The Great Grid Upgrade

Weston Marsh to East Leicestershire

# Draft Environmental Statement

## Appendix 11A Phase 1 Geotechnical and Geo-environmental Desktop Studies (8 of 12)

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# 11A. Phase 1 Geotechnical and Geo-environmental Desktop Studies

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The Great Grid Upgrade

Weston Marsh to East Leicestershire

# Phase 1 Geotechnical and Geo-Environmental Desktop Study Report

**WMEL A to WMEL B Overhead Line**

June 2026

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# Appendix B Historical Mapping Summary

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# Appendix B Historical Mapping Summary

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| **Region 1** | | |
| 1887-1888<br>(1:10,560; 1:2,500) | • Site predominantly occupied by undeveloped fields with associated field boundaries (including trees and possibly drains/linear surface water features e.g. Region 1e) and local roads/tracks (i.e. north of Region 1a, on Region 1b near the offsite Birkholme House, Region 1d near the encroaching Todds Lodge and on 1e linking into the offsite Black Bull).<br>• Pond located in Region 1a at 496905 E 323978 N, associated with linear alignment of depressions suspected to be resulting from karst development of features, or possibly mining.<br>• Herricho Wood and local pond encroaching on south of Section 1b/c at 496607 E, 322884 N.<br>• Local ponds in Region 1c at 496020 E, 322582 N; 496147 E, 322877 N, 496018 E 322827 N and 496414 E, 323049 N, including in area of Shake Hole.<br>• Circular feature, indicated to be water filled and a depression, possibly associated with a Shake Hole, on Region 1d at 495463 E, 322290 N. | • Adjacent land generally extensions of on Site fields and linear features.<br>• Great Osgrove Wood adjacent within Region 1a, with indicated local pond on southern edge.<br>• Unknown structure adjacent to west of Region 1a at 496537 E, 324509 N.<br>• Townshond Lodge and associated ponds adjacent to south of Reg/ion 1a at 497605 E 323716 N.<br>• Little Osgrove Wood located adjacent to northwest of Section 1b at 496484E 323753N.<br>• Birkholme House and associated developments, including ponds adjacent to Region 1b at 496935 E, 323464 N.<br>• Ponds in general in local area e.g. located 130m northwest and 170m north of Region 1b at 496046E 323323N and 496099E 323787N.<br>• Strips of woodland and local ponds south of Region 1b, including at 496711 E, 323518 N in central area and set of ponds partially at 496846 E, 323542 N, northwest of Birkholme House (496935 E, 323464 N).<br>• Todd's Lodge is located adjacent to south of Region 1d at 495278 E, 322108N. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | • Twyford Lodge, including local building footprints, in Region 1d at 495186 E, 322315 N.<br>• Ponds in Region 1d and 1e e.g. 494973 E, 322060 N and 494832 E, 321333 Nand 494802 E, 321719 N. | • Porters Farm and associated ponds located adjacent to southeast of Region 1c at 496176 E, 322451 N.<br>• Pond located c.140m from Region 1c at 496330 E, 322888 N.<br>• Quarry and pumphouse located approximately 160m east of Region 1b at 497280 E 323518 N.<br>• Numerous ponds to the west/northwest of Region 1d e.g. adjacent in northwest at 494884 E, 321961 N and c.100m northwest at 494975 E, 322339 N.<br>• Numerous ponds located to the east and west of Region 1e e.g. adjacent in north and 494747 E, 321895 N, 134m northwest at 494803 E, 321724 N, adjacent northwest at 494050 E, 321158 N, c.40m southeast at 494682 E, 321162 N, c.90m southeast at 494294 E, 320912 N, adjacent to northwest at 494781 E, 321719 N and c.80m northwest at 494162 E, 321265 N. |
| 1903 (1:10,560) | • Ponds in Region 1b at 496706 E, 324078 N and 496447 E, 323560 N.<br>• Well mapped encroaching on Region 1d associated with Todd's Lodge at 495235 E, 322108 N. | • Pump mapped associated with Todd's Lodge. |
| 1904-1905[1] (1:10,560; 1:2,500) | • Partial map coverage, where map coverage is present, no significant changes. | • Woodview Farm and well located 160m southeast of Region 1c at 495978 E, 322277 N. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| 1915-1929 | • No map coverage. | • No map coverage. |
| 1930[2] (1:2,500) | • Partial map coverage.<br>• Some minor changes to pond extents indicated locally. | • Partial map coverage, where map coverage is present, no significant changes.<br>• 'Tk' and associated rectangular structure, assumed to be a tank mapped adjacent to south of Region 1b at 496830 E, 323596 N. |
| 1931[3] (1:10,560) | • Partial map coverage, where map coverage is present, no significant changes | • Partial map coverage, where map coverage is present, no significant changes. |
| 1938-1946 | • No map coverage. | • No map coverage. |
| 1950 (1:10,560) | • Local shaded irregular feature of unknown origin within field present for this map sheet only within southeast of Region 1a at 497158 E, 323865 N.<br>• Rectangular features now present in previous location of pond on Region 1e.<br>• Widening/upgrade to road on Region 1e connecting into offsite Black Bull. | • Tanks located adjacent to the southwest of Region 1b associated with Birkholme House at 497017 E, 323513 N.<br>• Property with tanks located 140m southeast of Region 1c at 496366 E 322187 N. |
| 1958-1959, 1964[4] ('provisional scale') | • Partial map coverage.<br>• Rectangular features, assumed to be structures, present at 495098 E, 321986 N on Region 1d. | • Partial map coverage.<br>• Cluster of buildings following roadway adjacent northwest of the Site boundary between Regions 1d and 1e, centred around 494759 E, 322009 N. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | | • Assumed extents of airfield apparent adjacent to the west of Region 1d/e, including assumed infilling of ponds.<br>• 'Tk' and associated rectangular structure, assumed to be a tank mapped at 496830 E, 323596 N on Region 1b, no longer present. |
| 1965 - 1976 | • No map coverage. | • No map coverage. |
| 1977[5]<br>(1:2,500) | • Partial map coverage.<br>• Pond at 496022 E, 322584 N on 1c no longer mapped; assumed infilled. | • Partial map coverage.<br>• Some minor alterations to mapped pond extents in area. |
| 1978[6]<br>(1:2,500) | • Partial map coverage.<br>• Pond in western half of Region 1b, alongside locally elsewhere in Region, no longer mapped.<br>• Shake hole and linear alignment of vegetation mapped on western boundary of Region 1c.<br>• Track across Region 1c leading to land associated with offsite Shake Hole.<br>• Pond mapped around location of aforementioned suspected Shake Hole on Region 1d at 495463 E, 322290 N.<br>• Shake Hole located in Region 1d at 495403 E, 322241 N.<br>• Honey Pot Lane clearly mapped to cross the site on the south of Region 1d with associated track, and surface water | • Partial map coverage.<br>• Warehouses, with associated depot and tanks, alongside areas of camp site, other unnamed structures/features adjacent to the west of Regions 1d and 1e, including a present-day electrical substation. Matches configuration of present day Honeypot Land Industrial Estate. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | features including pond, spreads (including wet/marshy ground) and issues with breaks in linear water features suggesting local culverting.<br>• Track/roads and associated drains more clearly mapped through Region 1e at 3no. locations.<br>• Unknown square feature in Region 1e at 494821 E, 321378 N. | |
| 1980-1981 | • No map coverage. | • No map coverage. |
| 1982 (1:10,000) | • Minor adjustment to pond extents on Region 1b.<br>• Twyford Lodge in Region 1d at 495186 E, 322315 N reduced in extent.<br>• Drains mapped locally associated with Pond in Herricho Wood. | • Tank located in Region 1b associated with Birkholme House at 496830 E, 323596 N no longer present.<br>• Numerous ponds in area no longer mapped; potentially infilled.<br>• Other Tank located southeast of Region 1b associated with Birkholme House at 497017 E, 323513 N no longer present.<br>• Woodview Farm and well located 100m southeast of Region 1c at 495978 E, 322277 N now labelled as Long Pocket Farm and a disused pit.<br>• Property with tanks located 140m southeast of Region 1c at 496366 E 322187 N, now labelled sewage works (disused). |
| 1985-1986 | • No map coverage. | • No map coverage. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| 1985<br>(Google Earth Satellite Imagery) | • Imagery unclear; Site generally appears to be in present day layout | • Imagery unclear; Site generally appears to be in present day layout. |
| 1989[7]<br>(1:2,500) | • No significant changes. | • Buildings labelled stores located adjacent to Region 1e Site boundary centred on 494722 E, 321700 N, seemingly replacing extents of old airfield.<br>• Electrical substation located adjacent to Region 1e at 494781 E, 321719 N. |
| 1991-1993 | • No map coverage. | • No map coverage. |
| 1994<br>(1:2,500) | • Area of Twyford Lodge now mapped as single small rectangular structure and pond on Region 1d.<br>• Spreads now mapped as Marsh Spreads on Region 1d. | • Tank located c.150m southeast of Region 1d at 495218 E, 321785 N. |
| 1995 | • No map coverage. | • No map coverage. |
| 1999<br>(Google Earth Satellite Imagery) | • Site generally as per present day layout, comprised predominantly of agricultural fields, local roads/lanes and adjacent/encroaching woodland.<br>• Evidence of vegetated local features and darker linear depressions, typically correlating with suspected ponds/karst features generally as outlined in Report Section 2 and 3. | • Evidence of vegetated local features and darker linear depressions, typically correlating with suspected ponds/karst features generally as outlined in Report Section 2 and 3.<br>• Birkholme House adjacent appears to be a farm with storage buildings and barns present.<br>• Airfield north of the Region 1c to 1e is visibly present on aerial photography, appearing as |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | | no longer in use with areas of spare vegetation along the runways.<br>• Buildings labelled stores located adjacent to Region 1e centred on 494722 E, 321700 N and warehouses and depot located north of Region 1e centred around 494759 E, 322009 N associated with Honeypot Lane Industrial Estate. |
| 2000, 2005, 2010, 2012, 2016, 2018, 2019, 2020, 2021, 2022, 2024<br>(Google Earth Satellite Imagery) | • Development area associated with Honey Pot Lane industrial estate very locally encroaching on Site at Region 1e.<br>• General changes to vegetation colour/coverage evident, alongside local stockpiles, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features and darker linear depressions, typically correlating with suspected ponds/karst features generally as outlined in Report Section 2 and 3. | • General changes to vegetation colour/coverage evident, alongside local stockpiles, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features and darker linear depressions, typically correlating with suspected ponds/karst features generally as outlined in Report Section 2 and 3. |
| **Region 2** | | |
| 1884[8], 1887-1888[9]<br>(1:10,560, 1:2,500) | • Site predominantly occupied by undeveloped fields with associated field boundaries (including trees and possibly drains/linear surface water features) and numerous local roads/tracks/footpaths (e.g. in Region 2a (North Road), 2b, 2c, 2e (Drift Road, including triangle area of trees) and 2f). | • Adjacent land generally extensions of on Site fields and linear features.<br>• Buildings labelled ‘Black Bull’ and associated ponds and pump located adjacent to north of Region 2a at 493879 E, 321263 N, with ponds also present generally in fields around Region 2a. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | • North Road, with assumed connecting drain and a small cluster of buildings locally on its east site on Region 2a at 493809 E, 320795 N.<br>• Sheepfold located in Region 2a at 493108 E 321030 N.<br>• Sheepfold located in Region 2b at 492798 E, 320980 N.<br>• Small scale shaded feature, possibly a pond, on Region 2a at 493714 E, 320988 N.<br>• Pond located at 493398 E, 320822 N in Region 2a, with adjacent ground indicated to be overgrown/vegetated, with indication of a cutting on its northern extent (indicated by Groundsure to be an unspecified pit).<br>• River Witham in Region 2b at 492834 E, 320864 N, entering region from the north at 492812 E, 320938 N and exiting to south at 492854 E, 320789 N, mapped to flow northwards, with evidence of adjoining tributaries in the north and south, bearing east-west/northeast-southwest.<br>• Pond in Region 2b at 492430 E, 320781 N, on linear alignment with ponds adjacent to on Site footpath.<br>• Local shaded irregular feature of unknown origin present in field at 492558 E, 320467 N in south of Region 2b; only present on 1887 mapping. | • Settlement of Gunby and associated farm, church and other buildings adjacent to north of Region 2c linear Site boundary extension.<br>• Numerous ponds south of Region 1 c. 230m south of Region 2a e.g. around 493376 E 320513 N and at 493437 E 320060 N.<br>• Ponds located approximately c.90m north of Region 2b at 492507 E 321275 N.<br>• Temple Hill located c.60m south Region 2b at 492773 E, 320651 N alongside indicated Preceptory of (site of) a development; nature unknown due to map coverage.<br>• Local ponds in adjacent land to 2b/c e.g. adjacent to Region 2b at 492080 E, 320736 N and 492183 E, 320747 N, c.25-110m north and south of 2c at 491808 E, 321029 N and 491376 E 320681 N and c.95-125m north of 2d at 490515 E, 320960 N and 490517 E 320959 N.<br>• Cluster of ponds adjacent to Region 2c to the north at 491257 E, 321154 N.<br>• Numerous ponds in adjacent land around Region 2e e.g. c.120m south at 488632 E, 320572 N, c.105m south at 488520 E, 320598 N and c.110m south at 488322 E, 320585 N, c. 170m north at 488470 E, 320980 N, c160m northwest at 488592 E, 321175 N and c.100m north at 488703 E, 321108 N.<br>• Well east of northern extension to Site boundary in Region 2e at c.30m, 488985 E, 321293. Note, this feature is present on the |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | • Ponds in Region 2c at 491596 E, 320812 N, 491330 E, 321117 N and 490819 E 320736 N.<br>• Linear surface water feature indicated encroaching on southern extent of Region 2c at 491116 E, 320558 N.<br>• Locally meandering field boundary with small scale triangle of trees, assumed to be associated with surface water feature and connecting drain in the west of Region 2c.<br>• Ponds on Region 2d at 490267 E, 320818 N and 489716 E, 320966 N.<br>• 6No. Ponds located at 489101 E, 320808 N, 489036 E, 320810 N, 489464 E, 321174N 488,949.97E 321,292.51N m , 488876 E, 321220 N and 488822 E, 320794 N, in Region 2e, the eastern of which with track to its east and adjacent small cluster of buildings, connecting into surface water feature crossing southeast across the site.<br>• Potential pond on field boundary at 488409 E, 320763 N.<br>• Pond located in Region 2f at 488195 E, 320710 N. | edge of BGS mapped areas of Worked Ground associated with ironstone workings.<br>• Numerous ponds in adjacent land to Region 2f e.g. 487920 E, 320933 N, 487731 E, 320889 N and 487330 E, 320932 N, including around Buckminster Lodge located adjacent to the northwest.<br>• Other ponds in area of Region 2e/f include at 488592 E 321175 N, 487255 E, 320514 N, 487455 E 320333 N and at 487809 E 320449 N.<br>• Local groups of structures, including associated with Sewstern Grange c.20-120m south of Region 2f. |
| 1900 | • No map coverage. | • No map coverage. |
| 1902-1904, 1905[10] (1:10,560, 1:2,500) | • Mineral Railway line in Region 2d at 490041 E, 320774 N, entering the region | • Preceptory of Knights Templars named next to Temple Hill. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | at 490024 E, 321101 N and exiting region to the south at 490043 E, 320483 N.<br>• Pond encroaching on north of Region 2d at 489926 E 320849 N.<br>• Small scale structure no longer mapped in north of Region 2e. | • Pumps mapped associated with structures north and south of Region 2f and north of Region 2e. |
| 1915-1928 | • No map coverage. | • No map coverage. |
| 1929-1930[11] (1:10,560, 1:2,500) | • Pump present on linear extension to Site boundary adjacent to pond on linear alignment in south of Region 2b at 492185 E, 320738 N.<br>• Pond on northernmost linear extension to Site in Region 2e at 488964 E, 321390 N. | • Region 2b, building adjacent to south of Site near to on Site pump at 492159 E, 320718 N. |
| 1931-1938 | • No map coverage. | • No map coverage. |
| 1946[12] (1:10,560) | • Partial map coverage, where coverage, no significant changes. | • Partial map coverage, where coverage, no significant changes. |
| 1950 (1:10,560 and 'provisional scale') | • Linear surface water feature running from pond in 2e now mapped as rises, flowing southeast across site.<br>• Rail tracks in north of linear extension to Region 2e boundary encroaching on Site; assumed to be associated with opencast ironstone mining (note, previously mapped well to east now mapped as pump adjacent to off Site portion of tracks). | • Partial map coverage, where coverage, no significant changes. |
| 1958[13] ('provisional scale') | • Partial map coverage, where coverage, no significant changes. | • Partial map coverage, where coverage, no significant changes. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| 1959-1962 | • No map coverage. | • No map coverage. |
| 1964[14] ('provisional scale') | • Partial map coverage, where coverage, no significant changes. | • Partial map coverage, where coverage, no significant changes. |
| 1965-1969 | • No map coverage. | • No map coverage. |
| 1975-1976[15] (1:2,500) | • Partial map coverage.<br>• Rail tracks and ponds generally not mapped in north of Region 2e, suggesting potential infilled/de-construction. | • Partial map coverage.<br>• Pumps and ponds generally not mapped in land adjacent to Region 2e, suggesting infilling.<br>• Issues and associated woodland mapped c.75m northeast from linear northern extension to Site boundary on Region 2e, east of historical opencast ironstone workings. |
| 1977-1978[16] (1:2,500) | • Partial map coverage.<br>• Structures on east side of North Road no longer mapped on Region 2a.<br>• Extent of suspected excavation associated in pond/pit on south of Region 2a no longer mapped.<br>• Pump on Region 2b no longer mapped. | • Mast located c.105m north of Region 2e at 488472 E, 320880 N. |
| 1980-1981 | • No map coverage. | • No map coverage. |
| 1982 (1:10,000) | • Railway line crossing Region 2d now labelled 'dismantled'.<br>• Drains now locally mapped along field boundaries e.g. in the north of Region 2b and 2c, and indicated flowing southwest across 2f, including local gaps in alignments suggesting culverting. | • Ponds generally no longer mapped (note, still present adjacent to 2b), suggesting potential infilling. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | • Ponds generally no longer mapped, except for in 2a and 2b, suggesting potential infilling.<br>• Overhead line and associated towers indicated running north-south on Region 2e at the same location as The Drift Road. | |
| 1985-1993 | • No map coverage. | • No map coverage. |
| 1994<br>(1:2,500) | • Circular feature within inner point, assume dot be a pill box, mapped adjacent to track/road crossing Region 2b at 492,585.79E 320,831.53N (note, shown as stone block structure with window slots on present day street view and on same linear alignment as pond/excavation area on the south side of Region 2b and offsite ponds/pump to the south). | • No significant change. |
| 1985<br>(Google Earth Satellite Imagery) | • Imagery unclear. | • Imagery unclear. |
| 1999, 2000, 2005, 2006, 2010<br>(Google Earth Satellite Imagery) | • Site generally as per present day layout, comprised predominantly of agricultural fields.<br>• General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, correlating with ponds/pits generally as outlined in Report Section 2 and 3. | • General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, correlating with ponds/pits generally as outlined in Report Section 2 and 3. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| 2011<br>(Google Earth Satellite Imagery) | • Triangular land parcel vegetated with trees adjacent to The Drift Road on boundary between Region 2d/2e at 489487 E, 320794 N. | • No significant changes. |
| 2012, 2016, 2018, 2019, 2020, 2021, 2022, 2024, 2025<br>(Google Earth Satellite Imagery) | • General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, typically correlating with ponds/pits generally as outlined in Report Section 2 and 3. | • General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, typically correlating with ponds/pits generally as outlined in Report Section 2 and 3. |
| **Region 3** | | |
| 1884<br>(1:10,560) | • Site predominantly occupied by undeveloped fields with associated field boundaries (including trees and possibly drains/linear surface water features) and numerous local roads/tracks/paths (e.g. through 3d).<br>• Surface water feature, including meandering vegetated extent in south, through Region 3a.<br>• Pond located in Region 3a at 486182 E, 320577 N.<br>• Ponds located in Region 3b at 485817 E, 320683 N and 485448 E, 320870 N.<br>• River Eye in Region 3d at 484227 E, 321520 N and flowing toward the southwest, including potential connecting | • Adjacent land generally extensions of on Site fields and linear features.<br>• Numerous ponds located c.45m south of Region 3a e.g. at 486091 E, 320552 N, c. 190m at 486182 E 320377 N, c.195m at 486454 E 320390 N and c.190m at 486849 E 320399 N.<br>• Structures, wells and pumps c.70m southeast of linear extension to Site boundary in Region 3a.<br>• Ponds located in adjacent land to Region 3b e.g. c.30m northeast at 485567 E, 320870 N, c.183m southwest of 485479 E, 320498 N and c.20m northeast at 485593 E 321059 N.<br>• Numerous pond e.g. located c.30m northeast of Region 3c at 485020 E, 321303 N and |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | drain bearing off to the northwest. River enters region at 484289 E, 321568 N and exiting to the south at 484179 E, 321463 N.<br>• Ponds located in Region 3d at 484219 E, 321800 N, 484156 E, 321907 N and 484020 E, 321952 N.<br>• Ponds in Region 3e at 482735 E, 321911 N, 483526 E, 321789 N, 483608 E 321863 N (adjacent), 483457 E, 321892 N (adjacent), 483415 E 321771 N and 483089 E, 321969 N (note, central pond shown on present day satellite imagery to be overgrown circular features on linear alignment with similar offsite features).<br>• Gypsy Nook road and surface water feature through Region 3f at 482272 E 322225 N, with adjacent structure with pump and pond at 482247 E, 322207 N, and area of reeds/scrub vegetation associated with water feature in the south.<br>• Surface water feature through Region 3g at 481491 E, 322499 N and pond in west associated with strip of woodland at 480786 E, 322404 N.<br>• Surface water feature through southern linear extension to Site in south of Region 3f. | c.90m southeast at 485230 E 321300 N, with local structures adjacent to linear extension to Site boundary in similar area (encroaching here, but shown to be adjacent on subsequent map dates) at 485097 E, 321332 N.<br>• Ponds located in land adjacent to Region 3d e.g. at c.135m southwest at 484390 E, 321246 N, c.137m northeast at 483772 E, 321898 N and c. c. 40m southwest at 483547 E, 321657 N (note, latter mapped with cutting, suggesting possible pit).<br>• School located adjacent to south of Region 3d at 483953 E, 321559 N.<br>• Pump and associated buildings and ponds located adjacent to the north of Region 3e at 482981 E, 322119 N.<br>• Numerous ponds located in land adjacent to Region 3e e.g. c.218m and 230m northeast at 483723 E, 321964 N and 483479 E, 322063 N.<br>• Pond located c.248m northeast of Region 3f at 482599 E, 322365 N.<br>• Rectangular pond feature adjacent to south of 3f at 482262 E, 321916 N.<br>• Waltham Pasture Farm and associated pond and pump northeast between Regions 3g and 4a at 481007 E, 322674 N.<br>• Local structures mapped on east side of linear extension to Site boundary south from Region 3g. |
| 1887-1900 | • No map coverage. | • No map coverage. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| 1902-1904[17] (1:10,560, 1:2,500) | • Pond at 485448 E, 320870 N in Region 3b no longer mapped; assumed infilled.<br>• Small scale square structure in Region 3b no longer mapped.<br>• Pond at 482494 E, 321951 N in Region 3e no longer mapped; assumed infilled. | • Well mapped in areas of local structures adjacent to Site on extension to Region 3c in north.<br>• Some structures no longer mapped adjacent to southern extension to Region 3g. Expansion of structures noted around 481552 E, 321987 N. |
| 1905-1920 | • No map coverage. | • No map coverage. |
| 1928-1930[18] (1:10,560, 1:2,500) | • Partial coverage.<br>• Structures around pump on Region 3f no longer mapped by 1930.<br>• Surface water features in 3g mapped to flow to the south/southwest. | • Partial coverage.<br>• Pump located to the north of Region 3e no longer labelled; buildings remain present. |
| 1931-1946 | • No map coverage. | • No map coverage |
| 1950-1959[19] (1:10,560, 'provisional scale') | • Structure present locally across southern linear extension to Region 3a at 486256 E, 319963 N.<br>• Linear surface water feature indicated through north of Region 3d, including breaks in alignment suggesting culverting at 484072 E, 321839 N. | • Partial coverage.<br>• Expansion to buildings and well adjacent to Region 3c at 485059 E, 321249 N.<br>• Buildings associated with previously mapped pump adjacent to Region 3e now labelled as Abbott Lodge.<br>• Local square structure mapped adjacent to southern linear extension to boundary of Region 3f. |
| 1962-1972 | • No map coverage. | • No map coverage |
| 1975-1976[20] (1:2,500) | • No significant changes (note, some ponds locally no longer mapped; potentially infilled). | • Numerous ponds in area no longer mapped, potentially infilled e.g. c.45m south of Region |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | | 3a at 486091 E, 320552 N and Region 3b c.183m southwest at 485479 E, 320498 N.<br>• Buildings adjacent to northeast of Region 3c now mapped as Hall Farm. |
| 1977-1980 | • No map coverage. | • No map coverage. |
| 1981-1982 (1:10,000) | • Some field boundaries/drains more clearly mapped with flow directions e.g. central Region 3a to the southeast, around boundary between 3b/3c flowing to the southwest, east of Region 3e to the southwest and central Region 3f to the southwest.<br>• Some ponds no longer mapped e.g. in Region 3e at 483526 E, 321789 N and 482729 E, 321923 N; potentially infilled.<br>• | • Well located adjacent to northeast of Region 3c associated with Hill Farm at 485059 E, 321249 N no longer labelled.<br>• Numerous ponds in area no longer mapped; potentially infilled e.g. Region 3d adjacent southwest at 483547 E, 321657 N, Region 3e c.218m northeast at 483723 E, 321964 N and c.230m northeast at 483479 E, 322063 N.<br>• School located adjacent to Region 3d at 483953 E, 321559 N largely no longer present. |
| 1985-1993 | • No map coverage. | • No map coverage. |
| 1994 (1:2,500) | • No significant changes. | • No significant changes (note, issues evident offsite connecting into on Site drainage ditches/linear surface water feature e.g. north of Region 3a and 3e, suggesting potential springs). |
| 1985 (Google Earth Satellite Imagery) | • Imagery unclear; Site generally appears to be in present day layout. | • Imagery unclear; Site generally appears to be in present day layout. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| 1999, 2000, 2005, 2006, 2010, 2011, 2012, 2018, 2019, 2020, 2021, 2022, 2025<br>(Google Earth Satellite Imagery) | • Site generally as per present day layout, comprised predominantly of agricultural fields with local roads/lanes (including adjacent structures/assumed agricultural storage/stockpiling locally on/adjacent to linear extensions to Region 3c and 3g/f) and River Eye (including local section of woodland).<br>• General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, correlating with ponds generally as outlined in Report Section 2 and 3. | • Abbott Lodge north of Region 3e at 482981 E, 322119 N is no longer present.<br>• General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, typically correlating with ponds generally as outlined in Report Section 2 and 3. |
| **Region 4** | | |
