



The London Resort Development Consent Order

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Environmental Statement Volume 2: Appendices

Appendix 18.7 – Phase 1 Geo-environmental Assessment Update, Kent Project Site (A2 Access Corridor)

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The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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The Infrastructure Planning (Environmental Impact Assessment) Regulations 2017

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London Resort

Desk Study – Kent Project Site (A2 Highway Works)

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1 Introduction

1.1 General

This report presents the results of a Geoenvironmental Desk Study for the A2 Highway Works element of the Kent Project Site prepared by Buro Happold on behalf of London Resort Company Holdings (LRCH). This report forms one study as part of the wider London Resort project, which has been divided into the Kent Project Site and Essex Project Site. It is one of two Desk Study reports prepared for the Kent Project Site, which has been assessed as the Swanscombe Peninsula and A2 Highway Works elements. This current report is an update to a desk study report for a similar area that was produced for the Paramount Park Entertainment Resort (by Atkins) [1]. This update includes a current set of environmental data and historical mapping and study of some additional areas, but much of the information in that earlier Atkins report remains pertinent. For brevity, not all of that earlier text is repeated here, and this report should therefore be read in conjunction with that earlier Atkins report.

The study area covered by this report (A2 Highway Works) is shown by the pink hatched area in Figure 1-2. It is located south of the Swanscombe Peninsula and is approximately centred at National Grid Reference (NGR) TQ 61209 72763 and covers some 143 hectares. Note: Because this Report has followed the structure of the earlier Atkins reports, the northern part of the Resort Access Road (including the People Mover) falls into Zone 6 and is therefore reported in the studies of the Swanscombe Peninsula [2] [3]. Furthermore, since preparing the report some parts of the area are no longer included within the DCO Order Limits. The purpose of this study is to establish the environmental, geological, hydrological and hydrogeological conditions present that may result in potential contamination and ground related risks for the proposed future use. The assessment is also prepared to support a planning application in accordance with the Planning Act (2008) [4] for a Nationally Significant Infrastructure Project (NSIP) for the wider London Resort.



Figure 1-1 - Aerial photograph of the Kent Project Site (Google Maps, 2020).

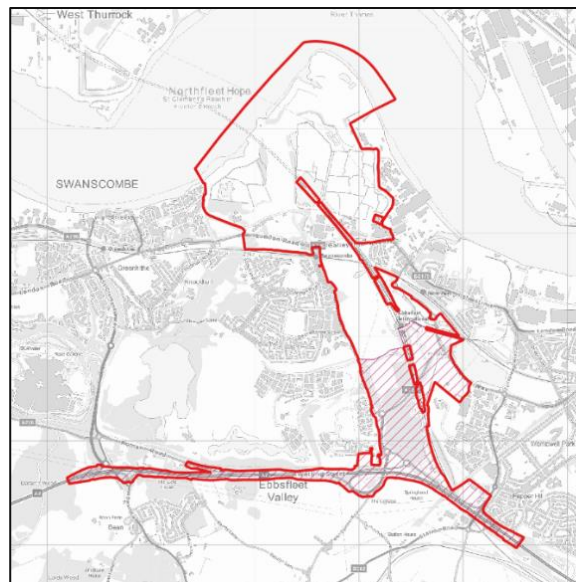


Figure 1-2 - OS map of Kent Project Site, A2 Access Works assessment area shown by pink shading (OS Open Data, 2020).

1.2 Proposed development

The London Resort will be a nationally significant visitor attraction and leisure resource, built largely on brownfield land at Swanscombe Peninsula on the south bank of the River Thames (the Kent Project Site) and with supporting transport and visitor reception facilities on the northern side of the river (the Essex Project Site). The focus of the Resort will be a Leisure Core located on the Swanscombe Peninsula, comprising a range of event spaces, themed rides and attractions, entertainment venues, theatres and cinemas, developed in two phases known as Gate One and Gate Two. The Gates will have entrance plazas offering ancillary retail, dining and entertainment facilities. The Resort will also include hotels, a conference and convention centre, an eSports venue, creative spaces, a transport interchange and 'back of house' service buildings.

This report relates to the A2 Highway Works elements. The purpose of these works is to provide dedicated access to the Resort and separate local and Resort traffic close to the point where it leaves the A2(T). As envisaged currently, two existing roundabouts at the A2(T) / A2260 Ebbsfleet junction would be replaced by a signalised at-grade gyratory junction, from which the Resort access road would branch off towards the Resort. A new Resort access road up to four lanes in width and approximately 2.3km in length will provide the sole means of visitor access by private car between the A2(T) / A2260 junction and the Entertainment Resort.

1.3 Study aims and objectives

The overall aim of this work was to carry out a Geoenvironmental assessment of the site, presented in the form of an update to a Desk Study Report for a similar portion of the A2 Highway Works area (by Atkins), in order to inform the Client's understanding of potential contamination and ground-related risks associated with the proposed development. This report will provide information relevant to redevelopment in accordance with the requirements of the Planning Act 2008 [4] and relevant policy in the NPS for National Networks (NPS NN). Regard is also given to the National Planning Policy Framework (NPPF) [5] and also with respect to any potential liability under Part 2A of the Environmental Protection Act [6], the primary policies under which contaminated land is managed in the UK. The work was carried out in general accordance with the Model Procedures [7] and its recently published replacement [8], the relevant British Standard [9], the Environment Agency Guiding Principles [10] and other current good practice guidance. The particular objectives were:

- To determine the historical and current use of the Site and its surroundings;
- To determine the nature of the ground conditions and the environmental sensitivity of the Site;
- To assess the potential location, nature and extent of any ground and groundwater contamination;
- To assess the potential risks to people and the environment (natural and built) associated with ground contamination (solid, liquid or gas) both in the site's existing condition and for the proposed future use;
- To construct an initial Conceptual Site Model and carry out a preliminary contaminated land risk assessment;
- To prepare a report based upon all of the above suitable to inform the Client about potential risks related to ground conditions and also suitable to support a planning application in accordance with the Planning Act 2008 [3] and to provide baseline information suitable to enable Environmental Impact Assessment.
- To determine the status of the Site with respect to Part 2a of the Environmental Protection Act 1990 [7] and the nature and extent of any associated environmental liabilities; and
- To evaluate the need for and scope of any subsequent site investigation and/or remedial action or design.

1.4 Information sources

The principal sources of information for this Desk Study include: the previous Desk Study prepared for the A2 Highway Works area [1]; results of a ground investigation undertaken subsequent to this [11, 12]; findings of a site walkover survey carried out in 2020; public register information and a current Groundsure Report; information available from the Environment Agency website; and other online sources. This report is therefore based upon information obtained from third party sources, together with observations from the site walkover survey. The third-party data has been accepted at face value and has not been independently verified. Buro Happold can therefore give no warranty, representation or assurance as to the accuracy or completeness of such information.

1.5 Methodology and site zoning

To facilitate assessment of this approximately 143-hectare area, the A2 Highway Works assessment area has been divided into three Zones, sequential to those described in the Swanscombe Peninsula reports [1], [3] (Zones 7 to 9). Zone 7 is further divided into two sub-zones (Zone 7A and Zone 7B). This report provides an updated assessment to areas that were previously considered in the Atkins Study, to reflect further / updated data that have been obtained since that report was published (Chapters 3 to 5). Where possible, the structure adopted in the Atkins Desk Study is repeated. A complete assessment of A2 Highway Works Areas that were not previously included within the assessment area of the previous study (Zone 7B) is then presented (Chapter 6).

Notes: As stated above, the northern part of the access road (which also includes a dedicated roadway called the People Mover, from Ebbsfleet International Station to the Resort (falls within Zone 6 and is therefore covered in the Desk Studies for the Resort area [2] [3].

Furthermore since preparing the report some parts of the area subject to study (Zone 7B and the western part of Zone 7A) have been excluded from the DCO Order Limits.

1.6 Competence

This work reported here was carried out by geoenvironmental scientists and engineers from Buro Happold. Buro Happold is a consulting engineering company that manages its work under various Quality Management Systems that are certified to ISO 9001. The work itself was carried out by the staff with relevant qualifications, training and experience. This overall technical responsibility for the work was held by a Technical Director with substantial experience in the assessment of land affected by contamination who is a Chartered Geologist and registered SiLC (Specialist in Land Contamination) and SQP (Suitably Qualified Person).

2 Site setting

2.1 Site location

The A2 Highway Works area is an irregularly shaped parcel of land, approximately centred at National Grid Reference (NGR) TQ 61209 72763. The assessment area principally encompasses a section of the A2(T) (which runs east to west) between approximately the A2(T) / B255 junction at Bean in the west and the A2(T) / B262 junction in the east. It also includes an area to the north of the A2(T) that surrounds the A2260 and B259 roads that lead towards the remainder of the Kent Project Site. Northfleet (an area of mixed residential and commercial uses) is located to the east of the A2 Highway Works Area and Swanscombe (which is predominantly residential) is to the northwest. To facilitate assessment, this area has been divided into three zones, illustrated by Figure 2-1 and described in Section 2.2.

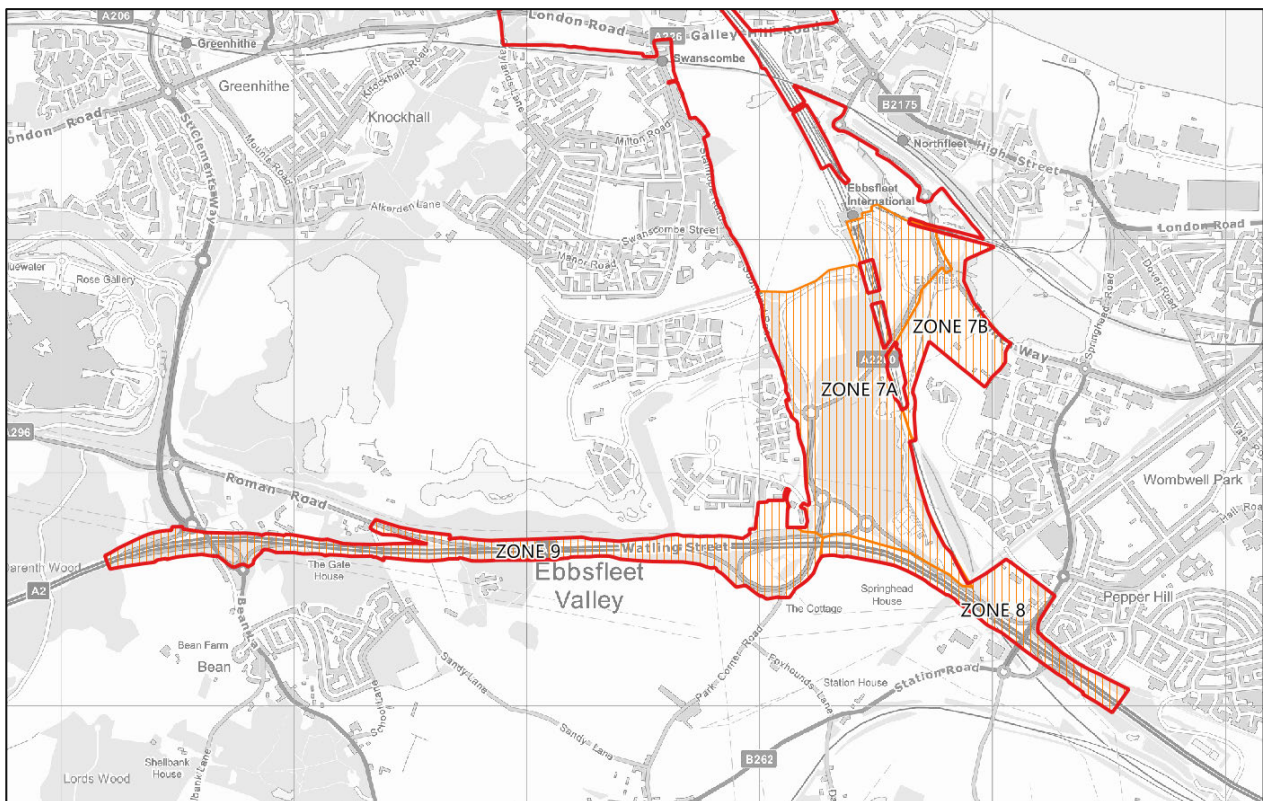


Figure 2-1 - Zoning of A2 Highway Works area (Zones 7-9), indicated by orange hatched area. Kent Project site shown by red line.

2.2 Site zoning

The A2 Access Works area has been divided into three zones, determined based on previous land use patterns, current ownership, plus the zoning adopted in the Atkins Desk Study [1]. It should be noted that the area of the Kent Project Site has changed (by omission and addition of parcels of land) since that report was published. In particular, an area of land that has not previously been assessed (Zone 7B) was subject to study in this report but has since been excluded from the DCO Order Limits. In addition, the western part of Zone 7A has also been excluded from the DCO Order Limits. The various zones are described in Table 2-1.

Table 2-1 - Summary of Zones adopted for the A2 Highway Works area.

Zone	Description
Zone 7	<p>Zone 7A is bounded by Zone 6 of the Swanscombe Peninsula area to the north. It covers approximately 70.8 hectares and is the same area of land that was referred to as Zone 7 in the Atkins Desk Study. The zone is characterised by infrastructure to support access to Ebbsfleet International Railway Station, including two large parking areas, roads, pavements, landscaped areas and roundabouts. Springhead Nurseries is present in the south-eastern corner. The history of the zone predominantly related to excavation of chalk. Note – the western part of this Zone is now not included within the DCO Order Limits.</p> <p>Zone 7B is a parcel of land that was not assessed in the Atkins Desk Study [and now not included within the DCO Order Limits]. It covers approximately 16.4 hectares and is located to the southeast of Zone 7A. It is characterised by the presence of a Sewage Works which covers about 40% of the area and by the River Ebbsfleet which flows from approximately southwest to northeast. Historically, a mineral railway / tramway passed through the north of the zone and there was a small refuse tip.</p>
Zone 8	<p>Zone 8 is located to the south of Zone 7. Its area is reduced in extent to that which was assessed in the Atkins Desk Study. The majority of Zone 8 now only encompasses the A2(T) road approximately between the B262 junction in the east and the A260 junction in the west, plus an area to the north of the A2(T) that is occupied by Northfleet East Grid Substation. A portion of land to the south of the A2(T) is no longer included in Zone 8. It covers an area of approximately 18.3 hectares. Roman artefacts have been discovered in the zone (during the 1930s) and in the immediate surrounding area.</p>
Zone 9	<p>Zone 9 is adjacent to the west of Zone 8. Similar to Zone 8, its area is reduced in extent to that which was assessed in the Atkins Desk Study. The zone has a limited history of development which has mainly been characterised by a road intersecting the area which was gradually widened and developed into the existing A2. It now mainly encompasses the A2(T) road between approximately the A260 junction in the east and the B225 junction in the west and covers an area of approximately 37 hectares.</p>

3 Update to Zone 7A

3.1 Description

Zone 7A (referred to as Zone 7 in the Atkins Desk Study) remains as described by Atkins in 2015 [1]. It is located to the south of Zone 6B and Zone 6C (assessed in the reports for the Swanscombe Peninsula [2] [3]) and to the north of Zone 8. The zone is characterised by infrastructure to support access to Ebbsfleet International Station, including two large car parks, roads, pavements, landscaped areas and roundabouts. In the southeast corner is Springhead Nurseries. The remainder of the site comprises open / agricultural land. Note: Since this report was prepared the western part of this Zone was excluded from the DCO Order Limits.

3.2 Data sources

The following additional sources relevant to Zone 7A have been available for review, with a summary provided below:

- Atkins (2015) London Paramount Entertainment Resort. Geotechnical and Geo-environmental Interpretative Report [11].
- Geotechnical Engineering (2015) London Paramount Entertainment Resort. Factual Report on Ground Investigation [12].

3.2.1 2015 ground investigation

Atkins were commissioned by LRCH in 2015 to design and procure a ground investigation and to produce a Geotechnical and Geo-environmental Interpretative Report based on the findings. Contractor services for the on-site works were provided by Geotechnical Engineering. The investigation included a limited number of exploratory holes within Zone 7A, a total of 6 boreholes (BH703 to BH708) and 2 trial pits (TP701 and TP702). Due to access constraints, the majority of these were located in the south of the zone. The boreholes were installed with groundwater monitoring wells: BH703 was screened across River Terrace Deposits (RTDs) and Chalk, BH704 screened Alluvium, and BH705 to BH708 screened Chalk. Summary text included in the Atkins Interpretative Report is repeated below.

The key sources of contamination identified for Zone 7 include the CKD waste deposited within Southfleet Quarry, the former cement works wash mills, the former petrol station and the miniature rifle range. Investigation was only completed in the southern portion of the zone and, notably, Southfleet Landfill was unable to be investigated due to ownership and access issues.

There were no exceedances of the human health generic screening criteria within either the soils or the groundwater within Zone 7. Asbestos was detected in one sample below the hazardous waste threshold.

The controlled waters risk assessment identified contaminants which exceeded the relevant screening criteria, through groundwater quality was generally better than noted within the zones in the Swanscombe Peninsula to the north. However, the contaminants encountered within Zone 7 were also encountered within Zones 1, 2 and 5, indicating that these may suggest a groundwater quality issue within the wider area of the Site rather than attributable to specific zonal activities.

