

February 2023

London Luton Airport Expansion

Planning Inspectorate Scheme Ref: TR020001

Volume 5 Environmental Statement and Related Documents
**5.02 Appendix 17.1 Preliminary Risk Assessment of Land
Contamination - Part H**

Application Document Ref: TR020001/APP/5.02

APFP Regulation: 5(2)(a)

The Planning Act 2008





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





**London Luton Airport Expansion Development Consent
Order 202x**





**5.02 ENVIRONMENTAL STATEMENT APPENDIX 17.1
PRELIMINARY RISK ASSESSMENT OF LAND CONTAMINATION -
PART H**

Regulation number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference:	TR020001
Document Reference:	TR020001/APP/5.02
Author:	Luton Rising

Version	Date	Status of Version
Issue 01	February 2023	Application issue

Photograph number		Description
59		Rear of workshop, looking west.
60		Waste Storage area at southern boundary, looking southeast.
61		Contaminated plastic storage
62		Waste Oil transfer pump at southern boundary

Photograph number		Description
63		Barrels waste oil filters, fuel tanks, car batteries, hub caps, petroleum distillate barrels.
64		View of southwestern area, looking west.
65		View looking northwest from southern boundary.
66		Waste skip at southern site boundary, looking east.

Photograph number		Description
67		Southern façade of building showing plant compound and valet area, looking east.
68		Footpath at eastern site boundary looking south.
69		Landscaping to New Airport Way, looking south.
70		Landscaping to banking on New Airport Way, looking southeast.

SITE WALKOVER PROFORMA

Client Luton Rising

PROJECT: London Luton Airport Expansion Development Consent Order Project No:261327-05

SITE DETAILS:

Site:	Area E
Date & Time of Visit:	19.06.19 9.00am
Visit conducted by:	
People met/interviewed:	N/A
Address:	Land East of Winch Hill Lane Eaton Green Road Luton
Postcode:	LU2 9JB

PURPOSE OF SITE VISIT:

The site inspection comprised of a “walkover” to determine the current usage of the site and to visually identify possible sources of pollution, which may have resulted in the release of contamination into the environment. General observations of physical characteristics of the site were made. The survey does not include a structural survey of retaining structures or buildings (where present).

DEVELOPMENT REQUIREMENTS:

<u>Proposed use:</u>	The areas surveyed will form part of the DCO application for the expansion of Luton airport, Area E to be redeveloped with car parking.
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SITE HISTORY:

<u>Previous land use</u> (check if awaiting historical map information).	Area E –earthwork mounds during 1940s in the south eastern area these became formalised platforms by 1960 Building in north western area between 1940 to 1960, use unknown.
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GENERAL SITE DESCRIPTION:

<p><u>General Site Description</u></p> <p>Areas of buildings, roads and other features.</p> <p>Topography Boundaries General topography General state of repair</p>	<p>The site comprises flat areas of concrete/asphalt hardstanding, ranged across 4 levels. The northern area of the site is set at a lower level and is at gradient with the access spur from Parkway Road. From the centre the site steps up on 3 levels to the southeast toward the A1081 New Airport Way. 2No. platforms have been created at each level either side of a central access road with a final platform at the end of the access road. The platforms are retained by brick walls/embanked earth. The final platform in the south eastern corner is surfaced with hardcore/crushed demolition material.</p> <p>The site is bounded by the link road from Parkway Road to New Airport Way at the southwestern and southern boundaries and by the Midlands Mainline Railway at the north eastern boundary, both of which sit on embankments. The north western boundary is formed by an access road which passes beneath the railway to the northeast, to link Parkway Road with the developments north of the railway. The access road is gated and is currently not in use.</p> <p>The embankments to the road and rail infrastructure are heavily vegetated with shrubs and mature trees, and reduce in height toward the southeast as the site rises toward the railway and road levels.</p> <p>No invasive weeds, e.g. Japanese Knotweed were identified in vegetated areas.</p> <p>The hardstanding is generally in average/poor condition with cracking, degraded areas, potholes and patches of reinstatement.</p> <p>Small amounts of localised fly tipping were noted in the embankment to the railway including car seats, possible paint tins, wooden cable reel and made ground/earth, litter. Platform No.4 at the southwestern boundary had evidence of metal girders which had been cut to ground level indicating there may previously have been two small buildings or decked storage. A sign on a brick retaining structure 'VFM', which indicates site was used by Vauxhall Fleet Management.</p>
<p><u>Areas of site not visited or inaccessible</u></p>	<p>Access to the vegetated embankments, portacabin, brick electrical enclosure.</p>

BUILT ENVIRONMENT – GENERAL:

<p><u>Existing Land Use</u> (photographs required)</p>	<p>The site is currently used by the Contractor working on the MPTE, for overflow car parking and storage of construction materials. The Contractors site cabins are located in the north western corner of the site. Building materials are being stored in the south eastern area of the lower level and on the platforms. Cars were also parked on two of the platforms and across the lower area. The contractor was connected to the mains electric supply located at the south eastern boundary, a diesel generator was also present on site but no fuel tanks observed.</p> <p>An IBC containing 200l of antifreeze was located on platform 6, at the north eastern boundary.</p>
<p><u>Site Access</u> location; access suitable for GI plant or demolition plant?</p>	<p>A gated access is located at the north western corner of the site, access is controlled by the Contractor.</p>
<p><u>Existing Services</u> Type and general location. Could services be affected by a GI?</p>	<p>Drainage identified through the central access road, with surface drainage channels in the concrete on the lower level.</p> <p>Assumed to be a live electric supply being used by the Contractor, electrical cabinet was located at the south eastern boundary on the lower level.</p>
<p><u>Hardstanding</u> Location, type and repair</p>	<p>The site is almost entirely comprised of hardstanding concrete and asphalt, all of which is in average to poor condition, with cracking, areas of degraded surfacing and patching. At the south eastern corner the site is unmade/hardcore/6F2.</p>
<p><u>Site boundary</u> fences, walls, open, state of repair. Is boundary shown adequately on site plan?</p>	<p>The site is bounded by metal paling fence and concrete post and chain-link fencing. All appear to be in good condition. Landscaped/vegetated embankments to the rear of the fencing to all boundaries except for the north western boundary.</p>

EXISTING BUILDINGS AND PROCESSES

<p>Were there any buildings or structures on the site at the time of the walkover?</p>	<p>YES</p>
<p>Number, type, size, height, material, repair etc. of building(s).</p>	<p>A small building, former vehicle inspection shed was located at the northern end of the site at the southeast site boundary. Building was in good state of repair with concrete floor and sheet metal walls and roof, metal roller doors were located to either end of the building. Office furniture was being stored plus 1No. IBC likely containing small amount of water and a 25l container of rubber and plastic dressing, with a small volume of residual product noted.</p> <p>Either side of the site entrance was a derelict portacabin (west) and male and female toilet block (east).</p>

	A small brick electrical cabinet was noted at the south eastern boundary between the car wash and the portacabin.		
On going processes	NO		
Past Processes	NO		
<ul style="list-style-type: none"> - What were they - Raw materials used - Products - Waste residues - methods of waste disposal 			
Boilers	NO	Number	Location
Electrics (including sub stations and transformers)	Possibly Small brick building, likely electric cabinet	Number 1	Location On the lower level at southeast boundary to rear of vehicle inspection shed.
Stores	YES Informal storage of construction materials on platforms and on the lower level	Number 6	Location Across the site
Fuel dispensing (petrol, DERV)	NO	Number	Location
Suspected asbestos, Sheeting insulation	Possibly Possible fragment of board in hardcore. Possible asbestos in old portacabin/toilet block	Number unknown	Location At southern end of the site and site entrance
Ventilation/air conditioning	NO	Number	Location
Fire extinguishers	Possibly Used by Contractor	Number	Location
Hazchem signs Specify	No	Number	Location

CONTAMINATION ISSUES:

Were any of the following noted?

Stressed vegetation	NO
Stained ground / discolouration	NO
Abandoned drains	POSSIBLY- former office building on lower level.
Odours (indicators of soakaways, sumps, discharges into canals or streams). (Do NOT enter manholes. Do NOT inhale gas from standpipes).	NO
Obvious immediate hazards to: public health or safety (including to trespassers); the environment.	Falling from platforms
Presence, location and condition of surface deposits and made ground and signs of settlement, subsidence or disturbed ground.	Yes – small stockpiles of made ground to site boundaries, possible made ground used in embankments to retaining structures Retaining wall to platform 1 has significant crack on northeast corner.
Any evidence of gas production or underground combustion.	NO
Location of sewers etc.	POSSIBLE connection to toilets
Position of outfalls to surface water and the nature/condition of any discharges.	NO
Boreholes etc. remaining from previous investigations located and their condition.	NO
Fuel tanks, above and below ground Were any leaks, or any evidence of leaks, detected? location, volume, comments, state of repair.	NO
Were suitable portable instruments used to determine the presence, and possible concentrations of hazardous gases used?	NO
Was any limited sampling of surface deposits, surface waters etc. carried out?	NO

GEOTECHNICAL, HYDROLOGICAL AND HYDROGEOLOGICAL ISSUES:

<u>Surface features</u> eg Topography (any comments in addition to General Description at start of proforma)	No additional comments
<u>Surface Water</u> Location and depth of any standing water, and the direction and rate of flow of water in any rivers, streams or canals. Any evidence of flooding?	River Lea is 300m south of the site, no surface waters or ponding evident. No evidence of flooding

<u>Groundwater</u> any evidence of depth to water table? Location of any springs or seepages.	NO
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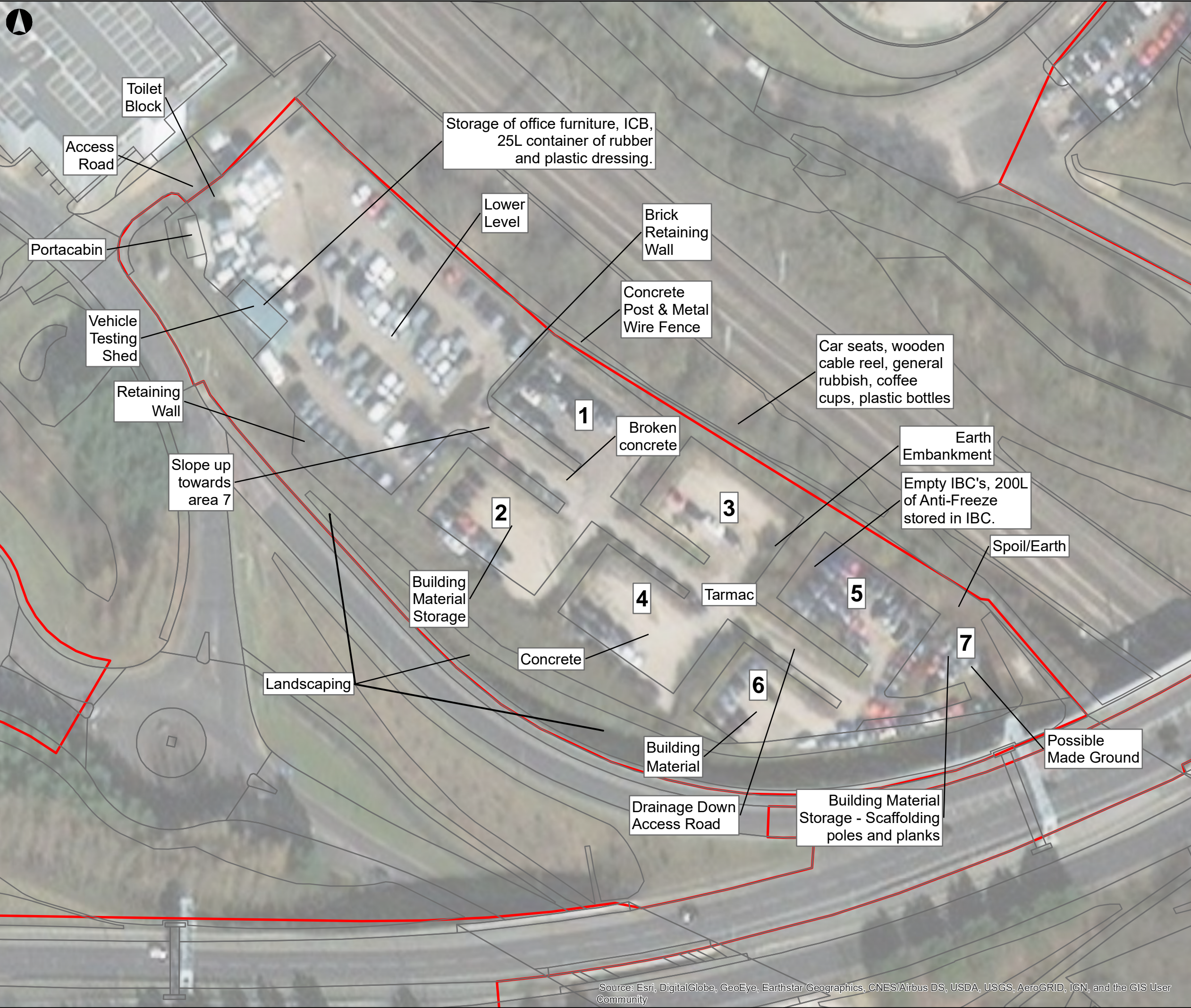
<u>Mining activity and subsidence history.</u> (site observations and desk study).	NO
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NEIGHBOURING SITES:

Information about neighbouring sites	Access	Present site use	Condition of surface cover
• Northwest of the site	Yes via road	Multi-storey car park/retail park	Hard standing
• Northeast of the site	Railway line – no access. No access beneath railway to sites to the north. Access via surrounding roads	Printing works/trailer park/car sales /active development sites	Hard standing, some landscaping
• East of the site	No access	Airport land and agricultural land	Mainly grass/arable crops
• South of the site	Access is possible via road	Landscaping to bank of River Lea	Dense Trees
• West of the site	Easy access is possible via road	Public leisure premises	Grass and hard standing

Have there been any potentially contaminative uses of adjacent sites? Details:	YES- Vauxhall Motor Works to the north of the site.
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Site layout sketch with location of photograph and direction indicated



Legend

- DCO Boundary
- XX

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P1	19-07-19	ES	RB	TB
Issue	Date	By	Chkd	Appd

Metres

0 10 20 40

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Client
Luton Rising

Job Title
Luton Airport Preliminary Risk Assessment

Drawing Title
Area E




Scale at A3
1:750





Drawing Status
FOR ISSUE





Job No 245580-00	Drawing No Figure 01	Issue P1
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community




ofFileLocation
© Arup





Photograph number		Description
1		Vehicle Inspection Shed, looking south
2		Brick utilities and temporary electric distribution box, at southwestern boundary.
3		Landscaped embankment to southwestern boundary looking south

4		Toilet Block at northern boundary, looking north.
5		View across northern area of site, looking north.
6		View of retaining wall to platform 1 and damage at northeast corner Looking southeast.
7		Sign on retaining wall, indicating possible previous use by Vauxhall Motors.

<p>8</p>		<p>Parking on platform 1 showing northeastern boundary, looking north.</p>
<p>9</p>		<p>View from platform 3 looking north over platform 1.</p>
<p>10</p>		<p>Level 1 platform retaining wall to west, and central access road looking south.</p>
<p>11</p>		<p>Storage of building materials, platform 2 looking southwest.</p>

12	 A photograph showing an outdoor construction or storage area. In the foreground, there are stacks of materials on pallets, including what appears to be concrete blocks or bricks. A person in a high-visibility vest is visible in the background near a dark car. The ground is dirt and gravel. In the distance, there are trees and a cloudy sky.	Platform No. 2, looking North.
13	 A photograph showing a pile of flytipped waste. The waste includes black plastic bags, sticks, and other debris. A large, dark, curved object, possibly a piece of machinery or a large container, is partially visible in the center of the pile. The area is overgrown with some green plants.	Flytipping at northeastern boundary at side of platform 3.
14	 A photograph showing a mound of soil and vegetation. The ground is covered with dense green undergrowth, including various leafy plants and small trees. The mound appears to be a spoil mound, possibly from a construction site, and is located in an undergrowth area.	Spoil mound in undergrowth at southeast corner of platform 3.
15	 A photograph showing a paint tin buried in the earth. The tin is partially covered by soil and is surrounded by green vegetation, including leaves and stems. The tin appears to be a discarded container, possibly for paint or another liquid, and is located in an undergrowth area.	Paint tin buried in earth, platform 3

16		Platform 5, looking north
17		View looking north down central access road.
18		View from platform 6, looking north over platform 4.

<p>19</p>		<p>Cut down steel girders, platform 4.</p>
<p>20</p>		<p>View looking north over platform 5 from platform 7.</p>
<p>21</p>		<p>IBC with antifreeze, platform 5.</p>
<p>22</p>		<p>Platform 7, looking southeast.</p>

23



Small stockpile of old asphalt/road chippings at edge of Platform 7, looking east.

24



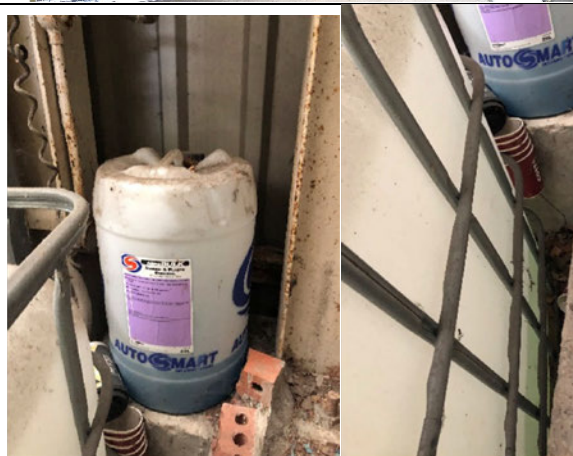



Fragment of fibrous material, possible asbestos.

25



Diesel generator, lower level at southwestern boundary, looking south

26	 <p>A photograph showing a storage area for construction materials. In the foreground, there are long, rectangular concrete slabs supported by a red metal frame. Behind them, there are stacks of rebar and other materials. In the background, there are stacks of red and white plastic containers and a blue container. The area is outdoors, with trees and a fence visible in the distance.</p>	Storage of construction materials in southwestern corner of lower level, looking south.
27	 <p>A photograph showing the interior of a vehicle inspection shed. The shed is long and narrow, with a concrete floor. On the right side, there are wooden cabinets and a desk. A white printer is on the desk. On the left side, there are stacks of papers and a small table. The shed has a high ceiling and a large door at the far end.</p>	Storage of furniture in vehicle inspection shed.
28	 <p>A close-up photograph of a white plastic container (IBC) with a purple label. The container is sitting on a concrete base. The label has the word 'AUTO SMART' on it. The container is in a storage area, with other items visible in the background.</p>	25l plastic container of rubber and plastics dressing and IBC with possible water content inside vehicle inspection shed.
29	 <p>A photograph showing a row of white portacabins at a site. The portacabins are arranged in a line, and there is a concrete path leading between them. A metal fence is in the foreground, and there are trees and a fence in the background.</p>	Portacabins at northeastern corner of site.

Appendix D – Historical Map Review

D1 Review of Historical Maps

Table D1.1: Review of historical mapping covering Main Application Site; Areas A, B,C, Existing Airport Land (including LLAOL Contractor’s Compound) and Airport Access Road.

Development Area							
Year	Mapping type and scale	Area A	Area B	Area C	Existing Airport Land (including LLOAL Contractor’s Compound)	Airport Access Road	Surrounding the site (within 250m)
1879	County series 1:10,560	<p>Predominantly agricultural land.</p> <p>Falconer’s Hall was shown at southwest corner of site</p> <p>An old gravel pit was present at the north western corner of the site.</p>	<p>Footpath/track was shown running along the boundary between areas A and B linking surrounding farmland to the track at the northern boundary (currently Eaton Green Road)</p> <p>A ‘well ‘was noted at the northern site boundary.</p> <p>Winchhill Wood encroached onto the south eastern corner of the site.</p>	<p>No coverage of the site.</p>	<p>Predominantly agricultural land. Falconer’s Hall is present towards the central area adjacent to Area A.</p> <p>Eaton Green Farm is present towards the northwest area.</p> <p>A clay pit and brick and tile works are located outside the boundary approximately 80m west of the farm.</p> <p>Spittlesea Wood is present on the western boundary.</p>	<p>The south western extent of the Airport Access Road crosses through the agricultural land and through Spittlesea Wood. As the route curves towards the northeast it crosses into the “Existing Airport Land” area adjacent and south to the clay pit and brick and tile works but north of Eaton Green Farm. The route continues east through Areas A and B south of Wigmore hall.</p>	<p>Wigmore Hall was present on the northern boundary of Area B with stables/outbuildings to the north of it and pond adjacent to the east.</p> <p>Surrounding land was agricultural with occasional pockets of woodland and orchards.</p> <p>No around Area C.</p>

Development Area							
Year	Mapping type and scale	Area A	Area B	Area C	Existing Airport Land (including LLOAL Contractor's Compound)	Airport Access Road	Surrounding the site (within 250m)
					An old chalk pit is present on the south western boundary. The Great Northern Railway is approximately 100m south west of the site. Winchill Wood is present on the south eastern extent.		
1884	County series 1:10,560	No coverage of the site	Winchill Farm was present at the eastern site boundary, off Winch Hill Lane. A small woodland was noted in the centre of the site, northeast of Winchill Farm.	The site was agricultural land with a small area of woodland at the north eastern corner identified as Stockinghill Spring.	No coverage of the site.	No coverage of the site.	Darleyhall a small hamlet with public house was located at the northern boundary to Area C.
1887-1899	County Series 1:10,560	No significant change	No significant change.	Winchill Farm outbuildings/barns located at western site boundary	No significant change.	No significant change.	Old clay pits were recorded east of Area C.