| 1883-1884<br>(1:10,560) | • Site predominantly occupied by undeveloped fields with associated field boundaries (including trees and possibly drains/linear surface water features) and numerous roads/tracks and paths (e.g. crossing Regions 4a, 4b and 4e).<br>• Waltham Thorns (Fox Covert) woodland encroaching on Region 4b in the south around 480294 E 322695 N.<br>• Ponds in Region 4c at 478996 E, 322746 N, 478563 E, 322639 N and 479241 E, 322558 N. | • Adjacent land generally extensions of on Site fields and linear features.<br>• Waltham Pasture Farm present c.140m northeast to the boundary between Regions 4a and 3g at 481007 E, 322674 N.<br>• Remaining extent of<br>• Rectory Farm located c.50m north of Region 4b at 479615 E, 322969 N.<br>• Pond located c.50m south of Region 4b at 479377 E, 322512 N.<br>• Pond and unnamed buildings located c.30m north of Region 4c at 479300 E, 322841 N. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | • Suspected linear surface water feature along northern linear extension of Site boundary between Region 4c and 4e.<br>• Thrope Ashes woodland encroaching on southern linear extension to Region 4c boundary.<br>• Pond in Region 4d at 477909 E, 322433 N.<br>• Meandering extent of surface water course in Region 4e at 477342 E, 322488 N (note; on linear alignment present day suggesting adjustment), with assumed drain and paths to the east of this.<br>• Local 'L' shaped structure in south of Region 4e at 477245 E, 322316 N. | • Remainder of Thorpe Ashes woodland adjacent to the south of Region 4c at 479073 E 322632 N.<br>• Pump and associated buildings (Thorpe Hindles) located c.40m north of Region 4e at 477581 E, 322640 N. |
| 1887-1900 | • No map coverage. | • No map coverage. |
| 1902-1904 (1:10,560, 1:2,500) | • Pond in Region 4a at 480508 E, 322790 N.<br>• Pond in Region 4c at 478991, E 322749 N.<br>• Linear surface water, including indicated culverted extents, more clearly mapped in south of Region 4c at 479152 E, 22504 N. | • Well adjacent to linear extension to boundary in north of Region 4d at 478742 E, 322929 N. |
| 1905-1928 | • No map coverage. | • No map coverage. |
| 1929-1930 (1:10,560, 1:2,500) | • Drain/surface water feature crossing 4a indicated to flow to the south.<br>• Meandering surface water course in Region 4e indicated to flow to the southeast.<br>• Surface water feature through linear extensions to Site boundary in north of | • No significant changes. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | Region 4c and linking into the above feature indicated to be associated with offsite Rises.<br>• 'L' shaped structure in south of Region 4e now rectangular in shape. | |
| 1931-1946 | • No map coverage. | • No map coverage. |
| 1950 (1:10,560) | • No significant changes. | • Rectory Farm located adjacent to north of Region 4b at 479615 E, 322969 N now labelled as Freeby View Farm. |
| 1958 | • No map coverage. | • No map coverage. |
| 1959 ('provisional scale') | • No significant changes. | • No significant changes. |
| 1962-1964 | • No map coverage. | • No map coverage. |
| 1965-1968[21] (1:10,000, 1:2,500, 'provisional scale') | • Partial map coverage.<br>• Issues mapped on field boundary in the south of Region 4b at 479816 E, 322698 N, flowing southeast, culverting beneath road/track, then southeast offsite (note, sinks mapped adjacent to northern boundary in same area, suggesting culvert across site).<br>• Road through west of Region 4b mapped as Melton Road.<br>• Drain clearly mapped on field boundary between Regions 4c and 4d. | • Partial coverage, where coverage, no significant changes.<br>• Collects mapped adjacent to assumed drain adjacent to western side of northern linear boundary extension to Region 4b.<br>• Offsite Rises to east of Region 4c now mapped as Issues and additional Issues mapped adjacent to east of Region 4c. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | • Ponds locally no longer mapped e.g. Region 4c.<br>• Marshy ground and drains indicated adjacent to meandering surface water course on 4e.<br>• Overhead line mapped in south extent of Region 4e at 477064 E 322315 N and issues also mapped in south around 477169 E, 322262 N. | |
| 1969-1972 | • No map coverage. | • No map coverage. |
| 1975[22] (1:2,500) | • Partial coverage, where coverage, no significant changes. | • Partial coverage, where coverage, no significant changes. |
| 1976-1981 | • Generally no map coverage; very local coverage in northern linear extension to boundary of Region 4a indicates no change. | • Generally no map coverage, very local coverage in northern linear extension to boundary of Region 4a indicated pond adjacent associated with grounds of Waltham Lodge. |
| 1982[23] (1:10,000) | • Partial coverage, where coverage, no significant changes. | • Partial coverage, where coverage, no significant changes. |
| 1985 (Google Earth Satellite Imagery) | • Imagery unclear; Site generally appears to be in present day layout. | • Imagery unclear; Site generally appears to be in present day layout. |
| 1985-1991 | • No map coverage. | • No map coverage. |
| 1992-1994 (1:10,000, 1:2,500) | • No significant changes. | • Redevelopments/extensions to development footprints adjacent to north of linear extension to Region 4a boundary around Waltham Lodge. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| 1999, 2000, 2006, 2010, 2011, 2012, 2018, 2019, 2020, 2021, 2022, 2025 (Google Earth Satellite Imagery) | • Site generally as per present day layout, comprised predominantly of agricultural fields with local roads/lanes.<br>• General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, typically correlating with ponds generally as outlined in Report Section 2 and 3. | • Woodland and local/general development areas present adjacent, general as per present day.<br>• Evidence of rectangular pond/basin north adjacent to north of Region 4e becoming present by 2006.<br>• General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, typically correlating with ponds generally as outlined in Report Section 2 and 3. |
| **Region 5** | | |
| 1884-1885 (1:10,560) | • Site predominantly occupied by undeveloped fields with associated field boundaries (including trees and possibly drains/linear surface water features) and numerous roads/tracks and paths (e.g. crossing Regions 5a, 5b, 5c, 5d and 5e).<br>• Melton Spinney Road, bearing north-south, through Region 5a at 476772 E, 322574 N.<br>• Pond in Region 5a at 476515 E, 322600 N.<br>• Meandering surface water feature (including adjacent path) crossing Region 5b at 476144 E, 322530 N.<br>• Railway line, including bridged portion with adjacent underpass with track/path through, crossing Region 5b at 476061 E, 322511 N. | • Adjacent land generally extensions of on Site fields and linear features.<br>• Melton Spinney woodland (Fox Covert) adjacent to south of Region 5a.<br>• Pumps located c.130m northeast of Region 5a at 477098 E, 322969 N.<br>• Pond located c.90m east of Region 5a at 476803 E, 322786 N.<br>• Melton Spinney Farm located c.110m southwest of Region 5a at 476749 E, 322088 N.<br>• Vicarage Farm (buildings and a pond) located adjacent to southeast of Region 5b at 475690 E, 322231 N.<br>• Pond and small scale structure located c.35m north of Region 5d at 474541 E, 322147 N. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | • Structure associated with Vicarage Farm locally encroaching on south of Region 5b.<br>• Framlands Farm at the linear extension of Region 5c. | • Scalford Gorse woodland present adjacent to west of Region 5d.<br>• Structures, well and pond associated with Framlands Farm adjacent too south of Region 5c<br>• Pond located c.55m northwest of Region 5e at 474341 E, 322203 N and structures, pond and well c.180m at 474006 E, 322193 N. |
| 1887-1888 | • No map coverage. | • No map coverage. |
| 1900-1902 (1:10,560) | • Well associated with Vicarage Farm encroaching on south of Region 5b at 475690 E, 322231 N.<br>• Structure and pond associated with Framlands Farms potentially encroaching on south linear extension to Region 5c. | • Square feature, seemingly raised, feature c.800m south of Region 5d at 474635 E, 321825 N (note; recorded by Groundsure as unspecified heap).<br>• Additional pond in similar area to aforementioned pond and structure north of Region 5d at 474531 E, 322137 N. |
| 1903 | • No map coverage. | • No map coverage. |
| 1904 (1:2,500) | • No significant changes. | • No significant changes.<br>• Allotment gardens adjacent (locally potentially encroaching) north of Region 5c at 475148 E, 322371 N. |
| 1905-1920 | • No map coverage. | • No map coverage. |
| 1928-1929 (1:10,560) | • Suspected pond in Region 5b adjacent to railway line at 476031 E 322479 N, with linear surface water feature seemingly flowing east through bridged crossing and | • Aforementioned small scale structure and suspected pond north of Region 5d no longer mapped. No significant changes. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | into meandering surface water feature (note, surface water feature starts offsite as issues, suggesting potential springs in area).<br>• Linear surface water feature along field boundary through 5e mapped to flow to the southwest. | |
| 1930 (1:2,500) | • No significant changes. | • No significant changes. |
| 1931 | • No map coverage. | • No map coverage. |
| 1938-1967[24] (1:10,560) | • Well no longer mapped in south of Region 5b. | • Glebe Farm and associated local structure present adjacent to north/south of linear extension to Site boundary in north of Region 5c.<br>• Square feature to south of Region 5d now mapped as pond, with 2no. suspected mounds adjacent.<br>• Rises mapped to the south of Region 5d. |
| 1946 | • No map coverage. | • No map coverage. |
| 1950 (1:10,560) | • No significant changes. | • No significant changes. |
| 1958 | • No map coverage. | • No map coverage. |
| 1959 (‘provisional scale’) | • No significant changes. | • No significant changes. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| 1962-1965 | • No map coverage. | • No map coverage. |
| 1966-1968[25] (1:10,000, 1:2,500, 'provisional scale') | • Pond located in Region 5a at 476515 E, 322600 N no longer mapped; potentially infilled.<br>• Overhead lines and associated towers cross Region 5a at 476848 E, 322595 N.<br>• Surface water feature clearly mapped along field boundary crossing Region 5c, slowing to the southeast (note, indicated to come from issues offsite to the north, suggesting potential springs in the area).<br>• Scalford Road labelled through Region 5d. | • Hindle Top Farm located adjacent to south of Region 5a at 476885 E, 322231 N, including silo.<br>• A number of ponds no longer present adjacent to Regions 5d and 5e, potentially infilled. |
| 1969[26] (1:1,10,000, 'provisional scale') | • Partial coverage, where coverage, no significant changes. | • Partial coverage, where coverage, no significant changes. |
| 1975-1985 | • No map coverage. | • No map coverage. |
| 1985 (Google Earth Satellite Imagery) | • Imagery unclear; Site generally appears to be in present day layout. | • Imagery unclear; Site generally appears to be in present day layout. |
| 1986-1993 (1:10,000, 1:2,500) | • No significant changes. | • No significant changes. |
| 1994-1995 | • No map coverage. | • No map coverage. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| 1999 (Google Earth Satellite Imagery) | • Site generally as per present day layout, comprised predominantly of agricultural fields and local roads/lanes, alongside the meandering Scalford Brook.<br>• Assumed local storage of materials on Site associated with structures adjacent to south of Region 5a. | • General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Local developments and woodland adjacent to Site, generally as per present day layout, except for around the north of Region 5c where extents are lesser than present day. |
| 2006-2010 (Google Earth Satellite Imagery) | • General changes to vegetation colour/coverage, assumed to be changes in the seasons/agricultural land uses. | • General developments adjacent to Region 5c.<br>• General changes to vegetation colour/coverage, assumed to be changes in the seasons/agricultural land uses. |
| 2010 (Google Earth Satellite Imagery) | • General changes to vegetation colour/coverage, assumed to be changes in the seasons/agricultural land uses. | • General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses. |
| 2011, 2012, 2018 (Google Earth Satellite Imagery) | • General changes to vegetation colour/coverage, assumed to be changes in the seasons/agricultural land uses. | • Agricultural/residential property located 170m north of Region 5d at 474556 E, 322287 N.<br>• General changes to vegetation colour/coverage, assumed to be changes in the seasons/agricultural land uses. |
| 2019-2021 (Google Earth Satellite Imagery) | • Land associated with developments and adjacent pond/basin locally encroaching on Site Region 5c.<br>• General changes to vegetation colour/coverage, assumed to be changes in the seasons/agricultural land uses. | • Pond/basin and associated developments adjacent to north of Region 5c.<br>• General changes to vegetation colour/coverage, assumed to be changes in the seasons/agricultural land uses. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| 2022, 2025 (Google Earth Satellite Imagery) | • General changes to vegetation colour/coverage, assumed to be changes in the seasons/agricultural land uses. | • General changes to vegetation colour/coverage, assumed to be changes in the seasons/agricultural land uses. |
| **Region 6** | | |
| 1883-1885 (1:10,560, 1:2,500) | • Site predominantly occupied by undeveloped fields with associated field boundaries (including trees and possibly drains/linear surface water features) and numerous roads/tracks and paths (e.g. crossing Regions 6a, 6b, 6c, 6d and 6e).<br>• ponds located in Region 6a e.g. at 474018 E, 321787 N, and then 473745 E, 321759 N, 473843 E, 321701 N and 473878 E, 321620 N adjacent to road, including local triangular parcels of woodland.<br>• Structures located in Region 6a associated with Farm at 473876 E, 321670 N adjacent to road.<br>• Small scale square structure in west of Region 6a at 473405 E, 321967 N.<br>• Railway line (Midland Railway, Holwell Branch) and adjacent surface water feature in Region 6b at 473101 E, 321728 N, with adjacent path/track and suspected pond at 473119 E, 321744 N. Alignment of surface water feature and rail line continue north, crossing linear semi-circular extension to Site boundary in the north of Region 6b at 473114 E, 322243 N and 473265 E, 322496 N. Rail line indicated to | • Adjacent land generally extensions of on Site fields and linear features.<br>• Numerous ponds in land adjacent to Region 6a e.g. c.30m southwest at 473838 E, 321587 N.<br>• Structures assumed to be associated with Sysonby Lodge located adjacent to Section 6a at 473846 E, 321538 N.<br>• Pond, pump and Potter Hill Farm adjacent to east of Region 6b at 473074 E, 322124 N.<br>• Structures associated with Welby Grange adjacent to southern linear extension to Site boundary in Region 6b around 473042 E, 321145 N.<br>• Ponds located south of Region 6c e.g. c.96m at 472155 E, 321621 N 472274 E, 321446 N and c.20m south at 472271 E 321446 N.<br>• Pond adjacent to Region 6c boundary at 472135 E, 321837 N.<br>• Ash and Oak plantation present adjacent to Region 6c (472499 E, 321910 N).<br>• Small scale feature (unknown origin) adjacent to Region 6d at 471464 E 321906 N.<br>• Welby Lodge, ponds and associated pump and well located adjacent to southern linear |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | be on cuttings/embankments; definition of such unclear based mapping.<br>• Other local features associated with the above rail/surface water feature alignment in Region 6b, including crossing/footbridge 473137 E, 321899 N, locally encroaching group of structures 473078 E, 322144 N and aforementioned road crossing rail and surface water feature at 473098 E, 322220 N.<br>• Linear surface water feature bearing east-west through north of Region 6a, connecting into aforementioned main surface water feature around 472983 E, 322226 N.<br>• Local small scale square structure of unknown origin in north of Region 6b at 472890 E, 322070 N.<br>• Crossing point of aforementioned surface water feature on southern linear extension to Site Boundary in Region 6b around 472866 E, 321179 N and pond to the east of this at 473082 E, 321148 N.<br>• Pond in Region 6c at 472307 E, 321699 N.<br>• Cant's Thorns woodland encroaching on the north of Region 6d.<br>• Small scale rectangular feature (unknown origin) in Region 6d at 471810 E, 321610 N.<br>• Ponds in Region 6d at 471435 E, 321795 N and 471295 E, 321831 N. | extension to Site boundary in Region 6d at 471845 E, 321524 N. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | • <br>• Pond and rectangular structure in Region 6e at 471206 E, 321882 N and 471201 E, 321914 N, adjacent to road and triangle feature with central point (assumed to be survey point).<br>• Fishpond House in Region 6e at 470837 E, 321995 N.<br>• Fishpond, weir and sluices, alongside associated cutting, in Region 6e between 470772 E, 322082 N and 470856 E, 322056 N, including adjacent wetland/marsh and woodland and paths. | |
| 1887-1888 | • No map coverage. | • No map coverage. |
| 1900-1902[27] (1:10,560) | • Partial coverage.<br>• Local well and feature of unknown origin present encroaching on southern linear extension to Site boundary around a mapped track in southeast of Region 6a at 473885 E, 321486 N and 474039 E, 321601 N. | • Partial coverage.<br>• Rail crossing to surface water feature (now mapped to be flowing south) adjacent to north of semi-circular Site extension in Region 6b around 473287 E, 322541 N.<br>• Pond mapped c.235m northeast of Region 6d (note, correlates with present day circular features within adjacent fields). |
| 1903[28] (1:2,500) | • Partial coverage.<br>• Sluice and road/track mapped adjacent to surface water feature on Region 6b, the former at 473102 E, 321758 N.<br>• Small scale feature in southeast of 6d no longer mapped. | • Partial coverage.<br>• Well and local structures mapped c.190m to south of linear extension to Site boundary in Region 6b, towards are understood to be associated with Asfordby Mine at 472695 E, 321056 N. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | • Rectangular feature on southwestern linear extension to Region 6d at 471119 E, 321689 N.<br>• Suspected pond east of road/track in Region 6e around 471249 E, 321921 N.<br>• Small scale rectangular structure near Fishpond House in west of Region 6e around 470875 E, 321960 N. | |
| 1904[34]<br>(1:10,560, 1:2,500) | • Linear surface water feature indicated to run southwest through Region 6a, beneath road.<br>• Aforementioned small scale rectangular structure near Fishpond House no longer mapped.<br>• Feature of unknown origin in southeast of Region 6a indicated to be surface water crossing/survey point. | • No significant changes. |
| 1905 | • No map coverage. | • No map coverage. |
| 1915-1920[29]<br>(1:10,560, 1:2,500) | • Partial coverage, where coverage, no significant changes. | • Suspected pond feature c.15m southeast inside linear semi-circular extension to Region 6b and c.35m to the northwest around 473210 E, 322167 N and 473098 E, 322496 N. of<br>• Rail crossing of surface water feature to the north of Region 1a no longer mapped. |
| 1928-1930[30]<br>(1:10,560, 1:2,500) | • Well in south of Region 6a no longer mapped.<br>• Extensions ‘L’ shaped structures around road in southeast of Region 6a. | • No significant changes. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| 1931 | • No map coverage. | • No map coverage. |
| 1938[31] (1:10,560) | • Partial coverage, where coverage, no significant changes. | • Partial coverage, where coverage, no significant changes. |
| 1946 | • No map coverage. | • No map coverage. |
| 1950 (1:10,560) | • No significant changes. | • Assumed residential buildings located adjacent to Region 6a centred around 473538 E, 321871 N.<br>• A refuse/slag heap is marked as presented offsite adjacent to the southernmost linear extension of 6a at 472978 E, 320747 N . The area is marked by slope indicating raised land on the north and western boundaries of its extent and associated rail lines (note, feature correlates with landfill associated with Holwell Works). |
| 1958 | • No map coverage. | • No map coverage. |
| 1959 ('provisional scale') | • No significant changes. | • Rises mapped c.50m south of Region 6c around 472162 E, 321631 N. |
| 1962[32] (1:2,500) | • Partial coverage, where coverage, no significant changes. | • Partial coverage.<br>• Square feature adjacent to Region 6a next to Nottingham Road around 472913 E, 322359 N. |
| 1964-1965 | • No map coverage. | • No map coverage. |
| 1966-1968 (1:2,500) | • Road crossing Region 6a now mapped as Nottingham Road. | • High View Farm located adjacent to Region 6a at 473538 E, 321871 N. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | • Rail line through Region 6a mapped as dismantled with mound/bund like feature on east side of surface water feature in north of semi-circle extent in Region 1a around 473273 E, 322502 N, with drain bearing east-west from feature (note, earthworks correlates with LiDAR data).<br>• Structures reconfigured and silo labelled at cluster of buildings located on Region 6a at 473876 E, 321670 N.<br>• Disused pump located In Region 6a at 473478 E, 322042 N assumed to be associated with adjacent assumed residual buildings.<br>• Square feature (unknown origin) on Region 6d at 471384 E, 321904 N (note, other small scale unknown feature to the northeast of this is no longer mapped and this feature appears to be on linear alignment with an on Site pond and other offsite ponds/satellite imagery features).<br>• Ponds noted on Region 6d at 471301 E, 321839 N and 471445 E, 321798 N.<br>• Fishponds House no longer mapped on Region 6e.<br>• Suspected cutting associated with linear southern extension to Region 6c around 472,036 E, 321284 N associated with track.<br>• Rectangular structure encroaching on southern extension to Region 6b boundary | • Yaxley House and other assumed residential building located adjacent northwest of Region 6a e.g. at 473448 E, 322029 N.<br>• Stonesby House located c.50m north of Region 6a at 473454 E, 322121 N.<br>• Slag heap now clearly labelled adjacent to south of southernmost linear extension to Region 6b.<br>• Areas of ground workings, mapped as Welby and Grange Cottage, present in area of previously mapped well to the south of linear extension to Site south of Region 6b around 472780 E, 321080 N, just northwest of slag heap. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | now mapped as smaller scale square feature. | |
| 1969 ('provisional scale') | • Square features on Region 6e and 6d no longer mapped.<br>• Linear feature with 'Tk', assumed to be a track located in Region 6e at 471134 E, 321957 N and 470787 E, 322047 N. | • No significant changes. |
| 1972-1977 | • No map coverage. | • No map coverage. |
| 1978-1980[33] (1:2,500) | • Partial coverage, where coverage, no significant changes. | • Partial coverage, where coverage, no significant changes. |
| 1985-1986 | • Partial coverage, where coverage, no significant changes. | • Partial coverage, where coverage, no significant changes. |
| 1985 (Google Earth Satellite Imagery) | • Imagery unclear. | • Imagery unclear. |
| 1991-1993 (1:2,500) | • Structure and tank associated with Sysonby Farm Lodge in south of Region 6a at 473900 E, 321710 N (note; also on present day satellite imagery).<br>• Structures encroaching on Region 6a at 473565 E, 321799 N (note; also on present day satellite imagery).<br>• Overhead lines and associated towers present through Region 6b at 472734 E, 321738 N.<br>• Ponds located in Region 6d no longer mapped e.g. at 471435 E, 321795 N and 471295 E, 321831 N; potentially infilled. | • Tank more clearly mapped adjacent to west of Region 6b associated with Potter Hill Farm around 473079 E, 322119 N.<br>• Welby Lodge, ponds and associated well located adjacent to southeast of Region 6d at 471845 E, 321524 N no longer clearly mapped.<br>• Local rectangular structure within Ash Plantation adjacent to north of Region 6c.<br>• Electrical substation located c.165m southeast of the linear extension south of Region 6c, located on Regions 6b/6c at 472289 E, 320981 N, with connecting overhead lines. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | • Track located in Region 6e at 471134 E, 321957 N and 470787 E, 322047 N no longer present. | |
| 1994-1995[35] | • No map coverage. | • Partial coverage, where coverage, no significant changes. |
| 1999, 2000 (Google Earth Satellite Imagery) | • Site generally as per present day layout, comprised predominantly of agricultural fields, with local roads/lanes, encroaching woodland and pond in the west.<br>• Structures, generally in present day layout, present within Region 1a, including clear evidence of tank/silo and assumed Gas Valve Compound on east side of A606.<br>• General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, typically correlating with ponds/other historical features generally as outlined in Report Section 2 and 3. | • General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, typically correlating with ponds/other historical features generally as outlined in Report Section 2 and 3.<br>• The slag heap/landfilling area adjacent to south of the linear extension to Region 6b is shown as present through aerial imagery with visible darker soil, ponding and variably vegetated ground.<br>• The Asfordby Mine spoil heap evidenced by grey/dark grey soils and access tracks adjacent to south of linear extension to Region 6c/d.<br>• Developments (assumed industrial) between the aforementioned landfilling/spoil heaps c.200m from the southern linear extension to Region 6a; not clearly with evidence of mining/shaft infrastructure, which may have already been decommissioned post closure of the mine.<br>• Railway line through Region 6a/b not evident. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| | | • Unknown development/storage area, including track, c.30m south of Region 6d.<br>• Other developments generally much in their present day layout adjacent to Region 6a/b and southern linear extension to Site boundary, including local rectangular basin/pond around Potters Hill in the south. |
| 2006<br>(Google Earth Satellite Imagery) | • Further development/groundworks around structure associated with assumed residential developments locally encroaching on Region 6a at 473569 E, 321809 N. | • General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, typically correlating with ponds/other historical features generally as outlined in Report Sections 2 and 3.<br>• Areas of vegetated ground now present within spoil heap south of Region 6c/d, suggesting no longer in use/becoming overgrown/landscaped. |
| 2010<br>(Google Earth Satellite Imagery) | • Structure and associated trackway in Region 6a at 473457 E 321795 N, associated with assumed residential developments. | • General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, typically correlating with ponds/other historical features generally as outlined in Report Section 2 and 3.<br>• The slag heap/landfill south of Region 6a is indicated to have been levelled.<br>• Spoil heap south of Region 6c/d now largely vegetated over, with local ponds. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| 2011<br>(Google Earth Satellite Imagery) | • General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, typically correlating with ponds/other historical features generally as outlined in Report Section 2 and 3. | • General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, typically correlating with ponds/other historical features generally as outlined in Report Section 2 and 3.<br>• Assumed small buildings (part of Cutie Pie Farm) adjacent to Region 6c at 472389 E, 321874 N. |
| 2012<br>(Google Earth Satellite Imagery) | | • General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, typically correlating with ponds/other historical features generally as outlined in Report Section 2 and 3. |
| 2018<br>(Google Earth Satellite Imagery) | | • General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Further development to Cutie Pie Farm at 472389 E, 321874 N.<br>• Evidence of vegetated local features, typically correlating with ponds/other historical features generally as outlined in Report Section 2 and 3.<br>• Spoil heap to south of Region 6c/d evidenced to be undergoing redevelopment as a solar farm. |

