

PHASE 1 PRELIMINARY RISK ASSESSMENT

Land to the East of Stansted Airport



JER8224
PHASE 1 PRELIMINARY RISK
ASSESSMENT
Revision 2
April 2022

REPORT

Document status

Version	Purpose of document	Authored by	Reviewed by	Approved by	Review date
0	Draft	NT	JL	Jim Lightbown	19/11/2019
1	Final	NT	CE	Jim Lightbown	21/11/2019
2	Revision 1	NT	JL	Jim Lightbown	16/12/21
3	Revision 2	NT	NT	Nancy Tonkin	29/04/22

Approval for issue

Jim Lightbown

16 December 2021

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EXECUTIVE SUMMARY

RPS Consulting Services Ltd (RPS) was commissioned by Manchester Airport Group & Stansted Airport Limited to undertake a Phase 1 Preliminary Environmental Risk Assessment of a plot of land to the east of Stansted Airport. The report has been commissioned prior to the proposed installation of a solar photovoltaic (PV) system on the site.

Current Site and Surrounding Land Use

The site currently comprises predominantly agricultural fields. Current on-site potential sources of contaminants of concern for the main site area are limited to chemicals associated with the agricultural land use, including the potential for herbicides, pesticides and fertilisers. A significant thickness of Made Ground is not anticipated to be present across the majority of the site, although the proposed cable route lies beneath roads, where Made Ground would form part of road construction.

History of Site and Surrounding Land use

A review of historical maps indicates the site has been largely undeveloped. The proposed cable route extends across land which was also shown as agricultural, although the route encompasses a section of road including a junction between the road currently known as Parsonage Road and a road which extends from Parsonage Road to the north east from c.1976. In 1991, Coopers Hill Roundabout, Thremhall Avenue and changes to Parsonage Road are shown as under construction in the area of the proposed cable route, and are shown as having been constructed by 1999, with associated embankment earthworks.

A series of rectangular buildings or structures of unspecified use is shown to the northwest of the main site, bisected by the proposed cable route, from c. 1950 to 1971.

“Tam O’Shanter Cottage” (1876-2021) was shown adjacent to the main site to the west with possible water feature, later infilled. Made Ground in areas of previous development or infilled water features could represent a localised source of contaminants of concern and/or ground gas, although this is highly localised in the vicinity of the site and unlikely to have significantly impacted the site.

Off-site historical potential sources of contaminants of concern include a sewage works, shown to have been located approximately 125m to the west of the site from c.1951, but no longer shown by 2021, and an engineering works with fire service training school beyond shown to have been located approximately 120m to the northwest of the cable route from c.1951 to 1992. Due to their distance from the site and the likely low permeability of underlying soils, it is considered that contamination potentially originating from these land uses is unlikely to have significantly impacted the site.

Environmental Setting

There are no residential properties in the immediate vicinity of the site.

The site is indicated to be underlain by Secondary Undifferentiated Aquifers relating to the Head Deposits and Lowestoft Formation. These are not considered to be of high sensitivity with regard to contamination sourced from the site. Secondary A Aquifers relating to the Glaciofluvial Deposits and/ or the Kesgrave Catchment Group may underlie the Lowestoft Formation in the east and south of the site. However, given the significant thickness of the Lowestoft Formation in the area, pathways of vertical migration to more sensitive deeper aquifers are unlikely to be active. The site is not indicated to be located in a groundwater Source Protection Zone (SPZ) and there are no sensitive groundwater abstractions in the vicinity of the site.

The nearest surface water feature is an issue or land drain located on site, and land drains or streams forming the eastern and southern site boundaries.

Outline Conceptual Site Model

An outline conceptual site model (CSM) has been derived on the basis of the desktop study and site reconnaissance. No significant potentially contaminative current or historical land uses have been identified on the main site, with potential contaminants likely to be limited to herbicides, pesticides and fertiliser

associated with agricultural land use. A limited number of potential pollutant linkages that may be active upon the redevelopment of the site have been identified. These are associated with the migration of airborne soil and dust, and the leaching of mobile contaminants to local surface waters and groundwater (Secondary Undifferentiated Aquifer). However, much of the surrounding area is used for agriculture and, following construction, the possible historical use of these substances on site is unlikely to cause significant detrimental impact to the identified receptors.

Made Ground may be present in the areas adjacent to the site that have previously been subject to development /demolition and or former water features (now potentially infilled). Due to the small scale of these and the likely low permeability of the underlying natural soils, contaminants of concern (if present) associated with fill material are considered unlikely to have caused widespread impact beneath the site.

The proposed cable route runs beneath existing roads. There is the potential for a degree of contamination to be present within Made Ground used as part of the road construction, however the cable route is not considered a sensitive receptor to this potential contamination.

Recommendations

It is considered unlikely that there would be significant active potential pollutant linkages upon completion of the proposed installation of a solar PV system on the site. On the basis of the above, no further assessment of the site is considered necessary.

It is recommended that a watching brief for contamination be carried out should excavations be proposed beneath roads along the cable route. If any visual or olfactory evidence of contamination is encountered either beneath the roads or during the groundworks or installation on the main site, works in the affected area should cease until further investigations are completed by a qualified consultant. Any necessary mitigation measures should then be put in place.

1 INTRODUCTION

1.1 Preamble

1.1.1 RPS Consulting Services Ltd (RPS) was commissioned by Manchester Airport Group & Stansted Airport Limited to undertake a Phase 1 Preliminary Environmental Risk Assessment of a plot of land to the east of Stansted Airport. The report has been commissioned prior to the proposed installation of a solar photovoltaic (PV) system on the site.

1.1.2 The site covers approximately 23.2 hectares and currently comprises predominantly agricultural land. A site location plan is presented as Figure 1.

1.2 Objectives

1.2.1 The principal objectives of this assessment were as follows:

- To assess potential sources of contamination at the site, associated with historical and current land uses both on site and in the surrounding area;
- To review the environmental setting to assess the sensitivity of the surrounding area to contamination/pollution;
- Produce an outline Conceptual Site Model (CSM) detailing how any contamination may impact the identified receptors via pollutant linkages; and
- Recommendations for further investigation of potential pollutant linkages, where considered necessary.

1.3 Legislation and Guidance

1.3.1 This report has been produced in general accordance with:

- Contaminated Land (England) Regulations 2006 (as amended);
- DEFRA Environmental Protection Act 1990: Part 2A - *Contaminated Land Statutory Guidance* (2012);
- DEFRA and Environment Agency (2004) Contaminated Land Report 11 (CLR 11): *Model Procedures for the Management of Land Contamination*;
- National Planning Policy Framework (2019);
- CIRIA Document C665: *Assessing Risks Posed by Hazardous Ground Gases to Buildings*;
- British Standard requirements for the '*Investigation of potentially contaminated sites - Code of practice*' (ref. BS10175:2011+A1:2017);
- British Standard requirements for the '*Code of practice for ground investigations*' (ref. BS5930:2015+A1:2020); and
- British Standard requirements for the '*Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings*' (ref BS8485:2015+A1:2019).

1.3.2 Where appropriate, consideration has also been given to the following:

- The potential for environmental liabilities to occur under other associated regimes, for example the Water Resources Act (1991) and the Environmental Damage Regulations (2009); and
- Key constraints on site redevelopment (if proposed);

- 1.3.3 Although not part of the scope of this report, the following may be commented on for information only where readily observed, reported or identified:
- Asbestos-containing materials; and
 - Japanese Knotweed (invasive plant species). It should be noted that its identification can be limited by the seasons, dense vegetation, physical, infrastructural, health & safety and other constraints.
- 1.3.4 Details of the limitations of this type of assessment are described in Appendix A.

2 SITE RECONNAISSANCE AND DESK STUDY

2.1 Site Reconnaissance

2.1.1 This section of the report is based upon observations made during a site visit carried out on 15th October 2019. A site boundary plan is provided as Figure 2. Selected photos are shown in Appendix B.



General view of the site. For further photos see Appendix B.