Development Area							
Year	Mapping type and scale	Area A	Area B	Area C	Existing Airport Land (including LLOAL Contractor's Compound)	Airport Access Road	Surrounding the site (within 250m)
				opposite Winchhill Farm.			
1899-1900	County series 1:10,560	A 'well' was shown at Falconer's Hall	No significant change.	Footpaths cross the northern area of the site. Woodland at north eastern boundary no longer noted.	No significant change to the majority of the site. Spittlesea Hospital of Infectious Diseases is present adjacent and west of the boundary. The clay pit and brick and tile works is no longer shown on the west of Eaton Green Farm.	No significant change.	A sewage farm is present to the west of the existing airport boundary.
1922-1925	County series 1:10,560	Old Gravel Pit was no longer noted although the pit extent was still recorded. Falconer's hall was no longer shown.	Wigmore Hall cottages were shown at the northern boundary adjacent to the well.	No significant change.	No significant change.	The south western extent of the site crosses allotments and the eastern boundary of Luton Corporation Sewage Farm which has expanded slightly.	Sewage works had expanded with a large number of sedimentation tanks filter beds and sewage tanks noted. A pit was shown 100 m northwest of the site.

Development Area							
Year	Mapping type and scale	Area A	Area B	Area C	Existing Airport Land (including LLOAL Contractor's Compound)	Airport Access Road	Surrounding the site (within 250m)
		Small pond shown in the southwest corner of the site.					
1947-	County series 1:10,560	No significant change.	No significant change.	No significant change.	No significant change.	No significant change.	New housing developments from northwest of Area A. Spittlesea Hospital had expanded.
1960	County series 1:10,560	The central part of the site and along the western boundary was shown as rough pasture. An area of approximately 100 m x 150 m in the south of the site was shown as refuse heap. A track was shown along the western boundary. A small building was marked in	Wigmore Hall cottages were no longer shown, although the well was still noted. The track at the western boundary had been formalised.	No significant change.	The area is shown to have been developed into an Airport – see additional detail of the 1:2,500 National Grid Map below.	See detail of 1:2,500 National Grid Map below.	No significant changes.

Development Area							
Year	Mapping type and scale	Area A	Area B	Area C	Existing Airport Land (including LLOAL Contractor's Compound)	Airport Access Road	Surrounding the site (within 250m)
		the north of the site.					
1961-1962	National Grid 1:2,500	No coverage.	No coverage.	No coverage.	Luton Airport is shown across the entirety of the western area. Eaton Green Farm is no longer shown. The development includes buildings labelled as "works" with smaller buildings placed within banded areas. Mapping for the eastern extent of the site still shows agricultural land.	Spittlesea Hospital has expanded to the south west and is directly along the proposed alignment. The sewage works have been redeveloped with numerous settling ponds and buildings denoted as works. The proposed route traverses an escarpment along Eaton Green Road and directly across Percival Works. There is no coverage of the eastern extents of the proposed route across Areas A and B.	
1967	National Grid 1:2,500	No coverage.	No coverage.	No coverage.	Limited coverage. No significant changes where mapping available.	Limited coverage. No significant changes where mapping available.	Limited coverage. A number of tanks are shown to be present at the works southwest of the site.
1971	National Grid 1:2,500	Refuse tip noted in the southern area.	A new rectangular wooded area was noted in the	No significant change.	Luton Airport and the existing runway is shown across the	Limited coverage across the western extent of the route.	Wigmore Hall, was identified as Wigmore Hall Farm and buildings to the

Development Area							
Year	Mapping type and scale	Area A	Area B	Area C	Existing Airport Land (including LLOAL Contractor's Compound)	Airport Access Road	Surrounding the site (within 250m)
			<p>central area of the site aligned north to south.</p> <p>Winch Hill Cottage noted at the western site boundary.</p> <p>New buildings had been added to Winchhill Farm.</p> <p>New Winchhill Cottages developed south of Winchhill Farm.</p>		<p>entirety of the site. The runway lies towards the southern extent in a south west to north east configuration. The main airport buildings are present towards the western extent.</p> <p>Coverage is limited towards the north west area however a series of industrial units or possible hangars are present. A building with large tanks is present towards the middle western area. It is possible that this building is a fuelling area.</p>	<p>The proposed alignment traverses the settling ponds and possible fuelling depot identified within the Existing Airport Land. Coverage is limited within the north western extent however the surrounding coverage (and later maps) indicate the alignment to traverse through an area of built up industrial units. The alignment traverses through Percival Works which are recorded as Engineering Works, across Luton Airport and Refuse Tip through Area A.</p>	<p>north had been expanded; several circular tanks were identified.</p> <p>A drain was shown at the southern boundary of Area B and a small building.</p>
1975	National Grid 1:10,060	The majority of the site was recorded as	Landfilling identified to encroach into	Winch Hill House and a plantation	No significant change. See detail of 1:2,500	No significant change. See detail of 1:2,500	Area of landfilling shown to extend outside the western

Development Area							
Year	Mapping type and scale	Area A	Area B	Area C	Existing Airport Land (including LLOAL Contractor's Compound)	Airport Access Road	Surrounding the site (within 250m)
		<p>refuse heap with two tracks running from the north to the centre of the site.</p> <p>Additional small buildings had been added in the northwest of the site.</p>	<p>the central area of the site.</p> <p>The well at the northern boundary was no longer noted.</p> <p>Small woodland in the central area of the site was no longer noted.</p>	<p>located in the southern area of the site.</p> <p>Winch Hill identified in the central southern area of the site, high point of 140m AOD.</p>	National Grid Map above.	National Grid Map above.	<p>site boundary of Area A. North of which is an area of car park.</p> <p>Winchhill Wood had been removed, apart from a small pocket remaining in Area B, for creation of the eastern end of the runway.</p> <p>A sports ground with pavilion, tennis courts and bowling green were shown 50 m northwest of the site.</p> <p>A drain was shown just off the southern boundary to Area B.</p> <p>An engineering works building was identified at the northern boundary with Area B at Wandon End.</p> <p>Breachwood Green had expanded, east of Area C.</p> <p>Residential properties had been</p>

Development Area							
Year	Mapping type and scale	Area A	Area B	Area C	Existing Airport Land (including LLOAL Contractor's Compound)	Airport Access Road	Surrounding the site (within 250m)
							built on the area of old clay pits.
1981	National Grid 1:1,250	No coverage.	No coverage.	No coverage.	Limited coverage of the mid, eastern and south western extents. Towards the north west there is little change. Where previous mapping had limited coverage Percival Way is shown with numerous non-descript buildings on either side.	Limited coverage of the eastern extents. There is limited change shown in the south west. The number of settling ponds have been reduced and the works adjacent to the site have expanded. Towards the north west where previous mapping had limited coverage Percival Way is shown with numerous non-descript buildings on either side.	A Rifle Range was shown adjacent to the bowling green to the northeast of Area A.
1985	National Grid 1:10,000	The site was identified as 'Workings'. The configuration of the tracks within the site has changed. Two buildings were present; one in the north	Landfilling was no longer recorded.	No significant change	A fire station and car park are shown towards the mid-western extent.	No significant change.	Landfilling no longer identified outside the western boundary Small rectangular area with embankments to southern and western boundaries at the centre of the western boundary.

Development Area							
Year	Mapping type and scale	Area A	Area B	Area C	Existing Airport Land (including LLOAL Contractor's Compound)	Airport Access Road	Surrounding the site (within 250m)
		<p>and one in the centre of the site.</p> <p>An area of raised ground was shown around the building in the centre of the site.</p> <p>In the northwest of the site an area was shown as bracken.</p>					<p>Car park at the western boundary had expanded to the west and the industrial area and engineering buildings cleared.</p> <p>Half of the sports ground to the northwest had been replaced by residential housing, the remainder identified as a recreation ground.</p> <p>A commercial centre was being developed 250m north of Area A.</p>
1989-1993	National Grid 1:1,250	The northern part of the site is identified as 'Playing field'	Wigmore Valley Park playgrounds, allotment gardens and community centre developed in Core Area, remainder	No significant change.	No significant change. No coverage for the western extent of the site.	No coverage for the site.	A hotel 'Wigmore Hall Hotel' had been developed at the northern site boundary on an area formerly occupied by Wigmore Hall.

Development Area							
Year	Mapping type and scale	Area A	Area B	Area C	Existing Airport Land (including LLOAL Contractor's Compound)	Airport Access Road	Surrounding the site (within 250m)
			identified as playing fields. Access into the site provided from Eaton Green Road.				
1990	National Grid 1:2,500	The northern part of the site was identified as 'Playing field' and the southern part as 'Landfill Site', a track separated the two areas. A rectangular building within the western site boundary appeared to be linked to the public tip, off-site to the west.		No significant change.	No significant change.	No coverage for the site.	Rectangular embanked area at the western boundary identified as a refuse tip(public). Small tank noted at the southern boundary of the tip. Grass runway noted at western site boundary.
1991	National Grid 1:10,000	No significant change.	North western area identified as playing fields and trees noted.	No significant change.	No significant change.	No significant change.	The area to the north of the site boundary (Areas A and B) was now largely residential with the exception of Wigmore Park Centre (commercial).

Development Area							
Year	Mapping type and scale	Area A	Area B	Area C	Existing Airport Land (including LLOAL Contractor's Compound)	Airport Access Road	Surrounding the site (within 250m)
							<p>Wigmore Hall Farm had been replaced by housing and Wigmore Hall was noted to be a hotel.</p> <p>A balancing pond was recorded at the northern boundary of Area B, associated with the new housing estate to the north.</p> <p>The works building at Wandon End remained.</p> <p>New development of the former industrial area to the west of Area A.</p>
1993	National Grid 1:2,500	Incomplete coverage.	Incomplete coverage.	No coverage.	London Luton Airport has expanded with the additional of further taxiways.	No significant change.	Two tanks are now shown approximately 200 m south of the boundary.
2002	National Grid 1:10,000	The workings were identified 'disused', rough pasture noted across the area. A track was noted running	An area of allotment gardens was shown in the north of the playing fields.	No significant change	Luton airport has expanded with further building and roads and an expanded terminal building. The petrol filling	The works towards the south western extents are no longer shown.	Area of tipping identified in a rectangular area to the western site boundary (currently Household Waste Recycling Site).

Development Area							
Year	Mapping type and scale	Area A	Area B	Area C	Existing Airport Land (including LLOAL Contractor's Compound)	Airport Access Road	Surrounding the site (within 250m)
		north-south through the western area linking to the airport land to the southern boundary.	A small building had been constructed in the northern area south of the hotel. A small pond was identified south of Winchhill Wood at the southern site boundary. Old Winch Hill Cottage noted at the eastern site boundary.		station had been removed.		The car park to the west had changed configuration. A drain was present on the western boundary of the car park. A new building was noted south of the area of tipping at the western boundary to Area A. Several small rectangular features were noted 10 m from the south eastern boundary. The balancing pond was noted at the northern boundary in the area of the former gravel pit, and a second one at the north western boundary adjacent an area of car parking. Additional housing had been added to the north of Area B.
2010	National Grid	No significant change.	No significant change.	No significant change.	The Terminal is shown to have	No significant change.	The rectangular area at the western

Development Area							
Year	Mapping type and scale	Area A	Area B	Area C	Existing Airport Land (including LLOAL Contractor's Compound)	Airport Access Road	Surrounding the site (within 250m)
	1:10,000				expanded. There has been minor modifications to the non-descript industrial buildings within the north western extent. A hotel is present within the south western area.		boundary to Area A, previously noted as tipping was identified as a Recycling Centre. A new airport building was noted at the western site boundary.
2014	OS Small Scale 1:10,000	No significant change.	Winchill Farm and New Winchill Cottages were no longer identified.	No significant change.	No significant change.	No significant change.	Additional roads had been developed south of the site on airport land and three balancing ponds added.

Table E1-2: Review of historical mapping/aerial photography covering Areas D and E.

Year	Mapping type and scale/photo reference	Area D	Area E	Surrounding the site (within 250m)
1879	County Series 1:10,560	50m south the Midland railway is shown. 100m south is the Great Northern Railway.	The site is shown as unused land. Bordered by the Midland railway to the north and Great Northern Railway to the south.	The River Lee is shown 200m south westward. Unidentified buildings are located between 10m and 25m from the southern boundary. Woodland is shown 50m southward.
1880	OS County Series 1:2,500	No significant change.	No significant change.	No significant change.
1884	County Series 1:10,560	No coverage.	No coverage.	No coverage.
1899	County Series 1:10,560	No coverage.	No coverage.	No coverage.
1900	County Series 1:10,560	A rifle range is shown in the southern portion of the site.	No significant change.	Sewage tanks shown 80m north, associated to "Sewage Farm (Luton Corporation)" located 120m north. Watercress beds are located 150m southwest.
1901	OS County Series 1:2,500	No significant change.	No significant change.	No significant change.
1922	County Series 1:10,560	No significant change.	No significant change.	The sewage tanks north have expanded, with the addition of an additional tank. Recreational ground is located 150m to the north. 100m westward an Engineering Works is shown. Allotments are shown 100m north east

Year	Mapping type and scale/photo reference	Area D	Area E	Surrounding the site (within 250m)
1924	OS county Series 1:2,500	No significant change.	No significant change.	No significant change.
1938	County Series 1:10,560	No significant change.	The Great Northern Railway has been renamed to London North East Rail (L.N.E.R.)	The engineering works to the west have expanded and now border the site, along the Vauxhall Road.
1941	RAF_HLA_111_R P_0005	On-site the plot looks to be agricultural land possibly allotments.	A series of earthwork mounds are present on-site, unable to ascertain the nature of these features. North of the site railway sidings and industrial buildings are shown.	The engineering works are denoted as Motor works building shown adjacent to the west of the plot.
1946	RAF_CPE_UK_1 779_RP_3385	Allotments still present on-site.	Two of the earthwork mounds are no longer visible on-site. Buildings are shown in the north west of the site.	No significant change.
1947	County Series 1:10,560	Two parallel minor roads run north to south through the site.	On-site, rectangular features are shown, in addition to two smaller buildings.	Further expansion of the motor works with additional buildings constructed. The allotments to the north west have been replaced with a large industrial building. Four rectangular structures are shown adjacent to the north west
1955	RAF_543_1426_2 f43_0409	A large earth work has been constructed on the southern portion of the plot. The north of the site is being used as vehicle parking, with some further parking atop the earthwork mound.	Stockpiles are shown in place of the earth mounds.	Buildings in the north west of the site are no longer shown, with the area being used for vehicle parking.

Year	Mapping type and scale/photo reference	Area D	Area E	Surrounding the site (within 250m)
1960	County Series 10,560	Some buildings within the motor works are no longer shown.	The watercress beds south west are no longer labelled.	The sewage farm north is no longer shown, with a large industrial building present adjacent. Sidings and two buildings are now shown northwest of the plot.
1961	RAF_82_1204+F44_0004	The profile of the earthwork platform has been modified. The north of the plot is still used for car parking.	North west of the site is now shown to be used for vehicle storage. Stockpiles are still present in the rest of the plot.	No significant change.
1962	OS National Grid 1:2,500	Buildings associated with the motor works are now present in the north eastern corner of the plot. A significant raised earthwork platform is shown covering the majority of the site, with the rifle range no longer shown.	In the west of the site a miscellaneous building is shown. The east of the site is shown as three earthwork platforms rising in level eastwards.	The motor works to the west has expanded further, now within 25m of the west boundary. North of the site further buildings are shown 50m away.
1969	OS_69110_v_235	The top of the earthwork platform has been expanded and covered in hard standing and is being used for vehicle parking.	Vehicle parking has returned in the north west of the site, with the stockpiles still present across the remainder of the plot.	No significant changes.
1974	OS National Grid 1:2,500	Partial coverage. Access track now visible to the raised platform.	The railway no longer has tracks shown.	No significant changes.

Year	Mapping type and scale/photo reference	Area D	Area E	Surrounding the site (within 250m)
1977	National Grid 1:10,000	Further expansion of the motor works to the west and north west.	The L.N.E.R railway is now shown as dismantled.	250m east Luton airport runway is shown. Works are shown 200m northeast. 50m north west modifications have been made to the buildings present. A running track is shown 200m west. In addition to a miniature rifle range. The allotments 250m north west are no longer shown with a bowling green now in their location.
1984	OS National Grid 1:2,500	25 m eastwards the A505 "Airport Way" has been constructed.	Woodland south of the site is no longer shown.	No significant changes.
1985	OS national Grid 1:10,000	A road is now shown bordering the east of the plot within a cutting.	A road is now shown bordering the east of the plot.	50m north west a depot has been constructed.
1986	OS National Grid 1:2,500	Limited coverage, no change visible.	Limited coverage.	Limited coverage.
1991	OS National Grid 1:10,000	The works building adjacent westward is no longer shown.	The works north eastward has undergone changes to layout. With the buildings adjacent to the plot no longer shown.	The depot northeast of the site has expanded towards the airport.
1993	OS National Grid 1:2,500	Limited coverage. The land to the west has been shown to be cleared.	Building in the west of the site is no longer shown.	Limited coverage.

Year	Mapping type and scale/photo reference	Area D	Area E	Surrounding the site (within 250m)
2002	OS National Grid 1:10,000	The extent of the earth work platform shown has been reduced. Additional works buildings westward have been demolished. With a vacant plot shown adjacent to the site.	. No significant changes are shown.	20m north westward of the plot a large building is now shown. A railway station is now shown 250m north west of the plot. 250m west the running track is no longer shown with a sports centre now occupying the land.
2010	OS National Grid 1:10,000	In the north of the site two buildings are shown.	No significant changes are shown.	The vacant plot adjacent to the west has been constructed upon, with a large building constructed.
2014	OS National Grid 1:10,000	The railway station is now labelled as "Luton Airport Parkway".	Directly along the southern boundary a minor road is now shown.	No significant change.

Table E1-3: Summary of historical mapping for Off-site Highway Interventions.

Area	Summary
Eaton Green Road/Frank Lester Way	<ul style="list-style-type: none"> Eaton Green Road is present on the earliest mapping (1879) Frank Lester Way was not developed until 1960, at which time works units belonging to Percival works were identified to either side. The roundabout was added in 2001.
Eaton Green Road/Lalleford Road	<ul style="list-style-type: none"> Earliest mapping (1880) shows the site to comprise of a road surrounded by agricultural land. By the 1960s development has occurred within the surrounding area including the presence of Percival Aircraft Works which were located adjacent to the site.
Eaton Green Road/Wigmore Lane	<ul style="list-style-type: none"> Earliest mapping (1880) shows the site to comprise a crossroads surrounded by open fields. No significant development occurs until the 1960s where Eaton Green Landfill is shown to be present off site. By 1970s mapping the landfill is shown to be adjacent and along the border of the site. 1980 mapping shows the Thames Water Storage pond to the south and residential housing to the west. Light commercial buildings including a petrol station are shown to have been developed adjacent and to the north.
Eaton Green Road Roundabout	<ul style="list-style-type: none"> Earliest mapping (1880) shows the site to be agricultural land, with Eaton Green Road already developed. The 1922-25 mapping recorded no change to the site, a sewage farm had been developed, and sedimentation tanks are present, approximately 200m south.

