmsford in the east. It also provides access to the M11 via junction 7, which lies just 2 kilometres to the north west of the airfield site. The site is therefore very easily accessed from the National strategic highway network.

3.2 The main site access would be from the north onto the A414 via Merlin Way. This would cater for all HGV movements to and from the site and also most employee trips. Local access to the south to connect with the existing village of North Weald Bassett, could be provided, although this could potentially be restricted to buses, cycles and emergency access in order to minimise any impacts of the development upon the village.

3.3 Merlin Way, which forms the western boundary to the site, connects to the A414 via Rayley Lane. These are both single carriageway roads with a width of between 7 and 8 metres. Merlin Way has a footway on the western side (adjacent to the airfield) but there is no footway on Rayley Lane. At the northern end, Rayley Lane connects to the A414 via a three arm

roundabout. Merlin Way is a no through route terminating at its southern end within the existing industrial estate.

3.4 Merlin Way and Rayley Lane meet at a 3 arm roundabout and Vicarage Lane provides the third arm. This is a minor access road which also provides an access route through the A414. However, the eastern end of Vicarage Lane is one way (westbound) and therefore whilst vehicles can access the airfield site via this junction there is no egress onto the A414. Church Lane also provides an access route between Vicarage Lane and the village of North Weald Bassett. At its southern end this routes through an existing residential area and is not suitable to accommodate high volumes of through traffic.

3.5 Further to the south of the site is the B181 Epping Road, which provides a link between the A414 and Epping. The road also runs through the village of North Weald Bassett which takes the form of a ribbon development along that road. Epping Road, which is a single carriageway road, runs on route to Epping through Epping Forest and has a footway on its southern side.

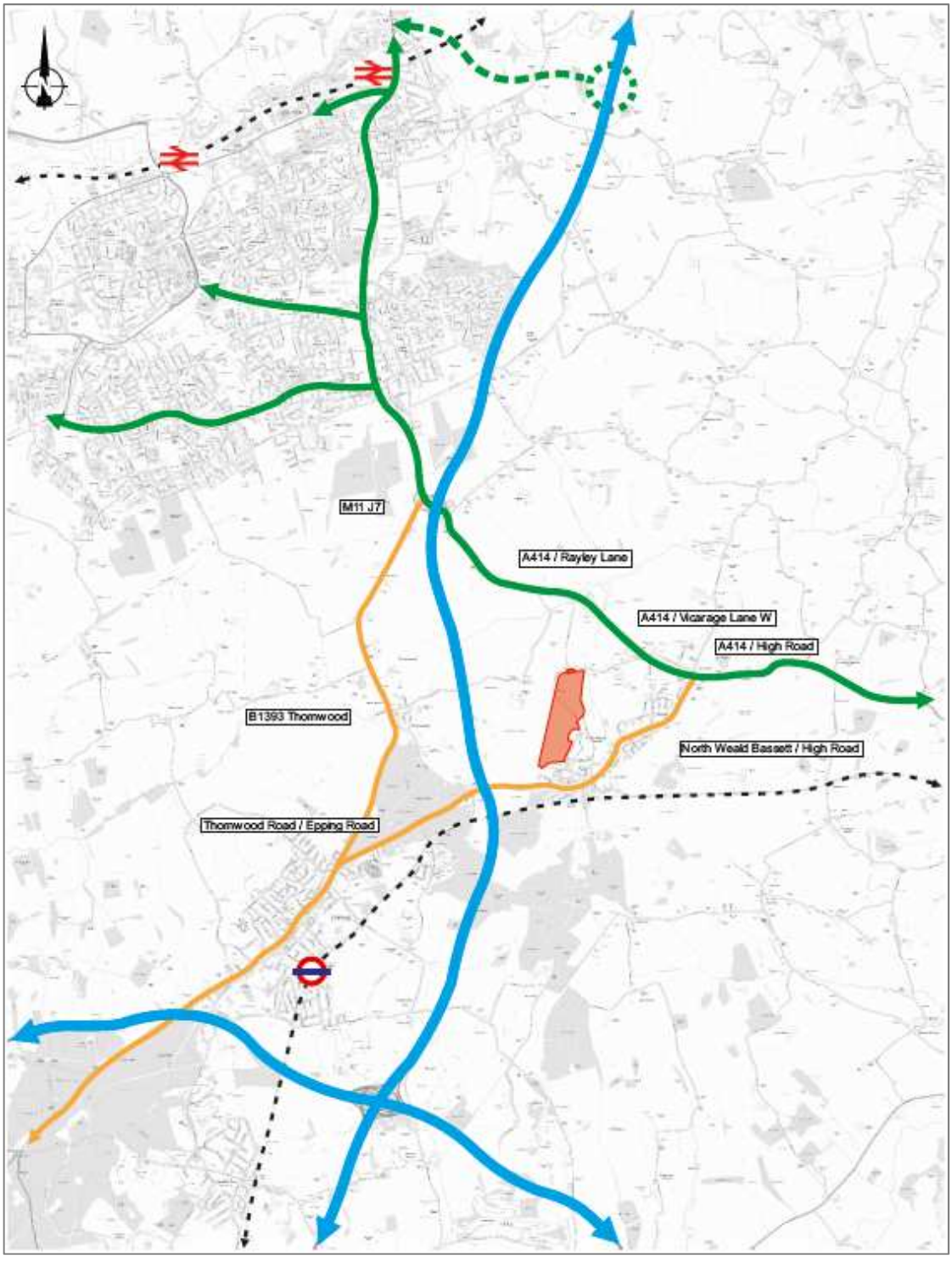


Figure 2: Local Highway Network

Highway (Hot Spots) Constraints

3.6 **Figure 3** identifies key hotspots on the highway network. These have been identified based upon site visits and earlier discussions with ECC and Highways England.

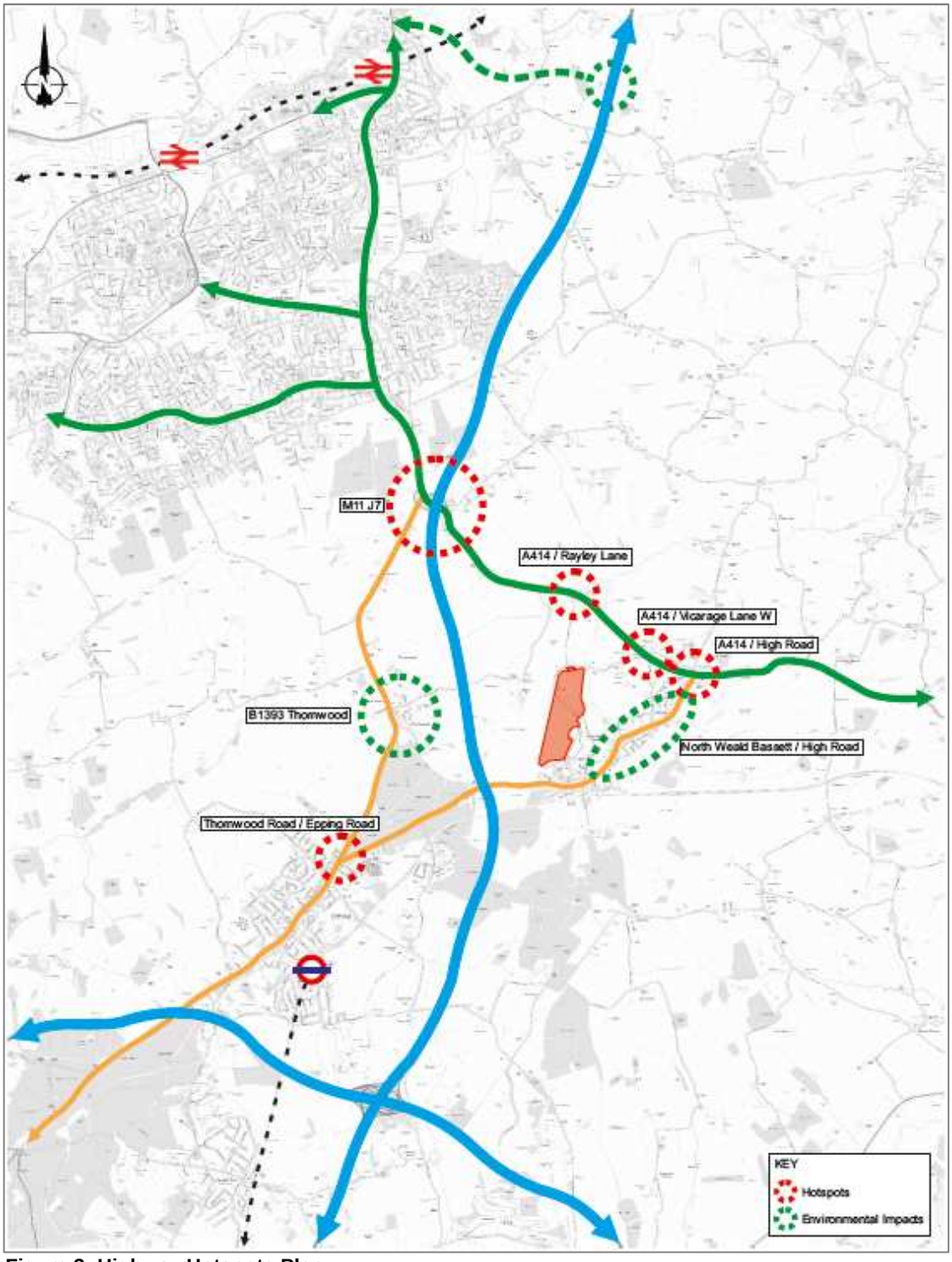


Figure 3: Highway Hotspots Plan

3.7 The key hotspots have been identified as follows:

- M11, J7 - there are peak period queues on the A414 approaches to the junction. It is understood that long queues also build up on the A414 (east) approach when Sunday markets are held on the site. Whilst there is some queuing at peak times on the approaches to the junction from the M11 slip roads, it is understood that such queues do not normally queue back into the mainline motorway. However, the consented M11 J7a to be located to

the north of M11 J7 will when fully implemented reduce traffic flows along the M11 J7 slip roads;

- The A414 between junction 7 and Harlow is also subject to peak period congestion, however the M11 J7a is anticipated to improve the current situation;

- The junction of the B181 Epping Road / B1393 Thornwood Road on the access route into Epping. From correspondence with ECC it is understood that in particular HGV movements generated by any development on the airfield site would need to be restricted to utilise the A414 and thus avoid the B181.

Other Hotspots which need to be considered

3.8 In addition to these main hotspots, there are other links and junctions which, based upon observation and discussions with ECC, may require attention in order to support the proposed development. These include:

- The three arm roundabout junction of A414 / Rayley Lane which provides access to the site;

- The four arm roundabout A414 / B181 High Road which provides access to North Weald Bassett and onwards to Epping;

- Link capacity of A414 to east of this junction, providing access towards Chipping Ongar and Chelmsford.

3.9 Other highway/environmental issues that require consideration are:

- The potential impacts of the development on North Weald Bassett and in particular potential use of the High Road as a through route towards Chelmsford;

- How to improve connectivity between the new and old communities without causing undue impact on North Weald Bassett as discussed above;

- Potential to improve eastern connections between the site and the A414; the existing junction of A414 and Vicarage Lane allows only for the left turn from A414 into Vicarage Lane; and

- Potential impact of development traffic on Thornwood Village due to possible increased use of the B1393 Thornwood Road and of Woodside, a lane connecting Epping Road to Thornwood Road, as an alternative access route to Junction 7 and to Harlow.

3.10 Of the above hotspots the proposed development would mainly impact the M11 junction 7 and the A414/Rugby Lane roundabout.

Epping Forest District Council - Submission Local Plan - Highway Assessment Report (December 2017)

3.11 A transport modelling assessment has been undertaken by Essex Highways, on behalf of EFDC and Essex County Council (ECC), to assess the potential transport related effects of the district's emerging Local Plan and some of the initial mitigation measures potentially required to support the delivery of planned development.

3.12 The results of the assessment indicate that the forecast development traffic would increase traffic levels significantly across the network. This would be expected given the quantum of employment land and housing proposed. The analysis demonstrates that the delivery of a combination of more ambitious sustainable transport and physical highway improvements could

potentially mitigate the most significant impacts of the Local Plan, particularly when considered against the 2033 Do Minimum Scenario where no Local Plan growth is delivered. The scale of mitigation required will be refined as part of ongoing assessments of the Submission Local Plan scenario.

3.13 Whilst the highway modelling work identifies significant over capacity issues at a wide range of junctions there is only one junction within North Weald Bassett, the A414 / B181 High Road roundabout which has been identified as in need of upgrading. This junction, which currently operates well within capacity, the opportunity for "*local widening to increase approach lane and circulatory capacity*" is identified.

3.14 The modelling report therefore does not identify any major issues on ECC managed roads that might compromise the ability to develop the whole of the site as proposed.

M11 Junction 7

3.15 The M11 J7 is currently operating close to its planned capacity. According to Jacobs (15 March 2017) M11 J7a Model Forecasting Report, "*in recognition of this constraint, HE* [Highways England] *has currently imposed a cap on the number of new jobs permitted within the Harlow Enterprise Zone until network capacity issues are addressed."*

3.16 From liaising with ECC, it is understood that improvements to the M11 J7 will be needed to accommodate growth in the wider Harlow and Epping Forest areas, as the junction is and is anticipated to be at capacity with committed growth, although the M11 J7a will release some pressure of the existing J7 once implemented. However, from liaising with Highways England it is understood that currently no improvement scheme for the M11 J7 has been identified.

3.17 According to Jacobs (15 March 2017) M11 J7a Model Forecasting Report, submitted as part of the planning application for the implementation of the M11 J7a scheme, traffic flows on links close to the proposed North Weald Airfield development site are forecast to increase with the new M11 J7a in place with the exception of traffic flows along the M11 mainline to the north of the existing J7.

3.18 The increase in traffic along the A414 to the east of M11 J7 is considered to be partially due to existing traffic re-routing as a result of freed up capacity at the M11 J7, However, it is also partially due to the traffic generation of committed and likely to be committed developments in North Weald Bassett and Chipping Ongar, as traffic of these areas is likely to utilise the A414 to access the strategic highway network (M11).

3.19 The medium growth scenario modelled by Jacobs includes the following development growth assumption for North Weald Bassett and Chipping Ongar:

- 505 new homes in 2021
- 981 new homes in 2036
- 437 new jobs in 2021
- 1473 new jobs in 2036

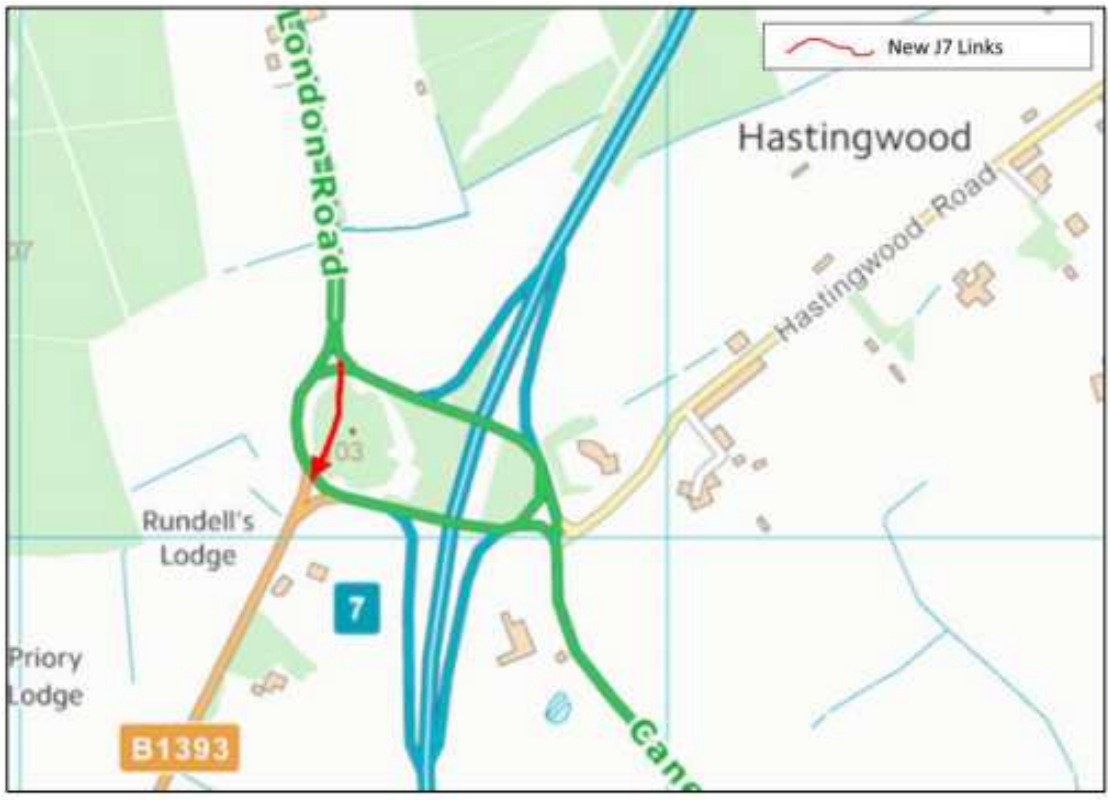
3.10 It should be noted that the above contains trips for the re-developed Airfield site. For the Airfield it has been assumed:

- 66 new homes in 2036
- 162 new B1 office jobs in 2036

3.11 It is furthermore understood that any improvements to the M11 J7 would need to be put forward by HE as part of the Road Investment Strategy (RIS) 2 or 3. Given that RIS 2 is covering the period between 2020 and 2025, with RIS 3 following post 2025, any major improvements to the M11 J7 could be a long time off.