The Site

Table 1 – Summary of on-site activities

Section	Description
Background:	The site is located to the east of Stansted Airport at National Grid Coordinates 555950,222934. It is irregular in shape and occupies an area of approximately 48.7 ha.
Site Layout:	The main site area comprised arable farmland, predominantly ploughed fields at the time of the walkover, with one area of crops. A strip of wild grassland was present towards the north of the site. Access to the site was through a gate on Parsonage Road and an unsurfaced track. A section of Parsonage Road, Coopers End Roundabout and Thremhall Avenue, and an access to the northwest of Thremhall Avenue are included within the site boundary.
Activity / Operations:	The main site area was in use as arable farmland with a number of feeding stations for game birds.
Building Structure(s):	No buildings were observed on site.
Surface Cover:	The main site area was unsurfaced, comprising predominantly ploughed fields, crops and grassland. Trees and hedgerow were observed along the field boundaries and site boundaries.
Drainage:	A number of drainage ditches were observed to cut through the site at field boundaries and along the eastern and southern site boundaries.

Section	Description
Bulk Storage / Tanks:	No bulk storage was observed within the site boundary.
Waste:	No waste disposal was observed on site during the walkover. Limited litter and an old tyre were observed along the boundary with Parsonage Road. Rusted empty oil drums were observed in the centre of one field.
Air Emissions:	No issues with air emissions were observed during the walkover.
Electricity Substations /Transformers:	No electricity substations or transformers were observed on site during the walkover.
Visual Evidence of Contamination:	No visual evidence of contamination was observed on site during the walkover.
Statutory Nuisance:	RPS is not aware of any statutory nuisance arising as a result of the use of the site.

The Surrounding Area

2.1.2 The site is located in an area of predominantly agricultural land use, on the periphery of Stansted Airport and its associated infrastructure. At the time of the site inspection, neighbouring land consisted of the following:

Table 2 – Neighbouring Land Uses

Direction	Description
North:	Agricultural land extends to the immediate north of the site, with a road, with a limited area of green space, residential dwellings and a car park beyond. Stansted Airport lies beyond Terminal Road South to the north of this area. A collection of steel buildings is located to the south of the road. These are labelled as Hammar Service and appear to comprise vehicle or plan maintenance. High House Nursery, with external children’s play area, is located adjacent to Hammar Service. In the northwestern corner of the main site area, the boundary is formed by a narrow strip of woodland which encroaches into the agricultural land from the road. This appeared to have been in use as a feeding and/ or breeding station for game birds.
East:	The site is bound to the east by a drainage ditch and tree/ hedgerow line, with areas of woodland and agricultural land beyond.
South:	The site is bound to the south by a drainage ditch or stream and tree/ hedgerow line, with agricultural land beyond.
West:	Agricultural land extends to the west of the main site area towards Parsonage Road, with Stansted Guest House, agricultural land and car parks associated with Stansted Airport beyond.

2.2 Proposed Development

2.2.1 It is proposed to install a solar photovoltaic (PV) system on the site.

2.3 Site History

Historical Map Review

2.3.1 The following review is based on past editions of readily available Ordnance Survey (OS) maps. These include scales of 1:1,250, 1:2,500 and 1:10,000 dated 1876 to 2019. Extracts from selected historical maps are given as Figure 3 to Figure 6.

Table 3 – Historical Site Uses

On-site Land Use and Features	Dates	
	From	To
The main site area and proposed western access route is shown as fields with occasional trees and paths along the field perimeters. A land drain or stream, flowing approximately to the south is shown along the eastern site boundary and a stream with footbridge is labelled on the southern boundary of the site. An	1876	1897

On-site Land Use and Features	Dates From	To
additional drain or stream is shown to issue from adjacent to the northern boundary of the site, flowing through the site towards the south.		
The proposed cable route extends across land also shown as agricultural, but the route encompasses a section of road including a junction between the road currently known as Parsonage Road and a road which extends from Parsonage Road to the north east.		
The footbridge is no longer shown.	1897/1898	1950
A series of rectangular buildings or structures of unspecified use is shown to the northwest of the main site, bisected by the proposed cable route.	1950	1971
The rectangular buildings in the area of the proposed cable route are no longer shown.	1971	1991
Coopers Hill Roundabout, Thremhall Avenue and changes to Parsonage Road are shown as under construction in the area of the proposed cable route, and are shown as having been constructed by 1999, with associated embankment earthworks.	1991	2019
An issues is labelled near the northern boundary of the site, at the top of the stream flowing through the site to the south.		

Table 4 – Historical Neighbouring Site Uses

Surrounding Land Uses (250m radius)	Orientation	Distance	Dates From	To
Agricultural land	North	Adjacent	1876	2021
Road to the north of the main site, predominantly agricultural land with occasional properties and occasional ponds	North and northwest	100m	1876	1951
Development of series of rectangular buildings of unknown use adjacent to cable route	West	Adjacent to cable route	1950	1971
Increased development, likely partly residential	North	c.150m	1950	1960
Some of the new (likely part residential) development no longer shown	North	c.150m	1960	1992
Rises, with stream flowing to the southwest	Northwest	100m from cable route	1876	1950
New development including large, possible industrial building, labelled engineering works with fire service training school beyond by 1969, with access via a new road constructed adjacent to the stream (now labelled drain) to northwest of proposed cable route	Northwest	120m from cable route	1950	1992
Additional buildings, possibly industrial, to southwest of engineering works. Additional building shown in 1971	West	150m from cable route	1950	1992
Tank for unknown use labelled	West	180m from cable route	1970	1992
Terminal Road South, with Stansted Airport infrastructure including car parks, coach station, railway line and station to northwest, and passenger terminal and airside infrastructure beyond.	North and northwest	150m	1992	2019
Coopers End Roundabout, Thremhall Avenue and Coopers End Road, with associated embankment construction	West	Adjacent to cable route	1992	2021
Likely commercial/ industrial structure to south of Coopers End Road. Further structures, likely airport infrastructure, shown to southwest by 2021	West	80m from cable route	1992	
Two new structures of unknown use to north of tip of cable route	West	20m from cable route	2021	2021

Surrounding Land Uses (250m radius)	Orientation	Distance	Dates	
			From	To
High-house (later "High House"), a collection of buildings, likely residential property with a pond	North	c.100m	1876	1921
Additional building shown to east of High-house	North	c.100m	1920	1950
Building to east of High-house redeveloped or extended to much longer structure, parallel to the road to the north	North	c.100	1950	1991
Building to east of High-house redeveloped to possible commercial/ industrial structure with crossovers for vehicle access from the road	North	c.100	1991	2001
The Montessori Nursery and Pre-Preparatory School shown on eastern part of High House site	North	20m	1991	1999
Old windmill (Corn) labelled adjacent to northern site boundary within road with circular structure shown	North	75m	1876	1920
Old windmill no longer labelled and circular structure no longer shown	North	75m	1920	1970
Old windmill building labelled Mill House, likely residential property	North	75m	1970	1992
Terrace of residential properties with pond	Northeast	c.250m	1881	1969
Likely residential dwelling constructed to the west of the terrace, later labelled "Dormers" and extended.	Northeast	c.250m	1950	2021
Little Newlands Wood	Northeast	c.150m	1923	2021
Seven Acres Wood	East	Adjacent	1923	2021
To the north of the proposed cable route, likely residential property, with possible outbuilding, streams and pond adjacent, later redeveloped and labelled Tam O'Shanter Cottage, redeveloped again prior to 1991 with new access route shown from the north and new outbuilding.	West	Adjacent	1876	2021
Tam O'Shanter Cottage no longer shown	West	Adjacent	2021	
Three terraced properties, likely residential, labelled "Mill End"	West	c.250m	1881	1971
Former Mill End labelled Le Knoll's Cottage	West	c.250m	1969	2019
Area of heathland or rough grassland	West	60m	1897	1970
Area of heathland shown as scrub with collects	West	60m	1970	2001
Localised development has occurred to the north and west of the heathland, including two unlabelled circular structures	West	125m	1951	1970
The development labelled as Sewage Works with filter beds	West	125m	1970	2021
Likely residential property labelled "Bridgefoot"	Southwest	180m	1876	1970
Bridgefoot has been redeveloped and is labelled as "Bridgefoot Cottages"	Southwest	180m	1970	2019
Bridgefoot Cottages renamed "Stansted Guest House"	Southwest	180m	2019	2021