The initial ground gas risk assessment indicates that the zone would be classified as CS2, which would require some protective measures to be installed within buildings established on the zone. However, Southfleet Landfill was not able to be assessed under this investigation although it is known to have a significant landfill gas regime which is managed by an active gas control system.

3.3 Surrounding land uses

Zone 6 and Northfleet Landfill are located immediately north of Zone 7A (assessed and reported in the Swanscombe Peninsula desk study reports [2], [3]). Ebbsfleet International Station is present to the northeast. HS1 runs at ground level parallel to the east of the zone. Beyond this is Zone 7B, which includes a sewage works and to the south of this, a residential development (part occupied and part under construction). Beyond this are a light commercial area, further residential development and Sawyer's Lake and Northfleet Urban Country Park. Zone 8 is located immediately to the south of Zone 7A. To the west of the zone are several residential developments (in part occupied and in part still under construction) and associated access road.

3.4 Historical land uses

There has been no significant change in land use within Zone 7A since the Atkins Desk Study was published in 2014. In the surrounding area are a number of new large residential developments. This includes Castle Hill, accessed via Whitecliffe Road and Castle Hill Drive from the B259 (located within Zone 7A) and a Redrow development accessed via Ackers Drive from the B259 and A2260 roads. These new developments are in part occupied and part still under construction. The Northfleet West Grid Substation which was previously to the southwest of Zone 7 is no longer present and is now within the area of residential development. There is another residential development located to the west beyond the HS1 railway (part occupied and part in construction), known as Springhead Park.

3.5 Geology

The limited number of exploratory holes constructed within Zone 7A by Atkins in 2015 confirm the general stratigraphic sequence reported in their Desk Study Report.

3.6 Hydrology and hydrogeology

3.6.1 Surface water

The River Ebbsfleet flows from its source in the southeast corner of Zone 7A, in a south to north direction approximately parallel to the eastern boundary (on-site). The River Thames is located approximately 950m northeast of Zone 7A at its closest point.

3.6.2 Groundwater

The boreholes installed within Zone 7A (BH703 to BH708) were all installed with groundwater monitoring wells. BH703 was screened across River Terrace Deposits (RTDs) and Chalk, BH704 screened Alluvium, and BH705 to BH708 screened Chalk. Groundwater levels ranged between about 3.8m AOD at BH708 and 2.3m AOD at BH703, and generally fell in a northwards direction, corresponding with regional groundwater flow towards the River Thames. Depth to groundwater was between about 4.2m bgl at BH704 (in Alluvium) and 16.0m bgl at BH708 (in Chalk).

3.6.3 Abstractions

The Atkins 2015 Desk Study identified ten groundwater abstractions within Zone 7A, one of which was inactive. The 2020 Groundsure dataset also identified ten records within the zone however a number of these are now inactive. These records relate to two abstraction points, both located in the southeast corner, close to Springhead Nurseries. The details of these abstractions are summarised in Table 3-1. Atkins also identified two active potable water supply

licenses within Zone 7A. The 2020 Groundsure dataset identified the same records (all now inactive) but positioned them off-site (about 35m west). These records are also summarised in Table 3-1.

Table 3-1 - Groundwater abstraction licenses within Zone 7A and the vicinity.

License no.	Location	Type	Status	Details	Volume (m ³)
9/40/01/0504/G	Point A, Borehole, H5 Chalk, Southfleet	Groundwater abstraction	Historical	Start: 15/05/1978 Expiry: Unknown General / process washing	Unknown
9/40/01/0504/G	Point A, Borehole, H5 Chalk, Southfleet	Groundwater abstraction	Historical	Start: 15/05/1978 Expiry: Unknown Spray irrigation – direct	Unknown
9/40/01/0504/G	Point A, Borehole, H5 Chalk, Southfleet	Groundwater abstraction	Historical	Start: 27/11/2006 Expiry: 31/03/2014 Spray irrigation - direct	Annual: 5910m ³ Max daily: 909.6m ³
9/40/01/0504/G	Point A, Borehole, H5 Chalk, Southfleet	Groundwater abstraction	Historical	Start: 27/11/2006 Expiry: 31/03/2014 General / process washing	Annual: 5910m ³ Max daily: 909.6m ³
9/40/01/0504/G/R01	Point A, Borehole, H5 Chalk, Southfleet	Groundwater abstraction	Active	Start: 01/04/2014 Expiry: 31/03/2024 Spray irrigation - direct	Annual: 5910m ³ Max daily: 910m ³
9/40/01/0504/G	Point A, Borehole, H5 Chalk, Southfleet	Groundwater abstraction	Active	Start: 01/04/2014 Expiry: 31/03/2024 General / process washing	Annual: 5910m ³ Max daily: 910m ³
9/40/01/0504/G	Point B, Borehole, H5 Chalk, Southfleet	Groundwater abstraction	Historical	Start: 27/11/2006 Expiry: 31/03/2014 Spray irrigation - direct	Annual: 5910m ³ Max daily: 909.6m ³
9/40/01/0504/G	Point B, Borehole, H5 Chalk, Southfleet	Groundwater abstraction	Historical	Start: 27/11/2006 Expiry: 31/03/2014 General / process washing	Annual: 5910m ³ Max daily: 909.6m ³
9/40/01/0504/G/R01	Point B, Borehole, H5 Chalk, Southfleet	Groundwater abstraction	Active	Start: 01/04/2014 Expiry: 31/03/2024 Spray irrigation - direct	Annual: 5910m ³ Max daily: 910m ³
9/40/01/0504/G/R01	Point B, Borehole, H5 Chalk, Southfleet	Groundwater abstraction	Active	Start: 01/04/2014 Expiry: 31/03/2024 General / process washing	Annual: 5910m ³ Max daily: 910m ³
01/152	Point B, Borehole at Southfleet (Off-site, 32m west)	Potable abstraction	Historical	Start: 07/07/2002 Expiry: 30/09/2004 Thames Water Utilities	Unknown
01/156	Borehole Point F, (EPM) Southfleet	Potable abstraction	Historical	Start: 01/10/2004 Expiry: 31/03/2010 Thames Water Utilities	Annual: 9,198,000 Max daily: 24,200
SO/040/0037/006	Borehole Point F, (EPM) Southfleet	Potable abstraction	Historical	Start: 23/06/2010 Expiry: 31/03/2020 Thames Water Utilities	Annual: 6,716,000 Max daily: 24,200

3.6.4 Groundwater vulnerability

Zone 7A is located part with a Source Protection Zone (SPZ) 1 (inner catchment), SPZ 2 (outer catchment) and SPZ 3 (total catchment). The SPZ 1 is centred about the potable water abstractions located adjacent to the west of Zone 7A (see Section 3.6.3). The Environment Agency designate the Alluvium and Head Deposits beneath the zone as a Secondary A and Secondary (Undifferentiated) Aquifer, respectively. Bedrock of the Thanet Formation is a Secondary A Aquifer, and Chalk a Principal Aquifer.

3.7 Regulatory data

The full dataset provided in the 2020 Groundsure Report has been reviewed and summarised in Table B-1 (Appendix B). The key items of relevant information are described in the following subsections.

3.7.1 Mineral abstractions

Most of Zone 7A was used as a chalk quarry and there was a small clay pit near the centre of the zone. Groundsure data identifies Zone 7A as 'Southfleet' surface mineral working for chalk, chert and flint. Land adjacent to west is identified as 'Southfleet' surface mineral working for chalk and clay and land adjacent to the east is identified as 'Northfleet' surface mineral working for chalk, chert and flint.

The area of the A2 Highway Works is at risk of encountering "deneholes" [medieval chalk extraction pits characteristically comprising a narrow shaft (2-3m dia) with a number of chambers radiating from the base]. The Atkins Desk Study noted that no man-made cavities were located within Zone 7A, although seven deneholes has been identified within 500m of the zone boundary. To the north of the A2 was a major chalk quarry (west of Zone 7A), known as Eastern Quarry, which is currently undergoing redevelopment predominantly for residential use (see Section 3.4).

3.7.2 Designated environmentally sensitive sites

A number of archaeological features were identified on historical maps within Zone 7A. An area within the zone (and also in Zone 7B) is therefore a Scheduled Ancient Monument, identified as 'Neolithic sites near Ebbsfleet' (list entry 1004206). There is also a relatively large Scheduled Ancient Monument identified as 'Springhead Roman site' located about 50m south, immediately beyond the A2(T) road. Baker's Hole (Zone 6B) is also a Scheduled Ancient Monument.

Zone 7A is located within a SSSI Impact Risk Zone due to the presence of Baker's Hole located in Zone 6B. There is also an area of designated Greenbelt Land (London area – Dartford) located 90m south of Zone 7A (beyond the A2(T) road).

A small area of Zone 7A, as well as land adjacent to the zone, is identified as habitat of principal importance (Priority Habitat Inventory) due to presence of deciduous woodland.

3.7.3 Environmental permits, incidents and registers

Discharge consents

The 2020 Groundsure dataset identified four records of discharge consents held within Zone 7A. Only one of these is active, which was also identified by the Atkins 2015 Desk Study. These records are summarised in Table 3-2. There are several further records within 1km of the zone, the nearest being a current license located about 330m east and related to release of surface water to a freshwater river (assumed the River Ebbsfleet).

Table 3-2 - Licensed discharge consents within Zone 7A.

Location	Address	Effluent type	Receiving water	Status
Zone 7A (north)	Hochtief Norwest Holst BCI Access Road Northfleet	Trade discharges – site drainage	Freshwater River (assumed River Ebbsfleet)	Issued: 29/05/2002 Revoked: 01/08/2005
Zone 7A (north)	Baker's Hole Landfill Northfleet	Trade discharges – site drainage	Freshwater River (assumed River Ebbsfleet)	Issued: 01/05/2001 Revoked: 05/09/2003
Zone 7A (centre)	Baker's Hole Landfill Northfleet	Trade discharges – site drainage	River Ebbsfleet	Issued: 05/09/2003 Effective
Zone 7A (southeast)	Channel Tunnel Rail Link Springhead Northfleet	Trade discharges – unspecified	River Ebbsfleet	Issued: 28/05/2003 Revoked: 21/01/2005

Pollution incidents

There are no records of pollution incidents within the zone. The nearest records are located within Zone 7B and Zone 8. The vast majority of pollution incidents had no (Category 4) or minor (Category 3) impact to air, water or land. Those incidents with significant (Category 2) or major (Category 1) impact within 1km of Zone 7A are summarised in Table 3-3. One of these post-dates publication of the Atkins 2015 Desk Study.

Table 3-3 - Pollution incidents with significant or major impact within Zone 7A.

Location	Incident date	Pollutant	Impact
Zone 7B	13 April 2018	Inert materials and wastes; mineral materials and wastes	Air – Category 4 (no impact) Land – Category 3 (minor) Water – Category 2 (significant)
Off-site, 500m east	30 April 2004	Atmospheric pollutants and effects; dust	Air – Category 2 (significant) Land – Category 3 (minor) Water – Category 4 (no impact)
Off-site, 330m east	04 May 2004	Atmospheric pollutants and effects; dust	Air – Category 2 (significant) Land – Category 3 (minor) Water – Category 4 (no impact)
Off-site, 565m south	27 October 2004	Oils and fuel; mixed/waste oils	Air – Category 4 (no impact) Land – Category 2 (significant) Water – Category 1 (major)

Part A2 and B LPPC Activities

There is one record of a Part B license located within Zone 7A, summarised in Table 3-4. There are nine further records of Part B permits within 1km of the zone. None of these have enforcements notified against them.

Table 3-4 - Records of LPPC Part B permits in Zone 7A.

Location	Address	Process	Status	Enforcement details
Zone 7A	Esso Springhead Station Road Northfleet DA11 8AA	Petrol vapour recovery	Historical Part B permit	No enforcements notified

3.7.4 Landfills and other waste sites

Landfills

The northern part of Zone 7A is identified as Southfleet Pit according to EA records. This is described in detail in the Atkins 2015 Desk Study. The area was infilled with Thanet Formation overburden from the adjacent Eastern Quarry, plus a smaller volume of cement kiln dust from Northfleet Cement Works. Northfleet Landfill, located predominantly within Zone 6B, is also shown to extend into the north of Zone 7A. There are two further records of landfills within 1km. The information provided in the 2020 Groundsure dataset is summarised in Table 3-5.

Table 3-5 - Landfill sites within Zone 7A.

Name	Location	Type of record	Permit number	Dates of operation	Description
Northfleet Landfill (Baker's Hole)	Zone 7A (north) and Zone 6B	Permitted waste site / authorised landfill	EA/EPR/KP3898HE/V006	Permit issued 16/11/1983	Household, commercial and industrial waste landfill
Southfleet Pit	Zone 7A (north)	Historical EA Landfill	-	-	Inert landfill. Operated by Blue Circle Industries Plc.
Springhead Road	Off-site, 660m east	Historical EA Landfill	REIN.2/1, 21BF	First input: 31/12/1951 Last input: 31/12/1984	Inert, industrial, commercial and household waste landfill
South of Springhead	Off-site, 900m east	Historical EA Landfill	-	-	Inert, commercial and household waste landfill

Other waste sites

There are three records of waste exemptions held within Zone 7A, all attributed to Springhead Nursery in the southeast of the zone. There are several further records within 1km, the nearest being 245m east (EPR/ZE5548VZ/A001) related to use of waste in construction at Springhead Park Development.

Table 3-6 - Waste exemptions held within Zone 7A.

Location	Permit number	Address	Exemption description
Zone 7A (south)	WEX050224	Springhead Nursery Watling Street	Disposing of waste exemption – burning waste in the open Using waste exemption – use of waste in construction Storing waste exemption – storage of waste in a secure place Storing waste exemption – storage of waste in secure containers
Zone 7A (south)	WEX209200	Springhead Nursery Watling Street	Storing waste exemption – storage of waste in secure containers Storing waste exemption – storage of waste in a secure place Disposing of waste exemption – burning waste in the open
Zone 7A (south)	EPR/ZE5788UD/A001	Springhead Nursery Watling Street	Disposing of waste exemption – burning waste in the open Using waste exemption – use of waste in construction Storing waste exemption – storage of waste in secure containers Storing waste exemption – storage of waste in a secure place

3.7.5 Unexploded ordnance (UXO)

A detailed UXO risk assessment was carried out in accordance with relevant guidance [13] and reported for this area of the Kent Project Site in 2015. The report of that assessment is included as an Appendix to the desk study report [1]. The assessment considered the overall risk for the wider site as High.

3.8 Conceptual Site Model

3.8.1 Sources

The main potential sources of contamination within Zone 7A are summarised in Table 3-7. Note that Zone 7B is assessed separately in Chapter 6. As described in Section 3.2, there were no exceedances of the human health generic screening criteria within soils or groundwater. Asbestos was detected in one sample, at a concentration below the hazardous waste threshold. Controlled waters risk assessment identified contaminants to exceed relevant screening criteria, but generally at concentrations below those recorded on the Swanscombe Peninsula. The initial ground gas risk assessment indicates that the zone would be classified as CS2. Southfleet Pit was not investigated due to ownership and access constraints. The main potential sources of contamination within Zone 7A are summarised in Table 3-7.

Table 3-7 - Summary of potential sources of contamination.

Potential source	Likely age	Potential contaminants of concern
Southfleet Pit (infilled with CKD waste)	40 to 50 years	High pH, asbestos, metals, potassium, sulphate, chloride, sodium, leachate Ground gas (methane, carbon dioxide)
Former land uses within Zone 7A: petrol station, miniature rifle range, cement works wash mills	Up to 90 years	Metals, asbestos, PAHs, TPH, VOCs and SVOCs
Current site use [carparking]	About 20 years	PAHs, TPH, VOCs and SVOCs, glycols
Alluvium and Head Deposits	Up to about 2 to 3 million years	Ground gas (methane, carbon dioxide)

3.8.2 Pathways and receptors

The detailed development proposals for London Resort are unconfirmed at this stage, but Zone 7A is anticipated to be developed with new access roads leading from the A2 to the Resort. In a departure from the Atkins 2015 Desk Study, the pathways and receptors in the proposed future use are also considered here. Correspondingly, the presence of contamination has the potential to impact upon human and environmental receptors both in the short term (during construction and in the long term (during the proposed future use). The pathways and receptors relevant to Zone 7A are summarised in Table 3-8.

Table 3-8 - Summary of receptors and potential pathways.

Receptor		Pathway
Human Health	Zone visitors	Inhalation, ingestion and / or dermal contact with contaminants in soil and soil-derived dust/fibres
	Zone workers	Inhalation of soil and groundwater derived vapours
	Trespassers	Migration and accumulation of ground gases, followed by inhalation or ignition, causing asphyxiation and/or explosion

Receptor		Pathway
Controlled Waters	Principal Aquifer in bedrock	Leaching from CKD / waste materials to groundwater Leaching / migration of contaminants from soils
	Secondary Aquifers in Head Deposits, Alluvium, and Thanet	
	River Ebbsfleet	Direct surface water run-off and sub-surface flow to surface waters Leaching / migration of contaminants from soils Lateral and vertical migration of contaminated groundwater
Environment	Neolithic Scheduled Monument	Direct contact / physical damage
Buildings / Services	Buried concrete foundations	Direct contact
	Potable water supply pipework	Aggressive attack

3.8.3 Assessment of risk

The assessment of the level of risk for each of the potential contaminant linkages identified above is summarised in Table 3-9. The assessment assumes that standard mitigation measures are adopted, for example appropriate site controls during construction (to ensure suitable health, safety and hygiene regime), use of gas protection measures in buildings, use of appropriate foundation solution / piling technique and provision of a clean capping layer in areas of soft landscaping.