3.12 However, ECC has pointed to the possibility of interim works at the junction to prolong its lifespan until more major works are completed and not impinge on the larger scheme.

3.13 Notwithstanding the above, within Jacobs (15 March 2017) M11 J7a Model Forecasting Report reference is made to a "full package of improvements" to the M11 J7 due to be implemented by 2020. The inclusion of these measures, according to the report, was informed by ECC and the probability was assessed taking account of 'Additional Development Information' provided by planning officers.



Contains Ordnance Survey data © Crown copyright and database 2017
Source: Jacobs (15 March 2017) M11 J7a Model Forecasting Report

Figure 4: Indicative M11 J7 Improvements

A414 / Raylay Lane Roundabout

3.15 Although no assessment has been undertaken for the A414 / Raylay Lane roundabout, given that this junction would provide the key access to the development site, it is considered that improvements would need to be implemented to facilitate the development.

3.16 It is anticipated that the scope of such improvements would be determined once more detailed assessment of the development proposals would be undertaken.

4.0 Public Transport Access

4.1 North Weald Bassett is served by a number of bus services but there are no regular bus services accessing the airfield site itself. The nearest public rail services are at Epping (Central Line services from Epping Underground Station), located approximately 4km from the site, and heavy rail services from Harlow located approximately 11km from the site. Heritage rail services are also available from North Weald Bassett Station.

4.2 It is considered likely that as part of any development on the site, enhancements to the site's public transport access would need to be provided to meet the needs of future employees of the site. However, new connections between the site and for instance Epping station / town centre would only be required at employee shift change times.

5.0 Pedestrian and Cycle Access

5.1 There are effectively no facilities, either on-site or within the surrounding area, to encourage cycle movement and, whilst distances between the site and key destinations such as Epping and Harlow are not excessive, the environment for cycling is generally not attractive.

5.2 Existing pedestrian facilities within the site are fairly rudimentary and are limited to a footway along the west side of Merlin Way. There are no direct connections between the site and the North Weald Bassett other than unofficial routes through the existing industrial estate.

5.3 However, the site is very easily accessible by foot or cycle from the existing village of North Weald Bassett and so it would be feasible to encourage local workers to use these modes to travel to and from the site. The proposed expansion of housing within the local area will also increase the potential for using these modes.

6.0 Development Access Strategy

6.1 It is anticipated that the following would be needed to support the access strategy for the proposed development:

- mitigation measures for M11 J7;
- highway enhancement works along Rayley Lane;
- contribution towards public transport improvements towards Epping station / town centre; and
- implementation of local pedestrian and cycle improvements.

6.2 In addition to the above infrastructure requirements, it is considered that the development of a robust Travel Plan would be beneficial to reduce the volume of vehicle trips accessing the site by encouraging sustainable travel modes amongst employees.

7.0 North Weald Park Proposals

7.1 Although at an early stage, plans to redevelop the North Weald golf course, which is located to the north of the Airfield development site, have emerged. The current proposals, developed on behalf of Quinn Estates, comprise a mixed use development comprising 750 residential units as well as commercial, sporting and educational spaces.

Highways Proposals

7.2 As part of the North Weald Park proposals, the developer is in discussions with ECC and HE to determine the highway improvements necessary to accommodate the potential development. These preliminary off-site highway proposals comprise:

- *"consideration of local highways improvements in the immediate vicinity of the site to ensure safe access / egress;*
- *consideration of highways improvements on the A414 corridor; and*
- *consideration of assisting / contributing to highways improvements on the strategic road network improving Junction 7 and the proposed Junction 7A of the M11."*

Public Transport Proposals

7.3 Initial public transport proposals of the potential North Weald Park site comprise:

- *"Improvements to local bus services to ensure longer hours of operation and weekend services to ensure a sustainable approach to delivery; and*
- *Enhancement of services between Epping and Harlow, which provide employment, shopping and leisure facilities, in addition to connectivity to the wider public transport network, serving London and East Anglia. "*

Pedestrian and Cycle Proposals

7.4 Preliminary off-site proposals for improvements to the pedestrian and cycle network include:

- *"Upgrading of existing footpath / cycleway in the immediate vicinity to improve connectivity to North Weald Bassett;*
- *Integration with other developments to create enhance connection and linkage to encourage walking and cycling as the preferred choice for people, with consequent health benefits".*

Relationship with North Weald Airfield

7.5 With regards to the neighbouring airfield site, the North Weald Park proposals have taken the following points into consideration in order to have a minimal impact upon North Weald Airfield:

- *"Creation of a buffer along Rayley Lane to incorporate commercial uses and landscaping; and*
- *Ensure there is an appropriate degree of separation between the airfield and areas for proposed residential uses."*

7.6 The varying distances from the runway to the North Weald Park development as well as possible access points onto the site are shown on the following figure.

Source: Quinn Estates (June 2017) North Weald Park Brochure

Figure 5: Indicative North Weald Park Masterplan

7.7 Potentially, therefore that are synergies between the two North Weald Park development and the Weald Airfield Development with the opportunity to create enhanced public transport and walking and cycle access to the sites as well as to address the local highway constraints.

8.0 Conclusion

8.1 The anticipated release of land from part of the North Weald Airfield for development provides the opportunity to create a B8 logistics park with excellent access to the national Road Network via M11, but on a sustainable site on the edge of North Weald Bassett. HGV traffic accessing the strategic network from the site would not impact on the existing village.

8.2 A recent transport modelling assessment that has been undertaken by Essex Highways, on behalf of EFDC and Essex County Council (ECC), to assess the potential transport related effects of the district's emerging Local Plan. Whilst this has identified many constraints on the wider highway network, none of these are directly impacted by the proposed development.

8.3 The main highway issue relating to this site is the capacity of M11, Junction 7. This is currently operating above capacity during the peak hours. However, the construction of the new Junction 7A, which is due to be completed in 2021 will provide some relief. Some further improvements are however likely to be required to the junction to support the full development aspirations of both Harlow and North Weald.

8.4 The proposed employment development of the whole of the site, along with other proposed developments within North Weald Bassett provides an opportunity to fund key transport infrastructure enhancements, including potentially contributions towards improvements to Junction 7A as well as enhanced public transport services. The latter could include an enhanced bus link to Epping Forest, including to the Central Line Station. There are opportunities to link the site to the adjoining residential development within the village, with excellent walking and cycling links.

8.5 It is considered that liaison with the developer of the potential North Weald Park development would be beneficial to gain an understanding of any highways and public transport proposals that could come forward and by when as part of the North Weald Park development.

8.6 There appears to be no fundamental reason to prevent the proposed development from being implemented from a transport point of view.

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TECHNICAL NOTE

Job Name: North Weald Airfield

Job No: 39454

Note No: 3002/TN01

Date: 22/01/18

Prepared By: Emma Heath

Reviewed By: Rachel Melbourne

Subject: **North Weald Airfield, Ecology - Allocation**

Introduction

This Technical Note has been prepared to review ecological matters in respect of this Site to assist formal representations to Epping Forest's emerging Local Plan Local Plan Submission Version 2017. Part of the Site has a proposed allocation - NWB.E4 – North Weald Airfield for employment use. This Technical note summarises the results of a desktop review exercise and the implications of the findings for the site. This review has been informed by the following sources of information:

1. The Multi-Agency Geographic Information for the Countryside (MAGIC) web portal (Magic.gov.uk) & online aerial photography;
2. Epping Forest District Council (EFDC) Local Plan (Submission Version, 2017);
3. Policies within the Epping Forest District Local Plan (1998) and Alterations (2006);
4. Habitats Regulations Assessment Screening of Epping Forest District Council Regulation 19 Local Plan (December 2017);
5. Memorandum of Understanding- Managing the impacts of growth within the West Essex/East Hertfordshire Housing Market Area on Epping Forest Special Area of Conservation (February 2017)
6. Epping Forest District Council Changes to Epping Forest District Council's Proposals Maps (January 2012);
7. North Weald Airfield: Masterplan + Aerial (Drawing 30851-FE-10A, Michael Sparks Associates Nov 2016);
8. North Weald Airfield: Allocations Plan + Aerial (Drawing 30851-FE-11A, Michael Sparks Associates, Nov 2016); and
9. North Weald Airfield: Boundary Plan + Aerial (Drawing 30851-FE-12A, Michael Sparks Associates, Nov 2016).

The table below sets out the findings of the desktop review, identifies relevant ecological features, legislation and local planning policy, and sets out potential implications for the proposed future development of the site for warehousing. No ecological considerations have been identified that would be a constraint to the allocation of the whole site within the emerging local plan or to the delivery of a

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forthcoming employment development of the site. The current proposed indicative masterplan for development of the site (Drawing 30851-FE-10A, Michael Sparks Associates, 2016) allows capacity for ecological mitigation and enhancements to be accommodated, as necessary, within the finalised scheme design.

Ecological Feature	Applicable Legislation	Relevant Planning Policy	Description of Ecological Features	Considerations for Allocation
International Designated Sites	The Conservation of Habitats and Species Regulations (2017)	Draft policies SP7, DM1, and DM2 of the emerging Epping Forest District Council (EFDC) Local Plan (Submission Version, 2017) – specifically under DM1: "*Development proposals…should not negatively impact on areas of international or national designation*."; and policy DM2: "*The Council will expect all relevant development proposals to assist in the conservation and enhancement of the biodiversity...of the Epping Forest…SAC*". Policy NC1 of the Epping Forest District Local Plan (1998) and Alterations (2006).	The Epping Forest Special Area of Conservation (SAC) is the only internationally designated site within 10 km of the Site. This site's primary reasons for designation are its beech *Fagus sylvatica* forest habitats and population of stag beetle *Lucanus cervus*.	The Epping Forest SAC is located approximately 4.9 km south-west of the site. Given this distance, no direct effects are expected to result from development of the site for employment. At this stage the only identifiable issue requiring further consideration is air quality. The Epping Forest SAC is already considered to be adversely affected by existing levels of air pollution. As such, future development that would result in significant increases in vehicle movements could exacerbate existing adverse effects through increased emissions. The Habitats Regulations Assessment (HRA) of the emerging Epping Forest District Local Plan concluded that the Submission Version of the Epping Forest District Local Plan will not result in a likely significant effect upon any European sites, subject to a number of recommendations being incorporated into the Local Plan. The recommendations of relevance to this allocation include the firm commitment of EFDC and other Local Authorities to develop mitigation strategies to address air quality around Epping Forest SAC to ensure no adverse effect arise on the integrity of the SAC as a result of development allocated within the emerging local plan. This commitment by EFDC and others is set out in a Memorandum of Understanding dated February 2017. Notwithstanding the above, it is acknowledged that a project level HRA will be required to assess potential impacts on European sites at the planning application stage.

National Designated Sites	Wildlife and Countryside Act, 1981 (as amended. Hereafter referred to as 'The WCA'). Natural and Environment and Rural Communities Act (2006), hereafter referred to as 'The NERC Act')	Draft policies SP7 and DM1 (EFDC Local Plan, 2017) – see above. Policy NC1 of the Epping Forest District Local Plan (1998) and Alterations (2006).	A unit of the Epping Forest Site of Special Scientific Interest (SSSI) is located approximately 890 m to the south-west of the site. This SSSI has a number of notified features, including woodland and grassland habitats; notable amphibian, breeding bird and insect assemblages and populations of notable insect and bryophyte species. Four Local Nature Reserves (LNRs) are also present within 2 km, the closest of which is Church Lane Flood Meadow, immediately east of the site. The LNR is designated for its wet meadow and pond habitats which support a diverse plant community. A further two LNRs are present within 300 m of the site.	The site falls within a Natural England Impact Risk Zone, which relates to the Epping Forest SSSI. The location of a site in an IRZ requires EFDC to consult Natural England when assessing planning applications for certain types of development. For this particular site, special consideration is required with regards to potential effects of warehousing. Any such potential effects would require assessment at the planning application stage and suitable mitigation to be introduced as required. Any future planning application will also need to take into account the presence of LNRs in the locality, most notably the nearby Church Lane Flood Meadow LNR.
Local Designated Sites	N/A	Draft policies SP7 and DM1 of emerging EFDC Local Plan, 2017 – specifically under DM1: "*Development proposals which are likely to have a significant adverse impact on a locally designated site will only be permitted where the benefits…clearly outweigh the value of the ecological feature adversely affected and there*	Eleven non-statutory designated Local Wildlife Sites (LWSs) lie within approximately 2 km of the site (as determined from the EFDC Changes to Epping Forest District Council's Proposals Maps, January 2012). The closest of these are Church Lane Flood Meadows LWS and St Andrew's Churchyard, North Weald LWS. The former is located adjacent to the site to the east, within the same	No direct impacts on LWSs are predicted to occur as a result of future development of the site. However due to their proximity to the site, any future planning application will need to take into account the presence of Church Lane Flood Meadow and St Andrew's Churchyard, North Weald LWSs. The potential for indirect impacts on this or any other designated areas will be a consideration for development.

		are no appropriate alternatives." Policies NC2 and NC3 of the Epping Forest District Local Plan (1998) and Alterations (2006)	boundary as the above-described Church Lane Flood Meadow LNR, and is designated for its lowland fen and reedbed habitats. The latter lies immediately adjacent to the site to the north-east and is designated for its species-rich grassland.	
Habitats	NERC Act (2006)	Draft policies SP7, DM1 and DM5 of emerging EFDC Local Plan, 2017 – specifically under DM1: "*Where…Priority Habitat or other valuable habitat may be affected…, applicants must provide a full survey and site assessment to establish the extent of potential impact. This evidence should inform appropriately designed plans and mitigation measures.*." Furthermore, under DM5: *Development proposals must demonstrate that they have been designed to retain and where possible enhance existing green infrastructure, including trees, hedgerows, woods and meadows, green lanes, wetlands, ponds and watercourses"*	The site encompasses a former golf driving range and the eastern part of the airfield and an arable field. Large parts of this area comprise highly modified and managed habitats which are likely to be of limited ecological importance. The site also appears to support some semi-natural habitats. These include hedgerows, a pond, a wet ditch, mature trees and rough grassland. The more valuable habitats are likely to be associated with the margins of the northern land parcel, i.e. around the driving range. Multiple areas of ancient woodland are present within 2 km of the site, the closest of which is 300 m to the south.	Available desktop information has not identified any habitat features likely to be a constraint to future development of the site. The majority of habitats within the site are likely to be of low ecological interest, which affords ready opportunity to deliver enhancement as part of future development. Retaining habitats which are elevated importance within the site, along with boundary habitats, and enhancing these habitats by additional landscape planting, wherever possible, will strengthen connectivity with linear habitat features in the wider landscape, including to the adjacent LNR and LWSs. This will improve green links and enhance the ecological functionality of the site, in accordance with policy DM5 of the EFDC Local Plan, 2017. An extended Phase 1 habitat survey will be required at the planning application stage, to assess the habitats present on site, and inform the production of necessary avoidance, mitigation, and enhancement measures to be delivered at part of its development. The potential for air quality impacts on off-site (non-designated) ancient woodland may also need to be considered in developing proposals for the site.