2.4 Previous Reports

2.4.1 RPS has not been provided with any previous reports for review.

2.5 Environmental Setting

Geology

- 2.5.1 Based on British Geological Survey (BGS) mapping (1:50,000-scale) and the Environment Agency (EA) Groundwater Vulnerability mapping (1:100,000-scale), the stratigraphic sequence and aquifer classifications beneath the site are indicated to be as follows:

Table 5 – Descriptions of Geological Strata

Strata	Description & approximate thickness	Aquifer Classification
Head Deposits	Clay, silt, sand and gravel. Shown in southern area of the site only. Anticipated to be of limited thickness beneath the site.	Secondary (Undifferentiated) Aquifer
Lowestoft Formation	Diamicton (chalky till together with outwash sands and gravels, silts and clays). Thickness reported to be extremely variable, BGS borehole records (see below) indicate 7.85-17.9m thickness in the vicinity of the site.	Secondary (Undifferentiated) Aquifer
Glaciofluvial Deposits*	Sand and Gravel; a limited thickness may be present beneath the Lowestoft Formation in eastern and southern areas of the site.	Secondary A Aquifer
Kesgrave Catchment Group*	Sand and Gravel; a limited thickness may be present beneath the Lowestoft Formation in eastern and southern areas of the site.	Secondary A Aquifer
London Clay Formation	Clay, Silt and Sand. May be up to 150m thickness in Essex.	Unproductive Stratum

*Indicated to be present beneath the Lowestoft Formation on BGS boreholes to the east and south of the site.

- 2.5.2 A BGS borehole log (ref. TL52 SE14), for a borehole located adjacent to Coopers End Roundabout and the proposed cable route, approximately 280m to the west of the northern part of the main site, indicates Lowestoft Formation (labelled Boulder Clay) to a depth of 15.2m below ground level (bgl), underlain by London Clay proven to the base of the borehole at 17m bgl. A BGS borehole record (ref TL52 SE23) for a borehole approximately 900m to the east of the site indicates a thickness of 3.1m of Kesgrave Sand and Gravel between the base of the Lowestoft Formation at 17.9m bgl and the upper surface of the London Clay at 21m bgl and these deposits are indicated on BGS mapping to outcrop locally in the wider area. A record for borehole TL52 SE44, located approximately 280m to the southwest of the site indicates Lowestoft Formation to a depth of 7.85m bgl, underlain by a thin band of sand and gravel, with London Clay present from a depth of 8.05m bgl. A record for borehole TL52 SE19, located approximately 550m to the southeast of the site, indicates Lowestoft Formation to 12.1m bgl underlain by Glacial Sand and Gravel (described as very clayey pebbly sand) to the base of the borehole at 12.9m bgl.
- 2.5.3 Made Ground may be present as a result of past construction and/or demolition activities in the vicinity of former properties on the site. No site investigation reports have been reviewed to verify this. A significant thickness of Made Ground is not anticipated across the site as a whole.

Hydrogeology

- 2.5.4 The site is located above Secondary Undifferentiated Aquifers relating to the Head Deposits and the Lowestoft Formation. These formations have varying characteristics in different locations.

- 2.5.5 Glaciofluvial Deposits and/ or the Kesgrave Catchment Group may be present beneath the Lowestoft Formation. These deposits are classified as Secondary A Aquifers, which provide a high level of water storage and may support water supply and / or river base flow on a strategic scale.
- 2.5.6 The underlying London Clay Formation is classified as an Unproductive Stratum. These formations have a low permeability and have negligible significance for water supply or base flow.
- 2.5.7 According to EA data, the site is not located in a groundwater Source Protection Zone (SPZ).
- 2.5.8 Information provided by the EA indicates that there is a record of one active licensed groundwater abstraction within 2km of the site. This is detailed in the table below:

Table 6 – Licensed Groundwater Abstractions

Licence Holder	Approx. Distance and Direction from Site	Source	Use
Stansted Airport Ltd	1626m Northwest	Groundwater	Drinking, Cooking, Sanitary, Washing, (Small Garden) - Household

Surface Water

- 2.5.9 A list of all nearby watercourses and water bodies is as follows:

Table 7 – Nearby Watercourses and Water Bodies

Watercourse / Body	Approx. Distance and Direction from Site
Issue and various drainage ditches	On site
Land drains or streams	On site, forming eastern and southern site boundaries
Land drains or streams	Network adjacent to east, south and west of the site
Pond	160m north
Pond	20m northeast
Pincey Brook	231m southwest

- 2.5.10 Information provided by the EA indicates that there is a record of one active licensed surface water abstraction within 2km of the site. The details of this are as follows:

Table 8 - Licensed Surface Water Abstractions

Licence Holder	Use	Approx. Distance and Direction from Site
R McGowan Ltd	Spray Irrigation - Storage	1687m southwest

Fluvial / Tidal Flood Risk

- 2.5.11 According to the Environment Agency (EA) flood map, the site is not located within an indicative fluvial floodplain.

Ecologically Sensitive Sites

- 2.5.12 Natural England data indicates that there are no ecologically sensitive sites that constitute environmental receptors as defined within Table 1 of the DEFRA Environmental Protection Act 1990: Part 2A - Contaminated Land Statutory Guidance (2012), located within a 1km radius of the site. Two areas of Ancient Woodland are located within 1km of the site: Priors Wood, approximately 560m to the southeast, and Greenstreet Spring/ Pidgeon Wood, approximately 920m to the northwest.

Radon

- 2.5.13 According to the Indicative Atlas of Radon in England and Wales published by the Health Protection Agency (part of Public Health England) and the British Geological Survey, the site is not located in an area at risk from radon gas.

Coal Authority

- 2.5.14 The Interactive Map Viewer on the Coal Authority website indicates that the site is not located in a coal mining reporting area.

Non-Coal Mining

- 2.5.15 No non-coal mining activities have been identified within 50m of the site boundary.

2.6 Authorised Processes and Pollution Incidents

Landfills and Waste Sites

- 2.6.1 Data provided by the EA, Local Authority and BGS indicates that there are no recorded licensed or known historical landfill sites or waste treatment/ waste transfer sites located within 250m of the site.

Environmental Permits

- 2.6.2 EA and Local Authority data indicates that there is one process regulated by an Environmental Permit (under the Environmental Permitting Regulations 2010) within 500m of the site. This is outlined in the table below:

Table 9 – Environmental Permits

Licence Holder	Approx. Distance and Direction from Site	Permitted Activity
Europcar	103m west of cable route	Unloading of Petrol into Storage at Service Stations (Part B)

COMAH Sites

- 2.6.3 There are no records of any operations under the Control of Major Accident Hazards (COMAH) Regulations 1999, located within 500m of the site.

Pollution Incidents

- 2.6.4 Environment Agency data indicates that there are no records of ‘major’ or ‘significant’ pollution incidents within 500m of the site.

2.7 Unexploded Ordnance

- 2.7.1 CIRIA Report C681 (Stone et al 2009) outlines recommendations for dealing with the potential risk associated with the legacy of Unexploded Ordnance Risk, largely relating the WWII bombing and military sites.
- 2.7.2 Reference to the Zetica Regional Unexploded Bomb Risk map indicates that the site is in an area of low potential risk from Unexploded Bombs. As the site is not within an area of known military history, in general accordance with CIRIA Report, no further consideration of Unexploded Ordnance is considered necessary at this time.

2.8 Regulatory Consultations

- 2.8.1 The Environmental Health Department at Essex Council was consulted regarding any known contamination issues at the site. A response is awaited and will be included in a final version of this report.