Area	Summary
	<ul style="list-style-type: none"> • By 1938 Eaton Valley Road and Hawarden Road have been constructed at the western site boundary. • 1960 mapping indicates the sewage farm to the south has been removed and housing developed to the north of the site. • By 1974-75 the motor works had expanded to be within 100m south west of the site and a garage approximately 100m north east. • The Eaton Green Roundabout is constructed by 1985 with Vauxhall Road to the north and south. A car park is noted at the south eastern site boundary accessed from the roundabout. • No further changes of note.
Wigmore Lane/Crawley Green Road	<ul style="list-style-type: none"> • Earliest mapping (1880) shows the site to comprises of a crossroads of between Wigmore Lane and Eaton Green Road, surrounded by fields. • A small chalk pit is present in 1901 mapping and by 1960 mapping a small building has been constructed within. • 1970 mapping shows a small filter bed to have been constructed adjacent to the north west. By the 1980s the surrounding area has been developed into residential properties and the current roundabout had been constructed.
Crawley Green Road/Lalleford Road	<ul style="list-style-type: none"> • Earliest mapping (1880) shows the site to comprise a road following the current Crawley Green Road through the northern area. The surrounding area consist of open fields. • The road has been developed by the 1960s into a "T" junction between Crawley Green Road and Lalleford road with access to Fermor Road. • Additional residential buildings are developed around the road in the 1970s and 1980s.
Windmill Road / Kimpton Road	<ul style="list-style-type: none"> • Earliest mapping shows the site to comprise of a road and underpass beneath a rail embankment which intersects the site in the east. Off-site land uses include a sewage works 110m to the west and a brass and iron foundry 150m north • The Brass and Iron Foundry expands to the south and adjacent to the site by 1901. Additional land adjacent and east of the site is designated as a sewage farm. A Dyeing and Bleaching Works is present 200m to the north. • 1920 mapping shows additional filter beds within the sewage works to the west. The Sewage farm is shown to be allotment gardens. A cemetery to the north has expanded to be within 160m of the site. • 1960 mapping shows the development of Vauxhall Motor Works adjacent to the east. The Sewage Works are no longer present, and a Depot and Abattoir are present. The Dyeing and Bleaching works are shown as a depot and Laundry building. • 1970 mapping shows that the site has been raised slightly to accommodate a large Motor Vehicle Works to the west, replacing the Abattoir and Depot. • By 2002, the most southern rail line has been dismantled and converted to a dedicated bus route.

Area	Summary
Windmill Road / Manor Road / St Mary's Road / Crawley Green Road	<ul style="list-style-type: none"> • Earliest mapping (1880) shows the site to be situated on open space. Lea Road transects the centre of the site west to east and bridges across the River Lea which flows in a south easterly direction. The eastern boundary of the site comprises a small unnamed road trending to the south east. A Boiler Engineering Works is present 130m to the north. Two rail lines are present trending from a north west to south east direction 95m to the north east. A cemetery is present beyond the rail lines 220m to the north east. A Brass and Iron Foundry is present 105m east. A sewage works is present 200m to the south. • By 1901 residential properties had been constructed within the site boundary. The south eastern extent of the site is shown to overlap a Dyeing and Bleaching Works. • 1920 mapping shows additional residential properties within the site boundary. The Boiler and Engineering Works has expanded with dedicated rail connections and an Electricity Station, Yard and Fire Station is present 60m to the north west. • By the 1960s some of the residential properties have been replaced by car parks. The Dyeing and Bleaching Works is now to be a Depot. A Laundry building is also present within this area. The electricity station and boiler engineering works are shown as non-descript works. A hat factory is shown adjacent to the south west in the 1970s • By the 1980s the existing roundabout is shown to have been constructed. The electricity generating station is no longer present. The hat factory is no longer present.
A1081/London Road (north)	<ul style="list-style-type: none"> • Earliest mapping (1880) shows the site to consist of open fields with London Road and Kidney Wood forming the north eastern boundary. • Little development is shown to occur until the 1960s where a roundabout has been constructed within the northern extent of the site linking the A1091 and M1 link road through the centre of the site. • 2015 aerial imagery shows the roundabout to have been reconfigured into the current road alignment
A1081/London Road (south)	<ul style="list-style-type: none"> • Earliest mapping (1879), site undeveloped agricultural land, London Road, approximately 100m to east, Newlands Farm at south west boundary and a small chalk pit approximately 50m south. • 1960 A1081 connection from M1 to London Road constructed approximately 180m north • 2020 A1081/London Road (south) junction constructed and north junction to link to A1081, previous alignment of London Road to west now local access road.
M1 J10	<ul style="list-style-type: none"> • Earliest mapping shows the site to largely comprise of open fields. The southern area of the site extends into Pepperstock. A small unnamed road intersects the north western extent of the site. A graveyard is present 150m north of the site. • The M1 motorway and link road is shown to have been constructed by the 1960s. • 2015 aerial imagery shows the M1 link road in the east to have been replaced by A1081 Airport Way.

Area	Summary
Hitchin Junctions	
A602 Park Way/A505 Upper Tilehouse Street	<ul style="list-style-type: none"> • Earliest mapping (1880) shows the site to consist of a road junction lined with residential and commercial properties. An Iron Foundry is present 50m to the east. Burial grounds are present 50m to the south east. The surrounding area consist of a mixture of light commercial and residential buildings. • By the 1920s the Iron Foundry building to be unlabelled however a tank is now present. Additional residential development has occurred 50m to the north east. A fire station is present 150m to the north east. • 1960 mapping shows the junction to have been modified with some residential properties demolished. Two garages are shown adjacent to the south east of the site. • By the 1980s additional residential properties on site have been demolished. An additional garage is present 100m to the north. • By 1990 mapping the road has been modified to its current alignment. • 2007 aerial imagery shows the two garages to the south east to be under development and are shown as residential properties in 2012 aerial imagery. • 2013 aerial imagery show the garage to the north to have been redeveloped into residential properties.
A505 Moormead Hill Offley Road/B655 Pirton Road/Upper Tilehouse Street	<ul style="list-style-type: none"> • Earliest mapping (1880) shows the site to consist of Tilehouse Street and two unnamed roads. The site is lined with residential properties along the southern boundary and a Timber Yard along the northern boundary. The surrounding land use is largely open fields to the north, west and south with residential areas to the east. • In the 1920s the timber yard is shown to have been replaced by allotment gardens. • 1960 mapping shows Tilehouse Street to have widened to the north. The allotment gardens have been replaced by residential properties. A garage is present adjacent to the east. • No significant changes are shown until 2007 aerial imagery shows the garage to have been demolished. • 2015 aerial imagery shows the former garage area to have been developed into residential properties.
B656 Hitchin Hill / A602 Park Way / Gosmore Road Roundabout	<ul style="list-style-type: none"> • Earliest mapping shows the north eastern extent of the site to comprise of London road and one other unnamed road which is bordered by allotment gardens. The remainder of the site comprises open fields. Clay pits and a Brick Field with kilns are present 130m to the north east. • By the 1920s a single non-descript building is shown to have been constructed in the centre of the site. A portion of the brick fields has expanded north with the southern extent converted to allotments. • 1960 mapping shows additional residential properties to have been developed throughout the site. London Road and Stevenage Road are shown to have been realigned and widened. The Brick Fields are shown to have been infilled and indicated as landfill. • 1990 mapping shows the residential properties to have been demolished and the current roundabout to have been constructed linking London Road, Stevenage Road, Gosmore Road and Park Way.

Appendix E – Aerial Photos

Air Photo Interpretation Consultancy

71a Oxford Gardens, London W10 5UJ, UK

tel: 020 8968 8647. email: [REDACTED]

14th March, 2016

[REDACTED]

Dear [REDACTED]

Re: Luton Airport site, Job No. 245580

Thank you for the assignment to determine the landfill history and character of the site on the north side of Luton Airport. I have used the site outline in the Groundsure report commissioned by the job team to locate the site, together with maps and images within that report, the air photo files for [REDACTED], historic vertical and oblique photographs at Historic England in Swindon, and online images from National Collection of Aerial Photographs and Google Earth to interpret the materials placed on the site over a forty year period. The information has been developed to a draft stage, as requested, for input into a model of the site.

Introduction

I have examined the site on historic aerial photographs spanning the period 1941 to 2003 and on large scale OS plans from 1879 to 1985. The site consists of land fill placed from before 1941 to the early 1990s in a dry chalk valley to the north of the main runway at Luton Airport. The fill thickness varies from less than 8m on along the northeast boundary to c.30m over the valley floor in the east corner. The valley intersects the near horizontal boundary between the Upper and Middle Chalk, marked by chalk rock strata. This was exploited by a small pit, already disused by the late 1800s, near the north corner of the site and two ploughed-through pits near the east corner and a shallow dew-pond in near the midpoint of the southeast side; otherwise, the chalk topography appears not to have been disturbed prior to infilling.

The fill present in 1941 and placed during and after WW2 appears connected with the Perceval (aircraft manufacturing) Works formerly just to the west of the site. The 1941 fill surface shows an area of small holes formed apparently to receive a special waste. Subsequently, the fill placed appears for the most part to be chalk and soil spoil imported to the site by truck and spread in by bull dozer with no other compaction measures. The infilling operation appears to have been controlled and well organised. There was a control hut at the entrance and later a gate. Fly tipping appears to have therefore been thwarted and none was observed. No liquid waste or slurry was observed; however, dried slurry originating from the Perceval Works slurry ponds, may have been a source of early waste. One small area, before the gate, appears to have operated as a scrap yard near the north end of the site.

The observations from the maps and photos have been compiled on three figures. Figures 1 and 2 show the site pre fill and as filled, schematically. Figure 3 shows schematic sections through the site. In addition I have attached the annotated photographs of the air photos viewed at Swindon. These are key to locating accurately the extents of possibly hazardous wastes deposited in the 1940s; when these images have been scanned and registered with the map base of the digital site model, the boundaries sketched in the attached figures may be drawn with more precision.

Further research into the operation of the Perceval Works and its apparent connection to the site is advisable. A current site survey with levels would assist to bring precision to the schematic presentation of fill thicknesses.

Sources of Information

The Ordnance Survey maps were provided as extracts from the 1:10,560 (6 inch) series spanning 1879 to 1985. These are listed in table 1 in the site history section. The earliest dates provide spot heights, in feet, along the line of the valley bottom and along the road forming the north boundary. The 1879 and 1900 map editions are to the old Liverpool datum, and the surviving spot heights were revised on the 1925 edition to the current datum, Newlyn. Survey convention omits height information where ground levels are constantly changing as at landfill and quarry sites; however, ground levels up to the site boundary are at 5m intervals on 1985 map edition.

The photographs were located in the files an earlier Arup job (no.19136), the Historic England archive in Swindon or were supplied via the job team via Groundsure and NCAP. These are listed in table 2 in the site history section. The photos have been examined in three dimensions through a mirror stereoscope where stereo coverage was accessible at the EH archive and from our earlier job records. Therefore, approximate heights and thicknesses of fill at different stages of infilling have been recorded and used in constructing the sections of figure 3.

Site History - Maps

The site area was open agricultural land on all pre WW2 dates of mapping. The level information from the maps records a gradual drop along the valley floor from north to south boundary of c8m (c24 feet). The maps show a gradual extension of fill after 1947 to cover the whole site. Levels on 1879 and 1900 map editions are in feet and to Liverpool datum. Newlyn Datum was introduced in 1919 and remains the current OS datum. It is possible to revise the earlier levels by comparison of the difference of the two bench marks still recorded in 1925, although see table 1 for 1925. The actual ground level at these bench marks (BMs) may be researched at the OS; the recorded level is to a mark on a brass plate on the post in the ground. As subsequent map editions do not record the bench mark levels at these two points, it may be assumed that the bench marks were lost.

Table 1: OS 1:10,560 scale Maps of the Site

Date	Comment
1879	Completely pastoral landscape. 'Old Gravel Pit' recorded in north corner of site. BMs (bench marks) show a drop from 454.1 to 431.6 feet from north to east boundaries along floor of dry valley. A further 4 spot levels on the track occupying the valley floor reveal a decreasing slope from northwest to southeast. No contours.
1900	No change.
1925	No change to land use. BMs revised but not only by the change in datum. The BM on the north boundary was revised downward from 458.0 to 454.1ft. The BM at east corner was revised downward from 431.6 to 430.8ft. The latter difference is the more typical difference between Liverpool and Newlyn datums. OS records will provide the actual difference between datums. No contours for site area. The map extract combines parts of two map sheets. The east sheet covering most of the site did not have contours. The west sheet had contours at 100 foot intervals and showed only the 500ft contour outside but near the west boundary of the site.

1947	Records outline of land fill within site, southwest of valley floor with access track from road on north boundary. BMs remain unchanged and contouring completed at 100ft intervals.
1960	Records extension of land fill area into south corner. BMs absent.
1975	Records fill as sand and gravel symbol over all but north half of east side of valley. 5m contours introduced outside of fill area. Within the site, the unfilled area reveals valley side from just below 140m to just below 150m the eventual fill limit. The west boundary of the site and of the fill is just above the 150m contour.
1985	Sand and gravel symbol removed. Storm water balancing pond constructed in north corner. No other change recorded.
1989	Geological map TL18SW uses 1975 base map. Records 'former municipal tip' in south corner of site, and 10m deep storm water lagoon in northeast corner of site.

Site History – Air Photos

The site has been examined on the aerial photos – verticals and obliques – listed in table 2. Where stereo cover was accessible the verticals have been examined with a mirror stereoscope to view the site in three dimensions.

Table 2: available aerial photography of the site

Date	Approx. Scale	Source	Comment
10.02.41		RAF at HE	
11.11.43		USAF at HE	Two single photos from adjacent flight lines. Not stereo.
03.05.46	oblique	Aerofilms at HE	Advise ordering no. A459. Notes 'Perceval Works'.
10.10.46	1:9,900	RAF at HE	
10.04.47	1:9,840	RAF at HE	
02.06.47	1:10,000	RAF at HE	
11.09.47	1:4,800	RAF at HE	
18.01.54	1:10,000	RAF at HE	
06.06.55	1:10,000	RAF at HE	
06.07.55	1:10,300	RAF at HE	
14.04.57	1:4,000	OS -19136	
16.08.61	1:11,000	RAF at HE	
09.09.64	oblique	Aerofilms at HE	Advise ordering no. A79541 to illustrate slurry ponds on Perceval Works site.
14.10.68	1:12,000	HSL -19136	
08.04.69	1:12,000	HSL -19136	
14.04.69	1:7,000	OS at HE	
03.05.71		NCAP	Single photo – non stereo. Colour
1972		NCAP	Single photo – non stereo.
03.07.76	1:12,000	HSL-19136	Partial coverage of west side. Limited stereo to northwest corner.
13.06.81	1:10,000	HSL -19136	
1982		NCAP	Single photo – non stereo.
1986		HSL -19136	
1990		NCAP	Single photo – non stereo.
14.06.92	1:8,250	OS at HE	Single photo – non stereo.
2000		Google Earth	Continuous image - non-stereo
2002		Google Earth	Continuous image - non-stereo
2003		Google Earth	Continuous image - non-stereo

2009		Google Earth	Continuous image - non-stereo
2013		Google Earth	Continuous image - non-stereo
Subsequent dates at Historic England's air photo archive for 1999, 2001 and 2003 are available only as negatives and must be scanned and printed for viewing. As infilling was completed, graded level and grassed over by 1992, these later dates are not necessary for a fill history.			
RAF= Royal Air Force, HE=Historic England, Swindon OS= Ordnance Survey, NCAP=National Collection of Aerial Photography, Edinburgh			

1941. The aerial photographs show a dry valley in chalk. The land use was primarily for grazing; the land was not ploughed and a dew pond near the southeast side was for stock watering.

The valley had slightly concave sides, i.e. steeper towards the top. The change of slope was coincident with a white tonal band in the soil on the northeast side of the valley at the level of the disused quarry at the north end of the site. This appears to be the chalk rock at the boundary between the middle and upper chalk, which the quarry evidently had exploited. The inferred boundary between the Upper and Middle Chalk on the 1989 geological map is higher on the slope (see figure 1).

A small area of fill was already present on the southwest side of the valley. Near the valley was a consistently very dark, dry material with a granular texture. To the south was a light toned waste; on the day of the photograph, there was smoke from a fire in this area. It was delivered by tipper trucks and spread by bull dozers. There was an access track from the factory to the west. This was the Perceval Works which was camouflaged and defended from two artillery compounds. The Perceval Works produced aircraft. Site clearance on the west side of the factory was underway for construction work to extend the works. Further to the west, in the next valley there was a water treatment plant with circular filter beds and an adjacent tip of dark material. Either or both of may have been the source of the waste disposed of on site.

1943. More fill had been placed in a fan distinct from the earlier fill and appeared to have been delivered via a single track from the Perceval Works. It was mostly dark waste but included white material. The earlier black waste was covered by more of the same. The area of the earlier light toned waste was inactive and had darkened. The construction work noted in 1941 had been completed at the Perceval Works. On the fill site, there were five white huts on what was to become the sole access track. There were several clusters of 4 and 5 huts in the general vicinity and they appear to have been dispersed accommodation. On subsequent dates the huts were in different positions. What was to become the access control post was set up at this stage. To the south of the fill area, in the vicinity of the later Luton Airport, there was an extensive top soil scrape in progress.

1946. In the 1941 area of tipping there was a grid of small rectangular compartments like a waffle iron. The grid cells were empty and appeared to waiting for a hazardous waste fill. The fan of black with some white fill extended southward to the south corner of the site, to the area of the former Falconer's Hall. This fill area had been levelled within a rim of darker material as if a partial bund had been formed to enclose the waste. This suggests the handling of a waste that was known to be hazardous.

1947. Chalky fill was being placed over the earlier dark fill. The line of the direct track from Perceval Works was visible but as a field boundary. The access to tip area appeared to be restricted to a single track from the road at the north boundary of the site

1954-55. Filling continued to raise the existing fill area and extend the existing area towards the bottom of the valley.

1957. The area of infilling along the base of the slope by the valley bottom extended north. It was predominantly white chalky fill. The large scale enabled a gate with a control hut to be seen on the access track, before it forked into several tracks leading to different parts of the landfill. A hut had been in this position since 1941, but if a gate had been present earlier, it was sub-resolution and no shadow was observed either.

1961. The fill area had expanded significantly southward from the original 1941 to fill a triangular area between the earlier fill fan to the south corner and the line of the dry valley bottom into the southeast boundary of the site, still remaining west of the valley floor. The visible fill appears to be a chalky soil spoil. There are no open areas of refuse, although the spoil may provide covering layers. South of the site, three rectangular ponds had been constructed 1955. (The 1957 air photo did not extend this far south.)

1964. Slurry ponds between the Perceval Works and the water treatment plant were observed in the Aerofilms collection of oblique views at HE. These could not be photocopied and one should be ordered for the record. One pond had been excavated for re-use and the black and white waste was very like the waste observed in the 1940s and 1950s.

1969. The fill level had been raised substantially and benched on the highest part, along the southeast boundary. For the first time viewed, fill was present on the northeast side of the valley. The fill platform was at a constant height across the south end of the valley down to the southeast boundary. The fill continued to be brought to site by tipper lorries and spread by bull dozer without additional compaction being evident. The fill was white to light grey in black and white photography. Two vent stacks were visible on the line of the valley floor indicating a buried culvert to accommodate drainage. To the west of the site access control there was an automobile scrap area.

1971. The colour photography enables a clear distinction between the active infilling areas over and east of the former valley and in the north of the site up to the road on the west side of the valley. The fill area of the great expansion of the years around 1961 was green with ground-covering vegetation. The active fill was a dry pale brown chalky soil. there was dense black smoke rising from the scrap yard.

1972. Infilling had commenced of the remainder of the valley on the east side, including the disused 'gravel' pit in the northeast corner. The fill cover is more extensive in this area than is indicated on the 1975 map.

1976. Limited cover shows the scrap yard area now covered with fill. Just disappearing of the edge of the existing cover there appears to be heavy equipment or large beams inside the control gate. Adjacent coverage should be ordered to see what is there.

1981. Chalk has been delivered and tipped at several points across the earlier fill surface with the spreading of it occurring simultaneously from the tipping points.

1982. Filling is close to completion with a light toned chalky capping layer over most of the site. The benches of the east corner are revealed clearly by shadows and are covered with vegetation. A balancing pond for storm water drainage had been excavated in the north corner. It is either concrete lined or a very clear neat exposure of the chalk, but higher than the 2m recorded on the geological map. Water lies on the floor of the pit. The extent of the pit intersects the area of the former 'gravel' pit.

1986. The infilling appears to be completed. On the northeast side the fill slopes down to the original surface, standing 8-15m m high, increasing to the southeast. On the southwest side the fill slopes down to the original surface, standing 12-20m m high, increasing to the south. On the line of the original valley floor, at the east corner of the

landfill, the fill thickness is approximately 30m. The surface looks vegetated and not yet smooth. There is recent fill at the east corner.

1990 and 1992. Between these years the fill surface has been graded and seeded to present a smooth grass surface in 1992.

2000 to 2013. Essentially unchanged in 2000. Landscaped with hedges, rough vegetation and mowed fields by 2002 and unchanged to 2013.

Summary

The site consists of landfill occupying a dry valley in Upper and Middle Chalk. The period of infilling was before 1941 to about 1990. The earliest fill appears to have been related to an aircraft manufacturing plant and/or a water treatment plant. The early fill may contain hazardous manufacturing waste and/or dried slurry. Subsequent landfill appears to be primarily soil and chalk spoil. The site access was controlled and the operation of the landfill site appeared tidy and well managed. One small area in the northwest part of site outside of the controlled access area was operated as a scrap yard in the 1970s. No refuse, slurry or standing water was observed on the dates of aerial survey cover. The fill was placed in layers by tipping and spreading but no additional compaction measures were observed. No significant fill was placed after 1990 and site area was landscaped between 2000 and 2002 to its present (2013) state.