		Policies NC3 and NC4 of the Epping Forest District Local Plan (1998) and Alterations (2006)		
Protected and Notable species	The Conservation of Habitats and Species Regulations (2017) WCA, 1981, as amended. NERC Act (2006)	Draft policies SP7 and DM1 of emerging EFDC Local Plan, 2017 – specifically under DM1: "*Where…Protected Species, Priority Species…may be affected…applicants must provide full survey and site assessment to establish the extent of potential impact. This evidence should inform appropriately designed plans and mitigation measures…"* Policy NC4 of Epping Forest District Local Plan (1998) and Alterations (2006).	Habitats within and adjacent to the site could support a range of protected or notable species, potentially including: great crested newts, reptiles, breeding birds, bats, badgers and brown hare.	The completion of an extended Phase 1 habitat survey will be required to allow protected species considerations to be fully determined in relation to the future development of the site. It is, however, unlikely that the site would support populations of protected or notable species of elevated importance within the local context that they would be a material consideration for allocation. Future site development would need to be supported by appropriate species-specific survey work, as relevant. Should protected and/ or notable species be present, suitable avoidance and mitigation measures will be required to minimise any potential effects. On the basis of initial masterplanning, it is anticipated that any required mitigation measures could be accommodated within any future development proposals for the site.

North Weald Airfield

Flood Risk Statement

On behalf of

Paragon North Weald Limited

Project Ref: 39454/4001 | Rev: - | Date: January 2018

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Document Control Sheet

Project Name: **North Weald Airfield**
Project Ref: **39454/FRS**
Report Title: **Flood Risk Statement**
Doc Ref: **39454**
Date: **January 2018**

	Name	Position	Signature	Date
Prepared by:	Michael Hartley	Assistant Engineer		25/01/18
Reviewed by:	Stephanie Knowles	Principal Engineer		26/01/18
Approved by:	Kieran Rushe	Equity Director		29/01/18
For and on behalf of Peter Brett Associates LLP				

Revision	Date	Description	Prepared	Reviewed	Approved

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Appendices

Executive Summary

This Flood Risk Statement (FRS) has been prepared by Peter Brett Associates LLP (PBA) to assess the deliverability of development on the site and to help support the promotion of the site for inclusion within the local plan.

In accordance with the fundamental objectives of the National Planning Policy Framework (NPPF), the FRS demonstrates that:

(i) The development is safe;

(ii) The development does not increase flood risk; and,

(iii) The development does not detrimentally affect third parties.

The Environment Agency (EA) Flood Zone map shows that a large portion of the site is located within Flood Zone 1 'Low Probability' of the North Weald Brook flood extent (as defined in NPPF Planning Practice Guidance (PPG) 'Flood Risk and Coastal Change' Table 1) as follows:

Flood Zone 1 'Low Probability'(less than 1 in 1000 (0.1%) annual probability of river or sea flooding

The northeast corner of the site is however located in Flood Zones 2 and 3. Flood Zone 2 is defined as 'Medium Probability' between 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of river or sea flooding. Flood Zone 3 is defined as 'High Probability' more than 1 in 100 (1%) annual probability of river or sea flooding.

The proposals for offices constitute a Less Vulnerability Classification land use, which is considered appropriate within Flood Zones 1,2 and 3 (reference NPPF PPG Tables 2 and 3).

The sequential test may need to be carried out given part of the site is located in Flood Zones 2 and 3 and in addition parts of the site are at low, medium and high risk of surface water flooding.

The flood risk mitigation strategy for the development consists of the following elements:

- Locate as much as possible of the development in Flood Zone 1 'low probability of flooding;
- Maintain the surface water flow/overland flow routes through the site;
- A minimum 300mm 'freeboard' is incorporated in setting ground floor levels for buildings close to surface water flood risk areas and undertake appropriate profiling of external ground levels to fall away from building entrances;

In summary, the FRS demonstrates that the proposed development is safe and in accordance with the requirements of national and local planning policy.

1 Introduction

1.1 Scope of Report

1.1.1 This Flood Risk Statement (FRS) has been prepared by Peter Brett Associates LLP (PBA), on behalf of our client, Paragon North Weald Limited, to help support the promotion of the site for inclusion within the local plan, for the redevelopment at North Weald Airfield, Essex.

1.1.2 The report is based on the available flood risk information for the site as detailed in **Section 1.2**, and prepared in accordance with the planning policy requirements set out in **Section 1.3**. The scope of the FRS will support a future Flood Risk Assessment (FRA) which will need to be provided to support the site through planning. The formation of the FRA will need to be consistent with the 'Site-specific Flood Risk Assessment Checklist' from the National Planning Policy Framework (NPPF) Planning Practice Guidance:

https://www.gov.uk/guidance/flood-risk-and-coastal-change#Site-Specific-Flood-Risk-Assessment-checklist-section

1.1.3 The required content of the checklist is detailed below along with specific cross-reference to the content in the FRS as follows:

1) **Development site and location –** see Section 2;

2) **Site-specific flood risk** – see Section 3;

3) **Development proposals** – see Section 4;

4) **Sequential Test** – see Section 4;

5) **Occupants and users of the development** – see Section 4;

6) **Exception Test** – see Section **Error! Reference source not found.** (if applicable)

7) **Residual Risk** – see Section 6;

8) **Flood risk assessment credentials** – PBA has many years of experience in, amongst other areas, the assessment of flood risk, hydrology, flood defence and river engineering. The authors and reviewers of the document are all experienced engineers and planners.

1.2 Sources of Information

1.2.1 The FRS has been prepared based on the following sources of flood risk information:

- Gov.uk website flood maps (accessed Jan 2018);
- EA Product 4 data (January 2018);
- Epping Forest District Council Church Lane Flood Meadow Local Nature Reserve Site Management Plan 2014-2018;
- The Epping Forest District Council Level 1 Strategic Flood Risk Assessment (SFRA), prepared by URS dated August 2015;

- Essex County Council Local Flood Risk Management Strategy, prepared by Capita Symonds dated February 2013.

1.3 Policy Context

1.3.1 This FRS has been prepared to help support a future FRA which will be produced in accordance with the relevant national, regional and local planning policy and statutory authority guidance as follows:

- National policy contained within the **National Planning Policy Framework (NPPF)** dated March 2012, issued by Communities and Local Government, with reference to Section 10 'Meeting the challenge of climate change, flooding and coastal change';
- The **NPPF Planning Practice Guidance (PPG)** released in March 2014 ('Flood Risk and Coastal Change' section);
- Epping Forest District Council Combined Policies of Epping Forest District Local Plan (1998) and Alterations (2006) released in February 2008, with particular reference to policy U2A -Development in Flood Risk Areas. It states that development should be located wherever possible in little to low flood risk areas, and developments located in flood risk areas will only be allowed provided that suitable flood minimisation and/or mitigation measures are included as part of the development (an extract of the policy is enclosed in **Appendix A**).

1.4 Caveats and Exclusions

1.4.1 This FRS has been prepared to support the promotion of the Site for inclusion within the emerging Local Plan and to help inform a future FRA for the site, which will need to be produced in full accordance of the NPPF and Local Planning Policy. The proposed flood management to be incorporated within the site for planning (including ground floor level recommendations) and surface water management strategies will need to be based on the relevant British Standards (BS8533), the standing advice provided by the EA or based on common practice.

1.4.2 The revised Construction (Design and Management) Regulations 2015 (CDM Regulations) came into force on April 2015 to update certain duties on all parties involved in a construction project, including those promoting the development. One of the designer's responsibilities is to ensure that the client organisation, in this instance Paragon North Weald Limited, is made aware of their duties under the CDM Regulations. For further information on the CDM Regulations is provided in the client guide is available at http://www.hse.gov.uk/pubns/indg411.pdf

1.4.3 The approach for the FRS is to give further detailed information made available having consulted stakeholders and to help inform a future FRA which will be based on the requirements of the EA and Essex County Council in its role as Lead Local Flood Authority (LLFA).

1.4.4 It should be noted that the insurance market applies its own tests to properties in terms of determining premiums and the insurability of properties for flood risk. Those undertaking development in areas which may be at risk of flooding are advised to contact their insurers or the Association of British Insurers (ABI) to seek further guidance prior to commencing development.

1.4.5 The EA Product 4 flood data on which the FRS is based is valid under a 12 month licence. As such, the FRS is accurate at time of issue but we would recommend the end user reviews the validity of the flood data on an annual basis with the EA.

1.4.6 PBA do not warrant that the advice in this report will guarantee the availability of flood insurance either now or in the future.

1.4.7 The findings of this FRS are based on data available at the time of the study and on the subsequent assessment that has been undertaken to date. They relate to current development proposals as outlined in Section 4. PBA does not warrant that the advice in this report will guarantee the availability of flood insurance either now or in the future.

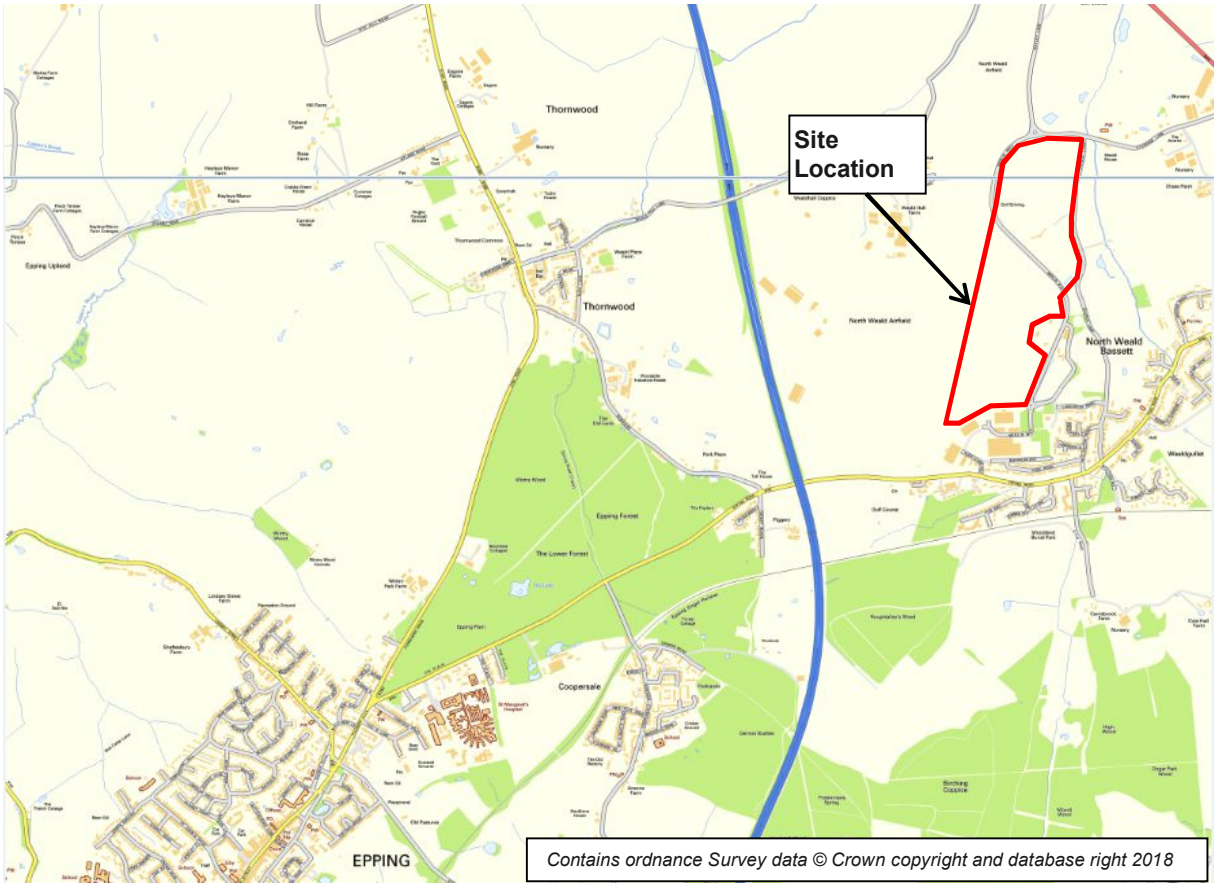
2 Site Setting

2.1 Site Description

2.1.1 The 37 hectare (ha) site is located at North Weald Airfield located in the village of North Weald Bassett, Essex. (postcode CM16 6HR, site centre OS grid reference 549203E, 204537N – see **Figure 2-1**).

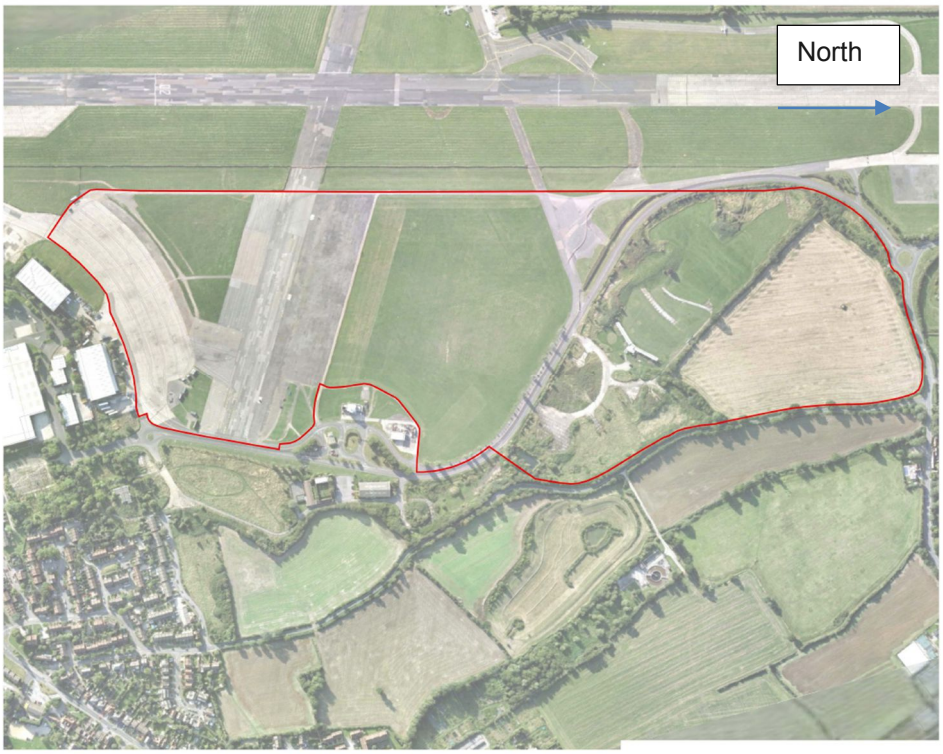
2.1.2 The village of North Weald Bassett lies within the administrative boundary of Epping Forest District Council (EFDC).

Figure 2-1: Site Location Plan (not to scale)



2.1.3 The site is located within the Eastern extent of the airfield and extends outside of the airfield boundary to include an existing golf range and parcel of arable farmland to the north of Merlin Way. The highway, Merlin Way, bisects the site in two areas (see **Figure 2.2 below**).

Figure 2-2: Site boundary Plan



2.2 Topography

2.2.1 No topographic survey is available for this site. Review of Ordnance Survey maps suggest the site falls in a north-easterly direction with site levels ranging between approximately 72m AOD in the north-east part of the site to 90m AOD in the southern part of the site.

2.3 Hydrological Setting

2.3.1 A review of Ordnance Survey (OS) mapping indicates that the Cripsey Brook, an EA defined 'Main River' is located approximately 780m to the North of the site.

2.3.2 OS mapping has also show the presence of another EA main River, which is a tributary of the Cripsey Brook believed to be locally referenced as the North Weald Brook, located approximately 50m to 610m to the east of the site. An unnamed land drain, classified as an ordinary watercourse, is shown within the northern part of the site and connects to the North Weald Brook to the east.

2.3.3 The catchment area of the site is within the River Roding and North Weald Brook.

2.3.4 Essex County Council states there are several small ponds located within 250m of the site and an overflow reservoir located just east of the site between the site and the North Weald Brook (see ECC Correspondence in **Appendix B**).

Public Sewers

2.3.5 No public sewer records were obtained for this assessment; however the airfield is likely to have its own -private drainage system.

2.4 Geology and Hydrogeology

2.4.1 A review of the 1:50,000 scale British Geological Survey (BGS) online digital viewer indicates that the site is underlain by bedrock geology of London Clay.