Table 3-9 - Summary of risk assessment for Zone 7A.

Zone / Source	Receptor	Pathway	Consequence	Probability	Risk
Zone 7A	Zone visitors	Inhalation, ingestion and / or dermal contact with contaminants in soil and soil-derived dust/fibres Inhalation of soil and groundwater derived vapours	Severe	Unlikely	Moderate / low
	Zone workers				
Southfleet Pit (infilled with CKD waste)	Trespassers	Migration and accumulation of ground gases, followed by inhalation or ignition, causing asphyxiation and/or explosion	Medium	Likely	Moderate
	Zone neighbours				
Current (car parking) and former land uses in Zone 7A (petrol station, miniature rifle range, cement works wash mills)	Secondary Aquifers	Leaching from CKD / waste materials to groundwater	Medium	Likely	Moderate
	Principal Aquifer in bedrock	Leaching / migration of contaminants from soils			
Alluvium and Head Deposits	River Ebbsfleet	Direct surface water run-off and sub-surface flow to surface waters Leaching / migration of contaminants from soils Lateral and vertical migration of contaminated groundwater	Mild	Likely	Moderate / low
	Flora and fauna	Direct contact and root uptake.	Minor	Likely	Low
	Neolithic Scheduled Monument	Direct contact / physical damage	Mild	Likely	Moderate / low
	Buildings / Services	Direct contact Aggressive attack	Mild	Unlikely	Very low

4 Update to Zone 8

4.1 Description

Zone 8 is located to the south of Zone 7A and is reduced in extent to that which was assessed in the Atkins Desk Study. The zone is characterised by the presence of the A2(T) road which runs through its entire length. The Northfleet East Grid Substation is also present within the north of Zone 8. HS1 passes in a tunnel in a northwest to southeast direction beneath the area. It covers an area of approximately 18.3 hectares.

4.2 Data sources

No data sources or reports further to those identified by Atkins in 2014 have been obtained.

4.3 Surrounding land uses

Immediately north of Zone 8 is Springhead, characterised by residential and light commercial / industrial development. Zone 7A is present to the northwest of Zone 8. The area to the northeast is characterised by residential development (Pepper Hill). The A2(T) road continues in a south-easterly direction from the eastern boundary of Zone 8. The area to the south is generally characterised by open agricultural land. There is a garden centre and recycling centre immediately south of the zone, with a few residential properties beyond. Zone 9 (predominantly occupied by the A2) is present to the west.

4.4 Historical land uses

The area of land that is encompassed within Zone 8 has been altered compared to that which was assessed in the Atkins 2015 Desk Study (by both addition and omission of areas of land). The history of land use within Zone 8 and the surrounding area has therefore been reproduced in Table 4-1 to reflect the current boundary for the zone. Zone 7A and Zone 9 are adjacent to Zone 8. Features within Zone 7A and Zone 9 are discussed within their respective chapters.

Table 4-1 - Historical land uses in Zone 8 and surrounding area.

Date and scale	Within Zone 8	Surrounding area
1865-1866 1:10,560	The majority of the zone is open land, with a number of roads crossing through.	The majority of the surrounding area comprises open land or farms.
1865-1868 1:2,500	The north-central part of the zone is noted to be the site of a Roman town, which includes a small chalk pit. A second small old chalk pit is located in the eastern part of the zone.	N: Pepper Hill present 100 m to the northeast. Source of the River Ebbsfleet appears to be adjacent to the northwest of the zone, at Springhead S: Two small chalk pits are located to the south, from about 300m distant.
1888-1895 1:10,560 1897 1:2,500	A short section of the Gravesend West Line (railway) passes through Zone 8, orientated approximately southwest to northeast. Railway is on an embankment.	S: Southfleet Station present about 600m south. The chalk pit located 300 m south of the zone is now listed as an 'old chalk pit'.
1907-1909 1:10,560 1909 1:2,500	No significant change.	No significant changes.

Date and scale	Within Zone 8	Surrounding area
1931-1955 1:10,560	The road that passes through the majority of Zone 8 (Watling Road) has increased in size and is shown on embankments in some parts. The Roman city has been identified as Vagniacae. Sites of a Roman kiln and cemetery are identified in the zone. A tramway surrounds the cemetery. A transformer station is present immediately south of the cemetery. A number of overhead electrical power cables cross the zone to terminate here.	The are a number of pylons in the surrounding area which terminate at the transformer station in Zone 8. N: A large residential development is shown from about 100m northeast. S: Southfleet Station is labelled as 'Southfleet & Springhead Station'. A cattle pen is shown immediately north of the station.
1931-1938 1:2,500		
1952-1959 1:1,250		
1961-1966 1:10,560	The electricity substation is labelled as Northfleet East Grid Substation.	The layout to the pylons and overhead electrical cables has been changed. N: The residential development has extended to adjacent to the zone (Pepper Hill). A bank, tennis courts, bowling green etc. are shown as part of the development. S: A roundabout has been constructed adjacent to the south and the associated roads have been expanded. A site of a Roman Temple is next to this. Southfleet & Springhead Station is shown as disused. The cattle shed is no longer present. Roads to the south have been expanded.
1971-1982 1:10,000		
1960-1979 1:2,500		
1968-1981 1:1,250		
1987-1990 1:10,000	The railway that previously crossed the zone is labelled as dismantled.	The railway line is labelled as dismantled. S: a car park and refuse tip (public) are adjacent to the south. A depot and electricity substation are present in the area of the former train station.
1985-1993 1:2,500		
1981-1993 1:1,250		
2002-2014 1:10,000	The channel tunnel rail link (HS1) passes beneath the zone and is orientated approximately northwest to southeast in the wider area.	E: There are balancing ponds from about 200m east of the zone, associated with HS1. S: the car park and refuse tip are no longer shown. There is a garden centre and recycling centre adjacent to the southwest.

4.4.1 Summary of historical land uses

Since the earliest available map (1860s), Zone 8 has been characterised by the presence of a road running through its entire length (now developed to the A2(T) road). At this time, aside for a number of minor roads, the surrounding area was predominantly open land. A Roman town has also been discovered in the area. The Gravesend West Railway line had been constructed on an embankment by the 1880s, a short section of which crossed Zone 8 and was orientated southwest to northeast. Southfleet Station was also present about 600m south. By the 1930s, the road within Zone 8 (Watling Street) has been increased in width and further Roman artefacts had been discovered, including a kiln and cemetery within the zone. A transformer substation (Northfleet East Grid Substation) was also present within Zone 8, with a number of overhead cables, supported by pylons in the wider area, terminating there. By the 1960s, a large residential development had extended to be adjacent to the northern boundary. Also by this time, Watling Street had been expanded further and a roundabout constructed. 1980s mapping shows the railway line to have been dismantled and a car park and refuse tip had been developed adjacent to Zone 8. By the early 2000s, HS1 (passing under the zone in a tunnel) has been developed.

4.5 Geology

The anticipated geological sequence remains as described by Atkins in 2015.

4.6 Hydrology and hydrogeology

4.6.1 Surface water

The Ebbsfleet River is considered to begin in Springhead, directly north of Zone 8. Balancing ponds associated with HS1 are present from about 200m east of the zone. The 2020 Groundsure dataset also indicates presence of a watercourse (inland river) with source about 200m south of the zone, which flows towards the River Ebbsfleet.

4.6.2 Groundwater

Few available to view BGS exploratory holes within Zone 8, predominantly associated with the Channel Tunnel Rail Link investigation, recorded occurrence of groundwater. Where groundwater was recorded, it was generally between about 10.0 and 19.5m bgl.

4.6.3 Abstractions

The 2020 Groundsure dataset did not identify any groundwater abstractions within Zone 8. The nearest groundwater abstractions are located in the southeast corner of Zone 7A, at two points close to Springhead Nurseries (i.e. within 100m of Zone 8). The license details related to these abstractions are provided in Section 3.6.3. The nearest potable water abstractions are off-site, the nearest being adjacent to the west of Zone 7A, and about 250m north of Zone 8 at its nearest point.

4.6.4 Groundwater vulnerability

Zone 8 is located in a Source Protection Zone 2 (outer catchment). Alluvium covers approximately 25% of the zone, which the Environment Agency classifies as a Secondary (Undifferentiated) Aquifer. The Thanet Formation bedrock is classified as a Secondary A Aquifer and the underlying Chalk as a Principal Aquifer.

4.7 Regulatory data

The full dataset provided in the 2020 Groundsure Report has been reviewed and summarised in Table B-2 (Appendix B). The key items of relevant information are described in the following subsections.

4.7.1 Mineral abstractions

Since the earliest available map, the majority of Zone 8 has been occupied by a road. This means that very little to no modern mineral abstraction has taken place within it. There are historical mineral planning areas surrounding Zone 8, the nearest being 'Northfleet' surface mineral working for Chalk about 100m north. Surface ground excavations within the zone have largely been associated with the discovery of Roman settlements / artefacts..

4.7.2 Designated environmentally sensitive sites

There are a number of Scheduled Ancient Monuments in the immediate vicinity of the zone. This includes Springhead Roman town, present to the immediate south and encroaching within Zone 8. About 110m south is a monument referred to as 'Roman enclosure southeast of Vagniacae'. Historical mapping identified much of Zone 8 to be located

within a Roman town, specifically, sites of a Roman kiln and cemetery were identified in the areas of Northfleet East Grid Substation.

Land immediately to the south of Zone 8 is designated Green Belt Land (London area – Dartford). There is also land identified to be managed under an Environmental Stewardship Agreement located about 200m south. Zone 8 is in a SSSI Impact Risk Zone. Land along the former railway line (present from adjacent to Zone 8) is identified as habitat of principal importance (Priority Habitat Inventory) due to presence of deciduous woodland.

4.7.3 Environmental permits, incidents and registers

Discharge consents

There are three records of discharge consents for within Zone 8. These all relate to release of trade discharges (site drainage) into land at Northfleet East Grid Substation. The consents are all revoked, the most recent having been revoked in 2010. There are further records within 1km of the zone, principally related to the recycling centre to the south and a supermarket in Springhead (about 100m north), summarised in Table 4-2.

Table 4-2 - Licensed discharge consents within Zone 8.

Location	Address	Effluent type	Receiving water	Status
Off-site, 50m south	Householders Waste Site & Recycling Centre Station Road	Trade discharges – site drainage	Into land	Records of two permits Issued: 27/09/2002 Re-issued: 21/12/2012
Off-site, 100m north	J Sainsbury Plc Store Springhead Road	Miscellaneous discharges – surface water	Freshwater river	Records of seven permits Issued: 12/11/1991
Off-site, 370m west	Southfleet Water Treatment Works	Trade discharges – process effluent	Groundwater via infiltration system / into land	Records of three permits Issued: 15/02/1995 Re-issued: 25/09/2009 and 17/12/2018
Off-site, 890m north	Northfleet Sewage Treatment Works	Sewage discharges – sewer storm overflow	Freshwater river	Records of two permits Issued: 15/11/1973 Revoked: 31/07/2017

Pollution incidents

There is one record of a pollution incident within Zone 8. This occurred in 2003 and was related to inert materials and wasted. It had no (Category 4) impact to air, land and water. There are seven further records of pollution incidents within 1km of the zone. The vast majority of these had no (Category 4) or minor (Category 3) impacts. One incident had a greater impact, summarised in Table 4-3.

Table 4-3 - Pollution incidents with significant or major impact within Zone 8.

Location	Incident date	Pollutant	Impact
Off-site, 490m southwest	27 October 2004	Oils and fuels; mixed / waste oils	Air – Category 4 (no impact) Land – Category 2 (significant) Water – Category 1 (major)

Part A2 and B LPPC Activities

There is one record of a Part B license (current) within 1km of Zone 8. This relates to Sainsbury's Supermarket for unloading of petrol into storage at service stations. No enforcements are notified. All other records are more than 1km distant or positioned within other site zones.

4.7.4 Landfills and other waste sites

There are no active or historical landfill or other waste management permits within Zone 8. The nearest records relate to Pepperhill Refuse Tip (located 50m south), which was later developed into Pepperhill Recycling Centre and then a waste transfer station. The information from the 2020 Groundsure dataset is summarised in Table 4-4. The Atkins 2015 Desk Study noted that, according to EA records, no formal infilling occurred at the Pepperhill Refuse Tip, but it is possible that there was localised infilling.

Table 4-4 - Landfill sites within Zone 8.

Name	Type of record	Permit / reference no.	Dates of operation	Description
Public Refuse Tip	Historical Landfill Local Authority Mapping	-	Identified from 1987 mapping	-
Pepperhill Recycling Centre	Historical Waste Sites	05/00328/CPO	-	Historical planning application dated 2008 for redevelopment of household waste recycling centre (HWRC) to integrate the HWRC and a waste transfer station.
Pepperhill Depot	Licensed Waste Sites	EA/EPR/KP3798 HZ/V002	Issued: 30/03/1994 Modified: 11/06/2002	Household Waste Amenity Site licensed to Kent County Council. Annual tonnage: <25,000.
Pepperhill Waste Transfer Station	Licensed Waste Sites	EA/EPR/GP3198 HY/V006	Issued: 23/07/2007 Modified: 14/11/2012	Household, commercial and industrial waste transfer station licensed to FCC Recycling Limited. Annual tonnage: 130,000

4.7.5 Unexploded ordnance (UXO)

A detailed UXO risk assessment was carried out in accordance with relevant guidance [13] and reported for this area of the Kent Project Site in 2015. The report of that assessment is included as an Appendix to the desk study report [1]. The assessment considered the overall risk for the wider site as High.

4.8 Conceptual Site Model

4.8.1 Sources

Review of the 2020 Groundsure Report and other data sources (geological and historical maps etc.) has identified a relatively limited history of development in Zone 8. No site investigation is known to have been undertaken within this zone since the Atkins 2015 Desk Study was published. Potential sources of contamination within Zone 8 and in the surrounding area (off-site) are summarised in Table 4-5.

Table 4-5 - Summary of potential sources of contamination.

Potential source	Likely age	Potential contaminants of concern
Current and historical site uses [A2 road, Northfleet East Grid Substation]	Up to about 150 years	Metals, asbestos, TPH, PAHs, oils, VOCs and SVOCs, PCBs
Current and historical uses in the surrounding area [refuse tip with potential for infilling, railway line]	Up to about 125 years	Metals, asbestos, TPH, PAHs, leachate
Head Deposits	Up to 3 million years	Ground gas (methane, carbon dioxide)

4.8.2 Pathways and receptors

The detailed development proposals for London Resort are unconfirmed at this stage, however development works within Zone 8 are principally expected to involve alteration and widening of the existing A2 road. In a departure from the Atkins 2015 Desk Study, the pathways and receptors in the proposed future use are also considered here. Correspondingly, the presence of contamination has the potential to impact upon human and environmental receptors both in the short term (during construction and in the long term (during the proposed future use). The pathways and receptors relevant to Zone 8 are summarised in Table 4-6.

Table 4-6 - Summary of receptors and potential pathways.

Receptor		Pathway
Human Health	Zone visitors	Inhalation, ingestion and / or dermal contact with contaminants in soil and soil-derived dust/fibres
	Zone workers	Inhalation of soil and groundwater derived vapours
	Trespassers	Migration and accumulation of ground gases, followed by inhalation or ignition, causing asphyxiation and/or explosion
Controlled Waters	Principal Aquifer and Secondary A Aquifer in bedrock	Leaching / migration of contaminants from soils
	Secondary Aquifers in Head Deposits	Lateral and vertical migration of contaminated groundwater
	River Ebbsfleet	Direct surface water run-off and sub-surface flow to surface waters Leaching / migration of contaminants from soils Lateral and vertical migration of contaminated groundwater
Environment	Scheduled Ancient Monuments (Roman town)	Direct contact / physical damage

4.8.3 Assessment of risk

The assessment of the level of risk for each of the potential contaminant linkages identified above is summarised in Table 4-7. The assessment assumes that standard mitigation measures are adopted, for example appropriate site controls during construction (to ensure suitable health, safety and hygiene regime), use of gas protection measures in buildings, use of appropriate foundation solution / piling technique and provision of a clean capping layer in areas of soft landscaping.

Table 4-7 - Summary of risk assessment for Zone 8.

Zone / Source	Receptor	Pathway	Consequence	Probability	Risk
Zone 8	Zone visitors	Inhalation, ingestion and / or dermal contact with contaminants in soil and soil-derived dust/fibres Inhalation of soil and groundwater derived vapours	Severe	Unlikely	Moderate / low
	Zone workers				
Current and historical site uses	Trespassers	Migration and accumulation of ground gases, followed by inhalation or ignition, causing asphyxiation and/or explosion	Medium	Unlikely	Low
	Zone neighbours				
Current and historical uses in the surrounding area	Secondary Aquifer in superficial deposits	Leaching and migration of contaminants from soils to controlled waters receptors	Mild	Low	Low
	Principal Aquifer in bedrock	Lateral and vertical migration of contaminated groundwater			
Head Deposits	River Ebbsfleet	Direct surface water run-off and sub-surface flow to surface waters Leaching / migration of contaminants from soils Lateral and vertical migration of contaminated groundwater	Mild	Unlikely	Very low
	Flora and fauna	Direct contact and root uptake.			
	Neolithic Scheduled Monument	Direct contact / physical damage	Mild	Likely	Moderate / low

5 Update to Zone 9

5.1 Description

Zone 9 is located in the southwest of the development site and adjacent to the west of Zone 8. It is reduced in extent to that which was assessed in the Atkins Desk Study and now covers an area of approximately 37 hectares. The zone is characterised by the presence of the A2(T) road between approximately the A260 junction in the east and the B225 junction in the west. It also includes a short section of the A296.