Recommendations

Further research is recommended:

- into the history of the Perceval Works and the water treatment plant to establish the nature of early waste.
- at the OS, to establish the levelling history and correction factor for the datum change to establish the pre-fill topography.
- using additional aerial photos to acquire stereo coverage in order to:
 - estimate fill thicknesses at different stages,
 - prepare cross sections in the fill sections to target and correlate the logs from the ground investigation.

The figures and annotated photographs are prepared to draft state for compilation in the layered GIS plan that the job team has assembled with map and uninterpreted aerial photographs. I would be happy come in to answer any queries and demonstrate the stereoscope with the survey photographs when the additional frames have been acquired.

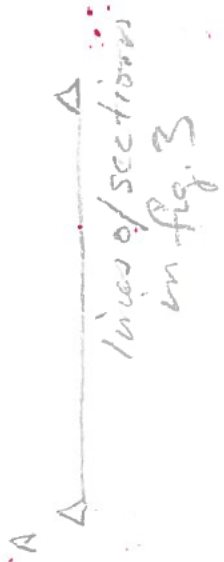


Attached figures:

1. Map of original surface condition of site
2. Map of fill deposits on site
3. Schematic cross sections through fill deposits on site

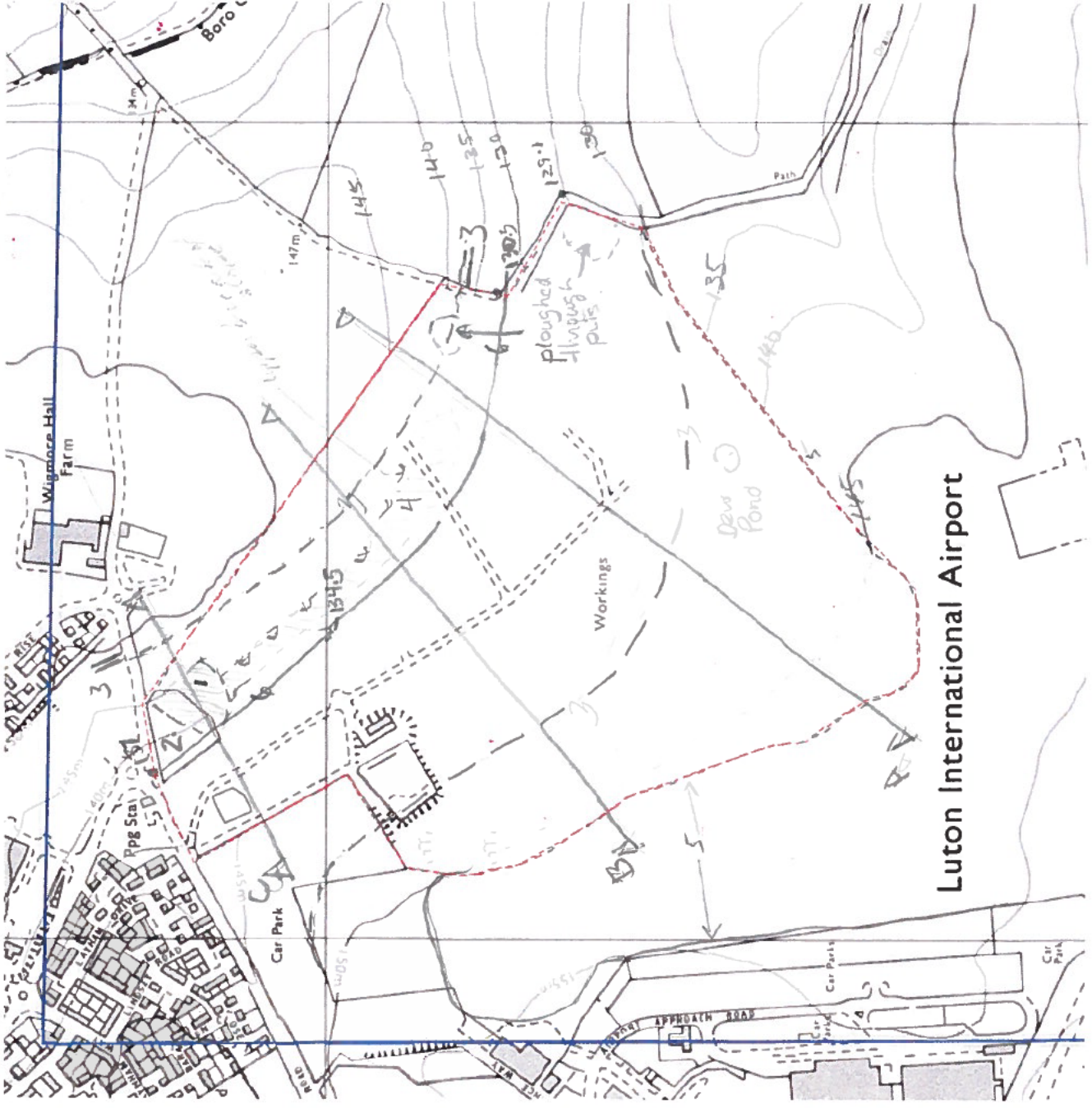
Pre-fill Surface.

1. Disused excavation 1879 visible 1957-71. Infilled 1972
 - Shymon infilled 1975 O.S. map
 excavated by 1982 as storm water lagoon - see 2
2. Storm water lagoon identified on 1989 6" geol. map - 2m. into chalk observed
 1982 - Standing water - vegetation full slope to chalk (on concrete lin)
3. Observed chalk rock - 1989 Geol. map - inferred line connecting
4. Chalky soil band visible 1957A extends from pit (see 1.)
5. extent of landfill on geol. map indicates most of site bound
6. E. dry valley bottom. 1879 OS map - levels adjusted to Newlyn re-converted from Imperial



PREFILL SURFACES

245580 fig 1



Luton Airport

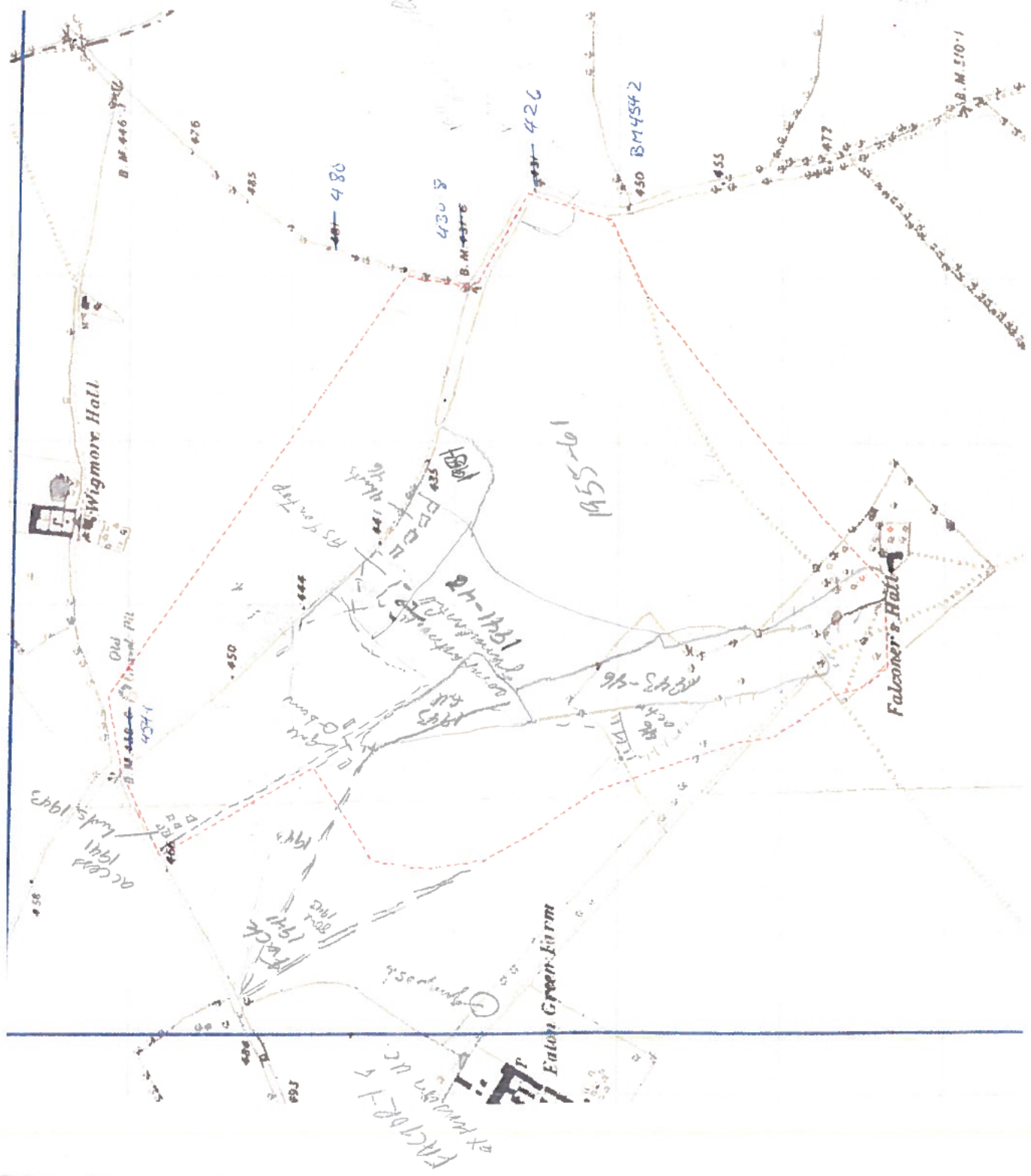
1879 levels
revised to

Newlyn datum
in 1925

1941

EXTENTS OF
FILL BY DATE

base map 1879
levels in feet.
to Liverpool datum
fig 2



ARUP

Calculation sheet

Job No. Sheet No. Rev.

245580-00

Member/Location

Job Title

LUTON AIRPORT

Drg. Ref.

Made by

Date 14/03/2016

Chd.

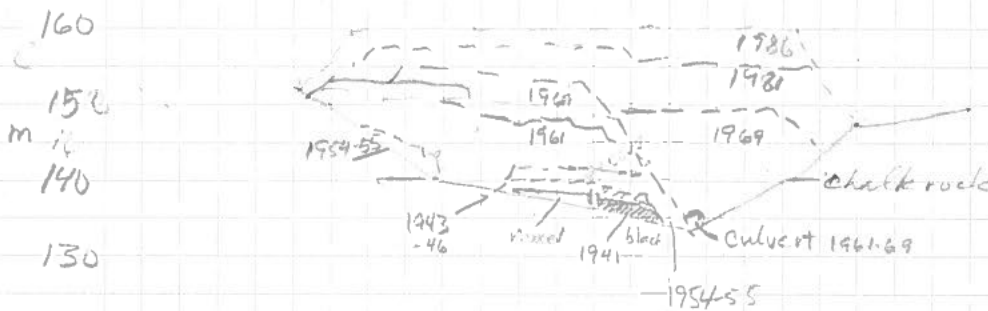
SW

NE

A



B



C



SCHEMATIC SECTIONS THROUGH FILL

see fig. 1 for locations

245580

fig. 3



1941



access track



Perceval works

aggressive gwn positions



w/c



1941



1941 ↑

HLA/III JPR U/F/20 10241 SR

- 1. fenced bdy of airfield
- 2. gun positions
- ③ site access
- ④ Company mounted
fill
- ⑤ fill over trenches
at site ex-
- Fulcrum's Hall.
- 6 - common place
factory
Co WC.
- 7. dew pond.



319

↑ 1943

↓ access track

old pit


control post

recent fill fan

N
← 1943



1946

1946 

Recent fill
placed within
bund

bund

1946

bund

Temporary
huts

De
Valley



↑ 1947

gun position
↓

gun position
↙

— dew pond.

↑ 1947



F-22 58 RAF 1342 18 JAN '54 12.00Z 20° 16.66'

1457

0164

per coral works

hill to valley floor

4094



↑ 1954



← 1954

↑ 1955



← 1955

left.

1961

→ N



← 1961

1969



auto
scrap
yard

Disused Pit

vent stacks
over buried
culvert

recent fill
on N.E. valley
slide

Route

1969

Scrap yard

1969 7



1969

HSL UK BED 69 858

152,27
C-306

8 APRIL 69



6,000' 6"



RUN

13

7617



HSL BEDS 81 2

13.6.81

5,000' amgl. approx.

6" F/L

RUN

9

8852



UAG 392
8852
152.33

CA911 3076 153.51

1732



HSL UK 86 79 RAN 10 1732

Appendix F – Review of Previous Reports

F1 Detailed Review of Reports

Table F1.1: Review of available reports covering the Main Application Site.

Report title	Date	Location	Summary of scope/findings
Fugro Engineering Services (FES) East Luton Corridor Improvements for Luton Borough Council	2003	A1081 (Airport Way)	Site investigation for road improvement works. The testing undertaken was for geotechnical purposes and no contamination analysis was undertaken. However, the report does describe Made Ground encountered in the area as granular fill, clay fill or chalk fill.
Burks Green. Foundation work risk assessment report	2004	Area A – Former Landfill – north western edge	<p>This report provides a foundation risk assessment for Hangar 202. An investigation was undertaken at Hangar 202 site by RSA Geotechnics in 2004. The investigation encountered thicknesses of landfill waste between 4.4m-9.9m. Landfill waste encountered included:</p> <ul style="list-style-type: none"> Commercial and industrial wastes comprising metal, plastic, cloth, glass, wire, paper, fibreglass insulation, wood, glass bottles, ash, asbestos cement, polythene sheeting; Domestic refuse comprising black plastic bags with varying proportions of paper, plastic, food tins, plastic and glass bottles, wood, cardboard and newspapers (dated 1974); and Construction and ashy waste- comprising bricks, ash, clinker and wood. <p>Ground gas monitoring was undertaken as part of the investigation which indicated methane levels up to 46.6% v/v and carbon dioxide up to 6.7% v/v.</p> <p>Burke Green report used the information from the RSA Geotechnics report to assess the likely foundations required for the hangar, apron and taxiway. The proposed solution was precast concrete piles driven into the chalk for the hangar. For the apron and taxiway ground improvement techniques such as stone columns interested the depth of the landfill or dynamic compaction were proposed. A methane gas barrier and passive ventilation system was also proposed to be installed below the foundation.</p>
Terrence O'Rourke Hangar 202, Apron and Taxiway Link London, Luton Airport Planning Support Statement	2004	Area A – Former Landfill - north western edge	This planning support document, provides an overview of proposed development and potential environmental issues, including those posed by the former landfill. It advises solutions via construction methods to limit contamination migration, which were agreed with consultation with Environment Agency.
Wardell Armstrong, Southside and City Developments Ltd. Vauxhall Motors Site, Luton,	2004	Former Vauxhall Motor Works	This report provides information relating to groundwater contamination conditions at the site of the Vauxhall Motor works. The report details that site investigation work was undertaken in 2004 trial pits, window samples and boreholes. This indicated that the

Report title	Date	Location	Summary of scope/findings
Bedfordshire. Initial Phase Site Investigations, Preliminary Hydrogeological Assessment			groundwater direction was to the south west, however some uncertainty around this flow direction was highlighted. Made Ground was noted to be over 5m thick in places, with some hydrocarbon odours noted.
Wardell Armstrong Southside and City Developments Ltd. Vauxhall Motors Site, Luton, Bedfordshire. Preliminary Review of Available Data	2004	Former Vauxhall Motor Works No plan available within the report but considered to relate to the motor works	Review of previous reports and published information for the former Vauxhall Motors site. The report details that there is published literature on groundwater quality in the area, which is affected by chlorinated solvents and hexavalent chromium as a result of the industrial history of Luton. Previous investigations reported various concentrations of organic contaminants, however these were concluded as unlikely to represent a significant source of contamination.
RSA Geotechnics Limited, Harrods Aviation, LLA Hangar and Taxiway Extension at Luton Airport, Preliminary Factual Report	2004	Area A – Former Landfill -north western edge	<p>This preliminary Investigation was undertaken to inform the foundation risk assessment it comprised of the following:</p> <ul style="list-style-type: none"> • 14 No. boreholes; • 10 No. trial pits; and • 10 No. dynamic probe locations. <p>Landfill waste was encountered with thicknesses between 4.5 m-9.9 m landfill waste was encountered as:</p> <ul style="list-style-type: none"> • Commercial and industrial wastes comprising metal, plastic, cloth, glass, wire, paper, fibreglass insulation, wood, glass bottles, ash, asbestos cement, polythene sheeting; • Domestic refuse comprising black plastic bags with varying proportions of paper, plastic, food tins, plastic and glass bottles, wood, cardboard and newspapers (dated 1974); and • Construction and ashy waste- comprising bricks, ash, clinker and wood. <p>Ground gas monitoring was undertaken as part of the investigation which indicated methane levels up to 46.6% v/v and carbon dioxide up to 6.7% v/v.</p>
Casella Stanger. Review of Environmental Reports LLA 202, Apron & Taxiway Link. Report No:C03607	2004	Area A – Former Landfill -north western edge	<p>This report reviews previous environmental reports relating to the construction of Hangar 201. This review was to inform future development plans for a second hangar (202). The report refers to 7 reports and summarises each of them, key points relating to the landfill were as follows:</p> <ul style="list-style-type: none"> • Fill materials overlie a dry valley in which chalk and possibly Dry Valley Deposits originally cropped out;

Report title	Date	Location	Summary of scope/findings
			<ul style="list-style-type: none"> • Previous investigations have indicated that the base of the landfill is underlain by Clay with Flints ranging from 5m thickness at the western side to 1m thickness at the eastern boundary; • The landfilled material ranged in depth between 5 and 13.5m; • The upper 1-3m of the landfilled area was thought to represent some form of capping material comprising soft to firm orange/brown silty clay with fragments of brick, ash and clinker and some fragments of paper, plastic, glass, metal, textile, straw wood and wire; • Groundwater was not encountered in the landfill area and that data from monitoring wells located in the vicinity of the airport indicated that the landfill was not having a significant effect on the quality of groundwater in the area.; • Methane and carbon dioxide were detected at elevated concentrations with a maximum of 73% v/v and 20% v/v respectively, in general gas flow rates were less than 1 l/hr; and • Gas protection measures were installed within Hangar 201 due to elevated concentrations of landfill gases. <p>As part of the report, the data from the previous site investigations was reviewed and assessed against the then current Soil Guideline Values (SGVs) and other relevant assessment criteria. Concentration of cyanide and total PAHs were found to exceed, with significantly elevated concentrations tending to be located at depth within the fill material. Groundwater samples indicated exceedances of dissolved hydrocarbon above drinking water standard (DWS) limits. Previous groundwater sampling events also highlighted exceedances in the concentrations of Iron, Manganese and Total Petroleum Hydrocarbon. This was however attributed to borehole construction materials and spillages into the drainage system.</p>
Wardell Armstrong, Southside and City Developments Ltd. Vauxhall Motors Site, Luton, Bedfordshire. Ground Investigation Report	2005	Former Vauxhall Motor Works	Summary report of ground investigations undertaken in 2004 and 2005. The soil and groundwater chemistry indicated elevated concentrations of Diesel Range Organics (DRO). The report concluded remedial treatment of the soils was required but not active remediation of the groundwater.
Wardell Armstrong, Southside and City Developments Ltd. Vauxhall Motors Site, Luton, Bedfordshire. Supplementary Ground Investigation Report	2005	Former Vauxhall Motor Works	The report covers supplementary investigation undertaken at the former Vauxhall Motor Works, which was not accessible in previous investigations. The findings of the investigation were consistent with the previous investigations, and it was concluded that no additional remediation was required.