3 OUTLINE CONCEPTUAL SITE MODEL

3.1 Background

3.1.1 An outline conceptual site model (CSM) consists of an appraisal of the *source-pathway-receptor* 'contaminant linkages' which is central to the approach used to determine the existence of 'contaminated land' according to the definition set out under Part 2A of the Environmental Protection Act 1990. For a risk to exist (under Part 2A), all three of the following components must be present to facilitate a potential 'pollutant linkage'.

- **Source** referring to the source of contamination (Hazard).
- **Pathway** for the contaminant to move/migrate to receptor(s).
- **Receptor** (Target) that could be affected by the contaminant(s).

3.1.2 Receptors include human beings, other living organisms, crops, controlled waters and buildings / structures. The National Planning Policy Framework, used to address contaminated land through the planning process, follows the same principles as those set out under Part 2A. Further details on the Part 2A regime are presented within Appendix C.

3.2 Potential Pollutant Linkages

3.2.1 Each stage of the potential pollutant linkages has been assessed individually on the basis of information obtained during the site reconnaissance and desk study exercise and are discussed in the following section.

Potential Contaminant Sources

On Site – Current

3.2.2 No current on site potentially significantly contaminative land uses have been identified. However, agricultural land use may have resulted in the use of herbicides, pesticides and fertiliser.

3.2.3 Made Ground may be present beneath the site, particularly in the vicinity of former properties or within potentially infilled former water features associated with Tam O'Shanter Cottage. Where present this could represent a potential source of contaminants of concern and / or ground gas. However, given the lack of development across the site, it is considered unlikely that a widespread significant thickness of Made Ground is present.

3.2.4 Made Ground is anticipated to be present beneath the roads along the proposed cable route.

On Site – Historical

3.2.5 Due to historical agricultural use, herbicides, pesticides and fertiliser may have been used on site. No other historical on site potentially contaminative land uses have been identified.

Off-site – Current

3.2.6 Current off-site potential sources of contaminants of concern include Hammar Service (formerly McMillan's engineering), to the north of the site. Stansted Airport and associated infrastructure is a potential source of contaminants of concern; however, the main infrastructure is located at least 500m from the main site.

Off-Site – Historical

3.2.7 Historical maps indicate that an engineering works, with fire training school beyond, was located approximately 120m to the northwest of the proposed cable route from approximately 1950 until

1992. Due to the time elapsed since the engineering works was operational, the later redevelopment of the area as part of Stansted Airport, the distance from the site and the likely low permeability of the underlying soils, it is unlikely that contamination that may have originated from the engineering works is significantly adversely impacting the site.

3.2.8 A former sewage works was located 125m to the west of the site from approximately 1951 to 2001. Due to the likely low permeability of the underlying soils and the presence of a stream between the site and the former sewage works, the potential for contamination potentially originating from the sewage works to have impacted the site is considered to be low.

3.2.9 A pond adjacent to Tam O'Shanter Cottage was shown on historical maps adjacent to the west of the site. The pond appears to have been infilled and the fill material may represent a localised potential source of contamination. However, the area is very limited and the fill is not anticipated to have significantly impacted the site.

Potential Pathways

3.2.10 Following construction, it is anticipated that the majority of the main site surface will be soft landscaping and pathways of dermal contact, ingestion and inhalation of soil or dust could be active. These pathways would be broken in any areas of building or hardstanding cover; however, these are likely to be limited. Hardstanding road cover is anticipated in areas of the proposed cable route.

3.2.11 Potential contaminants associated with the on-site current and historical land uses are not considered likely to be volatile in nature or to likely to generate significant quantities of ground gases. Furthermore, buildings are not currently proposed as part of the development. It is therefore considered that there is limited potential for any ground gas and volatile contaminants of concern in soil and/or groundwater (if present) beneath the site to impact future site users via the inhalation pathway in indoor areas. There is a limited potential for ground gases to be generated locally in the area of infilled water features adjacent to the former Tam O'Shanter Cottage, and these may require further consideration if indoor plant or maintenance facilities are proposed in this vicinity. However, significant impact is not anticipated.

3.2.12 The site is indicated to be underlain by the relatively impermeable Head Deposits and Lowestoft Formation, which will likely limit the lateral off-site migration of contaminants of concern via groundwater (where present). A significant thickness of granular Made Ground is not anticipated beneath the site. This migration could, however, be facilitated by any perched groundwater/ rainwater via agricultural drainage (where present).

Potential Receptors

3.2.13 Potential human health receptors include future site users and off-site human health receptors. However, due to the nature of the proposed installation/activities, the exposure duration for future site users is likely to be limited.

3.2.14 Providing construction workers adopt appropriate levels of hygiene and personal protective equipment, they are not considered to be at significant risk from potential contaminants of concern and have not been considered further as part of this assessment.

3.2.15 The site is underlain by Secondary Undifferentiated Aquifers relating to the Head Deposits and Lowestoft Formation beneath the site. These are not considered to be of high sensitivity with regard to contamination sourced from the site. Secondary A Aquifers relating to the Glaciofluvial Deposits and/ or the Kesgrave Catchment Group may underlie the Lowestoft Formation in the east and south of the site. However, given the significant thickness of the Lowestoft Formation in the area, pathways of vertical migration to more sensitive deeper aquifers are unlikely to be active.

3.2.16 The nearest surface water is an issue, which is located on site and flows into land drains or streams along the eastern and southern site boundaries.

3.3 Outline Conceptual Site Model

3.3.1 An outline CSM has been developed on the basis of the site reconnaissance and desk study. The CSM is used to identify potential sources, pathways and receptors (i.e. potential pollutant linkages) on site and is summarised in the table below:

Table 10 – Outline Conceptual Site Model

Potential Source	Contaminants of Concern	Via	Potential Pathways	Linkage Potentially Active?	Receptors	
On site – current: Agriculture	Herbicides, pesticides and fertiliser	Soil	Direct contact/ingestion	×	Future site users	
			Inhalation of volatiles	×		
Made Ground beneath road along cable route	Metals, hydrocarbons and asbestos		Airborne migration of soil or dust	✓	Off-site users	
			Leaching of mobile contaminants	✓	Secondary Undifferentiated Aquifer Surface watercourse	
On site – historical: Agriculture	Herbicides, pesticides and fertiliser		Groundwater	Direct contact/ingestion	×	Future site users
				Inhalation of volatiles	✓	Off-site users
		Inhalation of volatiles		×	Future site users	
		Inhalation of volatiles		×	Off-site users	
Off-site – current: Hammar Service	Metals, hydrocarbons, solvents and Polychlorinated biphenyls (PCBs)	Groundwater	Vertical and lateral migration in permeable strata and drainage	✓	Secondary Undifferentiated Aquifer Surface watercourse	
			Vertical and lateral migration in permeable strata and drainage	✓	Surface watercourse	
Off-site – historical: Potential infilled water feature (localised to one small area adjacent to the site, unlikely to have caused widespread impact)	Metals, hydrocarbons and asbestos		Direct contact/ingestion	×	Future site users	
			Inhalation of volatiles	×	Future site users	
Engineering works and fire training school	Metals, hydrocarbons, VOC, SVOC, PFAS		Groundwater	Inhalation of asbestos	×	Future site users
				Inhalation of asbestos	×	Future site users
Off-site – Infilled pond	Carbon dioxide and methane	Ground Gas	Inhalation of ground gas	×	Future site users	
			Explosive risks	×	Future site users	

3.3.2 There is the potential for pollutant linkages to be active beneath the site. These are associated with the migration of airborne soil and dust, and the leaching of mobile contaminants to local surface waters and groundwater (Secondary Undifferentiated Aquifer). No significant potentially contaminative current or historical land uses have been identified on the main site, with herbicides, pesticides and fertiliser associated with agricultural use the identified potential contaminants of concern. Much of the surrounding area is used for agriculture and, following construction, the

possible historical use of these substances on site is unlikely to cause significant detrimental impact to the identified receptors.