5.2 Data sources

No data sources or reports further to those identified by Atkins in 2015 have been obtained.

5.3 Surrounding land uses

There is a parcel of land between the A2 and A296 roads which is currently occupied by light commercial / industrial buildings. To the north of Zone 9 is Eastern Quarry which is currently being redeveloped for residential use (Castle Hill) and is part-occupied. Beyond Eastern Quarry is the town of Swanscombe (from about 1km). Bluewater Shopping Centre is about 600m northwest. To the northeast and east of Zone 9 are Zone 7A and Zone 8, respectively. The area to the south is predominantly agricultural land. The village of Bean is about 250m southwest and Betsham about 1km southeast. The A2 road continues in a westerly direction and the surrounding land is predominantly agricultural and woodland. Dartford is present from about 2km northwest.

5.4 Historical land uses

The area of land that is encompassed within Zone 9 has been reduced compared to that which was assessed in the Atkins 2015 Desk Study. The history of land use within Zone 9 and the surrounding area has therefore been reproduced in Table 5-1 to reflect the current boundary for the zone. Zone 7A and Zone 8 are present to the east of Zone 9. Features within Zone 7A and Zone 8 are discussed within their respective chapters.

Table 5-1 - Historical land uses in Zone 9 and surrounding area.

Date and scale	Within Zone	Surrounding area
1865-1866 1:10,560	A small road (Watling Street) intersects much of Zone 9. A number of other small roads join Watling Street, predominantly in the western part of the zone. Aside for this, the area is occupied by agricultural land and woodland.	The surrounding area is largely undeveloped and comprises fields and woodlands, with few buildings. N: Caerberlarber (a British village) is present from 60m, with Swanscombe Park (woodland) beyond. S: The Thrift (woodland) with Bean (village) and Beacon Wood beyond. W: Darenth Wood.
1865-1868 1:2,500		
1888-1895 1:10,560	An Old Chalk Pit is shown in the eastern part of the zone.	The surrounding area is predominantly unchanged, but with a few additional farm and residential buildings. There are also a number of Old Chalk Pits and Old Gravel Pits, the nearest being an old chalk pit about 50m north. S: A Shaft is present 200m southeast and Denehole 230m southwest. Powder Works present 980m southwest. A Roman Foundation was discovered about 1km south.
1897-1898 1:2,500		

Date and scale	Within Zone	Surrounding area
		W: A large area from about 930m west is labelled as 'Metropolitan District Imbecile Asylum & Schools'. A number of associated mortuaries, chapels, a hospital and assumed residential blocks are shown.
1907 1:10,560 1909 1:2,500	A Shaft is present in the eastern part of the zone.	N: A Brick Works is present about 85m north. S: A Pumping Station (Metropolitan Water Board, Kent District) is present adjacent to the southeast. The Powder Works now has an associated Testing Range and two Tramway lines associated with it. W: Ancient Earthworks are shown from about 165m west.
1931-1938 1:10,560 1931-1939 1:2,500	Watling Street (also known as Roman Road and later, the A2) has expanded, and is now a main road.	N: Pumping Station 130m north. A Clay Pit, Clay Plant and Engine Shed are present from adjacent to the north, within Swanscombe Park. Tramways lead from Watling street to the Clay Plant. S: A reservoir is shown approximately 230m south of the central portion of Zone 9. The Powder Works is no longer shown. Clay Pits with tramways present from about 770m south.
1946-1955 1:10,560	Coverage of eastern half only. No significant change.	Coverage of eastern half only. Numerous pylons with overhead electricity cables cross the surrounding area. N: Extent of clay excavations to north increased over time. S: A Saxon Burial site is shown within the village of Betsam, approximately 900 m south of the eastern part of the zone
1961-1967 1:10,560	A pipeline (orientated north-south) crosses beneath the western part of the zone.	N: Northfleet West Grid Substation is shown adjacent to the northern boundary of the eastern part of the zone. Brickfield Nurseries and Watling Street Nursery are present in the former location of the Brick Works adjacent to the north of the western part of the zone. Excavations to the north of the western part of the zone have increased in scale. Clay Plant and Engine Shed no longer present S: Pumping Station to the south of the eastern part of the zone is labelled as a Works. Clay Pits about 670m south are no longer shown.
1971-1993 1:10,000 1968-1995 1:2,500	The A2 main road (widened Watling Road) has been constructed through the entire length of the zone. A number of slip roads have been developed.	N: Works are shown adjacent to the zone's northern boundary, on the western part of the zone. This comprises eight large circular tanks, rectangular structures, hopper and two conveyors. By 1978, the conveyors are shown leaving from this works premises into Chalk Pits to the north. S: Bean has expanded significantly and is now present from 215m south. Clay Pits from 795m south are no longer present / part infilled. A caravan site has been developed adjacent to the south of the zone (central portion). W: The A2 continues in a south-westerly direction towards the area previously labelled as 'Metropolitan District Imbecile Asylum & Schools', now in part disused.
2002 1:10,000	Further development to road network. The western part of the zone is shown in a similar arrangement as today, including roundabouts and wider roads.	N: The works premises adjacent to the northern part of the zone is now shown with 10 tanks. Another building is shown north of Northfleet West Grid Substation to the, along with a pumping station. Chalk Pits no longer evident.

Date and scale	Within Zone	Surrounding area
		W: The former Metropolitan District Imbecile Asylum & Schools' are has largely been cleared. Darrenth Valley Hospital and residential properties now present in the area.
2010-2014 1:10,000	The road network within the eastern part of the zone is shown in its present-day arrangement, with the roads connecting the A2 to the A2260 (Southfleet Road) to the north.	No significant change.

5.4.1 Summary of historical land uses

Zone 9 has a limited history of development. A road has intersected the eastern part of the zone since the earliest available map (dated 1865), whilst the western part was woodland / agricultural land. By the 1930s this section of road has been widened and was by now a main road. The A2 main road had been constructed through the entire length of the zone by the 1970s. Further alterations were undertaken during the early 2000s and by 2010 it had been developed to its current configuration.

From the earliest available map, the surrounding area was characterised by woodland and agricultural land with limited industrial presence. Throughout the 20th century, there were a number of ground workings / abstractions, notably Eastern Quarry to the north which was variably worked between approximately the 1930s and early 2000s. A number of archaeological features (Roman and Saxon) have also been uncovered in the wider area. Other industrial / commercial uses in the immediate surrounds have included: Northfleet West Grid Substation (adjacent to north [eastern portion], 1960s to 2010s); a Water Works / Pumping Station (adjacent to south [eastern portion], 1900s to present); Brick Works (adjacent to north [western portion], 1900s to 1960s); Nurseries (former location of Brick Works, 1960s to 1990s); and unspecified Works with tanks (adjacent to north [central portion], 1970s to 2010s).

5.5 Geology

The anticipated geological sequence remains as described by Atkins in 2015.

5.6 Hydrology and hydrogeology

5.6.1 Surface water

The 2020 Groundsure dataset identified a short unnamed watercourse (inland river) in the far east of Zone 9, parallel to the A2. This is likely to be a drainage ditch associated with the road. There is a small unnamed pond adjacent to the northern boundary, close to Ingram Cottages, towards the western side of the zone. The Groundsure data also identifies a number of large ponds in the area of Eastern Quarry. The Atkins 2015 Desk Study noted that these were thought to be fed by groundwater paths in the Chalk.

5.6.2 Groundwater

The Atkins 2015 Desk Study noted that two available BGS borehole detected presence of groundwater at 16m bgl and 15m bgl. The general groundwater regime across the zone is unknown.

5.6.3 Abstractions

There is one potable water abstraction located within Zone 9, within the southeast of the zone. The license is noted to be historical (license no: 9/40/01/0128/GR) and related to abstraction for potable water supply by Thames Water Utilities Ltd. The license was issued in 1994, but no further detail is provided. There are several other potable water abstractions located about 500m south.

The nearest groundwater abstractions are located in Eastern Quarry (about 450m north). There are two active licenses related to abstraction for use as process water and general use. These abstractions have been licensed since 2017 for abstraction of annual volume 1,700,204m³ and maximum daily volume 6,546m³.

5.6.4 Groundwater vulnerability

Most of Zone 9 is located in a Source Protection Zone 2 (outer catchment), and a smaller proportion Source Protection Zone 3 (total catchment). A very limited area surrounding the potable water abstraction is designated Source Protection Zone 1 (inner catchment).

Superficial deposits are present over a small proportion of Zone 9. Where present, the River Terrace Deposits are classified as a Secondary A Aquifer, and Head deposits as a Secondary (Undifferentiated) Aquifer. Over most of the Zone, superficial deposits are underlain by a Secondary A Aquifer in the Thanet Formation.

5.7 Regulatory data

The full dataset provided in the 2020 Groundsure Report has been reviewed and summarised in Table A-3 (Appendix B). The key items of relevant information are described in the following subsections.

5.7.1 Mineral abstractions

The 2015 Atkins Desk Study noted that the area of the A2 corridor is known to encounter deneholes (see Section 3.7.1). Historical mapping identified a denehole 200m southeast. There are also a number of shafts in the area, the nearest in the eastern part of Zone 9.

The area immediately to the north of Zone 9 is a former chalk quarry, known as Eastern Quarry. There are historical mineral planning areas surrounding the zone, including 'Swanscombe' surface mineral working for chalk, chert and flint adjacent to northwest and 'Southfleet' surface mineral working for chalk and clay adjacent to northeast.

5.7.2 Designated environmentally sensitive sites

There are several areas of ancient and semi-ancient woodland immediately surrounding the zone: Parkhill Wood, The Thrift, and Darenth / Ladies Wood. Lords Wood is also present 750m south. Darenth Wood is designated as a Site of Special Scientific Interest (as is Lords Wood which falls under the Darenth Wood designation). Most of the SSSI is in a favourable condition, but the eastern part nearest Zone 9 is in an unfavourable – recovering condition. The whole of Zone 9 is an SSSI Impact Risk Zone for all planning applications. The medieval woodland boundary of Darenth Wood is also classified as a Scheduled Ancient Monument.

Much of Zone 9 and the immediate surrounds are identified as habitat of principal importance (Priority Habitat Inventory) due to presence of deciduous woodland. Additionally, the majority of the surrounding area is classified as Greenbelt Land (London – Dartford). There is an Environmental Stewardship Agreement (entry-level stewardship) about 700m south. There is one listed building in Zone 9, Swanscombe Cutting Footbridge Crossing, located on A2 east of A296 junction, which is Grade II listed.

5.7.3 Environmental permits, incidents and registers

Discharge consents

There are three records of discharge consents associated with Southfleet Water Treatment Works, located about 30m southeast of Zone 9. There are a number of other off-site records within 1km of the zone, related to discharges within Eastern Quarry and Northfleet Quarry. The details of these are summarised in Table 5-2.

Table 5-2 - Licensed discharge consents within 1km of Zone 9 (excluding records in other site zones).

Location	Address	Effluent type	Receiving water	Status
Off-site, 30m southeast	Southfleet Water Treatment Works	Trade discharges – process effluent	Groundwater via infiltration system / into land	Records of three permits, one active Issued: 15/02/1995 Re-issued: 25/09/2009 and 17/12/2018
Off-site, 500m north	Land east of Cherry Orchard Quarry, Eastern Quarry	Sewage discharge – final / treated effluent	Underground strata	Records of two permits, one active Issued: 20/12/2004 Reissued: 21/12/2012
Off-site, 500m north	Lafarge Cement UK, Northfleet Quarry	Sewage discharge – final / treated effluent	Lake / reservoir with outlet	Record of two permits, both active Issued: 15/11/2002

Pollution incidents

There is one record of a pollution incident within Zone 9. This occurred in 2001 and related to firefighting run-off. The incident has minor (Category 3) impact to water, and no (Category 4) impact to land and air. Seven further pollution incidents are known to have occurred within 1km of the zone (excluding those in other site zones). The details of these are summarised in Table 5-3.

Table 5-3 - Pollution incidents within 1km of Zone 9 (excluding those in other site zones).

Location	Incident date	Pollutant	Impact
On-site	18 July 2001	Contaminated water; firefighting run-off	Water – Category 3 (minor) Land – Category 4 (no impact) Air – Category 4 (no impact)
Off-site, 65m southeast	15 August 2002	Oils and fuels; insulating and cable oils	Water – Category 3 (minor) Land – Category 3 (minor) Air – Category 4 (no impact)
Off-site, 136m south	05 July 2002	Inert materials and wastes; construction and demolition materials and wastes	Water – Category 4 (no impact) Land – Category 3 (minor) Air – Category 4 (no impact)
Off-site, 210m southeast	27 October 2004	Oils and fuels; mixed / waste oils	Water – Category 1 (major) Land – Category 2 (significant) Air – Category 4 (no impact)
Off-site, 285m north	04 March 2002	Oils and fuels; diesel	Water – Category 2 (significant) Land – Category 2 (significant) Air – Category 3 (minor)
Off-site, 445m south	26 April 2002	Specific waste material; household waste	Water – Category 4 (no impact) Land – Category 3 (minor)

Location	Incident date	Pollutant	Impact
			Air – Category 4 (no impact)
Off-site, 470m northwest	19 September 2002	Specific waste material; household waste	Water – Category 4 (no impact) Land – Category 3 (minor) Air – Category 4 (no impact)
Off-site, 900m south	17 July 2002	Other pollutant	Water – Category 3 (minor) Land – Category 4 (no impact) Air – Category 4 (no impact)

5.7.4 Landfills and other waste sites

Landfills

There are no current or historical landfills within Zone 9. There is one record of a landfill site located about 980m north, known as Alkerden Landfill, Swale. Permit / license information is summarised in Table 5-4.

Table 5-4 - Landfill sites within 1km of Zone 9 (excluding those in other site zones).

Name	Type of record	Permit / reference no.	Dates of operation	Description
Alkerden Landfill, Swale	Historical Landfill (EA records)	DA14	License issued: 01/01/1976	Accepted inert waste. Operated by Blue Circle Industries Plc

Other waste sites

There are no active or historical waste management permits within Zone 9. The nearest historical waste site is identified from historical mapping and relates to ground workings and a refuse heap 220m north. There are a number of current licensed waste sites within 1km of Zone 9, the nearest being 65m north, attributed to Washmills Recycling Centre, Eastern Quarry. Information on these waste management permits from the 2020 Groundsure dataset is summarised in Table 5-5 below. Those records within 1km of Zone 9 includes seven related to Pepperhill waste facility (810m southeast of Zone 9) – permit information for this site is summarised in Section 4.7.4 for Zone 8.

Table 5-5 - Waste management sites within 1km of Zone 9 (excluding those in other site zones).

Name / address	Location	Type of record	Permit / reference no.	Dates of operation	Description
Ground workings and refuse heap	Off-site, 220m north	Historical Waste Sites	-	-	-
Northfleet West Substation	Off-site, 285m north	Historical Waste Sites	13/01667/FU L	-	Historical planning application related to land reclamation (remediation works to contaminated land)
Washmills Recycling Centre, Eastern Quarry	Off-site, 65m north	Licensed Waste Site	EA/EPR/PB39 334RN/S004	Licensed: 03/06/2014 Surrendered: 19/06/2017	Licensed for treatment of waste to produce soil, up to 25,000 tonnes.
A2 Breakers, Oakdene, Watling Street	Off-site 75m north	Licensed Waste Site	EA/EPR/GP37 98HT/V003	Four records Licensed: 22/06/2007	Activities relate to end of life vehicle facility, metal recycling site (vehicle

Name / address	Location	Type of record	Permit / reference no.	Dates of operation	Description
			EA/EPR/GP37 98HT/V002 BEA002	Modified: 15/10/2009 Modified: 24/06/2014 Still active	dismantler) and vehicle depollution facility.
Washmills Recycling Centre, Eastern Quarry	Off-site, 215m north	Licensed Waste Site	EA/EPR/DB30 06CA/A001	Licensed: 09/05/2007 Still active	Licensed material recycling treatment facility.

5.7.5 Unexploded ordnance (UXO)

A detailed UXO risk assessment was carried out in accordance with relevant guidance [13] and reported for this area of the Kent Project Site in 2015. The report of that assessment is included as an Appendix to the desk study report [1]. The assessment considered the overall risk for the wider site as High.

5.8 Conceptual Site Model

5.8.1 Sources

Review of the 2020 Groundsure Report and other data sources (geological and historical maps etc.) has identified a relatively limited history of development in Zone 9. No site investigation is known to have been undertaken within this zone since the Atkins 2015 Desk Study was published. Potential sources of contamination within Zone 9 and in the surrounding area (off-site) are summarised in Table 5-6.

Table 5-6 - Summary of potential sources of contamination.