Report title	Date	Location	Summary of scope/findings
(Existing Vehicle Release Facility)			
WSP Environmental Limited. Phase 1 Environmental Assessment (Project Odyssey) London Luton Airport. Project Number 12220076/001	April 2006	Area A – Former Landfill - Long stay car park - western edge of the former landfill.	<p>A Phase 1 Environmental Site Investigation on the airport undertaken by WSP for 'Project Odyssey'. This includes extension of Car Park E which is the long stay car park which is situated on the western edge of the former landfill. The report provides a summary of previous site investigation reports. The following points of note were identified from the review:</p> <ul style="list-style-type: none"> Terrasearch undertook a site investigation in the western edge of the former landfill, which indicated that the waste extends to at least 8 m bgl. Lead concentrations were particularly elevated with a maximum concentration of 35,599 mg/kg; An investigation into the former landfill was undertaken in 1991, WSP were only provided with an interpretation of the logs, with the actual report not reviewed. It indicated fill extended to depths of 21m bgl. It also noted contamination in the groundwater below and outside the former landfill, phenols, nitrate, chloride, sulphate and mineral oils. It was also stated that groundwater in the bedrock was being impacted by the landfill. <p>WSP concur with an appraisal by Stanger, that the presence of clay with flints has prevented metals within the landfill leaching from the site.</p>
Vertase F.L.I Contract Completion Report. Napier Park, Luton	2006	Former Vauxhall Motor Works	The report details that free product was found during redevelopment works, therefore Vertase F.L.I undertook further investigation to assess whether additional remediation was required. It was concluded that residual free product had become entrained in the chalk but that no further remediation was warranted.
Wardell Armstrong, Explore Investments Ltd. Napier Park, Kimpton Road, Luton. Groundwater Risk Assessment.	2007	Former Vauxhall Motor Works	The report details additional groundwater boreholes, monitoring and risk assessment modelling undertaken as part of the development of the former Vauxhall Motor Works (Napier Park). Additional assessment was required as during the reclamation works a zone of chalk which was heavily contaminated with DROs was revealed. Groundwater risk assessment modelling was undertaken which indicated that there was no risk to the River Lee and no additional remediation of the groundwater was warranted
URS, East Luton Corridor Improvements, Geotechnical Report for Luton Borough Council	2007	A1081 (Airport Way)	Geotechnical interpretation of a site investigation for road improvement works including geotechnical testing data.
Mott Macdonald, Veolia Water Projects, London Luton Airport, Surface Water	2008	Existing Airport Land	This report inventories existing surface water drainage assets, which are reviewed for condition and performance. With potential solutions along with maintenance strategy outlined. Highlighting works required with vary degrees of urgency.

Report title	Date	Location	Summary of scope/findings
Drainage, Asset Management Plan Report			
Wardell Armstrong, Stirling Place – (Former Kimpton distribution centre), Kimpton Road Luton, Bedfordshire	2008	Adjacent to Luton Parkway Station	The report provides information relating to when the site was developed in 1995 as distribution depot. Remediation was undertaken for hydrocarbon contamination in the groundwater through pump and treat. Wardell Armstrong undertook an investigation in 2007. Chemical analysis indicated the presence of asbestos (chrysotile). Analysis also indicated that concentrations of polyaromatic hydrocarbons (PAHs) and hydrocarbons were elevated but not above remediation targets agreed with the Environment Agency (EA) for the neighbouring site (Napier Park).
Wardell Armstrong, Various validation reports for Zones 1-6 of Napier Park	2008 - 2012	Former Vauxhall Motor Works	Various reports for areas of the Napier Park site validating the work to remove localised areas of soil contamination in the area of the former Motor Works.
Wardell Armstrong, Letter report to Environment Agency on Groundwater Monitoring at Napier Park and Stirling Place.	2012	Former Vauxhall Motor Works	The groundwater monitoring data for six boreholes at Napier Park and one borehole at Stirling Place are detailed within the report. It also details the results of a passive hydrocarbon removal trial within Napier Park to achieve groundwater betterment. It is detailed within the report that the groundwater flow gradients are minimal and variable, with some more southerly flow noted in previous studies. The report indicates that although the site is underlain by a Principal Aquifer, there is poor background water quality in the area and the nearest sensitive receptor was considered to be the River Lea. It concludes that Total Petroleum Hydrocarbon (TPH) concentrations at Sterling Place (BH RC5) were below detection limit and therefore it was not being affected by contaminant migration from Napier Park.
AECOM Phase 1 Geotechnical and Geo-Environmental Desk Study Report	May 2012	Area A – Former Landfill	Desk Study focussing on a development comprising of a cargo hangar and a fixed base operation (FBO) area, reviewing various sources of material. The southeast corner of the cargo hangar lies partially within the extent of the former landfill. The report reviewed previous investigations undertaken at Luton airport and its surrounds, including reports on the former landfill.
AECOM. Geotechnical and Geo-environmental interpretative report	Sept 2012	Area A – Former Landfill	AECOM reviewed two sites within Luton Airport, comprising of a cargo hangar and a fixed base operation (FBO). The south eastern corner of the cargo hangar lies site lies within the boundary of the former landfill. A limited investigation was undertaken comprising of: <ul style="list-style-type: none"> • 5 No. boreholes; and • 10 No. window sample locations.

Report title	Date	Location	Summary of scope/findings
			Up to 3.35 m of Made Ground encountered at the cargo hangar site, no mention is made of landfill waste being encountered. A possible dissolution feature noted within the chalk. Localised asbestos was encountered within the Made Ground.
Delta Simmons Environmental Consultants Limited. Preliminary Site Investigation for proposed Taxiway Foxtrot	Aug 2012	Area A – Former Landfill	A preliminary site investigation was undertaken within the extent of the former landfill for Taxiway Foxtrot. The Investigation found waste to be predominantly well decomposed, with some parts of the landfill waste comprising more granular materials suggesting construction & demolition rather than household waste in those areas. Occasional visual/olfactory evidence of hydrocarbon contamination was encountered. No groundwater or leachate was encountered during the investigation; however, the landfill waste was described as damp/moist in some locations. The report also identifies two stands of Japanese knotweed totalling an area of around 30-40 m ²
RSK Environment Limited, RPS Group Limited, Ocean Sky Jet Building, Luton Airport, Geoenvironmental and Geotechnical Ground Investigation	2012	Area A – Former Landfill - 400m west	The report covers an extension to an existing office building, it comprises of a geo-environmental preliminary risk assessment, A review of an investigation comprising a single 10m borehole bored to confirm ground conditions and validate conceptual site model. The included geo-environmental GQRA, with comparison to CLEA GAC's for relevant receptors, it concludes soils at the site do not pose a risk to further development. It also includes a geotechnical risk assessment of potential hazards, noting presence of Made Ground, shrinkable clay soils, and existing services.
Waterman, Napier Park and Sterling Place. Environmental Statement	2013	Adjacent to Luton Parkway Station	Environmental Statement (ES) reviewed previous investigations undertaken at both the Sterling Place and Napier Park. These reports are presented in the appendices of the report and are discussed above (3-11). The ES [TR020001/APP/5.01] concludes that there is the potential for residual groundwater contamination associated with the former Motor Works but that there is no evidence of significant source of contamination at Stirling Place. The report recommended additional groundwater monitoring to inform an updated DQRA [TR020001/APP/5.02] and if necessary further remediation.
Ivy House Materials Management & Remediation Verification Report. Signature FBO, Luton Airport	Dec 2013	Area A – Former Landfill	The report details the remediation activities to develop a new fixed base operation (FBO) within the boundary of the former landfill. It details segregation of materials dependant on material waste category. Subsequent verification was undertaken to ensure no significant risk to controlled waters or human health remained.
Crossfield Consulting. New Ramp, Adjacent to Stand 80, Luton Airport, Phase 1 Desk Study Report	2013	Existing Airport Land - adjacent to Stand 80	Desk based assessment of a site approximately 150 m west of the former landfill. The report acknowledges the presence of the former landfill, but no other additional information is provided.

Report title	Date	Location	Summary of scope/findings
Mott MacDonald London Luton Airport Surface Water Drainage Strategy	2014	Existing Airport Land	<p>This report evaluates historical water monitoring with results assessed against water quality standards (WQS). The report identified 27 'contaminants of concern' (CoC) which exceeded WQS. These were selected for proposed monitoring as part of the strategy. It also identifies a number of potential risks, based upon processes and historical usage.</p> <p>It assesses the quality of existing measures to protect water quality and proposes methods to manage future pollution events. It outlines a series of actions to be undertaken including monitoring, engagement with authorities and further assessment of certain possible solutions.</p>
Mott MacDonald, London Luton Airport Operations Ltd, Phase 1 Geotechnical and Geo-environmental Desk Study	Jan 2014	Existing Airport Land/ Area A/ LLAOL Contractor's Compound	<p>Phase 1 Geotechnical and Geo-environmental Desk Study. A preliminary risk assessment (PRA) for proposed airport extensions to terminal buildings, extensions to existing mid and long-term car parks, new taxiway (foxtrot), extension to existing taxiway (alpha) and aprons and new multi-storey car park linked to terminal building. The PRA was for planning purposes and to address concerns raised by the Environment Agency during planning consultations.</p> <p>The report includes a summary of ground conditions, current and historical land uses, environmental setting of the site and review of previous site investigations and historical mapping.</p> <p>Previous ground investigations identified elevated concentrations of metals and inorganics in Made Ground (particularly the former landfill area) and groundwater beneath the site. Tri-ethylene glycol, TPH, PAH, PFOS were encountered locally and intermittently in ground water and surface water. Elevated ground gas was recorded associated with the former landfill. A Phase 1 Remediation Report was reviewed for the Fire training Ground which was completed when it was up-graded to meet new industry standards. Contaminated materials were excavated to depths between 0.3m to 6.0m bgl and removed from the area, remedial criteria adopted were less than 1000 mg/kg for TPH and less than 1 mg/kg for fluorinated surfactants (PFOS).</p> <p>Activities identified as potential sources of contamination included:</p> <ul style="list-style-type: none"> • Airport activities, • Commercial and industrial activities, • Historical landfill, • Fuel farm, • Historical sewage treatment works, • Constructions works, • Concrete and asphalt works

Report title	Date	Location	Summary of scope/findings
			<ul style="list-style-type: none"> • Electricals substations, and • Generators and associated fuel tanks. <p>High to Moderate risks were identified to River Lea/Luton Hoo Lakes and Principal chalk aquifer, with low risks to human health receptors.</p> <p>It was concluded that risks could be adequately mitigated through design and construction techniques and remediation.</p> <p>Ground investigations were recommended to support planning application and update data gained from previous GIs to obtain information on:</p> <ul style="list-style-type: none"> • contamination status of proposed development areas; • extent of the Chalk with Flints stratum; and • groundwater quality and flow direction.
Mott MacDonald. London Luton Airport Expansion. Contamination Risk Assessment Report- Phase 1 Development.	2015	Existing Airport Land	<p>Mott MacDonald completed a Contamination risk assessment for Phase One Development Area (which comprises the terminal building, aircraft hangars, car parks, road ways/roundabouts and associated soft landscaping.</p> <p>The assessment included a discussion of the historical development of the airport site but includes some reference to the former landfill and the areas surrounding it. The fire training ground to the south of the former landfill is recorded as comprising a fuel tank with a capacity of 1000 litre and several containers of firefighting foam Petrosel- Film Forming Fluoro Protein (FFFP). In addition, there are two balancing ponds located in this area. The surface run off from this area is collected in two lined ponds which are regularly emptied by tankers. In addition, the area to the south of the long stay car park (which is located on the western edge of the former landfill) is noted to be a concrete and asphalt works.</p> <p>The report also indicates that data from a groundwater quality monitoring programme by Veolia in 2006-2007 indicated the groundwater levels in the White Chalk subgroup beneath the airport decrease from approximately 120m AOD (25 mbgl) in the centre of the airport to 101m AOD (approximately 60m bgl) at the western boundary. It also indicated that during historical groundwater monitoring across the airport, elevated concentration of lead, aluminium, iron, manganese, arsenic, mercury, selenium, nitrate, sodium, chloride and pesticides were noted.</p> <p>Site investigation was undertaken by Mott MacDonald which comprised 10 boreholes to a maximum depth of 60m and 4 boreholes to a maximum depth of 6m across the area for groundwater and gas monitoring purposes. In addition, 26 trial pits were undertaken across the area.</p> <p>Gas monitoring exercises reported depleted oxygen concentrations in some of the boreholes and elevated carbon dioxide concentrations. These monitoring locations were</p>

Report title	Date	Location	Summary of scope/findings
			not adjacent to the former landfill. They were no reported methane concentrations in the gas monitoring exercise.
Concept Site Investigations, Luton Airport Terminal Extension, Site Investigation Report	2015	Existing Airport Land	<p>Concept Site Investigations undertook an intrusive site investigation as part of works for a potential terminal extension, comprising of the following:</p> <ul style="list-style-type: none"> • 6 No. Cable Percussion Boreholes to a maximum depth of 30 m; • 3 No. Rotary Follow on Boreholes to a maximum depth of 60 m; • 1 No. Rotary Borehole to a depth of 60.0 m; • 4 No. Windowless sampler boreholes to a maximum depth of 6.0 m; and • 27 No. hand excavated trial pits to a maximum depth of 2.3 m. <p>With 14 No. groundwater monitoring standpipes installed.</p> <p>The investigation encountered Made Ground with thickness of up to 1.75m, underlain by natural strata.</p>
Pell Frischmann, Luton Airport Perimeter, Preliminary Sources Study Report	2016	Airport Access Road	<p>Pell Frischmann undertook a Preliminary Sources Study Report for Century Park Access Road, a 3km long section of dual carriageway to connect New Airport Way with the Enterprise Zone, running along a similar alignment to the existing routes of Percival Way and President Way. The report summarises the geology, geomorphology, hydrological and geo-environmental aspects of the site as well as the historical development of the area.</p> <p>A conceptual site model and preliminary assessment identified the following as potential sources of contamination:</p> <ul style="list-style-type: none"> • Eaton Green Landfill. • Airport fuel depot adjacent to Percival Way. • Former sewage works adjacent to Vauxhall Ridge. • Historical settlement ponds (now encapsulated with a 1.5mm HDPE membrane) and settlement tanks, assumed to be a waste treatment facility associated with the Vauxhall motors plant to the north of Airport Way. • Numerous works and depots. • Previous military usage of the airport including the risk of unexploded ordnance. • Spittlesea hospital. <p>The report identifies the potential for the following contaminants to be present across the road alignment:</p> <ul style="list-style-type: none"> • Inorganic contaminants; Metals and Metalloids (previous land use, in particular waste treatment facility and landfill).

Report title	Date	Location	Summary of scope/findings
			<ul style="list-style-type: none"> Organic contaminants; Oil/fuel Hydrocarbons, Semi-volatile organic compounds (SVOC), Volatile organic compounds (VOC). Pathogens (former sewage works). Landfill gases. Landfill leachate. <p>The report identified several contaminant linkages with an overall Moderate to High risk. The receptors, pathways and assigned risks from the potential sources of contamination for each linkage identified are summarised as:</p> <ul style="list-style-type: none"> Construction Workers from dermal, ingestion or inhalation – Low to Moderate. End users of the developed site from dermal, ingestion or inhalation – Low. Adjacent buildings and structures from migration of vapours – Moderate to High. Leaching of contaminants to groundwater – Moderate to High. Groundwater /surface water abstractions – Moderate. Contaminated runoff to surface waters – Low to Moderate. Impact to local ecosystems from dermal contact, ingestion and inhalation – Low. <p>The report recommended the following work to be undertaken:</p> <ul style="list-style-type: none"> A ground investigation with chemical testing to identify areas/extent of contaminated land. Design levels for the highways infrastructure to be set to minimise the requirements to disturb the existing landfill area and other potentially contaminated areas. Remediation of contamination materials on site.
<p>Mott MacDonald Contamination Risk Assessment Report, Phase 2 and 3 Development</p>	<p>March 2017</p>	<p>Existing Airport Land</p>	<p>Mott Macdonald undertook a contamination risk assessment for the area of the Terminal 1 expansion works, this included Area D. The report summarised the findings of an earlier desk study (Mott MacDonald (2014) Luton Airport Operations Limited, Phase 1 Geotechnical and Geoenvironmental Desk Study). Potential sources of contamination identified in Area D included fuel tanks and cement and asphalt works, an electrical substation and fuel tank to the south of the fire training ground and a fuel tank and fire fighting foam containers in the fire training ground. Off-site in the wider area, numerous de-icing tanks are noted as well as further fuel tanks.</p> <p>Site investigation was undertaken, and the results interpreted. The report identified minimal contamination of the materials for excavation, comprising cohesive Made Ground materials derived from the underlying Clay with Flints Formation, but concluded that there were no significant contamination risks to human health or controlled waters associated</p>

Report title	Date	Location	Summary of scope/findings
			with the material when compared to current assessment criteria. The reports were considered sufficient for the discharge of the condition by the Local Planning Authority.
Concept Site Investigations, Geo-environmental GI Site Investigation Report	2017	Existing Airport Land	<p>Concept site Investigations carried out an intrusive site investigation comprised of the following:</p> <ul style="list-style-type: none"> • 5 No. rotary boreholes to a maximum depth of 70.0 m; • 4 No. dynamic sampling boreholes to a maximum depth of 6.0 m; and • 11 No. hand excavated trial pits to a maximum depth of 1.5 m <p>All rotary boreholes were installed with groundwater standpipes. Made ground was encountered with a thickness between 0.25 m and 3.32 m</p>
Structural Soils Access Road Factual Report on Ground Investigation	June 2017	Along the proposed footprint of the Airport Access Road	<p>This is a factual site investigation report undertaken for the access road undertaken by Structural Soils for Pell Frischmann in 2016/2017, subsequent to the PSSR. Exploratory locations were advanced along the proposed road alignment which crosses the north of the former landfill, and through WVP core area in Areas B. The GI Comprised of:</p> <ul style="list-style-type: none"> • 22 Cable percussion boreholes to depths between 5.8 and 15.6m bgl; • 38 Cable Percussion with follow on rotary drilling to depths between 12 and 31m bgl; • 5 Rotary cored boreholes to depths to 31m bgl; • 46 Dynamic window sample holes to depths between 0.5 and 7.5m bgl; • 24 trial pits up to depths between 1.2 and 4.2m bgl; and • 28 groundwater and gas monitoring standpipes. <p>The presence of hydrocarbon odours, discolouration and the presence of membranes and geotextiles were observed across areas across the scheme.</p>
Structural Soils Century Park Factual Report on Ground Investigation	June 2017	Area B	<p>This is a factual GI report undertaken on the land situated east of the former landfill (within Area B), to inform the Century Park development. This was a preliminary site investigation based on the findings of the Arup PRA (2017). The GI comprised of:</p> <ul style="list-style-type: none"> • 13 No. Cable Percussion Boreholes to a depth of between 1.9 m bgl and 15.5 m bgl; • 38 No. Cable Percussion Boreholes extended by rotary drilling, to a depth of between 1.9 and 15.5 m bgl extended to a depth of between 39.0 and 53.7 m bgl; • 52 No. Trial Pits excavated to depths of up to 4.5 m bgl; • Geotechnical and environmental soil sampling and laboratory testing; and • 9 No. groundwater and gas monitoring standpipes.

Report title	Date	Location	Summary of scope/findings
			<p>The GI encountered Made Ground, south of the former landfill up to 6 m in thickness on existing airport land. Across the wider Century Park development, the investigation found clay with flints with varying thickness between 0.3 m and 8.2 m overlying chalk to depth the clay with flints was absent in the base of the dry valley.</p>
<p>Arup, Century Park Development, Contamination Preliminary Risk Assessment – Former Eaton Green Landfill</p>	<p>2017</p>	<p>Area A – Former Landfill</p>	<p>This report assessed the risk posed by the former Eaton Green Landfill, it utilises existing sources of information to produce an interpreted 3D ground model. The key findings are summarised as follows:</p> <ul style="list-style-type: none"> • Former landfill has been filled from 1940's to the late 1980's; • Due to the age of the landfill it is likely to be 'dilute and disperse', therefore unlined with leachate migrating and diluting within the groundwater; • The landfill lies within a dry valley, formed by periglacial process. The upper slopes have cohesive strata which would act as a barrier to downward migration where it is present. However the lower parts and base of the valley are fluvial deposits and exposed chalk which are permeable, as such contamination will migrated downwards more readily; • Historical information suggests a range of waste present within the landfill, including wastes from car scrap yard, aircraft manufacturing facility, local industry (such as Laporte Chemical works) and household waste; • Groundwater level may be depressed due to abstraction in the area, with a possibility that if abstraction cease groundwater levels would rise, resulting in water emerging in the currently dry valley; • The infilled waste is unsored and uncompacted, there is evidence of settlement noted during the site walkover; • The chalk aquifer underlying the site is highly protected as it is the main source of public water in the region, the nearest abstraction for public water supply is located 3km northeast; • Groundwater levels from previous investigations suggested groundwater is not present within the landfill. As the investigations indicated that wastes were generally dry. This may mean the leachate production potential of the waste is limited; • 3D interpretive model estimates 4.5million m³ of waste is present within the landfill; • Limited information on contamination is available, restricted to the western boundary, where development has already been undertaken;

Report title	Date	Location	Summary of scope/findings
			<ul style="list-style-type: none"> Identified a number potential pollutant linkages (PCLs) which may pose a risk to future development, including risks from ground gases/vapours and risks to the underlying Chalk Aquifer; and A number of physical conditions on site likely to present potential risk to any development, such as large obstructions, settlement, aggressive ground conditions and solution features. <p>It recommended comprehensive site investigation to determine the geo-environmental and geotechnical risks, further risk assessment to quantify this risk.</p>
Structural Soils Landfill Factual Report on Ground Investigation	June 2017	Area B	<p>This is a factual GI report undertaken on the landfill to inform the Century Park development. This was a preliminary site investigation based on the findings of the PRA (2017). The GI comprised of:</p> <ul style="list-style-type: none"> 18 No. resonance (sonic) boreholes drilled to a depth of between 6.00 m bgl and 60.00 m bgl; 2 No. Cable Percussion Boreholes extended with rotary drilling. Boreholes to a depth of between 6.45m bgl – 9.00 m bgl with rotary follow on to a depth of 58.50 m bgl; 9 No. permeability tests in boreholes; 26 No. Dynamic Probe Penetrometer tests; Geotechnical and environmental soil sampling and laboratory testing; and 17 No. groundwater and gas monitoring standpipes. <p>The GI recorded landfilled wastes up to 20m thickness over the landfilled area. This was underlain by Clay with Flints (sides of valley only) highly plastic clay containing flint gravel, thickness was generally 3 m but up to 15 m in places. Structureless Chalk was noted beneath the superficial deposits recovered as sandy very silty gravel or sandy gravelly silt, in some places, at the base of the landfill, wastes were placed directly onto the chalk. No evidence of a basal ‘liner’ layer to the landfill was noted.</p>
Arup Century Park Development, Landfill Area Contamination Quantitative Risk Assessment.	Sept 2017	Area A – Former Landfill	<p>The aim of this report was to build on the findings of the Preliminary Risk Assessment (PRA) to inform the Century Park development. It presents a quantitative contamination risk assessment relating to human health, ground gas and groundwater. The main findings of this report were as follows:</p> <ul style="list-style-type: none"> Characterisation of the waste was undertaken which indicated the main categories were construction and demolition, industrial waste, old domestic and recent domestic waste. Industrial type wastes were only encountered in a few locations associated with older eras of waste.