2.4.2 The online BGS 1:50,000 scale superficial geology map indicates that the site is underlain by 'Lowestoft Formation' comprising of silty clay and clay.

2.4.3 The National Soil Resources Institute (NSRI) Soilscape viewer indicates that the site is underlain by a Lime rich loamy, clayey soil which is classed as a low permeable soil.

2.4.4 The site is not located within an EA Groundwater Source Protection Zone (SPZ) nor within an area classed as having and designated Aquifer.

2.4.5 The SFRA published by Epping Forest District Council also concludes the findings of the aforementioned geological digital databases, with clay soils being present within the local areas.

2.4.6 Based on the information currently available, the site is unlikely to support infiltration of surface water directly into ground. However, this is subject to site specific intrusive geotechnical investigations.

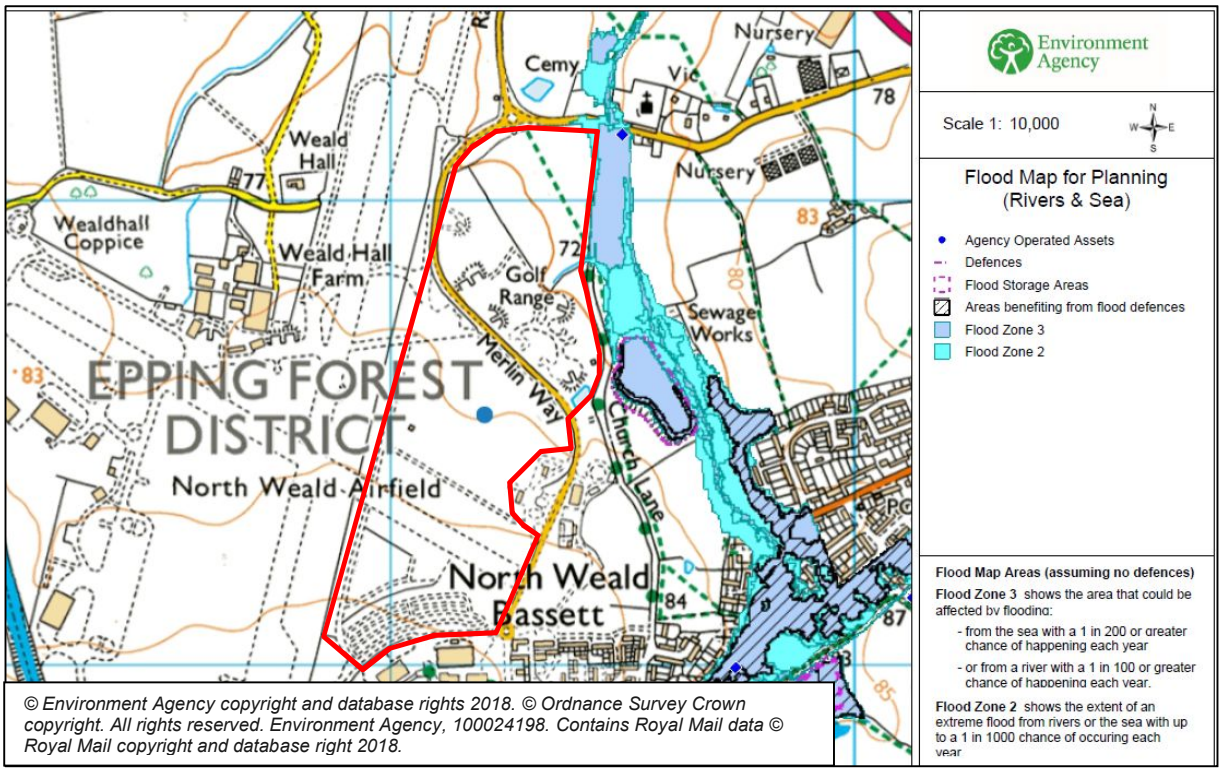
3 Overview of Flood Risk

3.1 Sources of Flooding

Flood Zone Map

3.1.1 The EA have provided a response and Flood Zone map, see figure 3-1 below as part of their detailed 'Product 4' flood risk information enclosed in **Appendix C**.

Figure 3-1: EA Flood Zone Map



3.1.2 The EA Flood Zone map indicates that a large portion of the site lies within **Flood Zone 1 'Low Probability' less than 1 in 1000 (0.1%) annual probability of river flooding.**

3.1.3 There is however a small area in the north-east most corner of the site that is located in **Flood Zone 2 'Medium Probability between 1 in 100 (1%) and 1 in 1000 (0.1%) annual probability of river flooding** and a marginal area in **Flood Zone 3 'High Probability more than 1 in 100 (1%) annual probability of river flooding.**

3.1.4 Flood storage areas (FSA) are detailed within the SFRA as being located within three areas close to North Weald. Two storage areas are located along Thornhill Storage Pond and Ditch and North Basset Drain, which are designed to store water during events up to an including the 1 in 75 year (1.33% AEP) fluvial event, with associated raised embankments, these are situated approximately 950m to 980m, south east of the site.

3.1.5 To the north of North Weald, along Church Lane is a FSA and an associated earth embankment which provide storage of flood waters for events up to and including the 1 in 50 year (2% AEP) fluvial event. The FSA was constructed in 1990 and is fed via a bypass channel upstream of Station Road. It is this FSA which can be seen on the EA maps and within close proximity to the site, within 20m of the site, located directly adjacent to the existing golf range.

3.1.6 The aforementioned FSAs formed part of the North Weald Flood Alleviation scheme, which also looked at creating biodiverse habitats for native wildlife and fauna. The FSAs, to the south and adjacent to the site, are owned and maintained by Epping Forest District Council. The Church Lane FSA has within its confines a large stream fed pond and wet grassland meadow.

3.1.7 A plan showing the North Weald Flood Alleviation Scheme is enclosed in **Appendix D**.

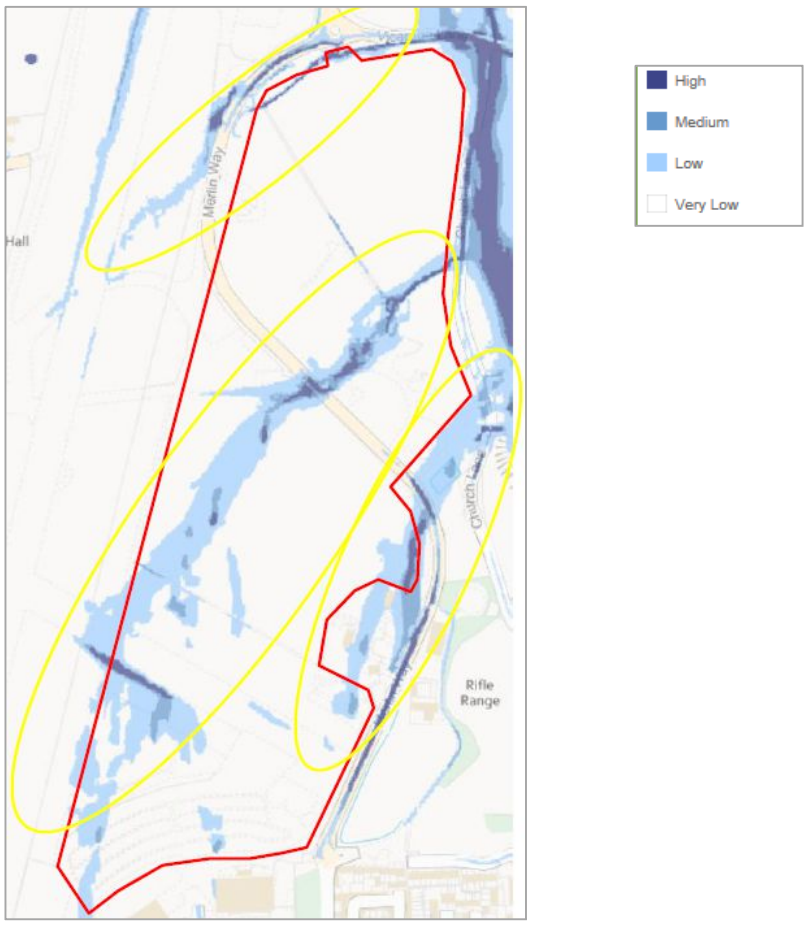
Flood Risk from Reservoirs Map

3.1.8 The site is not shown to be at risk from reservoir flooding.

Flood Risk from Surface Water

3.1.9 PBA consulted Essex County Council (ECC) for flood related information they hold for the site including surface water flood risk. Their response is provided in **Appendix B**. The 'Surface Water Flood Risk Map' included in their response, see Figure 3-2 below, shows where areas could be potentially susceptible to surface water flooding in an extreme rainfall event.

Figure 3-2: Surface Water Flood Risk Map



3.1.10 It should be noted that the surface water maps are generated using a generic methodology on a national scale, whereby rainfall is routed over a ground surface model. The analysis does not take account of any specific local information on below-ground drainage infrastructure and infiltration, although an adjustment is included in urban areas to account for the impact of sewerage and a standard infiltration allowance based on soil type. Consequently, the mapping provides a guide to potentially vulnerable areas based on the general topography of an area.

3.1.11 Figure 3.2 indicates that there are three significant surface water flow routes which traverses or borders the site. ECC stated that each of these routes will be due to a defined valley which channels surface water from the surrounding areas and concentrates it in those three flow routes. Velocities of surface water available from the online maps show surface water would flow in a northerly and easterly direction towards North Weald Brook. Figure 3-2 also shows the majority of the site is at very low risk of surface water flooding (no shading), with the aforementioned surface water flow routes identified as mostly being at 'Low Risk (light blue) of surface water flooding, with an Annual Probability of between 1 in 1000 (0.1%) and 1 in 100 (1%).

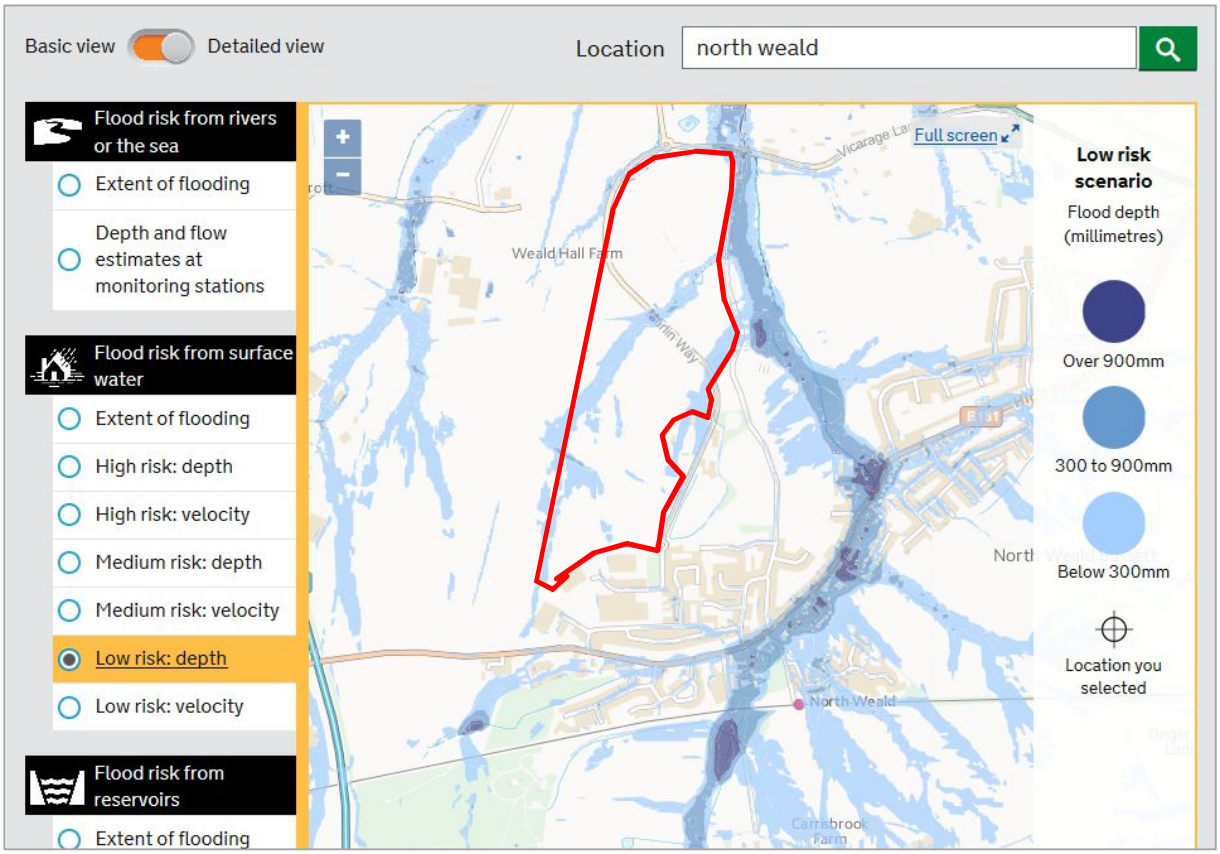
The EA definitions for each surface water flood risk category is defined in Table 1 below.

Table 1: EA Surface Water Flood Risk Categories

Risk of flooding	Probability
Very low	< 1 in 1000 (0.1%)
Low	1 in 1000 (0.1%) - 1 in 100 (1%).
Medium	1 in 100 (1%) - 1 in 30 (3.3%)
High	>1 in 30 (3.3%)

3.1.12 Figure 3-3 below shows there is a low risk that some areas of the site could flood to a maximum depth of 300mm where the three surface water flow routes are located.

Figure 3-3: EA Surface Water Flood Depth Map (Low Risk)



Groundwater Flooding

3.1.13 The EA have no groundwater level monitoring points in the vicinity of the site and therefore could not provide accurate groundwater level data. However, data taken from the Essex Regional Groundwater Model suggest that in a wet month levels typically range between 72m AOD in the north part of the site and 90m AODint the south part of the site. No topographic survey is available for the site, however review of OS Maps suggests these groundwater levels are close to the ground surface. The EA state that the water table in an average month ranges between 1.5m and 3m below ground levels across the site with minor fluctuations.

3.1.14 Information provided within the Epping Forest District Council SFRA state:

3.1.15 Groundwater flooding is known to occur around Nazeing in Epping Forest District associated with outcrops of the highly permeable Lambeth Group sands and the Kesgrave Sands and Gravels.

3.1.16 Groundwater flooding is most likely to occur in low-lying areas underlain by permeable rocks. The site is underlain by London Clay and impermeable superficial deposits and therefore groundwater flooding is unlikely.

Sewer Flooding

3.1.17 Correspondence with Thames Water has confirmed there are no recorded incidents of flooding in the area that are attributable to surcharging sewers (see response in **Appendix E**).

Canals, Ponds and other Artificial Watercourses

3.1.18 There are no artificial canals in the local area and as such, the risk of flooding from canals, and other artificial watercourses is considered to be low.

3.1.19 The local FSA of Church Road has a drainage maintenance plan in place which is carried out by the local Council' Engineering, Drainage and Water Team on a yearly basis (see extract in **Appendix E**). It is considered therefore that the risk of breach of the feature is low. The FSA is understood to be situated on higher land than the northern part of the site including the golf course so any overtopping of the feature would flood part of the site. However, the feature is designed to cater for a 1 in 50 year storm event and for l events exceeding this event, there is a spillway in place which discharges to the adjacent North Weald Brook. It is therefore considered that the risk of overtopping is low. Further details of the storage area including cross sections is shown in **Appendix E**.

Historic Flood Records

3.1.20 ECC have one recorded flood incident within 250m of the site boundary, located close to the north-eastern most tip of the site. It is understood that a blocked "stormpoint" caused road flooding at this point and so is likely to have been resolved. The EA have no flood records for the site. Epping Forest District Council have no flood records for this site (see response in **Appendix F**).

3.1.21 The SFRA confirms areas of North Weald have suffered from historical flooding. A number of properties in areas adjacent to High Road and a small number of properties in proximity to Wheels Farm Gardens, situated approximately 400m to the east of the site have recorded flood incidents.

3.2 Summary of Flood Risk

3.2.1 The following table provides an overview of the flood risk to the site, based on the information obtained and detailed in Section 3.