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|
| 2019, 2020, 2021, 2022, 2025 (Google Earth Satellite Imagery) | | • General changes to vegetation colour/coverage evident, assumed to be changes in the seasons/agricultural land uses.<br>• Evidence of vegetated local features, typically correlating with ponds/other historical features generally as outlined in Report Section 2 and 3.<br>• Assumed agricultural developments adjacent to northern linear extension to Region 6b in the north off the A606.<br>• The landfill/slag heap to the south of Region 6a appears largely vegetated over in its northern extent. |

Notes:

[1] Partial map coverage including Region 1a, 1d and 1e only.
[2] Partial map coverage including Region 1a, 1b, 1c and 1d only.
[3] Partial map coverage including Region 1a, 1b and 1c only.
[4] Partial map coverage including Region 1d (local) and 1e only.
[5] Partial map coverage including Region 1a, 1b, 1c and 1e (locally).
[6] Partial map coverage including Region 1c, 1d and 1e.
[7] Partial map coverage including Region 1e.
[8] Partial map coverage of Region 2e and 2f.
[9] Partial map coverage of Region 2a to 2e, locally 2f.
[10] Partial map coverage of Region 2a and locally Region 2b.
[11] Partial map coverage of Region 2b, 2c, 2d, 2e and 2f.
[12] Partial map coverage of Region 2b, 2c, 2d, 2e and 2f.
[13] Partial map coverage of Region 2a, 2b, 2c and locally 2d.
[14] Partial coverage including Region 2a, 2b, 2c and part of 2d.

| Date(s) of Mapping | On Site Features | Offsite Features |
|---|---|---|

[15] Partial coverage of 2f and offsite north of 2e.
[16] Partial coverage of 2a to 2e and part of 2f.
[17] No map coverage for 1903.
[18] Partial map coverage for Region 3e, 3f and 3g.
[19] No map coverage for 1958 and partial map coverage for 1959 of Region 3c, 3d, 3e and 3f.
[20] Partial map coverage for 1976 of Region 3b and 3c.
[21] Partial map coverage of majority of Region 4b and all of 4c, 4d and 4e and in earlier mapping, partial coverage of north of 4b and 4c only.
[22] Partial map coverage of Region 4a and east of 4b only.
[23] Partial map coverage of Region 4a and east of 4b only.
[24] Partial map coverage of majority of Region 5e and locally 5d.
[25] Partial map coverage of Region 5a, 5b, 5c, and locally 5d and 5e.
[26] Partial map coverage of majority of Region 5d and 5e.
[27] Partial map coverage of Region 6a and 6e.
[28] Partial map coverage of Region 6a, full coverage of Region 6b, 6c, 6d and 6e.
[29] Partial map coverage of Region 6e and north of Region 6a.
[30] Partial map coverage of Region 6a.
[31] Partial map coverage of the majority of Region 6a.
[32] Partial map coverage of Region 6b locally.
[33] Partial map coverage of Region 6b locally.
[34] Partial map coverage of Region 6b, 6d and 6e and full coverage of 6a and 6c.
[35] Partial map coverage adjacent to south of Region 6b/6c.