- 3.3.3 There is the potential for a degree of contamination to be present within the Made Ground beneath roads along the proposed cable route. However, the cable route is not considered to be a sensitive receptor to this potential contamination.

4 CONCLUSIONS AND RECOMMENDATIONS

- 4.1.1 No significant potentially contaminative current or historical land uses have been identified on the main site, with potential contaminants likely to be limited to herbicides, pesticides and fertiliser associated with agricultural land use. The outline CSM produced upon completion of the desk study assessment has identified a limited number of potential pollutant linkages that may be active upon the redevelopment of the site. These are associated with the migration of airborne soil and dust, and the leaching of mobile contaminants to local surface waters and groundwater (Secondary Undifferentiated Aquifer). However, much of the surrounding area is used for agriculture and, following construction, the possible historical use of these substances on site is unlikely to cause significant detrimental impact to the identified receptors.
- 4.1.2 There is the potential for a degree of contamination to be present within Made Ground beneath the roads along the proposed cable route; however, the cable route is not considered a sensitive receptor to this potential contamination. It is recommended that a watching brief is carried out should excavations be proposed beneath these roads, and should evidence of any contamination be encountered, works should cease until a risk assessment and appropriate remediation or mitigation strategy have been completed.
- 4.1.3 On the basis of the above, no further assessment of the site is considered necessary. If any visual or olfactory evidence of contamination is encountered during the groundworks or installation, works in the affected area should cease until further investigations are completed by a qualified consultant. Any necessary mitigation measures should then be put in place.



FIGURES

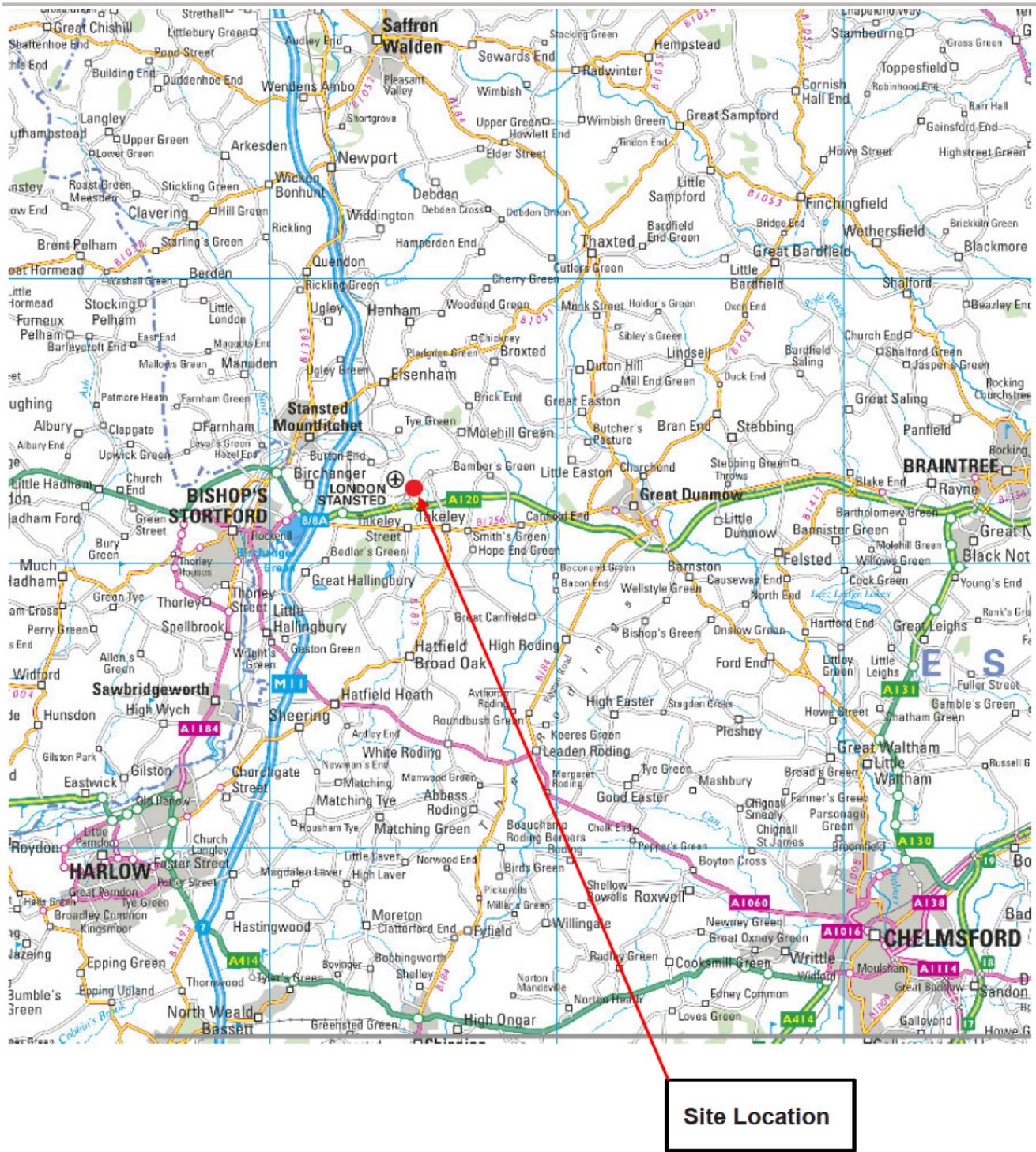


Figure 1: Site Location Plan

Client:	Manchester Airport Group & Stansted Airport Limited		
Project:	Land to the East of Stansted Airport		
Checked By:	NT		
Job Ref:	JER8224	Date:	13/12/2021



Figure 2: Site Boundary Plan

Client:	Manchester Airport Group & Stansted Airport Limited		
Project:	Land to the East of Stansted Airport		
Checked By:	NT		
Job Ref:	JER8224	Date:	13/12/2021