Table 3.1: Summary of Sources of Flood Risk

Source of Flooding	Risk of Flooding to Site	Comment/Justification	Source of data	Mitigation requirements for new development (see Section 5)
Tidal		The site is not close to a tidal influenced watercourse.	EA Data (see Section 3)	N/A
Fluvial		A small portion of the north-eastern most portion of the site falls within EA Flood Zones 2 and 3.	EA Data (see Section 3) Epping Forest District Council (see Section 3)	Avoid development in Flood Zone 2 and 3.
Land Drainage (i.e. Surface Water/ Pluvial)		The majority of the site is at very low risk of surface water flooding. There is a surface water flow route which crosses the development identified as being at low, medium and high risk of surface water flooding. This surface water flow routes should be considered as part of the mitigation strategy.	EA surface water flood maps Essex County Council.	Avoid locating any buildings on surface water flow path if possible. Allow for in floor level recommendations.
Ground water		The site is underlain by London Clay and impermeable superficial deposits and therefore groundwater flooding is unlikely.	EA Data (see section 3) SFRA Data BSG Viewer Soilscapes website	N/A
Reservoir, Canals, Ponds and Other Artificial Sources		The site is considered to be at very low risk of reservoir flooding. PBA considers the risk of flooding from Church Lane FSA to be low.	EA Online Reservoir flood map Epping Forest District Council Church Lane Flood Meadow Local Nature Reserve Site Management Plan 2014-2018	N/A
Sewers		Thames Water has confirmed there are no recorded incidents of flooding in the area that are attributable to surcharging sewers.	Thames Water correspondence	N/A
Key:		**Low/Negligible Risk** – No noticeable impact to site and not considered to be a constraint to development		
		Medium Risk – Issue requires consideration but not a significant constraint to development		
		High Risk – Major constraint to development requiring active consideration in mitigation proposals		

4 Proposed Development and Sequential Test

4.1 Proposed Development

4.1.1 This FRS provides information to inform the promotion of the site for inclusion within the local plan for:

> *"B8 warehousing development for up to13 units comprising offices covering an area of approximately 173,000 square metres with associated infrastructure landscaping and a control tower area."*

4.1.2 The masterplan will be developed to inform a future planning application. The proposed future buildings will be located outside flood zones 2 and 3 via the sequential approach so there is no detriment to offsite areas. The on-site surface water flood risk will be taken into account through accommodation of surface water flow route or flood storage compensation.

4.2 Flood Risk Vulnerability

4.2.1 NPPF PPG 'Flood Risk and Coastal Change' Table 2 confirms the *'Flood risk vulnerability classification'* of a site, depending upon the proposed usage. This classification is subsequently applied to PPG Table 3 to determine whether:

- The proposed development is suitable for the flood zone in which it is located, and;
- Whether an Exception Test is required for the proposed development.

4.2.2 The proposed office led development is classed as 'less vulnerable' development.

4.2.3 The location of the proposed 'less vulnerable' development is suitable in Flood Zones 1 and 2.

4.3 NPPF Sequential Test

4.3.1 The NPPF follows a sequential risk-based approach in determining the suitability of land for development in flood risk areas, with the intention of steering all new development to the lowest flood risk areas.

4.3.2 A Sequential Test may need to be undertaken due to the presence of Flood Zones 2 and 3 at the far north east extent of the site depending on the proposed masterplan.

5 Flood Mitigation Strategy

5.1 Sequential Approach

5.1.1 The NPPF encourages the application of the 'sequential approach' in the master-planning process for new development, i.e. locating the more sensitive/vulnerable elements of new development in the areas which lie in areas with the lowest probability of flooding and, conversely, reserve the areas of the site at greatest risk of flooding for the least vulnerable elements of the development (or, preferably, leave such areas undeveloped or as soft landscaping).

5.1.2 The sequential approach will be undertaken as part of the master planning process with buildings and development located in lower flood risk areas of the site and any high risk areas will be free from built development.

5.2 Surface Water Flooding

5.2.1 The site is shown to be at risk of surface water flooding. It is recommended that site levels are landscaped to allow the maintenance of the surface water flow routes through the site, via an access road/pedestrian path or green open space. Where built development is required within areas shown to be at surface water flood risk then flood compensation works could be required.

5.2.2 It should be noted that until further investigations and potential works, such as hydraulic modelling, is undertaken it will not be possible to confirm if the surface water flooding currently illustrated is an accurate reflection of flood risk and therefore the current mapping should be used with caution.

5.2.3 It is also recommended that all floor levels are set nominally above surrounding final ground levels in the order of 150mm within plots, increasing to 300mm for those office plots in the vicinity of a surface water flow route, and that there is a slight fall from final plot levels to footpaths to avoid any possible issues with surface water flooding.

5.2.4 It is recommended that a topographic survey is carried out as part of the future FRA to gain a better understanding of the surface water flow route which traverses the site and overland flow routes.

5.3 Safe Access

5.3.1 It is necessary to consider and incorporate safe access and egress arrangements as part of the mitigation, to ensure the users/occupants of the development are safe in times of flooding.

5.3.2 Safe access and egress is not considered to be an issue as there are opportunities to locate the entrances and exits in low flood risk areas of the site.

5.4 Surface Water Drainage

5.4.1 The surface water drainage strategy will be designed to comply with the requirements of Essex County Council in their role as the LLFA and Epping Forest Council drainage team. Surface Water runoff from the site will be discharged in accordance with the Building Regulations Approved Document H drainage hierarchy and Essex County Council SuDS Design Guide. The geological conditions of the site suggest infiltration drainage will be limited, however this needs to be confirmed by an on-site investigation. If infiltration drainage is deemed not viable, discharge rates leaving the site will be agreed with the LLFA or with Thames water if discharging to the local public sewers.

5.4.2 SuDS features such as permeable paving, swales, filter drains, bioretention areas and basins should be considered at the planning stages to control the quantity of runoff, manage quality of runoff, and to provide amenity and biodiversity benefits. It is recommended that a site investigation is carried out to ascertain infiltration drainage viability and if suitable undertake BRE 365 soakaway tests.

5.4.3 With parts of the site within close proximity to the airfield, the risk of birdstrike will need to be considered within the drainage design proposals for the site and may impact on the types of SuDS features being promoted within the emerging masterplan.

6 Residual Risk

6.1.1 It is difficult to completely guard against flooding since extreme events greater than the design standard event are always possible, however, it is practicable to minimise the risk by allowing a substantial freeboard (safety margin) and by using suitable construction and management techniques.

6.1.2 To minimise residual risks, such as climate change and other uncertainties, floor levels of proposed units will be set a minimum of 300mm above the agreed surface water flood level adjacent to the surface water flow route through the site.

6.1.3 As such, the residual risk is considered to be acceptable for the lifetime of the development.

7 Conclusions and Recommendations

7.1.1 This Flood Risk Statement (FRS) has been prepared by Peter Brett Associates LLP (PBA) to support the promotion of the whole site for its inclusion within the local plan as a strategic warehousing (B8 use) site at North Weald Airbase, Essex.

7.1.2 The site is located predominately within Flood Zone 1 and at 'Low' and 'Very Low' susceptibility to surface water flooding. However, there are small areas of the site which are shown as being within Flood Zone 3 and 'High' risk of surface water flooding. These areas are concentrated within existing land drainage features at the site and within the far north corner of the site.

7.1.3 The proposed future mitigation strategy for the development will comprise of a number of measures to ensure any future development is safe:

- Sequential approach whereby all future buildings are located in Flood Zone 1;
- Maintain the surface water flow/overland flow routes through the site or provision of flood storage compensation;
- Ground floor levels of the units are set at 300mm above the agreed surface water flood level in the vicinity of the surface water flow route;
- Provision of safe access and egress;
- Drainage Strategy designed to attenuate surface water including an allowance for climate change.

7.1.4 Based on the consultation from Stakeholders and current information available for the site it is considered to be at low risk of flooding. This is subject to further detailed investigations and design required to support the production of a fully compliant FRA and drainage strategy.

7.1.5 Subject to the production of a fully compliant FRA and supporting drainage strategy, it is possible for the future occupants and users of the proposed development to be safe from flooding and for there not be detrimental impact on third parties. The proposal complies with the National Planning Policy Framework (NPPF) and local planning policy with regards to flood risk and is an appropriate development at this location.

Appendix A Planning Policy Guidance

POLICY U1- INFRASTRUTURE ADEQUACY

Before granting planning permission for development on large sites the Council will have regard to the adequacy of the existing infrastructure. If the existing infrastructure provision is inadequate the Council will either:-

(i) seek to phase or postpone the development until adequate infrastructure provision is likely to be available; or

(ii) refuse planning permission where appropriate phasing or postponement cannot be agreed.

POLICY U2A – DEVELOPMENT IN FLOOD RISK AREAS

Development proposals within the Environment Agency's currently designed Flood Risk Zones will be determined in accordance with a sequential approach as set out in PPG25. This will be, in order of priority:

(a) areas with little or no flood risk

(b) areas of low to medium risk

(c) areas of high risk

(d) areas of functional flood plain.

In accordance with this order of priority, the Council will only permit development in areas of functional flood plain if:

(i) it involves use of land only, and would not increase flood risk or danger from flood risk; or

(ii) it is proven to be essential infrastructure which cannot be located elsewhere. No such development will be allowed if it would cause any negative impacts on any part of the flood regime of the watercourse involved.

Development in high risk areas will only be allowed if:

(iii) there will be no increased risk of flooding either on site or elsewhere in the floodplain or suitable mitigation measures will be incorporated as part of the scheme; and

(iv) the development would not reduce the effectiveness of existing flood defence measures; and

(v) there is no suitable alternative site available in the locality which is at a lower risk of flooding; and

(vi) there will be no significant adverse effects upon a watercourse, navigable waterway or sewer; or

(vii) adequate and appropriate flood-prevention measures to minimise the risk of flooding are incorporated as part of the development.

Development in all other flood risk areas will be allowed under this policy, provided that suitable flood minimisation and/or mitigation measures are included as part of the development. All

applications or proposals for development in flood risk areas will be required to be accompanied by a Flood Risk Assessment covering matters (i) to (v) above, to be carried out to the satisfaction of the Council and/or the Environment Agency.

POLICY U2B – FLOOD RISK ASSESSMENT ZONES

Within the Flood Risk Assessment Zones as shown on the Alterations Proposals Map, Flood Risk Assessments will be required for any development proposals (other than house extensions) which exceed 50m^2. Outside these zones, a Flood Risk Assessment will be required for any proposals which exceed 235m^2.

POLICY U3A – CATCHMENT EFFECTS

The Council will not permit development which would result in either:

(i) increased risk of flooding or a reduction in the effectiveness of existing flood defence measures, either on site or elsewhere within the catchment; or

(ii) significant adverse effects upon a watercourse, navigable waterway or sewerage infrastructure,

unless it is satisfied that adequate and appropriate attenuation measures, such that there is no increase in the risk of flooding, are incorporated as part of the development.

POLICY U3B – SUSTAINABLE DRAINAGE SYSTEMS

In consultation with the Environment Agency and, where appropriate, sewerage undertakers, the Council may require developments to include sustainable drainage systems to control the quality or attenuate the rate of surface water run-off. Contributions in the form of commuted sums may be sought in legal agreements to ensure that the drainage systems can be adequately maintained.

POLICY U5- MASTS AND AERIALS UNDER 15M

Prior approval for the siting and appearance of new masts under 15m tall will be required within conservation areas, or where they may affect the setting of listed buildings, or in other locations where there is likely to be a significant impact on amenity. Factors to be taken into account include:

(i) topographical features, including the height of the site in relation to surrounding land;

(ii) views of the site from adjoining land, both within and outside the district, with particular reference to the effect on the skyline or horizon;

(iii) impact on, and possible screening by, existing vegetation;

(iv) proximity to residential property;

(v) other masts, buildings or structures in the locality; and

(vi) prominence from public rights of way used for recreational purposes (e.g. footpaths, bridleways and towpaths).

Appendix B ECC Records

Essex County Council
Environment and Planning
Flood and Water Management Team
E3 County Hall
Chelmsford
CM1 1QH

Michael Hartley
Telford House
Cowe Lane
Cambridge
Cambridgeshire
CB21 5HB

Date: 20.12.17
Our Ref: FIIR-000124

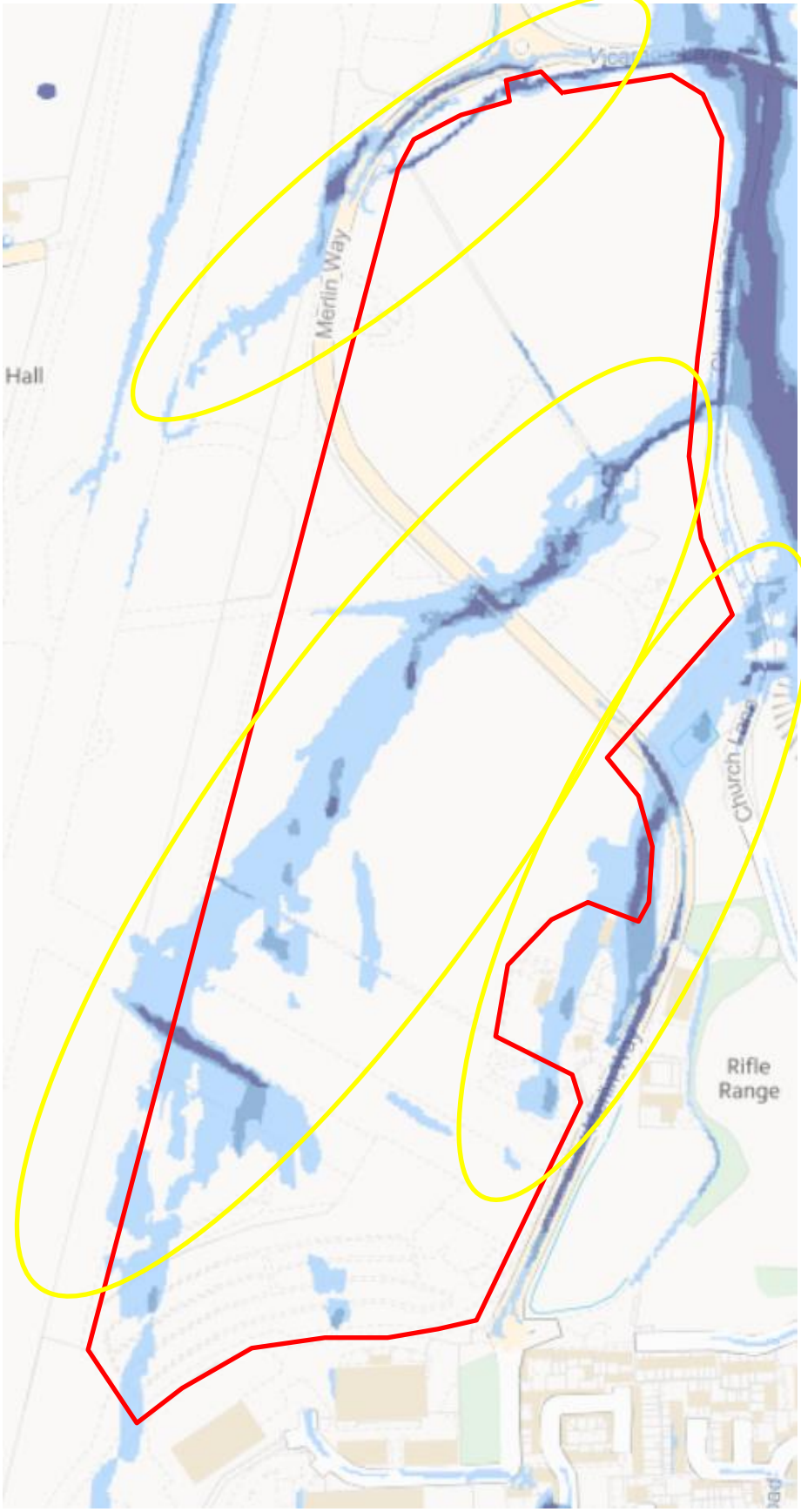
Dear Mr Hartley

Basic Information Request – North Weald Airfield

Thank you for contacting us for information held on the above site. I have checked our database and other sources for any data regarding surface water flood risk and compiled it as the below report.