# Appendix C Preliminary Geotechnical Risk Register

# Appendix C Preliminary Geotechnical Risk Register

13.1.2 A Preliminary Geotechnical Risk Register has been compiled to show the degree of risk attached to various ground related aspects of the proposed scheme. The purpose of the register is to produce an assessment of the risk to the project posed by site specific ground related problems and identify suitable mitigation measures to control the risk to an acceptable level. The risk register should be developed and refined as the geotechnical design and assessment progresses such that the register will allow management of the geotechnical risks.

13.1.3 The degree of risk (R) is determined by combining an assessment of the likelihood (L) of the hazard with an assessment of the severity (S) of the hazard. The scale against which the likelihood and severity are measured, and the resulting degree of risk determined is presented below. Table C-4 presents the preliminary risk register for the proposed scheme.

Table C. 1: Classification of probability and impact

| Likelihood (L) | | Severity (S) | |
|---|---|---|---|
| Very Likely | 5 | Very High | 5 |
| Likely | 4 | High | 4 |
| Probable | 3 | Medium | 3 |
| Unlikely | 2 | Low | 2 |
| Negligible | 1 | Very Low | 1 |

Table C. 2: Risk matrix

| | | | | | | |
|---|---|---|---|---|---|---|
| Likelihood | 5 | 5 | 10 | 15 | 20 | 25 |
| | 4 | 4 | 8 | 12 | 16 | 20 |
| | 3 | 3 | 6 | 9 | 12 | 15 |
| | 2 | 2 | 4 | 6 | 8 | 10 |
| | 1 | 1 | 2 | 3 | 4 | 5 |
| | | 1 | 2 | 3 | 4 | 5 |
| | | Severity | | | | |

Table C. 3: Classification of risk rating

| Risk rating | Response |
|---|---|
| Intolerable | Unacceptable |
| Substantial | Early Attention |
| Tolerable | Regular Attention |
| Trivial | Monitor |

Table C. 4: Preliminary geotechnical risk register

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| Unknown/ unexpected ground conditions (including groundwater) | Site wide | Absence of ground investigation information across Site.<br><br>Site is linear alignment which crosses numerous mapped changes in superficial and bedrock geology, which may not be a true reflection of the ground conditions (as indicated locally by historical logs).<br><br>Local features/geological conditions increasing likelihood of local unexpected ground conditions e.g. karst, mining, slope instabilities, faulting, buried channels/valleys, local historical/present day developments etc. | 4 | 4 | 16 | Damage to and possible failure of proposed development due to incorrect ground model, design parameters etc.<br><br>Increased cost and delay to account for unexpected ground conditions. | Ground investigations and associated in-situ and laboratory testing to identify underlying ground conditions (including groundwater) and assess risk, targeted across Site depending on nature of proposed development and anticipated ground hazards/constraints.<br><br>Appropriate design ground model (including groundwater conditions) and parameters to be incorporated, considering changes in ground conditions and nature of associated hazards/constraints.<br><br>Consideration of inspection by a suitably qualified geotechnical engineer and inclusions of validation testing during construction | 2 | 3 | 6 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | | to confirm design assumptions, alongside maintenance regime, subject to final mitigation/remediation. | | | |
| Karstic terrains and associated subsidence features | Lincolnshire Limestone Formation | Limestone is prone to solution, forming karstic terrains which are prone to subsidence.<br><br>Presence of recorded karstic terrains and associated subsidence features and likely additional unrecorded/associated features, including swallet/sink/shake holes and stream sinks (Table 3.32 and Figure 10).<br><br>Increased likelihood of features in proximity to faulting through the Lincolnshire Limestone Formation, and potentially at boundaries | 4 | 4 | 16 | Subsidence/settlement at surface causing damage and possibly failure of proposed developments.<br><br>Potential for increased cost and delays during site works to investigate and remediate features.<br><br>Possible risk to life/injury and damage to plant due to ground collapse. | Site reconnaissance by suitably qualified geotechnical engineer/engineering geologist, including inspection of existing and suspected features to further profile risk.<br><br>Ground Investigation to identify underlying ground conditions and assess risk, including geophysical survey and targeted investigation of identified features.<br><br>Investigation and construction work to consider the potential for void spaces/solution features on Site e.g. inspections, drilling | 4 | 2 | 8 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | of superficial deposit cover. | | | | Requirement for more significant scale investigations to inform risk, although such would not be able to fully de-risk the Site due to nature of karst terrains. | platforms, validation testing etc.<br><br>Account for risk through remediation of features/in designs e.g. through extending foundations into deeper intact rock not prone to dissolution, ignoring base resistance in pile design, design shallow foundations to span voids etc.<br><br>Consideration of locating developments outside of higher risk areas.<br><br>Avoid of use of infiltration drainage, and if used, ensure suitable offset from foundations and infrastructure.<br>Incorporate appropriate ground model and engineering parameters into designs. | | | |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | | Consideration given to monitoring/maintenance regimes post construction, depending on level of risk and final mitigation/remediation. | | | |
| Lateral and vertical variabilities in ground conditions and associated engineering properties, including potential for sudden changes | Site wide | Variations in stratigraphy and engineering properties across the Site, leading to changes in ground conditions and potentially design/construction/maintenance requirements.<br><br>Variability in the lateral extents and vertical thickness of composition of superficial deposits and composition of in-situ bedrock, including: geological boundaries, faulting, buried channels/valley, boulders and variations in extents of alluvial channels.<br><br>Historical/present day developments/ | 4 | 3 | 12 | Damage to and possible failure of proposed development due to incorrect ground model, design parameters etc. if varied approach of design/construction/maintenance is not taken, considering variations in ground conditions.<br><br>Differential settlement due to variable ground conditions at | Ground investigations and associated in-situ and laboratory testing to identify underlying ground conditions (including groundwater) and assess risk, targeted across Site depending on nature of proposed development and variations in ground condition.<br><br>Changes in ground conditions and engineering properties of the ground taken into account subject to the location of the proposed development on Site in design, construction and maintenance.<br><br>Designs to account for variations e.g., through | 2 | 2 | 4 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | land uses, including realignment of rivers, infilling ponds etc. | | | | similar depths, resulting in damage to proposed infrastructure.<br><br>Changes in ground conditions resulting in construction difficulties and delays. | increasing construction depths to account for variations in ground conditions, breaking out local boulders, incorporating reinforcement in foundation etc.<br><br>Incorporate appropriate ground model and engineering parameters into designs.<br><br>Consideration of locating infrastructure outside of areas anticipated to have more significantly variable ground conditions.<br><br>Selecting suitable excavation methodologies/equipment/plant during construction, consideration of potential for changes in ground/groundwater conditions and impact of such. | | | |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| Aggressive Ground Chemistry | Site wide, but anticipated to be more notably elevated in mudstones of the Lias Group (including Tills derived from such): | Sulphide/sulphate bearing stratum, posing risk of aggressive ground conditions, anticipated to be most prevalent mudstones/soils derived from such.<br><br>Potential for other stratum and groundwater to also contain sulphate/sulphides generally, including Made Ground (especially if colliery spoil) and Alluvium. | 4 | 3 | 12 | Deleterious effects on buried construction materials, causing damage and potential failure of proposed development.<br><br>Potential to preclude some forms of ground improvement e.g. lime stabilisation. | Ground investigations to identify underlying ground conditions, including BRE Special Digest 1 (SD1) suite testing, and assess risk.<br><br>Design concrete mix and the additional protective measures incorporated based on BRE SD1 test results into designs.<br><br>Designs to account for aggressive ground conditions generally if present, including consideration of construction depths being adjusted to not interface with ground conditions of elevated aggressivity to buried construction materials.<br><br>Consideration of aggressivity of Site won materials, including oxidisation of sulphides, in | 3 | 2 | 6 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | | material re-use/earthworks design. | | | |
| Presence of natural highly compressible deposits | Alluvium/associated soils generally around natural surface water courses | Alluvial soils formed of unconsolidated low strength soils, prone to compression and subsequent significant settlements under load.<br><br>Potential for greater extents of Alluvium than record on mapping due to re-alignment of rivers e.g. Region 4e and more generally around other surface water features. | 4 | 3 | 12 | Unacceptable degrees of settlement, including differential settlement resulting in damage to proposed developments. | Ground investigations to identify underlying ground conditions and assess risk, including targeted investigations around river banks to confirm extent of deposits.<br><br>Designs to account for settlement e.g., through:<br>Deepening foundations to competent underlying stratum.<br>Laying new utilities with increased falls and flexible service connections.<br>Ground improvement.<br><br>Consideration of locating proposed developments outside of areas anticipated to be prone to settlement. | 3 | 2 | 6 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | | Incorporate appropriate ground model and engineering parameters into designs.<br><br>Consider ongoing monitoring post construction and maintenance plan, as appropriate. | | | |
| Potential for slope instabilities and cambering terrains, including potential for scour in water courses | Existing slopes where potential slope instabilities identified (Table 3.33) and evidence of local steeper slopes topographically generally.<br><br>Local evidence of slickensides in ground around sloping | Potential for slope instability issues, including relict shear surfaces and soils at residual strengths, with mapped cambering terrains (with possibility for fissures/gulls) and possible signs of local slope instabilities in existing sloping topographies.<br><br>Potential for natural cavities associated with gulls/fissures in cambering terrains. | 3 | 4 | 12 | Slope failure resulting in damage to and potentially failure of proposed developments and adjacent infrastructure.<br>Possible risk to life/injury and damage/loss of plant due to landslip.<br>Requirement for more significant scale investigations to inform risk relative to cambering, | Site reconnaissance by suitably qualified geotechnical engineer/engineering geologist, including inspection of existing and suspected features to further profile risk.<br><br>Topographical surveys to confirm the topography of any slopes along Site.<br><br>Ground investigations, including geophysical surveying (to inform location of exploratory holes in cambering terrains) and in-situ and laboratory testing, | 3 | 2 | 6 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | topography as per Report Section 3.3.<br>Cambering terrains, indicated to be associated with the Northampton Sand Formation as per Report Section 3.3.<br><br>Potential over steepened slopes locally indicated by Groundsure Moderate hazard rating in area of suspected subsidence in Region 1a/b. | Existing gully/valley features potentially formed of low strength Head deposits.<br><br>Potential for scour on slopes forming river banks generally. | | | | although such would not be able to fully de-risk site due to nature of such terrains.<br>Some potential for voids, with potential for collapse settlement/subsidence resulting in damage and potential failure of proposed development associated with cambering.<br>Delays/increased costs to remediate features. | to identify underlying ground and assess risk, considering proposed developments.<br><br>Designs to account for slope instability as necessary e.g.:<br>Avoiding unsuitably loading slopes or locating loads a sufficient distance from the crest of slopes.<br>Ensuring slopes are not undermined in a way that would preclude stability.<br>Incorporation of mitigation measures if required e.g. slope stabilisation.<br>Avoiding developments in higher risk areas.<br>Piled foundations extending to competent strata at depth.<br>Foundations designs to span voids/accommodate differential settlement.<br>Remediation of cavities/slope instabilities. | | | |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | | Ensure no vegetation is removed from slopes, which could be providing stabilising effects.<br><br>Consider risk of slope stability during any ground investigation and construction works e.g. avoid loading slopes/ incorporate exclusions zones at crests, avoid discharging water over slopes etc.<br><br>Avoid locating infiltration devices at top of slopes in a way that could induce/increase risk of instabilities.<br><br>Appropriate design ground models and parameters to be incorporated into designs, alongside slope stability assessments. | | | |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | | Consideration of inspections by a suitably qualified engineering geologist/ geotechnical engineer during construction.<br><br>Consider ongoing monitoring post construction and maintenance plan, as appropriate, based on residual risk due to ongoing natural subsidence risk associated with cambering. | | | |
| Local Head deposits with potential for poor load bearing characteristics. | Head deposits/potential for generally on sloping/valley topographies. | Head deposits likely to be variable with potential for low strength soils associated with historical mass soil movements on slopes. | 4 | 3 | 12 | Unacceptable degrees of settlement, including differential settlement resulting in damage and possibly failure of proposed developments. | Ground investigations to identify underlying ground conditions and assess risk, including targeted investigations around sloping topographies.<br><br>Avoid locating proposed developments in areas of Head deposits.<br><br>Consider in designs e.g. through deepening | 2 | 2 | 4 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | | foundations to underlying competent stratum.<br><br>Appropriate design ground models and parameters to be incorporated into designs.<br><br>Consideration of inspections by a suitably qualified engineering geologist/ geotechnical engineer during construction. | | | |
| Sloping topographies on Site requiring earthworks/retaining structures to form enabling works | Sloping topographies | Sloping topography requiring earthworks/retaining walls to manage level changes as part of enabling works i.e. to form level laydown/construction areas and haul roads to enable access to proposed towers. | 4 | 3 | 12 | Delays during construction if not suitably accounted for.<br>Increased costs/program generally to complete enabling works and ensure feasible access including for long term maintenance. | Ground investigations and topographical survey to identify underlying ground and groundwater conditions and confirm level changes, to inform earthworks design.<br><br>Design earthworks to manage levels as efficiently as possible, and where necessary, incorporate slopes or retaining | 2 | 2 | 4 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | | structures to manage level changes.<br><br>Where possible, avoid the need for developments/working areas through sloping ground.<br><br>Where possible, re-use site won fill to minimise importing of fill materials. | | | |
| Potential for shallow groundwater and artesian waters/confined aquifers, including springs | Rivers including Witham and Eye and other natural surface water features/associated lower lying topographies.<br><br>Alluvium/associated soils | The likely presence of shallow groundwater associated with existing rivers/surface water features and lower lying topographies in such areas, in continuity with surrounding ground.<br><br>Variation in permeability characteristics of stratum, resulting in formation of confined aquifers and artesian | 4 | 4 | 16 | Worsening of issues with excavation instabilities (including scour and running sands) and if present, issues with slope instabilities, posing risk to life, alongside damage and potential failure | Ground investigations to identify underlying ground conditions, including for groundwater monitoring, and assess risk.<br><br>Consider groundwater regime during construction and investigations and need for mitigation measures e.g., dewatering as part of temporary works design. | 2 | 2 | 4 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | generally around natural surface water courses.<br><br>Springs and confined groundwater between a number of geological formations as per Report Section 8. | water pressures underground and springs issuing from ground level. | | | | of proposed developments.<br><br>Uplift/buoyancy effect on infrastructure.<br><br>Reducing bearing capacity and degrading/reducing strength of ground. | Consideration of locating infrastructure outside of areas where significant shallow groundwater is anticipated.<br><br>Suitably account for groundwater in designs including flotation checks as necessary.<br><br>Measures may be required to reduce buoyancy of ducting and chambers during construction e.g., dewatering<br><br>Redirection of existing watercourses away from critical Site areas.<br><br>Consider suitable groundwater level in design ground model.<br><br>Design and construction depths to avoid interfacing with artesian groundwater. | | | |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | | Consideration of inspections by a suitably qualified engineering geologist/ geotechnical engineer during construction. | | | |
| Potential for excavation/ cutting instabilities | Site wide | Potential for shallow superficial/weathered bedrock soils prone to instabilities in excavations, more likely in Alluvium, Head, Artificial deposits and granular soils weathered from sandstones e.g. Northampton Sand Formation (evidenced on historical log).<br><br>Potential for discontinuities in rock with characteristics that would make faces in such unstable e.g. evidence of smooth/ discontinuities in historical borehole records. | 3 | 4 | 12 | Unstable temporary or permanent excavations/cuttings, prone to instability, posing risk to life and difficulties/delays during construction, with potential for increasing construction and maintenance costs and causing delays if not suitably accounted for in designs. | Ground investigations to be undertaken to identify underlying ground and groundwater conditions and assess risk.<br><br>Instabilities to be considered during investigations, design and constructions e.g. through:<br>Battering back excavation faces to suitable safe angles.<br>Excavation support.<br>Selecting suitable excavation methodologies/equipment/plant.<br>For any permanent cuttings, engineering solution to mitigate instabilities e.g. retaining wall, soil nails, | 2 | 2 | 4 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | Potential heavily faulted rock unstable in excavations.<br><br>Potential for shallow groundwater/ springs/artesian groundwater exasperating stability issues. | | | | | rock bolts, netting/mesh systems etc.<br><br>Consideration of limiting any cut works, especially any permanent cuttings, in areas likely prone to excavation instabilities.<br><br>Appropriate design ground models and parameters to be incorporated into designs, including stability analysis.<br><br>Consideration of inspections by a suitably qualified engineering geologist/ geotechnical engineer during construction.<br><br>Consider ongoing monitoring post construction and maintenance plan, as appropriate, for any permanent cuttings. | | | |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| Potential for shallow bedrock, boulders and localised anthropogenic materials acting as obstructions during excavation | Till<br><br>Bedrock with no superficial cover<br><br>Local existing/historical structures., including rail and local wells and pumps.<br><br>Indicated rail crossing of surface water feature in north of 6b no longer present. | Potential for shallow bedrock/natural obstructions, including boulders in Tills and harder rock beds e.g. of limestone within mudstone formations.<br><br>Potentially locally anthropogenic obstructions associated with historical/present day developments, relict foundations, structures, including possibility for voids e.g. associated with wells/pumps etc. | 3 | 3 | 9 | Early refusals, difficult excavation and potential for overbreak.<br><br>Potential for delays or design changes if not suitably accounted for.<br><br>Potential for subsidence from voids associated with historical structures. | Ground investigations and associated in-situ and laboratory testing to identify underlying ground conditions and assess risk, targeted across Site depending on nature of ground/local potential anthropogenic obstructions and likely cut magnitudes.<br><br>Select suitable plant/methodologies to undertake investigation and construction works.<br><br>Where possible, limit cut magnitudes on Site as part of designs due to risk of costly and potentially difficult excavation in bedrock.<br><br>Avoid locations of identified structures/potential for voids e.g. associated with wells, or remediate as necessary | 2 | 2 | 4 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | | e.g. through suitable backfilling. | | | |
| Existing utilities, including culverts and overhead lines | Site wide | Utilities present locally e.g. overhead lines and local culverts indicated by gaps on field boundaries with surface water features.<br><br>Full utility records not reviewed as part of this Report/held and therefore, potential for currently unknown utilities crossing/adjacent to the Site.<br><br>Relatively rural site, therefore, presence of Site wide utilities is considered unlikely, although could be present e.g. associated with adjacent existing developments, including tanks and Gas Valve Compound. | 4 | 5 | 20 | Damage to utilities/infrastructure.<br>Increased cost and delay to divert or lower utilities.<br>Potential for delays to suitably account for presence of utilities e.g. relocations, protection, surveys etc.<br>H&S impact during any excavations during Ground Investigation or construction, including potential for injury/loss of life due to utility strike. | Ensure up to date utility plans and records are obtained, including PAS128 Type D, C, B and A compliant utility surveys and drainage surveys as required.<br><br>Early liaisons with asset owners to confirm constraints/requirements and continue such throughout works.<br><br>Undertake safe digging procedures in accordance with HSE HSG47 and PAS128.<br><br>Undertake works in accordance with HSE GS6, where relevant.<br><br>Undertake GPR surveys and mark out utilities prior to any | 2 | 2 | 4 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | Relocation of ground investigation or site area to avoid overhead lines.<br>Scheme design alterations to avoid overhead/underground utilities. | investigations/breaking ground.<br><br>Plan ground investigation works, including access onto and through site, to avoid utilities.<br>Design proposed scheme to minimise impact on existing utilities.<br><br>Where/if necessary, incorporate additional mitigation measures into designs e.g., bridging structures to protect existing utilities. | | | |
| Existing developments/infrastructure/land uses constraining development and that could be impacted by the proposed development | Site wide | Presence of developments, infrastructure and land uses e.g. overhead line towers, rivers, agricultural fields and boundaries, rivers, roads, paths, towers, ponds/basins, existing structures/tank, Gas Valve Compound and | 4 | 3 | 12 | Failure/subsidence of/damage to existing features resulting from interaction with proposed developments.<br><br>Difficulties/constraints during investigations, | Site reconnaissance to confirm site layout/features and access constraints.<br><br>Liaisons with asset owners and appropriate bodies to establish nature of existing features and any requirements/restrictions relating to ground investigation and | 2 | 2 | 4 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| s, including access constraints. | | potential cuttings/retaining walls etc.<br><br>Potential for damage to existing features/developments/infrastructure if not suitably considered, including existing tower foundations.<br><br>Access constraints caused by generally by rural/agricultural setting with numerous field boundaries, surface water features and associated culverts, alongside existing road and dismantled rail infrastructure with bridge. | | | | construction, resulting in delays etc. | development works e.g. Environment Agency, Local Authorities etc.<br><br>Undertaking appropriate assessments as required to confirm the nature/stability/condition of the specific features and assess associated risks/constraints to the proposed development.<br><br>Ground investigations to identify underlying ground conditions in the vicinity of specific features and assess risk as required.<br><br>Investigation and construction work to take into account risk of damage/failure e.g., through safe working distances, selecting suitable plant/equipment and working/construction methodologies etc. | | | |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| Historical surface mineral extraction (including infilled ponds/demolished historical structures) and associated fill and buried high walls | Identified and suspected features locally (Figure 10, Appendix B and Report Section 3.4) | Surface mineral extraction, including area of opencast ironstone worked ground and local recorded/suspected pits, and suspected infilled ponds; associated buried high walls and likely un-engineered infill prone to settlement when loads.<br><br>Historical developments no longer present, likely demolished and ground altered/backfilled as part of this. | 4 | 3 | 12 | Differential settlement from un-engineered fill and potential for collapse settlement, resulting in significant subsidence at surface, causing damage to or failure of proposed developments.<br><br>Potential for increased cost and delays during site works to investigate and remediate features. | Ground investigations based on location specific development proposals to identify underlying ground conditions and assess risk, including confirmation of extent/nature of any fill materials.<br><br>Avoid infilled ground/buried high walls and areas of demolished historical structures when designing layout of proposed developments.<br><br>If encountered, designs to suitably remediate/mitigate the risk e.g. through deep foundations extending through fill, excavation and replacement of fill with engineered fill, ground improvement etc. | 2 | 2 | 4 |
| Historical deep coal mining and potential for | Some bedrock geology e.g. Marlstone | Deep coal mining recorded beneath Region 6; some low potential for associated unrecorded | 2 | 4 | 8 | Damage to and possible failure of proposed development | Liaison with landowners to confirm any further known information of possible features and Site | 1 | 4 | 4 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| other historical underground non-coal (e.g. ironstone) and coal mining | Rock, Northampton Sand and Rutland Formations mined for ironstone, with possibility for unrecorded underground mining.<br><br>Coal Mining Report Area associated with deep coal and recorded deep mining beneath Region 6 associated with Asfordby Mine.<br><br>Suspected/unknown features | features (considered low due to relatively modern age of mine) e.g. shafts on Site/adjacent to Site and possibility for other extents of unrecorded mining within wider Coal Mining Reporting Area generally.<br><br>Possibility for unrecorded underground mining, including mineral permissions encroaching, associated with old ironstone mines, locally, unknown small scale features on historical mapping locally elsewhere possibly associated with underground mining and susceptible to subsidence.<br><br>Possibility that suspected karst features are mis-identified evidence of | | | | due to subsidence associated with historical mining, including risk of collapse settlement.<br><br>Increased cost and delay to obtain permitting/licensing in area of potential historical coal mining and to remediate features, if encountered. | reconnaissance by suitably qualified geotechnical engineer/engineering geologist, including inspection of existing and suspected features to further profile risk.<br><br>Subject to inspections, obtaining Consultants Coal Mining Report, mine plans and undertaking Mining Risk Assessment, if deemed appropriate.<br><br>Avoid any identified high risk areas with the design of proposed development layouts.<br><br>Geophysics survey ahead of intrusive works to survey voids associated with mining activity to target ground investigation.<br><br>Investigate identified desk-based features as part of | | | |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | locally (Report Section 3.4 and Figure 10) | historical unrecorded underground mining.<br><br>Indication of workable ironstone thicknesses in area during historical exploration works. | | | | | ground investigation, considering results of geophysical survey.<br><br>If identified, remediation of identified features/mitigation through design measures and, subject to residual risk, subsequent maintenance plans.<br><br>Management of mining subsidence risk during investigation and construction e.g. drilling platforms, inspections of formation for signs of mining related features etc. | | | |
| Possibility for constraints associated with mineral resources | Lincolnshire Limestone Formation<br><br>Historical Mineral Planning Permissions associated with | Mineral resources recorded on Site, mainly safeguarded limestone minerals.<br><br>Historical mineral planning permissions locally encroaching on Site, possibly posing constraint on | 4 | 2 | 8 | Delays/increase d costs to suitably consider mineral planning matters. | Liaise with MPA to confirm requirements around mineral resources, planning permissions and safeguarding.<br>If/where required, undertake minerals assessment to inform risk assessment. | 2 | 1 | 2 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | Ironstone extraction | development, although future obstruction is indicated to be highly unlikely. | | | | | Consider re-use of Site won mineral resources in developments. | | | |
| Shrink swell of clay soils, exacerbated due to presence of trees | Site Wide | Shallow ground conditions generally mapped as Till, anticipated to be clay dominated; higher plasticity clays also anticipated associated with upper weathering profile of Mudstone Formations.<br><br>The presence of clay soils with potential for shrinking and swelling on changes in moisture content, exacerbated by the presence of trees and possibly dense vegetation. | 3 | 3 | 9 | Damage to proposed developments and increased maintenance costs if not suitably designed against. | Ground investigations, alongside laboratory testing to confirm plasticity of soils, to identify underlying ground conditions and assess risk.<br><br>Arboricultural survey to determine the type of vegetation in the vicinity to allow for a more refined assessment of foundation depth requirements to avoid the influence of shrink/swell induced by trees/vegetation drawing water from the ground.<br><br>Designs to account for risks associated with shrink/ swell of clays as required e.g., through:<br>Accounting for the plasticity index/volume change | 2 | 2 | 4 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | | potential of cohesive soils, with consideration of trees/vegetation (existing, proposed and removed).<br>Deepening of foundations and incorporation of heave protection.<br>Deepening pavement thicknesses, including excavation and replacement of desiccated soils.<br>Laying infrastructure with increased falls and flexible connections.<br>Forming pavements surfaces using flexible materials.<br>Consideration of re-bound in significant cuttings in clays.<br>Flexible pavement surfacing.<br>Root barriers. | | | |
| Potential for frost susceptible soils | Site Wide | Potential for shallow Till and weathered soils to be susceptible to frost heave i.e. fine/silty/variable. | 3 | 3 | 9 | Damage to proposed haul road/shallow infrastructure developments | Ground investigations to identify underlying ground conditions and assess risk. | 2 | 2 | 4 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | and increased maintenance costs if not suitably designed against. | Designs to account for frost heave e.g., through deepening infrastructure, pavement thicknesses etc. | | | |
| Potential for ground conditions unsuitable for use of infiltration drainage | Site Wide | Ground conditions generally anticipated to be dominated by clay soils, likely with low permeability, which are more likely to preclude use of infiltration drainage. | 4 | 3 | 9 | In the event that ground conditions preclude use of infiltration, drainage will likely require connecting into existing network.<br><br>Potential for introduction of point discharge of waters resulting in solution of limestone and/or increasing risk of instabilities/subsidence generally associated with slope | Ground investigations and associated in-situ testing to assess the suitability for infiltration drainage and develop drainage strategy and designs considering this, including undertaking in-situ testing in line with BRE 365.<br><br>If feasible, design and construct any infiltration drainage to avoid creating an unacceptable risk of subsidence. | 2 | 2 | 4 |