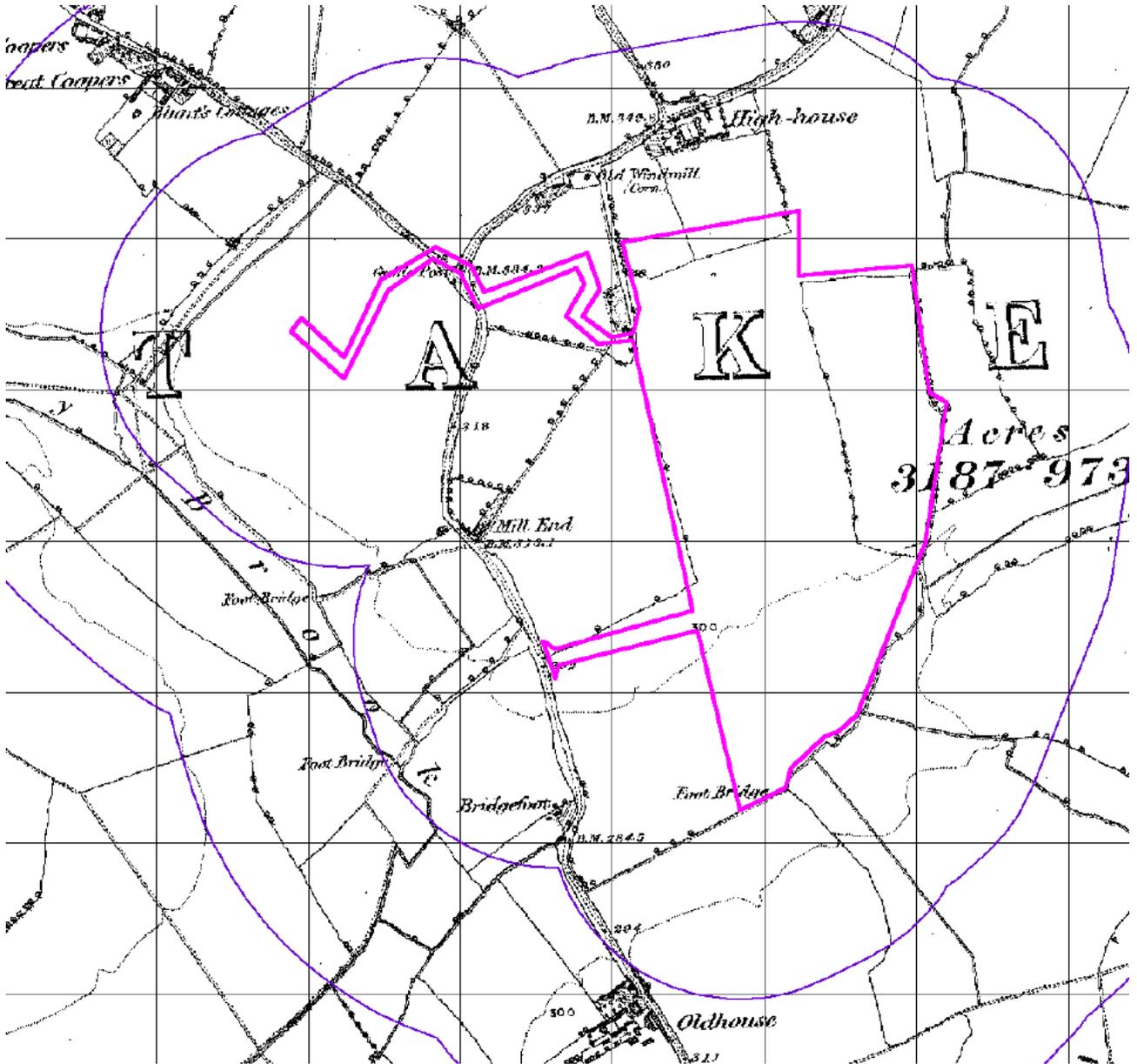


Figure 3: Historical Map Extract 1881

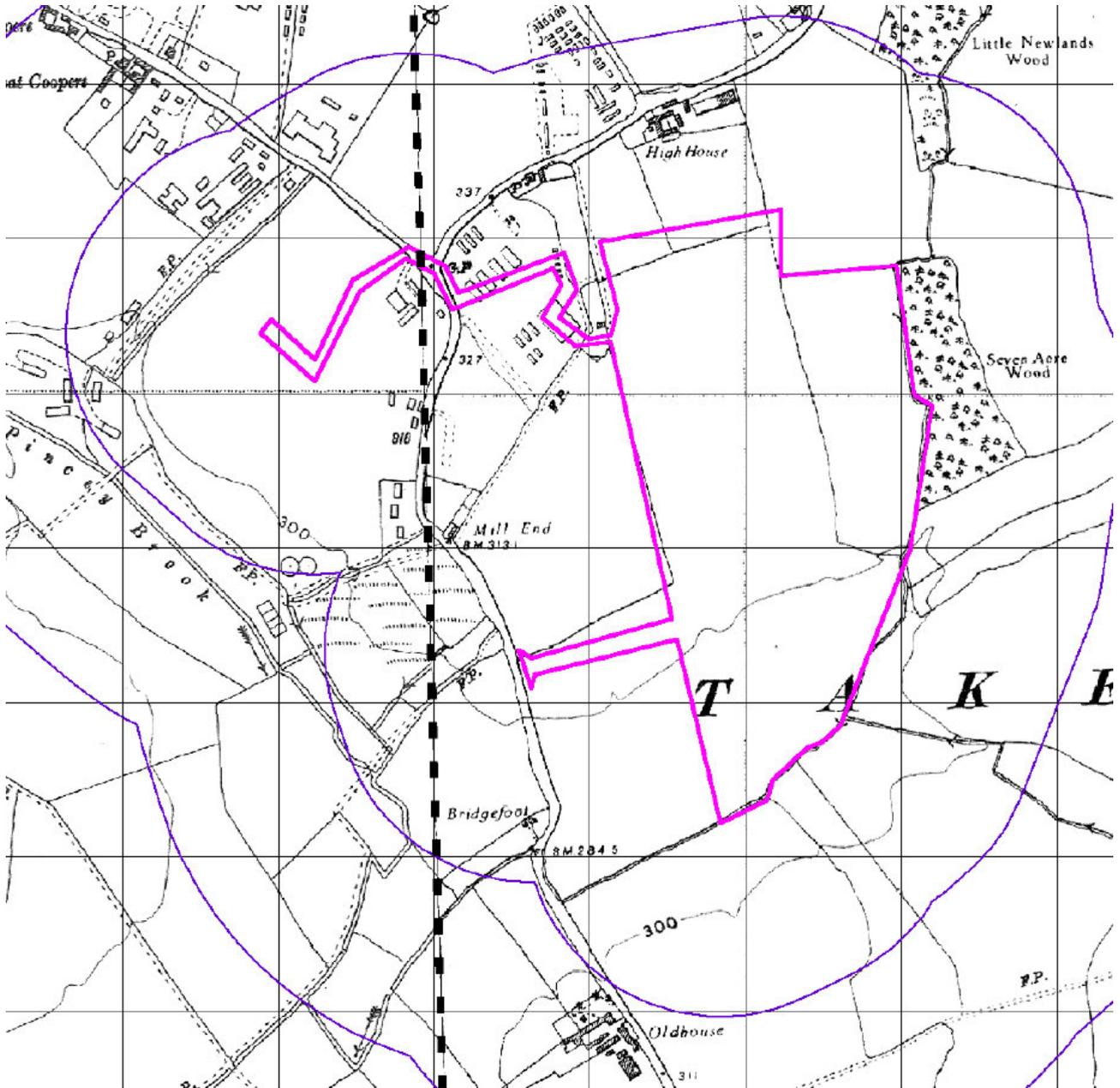


Figure 4: Historical Map Extract 1950-1951

Client:	Manchester Airport Group & Stansted Airport Limited	
Project:	Land to the East of Stansted Airport	
Checked By:	NT	
Job Ref:	JER8224	Date: 13/12/2021