Potential source	Likely age	Potential contaminants of concern
Current site uses [A2 road]	Up to about 150 years	Metals, TPH, PAHs, oils, VOCs and SVOCs.
Former Northfleet West Grid Substation	Up to about 60 years	Metals, asbestos, TPH, PAHs, oils, VOCs and SVOCs, PCBs
Made Ground arising from other current and historical off-site land uses [water / pumping works, former brick works, A2 Breakers]	Up to about 150 years	Asbestos, metals, TPH, PAHs, VOCs and SVOCs Ground gas (methane, carbon dioxide)

5.8.2 Pathways and receptors

The detailed development proposals for London Resort are unconfirmed at this stage, however development works within Zone 9 are principally expected to involve alteration and widening of the existing A2 road. In a departure from the Atkins 2015 Desk Study, the pathways and receptors in the proposed future use are also considered here. Correspondingly, the presence of contamination has the potential to impact upon human and environmental receptors both in the short term (during construction and in the long term (during the proposed future use). The pathways and receptors relevant to Zone 9 are summarised in Table 5-7.

Table 5-7 - Summary of receptors and potential pathways.

Receptor		Pathway
Human Health	Zone visitors	Inhalation, ingestion and / or dermal contact with contaminants in soil and soil-derived dust/fibres
	Zone workers	Inhalation of soil and groundwater derived vapours
	Trespassers	Migration and accumulation of ground gases, followed by inhalation or ignition, causing asphyxiation and/or explosion
Controlled Waters	Principal Aquifer in Chalk	Leaching / migration of contaminants from soils Lateral and vertical migration of contaminated groundwater
	Secondary Aquifers in Head Deposits, Lambeth Group, Thanet Formation	
	Ponds (adjacent to northern boundary and within Eastern Quarry)	Direct surface water run-off and sub-surface flow to surface waters Leaching / migration of contaminants from soils Lateral and vertical migration of contaminated groundwater

5.8.3 Assessment of risk

The assessment of the level of risk for each of the potential contaminant linkages identified above is summarised in Table 5-8. The assessment assumes that standard mitigation measures are adopted, for example appropriate site controls during construction (to ensure suitable health, safety and hygiene regime), use of gas protection measures in buildings, use of appropriate foundation solution / piling technique and provision of a clean capping layer in areas of soft landscaping.

Table 5-8 - Summary of risk assessment for Zone 9.

Zone / Source	Receptor	Pathway	Consequence	Probability	Risk
Zone 9	Zone visitors	Inhalation, ingestion and / or dermal contact with contaminants in soil and soil-derived dust/fibres Inhalation of soil and groundwater derived vapours	Severe	Unlikely	Moderate / low
	Zone workers				
A2 road	Trespassers	Migration and accumulation of ground gases, followed by inhalation or ignition, causing asphyxiation and/or explosion	Medium	Unlikely	Low
Former Northfleet West Grid Substation	Secondary Aquifer in superficial deposits	Leaching and migration of contaminants from soils to controlled waters receptors	Medium	Low	Moderate / low
Made Ground arising from other current and historical off-site land uses	Principal Aquifer in bedrock	Lateral and vertical migration of contaminated groundwater			
		Ponds (adjacent to northern boundary and within Eastern Quarry)	Direct surface water run-off and sub-surface flow to surface waters Leaching / migration of contaminants from soils Lateral and vertical migration of contaminated groundwater	Mild	Unlikely

6 Zone 7B

6.1 Zone characterisation

6.1.1 Location

Zone 7B is located on the north-eastern part of the wider A2 Corridor land. It is located immediately to the east of Zone 7A and south of Zone 6C. It is approximately centred at NGR 561845 173664 and covers some 16.4 hectares.

Note: Since this Desk Study was prepared, this area has been excluded from the DCO Order Limits.

6.1.2 Zone description

Zone 7B is an irregularly shaped parcel of land, bounded on its northwest boundary by the A2260 / Ebbsfleet Gateway and its northeast boundary by Thames Way and the North Kent Railway line. Most of the zone (about 40%) is currently occupied by a Sewage Works, which is located within a secure site and accessed from Thames Way. The River Ebbsfleet flows through the zone from approximately southwest to northeast, parallel to the northwest boundary, with an area of wetlands surrounding the river channel. A new road and bridge crosses the River Ebbsfleet from the new Springhead Park residential development (off-site to the south) to the A2260. The remainder of the area is vegetated grassland / woodland.

6.1.3 Zone-specific data sources

Zone 7B is outside of the London Paramount site that was assessed by Atkins in 2015. No data sources specific to the zone have been obtained.

6.1.4 Surrounding land uses

The A2260 / Ebbsfleet Gateway (off-site) bounds Zone 7B to the northwest, beyond which is Ebbsfleet International Station and associated infrastructure within Zone 7A. To the northeast is the Thames Way (on-site), beyond which is Sawyer's Lake, the North Kent Railway Line and the town of Northfleet. Immediately to the south is an area of land currently undergoing redevelopment for residential use (Springhead Park), which is currently part occupied and part under construction. Directly west is the central / southern portion of Zone 7A which includes Southfleet Pit.

6.1.5 Historical land uses

A summary of historical land uses within Zone 7B and in the surrounding area (within 1km) is presented in Table 6-1. Table 6-1 provides a brief description of land uses within other site zones that are in the vicinity of Zone 7B, but the relevant Chapter of this report or the Atkins 2015 Desk Study should be consulted for the complete information.

Table 6-1 - Historical land uses in Zone 7B and surrounding area.

Date and scale	Within Zone 7B	Surrounding area
1865 1:2,500	Zone 7B is undeveloped. The River Ebbsfleet flows from approximately southwest to northeast, parallel to the west of the zone. There are also a number of associated drains.	N: Zone 6C, occupied by River Ebbsfleet and associated drains. North Kent Railway line beyond.
1865 1:10,560		E: open land with North Kent Railway Line beyond (from 30m). Rectory Farm present 220m southeast. S: Open land. W: Generally open land. Small Old Chalk Pit about 490m west.
1888-1898 1:10,560	No significant change.	N: Small quarry and Old Clay Pit shown in Northfleet beyond railway line. E: Rectory Farm no longer present. Old Chalk Pit shown in former location.

Date and scale	Within Zone 7B	Surrounding area
1897 1:2,500		S: Watercress Beds surround River Ebbsfleet from adjacent. W: Quarry, Gravel Pit and Old Chalk Pit present in Zone 6C, Swanscombe beyond.
1907-1916 1:10,560 1909 1:2,500	No significant change.	N: Expansion to quarry and pits within Northfleet. Tramways also present. E: Isolation hospital, chaplaincy and Northfleet Cemetery present from about 350m southeast. S: Expansion to Watercress Beds about 400m distant. W: Further ground workings within Zone 6C and to west of Zone 7A. Swanscombe has expanded.
1923-1931 1:10,560	No significant change.	N: Small area of open land, with a number of cement works beyond. E: Further areas of ground workings with Tramways. Heavy industry on bank of River Thames. S: No significant change. W: Further ground workings within Zone 6B.
1932-1938 1:10,560 1932-1933 1:2,500	Sewage Works with nine tanks and ancillary buildings occupies southeast of zone.	N: No significant change. E: Chalk Pit with Tramway immediately adjacent. Tramway crosses through north of Zone 7B. S: Nursery present in southeast of Zone 7A. W: Old Chalk Pit occupies large proportion of Zone 7A, from adjacent to Zone 7B.
1938-1939 1:2,500	Tanks labelled as Hummus Tank. Evidence of ground workings beyond Sewage Works to east.	No coverage to north and south. E: Further Chalk Pit about 370m east. Isolation Hospital no longer shown, Allotment Gardens, Drill Hall Recreation Ground present in area. W: Expansion within Swanscombe. Quarry from about 700m southwest.
1946 1:10,560	No significant change.	N: Portland Cement Works (Wash Mills) with numerous tanks present in Zone 7A, Sports Ground and Allotment Gardens beyond in Zone 6C. E: No significant change. S: No significant change. W: Baker's Hole and Old Quarry shown in Zone 6B.
1955 1:10,560	No significant change.	N: Portland Cement Works labelled as Works. Miniature Rifle Range adjacent to south of this, from 275m. E: Two large Chalk Pits to east no longer labelled. One possibly filled with water. S: No significant change. W: Possible infilling to pits within Zone 7A.
1961 1:2,500	Expansion to Sewage Works; a number of rectangular ponds are shown. Evidence of ground workings in north and east of zone, Neolithic Pottery and Flints found. Three Electricity Pylons in area.	W: Two ponds shown in Zone 7A, Chalk Pits in area shown as disused.
1966 1:10,560	Mineral Railway labelled.	N: Residential properties present in previous areas of quarries / pits. E: Residential properties present from 400m southeast. S: Neolithic Pottery and Flints found adjacent to south. Springhead Nurseries labelled. W: Evidence of infilling within Zone 7A. Palaeolithic Flints found in Zone 7A. Roman Burial found beyond western boundary. Northfleet West Grid Substation 750m southwest.

Date and scale	Within Zone 7B	Surrounding area
1969 1:2,500 1971 1:10,000	Small Refuse Tip labelled in centre / east of zone.	N: Evidence of infilling of former pits within Zone 6B. E: Anglo Saxon Burial Ground found 150m east. S: No significant change. W: Further evidence of infilling in Zone 7A.
1977 1:10,000 1978-1985 1:2,500	Expansion to Sewage Works. Sedimentation Tanks, Aeration Tanks, Electricity Substation, Stormwater Tanks and Sludge Lagoons shown. Refuse Tip no longer shown.	N: Electricity Substation present in Zone 7A, 200m distant. E: Evidence of infilling of one of the large Chalk Pits, 350m southeast. S: Springhead expanding northwards, residential and light commercial buildings. W: Pits and infilling in Zone 7A no longer evident. Areas of vegetation shown over zone. Expansion to Chalk Pits (Eastern Quarry) from 650m distant.
1990 1:10,000 1992-1993 1:2,500	No significant change.	N: Land immediately north has been cleared. Evidence of landfilling in Zone 6B and Zone 6A. E: Springhead Enterprise Park adjacent to east. S: No significant change. W: Expansion to Northfleet Grid Substation.
2010 1:10,000	Thames Way crosses through north of zone, River Ebbsfleet appears to be culverted beneath.	N: Ebbsfleet Gateway and Thames Way present adjacent to northwest and northeast boundaries, respectively. Ebbsfleet International Station and associated infrastructure developed to current configuration. E: Former Chalk Pit adjacent to east is now a reservoir.
2018 Google Earth Imagery	No significant change.	Redevelopment of land adjacent to south had commenced by 2018.

6.1.6 Summary of historical land uses

Since the earliest available map (1865), the River Ebbsfleet has flown in a southwest to northeast direction parallel to the west of Zone 7B, with a number of land drains surrounding the river. There was no significant change within the zone until the 1930s when a Sewage Works with nine tanks and ancillary buildings was constructed in the southeast. By the 1960s, this had been expanded to cover a larger area and with more tanks. Mapping also showed evidence of ground workings in the area of the Sewage Works and discovery of Neolithic Pottery and Flints was labelled. As this development progressed, the drains associated with the River Ebbsfleet were no longer shown. Later in the 1960s, a Mineral Railway passed through the northern part of the zone, associated with quarries and pits in the wider area. A small Refuse Tip was also labelled in the central part of the zone. The Mineral Railway and Refuse Tip were no longer present by the 1970s. The next significant development had occurred by 2010 when the Ebbsfleet Gateway and Thames Way had been built adjacent to the zone. Part of the Thames Way crosses through the north of the zone, with the River Ebbsfleet culverted beneath it.

6.2 Environmental context

6.2.1 Geology

The 1:10,000 BGS Geology Sheet Map for the area (217 – Dartford) [12] indicates the geology within Zone 7B to be influenced by the presence of the River Ebbsfleet. Around the channel of the river, the zone is underlain by Alluvium (mainly silt and clay, locally peaty). This is shown at the surface over approximately 30% of the area. Beneath this and covering about 20% of the zone are Head Deposits (silt, sand and clay with variable gravel; chalky in places). Elsewhere at the surface, and beneath the superficial deposits, is the Upper Chalk Formation, described as soft white

chalk with courses of flints. The chalk is regionally up to 70m thick. Made Ground will also be expected at the surface, consistent with the relatively history of development in the zone. In particular, fill materials may in the area of its former drainage channels of the River Ebbsfleet.

6.2.2 Historical borehole records

There are a limited number of available to view BGS borehole records located within Zone 7B. These exploratory holes generally proved the stratigraphic sequence shown by the available geological map. Made Ground was absent in some locations and up to about 5m thick, and was described as fill, ashes, soil and brick in one location. Superficial deposits were generally between about 5 and 16m thick and were comprised of a variable thickness of Alluvium, River Terrace Deposits and Head Deposits, beneath which was the Upper Chalk.

6.2.3 Surface water

The River Ebbsfleet flows from approximately southwest to northeast through Zone 7B. The river flows in a generally south to north direction from its spring source in Springhead to the River Thames on the eastern side of the Swanscombe Peninsula. The earliest maps showed a number of drains / streams associated with the river in Zone 7B. By the map dated 1977-1982, these were mostly no longer evident. The river is also now culverted beneath the Thames Way road. The River Thames is located about 880m east at its nearest point. Sawyer's Lake (also known as Blue Lake), is also located adjacent to the east.

6.2.4 Groundwater

One available to view historical BGS exploratory hole recorded encountering groundwater at 4.7m bgl in River Terrace Deposits. No further data specific to Zone 7B has been obtained. However, a shallow / perched groundwater body is expected in superficial deposits, with a deeper aquifer in Chalk.

6.2.5 Abstractions

The nearest groundwater abstraction is located about 40m east of Zone 7B, described as Point B at Blue Lake Northfleet Cement Works. There are three active licenses and one historical license associated with this, all licensed to Lafarge Cement UK Plc. The active licenses relate to abstraction for non-evaporative cooling, process water, spray irrigation and general use relating to a secondary category. The annual abstraction volume listed on each of these licenses is 1,186,000m³, with a maximum daily volume of 4,374m³. There are several other records of groundwater abstraction in the area surrounding Sawyer's Lake. There are no potable water abstractions within 1km of Zone 7B.

6.2.6 Groundwater vulnerability

The Alluvium within Zone 7B is classified as a Secondary A Aquifer, and the underlying Head Deposits as a Secondary (Undifferentiated) Aquifer. The Chalk is a designated Principal Aquifer. The zone is located in a Source Protection Zone 1 (inner catchment), centred about the nearby groundwater abstractions.

6.3 Regulatory data

6.3.1 Data summary

The full dataset provided in the 2020 Groundsure Report has been reviewed and summarised in Table B-4 (Appendix B). The key items of relevant information are described in the following subsections.

6.3.2 Mineral abstractions

No mineral abstractions are known to have taken place within Zone 7B. Historical mapping has shown evidence of ground workings within the area, generally associated with the expansion of the Sewage Works. There is a history of mineral abstraction in the surrounding area, with 'Northfleet' surface mineral working for chalk, chert and flint present adjacent to the south and 'Southfleet' surface mineral working for chalk present from 240m east.

6.3.3 Designated environmentally sensitive sites

Discovery of archaeological features within Zone 7B was noted on historical mapping. Part of the area is therefore a Scheduled Ancient Monument, referred to as 'Neolithic sites near Ebbsfleet' (list entry 1004206). There are no other designated environmentally sensitive sites within the zone, however it is located in a SSSI Impact Risk Zone for all planning applications.

6.3.4 Environmental permits, incidents and registers

There are very limited records of environmental permits, incidents and registers within 1km of Zone 7B that have the potential to impact the zone. Those relevant records are presented below.

Discharge consents

There are three records of discharge consents held within Zone 7B, related to releases to the River Ebbsfleet. Two of the records relate to release of sewage discharges from Northfleet Sewage Treatment Works. The details of these consents are summarised in Table 6-2. There are numerous further records within 1km of the zone. Excluding those held within other site zones, these are all positioned on the eastern side of the Swanscombe Peninsula or within Springhead, with discharge to the River Thames or River Ebbsfleet, respectively. The nearest of these is about 500m distant.

Table 6-2 - Licensed discharge consents within Zone 7B.

Location	Address	Effluent type	Receiving water	Status
Zone 7B	Northfleet Sewage Treatment Works	Sewage discharges – sewer storm overflow	Freshwater River (assumed River Ebbsfleet)	Issued: 15/11/1973 Revoked: 30/03/2010
Zone 7B	Northfleet Sewage Treatment Works	Sewage discharges – sewer storm overflow	Tributary of River Ebbsfleet	Issued: 31/03/2010 Revoked: 31/07/2017
Zone 7B	Northfleet Eastern Quarry Watling Street	Trade discharges – mineral workings	River Darent	Issued: 06/10/1993

Pollution incidents

There are two records of pollution incidents within Zone 7B, summarised in Table 6-3. There are 26 further records within 1km (excluding those located in other site zones). The vast majority had no (Category 4) or minor (Category 3) impact to air, land and water. Those incidents that had a greater impact (i.e. Category 2 or Category 1) are also summarised in Table 6-3.

Table 6-3 - Pollution incidents with significant or major impact within Zone 7B.