| Identified Geotechnical Hazard/ Constraint | Associated Ground Condition/ Feature | Cause | Risk before Control/ Mitigation | | | Consequence | Control/Mitigation Measures | Risk after Control/ Mitigation | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | L | S | RR (LxS) | | | L | S | RRR (LxS) |
| | | | | | | instabilities/cambering terrains. | | | | |
| Potential for Unexploded Ordnance (UXO) | Site Wide | Preliminary UXO Risk Assessment with identification of potential for encountering UXO on Site.<br>Subsequent Detailed UXO Risk Assessment awaited.<br>Historical airfield adjacent to Region 1, increasing likelihood for UXO.<br>Generally greenfield site, reducing likelihood for UXO to have been uncovered in past and increasing likelihood to unrecorded UXO.<br>Other evidence of military land use e.g. Pill Box. | 3 | 5 | 15 | Potential for loss of life if struck.<br>Delays/increased costs if encountered. | Obtain Detailed UXO Risk Assessment to further inform risk and mitigation measures.<br>Mitigation measures implemented based on UXO assessments prior to any breaking ground works.<br>If further assessment not undertaken prior to ground investigation works, full UXO supervision/mitigation measures to be incorporated throughout works. | 2 | 4 | 8 |

# Appendix D AAJV Approach to Reporting

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# Appendix D AAJV Approach to Reporting

### Legislative Context And Guidance

13.1.4 Where this report relates to existing or proposed planning application, it considers the contents of the Town and Country Planning Act 1990 (as amended), the National Planning Policy Framework (2012, updated in December 2024) and considers the potential implications of Part 2A of the Environmental Protection Act 1990 (Part 2A) and the associated Contaminated Land (England) Regulations 2006 and Contaminated Land Statutory Guidance (2012) (Ref 13.53 to Ref 13.57).

13.1.5 This report has been prepared in general accordance with the technical guidance and procedures described in the UK Government guidance Land Contamination: Risk Management (2019) and its predecessor, Model Procedures for the Management of Land Contamination, Contaminated Land Report (CLR) 11 (Department of Food and Rural Affairs (Defra)/Environment Agency, 2004), British Standard (BS) 5930:2015 (as amended) Code of Practice for Site Investigations (BSI), BS:EN 1997 Eurocode 7 – Geotechnical Design (BSI) and BS 10175:2026 (as amended) Investigation of Potentially Contaminated Sites – Code of Practice (BSI) (Ref 13.51, Ref 13.16, Ref 13.58, Ref 13.59, Ref 13.60).

### Historical Map Review

13.1.6 AAJV notes that only indicative map scales are provided. Where dates are stated, these refer to the dates of maps on which the features are present, have changed use or are no longer annotated, and do not necessarily refer to the exact dates of existence of a particular feature. Development that may have occurred between map editions is recorded as occurring on the latter published map, hence there are some limitations to the accuracy to the date of development unless supplementary evidence is available.

### Conceptual Site Model Derivation

13.1.7 The CSM is aimed at identifying possible risks, if any, arising from substances used or deposited on-site, or from other sources of land contamination. Both past and current potentially contaminative land uses have been considered. It is based on the proposed Site redevelopment described in Report Section 1 of this Report.

#### *Assessment framework*

13.1.8 The site, in terms of potential land contamination, will be regulated by the Local Authority under the Town and Country Planning Act 1990 (as amended), taking account of the National Planning Policy Framework (2012, updated in December 2024; Ref 13.39), with the Environment Agency, Natural England and English Heritage acting as potential statutory consultees.

13.1.9 Environmental liabilities can arise through provisions contained within statutory legislation including Part 2A of the EPA 1990, the Environmental Damage (Prevention and Remediation) Regulations 2009, the Water Resources Act 1991, the Groundwater Regulations 2009 and the Water Act 2003 (Ref 13.61 to Ref 13.64).

13.1.10 Current best practice recommends that the determination of health hazards due to contaminated land is based on the principle of risk assessment, as outlined in the Statutory Guidance to Part 2A (2012) and Land Contamination: Risk Management (LCRM)(Ref 13.58).

13.1.11 The “suitable for use” approach is adopted (as outlined in the Contaminated Land Statutory Guidance) for the assessment of contaminated land where remedial measures are undertaken where unacceptable risks to human health or the environment are realised taking into account the use (or proposed use) of the land in question and the environmental setting.

13.1.12 The risk assessment process for environmental contaminants is based on a source-pathway-receptor analysis. These terms can be defined as follows:

- **Source:** hazardous substance that has the potential to cause adverse impacts;
- **Pathway:** route whereby a hazardous substance may come into contact with the receptor: examples include ingestion of contaminated soil and leaching of contaminants from soil into watercourses; and
- **Receptor:** target that may be affected by contamination: examples include human occupants/ users of site, water resources (surface waters or groundwater), or structures.

13.1.13 For a risk to be present, there must be a relevant/viable contaminant linkage; i.e. a mechanism whereby a source impacts on a sensitive receptor via a pathway.

13.1.14 AAJV have determined the potential sources, pathways and receptors to assess potential risks/ liabilities and constraints associated with the Site in its current condition prior to any proposed redevelopment. Risks associated with the proposed redevelopment have also been assessed based on the future land use scenario specified, including any potential sources of contamination, potential receptors and potential contaminant pathways identified during this desk based assessment.

### Approach to Risk Assessment

13.1.15 Current best practice recommends that the determination of hazards due to contaminated land is based on the principle of risk assessment, as outlined in the Environment Agency guidance on LCRM.

13.1.16 For a risk to be present, there must be a viable contaminant linkage; i.e. a mechanism whereby a source impacts on a sensitive receptor via a pathway.

13.1.17 Assessments of risks associated with each of these contaminant linkages are discussed in the following below.

13.1.18 Using criteria broadly based on those presented in the CIRIA C552 (Ref 13.50), the magnitude of the risk associated with potential contamination at the Site has been assessed. To do this an estimate is made of:

- The magnitude of the potential consequence (i.e. severity).
- The magnitude of probability (i.e. likelihood).
- The severity of the risk is classified according to the criteria in Table D. 1.

Table D. 1: Description of severity of risk

| Severity | Definition | Examples (as defined by C552) |
|---|---|---|
| Severe | Short-term (acute) risk to human health likely to result in "significant harm" as defined by Environmental Protection Act 1990, Part IIA. Short-term risk of pollution (note: Water Resources Act contains no scope for considering significance of pollution) of sensitive water resource. Catastrophic damage to buildings \ property. A short-term risk to a particular ecosystem, or organism forming part of such ecosystem (note: the definitions of ecological systems Within the Draft Circular on Contaminated Land, DETR, 2000). | High concentrations of cyanide on the surface of an informal recreation area.<br>Major spillage of contaminants from site into controlled water.<br>Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied). |
| Medium | Chronic damage to Human Health ("significant harm" as defined in DETR 2000). Pollution of sensitive water resources (note: Water Resources Act contains no for considering significance of pollution). A significant change in a particular ecosystem, or organism forming part of such ecosystem. (note: the definitions of ecological systems within Draft Circular on Contaminated Land, DETR, 2000). | Concentrations of a contaminant from site exceed the generic, or site specific assessment criteria.<br>Leaching of contaminants from a site to a major or minor aquifer.<br>Death of a species within a designated nature reserve. |
| Mild | Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ("significant harm" as defined in the Draft Circular on Contaminated Land, DETR, 2000). Damage to sensitive buildings/structures/services or the environment. | Pollution of non-classified groundwater.<br>Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability). |
| Minor | Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing etc). Easily repairable effects of damage to buildings, Structures and services. | The presence of contaminants at such concentrations that protective equipment is required during site works.<br>The loss of plants in a landscaping scheme.<br>Discoloration of concrete. |

13.1.19 An overall evaluation of the level of risk is gained from a comparison of the severity and probability, as shown in Table D. 2.

Table D. 2: Risk based on comparison of likelihood and severity

| | | Severity | | | |
|---|---|---|---|---|---|
| **Likelihood** | | **SEVERE** | **MEDIUM** | **MILD** | **MINOR** |
| | **HIGH** | Very High | High | Moderate | Moderate/Low |
| | **LIKELY** | High | Moderate | Moderate/Low | Low |
| | **LOW** | Moderate | Moderate/Low | Low | Very Low |
| | **UNLIKELY** | Moderate/Low | Low | Very Low | Very Low |

13.1.20 Further description of the classified risks as defined by CIRIA C552 is provided below.

### Very High Risk

13.1.21 There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the Site without remediation action OR there is evidence that severe harm to a designated receptor is already occurring. Realisation of that risk is likely to present a substantial liability to the Site owner/or occupier. Investigation is required as a matter of urgency and remediation works are likely to follow in the short-term.

### High Risk

13.1.22 Harm is likely to arise to a designated receptor from an identified hazard at the Site without remediation action. Realisation of the risk is likely to present a substantial liability to the Site owner/or occupier. Investigation is required as a matter of urgency to clarify the risk. Remediation works may be necessary in the short-term and are likely over the longer term.

### Moderate Risk

13.1.23 It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, and if any harm were to occur, it is more likely that the harm would be relatively mild. Further investigative work is normally required to clarify the risk and to determine potential liability to the Site owner/occupier. Some remediation works may be required in the longer term.

### Low Risk

13.1.24 It is possible that harm could arise to a designated receptor from identified hazard, but it is likely at worst, that this harm if realised would normally be mild. It is unlikely that the Site owner/or occupier would face substantial liabilities from such a risk.

Further investigative work (which is likely to be limited) to clarify the risk may be required. Any subsequent remediation works are likely to be relatively limited.

### Very Low Risk

13.1.25 It is a low possibility that harm could arise to a designated receptor, but it is likely at worst, that this harm if realised would normally be mild or minor.

### Discussion of Acute Risk to Construction Workers

13.1.26 AAJV understands that the proposed development works will be undertaken in compliance with Construction Design and Management (CDM) 2015 regulations (Ref 13.52).