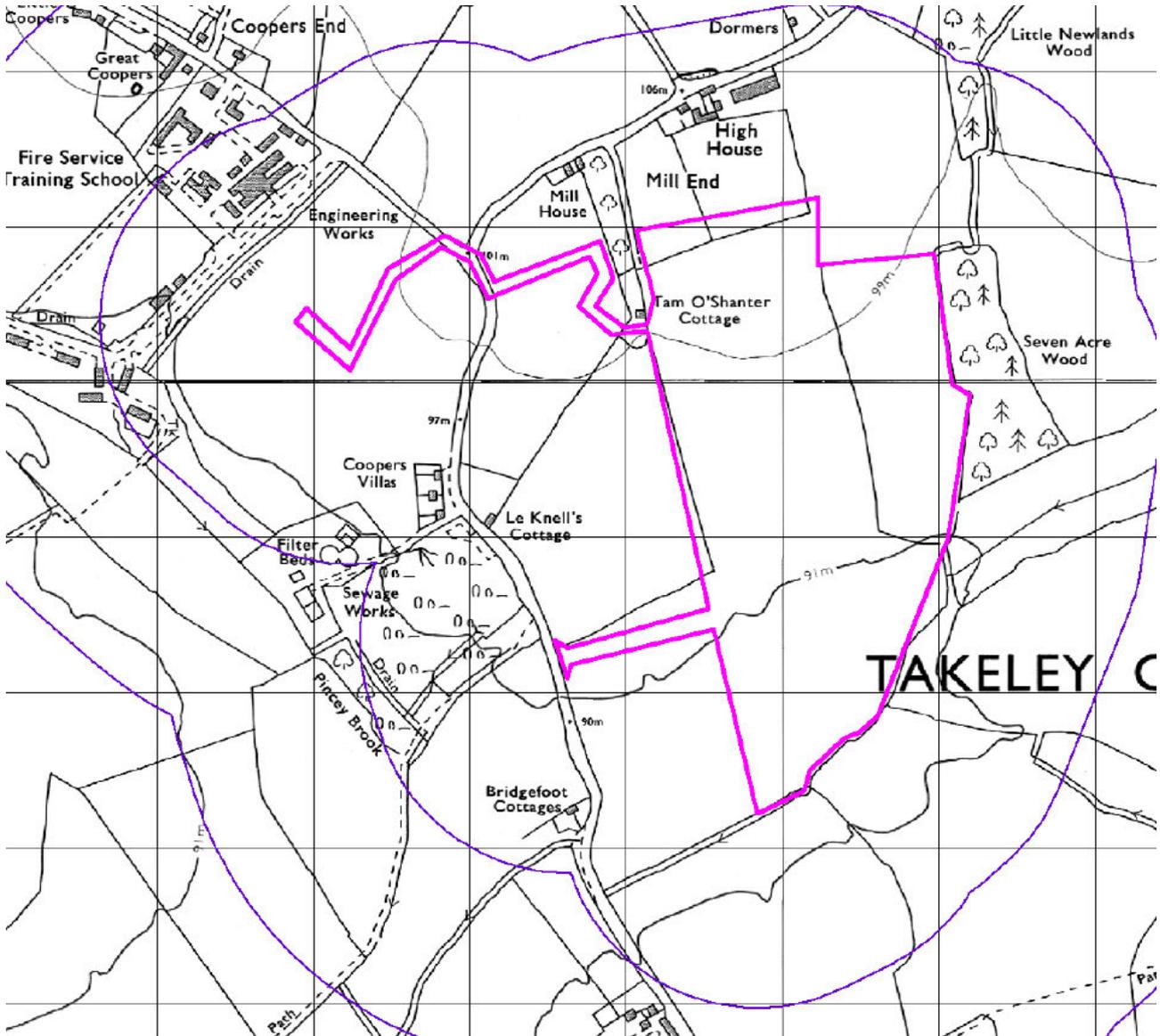


Figure 5: Historical Map Extract 1971

Client:	Manchester Airport Group & Stansted Airport Limited	
Project:	Land to the East of Stansted Airport	
Checked By:	NT	
Job Ref:	JER8224	Date: 13/12/2021

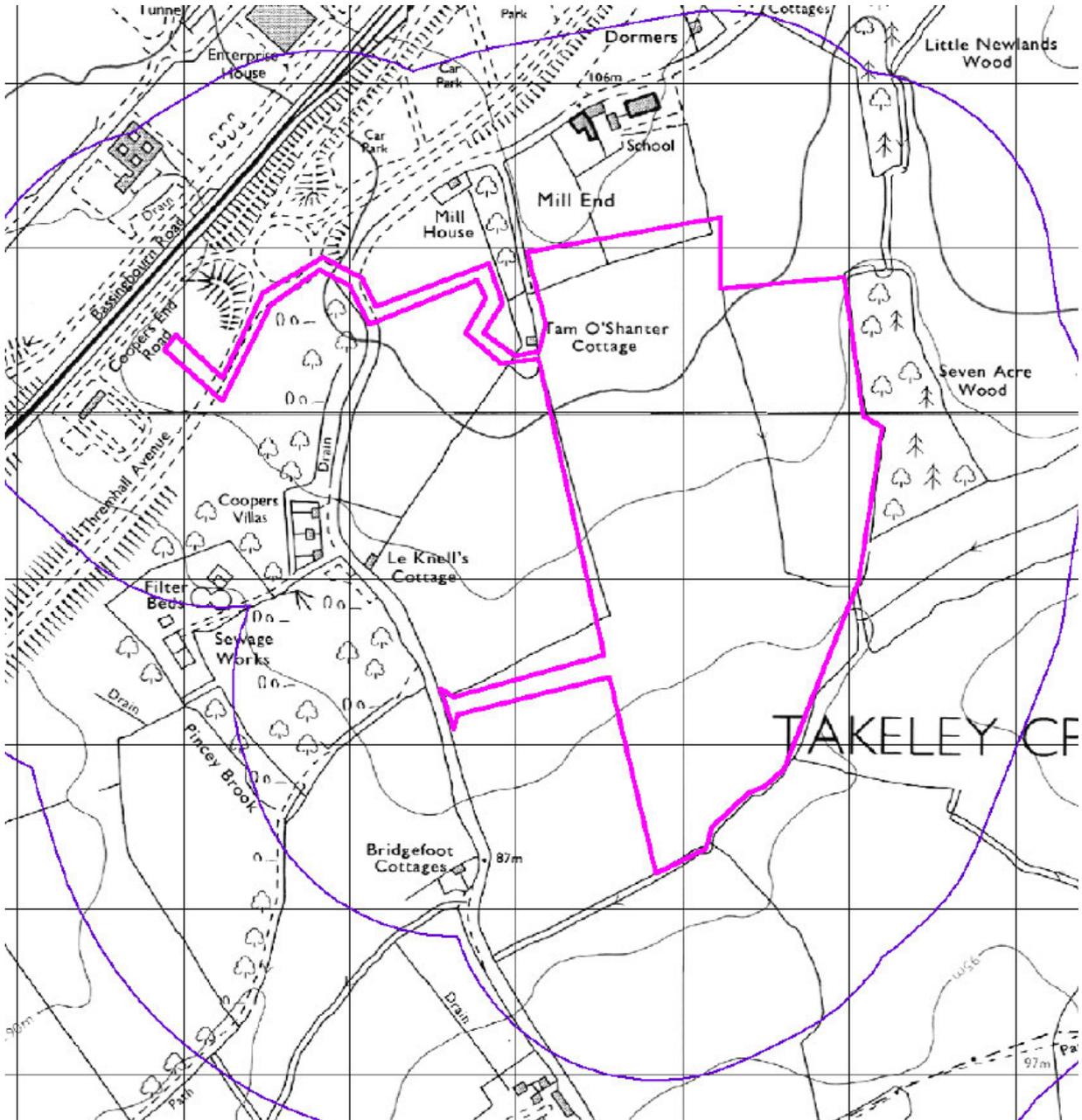
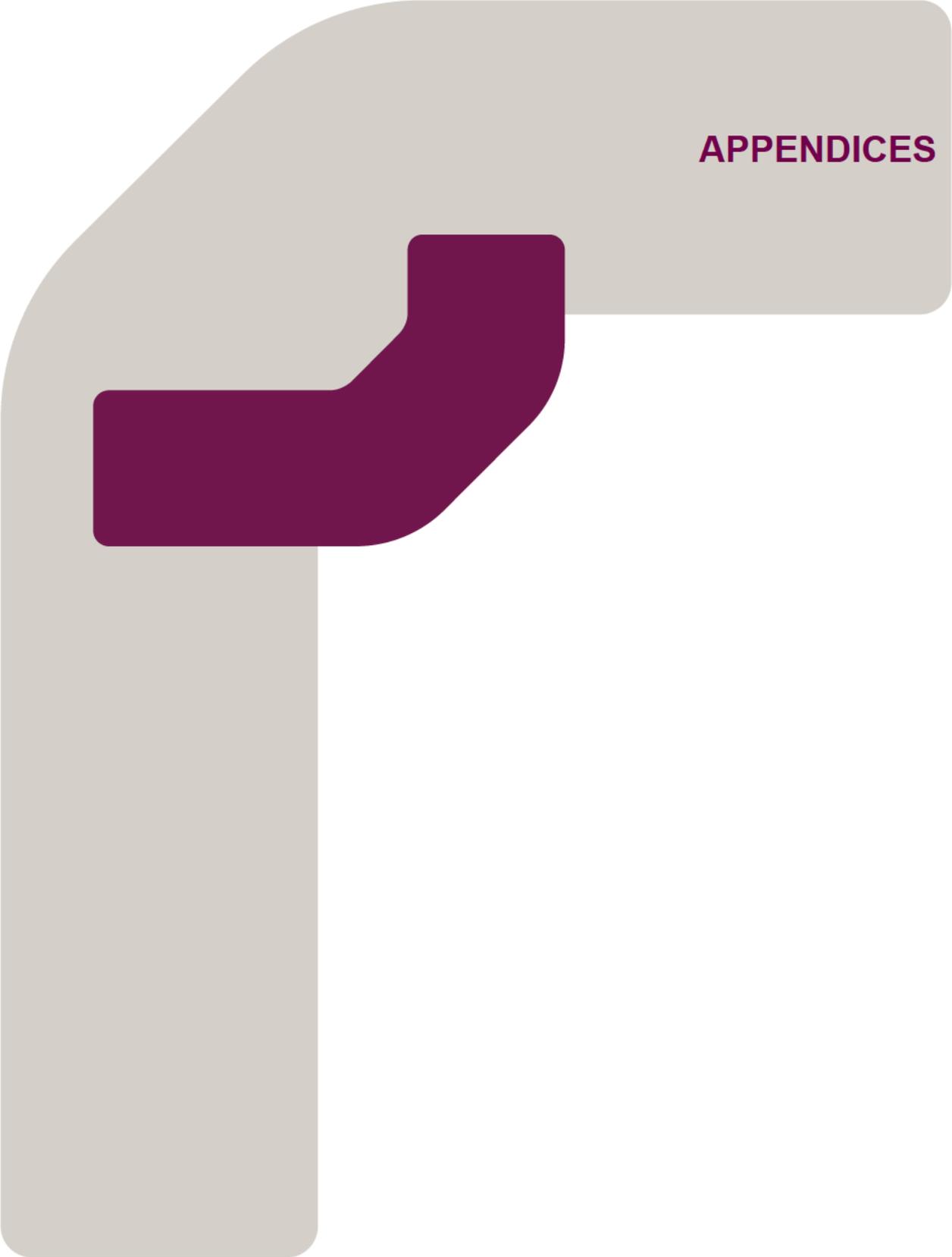