According to the Gov.uk Risk of Flooding from Surface Water (RoFSW) maps, (Figure 1, see next page) your site is mostly at very low risk of flooding from surface water. It does however have 3 significant surface water flow routes intersecting it as can be seen on figure 1 (circled yellow.) Each of these three surface water flow routes will be due to a defined “valley” which channels surface water from the surrounding areas and concentrates it on to these three routes. Surface water flow routes tend to form cut channels to carry their flows or have them dug by humans, these then class as an ordinary watercourses. There is mapped evidence of this for the middle and Southern flow routes as will be discussed in further sections of this report. This mapping can be accessed by following this link, locating your site and selecting the option “Flood risk from surface water”.

Figure 1: Gov.uk surface water flood maps – North Weald Airfield



Watercourses and rivers

Our database has record of multiple watercourses within the 250m buffer zone of your site which can be seen on figure 2 as green and purple lines.

Purple Lines represent Environment Agency controlled “Main Rivers”. Those visible on figure 2 are part of an upper tributary of Cripsy Brook and overall flow Northwards.

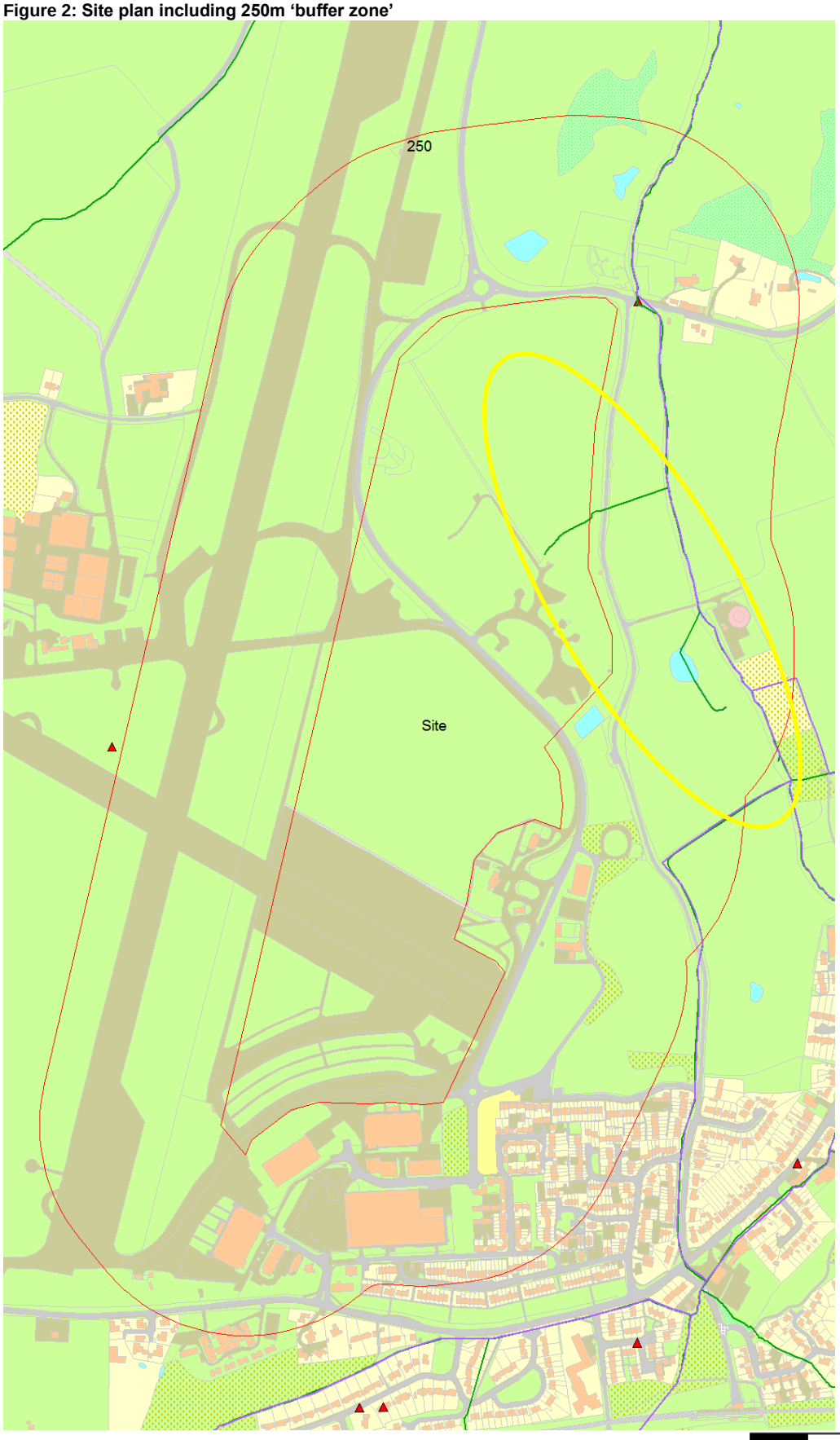
The Green Lines shown are Ordinary Watercourses. These are the responsibility of the relevant Riparian Landowner however Essex County Council are responsible for ensuring these landowners carry out their duties. The two Ordinary Watercourses highlighted by a yellow circle on figure 2 are likely created by or to control the middle and southern surface water flow routes highlighted in figure 1.

It should be noted that smaller watercourses are not always mapped and so it is likely smaller unrecorded lengths of this watercourse network flow further into your site therefore site investigations should be carried out to verify information supplied.

If proposed works entail temporary (Through works) or permanent (Through design) alterations to an Ordinary Watercourse, consent will be required. At this point, you can also request for an engineer to attend and offer on-site guidance. Further information can be found using the following link:

http://flood.essex.gov.uk/change-a-watercourse/apply-for-a-watercourse-consent/

Figure 2: Site plan including 250m 'buffer zone'



Flood risk assets
Our database shows several small ponds located in various areas within the 250m buffer zone surrounding your site and an overflow reservoir located within the yellow circle of figure 2. These are shown by blue polygons on figure 2. Our data does not state whether they constitute a significant flood risk threat so some investigation of them may be worthwhile.

As with smaller watercourses, not all flood risk assets will be mapped so further site investigation is advised.

Surface Water Management Plans

A Surface Water Management Plan (SWMP) produces more detailed modelling and identifies Critical Drainage Area's (CDA); highlighting areas most at risk. Essex County Council (ECC) has completed one for Harlow and Loughton however these unfortunately do not encompass your site.

Flood Incidents and Investigations
We have one recorded flood incident within the buffer zone surrounding your site which is indicated by the red triangle in the top right of figure 2, intersecting the main river. Records of this flood are from Epping Forest District Council and not dated (so pre 2015) however they indicate a blocked "stormpoint" caused road flooding so this has most likely been resolved.

Though this is the only recorded flood incident this does not mean there has been no other flooding, simply that no more has been reported to us. It may be worth discussing with local landowners any possible flooding they may have witnessed, especially on open land where witnesses may have seen no reason to report it.

The Environment Agency hold records of flooding and river levels on Main Rivers and so I recommend contacting them to see if they have any data that may concern you.

I hope that the above assists you with your enquiries.

Yours sincerely,

George Allen
Essex County Council
Flood and Water Management Team

Please reply to: Flood & Water Management Team
Email: floods@esssex.gov.uk

Appendix C EA Records and Correspondence

Michael Hartley

From: Enquiries_EastAnglia <Enquiries_EastAnglia@environment-agency.gov.uk>
Sent: 15 January 2018 16:04
To: Michael Hartley
Subject: EAn.2017.70307 - North Weald
Attachments: 70307 response.pdf; 70307 Flood Map for Planning (Rivers and Sea).pdf; North Weald Groundwater Flow Direction.pdf; North Weald Groundwater Modelled Levels.pdf; FRA advisory note.pdf

Dear Mr Hartley

Thank you for your enquiry of 14 December 2017 about your site at North Weald Airfield. Please find attached our response and information.

If we can be of further help, please do contact us.

Regards

Karen

Karen Brown
Customers & Engagement Officer, Customers & Engagement Team, East Anglia Area
Environment Agency | Bromholme Lane, Brampton, Huntingdon, Cambridgeshire, PE28 4NE
Environment Agency | Iceni House, Cobham Road, Ipswich IP3 9JD

enquiries_eastanglia@environment-agency.gov.uk
External: 0203 02 55472

Working days: Monday, Tuesday, Wednesday

creating a better place

Environment Agency

Mr M Hartley
Peter Brett Associates
mhartley@peterbrett.com

Our ref EAn/2017/70307

Date 15 January 2018

Dear Mr Hartley

Enquiry regarding Flood Map for Planning (Rivers and Sea) information for part of North Weald Airfield.

Thank you for your enquiry which was received on 14 December 2017.

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

I have attached a copy of the Flood Risk Assessment (FRA) advisory note. Please refer to Open Government Licence which explains the permitted use of this information. We have no defences that benefit this site. The local authority should be able to provide you with any details of surface water flooding.

The information on Flood Zones in the area relating to this address is as follows:

The site is in an area located Flood Zone 1 shown on our Flood Map for Planning (Rivers and Sea).

Note - This information relates to the area that the above named property is in and is not specific to the property itself as it is influenced by factors such as the height of door steps, air bricks or the height of surrounding walls. We do not have access to this information and is not currently used in our flood modelling.

Flood Zone definitions can be found at www.gov.uk/guidance/flood-risk-and-coastal-change#Table-1-Flood-Zones

Please find attached a copy of the Flood Map for Planning (Rivers and Sea) for the area relating to your site.

Name	Product 1
Description	Flood Map for Planning (Rivers and Sea) for North Weald Airfield
Licence	Open Government Licence
Information	*The mapping of features provided as a background in this product is*

Warning - OS background mapping	*© Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply to this background mapping. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial purposes for the period during which the Environment Agency makes it available. You are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS.*
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2017 Ordnance Survey 100024198.

TEAM2100 is delivering the first 10 years of capital investment in tidal flood defences in London and the Thames estuary, as recommended by the TE2100 plan. For more information, visit the TEAM2100 website or email team2100@ch2m.com.

Groundwater modelled levels and flow direction

Please see the attached document for the direction of groundwater flow in the vicinity of the North Weald Airfield Site. These maps have been exported from the Essex Regional Groundwater Model and display groundwater directional flow for the following geological layers; till, Crag/sands & gravels, London Clay and Top Chalk.

There are no groundwater level monitoring points in the vicinity of the site, as such accurate groundwater level data cannot be supplied. However we have attached a document which displays modelled groundwater level data and depth to water table. Reference to the Essex Regional Groundwater Model suggests that Historic Modelled Head Contours for the water table in a dry month (September 1991) range between 70mAOD at the North of the site and 88mAOD at the South of the site. In a wet month (March 2001) these are 72mAOD to 90mAOD respectively. Historic Modelled Head Contours for the chalk in both dry and wet months are approximately 42-44mAOD.

The modelled depth to the water table in an average month (May 1994) ranges between 1.5m and 3m across the site with minor annual fluctuations.

Groundwater flooding is only kept for reported events in our area since 2010 but we have not had any reported events so most of the time we will not be aware of any official groundwater flooding events. Because of the nature of the events, more often than not, events that appear to be groundwater flooding are actually caused by a leaking/burst water main or surface water flooding where the underlying ground is impermeable and rain cannot drain away through the underlying ground quick enough which can be confused as groundwater flooding when in fact it is surface water flooding. ‘Groundwater flooding’ only occurs when groundwater levels exceed ground level which only happens after significant groundwater recharge in certain hydrogeological conditions (not common in Essex, Norfolk and Suffolk).

Data Available Online

Many of our flood datasets are available online:

- Flood Map For Planning (Flood Zone 2, Flood Zone 3 ,Flood Storage Areas, Flood Defences, Areas Benefiting from Defences)
- Risk of Flooding from Rivers and Sea
- Historic Flood Map
- Current Flood Warnings

Further details about the Environment Agency information supplied can be found on the GOV.UK website:

https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather

If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency Information for Flood Risk Assessments

https://www.gov.uk/planning-applications-assessing-flood-risk

Please be aware that we now charge for planning advice provided to developers, agents and landowners. If you would like advice to inform a future planning application for this site then please complete our https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion and email it to our Sustainable Places team. planning.ipswich@environment-agency.gov.uk.
They will initially provide you with a free response identifying the following:

- the environmental constraints affecting the proposal;
- the environmental issues raised by the proposal;
- the information we need for the subsequent planning application to address the issues identified and demonstrate an acceptable development;
- any required environmental permits.

If you require any further information from us (for example, a meeting or the detailed review of a technical document) we will need to set up a charging agreement. Further information can be found on our website.

Please note we have published revised climate change allowances, which are available online. These new allowances will need to be reflected in your Flood Risk Assessment. If you want to discuss this please call our Sustainable Places team on 0203 025 5475.

Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

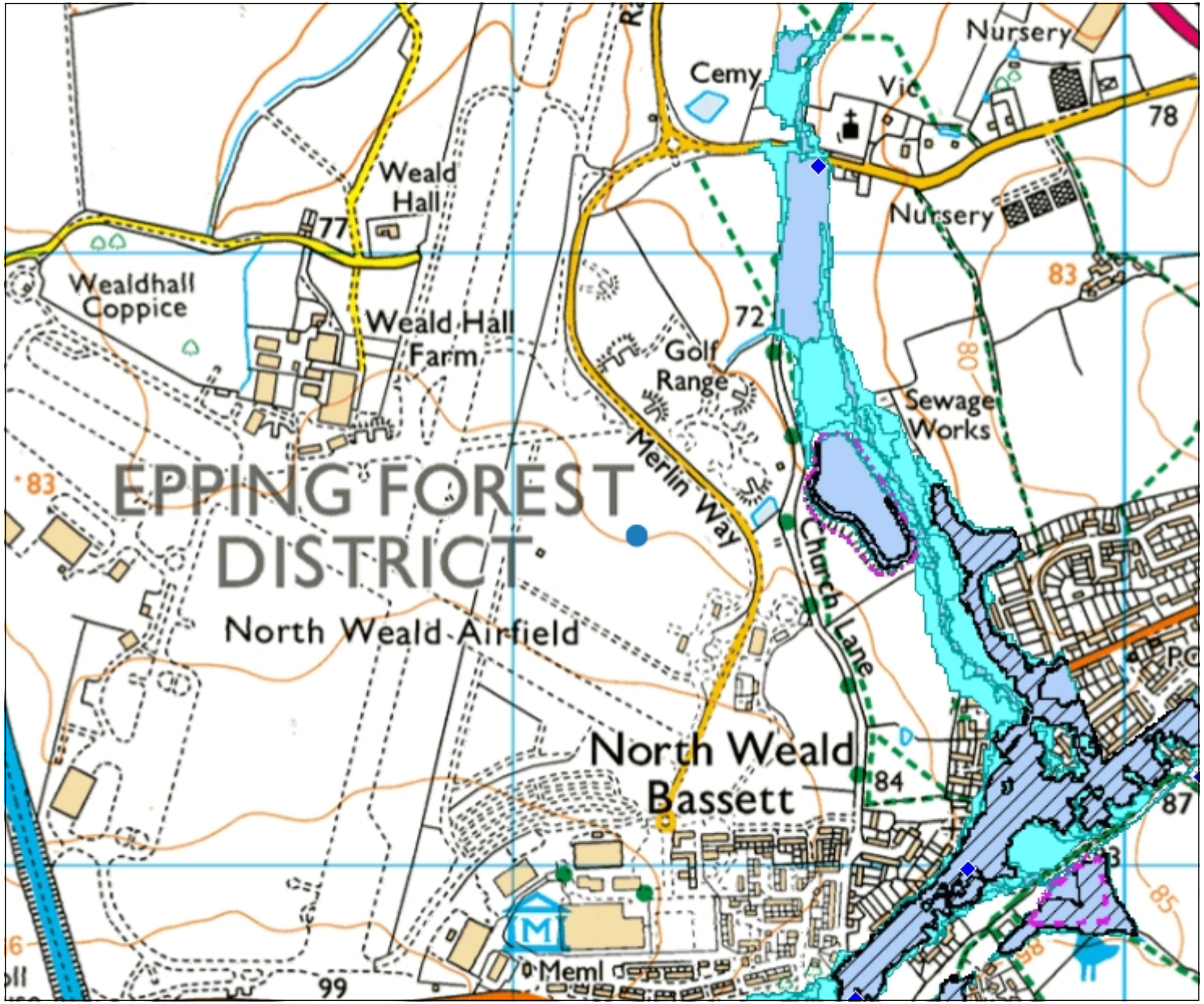
Yours sincerely

Karen Brown

Karen Brown
Customers and Engagement Officer
Direct dial: 02030 255472

East Anglia Area
Ipswich Office, Iceni House, Cobham Road, Ipswich, Suffolk, IP3 9JD
Brampton Office, Bromholme Lane, Brampton, Huntingdon, PE28 4NE
General Enquiries: 03708 506506
Email: enquiries@environment-agency.gov.uk
Website: https://www.gov.uk/government/organisations/environment-agency

EAn.2017.70307 Flood Map for Planning (Rivers and Sea) Created on 15.01.18



Environment Agency

Scale 1: 10,000

N W E S

Flood Map for Planning (Rivers & Sea)

- Agency Operated Assets
- Defences
- Flood Storage Areas
- Areas benefiting from flood defences
- Flood Zone 3
- Flood Zone 2

Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occuring each year.