Location	Incident date	Pollutant	Impact
Zone 7B	13 April 2018	Inert materials and wastes; mineral materials and wastes	Air – Category 4 (no impact) Land – Category 3 (minor) Water – Category 2 (significant)

Location	Incident date	Pollutant	Impact
Zone 7B	17 March 2003	Oils and fuels; crude oil	Air – Category 4 (no impact) Land – Category 3 (minor) Water – Category 3 (minor)
Zone 7B	17 May 2001	Inert materials and wastes; mineral materials and wastes	Air – Category 4 (no impact) Land – Category 4 (no impact) Water – Category 3 (minor)
Off-site, 110m northeast	04 May 2004	Atmospheric pollutants and effects; dust	Air – Category 2 (significant) Land – Category 3 (minor) Water – Category 4 (no impact)
Off-site, 350m northeast	30 April 2004	Atmospheric pollutants and effects; dust	Air – Category 2 (significant) Land – Category 3 (minor) Water – Category 4 (no impact)

6.3.5 Landfills and other waste sites

Landfills

Landfill records within 1km of Zone 7B (excluding those located in other site zones) are summarised in Table 6-4. One of these records is located on-site and relates to a Refuse Tip (covering a small proportion of the zone) that was identified on 1969 mapping. The Refuse Tip was not present on the 1977 mapping. There are a number of other landfill sites within 1km, the nearest being Springhead Road landfill located 350m east. All of these landfills are located beyond Sawyer's Lake (adjacent to Zone 7B) and most appear to relate to the infilling of former chalk pits.

Table 6-4 - Landfill sites within 1km of Zone 7B, excluding those in other site zones.

Name	Location	Type of record	Ref. number	Dates of operation	Description
Refuse tip	Zone 7B	Historical local authority landfill records	-	-	Identified from historical mapping dated 1969
Refuse tip (Springhead Road Landfill)	Off-site, 350m southeast	Historical local authority landfill records	-	-	Identified from historical mapping dated 1971
Springhead Road	Off-site, 350m east	Historical landfill (EA records)	REIN.2/1, 21BF	First input: 31/12/51 Last input: 31/12/84	Operated by Northfleet Urban District Council. Licensed held by Kent County Council. Accepted inert, industrial, commercial and household waste
South of Springhead	Off-site, 450m southeast	Historical landfill (EA records)	GR14	-	License held by Reed Paper and Board. Accepted inert, commercial and household waste.
Dykes Pit	Off-site, 850m east	Historical landfill (EA records)	P/02/05, 21EH	First input: 31/12/77 Last input: 31/12/93	Operated by and licensed to D Justice. Accepted inert waste.
Northfleet Power Station	Off-site, 870m east	Historical landfill (EA records)	21EL, P/02/02	First input: 31/12/60 Last input: 31/12/92	Operated by and licensed to Central Electricity Generated Board. Accepted inert, industrial and liquid sludge.

Name	Location	Type of record	Ref. number	Dates of operation	Description
Springhead Road	Off-site, 585m southeast	BGS historical landfill record	-	-	Record dated 1987.
Northfleet Power Station	Off-site, 755m east.	BGS historical landfill record	-	-	Record dated 1947.

6.3.6 Other waste sites

There are a number of records of current and historical waste sites within 1km of Zone 7B. The nearest records all relate to a Special Waste Transfer Station located about 200m south in Springhead Enterprise Park. The information related to this site is provided in Table 6-4. All other records relate to sites more than 700m distant.

Table 6-5 – Waste management sites with potential to affect Zone 7B.

Name / address	Type of record	Permit / ref no.	Dates of operation	Description
Special Waste Transfer Station D2, Springhead Enterprise Park	Historical planning application	KCC/GR/0015/2015	-	Scheme comprises construction of a waste oil transfer station. The associated works include sewer systems, landscaping, infrastructure, enabling and access road.
	Licensed waste sites	EA/EPR/CB3005LP/A001	License issued: 05/05/15	Special Waste Transfer Station licensed to Polihim – SS UK Ltd. Accepts <25,000 tonnes.

6.3.7 Unexploded ordnance (UXO)

A detailed UXO risk assessment was carried out in accordance with relevant guidance [13] and reported for this area of the Kent Project Site in 2015. The report of that assessment is included as an Appendix to the desk study report [1]. The assessment considered the overall risk for the wider site as High.

6.4 Conceptual Site Model

6.4.1 Sources

Review of the 2020 Groundsure Report and other data sources (geological and historical maps etc.) has identified a relatively limited history of development within Zone 7B. Potential sources of contamination within the zone and surrounding area (off-site) are summarised in Table 6-6.

Table 6-6 - Summary of potential sources of contamination.

Potential source	Likely age	Potential contaminants of concern
Current and historical land uses within Zone 7B [sewage works, electricity substation, tramway / railway line, refuse tip]	Up to about 150 years	Metals, asbestos, PAHs, TPH, VOCs and SVOCs, PCBs, landfill waste, leachate, nitrates. Ground gas (methane, carbon dioxide)
Current and historical land uses in the surrounding area [roads, railway line, Springhead Enterprise Park]	Up to about 150 years	Metals, asbestos, PAHs, TPH, VOCs and SVOCs. Ground gas (methane, carbon dioxide)

Potential source	Likely age	Potential contaminants of concern
Alluvium and Head Deposits	Up to about 2 to 3 million years	Ground gas (methane, carbon dioxide)

6.4.2 Pathways and receptors

The detailed development proposals for London Resort are unconfirmed at this stage, but Zone 7B is anticipated to remain largely unchanged. However, there remains a potential for minor development within the zone, such as alterations to roads and existing infrastructure, and landscaping works etc. In a departure from the Atkins 2015 Desk Study, the pathways and receptors in the proposed future use are also considered here. Correspondingly, the presence of contamination has the potential to impact upon human and environmental receptors both in the short term (during construction and in the long term (during the proposed future use). The pathways and receptors relevant to Zone 7B are summarised in Table 6-7.

Table 6-7 - Summary of receptors and potential pathways.

Receptor		Pathway
Human Health	Zone workers	Inhalation, ingestion and / or dermal contact with contaminants in soil and soil-derived dust/fibres
	Trespassers	Inhalation of soil and groundwater derived vapours Migration and accumulation of ground gases, followed by inhalation or ignition, causing asphyxiation and/or explosion
Controlled Waters	Principal Aquifer in bedrock	Leaching / migration of contaminants from soils Lateral and vertical migration of contaminated groundwater
	Secondary Aquifers in Head Deposits and Alluvium	
	River Ebbsfleet and associated drains	Direct surface water run-off and sub-surface flow to surface waters Leaching / migration of contaminants from soils
	Sawyer's Lake	Lateral and vertical migration of contaminated groundwater
Environment	Neolithic Scheduled Monument	Direct contact / physical damage

6.4.3 Assessment of risk

The assessment of the level of risk for each of the potential contaminant linkages identified above is summarised in Table 6-8. The assessment assumes that standard mitigation measures are adopted, for example appropriate site controls during construction (to ensure suitable health, safety and hygiene regime), use of gas protection measures in buildings, use of appropriate foundation solution / piling technique and provision of a clean capping layer in areas of soft landscaping.

Table 6-8 - Summary of risk assessment for Zone 7B.

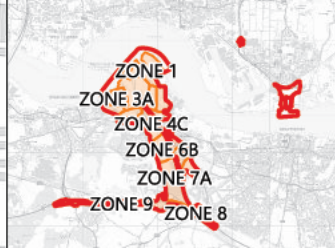
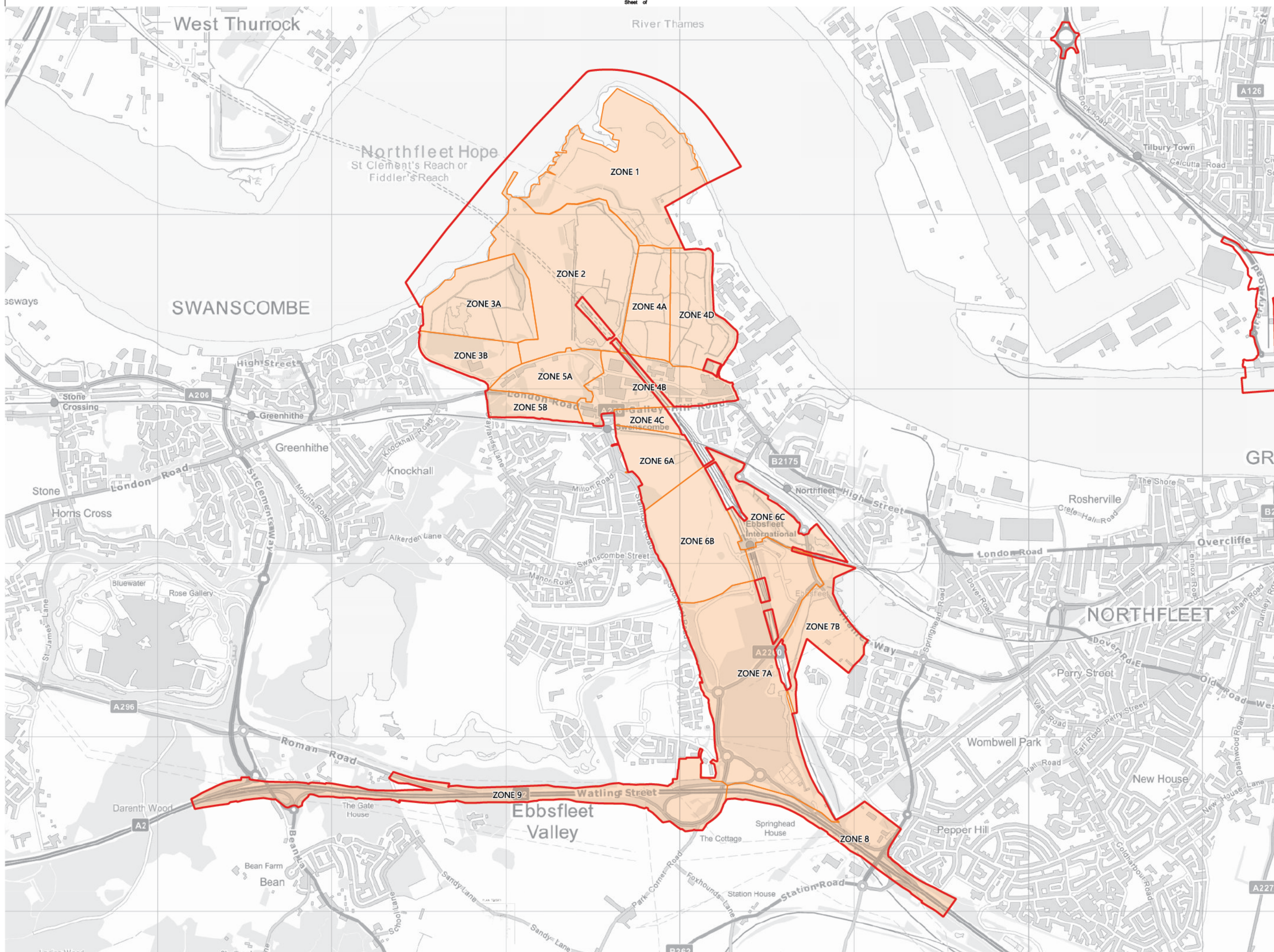
Zone / Source	Receptor	Pathway	Consequence	Probability	Risk
Zone 7B	Trespassers	Inhalation, ingestion and / or dermal contact with contaminants in soil and soil-derived dust/fibres	Severe	Unlikely	Moderate / low
Current and historical land	Zone neighbours	Inhalation of soil and groundwater derived vapours			

Zone / Source	Receptor	Pathway	Consequence	Probability	Risk
uses within Zone 7B		Migration and accumulation of ground gases, followed by inhalation or ignition, causing asphyxiation and/or explosion	Medium	Unlikely	Low
Current and historical land uses in surrounding area	Secondary Aquifer in superficial deposits	Leaching / migration of contaminants from soils	Medium	Low	Moderate / low
	Principal Aquifer in bedrock	Lateral and vertical migration of contaminated groundwater			
Head Deposits / Alluvium	River Ebbsfleet and associated drains	Direct surface water run-off and sub-surface flow to surface waters	Mild	Likely	Moderate / low
	Lawyer's Lake	Leaching / migration of contaminants from soils Lateral and vertical migration of contaminated groundwater			
	Neolithic Scheduled Monument	Direct contact / physical damage	Mild	Low	Low

7 References

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- [14] British Geological Survey, "Dartford. England and Wales Sheet 271. Solid and Drift Geology. 1:50 000," Keyworth, Nottingham, 1998.
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Appendix A Relevant figures



Key
 DCO Order Limits
 Zoning of Kent Project Site

BURO HAPPOLD

Project: The London Resort Project No. 0042936

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PO	Issue	Reason for Issue	23/02/20	NS/IM
Rev			Date	Drw Chk

THE LONDON RESORT DEVELOPMENT CONSENT ORDER
Zoning of Kent Project Site

Sheet of

Application Number
BC080001

Drawing Reference
Figure 1

Scale: **1:10,000 @ A1** Sheet: **1 of 1** Revision: **P01**

Appendix B Regulatory data summary (Groundsure 2020)

B.1 Zone 7A

Table A-1 - Summary of regulatory data for Zone 7A.

Item	Location [relative to Zone 7]	Information	Potential to impact
Past land use			
Historical energy features	On-site	Numerous records of electricity substations in northeast of Zone 7A (within area of carparking for Ebbsfleet International Station), dated between 1952 and 1993.	Yes
	<100m	Numerous further records within 1km. Nearest related to electricity substations 22m west. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	Yes
Historical garages	On-site	Record of historical garage in far south of Zone 7A, dated 1961 and 1968.	Yes
	>250m	Several further records within 1km. Nearest related to a historical garage about 720m east, dated 1952. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Historical industrial land uses	On-site	Cement works, chalk pit, cuttings, miniature rifle range, nursery, old chalk pit, railway sidings, tramway sidings, unspecified disused pit, unspecified pit, unspecified quarry, unspecified tanks, unspecified works, watercress bed	Yes
	<100m	Off-site: cuttings, old chalk pit, old clay pit, pumping station, railway sidings, tramway sidings, unspecified ground workings, unspecified pit	Yes
	100 to <250m	Off-site: chalk pit, quarry, unspecified old quarry	No
	>250m	Off-site: barrack field, brick works, burial ground, cemetery, clay plant, corn windmill, disused windmill, dock, gas works, gasometer, goods depot, grave yard, gravel pit, grid substation, hop kilns, industrial estate, isolation hospital, mineral railway sidings, nursery, paper mill, portland cement works, pump house, railway building, railway building, railway station, refuse heap, tanks, tunnel, unspecified commercial / industrial, unspecified depot, unspecified disused pit, unspecified disused workings, unspecified heap, unspecified hole, unspecified mills, unspecified wharf, water works All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Historical mineral planning areas	On-site	Zone 7A identified as 'Southfleet' surface mineral working for chalk, chert and flint.	Yes
	<100m	Land adjacent to west of Zone 7A identified as 'Southfleet' surface mineral working for chalk and clay. Land adjacent to east of Zone 7A identified as 'Northfleet' surface mineral working for chalk, chert and flint. 'Southfleet' surface mineral working for chalk also 800m east. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	Yes
Historical Petrol Stations	On-site	Historical petrol filling station located in south of Zone 7A. Record dated 1987.	Yes
Historical railway features	On-site	Historical railway line runs north-south through Zone 7A and extends through other site zones and off-site. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	Yes
Historical tanks	On-site	Cluster of historical tanks identified in northeast of zone (near current car park to Northfleet International Station). Records dated between 1932 and 1970. Cluster of historical tanks in centre of Zone 7A (to south of current Ebbsfleet Car Park D). Records dated	Yes
	<100m	Cluster of historical tanks in south of Zone 7A (location of former garage / petrol station). Records dated 1938 to 1999. Numerous further records within 1km, nearest 50m west and dated 1897 to 1909. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No

Item	Location [relative to Zone 7]	Information	Potential to impact
Historical tunnel features	100m to <250m	Nearest associated with North Kent Railway line, about 180m northeast. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
No records of the following within 1km of Zone 7A (excluding records within other site zones): military land.			
Waste and landfill			
Permitted waste sites / authorised landfills	On-site	Northfleet Landfill (predominantly located in Zone 6B) extends into north of Zone 7A. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	Yes
Surface ground workings	On-site <100m	Most of Zone 7A identified as area of surface ground workings. Off-site: areas of surface ground workings identified to immediate east and west. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	Yes Yes
Waste exemptions	On-site >250m	Permit EPR/ZE5788UD/A001 attributed to Springhead Nursery for burning waste in the open, use of waste in construction, storage of waste in secure containers and storage of waste in a secure place. Permit WEX050224 attributed to Springhead Nursery for burning waste in the open, use of waste in construction, storage of waste in a secure place and storage of waste in secure containers. Permit WEX209200 attributed to Springhead Nursery for storage of waste in secure containers, storage of waste in a secure place, and burning waste in the open. Several further records within 1km. Nearest 245m east (EPR/ZE5548VZ/A001) related to use of waste in construction at Springhead Park Development. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	Yes No
BGS historical landfill record	>250m	Springhead Road, dated 1987, identified 990m east. Northfleet Power station, dated 1947, identified 825m east. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Historical landfill (EA records)	On-site >250m	Southfleet Pit (GR19) identified in northern quarter of Zone 7A. Operated by Blue Circle Industries Plc. Accepted inert waste. Off-site: Springhead Road landfill located 700m east of Zone 7A. Accepted inert, industrial, commercial and household waste. First input 1951 and last input 1984. South of Springhead landfill located 950m east of Zone 7A. Accepted inert, commercial and household waste. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	Yes No
Historical Local Authority landfill records	>250m	Public refuse tip identified 300m south, identified from mapping dated 1987 and 1993. Record of refuse tip 700m east from 1971 mapping (Springhead Road Landfill). All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Historical waste sites	>250m	Record 470m east from a historic planning application (KCC/GR/0015/2015). Scheme comprised construction of waste oil transfer station. Record 200m west from a historical planning application (13/01667/FUL). Scheme comprises remediation works to contaminated land. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Licensed waste sites	>250m	Off-site: two records 500m east related to Springhead Enterprise Park for a Special Waste Transfer Station (EA/EPR/CB3005LP). Three records located 840m northeast related to Northfleet Works (EA/EPR/RP3194EY) for a transfer station taking non-biodegradable wastes. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
No records of the following within 1km of Zone 7A (excluding those in other site zones): permitted waste sites / authorised landfills, active or recent EA landfill records,			
Current Industrial Land Use			
Recent industrial land uses	On-site <100m 100 to <250m	Pylon, electricity substation, silo Off-site: electricity substation, pumping station Off-site: electricity substation, pylon	Yes No No