Figure 6: Historical Map Extract 1992-1993

Client:	Manchester Airport Group & Stansted Airport Limited	
Project:	Land to the East of Stansted Airport	
Checked By:	NT	
Job Ref:	JER8224	Date: 13/12/2021



APPENDICES

Appendix A
General Notes

RPS CONSULTING SERVICES LTD

GENERAL NOTES

PHASE 1 - ENVIRONMENTAL RISK ASSESSMENT / DESK STUDY ENVIRONMENTAL REVIEW

1. A "desk study" means that no site visits have been carried out as any part thereof, unless otherwise specified.
2. This report provides available factual data for the site obtained only from the sources described in the text and related to the site on the basis of the location information provided by the Client.
3. The desk study information is not necessarily exhaustive and further information relevant to the site may be available from other sources.
4. The accuracy of maps cannot be guaranteed and it should be recognised that different conditions on site may have existed between and subsequent to the various map surveys.
5. No sampling or analysis has been undertaken in relation to this desk study.
6. Any borehole data from British Geological Survey sources is included on the basis that: "The British Geological Survey accept no responsibility for omissions or misinterpretation of the data from their Data Bank as this may be old or obtained from non-BGS sources and may not represent current interpretation".
7. Where any data supplied by the Client or from other sources, including that from previous site investigations, have been used it has been assumed that the information is correct. No responsibility can be accepted by RPS for inaccuracies in the data supplied by any other party.
8. This report is prepared and written in the context of an agreed scope of work and should not be used in a different context. Furthermore, new information, improved practices and changes in legislation may necessitate a re-interpretation of the report in whole or in part after its original submission.
9. The copyright in the written materials shall remain the property of the RPS Company but with a royalty-free perpetual licence to the Client deemed to be granted on payment in full to the RPS Company by the Client of the outstanding amounts.
10. The report is provided for sole use by the Client and is confidential to them, their professional advisors, no responsibility whatsoever for the contents of the report will be accepted to any person other than the Client. [Unless otherwise agreed]
11. These terms apply in addition to the RPS "Standard Terms & Conditions" (or in addition to another written contract which may be in place instead thereof) unless specifically agreed in writing. (In the event of a conflict between these terms and the said Standard Terms & Conditions the said Standard Terms & Conditions shall prevail.) In the absence of such a written contract the Standard Terms & Conditions will apply.

Appendix B
Photographs

Photo 1: Stream or land drain on southern boundary of the site



Photo 2: Bird feeding station



Photo 3: Hammar Service, viewed from the south



Photo 6: Fertiliser container on agricultural land adjacent to the site



Appendix C

Part 2A (The Contaminated Land Regime)

CONTAMINATED LAND DEFINITION

Under Section 57 of the Environmental Act 1995, Part 2A was inserted into the Environmental Protection Act 1990 to include provisions for the management of contaminated land.

Subsequent regulations were first implemented in England in April 2000, Scotland in July 2000 and Wales in July 2001¹, providing a definition of ‘contaminated land’ and setting out the nature of liabilities that can be incurred by owners of contaminated land and groundwater.

According to the Act, contaminated land is defined as ‘any land which appears to the local authority in whose area the land is situated to be in such a condition, by reason of substances in, on or under the land that:

1. *significant harm* is being caused or there is a *significant possibility* of such harm being caused; or
2. *significant pollution* of controlled waters² is being caused or there is a significant possibility of such pollution being caused³

The guidance on determining whether a particular possibility is significant is based on the principles of risk assessment and in particular on considerations of the magnitude or consequences of the different types of significant harm caused. The term ‘possibility of significant harm being caused’ should be taken, as referring to a measure of the probability, or frequency, of the occurrence of circumstances that could lead to significant harm being caused.

The following situations are defined where harm is to be regarded as significant:

1. Chronic or acute toxic effect, serious injury or death to humans
2. Irreversible or other adverse harm to the ecological system
3. Substantial damage to, or failure of, buildings
4. Disease, other physical damage or death of livestock or crops
5. The pollution of controlled waters⁴.

With regard to radioactivity, contaminated land is defined as ‘any land which appears to be in such a condition, by reason of substances in, on or under the land that harm is being caused, or there is a *significant possibility of such harm being caused*⁵’.

The Risk Assessment Methodology

Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risks to receptors. The receptor may be humans, a water resource, a sensitive

¹ In England by The Contaminated Land (England) Regulations 2000, updated by The Contaminated Land (England) (Amendment) Regulations 2012; in Scotland by The Contaminated Land (Scotland) Regulations 2000, updated by the Contaminated Land (Scotland) Regulations 2005; and in Wales by The Contaminated Land (Wales) Regulations 2001, updated by the Contaminated Land (Wales) Regulations 2006.

² In Scotland the term “controlled water” has been updated to “water environment” under the Contaminated Land (Scotland) Regulations 2005 in line with the Water Environment and Water Services (Scotland) Act 2003.

³ The definition was amended in 2012 by implementation of the Water Act 2003.

⁴ Groundwater in this context does not include waters within underground strata but above the saturated zone.

⁵ The Radioactive Contaminated Land (Modification of Enactments) (England) Regulations 2006 and Contaminated Land (Wales) Regulations 2006.

local ecosystem or future construction materials. Receptors can be connected with the hazard via one or several exposure pathways (e.g. the pathway of direct contact). Risks are generally managed by isolating or removing the hazard, isolating the receptor, or by intercepting the exposure pathway. Without the three essential components of a source (hazard), pathway and receptor, there can be no risk. Thus, the mere presence of a hazard at a site does not mean that there will necessarily be attendant risks.

The Risk Assessment

By considering where a viable pathway exists which connects a source with a receptor, this assessment will identify where pollutant linkages may exist. A pollutant linkage is the term used by the DEFRA in their standard procedure on risk assessment. If there is no pollutant linkage, then there is no risk. Therefore, only where a viable pollutant linkage is established does this assessment go on to consider the level of risk. Risk should be based on a consideration of both:

- The likelihood of an event (probability) - takes into account both the presence of the hazard and receptor and the integrity of the pathway.
- The severity of the potential consequence - takes into account both the potential severity of the hazard and the sensitivity of the receptor.

For further information please see the Contaminated Land section on the DEFRA website (www.defra.gov.uk).

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