13.1.27 Prior to work commencing, a health and safety risk assessment should be carried out by the appointed Principal Contractor/developed in accordance with current health and safety regulations. This assessment should cover potential risks to construction staff, permanent Site staff and the local population. Based on the findings of this risk assessment, appropriate mitigation measures should be implemented during the construction period.

13.1.28 The greatest potential for generation of dust will be during the Site works and therefore dust generation should be kept to a minimum in accordance with general best practice, as outlined in, for example, 'Environmental Good Practice on Site', CIRIA Publication C692 (Ref 13.68) to reduce this risk.

13.1.29 The risk to construction workers during the excavation and construction phases in terms of potential exposure to high concentrations of contaminants is considered to be low given the historic and current land uses identified at the Site. Should gross contamination be identified during the construction phase, then this may pose a potential acute risk to construction works. It is likely to be able to be effectively managed through good health and safety practices and protocols. Adoption of appropriate dust suppression techniques would also mitigate the degree of potential particulate migration off-site.

# Appendix E Initial Conceptual Site Model

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# Appendix E Initial Conceptual Site Model

Table E. 1: Initial Conceptual Site Model

| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| **Onsite Sources:** Agricultural Land, Made Ground, Infilled Land, Railway Land / buildings, Tanks, Sludge Storage, Surface Workings and the disused airfield. | **Human Health – On-site** | Trespassers, general public and site users post development / during construction i.e., owners of land or public passing through rights of way | **Agricultural Land, Made Ground and Infilled Land – All Regions** | | | | The sources onsite with respect to trespassers, general public and site users have been divided between sources considered to be of a lower-level contamination (agricultural land, Made Ground and infilled land) and those that may be of a higher-level contamination (railway land, tanks and the disused airfield). Note the disused airfield only encroaches slightly onto Site on Regions 1a and b.<br>**Agricultural Land, Made Ground and Infilled Land – All Regions**<br>Onsite sources and their associated contaminants are listed in Table 9.1. The land is used predominantly for agricultural purposes along the entire extent of the site, with the use of herbicides/pesticides the predominant Contaminants of Potential Concern (CoPC). The use of these extensively across the sites means the presence of them in the soils and groundwater is likely, although they are unlikely to accumulate in hazardous concentrations. However, the use of them in diffusive application is considered to be of a lesser risk to receptors in comparison to point sources such as agricultural tanks and sheep dips. At this stage during the desk base review no point sources have been noted. Made Ground is also anticipated to be present in some areas due to the presence of various roads, railways, and buildings in the vicinity of the transmission towers and OHL, which are unlikely to present a substantial source of contamination. Similarly, former ponds, pits that have since been infilled are |
| | | | Inhalation of contaminants in soil-derived dust and asbestos fibres<br>Dermal contact with and ingestion of contaminants in soil, soil-derived dust and water.<br>Inhalation of vapours – outdoors<br>Gas Ingress – Inhalation | Unlikely | Medium | **Low Risk** | |
| | | | **Railway Land, Surface Workings and Tanks – Regions 1b, 2a, 2d, 4e, 5b, 6a, 6b and 6e** | | | | |

| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| | | | Inhalation of contaminants in soil-derived dust and asbestos fibres<br>Dermal contact with and ingestion of contaminants in soil, soil-derived dust and water.<br>Inhalation of vapours – outdoors<br>Gas Ingress – Inhalation | Unlikely | Medium | **Low Risk** | also present along the extent of the site, with these for the same reason unlikely to present a substantial source of contamination. It is unlikely for the receptors to come into direct contact with the soils due to their short-term exposure to and with crop coverage limiting the likelihood of soil disturbance and particulates becoming airborne.<br>No volatile vapours are noted in association with any of the above sources. For Made Ground and infilled land, in accordance with BS 8576 (Ref 13.48) the potential for gas generation is classified as 'very low to low' as outlined in Table 9.2, therefore due to the limited gas generation potential of the source, and the dissipation of gases into the open air, the risk in line with CIRIA C522 (Ref 13.50) is considered to be Low.<br>**Railway Land, Sludge Storage Site, Surface Workings and Tanks – Regions 1, 2, 5 and 6**<br>Historical railway land is located onsite of Regions 2d, 5b, and 6b, with aerial photography noting the absence of tracks onsite in present day data. Based on the CoPC, the risk to the receptors is considered to remain Low considering that when operational re-fuelling activities would not have taken place on regions of the running line limiting the risk with respect to both volatile compounds and presence of contaminants in the underlying soils. Additionally, from aerial photography these railway lines haven't been present since 1999 – 2006 with it likely that any formerly present volatile vapours associated with the railway would have since dissipated. With this in mind and vegetation surrounding the areas once occupied by tracks, it is unlikely that the receptors will be at risk from direct contact / ingestion / inhalation of soils or groundwater, and volatile vapours. A Low risk has been adopted.<br>Tanks are noted onsite of Region 1b, 6a, and 6e. The presence of possible volatile vapours is not considered likely for tanks, although there is a potential for volatile vapours associated with the sludge storage sites. Unrecorded tanks associated with agricultural fuel storage may be present. Although the impact to the receptors listed is unlikely due to the short-term exposure, restrictions entering the vicinity of the tanks/sludge storage sites on private land, and outdoor atmosphere – therefore the risk is considered to be Low across all pathways.<br>Ground gas is not considered as a concern with respect to tanks and railways, so no further assessment has been made. For the surface workings and sludge storage sites, in accordance with BS 8576 (Ref 13.48) the potential for gas generation is classified as 'very low' and 'moderate' as outlined in Table 9.2, respectively. Therefore, for the sludge |
| | | | **Disused Airfield – Regions 1c to 1e** | | | | |
| | | | Inhalation of contaminants in soil-derived dust and asbestos fibres<br>Dermal contact with and ingestion of contaminants in soil, soil-derived dust and water.<br>Inhalation of vapours – outdoors<br>Gas Ingress – Inhalation | Unlikely | Medium | **Low Risk** | |
| **Onsite Sources:** Agricultural Land, Made Ground, Infilled Land, Railway Land / buildings, Tanks, Surface Workings and the disused airfield. | | | **Sludge Storage Site – Region 2f** | | | | |
| | | | Inhalation of contaminants in soil-derived dust and asbestos fibres<br>Dermal contact with and ingestion of contaminants in soil, soil-derived dust and water. | Unlikely | Medium | **Low Risk** | |

| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| | | | Inhalation of vapours – outdoors | | | | storage site a severe consequence rating has been adopted. However, due to the dissipation of gases into the open air if present, the risk in line with CIRIA C522 (Ref 13.50) is considered to be Moderate/Low. The risk for surface workings can remain as Low based on the above.<br><br>Unrecorded shallow aggregate workings may be present along the Site up to Region 4, and unrecorded deep coal workings may be present from Region 4e westwards. Spoil heaps associated with unrecorded workings may also be present.<br><br>**Disused Airfield – Region 1**<br><br>For the disused airfield, it was last active in 1956, with c. 70 years passed since activity on the airfield it is considered that formerly present volatile vapours are likely to have dissipated. Similarly, contaminants that may be in the soils and groundwater are likely to be present under a layer of hardstanding (still visible from aerial photography) reducing the likelihood of particulates becoming airborne, or receptors coming in to contact with underlying soils. Based on this, the risk is also considered Low here for all pathways.<br><br>Ground gas is not considered as a concern with respect to airfields. No further assessment has been made. |
| | | | Gas Ingress – Inhalation | Unlikely | Severe | **Moderate/Low** | |
| | | Construction / Ground Investigation | **Agricultural Land, Made Ground, Surface Workings and Infilled Land – All Regions** | | | | As above, the sources on site have been split between those considered of a higher-level contaminative source and those lower. Note, that where a higher than Low risk is noted, the risk is only considered within a 250 m buffer of the source. Beyond this, the risk is considered Low.<br><br>**Agricultural Land, Made Ground Surface Workings and Infilled Land – All Regions**<br><br>For a detailed account of the risk from agricultural land, surface workings, infilled land and Made Ground onsite see the row above. For construction workers the risk is typically slightly increased as it is anticipated that soils will be disturbed during the GI and construction phases, as well as the potential for workers to enter confined spaces (such as excavations). However, due to the nature of these sources which are unlikely to present a substantial source of contamination, the risk is considered to be Low for inhalation of contaminants, dermal contact and ingestion. Risks during construction are expected to be managed through appropriate work methods.<br><br>No volatile vapours are noted in association with any of the above sources. While construction workers may enter confined spaces the likelihood for gases to accumulate to harmful levels is unlikely – for Made Ground, infilled land and surface workings, in accordance with BS 8576 the potential |
| | | | Inhalation of contaminants in soil-derived dust and asbestos fibres. | Unlikely | Medium | **Low Risk** | |
| | | | Dermal contact with and ingestion of contaminants in soil, soil-derived dust and water. | Unlikely | Medium | **Low Risk** | |
| | | | Inhalation of ground gas | Unlikely | Medium | **Low Risk** | |
| | | | **Railway Land and Disused Airfield – Regions 1c, 1d, 1e, 2e, 5b and 6b** | | | | |
| | | | Inhalation of contaminants in soil-derived dust and asbestos fibres. | Low | Medium | **Moderate/Low Risk** | |

| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| | | | **Tanks and Storage Sites – Regions 1b, 2f, 6a and 6e** | | | | for gas generation is classified as 'very low to low', and gases are expected to dissipate in the open air. Therefore, due to the limited gas generation potential of the source, the risk in line with CIRIA C522 (Ref 13.50) is considered to be Low.<br>**Railway Land, Tanks, Sludge Storage Site and Disused Airfield – Regions 1, 2, 5 and 6**<br>As detailed above the railway land, sludge storage site, disused airfield and tanks are noted onsite (albeit the airfield only very slightly). It is considered that due to the CoPC associated with these sources and the fact that GI and construction phases are anticipated to lead to the disturbance of soils the risk associated with dust inhalation, dermal contact and ingestion is slightly increased compared to other onsite receptors and has been assessed as Moderate/Low. No transmission towers are noted to directly intersect these features although soils within 250 m of them will be disturbed. The potential presence of asbestos associated with the historical railway land, tanks and airfield is considered as a Moderate/Low risk here as structures are no longer present (railway and airfield), and soils beneath them potentially containing remnants of ACMs are at risk of being disturbed. Where the tanks and storage sites are still present, the risk from inhalation of asbestos fibres is reduced, with it unlikely that the tanks / storage containers would be removed. Should these structures be removed/demolished then the risk will have to be reassessed.<br>Volatile compounds which could produce vapours are most likely to be associated with refuelling activities for trains. However, as mentioned above re-fuelling activities would not have taken place on regions of the running line which limits the risk with respect to volatile compounds. Similarly, for the disused airfield, as c. 70 years has passed since it was last active it is considered that formerly present volatile vapours are likely to have dissipated. Therefore, the risk from vapours remains Low.<br>For construction workers the risk from ground gas is increased where confined spaces (such as excavations) are entered and gases may accumulate to harmful levels. Ground gas is not identified as a CoPC with regard to railway land, tanks or the disused airfield. No risk rating has therefore been considered. However, for sludge storage sites where the potential ground gas generation in line with BS 8576 (Ref 13.48) is considered 'moderate' and construction workers may potentially enter confined spaces (although the likelihood low) the overall risk is Moderate. |
| | | | Inhalation of contaminants in soil-derived dust and asbestos fibres. | Unlikely | Medium | **Low Risk** | |
| | | | **Railway Land, Tanks and Disused Airfield – Regions 1b, 1c, 1d, 1e, 2e, 5b, 6a, 6b and 6e** | | | | |
| | | | Dermal contact with and ingestion of contaminants in soil, soil-derived dust and water. | Low | Medium | **Moderate/Low Risk** | |
| **Onsite Sources:** Agricultural Land, Made Ground, Infilled Land, Railway Land / buildings, Tanks, Surface Workings and the disused airfield. | | | Intrusion and inhalation of vapours. | Unlikely | Medium | **Low Risk** | |
| | | | **Sludge Storage Site – Region 2f** | | | | |
| | | | Inhalation of ground gas | Low | Severe | **Moderate Risk** | |
| | | | **All Onsite Sources – All Regions** | | | | |

| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| | **Human Health – Off-site** | Adjacent Site Users | Inhalation of contaminants in soil, soil-derived dust and volatile vapours.<br>Inhalation of asbestos fibres. | Unlikely | Medium | **Low Risk** | The same risk rating is considered with respect to adjacent site users as those identified for onsite trespassers/general public/site users. The lack of disturbance of the soils is considered to limit the risk of inhalation of vapours/dust particulates and direct contact. It should be noted that during GI and construction phases the possibility of dust becoming airborne and travelling offsite (particularly on windy days) is more possible, however it is anticipated that mitigation of this through barriers and use of dust suppressants will be in place where/when necessary. Whilst some buildings are noted within 250 m of the site, resulting in enclosed spaces for ground gas to accumulate, the onsite gas sources present are Made Ground and infilled ground – both classed as non-credible sources of ground gas unlikely to cause harm. Therefore, the risk across board remains as Low. |
| | | | Inhalation of vapours / ground gas | Unlikely | Medium | **Low Risk** | |
| **Onsite Sources:** Agricultural Land, Made Ground, Infilled Land, Railway Land / buildings, Tanks, Surface Workings and the disused airfield. | **Controlled Waters** | Superficial Aquifers:<br>Secondary Undifferentiated and Secondary A<br>Bedrock Aquifers:<br>Unproductive, Secondary Undifferentiated, Secondary B, Secondary A and Principal. | **Unproductive and Secondary B Aquifers - All Sources – Regions 1a to 1c, 1e, 2a to 2f and 4b** | | | | The risks to controlled waters with respect to groundwater depends on the proximity to the sources and the type of aquifer present in that area and the geology, as well the presence of any SPZs or abstraction points, and the depth to groundwater. Based on this, the risk to groundwater has been split by aquifer type. Region 3.6.1 outlines the superficial and bedrock geologies associated with each aquifer classifications across the site.<br>**Unproductive and Secondary B Aquifers**<br>The onsite sources of agricultural land, Made Ground, surface workings, infilled land, railway land, the sludge storage site and tanks in Region 1a to 1c, 1e, 2a to 2f and 4b are all located within areas of unproductive superficial and bedrock aquifers. Note, the disused airfield appears outside of the area of these aquifers. These aquifers typically have a limited water resource value and are unlikely to transmit potential contamination quickly or widely due to their low permeability. Where the Whitby Mudstone (Unproductive) and Rutland Formation (Secondary B) are noted, these act as confining aquifers, preventing both lateral and vertical migration of contaminants. The likelihood of linkage between the sources above ground and underlying groundwater in these areas has therefore been assessed as low, with a mild consequence and an overall risk of Low.<br>**Secondary Undifferentiated Aquifers**<br>All onsite sources are within the area of a superficial secondary undifferentiated aquifer, whilst the sources within Regions 2f to 6e are within the area of a bedrock secondary undifferentiated aquifer. This is inclusive of Made Ground, agricultural land, infilled land, railway land (5b and 6b) and |
| | | | Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers | Low | Mild | **Low Risk** | |
| | | | Lateral and vertical migration of groundwater | Low | Mild | **Low Risk** | |
| | | | **Secondary Undifferentiated Aquifers – Made Ground, Infilled Land, Agricultural Land, Railway Land and Tanks – Regions 2f to 6e** | | | | |
| | | | Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers | Unlikely | Medium | **Low Risk** | |
| | | | Lateral and vertical migration of groundwater | Unlikely | Medium | **Low Risk** | |
| | | | **Principal and Secondary A Aquifers - Made Ground, Agricultural Land, Infilled Land, and former deep coal mine – All Regions** | | | | |

| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| | | | Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers | Low | Medium | **Moderate/Low Risk** | tanks (6a and 6e). It is considered that Made Ground, infilled land and agricultural land are unlikely to present a substantial source of contamination, with a Low risk identified. For the land surrounding the railways / tanks the superficial geology has been assessed. Here, Oadby Till Member is present which predominantly comprises clay deposits. These are likely to act as a cohesive barrier for migrating contaminants into the underlying groundwater aquifers, and therefore the risk here has also been assumed as Low.<br><br>**Principal and Secondary A Aquifers**<br><br>These aquifers are typically more permeable and productive, supporting water supply or baseflow to rivers and are therefore generally more vulnerable to pollution. No SPZ1s or potable abstraction points are present within 250m of the onsite sources. The Principal / Secondary A aquifers are present across Regions 2b, 3a, 3d, 4e, 5b and 6b for superficial deposits (Secondary A only) and Regions 1a to 1e, 2e, 2f and 4b for the bedrock geology. Note the principal aquifer is present only across Region 1.<br><br>Where agricultural land, Made Ground and infilled land is located as a source, the superficial geology where these aquifers sit within or are below varies, with Till predominantly noted, and Alluvium following the alignment of onsite watercourses. Across this extent is unlikely that a continuous cohesive layer would be present, acting as a barrier between the downwards migration of contaminants into these more vulnerable aquifers. Based on this, a risk of Moderate/Low has been given with respect to these lower-level contaminative sources across the majority of site where principal / secondary A aquifers exist.<br><br>In the isolated areas where the railways and the tanks only the railways in Region 5b and 6b, and the tank in Region 1b are located within 250m of a principal / secondary A aquifer. In these areas Till with some Alluvium deposits are noted. At this stage without intrusive investigation, it is unknown whether a continuous cohesive layer is present acting as a barrier to contaminants migrating downwards into the vulnerable bedrock aquifers. Based on this, a Moderate risk has been deemed appropriate within 250 m of these areas.<br><br>Although the disused airfield is noted as a higher contaminative risk to the underlying aquifers, the presence of hardstanding here along the runways and in the hangars reduces the likelihood for migrating contaminants to reach underlying aquifers. However, as a walkover has not been undertaken at this stage the condition of the runways is unknown. Should the ground be in poor conditions, there is a possibility that degradation of the hardstanding had happened |
| | | | Lateral and vertical migration of groundwater | Low | Medium | **Moderate/Low Risk** | |
| | | | **Principal and Secondary A Aquifers – Railway Land and Tanks – Region 1b, 5b and 6b** | | | | |
| | | | Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers | Likely | Medium | **Moderate Risk** | |
| **Onsite Sources:** Agricultural Land, Made Ground, Infilled Land, Railway Land / buildings, Tanks, Surface Workings and the disused airfield. | | | Lateral and vertical migration of groundwater | Likely | Medium | **Moderate Risk** | |
| | | | **Principal and Secondary A Aquifers – Disused Airfield – Region 1c to 1e** | | | | |
| | | | Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers | Likely | Medium | **Moderate Risk** | |

| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| | | | Lateral and vertical migration of groundwater | Likely | Medium | **Moderate Risk** | over the last 70 years rather than during use, however without being able to confirm this the risk remains. Additionally, the potential for underground fuel tanks related to the airfield may be present and it is likely that the use of PFAS onsite was prevalent whilst operational is considered. The karst features and swallet holes associated with the Upper Lincolnshire Limestone member bedrock have been identified in Regions 1a to 1e. Contamination may spread more rapidly in these features if present. Therefore, the risk is considered as Moderate.<br><br>Where swallet holes are present in the vicinity of the transmission towers / haulage roads mitigation is to include doubled-up spill protection (use of dip trays and spill kits) in these specific areas during ground works. |
| **Onsite Sources:** Agricultural Land, Made Ground, Infilled Land, Railway Land / buildings, Tanks, Surface Workings and the disused airfield. | | Surface Water Features listed in Section 3.7.1, including numerous named and unnamed drains/drainage channels. | **Areas of Impermeable Soils (cohesive deposits)** | | | | From review of the disused airfield and tank's locations onsite, no major surface water features are noted within 250 m of these sources. The Scalford Brook is noted 80 m east of the railway on Region 5b and an unnamed watercourse is within 350m of the railway on Region 6b. However, where the extent of the site is occupied by agricultural land, the potential for herbicides/pesticides used on site through diffusive application to enter watercourses is possible. No potable abstraction points are noted within influencing distance of the site. However, the presence of major drainage channels and streams cannot be discounted, which would result in connecting waters to those larger watercourses.<br><br>With the land dominated by crops and vegetation the ground limits the amount of runoff. However, it should be noted that although the superficial deposits across the site are variable, the presence of impermeable clay layers would limit the permeability in these areas. Based on this, the risk to surface waters has been sub divided into the below:<br><br>In areas where cohesive superficial deposits are present an impermeable barrier would suggest a Low risk with respect to baseflow and a Moderate/Low risk with respect to surface run-off, due to the opposing effects an impermeable stratum would have on surface waters (i.e., not infiltrating into the soils). Conversely, in areas where permeable granular deposits are noted across site a Moderate/Low risk with respect to baseflow, and a Low risk with respect to surface run-off is considered. |
| | | | Lateral migration of contaminated groundwater with discharge to surface watercourses as base flow. | Unlikely | Medium | **Low Risk** | |
| | | | Discharge of contaminants entrained in surface water run-off followed by overland flow and discharge. | Low | Medium | **Moderate/Low Risk** | |
| | | | **Areas of Permeable Soils (granular deposits)** | | | | |
| | | | Lateral migration of contaminated groundwater with discharge to surface watercourses as base flow. | Low | Medium | **Moderate/Low Risk** | |
| | | | Discharge of contaminants entrained in surface water run-off followed by overland flow and discharge. | Unlikely | Medium | **Low Risk** | |
| | **Property** | Foundations for Pylons | **Made Ground, Infilled Land, Railway Land, Sludge Storage Site and Disused Airfield – All Regions** | | | | The foundations associated with the transmission towers will be in direct contact with the soils onsite. Although direct |

| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| | | | Direct contact of contaminants in soil and/or groundwater | Low | Mild | **Low Risk** | evidence of the corrosive nature of the soils/ groundwater onsite is unknown, the CoPC relating to the onsite sources suggest there may be a potential for isolated areas of aggressive ground conditions – particularly in the vicinity of the Made Ground, infilled land, sludge storage site, disused airfield and railway land.<br><br>The majority of the site is undeveloped agricultural land with the presence of herbicides/ pesticides associated with farming which are unlikely to affect aggressive ground conditions. Based on this an overall Low risk has been given for the site, although a Very Low risk may be considered for the majority. |
| | | | **Agricultural Land and Tanks – All Regions** | | | | |
| | | | Direct contact of contaminants in soil and/or groundwater | Unlikely | Mild | **Very Low Risk** | |
| | | Buildings & Infrastructure: Structures with enclosed spaces | **Sludge Storage Site and Surface Workings – Regions 2a and 2f** | | | | The greatest risk of ground gas generation comes from offsite sludge storage site on Region 2f and the surface workings located in Region 2a. However, due to the lack of structures onsite the risk remains as Low. Should structures be built within 250 m of this structure, the risk rating should be reassessed. |
| | | | Gas Ingress – Explosion | Unlikely | Medium | **Low Risk** | |
| | | Livestock and Crops | **Railway Land, Tanks Sludge Storage Site and Disused Airfield – Regions 1b, 1c, 1d, 1e, 2d, 2f, 5b, 6a, 6b and 6e** | | | | There is a potential for livestock/crops to be present onsite due to the rural nature. However, in areas where particular risk is present (i.e., railway land, tanks, sludge storage, disused airfield) these areas are likely to be sectioned off / located away from livestock and crop faming. Note that the former railway land has vegetation surrounding and the disused airfield has hardstanding remaining and surrounded by tree cover. Based on this, a Low risk has been assessed for railways, tanks and the disused airfield and a Very Low risk for agricultural land, Made Ground and infilled land. |
| | | | Direct contact, ingestion and inhalation of contaminants in soil and/or groundwater<br><br>Plant uptake via roots | Low | Mild | **Low Risk** | |
| | | | **Agricultural Land, Made Ground and Infilled Land – All Regions** | | | | |
| | | | Direct contact, ingestion and inhalation of contaminants in soil and/or groundwater<br><br>Plant uptake via roots | Unlikely | Mild | **Very Low Risk** | |
| | | | **All Sources – All Regions** | | | | **All Sources – All Regions** |

| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| **Offsite Sources:** Agricultural Land, Made Ground, Infilled Land, Railway Land, Disused Airfield, Tanks, Industrial Estates, Sludge Storage, Electricity Substation, Unspecified Works, Spoil Heaps, Vehicle Repair Site and Waste Sites. | **Human Health - Onsite** | Trespassers, general public and site users post development / during construction i.e., owners of land or public passing through rights of way | Inhalation of contaminants in soil-derived dust and asbestos fibres.<br>Dermal contact with and ingestion of contaminants in soil, soil-derived dust and water.<br>Inhalation of vapours<br>Inhalation of ground gas<br>Gas ingress – explosive atmosphere | Unlikely | Medium | **Low Risk** | Risks from offsite railway land, tanks, disused airfield, Made Ground, infilled land and agricultural land are all considered to be Low risk, in line with the 'onsite sources' region above. A number of other offsite sources including the electricity substation and distribution & haulage site, have also been included within this region as it is unlikely their presence due to distance from site and associated CoPC, will have a significant risk on the receptor type here. Based on this, a Low risk is given across board for all listed pathways.<br>A number of other sources are noted along the extent of site including the Honeypot Industrial Estate (Region 1d and 1e), Asfordby Estate (Region 6b), electricity substation (Region 1e and 6c), waste sites (Regions 5a and 6b), vehicle repair site (Region 1d), Sludge Storage Sites (Region 2e, 3b, 4 to 4e and 5a) and the unspecified works/factory (Region 4b). Due to their distance from site, it is unlikely that contaminants from these sources would come into contact with receptors onsite, where soils are susceptible to minimal disturbance from passers-by travelling across the ground. Due to this the risk from dermal contact, ingestion and inhalation of fibres/dust is considered Low.<br>For vapour inhalation, no enclosed structures are proposed as part of the development. Additionally, the receptors considered here are in the outdoor environment where vapours are unlikely to accumulate to harmful levels – the risk remains Low across board.<br>For ground gas, the presence of potential sewage sludge is noted to have a 'moderate' ground gas generation potential in line with BS 8576 (Ref 13.48). All other ground gas sources (Made Ground, infilled land, historical deep coal mining) are considered to have a 'very low to low' generation potential. However, due to the open-air environment and lack of enclosed spaces, the consequence has been downgraded to medium, and an overall risk of Low given for these receptors. |
| | | | **Sludge Storage Site and Historical Deep Coal Mining– Regions 2e, 3b, 4c, 4d, 4e, 5a, and 6b** | | | | |
| | | | Inhalation of ground gas<br>Gas ingress – explosive atmosphere | Unlikely | Medium | **Low Risk** | |
| | | Construction / Ground Investigation | **All Sources – All Regions** | | | | For construction workers the risk is typically elevated across board due to the disturbance of soils and the requirement to potentially enter confined spaces.<br>**All Sources – All Regions**<br>For dermal contact and ingestion, across all sources the risk is generally the same as the receptors above. While the likelihood of being in direct contact with soils is increased for workers, the likelihood of potentially contaminated offsite soils being present in influencing quantities onsite is lower. Therefore, a Low risk is considered appropriate.<br>For inhalation of dust and asbestos fibres the risk can increase where windy days can cause dust/fibres to become airborne from offsite sources and inhaled by onsite workers |
| | | | Dermal contact with and ingestion of contaminants in soil, soil-derived dust and water. | Unlikely | Medium | **Low Risk** | |
| | | | **Made Ground, Railway Land, Industrial Estate, Sludge Storage (<100m), Waste Sites, and Disused Airfield - All Regions** | | | | |
| **Offsite Sources:** Agricultural Land, Made Ground, Infilled Land, Railway Land, | | | Inhalation of contaminants in soil-derived dust and asbestos fibres. | Low | Medium | **Moderate/Low Risk** | |

| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| Disused Airfield, Tanks, Industrial Estate, Sludge Storage, Electricity Substation, Unspecified Works, Vehicle Repair Site and Waste Site. | | | **Agricultural Land, Tanks, Electricity Substation, Infilled Land, Sludge Storage Sites (>100m), Vehicle Repair Site, Waste Site and Unspecified Works – All Regions** | | | | present in the area over longer periods of time. However, with asbestos in particular those sources identified which may result in this include the railway land, Made Ground (fly-tipping), tanks, disused airfield, industrial estate, waste sites, sludge storage, unspecified works and the vehicle repair site. All except a number of sludge storage sites, the disused airfield, Made Ground (particularly if fly-tipped stockpiles are noted), railway land including sidings, waste sites, spoil heaps, and the industrial estate are >100m from the site. Where these sites are<100m from the site boundary and workers onsite – the risk remains Low. Whilst it is unlikely that the sources offsite, should they contain asbestos/ACMs, be disturbed, the risk cannot be ruled out. Based on this, a Moderate/Low risk has been given for these sources.<br><br>VOCs and SVOCs have been noted in association with railway land/sidings (Regions 2d, 4b, 5b and 6b), disused airfield (Region 1c to 1d), industrial site (Region 1d and 1e), waste sites (Regions 5a and 6b), sludge storage (Regions 2e, 3b, 4c to 4e and 5a), the vehicle repair site (Region 1d) and the unspecified works (Region 4b). These have the potential to migrate onto site and accumulate within confined spaces such as excavations or inside manholes. The superficial geology in these areas has been reviewed, noting the presence of variable till deposits. Where impermeable strata are noted, this could create a lateral barrier to migrating vapours. Overall, where these volatile compounds are present, the risk is considered to be Moderate/Low for workers entering confined spaces. All other sources (agricultural land, Made Ground, Infilled land, electricity substation and tanks) can be noted as Low risk with volatile vapours not readily associated with them as a CoPC.<br><br>For ground gas, while construction workers may enter confined spaces the likelihood for gases to accumulate to harmful levels is unlikely – for Made Ground and infilled land, in accordance with BS 8576 (Ref 13.48) the potential for gas generation is classified as 'very low to low'. Therefore, due to the limited gas generation potential of the source, the risk in line with CIRIA C522 (Ref 13.50) is considered to be Low. The sludge storage sites a 'moderate' ground gas generation potential in line with BS 8576 (Ref 13.48) with a severe rating considered appropriate. Overall, a Moderate risk for workers given the general distance from site and/or the unlikely situation where workers would enter confined spaces without reasonable H&S protocols to limit the risk. BS 8567 indicates a very low potential for ground gas generation from coal workings (Table 9.2), however, due to the depth of the workings (~350m -440m OD) and the likely saturation of coal seams due to the rising groundwater, ground gas generation potential is expected to remain very low. A moderate risk level |
| | | | Inhalation of contaminants in soil-derived dust and asbestos fibres. | Unlikely | Medium | **Low Risk** | |
| | | | **Railway land. Disused Airfield, Industrial Site, Waste Site, Sludge Storage, Vehicle Repair Site and Unspecified Works – 1c, 1d, 1e, 2e, 2f, 3b, 4b, 5a, 5b and 6b** | | | | |
| | | | Inhalation of vapours | Low | Medium | **Moderate/Low Risk** | |
| | | | **Agricultural Land, Made Ground, Infilled Land, Electricity Substation and Tanks – All Regions** | | | | |
| | | | Inhalation of vapours | Unlikely | Medium | **Low Risk** | |
| | | | **Made Ground and Infilled Land – All Regions** | | | | |
| | | | Inhalation of ground gas | Unlikely | Medium | **Low Risk** | |
| | | | Gas Ingress – explosion | Unlikely | Medium | **Low Risk** | |
| | | | **Sludge Storage Sites and historical deep coal mine – Regions 2e, 3b, 4c to 4e, 5a, and 6b** | | | | |
| | | | Inhalation of ground gas | Low | Severe | **Moderate Risk** | |
| | | | Gas Ingress – explosion | Low | Severe | **Moderate Risk** | |

| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| | | | | | | | has been assigned here due to the presence of two faults and the unknown nature of ground gas generation.<br>For all other sources, no ground gas is anticipated so the risk is negligible. |
| **Offsite Sources:** Agricultural Land, Made Ground, Infilled Land, Railway Land, Disused Airfield, Tanks, Industrial Estate, Sludge Storage, Electricity Substation, Unspecified Works, Vehicle Repair Site and Waste Site. | **Controlled Waters** | Superficial Aquifers:<br>Secondary Undifferentiated and Secondary A<br>Bedrock Aquifers:<br>Unproductive, Secondary Undifferentiated, Secondary B, Secondary A and Principal. | **Unproductive and Secondary B Aquifers – Made Ground, Infilled Land, Agricultural Land, Railway Land (2d) and Sludge Site (2e) – All Regions**<br>**Secondary Undifferentiated Aquifer – Made Ground, Infilled Land, Agricultural Land, Tanks (4 and 6), Railway Land (5b and 6b), Sludge Site (3b, 4c to 4e and 5a), Waste Site and Unspecified Works – All Regions** | | | | The risks to controlled waters with respect to groundwater depend on both the proximity to the sources and the type of aquifer present in that area, as well the presence of any SPZs or abstraction points. Fort this site, no SPZ1 areas or potable abstraction points are noted within 250m of the site extents.<br>Although the sources listed here are offsite, contaminants have the potential to leach downwards through soils into the underlying groundwater and be present onsite within the groundwater. Where confining aquifers are present or areas of impermeable superficial to depth, their presence may result in a barrier to lateral migration onto site. This has been discussed below.<br>**Unproductive and Secondary B Aquifers**<br>These aquifers typically have a more limited water resource value and are less likely to transmit potential contamination as quickly or as widely due to their permeability. They are noted offsite of Regions 1a to 1c, 2 and 4a/4b where the sources railway land (2d) and sludge storage site (2e) are present, as well as Made Ground, infilled land and agricultural land in this area. Based on this, and due to a Mild consequence, the risk to these aquifers from all sources is considered to be a Low risk.<br>**Secondary Undifferentiated**<br>The Undifferentiated bedrock aquifer covers the majority of the site with the following offsite sources noted as within its boundary; tanks (Regions 4a, 4e, 6a, 6b and 6d), railway land, including sidings (Regions 4b, 5b and 6b), sludge site (Region 3b, 4c to 4d and 5a), waste sites (Region 5a and 6b), and the historical deep coal mine (Region 6b) and the works (Region 4b). The vulnerability of the bedrock aquifers are classed as Low to Medium (Table 3.40), with all sources sitting within the low vulnerability undifferentiated aquifer. This is likely due to the Till member which overlies the aquifer, acting as a form of barrier from migrating contaminants. Based on this, a Low risk has been given.<br>The risk to the groundwater from the Made Ground, infilled land and agricultural land has been considered as Low risk across the site with respect to this aquifer. These sources have not been considered as containing highly contaminative compounds. Compounds associated with the historical deep coal mine may dissolve within groundwater as groundwater rises within the inactive workings, as opposed to migrating from the surface level, through the unsaturated zone, into |
| | | | Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers | Low | Mild | **Low Risk** | |
| | | | Lateral and vertical migration of groundwater | Low | Mild | **Low Risk** | |
| | | | **Principal and Secondary A Aquifers - Made Ground, Agricultural Land and Infilled Land – All Regions** | | | | |
| | | | Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers | Low | Medium | **Moderate/Low Risk** | |
| | | | Lateral and vertical migration of groundwater | Low | Medium | **Moderate/Low Risk** | |
| | | | **Principal and Secondary A Aquifers – Tanks, Electricity Substation, Disused Airfield, Sludge Sites and Vehicle Repair Site – Regions 1e, 1d and 2f** | | | | |
| | | | Leaching of contaminants in the unsaturated zone to groundwater in underlying aquifers | Likely | Medium | **Moderate Risk** | |
| | | | Lateral and vertical migration of groundwater | Likely | Medium | **Moderate Risk** | |

| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| | | | | | | | groundwater of the underlying aquifers, and may contribute to background concentrations of the compounds. Acidification of groundwater following exposure to potential contaminants associated with the deep coal mining is possible, although compounds are expected to be at depth, and not emanate from the Site. Groundwater vulnerability of the Charmouth Mudstone Formation is classified as low. Acidification of groundwater following exposure to potential contaminants associated with the deep coal mining is possible, although compounds are expected to be at depth, and not emanate from the Site. Groundwater vulnerability of the Charmouth Mudstone Formation is classified as low. It is noted that contaminated groundwater may rise in improperly decommissioned mining shafts, reaching more sensitive aquifers.<br><br>**Principal and Secondary A Aquifers**<br><br>These aquifers are typically more permeable and productive, supporting water supply or baseflow to rivers and are therefore more vulnerable. Where agricultural land, Made Ground and infilled land is located along the extent of the site the geology where these aquifers sit within or are below varies, with most variable till deposits noted. A lack of continuous cohesive barrier allows for the downwards and lateral migration of contaminants from offsite sources into these more vulnerable aquifers. Based on this, a risk of Moderate/Low has been given.<br><br>A number of the offsite sources are noted within areas where Secondary A or Principal aquifers are present which extend onto site. This is inclusive of tanks (regions 1d and 1e), electricity substation (Region 1e), disused airfield (Region 1d and 1e) sludge site (Region 2f) and the vehicle site (Region 1d). The majority of Region 1 are underlain by Till deposits, however in the areas where the principal aquifer is noted, no superficial deposits are noted. This encompasses all of the above sources within Region 1. Based on this, with desk-based evidence showing that sources may have a direct pathway to the underlying medium vulnerability aquifer, the risk is classed as Moderate. Similarly for Region 2f where the sludge site is noted, the underlying aquifer is a medium vulnerability Secondary A aquifer. Here Till deposits are noted, also without confirmation of a continuous cohesive barrier, the risk also remains as Moderate. Should a cohesive barrier be evident, this risk can be downgraded based on the aquifers not being of high vulnerability. |
| **Offsite Sources:** Agricultural Land, Made Ground, Infilled Land, | | Surface Water Features listed in Region 3.6.1, including numerous named | **Tank and Railway Land – Region 5b and 6b** | | | | The risks to controlled waters with respect to surface waters depends on the proximity and gradient (groundwater base flow) of the source to the surface water feature and the ground conditions (permeability of the soils). Offsite sources |
| | | | Lateral migration of contaminated groundwater with discharge to | Low | Medium | **Moderate/Low Risk** | |