Report title	Date	Location	Summary of scope/findings
			<ul style="list-style-type: none"> • Testing did not suggest a significant variation in chemistry between the different eras of filling. Visual and olfactory evidence of contamination were identified, including; clinker, ash, black staining, hydrocarbon odours. Daily cover materials were encountered and classified as non-chalky or chalky both with limited waste content and encountered at variable depths. Significant depth of ‘cover’ material was noted but not considered to be an engineered cap. • Perched waters were not recorded during the investigations. Post fieldwork groundwater levels measured in the boreholes were typically around 110 mAOD (40 mbgl) and ranged between 22 m – 38 m below the base of the landfill. • Limited quantities of leachate were recorded. Comparison of leachate analysis results against typical compositions of leachate depending on stage of decomposition (Stages 1-4) suggested the landfill is approaching an aged state between stages 3/4 with low gassing and leachate potential. • The results of the gas monitoring indicated methane and carbon dioxide concentrations were higher in the northern part of the landfill (although limited data across the central area). Maximum recorded concentrations were 62.1% v/v for methane and 53.1% v/v for carbon dioxide with a maximum positive flow rate of 3.6l/hr. This is consistent with this area being filled more recently and the waste being less degraded than the southern part of the landfill. • Low levels of methane (<0.1 v/v) were detected outside the landfill boundary, maximum carbon dioxide was 9.7v/v, maximum flow was 0.6l/hr. • Asbestos was identified at 3No. borehole locations, chrysotile fibres were identified below the limit of detection <0.001%. • The results indicated the chemistry of the landfill presents a low risk to future site users assuming a clean cover system to remove potential pathways and protect the development from odours and the poor physical properties of the waste. • Comparison of groundwater quality analysis results from below the landfill and area to the east, against generic guidance values (UK DWS, EU DWS, EQS) identified several contaminants which exceeded the guidelines. Detailed modelling was undertaken. This concluded that overall there is little evidence that the landfill is causing significant contamination of the groundwater. This suggests that providing appropriate techniques are used during construction to prevent downward migration of contaminants, it is unlikely that the new development will result in significant contamination of the groundwater. <p>Recommendations were made for further site investigation of the landfill area, including groundwater and gas monitoring to confirm the findings of the assessment and refine the CSM.</p>

Report title	Date	Location	Summary of scope/findings
Arup. Luton Airport Mass Passenger Transit System. Land Contamination Preliminary Risk Assessment	2017	Adjacent to areas Luton Parkway Station and Existing Airport Land.	This report is a desk-based assessment of the contamination risks associated with the route of the Mass Passenger Transit (MPT) System which runs from Luton Parkway Station to Terminal 1 at Luton Airport. A conceptual site model (CSM) was produced identifying potential pollutant linkages (PCLs) which may pose a risk to future development, including risks from ground gases/vapours and risks to the underlying Chalk Aquifer. Potential geotechnical constraints/risks to the development were identified. A comprehensive site investigation was recommended to determine the geoenvironmental and geotechnical risks and inform the design of the development.
Structural Soils. London Luton Airport Mass People Transfer Ground Investigation Phase 1: Factual Report on Ground Investigation.	2017	Adjacent to areas Luton Parkway Station and Existing Airport Land.	This is a factual GI report undertaken along the proposed MPT route. This was a preliminary site investigation based on the findings of the PRA (2017). This was a preliminary GI and consisted of 16 cable percussion boreholes, 7 of which were extended by rotary drilling, 1 rotary cored borehole, 8 trial pits, 1 hand dug pit and 3 hand dug trial trenches. The GI recorded Made Ground of variable composition along the route, with the thick deposits encountered near to Luton Parkway Station up to 7.5m. Clay with Flint deposits were absent in the area of Parkway Station, where the Made Ground is directly underlain by the Chalk bedrock. However, in the area of the existing airport Clay-with-Flint deposits overly the Chalk and are present up to 8m in thickness.
Arup. Luton Airport Mass Passenger Transit System. Land Contamination Quantitative Risk Assessment.	June 2017	Adjacent to areas at Luton Parkway Station and Existing Airport Land.	The aim of this report was to build on the findings of the Preliminary Risk Assessment (PRA) to inform the MPT development. It presents a quantitative contamination risk assessment relating to human health, ground gas and groundwater, as well as characterisation of the waste and analysis of leachate, soil and groundwater quality. The following was noted: <ul style="list-style-type: none"> • There were no exceedances in the soil or groundwater when compared to the relevant human health GACs. Therefore, no remediation is required at the site with respect to human health. • No asbestos fibres were detected in the soil samples submitted to the laboratory for testing. • Assessment of the ground gas results indicated a low risk according to CIRIA C665. The worst case measurement resulted in a classification of CS1 conditions. However, it was recommendation that consideration was given to possible preferential pathways associated with the former Eaton Green landfill 90 m east of the existing airport; • Concentrations of several contaminants in soils and groundwater exceeded the generic controlled waters criteria. Therefore, further assessment of these contaminants was required by undertaking a DQRA. • The controlled waters DQRA was undertaken using the Environment Agency remedial targets worksheet. Overall, the quantitative risk assessment indicated that the

Report title	Date	Location	Summary of scope/findings
			identified potential pollutant linkages were low risk and no remediation was required at the site with respect to contamination.
Arup, Century Park, Airport Way, Play and Skate – Contamination Desk Study	2018	Area B	<p>This report was undertaken to assess potential contamination issues which could affect the proposed playground. It noted the following:</p> <ul style="list-style-type: none"> no previous contaminative uses on site; a number of off-site contaminative uses such as Made Ground, allotment and landfill; and potential pollutant linkages of very low to low risk were identified, which could be mitigated by design. <p>It recommended suitable supervising to appropriately manage any unforeseen contamination, and the production of a Materials Management Plan, if material is</p>
Arup London Luton Airport Expansion Ground Investigation Strategy	2018	Area A – Former Landfill	This report sets out the strategy for further ground investigation of the landfill. The GI strategy was based on the findings of the Arup (2017) DQRA report for the Green Horizons Park. The report set out the requirements for investigation of the potential pollutant linkages (PCLs) identified in the DQRA.
AECOM Luton Hangar 24 Ground Investigation. Factual Ground Investigation Report	Feb 2018	Area A - Area of Tidy Tip and TUI car park, north western corner of the former landfill	<p>This is a factual GI report undertaken to inform the construction of a new maintenance facility comprising garage space, offices and workshops. The GI comprised:</p> <ul style="list-style-type: none"> 2 No. Cable Percussion Boreholes (BH101-BH102) drilled to 20.00m and 21.00m bgl; 3 No. Cable Percussion boreholes (BH104-BH106) drilled to between 4.50 m and 4.95 m bgl; 5 No. Windowless Sampling Boreholes (WS101-WS105) drilled to between 4.80 m and 6.00 m bgl; 5 No. Machine Excavated Trial Pits (TP102 and TP104-TP107) excavated to between 2.90 m and 4.50 m bgl; <p>Geotechnical and environmental soil sampling and laboratory testing;</p> <ul style="list-style-type: none"> 2 No. Falling Head Permeability Tests; and 3 No. groundwater and gas monitoring standpipes. <p>In addition, the following was undertaken in an area south of the site to inform on the design for a new entry roadway into the Eaton Green Civic Amenity Site ‘Tidy Tip’ to the south of the site:</p> <ul style="list-style-type: none"> 1 No. Cable Percussion Borehole (BH103) drilled to 4.50 m bgl. 1 No. Machine Excavated Trial Pit (TP101) excavated to 4.00m bgl. 1 No. Machine Excavated Trial Pit (TP101) excavated to 4.00 m bgl.

Report title	Date	Location	Summary of scope/findings
Arup, Proposed Airport Potential Parking Sites, Review of Ground and Construction Issues	2018	Two parcels of land close to Luton Parkway Station	<p>This desk-based report assessed land contamination and geotechnical issues. A summary of its findings are as follows:</p> <ul style="list-style-type: none"> • A number of historical sources of contamination on and off site, e.g., former motor works, rifle range, sewage works and railway and railway sidings; • Significant uncharacterised material imported for fill to produce development platforms, which poses a geo-environmental and geotechnical risk; • A conceptual site model identifying potential pollutant linkages (PCLs); and • A lack of previous geotechnical or geoenvironmental investigation. <p>The report made the following recommendations:</p> <ul style="list-style-type: none"> • Site investigation to characterise material present on site; and • Revised risk assessment to revise and PCLs.
Arup London Luton Airport Limited, Hangar 24 Ground Investigation Interpretative Report	July 2018	Area A - Area of Tidy Tip and TUI car park, north western corner of the former landfill	<p>The interpretive report was based on the Aecom GI undertaken in 2017.</p> <ul style="list-style-type: none"> • Works comprised 2 No. deep boreholes to 20.0m and 21.0m bgl and 3No. shallow boreholes to 4.5 to 4.95m bgl, windowless sampling boreholes up to 6.0m bgl and machine excavated trial pits, geotechnical and environmental soil sampling and laboratory testing. Standpipes for gas monitoring in the Made Ground were installed, with monitoring completed on 6 occasions between October 2017 and January 2018. • The GI did not encounter any landfilled wastes, Made Ground was recorded to depths up to 3.0m thickness underlain by Clay with Flints/Glacial Till overlying Holywell Nodular Chalk Formation and New Pit Chalk Formation. Chalk was classified as CIRIA Grade Dm to approximately 9.5m bgl grading onto CIRIA Grade B. • Groundwater was not encountered during drilling; perched water was recorded in the Made Ground during monitoring works. • No chemical contaminants in exceedance of guideline values were identified in car park area or evidence of asbestos containing materials/fibres. Lead and dibenz[ah]anthracene were detected at concentrations above Arup assessment levels in soil samples taken from the bunds around the Tidy Tip. Asbestos was also found in samples taken from the bunds. The identified contaminants were not considered a risk to human health, and remediation works were not considered necessary, however it was recommended suitable control measures be adopted during site preparation and construction works. • No risk to groundwater was identified from the recorded contamination. • Ground gas assessment based on a peak concentration of CO₂ at 2.9% and maximum average flow indicated a Characteristic Situation 2 would be applicable, and

Report title	Date	Location	Summary of scope/findings
			<p>basic gas protection measures would be required for the new building. The potential for gas migration from the adjacent landfill was identified and precautionary measures were proposed such as continuous trenching around the proposed building to detect any potential pathways e.g., old land drains/service trenches.</p> <ul style="list-style-type: none"> • Geotechnical recommendations were for traditional spread pad foundations in the Glacial Till/Clay with Flints or driven piles with ground bearing floor slab. The use of soakaways was not considered feasible. • The report concluded that there is no evidence that the area currently occupied by the TUI car park was ever part of the former landfill. The ground investigation found that there is a limited thickness of Made Ground beneath the majority of the car park and that what was found was typical of the formation of a hardstanding. • Historical maps and other records suggest that the Tidy Tip site was a 'scrapyard' within the landfill area and that the bunds that form part of the Hangar 24 site were formed when the scrapyard was cleared and levelled to form the tip site. • Based on the proposed development no remediation of the site was considered to be required with respect to human health or controlled water.
GL Hearn, Environmental Statement (Volume 1: Non-Technical Summary) New Century Park Luton and Volume 2: Environmental Statement – Addendum, Land Adjacent to Luton Airport: New Century Park	2018	Airport Access Road within Area A - Former Landfill	<p>The Environment Statement reports the findings of the Environmental Impact Assessment (EIA) undertaken to identify the likely significant effects arising from the Proposed Development. The ES covers Ground Conditions and Contamination [TR020001/APP/5.01] along the route of the proposed access road and the business park. Assessment of the former landfill area is based on Arup (2017) Century Park Development, Landfill Area Contamination Quantitative Risk Assessment (described in detail above). Other areas of contamination noted were as follows:</p> <ul style="list-style-type: none"> • Localised asbestos contamination within the Made Ground; and • Substantial Made Ground deposit were encountered in the vicinity of Airport Way <p>The ES concluded following suitable mitigation there were no significant effects.</p>
Geotechnics Century Park Access Road Additional Works. Factual Report.	2018	Airport Access Road - area between the A505 Airport Way and Proctor Way with additional holes along Princes Way	<p>This is a factual site investigation report undertaken to supplement information along the access road undertaken by Geotechnics Ltd for Opus International Consultants in August 2018. Exploratory locations were advanced in two distinct areas between the A505 Airport Way and Proctor Way and also at the junction of Eaton Green Road and the access road to the Tidy Tip. The GI Comprised of:</p> <ul style="list-style-type: none"> • 7 Cable percussion boreholes to depths between 1.2 and 15.0m bgl; • 2 Cable Percussion with follow on rotary drilling to depths of 20.0m bgl; • 2 Dynamic window sample holes with follow on rotary drilling to depths between 0.5 and 7.5m bgl;

Report title	Date	Location	Summary of scope/findings
		and between Eaton Green Road and the Tidy Tip access road.	<ul style="list-style-type: none"> • 10 Dynamic window sample holes to depths between 1.00 and 7.45m bgl; • 13 trial pits up to depths between 0.5 and 4.5m bgl; and • 7 Concrete cores to depths between 0.26m and 0.37m bgl; <p>The presence of hydrocarbon odours, discolouration and the presence of membranes and geotextiles were observed across areas of the scheme.</p>
AECOM Luton Airport Landfill Main Ground Investigation Factual Report	2019	Area A – Former Landfill	This is a factual GI report undertaken to inform the works associated with the expansion of the airport based on the Arup (2018) Ground Investigation Strategy. Investigation locations were more closely spaced since this was a main GI, with some off-site locations included to assess off-site conditions. No interpretation of this GI has been undertaken yet. Preliminary findings, where relevant, have been included in this report.
Mott MacDonald, Taxiway Foxtrot Verification Report	Oct 2019	Existing Airport Land/Area A and LLAOL Contractor's Compound	<p>Mott MacDonald prepared a Verification Report for the remediation works completed as part of the creation of the Foxtrot Taxiway. The taxiway was constructed to the east of terminal 1 and the north eastern corner lies over the former Eaton Green Landfill. The aim of the report was to confirm that the remediation objectives identified in the Ivy House Environmental remediation method statement (RMS) were achieved. The report was submitted to discharge the second part of planning condition No. 19 related to site remediation and verification. The report summarises the previous site investigations and assessments completed for the area, the earthworks and construction works completed, including materials management data relating to volumes of soil types excavated and reused or imported, verification testing of the chemical quality of the soils, volumes and type of materials disposed off-site and discussion on compliance with environmental management systems. The Information reviewed included:</p> <ul style="list-style-type: none"> • Chemical test results by i2 Analytical Ltd, including soil quality and leachate analysis; • Waste acceptance criteria analysis; • As built drawings; • Hazardous waste consignment notes, waste carrier registration and landfill site permit; and • Materials Management Plan (MMP) Verification Report. <p>The report states the earthworks were completed under a materials management plan prepared by Ivy House Environmental dated November 2018 with a QP declaration submitted in June 2019 after Environment Agency and LBC agreed in principle to the works. However, the works were completed in October and November 2018. It confirms that a variety of materials were reused in the development area; topsoil, 2C stony cohesive material from cut and drainage excavations and landfill capping materials. A total</p>

Report title	Date	Location	Summary of scope/findings
			<p>volume of 22,322m³ of cut materials were reused in the scheme from a total volume of 24,175m³.</p> <p>The chemical analysis results were verified against '<i>limiting criteria</i>' for public open space land use and leachate data against UK drinking water standards. Ivy House Environmental calculated site-specific criteria using the CLEA model for contaminants which exceeded these generic criteria; benzo(b)fluoranthene, dibenzo(ah)anthracene and lead using a commercial exposure scenario with no building present, and a human receptor of working age. Some exceedances of the applied criteria were noted, generally metals, however, a low risk was concluded due to the use of materials beneath hardstanding.</p> <p>No unexpected contamination was identified and no pollution incidents or non-compliance with environmental management plan during the works.</p> <p>The report notes that exported materials included landfill materials and excess 2C classified arisings, which were taken to either landfill or waste treatment facility confirmed by copies of waste transfer and hazardous waste consignment notes. A volume of topsoil was retained on site in stockpile for use around the airport.</p> <p>A revised CSM was produced to assess risks to receptors on completion of the works, all residual risks were concluded to be low or very low.</p> <p>The report concluded there was compliance with the remediation method statement.</p>

Appendix G - Preliminary Risk Assessment

G1 Main Application Site CSM and PCLs

Table G1.1: Main Application Site – Area A- Former Landfill, Existing Airport Land, LLAOL Contractor’s Compound, Airport Access Road, Area B and Area C CSM and PCLs.

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
Area A						
1	Ground gases from former landfill e.g. methane and carbon dioxide	Migration into future buildings and build-up of gases within confined spaces.	Users of the future development – public/airport operatives/Green Horizons Park users	Very High	The assessment of monitoring data undertaken for the proposed Green Horizons Park indicates elevated landfill gases, particularly in the areas of thicker more recent waste disposal in the north of the landfill, although associated with low flow rates. Overall the measurements typically indicated CS2 or CS3 scenario with CS4 encountered on one occasion.	Yes - further detailed assessment of recent GI to understand the gassing conditions after work is undertaken to remodel the landfill. Risk to future development can be mitigated by appropriate design of ground gas control measures.
2		Migration off-site through preferential pathways	Adjacent site users (e.g. residential housing and other buildings on Luton Airport, WVP	Moderate	Current ground gas monitoring and assessment indicates there is no evidence of landfill gas migrating to adjacent areas. However, the gassing conditions may be affected by the proposed remodelling of the landfill for the Proposed Development.	Yes - further detailed assessment of recent GI is required to understand the

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
			Community Centre/ pavilion)		Mitigation measures will be required to treat existing pathways e.g. Thames Valley Drain and install control measures e.g. vent trench, to prevent preferential pathways forming.	gassing conditions after work is undertaken to remodel the landfill.
3	Volatile radionuclides occupying buildings overlying radioactive land contamination	Migration into future buildings and build-up of gases	Users of future development – public/airport operatives/Green Horizons Park users	Low/ Moderate	The recent GI included testing for radionuclides, which indicated levels observed were consistent with background levels.	No
4		Migration off-site through preferential pathways	Adjacent site users (e.g. residential housing and other buildings on Luton Airport, WVP Community Centre/ pavilion)	Low/ Moderate	The recent GI included testing for radionuclides, which indicated levels observed were consistent with background levels.	No
5	Waste in former landfill	Direct contact e.g. dermal contact, soil ingestion	Construction worker	Low	Construction workers may be exposed to areas of landfill waste during excavation/construction. This can be reduced by adoption of appropriate site management protocols and PPE.	No
6			Future maintenance workers	Low/ Moderate	Maintenance workers may be exposed to areas of landfill waste during future excavation. This can be reduced by placement of services in a clean cover system and adoption of appropriate site management protocols and PPE.	No

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
7			Users of future development – public/airport operatives/Green Horizons Park users	Low	The GI completed to date indicates the risk to future users of the new airport development is likely to be low, most contaminants were below their respective GAC. The future development will also comprise buildings & hardstanding and therefore there is unlikely to be any contact with landfilled wastes.	Yes - further assessment will be required of the most recent GI data based on the land use scenarios associated with the proposed airport expansion to confirm this assessment.
8		Direct or indirect contact with radionuclides – incurring radiation dose by indirect dose received from ingestion of radium (or other alpha emitting contaminated material) or direct risk from contact with beta emitters such as Carbon-14 or Caesium-137	Construction workers	Low/ Moderate	Potential for radioactive materials to be present within the earlier waste which was deposited prior to the introduction of the Radioactive Substances Act in 1963. Potential for arisings from piling and foundation activities to encounter such materials. The recent GI included testing for radionuclides, which indicated levels observed were consistent with background levels.	Yes - Procedures during construction should be in place to detect any radionuclides which may be encountered.
9			Future maintenance workers	Low	Potential for radioactive materials to be present within the earlier waste which was deposited prior to the introduction of the Radioactive Substances Act in 1963. Potential for maintenance workers to be exposed to areas of landfill waste during future excavation. This can be reduced by placing of services in a clean cover system and adoption of appropriate site management protocols and PPE.	Yes - The recent GI included testing for radionuclides. Assessment of this data is required to inform the risks from this PCL.