Item	Location [relative to Zone 7]	Information	Potential to impact
	>250m	Off-site: electricity substation, pylon, garden goods, waste processing and disposal, vehicle cleaning services, petrol and fuel stations, baking and confectionery, civil engineers, cutting and welding services, metalworkers, industrial products, electrical equipment repair and servicing, foodstuffs, unspecified quarries or mines, pump house, travelling crane, mast All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
List 2 dangerous substance inventory site	>250m	Off-site: record located 850m northeast, attributed to W T Henley (not active) for chromium, copper, cyanide, iron, pH, silver and zinc. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Pollution incidents	100 to <250m	Off-site: 1 located 120m east. Category 4 (no impact) to air and land, Category 3 (minor impact) to water.	No
	>250m	Off-site: 23 further records within 1km. One incident located 540m south had major impact (Category 1) to water, significant (Category 2) impact to land, and no impact (Category 4) to air. All others had no (Category 4) or minor (Category 3) impact to air, land and water. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
List 1 dangerous substance inventory site	>250m	Off-site: 7 records within 1km. Nearest related to Gec Henley (860m east) for release of mercury and cadmium. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Part A1 licensed industrial activities	>250m	Off-site: one record within 1km. Licensed to Lafarge Cement UK Plc at Northfleet Cement Works for cement and lime processes (producing cement clinker etc.). License issued 2004, now superseded. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Discharge consents	On-site	License no. P09808. Release of trade discharges (site drainage) from Baker's Hole Landfill to a freshwater river (River Ebbsfleet). Issued 01/05/2001, revoked 05/09/2003 (varied by application). License no. P09808. Release of trade discharges (site drainage) from Baker's Hole Landfill to a freshwater river (River Ebbsfleet). Issued 05/09/2003. License no. P10726. Release of trade discharges (site drainage) from Hochtief Norwest Holst to freshwater river (River Ebbsfleet). Issued 29/05/2002, revoked 01/08/2005. License no. P11675. Release of trade discharges to the River Ebbsfleet from CTRL, Springhead. Issued 28/05/2003, revoked 21/01/2005.	Yes
	>250m	Off-site: nearest located 300m east, related to release of surface water to freshwater river. Issued 12/11/1991. Several further records held in Springhead. 23 further discharge consents held along bank of River Thames (eastern side of Swanscombe Peninsula). All relate to release to River Thames. Nearest 780m distant. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Local Pollution and Prevention Control (LPPC) activities Part A2 and B	On-site	Historical Part B permit related to Esso Springhead for petrol vapour recovery. No enforcements notified.	Yes
	>250m	Off-site: 11 further Part B permits within 1km. No enforcements notified. Nearest record 330m east of current Part B permit related to Sainsbury's Supermarket for unloading of petrol into storage at service stations. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
COMAH sites	>250m	Britannia Refined Metals Limited (975m north of Zone 7A) listed as COMAH Upper Tier Operator. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Radioactive substance authorisations	>250m	Off-site (640m west of Zone 7): Revoked or cancelled authorisation attributed to Sirs Navigation Ltd for disposal of radioactive waste. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
No records of the following within 1km of Zone 7A (excluding records within other site zones): Part 2A sites, pollution inventory waste transfer sites, pollutant releases to public sewer, red list discharges, pollution inventory radioactive substances, pollution inventory substances, historical licensed industrial activities, hazardous substances storage.			
Environmental, visual and cultural designations			
Greenbelt Land	<100m	London area (Dartford) Greenbelt Land located from adjacent (beyond A2 road). All other records (excluding those within other site zones) > 1km distant from Zone 7A.	Yes

Item	Location [relative to Zone 7]	Information	Potential to impact
Tree Felling Licenses	>250m	Clear Fell (Conditional) area located 610m east (Ref: 019/245/04-05). Application date 25/03/2005. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Scheduled Ancient Monuments	On-site <100m >250m	Area identified as 'Neolithic sites near Ebbsfleet' located in central portion of Zone 7A, list entry 1004206. Zone 6B: Palaeolithic site near Baker's Hole identified as Scheduled Ancient Monuments. Zone 7B: 'Neolithic sites near Ebbsfleet' located in Zone 7B, list entry 1004206. Off-site: Springhead Roman site located 80m south, beyond A2. Roman enclosure SE of Vagniacae located 400m south, list entry 1004226. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	Yes Yes No
Sites of Special Scientific Interest	<100m	Zone 6B: Baker's Hole SSSI. Status listed as unfavourable – declining. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	Yes
Conservation Areas	>250m	The Hill, Northfleet, located 530m east. Designated 01/02/1990. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Environmental Stewardship Agreements	>250m	Area identified as Entry Level Stewardship since 01/07/2013 located 525m south. Ref AG00483389. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Listed Buildings	>250m	Numerous listed buildings within 1km of Zone 7A. Nearest is The Factory Club (Grade II listed) located 460m east. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	No
Priority Habitat Inventory	On-site <100m	Small proportion (<10%) of Zone 7A identified as deciduous woodland. Deciduous woodland identified from adjacent to Zone 7A boundary. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	Yes Yes
SSSI impact risk zone	On-site	Zone 7A is located in a SSSI impact risk zone for all planning applications (except householder) outside or extending outside existing settlements / urban areas. All other records (excluding those within other site zones) > 1km distant from Zone 7A.	Yes
No records of the following within 1km of Zone 7A (excluding records within other site zones): Countryside Stewardship Scheme, Forest Parks, Open Access Land, Special Areas of Conservation, Special Protection Areas, Areas of Outstanding Natural Beauty, Ramsar Sites, Designated Ancient Woodland, Local Nature Reserves, National Nature Reserves, National Parks, Possible Special Areas of Conservation, Potential Special Protection Areas, Proposed Ramsar Sites, Registered Parks and Gardens, World Heritage Sites.			

B.2 Zone 8

Table A-2 - Summary of regulatory data for Zone 8.

Item	Location [relative to Zone 8]	Information	Potential to impact
Past land use			
Historical energy features	<100m	Numerous records of electricity substations / transformers within 1km. Nearest located about 100m north. All other records (excluding those within other site zones) >1km distant from Zone 8.	Yes
Historical garages	<100m	Record of historical garage in far south of Zone 7A, dated 1961 and 1968. All other records (excluding those within other site zones) >1km distant from Zone 8.	Yes
Historical industrial land uses	On-site	Burial ground, grid substation, old chalk pit, railway sidings, site of cemetery, unspecified pit, unspecified quarry, unspecified tank	Yes
	<100m	Off-site: burial ground, cuttings, refuse tip, unspecified pit Zone 8: nursery, watercress bed	Yes
	>250m	Off-site: boiler, cemetery, chalk pit, clay pit, disused railway station, gravel pit, grid substation, isolation hospital, nursery, old chalk pit, pumping station, railway sidings, sewage works, smithy, tramway sidings, unspecified depot, unspecified ground workings, unspecified heap, unspecified hole, unspecified works, water works, watercress bed All other records (excluding those within other site zones) >1km distant from Zone 8.	No
Historical mineral planning areas	100 to <250m	Land north of Zone 8 identified as 'Northfleet' surface mineral working for Chalk.	Yes
	>250m	Land about 850m north identified as 'Southfleet' surface mineral working for Chalk. All other records (excluding those within other site zones) >1km distant from Zone 8.	No
Historical Petrol Stations	<100m	Historical petrol filling station located in south of Zone 7A. Record dated 1987.	Yes
Historical railway features	On-site	Historical railway features shown in area of Northfleet East National Grid Substation.	Yes
	<100m	Former railway line orientated southwest to northeast from adjacent to Zone 8. All other records (excluding those within other site zones) >1km distant from Zone 8.	Yes
Historical tanks	On-site	Records of historical tanks in area of Northfleet East National Grid Substation and along A2 road.	Yes
	>250m	Other records (excluding those in other site zones) more than 650m distant. All other records (excluding those within other site zones) >1km distant from Zone 8.	No
No records of the following within 1km of Zone 8 (excluding records within other site zones): military land, historical tunnels.			
Waste and landfill			
Surface ground workings	On-site	Associated with locations of discovery of Roman artefacts, old chalk pit.	No
	<100m	Off-site: associated the former railway line and old chalk pits. All other records (excluding those within other site zones) >1km distant from Zone 8.	No
Waste exemptions	100 to <250m	Off-site: 10 within 1km. Nearest 230m north. Related to Springhead Park Development for use of waste in construction (EPR/ZE5548VZ/A001). All other records (excluding those within other site zones) >1km distant from Zone 8.	No
BGS historical landfill record	>250m	Springhead Road, dated 1987, identified 880m north. All other records (excluding those within other site zones) >1km distant from Zone 8.	No
Historical landfill (EA records)	>250m	Off-site: South of Springhead landfill located 560m north. Accepted inert, commercial and household waste. Springhead Road landfill located 925m north. Accepted inert, industrial, commercial and household waste. First input 1951 and last input 1984. All other records (excluding those within other site zones) >1km distant from Zone 8.	No

Item	Location [relative to Zone 8]	Information	Potential to impact
Historical Local Authority landfill records	<100m	Public refuse tip identified 50m south, identified from mapping dated 1987 and 1993.	Yes
	>250m	Record of refuse tip 940m north from 1971 mapping (Springhead Road Landfill). All other records (excluding those within other site zones) >1km distant from Zone 8.	No
Historical waste sites	<100m	Pepperhill Recycling Centre (05/00328/CPO) identified from historic planning application. Scheme comprised the redevelopment of a household waste recycling centre (HWRC) to integrate the HWRC and a waste transfer station.	Yes
	>250m	Record 530m north from a historic planning application (KCC/GR/0015/2015). Scheme comprised construction of waste oil transfer station. Record 400m northwest from a historical planning application (13/01667/FUL). Scheme comprises remediation works to contaminated land. All other records (excluding those within other site zones) >1km distant from Zone 8.	No
Licensed waste sites	<100m	Seven records related to the Pepper Hill waste facility. Pepperhill Depot – Household Waste Amenity Site (EA/EPR/KP3798HZ/V002). Licensed to Kent County Council. License issued 30/03/1994, modified 11/06/2002. Pepperhill Waste Transfer Station (EA/EPR/GP3198HY/V006 – household, commercial and industrial waste transfer station. Licensed to F C C Recycling Limited. License issued 23/07/2007, modified 14/11/2012 Pepper Hill Depot (EA/EPR/GP3198HY/V005) – household, commercial and industrial waste transfer station. Licensed to Waste Recycling Limited. License issued 23/07/2007, modified 12/03/2012.	Yes
	>250m	Off-site: two records 635m north related to Springhead Enterprise Park for a Special Waste Transfer Station (EA/EPR/CB3005LP). All other records (excluding those within other site zones) >1km distant from Zone 8.	No
No records of the following within 1km of Zone 8 (excluding those in other site zones): permitted waste sites / authorised landfills, active or recent EA landfills.			
Current Industrial Land Use			
Recent industrial land uses	On-site	Travelling crane, pylon, tanks,	Yes
	<100m	Off-site: pylon, mast, garden goods, electricity substation, waste processing and disposal, electrical equipment and repair services, petrol and fuel station, vehicle cleaning services.	Yes
	100 to <250m	Off-site: pylon, electricity substation, silo	No
	>250m	Off-site: electricity substation, pylon, civil engineers, cutting and drilling services, tanks, container and storage, plate makers, construction and tool hire, business park. All other records (excluding those within other site zones) >1km distant from Zone 8.	No
Pollution incidents	On-site	Incident dated 2003 related to inert materials and wastes. No impact (Category 4) to air, land and water.	No
	<100m	Incident 50m south, dated 2001 and related to inorganic chemicals / products. No impact (Category 4) to air and minor impact (Category 3) to land and water. Incident adjacent to the north, dated 2002, related to atmospheric pollutants and effects. Minor (Category 3) impact to air and no (Category 4) impact to land and water. Incident 50m north, dated 2002 and related to oils and fuels. No impact (Category 4) to air and minor (Category 3) impact to land and water.	No
	100 to <250m	Two records, both with no (Category 4) or minor (Category 3) impact.	No
	>250m	Two further records. One had major (Category 1) impact to water, significant (Category 2) impact to land and no (Category 4) impact to air. All other records (excluding those within other site zones) >1km distant from Zone 8.	No
Discharge consents	On-site	Three records related to Northfleet East Grid Substation. All relate to release of trade discharges (site drainage) into land. Most recent record revoked in 2010.	Yes
	100 to <250m	Seven records related to Sainsbury's in Springhead, related to release of miscellaneous discharges to freshwater river.	No
	>250m	Five further records within 1km. All other records (excluding those within other site zones) >1km distant from Zone 8.	No

Item	Location [relative to Zone 8]	Information	Potential to impact
Local Pollution and Prevention Control (LPPC) activities Part A2 and B	<100m	Current Part B permit related to Sainsbury's Supermarket for unloading of petrol into storage at service stations. No enforcements notified. All other records (excluding those within other site zones) >1km distant from Zone 8.	No
No records of the following within 1km of Zone 8 (excluding records within other site zones): Part 2A sites, List 2 dangerous substance inventory site, List 1 dangerous substance inventory site, pollution inventory waste transfer site, pollutant release to public sewer, red list release to surface waters, Part A1 licensed industrial activities, radioactive pollution inventory substances, pollution inventory substances, COMAH sites, radioactive substance authorisations, historical licensed activities, hazardous substances storage, regulated explosive sites.			
Environmental, visual and cultural designations			
Greenbelt Land	<100m	London area (Dartford) Greenbelt Land located from adjacent. All other records (excluding those within other site zones) >1km distant from Zone 8.	Yes
Scheduled Ancient Monuments	<100m 100 to <250m	Springhead Roman site present adjacent to south. Roman enclosure southeast of Vagniacae about 130m south. All other records (excluding those within other site zones) >1km distant from Zone 8.	Yes Yes
Environmental Stewardship Agreements	100 to <250m	Area identified as Entry Level Stewardship since 01/07/2013 located from 200m south. Ref AG00483389. All other records (excluding those within other site zones) >1km distant from Zone 8.	Yes
Listed Buildings	>250m	Two listed buildings within 1km. North End Farmhouse, located 950m south, is Grade II listed. The Old Rectory House, located 850m north, is Grade II* listed. All other records (excluding those within other site zones) >1km distant from Zone 8.	No
Priority Habitat Inventory	<100m	Deciduous woodland identified from adjacent to the zone, on area of former railway line. All other records (excluding those within other site zones) >1km distant from Zone 8.	Yes
SSSI impact risk zone	On-site	Zone 8 is located in a SSSI impact risk zone for all planning applications (except householder) outside or extending outside existing settlements / urban areas. All other records (excluding those within other site zones) >1km distant from Zone 8.	Yes
No records of the following within 1km of Zone 8 (excluding records within other site zones): Countryside Stewardship Scheme, Forest Parks, Open Access Land, Tree Felling Licenses, Sites of Special Scientific Interest, Special Areas of Conservation, Special Protection Areas, Areas of Outstanding Natural Beauty, Biosphere Reserves, Conservation Areas, Ramsar Sites, Designated Ancient Woodland, Local Nature Reserves, Marine Conservation Zones, National Nature Reserves, National Parks, Possible Special Areas of Conservation, Potential Special Protection Areas, Proposed Ramsar Sites, Registered Parks and Gardens,			

B.3 Zone 9

Table A-3 - Summary of regulatory data for Zone 9.