Contact Us: National Customer Contact Centre, PO Box 544, Rotherham, S60 1BY. Tel: 03708 506 506 (Mon-Fri 8-6). Email: enquiries@environment-agency.gov.uk

Appendix D Church Lane Flood Meadow Local Nature Reserve Site Management Plan

North Weald Flood Alleviation Scheme (F.A.S.)

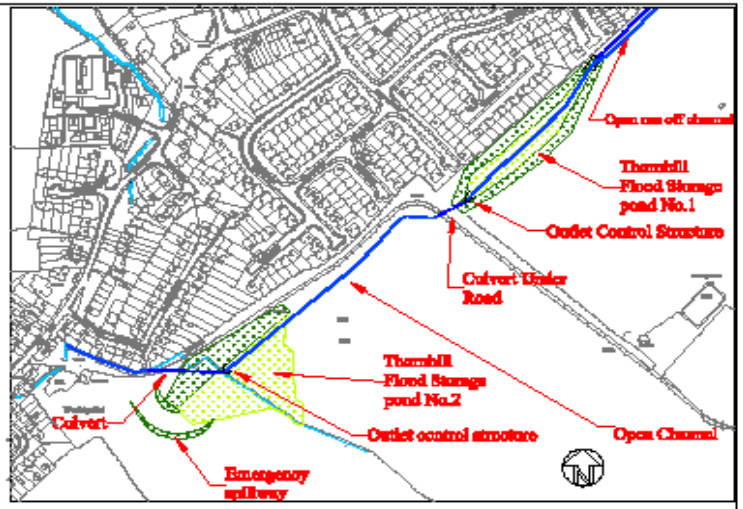
Description of the scheme
The North Weald Flood Alleviation Scheme was constructed in two distinct phases. The phase at North Weald was carried out in 1990 with a further addition carried out at Thornhill in 1995. The schemes comprised the construction of a large diameter by-pass culvert with Flood Storage Ponds with culverts, pipes, ditches, inlet & outlet structures. The two phases of the scheme are detailed below.

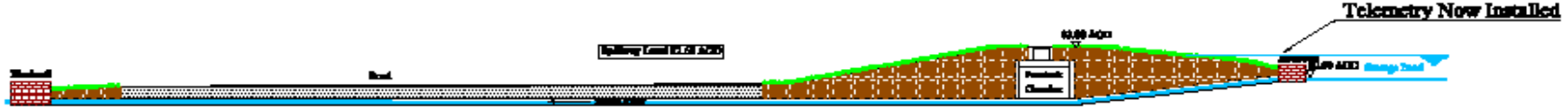
The works executed under the North Weald FAS in 1990 comprised:
Flood flow diverted away from the High Road, via an offtake structure at Station Road into a 1.5m diameter pipeline approximately 820m long. A sweetening flow is maintained at all times along the existing watercourse. Gravity pipe diversion, running along Church Lane and discharging into the watercourse downstream of the village with a side-spill weir into the Church Lane Flood Storage Reservoir (FSR). This Reservoir was constructed to maintain the interests of downstream riparian owners and others subject to flooding and stores 38,000 m3 of floodwater (The pipeline itself varies from approximately 4m to 8m in depth below ground level.). At the inlet control structure to the storage pond, a proportion of the flow continues by twin pipeline to the brook, but under heavy flows excess water will enter the storage reservoir, where its passage downstream will be delayed until flows in the brook subside.
Work was also carried out on the existing North Weald Brook as part of this Contract. The work involved excavation, embankment raising, landscaping and the placement of Gabion baskets. The Scheme was designed to cater for a 1 in 50 year storm (probability of 0.02), if this is exceeded then the FSR will discharge via a spillway to the adjoining North Weald Brook.

The works executed under the Thornhill FAS in 1995 comprised:
Improvements to existing ditches, excavation of new ditches and culverts and the construction of 2 flood storage ponds to alleviate flooding in Thornhill, Emberson Way and the High Road (which was caused by run-off from approximately 60 hectares of arable farmland).
New ditches and culverts were constructed to intercept run-off at the boundary between the farmland and the housing estate, collecting run-off from approximately one third of the catchment and draining in to Pond 1. This run-off is attenuated by the penstock at the outlet to the pond. A new ditch then carries the attenuated flow to a confluence with an existing ditch, which collects run-off from the other two thirds of the catchment. A small permanent pond was formed at the confluence, and an earthfill dam with a penstock to control outflow was constructed to attenuate the combined flows (Pond 2). The outlet pipe from Pond 2 discharges into an existing concrete channel which itself discharges into the main North Weald Brook.
The two flood storage ponds (Ponds 1 and 2) are capable of storing a total of approximately 6300m3 of surface water run-off during periods of heavy rainfall (2250m3 in pond 1 and 3920m3 in Pond 2). Included in the construction of these was a 450mm-diameter outlet pipe to each pond with inlet and outlet headwalls and a flow control penstock chamber. The outlet pipe to Pond 1 is approximately 38m long, that to Pond 2 approximately 64m long. Pond 1 was formed mainly by excavation and Pond 2 by Construction of an embankment.
The Scheme was designed to cater for a 1 in 75 year storm (probability of 0.013) and if this is exceeded then the ponds discharge via a spillway either to Pond 2 (for Pond 1) or to the culvert channel leading to the North Weald Brook for Pond 2.
Telemetry to warn the Councils Land Drainage Section of either blockage to the outlet grille or very high water levels in Pond 2 was installed in March 2002. This would enable either emergency screen clearance or warning to residents to be issued, should overtopping appear to be imminent.

Thornhill Phase

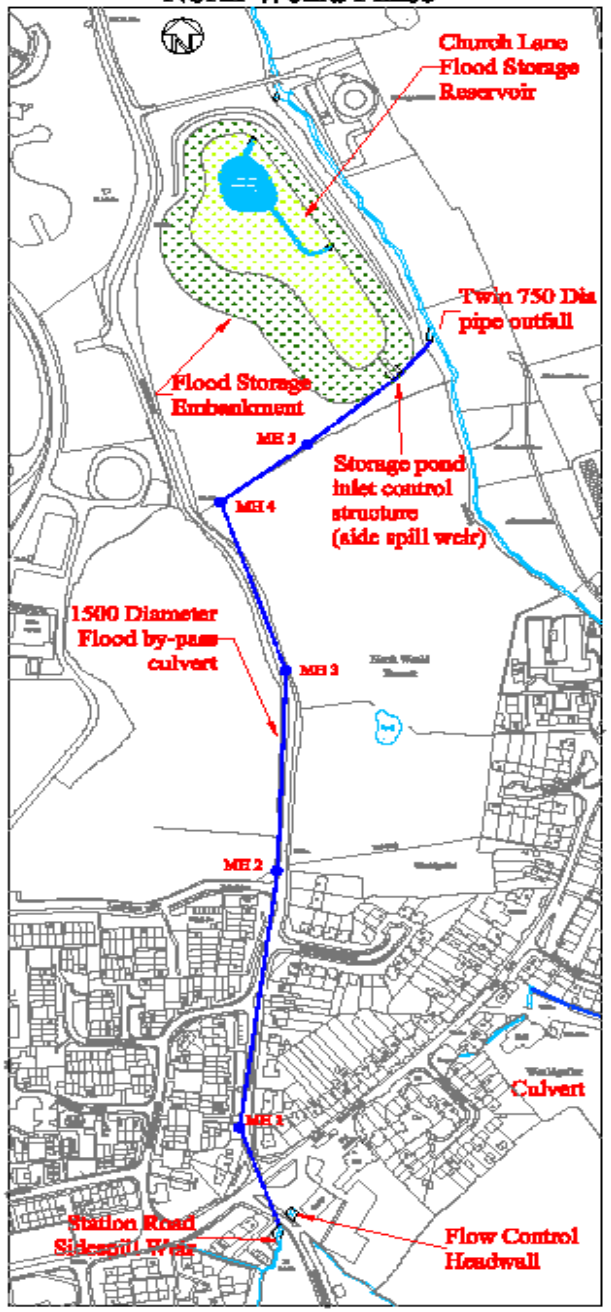
Section through Outlet Structure, Storage Pond 1

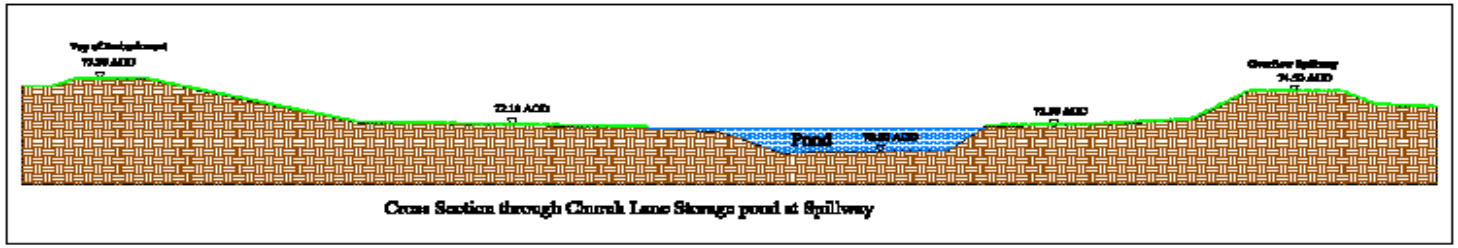




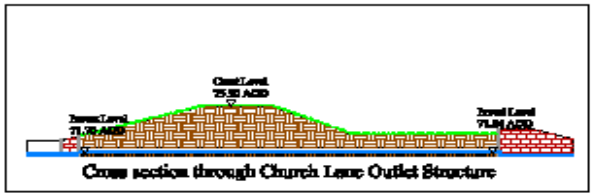
Section through Outlet Structure, Storage Pond 2

North Weald Phase

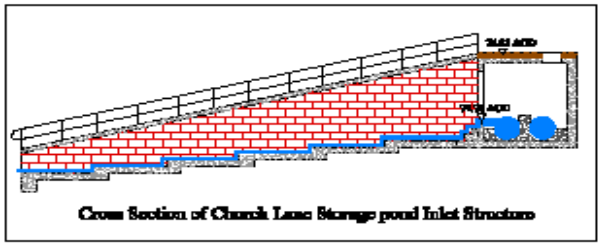




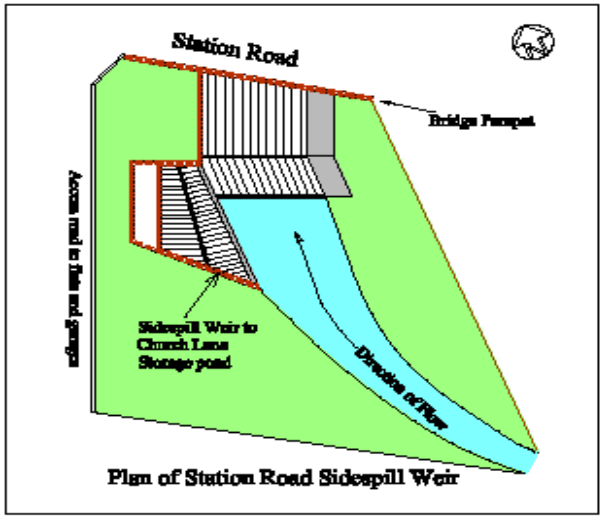
Cross Section through Church Lane Storage pond at Spillway



Cross section through Church Lane Outlet Structure

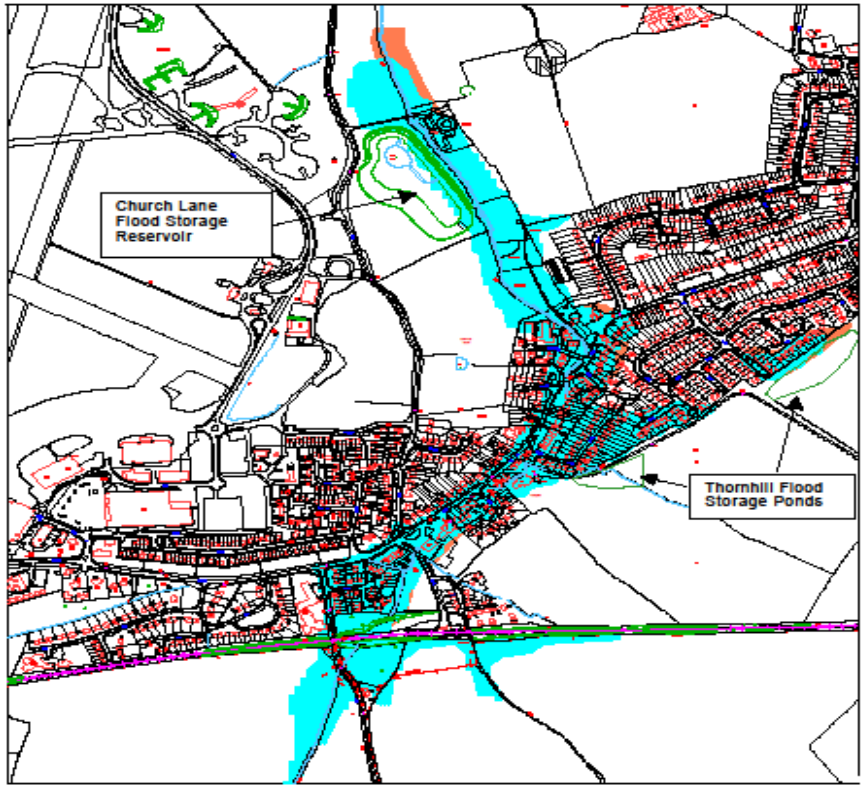


Cross Section of Church Lane Storage pond Inlet Structure



Plan of Station Road Sidespill Weir

Flood Envelope and Properties at risk



Epping Forest District Council

North Weald Flood Alleviation Scheme
Operating information sheet

Drawn by	Checked by
S.Isgar	J.Canton
Passed by	Date
J.Canton	May 2001

Not to Scale

Sheet 2

7.5 Drainage Maintenance Plan

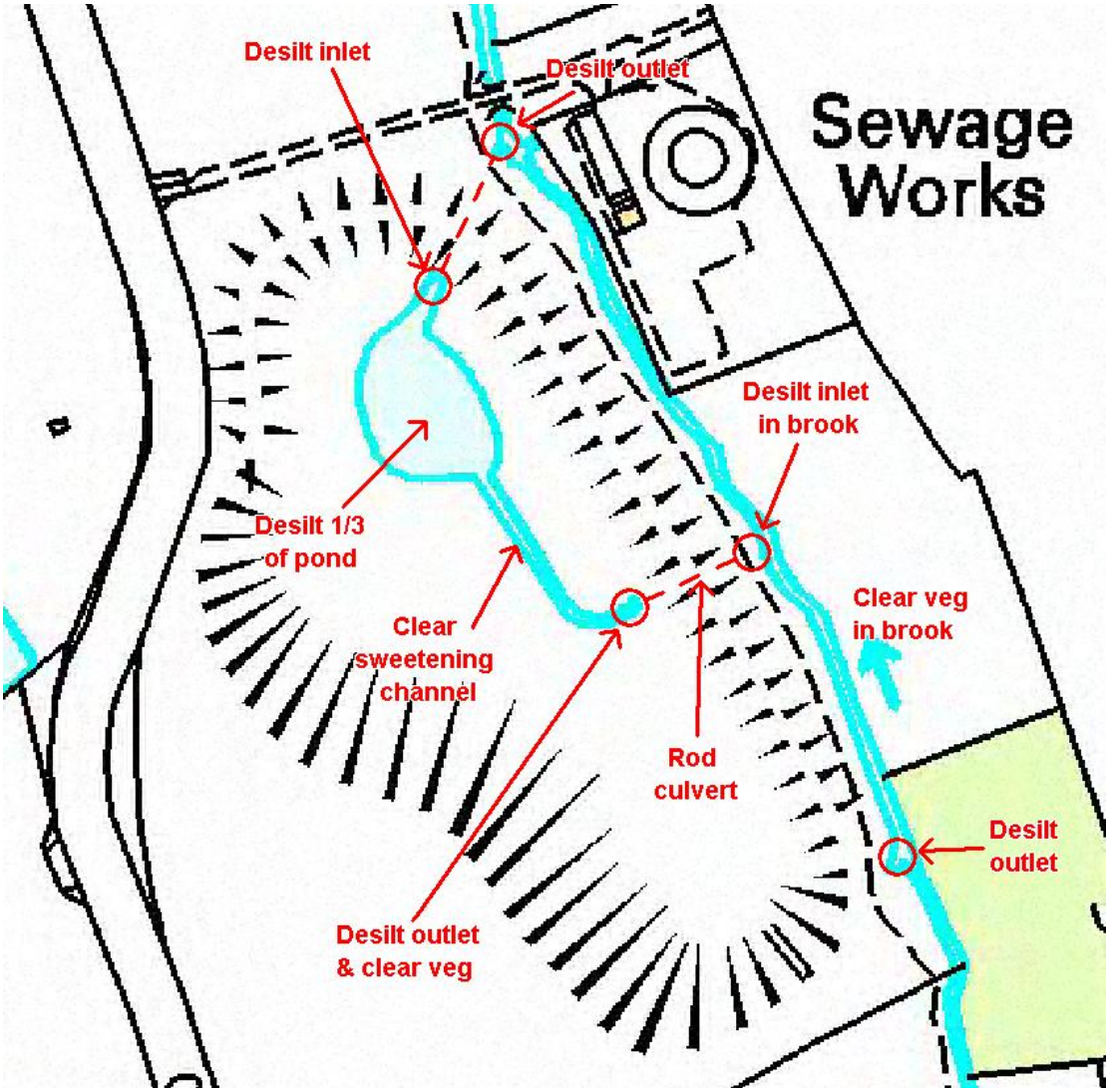
Drainage maintenance is arranged by the Engineering, Drainage and Water team.