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
10			Users of future development – public/airport operatives/Green Horizons Park users	Low	Radioactive material (if present) will be limited to the earlier waste in the landfill – new development unlikely to be in contact with older waste. The future development will comprise buildings & hardstanding and likely include an engineered cover layer, therefore there is unlikely to be any contact with landfilled wastes. The recent GI included testing for radionuclides, which indicated levels observed were consistent with background levels. The risk assessment suggests there are not significant concentrations of volatile contaminants present within the landfill soils/groundwater.	No
11		Inhalation of vapours	Construction worker	Low	The risk assessment suggests there are not significant concentrations of volatile contaminants present within the landfill soils/groundwater.	Yes - The recent GI included testing for vapours. Assessment of this data is required to inform the risks from this PCL.
12	Future maintenance workers		Low			
13			Users of future development – public/airport operatives/Green Horizons Park users	Low	The assessment of the monitoring results undertaken as part of the 2016 Structural Soils GI works indicated that levels of soil vapours did not pose a risk to future users of the Proposed Development (Hazard Index <1.0).	

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
14		Inhalation of airborne contaminants/ dust/ asbestos fibres and micro-organisms	Construction workers	Moderate	Construction workers are likely to be exposed to areas of landfill waste during future excavation. Any excavation work would adopt appropriate site management protocols and PPE to include personal monitoring and protection against airborne asbestos fibres as necessary based on outcome of risk assessments.	Yes – further assessment of asbestos in soils results from the recent GI.
15			Users of future development – public/airport operatives/Green Horizons Park users	Low	The future development will be buildings and hardstanding and likely include an engineered cover layer, therefore there is unlikely to be any exposure of landfilled waste at the surface which could generate dusts..	No
16			Adjacent site users (e.g. residential housing, Luton Airport visitors and operatives, users of WVP)	High	Future works will require significant movement of waste i.e. for waste processing/re-engineering, therefore there is the potential for generation of airborne contaminants, which could affect adjacent site users. Good site management practices, monitoring and mitigation measures would reduce the potential risk. Any future works will be undertaken in accordance with a code of construction practice (CoCP) which would include perimeter monitoring, with adoption of additional control measures as necessary.	Yes - further assessment of asbestos in soils results from the recent GI.
17		Driving of contaminants downward during any future piling	Principal aquifer in Chalk	Moderate	The quantitative risk assessment [ref. 50] has indicated that based on current data there is a low likelihood that groundwater would be impacted by contaminants in the landfill. Care will be required during construction not to create a pathway. Risk from piling and construction can be mitigated	Yes - Further detailed risk assessment of the recent GI data is required to inform the risks from this PCL.

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
					by completion of foundation works risk assessment report to determine appropriate assessment for pile design and construction.	
18		Direct contact of foundations of future development	Foundations of future buildings, and other structures such as piers/buried infrastructure	Moderate	Presence of landfill waste in contact with building foundations / buried infrastructure may cause damage to foundations through aggressive ground conditions. Site GI in the design of the foundation. Risk can be mitigated by appropriate design to select suitable foundation materials/concrete classification.	Yes
19	Japanese Knotweed	Direct contact with rhizomes on floor slabs, external pavement and drainage	Floor slabs/drainage/pavement	Moderate/ Low	Japanese Knotweed has been identified in WVP, this can cause damage to buried infrastructure/buildings and pavement through growth of rhizome. Risk can be mitigated through application of remedial works; treatment with herbicide/removal/on-site burial/containment.	Yes – remedial works
20	Landfill leachate	Direct contact e.g. dermal contact	Construction workers	Moderate/ Low	Construction workers may be exposed to landfill leachate during future excavation works. The previous GI undertaken indicates there is likely to be limited leachate present. Any excavation work would adopt appropriate site management protocols and PPE.	Yes - further detailed risk assessment of the recent GI data is required to inform the risks from this PCL.
21			Future maintenance workers			

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
					appropriate site management protocols and PPE.	
22			Users of future development – public/airport operatives/Green Horizons Park users	Low	The previous GI undertaken indicates there is likely to be limited leachate present. However, the future development will be buildings and hardstanding and is likely to include an engineered cover layer and leachate control system, therefore there is limited potential for contact with any leachate in the landfill.	Yes - further detailed risk assessment of the recent GI data is required to confirm the risks from this PCL.
23		Downward migration of leachate	Principal aquifer in Chalk	Moderate/ Low	The previous GI undertaken indicates there is likely to be limited leachate present. The groundwater monitoring data from beneath the landfill and outside the boundary does not suggest a significant leachate plume affecting the aquifer.	Yes - further detailed risk assessment of the recent GI data is required to inform the risks from this PCL.
24		Direct contact with foundations of future development	Foundations of future structures/buried infrastructure	Moderate/ Low	Presence of leachate in contact with building foundations may cause damage to foundations through aggressive ground conditions. The previous GI undertaken indicates there is likely to be limited leachate present.	Yes - further detailed risk assessment of the recent GI data is required to inform the risks from this PCL.
25		Leachate breakout and plant uptake	Areas of Landscaping in the airport and Green Horizons Park developments/ WVP allotments	Low	No evidence of leachate breakout currently occurring. The previous GI undertaken indicates there is likely to be limited leachate present. A clean cover system with suitable depth of growth medium will further reduce this risk.	Yes - further detailed risk assessment of the recent GI data is required to inform the risks from this PCL.

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
26	Contaminants in perched water	Driving of contaminants downward during any future piling	Principal aquifer in Chalk	Low	The GI indicated the waste was relatively dry and no evidence of significant perched water in the landfill was encountered. Risk from piling and construction can be mitigated by completion of foundation works risk assessment to determine appropriate assessment for foundation design and construction.	Yes - further detailed risk assessment of the recent GI data is required to inform the risks from this PCL.
27		Migration of contaminants via preferential pathways e.g. drainage	Principal aquifer in Chalk	Moderate	Existing drainage runs such as the TVD could create preferential pathways.	Yes – identification and treatment of potential preferential pathways e.g. TVD
28			Thames Water storage pond	Very Low Risk	Thames Water compound storage pond present in the north of Area A will remain in place during the Proposed Development.	Yes Appropriate site management and construction techniques will be required during the development construction process in the vicinity of the current pond.
29	Contaminants in Made Ground (car park, capping material)	Direct contact e.g. dermal contact, soil ingestion	Construction workers	Moderate/ Low	Construction workers will likely be exposed to areas with contaminated Made Ground during earthworks. Any excavation work would adopt appropriate site management protocols and PPE.	Yes

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
30			Future maintenance workers	Moderate/ Low	Maintenance workers may be exposed to areas of contaminated Made Ground during future excavation where buried infrastructure is placed adjacent such materials. Any future excavation work would adopt appropriate site management protocols and PPE. The risk can be further reduced by placement of services in a clean cover system.	Yes
31			Users of future development – public/ airport workers/users of Green Horizons Park.	Low	The GI indicated the risk to future occupants of the development is likely to be low. The future development will incorporate hardstanding and/or include an engineered cover layer therefore there is unlikely to be any contact with contaminants in the Made Ground.	Yes - further detailed risk assessment of the recent GI data is required to inform the risks from this PCL.
32		Inhalation of soil derived dusts/ asbestos fibres	Construction workers	Moderate	Construction workers will be exposed to Made Ground during earthworks. Any excavation work would adopt appropriate site management protocols, air monitoring, personal monitoring and PPE.	Yes
33		Future maintenance workers	Moderate/ Low	Maintenance workers may be exposed to Made Ground during future excavation where buried infrastructure is placed adjacent such materials. Any future excavation work would adopt appropriate site management protocols, and PPE. Where possible services should be placed in clean cover layer.	Yes	
34		Users of future development – public/ airport workers/users of	Low	The future development will be predominately buildings and hardstanding and likely include an engineered cover layer, therefore there is unlikely to be any exposure	No	

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
			Green Horizons Park		of Made Ground at the surface which could generate dusts etc.	
35			Adjacent site users (e.g. residential housing, Luton Airport, WVP)	Moderate/ Low	There is the potential for soil derived dusts which contain contaminants to be generated during construction works. Good site management practices and mitigation measures would reduce the potential risk, which will be detailed in the CoCP, and include perimeter monitoring.	Yes - further detailed risk assessment of the recent GI data is required to inform the risks from this PCL.
36		Inhalation of vapours	Construction worker	Low	The 2017 Structural Soils (Ref. 46) GI indicated levels of volatile contaminants in the Made Ground are not significantly elevated (HI <1.0), exposure is also likely to be in outdoor air and therefore vapours will be diluted.	Yes - further detailed risk assessment of the recent GI data is required to inform the risks from this PCL.
37	Future maintenance workers					
38	Users of future development – public/ airport workers/users of Green Horizons Park		Moderate/Low			
39	Adjacent site users (e.g. residential housing, Luton Airport, WVP Buildings)		Low			
40	Contaminants in groundwater (dissolved phase)	Lateral migration of contaminants in groundwater	Controlled waters (including potable water)	Moderate	Assessment of the GI for the Green Horizons Park development.	Yes - further detailed risk assessment of the recent GI data is

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
			groundwater abstraction)			required to inform the risks from this PCL.
41	Unexploded Ordnance	Driving of piles impact UXO	Construction workers/public/terminal buildings	High/ Moderate	Based on Detailed UXO Risk Assessment 'Very High' probability of UXO on-site.	Yes - correct detection and monitoring procedures will be required during site works to mitigate risks.
Existing Airport Land						
1	Contaminants in Made Ground	Direct contact e.g. dermal contact, soil and/or ingestion	Construction workers	Moderate/ Low	PAHs have been encountered as above the adopted assessment criteria. Asbestos was encountered in isolated instances. Discrete/unencountered contamination may be present within the Made Ground. Any excavation work should adopt appropriate site management protocols and PPE.	Yes – additional investigation into the areas proposed for construction to verify existing mitigation requirements and design measures prior to construction.
2			Future maintenance workers	Low	Maintenance workers may be exposed to areas with contaminated Made Ground during future excavation. Any future excavation work would adopt appropriate site management protocols and PPE.	No
3			Users of future development – members of the	Very Low	The final constructions will re-instate the hardstanding and, therefore there is unlikely to be any contact with contaminants in the Made Ground.	No

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
			public/ airport operatives			
4		Inhalation of soil derived dusts/ asbestos fibres	Construction workers	Moderate	Construction workers will be exposed to Made Ground during excavation. Any excavation work would adopt appropriate site management protocols, air monitoring, personal monitoring and PPE.	Yes - additional investigation into the areas proposed for construction to verify existing mitigation requirements and design measures prior to construction.
5			Future maintenance workers	Low	Maintenance workers may be exposed to Made Ground during future excavation where buried infrastructure is placed adjacent such materials. Any future excavation work would adopt appropriate site management protocols, and PPE. Service trenches should be backfilled with clean materials.	Yes
6			Users of development-public/ airport workers	Very Low	The future development will be predominately buildings and hardstanding, therefore there is unlikely to be any exposure of Made Ground at the surface which could generate dusts etc.	No
7			Adjacent site users (e.g. residential housing, Luton Airport)	Low	There is the potential for soil derived dusts which contain contaminants to be generated during construction works. Good site management practices and mitigation measures would reduce the potential risk, to include perimeter monitoring.	Yes

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration		
8		Inhalation of vapours	Construction worker	Low	The GI to date does not indicate there are significant concentrations of volatile contaminants presented within the Made Ground. Exposure is likely to be in outdoor air and therefore vapours will be diluted. Any work would adopt appropriate site management protocols, and PPE.	Yes – additional investigation into the areas proposed for construction to verify existing mitigation requirements and design measures prior to construction.		
9			Future maintenance workers					
10			Users of future development-public/ airport workers	Low			Volatile contaminants may accumulate within indoor air in extensions to terminal 1 and in Luton DART extension. The GI to date does not indicate there are significant concentrations of volatile contaminants presented within the Made Ground.	Yes - additional investigation into the areas proposed for construction to verify existing mitigation requirements and design measures prior to construction.
11			Adjacent site users (e.g. residential housing, Luton Airport)	Very Low			The GI to date does not indicate there are significant concentrations of volatile contaminants presented within the Made Ground.	No
12	Contaminants in Made Ground	Leaching of contaminants in soil to groundwater	Principal aquifer in the Chalk	Low	Groundwater quality is understood to be poor within the area. Previous assessments have indicated that leaching potential is low. The construction of hardstanding is likely to limit infiltration and reduce leaching potential further.	No		

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
13	Contaminants in Made Ground	Direct contact with contaminated materials	Building infrastructure (foundations), Services (water supply pipes)	Moderate	Aggressive ground conditions have not been assessed as part of previous reporting. Chemical attack on foundations may lead to expedited deterioration and cause stability issues to the final construct.	Yes – a BRE SD1 assessment of aggressive ground conditions should be undertaken to provide suitable classification of concrete. Should water supply pipes be included in the final scheme then a UKWIR assessment should be undertaken to inform pipe selection.
14	Contaminated Groundwater	Lateral migration of contaminants in groundwater off-site	Principal Aquifer	Low	Groundwater quality is understood to be poor within the area, Construction works may temporarily cause expedited migration or cause additional leaching potential by temporarily removing the hardstanding.	Yes – control measures to be included in CoCP
15	Ground gases from Made Ground (methane, carbon dioxide)	Migration into buildings and build-up of gases	Users of future development (public/airport operatives)	Very low	Previous investigation within the area indicates Made Ground is up to 1.5m in thickness which will exhibit limited gas generation. Organic content of the Made Ground beneath this area was not recorded however the log descriptions from the investigations do not indicate significant deposits or layers. Low levels of gas currently recorded.	No

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
16	Landfill gas migration (off-site source – Area A)	Lateral / vertical migration along permeable strata and migration into buildings/structures.	Users of future development (public/airport operatives)	Low to Moderate	Previous assessment has classified the area as a CS1 with a consideration to upgrade to CS2 based on a recorded carbon dioxide concentration. No evidence of landfill gas migration onto site. Extension of the Luton DART could from T1 could create a potential migration pathway for landfill gas.	Yes - further detailed risk assessment of the recent GI data from adjacent landfill is required to confirm the risks from this PPL and inform gas protection measures to be included in design of the Luton DART extension.
17	Unexploded Ordnance	Deep excavation	Construction workers/public/airport buildings	Moderate	Readily available information has given the area across the site a generic risk rating of "Moderate". The site is known to have been adjacent to large manufacturing areas that may have been targeted during the war.	Yes – A detailed desktop threat assessment should be undertaken to further clarify the risks associated with UXO prior to construction.
LLAOL Contractor's Compound						
1	Contaminants in Made Ground (including stockpiled materials)	Direct contact e.g. dermal contact, soil ingestion	Construction workers	Moderate/ Low	Construction workers will likely be exposed to areas with contaminated Made Ground during excavation/construction. Any future excavation work would adopt appropriate site management protocols and PPE.	Yes

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
2			Future maintenance workers	Low	The area is likely to undergo some filling during the development, predominately with uncontaminated soils (Clay with flints and chalk) from Area B . Maintenance workers are unlikely to be exposed to areas with contaminated Made Ground during future excavation. Any future excavation work would adopt appropriate site management protocols and PPE. The risk can be further reduced by placement of services in a clean cover system.	No
3			Users of future development – public/ airport workers/	Low	The future development will incorporate hardstanding and/or include an engineered cover layer therefore there is unlikely to be any contact with contaminants in the Made Ground.	No
4			Inhalation of soil derived dusts/ asbestos fibres	Construction workers	Moderate	Construction workers will be exposed to Made Ground during excavation/construction. Anecdotal evidence of ACMs within stockpiles. Any excavation work would adopt appropriate site management protocols, air monitoring, personal monitoring and PPE.
5			Future maintenance workers	Low	The area is likely to undergo some filling during the development. However, maintenance workers may be exposed to areas with contaminated Made Ground during future excavation. Any future excavation work would adopt appropriate site management protocols and PPE. The risk can be further reduced by placement of services in a clean cover system.	Yes - further risk assessment of the recent GI data is required to inform the risks from this PCL

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
6			Users of future development – public/ airport workers	Low	In the short-term during construction Made Ground materials will be placed on the surface to surcharge Area A. Materials to be compacted to reduce likelihood of airborne contaminants being mobilised. The future development will be predominately buildings and hardstanding and likely include an engineered cover layer, therefore there is unlikely to be any exposure of Made Ground at the surface which could generate dusts etc.	No
7			Adjacent site users (e.g. Luton Airport, WVP)	Moderate/ Low	There is the potential for soil derived dusts which contain contaminants to be generated during construction works. The 2016 Structural Soils GI indicated that the levels of contaminants in the Made Ground are not significantly elevated although asbestos fibres have been recorded in stockpiled soils. Good site management practices and mitigation measures would reduce the potential risk, to include perimeter monitoring.	Yes - further risk assessment of the recent GI data is required to inform the risks from this PCL
8		Inhalation of vapours	Construction worker	Low	Assessment of previous GI data [50] there are no significant concentrations of volatile contaminants presented within the Made Ground (HI <1.0). Exposure is likely to be in outdoor air and therefore vapours will be diluted. Further risk assessment of the recent GI data is required to inform the risks from this PCL	Yes - further risk assessment of the recent GI data is required to inform the risks from this PCL.
9	Future maintenance workers					
10	Users of future development – public/ airport		Low	Volatil contaminants may accumulate within indoor air in future buildings. Previous assessment [50] suggests there are no		

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
			workers/users of Green Horizons Park		significant concentrations of volatile contaminants presented within the Made Ground (HI <1.0).	required to inform the risks from this PCL.
11			Adjacent site users (e.g. residential housing, Luton Airport, WVP Buildings)	Low	Previous assessment [50] suggests there are no significant concentrations of volatile contaminants presented within the Made Ground (HI <1.0).	Yes - further risk assessment of the recent GI data is required to inform the risks from this PCL.
12		Leaching of contaminants in soil to groundwater	Principal aquifer in Chalk	Moderate/ Low	Made Ground to be excavated and temporarily placed over landfill to surcharge landfill materials prior to development. Materials will be compacted to reduce infiltration and encourage run-off of precipitation, reducing likelihood of contaminants being mobilised. Soils will be placed permanently beneath hardstanding within the development reducing potential for infiltration and leaching of contaminants to the Principal aquifer.	Yes - further risk assessment of the recent GI data is required to inform the risks from this PCL.
13		Driving of contaminants downward during any future construction works	Principal aquifer in Chalk	Moderate/ Low	Care will be required during construction not to create a pathway. Risk from piling and construction can be mitigated by completion of foundation works risk assessment to determine appropriate assessment for pile design and construction.	Yes - further risk assessment of the recent GI data is required to inform the risks from this PCL.
14	Contaminants in groundwater (dissolved phase)	Soakaways/ storage ponds	Principal aquifer in Chalk	Moderate/ Low	Soakaways and storage ponds present within LLAOL Contractor's compound will be removed during the Proposed Development. However, the soakaways currently provide a pathway to the chalk. Appropriate site management and construction techniques	Yes

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
					will be required during the construction process to reduce the risk to eth aquifer.	
15		Lateral migration	Controlled waters (including groundwater abstraction)	Low	Source unlikely to be within LLAOL Contractor's compound. However, it is thought that the groundwater in the area would be similar chemically to that within Area A.	Yes - further risk assessment of the recent GI data is required to inform the risks from this PCL.
16	Unexploded Ordnance	Driving of piles impact UXO	Construction workers/public/terminal buildings	High	Based on Detailed UXO Risk Assessment covering part of this area – Very High . Low Risk – where works are to be undertaken within post war fill material/Made Ground.	Yes - correct detection and monitoring procedures will be required during site works to mitigate risks.
Airport Access Road						
1	Contaminants in Made Ground	Direct contact e.g. dermal contact, soil and/or ingestion	Construction workers	Moderate	GI has been completed within the site boundary, although this has not covered all areas and the works have not addressed all potential contaminant sources. Made Ground is confirmed to be present within the boundary up to 20.0m in thickness. However no formal assessment of soils analysis results has been completed. Construction workers will likely be exposed to areas with contaminated Made Ground during excavation/construction. Any future excavation work would adopt appropriate site management protocols and PPE.	Yes – assessment of previous GI data plus additional GI to fill in data gaps and confirm mitigation and design requirements prior to construction.