Item	Location [relative to Zone 9]	Information	Potential to impact
Past land use			
Historical garages	>250m	Nearest record 1km south, dated 1978. All other records (excluding those within other site zones) >1km distant from Zone 9.	No
Historical industrial land uses	On-site	Cuttings, nursery, old chalk pit, unspecified heap, water works	Yes
	<100m	Cuttings, old clay pit, railway sidings, tramway sidings, unspecified ground workings, unspecified works	Yes
	100 to <250m	Off-site: chalk pit, clay pit, clay plant, grid substation	Yes
	>250m	Off-site: burial ground, dene hole, refuse heap, smithy, unspecified depot, disused pit All other records (excluding those within other site zones) >1km distant from Zone 9.	No
Historical mineral planning areas	<100m	'Swanscombe' surface mineral working for chalk, chert and flint adjacent to northwest. 'Southfleet' surface mineral working for chalk and clay adjacent to northeast. All other records (excluding those within other site zones) >1km distant from Zone 9.	Yes
Historical railway features	<100m	Historical railway features adjacent to north. All other records (excluding those within other site zones) >1km distant from Zone 9.	Yes
Historical tanks	100 to <250m	Historical tank record located 180m north, dated 1961 to 1993. All other records (excluding those within other site zones) >1km distant from Zone 9.	No
No records of the following within 1km of Zone 9 (excluding records within other site zones): historical energy features, historical military land, historical petrol stations.			
Waste and landfill			
Surface ground workings	On-site	Associated with expansion of Watling Street (now A2 road) and old pits.	Yes
	<100m	Off-site: Eastern Quarry present from adjacent to north. All other records (excluding those within other site zones) >1km distant from Zone 9.	Yes
Waste exemptions	<100m	Record 40m north attributed to The Thrift, Watling Street (WEX220152). Storing waste exemption – storage of waste in a secure place. Record 60m south attributed to Thames Water, The Cottage (WEX224425). Using waste exemption – use of waste in construction. Two records 77m northwest attributed to Castle Hill Development, Watling Street (EPR/EF0331FS). Using waste exemption – use of waste in construction, and treating waste exemption – screening and blending of waste.	No
	>250m	Nearest record 330m south (WEX163488). Using waste exemption – use of waste in construction. All other records (excluding those within other site zones) >1km distant from Zone 9.	No
Historical landfill (EA records)	>250m	Off-site: Alkerden Landfill, Swale (DA14) identified 980m north. Accepted inert wastes, operated by Blue Circle Industries. License issued 1976, no further information provided. All other records (excluding those within other site zones) >1km distant from Zone 9.	No
Historical waste sites	100 to <250m	Ground workings and refuse heap identified 220m north.	Yes
	>250m	Record 430m north from a historical planning application (13/01667/FUL). Scheme comprises remediation works to contaminated land. Record 700m southeast from a historical planning application (05/00328/CPO). Scheme comprises the redevelopment of a household waste recycling centre (Pepperhill Recycling Centre). All other records (excluding those within other site zones) >1km distant from Zone 9.	No

Item	Location [relative to Zone 9]	Information	Potential to impact
Licensed waste sites	<100m 100 to <250m	One record 65m north, attributed to Washmills Recycling Centre, Eastern Quarry. Licensed for treatment of waste to produce soil (EA/EPR/PB39334RN/S004). Issued 2014, surrendered 2017. Four records 75m north attributed to A2 Breakers. Permits relate to an end of life vehicle facility (EA/EPR/GP3798HT/V003), metal recycling site (vehicle dismantler) and vehicle depollution facility (EA/EPR/GP3798HT/V002). Current permits. Record 215m north related to Washmills Recycling Centre, Eastern Quarry. Licensed material recycling treatment facility. Licensed issued 2017, still active. Seven records related to the Pepper Hill waste facility. Pepperhill Depot – Household Waste Amenity Site (EA/EPR/KP3798HZ/V002). Licensed to Kent County Council. License issued 30/03/1994, modified 11/06/2002. Pepperhill Waste Transfer Station (EA/EPR/GP3198HY/V006 – household, commercial and industrial waste transfer station. Licensed to F C C Recycling Limited. License issued 23/07/2007, modified 14/11/2012 Pepper Hill Depot (EA/EPR/GP3198HY/V005) – household, commercial and industrial waste transfer station. Licensed to Waste Recycling Limited. License issued 23/07/2007, modified 12/03/2012. All other records (excluding those within other site zones) >1km distant from Zone 9.	Yes No
No records of the following within 1km of Zone 9 (excluding those in other site zones): permitted waste sites / authorised landfills, active or recent EA landfill, historical BGS landfill, historical local authority landfill.			
Current Industrial Land Use			
Recent industrial land uses	On-site <100m 100 to <250m >250m	Pylon Off-site: pylon, pumping station, tank Off-site: pylon, shaft Off-site: pylon All other records (excluding those within other site zones) >1km distant from Zone 9.	Yes Yes No No
Pollution incidents	On-site <100m 100 to <250m >250m	Incident dated 2001 related to firefighting run-off. Minor (Category 3) impact to water, no (Category 4) impact to land and air. One incident. Two incidents. Four incidents All other records (excluding those within other site zones) >1km distant from Zone 9.	No No No No
Discharge consents	<100m >250m	Three records related to Southfleet Water Treatment Works for discharge of process effluent. Two historic and one current permit. Record 500m north licensed to Lafarge Cement UK, Northfleet Quarry. Related to release of final / treated sewage to lake / reservoir. License effective 15/11/2002. Two licenses 500m north. Related to release of final / treated sewage to underground strata at land east of Cherry Orchard Quarry, Eastern Quarry. All other records (excluding those within other site zones) >1km distant from Zone 9.	Yes No
No records of the following within 1km of Zone 9 (excluding records within other site zones): Part 2A sites, list 2 substance inventory sites, list 1 substance inventory sites, pollution inventory substances, pollution inventory waste transfers, pollutant release to public sewers, red list pollutant release to surface waters, part A(1) industrial activities, part A(2) / B industrial activities, radioactive pollution inventory sites, pollution inventory substances, COMAH sites, radioactive substance authorisations, historical licensed industrial activities, hazardous substances storage, regulated explosive sites.			
Environmental, visual and cultural designations			
Greenbelt Land	<100m	Greenbelt land (London area – Dartford) present adjacent to northwest and south of Zone 9. All other records (excluding those within other site zones) >1km distant from Zone 9.	Yes
Sites of Special Scientific Interest	<100m	Darenth Wood SSSI located from adjacent to the west of Zone 9, of favourable and unfavourable – recovering condition. All other records (excluding those within other site zones) >1km distant from Zone 9.	Yes

Item	Location [relative to Zone 9]	Information	Potential to impact
Designated Ancient Woodland	<100m	Parkhill Wood, The Thrift and Darenth / Ladies Wood (areas of ancient and semi-ancient woodland) present from adjacent to Zone 9.	Yes
	>250m	Lords Wood (ancient and semi-ancient woodland) present 750m south. All other records (excluding those within other site zones) >1km distant from Zone 9.	No
Listed Buildings	On-site	Swanscombe Cutting Footbridge Crossing, located on A2 east of A296 junction is Grade II listed. All other records (excluding those within other site zones) >1km distant from Zone 9.	Yes
Scheduled Ancient Monuments	On-site	A medieval woodland boundary in Darenth Wood is present in west of Zone 9 and extends off-site. All other records (excluding those within other site zones) >1km distant from Zone 9.	Yes
Environmental Stewardship Agreements	>250m	Entry-level Stewardship present 700m south. All other records (excluding those within other site zones) >1km distant from Zone 9.	No
SSSI impact risk zone	On-site	Zone 9 is located in a SSSI impact risk zone for all planning applications (except householder) outside or extending outside existing settlements / urban areas. All other records (excluding those within other site zones) >1km distant from Zone 9.	Yes
Priority Habitat Inventory	On-site	Areas identified as deciduous woodland present on-site and extending off-site. All other records (excluding those within other site zones) >1km distant from Zone 9.	Yes
<p>No records of the following within 1km of Zone 9 (excluding records within other site zones): National Nature Reserves, Marine Conservation Zones, Ramsar Sites, Special Areas of Conservation, Special Protection Areas, National Nature Reserves, Local Nature Reserves, Biosphere Reserves, Forest Parks, Proposed Ramsar Sites, Possible Special Areas of Conservation, Potential Special Protection Areas, World Heritage Sites, Conservation Areas, National Parks, Areas of Outstanding Natural Beauty, Registered Parks and Gardens, Open Access Land, Tree Felling Licenses, Countryside Stewardship Schemes.</p>			

B.4 Zone 7B

Table A-4 - Summary of regulatory data for Zone 7B.

Item	Location [relative to Zone 7B]	Information	Potential to impact
Past land use			
Historical energy features	On-site	Record of electricity substation associated with Sewage Works, dated 1985 to 1993.	Yes
	100 to >250m	Off-site: numerous electricity substations and transformers within 1km, nearest about 150m east. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Historical garages	>250m	Off-site: several records within 1km. Nearest refers to a garage, dated 1952-1963, located 460m northeast. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Historical industrial land uses	On-site	Cuttings, railway sidings, refuse heap, sewage tanks, sewage works, tramway sidings, unspecified works	Yes
	<100m	Off-site: burial ground, chalk pit, tramway sidings, unspecified disused pit, unspecified ground workings, unspecified heap, unspecified heap, watercress bed	Yes
	100 to <250m	Off-site: mineral railway sidings, quarry.	No
	>250m	Off-site: barrack field, brick works, cement mill, cement works, cemetery, disused cement works, disused dock, dock, electricity substation, gasworks, goods depot, graveyard, gravel pit, grid substation, hop kilns, industrial estate, isolation hospital, lime kilns, nursery, old clay pit, papermills, Portland cement works, railway building, railway station, refuse heap, rifle range, tunnel, unspecified commercial / industrial, unspecified disused workings, unspecified mills, unspecified tanks, unspecified warehouse, wharf All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Historical mineral planning areas	<100m	'Northfleet' surface mineral working for chalk, chert and flint adjacent to south.	Yes
	100 to <250m	'Southfleet' surface mineral working for chalk present from 240m east. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Historical railway features	On-site	Railway sidings cross north of zone and extend off-site and cross other site zones. All other records (excluding those within other site zones) >1km distant from Zone 7B.	Yes
Historical tanks	On-site	Numerous tank records, all associated with sewage works.	Yes
	<100m	Numerous records of historical tanks within 1km, nearest dated located about 80m south. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Historical tunnel features	>250m	Nearest 300m east, beneath railway line. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
No records of the following within 1km of Zone 7B (excluding records within other site zones): military land, historical petrol stations.			
Waste and landfill			
Surface ground workings	On-site	Southeast part of zone identified as area of ground workings.	Yes
	<100m	Off-site: land from adjacent identified as surface ground workings (associated with nearby chalk extraction). All other records (excluding those within other site zones) >1km distant from Zone 7B.	Yes
Waste exemptions	100 to <250m	Off-site: four records 155m southeast, related to storage of waste in a secure place, crushing waste fluorescent tubes and storage of waste in secure containers.	No
	>250m	Off-site: 11 further records within 1km. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
BGS historical landfill record	>250m	Two records. Northfleet Power Station, dated 1947, located 755m east. Springhead Road, dated 1987, located 585m east. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No

Item	Location [relative to Zone 7B]	Information	Potential to impact
Historical landfill (EA records)	>250m	Off-site: Springhead Road landfill located 350m east of Zone 7B. Accepted inert, industrial, commercial and household waste. First input 1951 and last input 1984. South of Springhead landfill located 450m east of Zone 7B. Accepted inert, commercial and household waste. Dykes Pit located 850m east. Accepted inert waste. First input 1977, last input 1993. Northfleet Power Station located 870m east. Accepted inert, industrial and liquid sludge waste. First input 1960 and last input 1992. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Historical Local Authority landfill records	On-site >250m	Refuse tip identified from 1969 mapping. Off-site: Record of refuse tip 350m east from 1971 mapping (Springhead Road Landfill). All other records (excluding those within other site zones) >1km distant from Zone 7B.	Yes No
Historical waste sites	100 to <250m >250m	Two records 190m south from a historic planning application (KCC/GR/0015/2015). Scheme comprised construction of waste oil transfer station. Record 700m west from a historical planning application (13/01667/FUL). Scheme comprises remediation works to contaminated land. Record 900m south from a historical planning application (05/00328/CPO) related to redevelopment of a Waste Transfer Station (Pepperhill Recycling Centre) All other records (excluding those within other site zones) >1km distant from Zone 7B.	No No
Licensed waste sites	100 to <250m >250m	Off-site: two records 200m south related to Springhead Enterprise Park for a Special Waste Transfer Station (EA/EPR/CB3005LP). Off-site: three records located 760m northeast related to Northfleet Works (EA/EPR/RP3194EY) for a transfer station taking non-biodegradable wastes All other records (excluding those within other site zones) >1km distant from Zone 7B.	Yes No
No records of the following within 1km of Zone 7B (excluding those in other site zones): permitted waste sites / authorised landfills, active or recent EA landfills.			
Current Industrial Land Use			
Recent industrial land uses	On-site <100m 100 to <250m >250m	Pylon, electricity substation, mast, waste storage and disposal Off-site: fish and meat products, depot, tanks, electricity substation Off-site: disused pit, pump house, electricity substation, published goods, construction completion services, electrical equipment and repairs Off-site: general purpose machinery, construction supplies, vehicle repair and testing services, construction and tool hire, civil engineers, cutting and drilling services, metal workers, industrial products, chalk pit, pylon, electricity substation, tanks, construction and tool hire, concrete products, travelling cranes. All other records (excluding those within other site zones) >1km distant from Zone 7B.	Yes No No No
List 2 dangerous substance inventory site	>250m	Off-site: record located 860m northeast, attributed to W T Henley (not active) for chromium, copper, cyanide, iron, pH, silver and zinc. Record positioned 980m northeast. Attributed to Kimberly Clark Ltd, related to organotin, atrazine and simazine. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Pollution incidents	On-site <100m 100 to <250m >250m	Record dated 2003 related to oils and fuels (crude oil). No (Category 4) impact to air, minor (Category 3) impact to land and water. Record dated 2018 related to inert materials and wastes. No (Category 4) impact to air, minor (Category 3) impact to land, significant (Category 2) impact to water. Record dated 2002, 85m east within Sawyer's Lake. No (Category 4) impact to air and land, minor (Category 3) impact to water. Record dated 2004, 130m northeast, related to release of dust. Significant (Category 2) impact to air, minor (Category 3) impact to land, no impact (Category 4) to water. Off-site: 24 further records within 1km. Majority had no (Category 4) or minor (Category 3) impact to air, land and water. One record located 340m northeast dated 2004 related to dust. Significant (Category 2) impact to air, minor (Category 3) impact to land, no impact (Category 4) to water. All other records (excluding those within other site zones) >1km distant from Zone 7B.	Yes No No No

Item	Location [relative to Zone 7B]	Information	Potential to impact
List 1 dangerous substance inventory site	>250m	Off-site: 6 records within 1km. Nearest are three records related to Blue Circle Cement Works (820m northeast) for release of mercury and cadmium to River Thames All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Part A1 licensed industrial activities	>250m	Off-site: record about 900m east attributed to Lafarge Cement UK Plc for cement and lime producing etc. License issued 2004, now superseded. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Discharge consents	On-site	Three records in Zone 7B. Record for release of trade discharges – mineral workings to the River Ebbsfleet, consent issued 1993. Two records related to release of sewage discharges (sewer storm overflow) to freshwater river. Most recent consent revoked 2017.	Yes
	>250m	Off-site: numerous records located on eastern side of peninsula from 500m distant and within Springhead from 600m south. Related to release to River Thames and River Ebbsfleet, respectively. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Local Pollution and Prevention Control (LPPC) activities Part A2 and B	>250m	Six records within 1km. Nearest a current Part B permit attributed to Tarmac Cement Terminal, Northfleet for use of bulk cement, located 650m distant. No enforcements notified.	No
		All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Hazardous substances storage	>250m	One record 930m east, related to a historical consent for Ridgeway International. No further details provided. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
No records of the following within 1km of Zone 7B (excluding records within other site zones): Part 2A sites, pollution inventory waste transfer sites, pollutant release to public sewer, red list pollutant release, radioactive pollution inventory sites, pollution inventory substances sites, COMAH sites, radioactive substance authorisations, historical licensed industrial activities, regulated explosive sites.			
Environmental, visual and cultural designations			
Greenbelt Land	>250m	Off-site: London area – Dartford Greenbelt Land present from about 650m south. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Scheduled Ancient Monuments	On-site	Neolithic sites near Ebbsfleet identified within Zone 7B.	Yes
	>250m	Off-site: Springhead Roman site present about 550m south. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Conservation Areas	>250m	Off-site: The Hill, Northfleet Conservation Area located 350m east. Designated since 01/02/1990. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Listed Buildings	>250m	Numerous listed buildings within 1km of Zone 7B, within Northfleet / Springhead. Nearest is the Old Rectory House, located 275m southeast, which is Grade II listed. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
Priority Habitat Inventory	On-site	About 10% of zone identified as deciduous woodland and 10% identified as reed beds.	Yes
	<100m	Off-site: areas of deciduous woodland identified from adjacent. All other records (excluding those within other site zones) >1km distant from Zone 7B.	No
SSSI impact risk zone	On-site	Zone 7B is located in a SSSI impact risk zone for all planning applications (except householder) outside or extending outside existing settlements / urban areas.	Yes
No records of the following within 1km of Zone 7B (excluding records within other site zones): Countryside Stewardship Scheme, Forest Parks, Open Access Land, Tree Felling Licenses, Sites of Special Scientific Interest, Special Areas of Conservation, Special Protection Areas, Areas of Outstanding Natural Beauty, Biosphere Reserves, Ramsar Sites, Designated Ancient Woodland, Entry Level Stewardship, Local Nature Reserves, Marine Conservation Areas, National Nature Reserves, National Parks, Possible Special Areas of Conservation, Potential Special Protection Areas, Proposed Ramsar Site, Registered Parks and Gardens			

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