Drainage works are reactive but will often consist of a combination of the following routine works in September each year:

- Desilt of culvert inlets and outlets
- Vegetation clearance around culvert inlets and outlets
- Rodding of culverts
- Vegetation clearance along banks of the brook
- Grass cut of the whole site
- Short grass cut of the spillway section
- Desilt of 1/3 of the pond (infrequent)
- Clearance of silt and vegetation in the sweetening channel
- Health and safety repairs to structures and life buoy.

Urgent works may be required such as repairs to inlet/outlets, clearance of culvert blockages, strimming, desilting etc.

Drainage works:



Any queries regarding drainage work to be directed to the Senior Land Drainage Engineer.

Appendix E Thames Water Correspondence

Sewer Flooding
History Enquiry

Property Searches

Peter Brett Associates LLP

Cow Lane

Search address supplied	North Weald Airfield Merlin Way North Weald Basset CM16 6HR
Your reference	39454
Our reference	SFH/SFH Standard/2017_3710888
Received date	**19 December 2017**
Search date	**20 December 2017**

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

Sewer Flooding
History Enquiry

Property Searches

Search address supplied: North Weald Airfield,Merlin Way,North Weald Basset,CM16 6HR

This search is recommended to check for any sewer flooding in a specific address or area

TWUL, trading as Property Searches, are responsible in respect of the following:-

(i) any negligent or incorrect entry in the records searched;

(ii) any negligent or incorrect interpretation of the records searched;

(iii) and any negligent or incorrect recording of that interpretation in the search report

(iv) compensation payments

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

Sewer Flooding
History Enquiry

Thames Water Property Searches

History of Sewer Flooding

Is the requested address or area at risk of flooding due to overloaded public sewers?

The flooding records held by Thames Water indicate that there have been no incidents of flooding in the requested area as a result of surcharging public sewers.

For your guidance:

- A sewer is "overloaded" when the flow from a storm is unable to pass through it due to a permanent problem (e.g. flat gradient, small diameter). Flooding as a result of temporary problems such as blockages, siltation, collapses and equipment or operational failures are excluded.
- "Internal flooding" from public sewers is defined as flooding, which enters a building or passes below a suspended floor. For reporting purposes, buildings are restricted to those normally occupied and used for residential, public, commercial, business or industrial purposes.
- "At Risk" properties are those that the water company is required to include in the Regulatory Register that is presented annually to the Director General of Water Services. These are defined as properties that have suffered, or are likely to suffer, internal flooding from public foul, combined or surface water sewers due to overloading of the sewerage system more frequently than the relevant reference period (either once or twice in ten years) as determined by the Company's reporting procedure.
- Flooding as a result of storm events proven to be exceptional and beyond the reference period of one in ten years are not included on the At Risk Register.
- Properties may be at risk of flooding but not included on the Register where flooding incidents have not been reported to the Company.
- Public Sewers are defined as those for which the Company holds statutory responsibility under the Water Industry Act 1991.
- It should be noted that flooding can occur from private sewers and drains which are not the responsibility of the Company. This report excludes flooding from private sewers and drains and the Company makes no comment upon this matter.
- For further information please contact Thames Water on Tel: 0800 316 9800 or website www.thameswater.co.uk

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

Appendix F Epping Forest District Council Correspondence

Epping Forest District Council
www.eppingforestdc.gov.uk

Date: 24 January 2018

Civic Offices
High Street
Epping
Essex
CM16 4BZ

Our Ref: WK/201744088

Michael Harley
Peter Brett Associates LLP
Caversham Bridge House
Waterman Place
Reading
Berks
RG1 8DN

Subject: Environmental Information Regulations Request

Dear Michael Hartley,

I am writing with regards to your recent request for information under Environmental Information Regulations. Please find below our reply to the enquiry you made under this scheme on 15th December 2017.

Please find below a list of certain information which we have withheld and is covered by an exemption provided in the Environmental Information Regulations 2004.

Drainage
The Drainage Team have checked the council's paper and electronic records for the Engineering, Drainage and Water team and can confirm the following:

1) Incidents of flooding to the site
Unfortunately we do not have any records of flooding at this site for any source of flooding. The applicant should note however, that our records rely on information from affected third parties or Council officers and therefore whilst our records do not indicate flooding at this location this does not mean that flooding has not occurred.

2) Possible problems with Flooding
Environment Agency modelling shows a surface water flow path running across the site in a South-westerly to North-easterly direction. A small portion of the North-eastern most portion of the site falls within EA Flood Zones 2 and 3. The area outlined in purple on the location plan is bound by ordinary watercourses on all four sides.

3) Land Drainage
Our records indicate that there is a the land drainage system on the land to the West of Merlin Way which is then piped through the former driving range on the East of Merlin Way and discharges in to the watercourse to the south of the site outlined in purple. However, we have no plans of the land drainage system on the East of Merlin Way.

If you are dissatisfied with the handling of your request, you have the right to ask for an internal review. Internal review requests should be submitted within two months of the date of receipt of the response to your original letter and should be addressed to: EIR@eppingforestdc.gov.uk

Please remember to quote the reference number above in any future communications.

If you are not content with the outcome of the internal review, you have the right to apply directly to the Information Commissioner for a decision. The Information Commissioner can be contacted at: Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF

Yours Sincerely

Amber Stewart
Epping Forest District Council,
EIR team
Tel No: (01992) 564608
Email: EIR@eppingforestdc.gov.uk

TECHNICAL NOTE

Job Name: North Weald Airfield

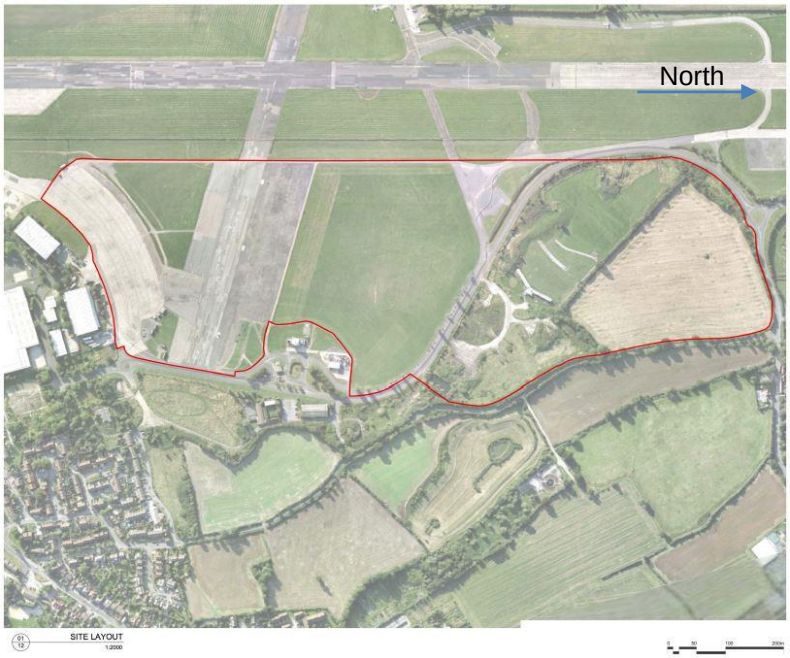
Job No: 39454

Note No: GEO1 Rev 3

Date: January 2018

Prepared By: J. Camp

Subject: **Ground Conditions - Baseline Opportunities & Constraints**

Item	Subject
1.	**Scope** • Peter Brett Associates (PBA) have been commissioned to make representations for this Site for Epping Forest's emerging local plan. This note provides the findings of a high level planning desk based assessment of the ground conditions, geology, site history and hydrogeology of the Site and immediate surroundings. • PBA have reviewed geological and hydrogeological maps, historical maps, published borehole and well records and other relevant information in order to establish a ground and groundwater model for the Site and surroundings.
2.	**Introduction** • The Site is located to the eastern part of North Weald Airfield, North Weald Bassett, Essex. The Site location is presented on **Figure 1** below.  Figure 1 Site Layout Plan

DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Checked	Reviewed (Discipline Lead)	Approved (Project Director)
39454/3501/Geo1	1	28/11/16	PW		MB	
39454/3501/Geo1	2	14/14/16	PW		MB	
39454/3501/Geo1	3	26/01/18	JC	OB	KR	KR

TECHNICAL NOTE

Item	Subject
3.	**Current Land Use** • The Site currently comprises the eastern part of North Weald Airfield including concrete apron and open grassed areas. The northern part of the site comprises open grassland, formerly used as a golf driving range and an agricultural field. • The main North Weald Airfield lies to the west, a golf course to the north, Merlin Way and agricultural fields to the east and Bassett Business Centre to the south.
4.	**Historical Land Use** • North Weald Airfield was first established in 1916[1] and the Site remained in military use until the 1970s. • Prior to the use as an airfield the Site comprised open farmland. • Since the end of military use the airfield has been in civilian airfield use. • The control tower at the airfield is a grade 2 listed building[2].
5.	**Geology** • Based on the British Geological Survey (BGS) digital mapping[3], superficial deposits comprise Lowestoft Formation, generally comprising chalky clay. • The bedrock geology beneath the Site comprises London Clay Formation which generally comprises clay and mudstone. • There are no BGS borehole records on the Site, however there are a number of records on the M11 to the west of the Site and in the village to the east. The nearest 2 boreholes are at the sewage treatment works located approximately 135m to the east of the Site. • These two boreholes have Topsoil recorded to 1' (0.3m) overlying firm to soft clay to 5' (1.5m) and 6' 6" (2m) this is interpreted as superficial Lowestoft Formation, this in turn overlies firm to stiff clay to 25' 6" (7.7m), this is interpreted as London Clay Formation.
6.	**Groundwater** • The Site does not lie within a Source Protection Zone. There is no Source Protection Zone within 2km of the Site. • The underlying superficial deposits (Lowestoft Formation) are classified as Secondary undifferentiated aquifer and Bedrock Geology (London Clay) is classified as unproductive strata (non aquifer)[4]. • The Site does not lie within a vulnerable water zone. • Groundwater flow direction is unknown.

[1] http://www.northwealdairfield.org/History/history.html last accessed 28/11/16
[2] http://magic.defra.gov.uk/MagicMap.aspx last accessed 28/11/16
[3] http://mapapps.bgs.ac.uk/geologyofbritain/home.html last accessed 28/11/16
[4] http://maps.environment-agency.gov.uk/wiyby last accessed 28/11/16

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39454/3501/Geo1	3	26/01/18	JC	OB	KR	KR

TECHNICAL NOTE

Item	Subject
7.	**Surface Water** • There is an unnamed stream 40m to the east of the Site flowing to the north into Crispey Brook approximately 1km to the north of the Site. • A small pond lies on the eastern Site boundary.
8.	**Environmental Data** • There are no landfill sites recorded within 500 m of the Site. • There is a sewage treatment works approximately 130m to the east of the Site. There was a significant pollution incident to water recorded at the sewage treatment works from 2nd April 2002[4].
9.	**Environmental Assessment – Conceptual Site Model** • Based on the historical mapping and review of available environmental data, a risk assessment has been undertaken for the development based on existing Site conditions. The underlying principle is the evaluation of *pollutant linkages* in order to assess whether the presence of a source of contamination could potentially lead to harmful consequences. A pollutant linkage consists of the following three elements: a. A **source** of contamination or hazard that has the potential to cause harm or pollution. b. A **pathway** for the hazard to move along / generate exposure. c. A **receptor** which is affected by the hazard. • For each potential pollutant linkage identified the risk is estimated through consideration of the magnitude of the potential consequences and the likelihood or probability of an event occurring. **Identified On-Site Potential Sources** • Due to the historical land use as an active WW2 airfield and the presence of the rifle range there is the potential for unexploded ordnance to be present at the Site. • Due to the historical and current land use as an airfield there is the potential for hydrocarbons from fuel leaks and organic compounds such as coolant and antifreeze to be present in soils. • Based on experience of other RAF airfields there is potential for asbestos contamination to be present in Made Ground particularly beneath areas of hardstanding such as the apron in the southern part of the Site. • Pesticides and fertilisers used on farmland on the northern part of the Site. **Identified Potential Pathways and Receptors** • Dermal contact by construction workers during construction phase any works of hydrocarbons (fuel) and organic compounds (coolant and antifreeze) to be present in soil.

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Item	Subject
	• Run off of fertilizers and herbicides into on-site and off-site surface water features (pond and stream to the east of the Site). • Inhalation of asbestos dust by construction workers and future site users.
10.	**Geotechnical Assessment** Following review of information obtained from the Environment Agency website and available online mapping the following geotechnical assessment has been made: **Soil Re-use** • Reusing natural London Clay as engineered fill will require careful handling and control. **Cavities and Mining** • The Site is not considered to be in a coal mining area. • Based on a search of the PBA man-made and natural cavities database there are no recorded dissolution features located within 500 metres of the Site. **Foundations** • Shallow foundations are likely to be suitable for low to moderate foundation loads. Piled foundations may be considered for more heavily loaded structures. **Excavations** • Shallow excavations for foundations and drainage are anticipated to be stable in the short term. Close or continuous support will be required for any manned entry to excavations. **SuDS Potential** • Shallow infiltration drainage is unlikely to be suitable due to the cohesive nature and very low permeability of the underlying soils.
11.	**Summary** • The Site is located on the eastern part of North Weald Airfield, North Weald Bassett, Essex. • Based on historical and current land uses on-site, the potential risk associated with land contamination from past and current land use activity is considered to be generally low. • There are risks from the use of the Site as an Airfield including hydrocarbons, organic pollutants and asbestos. • There are not considered to be any significant site wide on-site sources of potential contamination that would impact the redevelopment of the Site. • There are a number of potential opportunities at the Site these are summarised below: a. The Site does not lie within a source protection zone for groundwater therefore any impact of contamination of groundwater is very low.

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39454/3501/Geo1	3	26/01/18	JC	OB	KR	KR

Item	Subject
	b. Soils on-site are likely to be classified as inert for off-site waste disposal and will generally be suitable for reuse, however, the final decision on waste classification is ultimately with the receiving landfill facility. c. Shallow foundations are likely to be suitable. • There are a number of potential constraints at the Site these are summarised below: a) Shallow infiltration drainage is unlikely to be suitable due to the cohesive nature of the underlying soils. b) There may be locally contaminated areas particularly in the south of the Site underlying the apron and taxiway.

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