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
2		Inhalation of soil derived dusts/asbestos fibres from the Made Ground	Future maintenance workers	Low	Future workers and end users are unlikely to encounter contaminated material due to the presence of the road hardstanding which breaks any plausible exposure pathways. If excavation was required workers would adopt appropriate site management protocols and PPE.	Yes – assessment of available GI soils analysis results. plus additional GI to fill in data gaps and confirm mitigation and design requirements prior to construction.
3			Construction workers	Moderate	Construction workers will be exposed to Made Ground during excavation/construction. Asbestos fibres have been recorded, however no formal assessment of results has been completed. Construction workers will likely be exposed to areas with contaminated Made Ground during excavation/construction. Any future excavation work would adopt appropriate site management protocols and PPE.	
4			Future maintenance workers	Low	Future workers and end users are unlikely to encounter contaminated material due to the presence of the road hardstanding which breaks any plausible exposure pathways. If excavation was required workers would adopt appropriate site management protocols and PPE.	
5			Adjacent site users (e.g. commercial units, residential areas, Luton Airport)	Low	There is the potential for soil derived dusts which contain contaminants to be generated during construction works. asbestos fibres have been recorded in Made Ground. Good site management practices and mitigation measures would reduce the potential risk, to include perimeter monitoring.	

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
6		Inhalation of vapours	Construction worker	Low	Evidence of TPH odours were recorded during previous GIs. Risk to construction workers and future maintenance workers is considered to be lower than future users as exposure is likely to be in outdoor air and therefore vapours will be diluted.	Yes - further detailed risk assessment of the recent GI data is required to inform the risks from this PCL, plus additional GI to fill in data gaps and confirm mitigation and design requirements prior to construction.
7			Future maintenance workers	Low		
8			Adjacent site users (e.g. commercial units, Luton Airport, buildings)	Low		
9		Leaching of contaminants to groundwater	Principal aquifer in the Chalk	Low	The presence of road hardstanding will reduce the infiltration and potential mobilisation of leachable contaminants It is also anticipated that the Airport Access Road will have a drainage and collection system to minimise percolation through contamination material.	
10	Ground gases from Made Ground e.g. methane, carbon dioxide	Migration into buildings and build-up of gases (off-site)	Users of adjacent commercial properties – public/airport operatives	Moderate	Ground gases may be produced where a significant thickness of made ground is present. Significant depth of Made Ground is present at the western end of the proposed Airport Access Road.	Yes - further detailed risk assessment of the recent GI data is required to inform the risks from this PCL, plus

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
						additional GI to fill in data gaps and confirm mitigation and design requirements prior to construction
11	Contaminants in soils	Direct contact with contaminated materials	Building infrastructure (foundations / piled foundations), Services (water supply pipes)	Moderate	Aggressive ground conditions have not been assessed as part of previous reporting. Chemical attack on foundations may lead to expedited deterioration and cause stability issues to the final construct. Contaminants may permeate through Water supply pipes laid within contaminated soils.	Yes – a BRE SD1 assessment of aggressive ground conditions should be undertaken to provide suitable classification of concrete. Should water supply pipes be included in the final scheme then a UKWIR assessment should be undertaken to inform pipe selection.
12	Unexploded Ordnance	Encountering UXO during excavation,	Construction workers/public/ commercial units	Low/Moderate	A detailed desktop threat assessment undertaken adjacent to this site indicated a “Low” to “Medium” Risk. However, excavations are likely to be shallow as the proposed road is to be built up from existing levels.	Yes – correct detection and monitoring procedures will be required during site works to mitigate risks

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration	
Area B							
1	Contaminants in Made Ground (including proposed fill material)	Direct contact e.g. dermal contact, soil ingestion	Construction workers	Very Low	Very little Made Ground present within Area B. Previous GI has not identified any evidence of soil contamination in exceedance of generic guidance for public open space within the existing site materials. Fill material used on-site will be suitable for use and will not present a risk to human health or controlled waters.	No	
2			Future maintenance workers				
3			Users of future development – public/ airport workers				
4			Inhalation of soil derived dusts	Construction workers	Very Low	Very little Made Ground present within Area B. Previous GI has not identified any evidence of soil contamination in exceedance of generic guidance for public open space within the existing site materials. Fill material used on-site will be suitable for use and will not present a risk to human health or controlled waters. Areas of hardstanding will further reduce the creation of dusts.	No
5				Future maintenance workers			
6				Users of future development- public/ airport workers			
7				Adjacent site users (e.g. residential housing, Luton Airport)			
8			Inhalation of vapours	Construction worker	Very Low	Very little Made Ground present within Area B. GI data indicates levels of volatile contaminants in the Made Ground are not significantly elevated.	No
9				Future maintenance workers			

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
10			Users of future development-public/ airport workers		Fill material used on-site will be suitable for use and will not present a risk to human health or controlled waters.	
11			Adjacent site users (e.g. residential housing, Luton Airport)			
12			Leaching of contaminants in soil to groundwater			
13	Contaminated Groundwater	Lateral migration in groundwater off-site	Principal aquifer	Moderate/ Low	Contaminants have been recorded in groundwater beneath Area B, which exceed generic guidance. Subsequent to groundwater monitoring ammoniacal nitrogen has been identified as a contaminant which could impact off-site receptors. However, it may be representative of general groundwater quality in the area due to agricultural land uses.	Yes - Further detailed risk assessment of the recent GI data is required to inform the risks from this PCL.
14	Ground gases from Made Ground e.g. methane, carbon dioxide	Migration into buildings and build-up of gases	Users of future development – public/airport operatives	Very low	Very little Made Ground present within Area B and low levels of ground gas currently recorded.	Yes - Further detailed risk assessment of the recent GI data is required to inform the risks from this PCL.

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration	
15	Unexploded Ordnance	Driving of piles impact UXO	Construction workers/public/airport buildings	Low	Based on Dynasafe Explosive Ordnance Desktop Threat Assessment, Low Risk of UXOs .	Yes - adopt appropriate site protocols.	
Area C							
1	Contaminants in Made Ground	Direct contact e.g., dermal contact, soil ingestion	Users of future development-public/ airport workers/	Very Low	No previous historical contaminative use of this area. The site is considered a greenfield site and no source of contamination. Therefore, unlikely for a PCL to be formed.	No	
2			Construction workers				
3			Future maintenance workers				
4		Inhalation of soil derived dusts		Construction workers	Very Low	No previous historical contaminative use of this area. The site is considered a greenfield site and no source of contamination. Therefore, unlikely for a PCL to be formed.	No
5				Future maintenance workers			
6				Users of future development-public			
7				Adjacent site users e.g. residential housing,			
8		Inhalation of vapours	Construction worker	Very Low	No previous historical contaminative use of this area. The site is considered a greenfield	No	

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification	PCL requires further assessment / consideration
9			Future maintenance workers		site and no source of contamination. Therefore, unlikely for a PCL to be formed.	
10			Users of future informal parkland-public			
11			Leaching of contaminants in soil to groundwater			
12	Contaminated Groundwater	Lateral migration in groundwater off-site	Principal aquifer	Very Low	No previous historical contaminative use of this area. The site is considered a greenfield site and no source of contamination. Therefore, unlikely for a PCL to be formed.	No
13	Unexploded Ordnance	Excavation of chalk in the southern area	Construction workers/public	Low	A low risk of UXO being present. However, it is known that unused bombs were often jettisoned by the Luftwaffe aircraft in open countryside and there is the potential for unexploded bombs.	Yes - appropriate site protocols to be adopted in areas of intrusive works for proposed infiltration basin.

G2 Off-site Car Parks - Areas D and E

Table G2.1: Areas D and E CSM and PCLs.

PCL No.	Sources	Pathways	Receptors	Qualitative Assessment of Risk	Justification of Qualitative Assessment of Risk	PCL requires further assessment/consideration
On-site						
1	Contaminants in Made Ground	Direct contact e.g. dermal contact, soil ingestion	Construction workers	Moderate/ Low	Based on desk study information the overall risk of contamination is considered low. The areas are likely to undergo some reprofiling during the development, and there may be pile arisings in Area E where multi-storey car park is proposed, if such a foundation solution is adopted. Construction workers will likely be exposed to areas of Made Ground during excavation/construction.	Yes - GI and risk assessment should be undertaken to inform the potential risk to human health from contaminants in the soil, prior to construction, to verify mitigation requirements and design measures.
2			Future maintenance workers	Moderate/ Low	The sites will predominantly be covered in hardstanding, therefore there is unlikely to be contact with underlying soils. Any future excavation work would adopt appropriate site management protocols and PPE. The risk can be further reduced by placement of services in a clean cover system. Ground investigation and testing is required to identify any contaminants present.	
3			Future users of car park	Low	The future development will incorporate hardstanding therefore there is unlikely to be any contact with contaminants in the Made Ground.	
4		Inhalation of soil derived dusts/ asbestos fibres	Construction workers	Moderate	The area is likely to undergo some reprofiling during the development. Construction workers will be exposed to Made Ground during excavation/construction which may contain ACMs. Any excavation work would adopt appropriate site management protocols, air monitoring, personal monitoring and PPE.	

PCL No.	Sources	Pathways	Receptors	Qualitative Assessment of Risk	Justification of Qualitative Assessment of Risk	PCL requires further assessment/consideration
5			Future maintenance workers	Moderate/ Low	The future development will be predominantly hardstanding, however, maintenance workers may be exposed to areas with contaminated Made Ground during future excavation. Any future excavation work would adopt appropriate site management protocols and PPE. The risk can be further reduced by use of clean materials to backfill service trenches.	human health from contaminants in the soil, prior to construction, to verify mitigation requirements and design measures.
6			Future users of car park	Low	The future development will be predominately hardstanding and therefore there is unlikely to be any exposure of Made Ground at the surface which could generate dusts.	Yes - GI and risk assessment should be undertaken to inform the potential risk to human health from contaminants in the soil, prior to construction, to verify mitigation requirements and design measures.
7			Adjacent site users (e.g. commercial units/Luton DART passengers)	Moderate/ Low	There is the potential for soil derived dusts which contain contaminants to be generated during construction works. Good site management practices and mitigation measures would reduce the potential risk, to include perimeter monitoring.	Yes - GI and risk assessment should be undertaken to inform the potential risk to human health from contaminants in the soil, prior to construction, to verify mitigation requirements and design measures.
8		Inhalation of vapours	Construction worker	Very low to Low	Presence of vapours is unknown. Risk to construction workers and future maintenance workers is considered to be low as exposure is likely to be in outdoor air and therefore vapours will be diluted.	Yes - GI and risk assessment should be undertaken to inform the potential risk to human health from contaminants in the soil, prior to construction, to verify mitigation
9			Future maintenance workers			

PCL No.	Sources	Pathways	Receptors	Qualitative Assessment of Risk	Justification of Qualitative Assessment of Risk	PCL requires further assessment/consideration
						requirements and design measures.
10			Future users of car park	Very Low	Proposed use of car park has little potential for enclosed buildings.	No
11			Adjacent site users (e.g. commercial units/Luton DART passengers)	Very Low	Good site management practices and mitigation measures would reduce the potential risk, to include perimeter monitoring.	Yes - GI and risk assessment should be undertaken to inform the potential risk to human health from contaminants in the soil, prior to construction, to verify mitigation requirements and design measures.
12		Leaching of contaminants in soil to groundwater	Principal aquifer in Chalk	Moderate	Made Ground is anticipated across both areas which could contain leachable source of contamination.	Yes - GI and risk assessment should be undertaken to inform the potential risk to the groundwater from contaminants in the soil.
13		Migration of contaminants through preferential	River Lea	Low	The River Lea is 400m south of Area D and 250m southwest of Area E. The distance for contaminants to travel means it is unlikely that significant concentrations are reaching the watercourse from the site.	Yes - appropriate methods should be taken during site works to locate previous drainage and

PCL No.	Sources	Pathways	Receptors	Qualitative Assessment of Risk	Justification of Qualitative Assessment of Risk	PCL requires further assessment/ consideration
		pathways e.g. drainage				utility trenches and remove the possible pathway to any construction works should have mitigation measures for managing drains encountered during the works.
14		Driving of contaminants downward during any future piling	Principal aquifer in Chalk	Moderate/ Low	Care will be required during construction not to create a pathway. Risk from piling and construction can be mitigated by completion of piling risk assessment report to determine appropriate assessment for pile design and construction.	Yes - GI and assessment required to confirm risk.
15	Contaminants in soils	Direct contact with contaminated materials	Building infrastructure (foundations / piled foundations), Services (water supply pipes)	Moderate	Aggressive ground conditions have not been assessed as part of previous reporting. Chemical attack on foundations may lead to expedited deterioration and cause stability issues to the final construct. Contaminants may permeate through Water supply pipes laid within contaminated soils.	Yes – a BRE SD1 assessment of aggressive ground conditions should be undertaken to provide suitable classification of concrete. Should water supply pipes be included in the final scheme then a UKWIR assessment should be undertaken to

PCL No.	Sources	Pathways	Receptors	Qualitative Assessment of Risk	Justification of Qualitative Assessment of Risk	PCL requires further assessment/ consideration
						inform pipe selection.
16	Contaminants in groundwater (dissolved phase)	Lateral migration of contaminants through preferential pathways i.e. drainage	River Lea	Low	Area D is 400m from the River Lea, as such there is a minimal chance of pathways present to surface waters. Area E is closer being 250m from the River Lea, as such appropriate measures should be taken during site works to locate previous drainage and utility trenches and remove possible pathway.	Yes - new service runs should be designed appropriately to ensure no migration of contamination.
17		Migration of contaminants through preferential pathways i.e. piling	Principal aquifer	Moderate	Potential for the construction to require piles. Care will be required during construction not to create a pathway. Risk from piling and construction can be mitigated by completion of piling risk assessment report to determine appropriate assessment for pile design and construction.	Yes - GI and assessment required to confirm risk.
18	Unexploded Ordnance	Driving of piles impact UXO	Construction workers/adjacent commercial properties/ railway line/ public highways	Low/ Moderate	Nearby UXO assessment suggests Low to Medium risk of UXO.	Yes - formal UXO assessment required for Areas D and E.

G3 Off-site Sources

Table G3.1: Off-site Sources CSM and PCLs

PCL No.	Sources	Pathways	Receptors	Qualitative Assessment of Risk	Justification of Qualitative Assessment of Risk	PCL requires further assessment/consideration
1	Contaminants in groundwater associated with wider Luton area	Lateral migration in groundwater onto site	Principal aquifer in Chalk	Moderate	Contaminants in groundwater from the around the site may migrate onto site. Groundwater beneath the development area may be affected by the low level 'halo' of chlorinated solvents which is present in the Luton and Dunstable area.	Yes - further risk assessment of the recent GI data is required to inform the risks from this PCL.
2	Contaminants in adjacent land (e.g. motor works, railway land and sewage works) - adjacent to Areas D and E	Lateral migration of contaminants in groundwater	Principal aquifer	Moderate/Low	Potential for contaminants to migrate on-site should be confirmed during the ground investigation works.	
3		Inhalation of vapour	Future maintenance workers/users of the site	Low	Potential for permeable horizons or services which may run between the two sites to provide a preferential pathway for migration of vapours.	

G4 Off-Site Planting

Table G4.1: Off-site Planting CSM and PCLs

PCL No.	Source	Pathway	Receptor	Qualitative Assessment of Risk	Justification of Qualitative Assessment of Risk	PPL requires further assessment/consideration
Hedgerow Improvements						
1	Contaminants in Made Ground	Direct contact e.g. dermal contact, soil ingestion	Landscape Contractor	Very Low	The historical review has identified limited development for the Off-site planting areas. The areas are considered greenfield and no source of contamination. Therefore, unlikely a PCL would be formed.	No

G5 Off-site Highway Interventions

Table G5.1: Off-site Highway Interventions CSM and PCLs.

PCL No.	Source	Pathway	Receptor	Qualitative assessment of risk	Justification of Qualitative Assessment of Risk	PCL requires further assessment/consideration
On-Site						
1	Contaminants in Made Ground	Direct contact e.g. dermal contact, soil and/or ingestion	Construction workers	Very Low to Low Risk	No investigations have occurred within the Highway Interventions site boundaries, however Made Ground is anticipated to be present. Based on the history of the sites the contamination potential is deemed vary from unlikely where there have been no potentially contaminative activities on site to low likelihood where there have been potentially contaminative activities on site and in the surrounding area. Construction workers will likely be exposed to areas of Made Ground during excavation/construction. Any future excavation work would adopt appropriate site management protocols and PPE.	Yes – GI into the areas proposed for construction would clarify the risks and reduce uncertainty, prior to construction, to verify mitigation requirements and design measures
2			Future maintenance workers	Very Low	Future maintenance workers are unlikely to encounter contaminated material due to the presence of the road hardstanding which breaks any plausible exposure pathways. If excavation work is required workers would adopt appropriate site management protocols and PPE.	Yes – GI into the areas proposed for construction would clarify the risks and reduce uncertainty, prior to construction, to verify mitigation requirements.
3			Future Road users	Very Low	Future end users are unlikely to encounter contaminated material due to the presence of the road hardstanding which breaks any plausible exposure pathways.	No
4		Inhalation of soil derived	Construction workers	Very Low to Low	The area is likely to undergo some reprofiling during the development. Construction workers will be exposed to Made Ground during	Yes – GI into the areas proposed for construction would

PCL No.	Source	Pathway	Receptor	Qualitative assessment of risk	Justification of Qualitative Assessment of Risk	PCL requires further assessment/consideration
		dusts/asbestos			excavation/construction which may contain ACMs. Any excavation work would adopt appropriate site management protocols, air monitoring, personal monitoring and PPE.	clarify the risks and reduce uncertainty, prior to construction, to verify mitigation requirements.
5			Future maintenance workers	Very Low	The future development will be predominantly hardstanding, however, maintenance workers may be exposed to areas with contaminated Made Ground during future excavation. Any future excavation work would adopt appropriate site management protocols and PPE. The risk can be further reduced by use of clean materials to backfill service trenches.	Yes – GI into the areas proposed for construction would clarify the risks and reduce uncertainty, prior to construction, to verify mitigation requirements.
6			Future road users	Very Low	The future development will be predominately hardstanding and therefore there is unlikely to be any exposure of Made Ground at the surface which could generate dusts.	No
7			Adjacent site users (e.g. residential housing, Luton Airport)	Very Low	There is the potential for soil derived dusts which contain contaminants to be generated during construction works. Good site management practices and mitigation measures would reduce the potential risk, to include perimeter monitoring.	Yes - GI into the areas proposed for construction would clarify the risks and reduce uncertainty, prior to construction, to verify mitigation requirements.
8		Inhalation of vapours	Construction worker	Very low to Low	Presence of vapours is unknown. Risk to construction workers and future maintenance workers is considered to be low as exposure is likely to be in outdoor air and therefore vapours will be diluted.	Yes - GI and risk assessment should be undertaken to inform the potential risk to human health from contaminants in the soil, prior to construction, to verify mitigation
9	Future maintenance workers		Very Low			

PCL No.	Source	Pathway	Receptor	Qualitative assessment of risk	Justification of Qualitative Assessment of Risk	PCL requires further assessment/consideration
						requirements and design measures.
10			Future users of car park	Very Low	The future development will be predominately hardstanding and therefore there is unlikely to be any PCL for vapours.	No
11			Adjacent site users (e.g. commercial units/residential/public)	Very Low	Good site management practices and mitigation measures would reduce the potential risk, to include perimeter monitoring.	Yes - GI and risk assessment should be undertaken to inform the potential risk to human health from contaminants in the soil, prior to construction, to verify mitigation requirements and design measures.
12	Contaminants in Made Ground	Direct contact with contaminated materials	Building infrastructure foundations	Low	Aggressive ground conditions have not been assessed as part of previous reporting. Chemical attack on foundations may lead to expedited deterioration and cause stability issues to the final construct.	Yes – a BRE SD1 assessment of aggressive ground conditions should be undertaken to provide suitable classification of concrete.
13	Unexploded Ordnance	Encountering UXO during excavation, piled solution may come into direct contact with UXO.	Human health – Construction workers, adjacent land users public and airport buildings and infrastructure	Moderate/Low	Readily available information has given each site a generic risk rating of “Low” or “Moderate”. However, any excavations should be shallow and unlikely to encounter UXO.	No