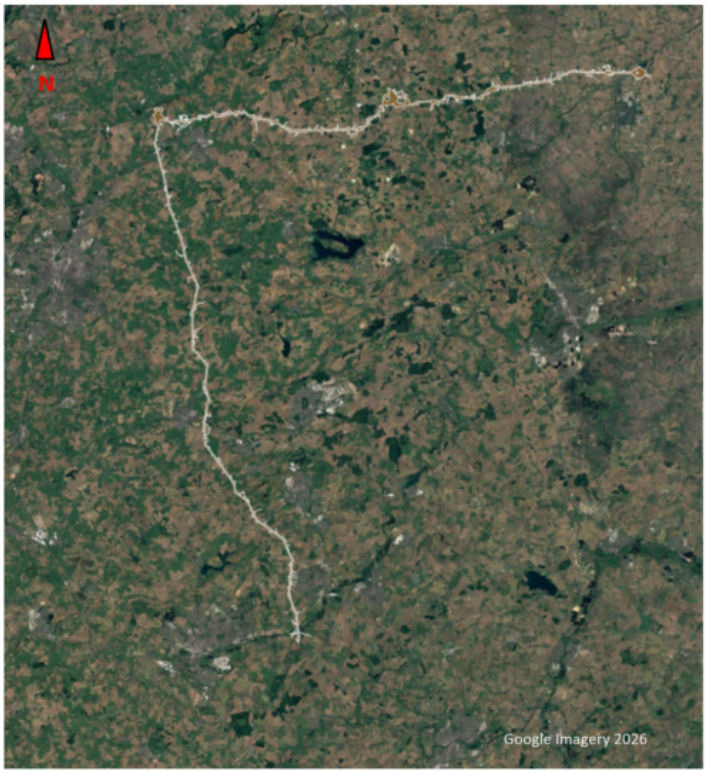
| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| Railway Land, Disused Airfield, Tanks, Industrial Estate, Sludge Storage, Electricity Substation, Unspecified Works, Vehicle Repair Site and Waste Site. | | and unnamed drains/drainage channels. | surface watercourses as base flow. | | | | have the potential to pollute watercourses which extend onto the site, by either baseflow or via runoff.<br>The locations of the offsite sources were reviewed with respect to the watercourses. For the most part, these were >250m from the sources, with the exception of 3No. sources. The railway tracks offsite of Regions 5b and 6b were both noted within 100m of the Scalford Brook and an unnamed watercourse, respectively, whilst a tank north of Region 6b was 20m east of the unnamed watercourse (all historical). For these, based on the distance from the source and the potential contaminants, the risk is considered to be Moderate/Low to surface waters.<br>Where Made Ground, infilled land or agricultural land is present within 250 m of a watercourse extending onto site the risk is still considered Low based on the CoPC and likelihood of these CoPC being present. Similarly, the risk to surface waters from sources >250 m is considered to also be Low due to distance to the watercourses, and in turn then distance to site. |
| | | | Discharge of contaminants entrained in surface water run-off followed by overland flow and discharge. | Low | Medium | **Moderate/Low Risk** | |
| | | | **All other sources – All Regions** | | | | |
| | | | Lateral migration of contaminated groundwater with discharge to surface watercourses as base flow. | Unlikely | Medium | **Low Risk** | |
| | | | Discharge of contaminants entrained in surface water run-off followed by overland flow and discharge. | Unlikely | Medium | **Low Risk** | |
| | **Property** | Existing and future structures, Foundations for Pylons | **All remaining other offsite sources – All Regions** | | | | The foundations associated with the transmission towers will be in direct contact with the soils onsite. Although direct evidence of the corrosive nature of the soils/ groundwater onsite is unknown, the CoPC relating to the offsite sources suggest there may be a potential for areas of aggressive ground conditions – particularly in the vicinity of the Made Ground, infilled land, railway land, disused airfield, industrial estate, waste sites, sludge storage sites and the unspecified works. The majority of the surrounding land of the site is undeveloped agricultural land with the presence of herbicides/ pesticides associated with farming are unlikely to affect aggressive ground conditions. Based on this a Low risk and Very Low risk has been considered for the site from offsite sources. |
| | | | Direct contact of contaminants in soil and/or groundwater | Low | Mild | **Low Risk** | |
| | | | **Agricultural Land – All Regions** | | | | |
| | | | Direct contact of contaminants in soil and/or groundwater | Unlikely | Mild | **Very Low Risk** | |
| | | Buildings & Infrastructure: Structures with enclosed spaces | Gas ingress – explosion | Unlikely | Medium | **Low Risk** | The greatest risk of ground gas generation comes from offsite sludge storage sites of Region 2e, 3b, 4c to 4e and 5a respectively. However, due to the lack of structures onsite the risk remains as Low. Should structures be built within 250 m of this structure, the risk rating should be reassessed. |

| Source | Receptor | | Exposure Pathway | Probability | Consequence | Risk Category | Justification |
|---|---|---|---|---|---|---|---|
| | | Livestock and Crops | Direct contact of contaminants in soil and/or groundwater<br>Plant uptake via roots | Unlikely | Mild | **Very Low Risk** | There is a potential for livestock/crops to be present onsite due to the rural nature. However, due to the distance from those sources offsite, and as noted above that many sources will be sectioned off and deemed inaccessible to crops/livestock a Very Low risk is considered. |

# Appendix F
# Preliminary UXO Risk Assessment

# Appendix F Preliminary UXO Risk Assessment

FELLOWS INTERNATIONAL GROUP
UXO Risk Specialists




# Preliminary UXO Risk Assessment

**FIG Reference:** 4363R

**Client:** AECOM

**Project:** Surfleet

**Site Location:** Surfleet

**Date:** 23 June 2026

## Document Control

| Version Date | Version | Author | Reviewer | Comments |
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| 23 Jun. 26 | 1.0 | Mark Khan AIExpE | Vicky Harper | Original |

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| Version Date | Version | Approved by | Comments |
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| 23 Jun. 26 | 1.0 | Carl Parnell MIExpE | QC / format check |

## Document Approval

| | Reviewed by | Approved by |
|---|---|---|
| **Signature** | | |
| **Print Name** | Vicky Harper | Carl Parnell MIExpE |
| **Date** | 23 June 2026 | 23 June 2026 |

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# 1. References

A. CIRIA Report C681 – UXO – A guide for the construction industry (2009)
B. CIRIA Report C785 – UXO risk management guide for land projects (2019)

# 2. Site Location

The site comprises an electric cable route with associated infrastructure running from Northamptonshire in the south, north through Leicestershire and east through Lincolnshire.

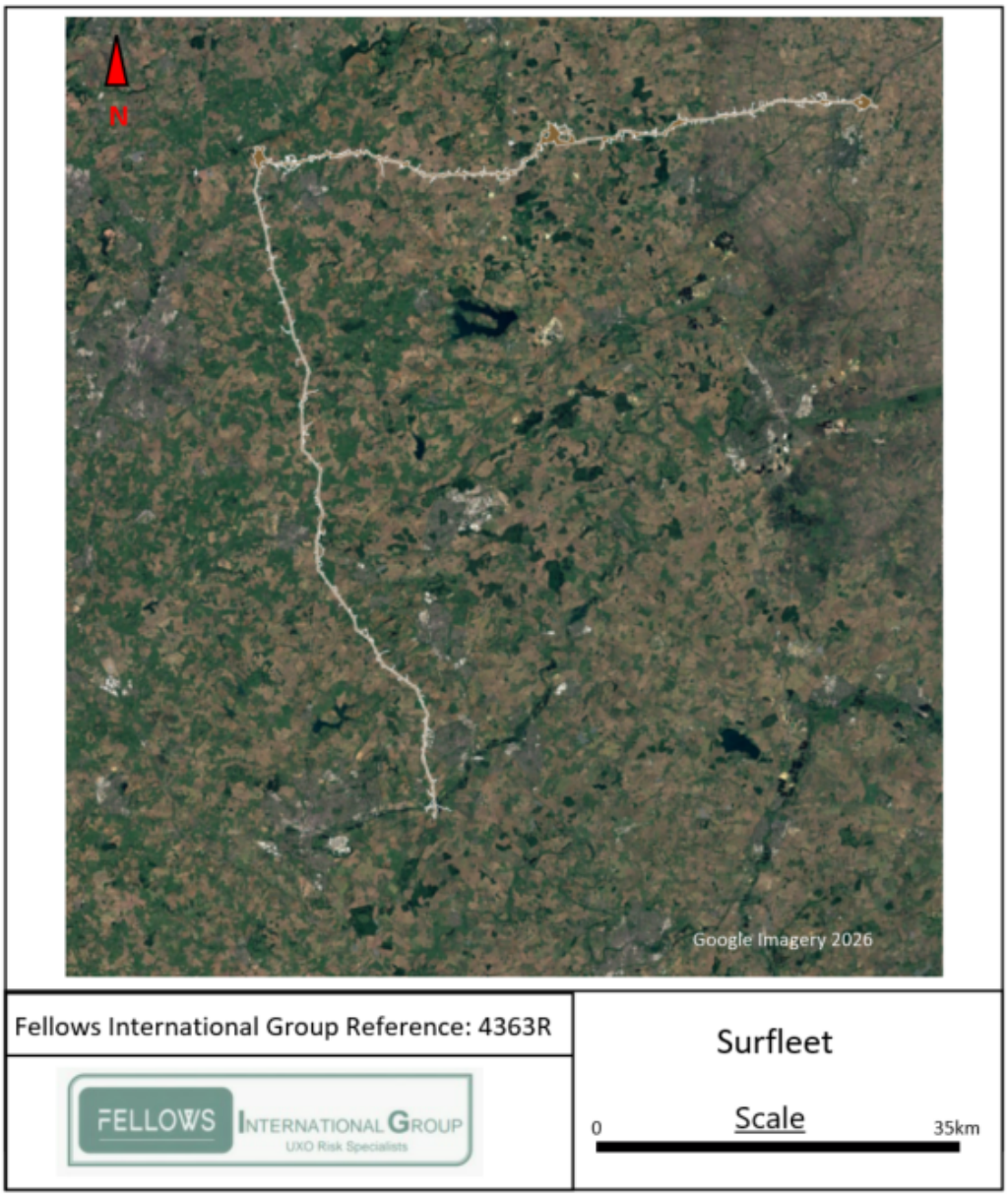


*Figure 1. Showing the site area. (Google Earth).*

## 3. Introduction

The purpose of this Preliminary UXO Risk Assessment is to establish the likelihood of encountering ~Unexploded Ordnance (UXO) on this site. If a UXO risk is identified, risk mitigation recommendations will be provided to allow the client to make an informed decision as to future procedures which will reduce the UXO risk to as low as reasonably practicable (ALARP).

## 4. UXO Risk Analysis

Fellows International Group Ltd utilises a research methodology using extensive archival (internal and public domain) content as well as a wide range of other available resources.

This includes the use of:

- Satellite imagery
- Historic Mapping
- Air Photography
- Historical Resources
- Archival Materiel
- Specialist Publications
- First world War UK Bombing Data
- Second World War UK Bombing Data.

This methodology identifies military or other potential UXO related activity that may influence risk of encounter with UXO. What are deemed to be potential UXO influences that may directly affect the site are identified within a 5km buffer of the site.

FIG does not use any form of artificial intelligence (AI) in relation to research carried out to produce this report.

## 5. Identified Potential UXO Risk at this Site

| Potential UXO Source | Remarks |
|---|---|
| **WW2 Aerial Bombing** | Bombing activity gives rise to the potential existence of undiscovered unexploded bombs.<br>**Initial research has identified WW2 bombing in proximity to the site.** |
| **Military Training Areas/Firing Ranges** | Military Training Areas/Firing Ranges are used for various types of military training and practice with various types of weapons systems.<br>**Initial research has identified WW2 firing range in proximity to the site.** |
| **Military Airfields** | Military airfields were sometimes subjected to attack and are also related to military activity.<br>This can result in potential encounter with UXO in areas located in proximity to an airfield site.<br>**Four military airfields have been identified in proximity to the site.** |
| **Bombing Decoy Sites** | RAF and Royal Navy decoy sites were constructed in the vicinity of legitimate targets to deceive and decoy enemy bombers.<br>For obvious reasons, such sites were often built in remote and uninhabited areas.<br>Some were more successful than others and received relatively high bombing rates.<br>**Three decoy sites have been identified in proximity to the site.** |
| **Explosive Ordnance Clearance (EOC) Tasks & Reports** | EOC tasks are potential indicators of the existence of legacy munitions.<br>**There are records of five post-war explosive ordnance clearance tasks and in proximity to the site.** |
| **Ordnance Factory/Ordnance Storage Facilities** | Ordnance factories were responsible for the manufacture of arms and ammunition, and ordnance storage facilities were used for storing of live munitions.<br>**An ordnance factory and an ordnance storage facility have been identified in proximity to the site.** |

*Table 1. Summary of potential UXO risk Identified.*

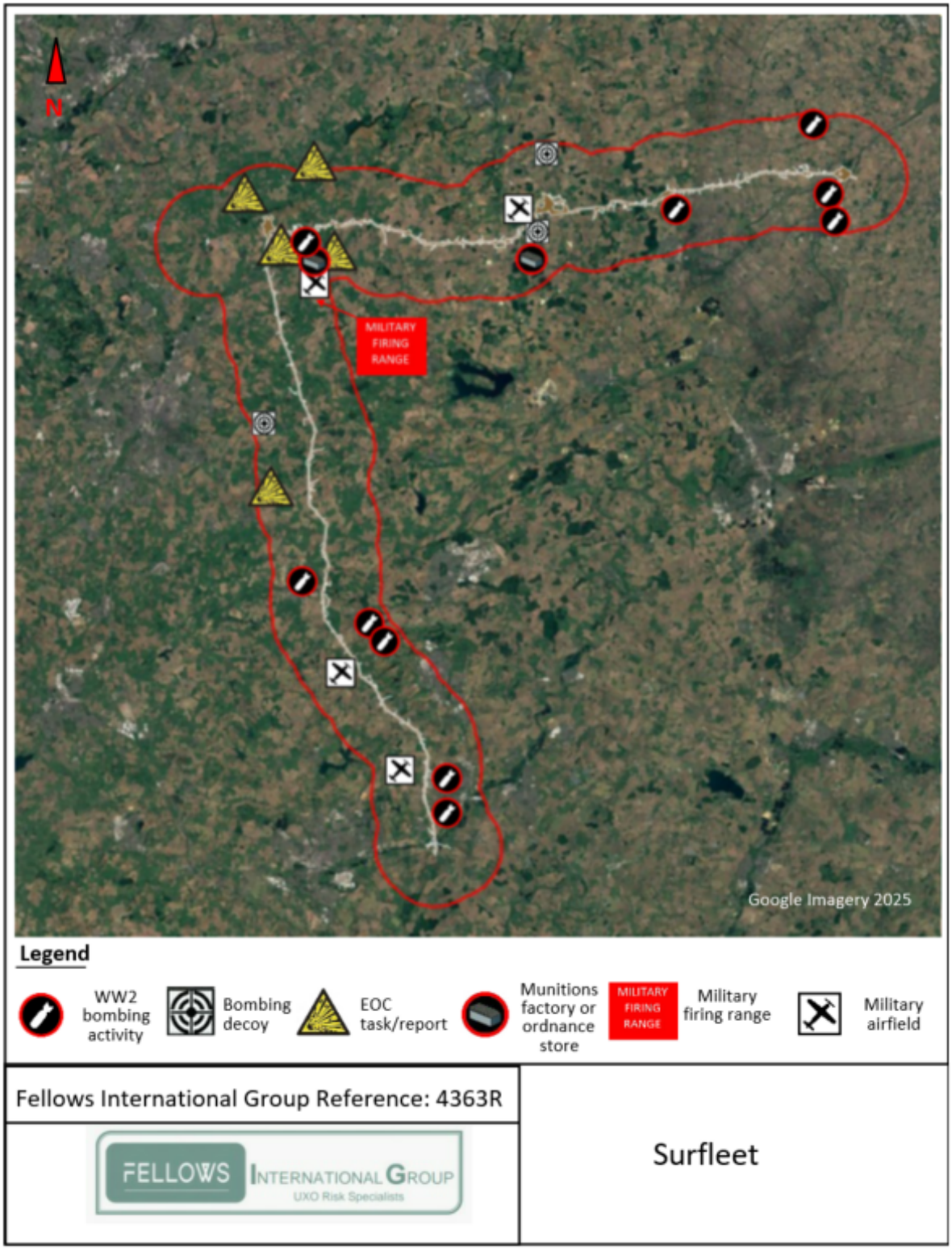


*Figure 2. Showing the location of potential UXO risk Identified in proximity to the site. The 5km buffer is shown in red.*

# 6. Risk Mitigation Options

It is assessed that there is a potential risk of encountering UXO at this site.

We recommend that a Detailed UXO Risk Assessment be produced for this site. Fellows International Group Ltd. would be pleased to offer a proposal with quotation to undertake these works and any further UXO risk mitigation processes required for this project.

This assessment has been produced for AECOM and has been completed without the benefit of knowing the exact intentions of third parties and should therefore not be used by such organisations without prior consultation with Fellows International Group Ltd.

Our assessment relies upon the accuracy of the information contained in the documents and resources consulted on the date of production. Fellows International Group can in no way be held responsible for the accuracy of such information or data supplied or for any hazard encountered at the site due to import of materials after this date.

Fellows International Group is recognised as one of the leading UXO Risk Management companies specialising in UXO Risk Assessments, Site Survey, Ground Investigation Support and UXO Awareness Training.

Conducting these operations requires not only the most experienced field staff, but also dedicated and experienced project management. Careful planning and co-ordination are needed from start to finish, backed up by detailed operational procedures. With many years' experience, Fellows International Group has built up a reputation for reliability, whatever the risk. In recognition of our commitment to the quality of our work and the health and safety of our workforce.

Fellows International Group Ltd
160 Ordnance Business Park
Aerodrome Road
Gosport
Hampshire
PO13 0FG

t. 08000 424 424
e. info@fellowsintgroup.com

FELLOWS INTERNATIONAL GROUP
UXO Risk Specialists

National Grid plc
National Grid House,
Warwick Technology Park,
Gallows Hill, Warwick.
CV34 6DA United Kingdom

Registered in England and Wales
No. 4031152
nationalgrid.com